TM 9-807

WAR DEPARTMENT TECHNICAL MANUAL

2½-TON 6 x 6 TRUCK *and* 2½- TO 5-TON 6 x 4 TRUCK (STUDEBAKER MODELS US 6 *and* US 6 x 4)

WAR DEPARTMENT *16 DECEMBER 1943*

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WAR DEPARTMENT
16 December 1943

****This Technical Manual supersedes 1st and 2nd echelon information in TM 10-1385, 1 February 1942; TM 10-1387, 3 February 1942; TM 10-1565, 15 February 1943; TM 10-1565 Change No. 1, 4 October 1943; TB 10-1565-1, 11 August 1943; TM 10-1503, 17 July 1941.***

WAR DEPARTMENT
Washington 25, D. C., 16 December 1943.

TM 9-807—2½-ton 6 x 6 truck and 2½- to 5-ton 6 x 4 truck (Studebaker models US 6 and US 6 x 4), is published for the information and guidance of all concerned.

[A. G. 300.7 (4 Dec. 43)]

BY ORDER OF THE SECRETARY OF WAR:

G. C. MARSHALL,
Chief of Staff.

OFFICIAL:

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

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2½-TON 6x6 TRUCK AND 2½- TO 5-TON 6x4 TRUCK (STUDEBAKER MODELS US 6 AND US 6x4)

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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 a description of the cargo, dump, and tractor trucks, this manual contains technical information required for the identification, use, and care of the materiel. The manual is divided into two parts. Part One, section I through section VIII, contains vehicle operating instructions. Part Two, section IX through section XXXVI, contains vehicle maintenance instructions for using arm personnel charged with the responsibility of doing maintenance work within their jurisdiction.

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

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*To provide operating maintenance 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.

2½-TON 6x6 TRUCK AND 2½- TO 5-TON 6x4 TRUCK
(STUDEBAKER MODELS US 6 AND US 6x4)

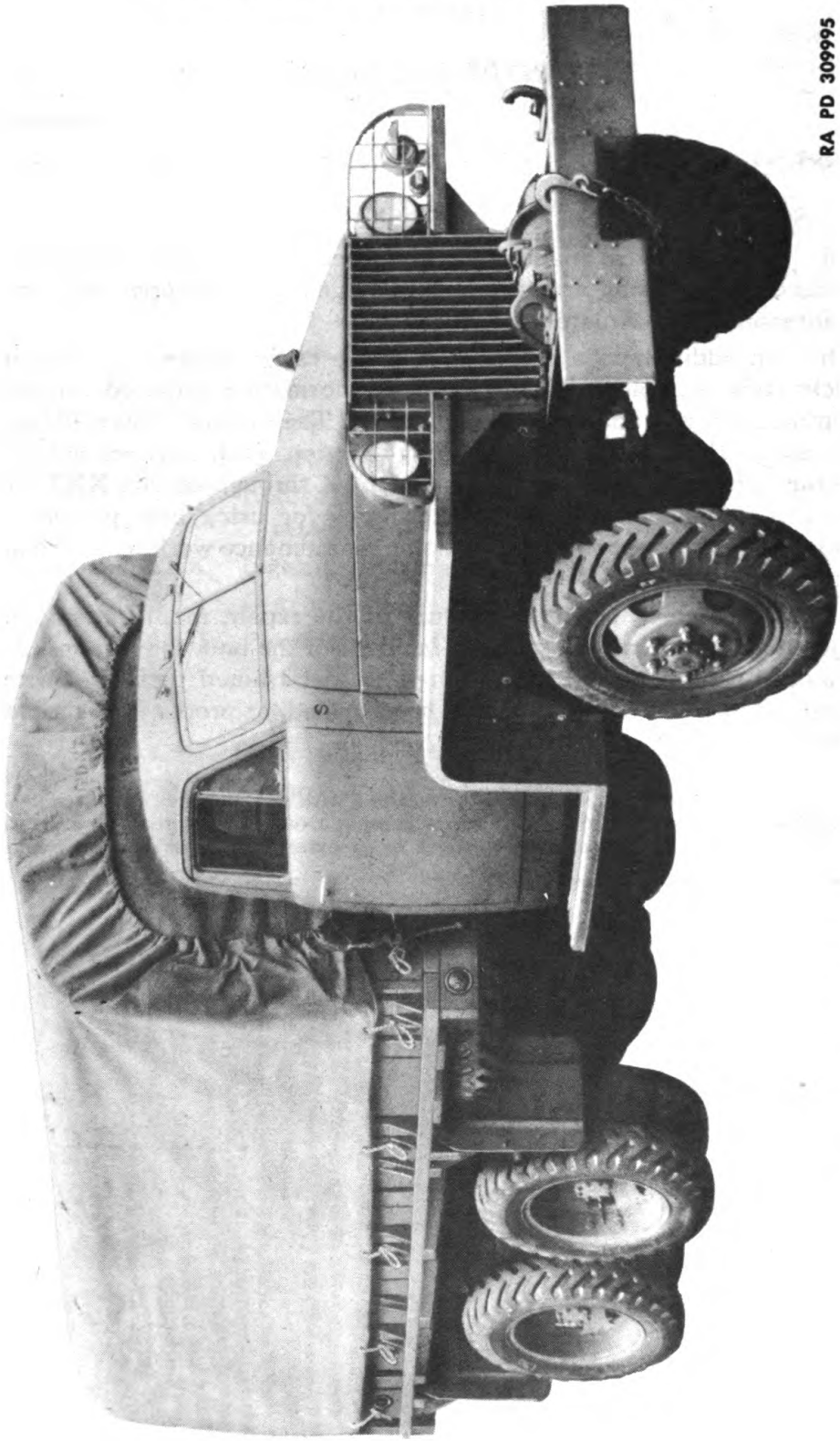

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Figure 1—162-inch W.B. Cargo Truck US 6—Right Front (With Winch)

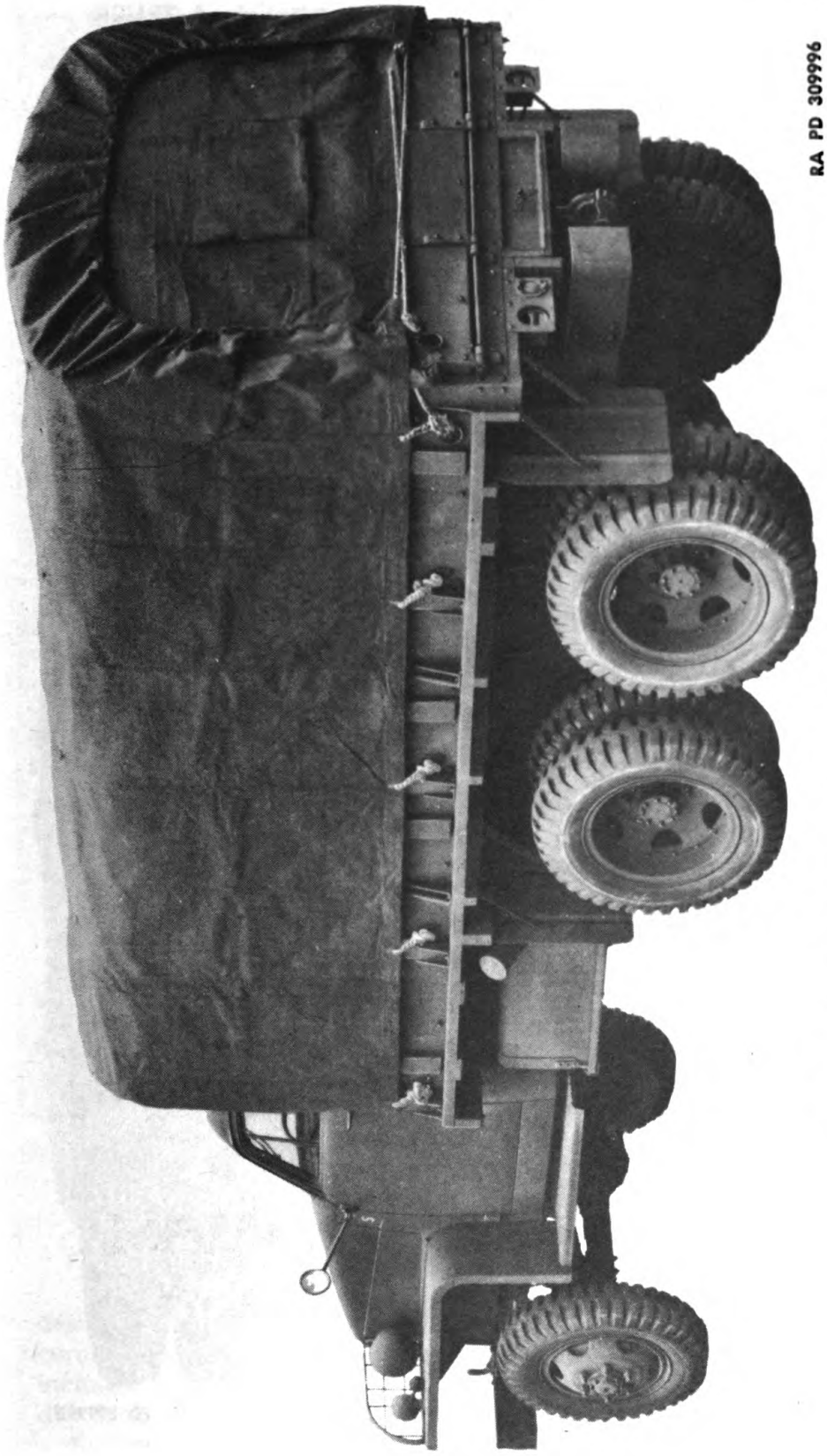

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Figure 2—162-inch W.B. Cargo Truck US 6—Left Rear

2½-TON 6x6 TRUCK AND 2½- TO 5-TON 6x4 TRUCK (STUDEBAKER MODELS US 6 AND US 6x4)

Section II

DESCRIPTION AND TABULATED DATA

2. DESCRIPTION.

a. The cargo trucks described in this manual are 2½-ton 6x6 with three driving axles, and 2½- to 5-ton 6x4 driven by two rear

RA PD 309998

Figure 3—Cargo Truck—Rear

DESCRIPTION AND TABULATED DATA

axles. These vehicles are designed for transporting cargo and troops, but are also equipped for towing guns, trailers, or other wheeled units. This manual also contains information concerning the 2½- to 5-ton 6 x 4 tractor trucks driven by two rear axles. The tractor trucks are

Figure 4—162-inch W.B. Cargo Truck US—Front (Less Winch)

designed for transporting cargo on semitrailers. Information concerning the 2½-ton 6 x 6 dump trucks with three driving axles is also included in this manual. The dump trucks are designed for moving dirt, rocks, etc.

b. These vehicles are powered by a 6-cylinder, L-head, liquid-

2½-TON 6x6 TRUCK AND 2½- TO 5-TON 6x4 TRUCK (STUDEBAKER MODELS US 6 AND US 6x4)

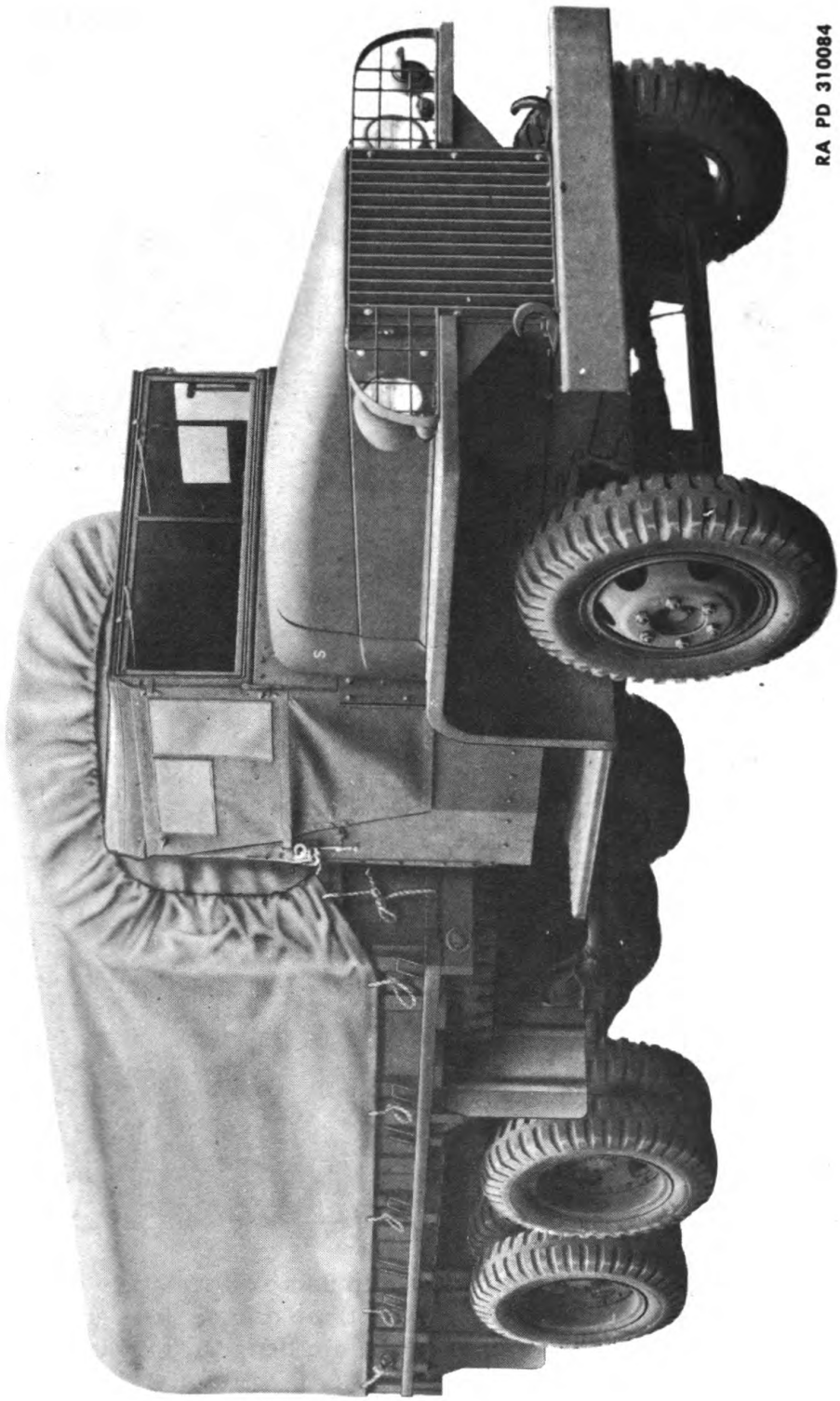

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Figure 5—162-inch W.B. Cargo Truck with Soft Top Cab US—Right Front (Less Winch)

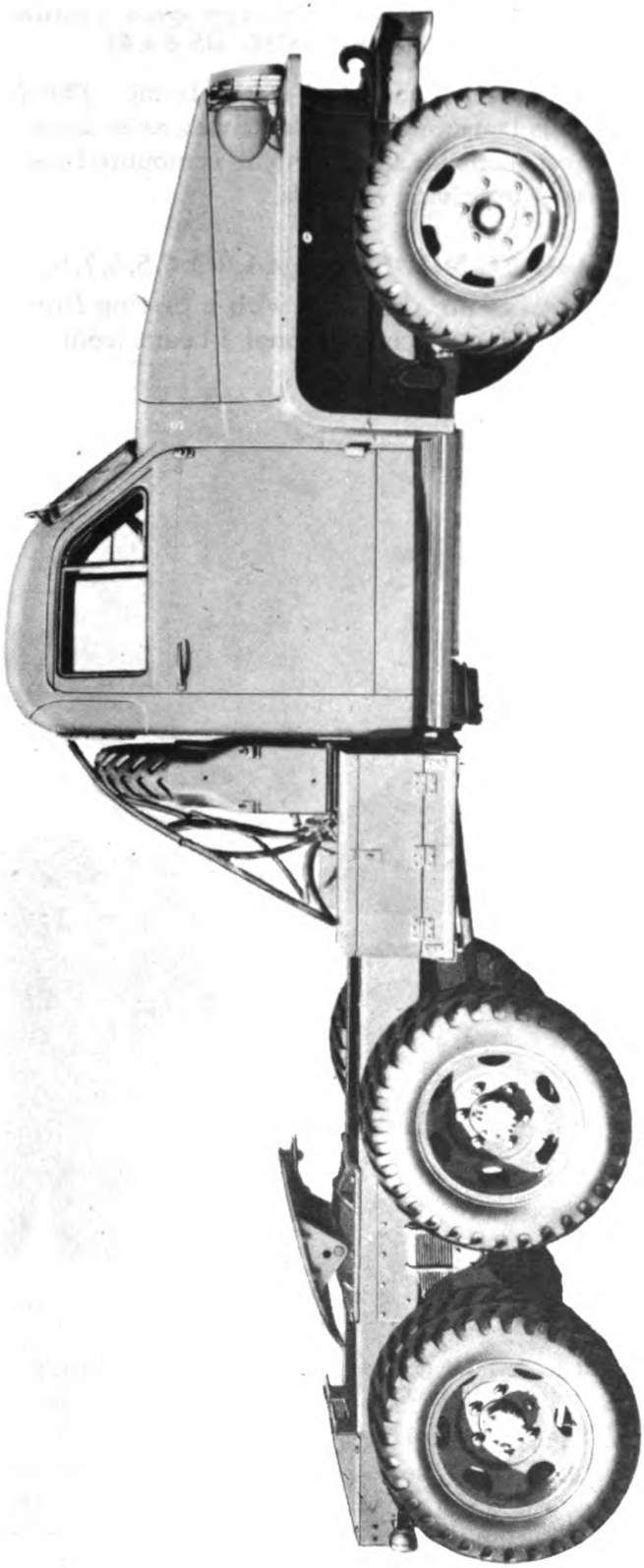

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Figure 6—148-inch W.B. Tractor Truck US—Right Side

cooled engine mounted near the front end of the frame. The power developed by the engine is transmitted to the driving axles by a transmission, transfer case, and propeller shafts. A cab is mounted just back of the engine, and houses the driving controls.

3. DIFFERENCES AMONG MODELS (figs. 1, 2, 3, 4, 5, 6, 7, 8, and 9).

a. The 6 x 6 cargo trucks are equipped with a driving front axle, and the 6 x 4 cargo trucks have a conventional I-beam front axle. A

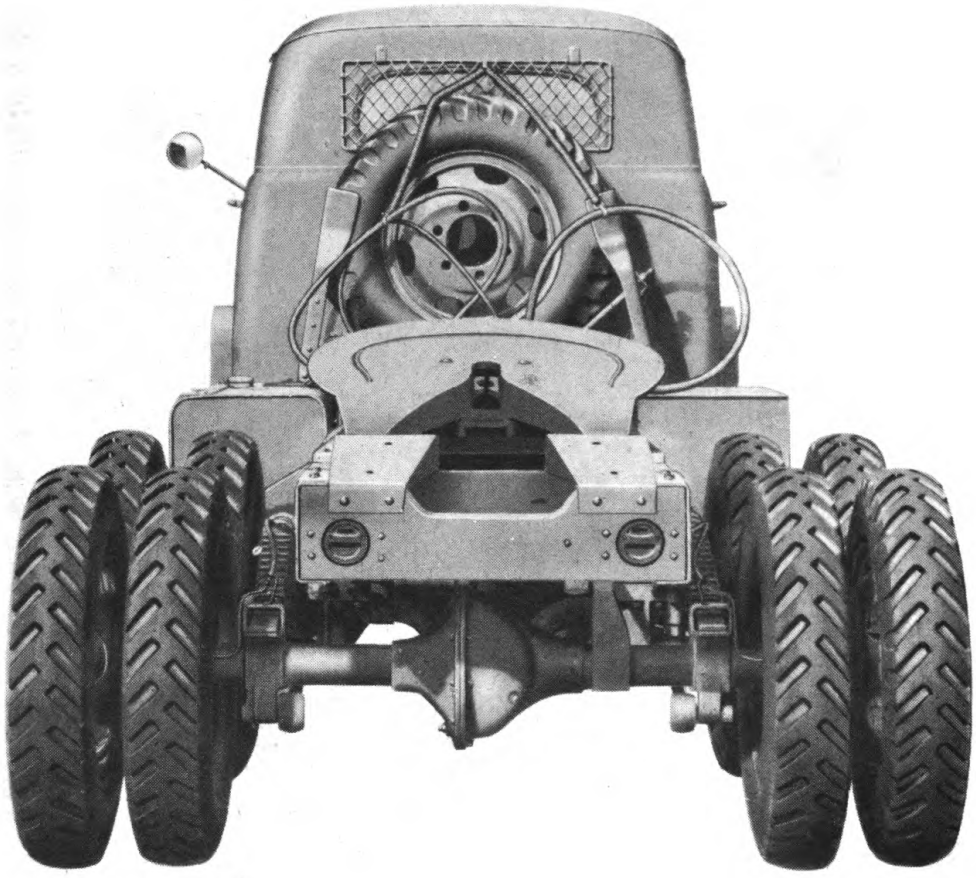

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Figure 7—148-inch W.B. Tractor Truck US—Rear

rugged cargo body equipped with bows, tarpaulins, and troop seats is mounted behind the cab. Otherwise the cargo trucks are the same, and may or may not be equipped with a winch. The 6 x 4 tractor truck is equipped with the conventional type I-beam front axle, a fifth wheel (semitrailer hitch) instead of a cargo body, and has a shorter wheelbase. The 6 x 6 dump trucks have a driving front axle, a conventional type

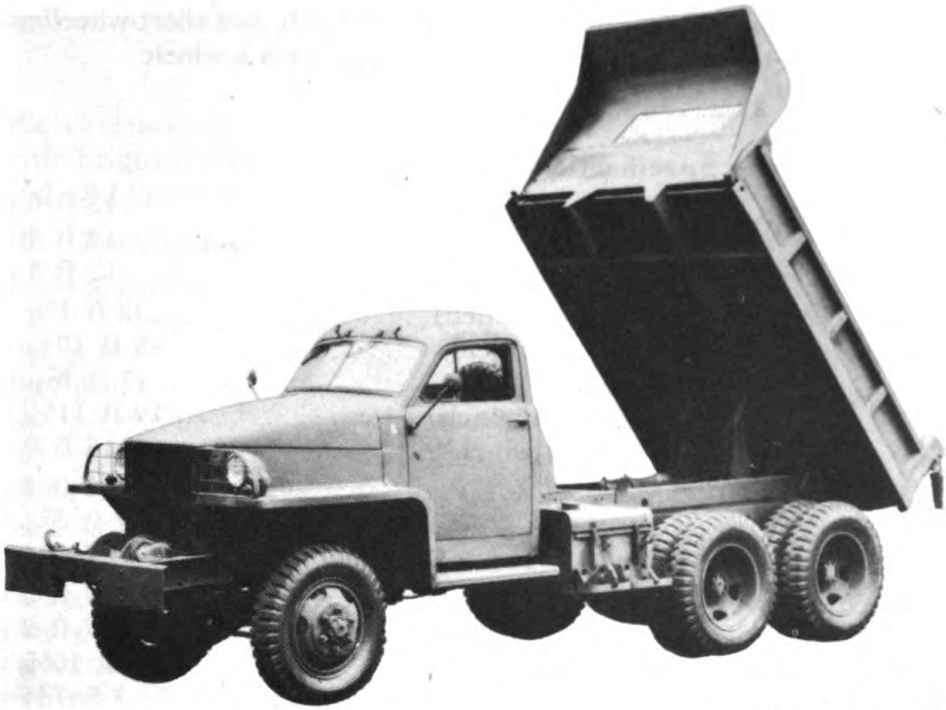

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Figure 8—148-inch W.B. End Dump Model Truck US 6—Body Raised

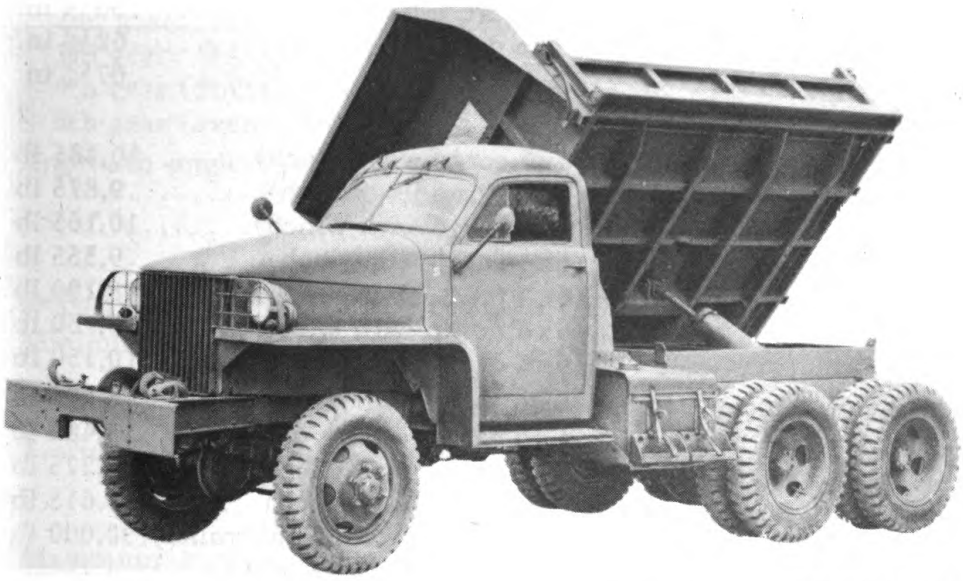

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Figure 9—148-inch W.B. Side Dump Model Truck US 6—Body Raised

end or side dump body mounted behind the cab, and short wheelbase. These vehicles may or may not be equipped with a winch.

4. DATA.

a. Vehicle Specifications.

Wheelbase	(cargo)	13 ft 6 in.
	(tractor)	12 ft 4 in.
	(dump)	12 ft 4 in.
Length, over-all	(cargo with winch)	22 ft 1 3/16 in.
	(cargo less winch)	20 ft 10 5/8 in.
	(tractor)	17 ft 8 7/16 in.
	(dump with winch)	19 ft 11 9/16 in.
	(dump less winch)	18 ft 9 in.
Width, over-all	(cargo)	7 ft 4 in.
	(tractor)	7 ft 2 3/4 in.
	(dump)	7 ft 4 in.
Height, over-all	(6x6 to top of cab)	7 ft 3 in.
	(6x4 to top of cab)	7 ft 2 in.
	(to top of bows)	8 ft 10 1/16 in.
	(to top of shield on dump body)	7 ft 7 3/8 in.
Wheel size		20 in.
Tire size		7.50 in. x 20 in.
Tire type		8 ply ground grip—ND
Tread	(center to center—6x6 front)	62 1/4 in.
	(conventional-type brake drum 6x4)	66 7/8 in.
	(demountable-type brake drum 6x4)	62 1/4 in.
	(rear)	67 3/4 in.
Crew		2
Weight of vehicle—empty	(6x6 cargo with winch)	10,485 lb
	(6x6 cargo less winch)	9,875 lb
	(6x4 cargo with winch)	10,165 lb
	(6x4 cargo less winch)	9,555 lb
	(6x4 tractor)	8,190 lb
	(6x6 dump with winch)	10,760 lb
	(6x6 dump less winch)	10,150 lb
Weight of vehicle—loaded	(6x6 cargo with winch)	16,095 lb
	(6x6 cargo less winch)	15,485 lb
	(6x4 cargo with winch)	20,225 lb
	(6x4 cargo less winch)	19,615 lb
	(6x4 tractor with semi-trailer)	30,000 lb
	(6x6 dump with winch (cross country))	15,760 lb
	(6x6 dump less winch (cross country))	15,150 lb

DESCRIPTION AND TABULATED DATA

(6x6 dump with winch)
(road travel) ..... 20,760 lb
(6x6 dump less winch)
(road travel) ..... 20,150 lb
Ground clearance ..... 10 in.
Pintle height (cargo and dump trucks) ..... 31 in.
Kind and grade of fuel (octane rating) ..... Gasoline—70 to 72

b. Performance.

Speeds allowable without front wheels driving (all vehicles).

Transmission	Transfer case in high
1st gear	6 mph
2nd gear	10.5 mph
3rd gear	20 mph
4th gear (direct)	36 mph
5th gear (overdrive)	45 mph

Speeds allowable with front wheels driving (6x6).

Transmission	Transfer case in low
1st gear	2.5 mph
2nd gear	4.5 mph
3rd gear	9 mph
4th gear (direct)	16 mph
5th gear (overdrive)	20 mph

Speeds allowable with transfer case in low (6x4 vehicles having shift lever).

Transmission	Transfer case in low
1st gear	3.7 mph
2nd gear	6.4 mph
3rd gear	12.5 mph
4th gear (direct)	22.5 mph
5th gear (overdrive)	28.1 mph

Approach angle (6x6 with winch) ..... 33 degrees
(6x6 less winch) ..... 55½ degrees
(6x4 with winch) ..... 30 degrees
(6x4 less winch) ..... 52 degrees
Departure angle (cargo and dump) ..... 44 degrees
Minimum turning radius (cargo) ..... 35 ft
(tractor) ..... 32 ft
(dump) ..... 32 ft
Towing facilities (front) all vehicles ..... 2 hooks
(rear) cargo and dump ..... Pintle hook
(rear) tractor ..... Fifth wheel
Maximum draw-bar pull ..... 12,000 lb
Maximum grade ascending ability (6x6 cargo and dump) ... 87.7%
Early production (6x4 cargo) 30.9%
Present production (6x4 cargo) 49.5%

2½-TON 6x6 TRUCK AND 2½- TO 5-TON 6x4 TRUCK (STUDEBAKER MODELS US 6 AND US 6x4)

Early production (6x4 tractor).....19.7%
Present production (6x4 tractor).....32.0%
Maximum allowable engine speed.....2620 rpm
Miles per gallon (at 25 mph).....5.9
Cruising range (at 25 mph).....236 miles

c. Capacities.

Transmission capacity (with power take-off).....5¼ qt
(less power take-off).....4½ qt
Transfer case capacity.....3½ qt
Front axle capacity (6x6).....3½ qt
Front axle universal joint housing capacity (6x6).....½ qt
Rear axle capacity (per axle).....3½ qt
Fuel capacity.....40 gal
Cooling system capacity.....5¼ gal
Crankcase capacity.....6 qt
Winch capacity.....1⅜ qt
Pillow block capacity.....5/16 qt
Steering gear capacity.....¾ qt
Air cleaner (oil bath) capacity.....1 qt
Hoist capacity.....14 qt

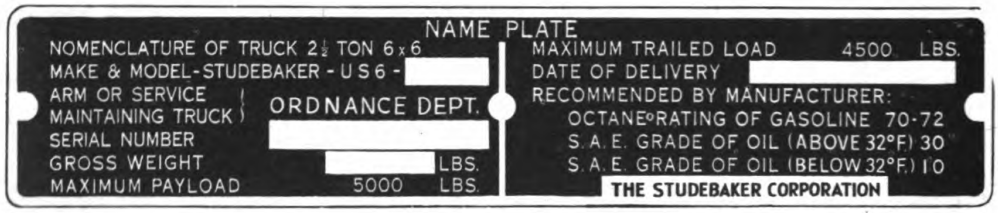

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Figure 10—US 6 Model Name Plate (Cargo)

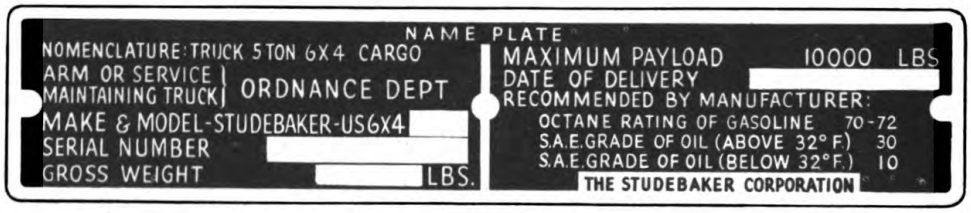

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Figure 11—US 6x4 Model Name Plate (Cargo)

DESCRIPTION AND TABULATED DATA

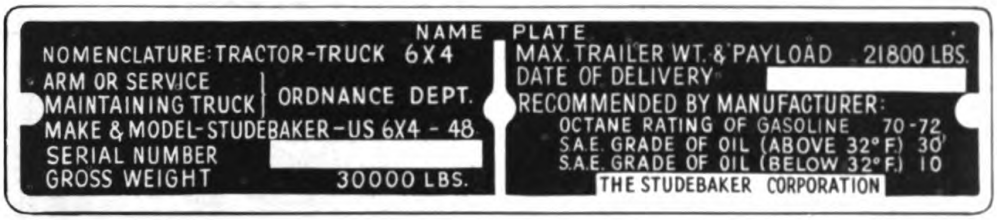

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Figure 12—US 6 x 4 Model Name Plate (Tractor Truck)

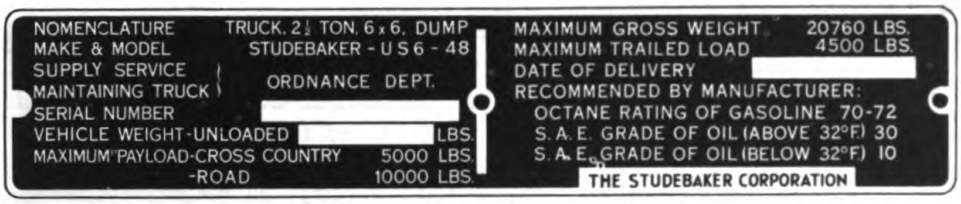

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Figure 13—US 6 Model Name Plate (Dump Truck)

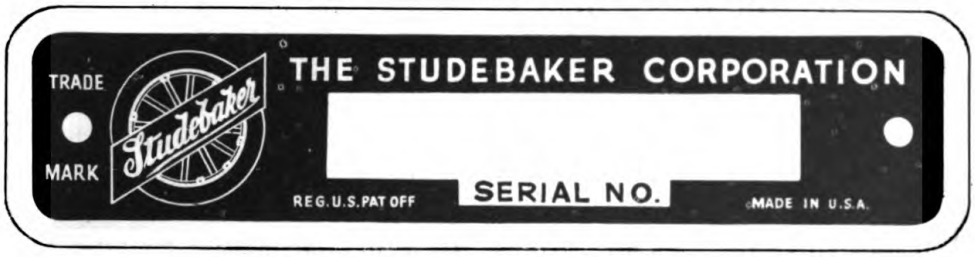

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Figure 14—Truck Serial Number Plate

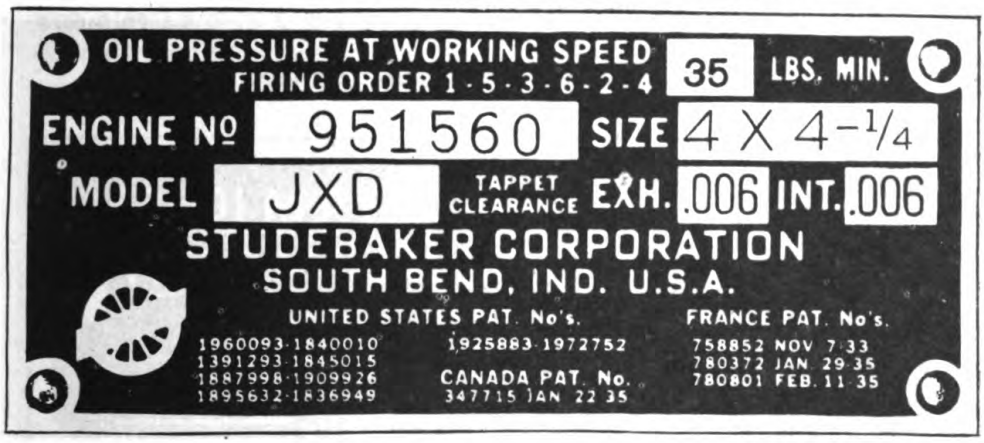

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Figure 15—Engine Serial Plate

2½-TON 6x6 TRUCK AND 2½- TO 5-TON 6x4 TRUCK (STUDEBAKER MODELS US 6 AND US 6x4)

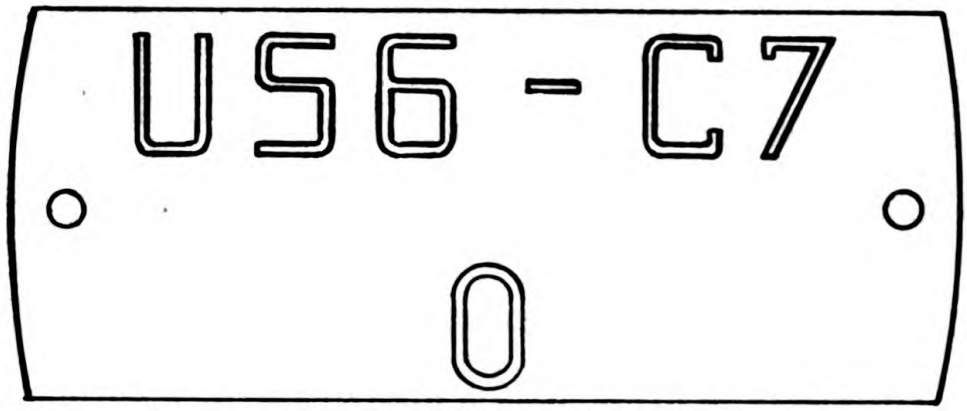

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Figure 16—Cab Number Plate

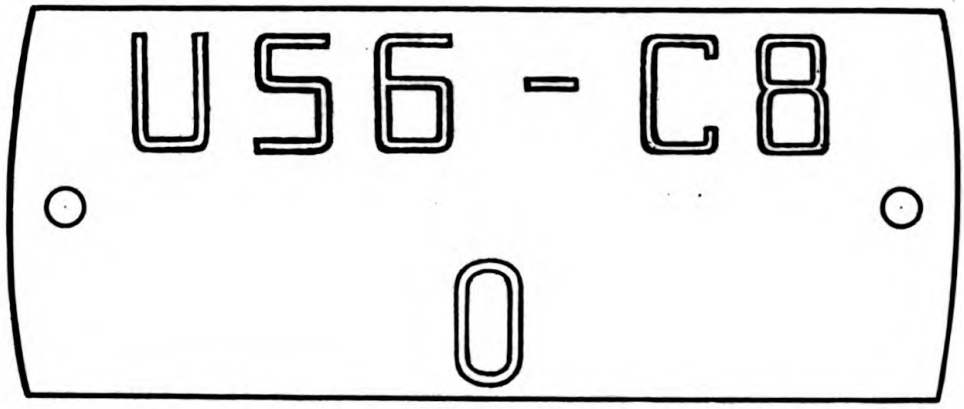

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Figure 17—Cab Number Plate (Soft Top Cab Vehicle)

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Figure 18—Publication Data Plate

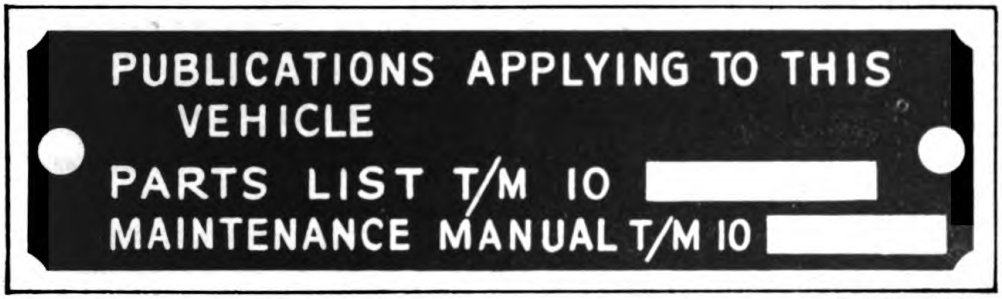

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Figure 19—Publication Data Plate (Quartermaster Type Formerly Used)

d. Name Plate. The name plate located in the cab of the vehicle above the package compartment carries the identification and loading information, and also the recommended fuel octane rating and engine oil grade (figs. 10, 11, 12, 13, and 14).

e. Truck Serial Number Plate. A serial number plate for the truck is located on the outside of the frame left side member above the front spring hanger.

f. Engine Serial Plate (fig. 15). This plate is located on right side of cylinder block. It designates the normal oil pressure, the firing order, the size (bore and stroke), and other engine specifications, as well as the engine serial number and model.

g. Cab Number Plate (figs. 16 and 17). This plate, which carries cab number, is attached under the hood on the forward right-hand face of the dash.

h. Publication Data Plate (figs. 18 and 19). The numbers of the technical manuals and the parts list applicable to the vehicle are on this plate, which is centrally located on the instrument board in the driver's compartment.

Section III

DRIVING CONTROLS AND OPERATION

5. DRIVING CONTROLS.

a. Accelerator Pedal (fig. 20). The accelerator pedal provides foot control of engine speed. This pedal is conveniently located on the floor of cab just to the right of brake pedal. Use the accelerator pedal to control the speed of vehicle.

b. Brake Pedal (fig. 20). The brake pedal, located to the right of steering post, controls the operation of the service brakes, which are used to stop the vehicle. CAUTION: *Driving with foot on brake pedal partially applies the brakes and causes rapid lining wear with possible drum distortion from overheating.*

c. Carburetor Choke Control (fig. 20). Pulling the choke control button outward closes the choke valve to enrich the fuel mixture for starting a cold engine. Adjust the control as required so that the engine operates smoothly during warm-up. Push the control button against the instrument board as soon as possible after the engine is started. Continued improper use of the choke will cause damage to the engine.

d. Carburetor Hand Throttle Control (fig. 20). The hand throttle control is used when starting the engine, and to regulate engine speed when tests are made on the engine with vehicle stopped. The hand throttle control is not to be used for controlling the speed of vehicle in motion; the accelerator pedal is provided for this purpose. When starting the engine, pull the hand throttle control button outward ½ inch or more as required.

e. Clutch Pedal (fig. 20). The clutch pedal, located to the left of the steering post, provides the means of disengaging the engine from the transmission to permit shifting the transmission, power take-off, and transfer case gears. Depressing the clutch pedal disengages the engine from the transmission, and releasing the pedal engages the engine with transmission. The clutch pedal also serves as the medium through which the cranking motor switch is operated. CAUTION: *Do not "ride the clutch" (resting foot on pedal while driving).*

DRIVING CONTROLS AND OPERATION

f. Cowl Ventilator Control (fig. 20). The cowl ventilator is mounted on top of the cowl and is controlled by a lever extending downward underneath and near the center of the instrument board. The ventilator may be opened by pushing downward on the lever handle of the control; the amount the ventilator opens is directly dependent on the extent to which the lever is moved.

g. Cranking Motor Switch (fig. 20). The cranking motor switch is located on floor of cab so that button is directly under the clutch pedal pad. Pressing the clutch pedal forward to the limit of its travel closes the circuit in switch to operate the engine cranking motor. As soon as the engine starts, release the clutch pedal sufficiently to break contact at the cranking motor switch. This arrangement reduces the possibility and danger of the vehicle moving unexpectedly if left in gear previously.

h. Front Axle Control Lever (6 x 6 vehicles only) (fig. 20). Engagement or disengagement of the front axle drive is controlled by moving the lever forward to engage the axle, and rearward to disengage it.

i. Hand Brake Lever (fig. 20). The hand brake lever is used to keep the vehicle stationary when parked, or to provide additional stopping power in an emergency. The hand brake is applied by pulling the lever rearward, and is released by pressing the release button to push the lever forward as far as possible. CAUTION: *Release hand brake before moving vehicle.*

j. Power Take-off Shift Lever for Winch (fig. 20). The power take-off shift lever for the winch is located just to the left of the transmission shift lever. The power take-off has "low," "reverse," and two "neutral" positions. It must be shifted to the proper position or speed as required for operation of the winch. When the winch is not in use, lock the power take-off shift lever in "NEUTRAL," with the lock which is pivoted on the seat riser (fig. 20).

k. Hoist Pump Controls (fig. 33). The hoist pump controls extend through the cab floor near the left side, in front of seat riser. The right control is used to engage the power take-off unit for driving the pump. The left control is used to operate the pump control valve.

l. Steering Wheel (fig. 20). A steering wheel is attached to the upper end of the steering post for the purpose of steering the vehicle. Rotate the steering wheel right or left to turn the vehicle in the desired direction.

m. Transfer Case Shift Lever (fig. 20). The transfer case shift lever controls the "HIGH" or "LOW" speed range of the transfer case. When the transfer case in a 6 x 6 vehicle is shifted into "LOW", the front axle drive is engaged at the same time. The transfer case used in 6 x 4 vehicles of previous production is blocked in "HIGH" and does not have a shift lever.

2½-TON 6x6 TRUCK AND 2½- TO 5-TON 6x4 TRUCK (STUDEBAKER MODELS US 6 AND US 6x4)

n. Transmission Shift Lever (fig. 20). The transmission shift lever permits the selection of gear ratios or transmission speeds. The transmission has five speeds forward and one reverse. The first speed forward and reverse gear can be engaged only when the lever is pushed all the way to the right.

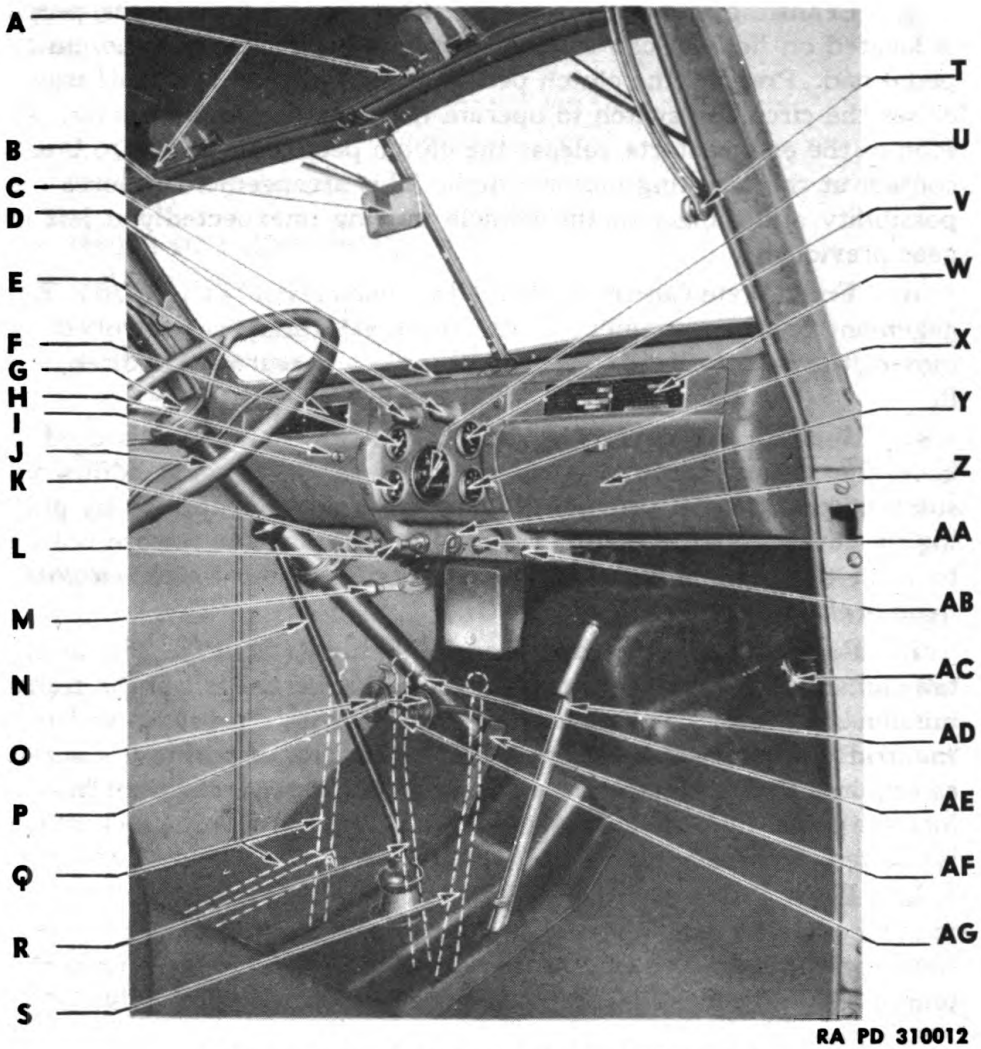


Figure 20—Instruments and Controls

6. INSTRUMENTS AND AUXILIARY CONTROLS.

a. Ammeter (fig. 20). The ammeter indicates the amount of current being drawn from the battery, the rate at which current is being supplied to the battery by the generator, or whether the electrical load or supply is predominating.

b. Fuel Gage (fig. 20). The fuel gage indicates the amount of fuel in the tank when the ignition switch is turned on.

c. Heat Indicator (fig. 20). The temperature of the coolant in the engine is indicated by the engine heat indicator. This gage is calibrated in degrees Fahrenheit. The normal operating range under average conditions should be between 140°F to 180°F.

d. Oil Pressure Gage (fig. 20). The oil pressure gage indicates the pressure at which oil is being circulated through the lubricating system of the engine. At a speed of 35 miles per hour, and with oil of the proper quality and viscosity, a normal reading of 35 pounds will show on the gage.

A WINDSHIELD WIPER CONTROLS
B REAR VISION MIRROR
C PUBLICATION DATA PLATE
D INSTRUMENT PANEL LIGHTS
E SHIFTING AND SPEED CAUTION PLATE
F OIL PRESSURE GAGE
G HORN BUTTON
H BLACKOUT DRIVING LIGHT SWITCH
I ENGINE HEAT INDICATOR
J STEERING WHEEL
K CARBURETOR CHOKE CONTROL
L MAIN LIGHTING SWITCH
M COWL VENTILATOR CONTROL
N TRANSMISSION SHIFT LEVER
O CLUTCH PEDAL
P BRAKE PEDAL
Q POWER TAKE-OFF SHIFT LEVER AND LOCK (WITH WINCH)
R FRONT AXLE CONTROL LEVER (ON US6 MODEL ONLY)
S TRANSFER CASE SHIFT LEVER (ON VEHICLES SO EQUIPPED)
T WINDSHIELD ADJUSTING ARM AND KNOB
U SPEEDOMETER
V FUEL GAGE
W NAME PLATE
X AMMETER
Y PACKAGE COMPARTMENT
Z IGNITION SWITCH
AA INSTRUMENT PANEL LIGHTS SWITCH
AB CARBURETOR HAND THROTTLE CONTROL
AC FIRE EXTINGUISHER
AD HAND BRAKE LEVER
AE CRANKING MOTOR SWITCH BUTTON
AF ACCELERATOR PEDAL
AG HEADLIGHT FOOT SWITCH

RA PD 310012B

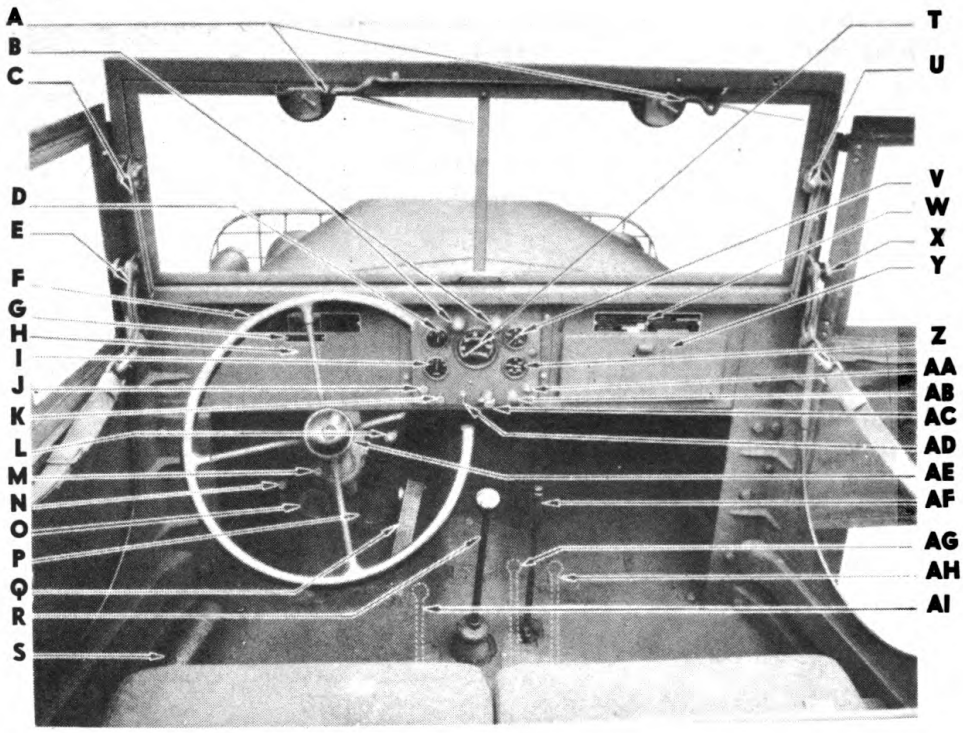
Legend for Figure 20

e. Speedometer (fig. 20). The speedometer shows the road speed of the vehicle in miles per hour. The indicator hand is specially treated and finished so that its position may be observed during vehicle operation under conditions of complete darkness. An odometer, incorporated at the top of the speedometer face, registers the number of miles the vehicle has been driven. The trip mileage indicator on the lower portion of the speedometer face may be set back to zero by turning the control stem on the back of the speedometer case.

f. Horn Button (fig. 20). The horn button is located in the center of the steering wheel.

g. Windshield Adjusting Arms and Thumb Nuts on Steel Top Cabs (fig. 20). Adjusting arms and knurled thumb nuts are provided

2½-TON 6x6 TRUCK AND 2½- TO 5-TON 6x4 TRUCK (STUDEBAKER MODELS US 6 AND US 6x4)



A WINDSHIELD WIPER CONTROLS
B INSTRUMENT PANEL LIGHTS
C WINDSHIELD ADJUSTING ARM
D FUEL GAGE
E WINDSHIELD FRAME ADJUSTING ARM
F SHIFTING AND CAUTION PLATE
G PUBLICATION DATA PLATE
H WINCH CAUTION PLATE
I AMMETER
J CARBURETOR HANDTHROTTLE CONTROL
K INSTRUMENT PANEL LIGHTS SWITCH
L COWL VENTILATOR CONTROL
M CRANKING MOTOR SWITCH BUTTON
N HEADLIGHT FOOT SWITCH
O CLUTCH PEDAL
P BRAKE PEDAL
Q ACCELERATOR PEDAL
R TRANSMISSION SHIFT LEVER
S FIRE EXTINGUISHER
T SPEEDOMETER
U WINDSHIELD ADJUSTING ARM KNOB
V OIL PRESSURE GAGE
W NAME PLATE
X WINDSHIELD FRAME ADJUSTING ARM KNOB
Y PACKAGE COMPARTMENT
Z ENGINE HEAT INDICATOR
AA CARBURETOR CHOKE CONTROL
AB BLACKOUT DRIVING LIGHT SWITCH
AC MAIN LIGHTING SWITCH
AD IGNITION SWITCH
AE HORN BUTTON
AF HAND BRAKE LEVER
AG FRONT AXLE CONTROL LEVER (ON US6 MODEL ONLY)
AH TRANSFER CASE SHIFT LEVER
AI POWER TAKE-OFF SHIFT LEVER (WITH WINCH)

RA PD 310082

Figure 21—Instruments and Controls (Soft Top Cab Vehicles)

to permit opening the windshield to a nearly horizontal position. This is accomplished by loosening the nuts, then pulling downward and pushing forward on the arms at each side. By tightening the nuts, the windshield may be locked in any desired outward position.

h. Windshield Adjusting Arms and Knobs on Soft Top Cabs. (fig. 21). Adjusting arms and knobs are provided to permit opening the windshield. Loosen the upper knobs, raise the arms on each side, and push forward to open windshield. Tighten the knobs to hold windshield in the desired outward position.

i. Windshield Frame Adjusting Arms and Knobs on Soft Top Cabs (fig. 21). The windshield frame pivots in brackets fastened to each side of instrument board. Adjusting arms and fastening knobs are provided so the windshield and frame can be lowered to a horizontal position after the top deck and side curtains have been removed. With windshield closed, loosen lower knobs, and apply pressure against top of windshield frame to push the assembly forward and downward. Tighten the knobs to secure the assembly in position.

j. Windshield Wipers and Controls (fig. 20). The vacuum-type dual windshield wipers are controlled by separate buttons on each wiper. A wiper may be turned on by pulling out the control button. To stop the windshield wiper, push in the button.

7. SWITCHES.

a. Blackout Driving Light Switch (fig. 20). This push-pull type switch operates the blackout driving light when the main light switch is in its first stop position (refer to subpar. **e** below).

b. Headlight Foot Switch (fig. 20). A foot-operated switch is located to the left of the clutch pedal for quick selection of the upper or lower headlight beam. Pressing down on the foot switch alternately raises and lowers the beam. Always lower the light beam at the approach of another vehicle. The foot switch is effective only when the main lighting switch is in its first or second stop positions.

c. Ignition Switch (fig. 20). The ignition may be turned on or off by means of a lever switch. Turning the lever to a horizontal position operates the engine ignition system and gasoline gage system. The switch lever must be turned to the horizontal position before the engine can be started. Turning the lever to a vertical position will stop the engine and open the gasoline gage circuit.

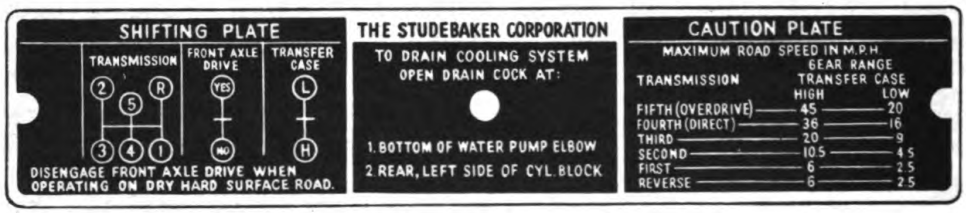
d. Instrument Panel Lights Switch (fig. 20). The instrument panel lights switch controls the instrument panel lights only when the main lighting switch is in its second stop position. If the main lighting switch button is moved to its first position, or to the "OFF" position, the instrument panel lights will automatically be turned off, even though the switch remains turned on.

2½-TON 6x6 TRUCK AND 2½- TO 5-TON 6x4 TRUCK (STUDEBAKER MODELS US 6 AND US 6x4)

e. Main Lighting Switch (fig. 20). The main lighting switch on the instrument board provides the "ON" and "OFF" control for all of the vehicle's operating lights, except the instrument panel lights and the blackout driving light. The upper or lower beam in the headlights is selected by operating the foot switch. The stop light is available for daytime use.

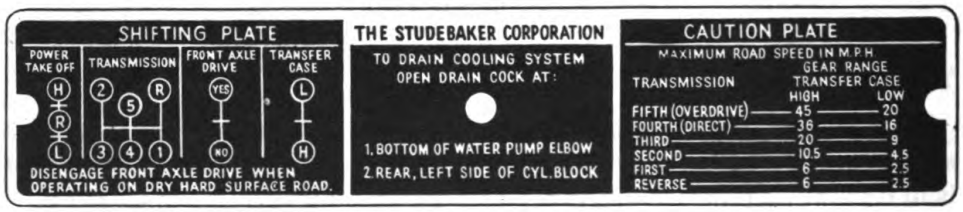
8. USE OF INSTRUMENTS AND CONTROLS.

a. Before-operation Service. Before starting the engine, perform the Before-operation Services (par. 19).



RA PD 310007

Figure 22—US 6 Model Shifting and Caution Plate (Less Winch)



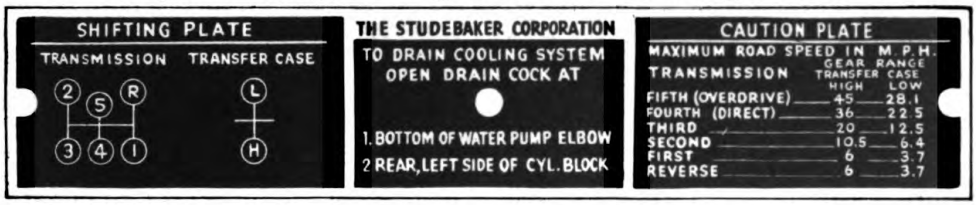
RA PD 310008

Figure 23—US 6 Model Shifting and Caution Plate (With Winch)

b. Starting the Engine. Place the transmission shift lever in neutral position, and make sure the winch power take-off shift lever (on vehicles so equipped) is locked in neutral position. Pull the choke control about halfway out to obtain the proper fuel and air mixture for starting. If the engine is warm this may not be necessary. In extremely cold weather pull choke control out all the way. Pull the hand throttle control out about ½ inch for a cold start (this is unnecessary if the engine is warm). Turn the ignition switch to its "ON" position and depress the clutch pedal to the limit of its downward travel to operate the cranking motor switch. As soon as the engine starts, release the clutch pedal sufficiently to break contact at the cranking motor switch. Adjust the throttle and choke controls until the engine attains an even idling speed. Then, after making sure the transmission shifting lever is in neutral position, gradually release the clutch pedal. CAUTION: *Do not race engine.*

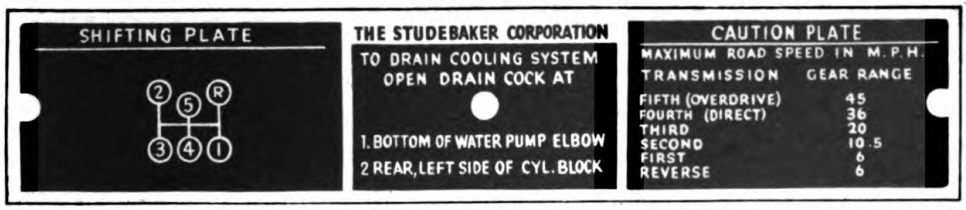
c. Operation of the Vehicle.

(1) PLACING THE VEHICLE IN MOTION. Start the engine (subpar. b above). Move the transfer case shifting lever into the "HIGH" or "LOW" speed range, depending on the terrain, as shown on caution plate. NOTE: *The transfer case used in 6 x 4 vehicles of previous production is blocked in high gear and does not have a shift lever.* On 6 x 6 vehicles, if it is necessary to operate in the transfer case "LOW" speed range because of poor traction, a heavy load, or other conditions, shift the front driving axle control lever forward into engagement before shifting the transfer case lever into "LOW" speed position as shown on caution plate. Disengage the clutch by pushing the clutch pedal downward. Move the transmission shifting lever into the first speed position as shown on caution plate, and release the hand brake. Release the clutch pedal slowly, and depress the accelerator pedal the amount



RA PD 310010

Figure 24—US 6 x 4 Model Shifting and Caution Plate (Less Winch and with Transfer Case Control)



RA PD 310080

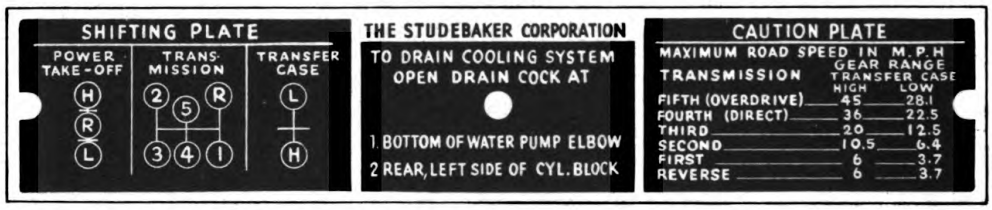
Figure 25—US 6 x 4 Model Shifting and Caution Plate (Less Winch and Transfer Case Control)

necessary for the engine to overcome the load and put the vehicle in motion. As the truck gains speed, release the accelerator pedal and depress the clutch pedal simultaneously. Move the transmission shift lever into "NEUTRAL" and then into the next higher speed. Depress the accelerator pedal and release the clutch pedal as before until the speed of the vehicle has increased enough for the next shift. Repeat these operations until the transmission is in fifth gear (if roads or terrain permit).

(2) SHIFTING TRANSMISSION TO A LOWER GEAR WHILE VEHICLE IS IN MOTION. Depress the clutch pedal and release accelerator pedal. Move the transmission shift lever to the "NEUTRAL" position. Release

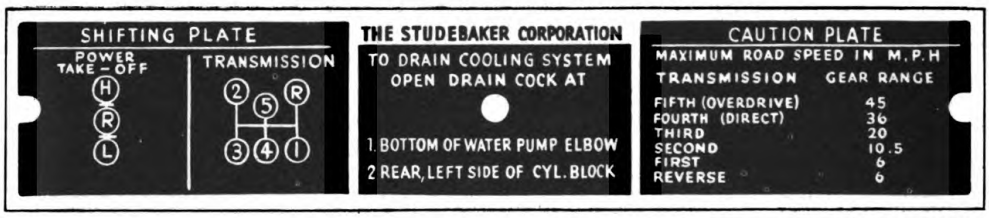
the clutch pedal and accelerate the engine to synchronize engine and vehicle speeds. Release the accelerator pedal, depress the clutch pedal, and move the shift lever into the lower speed position. Release the clutch pedal and accelerate if ascending a grade. NOTE: *In general, for easier and safer operation, it is good practice to employ the same transmission speed when going down a hill as would be required to climb the same hill.*

(3) TRANSFER CASE AND FRONT AXLE CONTROLS (6x6 VEHICLE). The "HIGH"- and "LOW"-speed ranges in the transfer case, and the engagement and disengagement of the front axle are controlled by two separate shift levers. The front axle control lever and the transfer



RA PD 310009

Figure 26—US 6 x 4 Model Shifting and Caution Plate (With Winch and Transfer Case Control)



RA PD 310081

Figure 27—US 6 x 4 Model Shifting and Caution Plate (With Winch and Less Transfer Case Control)

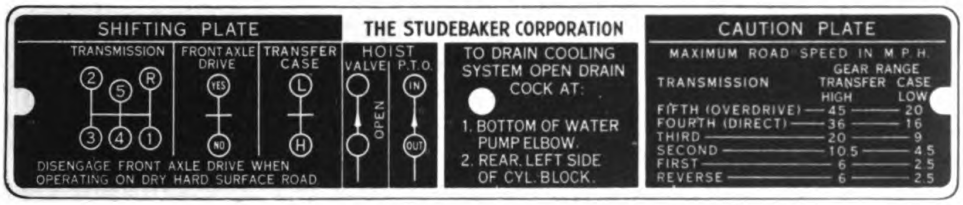
case shift lever are so arranged that the transfer case cannot be shifted into "LOW" without engaging the front axle. This is done in order that any heavy load or hard pull, placing gear strain on the driving members, will be distributed over the three axles. The "HIGH" gear range of the transfer case can be employed when the front axle is either engaged or disengaged. However, for high speed operation on hard surface roads, it is recommended that the front axle be disengaged. The position of the transmission shift lever has no effect on shifting either the transfer case or front axle control levers. The transfer case and front axle control shift levers function in relation to each other in the following manner:

(a) To engage or disengage the front axle with the transfer case in "HIGH", it is only necessary to move the front axle control lever into

the desired position. It is not necessary to disengage the clutch. The shift is usually easier to make when the vehicle is in motion.

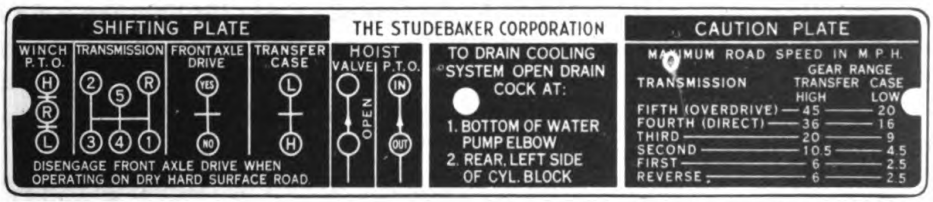
(b) To disengage the front axle drive with the transfer case in "LOW", it is first necessary to shift the transfer case into "NEUTRAL" or "HIGH". Then move the front axle control lever into its neutral or disengaged position. The vehicle can operate only in the transfer case "HIGH" range as long as the front axle is disengaged.

(c) To shift the transfer case from "HIGH" to "LOW", the vehicle must be at a standstill, or operating at low speed. Engage the front axle drive. Depress the clutch pedal, and move the transfer case shift lever into its neutral position. Release the clutch pedal and accelerate



RA PD 310098

Figure 28—US 6 Dump Truck Model Shifting and Caution Plate (Less Winch)



RA PD 310085

Figure 29—US 6 Dump Truck Model Shifting and Caution Plate (With Winch)

the engine to approximately double the relative speed of the vehicle. Again depress the clutch pedal and move the transfer case shift lever forward into its low-speed position. CAUTION: *Do NOT apply excessive pressure to make the shift.* Accelerate the engine and release the clutch pedal. Shifting from "HIGH" to "LOW" when the vehicle is in motion must be done in this manner in order to synchronize the speeds of the engaging gears and avoid damaging them.

(d) To shift the transfer case from "LOW" to "HIGH", depress the clutch pedal and move the shift lever through "NEUTRAL" into "HIGH". Make the shift slowly and without excessive force. Release the clutch pedal and accelerate the engine simultaneously.

(4) STOPPING THE VEHICLE. Release the accelerator pedal and apply the brakes by depressing the brake pedal. When the forward

speed of the vehicle has decreased to nearly the idling speed of the engine, depress the clutch pedal. When the vehicle has come to a complete stop, shift the transmission into "NEUTRAL", release the clutch pedal, and apply the hand brake. Shift the transfer case into its neutral position. In addition, if the front driving axle on the 6x6 vehicle has been in use, shift the front axle control lever rearward to disengage it.

(5) REVERSING THE VEHICLE. With the vehicle stopped, depress the clutch pedal. Move the transmission gearshift lever as far to the right as possible, then forward into the "REVERSE" position. Release the clutch pedal and accelerate the engine simultaneously in the same manner as when starting the vehicle forward.

d. Stopping the Engine. Turn the ignition switch to the "OFF" position and, while the crankshaft revolves to a stop, open the throttle valve by depressing accelerator pedal slightly so the cylinders will fill with fuel mixture for the next start.

9. TOWING THE VEHICLE.

a. Towing to Start Engine. If the engine fails to start when using the cranking motor or hand crank, the vehicle can be towed to start the engine. Attach a towing cable or chain to the hooks on front end of vehicle. Shift transfer case into "HIGH" range and transmission into fourth speed on the vehicle to be towed. CAUTION: *On a 6x6 vehicle do not engage the front driving axle.* Hold the clutch pedal down so the clutch is disengaged until the vehicle speed reaches 12 to 15 miles per hour. Turn ignition switch to the "ON" position, pull the choke control outward as required, and pull the hand throttle out about ½ inch. When the vehicle speed reaches 12 to 15 miles per hour, release the clutch pedal gradually to engage the clutch. After the engine starts firing, disengage the clutch, and adjust the choke and throttle controls as required to keep the engine operating. Signal driver of towing vehicle to stop, shift transmission to "NEUTRAL", unhook towing cable or chain, and allow engine to operate at fast idle speed until it reaches normal operating temperature.

b. Towing Disabled Vehicle. When it is necessary to tow a disabled vehicle, make sure that all shift levers are placed in "NEUTRAL". Attach one end of a towing cable or chain to the hooks on front end of vehicle to be towed, and the other end to the pintle hook fastened to rear cross member of frame on towing vehicle. Avoid extremely short turns when towing a disabled vehicle and do not exceed a speed of 25 miles per hour.

Section IV

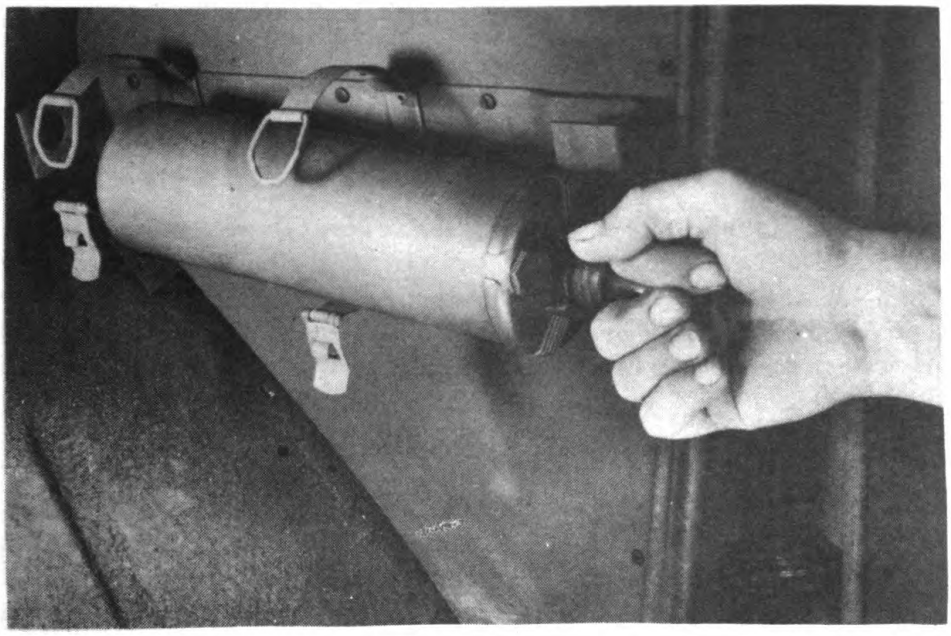
AUXILIARY EQUIPMENT CONTROLS AND OPERATION

10. FIRE EXTINGUISHER.

a. A 1-quart fire extinguisher is carried in a bracket mounted inside the cab (figs. 20, 21, and 30). Retaining straps that are easily unlatched hold the extinguisher tight in its bracket. To use the fire extinguisher, pull up on the catches to loosen the extinguisher, and remove it from the bracket (fig. 30); turn the handle 90 degrees counterclockwise to unlock the pump, and pull handle outward. Pumping the handle will force a continuous stream of the extinguishing chemical from the nozzle. Direct the stream toward the base of the fire, and continue to play the stream on the surrounding area after the blaze has been extinguished.

b. After using, make sure the handle is pushed all the way in, and turned 90 degrees clockwise to lock the handle and close the nozzle valve. If this is not done, the extinguisher will leak.

c. After using the extinguisher, refill it with the proper fluid at the first opportunity by removing the filler plug from the head. After re-



RA PD 310149

Figure 30—Removing Fire Extinguisher

filling, install filler plug, inspect for leakage, and replace if necessary. To discourage tampering, seal the filler plug, and check the seal during inspections.

11. WINCH.

a. Description. The winch is fastened to the forward end of frame on vehicles so equipped (fig. 31). Power for operating the winch is obtained from a power take-off unit mounted on the transmission, and is transmitted to the winch driving gears by a drive shaft.

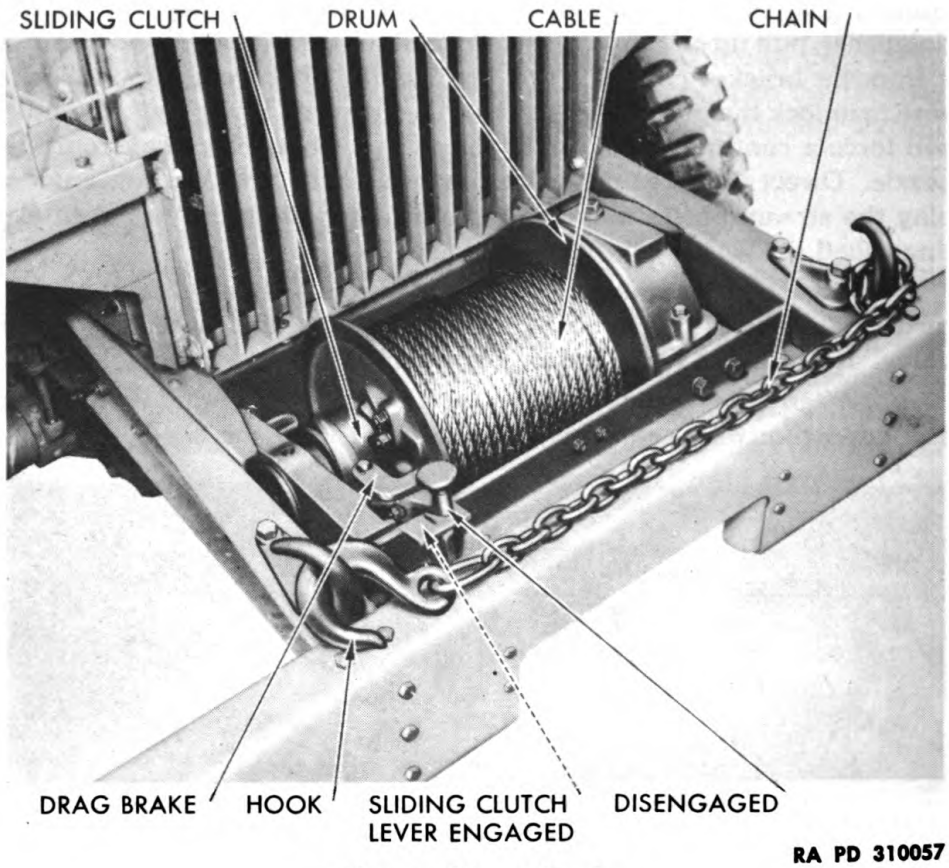


Figure 31—Winch

b. Power Take-off Control. The power take-off has a "HIGH," "LOW," "REVERSE," and two "NEUTRAL" positions, as indicated on the Shifting and Caution Plate mounted in the cab. The shift lever (fig. 20) is provided with a lock which holds it in a neutral position, and the lever must always be fastened with the lock when the winch is not in use.

c. Winch Control. The winch clutch control lever (fig. 31) is simply a handle on a pivoted arm which engages or disengages the

winch sliding clutch. A spring-loaded pin or poppet holds the handle in the engaged or disengaged position.

d. To Operate the Winch. Engage the winch sliding clutch by raising the winch control lever handle, and move it outward. Make certain that the handle pin is properly locked. Unlock the power take-off shift lever, disengage the engine clutch, and move the power take-off shift lever into either "HIGH," "LOW," or "REVERSE" position. Engage the clutch and accelerate the engine the amount necessary to overcome the load. When using the winch to pull the vehicle under heavy load, shift the power take-off into "LOW" speed, transmission into first speed, and transfer case into low if available.

RA PD 310011

Figure 32—Winch Caution Plate

e. To Stop the Winch. Disengage the engine clutch and move the power take-off shift lever to a neutral position. Make certain that, when work with the winch has been completed, the power take-off shift lever is moved to neutral, and securely fastened in this position by the lock. Also disengage the winch sliding clutch and lock the control lever in the released position.

f. To Slack Off the Winch Cable. If it is desired to slack off the winch cable, while it is under strain, leave the sliding clutch engaged, and reverse the power take-off. If there is no strain on the cable, disengage the winch sliding clutch, and pull the cable from the drum.

12. HOIST.

a. Description. The hoist is located under the dump body, and raises the body to dump the load. A power take-off unit is connected by a drive shaft to the hoist pump which operates the hoist.

2½-TON 6x6 TRUCK AND 2½- TO 5-TON 6x6 TRUCK (STUDEBAKER MODELS US 6 AND US 6x4)

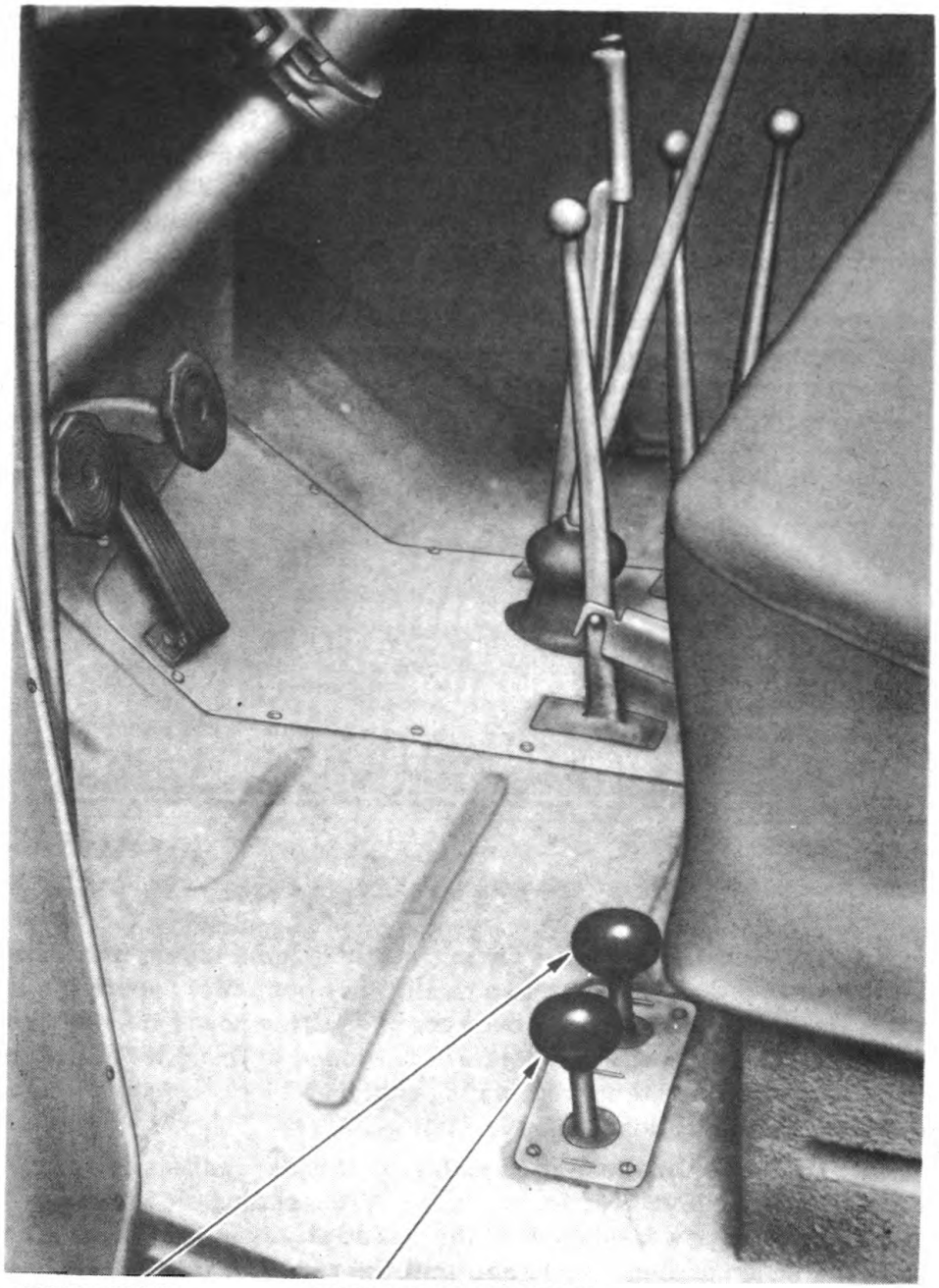


Figure 33—Dump Body Controls in Cab

b. Power Take-off Control (fig. 33). The power take-off control has two positions: engaged when up, and disengaged when down.

c. Hoist Pump Control (fig. 33). The hoist pump control has three positions: when all the way up, the pump valve is set to release body, half-way up operates pump valve to raise body, and all the way down locks body in raised position.

d. To Operate the Hoist. Start the engine, disengage the clutch, and pull right control up to engage the power take-off unit. Engage the clutch, and raise the left control half of its upward travel so the hoist will lift the body. Push the left control downward the limit of its travel to hold the body in any desired raised position. Pulling the left control up to the limit of its travel will open a valve, and allow the fluid to escape from hoist cylinder. When the body has lowered to the frame, depress the clutch pedal, and push the right control downward to disengage the power take-off unit. Release the clutch pedal, and push the left control down to close the pump valve.

Section V

OPERATION UNDER UNUSUAL CONDITIONS

13. OPERATION IN EXTREME COLD.

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

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

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

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

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

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

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

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

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

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

OPERATION UNDER UNUSUAL CONDITIONS

d. Lubrication.

(1) TRANSMISSION AND DIFFERENTIAL.

(a) Universal gear lubricant, SAE 80, where specified is suitable for use at temperatures as low as −20°F. If consistent temperature below 0°F is anticipated, drain the gear cases while warm and refill with Grade 75 universal gear lubricant, which is suitable for operation at all temperatures below +32°F. If Grade 75 universal gear lubricant is not available, SAE 80 universal gear lubricant diluted with the fuel used by the engine, in the proportion of one part fuel to six parts universal gear lubricant, may be used. Dilute make-up oil in the same proportion before it is added to gear cases.

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

(2) CHASSIS POINTS. Lubricate chassis points with general purpose grease No. 0.

(3) HYDROVAC CYLINDERS. Lubricate hydrovac cylinders with hydraulic oil above −20°F, and special recoil oil, or light shock absorber fluid, below −20°F.

(4) STEERING GEAR HOUSING. Drain housing, if possible, or use suction gun to remove as much lubricant as possible. Refill with universal gear lubricant, Grade 75, or, if not available, SAE 80 universal gear lubricant diluted with fuel used in the engine, in the proportion of one part fuel to six parts SAE 80 universal gear lubricant. Dilute make-up oil in the same proportion before it is added to the housing.

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

e. Protection of Cooling Systems.

(1) USE ANTIFREEZE COMPOUND. Protect the system with antifreeze compound (ethylene-glycol type) for operation below +32°F. The following instructions apply to use of new antifreeze compound.

(2) CLEAN COOLING SYSTEM. Before adding antifreeze compound, clean the cooling system, and completely free it from rust. If the cooling system has been cleaned recently, it may be necessary only to drain, refill with clean water, and again drain. Otherwise the system must be cleaned with cleaning compound.

(3) REPAIR LEAKS. Inspect all hose and replace if deteriorated. Inspect all hose clamps, plugs, and pet cocks; tighten if necessary. Repair all radiator leaks before adding antifreeze compound. Correct all leakage of exhaust gas or air into the cooling system.

(4) ADD ANTIFREEZE COMPOUND. When the cooling system is clean and tight, fill the system with water to about 1/3 capacity. Then

add antifreeze compound, using the proportion of antifreeze compound to the cooling system capacity indicated below. Protect the system to at least 10°F below the lowest temperature expected to be experienced during the winter season.

ANTIFREEZE COMPOUND CHART
(for 22-quart capacity cooling system)

Temperature	Antifreeze Compound (ethylene-glycol type)
10°F	5.5 qt
0°F	6.9 qt
–10°F	8.3 qt
–20°F	9.6 qt
–30°F	11 qt
–40°F	12.9 qt
–50°F	13.8 qt

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

(6) TEST STRENGTH OF SOLUTION. Stop the engine and check the solution with a hydrometer, adding antifreeze compound if required.

(7) INSPECT WEEKLY. In service, inspect the coolant weekly for strength and color. If rusty, drain and clean cooling system thoroughly, and add new solution of the required strength.

(8) CAUTIONS.

(a) Antifreeze compound (ethylene-glycol type) is the only antifreeze material authorized for ordnance materiel.

(b) It is essential that antifreeze solutions be kept clean. Use only containers and water that are free from dirt, rust, and oil.

(c) Use an accurate hydrometer. To test a hydrometer, use one part antifreeze compound to two parts water. This solution will produce a hydrometer reading of 0°F.

(d) Do not spill antifreeze compound on painted surfaces.

f. Electrical Systems.

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

(2) WIRING. Check, clean, and tighten all connections, especially the battery terminals. Care should be taken that no short circuits are present.

(3) COIL. Check coil for proper functioning by noting quality of spark.

(4) DISTRIBUTOR. Clean thoroughly, and clean or replace points. Check the points frequently. In cold weather, slightly pitted points may prevent engine from starting.

(5) SPARK PLUGS. Clean and adjust or replace, if necessary. If it is difficult to make the engine fire, reduce the gap to 0.005 inch less than that recommended for normal operation. This will make ignition more effective at reduced voltages likely to prevail.

(6) TIMING. Check carefully. Care should be taken that the spark is not unduly advanced nor retarded.

(7) BATTERY. The efficiency of batteries decreases sharply with decreasing temperatures, and becomes practically nil at –40°F. Do not try to start the engine with the battery when it has been chilled to temperatures below –30°F until battery has been heated, unless a warm slave battery is available. See that the battery is always fully charged, with the hydrometer reading between 1.275 and 1.300. A fully charged battery will not freeze at temperatures likely to be encountered even in Arctic climates, but a fully discharged battery will freeze and rupture at +5°F. CAUTION: *Do not add water to a battery when it has been exposed to subzero temperatures unless the battery is to be charged immediately. If water is added and the battery not put on charge, the layer of water will stay at the top and freeze before it has a chance to mix with the acid.*

(8) LIGHTS. Inspect the lights carefully. Check for short circuits and presence of moisture around sockets.

(9) ICE. Before every start, see that the spark plugs, wiring, or other electrical equipment are free from ice.

g. Starting and Operating Engine.

(1) INSPECT STARTER MECHANISM. Be sure that no heavy grease or dirt has been left on the starter throw-out mechanism. Heavy grease or dirt is liable to keep the gears from being meshed, or cause them to remain in mesh after the engine starts running. The latter will ruin the starter and necessitate repairs.

(2) USE OF CHOKE. A full choke is necessary to secure the rich air-fuel mixture required for cold weather starting. Check the butterfly valve to see that it closes all the way and otherwise functions properly.

(3) CARBURETOR AND FUEL PUMP. The carburetor, which will give no appreciable trouble at normal temperatures, is liable not to operate satisfactorily at low temperatures. Be sure the fuel pump has no leaky valves or diaphragm, as this will prevent the fuel pump from delivering the amount of fuel required to start the engine at low temperatures when turning speeds are reduced to 30 to 60 revolutions per minute.

(4) AIR CLEANERS. At temperatures below 0°F, do not use oil in air cleaners. The oil will congeal and prevent the easy flow of air. Wash

screens in dry-cleaning solvent, dry, and replace. Ice and frost formations on the air cleaner screens can cause an abnormally high intake vacuum in the carburetor air horn hose, resulting in collapse.

(5) FUEL SYSTEM. Remove and clean sediment bulb, strainers, etc., daily. Also drain fuel tank sump daily to remove water and dirt.

h. Chassis.

(1) BRAKE BANDS. Brake bands, particularly on new vehicles, have a tendency to bind when they are very cold. Always have a blow torch handy to warm up these parts, if they bind prior to moving, or attempting to move, the vehicle. Parking the vehicle with the brake released will eliminate most of the binding. Precaution must be taken, under these circumstances, to block the wheels, or otherwise prevent movement of the vehicle.

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

(3) SPEEDOMETER CABLE. Disconnect the oil-lubricated speedometer cable at the drive end when operating the vehicle at temperatures of –30°F and below. The cable will often fail to work properly at these temperatures, and sometimes will break, due to the excessive drag caused by the high viscosity of the oil with which it is lubricated.

14. OPERATION IN SNOW AND ICE.

a. Usually operation in snow or ice will be a matter of traction and proficiency in steering. It is very important in operations of this character, that tire chains or other traction devices furnished be kept in good condition and properly stowed so they will be immediately available. If the operation is over ice, slower speeds are recommended. If snow or ice is encountered at low temperatures, the instructions in paragraph 13 will also apply.

15. OPERATION IN EXTREME HEAT.

a. Where operations are conducted in extremely high temperatures, cooling and adequate lubrication are vitally important. Cooling system must be checked frequently for leaks, and to make certain that the circulation is not restricted. Inspect the fan for proper blade pitch, and the fan belt for proper adjustment (fig. 91). Check engine, transmission, and axle lubricant levels frequently, and use only lubricants of the proper grade and viscosity. Inspect carburetor air cleaner frequently, and clean if necessary. Keep tires inflated to recommended pressure. Keep the battery cells at the proper fluid level at all times.

OPERATION UNDER UNUSUAL CONDITIONS

16. OPERATION IN SAND.

a. Inspection and Lubrication. Operation in sand will require more frequent inspections and lubrication, as sand has a tendency to penetrate and work into bearings, etc.; therefore, cleaning and lubrication are essential to overcome the cutting action of sand particles. Give special attention to the carburetor air cleaner to prevent contamination of engine oil. Clean and lubricate steering knuckles, tie-rod ends, shifting and brake linkage, and rear spring seats as often as necessary to prevent undue wear.

b. Cooling System. Inspect the cooling system frequently for leaks, and keep the fan belt properly adjusted (fig. 90).

c. Fuel System. Take every precaution to prevent the entrance of sand into fuel tanks. Service the fuel filter (fig. 51) and fuel pump bowl (fig. 77) frequently.

d. Tires. Inspect tires frequently for proper inflation and evidence of blisters, cuts, or other damage. If necessary, lower tire pressure to provide sufficient traction if authorized by higher authority.

17. OPERATION IN DEEP MUD.

a. Inspection and Lubrication. Operation in deep mud will necessitate more frequent cleaning, inspection, and lubrication to prevent undue wear, and provide maximum operating efficiency. Clean and inspect the vehicle at every opportunity. Lubrication will be necessary at more frequent intervals as mud will work into bearings, etc., more quickly than ordinary dirt. Be sure and clean all fittings carefully before lubricating.

b. Traction Devices. To obtain adequate traction in deep mud, it may be necessary to use chains or other similar devices. These must be inspected frequently for condition, and repaired or replaced if necessary.

c. Towing Equipment. Towing equipment is used more frequently in operations of this character; therefore, it is more important that tow chains, pintle and tow hooks, winches, and cables be inspected for presence and good condition.

Section VI

FIRST ECHELON PREVENTIVE MAINTENANCE SERVICE

18. PURPOSE.

a. To insure mechanical efficiency, it is necessary that the vehicle be systematically inspected at intervals each day it is operated, also 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, and after operation and weekly.

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

c. The items listed on W.D. Form No. 48 that apply to this vehicle are 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 the item is in good condition, correctly assembled, secure, or excessively worn.

(1) The inspection for "good condition" is usually an external visual inspection to determine whether 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 if it is in its correctly assembled position in the vehicle.

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

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

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

19. BEFORE-OPERATION SERVICE.

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

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

(1) ITEM 1, TAMPERING AND DAMAGE. Examine exterior of vehicle, body, load, engine, wheels, brakes, and steering control for any damage by falling debris, shell fire, sabotage, or collision since parking the vehicle.

(2) ITEM 2, FIRE EXTINGUISHER. Inspect portable fire extinguisher to see that it is present, full, securely mounted, and that nozzle is clean. Check to determine contents.

(3) ITEM 3, FUEL, OIL, AND WATER. Add fuel, oil, or water as needed. Report unusual losses. NOTE: *During period when antifreeze is used, if it becomes necessary to replenish a considerable amount of water, have value of antifreeze tested.*

(4) ITEM 4, ACCESSORIES AND DRIVES. Examine carburetor, generator, regulator, cranking motor, and water pump to see that they are in good condition and securely mounted. Check fan belt for ½- to 11/16-inch deflection, finger pressure.

2½-TON 6x6 TRUCK AND 2½- TO 5-TON 6x4 TRUCK (STUDEBAKER MODELS US 6 AND US 6x4)

(5) ITEM 6, LEAKS, GENERAL. Look on ground, under vehicle, and under hood, for indications of fuel, oil, or water leaks. Examine axles, transmission, and transfer case for evidence of grease leaks. On vehicles equipped with hydraulic hoist inspect pump, cylinder, lines, and connections for evidence of leaks. Trace any leaks to source, and correct or report them to designated authority.

(6) ITEM 8, CHOKE. In cold weather pull choke about half-way out, and in freezing weather all the way out, while starting engine. Leave choke out only long enough to keep engine running smoothly until warmed up, then push to closed position.

(7) ITEM 7, ENGINE WARM-UP. Start engine, noting if cranking motor has adequate cranking speed, and engages and disengages properly without unusual noise. If oil pressure does not indicate 30 to 40 pounds within ½ minute, stop engine, and investigate or report trouble. Set hand throttle so that engine will idle smoothly during warm-up, and do not move vehicle until temperature gage reaches approximately 135°F.

(8) ITEM 9, INSTRUMENTS.

(a) Fuel Gage. Fuel gage should register approximate amount of fuel in tank as soon as ignition switch is turned on.

(b) Oil Pressure Gage. Oil pressure should register 30 to 40 pounds with engine running above fast idle. If gage shows low or zero, stop engine and investigate or report immediately to designated individual in authority.

(c) Ammeter. Ammeter may show high charging rate for first few minutes after starting engine, until generator has restored to battery current used, then register slight (+) charge or zero with lights and accessories turned off. High charging rate for extended period may indicate a dangerously low battery or faulty regulator.

(d) Engine Temperature Gage. Temperature should rise slowly during warm-up. Normal operating temperature is 140° to 180°F. If temperature continues to rise above 190°F, stop engine and investigate cause.

(9) ITEM 10, HORN AND WINDSHIELD WIPERS. Sound horn for proper tone if tactical situation permits. Examine windshield wipers for proper operation and good blades.

(10) ITEM 11, GLASS AND REAR VIEW MIRROR. Clean and inspect all glass for cracks and discoloration. Adjust mirrors for clear rear vision.

(11) ITEM 12, LAMPS AND REFLECTORS. With all light switches in "ON" position, including blackout and stop lights, inspect all lights to see that they are securely mounted, burning, clean, and go out when switch is turned off.

(12) ITEM 13, WHEEL AND FLANGE NUTS. Inspect all wheel stud nuts and axle drive flange cap screws to see that they are present and secure.

(13) ITEM 14, TIRES. Inspect tires for flats or low pressure. (Correct pressure, 55 lb.) Examine tires, wheels, rims, and valve caps for same condition as left when vehicle was parked.

(14) ITEM 15, SPRINGS. Inspect springs and suspensions for evidence of tampering or sabotage since parking the vehicle.

(15) ITEM 16, STEERING LINKAGE. Examine steering gear housing for leaks or loose mounting bolts, and all linkage for loose or damaged condition.

(16) ITEM 17, FENDERS AND BUMPERS. Make sure that all fenders and bumpers are in good condition, securely mounted, and have not been damaged since parking the vehicle.

(17) ITEM 18, TOWING CONNECTIONS. Towing and pintle hooks must be in serviceable condition, latch operate freely, and lock pin attached to chain.

(18) ITEM 19, BODY, LOAD AND TARPS. Inspect body for good condition, secure mounting, and for any evidence of tampering, or shifting of the load since parking the vehicle. See that tarpaulin and all fasteners are in good condition and secure. On vehicles equipped with cab tarpaulin and curtains, inspect to see that they are not torn and that all fasteners and attaching ropes, hooks, and bows are present and in good condition.

(19) ITEM 20, DECONTAMINATOR. Decontaminator must be present, fully charged, and securely mounted. Shake to determine contents. Recharge every 90 days.

(20) ITEM 21, TOOLS AND EQUIPMENT. Inspect all tools and equipment for presence, serviceability, and proper stowage.

(21) ITEM 22, ENGINE OPERATION. After proper operating temperature, 140° to 180° F, has been reached, engine should idle smoothly. Accelerate and decelerate engine a few times, and listen for any unusual vibration or noise. Observe instruments for proper reading, and exhaust for excessive smoking.

(22) ITEM 23, DRIVER'S PERMIT, ACCIDENT FORM NO. 26, MANUAL, AND LUBRICATING GUIDE. See that these items and all publications assigned to the vehicle are present, legible, and properly stowed.

(23) ITEM 25, DURING-OPERATION SERVICE. The During-operation Service should start immediately after the vehicle is put in motion, in the nature of a road test.

20. 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 indica-

tions of trouble in cooling system, and smoke from any part of the vehicle. Be on the alert to detect any odor of overheating components or units such as generator, brakes, or clutch, fuel vapor from a leak in fuel system, exhaust gas, or other signs of trouble. Each 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 indications that may signify possible trouble in system to which the instrument applies.

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

(1) ITEM 27, FOOT AND HAND BRAKES. With vehicle in motion apply foot brake, and observe for smooth and effective braking. Stopping of vehicle should be accomplished within reasonable distance without side pull. Pedal-to-floor-board clearance must be at least 1 inch with brake in applied position. Stop vehicle on grade and apply hand brake. Brake should hold vehicle securely with at least ⅓ ratchet travel in reserve.

(2) ITEM 28, CLUTCH. While shifting gears note any chatter, grabbing, or squealing of the clutch. Observe if clutch slips under load. Clutch pedal should have 1-inch free pedal travel before clutch starts to disengage.

(3) ITEM 29, TRANSMISSION. Transmission gears should shift smoothly, operate quietly, and not slip out of mesh. Stop vehicle and investigate if there is any unusual noise in transmission.

(4) ITEM 30, TRANSFER CASE. Gears must shift smoothly, operate quietly, and not slip out of mesh. Stop vehicle and investigate in case of any unusual noise in transfer case.

(5) ITEM 31, ENGINE AND CONTROLS. Driver should always be on the alert for any deficiencies in engine operation such as lack of power on acceleration, excessive smoke, misfiring, or overheating. Note any binding or unusual operation of the engine control linkage.

(6) ITEM 32, INSTRUMENTS. Observe all instrument readings frequently during operation for indication of normal functioning of systems to which they apply.

(a) Oil Pressure. Normal reading is approximately 30 to 40 pounds with engine running above fast idle.

(b) Ammeter. Ammeter may show high charging rate for first few minutes after starting engine, until generator has restored to battery current used in starting, then register slight (+) charge or zero with

lights and accessories turned off. High charging rate for extended period may indicate a dangerously low battery or faulty regulator.

(c) Fuel Gage. Fuel gage must register approximate amount of fuel in tank.

(d) Speedometer. Speedometer must register vehicle speed and record accumulated mileage without needle fluctuation or noise.

(e) Engine Temperature Gage. Normal temperature range is between 140° to 180°F. If temperature rises above 190°F, stop engine and investigate.

(7) ITEM 33, STEERING GEAR. Observe for wander, shimmy, binding, or pulling to either side of the road.

(8) ITEM 34, RUNNING GEAR. Listen for any unusual noise in wheels, axles, springs, or suspensions that would indicate loose or damaged units.

(9) ITEM 35, BODY. Be on the alert for any unusual noise that would indicate loose body mountings, shifting of the load, loose tarpaulins, or attachments.

21. AT-HALT SERVICE.

a. The At-halt Service may be regarded as minimum battle maintenance and should be performed under all tactical conditions, even 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 designated individual in authority.

(1) ITEM 38, FUEL, OIL, AND WATER. Inspect to see that there is adequate fuel, engine oil, and coolant to operate vehicle to next scheduled stop, otherwise replenish as required. If, during period when antifreeze is used, a considerable amount of water is required to fill radiator, have coolant tested with hydrometer and antifreeze added as required.

(2) ITEM 39, TEMPERATURES: (HUBS, BRAKE DRUMS, TRANSMISSION, TRANSFER, AND AXLES). Hand-feel wheel hubs and brake drums for abnormal temperatures. If any wheel hub is too hot to touch, bearings may be inadequately lubricated, damaged, or improperly adjusted. Abnormal temperatures at brake drums may be caused by dragging or improperly adjusted brake. Examine transmission transfer and rear axle for overheating and excessive oil leaks.

(3) ITEM 40, AXLE AND TRANSFER CASE VENTS. Inspect vents to determine if they are present, secure, and not clogged.

(4) ITEM 41, PROPELLER SHAFTS. Inspect universal joints for loose bolts and evidence of excessive lubricant leaks.

(5) ITEM 42, SPRINGS AND SUSPENSIONS. Inspect for loose, broken, or shifting spring leaves; and loose mounting bolts, U-bolts, torque rods, and shackles.

(6) ITEM 43, STEERING LINKAGE. Inspect Pitman arm and linkage for looseness or damage. Observe for grease leaks at steering gear housing.

(7) ITEM 44, WHEEL AND FLANGE NUTS. Inspect all wheel stud nuts and axle drive flange cap screws to see that they are present and secure.

(8) ITEM 45, TIRES. Inspect for flats or low pressure (normal pressure, 55 lb, cool). Examine tires for missing valve caps, cuts, or bruises. Remove all foreign objects imbedded in treads or wedged between duals.

(9) ITEM 46, LEAKS—GENERAL. Look on ground under vehicle for evidence of fuel, oil, or water leaks; and around axles, transmission, and transfer case for evidence of grease leaks. On vehicles equipped with hydraulic hoist inspect pump, cylinder, lines and connections for evidence of leaks. Trace all leaks to their source, and correct or report them.

(10) ITEM 47, ACCESSORIES AND BELT. Inspect all accessories for loose mountings and incorrect alinement. Fan belt must not be frayed or broken and should have ½- to $^{11}/_{16}$-inch deflection (finger pressure).

(11) ITEM 48, AIR CLEANER. If vehicle has been operated under extreme dust or sand condition, examine element for clogging. Remove and clean if necessary.

(12) ITEM 49, FENDERS AND BUMPERS. Inspect for loose mountings and damaged condition.

(13) ITEM 50, TOWING CONNECTIONS. Towing and pintle hooks must be in serviceable condition, latch operate freely, and pintle hook lock pin securely attached to chain.

(14) ITEM 51, BODY, LOAD AND TARPS. Inspect load for shifting and see that all tarpaulin hold-down ropes are in good condition and securely fastened.

(15) ITEM 52, APPEARANCE AND GLASS. Clean all cab glass, rear vision mirrors, and light lenses; inspect for damage. Clean exterior of vehicle as necessary, making certain identification markings are visible.

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

(1) ITEM 55, ENGINE OPERATION. Before stopping engine, check for smooth idle. Accelerate and decelerate a few times, noting any unusual noise or excessive smoking. Investigate any deficiencies noted during operation.

(2) ITEM 56, INSTRUMENTS. Before stopping engine, inspect all instruments for good condition, secure mounting, and proper readings.

(a) Fuel Gage. Gage should register approximate amount of fuel in tank. Recheck reading after filling.

(b) Oil Pressure Gage. Gage should register between 30 and 40 pounds with engine running above fast idle.

(c) Ammeter. The ammeter should show zero (0) or only slight charge (+) at idle speed with all lights and accessories turned off.

(d) Temperature Gage. Gage should register between 140° and 180°F for normal operation.

(3) ITEM 57, HORN AND WINDSHIELD WIPERS. Sound horn for proper tone (if tactical situation permits). Examine windshield wipers for proper operation and good blades.

(4) ITEM 54, FUEL, OIL, AND WATER. Fill the fuel tank; check the engine oil level with the bayonet gage and, if necessary, fill to correct level with specified oil. Check radiator coolant for proper level and contamination. Add coolant as needed. In freezing weather have coolant checked with hydrometer, and add antifreeze with water as required. See that any fuel oil or water used from spare cans is replenished.

(5) ITEM 58, GLASS AND REAR VIEW MIRRORS. Inspect all cab glass for looseness and damage. Clean glass and adjust rear vision mirrors.

(6) ITEM 59, LIGHTS AND REFLECTORS. With all light switches in "ON" position, including blackout and stop lights, inspect all lights

to see that they are securely mounted, burning, clean, and go out when the switch is turned off.

(7) ITEM 60, FIRE EXTINGUISHER. Examine portable fire extinguisher to see that it is full, nozzle clean, and securely mounted. A discharged extinguisher must be refilled or replaced.

(8) ITEM 61, DECONTAMINATOR. Decontaminator must be fully charged, securely mounted, and valve closed. Shake to determine contents. NOTE: *Decontaminator must be recharged every 90 days as contents deteriorate.*

(9) ITEM 62, *BATTERY.

(a) Inspect battery for leaks or damage, security of mountings, and connections. Battery connections and mountings must be kept clean and tight. Electrolyte must be ⅜ inch above top of plates. Add distilled or fresh, clean water if necessary.

(b) Weekly. Examine battery for cracks and leaks, tighten all terminals and mountings, clean corroded terminals, and apply coating of grease. Add distilled or clean water to bring level ⅜ inch above cell plates. In freezing temperatures do not add water until just before vehicle is to be operated.

(10) ITEM 63, *ACCESSORIES AND BELTS.

(a) Inspect generator, fan, and belt to see that they are securely mounted and properly alined. Belt must have ½- to $^{11}/_{16}$-inch deflection (finger pressure).

(b) Weekly. Examine fuel pump, carburetor, generator, regulator, cranking motor, and fan for loose mounting bolts. Inspect belt for condition and adjustment.

(11) ITEM 64, *ELECTRICAL WIRING.

(a) Inspect all accessible wiring and conduits to see that they are clean, secure, and properly supported.

(b) Weekly. Wipe all oil and dirt from wiring and inspect for deterioration. Make sure all connections are secure.

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

(a) If vehicle has been operated under extremely dusty or sandy conditions, examine filter elements for clogged condition. Remove and clean if necessary.

(b) Weekly. Remove and clean air cleaner element and sump. Refill to proper oil level, and tighten mountings securely. Clean oil filler breather cap.

(13) ITEM 66, *FUEL FILTER.

(a) Close shut-off valve, remove plug from filter bowl, and drain accumulated water and dirt.

(b) Weekly. Remove filtering element and clean with dry-cleaning

solvent. Make certain that all dirt is cleaned from filter bowl before reassembling.

(14) ITEM 67, ENGINE CONTROLS. Examine engine and accessory controls for loose, worn, or binding linkage. Lubricate as necessary.

(15) ITEM 68, *TIRES.

(a) Inspect tires for correct pressure (55 lb). Replace any missing valve caps and inspect tires for cuts, bruises, fractures, or evidence of excessive wear.

(b) Weekly. Inspect tires for evidence of abnormal wear, and replace badly worn or otherwise unserviceable tires. Match tires according to tread and over-all circumferences.

(16) ITEM 69, *SPRINGS AND SUSPENSIONS.

(a) Examine springs for evidence of broken or shifting leaves, loose or missing U-bolts, eyebolts, broken center bolts, shackle bolts, and rebound clips.

(b) Weekly. Look at springs for evidence of excessive sag, torque rods for alinement, bushings for deterioration, and spring seat bearing seals for leaks.

(17) ITEM 70, STEERING LINKAGE. Examine Pitman arm, drag link, and tie rod for damage and loose connections. Check for presence and security of steering stop screws.

(18) ITEM 71, PROPELLER SHAFTS, PILLOW BLOCK, AND VENT. Examine propeller shafts for proper alinement, and universal joints for lubricant leakage and wear. Inspect pillow block for leaking seals and security of mounting, and vent for clogged condition.

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

(a) Inspect axle, transmission, and transfer vents for good condition, for cleanliness, and secure attachment.

(b) Weekly. Remove, clean, and reinstall vents if necessary.

(20) ITEM 73, LEAKS—GENERAL. Inspect all fuel, oil and water lines and connections for evidence of leaks. Look on ground under vehicle and around axles, transmission, and transfer case for grease leaks. On vehicles equipped with hydraulic hoist inspect pump, cylinder, lines, and connections for evidence of leaks.

(21) ITEM 74, GEAR OIL LEVELS. Examine transmission, transfer case, and driving axles for proper oil levels. Oil must not be more than ½ inch below filler hole when cold, and not above bottom edge of filler hole when hot. Add lubricant if necessary.

(22) ITEM 76, FENDERS AND BUMPERS. Examine fenders and bumpers for good condition and secure mounting. Tighten all loose mounting bolts. Report if in damaged condition.

2½-TON 6x6 TRUCK AND 2½- TO 5-TON 6x4 TRUCK (STUDEBAKER MODELS US 6 AND US 6x4)

(23) ITEM 77, *TOWING CONNECTIONS.

(a) Towing and pintle hooks must be in serviceable condition and pintle pin attached to chain.

(b) Weekly. Lubricate and free up any binding condition of pintle hook.

(24) ITEM 78, BODY LOAD AND TARPAULINS. Inspect body for loose mountings, load for shifting, tarpaulin fastenings for security. Inspect tarpaulin for cuts or tears, and presence of tie-down ropes and fastenings. On vehicles equipped with cabs having tarpaulin top and side curtains, see that top is in raised position, properly lashed down, that all fasteners are present and secure, top is not ripped, seams torn, or glass broken. Test hoist mechanism for satisfactory operation.

(25) ITEM 82, *TIGHTEN: (WHEEL, RIM, AXLE DRIVE FLANGE, AND SPRING U-BOLT NUTS).

(a) Inspect to see that all wheel rim axle drive flange bolts and nuts are present and tightened securely.

(b) Weekly. Inspect all units for evidence of damage or loose mounting bolts and nuts, and tighten as required.

(26) ITEM 83, *LUBRICATE AS NEEDED.

(a) Oil and lubricate all parts where inspection reveals need for lubrication. Report any missing fittings. For specific intervals and lubricants to be used, refer to War Department Lubrication Guide, paragraph 24.

(b) Weekly. Lubricate all points indicated on vehicle Lubrication Guide as requiring attention on a weekly or mileage basis, or any points that conditions and experience indicate require additional lubrication.

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

(a) Thoroughly clean inside of cab and body. Remove excessive dirt and grease from exterior of vehicle, and make sure identification markings are visible.

(b) Weekly. Wash vehicle if possible, and observe for bright spots that would cause glare. Clean all excess dirt or oil from exterior of engine and if compressed air is available, blow out all foreign objects from the radiator cooling fins.

(28) ITEM 85, *TOOLS AND EQUIPMENT.

(a) Inspect all tools for presence and serviceability, checking against vehicle stowage list.

(b) Weekly. Clean, condition, and stow all tools and equipment. Replace missing tools or equipment.

Section VII

LUBRICATION

23. INTRODUCTION.

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

24. LUBRICATION GUIDE.

a. General. Lubrication instructions for this materiel are consolidated in Lubrication Guides (figs. 34 through 38). These specify the points to be lubricated, the periods of lubrication, and the lubricant to be used. In addition to the items on the Guides, other small moving parts, such as hinges and latches, must be lubricated at frequent intervals.

b. Supplies. In the field it may not be possible to supply a complete assortment of lubricants called for by the Lubrication 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 personnel.

c. Lubrication Notes, 6 x 4 Truck. The following notes apply to the Lubrication Guide (figs. 34 and 35). All note references in the Guide itself are to the subparagraph below having the corresponding number.

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

(2) INTERVALS. The intervals indicated are for normal service. For extreme conditions of speed, heat, water, sand, mud, snow, rough roads, dust, etc., reduce interval by ⅓ or ½, or more if conditions warrant.

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

(4) AIR CLEANERS. Daily, check level and refill oil reservoir of engine air cleaner to oil level stamped on side of reservoir, with used crankcase oil or OIL, engine, SAE 30 above +32°F and SAE 10, +32°F to 0°F. Every 1,000 miles, daily under extreme dust conditions, remove and wash all parts. Below 0°F, remove oil and operate dry. Every 500 miles, remove crankcase filler cap if equipped with filter, wash and reoil with OIL, engine, SAE 30 above +32°F and SAE 10,

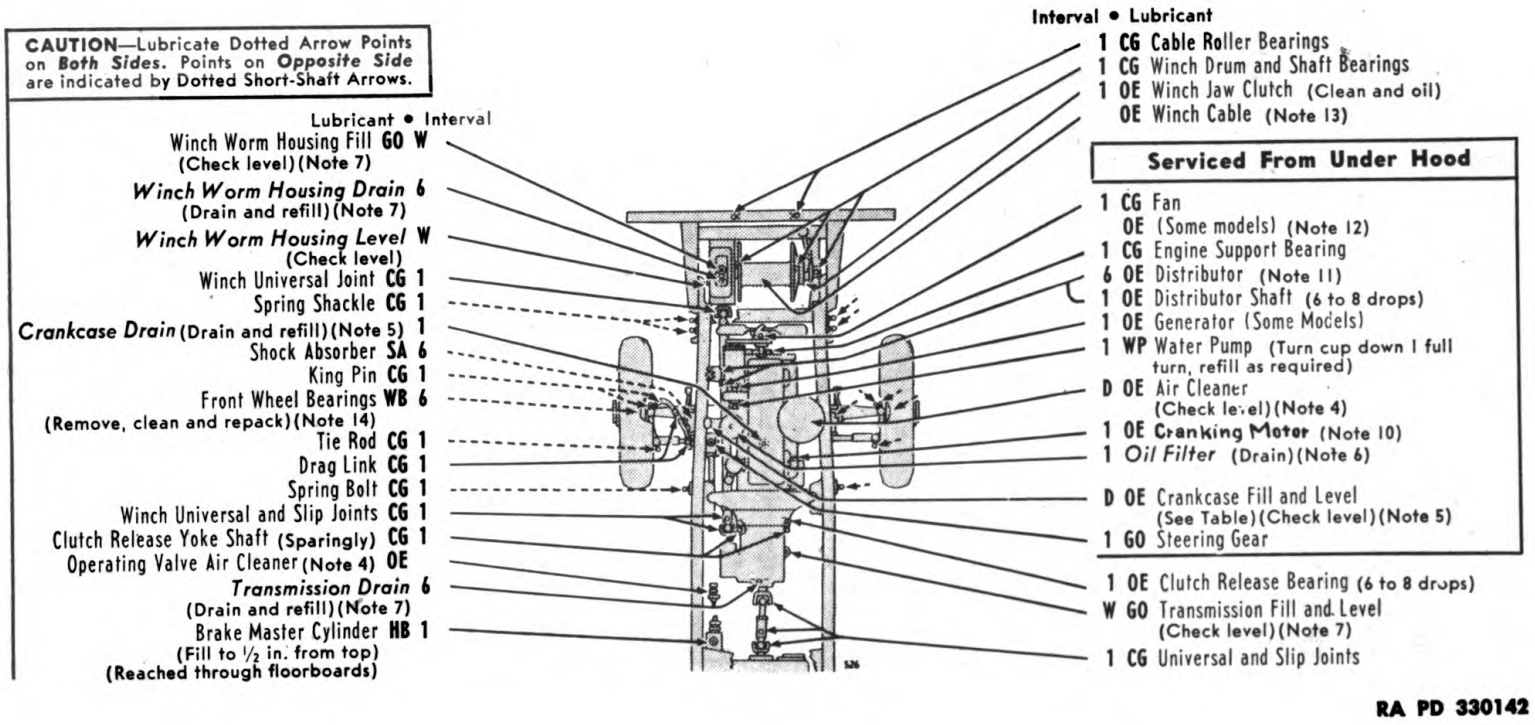
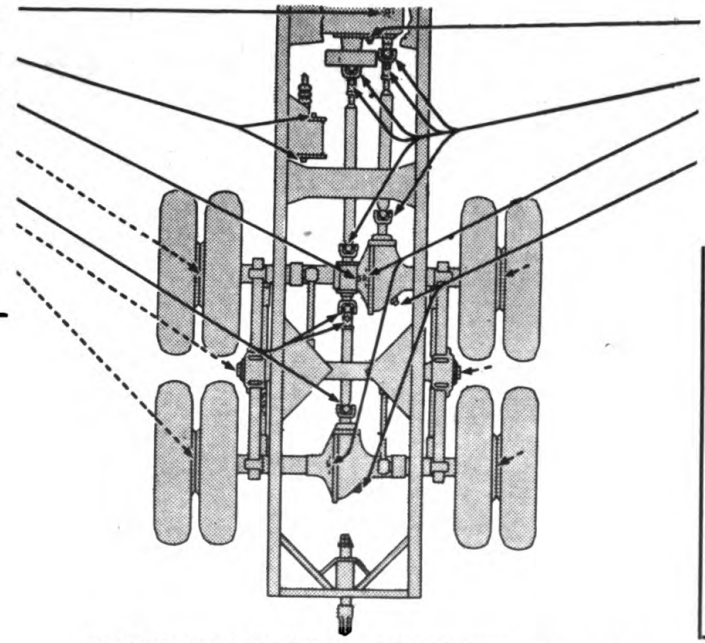


Figure 34—Chassis Lubrication Guide (6x4)

Transfer Case Drain 6 (Drain and refill) (Note 7)
Brake Vacuum Cylinder SA 6 (Note 8)
Propeller Shaft Center Bearing GO 1 (Fill to plug level)
Rear Wheel Bearings WB 6 (Remove, clean and repack) (Note 14)
Universal and Slip Joints CG 1
Rear Spring Bearing CG 6 (Note 9)
Rear Wheel Bearings WB 6 (Remove, clean and repack) (Note 14)

W GO Transfer Case Fill and Level (Check level) (Note 7)
1 CG Universal and Slip Joints
6 *Rear Axle Differential Drains* (Drain and refill) (Note 7)
W GO Rear Axle Differential Fill and Levels (Check level) (Note 7)



KEY

INTERVALS
D—DAILY
W—WEEKLY
1—1,000 MILES
6—6,000 MILES
CHECK DAILY
Crankcase
Air Cleaner

KEY

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

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	6 qt.	OE SAE 30	OE SAE 10	Refer to OFSB 6-11
Transmission (With Power Take-Off)	4½ qt. 5¼ qt.	GO SAE 90	GO SAE 80	GO Grade 75
Transfer Case	3½ qt.			
Differentials (each)	3½ qt.			
Winch Worm Housing	1⅞ qt.			

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Figure 35—Chassis Lubrication Guide (6 x 4)

+32°F to 0°F. Below 0°F, wash and replace dry. When disassembled for some other purpose, remove air-cleaning element of operating valve, wash and reoil curled hair with used crankcase oil or OIL, engine, SAE 30 above +32°F and SAE 10, +32°F to 0°F. Below 0°F, wash and refill reservoir with light shock absorber oil.

(5) CRANKCASE. Drain only when engine is hot. Refill to "FULL" (4/4) mark on gage. Run engine a few minutes and recheck oil level. CAUTION: *Be sure pressure gage indicates oil is circulating.*

(6) OIL FILTER. Every 1,000 miles, or more often if necessary, 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, recheck crankcase level and add OIL, engine, to "FULL" mark on gage (SAE 30 above +32°F; SAE 10, +32°F to 0°F; below 0°F, refer to OFSB 6-11).

(7) GEAR CASES. Weekly, check level with truck on level ground and, if necessary, add lubricant to within ½ inch of plug level when cold, or to plug level when hot. Drain and refill at intervals indicated on Lubrication Guide. Drain only after operation. Upon reassembly of front axle declutching unit, fill through plug hole with LUBRICANT, gear, universal. Axle housing, transfer case, and transmission breathers must be cleaned and kept open. Check each time level is checked and each time truck is operated under extremely dirty or muddy conditions.

(8) BRAKE VACUUM CYLINDER. Every 6,000 miles, remove pipe plug from piston rod end of cylinder and lubricate with about ½ ounce of FLUID, shock-absorber, light. Replace plug.

(9) REAR SPRING BEARINGS. Every 6,000 miles, remove bearing cap. Remove plug, insert fitting, and lubricate with GREASE, general purpose, No. 1 above +32°F, and No. 0 below +32°F, until all old lubricant is forced out of bearing. Replace plug and bearing cap.

(10) CRANKING MOTOR. Every 6,000 miles, remove cranking motor; clean and lubricate Bendix drive with six to eight drops of OIL, lubricating, preservative, special. When cranking motor is disassembled, wash bushings and soak in OIL, engine, SAE 30 above +32°F; SAE 10, +32°F to 0°F; OIL, lubricating, preservative, special, below 0°F.

(11) DISTRIBUTOR. Every 6,000 miles, wipe distributor breaker cam lightly with GREASE, general purpose, No. 1 above +32°F or No. 0 below +32°F, and lubricate breaker arm pivot and wick under rotor with one to two drops of OIL, engine, SAE 30 above +32°F; SAE 10, +32°F to 0°F; OIL, lubricating, preservative, special, below 0°F.

(12) FAN. On some models, OIL, engine, SAE 30 above +32°F; SAE 10, +32°F to 0°F; OIL, lubricating, preservative, special, below 0°F, is used for lubrication. Every 1,000 miles, or more often under severe dust conditions, remove oil filler screw plug from hub of fan

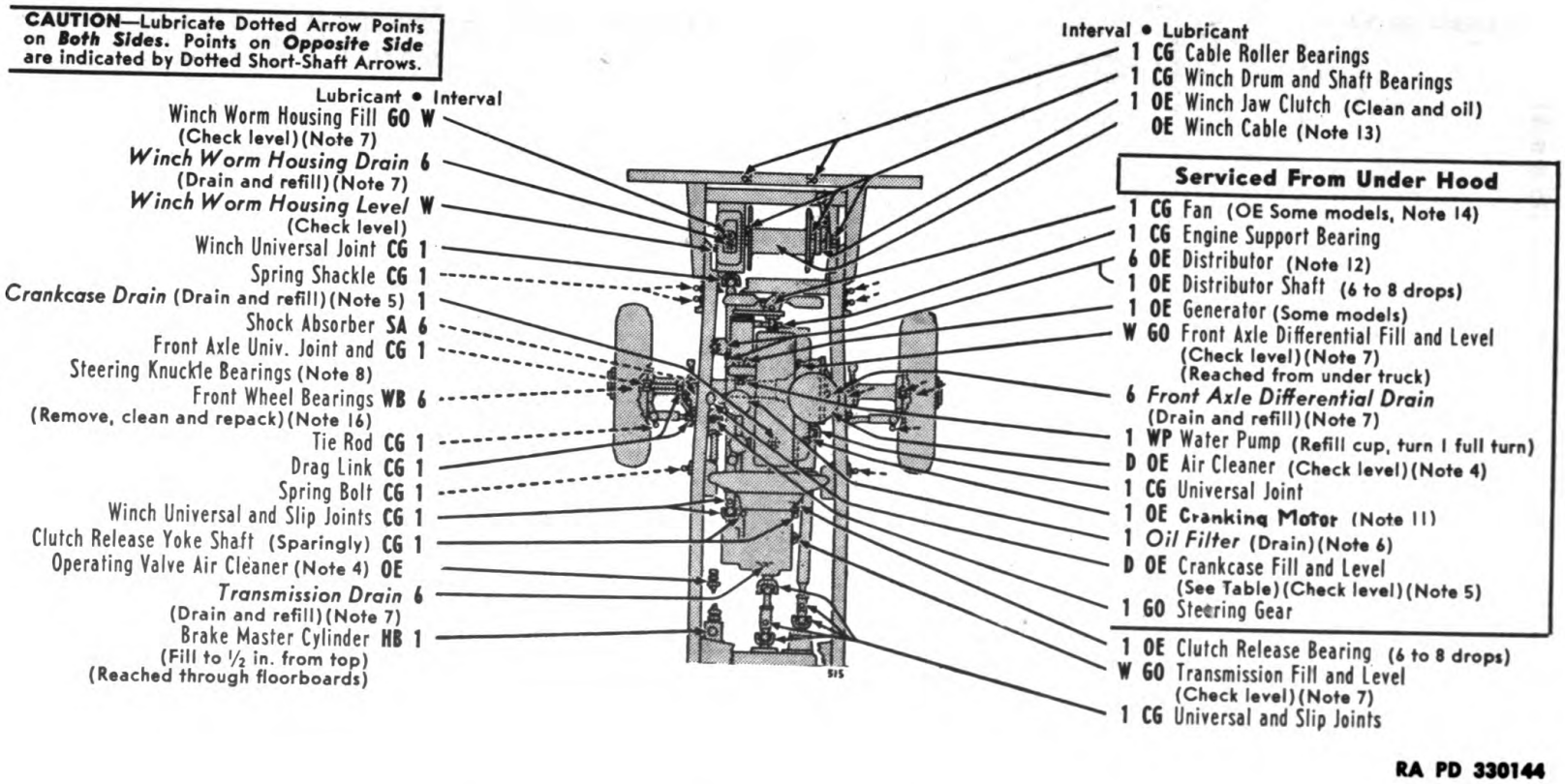

Figure 36—Chassis Lubrication Guide (6x6)

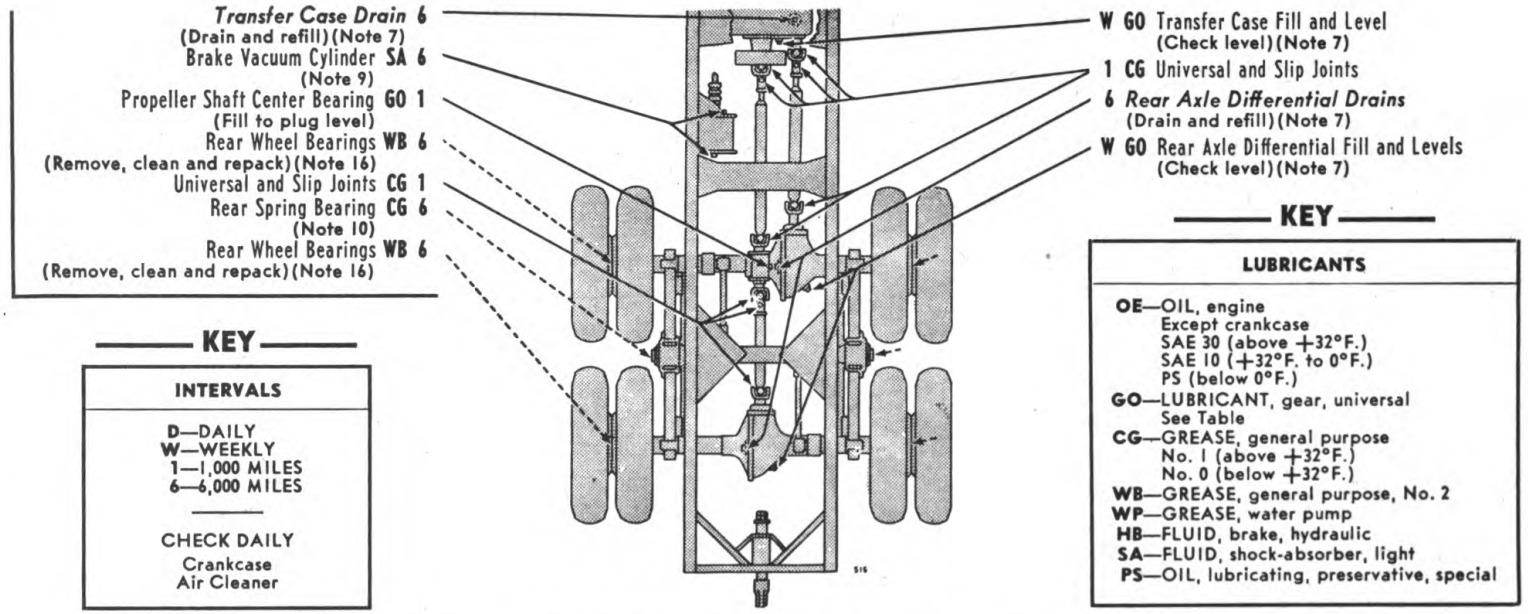

TABLE OF CAPACITIES AND LUBRICANTS TO BE USED

UNIT	CAPACITY (Approx.)	LOWEST EXPECTED AIR TEMPERATURE		
		+32°F. and Above	+32°F. to 0°F.	Below 0°F.
Crankcase	6 qt.	OE SAE 30	OE SAE 10	Refer to OFSB 6-11
Transmission (With Power Take-Off)	4½ qt. 5¼ qt.	GO SAE 90	GO SAE 80	GO Grade 75
Transfer Case	3½ qt.			
Differentials (each)	3½ qt.			
Winch Worm Housing	1⅞ qt.			

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Figure 37—Chassis Lubrication Guide (6x6)

LUBRICATION

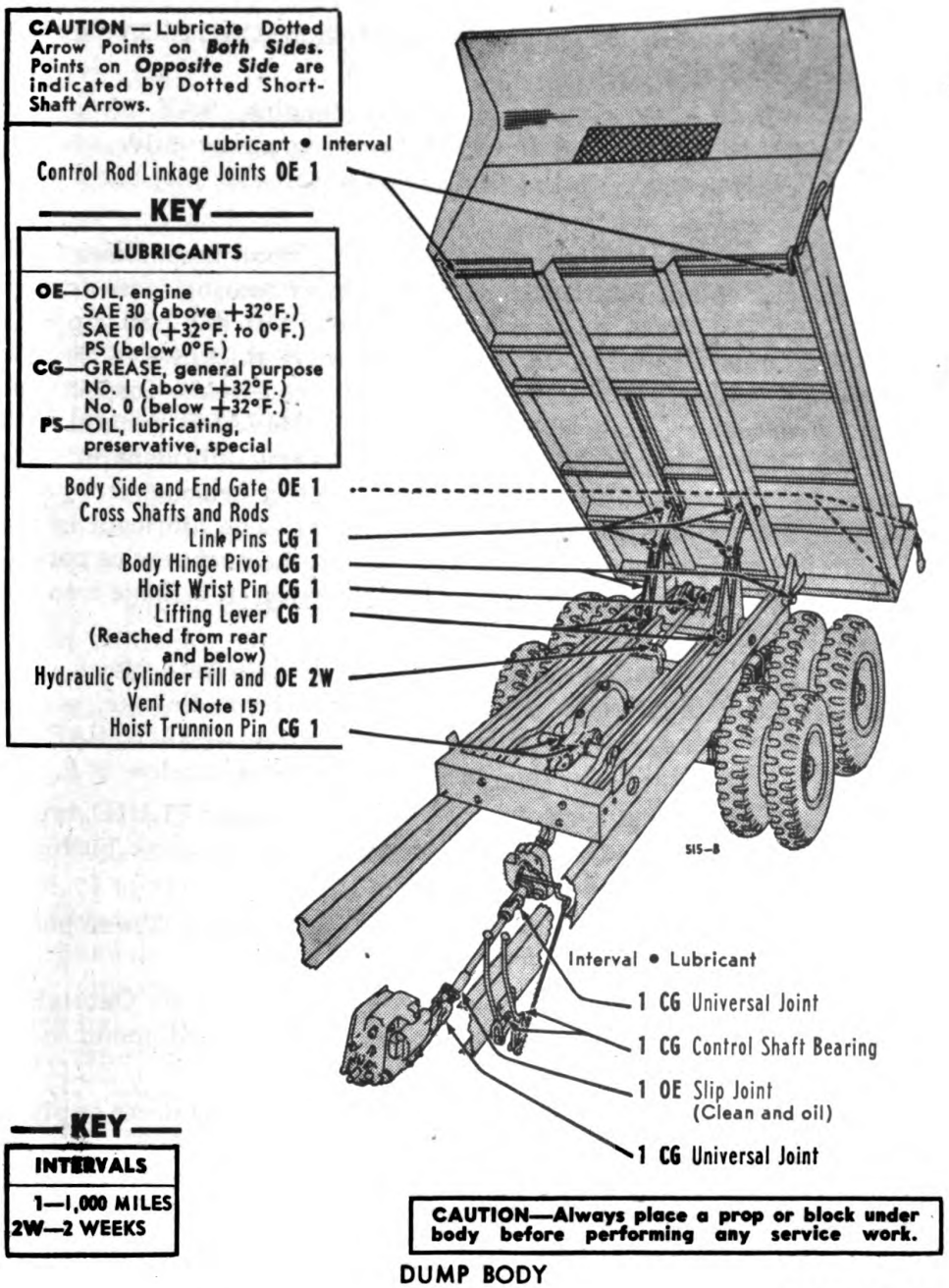


Figure 38—Hoist Lubrication Guide

pulley and fill reservoir with OIL, engine, SAE 30 above +32°F; SAE 10, +32°F to 0°F; OIL, lubricating, preservative, special, below 0°F. Rotate fan several times and stop fan so oil filler hole is downward, and allow excess oil to drain out of fan pulley hub. CAUTION: *Install screw plug in oil filler hole.*

(13) WINCH CABLE. Coat with 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.

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

(15) OILCAN POINTS. Every 1,000 miles, lubricate clevis pins, ends of control lever rods, throttle and accelerator linkage, pintle, hinges, and latches with OIL, engine, SAE 30 above +32°F; SAE 10, +32°F to 0°F; OIL, lubricating, preservative, special, below 0°F.

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

(17) POINTS REQUIRING NO LUBRICATION SERVICE. These points are the springs and generator (some models).

(18) POINTS TO BE SERVICED AND/OR LUBRICATED BY ORDNANCE MAINTENANCE PERSONNEL. These points are the speedometer cable and distributor governor weights.

d. Lubrication Notes, 6 x 6 Truck. The following notes apply to the Lubrication Guide (figs. 36 through 38). All note references in the Guide itself are to the subparagraph below having the corresponding number.

(1) FITTINGS. Clean fitting 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. The intervals indicated are for normal service. For extreme conditions of speed, heat, water, sand, mud, snow, rough

roads, dust, etc., reduce interval by ⅓ or ½, or more if conditions warrant.

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

(4) AIR CLEANERS. Daily, check level and refill oil reservoir of engine air cleaner to oil level stamped on inside of reservoir, with used crankcase oil or OIL, engine, SAE 30 above +32°F and SAE 10, +32°F to 0°F. Every 1,000 miles, daily under extreme dust conditions, remove and wash all parts. Below 0°F, remove oil and operate dry. Every 100 to 500 miles, remove crankcase filler cap. If equipped with filter, wash and reoil with OIL, engine, SAE 30 above +32°F and SAE 10, +32°F to 0°F. Below 0°F, wash and replace dry. When disassembled for some other purpose, remove air-cleaning element of operating valve, wash and reoil curled hair with used crankcase oil or OIL, engine SAE 30 above +32°F and SAE 10, +32°F to 0°F. Below 0°F, wash and fill reservoir with OIL, shock-absorber, light.

(5) CRANKCASE. Drain only when engine is hot. Refill to "FULL" (4/4) mark on gage. Run engine a few minutes and recheck oil level. CAUTION: *Be sure pressure gage indicates oil is circulating.*

(6) OIL FILTER. Every 1,000 miles, or more often if necessary, 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, recheck crankcase level and add OIL, engine, to "FULL" (4/4) mark on gage (SAE 30 above +32°F; SAE 10, +32°F to 0°F; below 0°F, refer to OFSB 6-11).

(7) GEAR CASES. Weekly, check level with truck on level ground and, if necessary, add lubricant to within ½ inch of plug level when cold, or to plug level when hot. Drain and refill at intervals indicated on Lubrication Guide. Drain only after operation. Upon reassembly of front axle declutching unit, fill through plug hole with LUBRICANT, gear, universal. Axle housing, transfer case, and transmission breathers must be cleaned and kept open. Check each time level is checked, and each time truck is operated under extremely dirty or muddy conditions.

(8) UNIVERSAL JOINTS (FRONT WHEELS). With truck on level ground, remove level plug in rear of joint, and fill through upper steering knuckle fitting to level plug hole.

(9) BRAKE VACUUM CYLINDER. Every 6,000 miles, remove pipe plug from piston rod end of cylinder, and lubricate with about ⅓ ounce of FLUID, shock absorber, light. Replace plug.

(10) REAR SPRING BEARINGS. Every 6,000 miles, remove bearing cap. Remove plug, insert fitting, and lubricate with GREASE, general purpose, No. 1 above +32°F and No. 0 below +32°F, until all old lubricant is forced out of bearing. Replace plug and bearing cap.

2½-TON 6x6 TRUCK AND 2½- TO 5-TON 6x4 TRUCK (STUDEBAKER MODELS US 6 AND US 6x4)

(11) CRANKING MOTOR. Every 6,000 miles, remove cranking motor; clean and lubricate Bendix drive with six to eight drops of OIL, lubricating, preservative, special. When cranking motor is disassembled, wash bushings and soak in OIL, engine, SAE 30 above +32°F; SAE 10, +32°F to 0°F; OIL, lubricating, preservative, special, below 0°F.

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

(13) WINCH CABLE. Coat with 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.

(14) FAN. On some models, OIL, engine, SAE 30 above +32°F; SAE 10, +32°F to 0°F; OIL, lubricating, preservative, special, below 0°F, is used for lubrication. Every 1,000 miles, or more often under severe dust conditions, remove oil filler screw plug from hub of fan pulley, and fill reservoir with OIL, engine, SAE 30 above +32°F; SAE 10, +32°F to 0°F; OIL, lubricating, preservative, special, below 0°F. Rotate fan several times, stop fan so oil filler hole is downward, and allow excess oil to drain out of fan pulley hub. CAUTION: *Install screw plug in oil filler hole.*

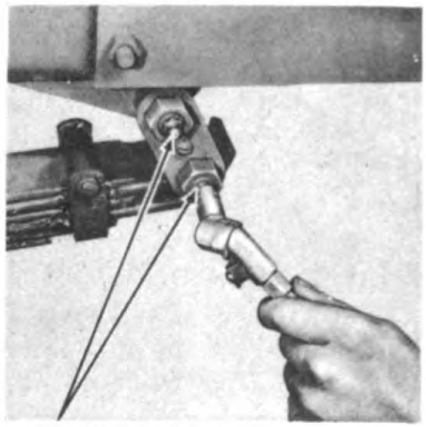
(15) HYDRAULIC CYLINDER. To fill hydraulic cylinder, raise body to only ½ its maximum height. While in this position remove filler and vent plug, and fill to overflowing with correct grade of OIL, engine, SAE 30 above +32°F; SAE 10, +32°F to 0°F; OIL, lubricating, preservative, special, below 0°F. When the cylinder appears to be full, remove block, operate hoist and raise the body to its maximum elevation; then add approximately ½ pint of OIL, engine, SAE 30 above +32°F; SAE 10, below +32°F; OIL, lubricating, preservative, special, below 0°F. Do not install vent plug at this time, but allow body to raise and lower several times to expel excess oil through the vent plug. Avoid excessive engine speed at this time to prevent foaming and creating air pockets. Install vent plug.

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

LUBRICATION

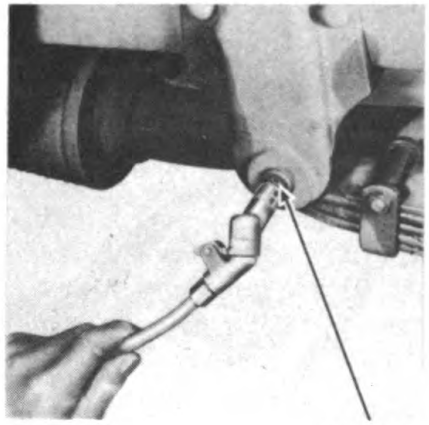
SPRING SHACKLE

4 FITTINGS (2 PER SHACKLE)
PRESSURE GUN
GENERAL PURPOSE GREASE
UNTIL NEW GREASE SHOWS



SPRING BOLT

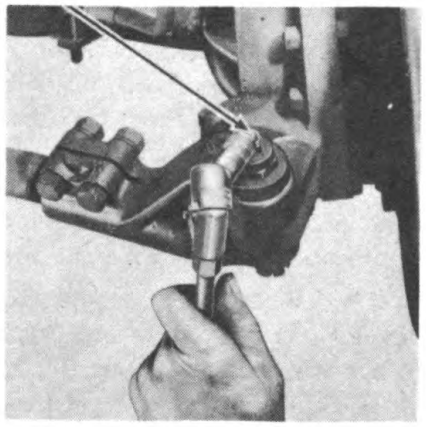
2 FITTINGS (1 PER BOLT)
PRESSURE GUN
GENERAL PURPOSE GREASE
UNTIL NEW GREASE SHOWS



FITTING

TIE-ROD END

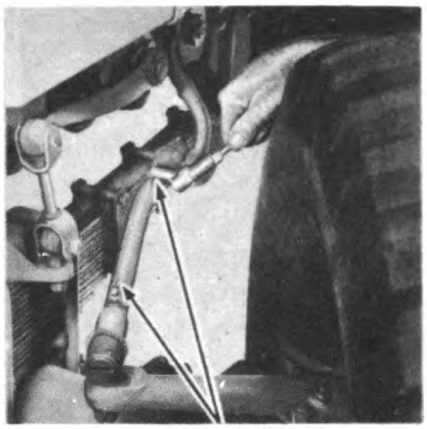
2 FITTINGS (1 PER END)
PRESSURE GUN
GENERAL PURPOSE GREASE
UNTIL NEW GREASE SHOWS



RA PD 310106

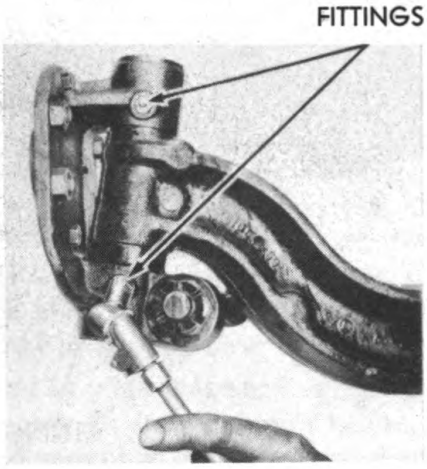
Figure 39—Localized Lubrication Views—A

2½-TON 6x6 TRUCK AND 2½- TO 5-TON 6x4 TRUCK (STUDEBAKER MODELS US 6 AND US 6x4)



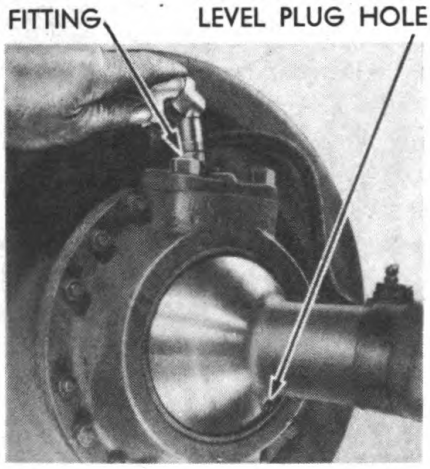
DRAG LINK

2 FITTINGS
PRESSURE GUN
GENERAL PURPOSE GREASE
UNTIL NEW GREASE SHOWS



KING PIN (US6x4 ONLY)

4 FITTINGS (2 PER PIN)
PRESSURE GUN
GENERAL PURPOSE GREASE
UNTIL NEW GREASE SHOWS



FRONT AXLE UNIVERSAL (US6 ONLY)

2 FITTINGS AND LEVEL
PLUGS (1 EACH PER UNIVERSAL)
PRESSURE GUN
GENERAL PURPOSE GREASE
SEE NOTE 8

RA PD 310107

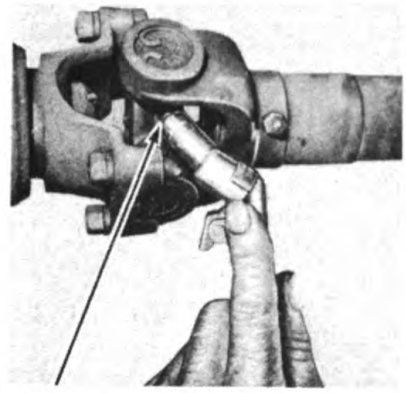
Figure 40—Localized Lubrication Views—B

LUBRICATION

UNIVERSAL JOINT

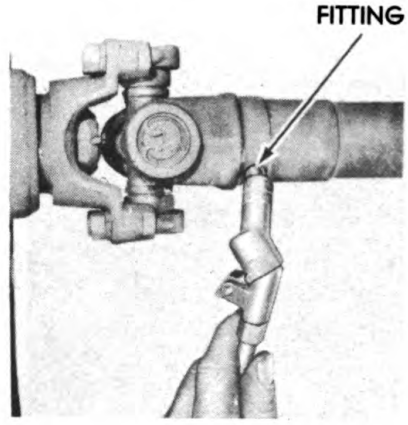
US 6

12 FITTINGS—WITH WINCH
10 FITTINGS—LESS WINCH
14 FITTINGS—WITH WINCH AND HOIST US 6 x 4
10 FITTINGS—WITH WINCH
8 FITTINGS—LESS WINCH
(1 FITTING PER CROSS)
PRESSURE GUN
GENERAL PURPOSE GREASE
SPICER—UNTIL GREASE SHOWS AT RELIEF VALVE IN CENTER OF CROSS
CLEVELAND—UNTIL GREASE SHOWS AT INNER END OF JOURNALS



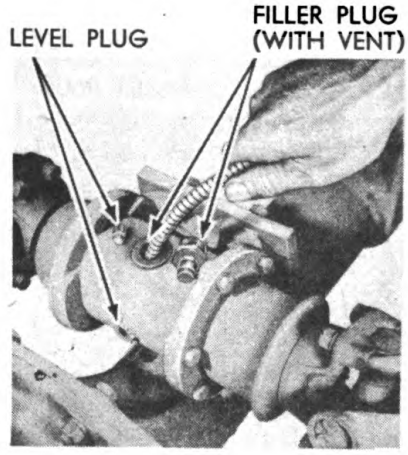
SLIP JOINT

6 FITTINGS—WITH WINCH
5 FITTINGS—LESS WINCH
7 FITTINGS—WITH WINCH AND HOIST US 6 X 4
5 FITTINGS—WITH WINCH
4 FITTINGS—LESS WINCH
(1 FITTING PER SHAFT)
PRESSURE GUN
GENERAL PURPOSE GREASE
SPICER—UNTIL GREASE SHOWS AT HOLE IN YOKE PLUG
CLEVELAND—UNTIL GREASE SHOWS AT SEAL



PROPELLER SHAFT CENTER BEARING

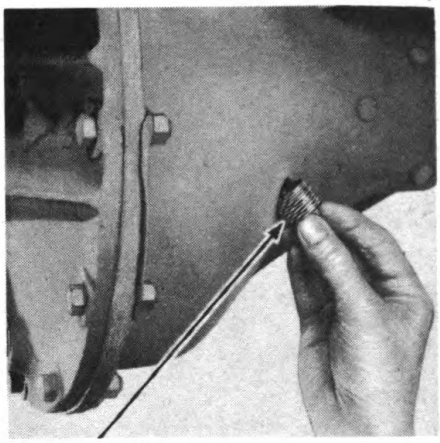
FILLER PLUG WITH VENT AND LEVEL PLUG
FLUID GUN
GEAR LUBRICANT
UNTIL LUBRICANT APPEARS AT LEVEL PLUG HOLE
CLEAN VENT



RA PD 310108

Figure 41—Localized Lubrication Views—C

2½-TON 6x6 TRUCK AND 2½- TO 5-TON 6x4 TRUCK (STUDEBAKER MODELS US 6 AND US 6x4)

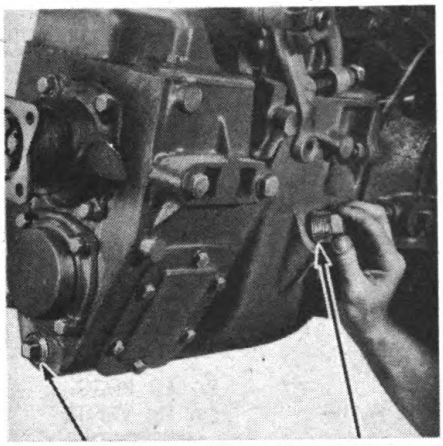


FILLER PLUG

AXLE HOUSING

US 6
3 FILLER PLUGS (1 PER HOUSING)
SEE NOTE 7

US 6 X 4
2 FILLER PLUGS (1 PER HOUSING)
SEE NOTE 7

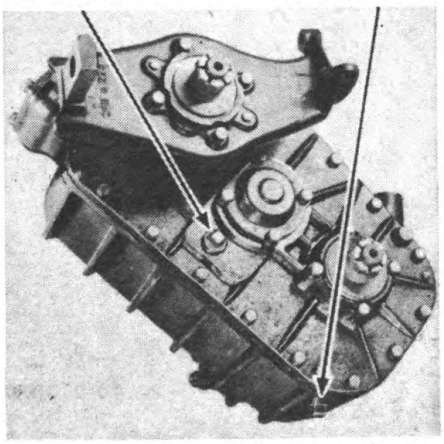


DRAIN PLUG FILLER PLUG

TRANSMISSION

1 FILLER PLUG
SEE NOTE 7

FILLER PLUG DRAIN PLUG



TRANSFER CASE

1 FILLER PLUG
SEE NOTE 7

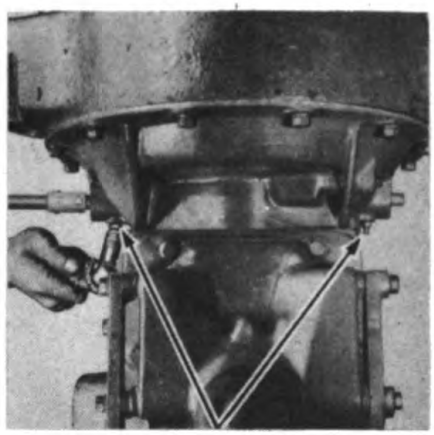
RA PD 310109

Figure 42—Localized Lubrication Views—D

LUBRICATION

CLUTCH RELEASE SHAFT

2 FITTINGS (1 PER END)
PRESSURE GUN
GENERAL PURPOSE GREASE
UNTIL GREASE JUST SHOWS
AVOID EXCESSIVE GREASING AT THESE POINTS TO ELIMINATE POSSIBILITY OF GETTING GREASE ON CLUTCH FACINGS

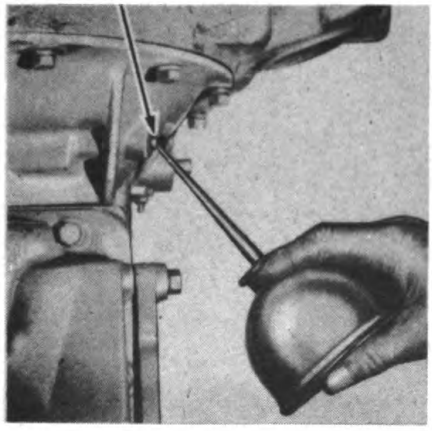


FITTINGS

OILER

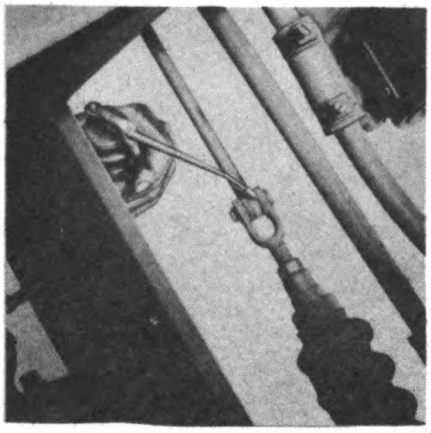
CLUTCH RELEASE BEARING

1 OILER
OIL CAN
ENGINE OIL
APPLY 6 TO 8 DROPS



LINKAGE

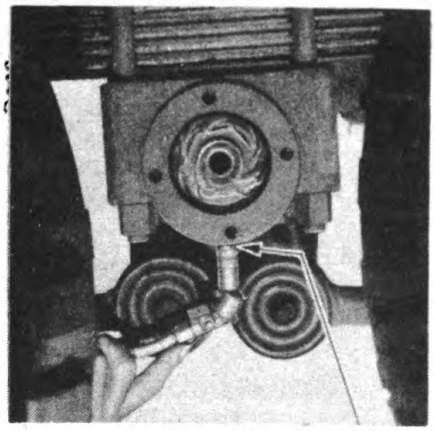
ALL POINTS
OIL CAN
ENGINE OIL
APPLY FEW DROPS



RA PD 310110

Figure 43—Localized Lubrication Views—E

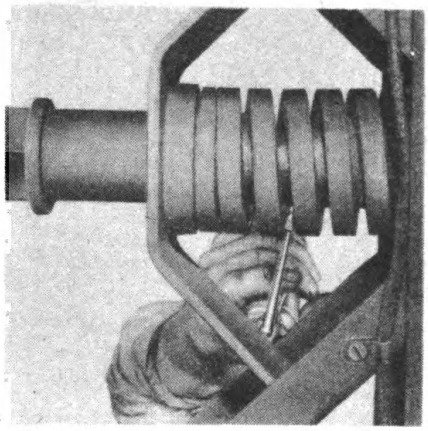
2½-TON 6x6 TRUCK AND 2½- TO 5-TON 6x4 TRUCK (STUDEBAKER MODELS US 6 AND US 6x4)



PLUG (FITTING REQUIRED)

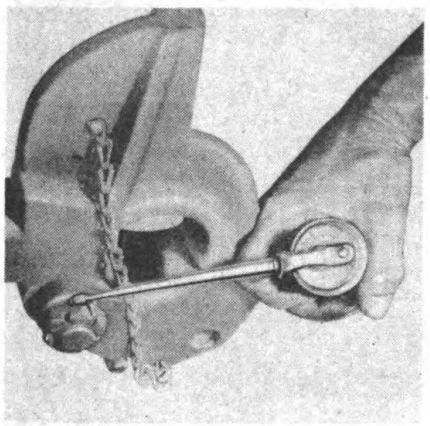
REAR SPRING (SEAT) BEARING

2 PLUGS (1 PER HOUSING)
FITTING REQUIRED
PRESSURE GUN
GENERAL PURPOSE GREASE
SEE NOTES 9 AND 10



PINTLE HOOK STEM

OIL CAN
ENGINE OIL
APPLY FEW DROPS



PINTLE HOOK PIN AND CONNECTIONS

OIL CAN
ENGINE OIL
APPLY FEW DROPS

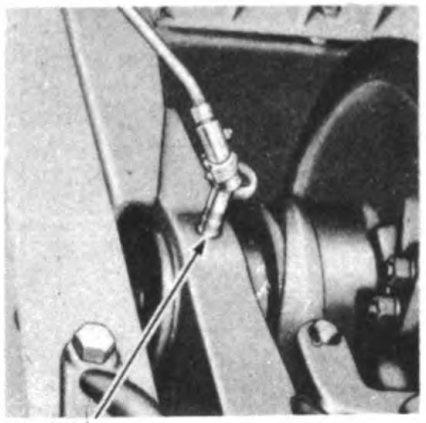
RA PD 310111

Figure 44—Localized Lubrication Views—F

LUBRICATION

WINCH SHAFT BEARING

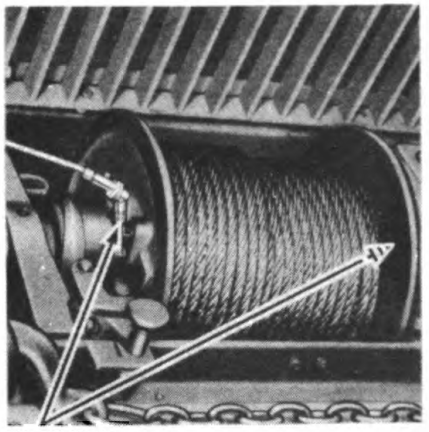
1 FITTING
PRESSURE GUN
GENERAL PURPOSE GREASE
UNTIL GREASE JUST SHOWS



FITTING

WINCH DRUM BUSHINGS

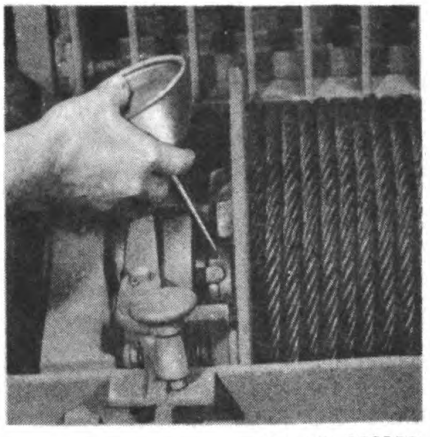
2 FITTINGS (1 EACH END)
PRESSURE GUN
GENERAL PURPOSE GREASE
UNTIL GREASE JUST SHOWS



FITTINGS

WINCH CLUTCH

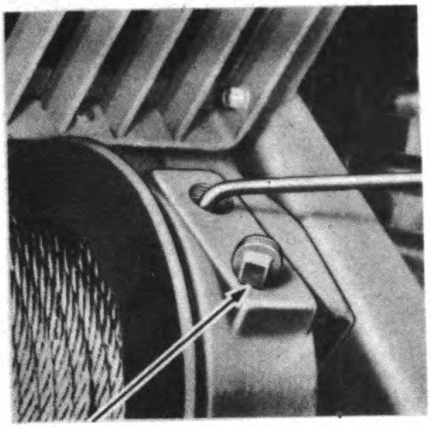
OIL CAN
ENGINE OIL
CLEAN AND OIL



RA PD 310112

Figure 45—Localized Lubrication Views—G

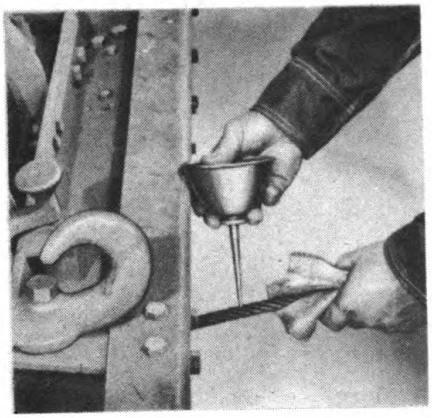
2½-TON 6x6 TRUCK AND 2½- TO 5-TON 6x4 TRUCK (STUDEBAKER MODELS US 6 AND US 6x4)



FILLER PLUG

WINCH WORM HOUSING

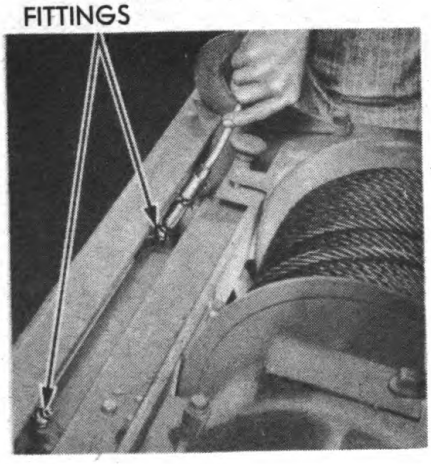
1 FILLER PLUG
FLUID GUN
GEAR LUBRICANT
SEE NOTE 7



WINCH CABLE

SEE NOTE 13

FITTINGS



WINCH CABLE ROLLER BEARING

2 FITTINGS
PRESSURE GUN
GENERAL PURPOSE GREASE
UNTIL NEW GREASE SHOWS

RA PD 310113

Figure 46—Localized Lubrication Views—H

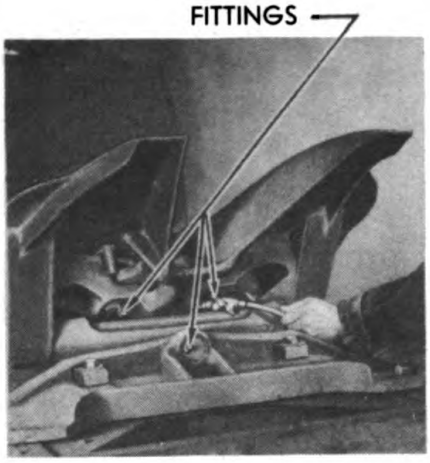
LUBRICATION

WHEEL BEARING

6 POINTS (REQUIRES REMOVAL OF WHEEL HUBS)
SEE NOTES 14 AND 16

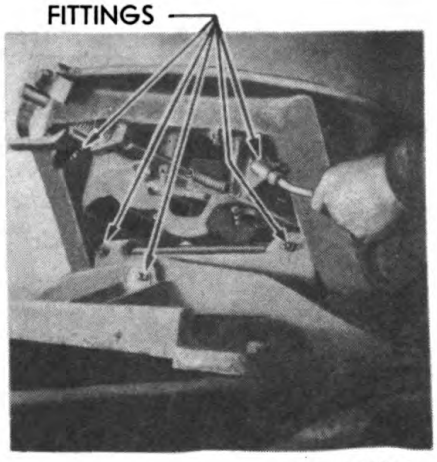
FIFTH WHEEL (TRACTOR TRUCK ONLY)

3 FITTINGS
PRESSURE GUN
GENERAL PURPOSE GREASE
UNTIL NEW GREASE SHOWS



FIFTH WHEEL SUPPORT (TRACTOR TRUCK ONLY)

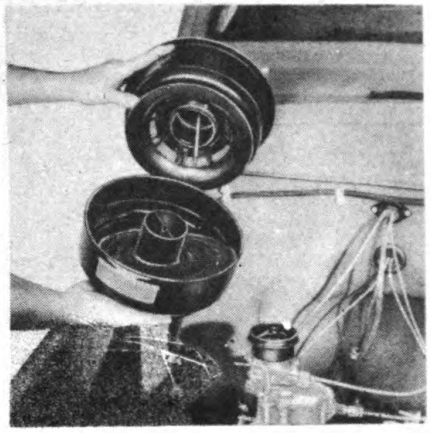
5 FITTINGS
PRESSURE GUN
GENERAL PURPOSE GREASE
UNTIL NEW GREASE SHOWS



RA PD 310114

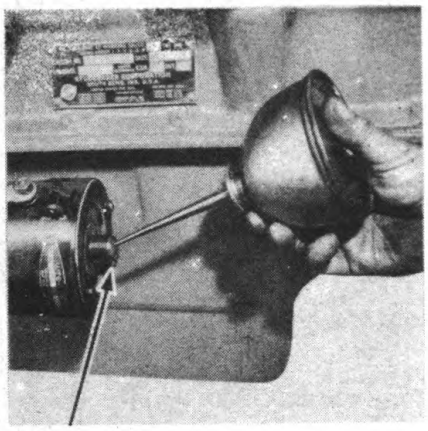
Figure 47—Localized Lubrication Views—I

2½-TON 6x6 TRUCK AND 2½- TO 5-TON 6x4 TRUCK (STUDEBAKER MODELS US 6 AND US 6x4)



AIR CLEANER

ENGINE OIL
REMOVE CLEANER ASSEMBLY:
CLEAN ELEMENT IN DRY-CLEANING SOLVENT:
DIP ELEMENT IN FRESH ENGINE OIL AND ALLOW TO DRAIN:
FILL RESERVOIR TO ARROW MARK AS SPECIFIED IN NOTE 4

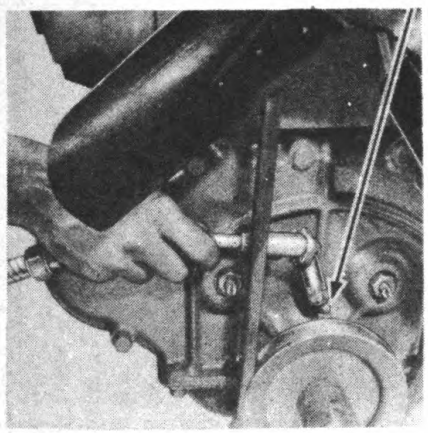


OIL CAP

CRANKING MOTOR

1 OIL CAP
OIL CAN
ENGINE OIL AS SPECIFIED IN NOTES 10 AND 11
APPLY 3 DROPS

FITTING



ENGINE FRONT SUPPORT

1 FITTING
PRESSURE GUN
GENERAL PURPOSE GREASE
UNTIL NEW GREASE SHOWS

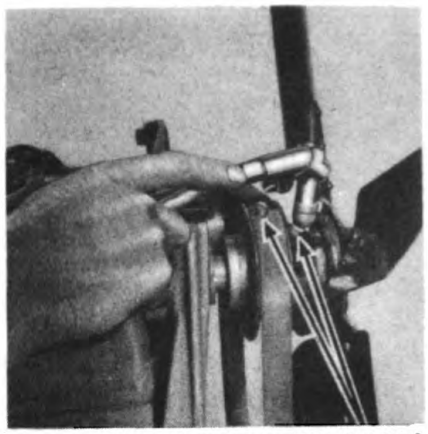
RA PD 310115

Figure 48—Localized Lubrication Views—J

LUBRICATION

FAN (BALL OR ROLLER BEARINGS)

1 FILLER PLUG
PRESSURE GUN
GENERAL PURPOSE GREASE
2 OUNCES

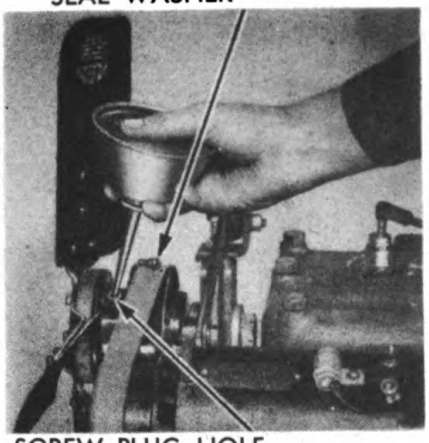


PLUG (FITTING REQUIRED)

SCREW PLUG AND SEAL WASHER

FAN (OIL TYPE)

1 FILLER PLUG
OIL CAN
ENGINE OIL AS SPECIFIED IN NOTES 12 AND 14

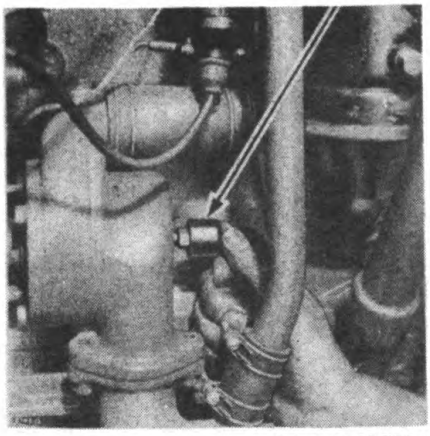


SCREW PLUG HOLE

GREASE CUP

WATER PUMP

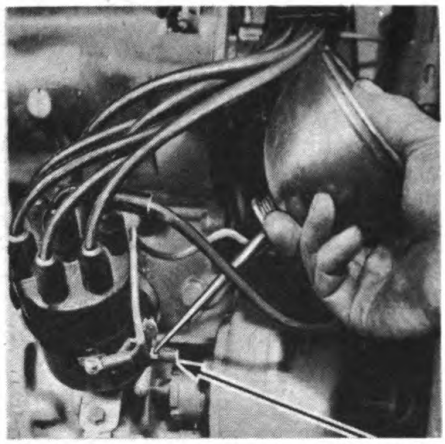
1 GREASE CUP
WATER PUMP GREASE
TURN CUP 1 TURN:
REFILL WHEN NECESSARY



RA PD 310116

Figure 49—Localized Lubrication Views—K

2½-TON 6x6 TRUCK AND 2½- TO 5-TON 6x4 TRUCK (STUDEBAKER MODELS US 6 AND US 6x4)

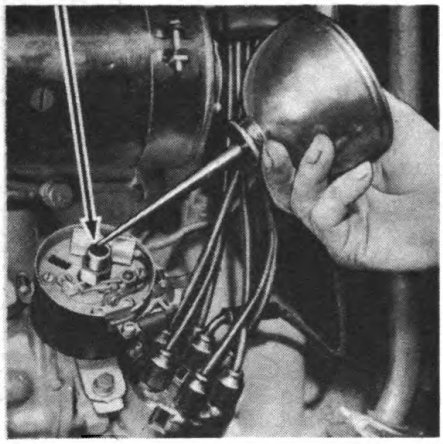


OIL CAP

DISTRIBUTOR SHAFT BEARINGS

1 OIL CAP
OIL CAN
ENGINE OIL
APPLY 6 TO 8 DROPS

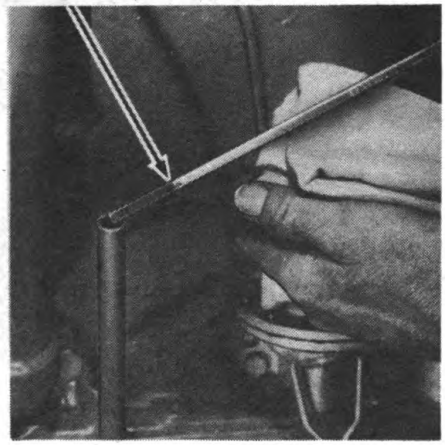
OIL FELT



DISTRIBUTOR CAM BEARINGS

SEE NOTES 11 AND 12

4/4 (FULL)



ENGINE OIL LEVEL

SEE NOTE 5

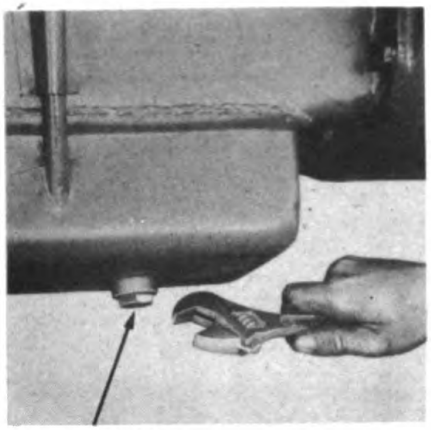
RA PD 310117

Figure 50—Localized Lubrication Views—L

LUBRICATION

OIL PAN DRAIN

1 DRAIN PLUG
ENGINE OIL SHOULD BE
DRAINED WHILE WARM

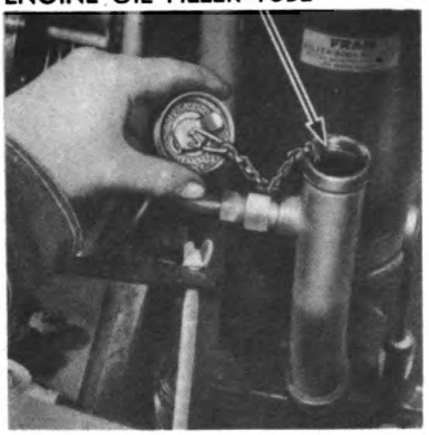


DRAIN PLUG

CRANKCASE OIL FILLER (SEALED CAP TYPE)

1 FILLER CAP
ENGINE OIL
CAPACITY 6 QUARTS
8 QUARTS WHEN OIL FILTER
ELEMENT IS REPLACED

ENGINE OIL FILLER TUBE



ENGINE OIL FILLER TUBE

FILTER WITHIN CAP

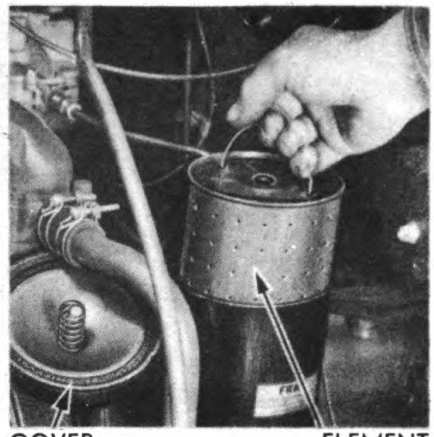
CRANKCASE OIL FILLER (FILTER CAP TYPE)

1 FILLER CAP (FILTER TYPE)
ON VEHICLES SO EQUIPPED
CLEAN CAP IN DRY-CLEANING
SOLVENT, AND DIP IN FRESH
ENGINE OIL AT FREQUENT
INTERVALS

RA PD 310118

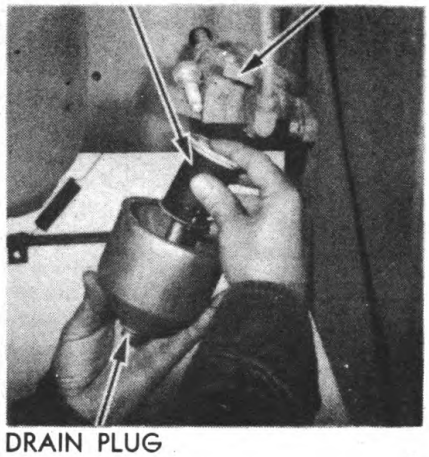
Figure 51—Localized Lubrication Views—M

2½-TON 6x6 TRUCK AND 2½- TO 5-TON 6x4 TRUCK (STUDEBAKER MODELS US 6 AND US 6x4)



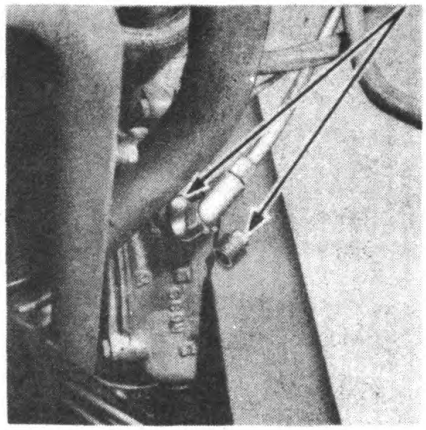
OIL FILTER

1 DRAIN PLUG
SEE NOTE 6



FUEL FILTER

1 DRAIN PLUG



STEERING GEAR HOUSING

1 FILLER PLUG
FLUID GUN
GEAR LUBRICANT

RA PD 310119

*Figure 52—Localized **Lubrication** Views—N*

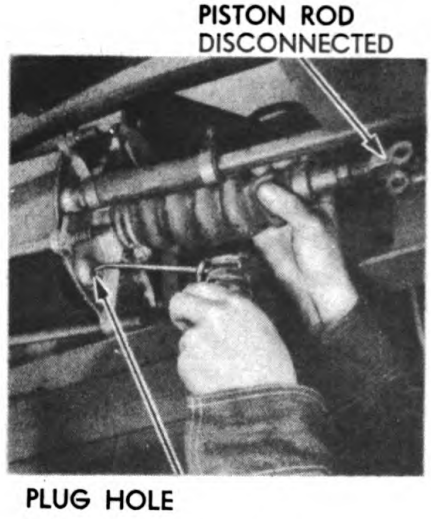
LUBRICATION

BRAKE MASTER CYLINDER

1 FILLER PLUG
HYDRAULIC BRAKE FLUID
MAINTAIN LEVEL AT ½ INCH
BELOW PLUG HOLE

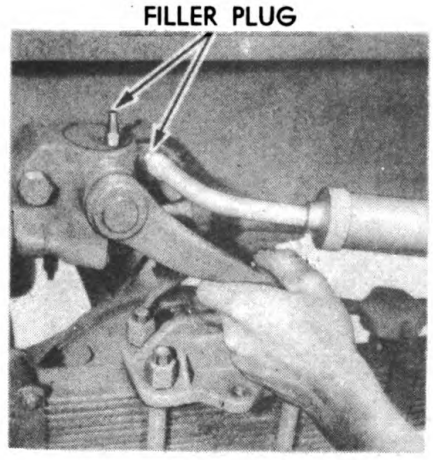
BRAKE VACUUM CYLINDER

SEE NOTES 8 AND 9



SHOCK ABSORBER

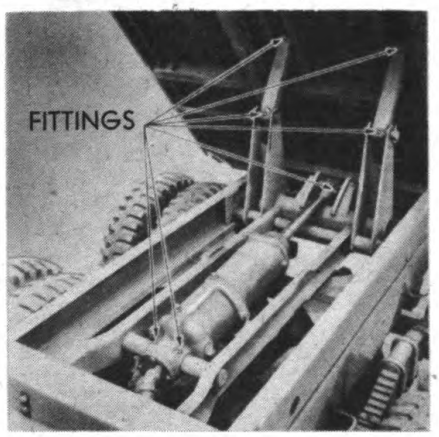
1 FILLER PLUG
FLUID GUN
LIGHT SHOCK ABSORBER FLUID
FILL TO PLUG LEVEL



RA PD 310120

Figure 53—Localized Lubrication Views—O

2½-TON 6x6 TRUCK AND 2½- TO 5-TON 6x4 TRUCK (STUDEBAKER MODELS US 6 AND US 6x4)



DUMP BODY LINKAGE

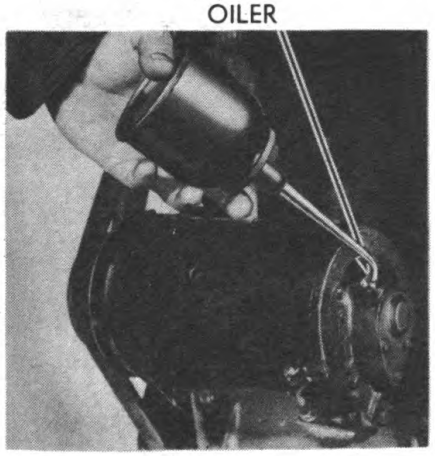
7 FITTINGS
PRESSURE GUN
GENERAL PURPOSE GREASE
UNTIL NEW GREASE SHOWS

FILLER (VENT) PLUG OPENING

HYDRAULIC CYLINDER (DUMP BODY)

1 FILLER PLUG
SEE NOTE 15

OILER



GENERATOR

1 OIL CAP
OIL CAN
ENGINE OIL
APPLY 3 DROPS

RA PD 310121

Figure 54—Localized Lubrication Views—P

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. CAUTION: *Do not fill hub or hub cap. Any excess might result in leakage into the brake drum.*

(17) OILCAN POINTS. Every 1,000 miles, lubricate clevis pins, ends of control lever rods, throttle and accelerator linkage, pintle, hinges, latches, dump body control rod linkage joints, body side and end gate cross shafts and rods with OIL, engine, SAE 30 above +32°F; SAE 10, +32°F to 0°F; OIL, lubricating, preservative, special, below 0°F.

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

(19) POINTS REQUIRING NO LUBRICATION SERVICE. These points are the spring and generator (some models).

(20) POINTS TO BE SERVICED AND/OR LUBRICATED BY ORDNANCE MAINTENANCE PERSONNEL. These points are the speedometer cable and distributor governor weights.

e. Reports and Records.

(1) REPORTS. If lubrication instructions are closely followed, proper lubricants used, and satisfactory results are not obtained, a report will be made to the ordnance officer responsible for the maintenance of the materiel.

(2) RECORDS. A record of lubrication servicing may be kept in the Duty Roster (W.D., AGO Form No. 6).

25. ILLUSTRATIONS OF LUBRICATION POINTS.

a. Localized Views. The series of illustrations (figs. 39 through 43) show localized views of various lubrication points. Caption under each view briefly describes the type of fitting, method of lubrication, and special information, regarding the lubrication of that specific item. The illustrations or captions do not specify lubricant (except by symbols) or intervals at which points must be lubricated. Reference must be made to Lubrication Guides (figs. 34 through 38) for those items. Information on those items which require special lubrication operations will be found in the respective sections of the manual.

Section VIII

TOOLS AND EQUIPMENT STOWAGE ON THE VEHICLE

26. VEHICLE TOOLS.

a. The vehicle hand tools and minor or emergency servicing equipment supplied with each vehicle are packed in a carton. This tool kit is placed in the cab on cargo vehicles, and in the tool box on tractor and dump truck vehicles when shipped from the factory. The following itemized list of the tools supplied in the kit applies to all vehicles, and indicates where they are to be stowed when vehicle is placed in service.

TOOL	NUMBER CARRIED	WHERE CARRIED
Hammer, machinist's ball peen, 16-oz (41-H-523)	1	In tool bag
Handle, spark plug wrench	1	In tool bag
Handle, wheel bearing nut wrench	1	In tool bag
Handle, wheel stud nut socket wrench	1	In tool box
Pliers, combination, slip joint (41-P-1650)	1	In tool bag
Screwdriver, common, heavy duty, 6-in. blade (41-S-1076)	1	In tool bag
Screwdriver, cross recessed head type (41-S-1638)	1	In tool bag
Wrench, adjustable, auto type, 15-in. (41-W-450)	1	In tool bag
Wrench, engineer's, open-end, 3/8-in. x 7/16-in. (41-W-991)	1	In tool bag
Wrench, engineer's, open-end, 1/2-in. x 19/32-in. (41-W-1003)	1	In tool bag
Wrench, engineer's, open-end, 9/16-in. x 11/16-in. (41-W-1005-5)	1	In tool bag
Wrench, engineer's, open-end, 5/8-in. x 25/32-in. (41-W-1008-10)	1	In tool bag
Wrench, engineer's, open-end, 3/4-in. x 7/8-in. (41-W-1012-5)	1	In tool bag
Wrench, socket, wheel stud nut	1	In tool bag
Wrench, spark plug	1	In tool bag
Wrench, water pump packing nut	1	In tool bag
Wrench, wheel bearing nut, front	1	In tool box
Wrench, wheel bearing nut, rear	1	In tool box

TOOLS AND EQUIPMENT STOWAGE ON THE VEHICLE

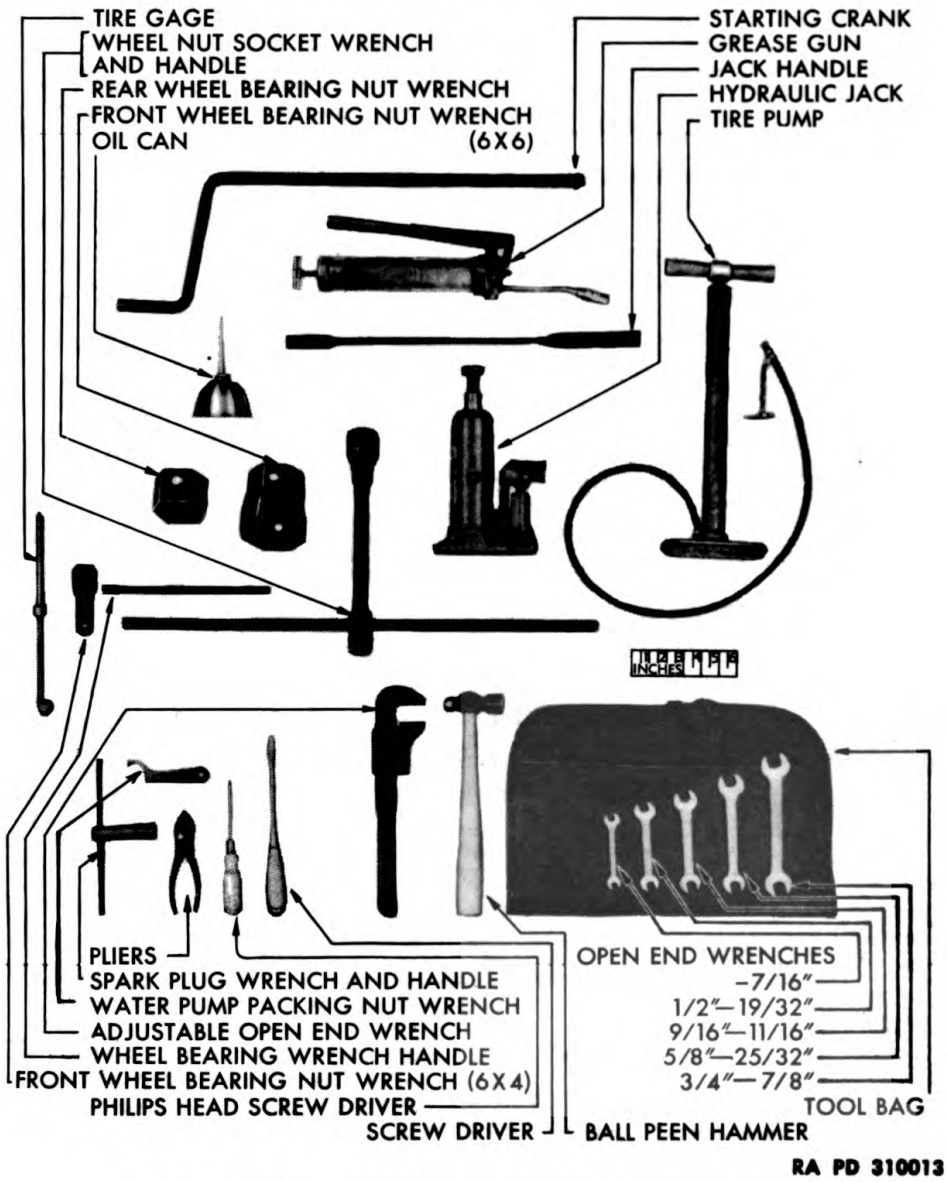


Figure 55—Vehicle Tools and Equipment

27. VEHICLE EQUIPMENT.

a. The vehicle equipment supplied with each vehicle is itemized in the following list which also indicates where they are stowed on the vehicle.

ITEM	NUMBER CARRIED	WHERE CARRIED
Block, snatch (with winch)	1	In tool box
Bracket assembly, universal rifle (soft top cab)	1	Fastened to right front corner of cab

2½-TON 6x6 TRUCK AND 2½- TO 5-TON 6x4 TRUCK (STUDEBAKER MODELS US 6 AND US 6x4)

TOOL	NUMBER CARRIED	WHERE CARRIED
Chains, tire, front 7.50 x 20 single (6x6 vehicles)	1 pr	In tool box
Chains, tire, rear 7.50 x 20 dual	2 pr	In tool box
Chain, tow (with winch)	1	In tool box
Crank, starting	1	In tool box
Extinguisher, fire	1	Fastened in cab with bracket
Gage, tire pressure	1	In tool bag
Gun, hydraulic, chassis lubricating	1	In tool box
Handle, jack	1	In tool bag
Jack, hydraulic, 3 ton	1	In tool box
Oilcan	1	Under hood
Parts List	1	Package compartment
Pump, tire, hand, single cylinder	1	In tool box
Technical Manual, TM 9-807	1	Package compartment

PART TWO—VEHICLE MAINTENANCE INSTRUCTIONS

Section IX

MAINTENANCE ALLOCATION

28. SCOPE.

a. The scope of maintenance and repair by the crew and other units of the using arms is determined by the availability of suitable tools, availability of necessary parts, capabilities of the mechanics, time available, and the tactical situation. All of these are variable, and no exact system of procedure can be prescribed.

29. ALLOCATION OF MAINTENANCE.

a. Indicated below are the maintenance duties for which tools and parts have been provided for the using arm and ordnance maintenance personnel. Replacements and repairs which are the responsibility of ordnance maintenance personnel may be performed by using arm personnel when circumstances permit, within the discretion of the commander concerned. Echelons and words as used in this list of maintenance allocations are defined as follows:

FIRST AND SECOND ECHELON: Table III AR 850-15	Operating organizations, driver, operator, or crew, companies and detachments, battalions, squadrons, regiments, and separate companies and detachments (first and second echelons, respectively).
THIRD ECHELON: Table III AR 850-15	Technical light and medium maintenance units, including post and post shops.
FOURTH ECHELON: Table III AR 850-15	Technical heavy maintenance and field depot units, including designated post and service command shops.
FIFTH ECHELON: Table III AR 850-15	Technical base units.
SERVICE: Par. 24 a (2) and (3) in part, AR 850-15	Preventive maintenance, checking and replenishing fuel, oil, grease, water and antifreeze, air, and battery liquid; checking and tightening nuts and bolts; cleaning; and making external adjustment of subassemblies or assemblies and controls.
REPLACE: Par. 24 a (5) AR 850-15	To remove an unserviceable part, assembly, or subassembly from a vehicle and replace it with a serviceable one.

2½-TON 6x6 TRUCK AND 2½- TO 5-TON 6x4 TRUCK (STUDEBAKER MODELS US 6 AND US 6x4)

REPAIR: Par. 24 a (4) in part AR 850-15	To restore to a serviceable condition, such parts, assemblies or subassemblies as can be accomplished without completely disassembling the assembly or subassembly, and where heavy riveting, or precision machining, fitting, balancing, or alining is not required.
REBUILD: Par. 24 a (6) AR 850-15	Consists of stripping and completely reconditioning and placing in serviceable condition any vehicle or unserviceable part, subassembly, or assembly of the vehicle, including welding, riveting, machining, fitting, alining, balancing, assembling, and testing.
RECLAMATION: AR 850-15 Par. 24 a (7) and in part CIR. 75, dated 3/16/43	Salvage of serviceable or economically reparable units and parts removed from vehicles, and their return to stock. This includes the process which recovers and/or reclaims unusable articles or component parts thereof, and places them in a serviceable condition.

NOTES: (1) Operations allocated will normally be performed in the echelon indicated by "X".

(2) Operations allocated to the third echelon as indicated by "E" may be performed by these units in emergencies only.

(3) Operations allocated to the fourth echelon by "E" are normal fifth echelon operations. They will not be performed by the fourth echelon, unless the unit is expressly authorized to do so by the chief of the service concerned.

ABSORBERS, SHOCK	ECHELONS 2nd	3rd	4th	5th
Absorber assemblies, shock (w/linkage)—replace	X			
Absorber assemblies, shock (w/linkage)—repair		X		
Absorber assemblies, shock (w/linkage)—rebuild			E	X
AXLE, FRONT				
Arm, steering knuckle—replace (6x6)		X		
Arms, steering knuckle—replace (6x4)	X			
*Axle assembly—replace	*	X		
Axle assembly—repair		X		
Axle assembly—rebuild			E	X
Bearings, wheel—service, adjust and/or replace	X			
Drums, brake—replace	X			
Gears, bevel and pinion—adjust (6x6)		X		

*The second echelon is authorized to remove and reinstall items marked by an asterisk. However, when it is necessary to replace an item marked by an asterisk with a new or rebuilt part, subassembly or unit assembly, the assembly marked by an asterisk may be removed from the vehicle by the second echelon *only after authority has been obtained from a higher echelon of maintenance.*

MAINTENANCE ALLOCATION

AXLE, FRONT (Cont'd)	Echelons 2nd	3rd	4th	5th
Hub assemblies—replace	X			
Hub assemblies—repair		X		
Hub assemblies—rebuild			X	
Hub and drum assemblies—replace	X			
Retainers, wheel grease—replace	X			
Rod assembly, tie—replace	X			
Rod assembly, tie—repair		X		
Seals, oil, trunnion housing—replace (6x6)		X		
Shafts, axle—replace (6x6)		X		
Spindle assemblies—replace (6x4)	X			
Spindle assemblies—repair (6x4)		X		
Spindle assemblies—rebuild (6x4)			X	
Wheel alinement, toe-in—adjust	X			
Wheel alinement, camber and caster—check		X		
Wheel alinement, caster—aline (6x6)			E	X
Wheel alinement, camber and caster—aline (6x4)			X	
AXLES AND SUSPENSION, REAR (TANDEM)				
*Axle assemblies—replace	*	X		
Axle assemblies—repair		X		
Axle assemblies—rebuild			E	X
Bar, connecting (bogie)—replace		X		
Bar, connecting (bogie)—rebuild			E	X
Bearings, spring seat—service, adjust and/or replace	X			
Bearings, wheel—service, adjust and/or replace	X			
Drums, brake—replace	X			
Gears, bevel and pinion—adjust		X		
Hub assemblies—replace	X			
Hub assemblies—repair		X		
Hub assemblies—rebuild			X	
Hub and drum assemblies—replace	X			
Retainers, wheel grease—replace	X			
Rod assemblies, torque—replace	X			
Rod assemblies, torque—repair		X		
Rod assemblies, torque—rebuild			E	X
Seat assemblies, spring—replace	X			
Seat assemblies, spring—repair		X		
Seat assemblies, spring—rebuild			E	X

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2½-TON 6x6 TRUCK AND 2½- TO 5-TON 6x4 TRUCK (STUDEBAKER MODELS US 6 AND US 6x4)

AXLES AND SUSPENSION, REAR (TANDEM) (Cont'd)	Echelons 2nd	3rd	4th	5th
Shafts, axle—replace	X			
Spring assemblies, rear suspension—replace	X			
Spring assemblies, rear suspension—repair		X		
Spring assemblies, rear suspension—rebuild			E	X
BODY				
Body assembly—replace			X	
Body assembly—repair		X		
Body assembly—rebuild			X	
Bows—replace (Cargo only)	X			
Bows—repair (Cargo only)		X		
Controls and linkage, adjust and/or replace (Dump only)	X			
Controls and linkage—repair (Dump only)		X		
Seats, troop—replace (Cargo only)	X			
Seats, troop—repair (Cargo only)		X		
Tarpaulins—replace (Cargo only)	X			
Tarpaulins—repair (Cargo only)		E	X	
BRAKE, PARKING				
Band assembly—adjust and/or replace	X			
Band assembly—repair (reline)		X		
Controls and linkage—adjust and/or replace	X			
Controls and linkage—repair		X		
BRAKES, SERVICE (POWER)				
Cleaner assembly, air—service and/or replace	X			
Cleaner assembly, air—repair		X		
Controls and linkage—adjust and/or replace	X			
Controls and linkage—repair		X		
Cylinder assembly, master—replace	X			
Cylinder assembly, master—repair		X		
Cylinder assembly, master—rebuild			X	
Cylinder assembly, power—replace	X			
Cylinder assembly, power—repair		X		
Cylinder assembly, power—rebuild			X	
Cylinder assemblies, wheel—replace	X			
Cylinder assemblies, wheel—repair		X		
Cylinder assemblies, wheel—rebuild			X	
Hose, flexible, lines and connections—replace and/or repair	X			
Shoe assemblies—adjust and/or replace	X			
Shoe assemblies—repair (reline)		X		
Valves—replace	X			
Valves—repair		X		
Valves—rebuild			E	X

MAINTENANCE ALLOCATION

CAB (CLOSED OR SOFT-TOP)	Echelons 2nd	3rd	4th	5th
Cab assembly—replace			X	
Cab assembly—repair		X		
Cab assembly—rebuild			X	
Cushions, seat—replace	X			
Cushions, seat—rebuild			X	
Door assemblies—replace and/or repair		X		
Glass—replace		X		
Hood assembly, engine—repair		X		
Seat assemblies—replace and/or repair		X		
Seat assemblies—rebuild			X	
Top and curtains—replace	X			
Top and curtains—repair			X	
Upholstering—replace			X	
Windshield assembly—replace	X			
Windshield assembly—repair		X		
Wiper assemblies, windshield—replace	X			
Wiper assemblies, windshield—repair		X		
Wiper assemblies, windshield—rebuild			X	
CASE, TRANSFER				
*Case assembly, transfer—replace	*	X		
Case assembly, transfer—repair		X		
Case assembly, transfer—rebuild			E	X
Controls and linkage—adjust and/or replace	X			
Controls and linkage—repair		X		
Drum, brake—replace	X			
CLUTCH				
Bearing, release—replace	X			
Clutch—service	X			
Clutch—replace and/or repair		X		
Clutch—rebuild			E	X
Controls and linkage—adjust and/or replace	X			
Controls and linkage—repair		X		
Housing, clutch—replace		X		
Plate, clutch driven—replace	X			
Plate, clutch driven—repair		X		
COOLING GROUP				
Connections—replace	X			
Radiator assembly—replace	X			

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2½-TON 6x6 TRUCK AND 2½- TO 5-TON 6x4 TRUCK (STUDEBAKER MODELS US 6 AND US 6x4)

	Echelons			
COOLING GROUP (Cont'd)	2nd	3rd	4th	5th
Radiator assembly—repair		X		
Radiator assembly—rebuild			X	
System, cooling—service	X			
ELECTRICAL GROUP				
Battery—service (recharge) and/or replace	X			
Battery—repair		X		
Battery—rebuild			X	
Cables, battery—replace and/or repair	X			
Filter assembly—replace	X			
Horn assembly—replace	X			
Horn assembly—repair		X		
Lamp assemblies—service and/or replace	X			
Lamp assemblies—repair		X		
Regulator, current and voltage—replace	X			
Regulator, current and voltage—adjust and/or repair		X		
Regulator, current and voltage—rebuild			X	
Switch assemblies—replace	X			
Switch assemblies—repair		X		
Wiring—replace	X			
ENGINE (Hercules JXD)				
Bearings, connecting rod (inserts)—replace		E	X	
Bearings, crankshaft (inserts)—replace		E	X	
Belt—adjust and/or replace	X			
Block, cylinder—rebuild (recondition)			E	X
Carburetor assembly—adjust and/or replace	X			
Carburetor assembly—repair		X		
Carburetor assembly—rebuild			X	
Cleaner, air—service and/or replace	X			
Cleaner, air—repair		X		
Coil, ignition—replace	X			
Condenser, distributor—replace	X			
Controls and linkage—adjust and/or replace	X			
Controls and linkage—repair		X		
Crankshaft—rebuild (recondition)			E	X
Distributor assembly—adjust and/or replace	X			
Distributor assembly—repair		X		
Distributor assembly—rebuild			X	

MAINTENANCE ALLOCATION

ENGINE (Cont'd)	Echelons 2nd	3rd	4th	5th
*Engine assembly—replace	*	X		
Engine assembly—repair		X		
Engine assembly—rebuild			E	X
Fan assembly—replace	X			
Fan assembly—repair		X		
Fan assembly—rebuild			X	
Filter assembly, oil—service or replace cartridge	X			
Filter assembly, oil—replace	X			
Flywheel—replace and/or repair		X		
Flywheel—rebuild (recondition)			E	X
Gaskets, cylinder head and manifold—replace	X			
Gears, timing—replace		X		
Generator assembly—replace	X			
Generator assembly—repair		X		
Generator assembly—rebuild			X	
Governor assembly—adjust and/or replace		X		
Governor assembly—rebuild			X	
Head, cylinder—replace and/or repair		X		
Housing, flywheel—replace		X		
Housing, flywheel—rebuild (recondition)			E	X
Lines and connections, oil (external)—replace and/or repair	X			
Lines and connections, oil (internal)—replace and/or repair		X		
Manifold—replace	X			
Manifold—rebuild			X	
Motor assembly, starting—replace	X			
Motor assembly, starting—repair		X		
Motor assembly, starting—rebuild			X	
Pan assembly, oil—service and replace gaskets	X			
Pan assembly, oil—replace and/or repair		X		
Pistons and rings—replace		E	X	
Plugs, spark—adjust and/or replace	X			
Points, breaker, distributor—adjust and/or replace	X			
Pump assembly, fuel—service and/or replace	X			
Pump assembly, fuel—repair		X		

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2½-TON 6x6 TRUCK AND 2½- TO 5-TON 6x4 TRUCK (STUDEBAKER MODELS US 6 AND US 6x4)

	ECHELONS			
ENGINE (Cont'd)	2nd	3rd	4th	5th
Pump assembly, fuel—rebuild			X	
Pump assembly, oil—replace and/or repair		X		
Pump assembly, oil—rebuild			X	
Pump assembly, water—replace	X			
Pump assembly, water—repair		X		
Pump assembly, water—rebuild			X	
Rods, connecting—replace		E	X	
Thermostat—replace	X			
Valves—adjust	X			
Ventilator, crankcase—service and/or replace	X			
Wiring, ignition—replace	X			
EXHAUST GROUP				
Muffler and exhaust pipes—replace	X			
EXTINGUISHER, FIRE				
Extinguisher, fire (carbon tetrachloride CCl_4)—service (refill) and/or replace	X			
Extinguisher, fire (carbon tetrachloride CCl_4)—repair		X		
Extinguisher, fire (carbon tetrachloride CCl_4)—rebuild			E	X
FRAME				
Bumpers—replace	X			
Bumpers—repair		X		
Carrier assembly, spare tire—replace	X			
Carrier assembly, spare tire—repair		X		
Coupler assembly, fifth wheel lower—service and/or replace (6 x 4) Tractor Truck	X			
Coupler assembly, fifth wheel lower—rebuild (6 x 4) Tractor Truck			X	
Frame assembly—repair		X		
Frame assembly—rebuild			X	
Hooks, towing—replace	X			
Hooks, towing—repair		X		
Pintle assembly—replace	X			
Pintle assembly—repair		X		
Pintle assembly—rebuild			X	
Shackles and bolts—replace	X			
Spring assemblies, front suspension—replace	X			
Spring assemblies, front suspension—repair		X		
Spring assemblies, front suspension—rebuild			E	X
FUEL GROUP				
Filter, fuel—service and/or replace	X			

MAINTENANCE ALLOCATION

FUEL GROUP (Cont'd)	ECHELONS 2nd	3rd	4th	5th
Lines and connections—replace and/or repair	X			
Tank—service and/or replace	X			
Tank—repair		X		
HOIST (HYDRAULIC) (DUMP TRUCK ONLY)				
Bearing assembly, propeller shaft support—replace	X			
Bearing assembly, propeller shaft support—repair		X		
Bearing assembly, propeller shaft support—rebuild			X	
Controls and linkage—replace	X			
Controls and linkage—repair		X		
Cylinder assembly—replace	X			
Cylinder assembly—repair		X		
Cylinder assembly—rebuild			E	X
Hoist assembly—service	X			
Hoist assembly—replace and/or repair		X		
Hoist assembly—rebuild			E	X
Lines and connections, oil—replace and/or repair	X			
Pump assembly—service and/or replace	X			
Pump assembly—repair		X		
Pump assembly—rebuild			E	X
Shaft assembly, propeller—replace	X			
Shaft assembly, propeller—repair		X		
Shaft assembly, propeller—rebuild			X	
INSTRUMENTS				
Instruments—replace	X			
Instruments—repair		X		
Instruments—rebuild			E	X
MISCELLANEOUS				
Boards, running—replace	X			
Boards, running—repair		X		
Drive assembly, speedometer—replace	X			
Drive assembly, speedometer—repair		X		
Fenders—replace	X			
Fenders—repair		X		
Hood assembly—replace and/or repair		X		
POWER TAKE-OFF				
Controls and linkage—adjust and/or replace	X			
Controls and linkage—repair		X		

2½-TON 6x6 TRUCK AND 2½- TO 5-TON 6x4 TRUCK (STUDEBAKER MODELS US 6 AND US 6x4)

	Echelons			
POWER TAKE-OFF (Cont'd)	2nd	3rd	4th	5th
Power take-off assembly—replace and/or repair		X		
Power take-off assembly—rebuild			E	X
SHAFTS, PROPELLER				
Block assembly, pillow—service and/or replace	X			
Block assembly, pillow—repair		X		
Block assembly, pillow—rebuild			X	
Shaft assemblies, propeller (w/universal joints) —replace	X			
Shaft assemblies, propeller (w/universal joints) —repair		X		
Shaft assemblies, propeller (w/universal joints) —rebuild			X	
STEERING GROUP				
Arm steering (pitman)—replace	X			
Gear assembly, steering—adjust	X			
Gear assembly, steering—replace and/or repair		X		
Gear assembly, steering—rebuild			E	X
Link assembly, drag—replace	X			
Link assembly, drag—repair		X		
TIRES				
Casings and tubes—replace	X			
Casings—repair			X	
Tubes, inner—repair	X			
TRANSMISSION				
*Transmission assembly—replace	*	X		
Transmission assembly—repair		X		
Transmission assembly—rebuild			E	X
VEHICLE ASSEMBLY				
Truck assembly—service	X			
Truck assembly—rebuild (with serviceable unit assemblies)			X	E
WHEELS				
Wheels—replace	X			
Wheels—rebuild			E	X

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MAINTENANCE ALLOCATION

WINCH	ECHELONS 2nd	3rd	4th	5th
Band assembly, safety brake—adjust and/or replace	X			
Band assembly, safety brake—repair (reline)		X		
Cable assembly—replace	X			
Cable assembly—repair		X		
Pin, universal joint, shear—replace	X			
Shaft assembly, propeller—replace	X			
Shaft assembly, propeller—repair		X		
Shaft assembly, propeller—rebuild			X	
Shoe assembly, drag brake—adjust and/or replace	X			
Shoe assembly, drag brake—repair (reline)		X		
Winch assembly—replace	X			
Winch assembly—repair		X		
Winch assembly—rebuild			E	X

Section X

SECOND ECHELON PREVENTIVE MAINTENANCE

30. SECOND ECHELON PREVENTIVE MAINTENANCE SERVICES.

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

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

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

(3) If instructions other than those 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 thoroughly trained in these procedures so that they will apply them automatically.*

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

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

(c) The general inspection of each item applies also to any supporting member or connection, and usually includes a check to see whether the item is in good condition, correctly assembled, secure, or excessively worn. The mechanic must be thoroughly trained in the following explanations of these terms.

1. The inspection for "good condition" is usually an external visual inspection to determine if the unit is damaged beyond safe or serviceable limits. The term "good condition" is explained further by the following: 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 that it would dam-

age. Clean the protective grease coating from new parts, since this material is not a good lubricant.

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

4. Serve. This usually consists of performing special operations, such as replenishing battery water, draining and refilling units with oil, and cleaning or changing 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. AGO Form No. 461, which is the Preventive Maintenance Service Work Sheet for Wheeled and Half-Track Vehicles. Certain items on the work sheet that do not apply to this vehicle are not included in the procedures in this manual. In general, the numerical sequence of items on the work sheet is followed in the manual procedures, but in some instances there is deviation for conservation of the mechanic's time and effort.

(5) SPECIFIC PROCEDURES. The procedures for performing each item in the 1000-mile (monthly) and 6000-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 6000-mile, and 1000-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	1,000 Mile

ROAD TEST

NOTE: *When the tactical situation does not permit a full road test, perform such operations which will require little, or no movement of the vehicle. When a road test is possible, it should be for preferably 3 miles but not over 5 miles.*

1 1 **Before-operation Service.** Perform the Before-operation Service as directed in paragraph 19, as a check to determine whether or not the vehicle is in a satisfactory condition to make the road test safely, and to see also that it has sufficient fuel, engine oil, and coolant.

3 3 **Dash and Instrument Gages.**

OIL PRESSURE GAGE. Oil pressure should be 30 to 40 pounds with engine above fast idle. Stop engine and investigate if gage registers zero (0) or low pressure.

AMMETER. High charging rate should be indicated for first few minutes, until generator restores to battery current used in starting engine. High charging rate for extended period with all the electrical units turned off may indicate a low battery or a faulty regulator.

TEMPERATURE GAGE. Reading should increase gradually during warm-up period until normal temperature of 140° to 180°F is reached.

CAUTION: *Stop engine and investigate if temperature rises above 190°F. Do not move vehicle until engine temperature reaches 135°F.*

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

SPEEDOMETER. Speedometer needle should indicate actual vehicle speed, and odometer should record total accumulated miles.

4 4 **Horns, Mirrors and Windshield Wipers.** Test horn for proper operation and tone, if tactical situation permits. Examine windshield wiper, arms, and blades to see that they are in good condition, securely mounted, and operating properly. Clean and adjust the rear vision mirror.

5 5 **Brakes (Service and Parking).** Apply foot brake during operation to test for smooth effective braking within reasonable distance without side pull. Pedal-to-floor-board clearance should be at least 1 inch with brake in applied position. Apply hand brake with vehicle on reasonable incline. Brake should hold vehicle securely with ⅓ ratchet travel in reserve.

2½-TON 6x6 TRUCK AND 2½- TO 5-TON 6x4 TRUCK (STUDEBAKER MODELS US 6 AND US 6x4)

MAINTENANCE		
6,000 Mile	1,000 Mile	
6	6	**Clutch.** While shifting gears, note any drag, chatter, or squealing of the clutch. Test for slipping while under load. Pedal free travel before meeting resistance should be 1 inch to 1½ inches.
7	7	**Transmission and Transfer.** Shifting levers must operate freely, gears operate quietly, and not slip out of mesh. Note any unusual noises that would indicate damaged or inadequately lubricated parts.
8	8	**Steering.** While driving vehicle turn steering wheel full travel in both directions (road conditions permitting), and observe any looseness or binding. Note any tendency to wander, shimmy, or pull to one side of road while driving in straight-ahead position. When the vehicle is stopped, inspect the steering wheel and column for good condition and secure mountings.
9	9	**Engine.** Engine should run smoothly at idle speed. Listen for knocks and rattles under both idle and load while engine is accelerated and decelerated. Under load, be on the alert for heavy ping, indicating excessive carbonization or incorrect ignition. Note any misfiring or excessive smoking. Test vehicle for power and governed speed (45 mph) with transmission in overdrive, and transfer case in high speed range. During road test, listen for any unusual noise or vibration that would indicate loose, worn, or damaged units or attachments, or lack of lubrication.
11	11	**Brake Booster Operation.** Stop vehicle and run engine at idle for 10 to 15 seconds. Turn off ignition switch and make five successive brake applications. An increase of foot pressure will be required with each succeeding application, if vacuum system is operating properly.
13	13	**Temperatures.** Cautiously hand-feel hubs, brake drums, transfer case, transmission, and axles for evidence of overheating. Transfer case temperature will run higher than other gear cases.
14	14	**Leaks (Engine Oil, Water, and Fuel).** Look on ground under vehicle, and around engine, radiator, axles, transmission, transfer case, for evidence of fuel, oil, or water leaks. Trace any leaks found to their source, and correct or report them to designated authority.

MAINTENANCE	
6,000 Mile	1,000 Mile
16	16

Gear Oil Level and Leaks. Remove filler plugs and check lubricant level in axles, transmission, and transfer case. NOTE: *A safe range level is from the lower edge of the filler hole when hot, to ½ inch below when cold.* If gear oil change is due, or condition of the lubricant indicates a change is necessary, drain and refill with specified oil. Examine all units for any evidence of grease leaking at the seals.

MAINTENANCE OPERATIONS

Raise Vehicle—Block Safely

17	17

Unusual Noises (Engine, Belts, Accessories, Transmission, Transfer Case, Propeller Shaft, and Joints). Run vehicle in an intermediate gear, slightly above idle speed, and listen for any unusual noises or excessive vibrations that would indicate worn, damaged, or under-lubricated units. Locate and correct or report any unusual noises heard during road test.

22	22

Battery. 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. AGO Form No. 461. Specific gravity readings below 1.225 indicate battery should be recharged or replaced. Electrolyte level must be ⅜ inch above plates. Replenish by adding distilled or clean fresh water.

22	

SERVE. Perform high-rate discharge test according to instructions for "condition" test, which accompany test instrument, and record voltage on W.D. AGO Form No. 461. Cell variation should not be more than 20 percent. NOTE: *Specific gravity must be above 1.225 to make this test.*

CLEAN. Clean entire battery and carrier; repaint carrier if corroded. Clean battery cable terminals, terminal bolts, nuts, and battery posts. Inspect bolts for serviceability. Lightly grease posts before reassembling terminals. Tighten hold-down carefully to avoid damage to the battery.

18	18

Cylinder Head and Gaskets. Examine cylinder head to see that it is in good condition and secure; and for oil, water, or compression leaks around studs or gaskets. Cylinder head will not be tightened unless there is a definite evidence of looseness or leaks. If necessary to

2½-TON 6x6 TRUCK AND 2½- TO 5-TON 6x4 TRUCK (STUDEBAKER MODELS US 6 AND US 6x4)

MAINTENANCE	
6,000 Mile	1,000 Mile
	tighten cylinder head, tighten in proper sequence to a tension of 80 foot-pounds with torque wrench. If necessary to install new head gasket, retighten head nuts after engine has reached normal operating temperature, and again after final road test.
19	**Valve Mechanism.** Listen for noisy valve tappets indicating excessive valve-stem to push-rod clearance. Adjust to 0.006 inch, engine hot, only when need is indicated by excessive noise or faulty engine performance.
19	ADJUST. Adjust valve tappet clearance to 0.006 inch, engine hot. Inspect valve tappets, push rods, springs, and seats to see that they are in good condition, correctly assembled, and secure. Inspect valve plate cover gasket for serviceability, and replace if necessary.
20	**Spark Plugs.** Remove high tension wires from spark plug terminals and wipe the insulators clean. Inspect insulators for cracks or any indication of compression leaks.
20	CLEAN AND ADJUST. Remove spark plugs and clean thoroughly on sand blast cleaner (if available). Inspect insulators for cracks and electrodes for excessive burning. If sand blast cleaner is not available, install new or reconditioned plugs. Reset the gap, bending outer electrode only, to 0.025 inch. Install plugs after item 21 has been performed, using new gaskets.
21	**Compression Tests.** Test compression of each cylinder and record gage readings on W.D. AGO Form No. 461. Normal compression at cranking speed is 80 pounds. Individual cylinder compressions should not vary more than 10 pounds between cylinders.
23	**Crankcase.** Inspect oil pan, valve cover, timing gear cover, and clutch housing for evidence of oil leaks. If an oil change is due, or condition of oil indicates the necessity, remove oil pan drain plug and drain oil. Refill to proper level with specified oil. CAUTION: *Do not start engine until item 24 has been performed.*
24	**Oil Filter and Lines.** Inspect oil filter and lines to see that they are in good condition, securely mounted, and not leaking. Remove filter drain plug and drain off accumulated sediment.

SECOND ECHELON PREVENTIVE MAINTENANCE

MAINTENANCE	
6,000 Mile	1,000 Mile
25	25
26	26
27	27
27	
29	29
31	31

SERVE. Remove oil filter element, clean and drain case, and install new filter element, making sure to replace cover gasket when reassembling. Check filter lines and connections for leaks after starting engine.

Radiator (Shell, Core, Mountings, Hose, Cap and Gasket, Antifreeze, and Record). Inspect radiator core for leaks, loose mounting bolts, or obstructions. Inspect shell for damage and coolant for contamination. If antifreeze is used, test for temperatures anticipated, and record on W.D. AGO Form No. 461. Clean dirt and insects from exterior of core, and tighten all mounting bolts and housing connections securely.

Water Pump, Fan, and Shroud. Examine water pump for evidence of leaks, see that fan blades are in good condition, that mounting bolts are tight, and if there is noticeable end play in shaft. Inspect shroud to see that it is securely mounted, not bent, and that it does not contact the fan blades.

Generator, Cranking Motor, and Switch. Inspect generator and cranking motor for loose mounting bolts and loose wiring connections. Fully depress clutch pedal to test operation of the starter switch.

SERVE. Remove generator and cranking motor inspection covers, inspect commutators and brushes to see that they are in good condition, that brushes are free in their holders and springs are not broken, and that all brush wires are in good condition and secure.

CLEAN. If commutators are dirty, clean with flint paper No. 00 and blow out accumulated dust with compressed air. Replace cover bands, and tighten all mounting bolts and electrical connections securely.

Drive Belt and Pulleys. Inspect fan, generator, and drive pulleys to see that they are in good condition and securely mounted. Examine fan belt for excessive wear and deterioration.

ADJUST. Adjust belt to $\frac{1}{2}$- to $1\frac{1}{16}$-inch deflection (finger pressure).

Distributor. Clean distributor cap and housing. Remove cap, and examine cap and rotor arm for cracks, carbon runners, or excessively burned electrodes. Inspect point for proper gap, alinement, burned or pitted condition. If points are slightly burned, reface on fine stone and adjust gap to 0.018 inch to 0.022 inch.

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6,000 Mile	1,000 Mile
31	

SERVE. If distributor plate assembly is excessively dirty, remove and thoroughly clean with dry-cleaning solvent. Dry with compressed air and lubricate all parts as specified below. If breaker points are pitted, burned, or worn to an unserviceable condition, install a new set of points and replace the condensor, as it may be the cause of the points pitting. Install the new points so they are well alined, engage squarely, and set gap 0.018 inch to 0.022 inch. Test centrifugal advance by finger rotation for normal range of movement, and return when released without binding or sticking. Make sure all wiring is clean and tight as unit is reassembled.

SPECIAL LUBRICATION. Lubricate the cam surface, breaker arm pin, wick, and cam shaft according to vehicle Lubrication Guide.

32	32	**Coil and Wiring.** Inspect coil for cracked insulation or loose mounting bolts. Examine all wiring for good condition, cleanliness, correct assembly, and tight connections; make sure it is not chafing against other parts. clean all exposed ignition wiring with a dry cloth.
33	33	**Manifolds and Heat Control.** Inspect intake and exhaust manifolds for cracks, gasket leaks, or loose mounting nuts. Test heat control valve for free operation.
	33	TIGHTEN. Tighten all manifold and mounting nuts securely.
34	34	**Carburetor Air Cleaner.** Remove air cleaner and disassemble. Inspect all gasket seals for evidence of leaks. Thoroughly clean element and oil reservoir in dry-cleaning solvent. Refill with engine oil to level mark on body and reassemble, tightening all mounting connections securely.
35	35	**Crankcase Ventilator Air Cleaner (type with filter element).** Remove the crankcase ventilator cap, thoroughly clean element in dry-cleaning solvent, dip in engine oil, drain off excess oil, and replace.
36	36	**Carburetor (Choke, Throttle, Linkage, and Governor).** Inspect carburetor, lines, and connections for evidence of leaks. Inspect all linkage for wear and see that it completely opens and closes choke and throttle valves when operated. Make sure that governor is secure and properly sealed.

SECOND ECHELON PREVENTIVE MAINTENANCE

MAINTENANCE		
6,000 Mile	1,000 Mile	
37	37	**Fuel Filter and Lines.** Examine filter for loose mountings and connections. Remove filter bowl and element and clean thoroughly in dry-cleaning solvent. Blow lightly with compressed air and reassemble, using new gaskets.
38	38	**Fuel Pump.** Inspect pump, see that it is in good condition, securely mounted, and not leaking. Remove sediment bowl and screen and clean thoroughly in dry-cleaning solvent. Reassemble, using new gasket, and tighten all mountings and connections securely.
	38	Attach pressure gage to fuel pump and start engine. Fuel pump pressure should be 2 pounds minimum, 3¾ pounds maximum with engine running at idle speed.
39	39	**Cranking Motor.** Start engine, note whether action of cranking motor is satisfactory, particularly whether starting drive engages and disengages properly without unusual noises, and has adequate cranking speed to start engine readily. As engine starts, observe if all instruments are operating properly.
40	40	**Engine Oil, Fuel, Water Leaks.** With engine running, inspect all units serviced for fuel, oil, or water leaks. Trace any leaks to their source, and correct or report them to designated authority.
41	41	**Ignition Timing.** With engine running at idle speed, connect neon light in series with the spark plug at No. 1 cylinder, and check the ignition timing (light flashes must synchronize with the dead center mark on the flywheel and the mark at the timing hole). Accelerate engine and note if centrifugal advance is operating correctly.
	41	Adjust the ignition timing by moving the distributor body in either direction until the dead center mark on flywheel and line at timing hole are synchronized with neon light flashes.
42	42	**Engine Idle and Vacuum Tests.** Connect vacuum gage to the intake manifold, and adjust the carburetor idle mixture until the highest steady reading is reached. If this adjustment increases normal idle speed, reset the idle speed adjusting screw and readjust the idle mixture until both are set.
43	43	**Electrical Unit.** Inspect regulator mountings and electrical connections, see that they are in good condition, secure, and that regulator is properly grounded.

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MAINTENANCE	
6,000 Mile	1,000 Mile
43	

TEST. Make voltage amperage and cut-out test, using the low voltage tester. Follow the instructions which accompany the test set to determine if the unit is functioning properly. Replace faulty regulators.

47	47

Tires and Rims, Including Spares. Observe if all valve stems are in good condition and in correct position. Replace leaky valve cores or missing caps. Examine tires for cuts, bruises, breaks, blisters, and irregular tread wear. Remove imbedded glass, nails, or stones from treads. Inflate tires to 55 pounds (cold) pressure. Any mechanical deficiencies causing abnormal tire wear must be determined, and corrected or reported. Remove tires worn thin at center of tread, or unserviceable tires, and exchange for new or retreaded tires. Change the wheel position of tires with irregular wear to equalize wear of all tires. When switching tire positions, spare tires must be mounted on one of the road wheels. Inspect rims for damage, and tighten all wheel lug nuts.

47	

MATCHING TIRES. Match tires according to tread wear and over-all circumferences. NOTE: *With tires properly inflated, ¾-inch variation is permissible in over-all circumferences.*

48	

Rear Brakes (Drums, Springs, Cylinders). Remove rear wheels and inspect and service as follows: On 6000-mile maintenance service, the several wheel bearing and brake items up to 52 are group services and may overlap. Perform in best order for economy of time and orderly reassembly.

DRUM, SPRINGS, AND WHEEL CYLINDERS. Thoroughly clean and inspect drums for excessive wear, scores, or leaking grease seals. Inspect backing plate for loose mountings or damaged condition, and wheel cylinders for leaks.

	49

Rear Brake Shoes (Linings, Linkage, Guides, and Anchors). Inspect linings through inspection holes in brake drums to see whether they are excessively worn so rivet heads may score drums within next 1000 miles of operation. If vehicle has recently been operated in deep water, mud, loose sand or dirt, that may have entered brake drums, remove rear hub and drum for inspection of brake linings to determine whether they

MAINTENANCE	
6,000 Mile	1,000 Mile

should be replaced, and if lubricant has been contaminated. If linings on this wheel brake must be replaced, remove all wheels and service their brakes similarly, being sure to lubricate and adjust all removed bearings; and clean drums, shoes, linings, and backing plates.

49 Remove rear wheel and inspect linings to see if they are in good condition, secure to brake shoes, in good wearing contact with drums, free of dirt or lubricant, and not excessively worn. Also see that brake shoes are in good condition, properly secured and guided by anchor bolts and springs, and return to cylinder posts by retracting springs. Clean all dust from linings with a wire brush, clean cloth or compressed air. When linings are worn to rivet heads or will not be serviceable until the next inspection, replace the shoes.

ADJUST. If linings are slightly worn, make minor brake shoe adjustment to compensate for wear. Where shoes with new linings have been installed, adjust shoes by the major adjustment method. Normal clearance is 0.005 inch at heel, and 0.010 inch at toe.

52 **Rear Wheel (Bearings, Seals, Drive Flanges and Nuts).** Revolve the wheels to test for runout, and listen for any indications of damaged wheel bearings. Grip top and bottom of wheel and push in on top while pulling out on bottom to test wheel bearing adjustment. Tighten wheels and adjust bearings if necessary.

53 **Front Brakes.** Remove front wheels and inspect and service as follows: On 6000-mile maintenance service, the several wheel bearings and brake items up to 52 are group services and overlap. Perform in best order for economy of time and orderly reassembly.

DRUMS, SPRINGS AND WHEEL CYLINDERS. Thoroughly clean and inspect drums for excessive wear, scores, or leaking grease seals. Inspect backing plates for loose mountings or damaged condition, and wheel cylinders for leaks.

54 **Front Brake Shoes (Linings, Linkage, Guides, and Anchors).** Inspect linings through inspection holes in brake drums to see whether they are excessively worn, or if rivet heads may score drums within next 1000 miles of operation. If vehicle has recently been

MAINTENANCE		
6,000 Mile	1,000 Mile	
		operated in deep water, mud, loose sand, or dirt, that may have entered brake drums, remove front hub and drum for inspection of brake linings to determine whether they should be replaced, and if lubricant has been contaminated. If linings on this wheel brake must be replaced, remove all wheels and service their brakes similarly, being sure to lubricate and adjust all removed bearings; and clean drums, shoes, linings and backing plates.
54		Remove front wheels and inspect linings to see if they are in good condition, riveted securely to brake shoes, in good wearing contact with drums, free of dirt or lubricant, and not excessively worn. Also see that brake shoes are in good condition, properly secured and guided by anchor bolts and springs, and return to cylinder posts by retracting springs. Clean all dust from linings with a wire brush, clean cloth or compressed air. When linings are worn to rivet heads or will not be serviceable until the next inspection, replace the shoes.
55	55	**Steering Knuckles (Bolts, Bearings, Seals).** Inspect steering knuckle housing for evidence of leaks or damaged seals (6 x 6 vehicles).
		CLEAN. Remove and clean steering knuckle and universal joint assembly. Examine steering knuckle bearings and universal-joint bearings for wear, cracks, pits, or damaged condition. Inspect axle splines for wear and seals for deterioration. Lubricate and reassemble steering knuckle and universal-joint assembly according to instructions in paragraph 112 **d.**
56	56	**Front Springs.** Inspect springs for sag, broken or shifted leaves, loose or missing U-bolts, shackle bolts, center bolts, and rebound clips.
		TIGHTEN. Tighten all mounting and assembly bolts and nuts securely.
57	57	**Steering.** Examine pitman arm, drag link, and tie rod for loose mountings, and worn or damaged condition. Inspect steering gear housing for proper oil level, loose mountings, or oil leaks.
	57	TIGHTEN. Tighten pitman arm nut and steering housing mounting bolts securely. CAUTION: *Loosen the steering column bracket when tightening steer-*

MAINTENANCE	
6,000 Mile	1,000 Mile
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ing case mounting nuts so as not to distort the column.

Shock Absorbers. Inspect shock absorbers and mountings to see that they are not damaged, excessively worn, or leaking.

SERVE. Fill reservoir with shock absorber fluid, disconnect link, and test shock absorber action. When arm is moved up and down, there should be resistance in both directions.

Front Wheel (Bearings, Wheels, Drive Flanges, and Nuts). Revolve the wheels to test for runout, and listen for any indications of damaged wheel bearings. Grip top and bottom of wheel, and push in on top while pulling out on bottom to test wheel bearing adjustment. Make sure that any excessive movement is not the result of worn king pins. Tighten wheels and adjust bearings if necessary.

Remove wheel and hub assembly and inspect wheel bearings and races for cracks, pits, and fractures. Clean bearings thoroughly and repack with specified lubricant. Reinstall bearings and install new seals. Adjust bearings and tighten drive flange nuts securely.

Front Axle. Inspect axle for alinement, leaking grease seals, and clogged vent. Test pinion shaft for excessive end play. Remove vent and clean thoroughly. Tighten all mounting bolts securely.

On 6 x 4, inspect to see if axle is sprung, bent, or appears to be out of line. Measure distance from front spring eyebolt to center of axle spring pad on each side. This distance should be approximately the same on each side. Tighten all mounting bolts securely.

Front Propeller Shaft. Inspect propeller shaft for alinement, flange bolts for looseness, and universal joints for excessive wear or grease leaks. Tighten all mounting and assembly bolts securely.

Engine (Mounting, Ground Strap). Inspect all mounting bolts to see that they are present and secure. Examine the upper and lower rubber cushions for wear and deterioration. Make sure ground strap is clean and good contact is obtained. Tighten all loose mounting and side pan bolts.

Hand Brake. Examine sector, pawl, and linkage for excessive wear or loose mountings. Inspect lining for

MAINTENANCE	
6,000 Mile	1,000 Mile

excessive wear or oil-soaked condition, and check drum for scores. Adjust clearance between linings and drum to 0.010 to 0.015 inch to compensate for wear. If inspection indicates or reveals that lining is excessively worn or oil-soaked, the lining should be replaced following instructions in paragraph 127.

65 | 65 **Clutch Pedal.** Test pedal for free travel (1 to 1½ in.) and examine linkage for wear, missing cotter pins, and check return spring for proper tension.

ADJUST. CAUTION: *Clutch pedal free travel must not be adjusted with the pedal linkage, as the free travel is maintained by shims at the clutch pressure plate.* If necessary to make adjustment, refer to paragraph 65.

66 | 66 **Brake Pedal.** Test pedal for free operation and pedal to toeboard reserve. Examine linkage for wear, missing cotter pins, and test return spring for proper tension. Pedal and toeboard clearance must not be less than 1 inch with brake in applied position.

67 | 67 **Brake Master Cylinder.** Wipe top of master cylinder clean, remove filler plug, and blow out vent. Fill reservoir to ½ inch below filler hole. Replace filler plug, inspect housing for leaks, and test stop light switch for proper operation.

68 | 68 **Brake Vacuum Booster.** Inspect booster cylinder and all linkage to see that they are in good condition and securely mounted. Remove the air cleaner element and clean in dry-cleaning solvent. Dip in light engine oil and replace, taking care not to disturb the control valve adjustments.

TEST. Start engine and idle for 10 to 15 seconds, then stop engine and make five successive brake applications. An increase of foot pressure will be required with each succeeding application if vacuum system is operating properly. With pedal fully depressed, check valve rod for free movement. After all clearance is taken up, valve rod free movement should be 5/16 inch. Tighten all housing connections and mounting bolts.

71 | 71 **Transmission.** Inspect all transmission seals and gaskets for evidence of leakage. Examine all attaching bolts for looseness. Vent must not be clogged; remove and clean if necessary.

SECOND ECHELON PREVENTIVE MAINTENANCE

MAINTENANCE		
6,000 Mile	1,000 Mile	
71		TIGHTEN. Tighten all assembly mounting bolts and screws securely.
72	72	**Transfer Case.** Examine all seals and gaskets for evidence of leaks, and inspect shift controls for worn or loose linkage and missing cotter pins. Vent must not be clogged; remove and clean if necessary.
72		TIGHTEN. Tighten all mounting bolts and nuts securely.
73	73	**Rear Propeller Shaft.** Inspect propeller shaft for alinement, flange bolts for looseness, universal joints for excessive wear or grease leaks.
73		TIGHTEN. Tighten all mounting bolts securely.
74	74	**Center Bearing.** Inspect center bearing for excessive end play, leaking grease seals, and clogged vent.
		SERVE. Clean vent, fill to proper level with specified lubricant, and tighten all mounting bolts.
75	75	**Rear Axles.** Inspect axle for alinement, leaking grease seals, and clogged vent. Test pinion shaft for excessive end play.
		SERVE. Clean vent and tighten all mounting bolts and cap screws securely.
77	77	**Rear Springs.** Inspect springs for sag, broken or shifted leaves, loose or missing U-bolts, shackle bolts, center bolts, and rebound clips. Tighten all mounting and assembly bolts and nuts.
79	79	**Cab and Body Mountings.** Examine cab mountings, cushions and blocks for cracks or deterioration, and make sure hold-down bolts and coil springs are present and secure. Examine body hold-down bolts for looseness, and sills for cracks or deterioration.
80	80	**Frame.** Examine frame and cross members for cracks, alinement, and loose or missing rivets.
81	81	**Wire, Conduits and Grommets.** Examine all wiring, wiring looms, conduits and grommets under vehicle for presence and condition. Tighten all loose wiring connections, and make sure no wiring is chafing against other parts.
82	82	**Fuel Tanks, Fittings and Lines.** Examine fuel tank to see that it is in good condition and securely mounted. Inspect cap for defective gasket or blocked vent, and see that it fits securely on filler neck. Inspect all full lines and connections, and see that they are in good condition, secure, and not leaking.

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MAINTENANCE		
6,000 Mile	1,000 Mile	
83	83	**Brake Lines.** Inspect all brake lines to see that they are in good condition and securely connected. Make sure that flexible hose are held tightly by clips and that there is no evidence of chafing or leaks. Tighten all connections and hose clamps as necessary.
84	84	**Exhaust Pipe and Muffler.** Examine exhaust pipe and muffler for loose mountings, loose connections, deterioration, or evidence of leaks. Inspect tail pipe for obstructions or damage.
85	85	**Vehicle Lubrication.** Check lubrication of entire vehicle. On any unit where disassembly was necessary for inspection purposes, lubrication must be performed, unless the vehicle is to be deadlined for repair of that unit. Lubricate all points of vehicle in accordance with instructions in this manual, W. D. Lubrication Guide, current lubrication bulletins or directives, and the following instructions: Use only clean lubricant, and keep all lubricant containers covered. Before applying lubricant, clean lubrication fitting or plug. Replace missing or damaged fittings, lines, plugs, or vents. On unsealed bushings or joints, the lubricant should be applied until it appears at openings. On units provided with lubricant retainer seals, do not force excess lubricant past seals. Drain oil from all units while warm. Refill units to correct level as soon as draining is completed, so that units will not be operated without lubricant. Do not apply more than specified amount of lubricant to generator or cranking motor; to do so may cause a failure of the unit. Wipe off excess lubricant that may soil clothes and equipment, or detract from the vehicle's appearance. Parts or assemblies that have been lubricated while disassembled for inspection, gear cases that have been drained and refilled as mandatory items in the procedures, and those parts that have been indicated in procedures for special lubrication may be omitted from the general lubrication of the vehicle.
86	86	**Toe-In and Turning Stops.** With front wheels in straight-ahead position, check the toe-in limit for 1/16 to 1/8 inch. Turn steering wheel limit in both directions, and inspect the turning stops to see that they are present, securely welded, and prevent the tires from rubbing against the vehicle.

SECOND ECHELON PREVENTIVE MAINTENANCE

MAINTENANCE	
6,000 Mile	1,000 Mile
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90	90

Winch (Clutch, Brakes, Drive, Shear Pin, and Cable). Inspect clutch movement and latch, automatic brake, and propeller shaft for good condition and for proper operation. Inspect winch shear pin for partially sheared condition, and universal coupling for wear. Chain, hooks, and spare shear pins must be present and in good condition. Lubricate universal joint, yoke, hub, shaft bearings, drum bearings, slide clutch, worm housing, and cable as necessary.

CLEAN AND SERVE. Unwind and thoroughly clean cable. Inspect cable for kinks or broken strands. Lubricate cable with engine oil or crankcase drainings, and rewind evenly on dum.

Fifth Wheel (Bed Plate and Bolts). Inspect the fifth wheel, rocker plate, and bed plate to see that they are in good condition, correctly assembled, and securely mounted. Examine the king pin to see that it is not excessively worn, and that king pin lock operates freely and locks securely. Clean rocker plate and bed plate thoroughly, and lubricate with chassis lubricant. Lubricate all fifth wheel assembly and latch mechanism if necessary. CAUTION: *When trailer is not attached to tractor, the fifth wheel should be covered to prevent accumulation of rust and dirt.*

TIGHTEN. Tighten all mounting bolts securely.

Tractor-to-Trailer Wiring and Connections. Examine all tractor-to-trailer wiring and connections to see that they are in serviceable condition and securely fastened to clips, springs, or brackets.

Hoist (Mounting, Drive, Controls, Pump, Lines, Cylinder). Raise body with hoist and examine these items to see that they are in good condition, correctly assembled, and secure. Inspect drive shaft, joints, controls, and linkage for wear; check pump lines and cylinder for leaks. Stop engine with body up, and observe tendency of body to slip back, indicating leakage past cylinder.

SERVE. With body raised to ½ maximum height and engine running, remove filler plug and add oil until cylinder appears to be full. Operate hoist, and while body raises to full height, continue to add ½ pint more oil. With filler plug still out, raise and lower body several times to permit excess oil to work out. Replace

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MAINTENANCE		
6,000 Mile	1,000 Mile	
90		filler plug. If oil is contaminated, drain system and refill with new oil of proper grade.
		TIGHTEN. Tighten mounting bolts securely. Tighten piston rod, pump packing, and gland nuts cautiously to avoid scoring rod and shaft.
91	91	**Lamps.** With all light switches, including stop and blackout, at "ON" position, inspect lights to see that they operate properly, are clean, and securely mounted. Adjust headlights for proper aim, and make sure that all lights go out when switches are in the "OFF" position.
92	92	**Safety Reflectors.** Inspect reflectors to see that they are present, secure, and that glass is not cracked or broken. Clean glass and tighten mountings.
93	93	**Front Bumpers (Tow Hooks, Brush Guards, and Grille).** Inspect these items to see that they are present, in good condition, and securely mounted.
94	94	**Hood.** Inspect hood to see that it is in good condition, properly alined with radiator and cowl, and that hood fasteners and prop are present and hold the hood securely. Lubricate hooks and hinges with engine oil.
95	95	**Front Fenders and Running Boards.** Examine fenders and running boards to see that they are in good condition and securely mounted. Tighten all mounting bolts and nuts as necessary.
96	96	**Cab Body (Hardware, Glass, Doors, Seats, Upholstery, Floor Boards, Ventilator, and Map Compartment).** Inspect these units to see that they are in serviceable condition and securely mounted. Operate ventilator; open and close doors to make sure they are in alinement, operate properly, and lock when closed.
98	98	**Circuit Breakers.** Examine the circuit breakers for loose mountings and electrical connections. Tighten mountings and connections securely.
99	99	**Splash Guards.** Inspect splash guards to see that they are in good condition and securely mounted. Tighten as necessary.
101	101	**Rear Bumper and Pintle Hook.** Inspect the rear bumper and pintle hook for good condition and secure mountings. Pintle latch must operate freely and lock pin must be attached to chain. Tighten mounting bolts and lubricate pintle latch.

MAINTENANCE	
6,000 Mile	1,000 Mile
103	103	**Paint and Markings.** Inspect body and cab for rust spots or chipping paint, and observe for any bright spots that would cause excessive glare or reflection. Make sure identification plates and markings are visible.
104	104	**Radio Bonding (Suppressors, Filters, Condensers, Shielding).** Inspect all bonding and connections to see that they are clean, secure, and in serviceable condition. NOTE: *Any irregularities except cleaning and tightening should be reported through proper channels to signal corps personnel.*
		TOOLS AND EQUIPMENT
131	131	**Tools.** Inspect all tools for condition, proper mounting, and serviceability, using the vehicle stowage list.
132	132	**Fire Extinguisher.** Inspect the portable fire extinguisher; see that it is present, fully charged, nozzle clean, and securely mounted.
133	133	**Decontaminator.** Inspect decontaminator to see that it is present, fully charged, nozzle clean, and securely mounted. Decontaminator must be recharged if empty, or if charge is over 90 days old.
135	135	**Publications and Form No. 26.** All vehicle manuals, Lubrication Guide, and Standard Accident Form No. 26 must be present, legible, and properly stowed.
141	141	**Modifications (FSMWO's Completed).** Inspect the vehicle to make certain that all Field Service Modification Work Orders have been completed.
142	142	**Final Road Test.** Repeat items 1 to 14 inclusive, paying particular attention to those units on which work has been performed to make certain that they have been restored to proper operating condition. Correct or report any deficiencies found during the final road test.

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Section XI

TROUBLE SHOOTING

31. GENERAL.

a. This section lists difficulties which might be encountered with this vehicle, during operation in normal temperatures, with the possible common causes and remedies. Only such symptoms and causes as can be detected by the using arms are included, and the tests to determine the possible causes are listed in the order of their importance. A systematic test procedure must be used if the difficulty is to be located and corrected with a minimum of time and effort. Therefore, this section has been arranged, wherever possible, with the symptom listed first. The causes, tests, and suggested remedies follow which provide a process of elimination to determine what is responsible for the con-

dition being experienced, and what action should be taken to effect a correction.

32. ENGINE.

a. Engine will not Turn.

(1) SEIZURE DUE TO INTERNAL DAMAGE. Refer to higher authority.

(2) CRANKING MOTOR INOPERATIVE. See paragraph 36 a.

(3) CRANKING MOTOR PINION GEAR TEETH ON FLYWHEEL STRIPPED. Refer to higher authority.

b. Engine Turns but Will Not Start.

(1) BATTERY DISCHARGED OR CHARGE VERY LOW. Test battery for charge with hydrometer. If hydrometer reading is below 1.200, recharge or replace with fully charged battery.

(2) CRANKING MOTOR SPEED TOO SLOW. See paragraph 36 c.

(3) NO SPARK AT PLUGS. Turn on ignition switch. Disconnect spark plug wire at plug terminal, crank engine with cranking motor, and note whether spark is obtained while holding terminal about ⅛ inch from cylinder head. If no spark, trace defect by following steps (5) to (8) below. If spark is visible, perform step (4) following.

(4) SPARK PLUGS BROKEN OR DIRTY, OR GAPS INCORRECTLY SPACED. Replace plugs if porcelain is broken. If dirty, clean with accredited cleaner and space electrode gaps to 0.025 inch before installation. In any event check and, if necessary, respace electrode gap before installing.

(5) DISTRIBUTOR CAP OR ROTOR BROKEN. Replace rotor or cap.

(6) DISTRIBUTOR BREAKER POINTS INCORRECTLY SPACED, PITTED OR EXCESSIVELY BURNED. Respace or install new points (par. 93 b).

(7) SPARK PLUG WIRES BROKEN, OR IMPROPERLY CONNECTED AT DISTRIBUTOR TOWERS OR PLUG TERMINALS. Inspect wires for breaks or broken or frayed insulation, corroded or dirty connections in distributor cap towers, or improperly seated terminals on plugs.

(8) IGNITION TIMING INCORRECT. See paragraph 93 f.

(9) FUEL SUPPLY EXHAUSTED. Replenish fuel supply.

(10) FUEL FILTER OR FUEL LINES CLOGGED. Disconnect fuel line at carburetor, operate cranking motor, and observe if fuel is discharging. If not, refer to paragraph 34 a (2) and (3).

(11) CARBURETOR CHOKE CONTROL WIRE LOOSE OR DISCONNECTED. Adjust choke control (par. 71 b).

c. Engine Runs But Misfires.

(1) IGNITION INCORRECTLY TIMED. Retime (par. 93 f).

(2) FAULTY SPARK PLUG. Locate faulty plug with suitable tester, and install new plug.

(3) DISTRIBUTOR CAP OR ROTOR BROKEN. Replace cap and/or rotor.

(4) DISTRIBUTOR POINTS WORN, PITTED, OR INCORRECTLY SPACED. Examine points; if worn or pitted, replace. Check point gap, and space to 0.018- to 0.022-inch maximum opening.

(5) INCORRECT VALVE TAPPET ADJUSTMENT. If valves are not closing or opening to proper limits, adjust tappets to 0.006-inch clearance between tappet face and end of valve stem, with valve in fully closed position and engine hot (par 55 c).

(6) BROKEN VALVE SPRING. Remove valve cover plate and examine valve springs. Replace spring if broken.

(7) LEAKING CYLINDER HEAD GASKET. Examine cylinder head for evidence of leakage between head and gasket. If leaks are detected, tighten cylinder head cap screws, using a torque wrench to tension of 80 foot-pounds (960 in.-lb). If gasket is defective, install a new one.

(8) PARTIALLY PLUGGED FUEL LINE. Remove fuel lines and clean. If cleaning lines does not correct difficulty, refer to higher authority for test of fuel pump pressure.

(9) THERMOSTAT DEFECTIVE. See paragraph 81.

d. Engine Lacks Power.

(1) IGNITION TIMING INCORRECT. See paragraph 93 f.

(2) DETONATION FROM LOW OCTANE FUEL. Retard ignition timing slightly or refer to higher authority.

(3) ENGINE OVERHEATING. Inadequate cooling solution, fan belt slipping, or improper grade or insufficient oil in crankcase. Add cooling solution, tighten fan belt, or replenish or change oil.

(4) CARBURETOR ADJUSTMENT INCORRECT. Adjust or replace complete assembly.

(5) LOW ENGINE COMPRESSION. If engine does not develop full power with fuel reaching combustion chambers, adequate ignition, and sufficient oil in crankcase, the compression of each cylinder should be checked by removing spark plug, inserting compression gage in spark plug opening, cranking engine over two or three times, and taking highest reading obtained. Gage should read 87 to 90 for satisfactory compression. If reading obtained is less than 87, check valve tappet adjustment. If tappet clearance is 0.006 inch with engine hot, refer to higher authority.

(6) RESTRICTION IN EXHAUST SYSTEM. Bent exhaust or muffler tail pipe, or muffler passages restricted by carbon formation. Straighten or replace bent pipes. Replace muffler.

(7) CLUTCH SLIPPING. See paragraph 64.

(8) BRAKES DRAGGING. See paragraph 44 f.

e. Engine Knocks.

(1) EXCESSIVE CARBON ACCUMULATION IN CYLINDER HEAD. In most cases condition will be apparent on acceleration or hard pull, and will sound like a rattle or ping. Retard timing slightly.

(2) IGNITION TIMING TOO FAR ADVANCED. This condition will result in a noise very similar to excessive carbon accumulation except that the ping will be more pronounced. To correct, retard timing until the ping just disappears when engine is pulling.

(3) LOOSE PISTON PIN. Loose piston pin knocks may usually be identified from other engine knocks as occurring intermittently and are of a sharper character than main bearing knocks. Refer to higher authority.

(4) LOOSE CONNECTING ROD BEARINGS. Knocks resulting from loose connecting rods occur at regular intervals, and are of a slightly deeper tone than piston pin knocks. Refer to higher authority.

(5) LOOSE MAIN BEARINGS. Main bearing knocks are more of a heavy thud than a knock, and are more apparent as the crankshaft revolves to a stop after the ignition has been turned off. Refer to higher authority.

(6) EXCESS VALVE TAPPET CLEARANCE. Excess clearance between valve tappet face and valve stems will result in a sharp click occurring at regular intervals. Adjust tappets to 0.006-inch clearance when engine is hot (par. 55 c).

f. Engine Overheats.

(1) COOLING SOLUTION LOW. Add sufficient coolant to bring solution to required level.

(2) THERMOSTAT DEFECTIVE. Test thermostat action by removing and placing in water heated to approximately 180°F. Thermostat should start to open at 162°F, and be fully open at 185°F. Replace if not operating within specifications (par. 81).

(3) FAN BELT SLIPPING. Test belt adjustment by pressing in on fan belt with thumb or finger. Belt has proper tension when deflection is from ½ to 1 1/16 inch by finger pressure. Readjust tension if necessary (par. 79 b).

(4) RADIATOR FINS CLOGGED. Remove restrictions from opening.

(5) ENGINE OIL LEVEL LOW. Check crankcase oil level, and add oil of correct grade and viscosity as required.

(6) CLUTCH SLIPPING. See paragraph 64.

(7) BRAKES DRAGGING. See paragraph 44 f.

(8) TRUCK DRIVEN IN TOO HIGH RATIO GEAR FOR LOAD OR TERRAIN. Shift to lower ratio gear.

(9) IGNITION TIMING INCORRECT. See paragraph 93 f.

g. Excessive Oil Consumption.

(1) CRANKCASE OIL LEVEL TOO HIGH. Check crankcase oil level, and drain excess oil if necessary.

(2) EXTERNAL OIL LEAKS. Inspect all gaskets and oil seals for visible evidence of leaks. If leaks are discovered, tighten all holding nuts or cap screws, and if correction is not effected, report to higher authority.

(3) EXCESSIVE OIL PRESSURE. Refer to higher authority.

(4) IMPROPER GRADE AND VISCOSITY OF OIL. Replace with oil of recommended grade and viscosity.

(5) EXCESSIVE CYLINDER AND PISTON WEAR. This condition is usually evidenced by loss of power, low cylinder compression, and smoking exhaust, in addition to excessive oil consumption. To correct, refer to higher authority.

(6) LOOSE MAIN OR CONNECTING ROD BEARINGS. Loose main or connecting rod bearings, usually identified by knocks (subpar. e (4) (5) above), will cause excessive oil consumption by virtue of the oil being thrown onto the cylinder walls in greater quantity than can be disposed of by the piston oil rings. Refer to higher authority.

h. Low Oil Pressure.

(1) IMPROPER GRADE OR VISCOSITY OF OIL. Change to oil of proper grade and viscosity.

(2) OIL PRESSURE RELIEF VALVE STUCK. Refer to higher authority.

(3) LOOSE MAIN OR CONNECTING ROD BEARINGS. Refer to subparagraph e (4) (5) above to identify. Refer to higher authority.

33. CLUTCH.

a. Clutch Slips.

(1) OPERATOR "RIDES" CLUTCH PEDAL. Correct driving habits.

(2) CLUTCH FACINGS IMPREGNATED WITH OIL OR GREASE. Replace clutch driven plate (par. 66).

(3) CLUTCH REQUIRES ADJUSTMENT. Adjust clutch as specified in paragraph 64. CAUTION: *Do not attempt correction by pedal adjustment.*

b. Clutch Grabs or Chatters.

(1) FACINGS LOOSE ON DRIVEN MEMBER. Replace clutch driven plate (par. 66).

(2) CLUTCH FACINGS IMPREGNATED WITH OIL OR GREASE. Replace clutch driven plate (par. 66).

(3) CLUTCH PRESSURE PLATE SCORED. Refer to higher authority.

34. FUEL SYSTEM.

a. Insufficient or No Fuel to Cylinders to Start Engine.

(1) FUEL PUMP INOPERATIVE. Remove fuel pump bowl, actuate priming lever and ascertain if pump delivers fuel. If not, perform steps (2) and (3) below and again test pump. If no fuel is delivered when testing second time, replace pump (par. 70 c).

(2) FUEL FILTER CLOGGED. Service fuel filter (par. 69 b). Examine filter to pump line for restrictions, and replace if necessary.

(3) FUEL TANK TO FILTER LINE CLOGGED OR RESTRICTED. Examine fuel line for restrictions, bends, kinks, or dents, and foreign matter which might shut off flow of fuel. Clean or replace line if necessary.

(4) AIR LEAKS IN LINES. Examine all connections for evidence of leakage and tightness.

(5) BROKEN FUEL PUMP OPERATING ARM. Disconnect fuel pump to carburetor line at carburetor fitting, crank engine with cranking motor, and determine if pump delivers fuel while engine camshaft turns. If inoperative, replace pump.

(6) CARBURETOR CHOKE CONTROL ADJUSTMENT INCORRECT. If insufficient fuel reaches cylinders to start engine when cool or cold, check control adjustment as outlined in paragraph 71 b.

(7) CARBURETOR THROTTLE CONTROL ADJUSTMENT INCORRECT. If throttle adjustment is incorrect, and insufficient fuel reaches cylinders to start engine, adjust throttle control to provide full opening throttle when accelerator is depressed, or throttle control is pulled out.

(8) CARBURETOR FLOAT LEVEL INCORRECT. If fuel level in carburetor bowl is too low to provide sufficient fuel to start engine, refer to higher authority.

b. Fuel Pump Noisy.

(1) PUMP BODY LOOSE ON ENGINE. Tighten pump mounting cap screws.

(2) ROCKER ARM CONTACT SPRING WEAK OR BROKEN. Remove pump and operate contact arm, observing spring tension. Replace pump if spring is weak.

(3) ROCKER ARM OR PIN WORN. With pump removed examine arm, and by operating arm, determine if pin is worn. Replace pump if necessary.

(4) OPERATING ROD SCORED OR WORN. With pump removed inspect operating rod for excessive wear or scores. Replace pump if necessary (par. 70 e).

c. Engine Backfires Through Manifold.

(1) CARBURETOR MIXTURE TOO LEAN. This condition usually occurs at high speed. Refer to higher authority for correction.

(2) IGNITION TIMING INCORRECT. Adjust ignition timing (par. 93 f).

d. Engine Stalls or Lacks Power Due to Excess Fuel.

(1) CHOKE VALVE REMAINS PARTIALLY OR FULLY CLOSED. Adjust choke control linkage until choke valve is fully open when control button is against dash (par. 71 b).

(2) CARBURETOR FLOAT VALVE INCORRECTLY ADJUSTED. Refer to higher authority.

(3) CARBURETOR METERING ROD SIZE INCORRECT FOR OPERATING CONDITIONS. Refer to higher authority.

e. Engine Falters on Acceleration.

(1) CARBURETOR ACCELERATOR PUMP DEFECTIVE. Replace carburetor (par. 71 g).

(2) DIRT IN METERING ROD SEATS. Clean or replace carburetor (par. 71 g).

35. COOLING SYSTEM.

a. Engine Overheats.

(1) INSUFFICIENT COOLANT IN SYSTEM. Add coolant.

(2) FAN BELT LOOSE. Adjust belt to correct tension by moving fan and shaft assembly in mounting bracket with adjusting screw until ½- to 1 1/16-inch belt deflection can be obtained with finger pressure (par. 79 b).

(3) FAN BELT OILY, GREASY, OR WORN. If belt is oily or greasy, resulting in slippage, clean belt, or if not satisfactory after cleaning, replace belt. If belt is worn enough to cause slipping, replace.

(4) WATER PUMP INOPERATIVE. Test pump action by filling radiator, and observing if water is agitated with engine running; or by grasping upper radiator hose tightly, and feeling if pressure is indicated when engine is accelerated. If pump is inoperative, replace (par. 80 d).

(5) THERMOSTAT INOPERATIVE. If engine heats rapidly and continues to rise after temperature indicator reaches 185-190, remove thermostat and test for opening. Thermostat should start to open when placed in water heated to approximately 160°F, and fully open at 185°F. If defective, replace thermostat (par. 81).

(6) RADIATOR CORE FINS CLOGGED. Clean radiator core openings of any mud, debris, or other foreign matter which would restrict air flow.

(7) RADIATOR UPPER OR LOWER HOSES COLLAPSED. Test both upper and lower hose by appearance and feel for pressure when engine is accelerated. If evidence of weak or collapsed hose is discovered, replace hose.

(8) RADIATOR CORE CLOGGED INTERNALLY. If thermostat and water pump action are determined to be satisfactory, and both upper and lower hose are in good condition, remove radiator cap and note

degree of turbulence in upper radiator tank when engine is accelerated. If sluggish, or no movement of solution is noticed, radiator core may be clogged internally. Reverse-flush or replace core.

(9) IGNITION TIMING INCORRECT. Retime ignition (par. 93 f).

b. Engine Runs Too Cool.

(1) THERMOSTAT STICKING OPEN. This condition will be evidenced by the engine running consistently cool, and not warming up during the period that the thermostat would normally remain closed until engine warmed up. Replace thermostat (par. 81).

c. Cooling System Leaks.

(1) HOSE CONNECTIONS LOOSE. Tighten upper and lower hose connections.

(2) HOSE BROKEN OR DETERIORATED. Replace hose.

(3) CYLINDER HEAD GASKET DEFECTIVE. Install new gasket.

(4) RADIATOR CORE LEAKING. Examine core for visual evidence of leaks and if leaking, replace core.

36. CRANKING SYSTEM.

a. Cranking Motor Will Not Operate.

(1) BATTERY PARTIALLY OR COMPLETELY DISCHARGED. Test battery with hydrometer for specific gravity. If reading is less than 1.200, recharge or replace with a fully charged battery.

(2) BATTERY TERMINALS LOOSE OR CORRODED. Examine terminals for tightness and corrosion. Clean and tighten as necessary.

(3) BATTERY GROUND STRAP NOT MAKING GOOD CONTACT. Examine ground strap for contact and tightness. Clean and tighten if necessary.

(4) CRANKING MOTOR DASH SWITCH DEFECTIVE. Remove one wire from terminal on switch and touch it to other switch terminal wire. If shorting causes cranking motor to operate, replace switch (par. 83 c).

(5) WIRES LOOSE AT TERMINALS ON CRANKING MOTOR OR SWITCH. Tighten terminals as required.

b. Cranking Motor Operates But Does Not Crank Engine.

(1) CRANKING MOTOR PINION OR FLYWHEEL GEAR TEETH STRIPPED. Replace cranking motor or refer to higher authority, if teeth are stripped on flywheel.

(2) CRANKING MOTOR PINION SHAFT DIRTY OR GUMMY. If cranking motor spins but pinion does not engage with flywheel gear teeth, because dirt or gum causes pinion to stick on Bendix shaft, remove cranking motor and clean Bendix drive parts. If gears do not engage as the result of a broken Bendix spring, or studs attaching spring to pinion are broken, replace parts or assembly.

c. Cranking Motor Speed Too Slow.

(1) IMPROPER GRADE OF ENGINE OIL. Too much drag or friction on engine parts. Change to correct grade of oil.

(2) VOLTAGE DROP IN CIRCUIT DUE TO POOR BATTERY OR GROUND CONNECTIONS. Examine battery and ground connections for tightness and poor contact. Clean and tighten.

37. IGNITION SYSTEM.

a. No Spark at Plugs.

(1) BATTERY DISCHARGED. Test battery for charge. If discharged, replace with fully charged battery.

(2) BATTERY CABLES LOOSE OR DISCONNECTED AT BATTERY TERMINALS. Connect or tighten terminal connections.

(3) BATTERY GROUND STRAP LOOSE, OR GROUND CONNECTION DIRTY. Clean and tighten ground connection.

(4) COIL TO DISTRIBUTOR WIRE DISCONNECTED. Examine wire at coil and distributor towers for tight, clean connection.

(5) DISTRIBUTOR ROTOR OUT OF CONTACT WITH DISTRIBUTOR CAP PLUNGER. Remove distributor cap, and examine plunger and spring. Replace if necessary.

(6) DISTRIBUTOR ROTOR OUT OF CONTACT WITH CAP TERMINALS. Examine cap for burned rotor contact or burned distributor cap terminals. Replace cap and/or rotor.

(7) DISTRIBUTOR TO CONDENSER WIRE DISCONNECTED. Examine for loose or disconnected terminals; connect and tighten if necessary.

(8) DISTRIBUTOR POINTS PITTED AND STUCK. Examine points for evidence of excessive pitting causing points to stick. This condition is usually the result of a defective condenser. Replace points, adjust gap to 0.018 to 0.022 inch, and replace condenser.

(9) DISTRIBUTOR POINT GAP INCORRECTLY ADJUSTED. If distributor point gap is adjusted so that points will not separate, or points are opening too wide, adjust point gap to 0.018- to 0.022-inch maximum opening.

(10) SPARK PLUG WIRES LOOSE AT DISTRIBUTOR OR PLUG TERMINALS. Examine wires at distributor cap towers and plug terminals for tightness. Push wires firmly in towers and down over plug terminals.

(11) SPARK PLUGS BROKEN OR ELECTRODE GAP INCORRECT. Examine plugs for broken porcelain, or electrode gaps spaced incorrectly. Adjust all electrode gaps to 0.025 inch and replace broken plugs.

b. Weak Spark at Plugs.

(1) BATTERY CHARGE LOW. Test battery for charge. Cranking motor may be draining most of battery energy to crank engine, leav-

ing insufficient voltage for intense spark. Recharge or replace with a fully charged battery.

(2) WEAK COIL. Coil may have deteriorated to such an extent as to fail to transform battery low voltage to high voltage necessary to jump spark plug gap. Replace coil.

(3) DISTRIBUTOR BREAKER POINT GAP INCORRECT. If gap is too close or too great, space points to 0.018 to 0.022 inch.

(4) COIL OR DISTRIBUTOR CAP COIL WIRE TOWER CORRODED OR DIRTY. Clean wire terminals, and distributor cap and coil tower terminals.

(5) LARGE FILTER UNIT ON DASH DEFECTIVE. Remove unit cover, disconnect the wires from the opposite ends of the filter, and join them together. If the lower filter is defective, normal ignition spark will be restored. If either of the other filters is responsible, the ammeter will indicate restoration of battery charging circuit. Replace filter assembly to eliminate either difficulty.

(6) DEFECTIVE CONDENSER ON IGNITION COIL. Test condenser by disconnecting lead wire to condenser, leaving other wires in place. Normal operation indicates need of replacing condenser.

c. Ignition Timing Incorrect.

(1) ENGINE MISFIRES, OR LACK OF POWER. Either condition may be the result of incorrect ignition timing. Retime as outlined in paragraph 93 f.

(2) ENGINE OVERHEATS. Check ignition timing, and retime if necessary (par. 93 f).

(3) ENGINE KNOCKS. If preignition knock having rattle or ping characteristics due to timing being too far advanced is evident, retime ignition (par. 93 f).

38. BATTERY AND GENERATING SYSTEM.

a. Battery Will Not Retain Charge.

(1) LOOSE, DIRTY, OR CORRODED CONNECTING TERMINALS. Battery discharging current through loose, dirty, or corroded terminals. Check terminals; clean, and tighten if necessary.

(2) LIGHT OR ACCESSORY SWITCHES DEFECTIVE OR NOT TURNED TO "OFF" POSITION. Inspect all light and accessory switches for "OFF" position; when turned off, observe ammeter reading for indication of current discharge. Trace any defective switches, and replace or report to higher authority.

(3) WIRING SHORTED. Trace out short in wiring and replace wiring.

(4) GENERATOR REGULATOR CIRCUIT BREAKER POINTS STICKING. This condition will be evidenced by discharge reading of the ammeter which cannot be eliminated by turning off all switches, and

determining that no shorts exist in wiring. If difficulty cannot be eliminated by jarring regulator, replace (par. 86).

b. Battery Does Not Charge.

(1) LOOSE CONNECTIONS AT BATTERY TERMINALS OR GENERATOR. Clean and tighten connections.

(2) BATTERY CELLS DRY. Replenish water in battery cell.

(3) BATTERY CELLS SHORTED, OR OTHER INTERNAL DAMAGE. Replace battery.

(4) DEFECTIVE GENERATOR OR GENERATOR REGULATOR. Refer to paragraphs 85 and 86.

(5) DEFECTIVE FILTER UNIT ON DASH. Refer to paragraph 88 c.

(6) DEFECTIVE FILTER ON GENERATOR REGULATOR. A defective filter will prevent proper functioning of the battery charging circuit. Remove the filter, and connect the generator field wire to the field terminal on the regulator. If the ammeter indicates the charging circuit is restored, replace the filter.

(7) DEFECTIVE CONDENSER AT GENERATOR ARMATURE TERMINAL. If the condenser at the generator armature terminal is believed defective, check by disconnecting the lead wire from condenser, allowing other wires to remain in place. Normal operation indicates the faulty condenser should be replaced.

c. Generator Does Not Develop Charge.

(1) DRIVE BELT SLIPPING. Adjust belt to ½- to $^{11}/_{16}$-inch deflection at finger pressure.

(2) GENERATOR PULLEY LOOSE ON SHAFT. Tighten pulley.

(3) GENERATOR COMMUTATOR DIRTY. Clean commutator by removing cover band and placing a strip of No. 00 flint paper over a thin strip of wood and holding it against commutator while it is rotating slowly.

(4) GENERATOR BRUSHES WORN OR NOT SEATING PROPERLY. Examine brushes for evidence of excessive wear or weak brush springs, allowing brushes to pull away from commutator. Replace generator if brushes are not making good contact with commutator, due to wear or weak springs.

(5) HIGH MICA BETWEEN COMMUTATOR BARS. If commutator bars are worn to such an extent as to prevent brushes from contacting bars due to high mica separators, replace generator.

(6) LOOSE WIRING CONNECTIONS. Examine all wiring from generator to regulator, and regulator to ammeter and battery. Clean and tighten all connections if necessary.

(7) DEFECTIVE AMMETER. If generator is actually charging, as evidenced by consistently charged battery, but ammeter does not register charge, replace ammeter.

(8) FAULTY GENERATOR REGULATOR. If generator regulator is defective, replace regulator (par. 86).

39. TRANSMISSION.

a. Transmission Noisy.

(1) INSUFFICIENT OR INCORRECT GRADE OF LUBRICANT. Check lubricant level and add lubricant as required. Test grade of lubricant and change if necessary.

(2) CLUTCH HOUSING LOOSE ON ENGINE. Tighten cap screws holding clutch housing to engine.

(3) TRANSMISSION LOOSE ON CLUTCH HOUSING. Tighten nuts on studs holding transmission to clutch housing.

(4) TRANSMISSION INTERNAL PARTS NOISY. Refer to higher authority and replace transmission (pars. 97 and 98).

b. Transmission Slips Out of Gear.

(1) INTERNAL PARTS INCORRECTLY ADJUSTED OR WORN. Refer to higher authority and replace transmission (pars. 97 and 98).

c. Transmission Leaks Lubricant.

(1) MAINSHAFT OIL SEAL WORN OR DAMAGED. Refer to higher authority and replace transmission.

(2) TRANSMISSION COVER LOOSE OR GASKET DAMAGED. Tighten cover and/or install new cover gasket, and reinstall cover.

40. TRANSFER CASE.

a. Transfer Case Noisy.

(1) INSUFFICIENT OR INCORRECT GRADE OF LUBRICANT. Observe lubricant level and add lubricant as required. Check grade of lubricant and change if necessary.

(2) CONTROL ROD LOOSE OR INCORRECTLY ADJUSTED. Adjust control rods to proper length, and check clevises for proper clearance. Inspect clevis pins for proper fit. Replace if necessary.

(3) LOOSE OR DAMAGED MOUNTING CUSHIONS. Examine frame cross member to transfer case mounting bolts for tightness, and mounting cushions for damage. Replace if necessary.

(4) INTERNAL PARTS WORN OR DAMAGED. Refer to higher authority and replace transfer case.

b. Lubricant Leakage.

(1) COVER LOOSE OR GASKET DAMAGED. Tighten cover or replace gasket if damaged.

(2) DAMAGED DECLUTCH SHAFT, DRIVEN SHAFT, OR MAINSHAFT OIL SEALS. Refer to higher authority and replace transfer case (pars. 100 and 101).

c. Slipping out of Gear.

(1) CONTROL ROD IMPROPERLY ADJUSTED. Readjust control rod.

(2) INTERNAL BEARING, GEAR OR SHIFT SHAFT LOCK PARTS. Refer to higher authority and replace transfer case (pars. 100 and 101).

41. PROPELLER SHAFT, UNIVERSAL JOINTS, AND PILLOW BLOCK.

a. Noise or Vibration.

(1) BENT OR INCORRECTLY INSTALLED SHAFT AND JOINTS. Inspect shaft for bent condition. If out of alinement, replace shaft. Examine shaft and slip joint for assembly alinement marks. If assembly marks are not in alinement, remove, disassemble, and reassemble according to alinement markings.

(2) DRY UNIVERSAL JOINT CROSS BEARINGS. Lubricate bearings as instructed in lubrication section (par. 23).

(3) WORN UNIVERSAL JOINT BEARINGS OR CROSS. Inspect parts for damage, and replace parts as necessary.

(4) PILLOW BLOCK ATTACHING SCREWS LOOSE. Inspect pillow block for tightness; if loose, tighten as required.

42. FRONT AXLE.

a. Front Axle Noise.

(1) IDENTIFYING AXLE NOISE. Many times what is first thought to be axle noise is in reality tire noise or hum due to the character of the road over which the vehicle is being operated. To determine if the noise actually emanates from the axle, drive the vehicle over a soft dirt road. If the noise disappears when driving over this type of road, it is safe to assume the noise results from the tires. As front and rear axle noises are very similar, determine if the noise emanates from the front or rear axles.

(2) CONTINUOUS HUM. If the hum exists at all speeds, and is apparent on both coasting and pulling, examine wheel bearings for evidence of looseness and lubrication. Readjust and relubricate bearings. If servicing wheel bearings does not eliminate noise, pinion bearings may require adjustment. Refer to higher authority.

(3) COASTING HUM. If hum or noise exists only on coasting (clutch disengaged), the condition may be caused either by incorrect wheel bearing adjustment, by pinion bearings, or pinion to bevel gear adjustment. Inspect, adjust, and lubricate wheel bearings and test for noise. If not eliminated by wheel bearing adjustment, refer to higher authority.

(4) PULLING HUM. If hum or noise exists only while vehicle is

pulling, it is safe to assume internal axle parts require adjusting. Refer to higher authority.

b. Front Axle Difficulties Affecting Steering.

(1) CERTAIN FRONT AXLE DIFFICULTIES WILL DIRECTLY AFFECT THE STEERING OF THE VEHICLE. Such conditions will be covered under paragraph 47.

43. REAR AXLE.

a. Rear Axle Noise.

(1) IDENTIFYING REAR AXLE NOISE. See remarks under paragraph 42 a (1).

(2) CONTINUOUS HUM. If hum has definitely been identified as emanating from rear axle and exists at all speeds, readjust wheel bearings and test for noise. If servicing wheel bearings does not eliminate noise, pinion bearings may require adjustment. Refer to higher authority.

(3) COASTING HUM. Refer to paragraph 42 a (3).

(4) PULLING HUM. Refer to paragraph 42 a (4).

(5) BACKLASH NOISE. This noise is usually identified by a sharp click or heavy thud when power is first applied to reverse. The axle shaft flanges may be loose, and should be examined and tightened if necessary. If tightening shaft flanges does not eliminate the noise, trouble is probably due to incorrect adjustment of internal parts. Refer to higher authority.

44. BRAKE SYSTEM.

a. Brake Pedal Goes to Floor Board, But Has Little or No Braking Effect.

(1) NORMAL WEAR OF LININGS. This condition is usually indicated by the need for pumping the brake pedal several times to obtain the necessary braking effect. If satisfactory results are not obtained by making minor brake adjustment, inspect linings; if worn badly, replace brake shoe assemblies (par. 128 a and b).

(2) BRAKE SHOES INCORRECTLY ADJUSTED. If anchor pins are not properly adjusted to effect relative brake shoe lining surface to drum contact, shoes may be sprung and drums distorted, causing one end of shoe lining to engage drum while other end does not make contact. A major brake shoe adjustment is necessary to position brake shoes correctly (par. 126 b (4)).

(3) LEAKAGE IN THE SYSTEM. This will allow gradual depression of the brake pedal to the floor. If inspection of the wheel cylinders, brake lines, and connections fails to reveal leakage, remove master cylinder and examine cylinder walls for scores and scratches. (Master cylinder rubber parts should be examined.) If defective, replace.

(4) AIR IN THE SYSTEM. Indicated by springy pedal operation. If air is present in system, pedal may go to floor under normal foot pressure. It is necessary to bleed the system to correct this difficulty (par. 126 **a** (1) and (2)).

(5) IMPROPER BRAKE PEDAL ADJUSTMENT. Correct pedal and linkage adjustment calls for 1/32 to 3/64-inch lash on the master cylinder piston rod before the pressure stroke starts. Excessive free movement results in a reduced volume of fluid being forced through the lines to the wheel cylinders, because the effective piston stroke in the master cylinder is shortened.

(6) NO FLUID IN SUPPLY RESERVOIR. Check for fluid leaks in system, particularly around master cylinder secondary cup and protective boot on piston rod. Replace master cylinder if necessary. Tighten leaking connections, add correct fluid to brake master cylinder, and bleed system. Check fluid level every 1,000 miles, and add fluid if necessary.

b. Springy or Spongy Pedal Action.

(1) BRAKE SHOES INCORRECTLY ADJUSTED. Refer to subparagraph **a** (2) above.

(2) AIR IN SYSTEM. Refer to subparagraph **a** (4) above.

c. Excessive Pedal Pressure with Little or No Braking Effect.

(1) BRAKE SHOE ADJUSTMENT INCORRECT. Refer to subparagraph **a** (2) above.

(2) INCORRECT TYPE OF LINING. Replace shoe assemblies.

(3) OIL OR GREASE ON LININGS. Replace shoe assemblies, and clean brake mechanism thoroughly. Inspect wheel hub oil seals for evidence of oil leakage, and replace if necessary.

(4) HIGH SPOTS ON LININGS CAUSING POOR SHOE TO DRUM CONTACT. Dress down high spots, or replace shoe assemblies.

(5) LEAKS IN VACUUM SYSTEM. The operation of the entire vacuum system can be checked for leaks as follows: Remove the pipe plug (not the center plug) on the rearward end plate of the power booster. Connect a vacuum gage into the pipe plug hole in the end plate. Start the engine, and note the reading on the gage. It should show a vacuum of 17 to 20 inches. Stop the engine, and note if the vacuum is retained for a reasonable length of time. If the vacuum drops rapidly, it indicates a leak in the cylinder, lines, or check valve connections. Correct leaks or replace units as required.

d. Severe Brake Action with Light Pedal Pressure.

(1) BRAKE SHOES INCORRECTLY ADJUSTED. Refer to subparagraph **a** (2) above. If front wheel brake shoes are not adjusted to same clearance, wheels may pull to one side. At rear brakes, wheel affected will slide first. Correction for this condition requires careful adjustment of brake shoe to drum clearance (par. 126 **b** (4)).

(2) LOOSE BACKING PLATES. Unequal braking will result from brake assemblies shifting on axle housing, or knuckles changing predetermined operating centers on which shoe adjustment is made. Tighten backing plates securely, and adjust brake shoes.

(3) GREASE-SOAKED LINING. No attempt should be made to salvage linings by cleaning to remove grease. Replace shoe assemblies at the points affected.

e. One Brake Drags.

(1) WEAK BRAKE SHOE RETURN SPRING. Replace return spring.

(2) SHOE BEARING SEIZED TO ANCHOR PIN. After freeing bearings on anchor pins, lubricate to reduce possibility of recurrence.

(3) BRAKE SHOE SET TOO CLOSE TO DRUM. Adjust brake shoes, paragraph 126 **b** (4).

(4) WHEEL CYLINDER CUPS DISTORTED. Inspect cups and replace if distorted. Wash all parts and dip cups in clean hydraulic brake fluid before installation.

(5) LOOSE WHEEL BEARINGS. Adjust wheel bearings carefully to center brake drums properly in relation to the brake shoes (pars. 136 and 137).

f. All Brakes Drag.

(1) MINERAL OIL IN SYSTEM. The use of engine oil, kerosene, or any mineral oil base liquid will cause the rubber cups, boots, hose, and master cylinder valve to distort. The entire hydraulic system should be flushed thoroughly with hydraulic brake fluid. All rubber parts are to be replaced.

(2) IMPROPER BRAKE PEDAL ADJUSTMENT. Refer to subparagraph **a** (5) above. The master cylinder cup may not completely return to the normal released position if correct pedal free movement is not maintained. With the relief port blocked so that excessive fluid will be drawn into the system, pressure will build up sufficiently to cause the brakes to drag. A temporary correction involves opening bleeder valve at one wheel to allow excess fluid to escape. It is important that the bleeder valve be tightened securely before brakes are applied. To reduce possibility of recurrence, brake pedal and linkage should be carefully adjusted as soon as possible.

(3) DEFECTIVE POWER BOOSTER OPERATING VALVE. Check brake pedal and booster operating linkage for adjustment (par. 126 **b** (2)). If adjustments are within specifications, the atmospheric valve in the booster operating valve may not be seating properly, resulting in a partial brake application. To check the atmospheric valve, disconnect the operating valve-to-power booster cylinder vacuum line from the operating valve, and connect a vacuum gage to valve fitting. Run the engine for a short time and then stop it. If the vacuum drops rapidly, replace operating valve.

g. Vehicle Pulls to One Side.

(1) GREASE-SOAKED LININGS. Refer to subparagraph **d** (3) above.

(2) BRAKE SHOES INCORRECTLY ADJUSTED. Refer to subparagraph **d** (1) above.

(3) LOOSE BRAKE BACKING PLATES. Refer to subparagraph **d** (2) above.

(4) LOOSE FRONT SPRING U-BOLTS. This condition is particularly noticeable during severe brake applications, and is due to front axle shifting under springs and running in misalinement. Restore axle to original position, first determining that spring center bolt has not sheared, and tighten spring U-bolts.

(5) DIFFERENT TYPES OF LININGS ON BRAKE SHOES. As linings differ in material specifications, it is important that linings of the same make, type, and thickness be used on all wheel brakes; otherwise linings having higher braking efficiency will affect braking effort. If this condition is discovered, refer to higher authority.

(6) TIRES NOT PROPERLY INFLATED. Braking effort is affected to a certain extent by variations in tire pressure. Inflate all tires to equal pressure.

45. WHEELS, TIRES, HUBS, AND DRUMS.

a. Wheel Noises.

(1) WHEEL NOISE CAUSED BY LOOSE OR BROKEN WHEEL BEARINGS. This condition is usually identified by a pounding sound, and will contribute materially to front wheel shimmy. Inspect for loose or broken bearings. Relubricate if necessary, adjust, or if bearings are broken, replace and adjust.

(2) BRAKE DRUMS LOOSE ON HUBS. Tighten drums to hubs (par. 128 **a** (3)).

(3) LOOSE BRAKE SHOES OR BACKING PLATES. These are usually identified by a rubbing or squeaking noise. Tighten or replace parts as necessary.

(4) WHEEL ASSEMBLY OUT OF BALANCE. This condition will develop to a minor degree, and make a sound similar to loose or broken wheel bearings. Wheel "shimmy" will also result at high speed. Remove tire, and balance or replace wheel.

(5) WHEEL BENT, SPRUNG, OR INCORRECTLY MOUNTED. Resulting condition is similar to step (4) above. Replace wheel or mount correctly.

(6) TIRES UNDERINFLATED. Inflate tires to proper pressure.

(7) FOREIGN OBJECTS IMBEDDED IN TIRE. Remove foreign objects from tread and from between duals. Examine tire for damage. Reinstall tire, or replace as condition indicates.

b. Excessive or Uneven Tire Wear.

(1) TIRES IMPROPERLY INFLATED. Inflate to recommended pressure.

(2) WHEEL BENT OR INCORRECTLY MOUNTED. Replace wheel, or remove and reinstall.

(3) FRONT WHEELS OUT OF ALINEMENT. Aline front wheels, paragraphs 108 and 114.

(4) BRAKES INCORRECTLY ADJUSTED. Adjust brakes, paragraph 126 b (3).

(5) CLUTCH GRABBING. Adjust clutch, paragraph 64 b.

(6) FRONT AXLE OUT OF ALINEMENT. Inspect front axle spring center bolt for breakage, and spring U-bolts for tightness. Replace center bolt, or tighten U-bolts as required.

(7) IMPROPER BRAKE APPLICATION BY DRIVER. Correct driving habits.

c. Vehicle Pulls to One Side.

(1) UNEVEN TIRE PRESSURE. Inflate all tires to recommended pressure.

(2) WHEEL BEARINGS IMPROPERLY ADJUSTED. Adjust wheel bearings (pars. 136 a, 137 a, and 138 a).

(3) BRAKES IMPROPERLY ADJUSTED. Adjust brakes (par. 126 b (3)).

(4) FRONT TIRE DIAMETERS UNEQUAL. Replace with tires having same diameters.

46. SPRINGS AND SHOCK ABSORBERS.

a. Vehicle Rides Hard.

(1) SPRING SHACKLES AND BOLTS INSUFFICIENTLY LUBRICATED. Clean and lubricate shackles and bolts.

(2) SHACKLE OR BRACKET BOLTS SEIZED. Remove bolts; clean or replace, and lubricate as necessary.

(3) VEHICLE OVERLOADED. Reduce vehicle load to rated load capacity.

(4) VEHICLE LOAD DISTRIBUTION UNEVEN. Distribute vehicle load evenly.

(5) SPRING LEAVES BROKEN. Remove spring, replace broken leaf or leaves, lubricate shackles and bolts, and reinstall.

(6) SPRING REBOUND CLIPS TOO TIGHT. Free up and adjust rebound clips.

(7) SHOCK ABSORBERS INOPERATIVE. Replace shock absorber.

b. Springs Too Flexible.

(1) SPRING LEAVES GREASY OR OILY. Spring leaves should never be lubricated. If leaves are oily or greasy, clean springs as much as

possible without dissassembly, and allow reasonable time to elapse to improve condition. If no improvement is noted, remove, disassemble, and clean. Reassemble and reinstall.

(2) LACK OF FLUID IN SHOCK ABSORBERS. Fill shock absorbers with correct fluid to proper level.

(3) SHOCK ABSORBERS INOPERATIVE. Replace defective shock absorbers (par. 147).

(4) SPRING REBOUND CLIPS BROKEN. Replace broken rebound clips.

c. Springs or Shock Absorbers Noisy.

(1) SHACKLE OR BRACKET BOLTS OR BUSHINGS WORN OR BROKEN. Inspect shackle and bracket bolts and bushings for wear or breakage. Replace if necessary.

(2) AXLE OR SPRING MISALINEMENT DUE TO LOOSE SPRING CLIP NUTS OR BROKEN CENTER BOLT. Inspect axle and springs for misalinement. Examine spring clip nuts; if loose, tighten. Inspect spring center bolt; if broken, replace and aline axle and spring.

(3) LOOSE REAR SPRING SEAT BEARINGS. Inspect rear spring seat bearing for end play of seal on cross bar. If loose, readjust bearings until no end play on cross bar is perceptible.

(4) SHOCK ABSORBER MOUNTINGS LOOSE. Tighten mountings as necessary.

(5) WORN SHOCK ABSORBER BUSHINGS. Replace bushings.

(6) LOOSE OR BROKEN SHOCK ABSORBER ARM. Tighten or replace shock absorber arm.

(7) SHOCK ABSORBER INOPERATIVE. Replace shock absorber (par. 142).

(8) INSUFFICIENT FLUID IN SHOCK ABSORBER. Add fluid as required.

(9) SHOCK ABSORBER FLUID DIRTY. Remove, clean, and refill with new, clean fluid.

47. STEERING GEAR.

a. Vehicle Difficult to Steer.

(1) LACK OF LUBRICATION. Lubricate at following points:

(a) Tie rod ends.

(b) Steering gear housing.

(c) Steering connecting rod (drag link).

(d) Steering knuckle bearings.

(2) IMPROPER ADJUSTMENT OF STEERING GEAR. To determine if difficult steering is caused by improper adjustment of the steering gear proper, disconnect the steering connecting rod (drag link) at the Pit-

man arm and check the ease with which the steering wheel can be turned. If the wheel can be turned without undue effort, the trouble must be in some unit other than the steering gear. If the wheel is difficult to turn, adjust as outlined in paragraph 144, or refer to higher authority.

(3) CONNECTING ROD (DRAG LINK) ENDS ADJUSTED TOO TIGHT. Check connecting rod ends for free movement. If difficult to move, lubricate properly, and free up by backing off adjusting plugs. Lock plugs with new cotter pins after adjustment is completed.

(4) TIE-ROD ENDS TIGHT OR IMPROPERLY LUBRICATED. Test tie-rod ends for freedom of movement and proper lubrication. Free up and lubricate if necessary.

(5) STEERING KNUCKLE TENSION INCORRECT. With front end jacked up and steering linkage disconnected, test steering knuckle for free movement. If difficult to move, refer to higher authority.

(6) TIRES UNDERINFLATED. Test air pressure in front tires. If under recommended pressure, inflate to proper pressure.

(7) INCORRECT CASTER, TOE-IN, BENT FRAME, OR FRONT WHEEL MISALINEMENT. Refer to higher authority.

b. Wheels Shimmy.

(1) TIRES UNDERINFLATED. Inflate tires to recommended pressure.

(2) TIRES WORN UNEVENLY. Shift tires or replace.

(3) FRONT WHEEL HUB BEARINGS LOOSE. Adjust wheel bearings (pars. 136 a and 137 a).

(4) FRONT AXLE SHIFTED. Inspect front axle spring center bolt for breakage, and spring U-bolts for tightness. If axle has shifted, realine, or refer to higher authority.

(5) IMPROPER LOAD DISTRIBUTION. Equalize load.

(6) FRONT WHEEL CASTER INCORRECT. Refer to higher authority.

(7) FRONT WHEEL TOE-IN INCORRECT. Adjust toe-in (pars. 108 and 114).

c. Steering Wander.

(1) TIRES IMPROPERLY INFLATED. Inflate to recommended pressure.

(2) FRONT WHEEL BEARINGS INCORRECTLY ADJUSTED. Adjust front wheel bearings (pars. 136 a and 137 a).

(3) STEERING GEAR MOUNTING BOLTS LOOSE. Inspect steering gear mounting bolts, and tighten if necessary.

(4) STEERING GEAR ASSEMBLY PARTS WORN OR INCORRECTLY ADJUSTED. Refer to higher authority.

(5) STEERING CONNECTING ROD (DRAG LINK) ENDS LOOSE. Inspect connecting rod ends for proper adjustment. Readjust if necessary.

d. Road Shock Transmitted to Steering Wheel.

(1) STEERING CONNECTING ROD (DRAG LINK) ENDS TOO TIGHT OR TOO LOOSE. Readjust connecting rod ends.

(2) INSUFFICIENT BACKLASH IN STEERING GEAR WORM. Refer to higher authority.

(3) FRONT WHEEL BEARINGS LOOSE. Adjust bearings (pars. 136 a and 137 a).

48. BODY AND FRAME.

a. Body Noises. Trouble shooting in connection with bodies and frames will be confined mainly to locating and eliminating body noises. Body noises can be grouped in two classifications; viz., those occurring in the cab, and those which occur in the cargo-carrying body proper.

(1) CAB NOISES. Cab noises can be grouped in two classifications, those occurring as a result of the cab being loose on the frame, which can be eliminated by tightening the cab mounting bolts, and those occurring as a result of doors, windows, and windshields being improperly fitted or loose at fastening points, or glass being loose in the window or windshield frames. No set procedure can be outlined for locating such noises, as the point of origin can only be determined by the process of elimination. If the condition is the result of loose mounting bolts, insufficient lubrication at door hinges, pins, locks, or loose fittings, tightening or lubricating will eliminate the noises. If the corrective work necessary is of a sheet metal character, refer to higher authority.

(2) CARGO BODY NOISES. If investigation determines that the noise occurs in the cargo-carrying section of the body, an effort should be made to locate the noise, and if possible eliminate it by tightening all fastening bolts, screws, etc. If breakage is discovered which would necessitate welding or repairs of a sheet metal nature, refer to higher authority.

b. Frame Noises or Repair. If it is determined, through the process of elimination, that the noise emanates from the frame, the condition should be referred to higher authority. If the frame is bent or damaged, refer to higher authority.

49. LIGHTING SYSTEM.

a. Lights Inoperative.

(1) BATTERY DISCHARGED. Recharge or replace with fully charged battery.

(2) BATTERY TERMINALS LOOSE OR DIRTY. Clean and tighten terminals.

(3) BATTERY GROUND STRAP LOOSE OR MAKING POOR CONNECTION. Clean and tighten.

(4) WIRING BROKEN OR SHORTED. Trace wiring, and repair or replace.

(5) LIGHT SWITCH DEFECTIVE. Test switch by shorting terminals and noting if light burns. Replace switch if defective.

(6) FUSE BLOWN. Examine fuses and replace if blown.

b. Insufficient Light.

(1) BATTERY CHARGE LOW. Recharge or replace with a fully charged battery.

(2) POOR GROUND CONNECTION. Clean and tighten.

(3) LOOSE WIRING TERMINALS. Tighten terminals.

(4) WIRES SHORTED. Trace wiring and repair or replace.

(5) LIGHTS INCORRECTLY AIMED (HEADLIGHTS). Adjust lights for proper focus (par. 151 b).

50. INSTRUMENTS.

a. Speedometer.

(1) FAILS TO REGISTER. Check cable for breakage and proper hook-up at connecting ends.

(2) NOISY. Inspect for proper fastening on instrument panel. Tighten if necessary. If due to internal defect, replace.

b. Oil Pressure Gage.

(1) DOES NOT REGISTER PRESSURE. If adequate oil is in crankcase, and the oil is circulating but no pressure is registered, make sure gage fittings are tight, and replace gage.

c. Engine Temperature Gage.

(1) GAGE DOES NOT REGISTER OR STICKS AT ONE READING. Remove element or bulb from cylinder head, and test gage action by immersing element in hot water. If gage does not register a change in reading, replace assembly (par. 159).

d. Fuel Gage.

(1) INCORRECT OR NO READING. Test gage for proper operation by connecting tank unit wires to new tank unit, and moving float up and down by hand. Notice if gage registers. Check wiring terminals for good connection and if gage remains inoperative, replace dash unit. If reading obtained when testing with new tank unit indicates tank unit is faulty, replace tank unit (par. 158 c).

e. Ignition Switch.

(1) SWITCH INOPERATIVE. Test switch for proper operation or contact by connecting a jumper wire across terminals, and operate cranking motor. If engine fires, replace switch (par. 83 c).

f. Cranking Motor Switch.

(1) SWITCH INOPERATIVE. See paragraph 83 c (cranking motor).

g. Light Switches.

(1) SWITCHES INOPERATIVE. Test switches by shorting across terminals and observing if lamps burn. If lamps do not burn, replace switches.

h. Ammeter.

(1) AMMETER INOPERATIVE. If ammeter fails to register when it is known that generator is charging and generator regulator is in good operating condition, install new ammeter (par. 157).

51. POWER TAKE-OFF.

a. Lubricant Leakage.

(1) OIL SEALS WORN OR DAMAGED. Inspect oil seals at mainshaft and shifter shaft for visual evidence of leakage. If leaking, refer to higher authority.

(2) GASKET LEAKAGE AT MOUNTING PAD. If examination indicates leakage at mounting pad gasket, remove and install new gasket, using gasket sealer when reinstalling.

b. Power Take-off Noisy.

(1) POWER TAKE-OFF MOUNTING SCREWS LOOSE. Tighten all mounting screws and nuts.

(2) POWER TAKE-OFF NOISY INTERNALLY. Refer to higher authority.

52. WINCH.

a. Winch Noisy.

(1) INSUFFICIENT OR IMPROPER GRADE OF LUBRICANT. Add, or drain and refill with correct quantity and grade of lubricant.

(2) BEARINGS, BUSHINGS, OR GEARS DAMAGED. Refer to higher authority.

b. Winch Inoperative (Power Take-off Engaged).

(1) PIN SHEARED IN DRIVE SHAFT FLANGE. Replace drive shaft flange shear pin.

c. Brake Housing Overheats.

(1) BRAKE INCORRECTLY ADJUSTED. Adjust brake (par. 168).

53. HOIST MECHANISM.

a. Hoist Does not Lift Body.

(1) FLUID LEVEL LOW. Add fluid to cylinder as instructed in paragraph 177 **c.**

(2) FLUID LEAKS IN SYSTEM. Inspect hose, connections, pump and cylinder gaskets, and packing nuts for leaks. Tighten connections or replace, and add fluid as required.

b. Hoist Action Jerky or Unsteady.

(1) FLUID LEVEL LOW. Add fluid as instructed in paragraph 177 **c.**

(2) AIR POCKETS IN SYSTEM. Drain fluid and refill, paragraph 177 **c.**

c. Body Will Not Remain in Raised Position.

(1) RELEASE VALVE NOT COMPLETELY CLOSED. Adjust release valve control linkage, paragraph 178 **b.**

(2) BALL CHECK VALVE LEAKING. Clean valve or replace pump (par. 176 **a** and **b**).

d. Pump Noisy.

(1) INSUFFICIENT OIL IN CYLINDER. Add necessary amount of oil.

(2) EXCESSIVE ENGINE SPEED CAUSES PUMP TO RUN AT SPEEDS TOO HIGH TO PICK UP OIL. Reduce engine speed.

(3) FAILURE OF OPERATOR TO DISENGAGE POWER TAKE-OFF WHEN BODY REACHES FULLY RAISED POSITION. This will cause pump to run idle, with insufficient oil to pump, causing it to pick up air. Shift power take-off out when body is fully raised.

(4) SLIP JOINT END OF PROPELLER SHAFT STICKING. Free up joint and lubricate.

Section XII

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

54. DESCRIPTION AND TABULATED DATA.

a. Description (figs. 56, 57, and 58). The 6-cylinder, L-head type engine used in this vehicle has a 4-inch bore and a 4¼-inch stroke. The engine is supported at three points: at the front by an integral bracket and standard which fits over a flange on the timing gear cover, and bolts at the lower end of the bracket to the frame front cross member; and at the rear by one bolt on each side of the flywheel housing through mounting plates which are in turn bolted (two bolts each) to brackets riveted to the frame side rails. The engine mountings are insulated at the front and rear to cushion vibrations. The cylinders are water-jacketed to provide efficient cooling. The cylinder head is fastened to the block by cap screws, and is completely water-jacketed. The water pump is located at the left front of the engine, and is fastened to the rear of the water pump and distributor support bracket, which in turn is held by cap screws to the rear of the timing gear housing. Downdraft carburetion is used, feeding all six cylinders through a single manifold bolted to the upper right side of the cylinder block. The engine oil pump supplies oil under pressure to the main, connecting rod, and camshaft bearings.

b. Tabulated Data.

Make	Hercules
Model	JXD
Type	L-Head
Number of cylinders	6
Bore	4 in.
Stroke	4¼ in.
Displacement	320 cu in.
Compression ratio	5.82 to 1
Oil pressure	35 to 40 lb

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

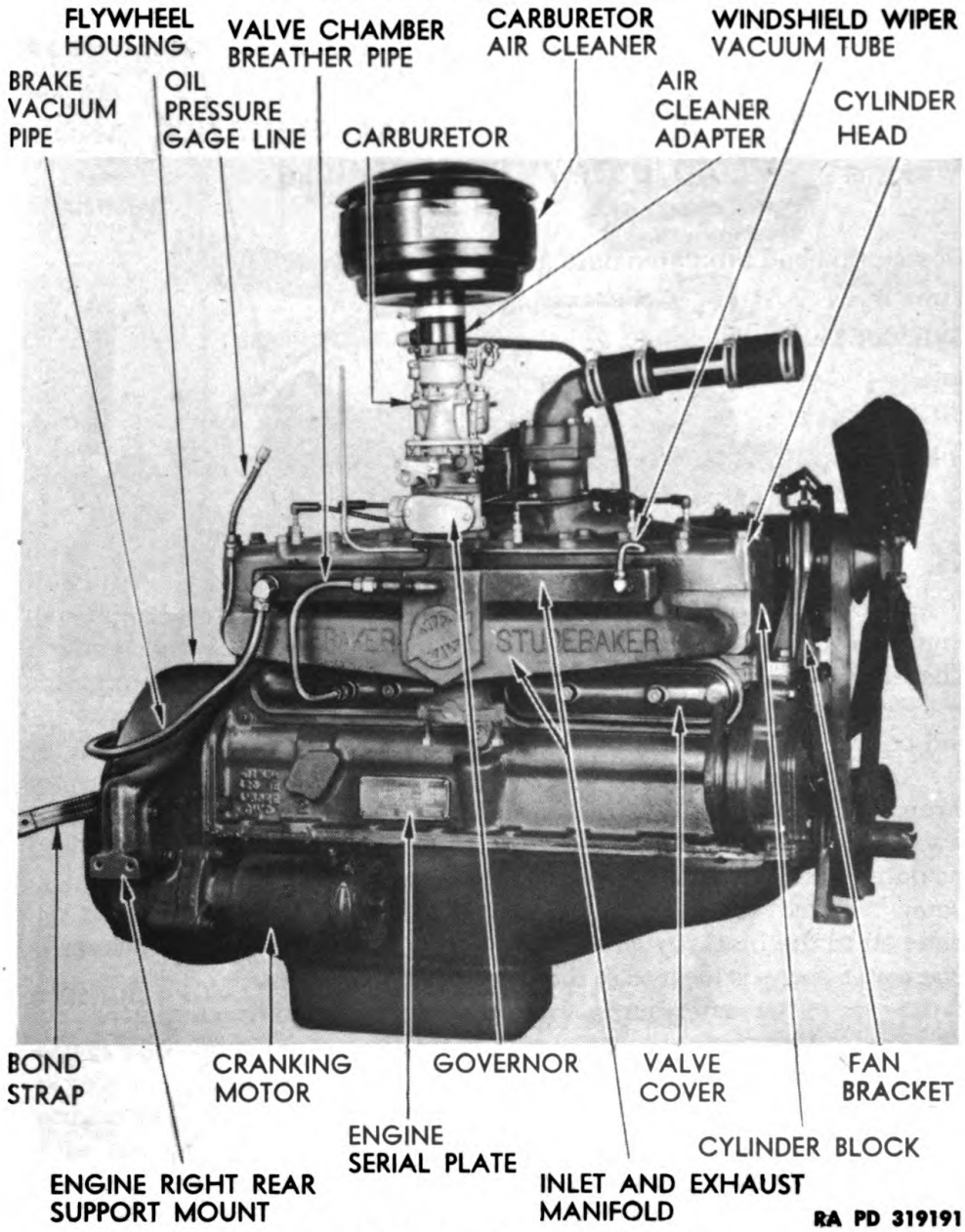


Figure 56—Engine—Right Side

Firing order	1-5-3-6-2-4
Horsepower—SAE	38.4
Crankcase capacity	6 qt
Weight (with accessories and less transmission)	734 lb

55. TUNE-UP.

a. Vacuum Test. Raise hood and remove both hood side panels and fender aprons (par. 61). Disconnect the valve cover to intake mani-

2½-TON 6x6 TRUCK AND 2½- TO 5-TON 6x4 TRUCK (STUDEBAKER MODELS US 6 AND US 6x4)

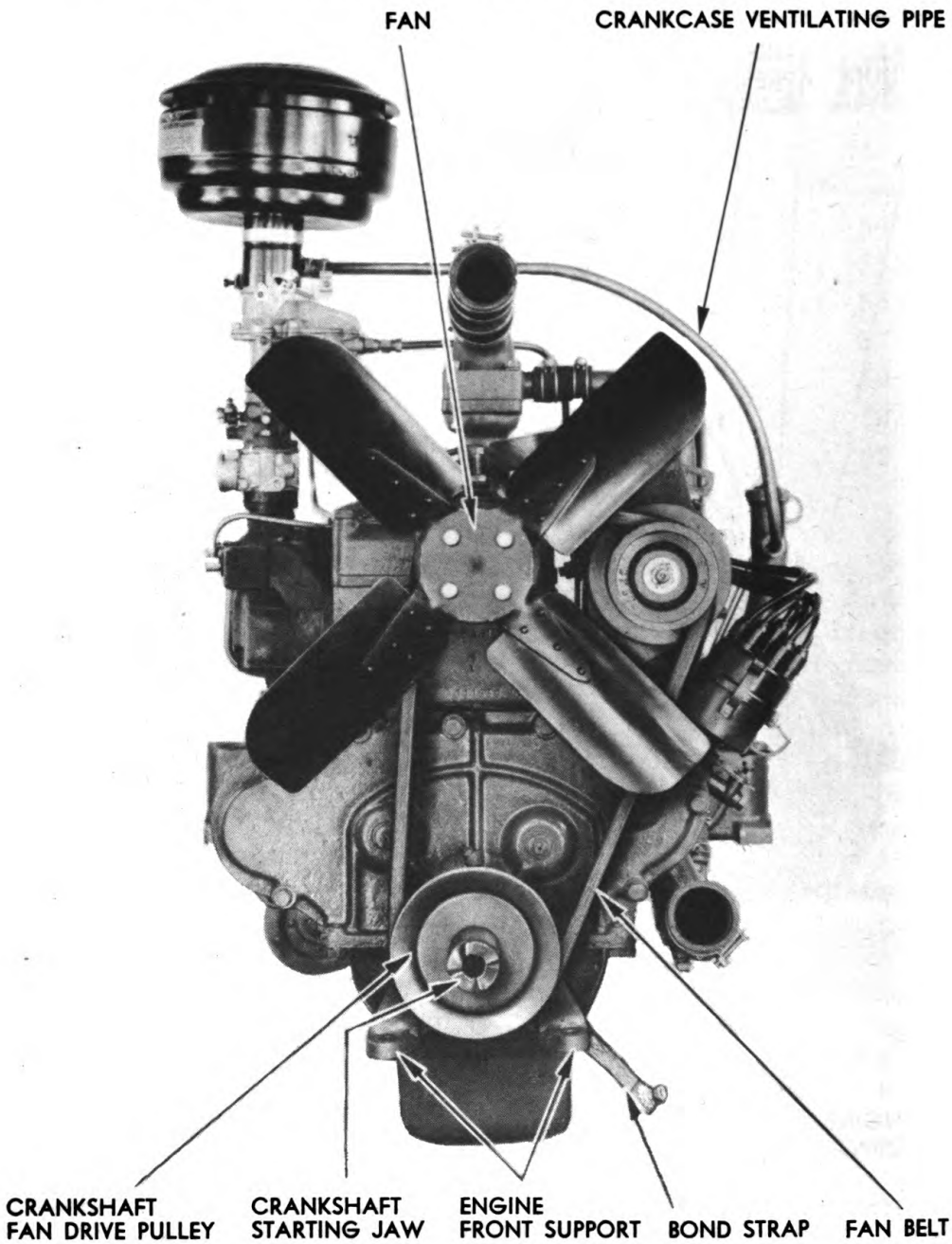


Figure 57—Engine—Front RA PD 319187

fold breather pipe from the intake manifold adapter. Connect the vacuum gage to the fitting in the adapter, start, and warm-up engine. Idle engine. If all manifold connections are tight, the carburetor is properly adjusted, the engine is firing on all cylinders, and the ignition timing is correct, the vacuum in the intake manifold will be between

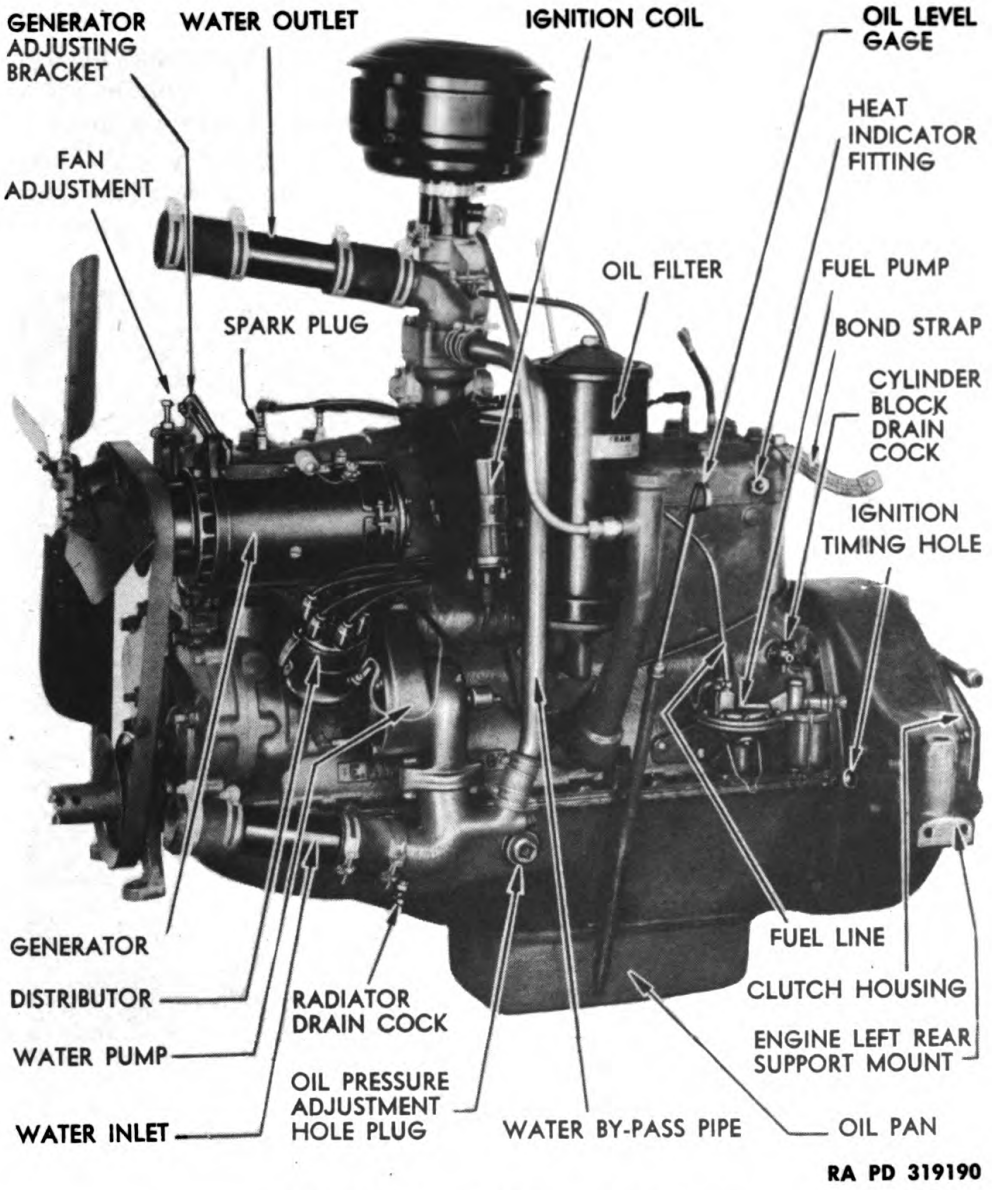
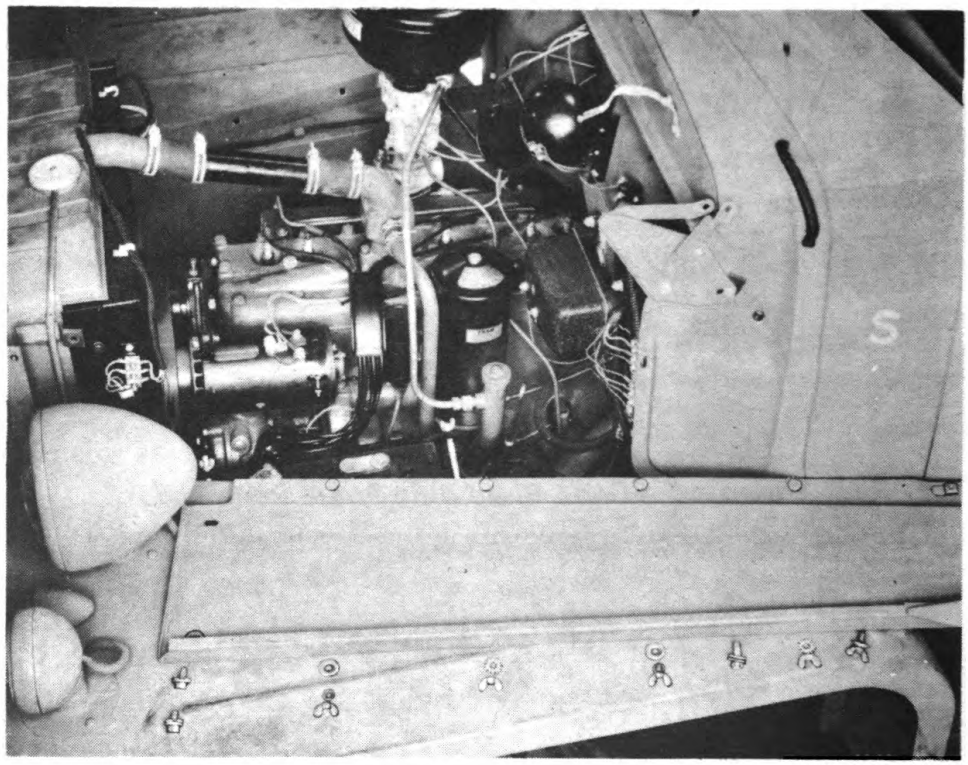


Figure 58—Engine—Left Side

16 and 18 inches at sea level. If the vacuum is less than 16 inches after all of the operations in this paragraph have been performed, investigate the exhaust system for a restriction. Stop the engine. Disconnect vacuum gage, connect the breather pipe to the manifold adapter, and proceed with the operations described in this paragraph.

b. Compression Test (Engine Hot). Remove all spark plugs and install compression gage in spark plug hole of No. 1 cylinder. With ignition switch off, and carburetor throttle wide open, crank engine

with cranking motor four or more engine revolutions until compression gage needle reaches a maximum reading. Test remaining cylinders in the same manner, writing the compression of each cylinder on a piece of paper. The normal compression of this engine at sea level is between 87 and 90 pounds as registered on compression gage. If the compression of one or more cylinders is 10 or more pounds less than the highest reading obtained from the best cylinder, these cylinders



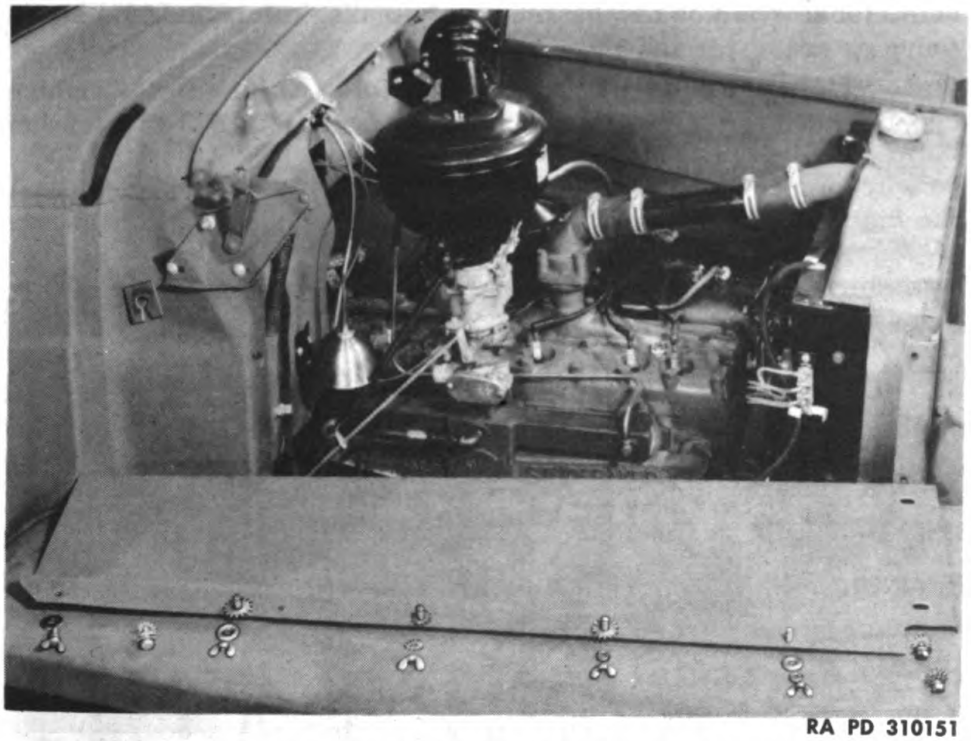
RA PD 310150

Figure 59—Hood Left Side Panel Removed

have leaking valves or rings, or are scored. Check the valve stem clearance (subpar. c below) and repeat the compression test. If one or more cylinders are defective, notify a higher authority. If the compression is satisfactory, proceed with the remaining steps in this paragraph.

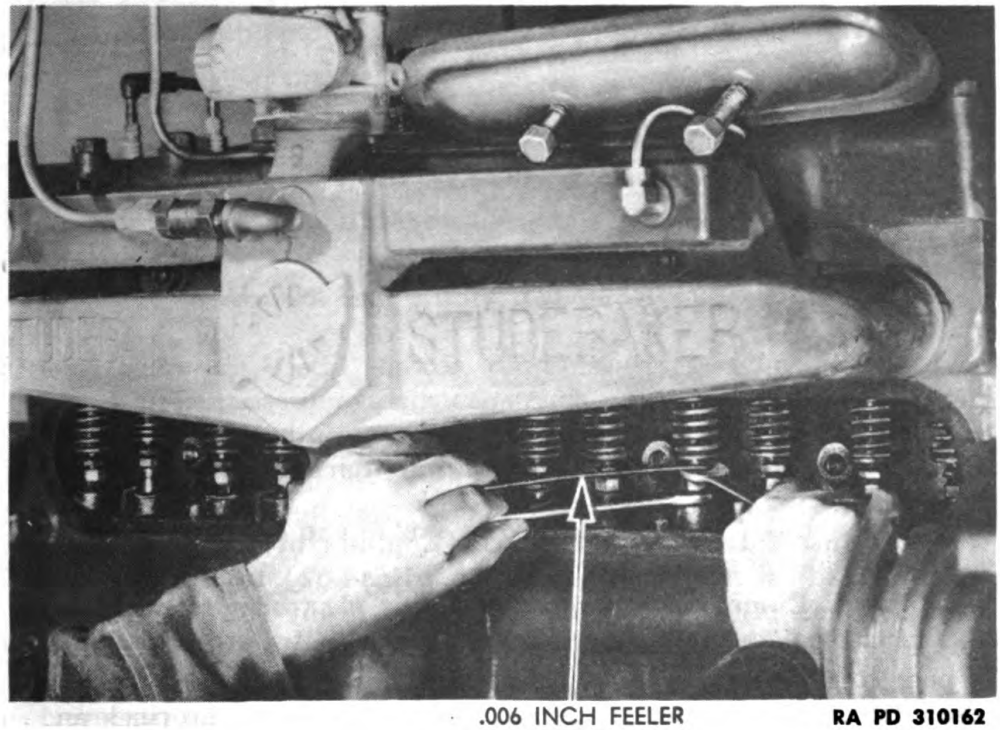
c. Adjust Valve Stem Clearance (Engine Hot). Remove valve covers and adjust valve lifter screw (figs. 61 and 62), to obtain a valve stem clearance of 0.006 inch for each valve. If any valve-stem clearance is less than 0.006 inch before adjustment, this may be the cause of poor compression on that cylinder, and repeating the compression test after adjustment will determine the condition of the rings and valves in that cylinder. Inspect valve springs for cracks, and valve

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



RA PD 310151

Figure 60—Hood Right Side Panel Removed

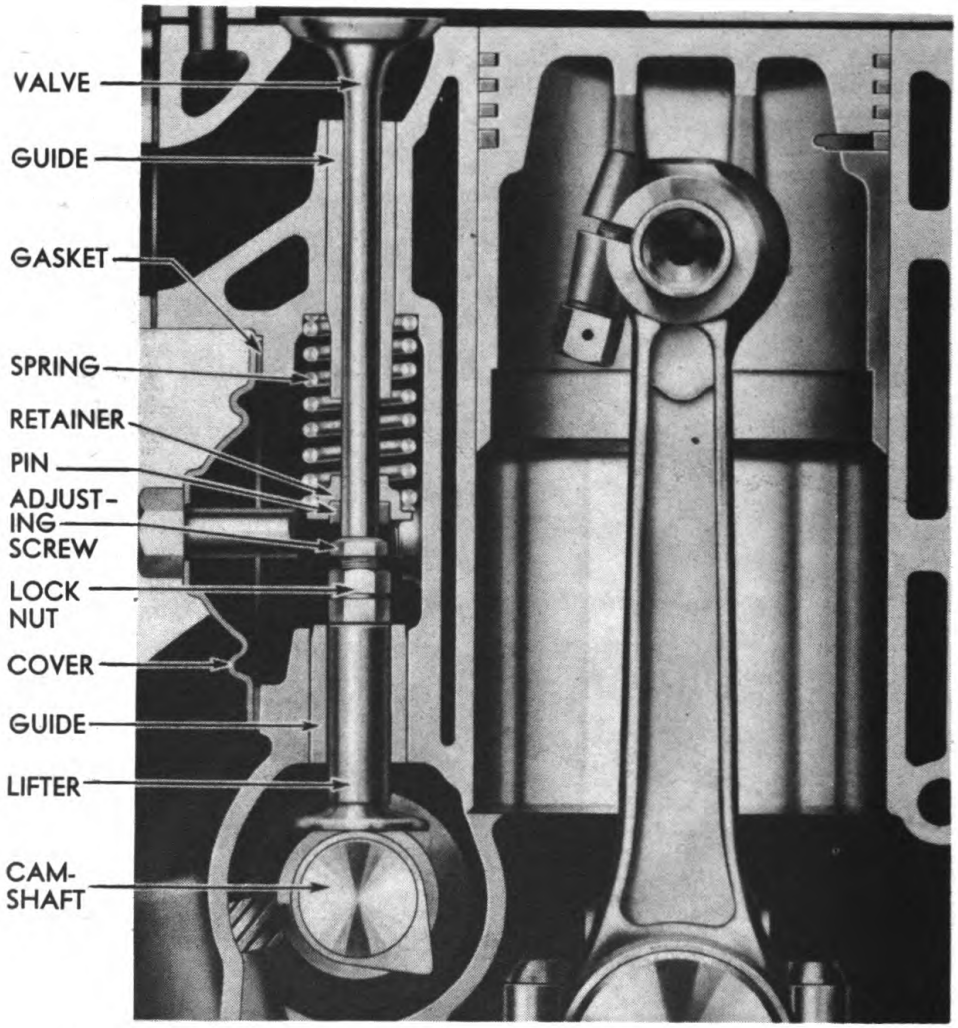


RA PD 310162

Figure 61—Adjusting Valve Clearance

stems for scores. Use new gaskets, apply sealing compound, and install valve covers.

d. Tighten Cylinder Head and Manifold (Engine Hot). Tighten cylinder head cap screws in the proper sequence (fig. 63) to a tension



RA PD 310014

Figure 62—Valve Operating Mechanism

of 80 foot-pounds. Tighten nuts holding intake and exhaust manifold to cylinder block if necessary.

e. Spark Plugs. Clean plugs and adjust electrodes to a gap of 0.025 inch. Replace defective plugs with new ones. Install spark plugs with new gaskets.

f. Air Cleaner. Clean air cleaner, and fill reservoir to proper level (par. 72).

g. Fuel Filter. Drain and clean fuel filter (par. 69).

h. Distributor. If contact points are pitted or burned, replace them (par. 93 **b**). Adjust contact point gap to 0.018 to 0.022 inch.

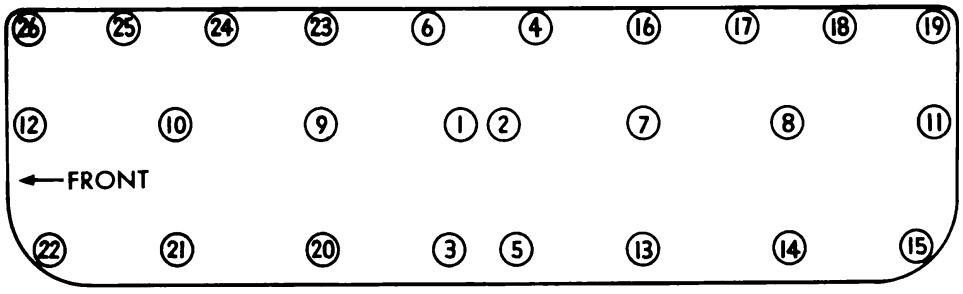
i. Fuel Pump. Remove fuel pump sediment bowl and screen, clean, and install with new gasket. Test fuel pump pressure (par. 70 **b**).

j. Ignition Timing. Check timing (par. 93 **f**).

k. Carburetor (Engine Hot). Adjust idle speed and idle mixture (par. 71). Install both hood side panels and fender aprons, and lower hood (par. 62 **p**).

56. CYLINDER HEAD AND GASKET.

a. Removal. Raise hood, remove both hood side panels (par. 61), and disconnect battery ground strap. Drain cooling system (par. 77).



RA PD 310015

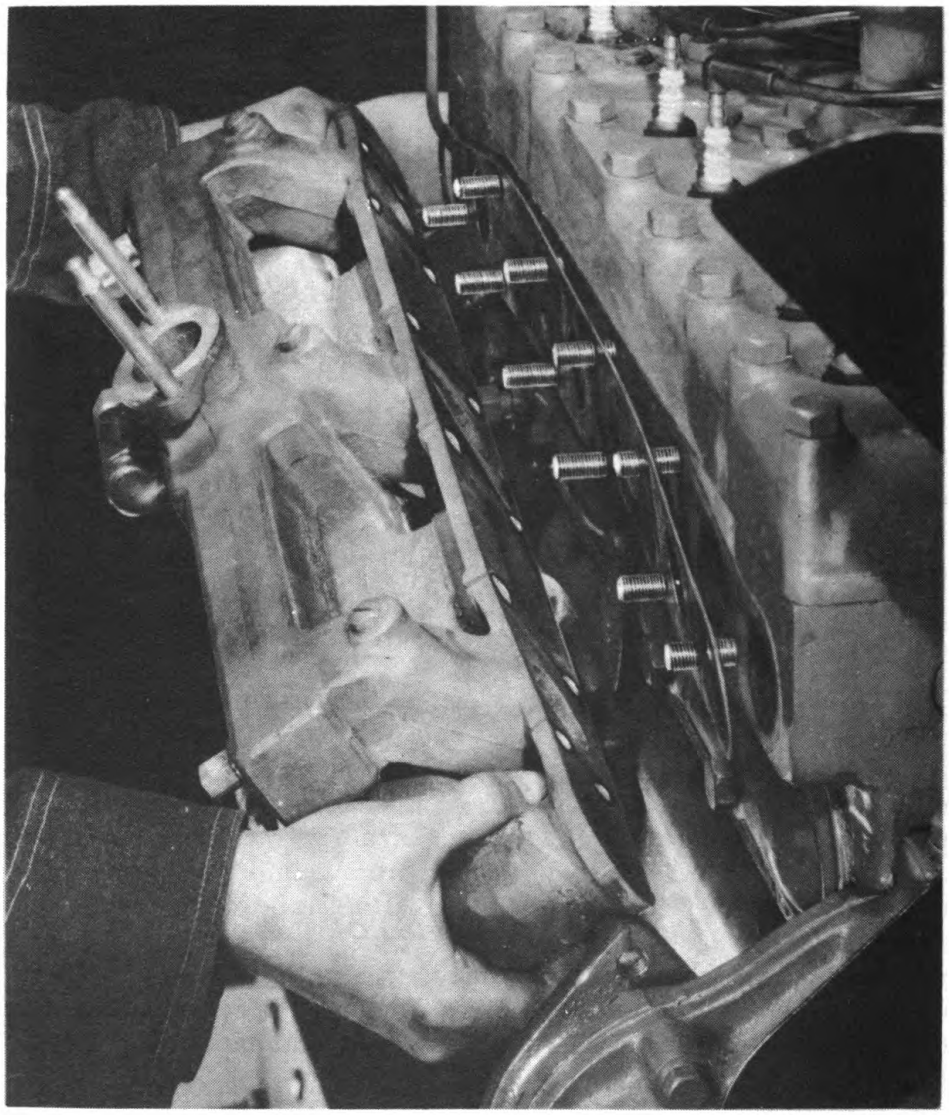
Figure 63—Cylinder Head Cap Screw Tightening Chart

Remove carburetor air cleaner. Loosen hose clamp at engine water outlet, and pull hose off the outlet. Disconnect the bypass line running from the engine outlet to the water inlet elbow on the water pump. Unscrew the heat indicator coupling nut from cylinder head, and carefully pull the element out of cylinder head. Disconnect the spark plug wires from the plugs, and remove the cylinder head cap screw holding spark plug wire bracket. Unsnap the distributor cap springs, and move bracket and wire assembly out of way. Remove the cylinder head cap screws, and lift off the cylinder head assembly and gasket.

b. Carbon Removal. Clean all carbon from head, cylinder block, and pistons; remove all traces of gasket or sealer from head and cylinder block. CAUTION: *Do not rotate valves, or allow any dirt to enter intake manifold or lodge between valves and seats.*

c. Installation. Apply joint and thread compound (liquid-type A) to both sides of new gasket, and set in place on cylinder block with the JXD stamped on gasket next to cylinder head. Place cylinder head in position, apply white lead to threads of all cylinder head cap screws and install, making sure that all accessory mounting brackets are prop-

erly located. Tighten cylinder head cap screws in the sequence shown on tightening chart (fig. 63) to a tension of 75 foot-pounds with a torque wrench if a steel asbestos gasket is used, and 55 to 60 foot-pounds if a copper asbestos gasket is used. Install radiator inlet bypass hose. In-



RA PD 319188

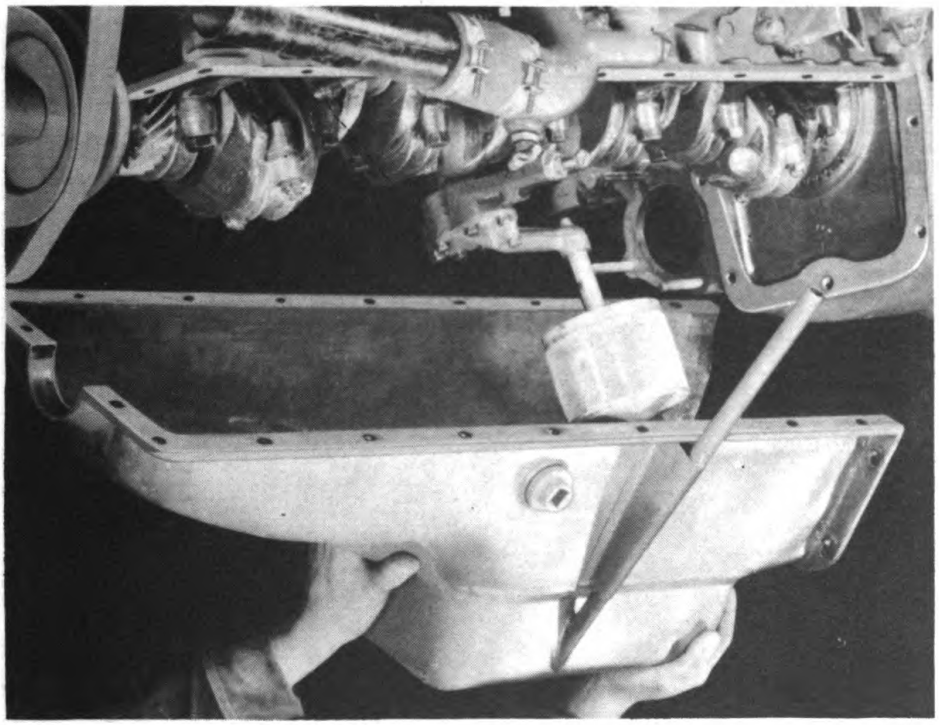
Figure 64—Removing Manifold

stall heat indicator element; close drain cocks at bottom of water pump inlet elbow and left rear side of engine just over the fuel pump. Place hose over water outlet, and tighten clamp screw. Install distributor cap, and connect wires to plugs. Fill cooling system, and install car-

buretor air cleaner. Connect battery ground strap, install hood side panels, and lower hood (par. 62 p).

57. INTAKE AND EXHAUST MANIFOLD.

a. Removal. Raise hood and remove right-front fender apron and hood side panel (par. 61). Remove carburetor (par. 71 f) and governor. Disconnect exhaust outlet pipe from manifold. Remove valve cover to manifold ventilator pipe. Disconnect windshield wiper pipe



RA PD 310163

Figure 65—Removing Oil Pan

and brake power booster check valve to inlet manifold pipe from intake manifold. Remove nuts and holding clamps from manifold studs, and remove manifold and gasket (fig. 64).

b. Installation. Install new manifold gasket in position on studs with stamping (THIS SIDE OUT) away from cylinder block. Install the manifold, and place the holding clamps over the studs. Install the nuts and tighten them securely. Install a new flange gasket, and enter exhaust pipe into manifold. Install manifold to exhaust pipe flange nuts and tighten securely. Connect windshield wiper pipe and brake power booster check valve pipe to fittings on intake. Install valve cover to manifold ventilator pipe. Install governor and carburetor

(par. 71 g). Install right-front fender apron and hood side panel (par. 62 p) and lower hood.

58. OIL PAN.

a. Removal. Drain engine oil, and remove engine left-side pan.

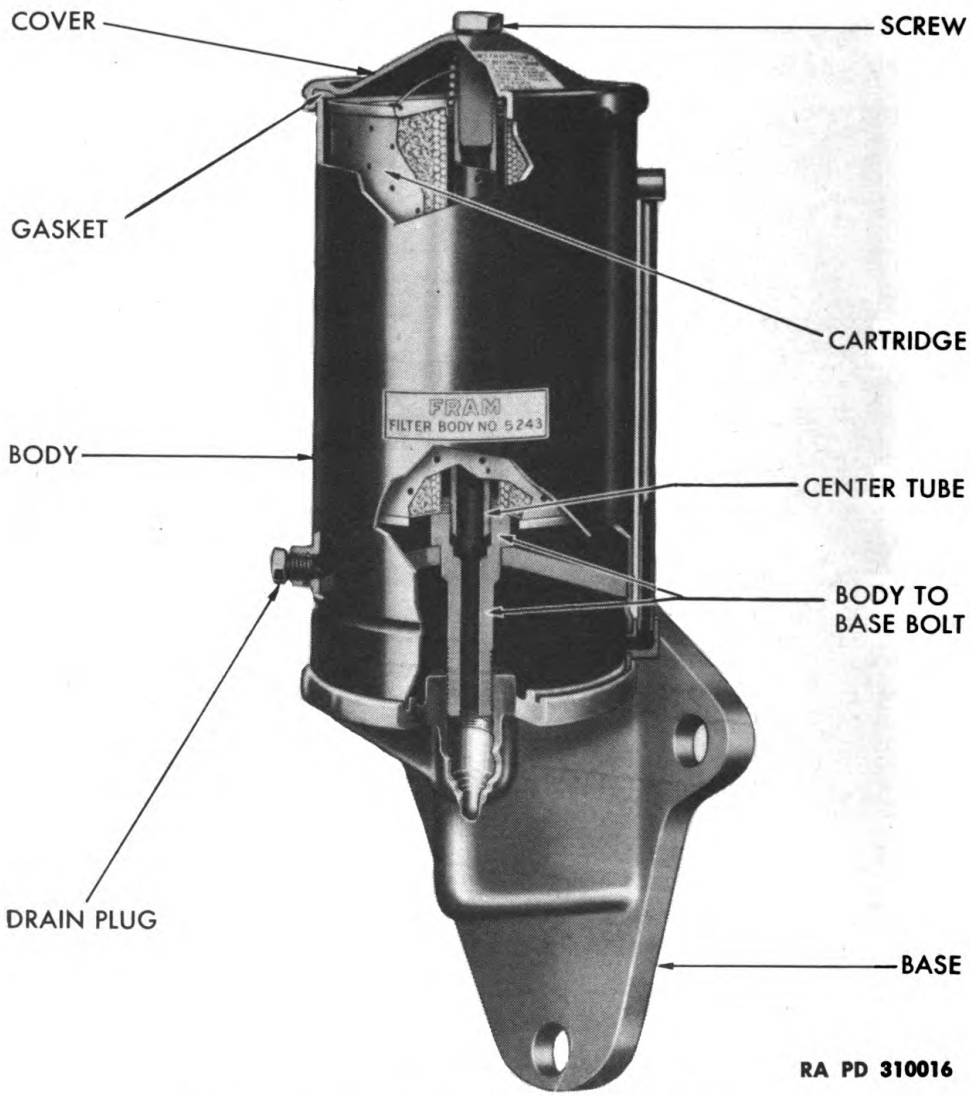


Figure 66—Sectional View of Oil Filter

Raise hood and remove dip stick. Install drain plug with new gasket in pan and tighten securely. Remove right fender apron (par. 61 b) and remove cranking motor (par. 83 b). Remove the oil pan retaining cap screws and lower the oil pan, being careful not to damage lower part of flywheel housing gasket (fig. 65).

b. Installation. Install new gasket to oil pan with gasket sealer. Install oil pan, tightening oil pan retaining cap screws uniformly to avoid distortion. Install cranking motor (par. 83 b), engine left-side pan, and right fender apron (par 62 p). Fill oil pan to proper level with correct grade of engine oil.

Figure 67—Removing Oil Filter RA PD 310161

59. OIL FILTER.

a. Cartridge Replacement. Remove cover screw, filter cover, and spring. Remove filter cartridge. Remove drain from filter body and thoroughly clean body. Install drain plug and tighten securely. Install new cartridge, spring, and filter cover, using a new gasket. Tighten cover screw securely (fig. 66).

b. Removal. Remove filter cartridge and drain body (subpar. a above). Unscrew center tube and with socket wrench and extension, remove filter body to base bolt. Lift off filter body and gasket (fig. 67).

c. Installation. Install new rubber gasket in oil filter base channel, and insert oil filter body plate inside bottom of filter body from the top. Insert filter body to base bolt, and securely tighten with socket and extension wrench. Install oil filter center tube and tighten. Place filter cartridge in body, install spring and filter cover with a new gasket, and securely tighten cover screw.

60. CRANKCASE AND VALVE CHAMBER VENTILATORS.

a. Valve Chamber Ventilator.

(1) REMOVAL. Disconnect ventilation pipe from intake manifold and rear valve cover, and remove pipe.

(2) INSTALLATION. Connect ventilation pipe to intake manifold and rear valve cover.

b. Crankcase Ventilator.

(1) REMOVAL. Disconnect ventilation pipe from air cleaner adapter and oil filler tube.

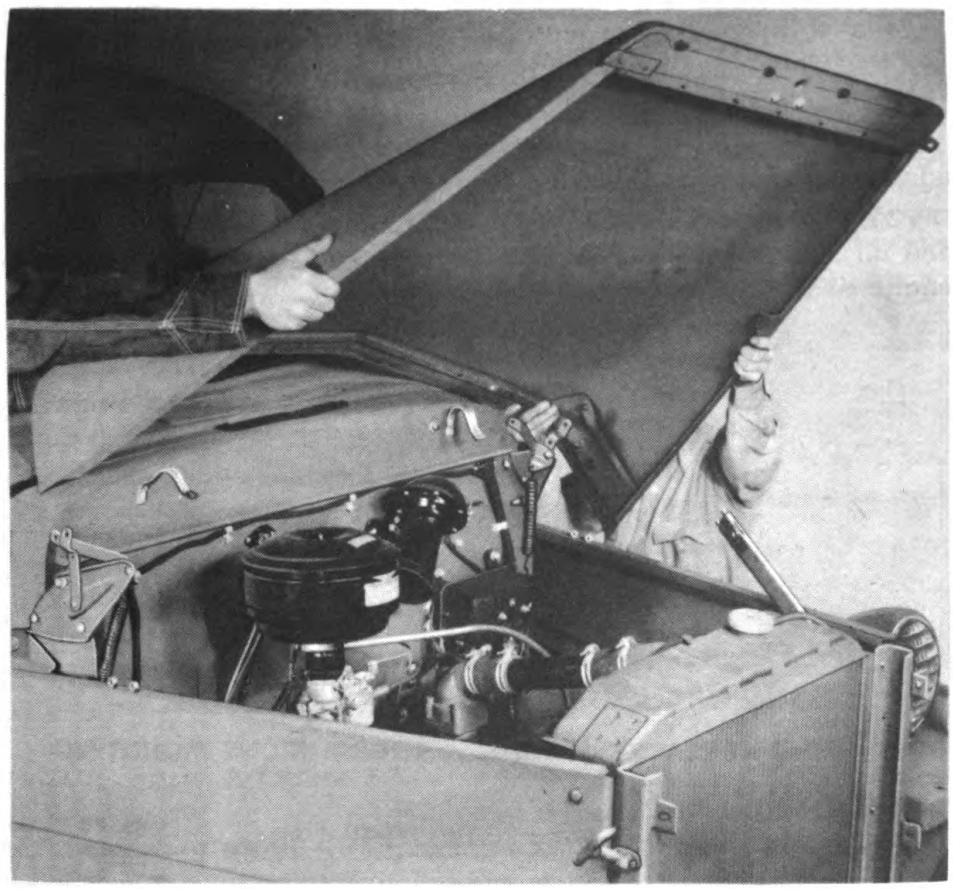
(2) INSTALLATION. Connect ventilation pipe to air cleaner adapter and oil filler tube. Be sure oil filler tube cap is airtight on vehicles equipped with ventilator pipes.

Section XIII

ENGINE REMOVAL AND INSTALLATION

61. REMOVAL.

a. Remove Hood. Unlatch hood and prop it open, remove hood support to radiator frame pin and spring, and fasten support to hood. Remove screws holding the two bond straps to hood. Unhook the hood hinge springs, and remove the cotter pins and castle nuts holding the



RA PD 310134

Figure 68—Removing Hood Top Assembly

hood hinge upper links to the hood. Pull link arms off the studs, and lower against dash. Remove the cotter pins and castle nuts holding the hood hinge lower links to the hood, push links off the hood studs and back out of the way, and remove hood (fig. 68).

b. Remove Hood Side Panels and Fender Aprons. Remove hood side panel to radiator screws and panel to dash screws. Remove panel to fender apron wing nuts, panel to fender and apron stud nuts

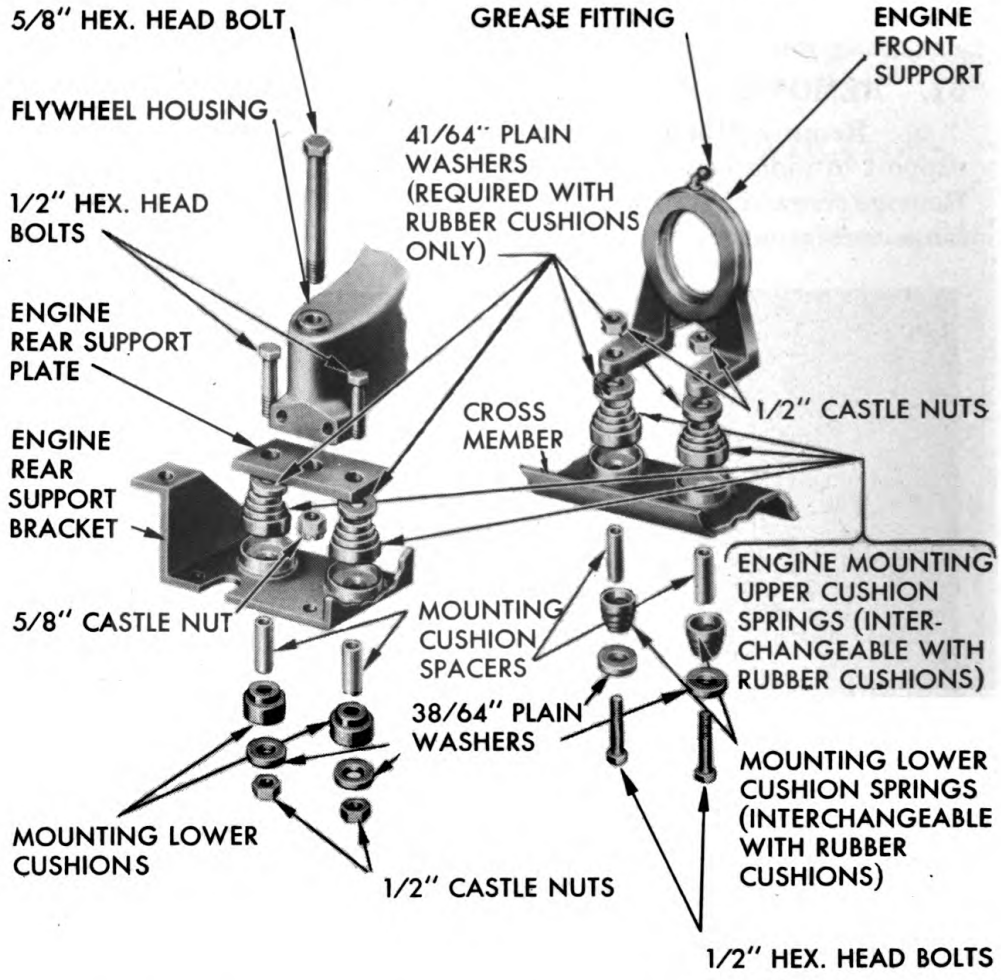


Figure 69—Engine Mountings RA PD 310096

and studs, and lift hood side panel off the vehicle. Remove fender apron to dash bolt and apron to radiator bolt. Remove wiring harness from clips on right fender apron. Disconnect bond straps, and remove fender apron.

c. Remove Battery. See paragraph 84 c.

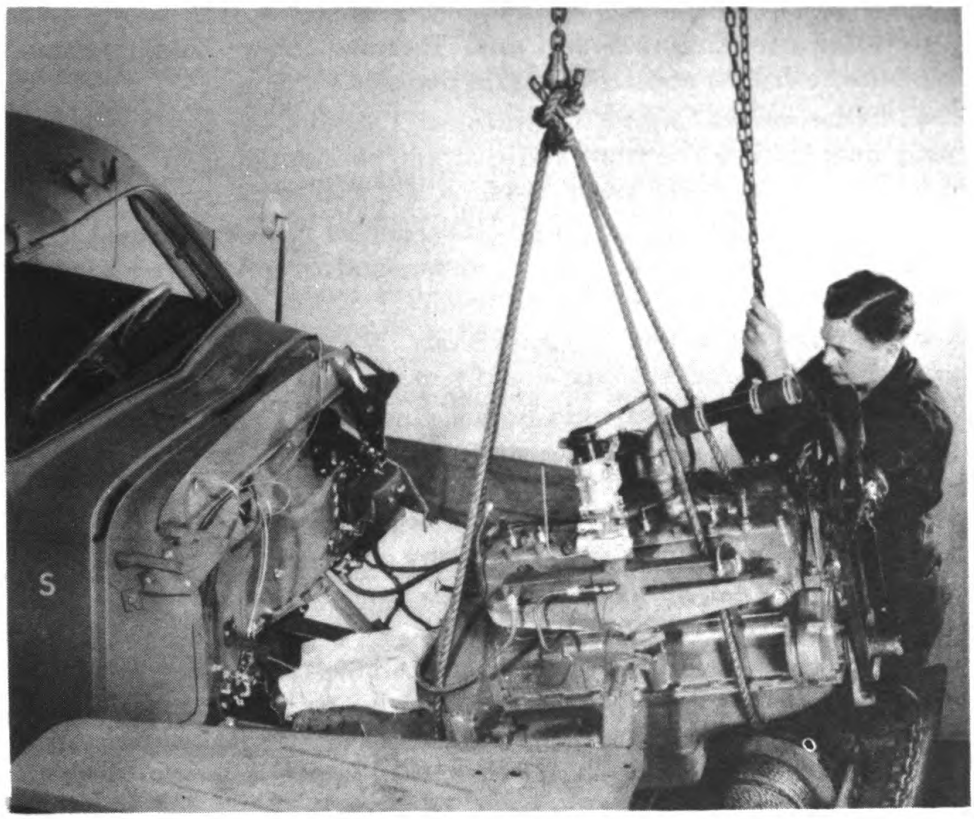
d. Drain Radiator and Cylinder Block. Drain cooling system (par. 77).

e. Remove Radiator. See paragraph 78.

f. Drain Engine and Transmission. Remove transmission and engine oil pan drain plugs, allow lubricant to drain, install drain plugs, and tighten securely.

g. Disconnect Clutch Linkage. Remove the clutch operating to release shaft sleeve bolts (two). Remove the sleeve.

h. Disconnect Propeller Shaft. Disconnect transmission to transfer case propeller shaft from transmission (par. 104). **NOTE:** *On ve-*



RA PD 319189

Figure 70—Removing Engine

hicles equipped with a winch, remove set screw from flange at power take-off unit, slide safety ring forward, move drive shaft forward, and lower rear end to floor.

i. Remove Transfer Case Shift Levers. See paragraph 102.

j. Remove Transmission Gearshift Cover Assembly. Remove the cap screws that hold the transmission cover to the case, lift cover and gasket off the case, and cover transmission case opening with a clean cloth.

k. Disconnect Carburetor Controls. See paragraph 71 f.

2½-TON 6x6 TRUCK AND 2½- TO 5-TON 6x4 TRUCK (STUDEBAKER MODELS US 6 AND US 6x4)

l. Disconnect Exhaust Pipe. Remove the nuts holding exhaust pipe flange to exhaust manifold flange. Remove the cap screws holding the muffler front clamp bracket to the clutch housing.

m. Disconnect Wires and Pipes from Engine. Disconnect all wires from engine electrical units. Disconnect the oil pressure gage pipe, windshield wiper pipe, and fuel pump pipe; remove heat indicator element from cylinder head. Disconnect intake manifold to power booster check valve pipe from check valve. Reach through hole in cab floor and remove the cap screw holding the check valve clamp to clutch housing.

n. Remove Engine Side Pans. Remove screws holding engine side pans to frame, and remove side pans.

o. Disconnect Engine Mountings. Take out the cotter pins and castle nuts holding the front and rear engine mountings in place (fig. 69). Remove the bolts, lower cushions, and spacers.

p. Disconnect Engine Bonds. Disconnect oil pan to frame front cross member bond from cross member, and cylinder head to dash bond from dash.

q. Remove Accelerator Cross Shaft. Remove nuts and bolts that hold cross shaft bracket to dash, and remove cross shaft assembly.

r. Remove Engine from Chassis. Inspect the engine, clutch, and transmission assembly to make sure that all lines, wires, and controls are disconnected. Place a rope sling or chains securely around the engine. Lift the engine assembly with a hoist, guide it forward, and out of the vehicle, making sure that it clears any obstructions (fig. 70).

62. INSTALLATION.

a. Position Engine in Chassis. Install a rope sling or chains around engine, and lift engine assembly with a hoist. Keeping the front end higher than the rear, lower and guide the complete engine assembly rearward into the vehicle, making sure that it clears any obstructions.

b. Connect Engine Mountings. Position engine front mounting upper cushions and plain washers under the engine front support. Place engine rear mounting upper cushions and plain washers under engine rear support plate. Install the engine rear mounting bolts (two on each side) down through engine rear support plates, plain washers, and upper cushions. Place a plain washer, lower cushion, and cushion spacers over each engine front mounting bolt. Push bolts up through the frame cross member from underneath, being sure that spacers pass completely through the lower and upper cushions. Lower the engine so that the weight rests on the upper cushions, and install the castle nuts on engine front mounting bolts. From the under side of vehicle install spacers, engine rear lower mounting cushions, and plain washers into position on bolts in rear mounting. Start castle nuts on bolts, and make sure that spacers pass completely through lower and upper

cushions. Tighten castle nuts enough to bring spacers into effective use, and install new cotter pins.

c. Connect Engine Bonds. Fasten oil pan to frame front cross member bond on cross member. Make sure the toothed lock washer is between the bond and frame front cross member, and tighten nut securely. Install bolt holding the cylinder head to dash bond, being sure the toothed lock washer is between the bond and dash; tighten the nut securely.

d. Install Accelerator Cross Shaft. Install cross shaft bracket to dash with bolt and nut.

e. Connect Wires and Pipes to Engine. Connect all wires to engine electrical units. Connect the oil pressure gage pipe, windshield wiper pipe, and fuel pump pipe; install heat indicator element in cylinder head. Connect intake manifold to power booster check valve pipe to check valve. Reach through hole in cab floor and install the clamp and cap screw holding the check valve to clutch housing.

f. Connect Exhaust Pipe. Place a new gasket on exhaust pipe flange, enter exhaust pipe in exhaust manifold, install pipe flange to manifold hex nuts, and tighten securely. Position muffler front clamp bracket, install the cap screws holding the bracket to the clutch housing, and tighten securely.

g. Install Engine Side Pans. Place engine side pans in position, install the bolts and nuts which hold each of the side pans to the frame, and tighten nuts securely.

h. Connect Carburetor Controls. See paragraph 71 **g**.

i. Install Transmission Gearshift Cover Assembly. Make sure the top of the transmission case cover and the case are clean. Install a new gasket on case, place the transmission gears in neutral, and set the cover on the case. Make sure the gearshift forks are properly located, and install the case cover cap screws with lock washers. Tighten the cap screws, and test the shifting action to be sure the shift forks and gears are properly engaged.

j. Install Transfer Case Shift Levers. See paragraph 102 **d**.

k. Connect Clutch Linkage. Position the sleeve on clutch operating and release shaft. Install the sleeve bolts and nuts. Tighten securely, and install cotter pins. If necessary, adjust clutch pedal free travel (par. 65 **f**).

l. Connect Propeller Shaft. Connect the transmission to transfer case propeller shaft to transmission (par. 104). NOTE: *On vehicles equipped with a winch, raise winch drive shaft, and slide the flange on power take-off shaft. Adjust safety ring, install set screw in flange, and tighten to power take-off shaft.*

m. Install Radiator. See paragraph 78 **c**.

n. Fill Transmission and Engine with Lubricant. See Lubrication Guide.

o. Install Battery. See paragraph 84 d.

p. Install Hood Side Panels and Fender Aprons. Place fender aprons in position, and install fender apron to cowl bolt and apron to radiator bolt. Place hood side panels in position, and install hood panel to fender apron wing studs and stud nuts. Install hood panel to fender apron wing nuts. Install hood side panel to radiator and dash screws. Secure bond straps to fender aprons, being sure toothed lock washers are between bond strap and fender apron, and tighten nuts securely. Fasten wiring harness in position on right fender apron with clips.

q. Install Hood. Place hood in position and prop it open. Install hood hinge lower links over the hood studs. Install hood stud castle nuts, tighten nuts, and install new cotter pins. Place the hood hinge upper links over hood studs. Install hood stud castle nuts, tighten securely, and install new cotter pins. Hook the hood hinge springs in position. Lower hood support to radiator frame. Install pin, spring, and new cotter pin holding support to radiator frame. Fasten the two bond straps to the hood, being sure the toothed lock washers are between the bond strap and the hood, and tighten screws securely.

r. Inspect and Test Engine. Check engine oil level in the crankcase. Inspect cooling system and start engine. Note oil pressure, and check for oil and water leaks.

Section XIV

CLUTCH

63. DESCRIPTION AND TABULATED DATA.

a. Description (fig. 71). The clutch is a single-plate, dry-disk type, having a coil spring which acts through toggle levers to force the

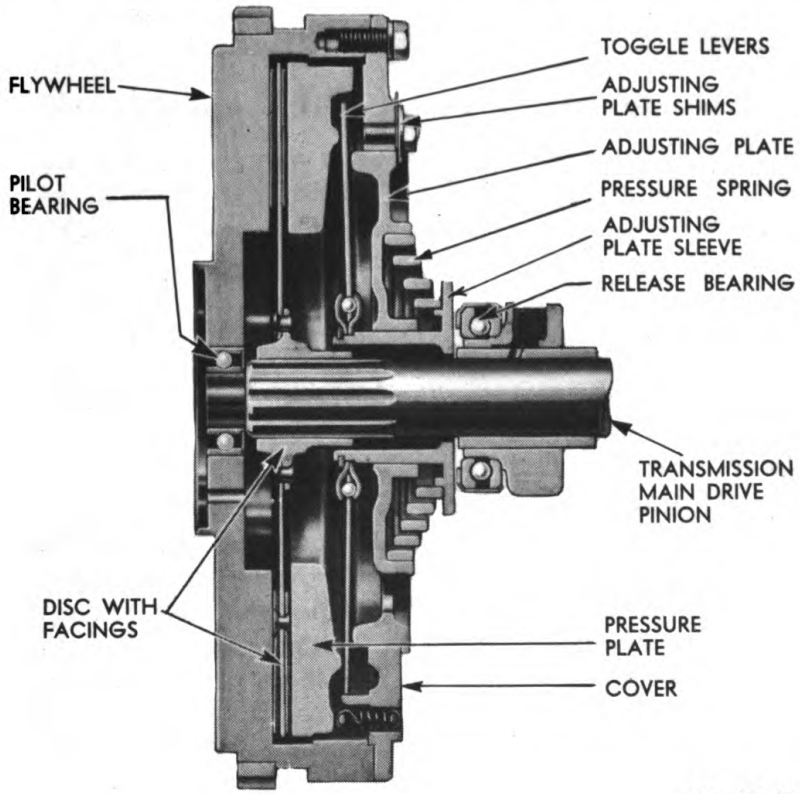


Figure 71—Cross-section of Clutch

pressure plate against the clutch facings in gripping the driven plate disk between the pressure plate and the engine flywheel. When the clutch pedal is depressed, the linkage turns the clutch release yoke shaft. The clutch release yoke presses against the clutch release bearing, moving it against the clutch adjusting plate sleeve. The sleeve slides on the transmission pinion shaft to compress the clutch pressure spring. This action relieves the tension on the clutch toggle levers so that the four clutch pressure plate retractor springs pull the pressure plate away

from the clutch driven plate to release it, thereby disengaging the clutch. A ball pilot bearing carries the front end of the transmission pinion, and it is pressed into the center bore of the flywheel. When the clutch pedal is released, the clutch release yoke allows the tension of the clutch pressure spring to slide the clutch adjusting plate sleeve rearward. The clutch toggle levers pivot on the clutch cover adjusting plate to move the clutch pressure plate against the clutch driven plate, gripping it between the clutch pressure plate and the engine flywheel to engage the clutch.

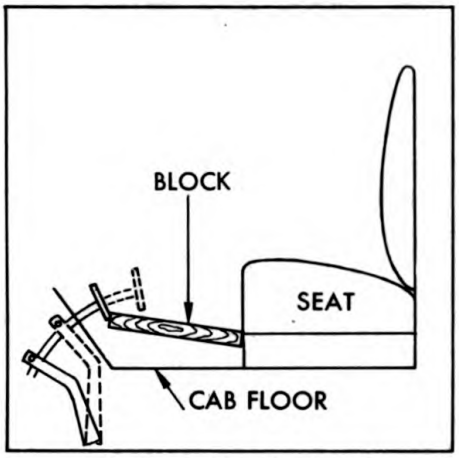
b. Tabulated Data.

Type	Single-plate, dry-disk
Make	W. C. Lipe
Model	Z34-S

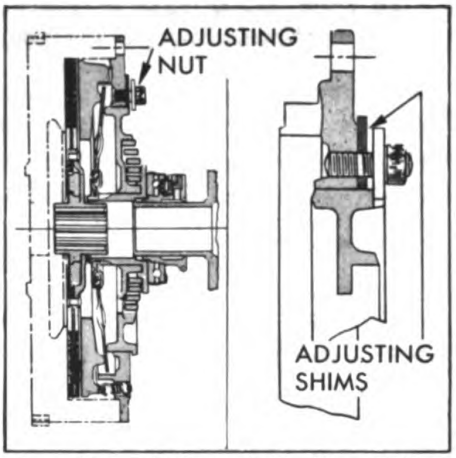
64. ADJUSTMENT OF CLUTCH IN VEHICLE.

a. General. As the clutch facings wear, the clutch sleeve moves toward the release bearing, thus reducing the clearance between the bearing and the sleeve. This reduced clearance will result in a reduction in pedal lash, or free movement of the pedal, before the pressure of clutch mechanism is detected. Whenever clutch wear has reduced free pedal movement to approximately ½ inch, the clutch must be adjusted. CAUTION: *Never wait until the clutch slips before making the adjustment, as slipping will cause facings to disintegrate through burning, and once linings are burned, they must be replaced to give satisfactory service.*

b. Adjustment of Clutch (fig. 72). *Do not adjust linkage.* Block pedal down so that clutch is in released position. NOTE: *This is necessary because otherwise the rectangular adjusting washers or studs at the clutch cover adjusting points may become bent, or the threads on the studs or nuts may be stripped.* With the clutch pedal blocked in the released position, remove the handhole cover, and back off each of the four adjusting nuts five full turns. Remove the block holding the pedal down, and allow clutch to engage. This will permit adjusting plate to move away from and out of contact with adjusting shims. Using sharp nosed pliers or cotter pin puller, remove one shim from under each rectangular washer. CAUTION: *Be sure that shim does not tear, and that no portion of it remains under rectangular washer. Also make certain that only one shim is removed from under each washer, and that the same number of shims remain under each washer after removal of one shim.* Disengage clutch, block pedal down again, and tighten the four adjusting nuts. Remove pedal blocking and allow the clutch to engage. Hold a straightedge or scale (4 in. long, attached to a chain) vertically between the release bearing and the rear face of the clutch sleeve (fig. 72). With a scale (3 in. long, attached to a chain) measure the distance from forward edge of the vertical scale



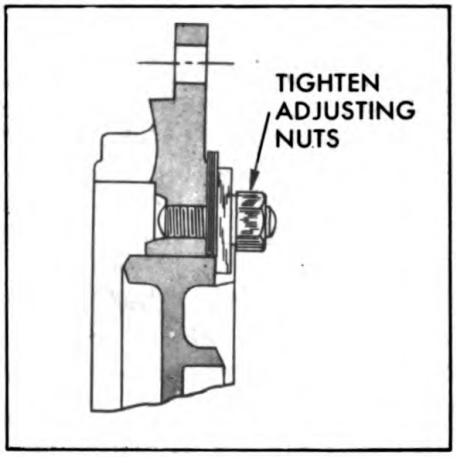
Blocking Clutch Pedal



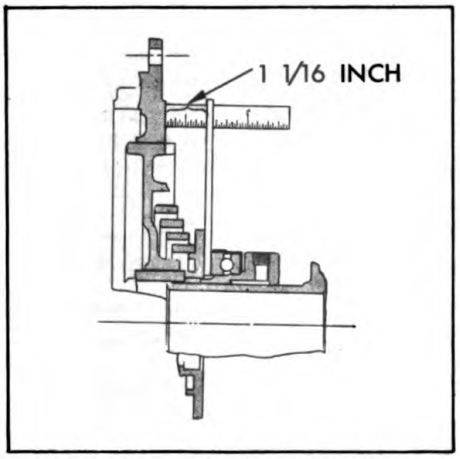
Location of the Adjusting Nuts

Adjusting Shims Released

Adjusting Shims Removal



Adjusting Nuts Tightened



Checking Adjustment with a Straight Edge and Scale

Release Bearing to Sleeve Clearance

RA PD 310069

Figure 72—Clutch Adjustments

to the machined surface (shim seat) of the clutch cover. This dimension, with new clutch parts and five shims under the washers, is 1 1/16 inch. The removal of one shim under each washer will reduce this measurement by 5/64 inch. Therefore, to obtain the correct adjustment,

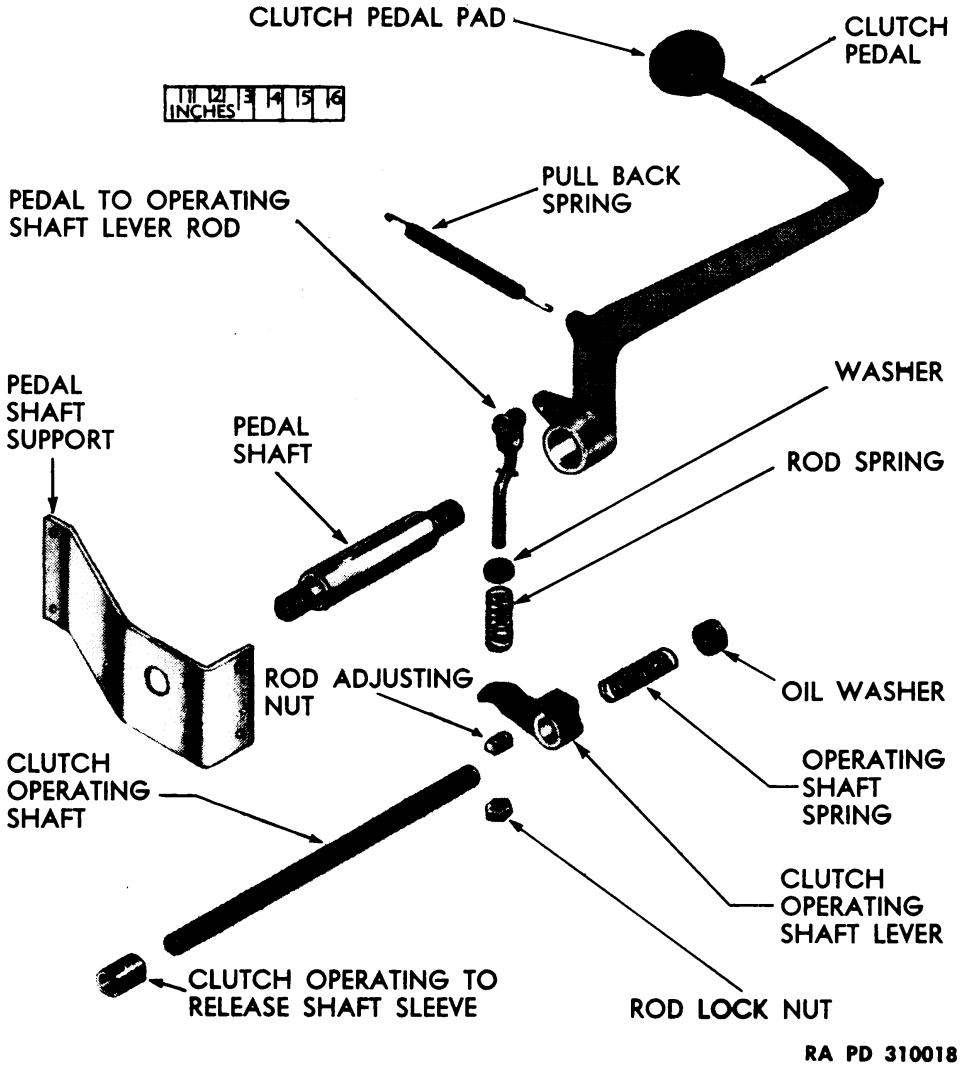


Figure 73—Clutch Operating Parts

it will be necessary to remove shims as required until the dimension of 1 1/16 inch is obtained. When the correct distance from the machined shim surface to the scale is obtained, measure the distance from the release bearing to the clutch sleeve. This clearance should be not less than 1/8 inch, and not more than 5/32 inch. Ordinarily it will not be necessary to adjust the pedal linkage unless some previous attempt has been made to compensate for lining wear by adjusting the linkage. If the

pedal linkage has been changed or removed previously, it will be necessary to readjust the linkage (par. 65 f) to obtain the proper clearance after removing shims.

65. CLUTCH CONTROLS AND LINKAGE.

a. Description (fig. 73). Clutch operation is accomplished by a foot pedal which, when depressed, moves the clutch release bearing forward, thereby releasing the clutch.

b. Clutch Pedal and Shaft Removal. Raise hood and disconnect battery ground strap. Remove clutch and brake pedal shaft support bolts and pedal shaft outer nut. Pull support and pedal shaft to the right, out of pedals. Take out screws, and remove pedal pad from pedal. Remove pedal pull-back spring, disconnect operating shaft lever rod, and remove clutch pedal.

c. Clutch Pedal and Shaft Installation. Install and connect clutch pedal, leaving operating shaft lever rod nuts loose. Lubricate pedal shaft, aline pedal hubs with drift inserted through frame side member, and install pedal shaft and support. Tighten securely the support bolts and nuts on left end of pedal shaft. Tighten nut on right end of pedal shaft. Install pedal pad on pedal with screws. Adjust clutch pedal free movement (subpar. f below). Connect battery ground strap.

d. Clutch Operating Shaft Removal. Remove cotter pins, nuts, and bolts that hold the clutch operating to release shaft sleeve in position. Move sleeve to the left onto operating shaft. Remove lock nut and adjusting nut from pedal to operating shaft lever rod. Move clutch pedal to disengage operating shaft lever rod from clutch operating shaft lever. Pull downward on inner end of clutch operating shaft, and move shaft away from frame toward center line of vehicle. Slide oil washer, spring, and sleeve off the operating shaft. Remove clutch operating shaft lever from operating shaft by loosening clamp bolt, and driving the lever off the Woodruff key and shaft.

e. Clutch Operating Shaft Installation. Install Woodruff key in operating shaft, and drive operating shaft lever on shaft and key. Install spring and oil washer on short end of operating shaft, and slide the sleeve onto other end of shaft. Insert short end of shaft through frame side member, position the sleeve over ends of operating and release shafts, and install bolts and nuts. Tighten the nuts and install new cotter pins. Place the flat washer and spring over end of pedal to operating shaft lever rod, enter rod through shaft lever, and install adjusting nut and lock nut. Adjust clutch pedal free movement (subpar. f below).

f. Adjustment of Clutch Pedal Free Movement. Loosen the adjusting nut lock nut on the clutch pedal to operating shaft lever rod. Turn the adjusting nut as required until the pedal free movement, or lash, is 1½ inches; tighten the lock nut securely.

66. CLUTCH DRIVEN PLATE.

a. Removal.

(1) REMOVE TRANSMISSION ASSEMBLY. See paragraph 97.

(2) DISCONNECT CLUTCH OPERATING SHAFT. Remove both bolts and nuts from clutch operating shaft sleeve, and slide sleeve onto operating shaft.

(3) REMOVE CLUTCH HOUSING. Take out cap screws attaching clutch housing to flywheel housing, and remove clutch housing.

(4) REMOVE CLUTCH ASSEMBLY. Loosen the clutch assembly to flywheel retaining screws a turn at a time. This will relieve clutch pressure spring tension on the clutch pressure plate gradually, to prevent distortion. When tension is relieved, remove screws, and tilt the top of clutch assembly backward and down to a nearly horizontal position to prevent the driven plate from falling off separately and being damaged.

b. Installation.

(1) LUBRICATION BEFORE ASSEMBLY. Lubricate main drive pinion splines and clutch release bearing felt with engine oil. Fill the recess in front of clutch pilot bearing with ball and roller bearing grease.

(2) INSTALL CLUTCH ASSEMBLY. Before installing clutch assembly, check the four adjusting screws to be sure five shims are under each rectangular washer. Place clutch driven plate into position on flywheel, using clutch plate alining tool (41-T-3085) to centralize the driven plate and splined hub in relation to the clutch pilot bearing. Install pressure plate with retaining screws, and tighten progressively to prevent distortion and binding of plates.

(3) INSTALL CLUTCH HOUSING. Place housing in position and attach it to flywheel housing with cap screws, tightening in such a manner as to draw the housings together without strain or distortion.

(4) CONNECT CLUTCH OPERATING SHAFT. Slide sleeve into position on both shafts, alining holes in sleeve and shafts. Install two bolts, nuts, and new cotter pins.

(5) INSTALL TRANSMISSION. See paragraph 98.

(6) ADJUST CLUTCH. See paragraph 64 b.

Section XV

FUEL, AIR INTAKE, AND EXHAUST SYSTEM

67. DESCRIPTION.

a. The fuel system (fig. 74) consists of a gasoline tank, fuel filter, fuel pump, carburetor, and connecting lines. An oil-bath type carburetor

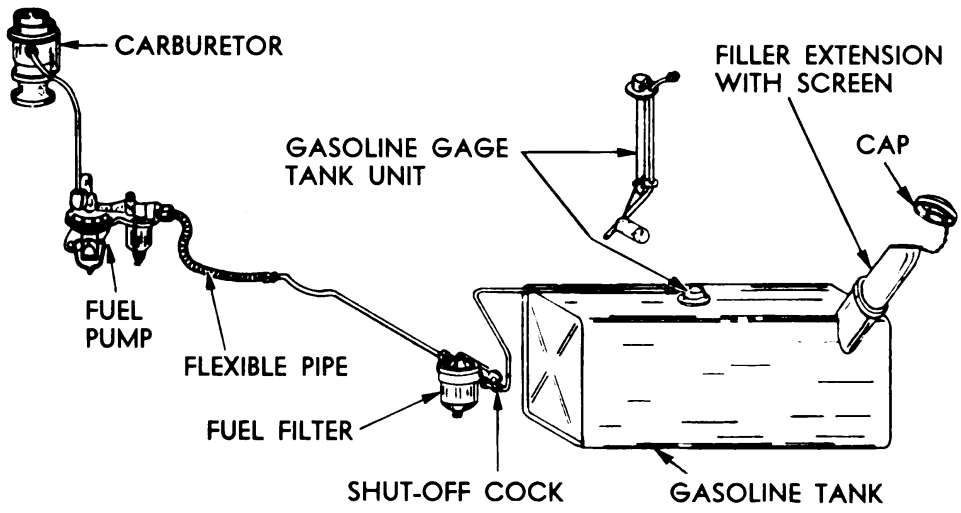


Figure 74—Fuel System Components

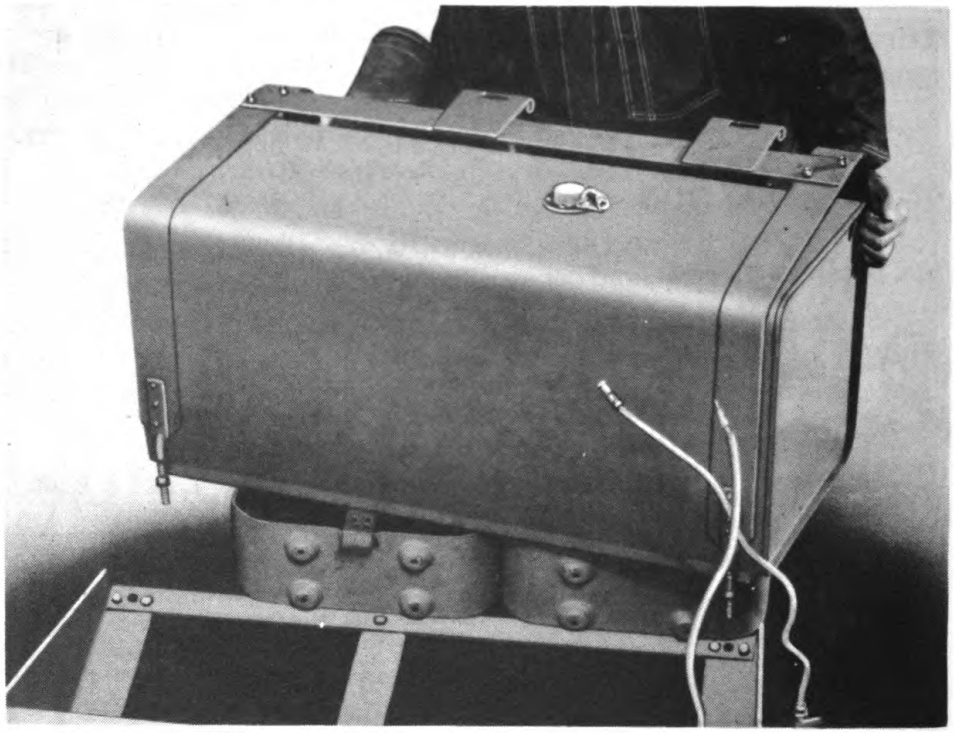
air cleaner is used to filter road dust and other harmful matter out of the air before it reaches the carburetor. The exhaust system consists of the exhaust pipe with flange, muffler, tail pipe, mountings, brackets, and clamps.

68. FUEL TANK.

a. Description and Data. The 40-gallon fuel tank is mounted on the frame left side member, and is held in position by straps. The fuel

tanks that have a 4¼-inch filler neck are equipped with a strainer located in the filler neck which is easily removed and cleaned. The fuel tank is connected to the filter with a pipe and shut-off valve.

b. Draining and Cleaning. Remove drain plug from bottom of tank, remove filler neck cap, and let tank drain; pour in a gallon or more of fuel and rock vehicle to dislodge any sediment which may have collected. Allow tank to drain and install drain plug. Remove strainer



RA PD 310153

Figure 75—Removing Fuel Tank

from filler neck, clean screen thoroughly with dry-cleaning solvent, and install in filler neck.

c. Removal. Disconnect battery ground strap from battery. Remove tank filler neck cap, and take out drain plug from bottom of tank. Allow fuel to drain out and install drain plug. Disconnect wire from gasoline gage unit, and remove gasoline tank to filter pipe. Remove the nuts holding the tank straps in place, unbuckle the gasoline can carrier straps, and remove gasoline tank strap assembly. Lift gasoline tank off the support (fig. 75).

d. Installation. Place gasoline tank in support, and install straps over tank with strap studs through support. Aline tank in support, install support strap nuts, tighten securely, and install lock nuts. Connect

wire to gasoline gage unit, and install gasoline tank to filter pipe. Connect battery ground strap to battery.

69. FUEL FILTER.

a. Description. The fuel filter is located between the pump and fuel tank. It contains a replaceable element to remove water and foreign material from the fuel before it reaches the fuel pump.

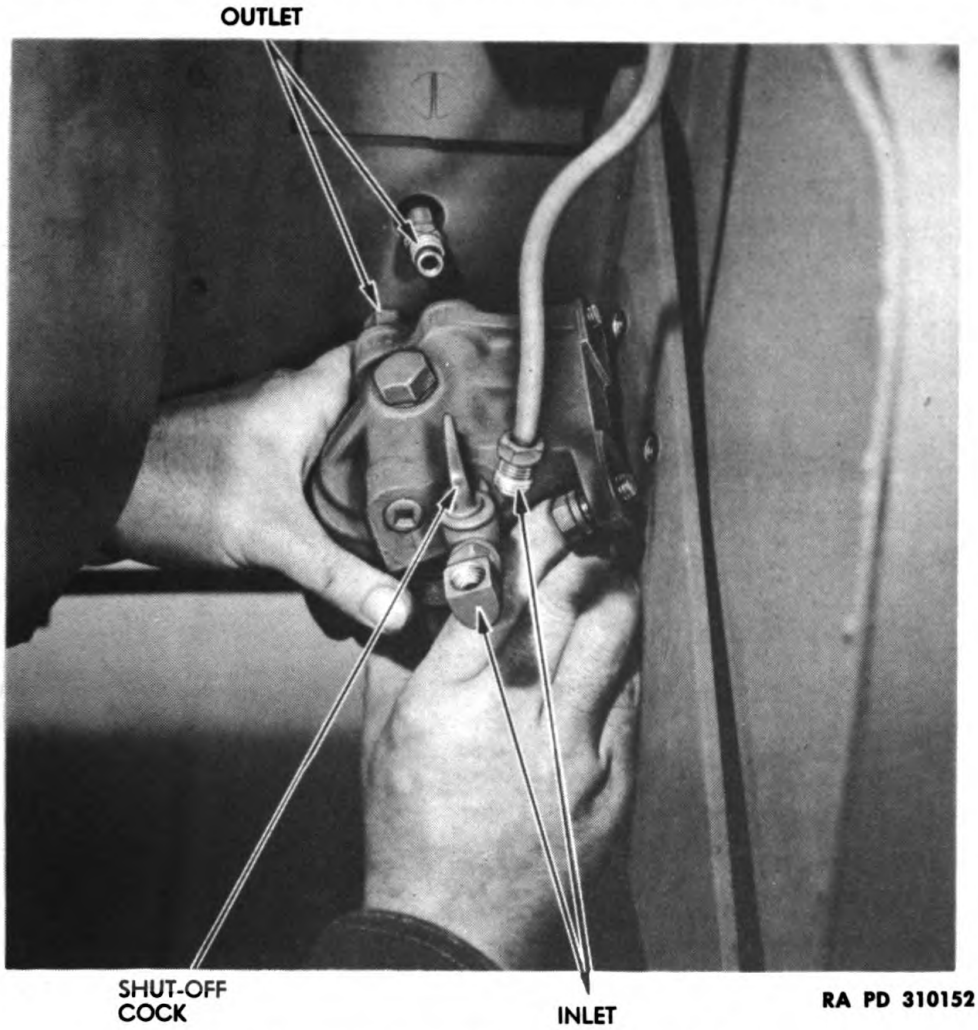


Figure 76—Removing Fuel Filter

b. Draining and Cleaning.

(1) DRAINING. Close the shut-off valve between filter and tank. Remove fuel filter drain plug from bottom of the fuel filter shell, and allow it to drain. Install drain plug and tighten securely.

(2) CLEANING. Remove shell retaining screw, shell, and gaskets. Remove filter strainer, and wash thoroughly in dry-cleaning solvent.

2½-TON 6x6 TRUCK AND 2½- TO 5-TON 6x4 TRUCK (STUDEBAKER MODELS US 6 AND US 6x4)

NOTE: *Dry with compressed air if available.* Clean all sediment from filter shell. Place spring and strainer in shell. Install shell with new gaskets, and tighten shell retaining screw. Open shut-off valve between filter and tank.

RA PD 319192

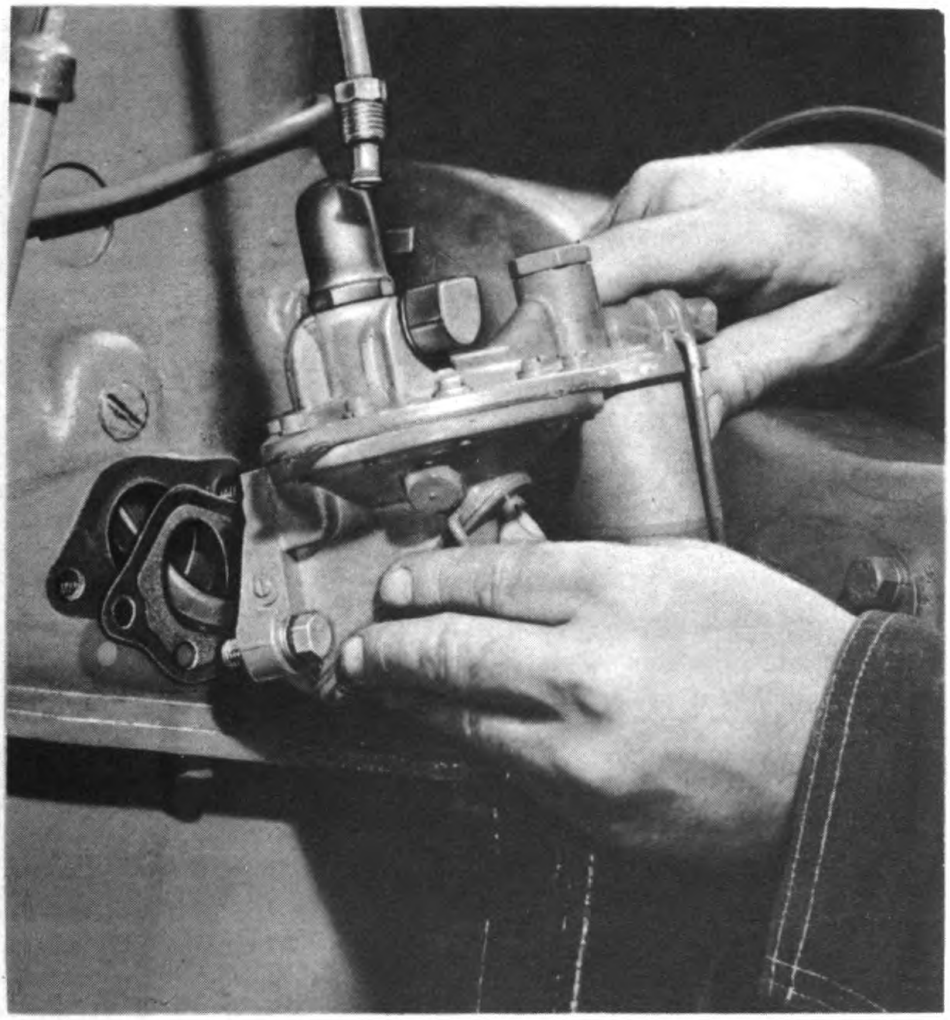
Figure 77—Removing Fuel Pump Screen

c. Removal. Remove fuel filter inlet pipe, and disconnect outlet pipe from filter. Remove the screws or nuts and bolts that fasten the filter in position, and remove filter from vehicle (fig. 76).

d. Installation. Place filter in position, install screws or bolts and nuts, and tighten securely. Install filter inlet pipe, and connect outlet pipe to filter. Test lines and connections for leaks with engine running.

70. FUEL PUMP.

a. Description. The diaphragm-type fuel pump is fastened to the left-rear side of the engine crankcase. The pump is operated mechanically by a rod which actuates the pump rocker arm, and the other end of the rod contacts an eccentric on the camshaft. A hand priming lever



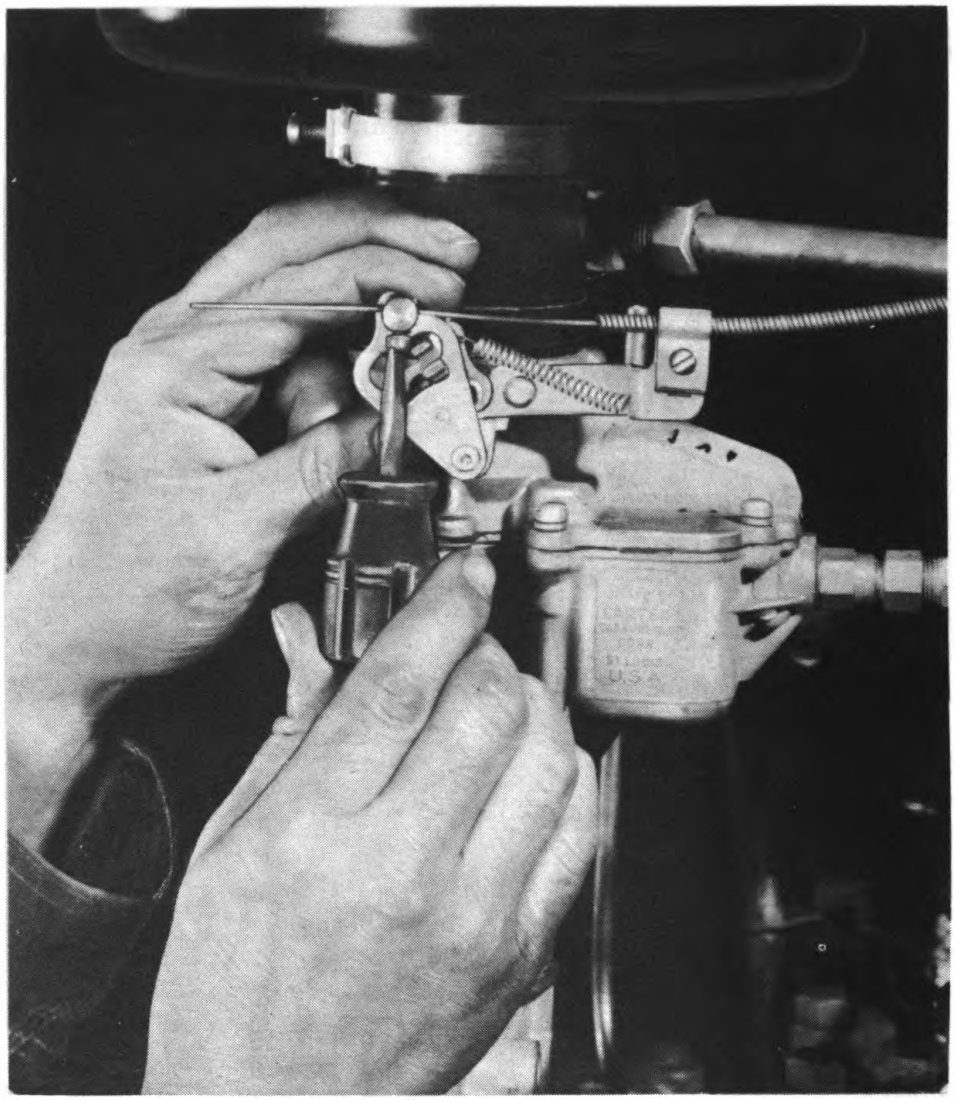
RA PD 319193

Figure 78—Removing Fuel Pump

permits pumping a supply of fuel into the carburetor if the fuel was exhausted previously, or the carburetor bowl is emptied for any reason. A sediment bowl and screen on inlet side of pump provide for removal of solid matter before fuel enters the pump, and outlet line to the carburetor.

b. Test Fuel Pump.

(1) PRESSURE TEST. Connect a fuel pump pressure gage into the



RA PD 310166

Figure 79—Adjusting Carburetor Choke Control

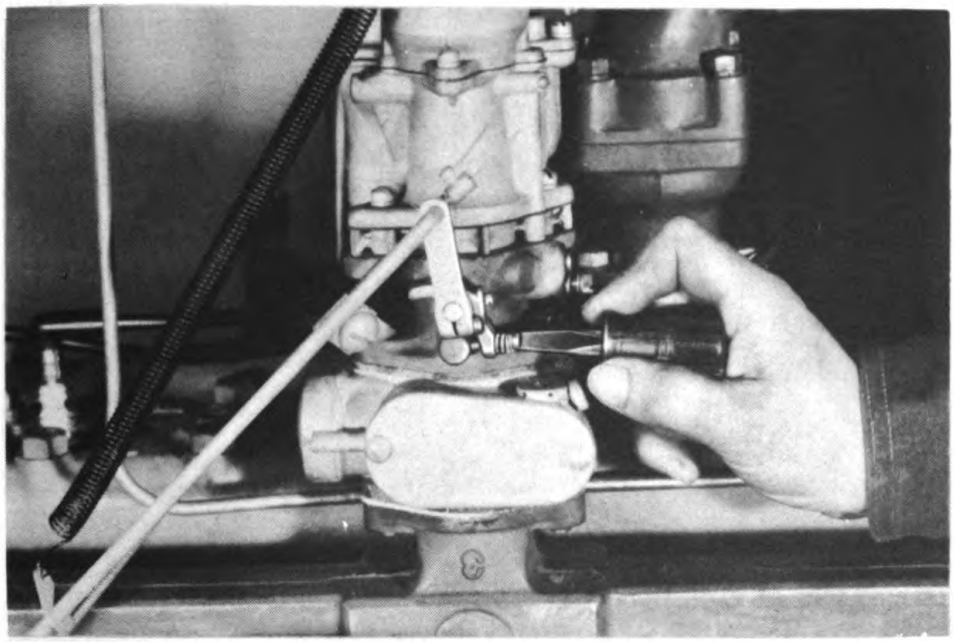
fuel pump outlet line. Check pressure at various engine speeds to duplicate actual operating conditions. Normal pressure is between 2 and 3¾ pounds.

c. Cleaning Fuel Pump Screen. Close shut-off valve at fuel filter. Loosen fuel pump bowl retainer nut; swing yoke and nut to one side; and remove fuel pump bowl, gasket, and screen (fig. 77). Clean bowl and screen thoroughly in dry-cleaning solvent. Blow through screen with compressed air, if available. Install screen with a new gasket, and place bowl in position. Swing yoke and clamp nut under bowl, and

tighten nut securely. Open shut-off valve at fuel filter and operate fuel pump hand lever to fill bowl.

d. Fuel Pump Removal. Disconnect battery ground strap. Remove left front fender apron to hood side panel bolts, and disconnect bond strap. Remove apron to cab and radiator bolts, and remove apron. Close shut-off valve at fuel filter; disconnect flexible coupling and carburetor pipe from fuel pump. Remove fuel pump to cylinder block screws, and remove fuel pump (fig. 78).

e. Fuel Pump Installation. Clean fuel pump and engine flange thoroughly. Crank engine until fuel pump operating rod is in its extreme released position. Install fuel pump with new flange gasket in



RA PD 310164

Figure 80—Adjusting Carburetor Throttle Stop Screw

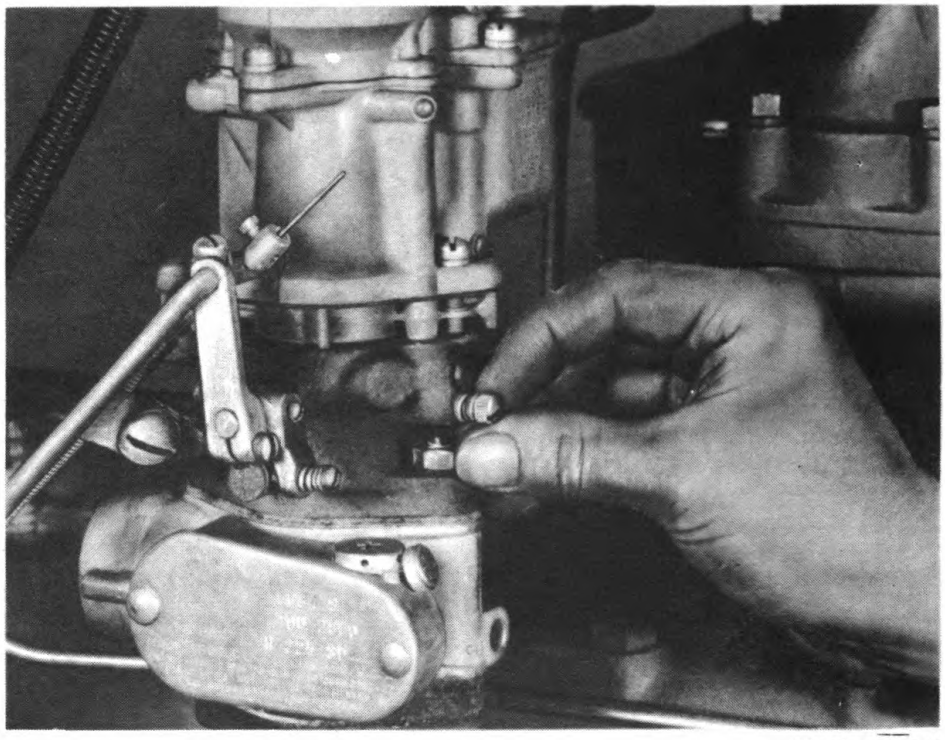
position on cylinder block. Make sure that pump rocker arm is contacting pump operating rod. Determine this by inspecting through the operating rod plug hole located just above the fuel pump flange. Install and tighten securely the fuel pump to cylinder block screws. Connect flexible coupling and carburetor pipe to fuel pump. Place left-front fender apron in position, and install apron to cab and radiator bolts. Install apron to hood side panel bolts, and connect bond strap. Connect battery ground strap.

71. CARBURETOR.

a. Description. The carburetor used is a Carter, Model 429-S, of the single-barrel, down-draft type, using a manual choke. The only ex-

ternal adjustments provided are one controlling idle mixture, and one for the idling speed.

b. Carburetor Choke Adjustment. Tighten the choke control sleeve to instrument board. Loosen choke control wire collar screw, and push choke valve all the way open. Push choke control button in until there is 1/16-inch clearance between button and instrument board. While holding choke valve in fully opened position, tighten collar screw securely to choke control wire (fig. 79).



RA PD 310165

Figure 81—Adjusting Carburetor Idle Mixture

c. Carburetor Idling Adjustment. Run engine until normal temperature is reached (140° to 180°F). Make sure that choke valve is fully open (button on the instrument panel all the way in). Adjust throttle adjusting screw (fig. 80) until ammeter shows a slight charge. NOTE: *Turning screw clockwise will increase engine idling speed, counterclockwise will reduce speed.* Adjust idle mixture by turning adjusting screw (fig. 81) in or out with fingers or screwdriver to obtain smoothest idle performance.

d. Carburetor Accelerator Linkage Adjustment (fig. 82). Loosen throttle control wire collar screw and remove collar. Remove cotter pin from upper end of accelerator cross shaft to carburetor rod,

and pull rod out of throttle lever. Loosen clevis lock nut, and adjust rod length so that carburetor throttle valve is wide open when accelerator pedal is pushed to floor. Make sure that the throttle adjusting screw contacts the boss on carburetor when accelerator pedal is released. Insert upper end of rod in throttle lever, and install a new cotter pin. Tighten clevis nut, and adjust hand throttle control (subpar. e below).

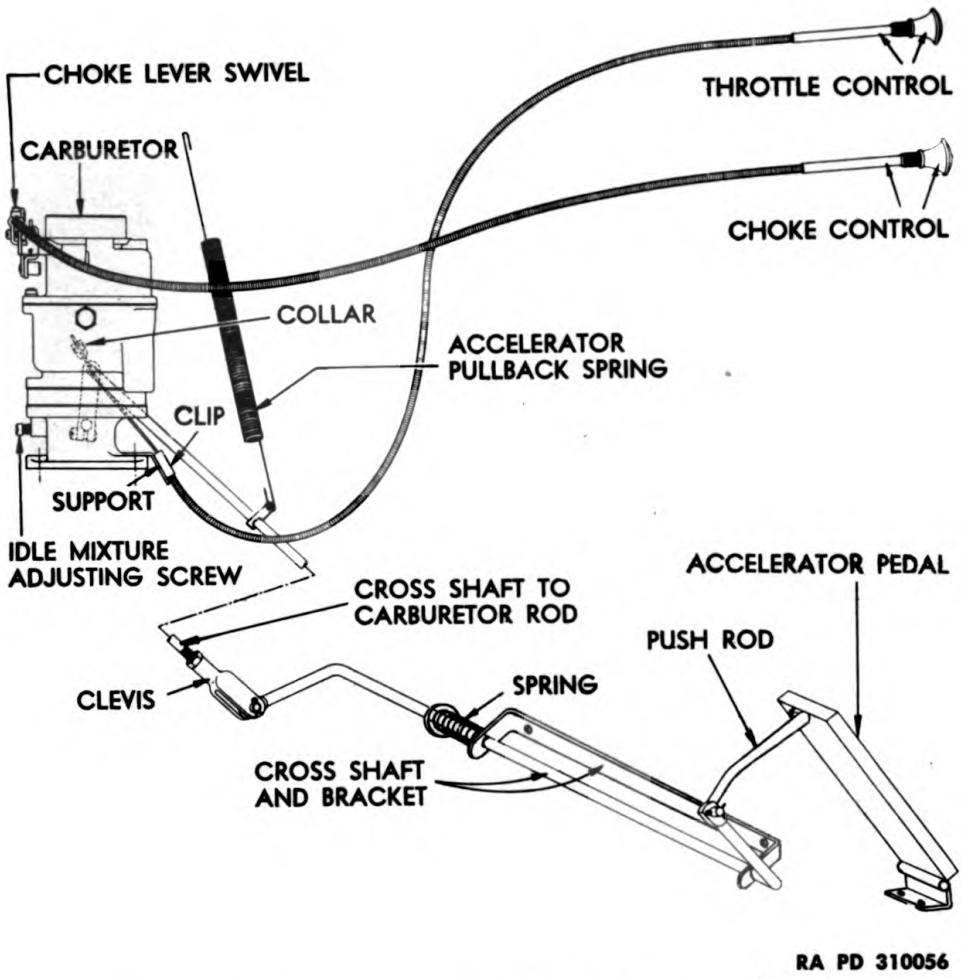
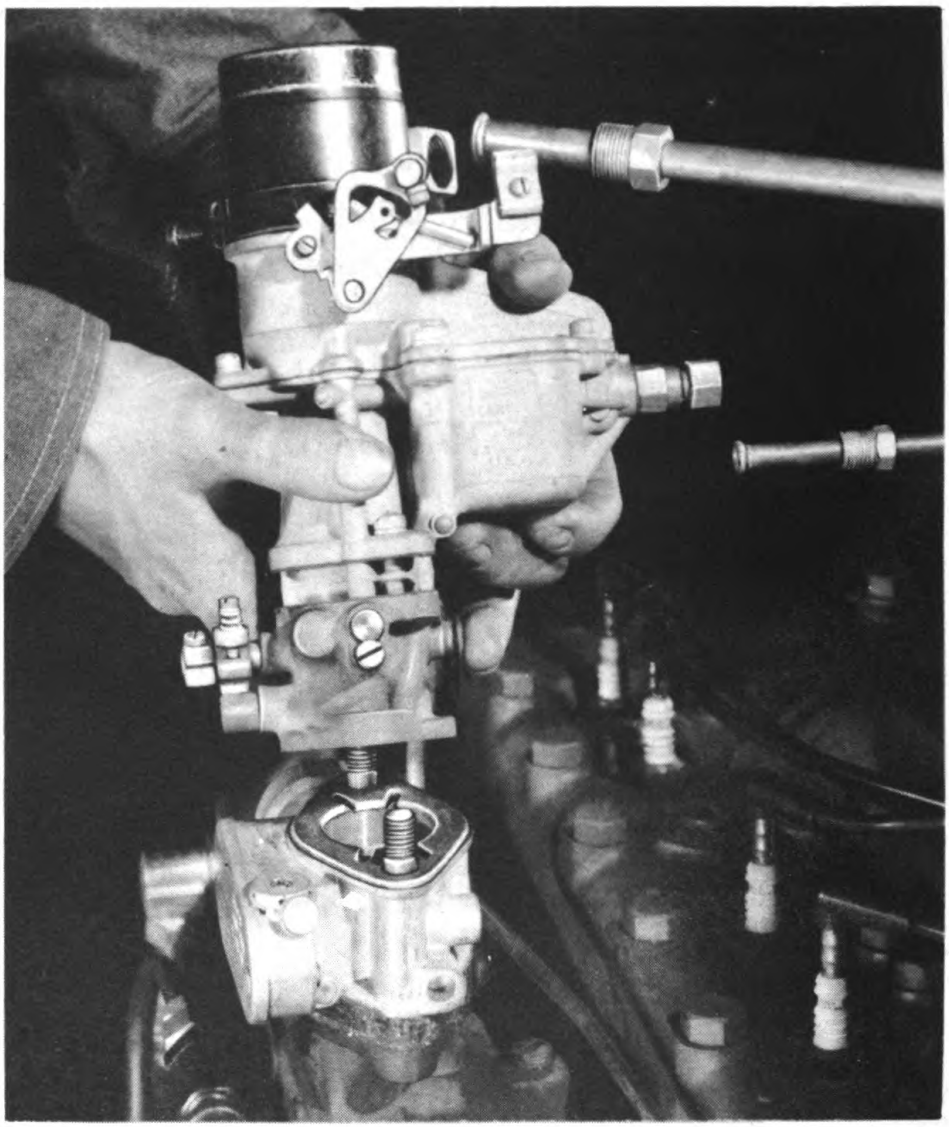


Figure 82—Carburetor Controls

e. Carburetor Hand Throttle Adjustment (fig. 82). Make sure that throttle control sleeve is securely fastened to instrument board. Push throttle button in until it strikes the instrument board, and loosen the throttle wire collar screw. Adjust clearance between the throttle lever and the throttle wire collar to ¼ inch. Hold collar in this position, and tighten collar screw securely to throttle wire.

f. Carburetor Removal. Raise hood and disconnect ventilator pipe from air cleaner adapter on vehicles so equipped. Unhook accel-

erator pull-back spring, loosen lower clamp screw holding air cleaner adapter to carburetor, and lift air cleaner and adapter off as a unit. Loosen collar screw, and remove collar from throttle control wire. Pull



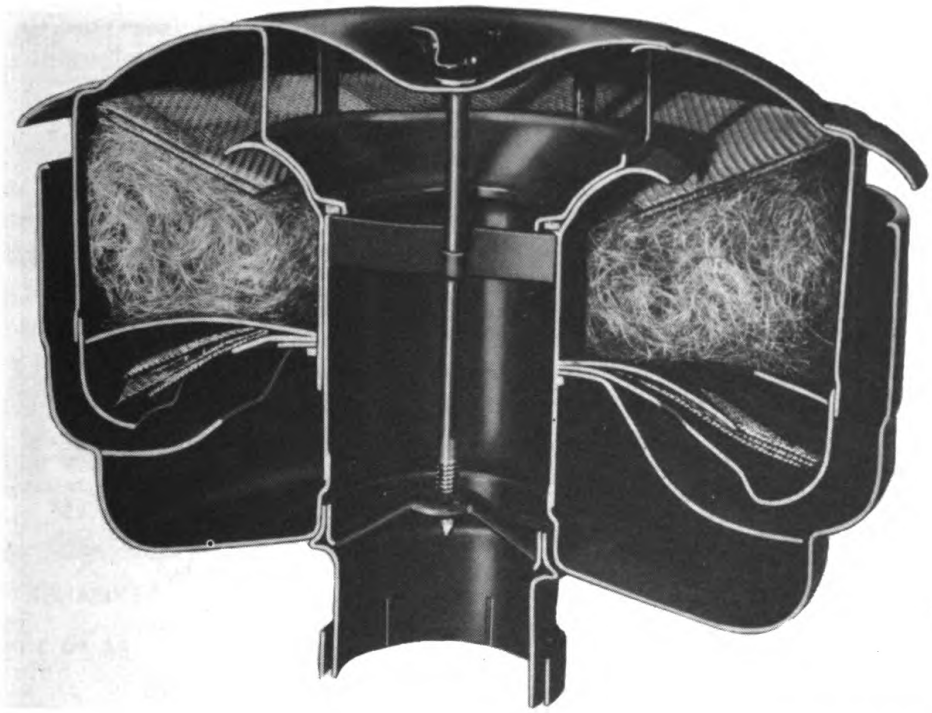
RA PD 310167

Figure 83—Removing Carburetor

throttle control wire out of accelerator rod, remove cotter pin, and move upper end of accelerator rod out of throttle lever. Loosen choke wire collar screw and clamp screw that holds choke wire tube to bracket. Pull the choke wire and tube from carburetor, and disconnect fuel line from carburetor. Remove the nuts that hold carburetor

in position on governor, lift throttle wire tube clip off the rear stud, and remove carburetor assembly (fig. 83).

g. Carburetor Installation. Install a new carburetor flange gasket on governor, and place carburetor in position. Place the throttle wire tube clip over rear stud, install the nuts, and tighten securely. Insert the choke wire through collar, fasten wire tube under clamp on bracket, and adjust choke (subpar. **b** above). Install upper end of



RA PD 310019

Figure 84—Sectional View of Carburetor Air Cleaner

accelerator rod into throttle lever and adjust (subpar. **d** above). Insert throttle control wire through hole in upper end of accelerator rod and adjust (subpar. **e** above). Place air cleaner with adapter on carburetor, tighten lower clamp screw, and hook accelerator pull-back spring on the screw. Connect ventilator pipe to air cleaner adapter, and fuel line to carburetor. Operate fuel pump priming lever to fill carburetor bowl, start engine, and test for leaks and proper operation. Lower hood.

72. AIR CLEANER (fig. 84).

a. Description. An oil-bath type carburetor air cleaner is used to filter road dust and other harmful matter out of the air before it reaches the carburetor. The air entering the cleaner passes into an oil chamber where the sudden flow reversal causes most of the dust to be deposited

in the oil bowl for settling in the bottom. The remaining dust is trapped as the air passes through an oil-coated filter element.

b. Cleaning. Remove air cleaner assembly (subpar. **c** below). Empty the oil from the reservoir bowl, and wash the bowl in dry-cleaning solvent to remove accumulated sludge. Immerse the filter element unit in dry-cleaning solvent, and wash the element thoroughly. After the unit has been allowed to drain and dry, dip it in fresh engine oil, and again allow any excess oil to drain away. Wipe off the oil film remaining on the outside of the element unit. Fill the oil reservoir to the arrow stamped on bowl, with engine oil. Place the filter element unit on the bowl, and install air cleaner assembly (subpar. **d** below).

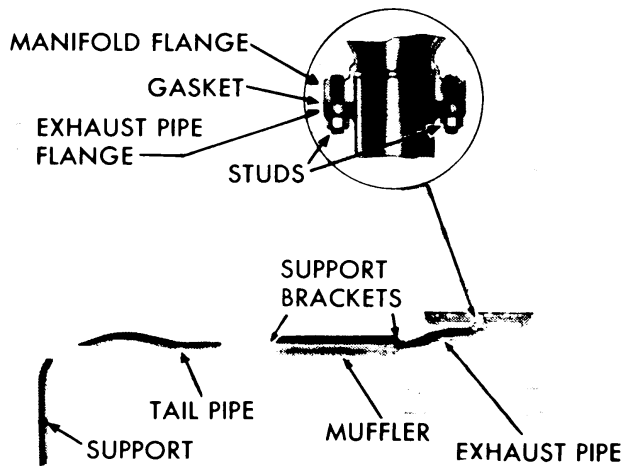


Figure 85—Exhaust System Components

c. Removal. Raise hood and loosen the screw holding the air cleaner to the air cleaner adapter. Lift air cleaner assembly off, being careful not to spill the oil out of the reservoir.

d. Installation. Place air cleaner in position on the air cleaner adapter, being careful not to spill the oil out of the reservoir. Install wing screw holding the air cleaner to adapter, tighten securely, and lower hood.

73. EXHAUST PIPE (fig. 85).

a. Description. The exhaust pipe is the connecting link between the exhaust manifold and the muffler. The forward end enters the exhaust manifold, and is held in place by the exhaust pipe flange. A flange gasket is provided to prevent leaks at the joint. The rear end of the exhaust pipe enters the muffler, and is held firmly in place by the front muffler clamp, which is bolted to the muffler front clamp bracket. The other end of the bracket is fastened to the clutch housing.

b. Removal. Remove right front fender apron (par. 150 c (1)). Remove exhaust pipe flange nuts, and remove muffler front clamp bracket to clutch housing screws. Loosen muffler front clamp, and pull front end of exhaust pipe downward off the manifold studs. Twist and pull exhaust pipe forward from muffler.

c. Installation. Install rear end of exhaust pipe in the muffler, and start the forward end into manifold, using a new exhaust pipe flange gasket. Aline flange on manifold studs, install flange washers and nuts, and tighten securely. Install muffler front clamp bracket to clutch housing cap screws and tighten. Tighten muffler front clamp bolt. Install right front fender apron (par. 150 c (2)).

74. MUFFLER (fig. 85).

a. Description. The muffler is designed to deaden the noise of escaping gases or vapors, and to reduce harmful back pressure to a minimum. It is located between the exhaust pipe and tail pipe.

b. Removal. Remove muffler tail pipe (par. 75 b). Loosen muffler front clamp bolt, and drive muffler rearward off the exhaust pipe with a wood block and hammer.

c. Installation. Install front of muffler on exhaust pipe, and tighten muffler front clamp bolt. Install muffler tail pipe (par. 75 c).

75. MUFFLER TAIL PIPE (fig. 85).

a. Description. The tail pipe is fastened to the outlet end of the muffler, and is used to carry the exhaust gases away from the cab.

b. Removal. Loosen muffler rear clamp. Remove muffler tail pipe support clip, and remove tail pipe by twisting and pulling pipe rearward.

c. Installation. Install forward end of tail pipe in muffler outlet. Install tail pipe support clip and tighten. Tighten muffler outlet clamp.

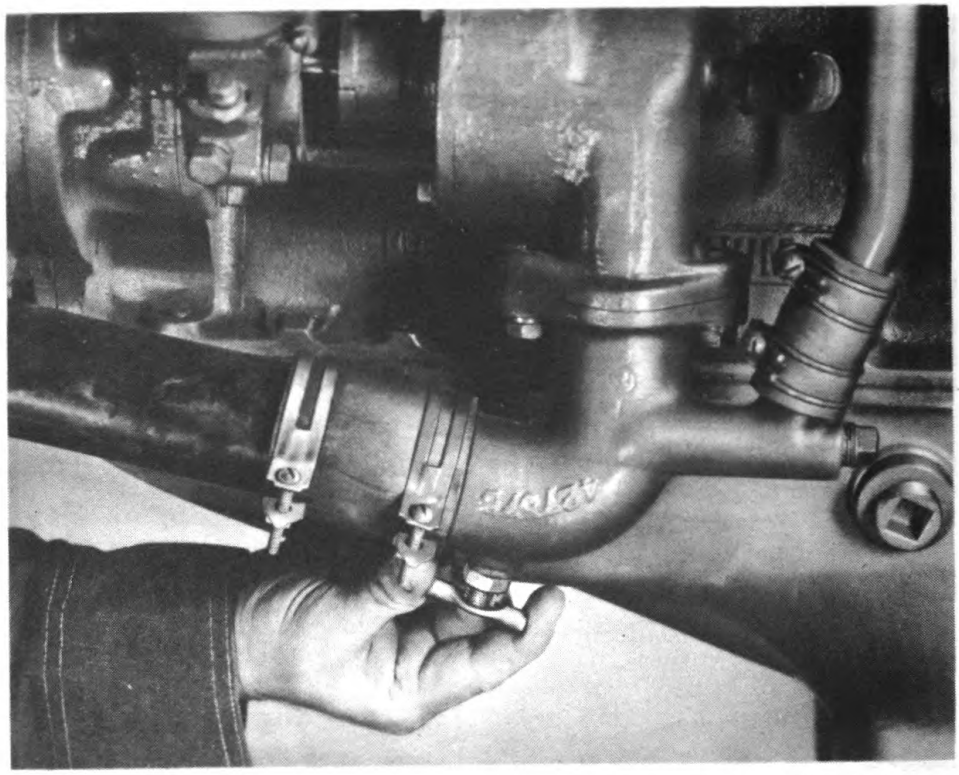
2½-TON 6x6 TRUCK AND 2½- TO 5-TON 6x4 TRUCK (STUDEBAKER MODELS US 6 AND US 6x4)

Section XVI

COOLING SYSTEM

76. DESCRIPTION OF SYSTEM.

a. The cooling system consists of the radiator, fan, water pump, thermostat, and engine water jacket. When the engine is operated, the



RA PD 319195

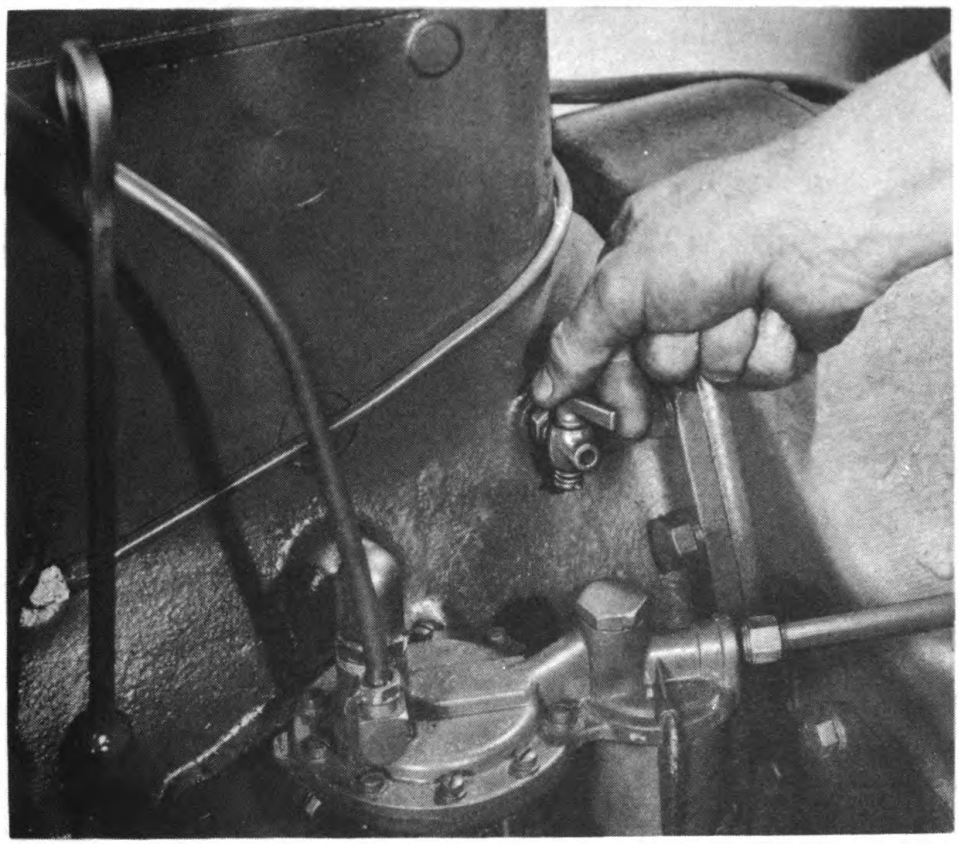
Figure 86—Radiator Drain Cock Location

cooling system pump operates and circulation is set up only within the water jacket of the engine, until the engine water thermostatic valve opens. The cooling fluid then flows unrestricted through the

entire cooling system. Two drain cocks are provided for draining the entire cooling system. One is located in the bottom of the water pump inlet elbow, and the other in the left rear side of the cylinder block just above the fuel pump.

77. DRAINING SYSTEM.

a. Raise hood and remove radiator cap. From underneath vehicle, reach through hole in engine left-side pan, and open the drain cock



RA PD 310169

Figure 87—Cylinder Block Drain Location

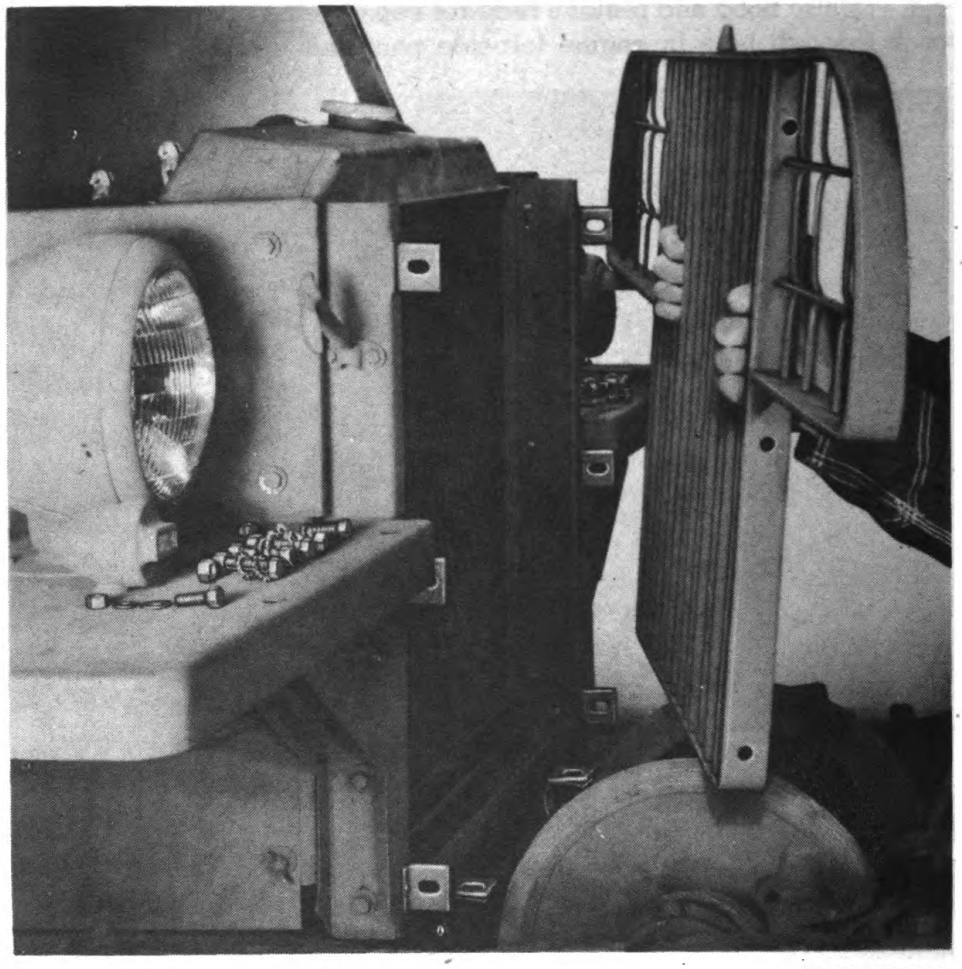
located at the water pump inlet elbow (fig. 86). Open the cylinder block drain cock located in the left-rear side of engine just over the fuel pump (fig. 87). After draining, close drain cocks.

78. RADIATOR AND GUARD.

a. Description. The radiator is of the fin-and-tubular type, and is provided with a self-sealing cap. It is mounted on the front of the vehicle, and is protected by a guard.

b. Removal. Raise hood, disconnect the hood prop from radiator frame, and support the hood. Drain cooling system (par. 77 a). Re-

move hood side panels (par. 61 b). Loosen the hose clamp screws, and remove the upper and lower radiator hose connections from the radiator core. Remove the nuts and bolts that hold the radiator guard in position, and lift guard off the vehicle (fig. 88). Take out screws, and remove headlight junction block from each side of radiator core. Dis-



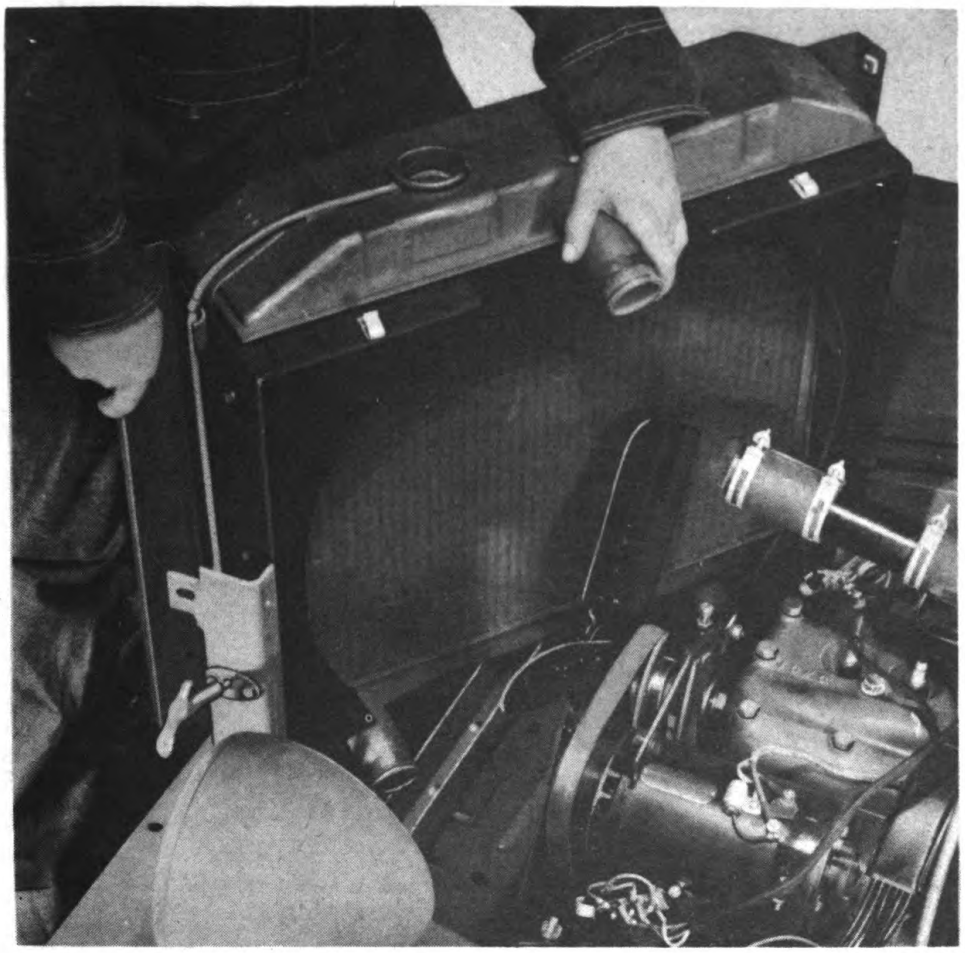
RA PD 310135

Figure 88—Removing Radiator Guard

connect the wiring harness from the clips on the radiator core. Remove wing screws holding fender aprons to radiator flanges. Take out the radiator flange to support screws, and lift the radiator core with fan shroud out as an assembly (fig. 89).

c. Installation. Place the radiator core with fan shroud in position, install the radiator flange to support screws, and tighten securely. Install upper and lower radiator hose connections, and tighten clamp screws. Install wing screws holding the fender aprons to radiator

flanges, and place the wiring harness in clips on radiator core. Fasten headlight junction block to each side of radiator core with bolts, nuts, and new lock washers. Place radiator guard in position, install the bolts and nuts, and tighten securely. Install hood side panels (par. 62 p). Connect hood prop to radiator frame with a clevis pin, spring, and new cotter pin. Fill cooling system, check for leaks, and lower hood.



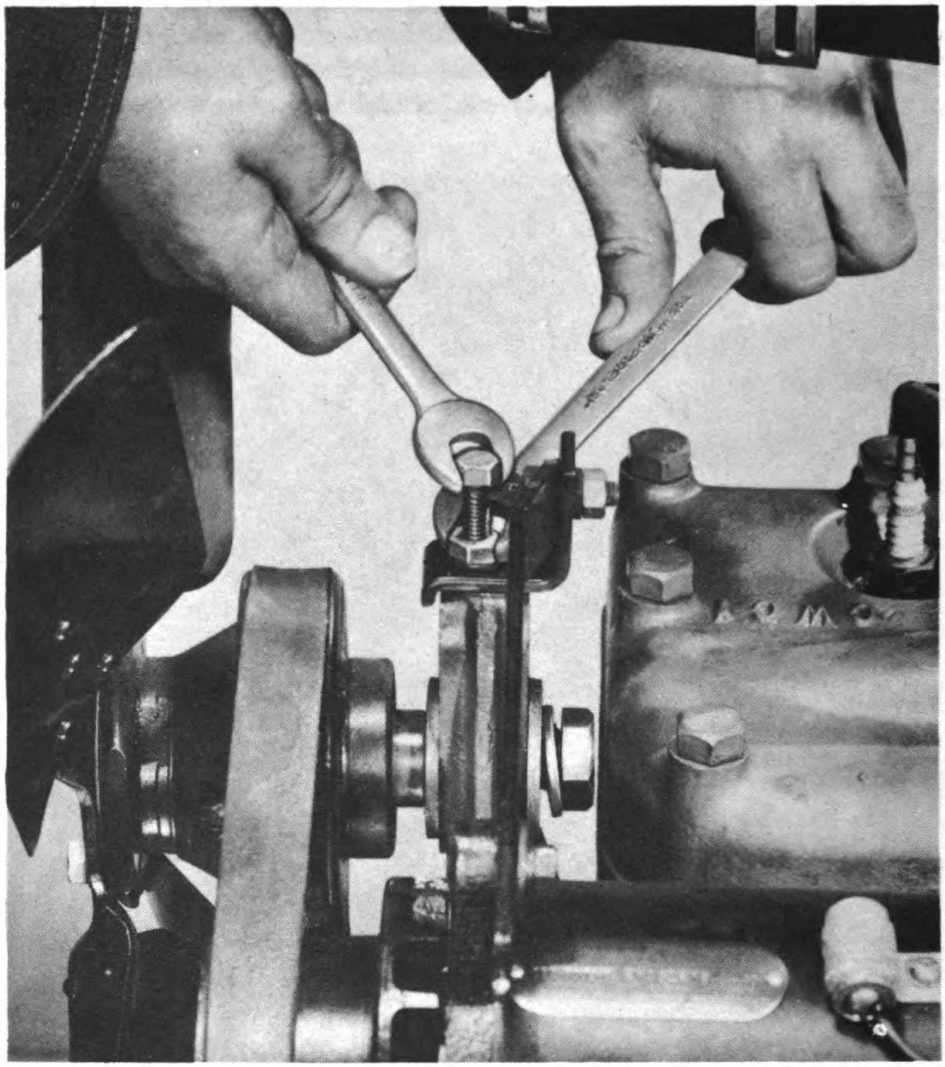
RA PD 310123

Figure 89—Removing Radiator

79. FAN AND FAN BELT.

a. Description. The vehicle may be equipped with a ball-bearing type, tapered roller-bearing type, or plain-bearing type fan assembly. Either type is mounted on bracket which is fastened to the front of cylinder block. A pulley on the crankshaft drives the fan by means of a V-type belt. For lubrication of the various type fans, see paragraph 24.

b. Adjustment of Fan Belt. Loosen the fan shaft mounting nut. Hold the fan adjusting screw lock nut, and move the fan assembly up



RA PD 319196

Figure 90—Adjusting Fan Belt

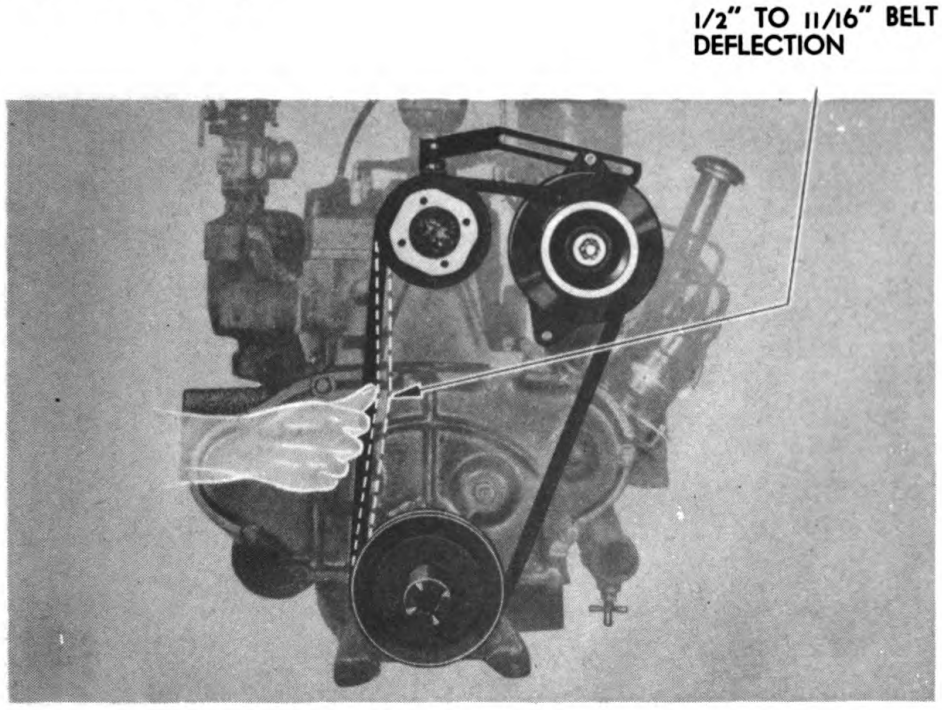
or down in the fan bracket with the fan adjusting screw (fig. 90) so that there is ½- to 11/16-inch belt deflection (fig. 91). Tighten fan shaft mounting nut securely.

c. Removal of Fan Belt. Loosen the generator hinge bolts, adjusting arm pivot bolt, and lock screw; and move the generator toward the engine. Loosen fan shaft mounting nut, and turn adjusting screw to lower the fan assembly in fan bracket. Slip fan belt off the generator and crankshaft pulleys, and lift it off the fan pulley.

d. Installation of Fan Belt. Place fan belt in position on fan,

crankshaft, and generator pulleys. Move the generator away from engine to take up the slack in fan belt, and tighten generator adjusting arm screw, pivot bolt, and hinge bolts. Adjust fan belt (subpar. **b** above).

e. Removal of Fan. Remove the fan shaft mounting nut, lock washer, and thrust washer which hold the fan shaft to the fan bracket. Remove the adjusting screw and lock nut from the top of fan bracket. Remove the fan assembly from bracket, and disengage fan belt from fan pulley (fig. 92).



RA PD 310024

Figure 91—Checking Fan Belt Adjustment

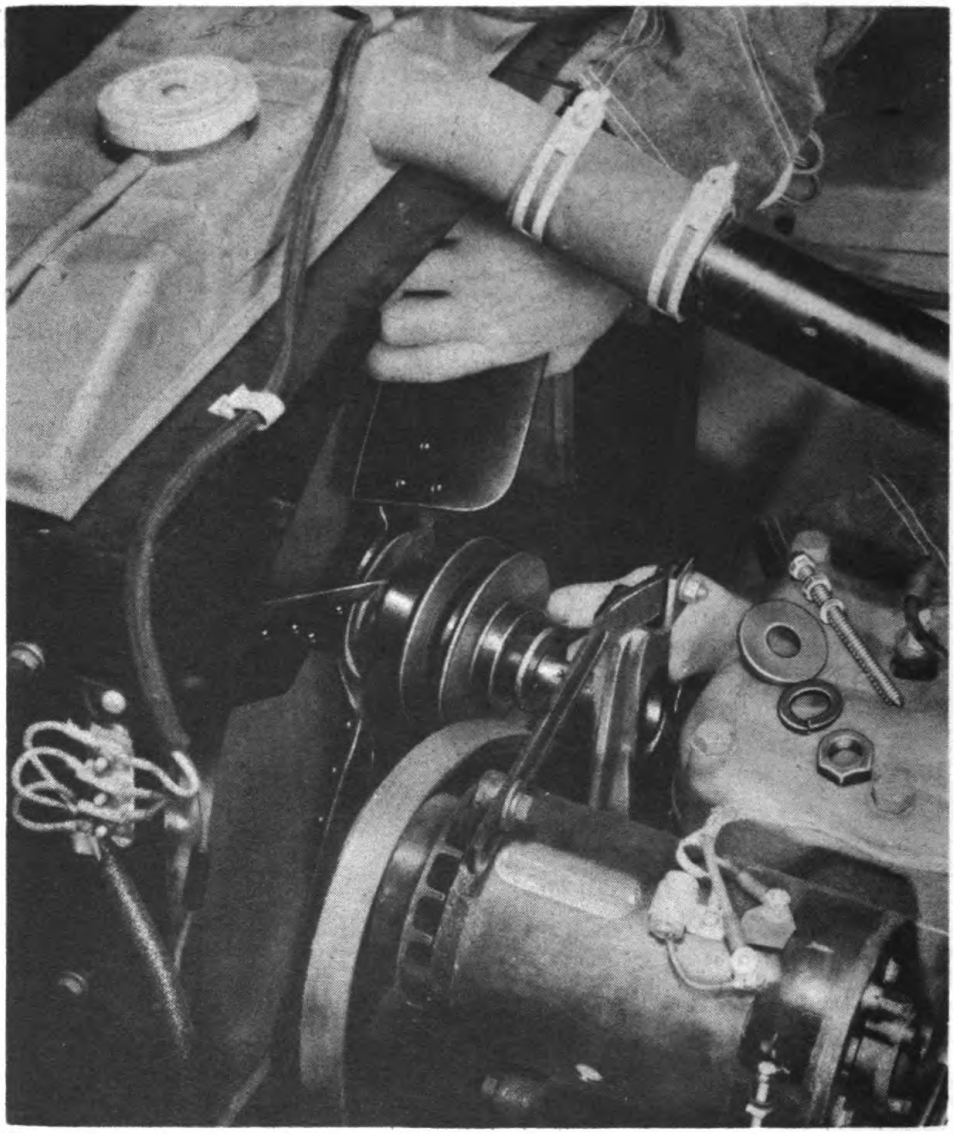
f. Installation of Fan. Place one of the plain washers over the rearward end of the fan shaft, engage fan belt on fan pulley, and insert the shaft end through the slot in fan bracket. Insert the adjusting screw into top of fan bracket, and start screw into the shaft. Place the second plain washer, lock washer, and nut on the rear of the fan shaft; tighten the fan shaft nut sufficiently for alinement only. Adjust fan belt (subpar. **b** above).

80. WATER PUMP.

a. Description. Water is circulated through the cooling system by a centrifugal-type pump which is mounted on the left-front side of the

cylinder block. The pump is driven by an idler gear, which in turn is driven by the camshaft gear.

b. Adjustment. An adjustable packing nut is used with a packing gland at the front of the water pump to seal against the escape of water

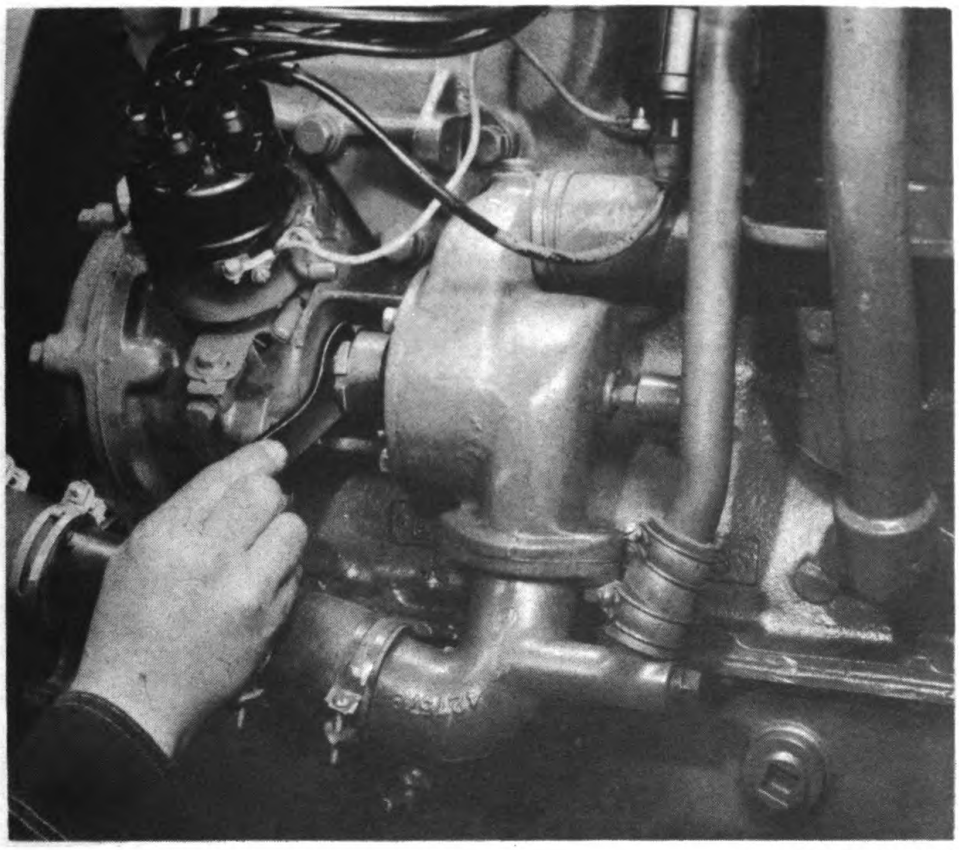


RA PD 310122

Figure 92—Removing Fan Assembly

at the point where the shaft enters the pump. Turn the packing nut counterclockwise to tighten with the special spanner wrench (fig. 93) provided in the vehicle tool kit for this purpose. **NOTE:** ***Only a slight pressure is required on the packing.***

c. Removal. Remove battery (par. 84 **c**). Drain cooling system (par. 77). Remove hood left-side panel and fender apron (par. 61 **b**). Remove distributor (par. 93 **d**). Loosen cylinder head cap screws holding coil bracket, and move coil and bracket out of the way. Remove the cap screws and lock washers holding cylinder block water inlet and oil filter bracket to block. Loosen hose clamp screws holding water pump to cylinder water inlet hose at water pump. Remove cylinder water inlet and oil filter bracket with hose from block. Loosen water bypass tube hose connections, and remove tube. Remove water pump



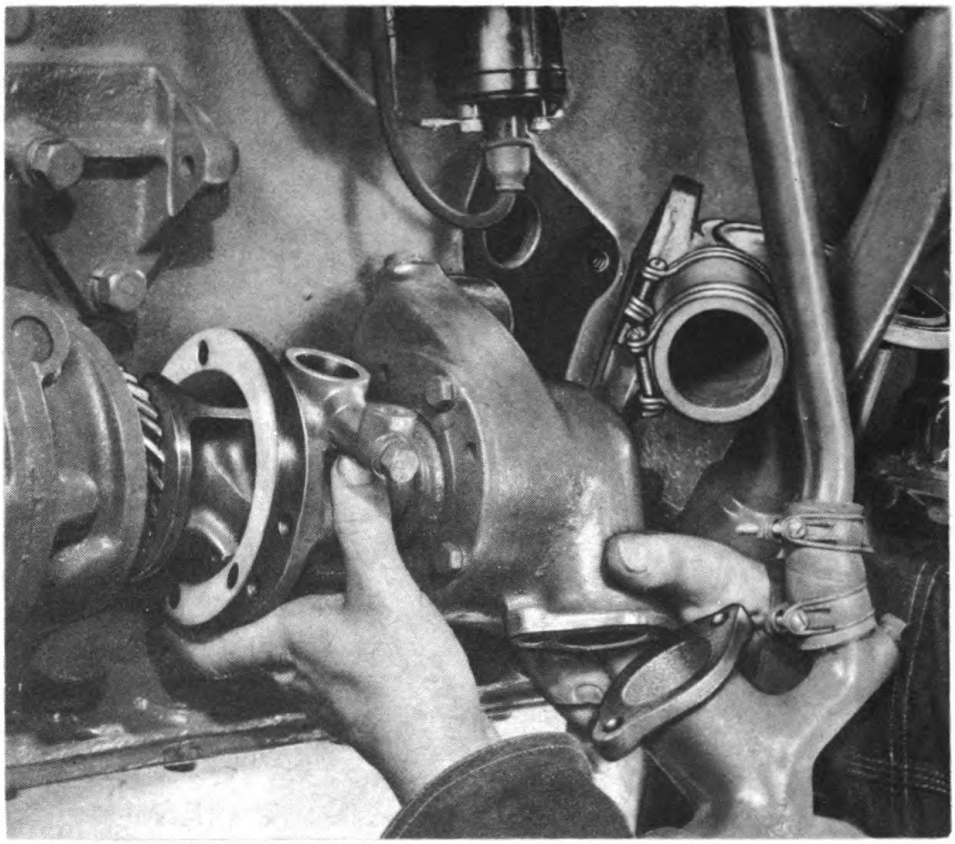
RA PD 319194

Figure 93—Adjusting Water Pump Packing

bracket to timing gear housing cap screws, loosen the radiator to water pump hose clamp screw, and remove the water pump and bracket assembly (fig. 94).

d. Installation. Place water pump and bracket assembly in position, using a new water pump bracket to timing gear housing gasket, and enter pump inlet elbow into radiator outlet hose. Install bracket to timing gear housing cap screws, and tighten securely. Tighten radiator to water pump hose clamp screw. Install the cylinder water inlet and

oil filter bracket with hose on block, using cap screws and lock washers. Tighten cap screws securely, and tighten hose clamp on water pump to cylinder water inlet hose. Install engine water bypass tube, and tighten hose clamp screws. Install distributor (par. 93 e). Place coil and high tension wires bracket in position, and install cylinder head cap screws. Fill cooling system with water or antifreeze compound as required. Install battery (par. 84 d). Start engine, and check ignition timing (par. 93 f). Install hood side panel and fender apron (par. 62 p).



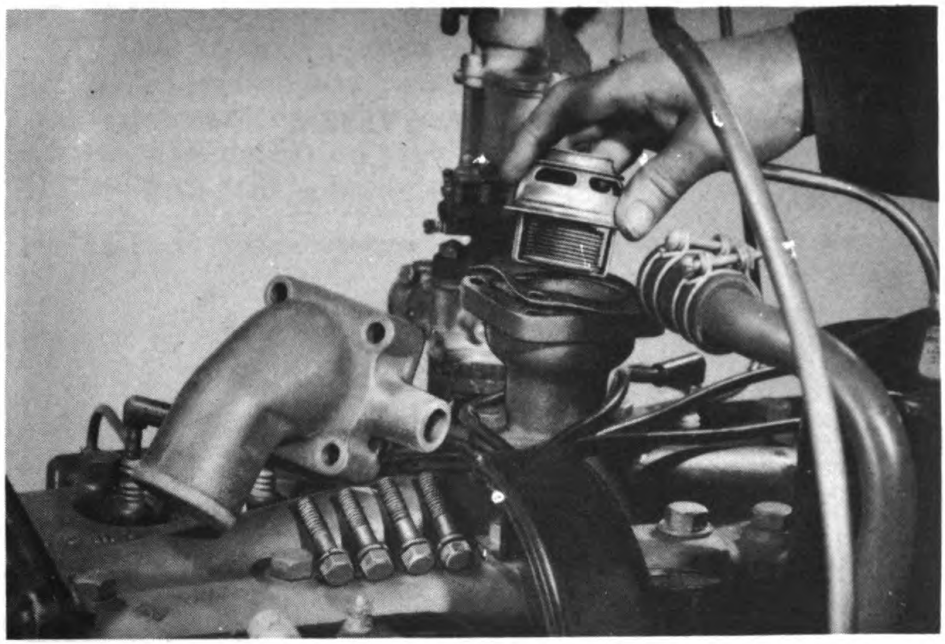
RA PD 310168

Figure 94—Removing Water Pump

81. THERMOSTAT.

a. Description and Data. The thermostat is of the bellows-type, and is located in a housing between the cylinder head and water outlet below. It starts to open at 157° to 162°F, is fully open at 180° to 185°F, and keeps the engine at the most efficient operating temperature.

b. Removal. Drain cooling system (par. 77). Remove cap screws which fasten the engine water outlet to the thermostat housing, raise



RA PD 319186

Figure 95—Removing Thermostat

the outlet and hose sufficiently to remove the gasket, and lift out the thermostat (fig. 95).

c. Installation. Place thermostat in the thermostat housing with the bellows downward. Install a new water outlet gasket, and tighten the outlet securely with cap screws. Fill cooling system with water or antifreeze compound as required.

2½-TON 6x6 TRUCK AND 2½- TO 5-TON 6x4 TRUCK (STUDEBAKER MODELS US 6 AND US 6x4)

Section XVII

ELECTRICAL SYSTEM

82. DESCRIPTION.

a. The electrical system is of the single-wire, grounded type. The various units making up the system include the battery, belt driven generator, cranking motor, generator regulator, necessary wiring, and various electrical accessories. As the vehicles may be equipped with radio, adequate grounding is extremely important, and is therefore provided at all points where necessary.

83. CRANKING MOTOR AND SWITCH.

a. Description and Data.

(1) DESCRIPTION. The Bendix-drive type cranking motor used on the vehicle is mounted to the flywheel housing at the right-rear side of the engine. The motor is operated by depressing the cranking motor switch to complete the circuit.

(2) DATA.

Make	Auto-Lite
Model	MAB-4071

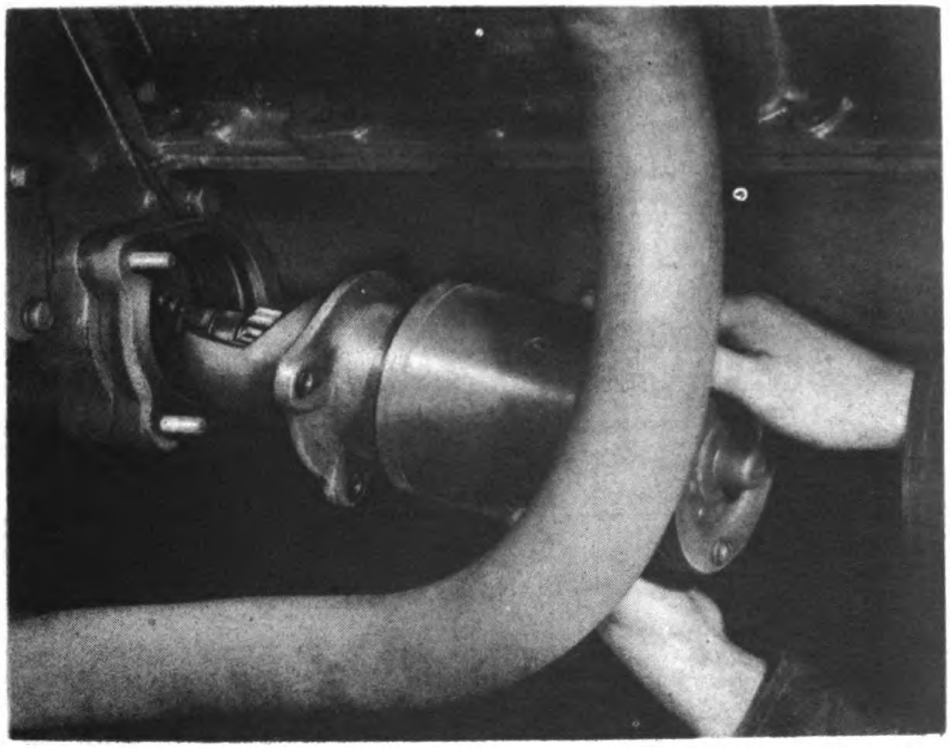
b. Cranking Motor.

(1) REMOVAL. Raise hood and disconnect battery ground strap. Remove right fender apron (par. 150 c (1)). Disconnect cranking motor switch cable from cranking motor terminal. Remove nuts and lock washers holding cranking motor to flywheel housing spacer. Lift unit forward and out of vehicle (fig. 96).

(2) INSTALLATION. Place the cranking motor in position on studs, install nuts and lock washers, and tighten the assembly securely to flywheel housing spacer. Connect the cranking motor switch cable to the cranking motor terminal, and connect the battery ground strap. Install the right fender apron (par. 150 c (2)). Lower hood.

c. Cranking Motor Switch.

(1) REMOVAL. Raise hood and disconect battery ground strap. Remove left fender apron (par. 150 c (1)). Disconnect cranking motor cable from lower terminal. Disconnect the horn circuit breaker wire, the ammeter wire, and battery cable from the upper terminal. Remove the nuts and bolts holding the switch to floor, and take off the switch.



RA PD 319198

Figure 96—Removing Cranking Motor

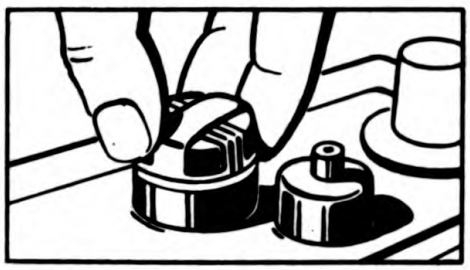
(2) INSTALLATION. Place switch assembly in position and fasten to floor with holding bolts, nuts, and washers. Connect the cranking motor cable to the lower terminal. Connect the battery cable, ammeter wire, and horn circuit breaker wire to the upper terminal. Install the left fender apron (par. 150 c (2)), connect battery ground strap, and lower hood.

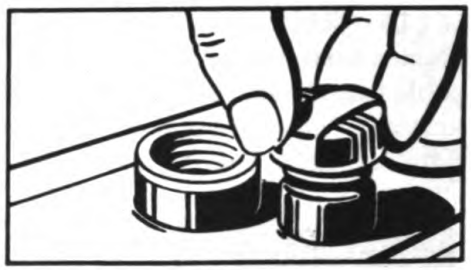
84. BATTERY.

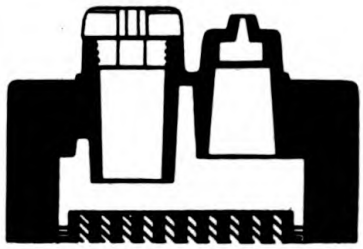
a. Description and Data.

(1) DESCRIPTION. The battery is of the 6-volt type, and is located within the engine compartment at the left-front corner. It is held in position by hold-down bolts which extend through a frame covering the outer top edge of the case. The positive (+) post is grounded on ve-

2½-TON 6x6 TRUCK AND 2½- TO 5-TON 6x4 TRUCK (STUDEBAKER MODELS US 6 AND US 6x4)

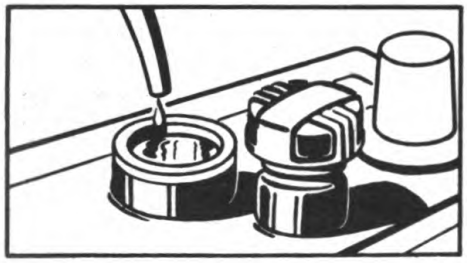


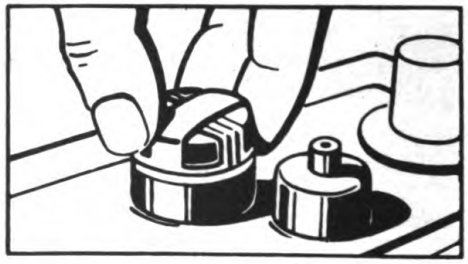




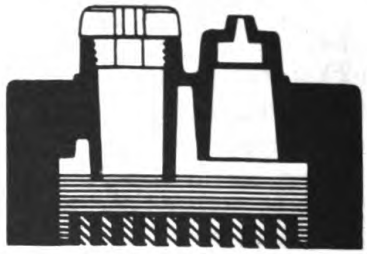
1. REMOVE FILLER-CAP.

2. PLACE CAP ON SAFETY-VENT FORMING AIR LOCK IN BREATHER-CHAMBER.





3. FILL WELL WITH DISTILLED WATER. AIR LOCK PREVENTS SOLUTION RISING ABOVE BOTTOM OF WELL.



4. REMOVE CAP FROM SAFETY-VENT AND SOLUTION DROPS TO CORRECT LEVEL. REPLACE CAP IN FILLER HOLE.

RA PD 49337

Figure 97—Procedure for Adding Battery Water

hicles without radio interference suppression, and the negative (—) post is grounded on vehicles with the suppression equipment.

(2) DATA.

Make and Model . . . . . Willard, Model SW-5-153
Capacity . . . . . 153 amp-hr
Voltage 6

b. Filling Battery. When required, add distilled water to cover plates by ⅜ inch. Always return the solution to the cell from which it was taken when testing for specific gravity with a hydrometer. As a partially or fully discharged battery will freeze at a temperature slightly below the freezing point of water, the battery should be tested frequently during cold weather to make certain that the specific gravity remains at or near 1.280. Always follow the procedure outlined in figure 97 when adding distilled water.

c. Removal. Raise the hood and remove the cables from the terminals by loosening the clamp bolts and lifting the cable clamps off the terminals. Remove the wing nuts from the battery hold-down clamp bolts, remove the clamp, and lift the battery out of vehicle.

d. Installation. After having carefully cleaned the battery case, top, and terminals, apply a small amount of vaseline or grease to the battery posts and set it in the vehicle. Place the hold-down clamp over the hold-down bolts, and install the wing nuts. CAUTION: *Do not tighten them excessively, as doing so may crack the case.* Install the ground strap and the cable leading to cranking motor switch on their respective posts, and tighten securely.

85. GENERATOR.

a. Description and Data.

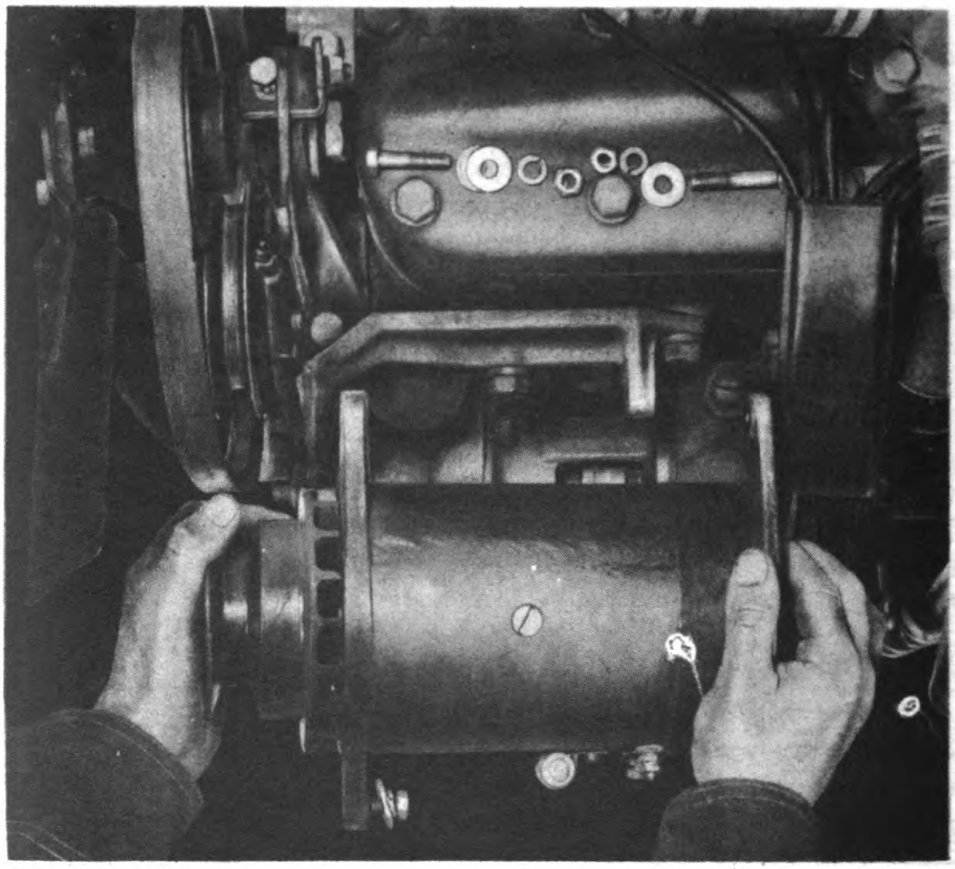
(1) DESCRIPTION. The high-output, shunt-wound, air-cooled generator is mounted on the left-front side of the engine, and is driven by the fan belt. The generator is fully controlled as to current and voltage output by the generator regulator.

(2) DATA.

Make . . . . . Auto-Lite
Model (less radio interference suppression) GEW-4806A
(with radio interference suppression) GEG-5002C

b. Removal. Raise the hood and disconnect ground strap from battery. Disconnect the brown wire from the terminal marked "A", and the black wire from the field, or "F" terminal. Also disconnect the ground wire which is fastened to the ground screw or condenser. Release the generator from the adjusting arm by taking out the lock screw and washers. Remove the hinge bolts holding generator to the bracket, disengage drive belt from pulley, and lift out generator (fig. 98).

c. **Installation.** Place the drive belt on the generator pulley, position the generator on the bracket, and install the hinge bolts. Install the adjusting arm screw, move the generator away from engine so the belt will have from ½- to $^{11}/_{16}$-inch deflection (fig. 91). Tighten the adjusting arm lock screw. Connect the brown wire to the "A" terminal, the black wire to the "F" terminal, and the ground wire to the ground screw or condenser. Connect ground strap to battery, and lower the hood.



RA PD 310170

Figure 98—Removing Generator

86. GENERATOR REGULATOR.

a. **Description and Data.**

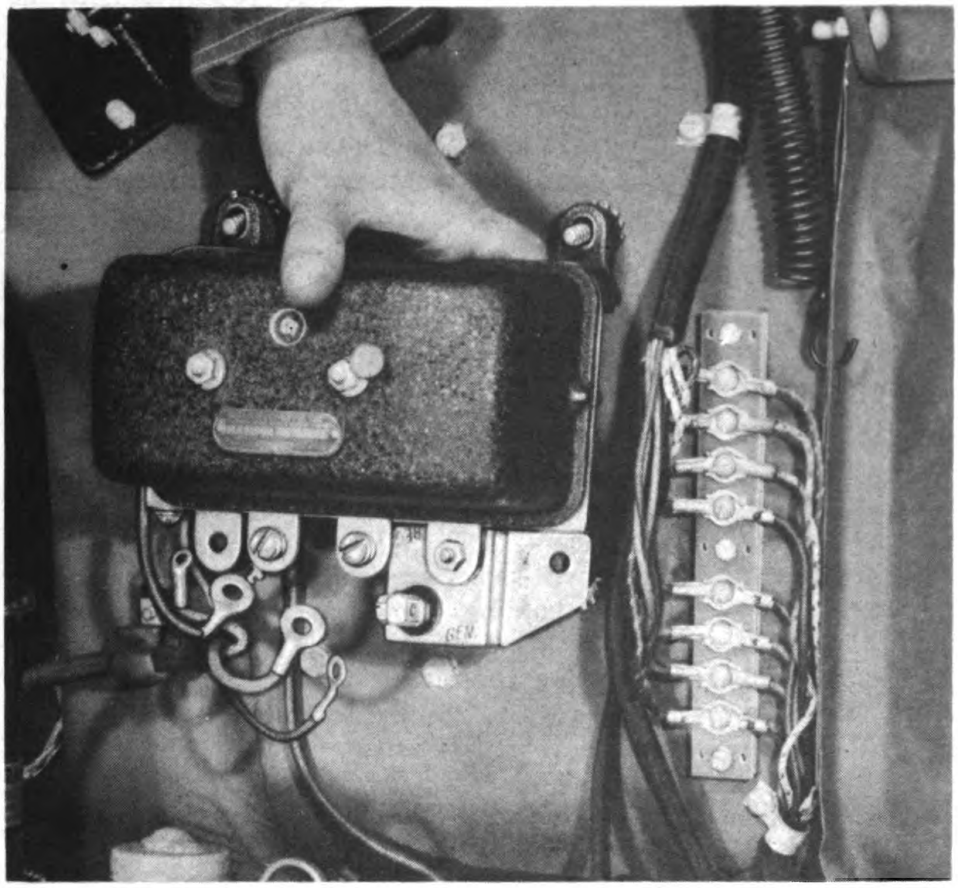
(1) DESCRIPTION. The generator regulator, mounted on the engine side of the dash, automatically regulates the generator output according to the requirements of the battery or current consumption for lights, cranking motor, electrical accessories, etc. The regulator is of the three-unit type containing a cut-out relay, a voltage regulator, and a current regulator.

(2) DATA.

Make ..... Auto-Lite

Model (less radio interference suppression) VRY-4201A
(with radio interference suppression) VRY-4203A

b. Removal (fig. 99). Raise hood and disconnect ground strap from battery. Remove wires from all terminals and nuts and bolts holding regulator to dash.



RA PD 310125

Figure 99—Removing Generator Regulator

c. Installation. Fasten regulator to dash with bolts, nuts, and toothed lock washers between regulator and dash. Connect ground wire to the ground screw on regulator, the No. 14 black wire from the generator to the terminal marked "F", the brown wire to the terminal marked "A", and the No. 10 black wire from ammeter or large filter to the terminal marked "B".

2½-TON 6x6 TRUCK AND 2½- TO 5-TON 6x4 TRUCK (STUDEBAKER MODELS US 6 AND US 6x4)

87. CIRCUIT BREAKERS.

a. Main Light Switch Circuit Breaker.

(1) DESCRIPTION. The main light switch circuit breaker is the thermal type. Its purpose is to prevent damage to the lighting circuit from overload, and is accomplished by the opening and closing of contact points according to the heat developed by the electrical energy.

(2) REMOVAL. Disconnect the black wire from circuit breaker, and remove the screw holding circuit breaker to the switch.

(3) INSTALLATION. Fasten the circuit breaker to switch with the screw, and connect the black wire to the circuit breaker.

b. Horn Circuit Breaker.

(1) DESCRIPTION. The horn circuit breaker is connected to the cranking motor switch, and is mounted on the engine side of dash.

(2) REMOVAL. Raise hood, disconnect battery ground strap, and disconnect the wires from terminals on circuit breaker. Remove the sheet metal screws holding circuit breaker to dash.

(3) INSTALLATION. Fasten circuit breaker to dash with the sheet metal screws. Connect the red horn wire to the upper terminal, and the other red wire to the lower terminal. Connect battery ground strap and lower hood.

c. Fuel Gage Circuit Breaker.

(1) DESCRIPTION. The fuel gage circuit breaker is located on the inside of the instrument board, is connected to the ignition switch, and is in series with the fuel gage.

(2) REMOVAL. Disconnect the wires from the terminals on circuit breaker. Take out the holding screws, and remove the circuit breaker.

(3) INSTALLATION. Fasten the circuit breaker in position with screws. Connect the black wire to the upper terminal, and the red wire to the lower terminal.

88. RADIO INTERFERENCE SUPPRESSION (figs. 100, 101, 102, 103 and 104).

a. Description and Data.

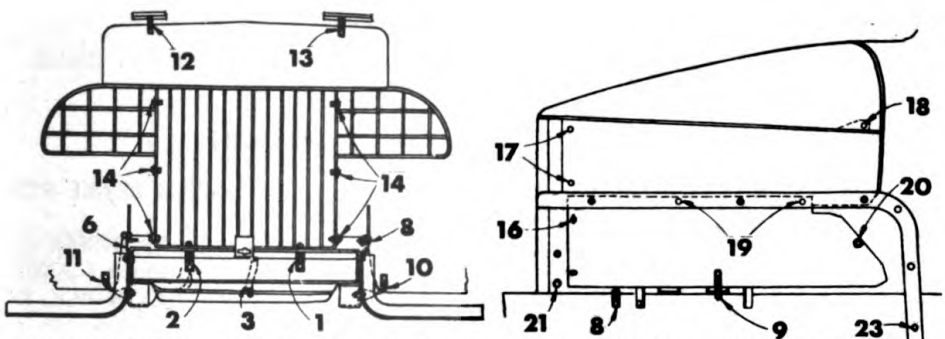
(1) DESCRIPTION. Suppressors, condensers, filters, shielding, and bonds or ground straps are used on some vehicles to prevent interference with radio communication. Suppressors are used at each spark plug, and on the secondary distributor to coil wire. The charging circuit, ignition circuit, and ammeter circuit are equipped with interference filters. Condensers are located on the switch side of the ignition coil, and on the generator "A" terminal. The primary wire between the ignition coil and distributor is shielded and grounded, as are the generator, ammeter, and field wires between the generator and regulator. Bonds or ground straps are located at numerous points on the chassis. In order

ELECTRICAL SYSTEM

LIST OF BONDS AND LOCATIONS

BOND NO.	LOCATION
1 & 2	Radiator Guard to Frame Front Cross Member (No. 1 — Left, No. 2 — Right).
3	Oil Pan to Frame Front Cross Member.
4	Cylinder Head to Dash.
5	Clutch Housing to Engine Support Bracket.
6,7&8	Front Fender Apron to Frame Side Member (No. 6 — Right Front, No. 7 — Right Rear, No. 8 — Left Front).
9	Left Front Fender Apron to Battery Cradle.
10&11	Cab to Frame (No. 10—Left Rear, No. 11—Right Rear).
12&13	Hood Top Panel to Cowl (No. 12 —Right, No. 13—Left).
14	Radiator Guard to Core Support.
15	Radiator Core to Support.
16	Front Fender Apron to Radiator Core Support.
17	Hood Side Panel to Radiator Core Support.
18	Hood Side Panel to Body.
19	Hood Side Panel to Fender and Apron.
20	Front Fender Apron to Cowl.
21	Front Fender to Radiator Core Support.
22	Control Rod Anti-Rattle Springs.
23	Front Fender to Cowl.

RADIO INTERFERENCE SUPPRESSION ILLUSTRATIONS



FRONT VIEW—RADIATOR GUARD AND HOOD

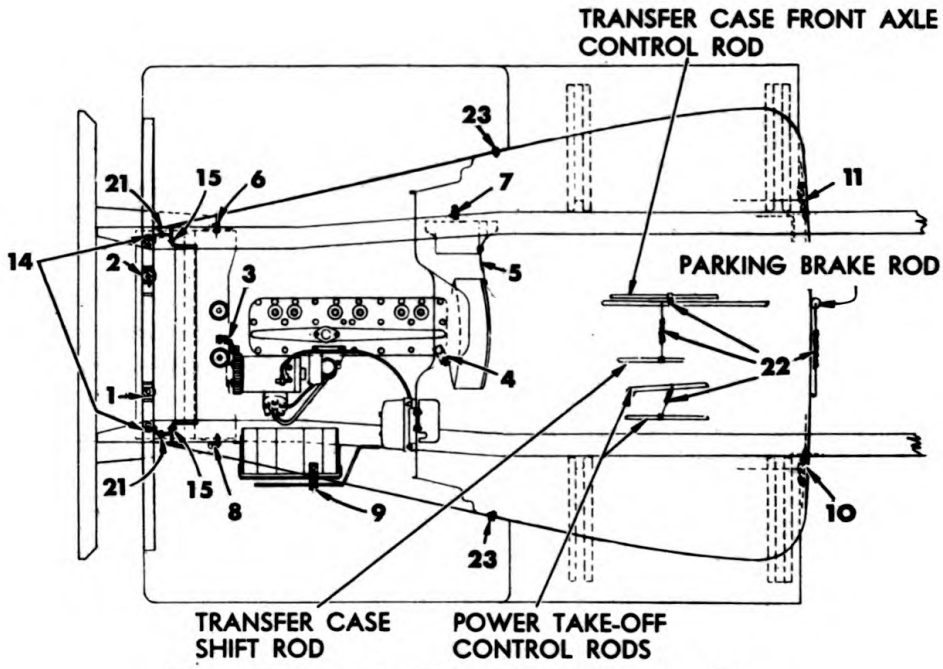
SIDE VIEW—SHEET METAL

RA PD 310060

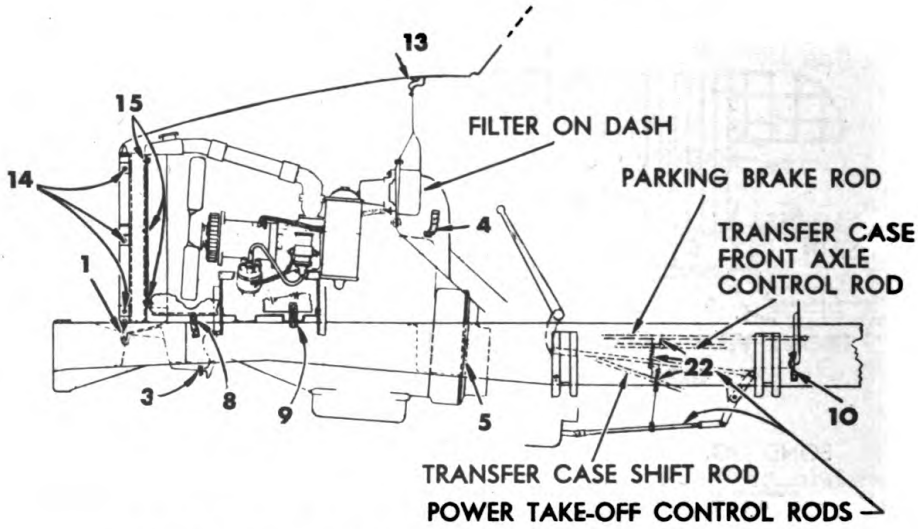
Figure 100—Radio Interference Suppression Bonds

to provide a ground at other points, toothed lock washers and plated bolts are used. The toothed lock washers are used for locking purposes, and to secure electrical connections. Install the washers next to the metal of the chassis, and the bond strap against the toothed lock washer.

2½-TON 6x6 TRUCK AND 2½- TO 5-TON 6x4 TRUCK (STUDEBAKER MODELS US 6 AND US 6x4)



TOP VIEW—CHASSIS FRONT END AND CAB



SIDE VIEW—CHASSIS FRONT END AND CAB

RA PD 310061

Figure 101—Radio Interference Suppression Bonds

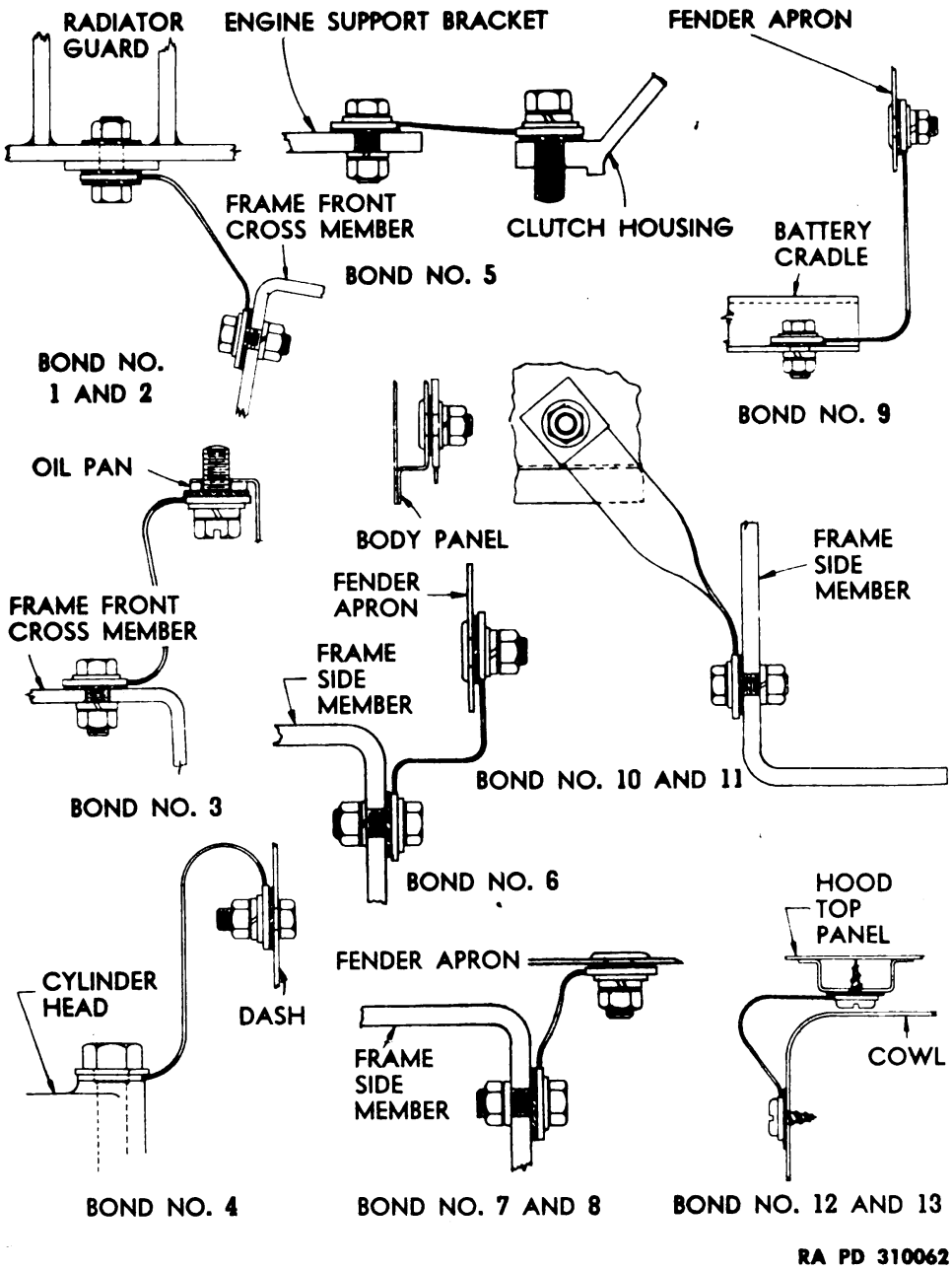


Figure 102—Radio Interference Suppression Bonds

(2) DATA.

Large filter—number . . . 1 Make . . . . . Tobe Deutshman Corp.
Signal corps type . . . . . FL 12-50 and FL 14-10 amp
Small filter—number . . . 1 Make . . . . . Tobe Deutshman Corp.
Signal corps type . . . . . FL 13-10 amp

2½-TON 6x6 TRUCK AND 2½- TO 5-TON 6x4 TRUCK (STUDEBAKER MODELS US 6 AND US 6x4)

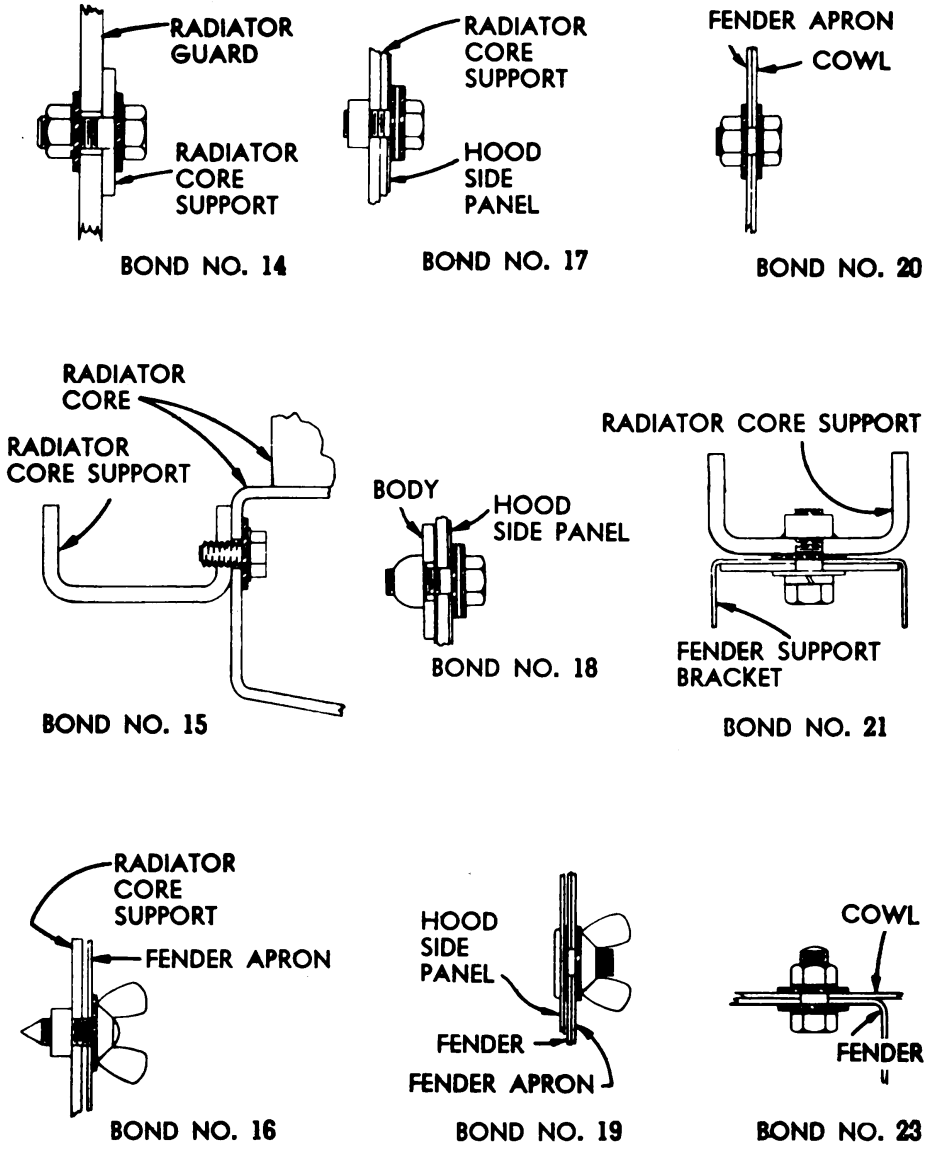


Figure 103—Radio Interference Suppression Bonds

b. Removal of Filter on Dash (figs. 101 and 104). Take out screw in center of filter cover, and remove cover. Disconnect all wires from terminals on filter. Remove the nuts and bolts that hold filter to dash, and remove filter.

c. Installation of Filter on Dash. Place filter in position on dash terminal so that marking is upside down with toothed lock washers

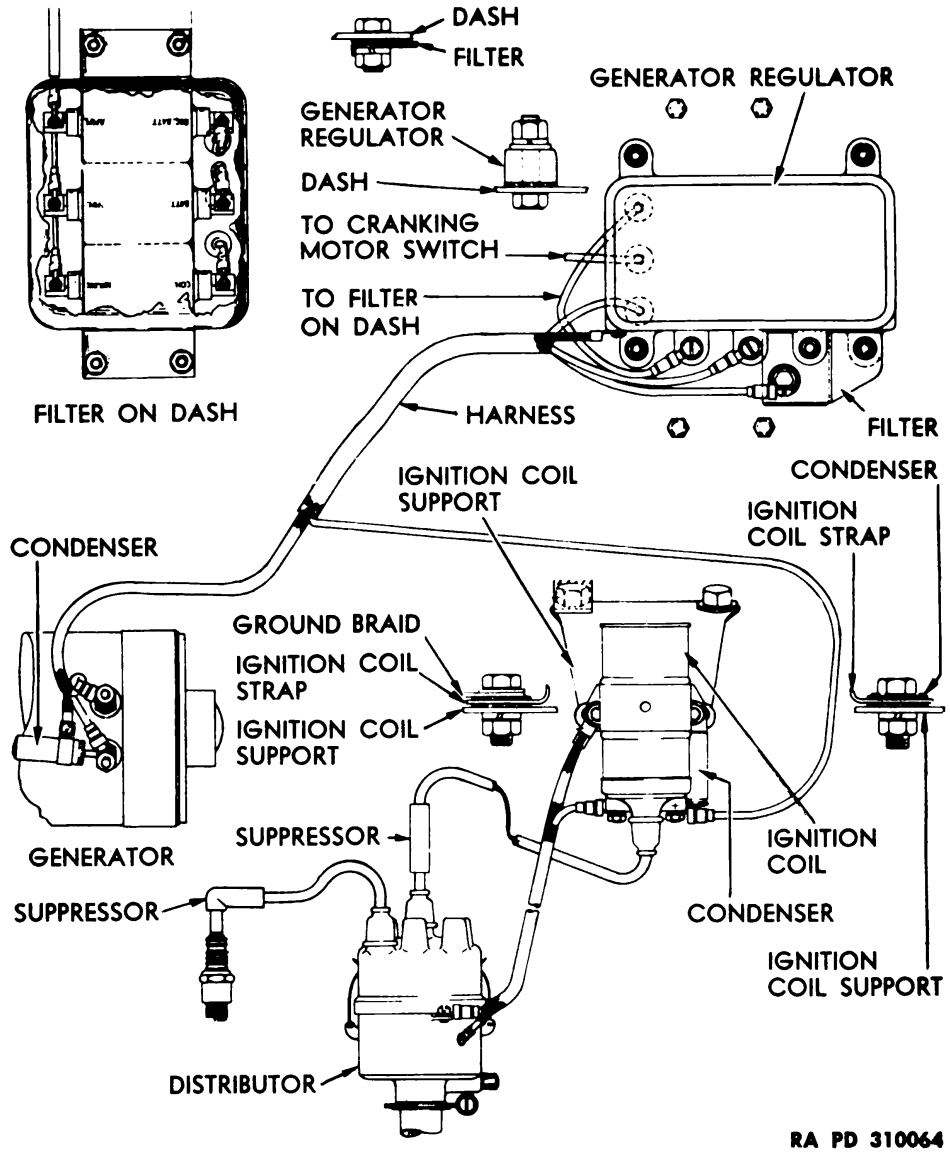


Figure 104—Radio Interference Suppression Bonds

between filter and dash. Fasten securely to dash with bolts, nuts, and lock washers. Connect wires on right side: black on top, red in center, and orange on bottom. Connect wires on left side: black on top, red in center, and black and green on bottom. Place cover in position, and fasten with locking screw.

d. Removal of Filter on Generator Regulator (fig. 104). Raise hood and disconnect black wire from filter post. Loosen all generator

regulator mounting bolt nuts, and remove lower outside nut and bolt. Remove nut holding filter to regulator "A" terminal, pull regulator away from dash, and remove filter.

e. Installation of Filter on Generator Regulator. Pull generator regulator away from dash, and insert filter stud through hole in regulator "A" terminal from rear. Install regulator lower outside bolt and

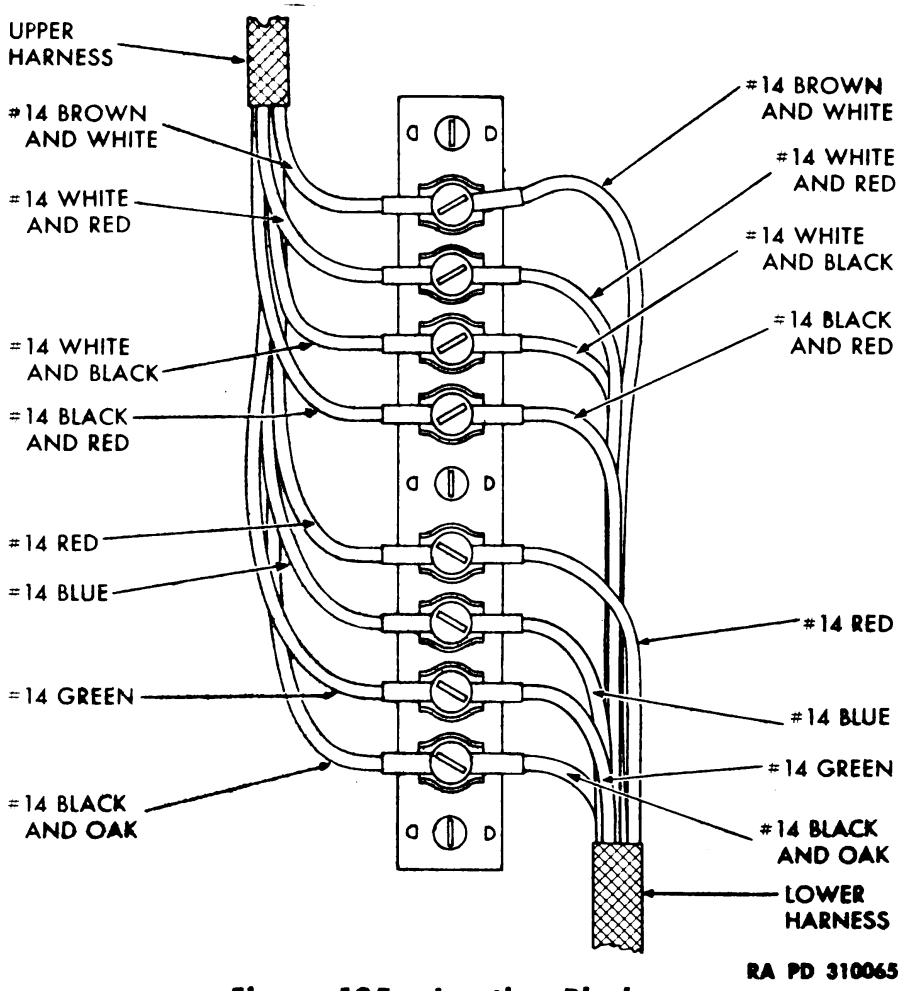


Figure 105—Junction Block

nut, and tighten all regulator mounting bolt nuts securely. Install toothed lock washer and nut on filter stud, and tighten securely. Connect black wire to filter post and lower hood.

89. JUNCTION BLOCKS.

a. Description. The wiring harness junction block is located on the dash, and provides a means of connecting the various wires of the main and auxiliary wiring harnesses.

b. Removal. Raise the hood and disconnect battery ground strap. Disconnect the various wires from their respective terminals on junction block, and remove the sheet metal screws holding the block in position.

c. Installation. Place the junction block in position, and fasten securely with the sheet metal screws. Connect the various wires to the terminals on junction block (fig. 105 or 106), connect battery ground strap, and lower the hood.

90. WIRING.

a. Description. The wiring system of this vehicle is laid out with wires in various sizes. Some wires are in plain colors, and others have

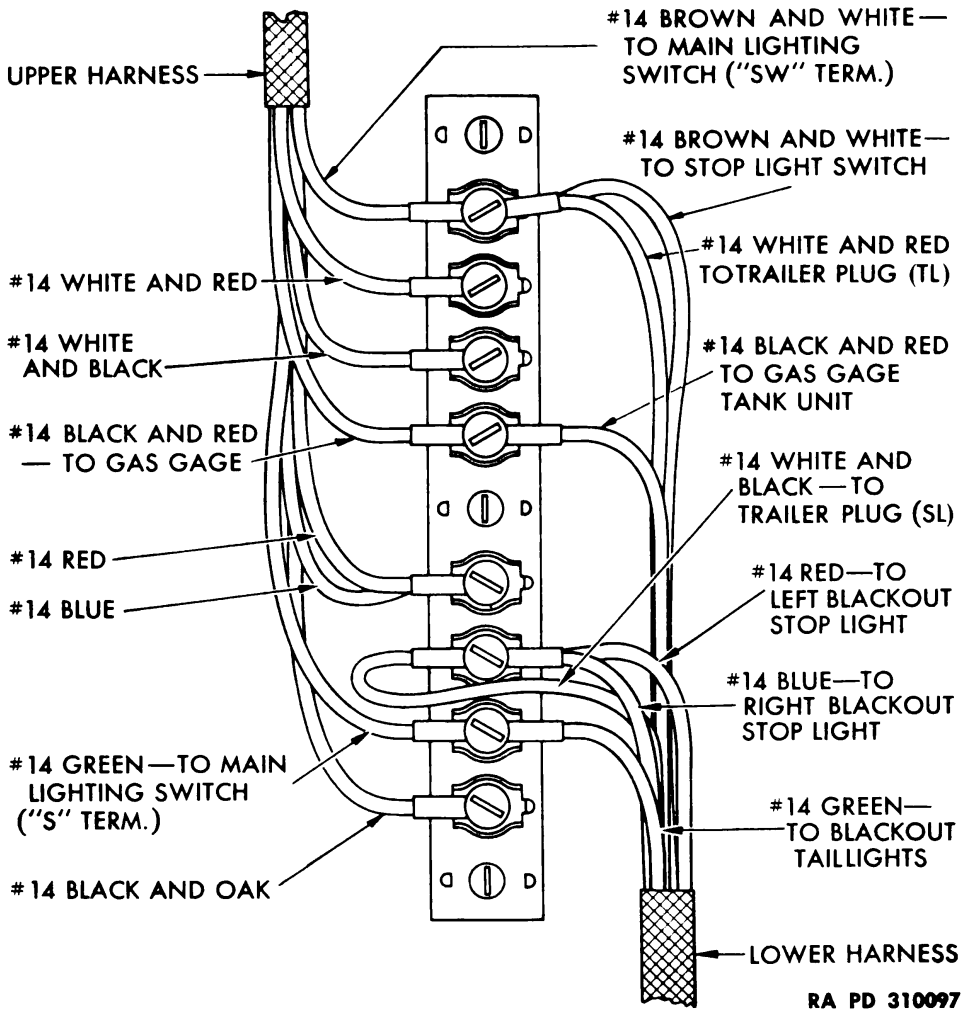


Figure 106—Junction Block (Wiring Connections used with Blackout Driving Light Only on Former Production Vehicles for Export)

2½-TON 6x6 TRUCK AND 2½- TO 5-TON 6x4 TRUCK (STUDEBAKER MODELS US 6 AND US 6x4)

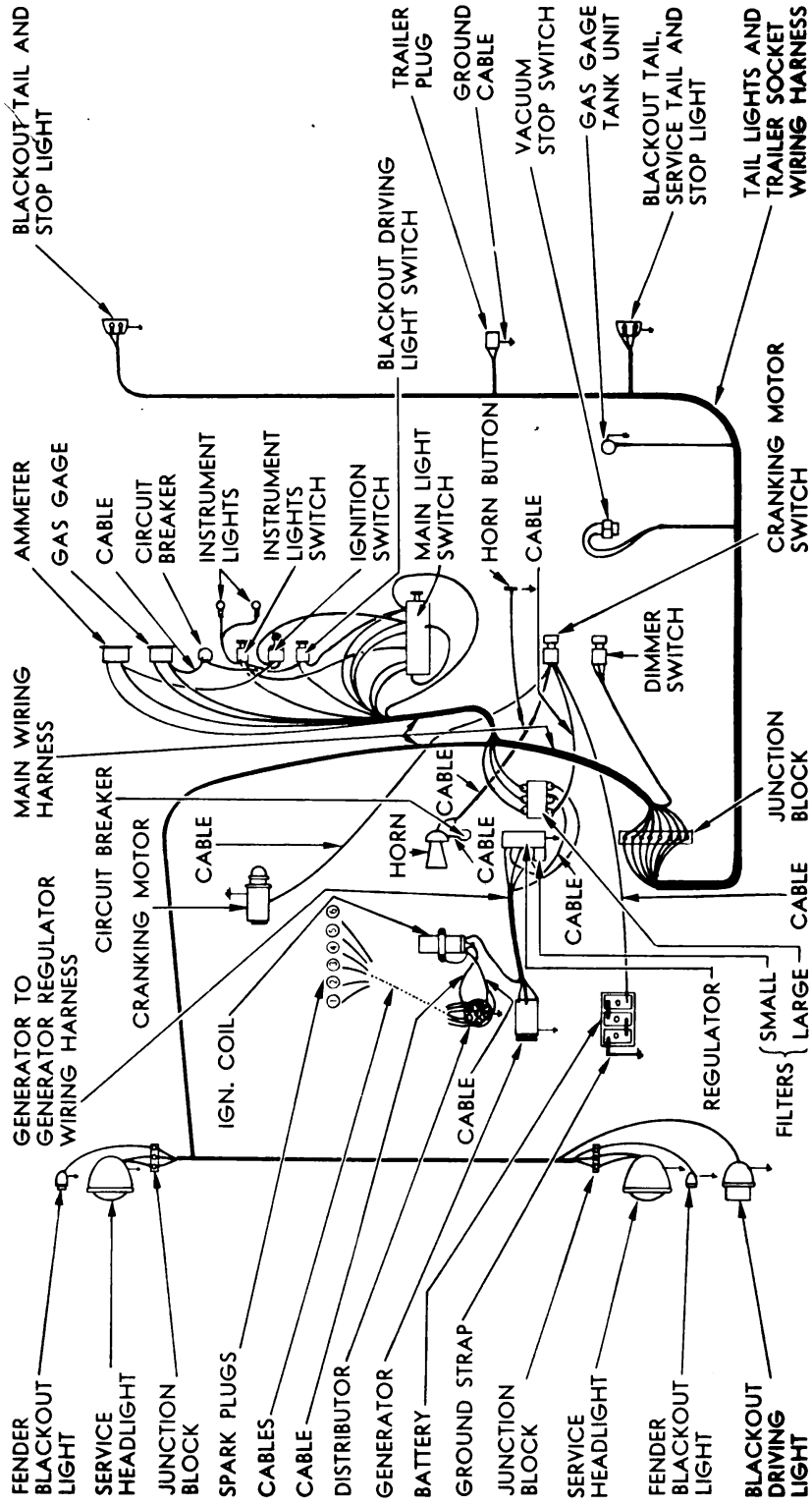


Figure 107—Wiring Harnesses and Cables

a tracer. The wires are grouped, wherever practical, in wiring harnesses (fig. 107).

b. Main Wiring Harness.

(1) REMOVAL. Raise hood and disconnect ground strap from battery. Disconnect wires in main wiring harness from junction blocks, instruments, and switches. Remove clips that hold the wiring harness in position. Take out the screws that hold the harness grommet retainer to the dash, and remove main wiring harness.

(2) INSTALLATION. Place main wiring harness in position, and insert portion that fastens to instruments and switches through hole in dash. Connect wires in harness to instruments, switches, and junction blocks (fig. 105 or 106). Fasten harness in position with clips, and install grommet retainer to dash with screws. Connect ground strap to battery and lower hood.

c. Generator to Regulator Wiring Harness.

(1) REMOVAL. Raise hood and disconnect ground strap from battery. Disconnect wires in generator to regulator wiring harness from generator and regulator. NOTE: *On vehicles with radio interference suppression equipment, the ignition coil to filter wire is included in this harness.* Disconnect one end of the wire from the coil, remove filter cover, and disconnect the other end from filter terminal. Take off clips that hold harness in position, and remove harness.

(2) INSTALLATION. Place the generator to regulator wiring harness in position and connect the wires to generator and regulator terminals. On vehicles with radio interference suppression equipment, insert coil to filter wire through grommet in dash, connect wire to filter terminal, and install filter cover. Connect the other end of wire to coil. Fasten harness in position with clips, connect ground strap tc battery, and lower hood.

d. Taillights and Trailer Socket Wiring Harness.

(1) REMOVAL. Raise hood and disconnect ground strap from battery. Disconnect wires in taillights and trailer socket wiring harness from junction block on dash, stop light switch, fuel gage tank unit, stop and taillights, and trailer socket. NOTE: *On tractor trucks, disconnect wires from vacuum switch.* Remove clips that hold wiring harness in position and remove harness.

(2) INSTALLATION. Install the taillights and trailer socket wiring harness through cross members and into position. Connect the wires to trailer socket, stop and taillights, fuel gage tank unit, stop light switch, and junction block on dash. NOTE: *On tractor trucks, connect wires to vacuum switch.* Fasten wiring harness in position with clips, connect ground strap to battery, and lower hood.

e. Replacement of Individual Wires. To remove a single wire, disconnect each end of the wire from terminals. Install the replacement wire, and tighten securely to the terminals.

2½-TON 6x6 TRUCK AND 2½- TO 5-TON 6x4 TRUCK (STUDEBAKER MODELS US 6 AND US 6x4)

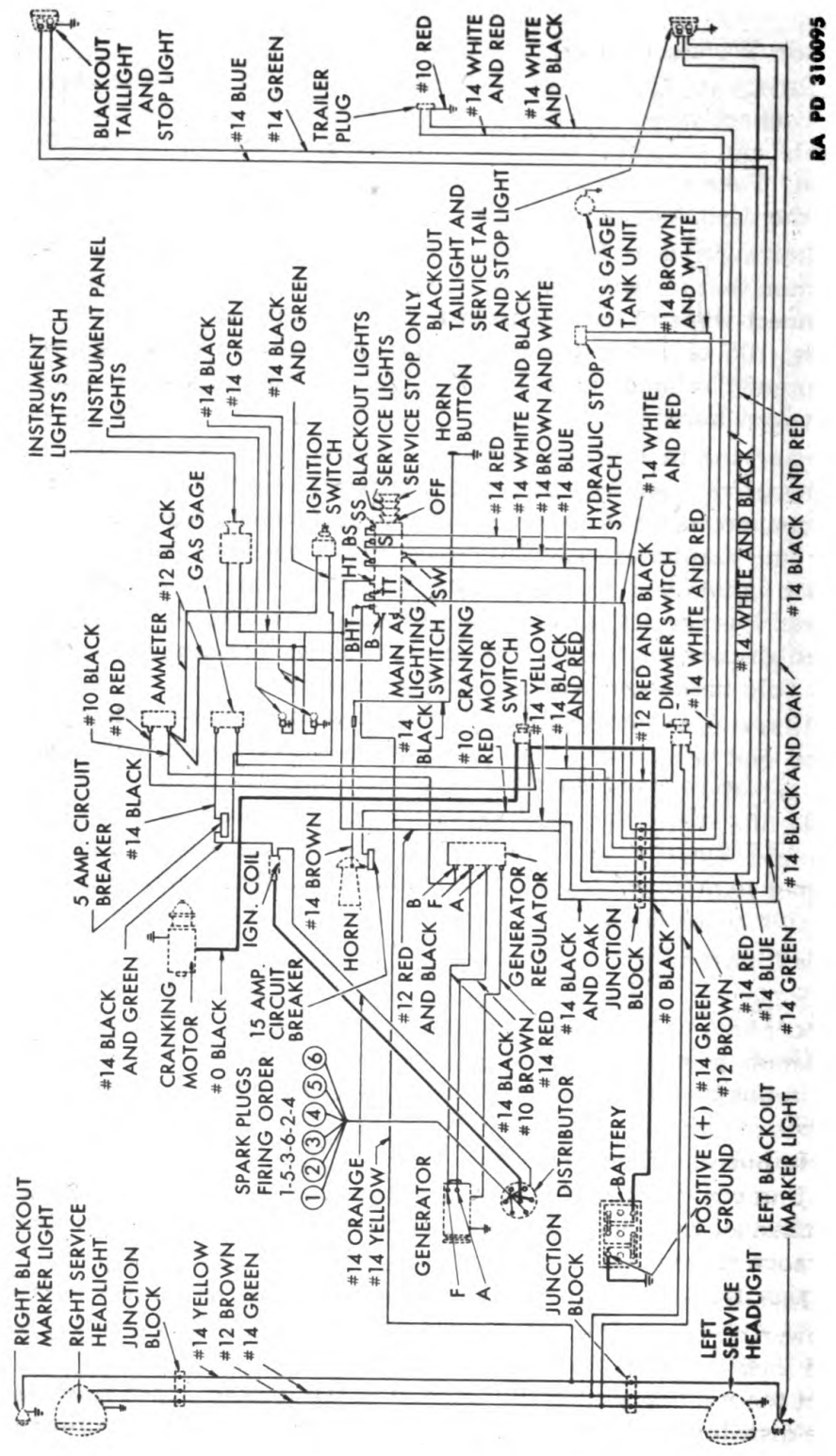


Figure 108—Complete Wiring Diagram (Covers Former Production Vehicles not Equipped with Radio Interference Suppression Parts)

Section XVIII

IGNITION SYSTEM

91. DESCRIPTION OF SYSTEM.

a. The ignition system proper consists of the battery, ignition coil, distributor assembly, spark plugs, and the high- and low-tension wiring (fig. 109). Two separate and distinct circuits are used in the system, viz., the primary and secondary circuits. In brief these circuits function as follows: The primary current from the battery enters distributor through the terminal connected to the breaker arm. A rubbing block attached to the breaker arm contacts a six-lobe cam within the distributor, which separates and closes the contact points as the distributor cam turns. The coil delivers current to the distributor under a high potential through a high-tension wire entering the center tower in the distributor cap, which in turn makes contact with the rotor by a spring arrangement. With the ignition switch turned on, and the distributor contact points closed, current flows through the primary winding of the coil and builds up a strong magnetic field in the coil. When the distributor contact points separate, the magnetic field collapses, and induces a high voltage into the secondary winding of the coil. The high voltage is distributed to the spark plugs at correct intervals by the distributor rotor through the distributor cap and spark plug high-tension wires.

92. IGNITION COIL.

a. Description. The ignition coil is mounted on a bracket that is held in position on left side of engine by cylinder head cap screws (fig. 109).

b. Removal. Disconnect the primary wires from the terminals on coil, and pull the high-tension wire from coil tower. Take the nuts and toothed lock washers off the bolts holding coil to mounting bracket, and remove the coil.

c. Installation. Place the coil in position on the mounting bracket with tower downward, and fasten securely with the bolts, nuts, and toothed lock washers. Push the high-tension wire into the coil tower. Connect the ignition switch to coil wire to the positive (+) terminal, and the distributor to coil primary wire to the negative (—) terminal. Tighten terminal nuts securely.

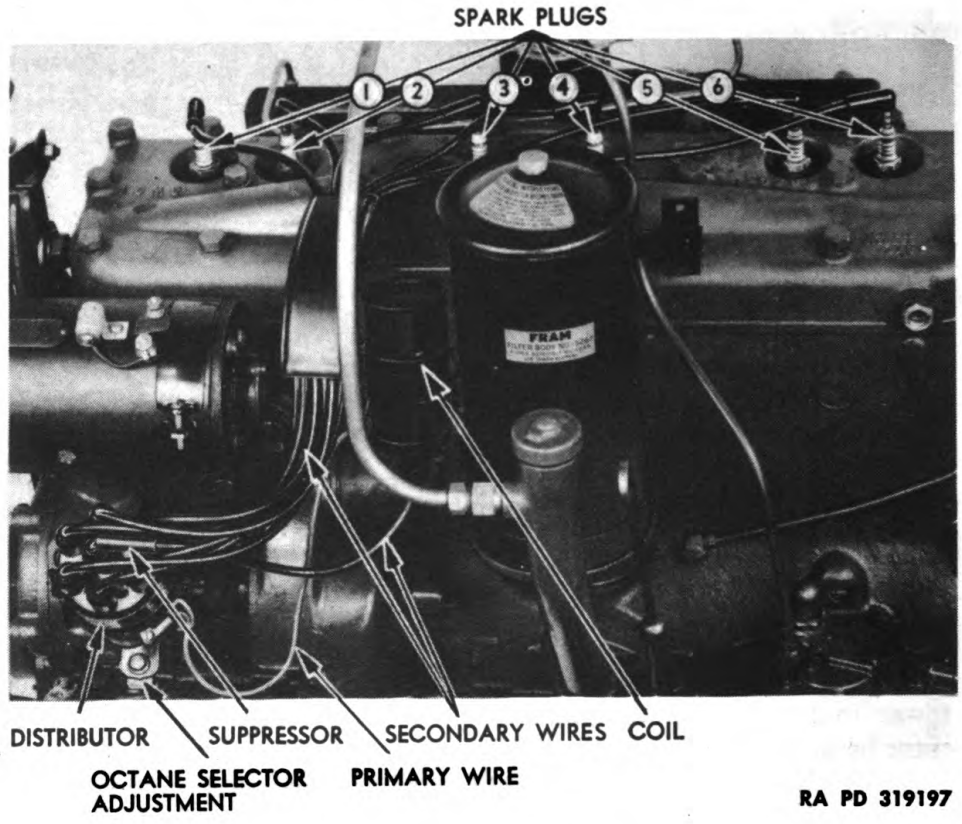


Figure 109—Ignition System Components

93. DISTRIBUTOR (fig. 110).

a. Description and Data.

(1) DESCRIPTION. The distributor is mounted on the water pump support bracket at the left-front side (fig. 109). It is held in place on the pump support bracket by a set screw and clamp. The distributor is of the six-lobe cam, full-automatic type. The direction of rotor travel is clockwise.

(2) DATA.

Make ..... Auto-Lite
Model (less radio interference suppression) IGC-4702-A
(with radio interference suppression) IGC-4709-A
Advance ..... Full automatic
Type of advance ..... Centrifugal

b. Contact Points.

(1) ADJUSTMENT. Remove battery (par. 84 c). Remove hood left-side panel and left fender apron (par. 61 b). Unfasten distributor cap clips, and lift cap from distributor. Crank engine slowly until

breaker arm rubbing block is on high point of cam. Loosen adjustable point plate lock screw, and turn eccentric adjusting screw (fig. 110) to provide a gap between the points of 0.018 to 0.022 inch. Tighten the adjustable point plate lock screw securely, and install distributor cap. Install hood left-side panel and left fender apron (par. 62 **p**). Install battery (par. 84 **d**).

(2) REMOVAL. Remove battery (par. 84 **c**). Remove hood left-side panel and left fender apron (par. 61 **b**). Remove distributor cap

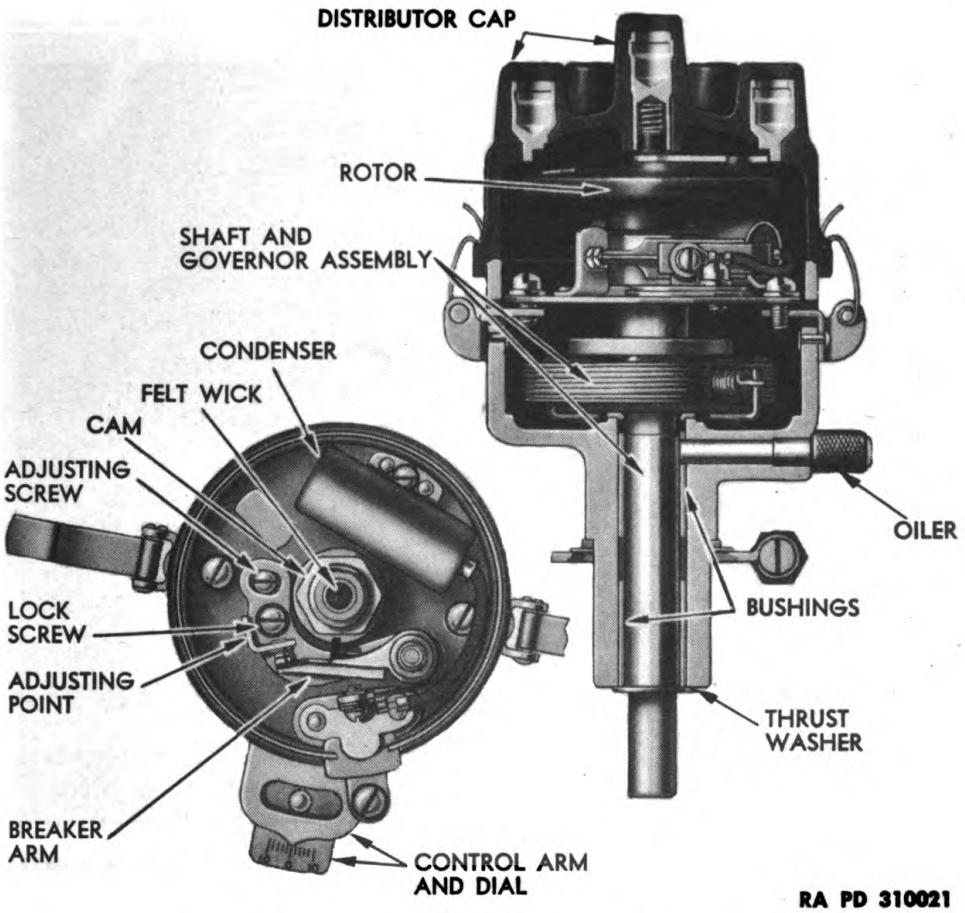


Figure 110—Cross-section of Distributor

and rotor. Loosen screw holding condenser wire and breaker arm spring to base plate bracket. Pull arm with spring up and off pivot pin. Take out lock screw, and lift adjustable point with plate out of distributor.

(3) INSTALLATION. Place adjustable point with plate on base plate, and insert lock screw, but do not tighten screw. Lubricate pivot pin sparingly, and place breaker arm with spring over pivot pin. Place screw in position through spring and condenser wire, and tighten

securely to base plate bracket. Adjust point gap as outlined in subparagraph **b** (1) above. Check breaker arm spring tension and adjust so that tension is 17 to 20 ounces. Install distributor rotor and cap. Install hood left-side panel and left fender apron (par. 62 **p**). Install battery (par. 84 **d**).

c. Condenser.

(1) REMOVAL. Remove battery (par. 84 **c**). Remove hood left-side panel and left fender apron (par. 61 **b**). Unfasten distributor cap

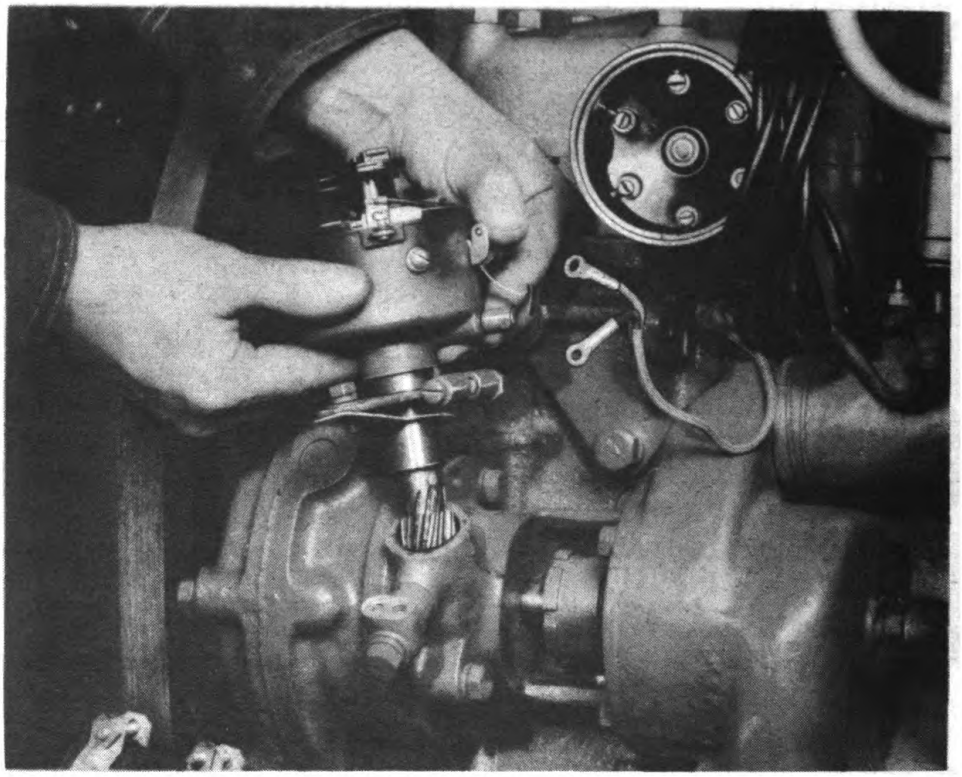


Figure 111—Removing Distributor RA PD 310171

clips, lift cap off distributor, and take out the screw holding condenser to base plate (fig. 110). Remove the screw that fastens condenser wire to distributor base plate bracket, and lift condenser out of distributor.

(2) INSTALLATION. Fasten condenser in position on base plate, and connect condenser wire to distributor base plate bracket. Adjust breaker arm spring tension (subpar. **b** (3) above) and install distributor rotor and cap. Install hood left-side panel and left fender apron (par. 62 **p**). Install battery (par. 84 **d**).

d. Distributor Removal. Remove battery (par. 84 c). Remove hood left-side panel and left fender apron. Unfasten the distributor cap clips, lift cap from distributor, and move it out of the way. Disconnect the primary wire from terminal on base plate, loosen the clamp screw, and lift distributor out of support bracket (fig. 111).

e. Distributor Installation.

(1) Remove spark plug from No. 1 cylinder. Place finger over spark plug opening, crank engine until compression in cylinder is felt, and remove finger. On vehicles equipped with winch, it may be necessary to unwind the winch cable so the crank can be used, or turn the crankshaft with a screwdriver inserted through hole in bottom of flywheel housing.

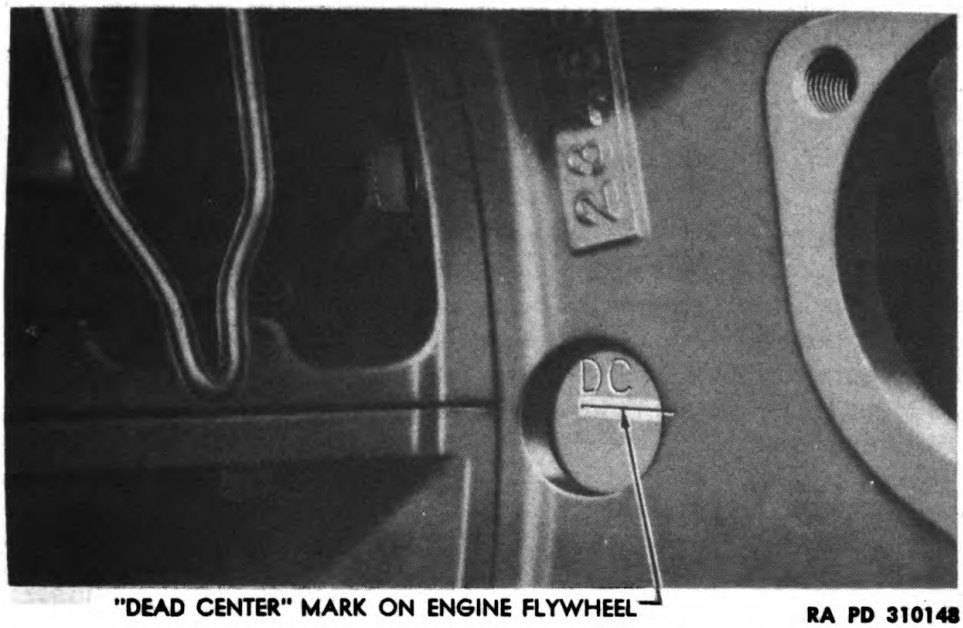


Figure 112—Ignition Timing Mark at Flywheel

(2) Crank engine slowly until "DC" mark on flywheel is alined with mark on flywheel housing at the timing hole (fig. 112). No. 1 piston is now in firing position.

(3) Place the distributor rotor in position on the distributor shaft. Enter distributor shaft and gear into the support bracket so the name plate on the distributor base is toward the cylinder block. Hold distributor base in this position and set distributor cap in place on distributor. The first distributor cap tower in a clockwise direction from the cap forward clip is for No. 1 cylinder. Mark this position on the distributor base and remove the cap. Turn the distributor rotor so the metal strip on the rotor is toward the mark on the distributor base, and lower distributor so the drive gear meshes with the gear on

the water pump shaft. Turn the distributor base until the contact points just start to separate, set the octane selector at zero, tighten the distributor clamp screw, and install distributor cap. If spark plug cables have been removed from the cap, see paragraph 95. Connect primary wire to terminal on distributor base plate.

(4) Install No. 1 spark plug, using a new gasket, and connect spark plug cable to plug.

(5) Install battery (par. 84 d), and set ignition timing (subpar. f below).

(6) Install hood left-side panel and fender apron (par. 62 p).

f. Ignition Timing. Raise hood and crank the engine until No. 1 piston is on the compression stroke, and the "DC" mark on flywheel is alined with mark on flywheel housing at timing hole (fig. 112). In this position the distributor contact points should be just in the act of separating to fire No. 1 cylinder. Set the octane selector at the center ("0") of the scale (fig. 110). Loosen the distributor clamp screw sufficiently to permit turning distributor in the mounting, and connect a neon timing light in series with No. 1 spark plug. Operate the engine at idling speed, and direct timing light at timing hole in flywheel. The dead center mark on the flywheel should appear in alinement with mark at timing hole when the light flashes. If the marks are not in alinement, turn the distributor until alinement is obtained. After adjustment is completed, tighten the clamp screw, and final-check with the timing light.

94. SPARK PLUGS.

a. Description. Six 14-mm spark plugs are used to provide the spark for igniting the combustible mixture in the combustion chambers (fig. 109).

b. Removal. Raise the hood and blow or otherwise clean all dirt from the area around plugs to prevent any dirt from falling into the cylinders. Pull the wire terminals from the plugs and unscrew the plugs from the cylinder head with the spark plug wrench. CAUTION: *Be careful that porcelains are not cracked during removal.*

c. Adjustment of Spark Plug Gap. Before adjusting electrode gap, inspect plugs carefully and if oily or carboned, clean them thoroughly. After cleaning, check electrode gap with a 0.025-inch feeler gage. Adjust the gap to 0.025 inch by bending the side electrode only.

d. Installation. After the electrode gap has been properly spaced, install the plugs, using new gaskets positioned so that the gasket seam is down. Tighten the plugs until they bottom on the gasket, and then give them an additional ¼ to ½ turn. Install the high-tension wires on the proper plugs, and lower the hood.

IGNITION SYSTEM

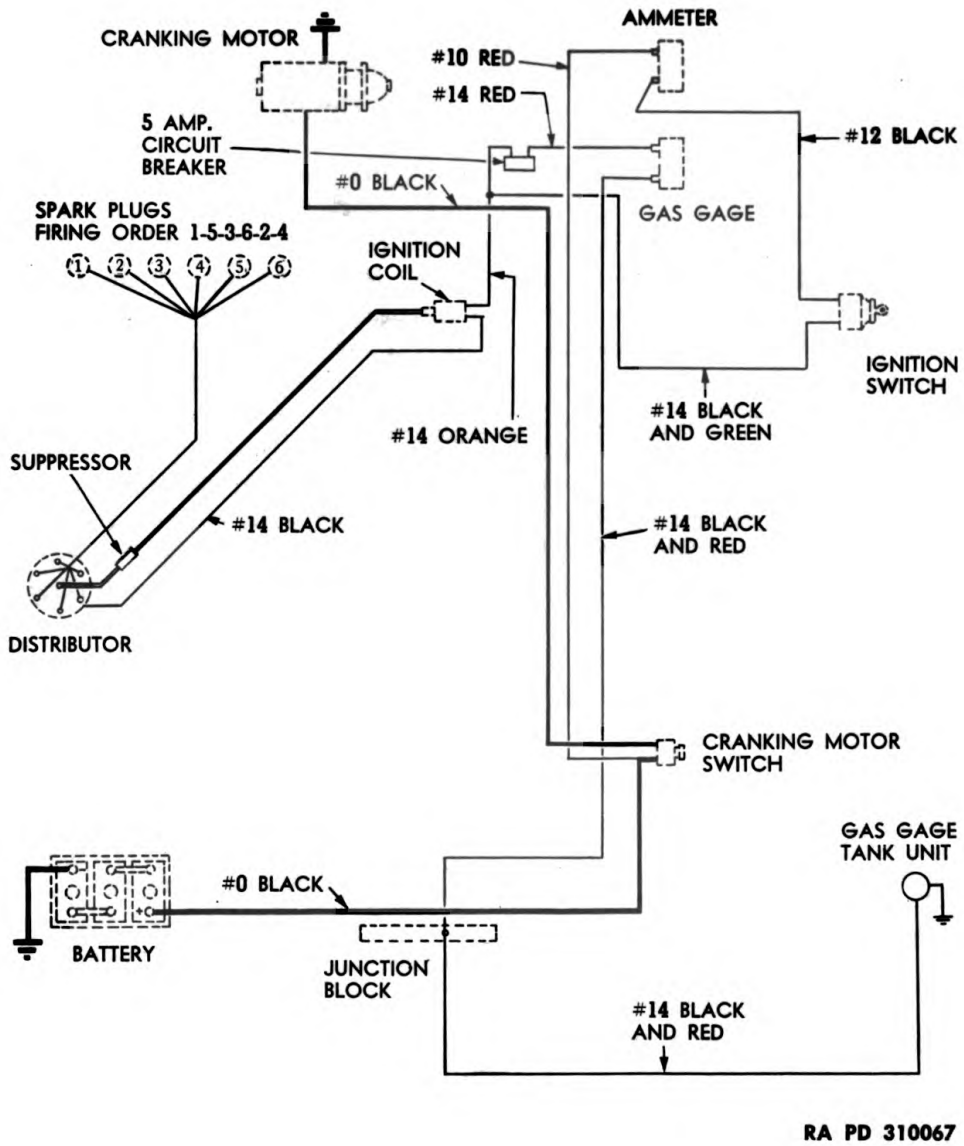


Figure 113—Ignition System Wiring Diagram

2½-TON 6x6 TRUCK AND 2½- TO 5-TON 6x4 TRUCK (STUDEBAKER MODELS US 6 AND US 6x4)

95. HIGH-TENSION WIRING (fig. 113).

a. Replacement of High-tension Wiring. Raise hood and loosen the clips holding the distributor cap to the base. Disconnect one spark plug cable at a time from the spark plugs, grasp it below the spark plug cable bracket, and pull it out of the bracket. Connect the new spark plug cable to spark plug, and insert the other end through the bracket. Pull the cable to be replaced out of the tower in the distributor cap, and insert the new wire in its place. Follow the same procedure to replace the other five cables one at a time, being sure all wires are seated firmly in the cap towers. Remove the coil high-tension cable from the center tower of the distributor cap, and replace it with the new cable. Remove the other end of the original cable from the tower on the coil, and install the new cable in its place (this cable does not go through the cable bracket). The distributor rotor turns clockwise, and the engine firing order is 1-5-3-6-2-4. If the spark plug cables have been removed, determine the No. 1 tower on the cap as follows: Position No. 1 piston on upper dead center (par. 93 f). Loosen the clips holding the distributor cap to the base, lift the cap, and note the position of the distributor rotor. The rotor will be in line with the No. 1 spark plug contact in the distributor cap; mark this contact tower as No. 1. Connect the wires to spark plugs, and insert the other end of wires through the bracket. Starting with wire connected to No. 1 spark plug, insert wire in No. 1 tower on distributor cap. Following the firing order (1-5-3-6-2-4), place wire connected to No. 5 spark plug in next tower in a clockwise direction. Install remaining wires in balance of distributor cap towers by following the firing order. Install cap on distributor base and lower hood.

Section XIX

TRANSMISSION

96. DESCRIPTION AND TABULATED DATA.

a. Description. The transmission has five speeds forward and one reverse. The fourth speed is the direct drive, and fifth speed is the overdrive speed. A conventional-type gearshift lever, located to the right of the driver, is used for shifting the transmission gears. The shifting positions are indicated on the shifting plate mounted in the cab.

b. Data.

Make	Warner Gear
Model	T 93
Type	Overdrive—selective sliding
Speeds	Five forward—one reverse

97. REMOVAL.

a. Remove Propeller Shaft. Remove transmission to transfer case propeller shaft (par. 104).

b. Drain Lubricant. Remove drain plug from rear of transmission case near bottom, and drain lubricant. Install and tighten plug after draining.

c. Remove Floor Plate and Support Transmission. Remove transmission cover plate from floor of cab (par. 102 **c** (1)). Use blocking or a roller jack, positioned in such a manner that the weight of transmission will be adequately supported and evenly distributed.

d. Remove Transfer Case Controls and Hand Brake Lever. See paragraph 102 **c** (2) and (3).

e. Disconnect Power Take-off. On vehicles so equipped, disconnect winch drive shaft (par. 173 **a** (1)), hoist pump drive shaft (par. 175 **a**), and hoist controls (par. 178 **c**).

f. Remove Cover. Take out cap screws and remove transmission cover assembly. CAUTION: *Place a cloth over opening in transmission to prevent the entrance of dirt.*

g. Remove Transmission to Clutch Housing Stud Nuts. Take off clutch housing handhole cover, reach through opening, and remove nuts from two lower studs inside the clutch housing. Remove two upper stud nuts from outside transmission.

h. Remove Transmission. Move transmission rearward sufficiently to disengage clutch release bearing spring. With transmission still supported so that weight will not rest on clutch driven plate hub,

continue to move the assembly rearward until main drive pinion is out of clutch housing. Lower transmission, and pull it out from under vehicle (fig. 114).

98. INSTALLATION.

a. Place Transmission in Position. With transmission on roller jack, or supported in a suitable manner, move it forward so that main

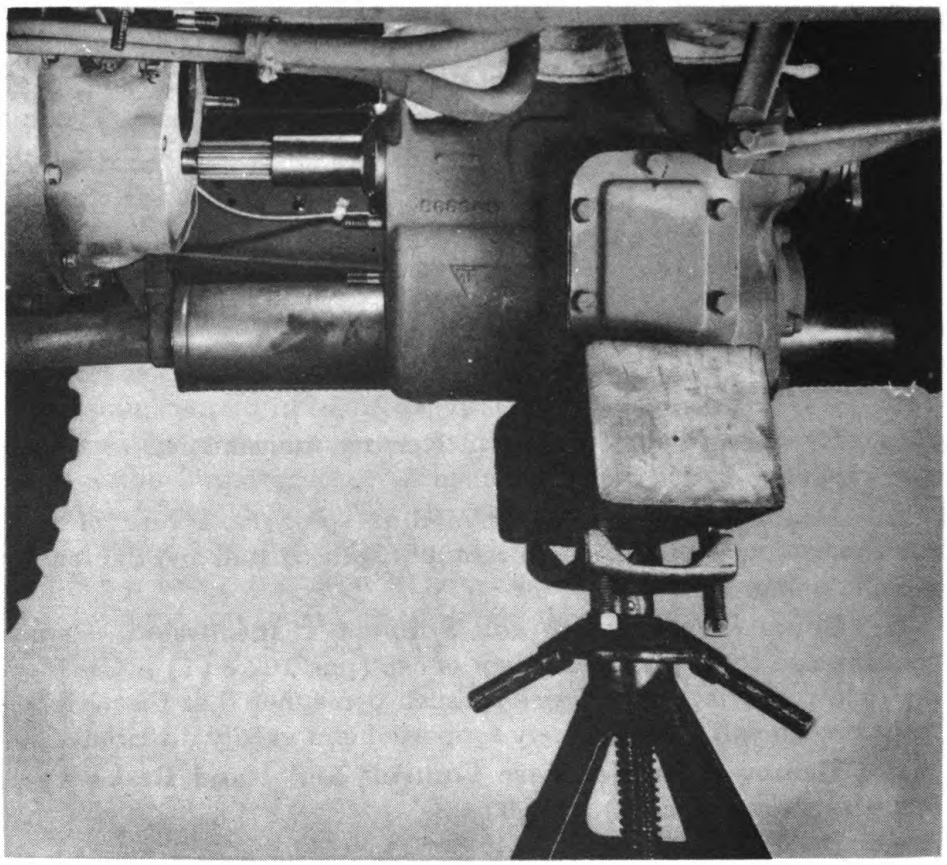


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Figure 114—Transmission Removal

drive pinion splines enter the spline in clutch driven plate hub. Continue to move it forward, making sure that the release bearing spring is properly hooked in the clip. The entire weight of the transmission must be evenly supported and remain in alinement with the clutch driven plate hub.

b. Fasten Transmission to Clutch Housing. With the transmission firmly in position against the clutch housing, install lock washers and nuts on upper studs. Reach through the clutch housing

handhole cover opening, and install the lock washers and nuts on the lower studs. Tighten all nuts securely and remove support.

c. Install Lubricant. Remove cloth from opening in top of transmission and fill to the proper level with the correct grade of lubricant (par. 24).

d. Install Cover. Make sure the sliding gears are in neutral, and install a new cover gasket on case with joint and thread compound. Place the shift lever and forks in neutral, and set the cover assembly carefully in position so that the forks enter the grooves in their respective sliding gears. Install the cover cap screws, and tighten cover securely to case.

e. Install Transfer Case Controls and Hand Brake Lever. See paragraph 102 **d** (2) and (3).

f. Connect Power Take-off. On vehicles so equipped, connect winch drive shaft (par. 173 **a** (2)), hoist pump drive shaft (par. 175 **b**), and hoist controls (par. 178 **d**).

g. Install Propeller Shaft. Install transmission to transfer case propeller shaft (par. 105).

h. Install Floor Plate. Install transmission cover plate (par. 102 **d** (4)).

2½-TON 6x6 TRUCK AND 2½- TO 5-TON 6x4 TRUCK (STUDEBAKER MODELS US 6 AND US 6x4)

Section XX

TRANSFER CASE

99. DESCRIPTION.

a. The transfer case is cushion-mounted on a frame cross member of the vehicle. It distributes the power from the transmission to the two rear axles, and to the driving front axle used on the 6 x 6 vehicles. The unit has two speeds, "HIGH" and "LOW," and a neutral position which allows the engine and transmission to operate without moving the vehicle. Control levers are provided in the cab for shifting the transfer case into high or low speed, and for engaging and disengaging the driving front axle on the 6 x 6 vehicles. The operating position of the transfer case is such that it equalizes the work angle of the connecting shafts. NOTE: *The transfer case used in the 6 x 4 vehicles of former production was blocked in "HIGH", therefore, a shift lever was not provided.*

100. REMOVAL.

a. Drain Lubricant. Remove drain plug from bottom of case, allow lubricant to drain out, and install drain plug securely.

b. Disconnect Propeller Shafts. Disconnect or remove all propeller shafts that are attached to transfer case (par. 104).

c. Disconnect Speedometer Cable. Unscrew the knurled nut that holds speedometer cable to transfer case, and pull the core end out of speedometer drive pinion.

d. Disconnect Control Rods. Remove cotter pins and clevis pins to disconnect transfer case control rods (on vehicles so equipped), and remove hand brake control rod from transfer case.

e. Remove Transfer Case. Support the weight of transfer case with a roller jack or suitable blocking placed to distribute the weight evenly. Cut the lock wire and remove from mounting studs (fig. 115). Remove the castle nuts, washers, and cushions from mounting studs. Lower the transfer case and move it out from under the vehicle (fig. 116).

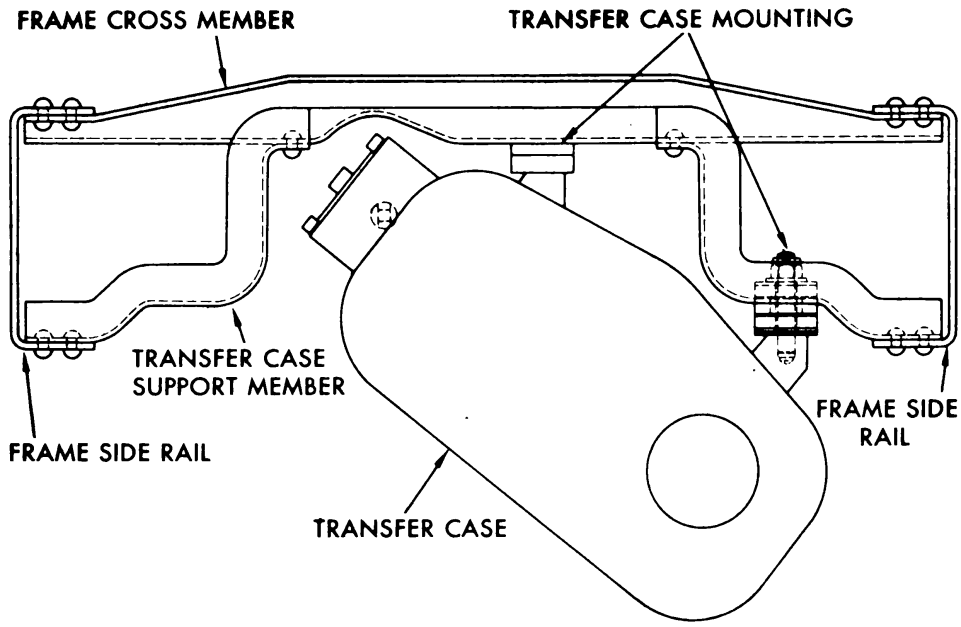

Figure 115—Transfer Case Mounting

101. INSTALLATION.

a. Install Transfer Case. Move the transfer case under vehicle and make sure that a washer, cushion, cup, and spacer are in place on each stud. Raise the unit into position so studs and spacers enter holes in frame cross member. Place a cushion and washer over each stud, install the castle nuts, and tighten securely. Lock-wire all studs, and remove the support.

b. Connect Control Rods. Connect and adjust the transfer case control rods (on vehicles so equipped) (par. 102 **b**). Connect and adjust the hand brake control rod (par. 126 **b** (1)).

c. Connect Speedometer Cable. Insert the end of speedometer cable core into the speedometer drive pinion, and tighten the knurled nut.

d. Connect Propeller Shafts. Connect or install all propeller shafts that attach to transfer case (par. 105).

e. Install Lubricant. Fill transfer case to proper level with correct grade of lubricant (par. 24).

102. TRANSFER CASE CONTROLS AND LINKAGE.

a. Description (fig. 117). A separate shift lever is mounted within easy reach of the driver for shifting the transfer case into "HIGH" or "LOW" speed. (The 6 x 4 vehicles of former production were not equipped with transfer case shift lever.) On the 6 x 6 vehicles a shift

2½-TON 6x6 TRUCK AND 2½- TO 5-TON 6x4 TRUCK (STUDEBAKER MODELS US 6 AND US 6x4)

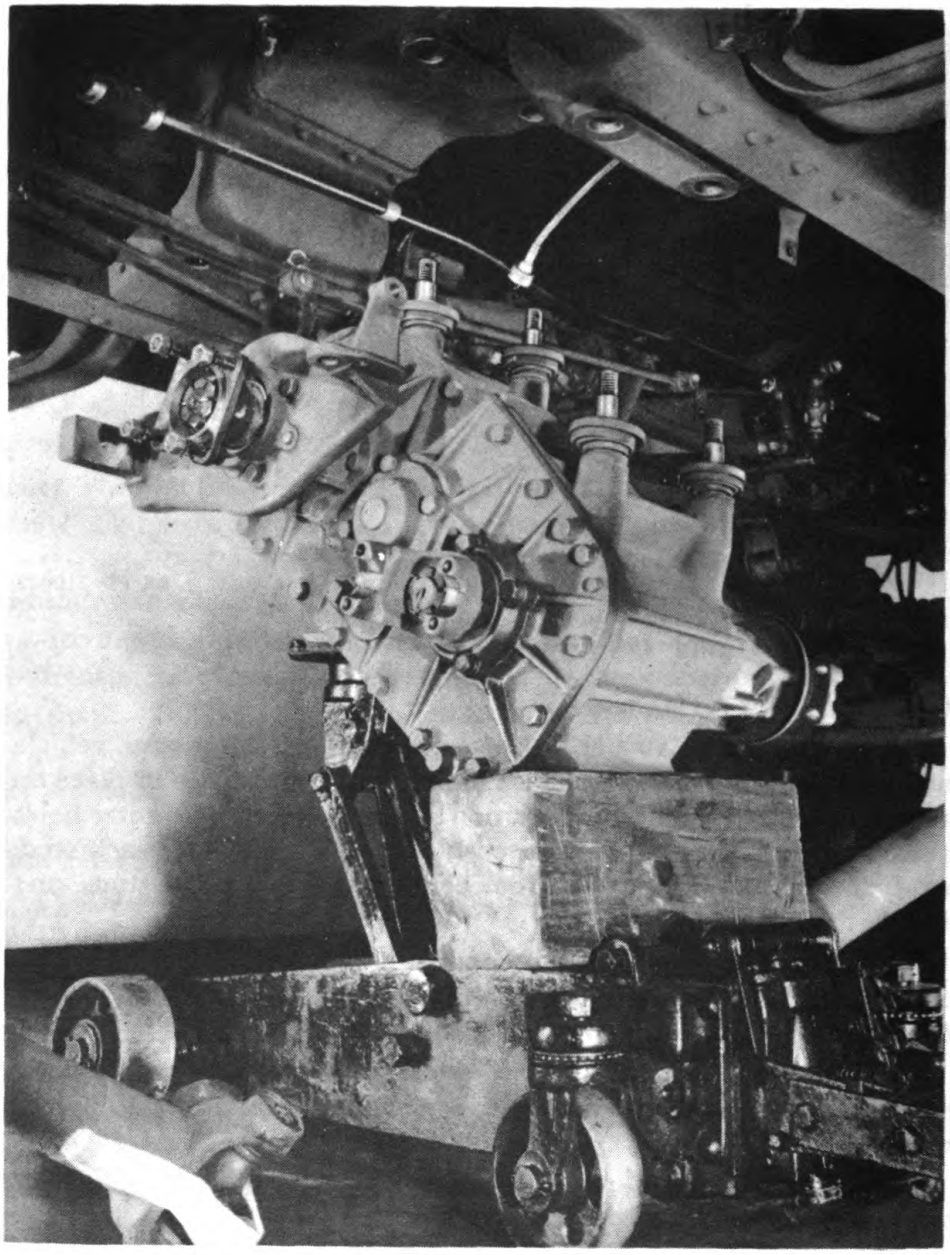

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Figure 116—Transfer Case Removal

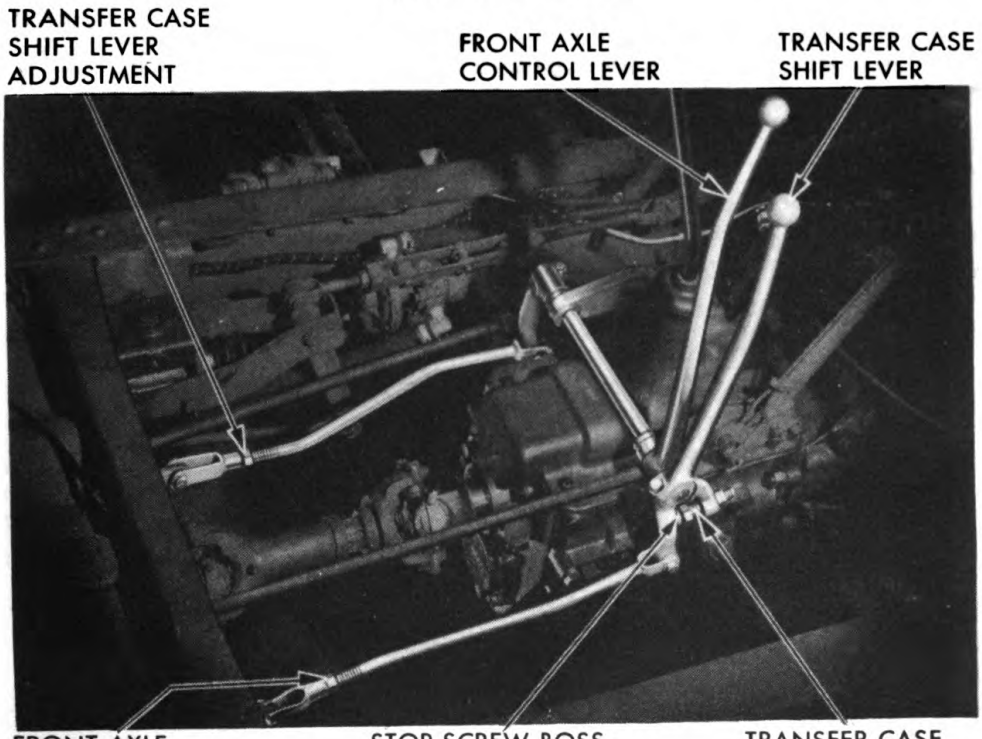

Figure 117—Transfer Case and Front Axle Controls (Axle Controls on 6 x 6 model only)

lever is provided to control front axle engagement or disengagement. The levers are connected to the transfer case with a cross shaft and rods that have adjustable clevises.

b. Adjustment.

(1) TRANSFER CASE SHIFT CONTROL. Shift the transfer case shift lever into the low speed position, and remove the cotter pin and clevis pin from the shift rod at the transfer case end. The transfer case gearshift shaft is held in position by the gearshift shaft lock ball located in the transfer case; therefore, make sure that the "LOW" and "HIGH" gearshift shaft is locked in low position with the gearshift shaft lock ball. Adjust the clevis on transfer case shift rod so that clevis pin can be inserted with ease. Tighten clevis lock nut, and install a new cotter pin. Adjust the transfer case and front axle shift stop screw on 6 x 6 vehicles (subpar. **b** (2) below).

(2) FRONT AXLE DRIVE CONTROL (6 x 6 VEHICLES). Shift front axle drive control lever into the engaged position, and the transfer case shift lever into the low speed position. Remove the cotter pin and clevis pin from front axle control rod at the transfer case end. The

front axle declutch shift shaft is held engaged or disengaged by a lock ball and spring located in the transfer case. Make certain the declutch shift shaft is locked with the front axle drive in the engaged position. Adjust the clevis on the front axle control rod so the clevis pin can be inserted with ease, tighten the clevis lock nut, and install a new cotter pin. Loosen lock nut, and adjust the stop screw on lower portion of transfer case shift lever so the stop screw just touches the boss near lower end of front axle control lever. Tighten the stop screw lock nut securely.

c. Removal of Transfer Case Controls and Linkage.

(1) REMOVE TRANSMISSION COVER PLATE. Remove the metal screws that hold the cover plate to floor of cab. Place transmission shift lever in second gear position, front axle drive control lever in disengaged position, transfer case shift lever in neutral, and apply hand brake lever about halfway. NOTE: *On vehicles equipped with a winch, shift the power take-off lever into reverse position.* Raise the cover plate, maneuvering it and the levers as required to remove plate.

(2) DISCONNECT CONTROL RODS. Remove cotter pins and clevis pin from both ends of transfer case front axle drive control rods, and remove rods (if vehicle is so equipped). Remove cotter pin and clevis pin from lower end of power take-off shift lever (on vehicles equipped with a winch).

(3) REMOVE TRANSFER CASE CONTROLS AND SHIFT LEVER SHAFT. Remove the cap screws that hold the shaft brackets to transmission case cover. Lift shaft, levers, and brackets assembly off transmission.

(4) REMOVE LEVERS AND BRACKETS FROM SHAFT. Remove the clamp screw from operating lever, drive lever off shaft, and remove Woodruff key. Slide the inner levers and brackets off the shaft. Remove the clamp bolt and nut from transfer case shift lever, drive lever off the shaft, and remove Woodruff key.

d. Installation of Transfer Case Controls and Linkage.

(1) INSTALL LEVERS AND BRACKETS ON SHAFT. Install Woodruff key in keyway at one end of shaft, and slide transfer case shift lever over shaft and key. Fasten securely with clamp bolt and nut. Place inner levers and brackets on shaft, install Woodruff key in keyway at other end of shaft, and slide the operating lever over shaft and key. Tighten clamp screw securely.

(2) INSTALL TRANSFER CASE CONTROLS AND SHIFT LEVER SHAFT. Place the shaft, levers, and brackets assembly in position, and install cap screws that hold the left bracket to transmission case cover. Hold the right bracket and hand brake lever in position, and fasten securely to transmission case cover with cap screws. Tighten the left bracket cap screws securely.

(3) CONNECT CONTROL RODS. Connect the transfer case control rod to the shift lever with a clevis pin and new cotter pin. Adjust the rod with adjustable clevis at rear end of rod (subpar. b (1) above). Connect the front axle drive control rod (6 x 6 vehicles) to the control lever with a clevis pin and new cotter pin. Adjust the rod with adjustable clevis at front end of rod (subpar. b (2)). Connect rod to power take-off shift lever (on vehicles equipped with winch) and adjust (par. 165 a).

(4) INSTALL TRANSMISSION COVER PLATE. Apply hand brake lever about halfway, place front axle drive control lever in disengaged position, and make sure the transfer case and transmission shift levers are in neutral. NOTE: *On vehicles equipped with a winch, shift the power take-off lever into reverse position.* Place the transmission cover plate over the levers, maneuvering it downward, and move the levers as required until the plate is in position on floor of cab. Install metal screws and fasten plate securely to floor.

Section XXI

PROPELLER SHAFTS, UNIVERSAL JOINTS, AND PILLOW BLOCK ASSEMBLY

103. DESCRIPTION AND TABULATED DATA.

a. Description. The propeller shafts have a universal joint at each end, with a slip joint at the end nearest the transfer case. All propeller shafts are of the tubular type, except the transmission to transfer case shaft, which is solid because of its short length. Each propeller shaft is tested and put in running balance after the universal joints are assembled. The vehicle may be equipped with either Cleveland or Spicer propeller shaft and universal joint assemblies, as both are used as standard equipment by the factory. The Cleveland universal joint bearings are retained in the yokes with lock plates, screws, and screw locks (fig. 119). The Spicer universal joint bearings are retained in the yokes with snap rings and U-bolts with nuts (fig. 118). The pillow block assembly is fastened to a bracket on the forward rear axle. It serves as a support and connecting link for the propeller shafts that drive the rearward rear axle.

b. Tabulated Data.

Make . . . . . Cleveland or Spicer
Type of joint . . . . . Needle bearing
Pillow block . . . . . Timken

104. PROPELLER SHAFT WITH UNIVERSAL JOINTS REMOVAL.

a. Cleveland. Remove the screws, locks, and lock plates from both sides of the universal joint flange yokes at each end of the shaft assembly. Bump the shaft by hand toward one side of yoke to slide the bearing out of flange yoke sufficiently to permit removal. Move the shaft toward opposite side of yoke, and remove the other bearing. With one journal of cross extending through yoke at one side, tip the cross to disengage it from the flange yoke. Use the same procedure to disconnect the shaft from the other flange yoke.

b. Spicer.

(1) FLANGE TYPE. Remove the nuts and lock washers from bolts

in flanges at both ends of shaft. Slide shaft into slip joint, and remove the assembly.

(2) FLANGE AND U-BOLT TYPE. Remove the nuts and lock washer from bolts at flange end of shaft. Take off the nuts and remove U-bolts that hold the other end of shaft to flange yoke. Hold the free bearings

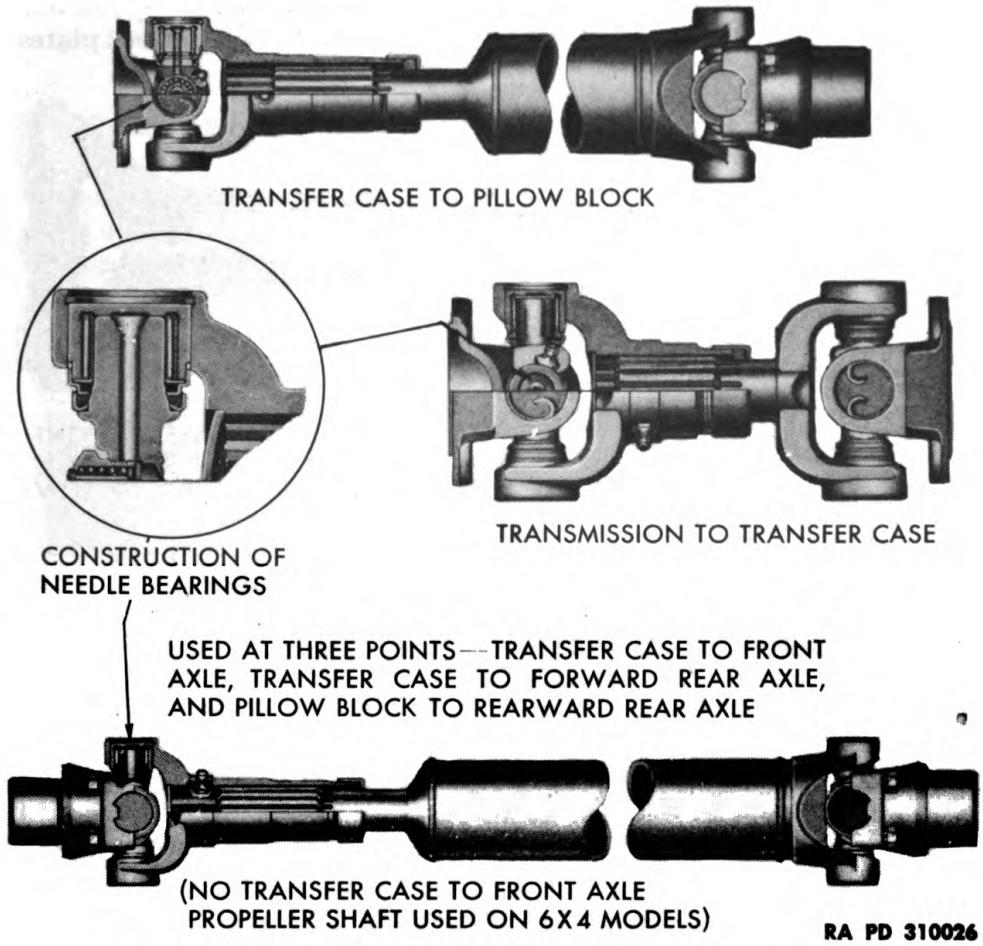

Figure 118—Spicer Type Propeller Shafts and Universal Joints

on cross journals that were released by removal of U-bolts, slide shaft into slip joint, and remove the assembly.

(3) U-BOLT TYPE. Remove nuts and U-bolts from flange yokes at both ends of shaft. Install clamps to hold the free bearings on cross journals that were released by removal of U-bolts. Slide the shaft into the slip joint, and remove the assembly.

2½-TON 6x6 TRUCK AND 2½- TO 5-TON 6x4 TRUCK (STUDEBAKER MODELS US 6 AND US 6x4)

105. PROPELLER SHAFT WITH UNIVERSAL JOINTS INSTALLATION.

a. Cleveland. Make sure the propeller shaft and slip joint marks are in alinement (fig. 120). Insert one trunnion or journal of cross into flange yoke as far as possible from the inside. Tilt cross until the opposite trunnion or journal clears the yoke, and move it into position. If original bearing washers are damaged, install new washers on cross. Apply lubricant to bearing assemblies, install them over cross journals from outside the yoke, and press them into place. Install the lock plates,

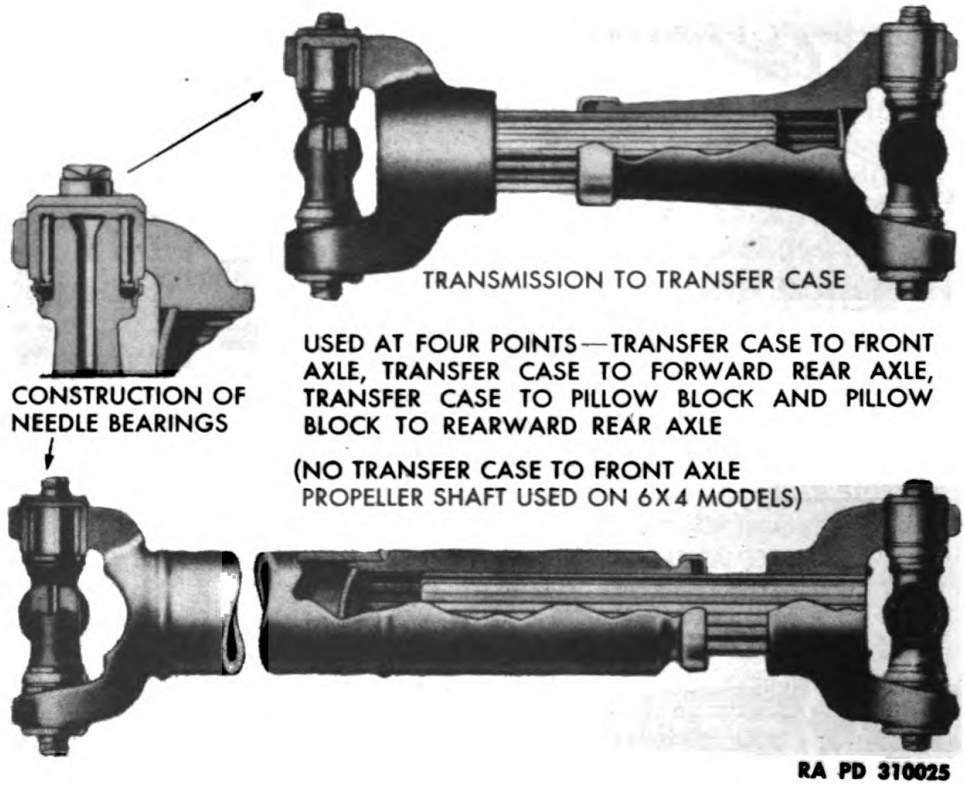

Figure 119—Cleveland Type Propeller Shafts and Universal Joints

new locks, and screws. Tighten the screws and bend ears of screw locks securely against flat side of screws to prevent loosening. Make sure that serrations on the lock plate engage the serrations on closed end of bearing to prevent turning. Use the same procedure to connect the other end of propeller shaft, and lubricate as required (par. 24).

b. Spicer.

(1) FLANGE TYPE. Make sure that the marks on the shaft and slip joint are in alinement (fig. 120). Place the flange at slip joint end in position against flange on transfer case, and insert bolts through both flanges. Raise front flange to flange on transmission, and insert bolts

PROPELLER SHAFTS, UNIVERSAL JOINTS, AND PILLOW BLOCK ASSEMBLY

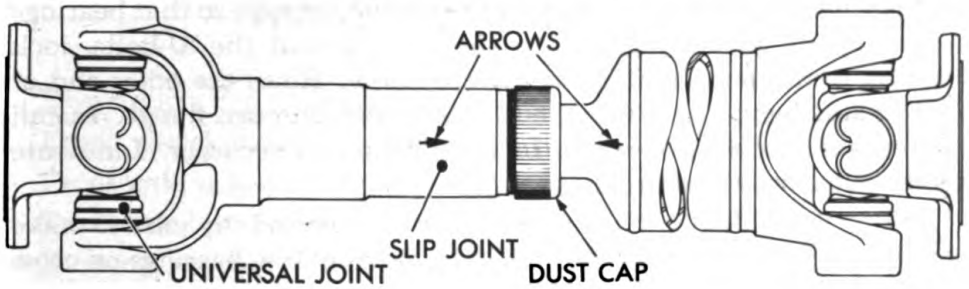

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Figure 120—Propeller Shaft Alinement Marks at Slip Joint

through both flanges. Install lock washers and nuts on bolts at both ends of shaft, and tighten nuts securely. Lubricate shaft and joints as required (par. 24).

(2) FLANGE AND U-BOLT TYPE. Check the marks on shaft and slip joint to make sure they are in alinement. Hold the free bearings on cross journals, and insert bearings into flange yoke. Apply pressure

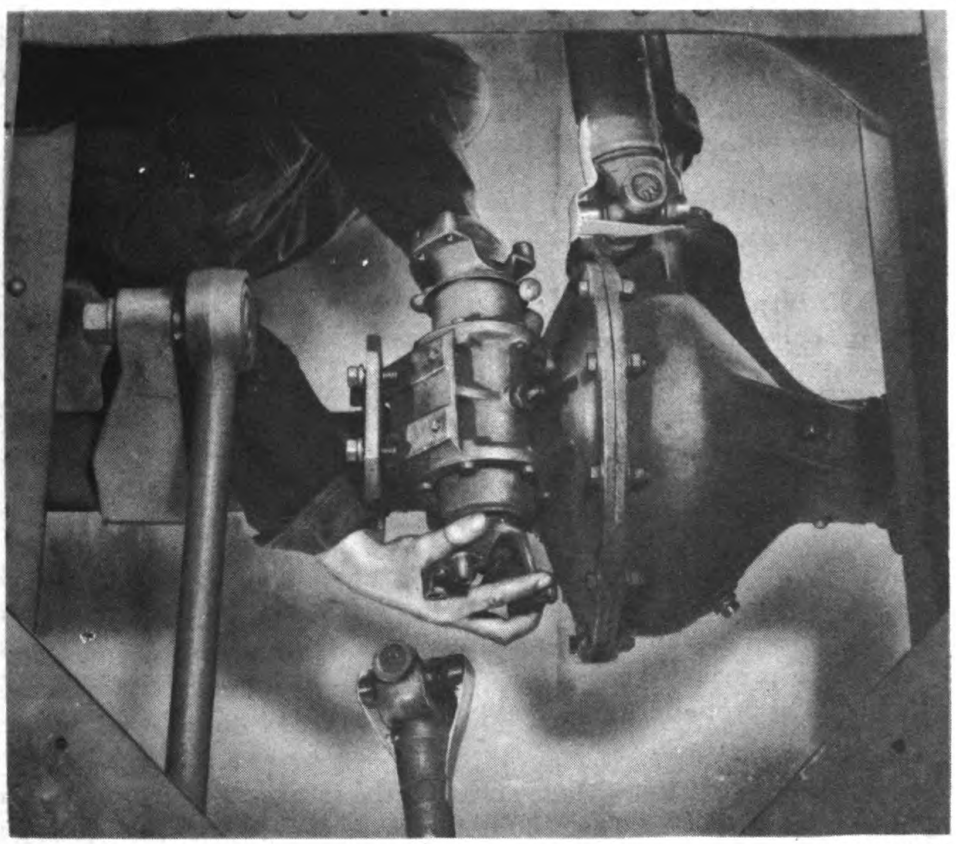

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Figure 121—Removing Midship Shaft and Pillow Block Assembly

on free bearings with a clamp to compress the washers so that bearings seat properly inside lugs in flange yoke. Install the U-bolts, lock washers, and nuts. Tighten the nuts securely. Raise the other end of shaft, place flange in position, and insert bolts through flange. Install lock washers and nuts on the bolts, and tighten securely. Lubricate shaft and joints as required (par. 24).

(3) U-BOLT TYPE. Check the marks on shaft and slip joint to make sure they are in alinement. With clamps holding free bearings on cross journals, insert bearings into the flange yokes. Apply pressure on the free bearing with clamps to compress the washers so that bearings seat properly inside lugs in flange yokes. Install the U-bolts, lock washers, and nuts at both ends of shaft, and tighten nuts securely. Lubricate shaft and joints as required (par. 24).

106. PILLOW BLOCK ASSEMBLY.

a. Removal. Disconnect the universal joints from the pillow block (par. 104). Remove the cap screws holding pillow block assembly to support on forward rear axle housing, and remove the assembly (fig. 121).

b. Installation. Place the pillow block assembly in position, and install the cap screws which hold it to pillow block support on forward rear axle housing. Tighten the cap screws securely. Connect the universal joints to pillow block shaft flanges (par. 105).

Section XXII

FRONT AXLE (6 x 6 VEHICLES)

107. DESCRIPTION AND TABULATED DATA.

a. Description. The single-reduction driving front axle unit used on the 6 x 6 vehicles contains a conventional four-pinion differential and two axle shafts that incorporate constant velocity universal joints. The axle shafts with universal joints are fully enclosed and transmit the power to the front wheels.

b. Tabulated Data.

Make	Timken
Housing	Split type
Drive	Through springs
Front wheel toe-in	1/16 to 3/16 in.

108. FRONT WHEEL TOE-IN ADJUSTMENT.

a. Description. The purpose of toe-in is to offset the effect of camber on tire wear. It is highly important that periodic checks be made for correct wheel toe-in. If it is found to be out of adjustment, make immediate corrections, and check all front axle parts to determine whether there are any bent or extremely loose parts. Toe-in is measured at the edge of the rim flange and is to be measured with wheels in the straight-ahead position (fig. 122).

b. Adjustment. Loosen the lock nut on left end of tie rod. After loosening the clamp bolts in the left tie rod end, remove cotter pin, castle nut, and end bolt. In order to decrease the amount of toe-in, turn the left tie rod end (having 14 threads per in.) clockwise onto the rod; to increase toe-in turn the end counterclockwise (fig. 123). Slip the left tie rod end bolt into position, and check the toe-in setting. If the wheels do not toe-in approximately 1/8 inch, loosen the right end clamp bolts, and remove the cotter pin and castle nut. Remove the right tie rod end bolt, and make an adjustment by turning the right end (having 12 threads per in.). Install right tie rod end bolt, and readjust the left end as required to obtain front wheel toe-in within the specified limits. On completion of the adjustment, make sure that all end clamp bolts, and the lock nut on left end of tie rod, are tightened securely, and that tie rod is in its original true-vertical-plane position.

2½-TON 6x6 TRUCK AND 2½- TO 5-TON 6x4 TRUCK (STUDEBAKER MODELS US 6 AND US 6x4)

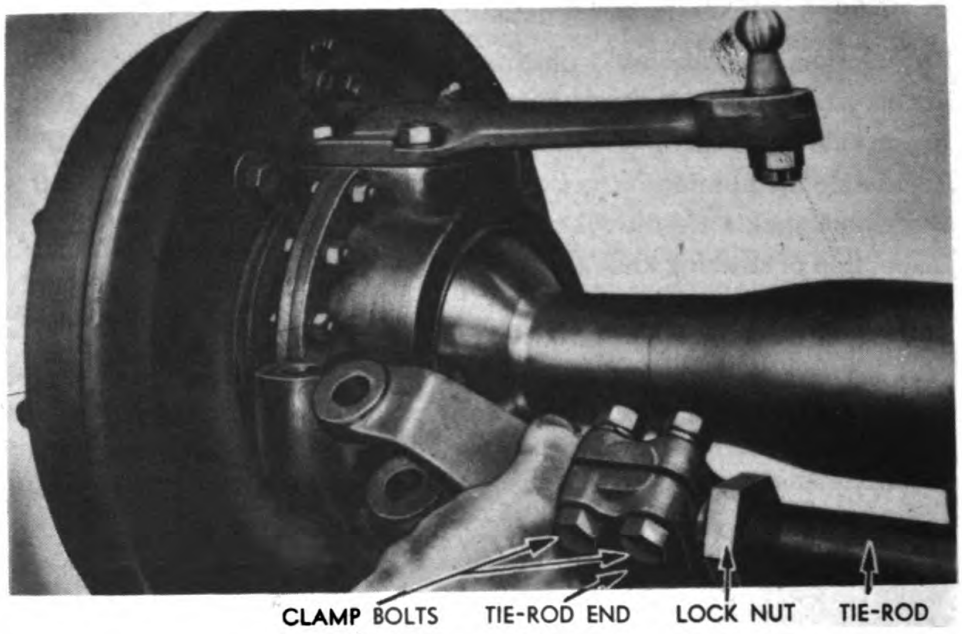

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Figure 122—Adjusting Toe-in (6x6)

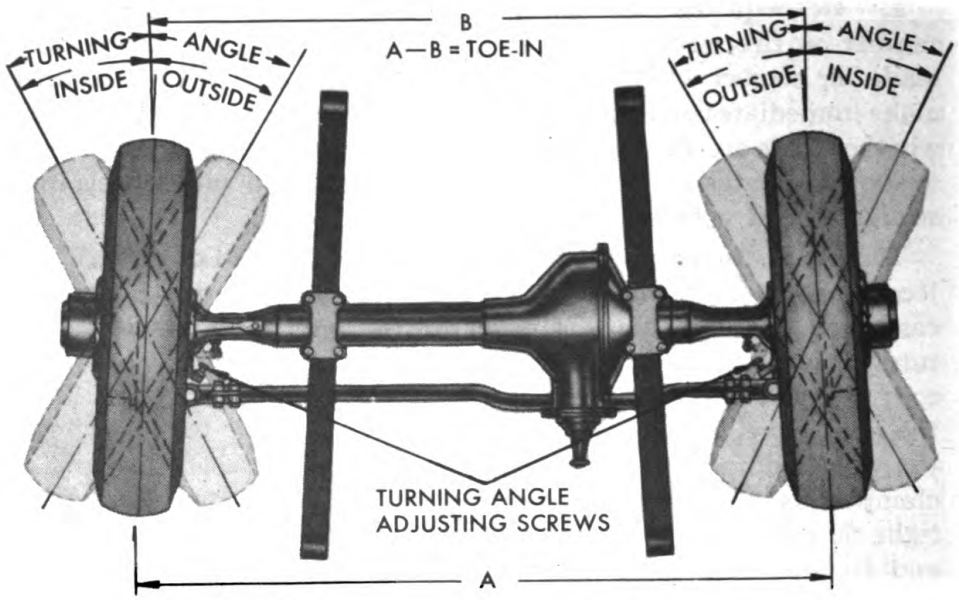

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Figure 123—Front Wheel Alinement Chart (6x6)

Tighten end bolt castle nuts securely, loosen ½ turn to prevent binding, and install new cotter pins.

109. FRONT AXLE REMOVAL.

a. Drain Lubricant. Remove the drain plug from axle housing, allow lubricant to drain out, and install drain plug securely.

b. Disconnect Propeller Shaft. Disconnect the front axle propeller shaft front universal joint from main drive pinion flange (par. 104). Place tape around the free bearings to hold them in position on universal joint cross journals.

c. Disconnect Drag Link and Brake Line. Remove the cotter pin and adjusting plug from front end of drag link, and disconnect

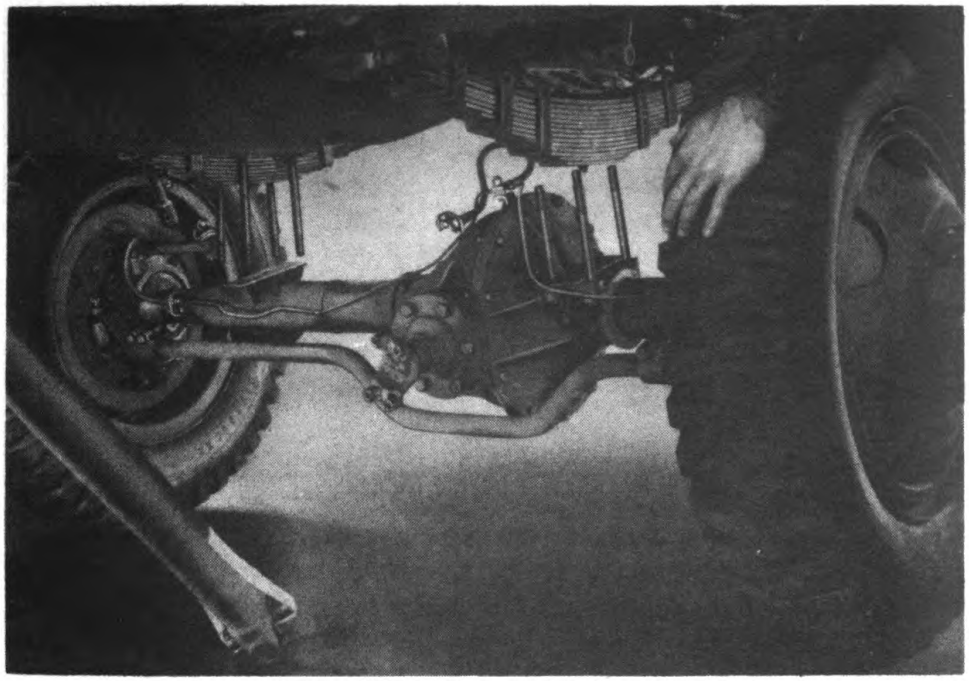

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Figure 124—Removing Front Axle Assembly (6 x 6)

ball cover spring. Lift drag link off steering arm ball stud. Disconnect hydraulic brake line from fitting on frame front cross member.

d. Support Weight of Vehicle. Lift front of vehicle until practically all weight is off the front axle.

e. Remove U-bolts and Plates. Remove U-bolt nuts, stud nuts, U-bolts, and plates that hold the axle to front springs.

f. Remove Axle Assembly. Raise front of vehicle to remove all weight from front axle and roll the axle assembly out from under front of vehicle (fig. 125). NOTE: *If the axle assembly is to be replaced,*

remove the wheels, main drive pinion universal joint flange and key, four studs, brake fluid lines and fittings from the original axle, and install them on the replacement axle.

110. FRONT AXLE INSTALLATION.

a. Place Axle Assembly in Position. Roll the axle assembly into position under front of vehicle. Lower front of vehicle until front springs rest firmly on axle pads with spring center bolts seated in recesses.

b. Install Plates and U-bolts. Install a spring plate on each spring so the recess is over spring center bolt. Place the U-bolts in position

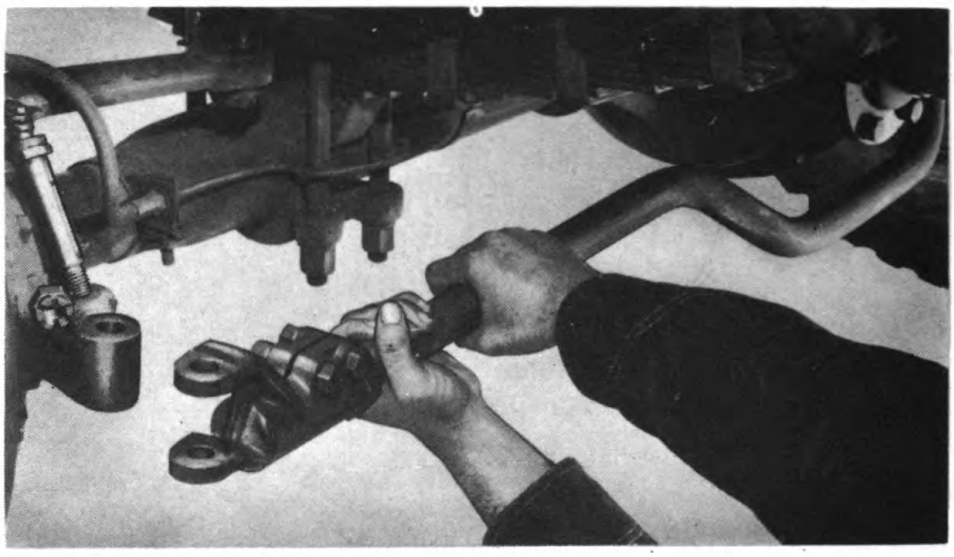

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Figure 125—Removing Steering Knuckle Tie Rod Assembly (6x6)

over left spring, install nuts on U-bolts, and nuts on studs. Tighten the nuts securely, lower front of vehicle so the full weight is supported by front axle, and retighten U-bolt nuts and stud nuts.

c. Connect Brake Line. Connect the hydraulic brake line to fitting on frame front cross member, and bleed hydraulic system (par. 126 a).

d. Connect Drag Link. Place front end of drag link over ball stud on steering arm, and install adjusting plug. Tighten the plug securely, loosen it ½ turn, install a new cotter pin, and connect ball cover spring.

e. Connect Propeller Shaft. Remove tape from universal joint free bearings, pull shaft forward, and connect universal joint to main drive pinion flange (par. 105).

f. Lubricate. Fill axle housing to proper level with lubricant of correct viscosity, and lubricate as required (see Lubrication Guide).

g. Check Toe-in. Check front wheel toe-in and adjust if necessary (par. 108).

111. STEERING KNUCKLE TIE ROD.

a. Removal. Remove cotter pins from the tie rod end bolts, and take off the castle nuts. Push or drive bolts upward to remove them from tie rod ends and knuckle flange arms. Remove the tie rod assembly (fig. 125).

b. Installation. Place the tie rod assembly in position on knuckle flange arms, insert tie rod end bolts from the top, and adjust toe-in of front wheels (par. 108).

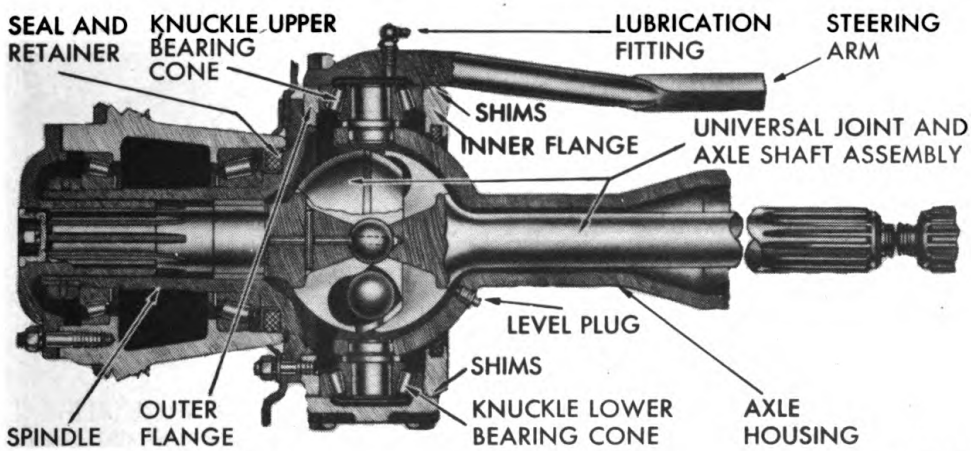


Figure 126—Cross-section of Universal Joint and Steering Knuckle—Left Side (6 x 6)

112. INSPECTION OF STEERING KNUCKLE AND SHAFT WITH UNIVERSAL JOINT.

a. Description (figs. 126 and 127). The steering knuckle consists of inner and outer flanges, a spindle, and bearings. The knuckle flanges enclose the Bendix-Weiss universal joint. Remove, clean, and inspect these parts every 6,000 miles.

b. Removal.

(1) REMOVE AXLE SHAFT WITH UNIVERSAL JOINT. Remove front hub and drum (par. 136 b). Take off nuts and lock washers that hold the brake backing plate, oil shield, and knuckle spindle to the knuckle outer flange. Hang backing plate on spring with brake line attached. Tap side of spindle to loosen it, and remove spindle from knuckle flange. Remove axle shaft with universal joint assembly from axle housing.

(2) REMOVE KNUCKLE OUTER FLANGE. Remove the nuts from studs holding upper cap on knuckle flanges, and cap screws that hold lower cap in position. Take off upper and lower caps with shims, and keep shims with respective caps. Remove nuts and bolts that hold knuckle flanges together, remove bearing cups, and knuckle outer flange. Pull bearing cones from knuckle bearing cone studs with universal puller (fig. 128).

c. Cleaning and Inspection.

(1) CLEANING. Thoroughly clean all removed parts with dry-cleaning solvent, and dry with clean cloths or compressed air. Allow

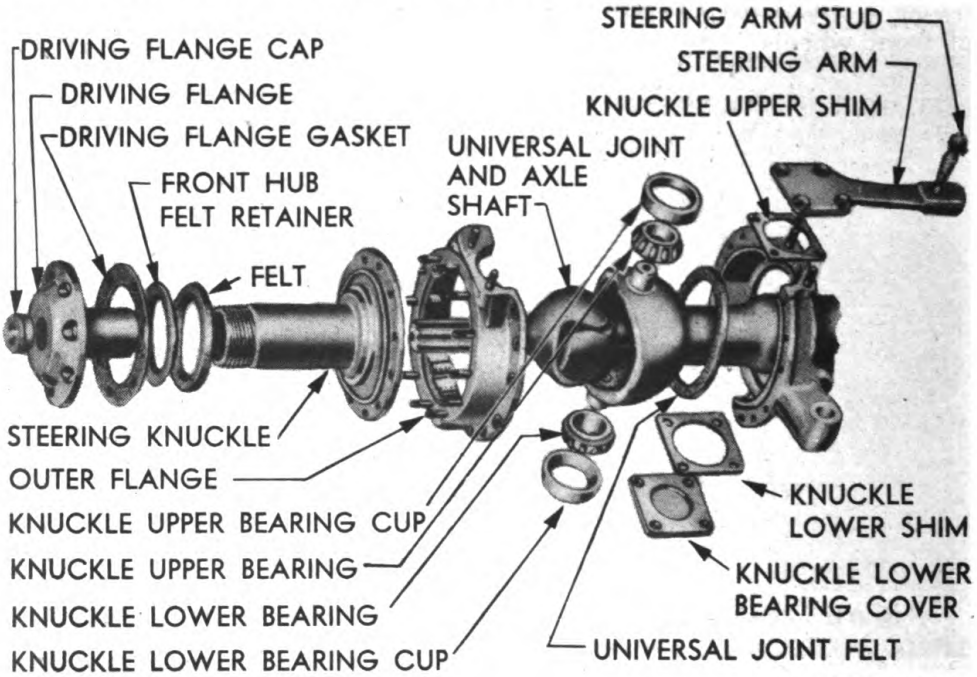


Figure 127—Steering Knuckle and Universal Joint—Left Side Disassembled (6 x 6)

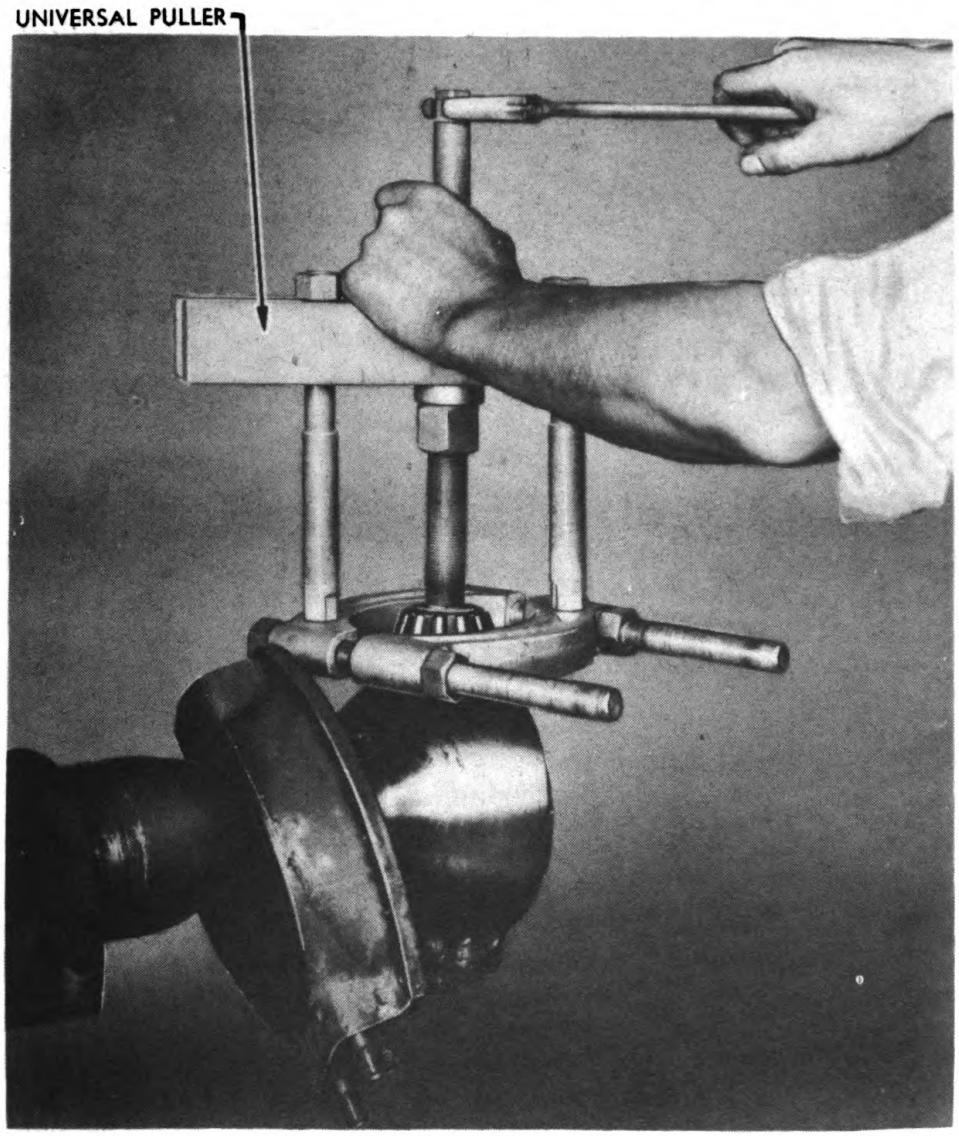
bearing cones to remain in dry-cleaning solvent a short time. Wash the cones thoroughly by turning them slowly below surface of dry-cleaning solvent. Remove cones from dry-cleaning solvent and strike large flat side against a wood block to dislodge the heavier and harder particles of lubricant. Repeat cleaning operation until bearing cones are clean. Then dry with compressed air directed across the cones, being careful not to spin them. Clean lubricant out of axle housing outer end.

(2) INSPECTION. Examine the shaft for twisted splines, cracks, or other damage. Inspect the universal joint balls for grooves, flat spots, or damage. Examine the knuckle flanges and spindle for cracks or other damage. Inspect the bearing cones and cups for chips, cracks,

or scores. If any of the parts are not satisfactory for further service, refer the matter to higher authority.

d. Installation.

(1) INSTALL KNUCKLE OUTER FLANGE. Install knuckle bearing cones on studs (fig. 129), and pack cones with general purpose grease.



RA PD 319223

Figure 128—Removing Knuckle Bearing Cones

Fasten knuckle outer flange to inner flange with bolts, lock washers, and nuts, but do not tighten. Place knuckle upper and lower bearing cups in position on bearing cones and install shims, caps, stud nuts, and cap screws. Tighten flanges and caps securely.

Figure 129—Installing Knuckle Bearing Cones

(2) INSTALL AXLE SHAFT WITH UNIVERSAL JOINT. Pack the universal joint with general purpose grease, and install axle shaft with universal joint into position in axle housing. Place knuckle spindle in position on knuckle flange studs so that oil escape channel is at bottom. Install brake backing plate and oil shield on flange studs, and tighten securely to flange with nuts. Install hub and drum (par. 136 e). Fill universal joint housing to proper level (par. 24).

Section XXIII

FRONT AXLE (6 x 4 VEHICLES)

113. DESCRIPTION AND TABULATED DATA.

a. Description. A conventional, forged I-beam section, Reverse-Elliott type front axle is used on the 6 x 4 vehicles. A forged steering knuckle is attached to each end of the axle with precision-machined king pins. A knuckle arm is keyed to each knuckle and a steering arm is keyed to the left knuckle. The tie rod joins the knuckle arms by means of ball studs located in the tie rod ends.

b. Tabulated Data.

Make	Clark
Model	F-550
Front wheel toe-in	1/16 to 1/8 in.

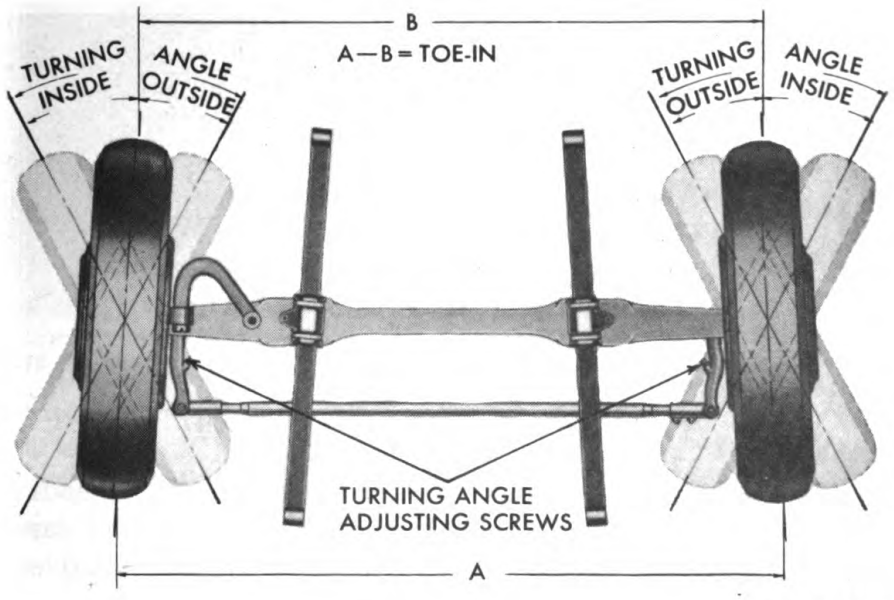
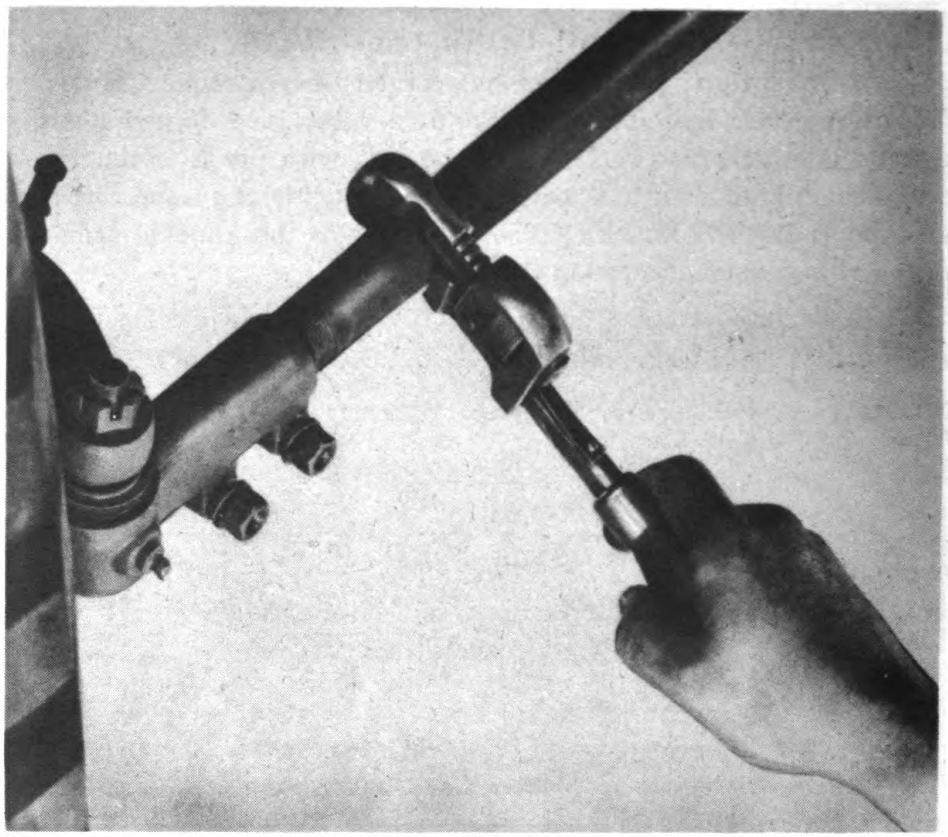


Figure 130—Front Wheel Alinement Chart (6 x 4)

2½-TON 6x6 TRUCK AND 2½- TO 5-TON 6x4 TRUCK (STUDEBAKER MODELS US 6 AND US 6x4)

114. FRONT WHEEL TOE-IN ADJUSTMENT.

a. Description. The purpose of toe-in is to offset the effect of camber on tire wear. It is highly important that periodic checks be made for correct wheel toe-in. If it is found to be out of adjustment, make immediate corrections and check all front axle parts to determine whether there are any bent or extremely loose parts. Toe-in is measured at the edge of the rim flange, and is to be measured with wheels in the straight-ahead position (fig. 130).



RA PD 310174

Figure 131—Adjusting Toe-in (6x4)

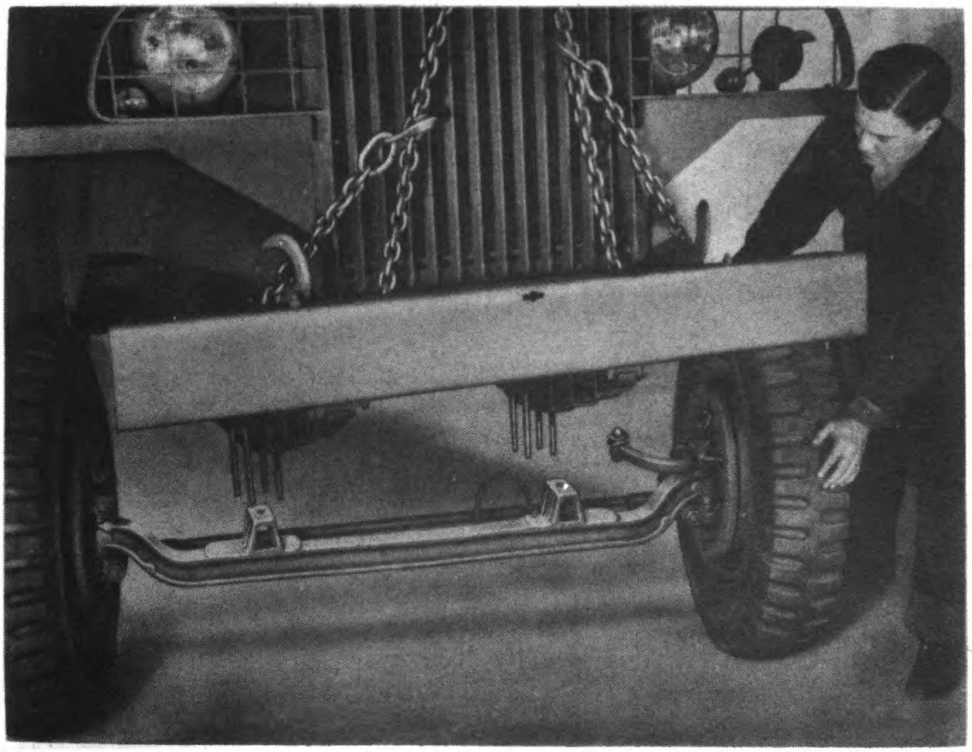
b. Adjustment. Loosen the clamp bolts in both tie rod ends and turn the rod clockwise (as viewed from the left end) to decrease, or counterclockwise to increase the toe-in (fig. 131). Adjust tie rod length so the front wheels toe-in 1/16 to 1/8 inch. The rod and ends have right- and left-hand threads, with 16 threads per inch to permit accurate adjustment. Tighten the clamp bolts securely at each end on completion of adjusting operation.

FRONT AXLE (6 x 4 VEHICLES)

115. FRONT AXLE REMOVAL.

a. Support Weight of Vehicle. Raise front of vehicle with a hoist until practically all weight is off the front axle.

b. Disconnect Drag Link and Brake Line. Remove the cotter pin and adjusting plug from front end of drag link, and unhook cover spring. Lift the drag link off the steering arm ball stud. Disconnect the hydraulic brake line from fitting attached to frame left-side member.



RA PD 319202

Figure 132—Removing Front Axle Assembly (6 x 4)

c. Remove U-bolts and Plates. Take off U-bolt nuts, and remove U-bolts and plates that hold the axle to front springs.

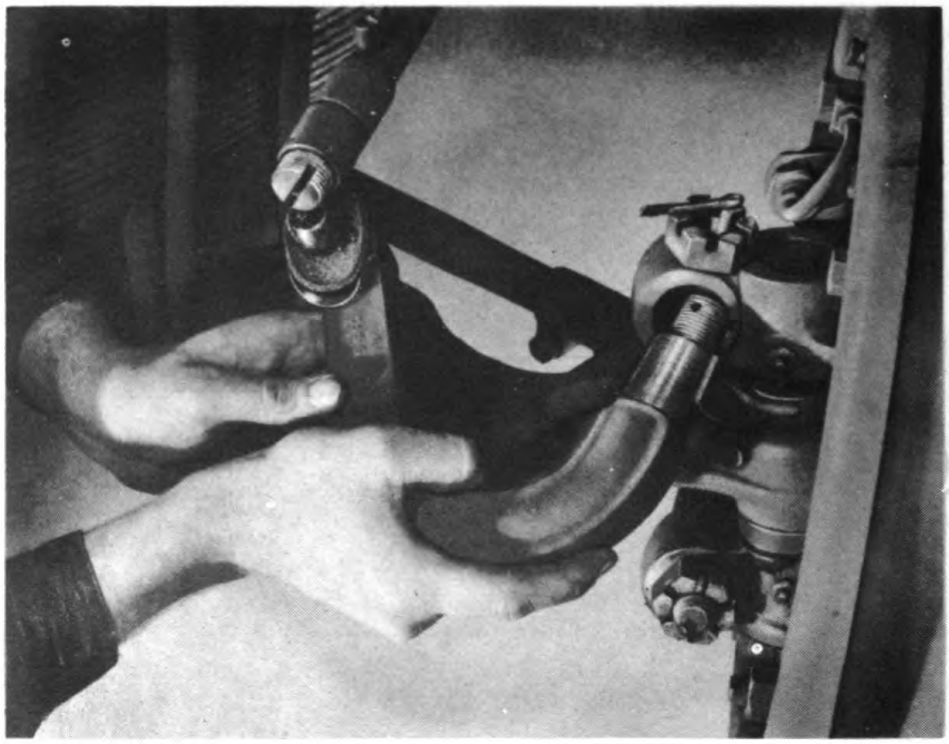
d. Remove Axle Assembly. Raise front of vehicle to remove all weight from front axle, and roll the axle assembly out from under front of vehicle (fig. 132). NOTE: *If the axle assembly is to be replaced, remove the wheels and brake fluid lines and fittings from the original axle, and install them on the replacement axle.*

116. FRONT AXLE INSTALLATION.

a. Place Axle Assembly in Position. Roll the front axle assembly under front of vehicle. Lower front of vehicle so front springs rest firmly on axle pads with spring center bolts seated in recesses.

b. Install Plates and U-bolts. Install a spring plate on each spring so the recess is over spring center bolt. Place the U-bolts in position over plates and springs. Install nuts on U-bolts, tighten them securely, and lower front of vehicle so the weight is supported by front axle.

c. Connect Brake Line. Connect the hydraulic brake line to fitting attached to frame left-side member, and bleed hydraulic system (par. 126 a).



RA PD 319199

Figure 133—Removing Upper Steering Knuckle Arm (6x4)

d. Connect Drag Link. Place front end of drag link over ball stud on steering arm, and install adjusting plug. Tighten the plug securely, loosen it ½ turn, install a new cotter pin, and hook cover spring in position. Check front wheel toe-in, and adjust if required (par. 114).

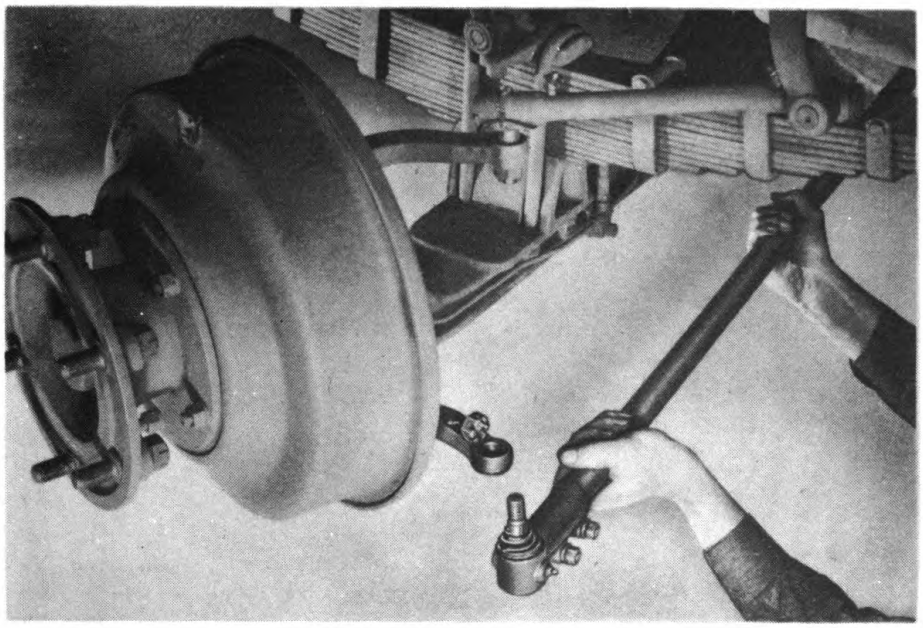
e. Lubricate. Lubricate axle as required (par. 24).

117. STEERING KNUCKLE ARM AND TIE ROD.

a. Steering Knuckle Arm Removal (fig. 133). Remove cotter pin and adjusting plug from front end of drag link, and unhook cover spring. Lift drag link off the steering arm ball stud. Take out the cotter pin, and remove castle nut that holds the steering arm in knuckle. Drive steer-

ing arm out of knuckle with a brass drift and hammer. NOTE: *If the arm is to be replaced, and the ball stud is in serviceable condition, remove it from the original arm, and install it on replacement arm.*

b. Steering Knuckle Arm Installation. Place a feather key in steering arm keyway, and insert tapered portion of arm into knuckle so the key enters keyway in knuckle. Install the castle nut, tighten it securely, and install a new cotter pin. Place front end of drag link over ball stud on steering arm, and install adjusting plug. Tighten the plug securely, loosen it one-half turn, install a new cotter pin, and hook cover spring.

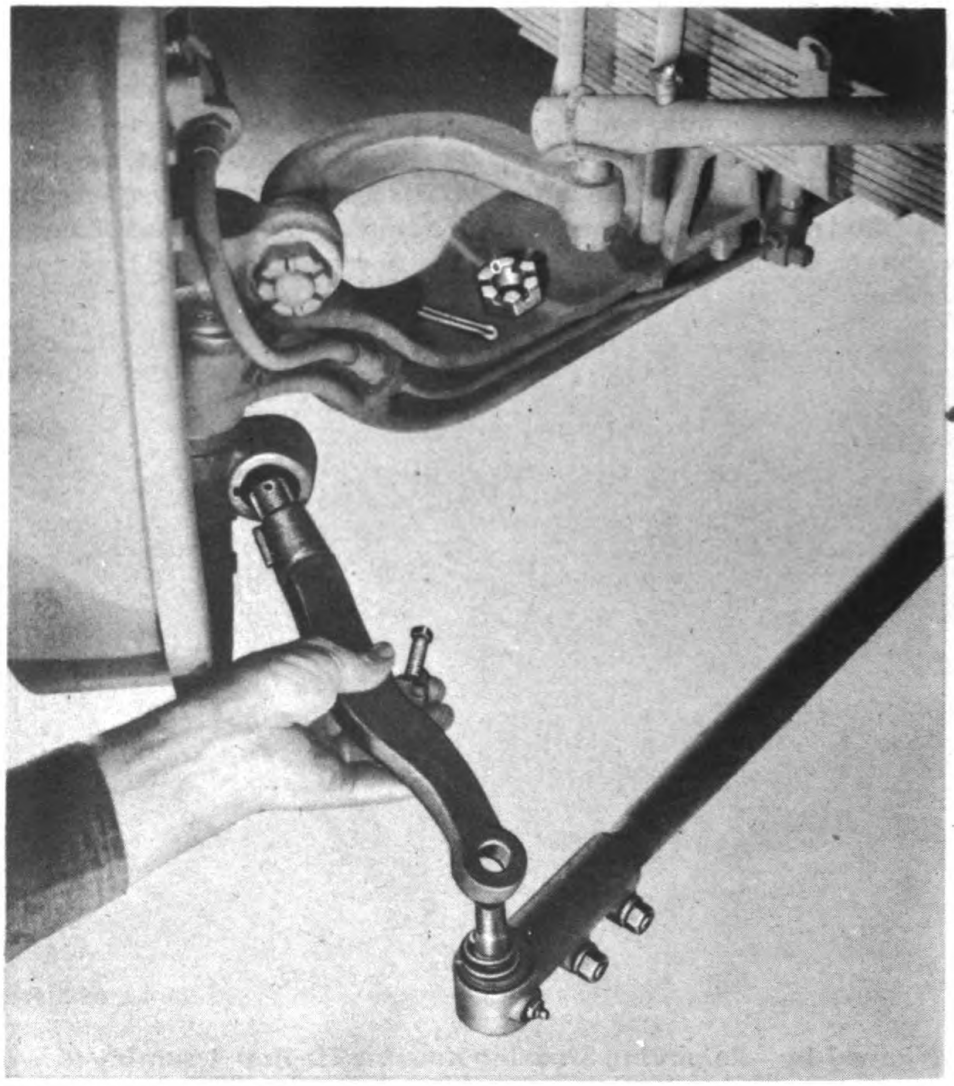


RA PD 319201

Figure 134—Removing Steering Knuckle Tie Rod Assembly (6 x 4)

c. Steering Knuckle Tie Rod Removal (fig. 134). Remove the cotter pin and castle nut from left tie rod end ball stud. Apply pressure downward on the tie rod end near ball stud with a pry bar, and strike the rear end of knuckle arm with a 2-pound hammer to disengage ball stud from knuckle arm bore. Use the same procedure to disengage the ball stud from the right knuckle arm to complete the removal of tie rod assembly.

d. Steering Knuckle Tie Rod Installation. Make sure that each ball stud has a cover, washer, washer cover, and spring in position. Place the tie rod assembly so the end that has right-hand threads is at right side of vehicle. Insert the tie rod ball studs into the knuckle arm bores from below, and install a castle nut on threaded end of each ball stud. Tighten the nuts securely to seat the tapered portion of ball studs



RA PD 319200

Figure 135—Removing Lower Steering Knuckle Arm (6x4)

in knuckle arm bores, and install new cotter pins. Adjust toe-in of front wheels (par. 114).

118. STEERING KNUCKLE OR SPINDLE ASSEMBLY.

a. Removal.

(1) REMOVE WHEEL, HUB, AND DRUM ASSEMBLY. Raise front end of vehicle so that front tires clear the floor. Remove hub cap, cotter pin, bearing adjusting nut, bearing locking washer, and outer bearing cone from left-front wheel. Pull the wheel, hub, and drum assembly off the left-front knuckle spindle.

(2) REMOVE BRAKE BACKING PLATE. Take out the screws and remove the hub oil drain. Remove the brake backing plate screws, bolts and nuts, and hang backing plate on spring without disconnecting the hydraulic brake line hose. Remove the inner bearing cone and felt washer with retainer from the knuckle spindle, using universal puller.

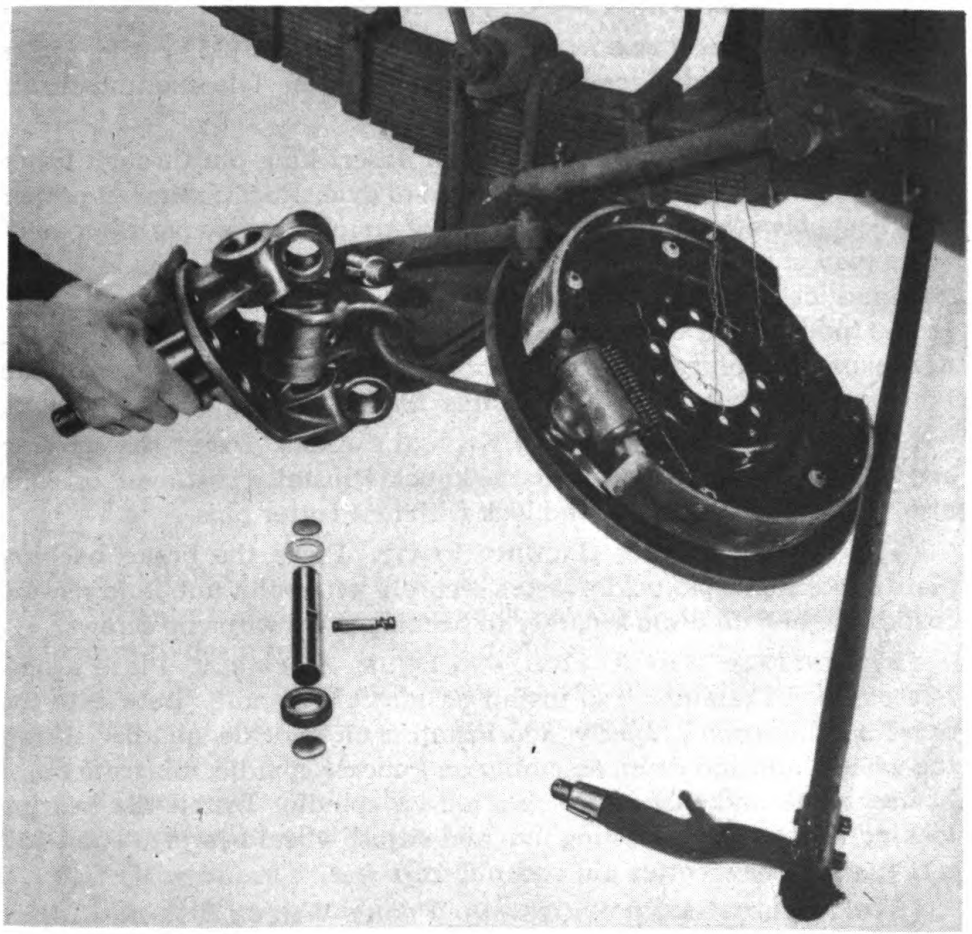


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Figure 136—Removing Steering Knuckle and Spindle Assembly (6 x 4)

(3) REMOVE STEERING AND KNUCKLE ARMS. Remove the cotter pins and castle nuts from steering and knuckle arms. Drive the arms out of knuckle with a brass drift and hammer.

(4) REMOVE KNUCKLE KING PIN. Drive a pointed tool into expansion plug over top of knuckle king pin, and pry it out of knuckle. Remove the king pin key nut, and drive the key out of axle toward the front with a brass drift and hammer. Drive the knuckle king pin downward with a brass drift and hammer to remove the lower expansion plug and king pin from knuckle.

2½-TON 6x6 TRUCK AND 2½- TO 5-TON 6x4 TRUCK (STUDEBAKER MODELS US 6 AND US 6x4)

(5) REMOVE KNUCKLE. Remove the knuckle, shims, and thrust bearing from end of axle. The right steering knuckle is removed by following the same procedure, except that no steering arm is attached to knuckle (fig. 135).

b. Installation (fig. 136).

(1) PLACE KNUCKLE IN POSITION. Hold the thrust bearing under left end of axle, and place left knuckle yoke over axle end and thrust bearing.

(2) INSTALL KNUCKLE KING PIN. Insert king pin through lower yoke of knuckle and into the bore in end of axle. Install shims of proper thickness between axle and upper yoke of knuckle to remove all up-and-down play of knuckle, without causing binding. Tap king pin into position, and insert threaded end of king pin key through axle from front. Install toothed lock washer and nut on key, and tighten securely. Install new expansion plugs in knuckle upper and lower yoke bores to retain lubricant and keep out water or other foreign matter.

(3) INSTALL STEERING AND KNUCKLE ARMS. Insert the steering and knuckle arms with keys into the knuckle, install a castle nut on each arm, tighten nuts securely, and lock with new cotter pins.

(4) INSTALL BRAKE BACKING PLATE. Place the brake backing plate in position on knuckle; fasten securely with bolts, nuts, and screws. Install the hub oil drain securely to backing plate with cap screws.

(5) INSTALL WHEEL, HUB, AND DRUM ASSEMBLY. Place a new felt washer in retainer, and install on knuckle spindle. Lubricate the inner bearing cone properly, and install it on knuckle spindle. Install the wheel, hub, and drum assembly on knuckle spindle, lubricate outer bearing cone and place it in position on spindle. Install the bearing locking washer and adjusting nut, and adjust wheel bearings (par. 137 **a**). Install a new cotter pin and hub cap.

(6) ADJUST BRAKE SHOES AND FRONT WHEEL TOE-IN. Adjust brake shoes to drum clearance (par. 126 **b** (4)). Lower front of vehicle, check front wheel toe-in, and adjust if necessary (par. 114).

Section XXIV

REAR AXLES

119. DESCRIPTION AND TABULATED DATA.

a. Description. The two single-reduction driving rear axles are of the full-floating type with bevel driving gears. Adjustments to the housings and bearing supports have been eliminated by holding the machining operations to close limits.

b. Tabulated Data.

Make	Timken
Housing	Split type
Drive	Through torque rods

120. FORWARD REAR AXLE REMOVAL (fig. 137).

a. Drain Lubricant. Remove drain plug from axle housing, allow lubricant to drain out, and install drain plug securely.

b. Remove Wheels and Tires. Raise vehicle until the tires on forward rear axle are off the floor, and remove wheel and tire assemblies from both sides (par. 135).

c. Remove Propeller Shaft. Remove the transfer case to forward rear axle propeller shaft (par. 104).

d. Disconnect Pillow Block. Remove the cap screws that hold the pillow block assembly to the support on forward rear axle, and fasten the rearward rear axle drive system to a frame cross member.

e. Disconnect Brake Line. Disconnect the hydraulic brake line flexible hose from fittings attached to each end of axle housing, and attach loose end of hose to frame side members. CAUTION: *Plug ends of brake hose to prevent excessive loss of fluid, and keep dirt from entering fluid lines.*

f. Disconnect Torque Rods. Place a support under bell of axle housing, and remove the nuts and lock washers from torque rod tapered studs attached to axle brackets. Apply pressure against each rod, and strike the bracket in front or back of the taper (fig. 138) with a heavy hammer to disengage the tapered stud.

g. Remove Axle Assembly. Lower the axle and move it forward to clear front end of rear springs. Roll or slide the axle assembly out

from under the vehicle (fig. 139). NOTE: *If the axle assembly is to be replaced, remove the main drive pinion universal joint flange and key, the brake fluid lines and fittings from original axle, and install them on replacement axle.*

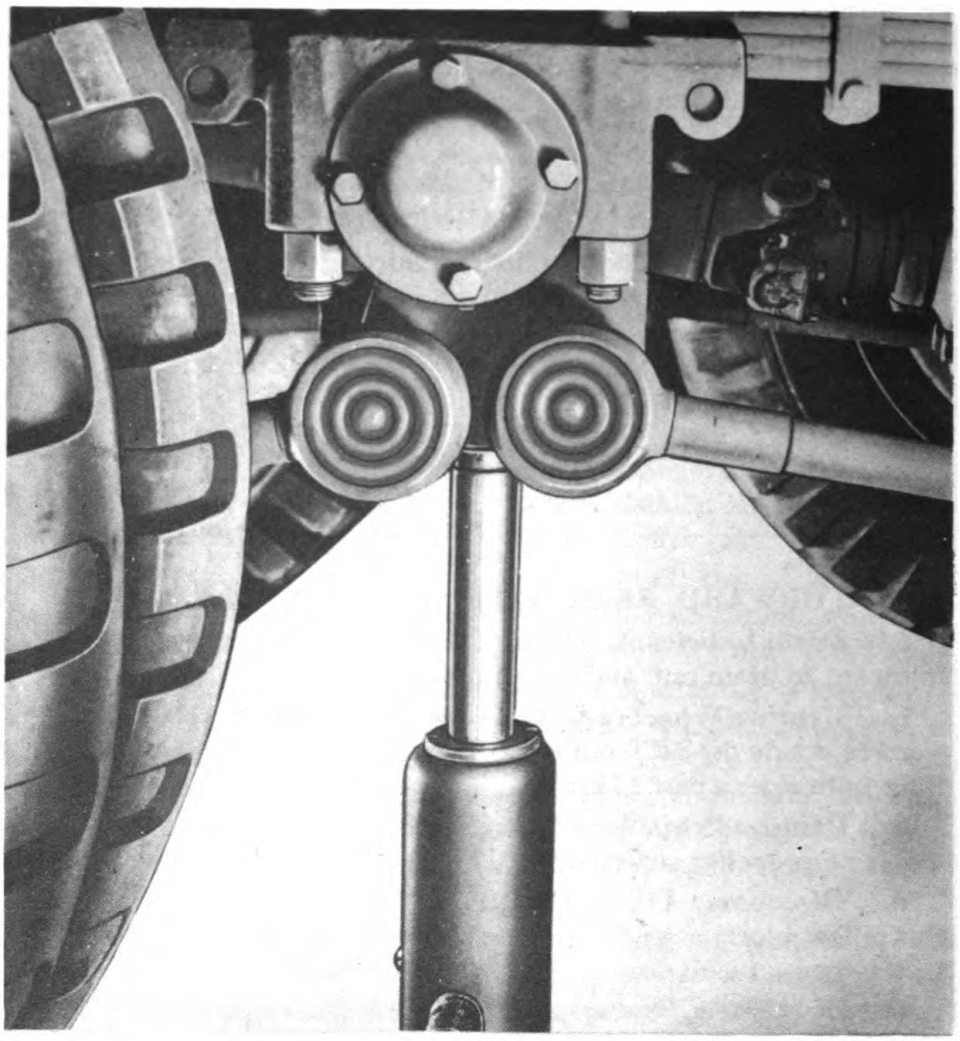

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Figure 137—Jacking at Connecting Bar Torque Rods Bracket

121. FORWARD REAR AXLE INSTALLATION (fig. 140).

a. Place Axle in Position. Place axle assembly in position under vehicle. Move axle up and toward rear of vehicle, guiding front end of rear springs into axle anchor straps on axle housing.

b. Connect Torque Rods. Insert torque rod tapered studs into axle brackets, install new lock washers on studs, and securely tighten nuts.

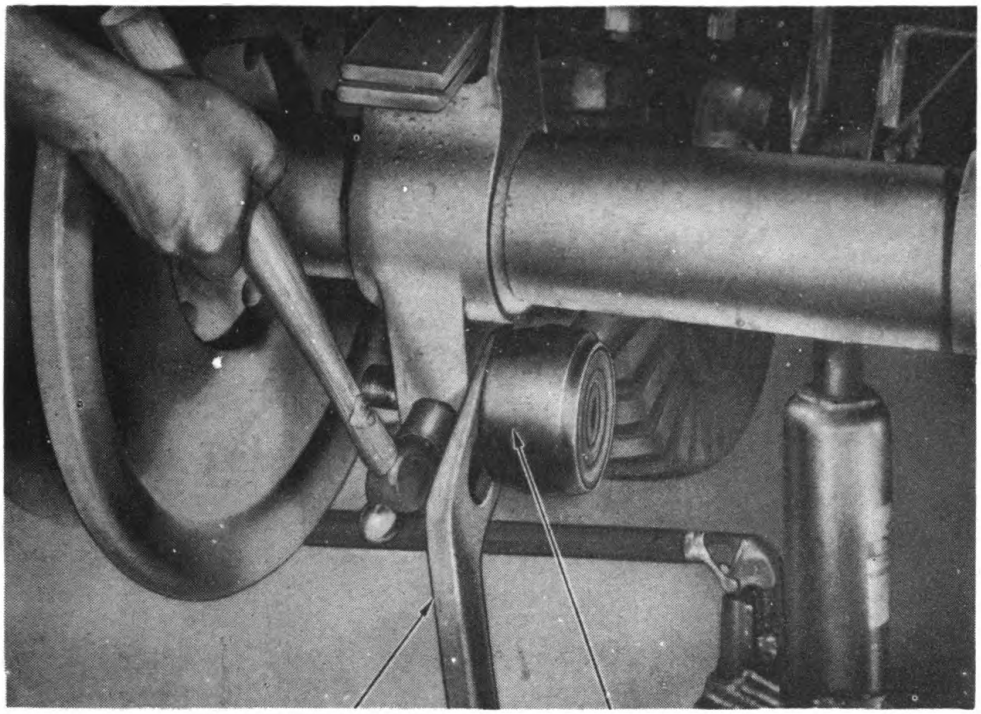

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Figure 138—Disconnecting Torque Rods

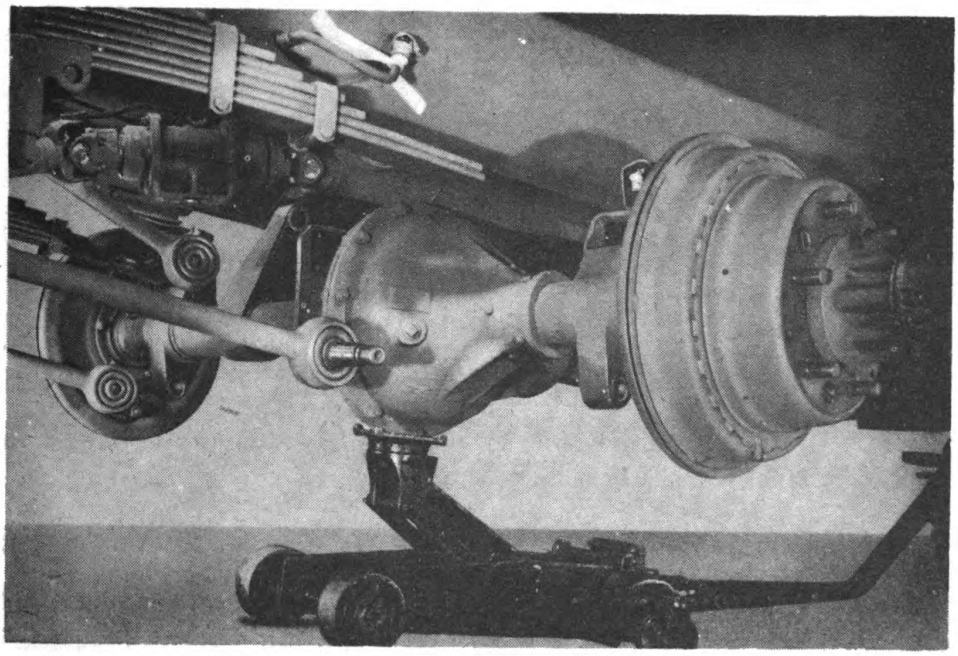

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Figure 139—Removing Forward Rear Axle Assembly

c. Install Propeller Shaft. Install the forward rear axle to transfer case propeller shaft (par. 105).

d. Connect Pillow Block. Lower pillow block into position, install the pillow block to axle support cap screws, and tighten securely (par. 106).

e. Install Wheels and Tires. Install the forward rear axle tire and wheel assemblies (par. 135).

f. Connect Brake Lines. Remove plugs from brake lines, and connect the brake line flexible hose to fittings attached to each end of axle housing. Bleed hydraulic system (par. 126 **a**).

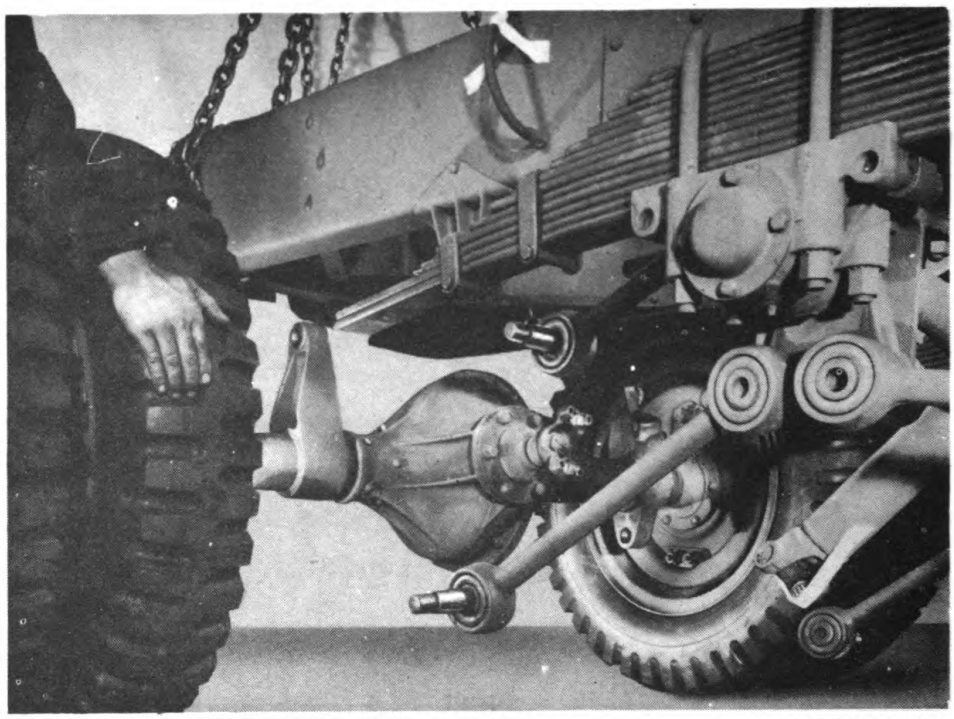

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Figure 140—Removing Rearward Rear Axle Assembly

g. Install Lubricant. Fill rear axle housing with proper lubricant to correct level. See Lubrication Guide.

122. REARWARD REAR AXLE REMOVAL.

a. Drain Lubricant. See paragraph 120 **a.**

b. Disconnect Propeller Shaft. Raise the rear of vehicle until the tires on rearward rear axle are off the floor. Disconnect the pillow block to rearward rear axle propeller shaft universal joint from main drive pinion flange (par. 104).

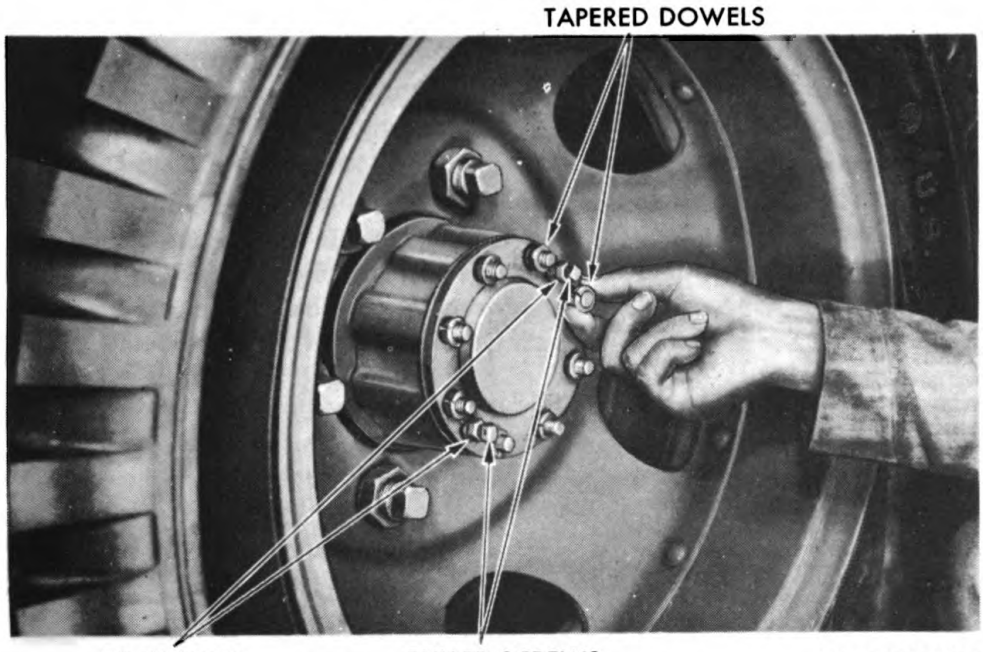


Figure 141—Removing Rear Axle Shaft Driving Flange Dowels

c. Disconnect Brake Lines. Disconnect the hydraulic brake flexible hose from fittings attached to each end of axle housing and attach loose end of hose to frame side members. CAUTION: *Plug ends of brake hose to prevent loss of fluid, and to keep dirt from entering lines.*

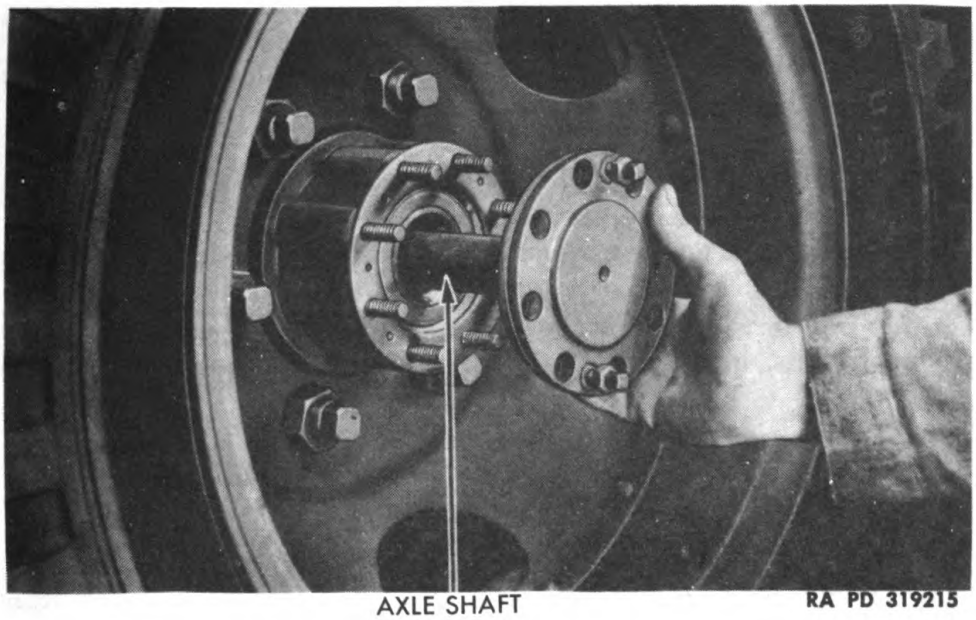


Figure 142—Removing Axle Shaft

d. Disconnect Torque Rods. Remove the stud nuts and lock washers from torque rod tapered studs attached to axle brackets. Apply pressure against each rod, and strike the bracket in front or back of the taper (fig. 138) with a heavy hammer to disengage the tapered stud.

e. Remove Axle Assembly. Move the axle assembly rearward until the rear end of rear springs are out of axle housing anchor straps. Roll the assembly out from under the vehicle (fig. 140). **NOTE:** *If the axle assembly is to be replaced, remove the main drive pinion universal*

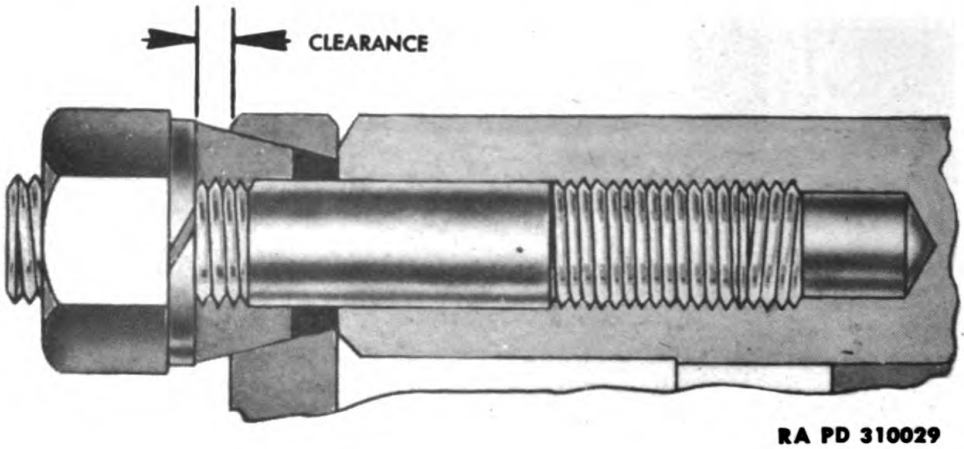


Figure 143—Clearance Required Between Axle Shaft Stud Nut Lock Washers and Driving Flange

joint flange and key, brake fluid lines and fittings, wheels and tires, from original axle; install them on the replacement axle.

123. REARWARD REAR AXLE INSTALLATION.

a. Place Axle Assembly in Position. Roll the axle assembly under vehicle and guide rear end of rear springs into axle anchor straps on axle housing.

b. Connect Torque Rods. Insert torque rod tapered studs into axle brackets, install new lock washers on studs, and tighten nuts securely.

c. Connect Brake Lines. Remove plugs from brake lines, and connect the brake line flexible hose to the fittings attached to each end of axle housing. Bleed hydraulic system (par. 126 a).

d. Connect Propeller Shaft. Connect propeller shaft to main drive pinion flange (par. 105).

e. Install Lubricant. Fill axle housing to the proper level with correct grade of lubricant (par. 24).

124. AXLE SHAFT.

a. Removal. Remove nuts and washers from rear axle flange studs, and loosen lock nuts on axle shaft puller screws. Turn puller screws in about ½ inch to move the axle shaft flange and split tapered dowels away from hub. Unscrew axle shaft puller screws until the points are flush with the axle shaft flange inner surface, and tighten lock nuts. Drive axle shaft flange in against hub, remove the split tapered dowels (fig. 141), and the axle shaft (fig. 142).

b. Installation. Install a new oil seal with a new gasket on each side of seal over axle shaft flange studs in hub. Insert splined end of axle shaft through hub, guiding splined end of axle shaft into differential side gear. Install split tapered dowels on all studs, install nuts with new lock washers, and tighten nuts alternately. There must be a slight clearance between lock washers and driving flange when the nuts are tightened securely (fig. 143). NOTE: *Excessive wear on studs, dowels, or holes in the flange will be indicated when no clearance exists.*

2½-TON 6x6 TRUCK AND 2½- TO 5-TON 6x4 TRUCK (STUDEBAKER MODELS US 6 AND US 6x4)

Section XXV

BRAKE SYSTEM

125. DESCRIPTION AND TABULATED DATA (fig. 167).

a. Description. The brakes operating at all wheels are of the hydraulic, internal, two-shoe type. The front brake shoe functions primarily in braking forward movement of the vehicle, while the rear shoe is used mainly for stopping vehicle movement in reverse. A vacuum power booster is included in the system to assist in brake application. The external, one-piece, band-type hand brake is mounted on the rear of the transfer case. The brake drum is balanced in production, and bolted to the front universal joint flange of the propeller shaft which connects the transfer case with the pillow block.

b. Tabulated Data.

Hand brake band to drum clearance—at anchor	0.010 in.
at ends of lining	0.020 in.
Pedal arm to floor clearance	1/16 in.
Master cylinder piston rod lash	1/32 to 3/64 in.
Vacuum power booster operating rod lash	3/16 in.
Shoe lining to drum clearance	
Take-up cam adjustment (top of lining)	0.010 in.
Anchor pin adjustment (bottom of lining)	0.005 in.
Brake shoes (hydraulic)	Wagner Electric
Brake fluid	Wagner Lockheed No. 21-11
Vacuum power booster	Bragg-Kliesrath
Booster operating valve	Bragg-Kliesrath

126. BLEEDING AND ADJUSTMENTS IN VEHICLE.

a. Bleeding Hydraulic System. Two methods are used for bleeding the hydraulic system: pressure and manual.

(1) When using pressure bleeding equipment, be sure that the tank is filled with brake fluid to the proper level. Also make sure that the tank has proper air pressure before beginning the bleeding operation. Make sure the master cylinder reservoir is filled. Connect the hose from bleeding tank to master cylinder reservoir, using the proper adapters. Remove the plug from body of bleeder valve (fig. 144) above the wheel cylinder inlet connection on one of the wheel brake backing plates, and connect the bleeder hose. Place the other end of hose into a suitable container so that end of hose is below the level of fluid in container.

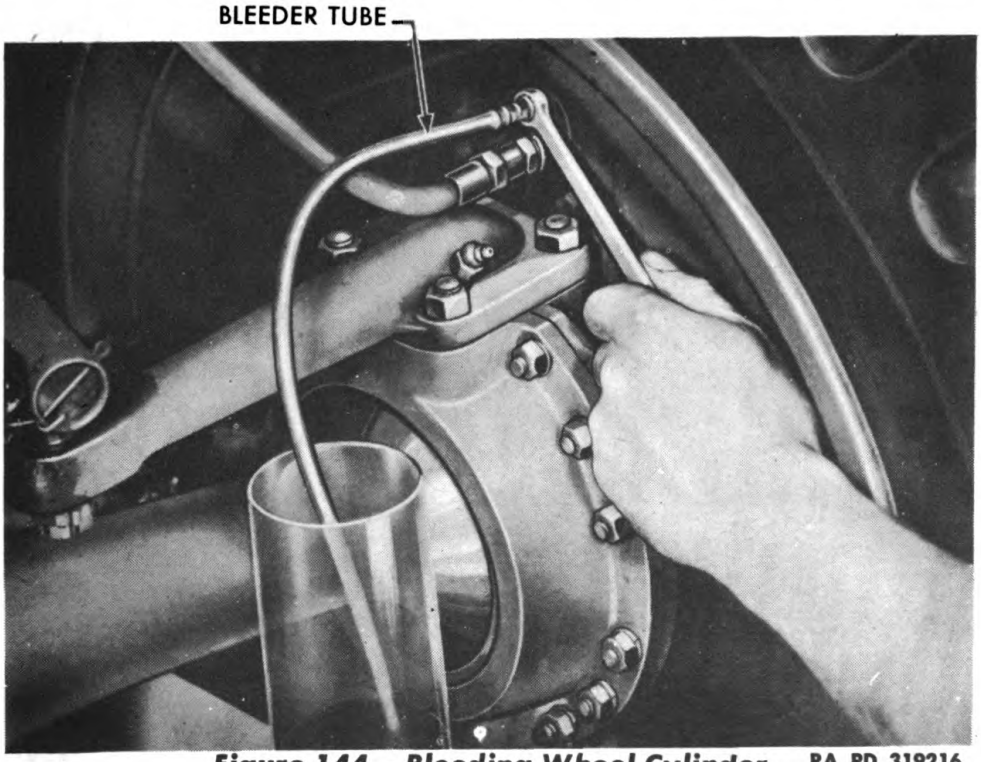


Figure 144—Bleeding Wheel Cylinder RA PD 319216

Open the bleeder valve ¾ turn in a counterclockwise direction, and watch the flow of fluid at end of bleeder hose. Close the bleeder valve tightly as soon as air bubbles stop in container and fluid runs out of bleeder hose in a solid stream. Remove the bleeder hose, and reinstall plug in bleeder valve. Repeat the wheel cylinder bleeding operations at the other wheels.

(2) Two men are required when the manual method is used to bleed the hydraulic system. Operate the engine at idling speed before the brake pedal is depressed. Manual bleeding amounts to filling the master cylinder reservoir and "pumping" the brake pedal in order to force the fluid through the lines to expel air from the system. The wheel cylinder bleeding operations are as given previously, except that it is

necessary to keep the master cylinder reservoir filled with brake fluid, or air will be pumped into the system.

b. Adjustments.

(1) HAND BRAKE. Release the hand brake lever, and make sure it operates freely. Remove lock wire and adjust the anchor screw until a clearance of 0.010 inch is obtained between lining and drum at the

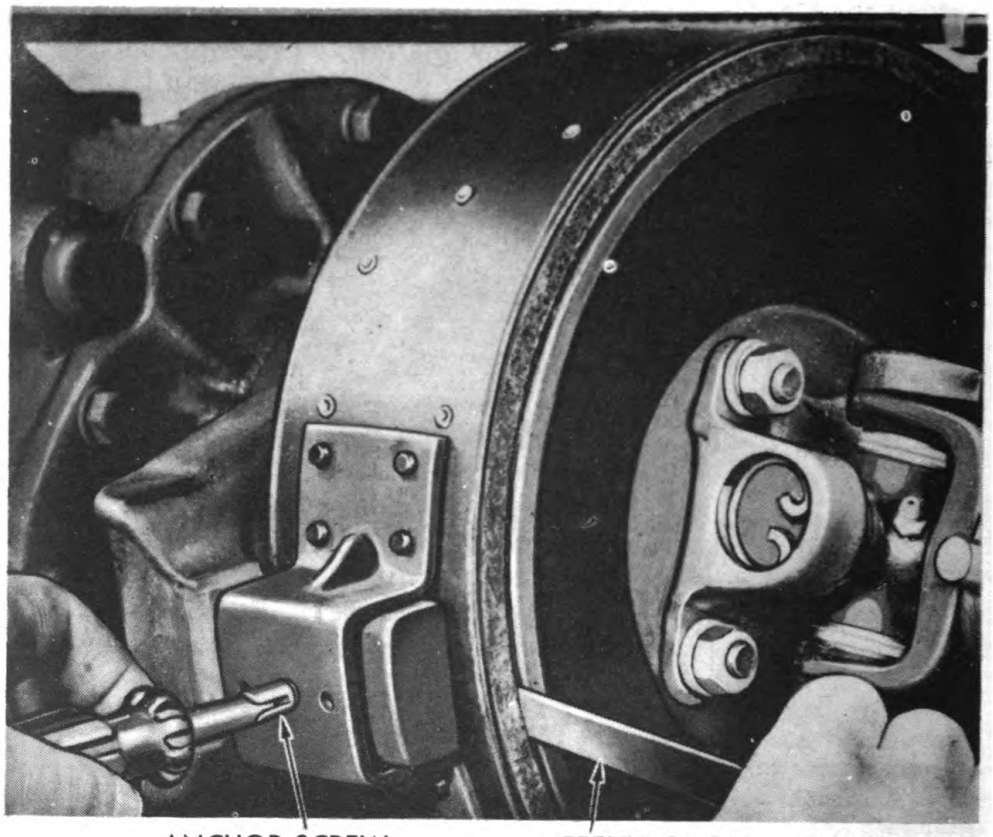


Figure 145—Adjusting Hand Brake Band at Anchor

anchor (fig. 145). Lock-wire the anchor screw. Loosen the adjusting screw lock nut, and turn the screw to provide 0.020-inch clearance between lower end of lining and drum (fig. 146). Tighten the adjusting screw lock nut securely. Loosen the adjusting nut lock nut, and turn adjusting nut until there is 0.020-inch clearance between upper end of lining and drum (fig. 147). Tighten the adjusting nut lock nut securely. Set the hand brake lever so the pawl or latch is engaged in the third notch on the sector or ratchet. Remove cotter pin and clevis pin from clevis at rear end of hand brake pull rod. Adjust pull rod length by turning clevis so the rear wheels can just be turned by hand. Install clevis pin, a new cotter pin, and release hand brake.

(2) PEDAL AND LINKAGE (fig. 148).

(a) Always adjust the pedal and linkage if the adjustments have been changed; also when the brake shoes, pedal, brake operating levers, valves, or linkage is replaced.

(b) Disconnect the power booster operating rod and operating valve rod from the operating lever. Adjust the operating lever set screw

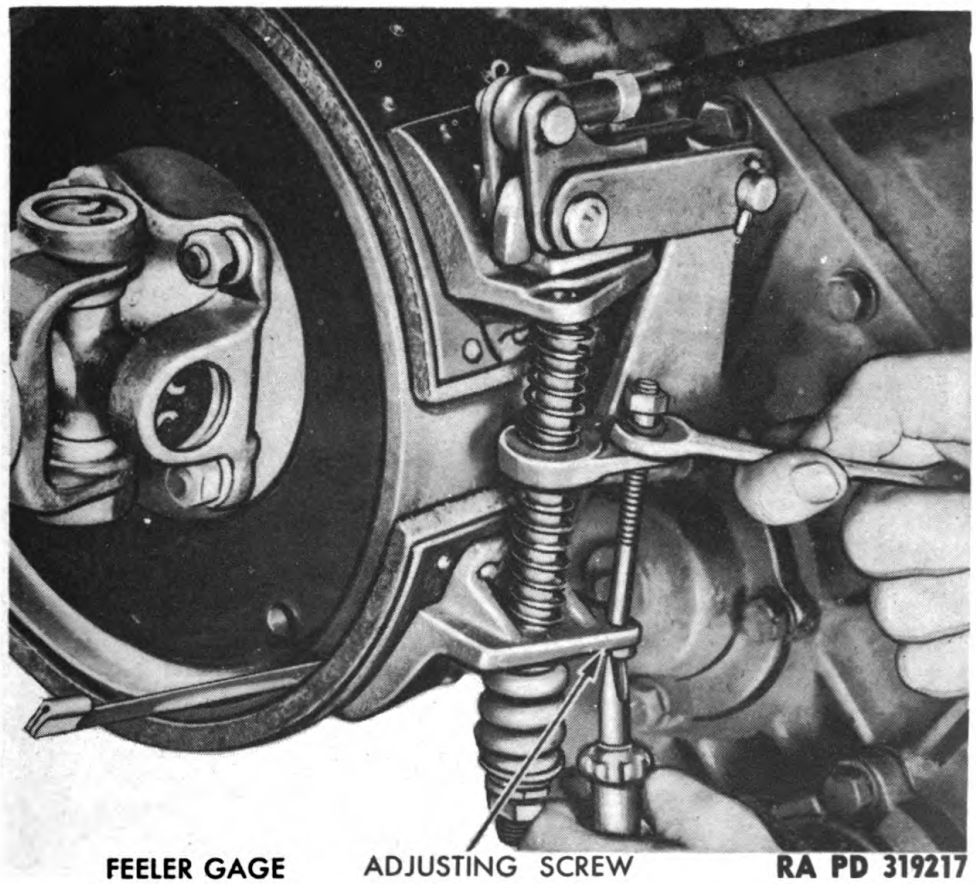


Figure 146—Adjusting Band at Bottom

(fig. 149) so the lever travels equal amounts each side of a vertical center line through the lever pivot bolt.

(c) Loosen the master cylinder piston rod lock nut, hold the operating lever against stop screw, and adjust piston rod so that 1/32 to 3/64-inch lash is provided before piston rod touches master cylinder piston. Tighten piston rod lock nut securely.

(d) Connect the power booster operating rod to operating lever with clevis pin, and install a new cotter pin. Hold the operating lever against stop screw, and adjust the booster operating rod length so the rod will move toward booster cylinder 3/16 inch before engaging the clevis pin in power booster piston rod.

2½-TON 6x6 TRUCK AND 2½- TO 5-TON 6x4 TRUCK (STUDEBAKER MODELS US 6 AND US 6x4)

(e) Connect the operating valve rod to the operating lever with clevis pin, and install a new cotter pin. Adjust the brake pedal to operating valve rod turnbuckle so the pedal arm stops within 1/16 inch of cab floor (underneath) when pedal is in released position.

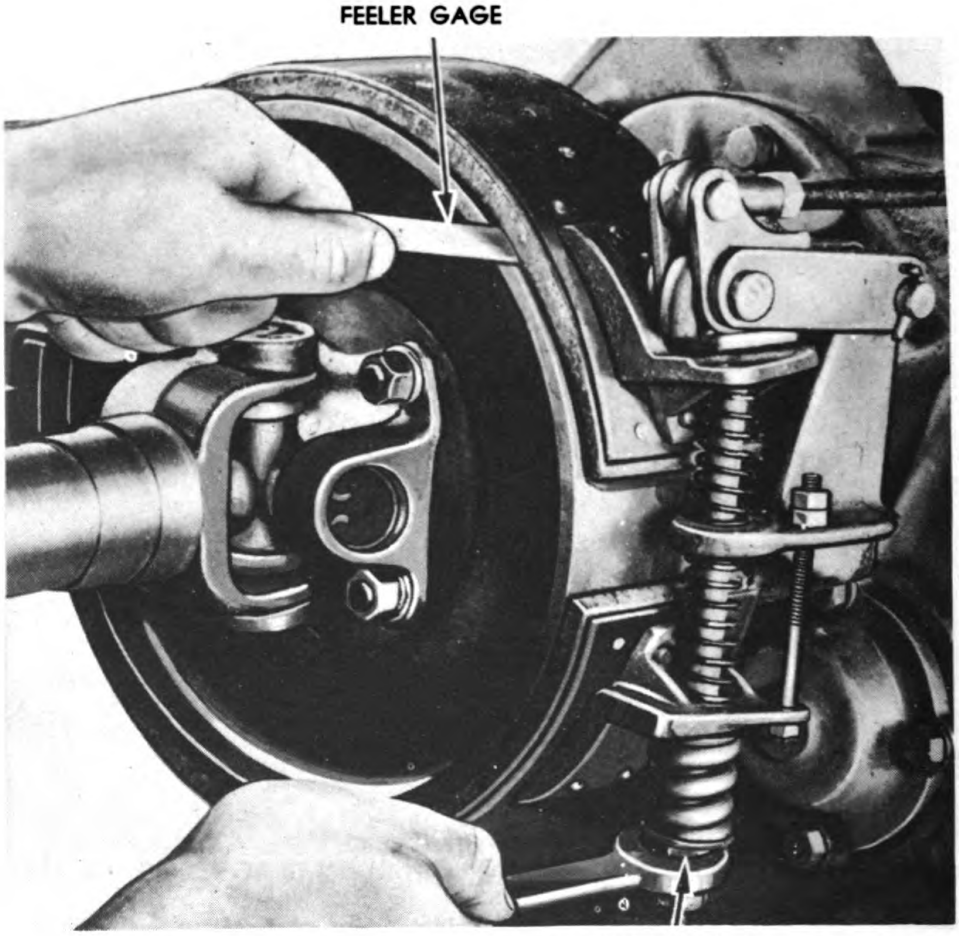


Figure 147—Adjusting Band at Top

(3) BRAKE SHOE MINOR ADJUSTMENTS. If the clearance between brake pedal arm and underside of cab floor is not approximately 1/16 inch, or the master cylinder piston rod lash is not within 1/32- to 3/64-inch limits, adjust the pedal and linkage (subpar. **b** (2) above). Raise axle so the wheels can be turned, check the adjustment of wheel bearings, and adjust if necessary (par. 136). Adjust one shoe at a time by turning the take-up eccentric pin in direction indicated by arrow (fig. 150) until lining drags slightly on drum when the wheel is rotated. Then back off the take-up eccentric pin just enough so the wheel turns freely

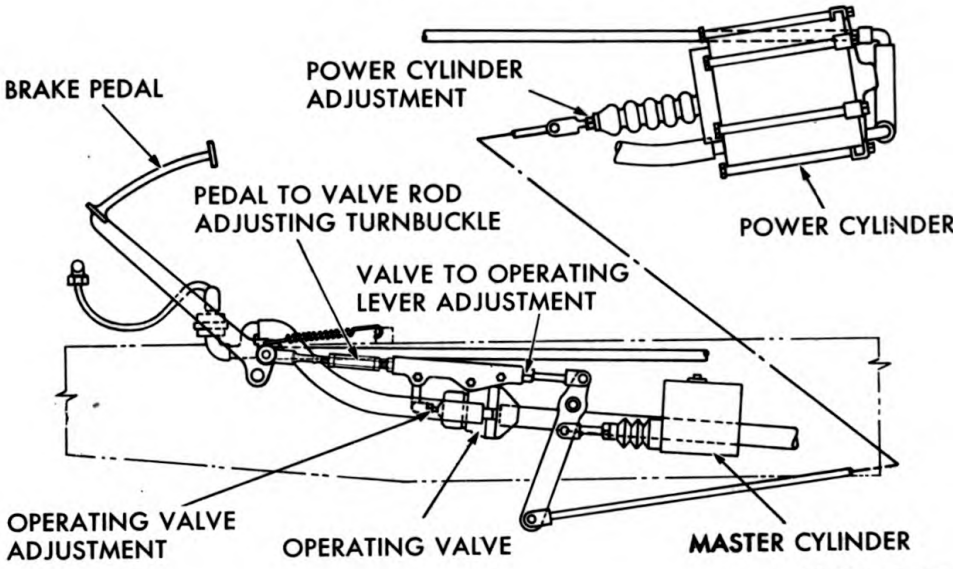


Figure 148—Pedal, Master Cylinder, Power Cylinder, and Connecting Linkage

with no evidence of lining drag. A tension spring holds each eccentric pin in position. Repeat the procedure with each take-up eccentric pin on all brake backing plates, and lower the wheels.

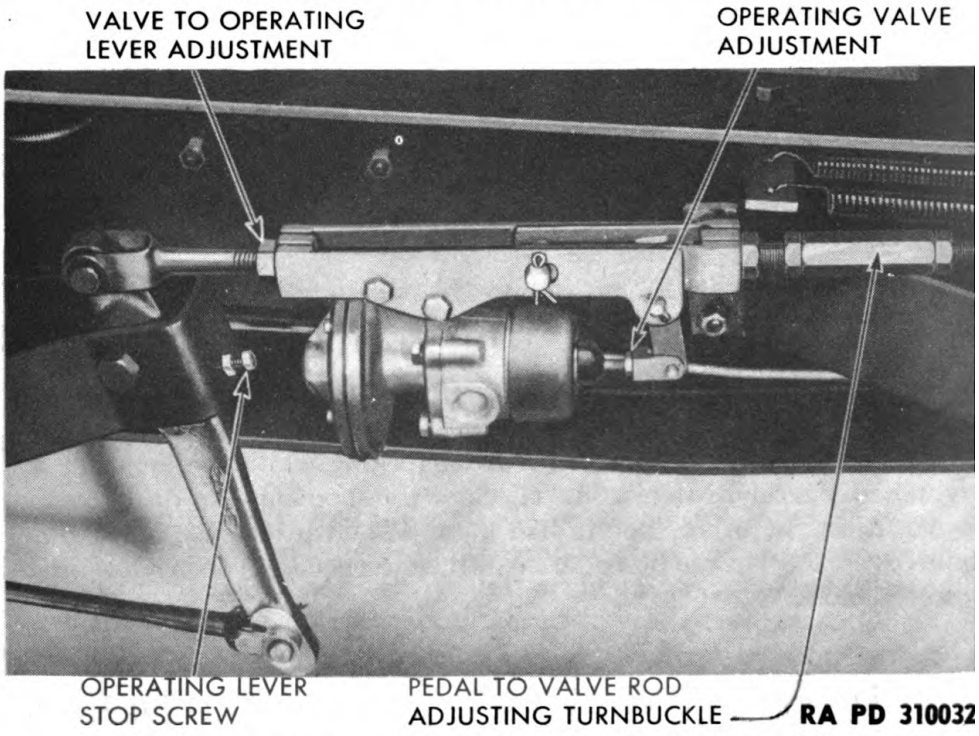
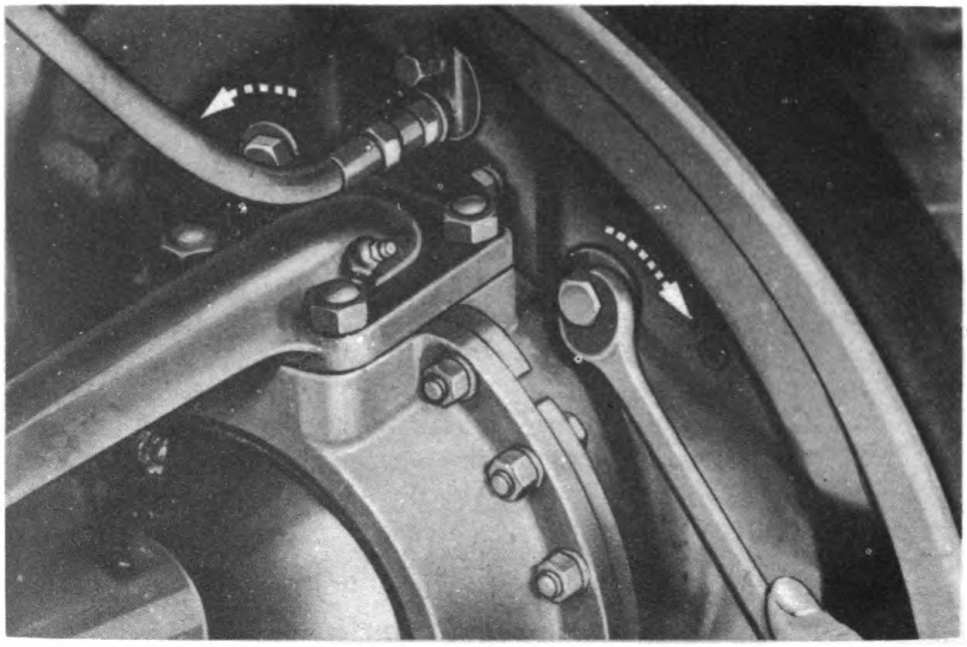


Figure 149—Pedal Linkage and Operating Valve

2½-TON 6x6 TRUCK AND 2½- TO 5-TON 6x4 TRUCK (STUDEBAKER MODELS US 6 AND US 6x4)

(4) BRAKE SHOE MAJOR ADJUSTMENTS. Major adjustments are ordinarily necessary only after relining brake shoes and reconditioning drums; if the eccentric anchor pins have been tampered with or loosened; or in rare instances where minor adjustments do not give satisfactory results. Raise front axle so wheels are off the floor. Check adjustment of wheel bearings, and adjust if necessary (par. 136). Remove inspection hole cover from brake drum, and loosen anchor pin lock nuts (fig. 151). Adjust one shoe at a time by turning the anchor



RA PD 64540

Figure 150—Making Minor Brake Shoe Adjustment (Front 6x6 Shown)

pin, and take-up eccentric pin in direction indicated by arrows in figure 152. While adjusting the shoe toward and away from the drum, check lining-to-drum clearance with feelers inserted through inspection hole about 1½ inch from end of lining (fig. 153). When a clearance of 0.005 inch is obtained at lower end or heel, and 0.010 inch at upper end or toe, hold the anchor pin to prevent it from turning while the lock nut is tightened securely. Make a final check on the shoe lining-to-drum clearance, adjust the other shoe in like manner, and install the inspection hole cover. Repeat the procedure to adjust the shoes on each wheel and lower vehicle.

127. HAND BRAKE AND LINKAGE (fig. 154).

a. Brake Band Removal. Disconnect hand brake pull rod from cam by removing cotter pin and clevis pin. Unhook spring from spacer

link extension, and remove cotter pin and clevis pin that fasten the spacer links to brake band support. Remove brake band adjusting screw with nuts and adjusting link nuts. Remove the adjusting link with cams and spacer links attached, springs, and cam shoe. Cut the

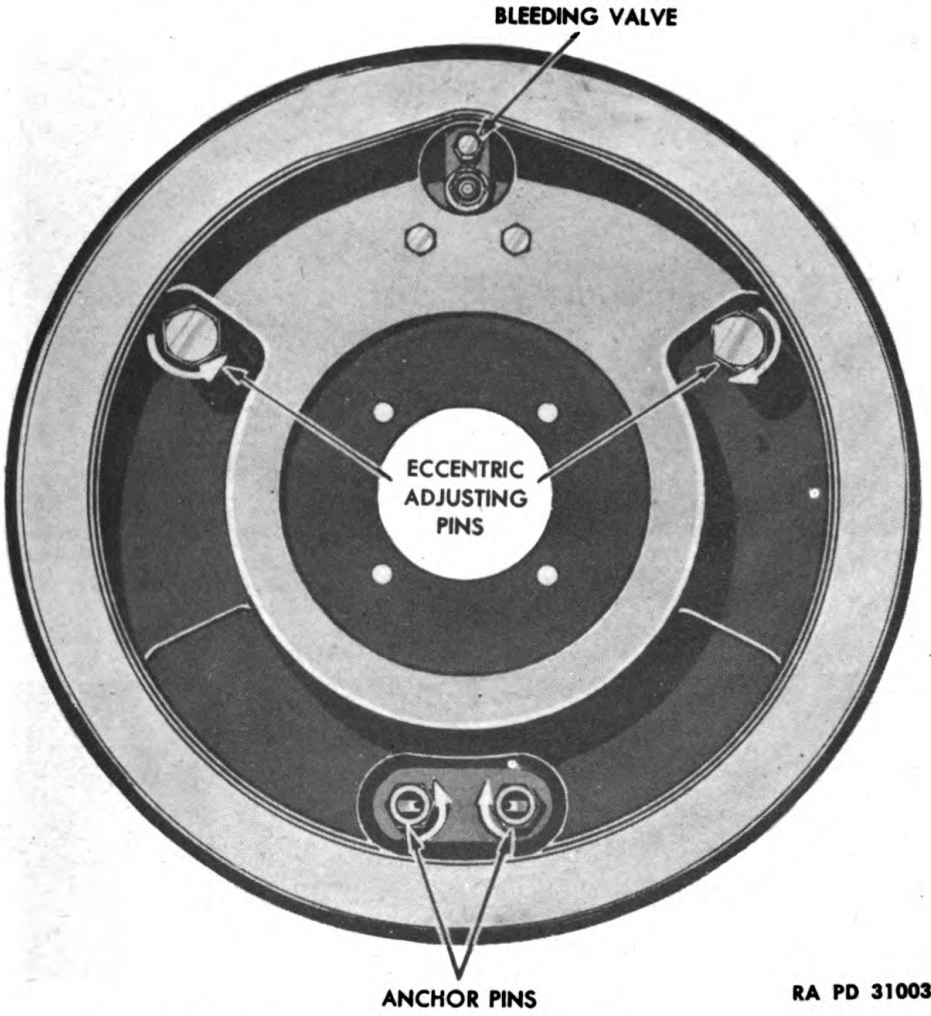


Figure 151—Backing Plate, Showing Location of Adjusting Cams, Anchor Pins, and Bleeding Valve

anchor screw lock wire, take out anchor screw, and remove brake band from drum (fig. 155).

b. Brake Band Installation. Slide brake band into position on drum so anchor bracket is over brake band support with anchor screw spring in recess on support, and install anchor screw. Place the cam shoe in position on upper bracket attached to brake band, and the release springs between band brackets and support. Insert the adjusting link (with cams and spacer links attached) through cam shoe, band upper bracket, upper release spring, support, lower release spring, and

2½-TON 6x6 TRUCK AND 2½- TO 5-TON 6x4 TRUCK (STUDEBAKER MODELS US 6 AND US 6x4)

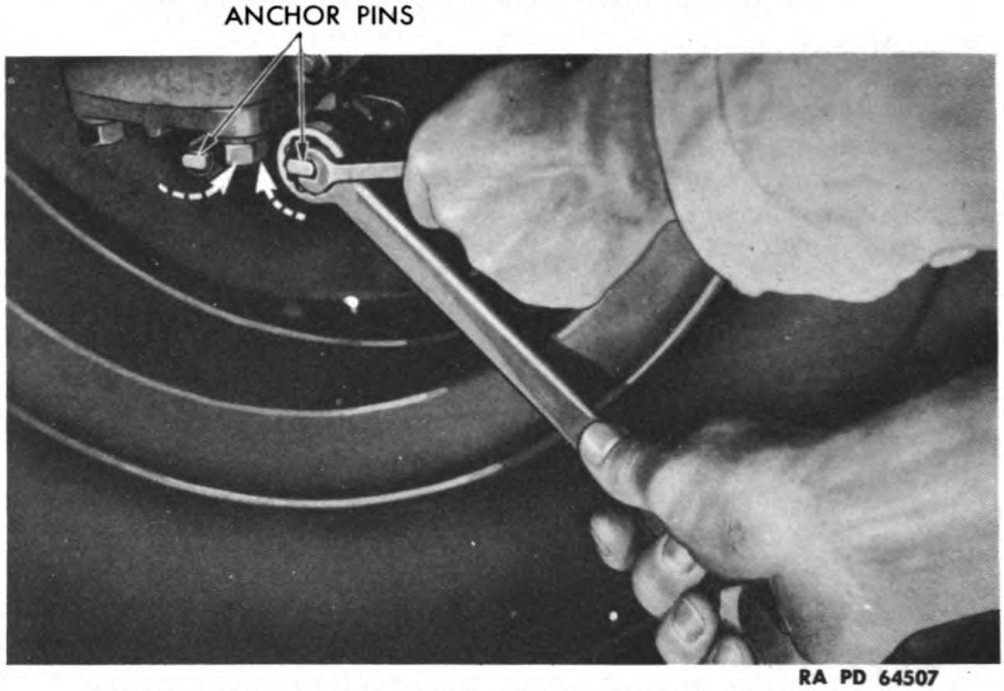


Figure 152—Making Major Brake Shoe Adjustment

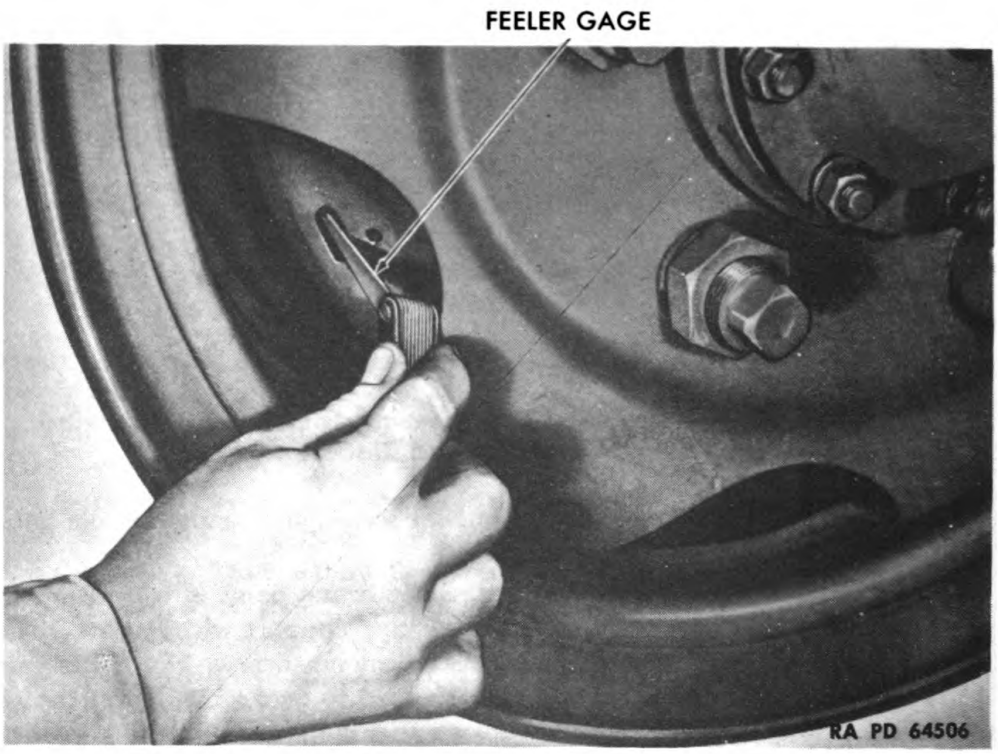


Figure 153—Checking Lining to Drum Clearance (Front 6 x 6 Shown)

band lower bracket. Install compression spring, plain washer, and nut on adjusting link. Insert the band adjusting screw through band lower bracket, and band support, and install nut and lock nut. Fasten the spacer links to band support with a clevis pin and new cotter pin. Hook spring to spacer link extension, and adjust hand brake (par. 126 **b** (1)).

c. Brake Drum Removal. Loosen the adjusting screw, adjusting link nuts, and anchor screw to provide additional clearance between lining and drum. Disconnect the transfer case to pillow block propeller shaft from flange on transfer case main shaft (par. 104). On vehicles

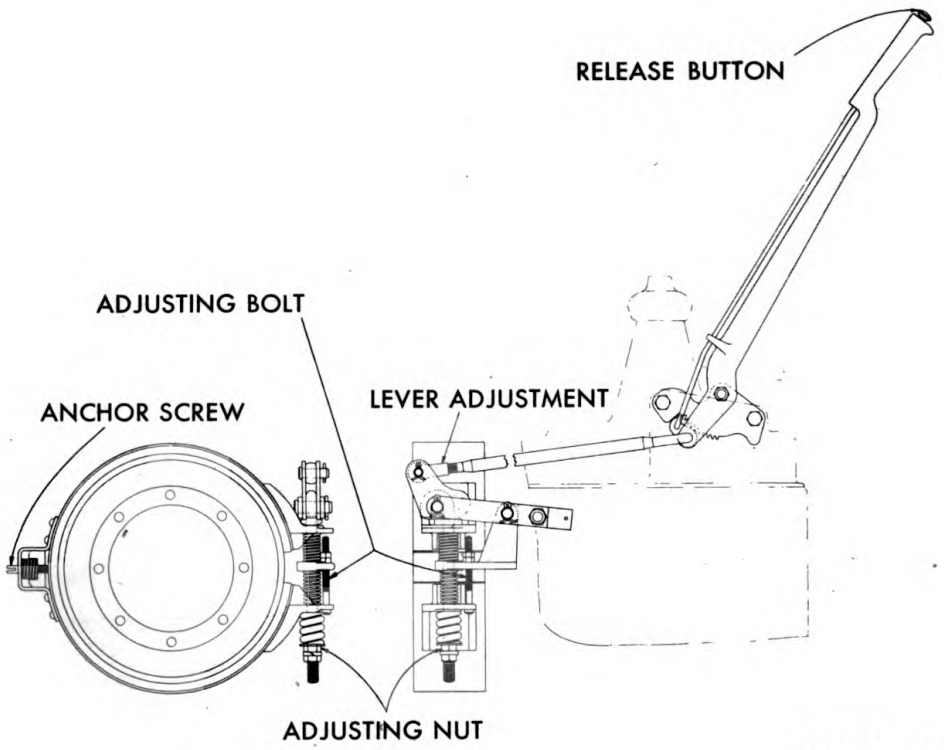


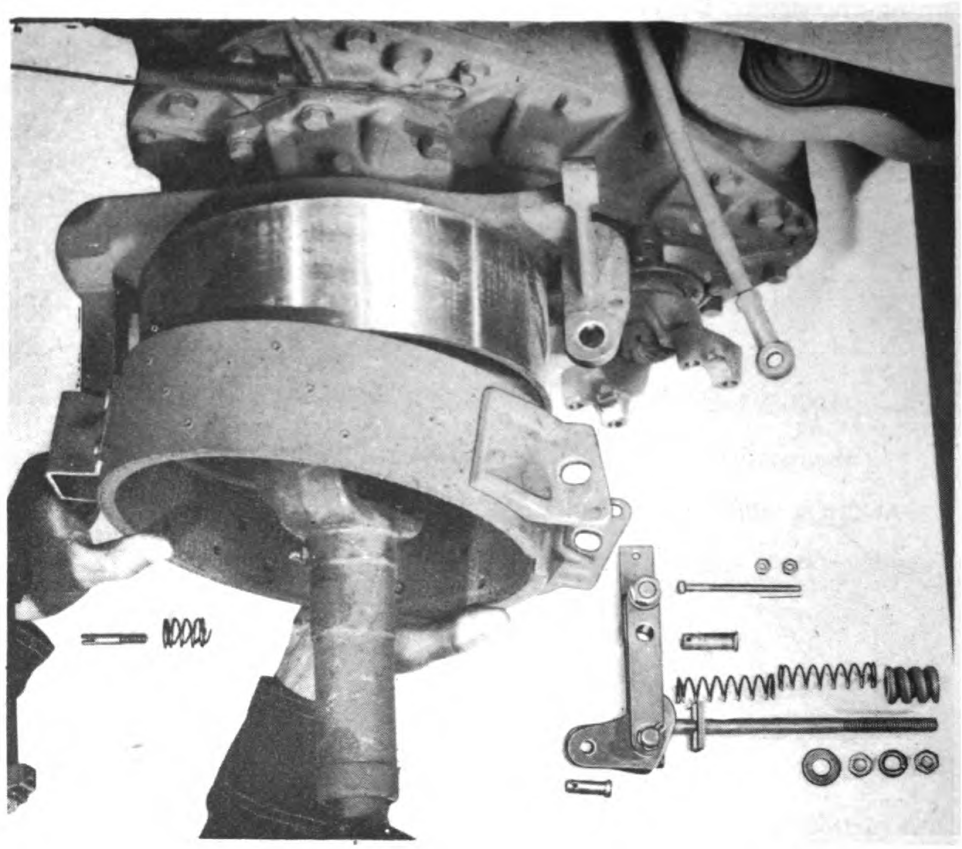
Figure 154—Hand Brake, Lever, and Controls

equipped with Spicer propeller shafts, it is only necessary to remove the drum from flange (fig. 156). On vehicles equipped with Cleveland propeller shafts, remove the cotter pin and castle nut from transfer case main shaft. Pull the flange and drum off the main shaft, remove drum to flange bolts and nuts, and remove the drum from flange.

d. Brake Drum Installation. On vehicles equipped with Cleveland propeller shafts, fasten the drum securely to forward side of flange with bolts and nuts. Slide flange and drum into position on transfer case main shaft, tighten securely with castle nut, and install a new cotter pin. On vehicles equipped with Spicer propeller shafts, place the drum in

position on bolts extending through flange on transfer case main shaft. Connect the transfer case to pillow block propeller shaft to the flange on transfer case main shaft (par. 105). Adjust the hand brake band to proper clearance (par. 126 **b** (1)).

e. Removal of Hand Brake Control and Linkage. Remove the transmission cover plate from floor of cab (par. 102 **c** (1)). Unhook

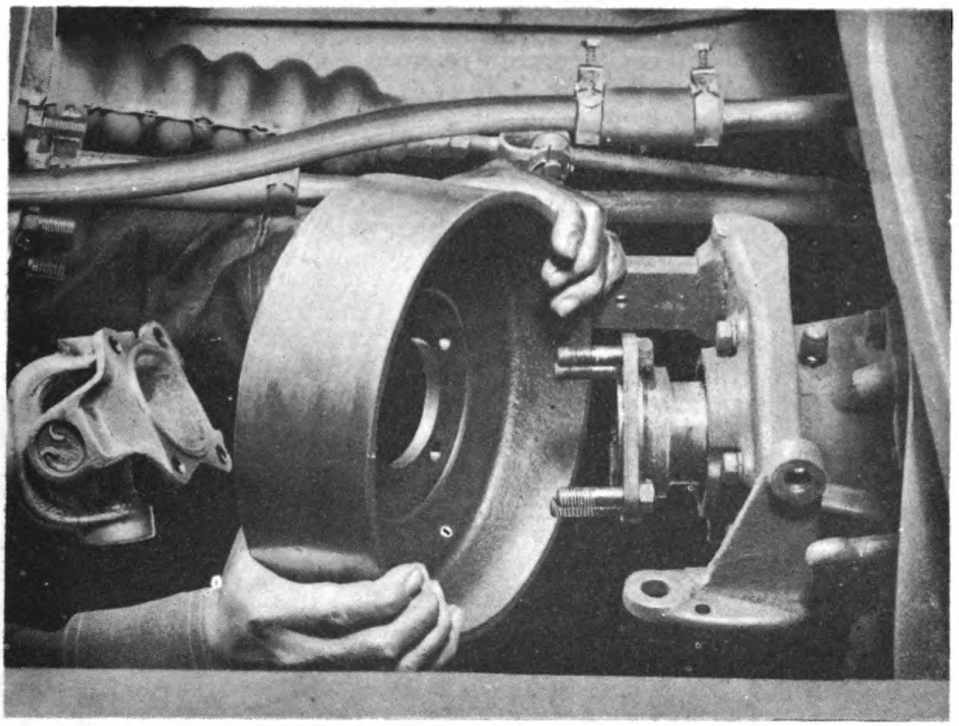


RA PD 310130

Figure 155—Removing Hand Brake Band

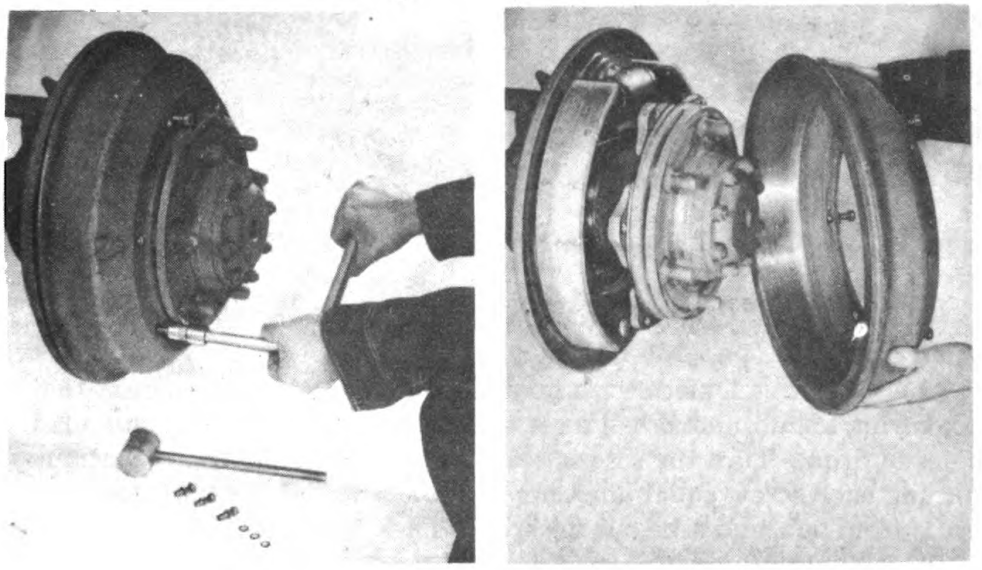
springs from brake pull rod, and remove cotter pin from front end of pull rod. Take out cap screws that fasten the band brake lever sector to transmission, move lever to the right, disengage pull rod from lower end of lever, and remove the lever assembly. Remove the cotter pin and clevis pin that attach the pull rod to hand brake cam, and remove the pull rod.

f. Installation of Hand Brake Control and Linkage. Place pull rod in position and install clevis pin through clevis and brake cam so that rod will not fall. Hold lower end of hand brake lever through floor of cab, insert front end of pull rod into hole in lower end of lever, and



RA PD 310131

Figure 156—Removing Hand Brake Drum



RA PD 310147

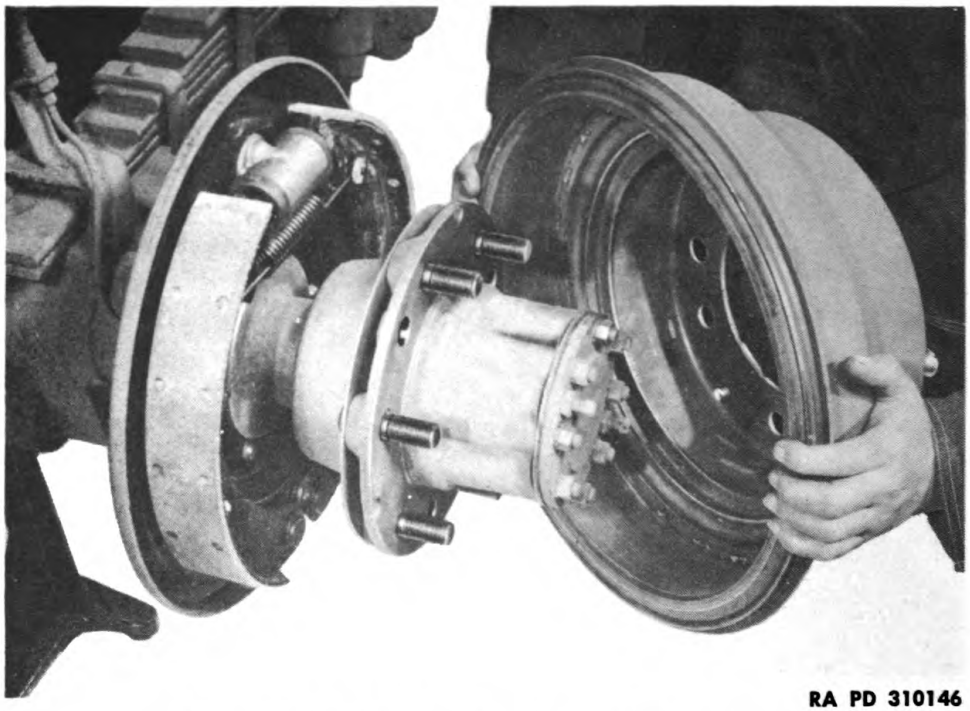
Figure 157— Removing Front Brake Drum

through hole in pawl. Install the cap screws through holes in sector, securely fasten the lever assembly to transmission, and install a new cotter pin through hole in front end of rod. Adjust pull rod length (par. 126 b), hook springs to pull rod, and install transmission cover plate (par. 102 d (4)).

128. SERVICE BRAKES AND LINKAGE.

a. Brake Shoe Removal.

(1) REMOVE WHEEL. Raise axle until the wheels are off the floor, and remove the wheel or wheels (par. 135).



RA PD 310146

Figure 158—Removing Rear Brake Drum

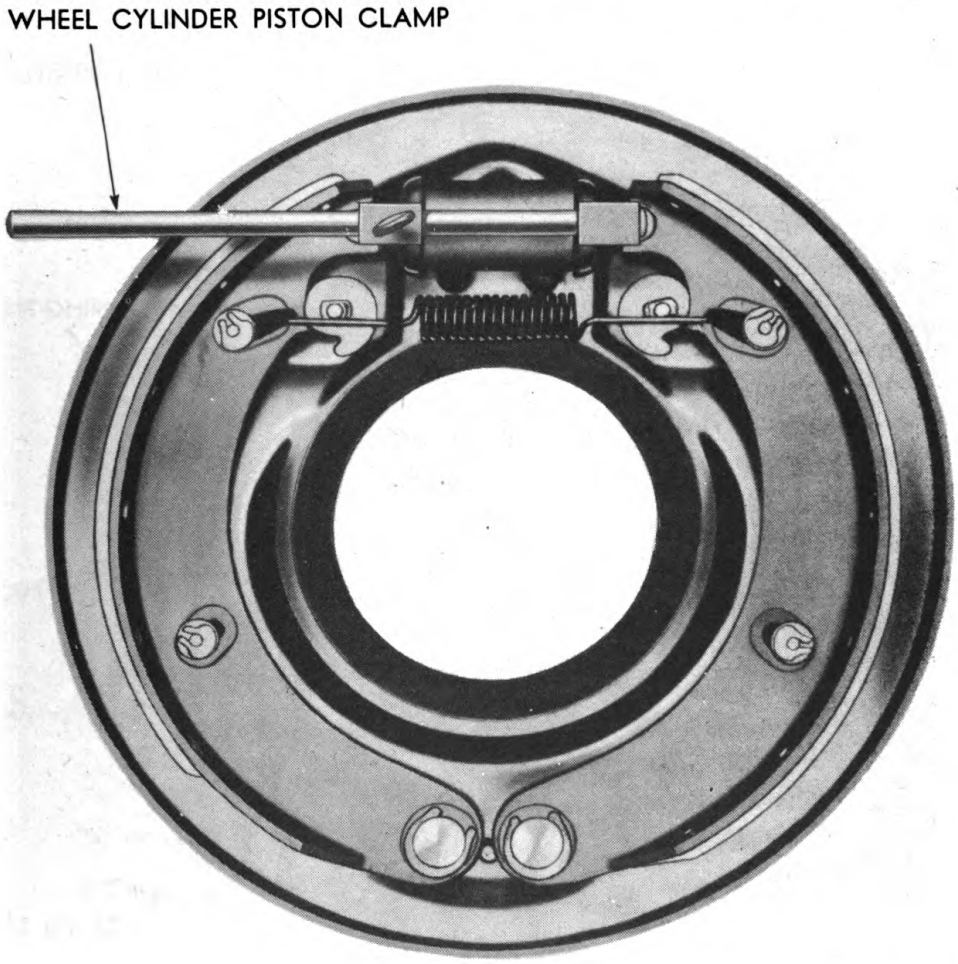
(2) REMOVE CONVENTIONAL-TYPE DRUM. Remove the hub and drum assembly (par. 136 b).

(3) REMOVE DEMOUNTABLE-TYPE DRUM. Remove the screws that hold drum to hub, and install three of the screws removed into threaded holes in drum. Turn the screws clockwise until they bottom; continue turning each screw equal amounts to start drum off the hub. Remove drum from hub, and take out the screws (figs. 157-158).

(4) DISCONNECT BRAKE SHOES. Place a wheel cylinder piston clamp in position on pistons (fig. 159). Mark shoes so they can be reinstalled in their original position, and note location of punch marks on heads of anchor pins. Remove C-washers from guide pins and anchor

pins, and unhook the return spring from shoes with brake spring pliers (fig. 160).

(5) REMOVE BRAKE SHOES. Pull upper end of shoes away from cylinder links, and remove lower end of shoes from anchor pins.



RA PD 310034

Figure 159—Wheel Cylinder Piston Clamp Installed

b. Brake Shoe Installation.

(1) INSTALL BRAKE SHOES. Lubricate eccentric on anchor pins, and place shoes in position on anchor pins and guide pins in backing plate. Engage notches in upper end of shoes with cylinder links. Hook the return spring to shoes with brake spring pliers, and install new C-washers on guide pins. Place a spacer washer, felt washer, washer retainer, and C-washer on each anchor pin.

(2) POSITION BRAKE SHOES. Remove wheel cylinder piston clamp, and make sure that clearance between shoes and backing plate

is uniform. If the shoes are replacements, turn the take-up eccentric pins and anchor pins to move the shoes inward to provide clearance for the drum (fig. 161).

(3) INSTALL DEMOUNTABLE-TYPE DRUM. Place drum in position on hub, install drum to hub screws, and tighten securely.

(4) INSTALL CONVENTIONAL-TYPE DRUM. Install hub and drum assembly (par. 137-138).

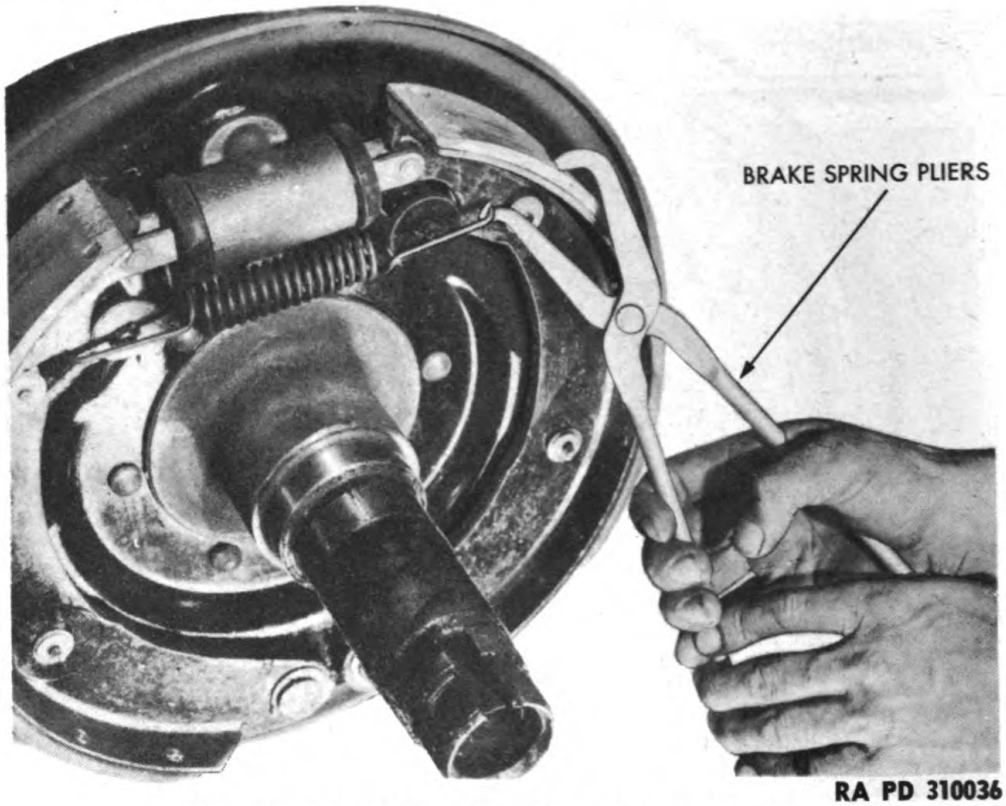


Figure 160—Removing Shoe Return Spring

(5) INSTALL WHEEL. Install the wheel or wheels (par. 135).

(6) ADJUST BRAKE SHOES AND PEDAL LINKAGE. Perform a major adjustment on brake shoes installed (par. 126). Adjust pedal linkage (par. 126 **b** (2)).

c. Removal of Brake Controls and Linkage. Disconnect and remove brake pedal (par. 65 **b**). Take out the cotter pins and clevis pins to disconnect the operating valve rod, power booster operating rod, and master cylinder piston rod from operating lever. Remove cotter pin and clevis pin to disconnect power booster operating rod from power booster piston rod. Remove cotter pin, castle nut, operating lever pivot bolt, and remove operating lever. Loosen hose clamps, pull hose from operating valve fittings, and remove operating valve from vehicle.

d. Installation of Brake Controls and Linkage. Place the operating valve in position, connect hose to fittings on valve, and tighten hose clamps securely. Hold the operating lever in position, install the pivot bolt, castle nut, and a new cotter pin. Install the power booster operating rod, connect rear end of rod to booster piston rod with clevis

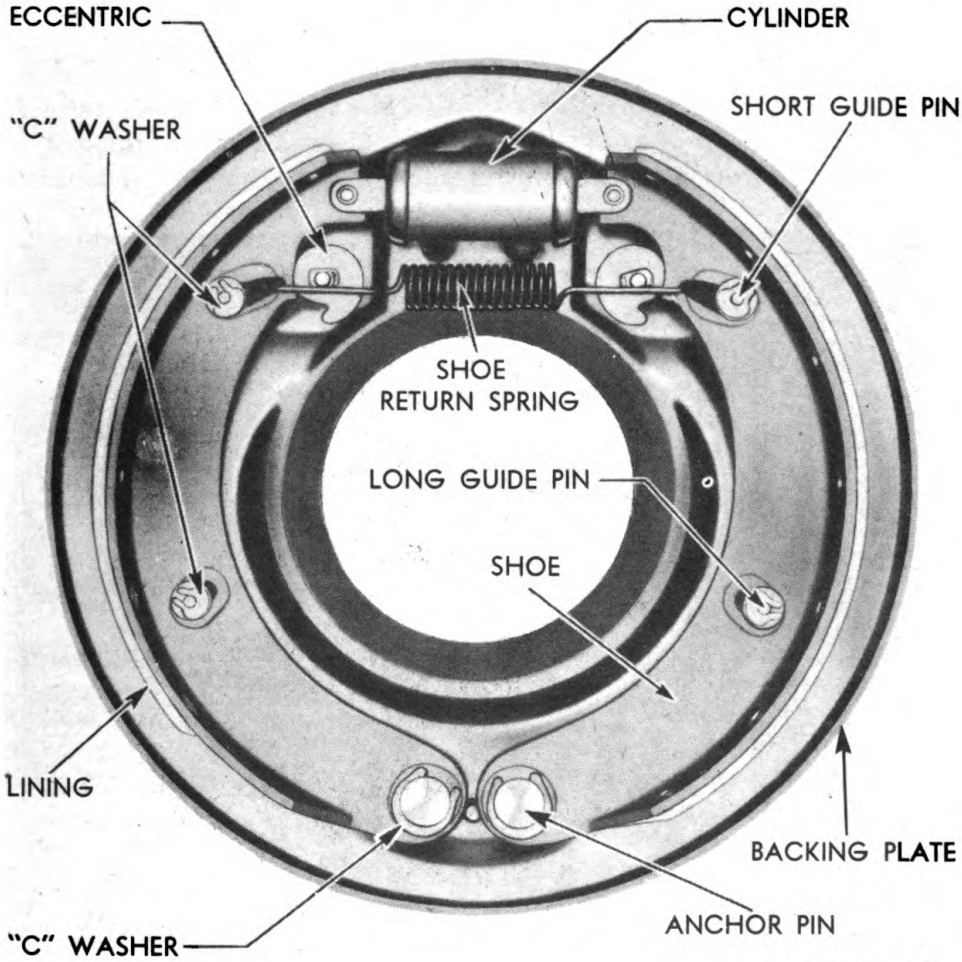


Figure 161—Backing Plate and Shoes Assembly

pin, and a new cotter pin. Connect the master cylinder piston rod to operating lever with a clevis pin and new cotter pin. Install and connect the brake pedal (par. 65). Adjust the pedal and linkage (par. 126 **b** (2)).

129. MASTER CYLINDER.

a. Removal. Disconnect hydraulic lines from fittings on master cylinder and wires from stop light switch. Remove the cotter pin and clevis pin that attaches master cylinder piston rod to the operating

lever. Take out the cotter pins and clevis pins from both ends of power booster operating rod, and remove rod. Remove the master cylinder assembly by taking out the screws that fasten master cylinder in support bracket, and pull the assembly downward (fig. 162).

b. Installation. Place the master cylinder in position; aline holes in bracket with holes in cylinder; install the screws, washers, and spacers. Install the spacers between cylinder and support bracket at the upper hole. Tighten the screws securely, and connect master cylinder piston rod to operating lever with clevis pin and a new cotter pin. Connect hydraulic lines to fittings on master cylinder and wires to

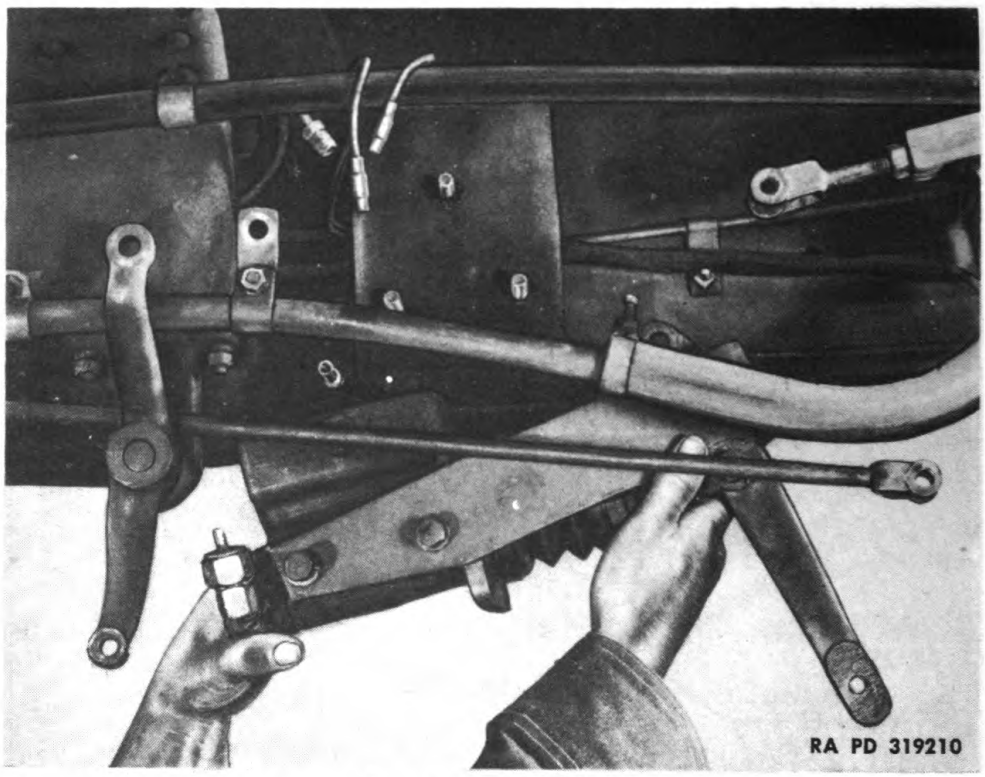


Figure 162—Removing Brake Master Cylinder Assembly

stop light switch. Place the power booster operating rod in position, and connect rear end of rod to power booster piston rod with clevis pin and a new cotter pin. Adjust pedal and linkage (par. 126 b (2)), and bleed hydraulic system (par. 126). Keep the master cylinder reservoir at least half full at all times.

130. WHEEL CYLINDER.

a. Removal. Raise the axle until wheels are clear of floor, and remove the wheel or wheels from hub. Remove demountable type drum

(par. 128 a (3)), or conventional-type drum with hub (par. 136). Install a wheel cylinder piston clamp in position on pistons, unhook brake shoe return spring, and disconnect the hydraulic line from wheel cylinder inlet fitting. Take out the screws that fasten cylinder to brake backing plate, pull upper end of shoes away from cylinder links, and remove cylinder from backing plate (fig. 163).

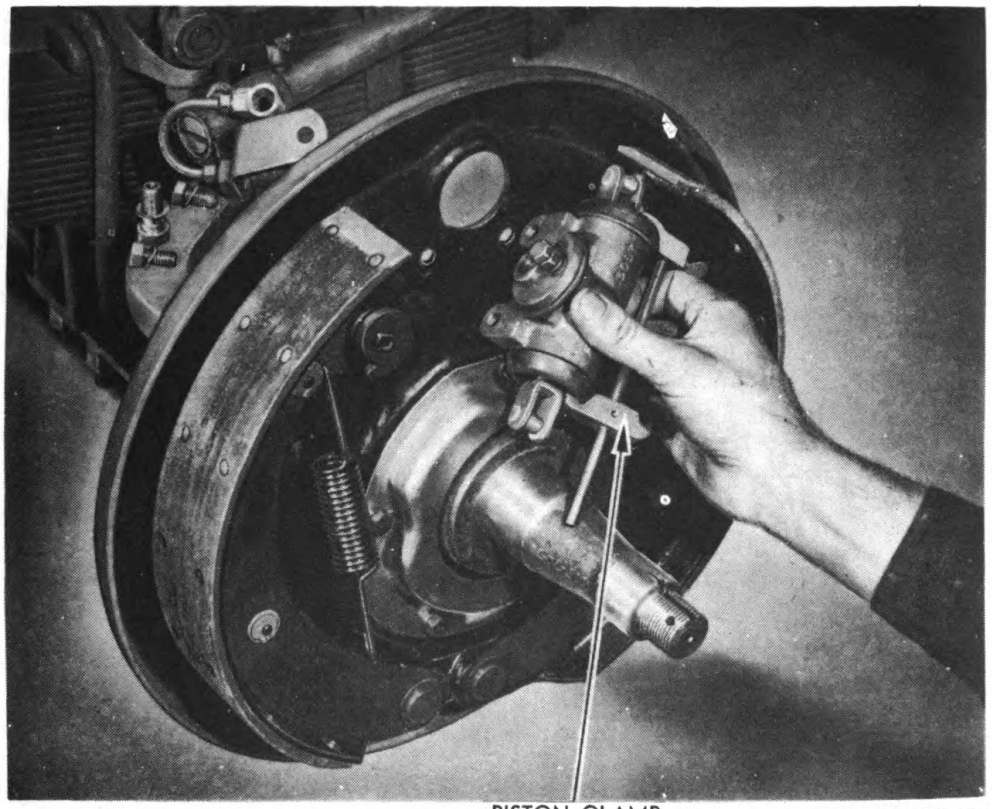


Figure 163—Removing Wheel Cylinder Assembly

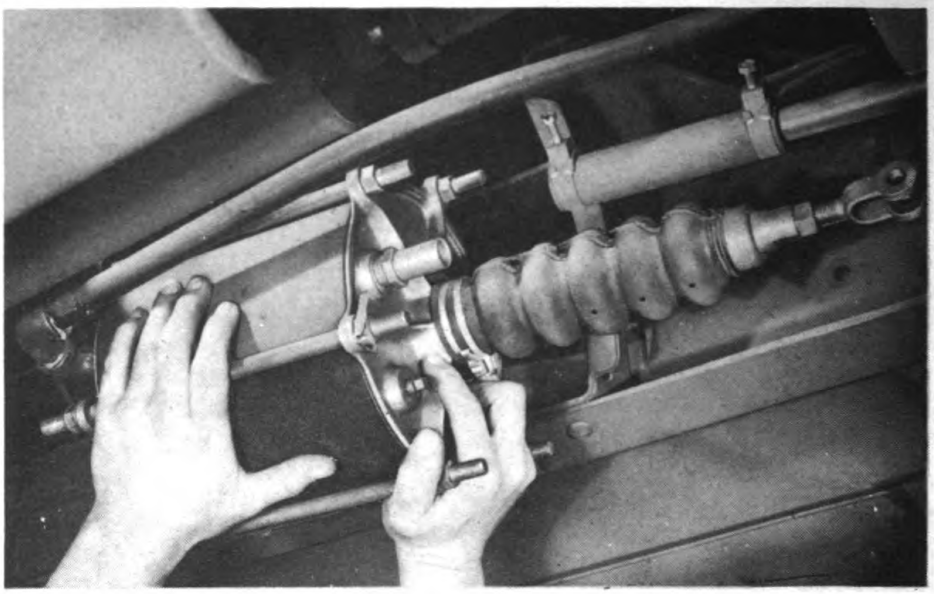
b. Installation. Place wheel cylinder in position on backing plate, install the screws, and tighten securely. Engage notches in upper end of shoes with cylinder links, and hook the shoe return spring to both shoes. Remove the wheel cylinder piston clamp, and connect the hydraulic line to inlet fitting on cylinder. Install demountable-type drum (par. 128 b (3)), or conventional type drum with hub (pars. 136 and 137). Perform brake shoe minor adjustment (par. 126 (3)) on shoes involved, and bleed hydraulic system (par. 126). Install the wheel or wheels on hub, and lower wheels to floor.

131. POWER BOOSTER AND VALVES.

a. Power Booster Removal. Remove the cotter pin and clevis pin to disconnect booster operating rod from booster piston rod. Loosen

hose clamp screws, and remove nuts holding power booster to support bracket. Move booster rearward, and disengage hose from pipe and fitting to remove booster unit from vehicle (fig. 164).

b. Power Booster Installation. Place power booster in position on support bracket, and slip hose over pipe and fitting on booster. Install nuts on booster studs, and tighten securely to bracket. Tighten hose clamp screws securely, connect booster operating rod to booster piston rod with clevis pin, and install a new cotter pin. Adjust pedal and linkage (par. 126).



RA PD 310129

Figure 164—Removing Brake Power Cylinder Assembly

c. Power Booster Check Valve Removal. Remove transmission cover plate from floor of cab (par. 102 c (1)). Disconnect the check valve to intake manifold pipe nut from check valve, and loosen the nut at fitting in manifold. Remove the cap screw that holds the check valve clamp to clutch housing, and slide the clamp downward off the check valve. Unscrew the check valve from lower elbow, and remove from vehicle. If the check valve is to be replaced, remove the upper elbow and nipple from original check valve, and install in replacement valve.

d. Power Booster Check Valve Installation. Apply white lead to threads in check valve, install on lower elbow, and tighten so that nipple in upper elbow is alined with pipe from intake manifold. Start nut on pipe into nipple to preserve alinement, and slip the clamp up over lower portion of check valve. Insert cap screw through clamp and spacer, and tighten securely to clutch housing. Tighten the check valve to intake manifold pipe nuts securely.

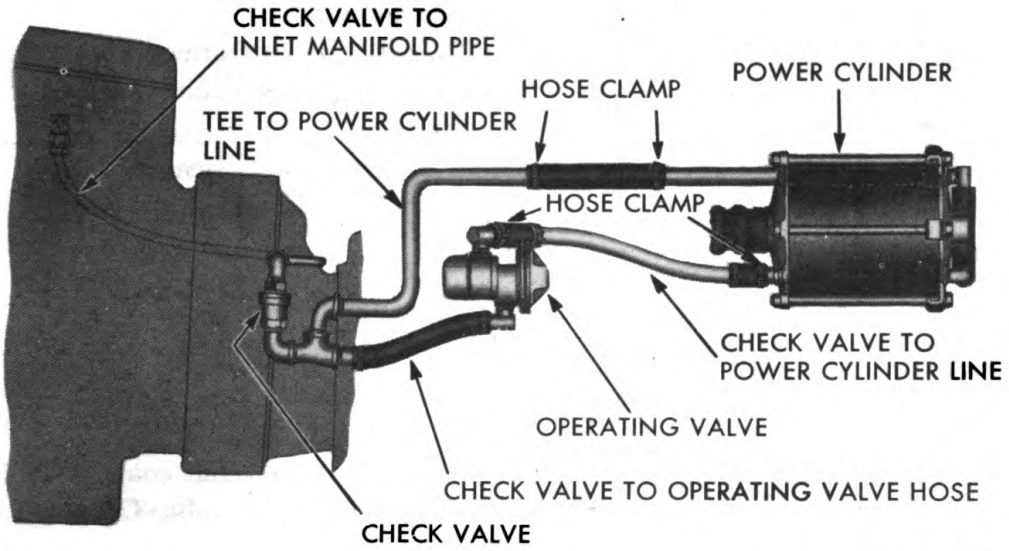


Figure 165—Units and Lines of the Brake Vacuum System (6 x 6 and 6 x 4 Cargo and Dump Truck Models)

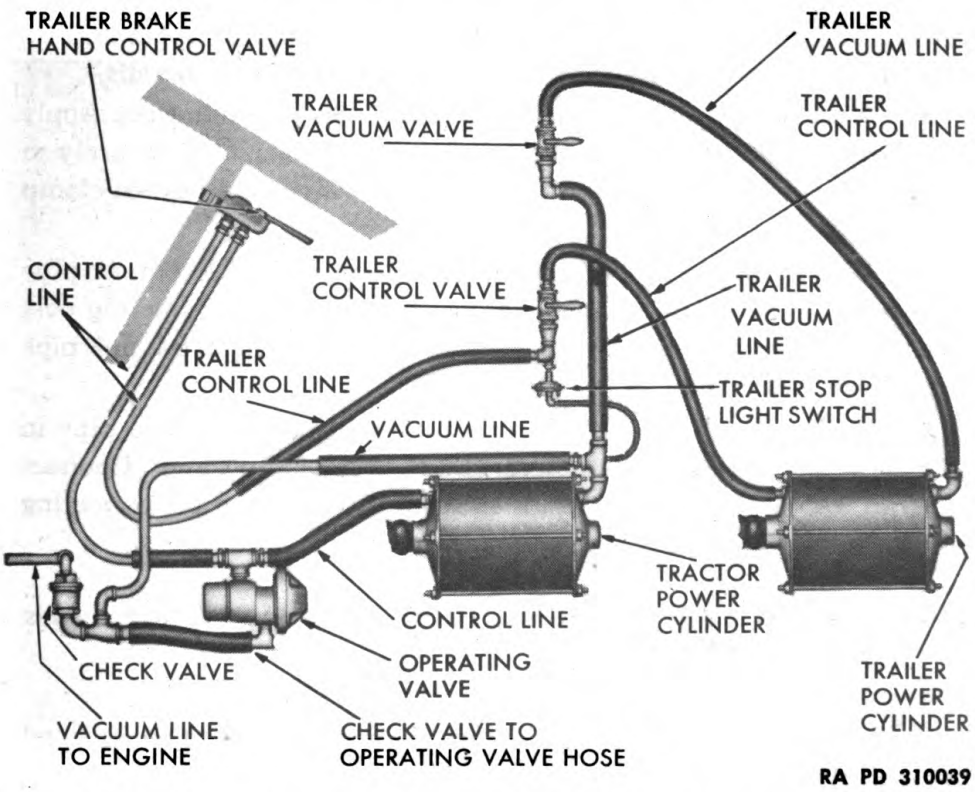


Figure 166—Units and Lines of the Brake Vacuum System on US 6 x 4 Tractor Truck

e. Power Booster Operating Valve Removal. Disconnect and remove the booster operating valve (par. 128 c). If the operating valve is to be replaced, remove the rods and turnbuckle from original valve, and install them on replacement valve.

f. Power Booster Operating Valve Installation. Install the booster operating valve (par. 128 d), and adjust pedal and linkage (par. 126).

132. TRACTOR TRUCK TRAILER BRAKE VALVES.

a. Brake Hand Control Valve Removal. Disconnect pipes from hand control valve, take out clamp bolts holding valve to steering post jacket, and remove valve.

b. Brake Hand Control Valve Installation. Place hand control valve in position on steering post jacket, install clamp, and bolts. Connect the control pipe nuts to fittings in valve, and tighten securely. Tighten the clamp bolts securely.

c. Brake Vacuum or Control Shut-off Valve Removal. Loosen the hose clamp screw, and remove hose from nipple in shut-off valve. Unscrew the valve from reducer on mounting bracket. If the shut-off valve is to be replaced, remove the nipple from original valve and install in replacement valve after applying white lead on threads.

d. Brake Vacuum or Control Shut-off Valve Installation. Apply white lead to threads on reducer, install valve, and tighten securely to reducer. Install the hose on nipple in shut-off valve, and tighten clamp screw securely.

e. Brake Hand Control Valve Pipe Removal. Disconnect pipe from control valve, and remove clamps that hold pipe to steering post jacket and frame left-side member. Loosen hose clamp screw, pull pipe out of hose, and remove pipe.

f. Brake Hand Control Valve Pipe Installation. Place pipe in position, insert lower end into hose, and tighten clamp screw. Connect pipe nut to control valve, and tighten securely. Fasten pipe to steering post jacket and frame left-side member with clamps.

133. BRAKE SYSTEM HOSE, PIPES, AND FITTINGS. (figs. 165 and 166)

a. Hydraulic System.

(1) HOSE REPLACEMENT. Remove the flexible hose to be replaced by unscrewing the connections from fittings. Install the replacement hose, tighten securely to fittings, and bleed hydraulic system (par. 126 a).

BRAKE SYSTEM

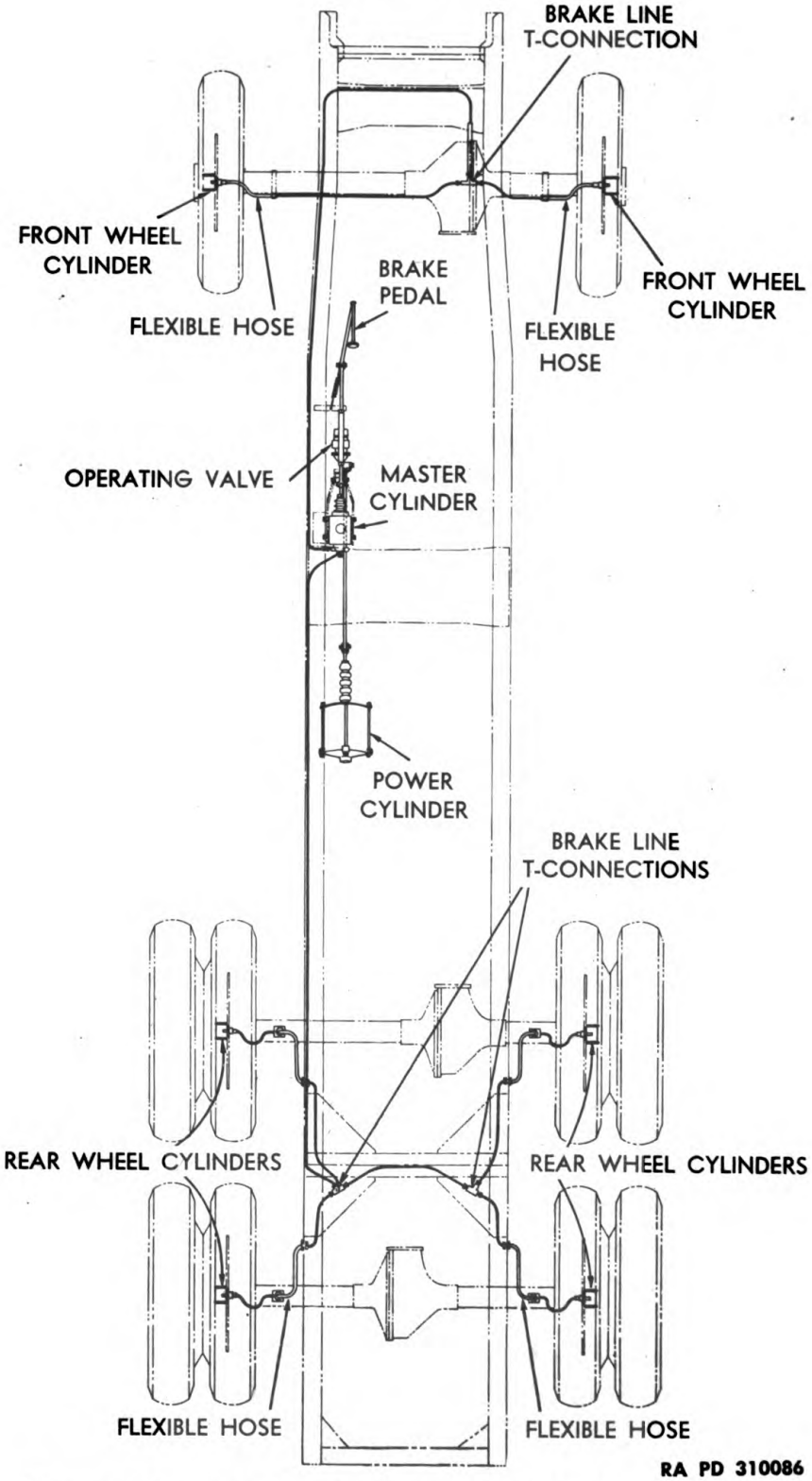


Figure 167—Arrangement of the Brake System (6 x 6)

2½-TON 6x6 TRUCK AND 2½- TO 5-TON 6x4 TRUCK (STUDEBAKER MODELS US 6 AND US 6x4)

(2) PIPE REPLACEMENT. Disconnect the pipe to be replaced from fittings, loosen or take off any clips holding pipe in position, and remove pipe from vehicle. Install replacement pipe in position, attach clips if used to hold pipe in place, and tighten connections securely to fittings. Bleed hydraulic system (par. 126).

(3) FITTING REPLACEMENT. Disconnect the pipe or hose connections from fitting, and remove fitting from vehicle. Install replacement fitting, and tighten securely in position. Connect pipe or hose connections securely to fitting, and bleed hydraulic system (par. 126).

b. Vacuum System.

(1) HOSE REPLACEMENT. Loosen hose clamp screws, and remove hose from fittings. Remove hose clamps from original hose, and install on replacement hose. Install replacement hose on fittings, and tighten clamp screws securely.

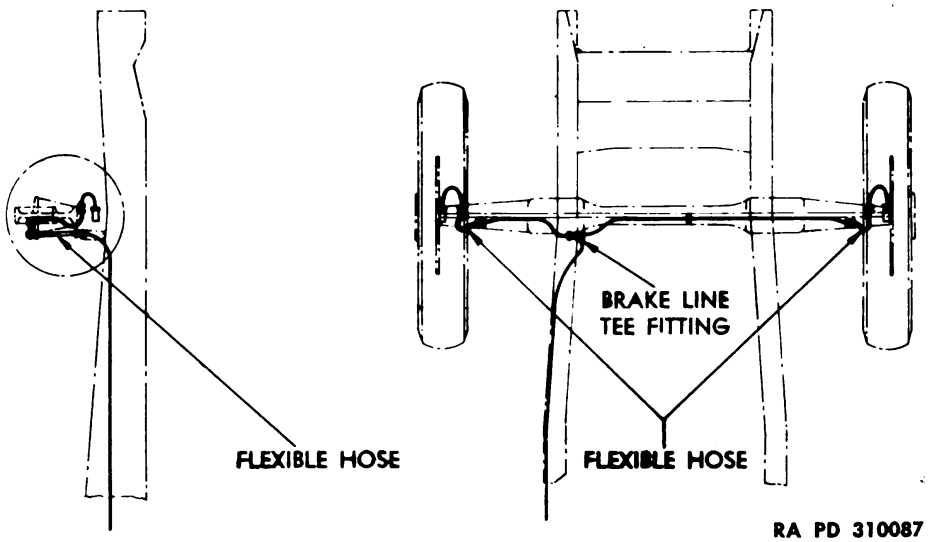


Figure 168—Arrangement of Brake Lines at the Front Axle on 6x4 Models

(2) PIPE REPLACEMENT.

(a) Disconnect intake manifold to check valve pipe nuts from fittings and remove pipe. Install the replacement pipe in position, and tighten nuts securely to fittings.

(b) Pipes with an integral connection at one end are removed by loosening hose clamp screw, pull hose off pipe, and unscrew pipe and connection from fittings. Apply white lead on threads of replacement pipe connection, install in fitting, and tighten securely. Place the hose over end of pipe, and tighten hose clamp screw.

(c) Pipes without connections are removed by loosening hose clamp screws and pulling hose off the pipe. Place replacement pipe in position, install hose on pipe ends, and tighten clamp screws.

(3) FITTING REPLACEMENT. Disconnect pipes or hose as required and remove fitting. Apply white lead to threads of replacement fitting, install fitting, and tighten securely. Connect pipes or hose that were removed and tighten.

2½-TON 6x6 TRUCK AND 2½- TO 5-TON 6x4 TRUCK (STUDEBAKER MODELS US 6 AND US 6x4)

Section XXVI

WHEELS, TIRES, HUBS, AND DRUMS

134. DESCRIPTION AND TABULATED DATA (figs. 183, 184, 187, and 188).

a. Description. The front and rear wheel hubs turn on opposed tapered roller bearings. The wheels are mounted on six studs which are installed in the hubs. At the rear, the inner and outer wheels are secured to the hub by separate nuts. The inner wheel is individually

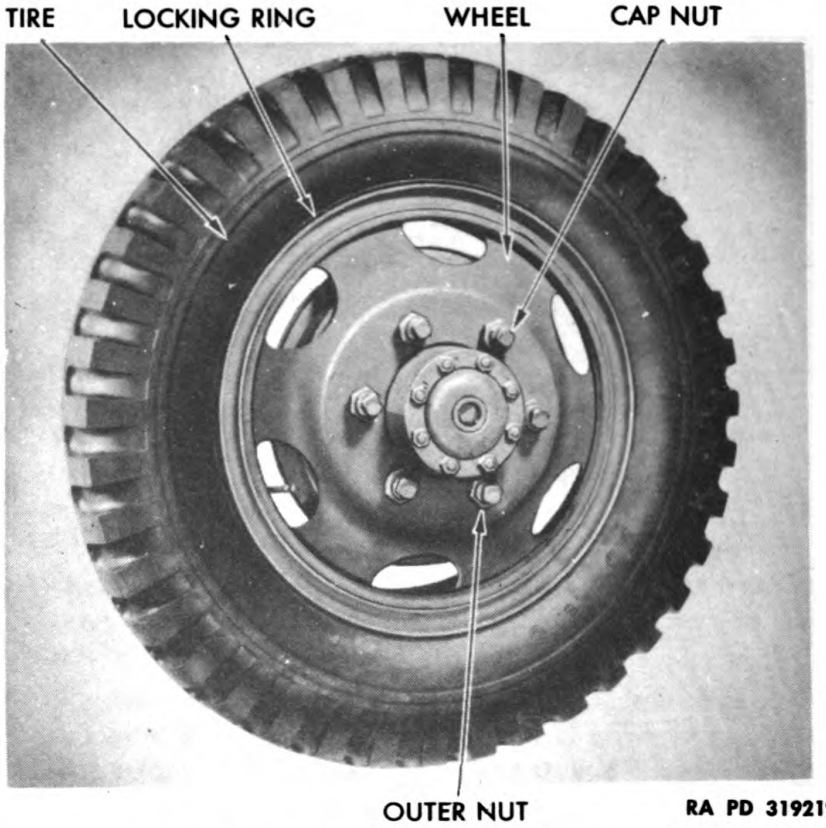
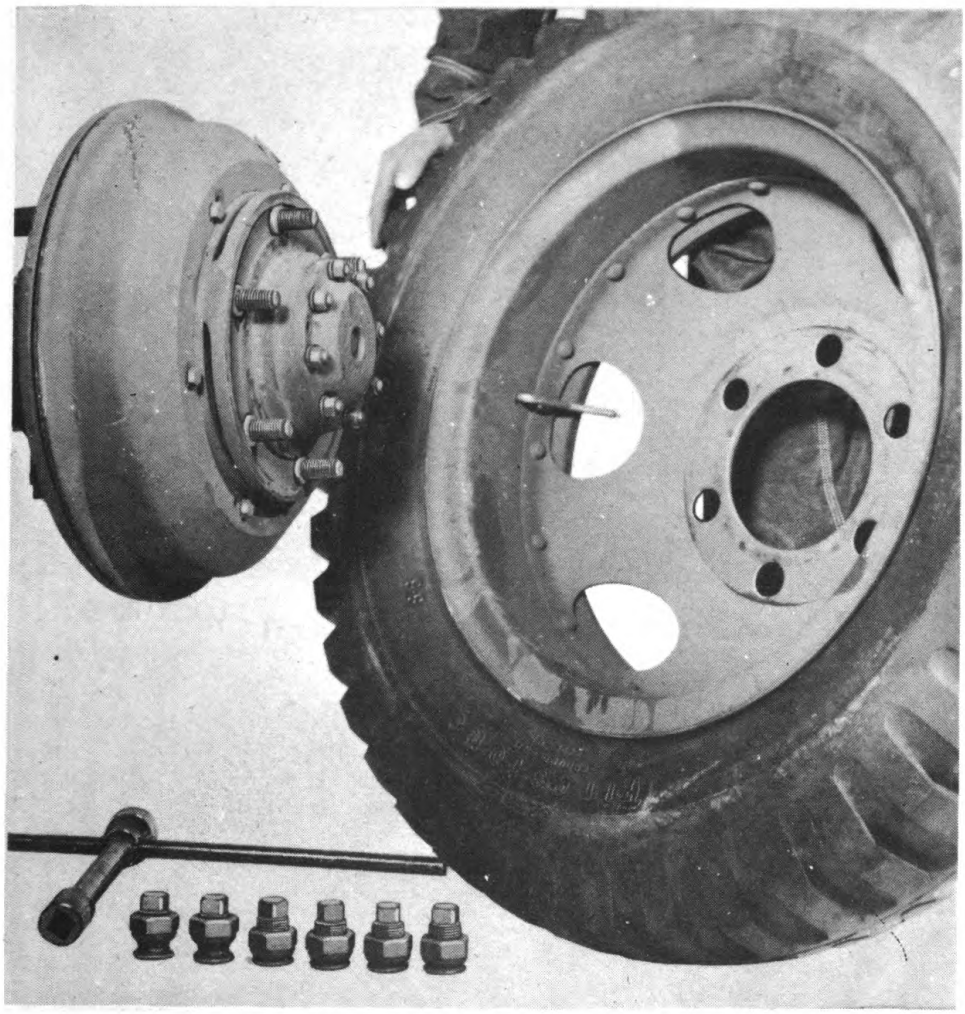


Figure 169—Front Wheel (6x6 Shown)



RA PD 310145

Figure 170—Removing Front Wheel

held to the hub with sleeve-type cap nuts. The outer wheel slips over the cap nuts, and is secured in place with outer nuts which thread onto the cap nuts. Tires are pneumatic-type and are held in place on rim with a solid clamp ring. Front and rear tires are the same size and are interchangeable.

b. Tabulated Data.

Wheels	6-stud disk
Wheel size	20 in. x 7 in.
Tire size	7.50 x 20
Minimum tire pressure	55 lb

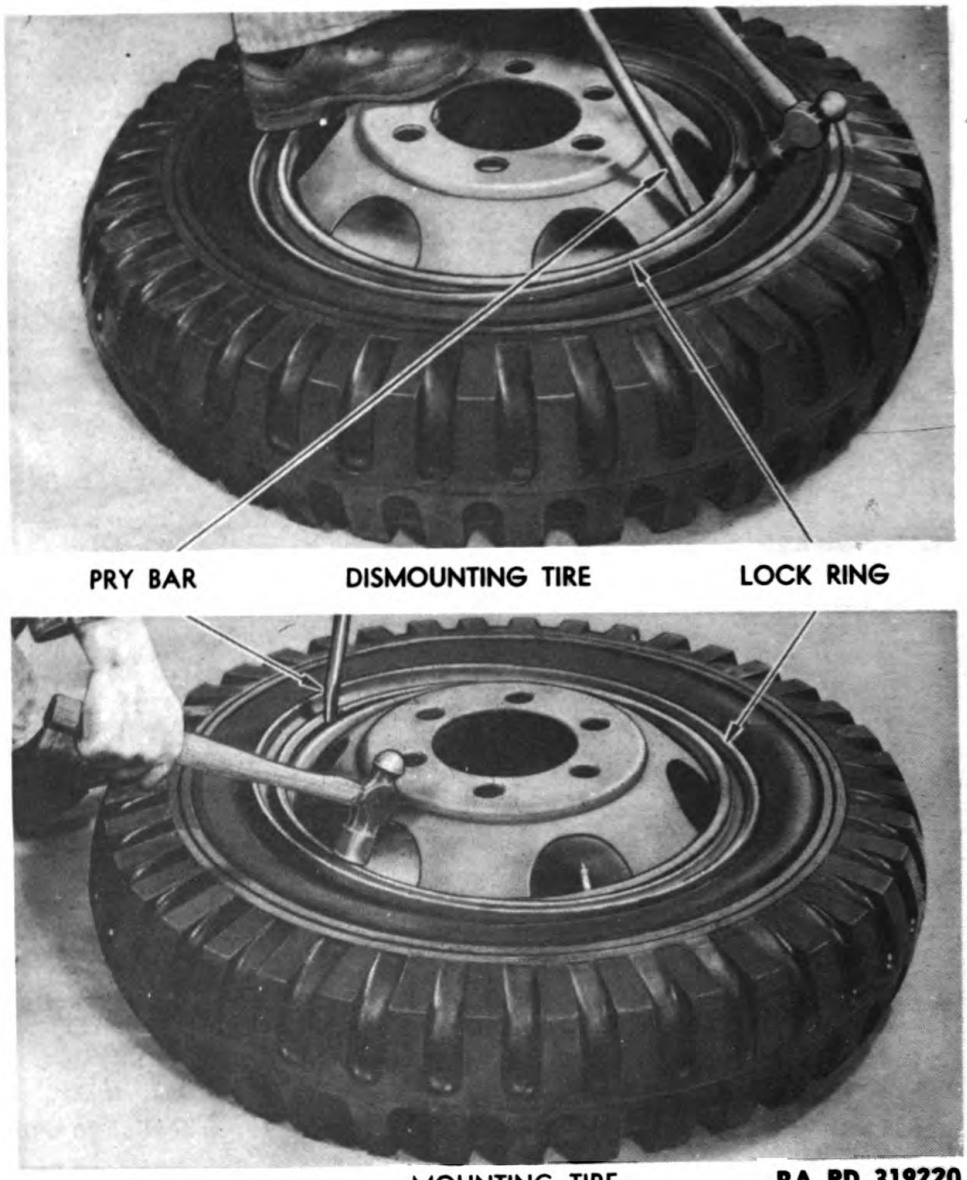


Figure 171—Removing and Installing Tire Lock Ring

135. WHEELS AND TIRES (fig. 169).

a. Removal.

(1) FRONT. Raise vehicle until tire clears the floor, and remove the square-head sleeve-type cap nuts on 6x6 vehicles, and large hexagon nuts on 6x4 vehicles, which hold the wheel to the hub. Remove wheel and tire assembly (fig. 170). Wheel nuts on right- and left-hand

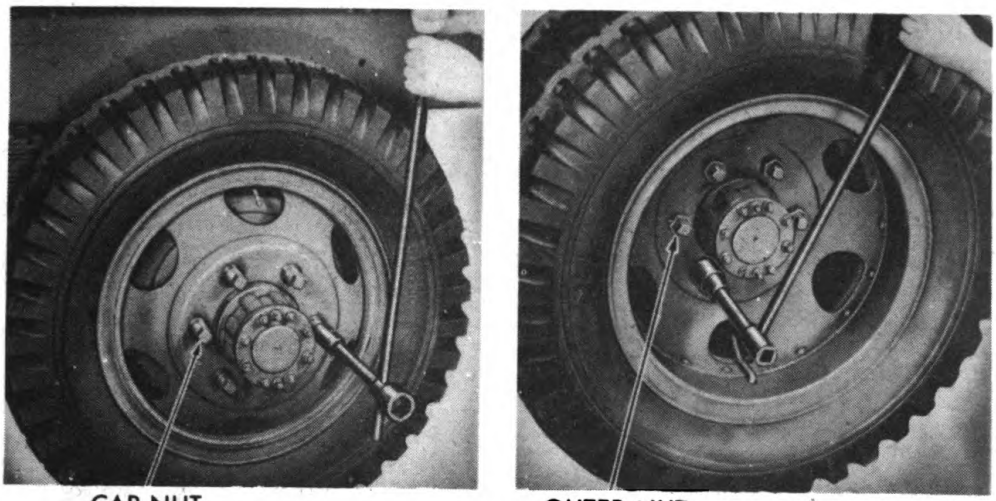


Figure 172—Installing Dual Wheels

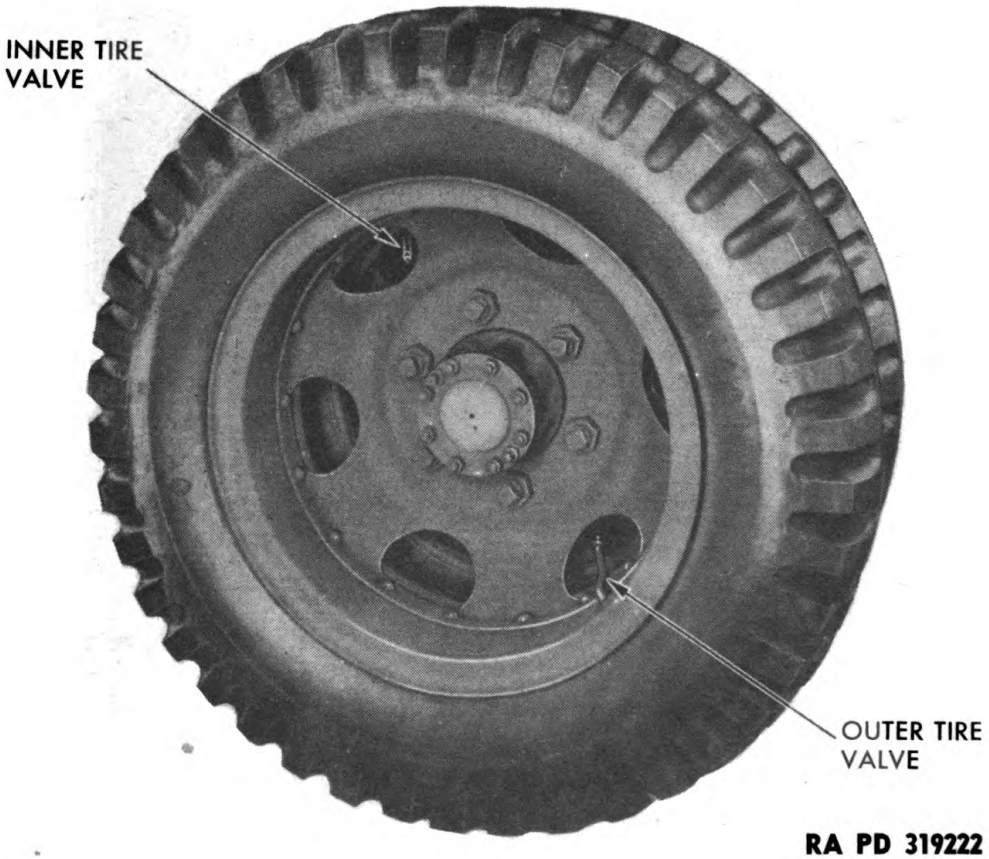
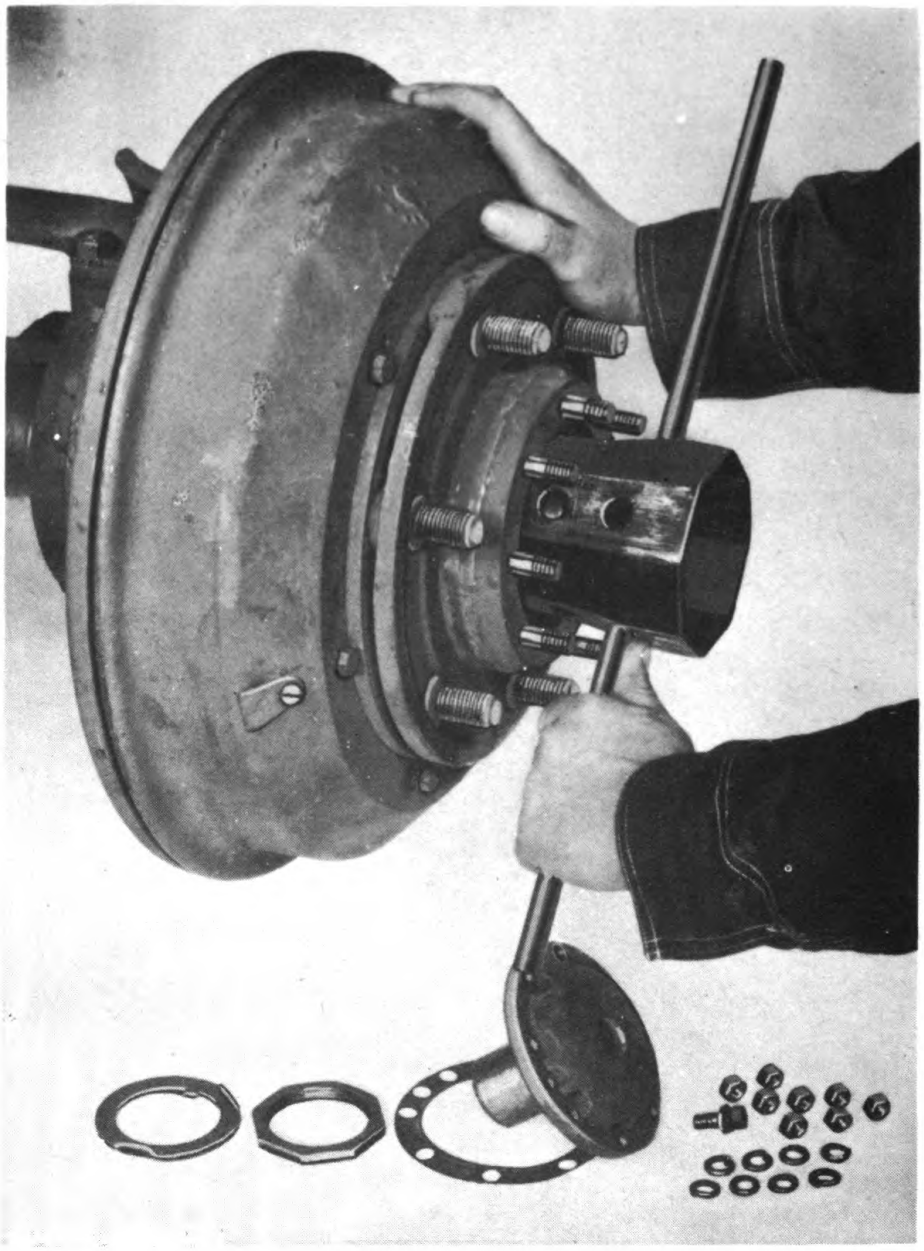


Figure 173—Inflation Valves Opposite at Dual Wheels



RA PD 310144

Figure 174—Adjusting Front Wheel Bearings (6 x 6)

wheels cannot be interchanged. Nuts for right-hand wheels are marked with "R," while nuts for left-hand side are marked with "L."

(2) REAR. An outer wheel may be removed without raising vehicle if inner wheel is inflated. Remove the outer nuts (hexagon), and pull

wheel from hub. To remove an inner wheel, raise vehicle until tire clears the floor. Remove the (square-head) sleeve-type cap nuts, and pull wheel from hub studs.

b. Disassembly. Deflate tube by removing valve core, and lay wheel and tire assembly flat. Force one side of clamp ring toward cen-

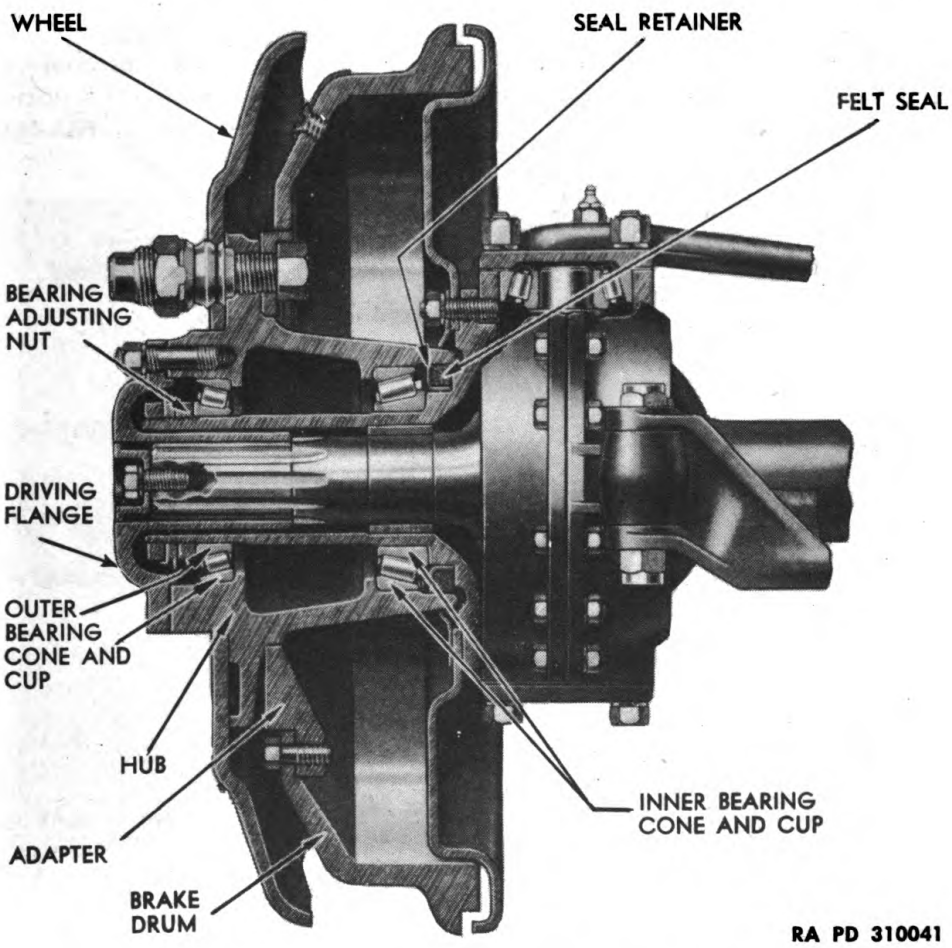


Figure 175—Front Wheel, Hub, and Drum Cross-sectional View (6 x 6) (Demountable-type Drum)

ter of wheel until it drops into groove in wheel. Insert heavy screwdriver or tire iron into recess in clamp ring, and pry this side of ring out over edge of wheel (fig. 171). Work ring off with screwdriver or tire iron and remove tire, flap, and tube.

c. Assembly. Place inner tube in tire so that valve stem is at red dot on sidewall of tire. Install tire flap. Inflate sufficiently to prevent tube from being pinched during mounting. Place wheel flat on floor or ground, and install tire over wheel. Insert valve stem through hole in wheel rim so the stem points toward wheel disk. With the flange of tire

locking ring to the outside, start the flange of ring under wheel flange opposite the notch in ring. Using a wood block and hammer, force the tire locking ring into position on the wheel rim. Make certain the locking ring is seated properly against rim of wheel through its entire circumference. Inflate tire to 55 pounds.

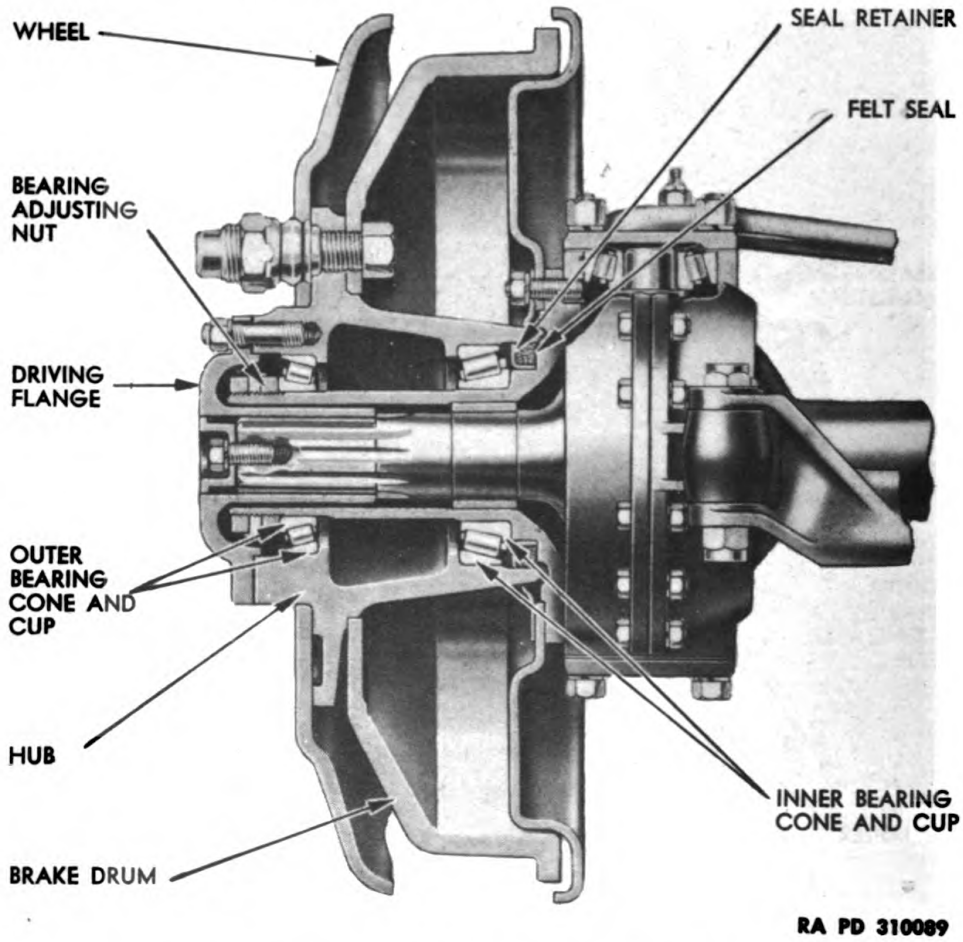


Figure 176—Front Wheel, Hub, and Drum, Cross-sectional View (6x6) (Conventional-type Drum)

d. Installation.

(1) FRONT. Place wheel over studs in the hub. Install the sleeve-type cap nuts (square-head) on 6x6 vehicles, and large hexagon nuts on 6x4 vehicles; tighten alternately, being sure they are firmly seated in the wheel disk.

(2) REAR (fig. 172). Place inner wheel over the studs in wheel hub so the tire locking ring is to the outside. Install the sleeve-type cap nuts (square-head), and tighten uniformly and securely, being sure the cap

nuts are firmly seated in the wheel disk. Place outer wheel in position over the sleeve-type cap nuts with the tire locking ring on the inside, and the tire valves on the inner and outer wheels 180 degrees apart (fig. 173). Install the large hexagon nuts on studs, tighten uniformly and securely.

136. FRONT HUBS AND DRUMS (6x6) (figs. 175 and 176).

a. Adjustment. (Wheel Bearing). Raise vehicle so tire clears the floor. Eliminate any existing brake shoe contact with the drum, and determine the amount of sidewise shake of wheel by using the hands.

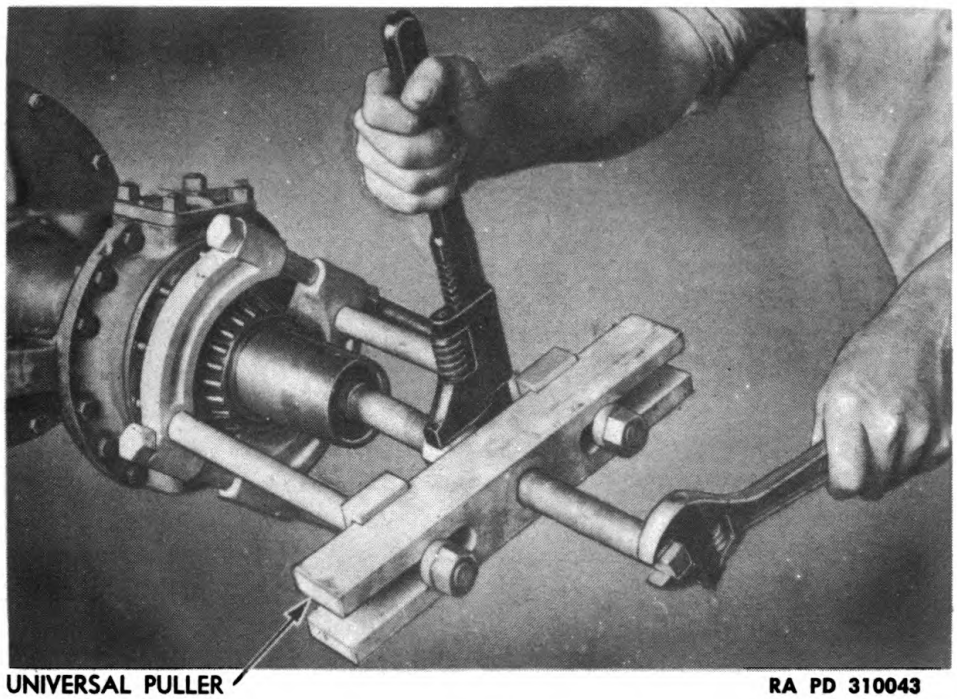


Figure 177—Removing Front Wheel Inner Bearing Cone (6x6)

Take off the driving flange stud nuts, center cap screw, and the driving flange. Bend the lips of the wheel bearing adjusting nut lock so the adjusting nut lock nut and lock can be removed. Tighten the adjusting nut with the wrench and handle supplied in the vehicle tool set until the wheel binds (fig. 174) and, at the same time, rotate the wheel to make sure all bearing surfaces are seating properly. Back off the adjusting nut about ⅛ turn, or more if necessary, making sure that the wheel rotates freely. Reinstall the lock and lock nut. Place driving flange with new gasket over flange studs and install the lock washers, stud nuts, and center cap screw; tighten securely. Lower vehicle and remove jack or hoist.

2½-TON 6x6 TRUCK AND 2½- TO 5-TON 6x4 TRUCK (STUDEBAKER MODELS US 6 AND US 6x4)

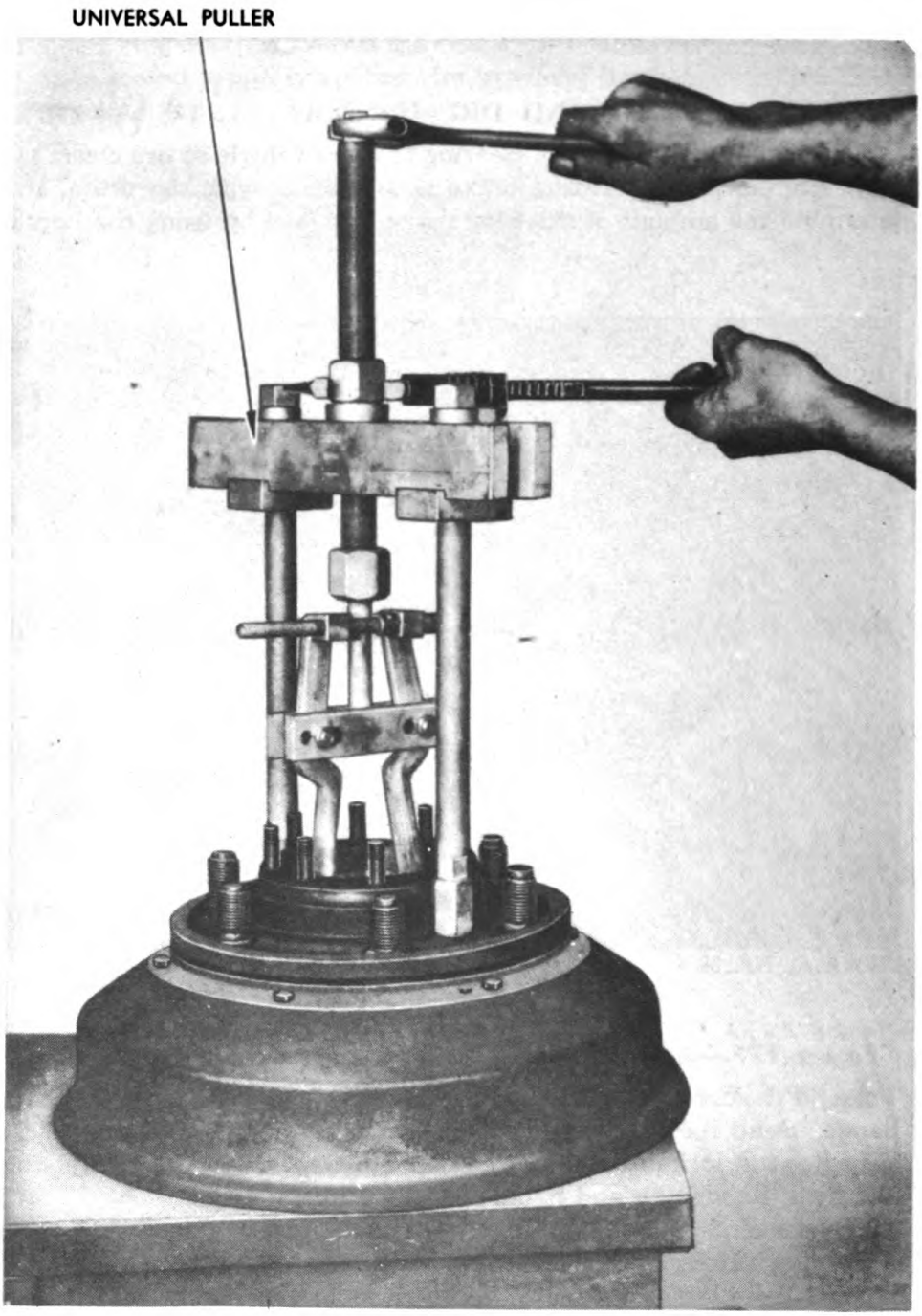


Figure 178—Method of Removing Wheel Bearing Cups

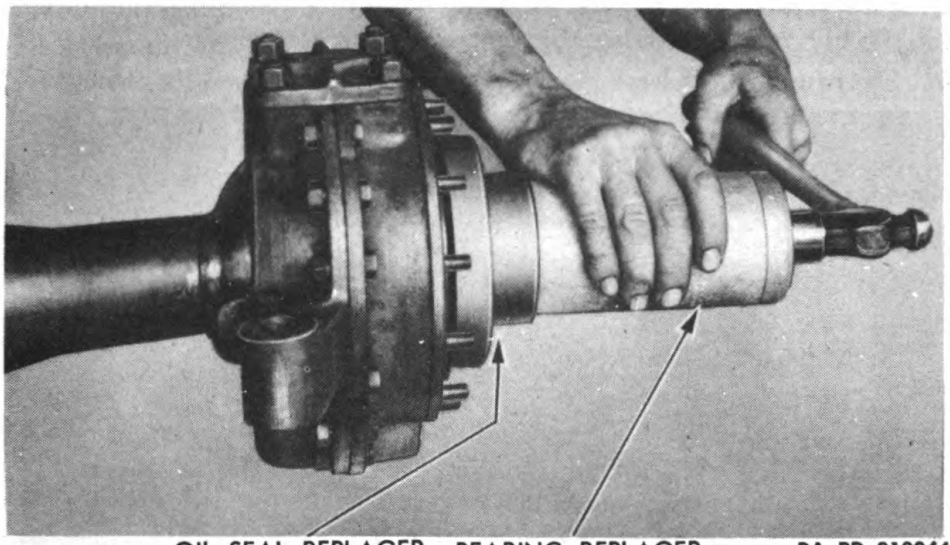


Figure 179—Installing Front Wheel Inner Bearing Oil Seal (6 x 6)

b. Removal of Hub and Drum. Remove wheel and tire assembly (par. 135 a (1)). Remove the driving flange nuts, lock washers, center cap screw, and driving flange. Bend the lips of the wheel bearing ad-

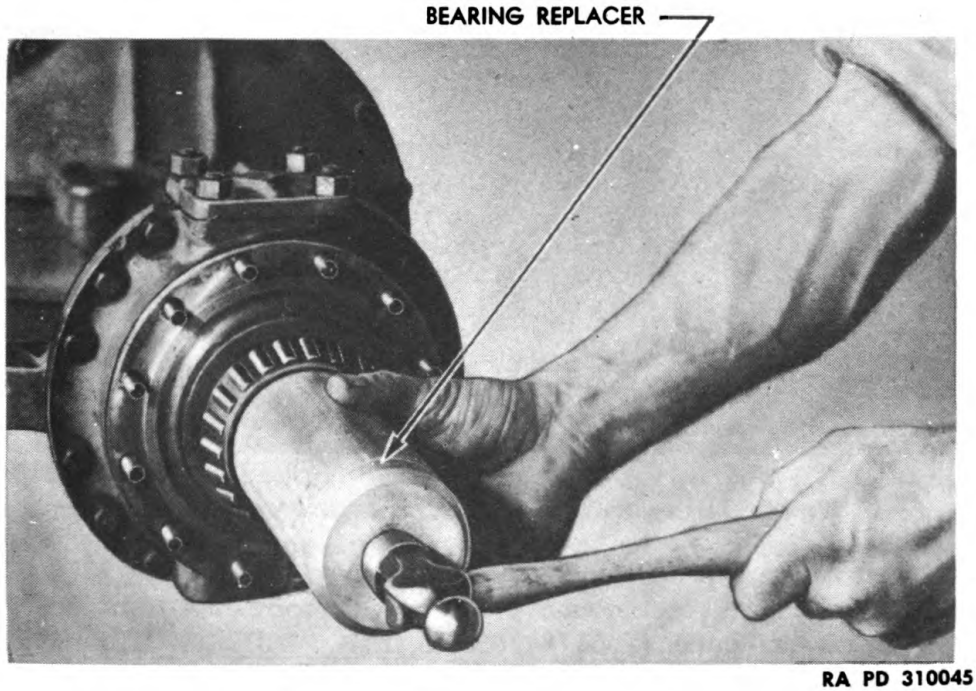
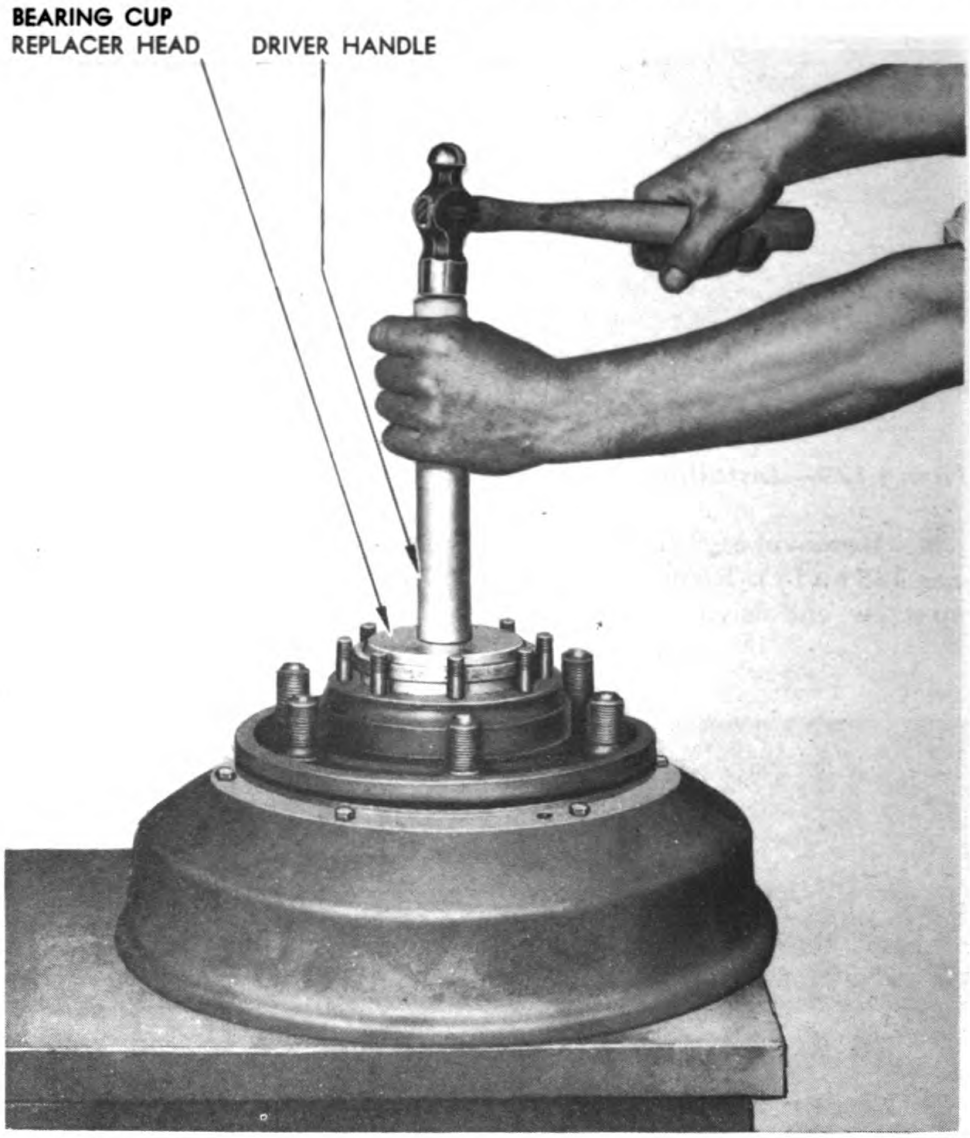


Figure 180—Installing Front Wheel Inner Bearing Cone (6 x 6)

justing nut lock so the lock nut, lock, and adjusting nut can be removed. Slide the hub and drum assembly from the knuckle spindle.

c. Removal of Wheel Bearing Cones and Cups. Lift the outer bearing cone from the bearing cup in the hub. Remove the inner bear-



RA PD 310075

Figure 181—Installing Wheel Bearing Cups

ing cone from the knuckle spindle, using the universal puller (fig. 177), and remove inner oil seal. Remove the wheel bearing cups from hub with the universal puller (fig. 178).

d. Installation of Wheel Bearing Cones and Cups. Place inner bearing oil seal over knuckle spindle and drive into position (fig. 179).

Drive inner bearing core into position on knuckle spindle (fig. 180). Install inner and outer wheel bearing cups in the hub (fig. 181).

e. Installation of Hub and Drum. Place hub and drum assembly over knuckle spindle; start the wheel bearing outer cone over knuckle

RA PD 319206

Figure 182—Adjusting Front Wheel Bearings (6 x 4)

spindle and into position in the outer bearing cup. Move the entire assembly into position so the inner bearing cup is against inner bearing cone. Start the bearing adjusting nut and adjust wheel bearings (sub-par. **a** above). Install wheel and tire assembly (par. 135 **d**).

137. FRONT HUBS AND DRUMS (6x4).

a. Adjustment (Wheel Bearings). Raise the front end of vehicle until the tires clear the floor. Remove the hub cap and adjusting nut

cotter pin. Tighten the adjusting nut with the wrench and handle supplied in the vehicle tool set until the wheel binds (fig. 182). Rotate the wheel to make sure the bearing surfaces are seating properly. Back off the adjusting nut about ⅙ turn, or more, and make sure that the wheel rotates freely. After checking the adjustment, lock the adjusting nut with a new cotter pin, and install the hub cap.

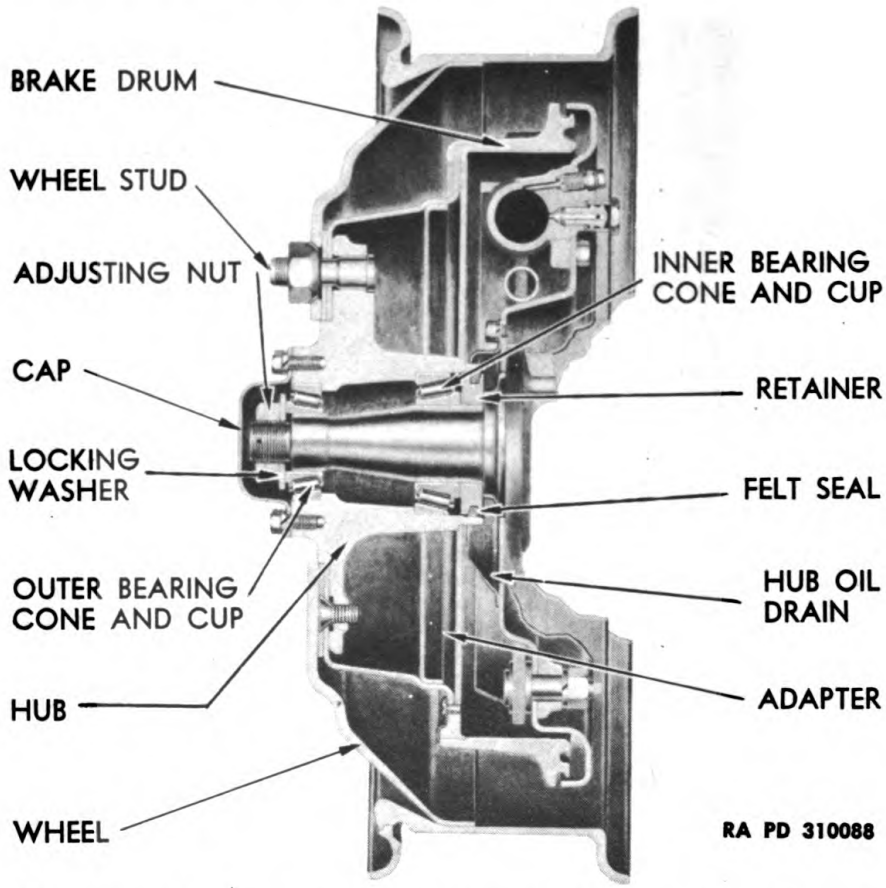


Figure 183—Front Wheel, Hub, and Drum, Cross-sectional View (6x4) (Demountable-type Drum)

b. Removal of Hub and Drum. Raise vehicle until the tires clear the floor or ground, and remove the tire and wheel assembly (par. 135 a). Remove the hub cap, adjusting nut cotter pin, adjusting nut, washer, and outer bearing cone. Remove the wheel and hub assembly from the knuckle spindle.

c. Removal of Wheel Bearing Cones and Cups. Slide the inner bearing cone off the knuckle spindle. Remove the bearing cups from the hub with the universal puller if they are not satisfactory for further service.

d. Installation of Wheel Bearing Cones and Cups. Place hub on a flat surface, and install the outer and inner bearing cups with the wide side toward the center of hub, using a suitable replacer. Install inner bearing cone in position on the knuckle spindle.

e. Installation of Hub and Drum. Place the hub and drum assembly on the steering knuckle spindle, install the outer bearing cone,

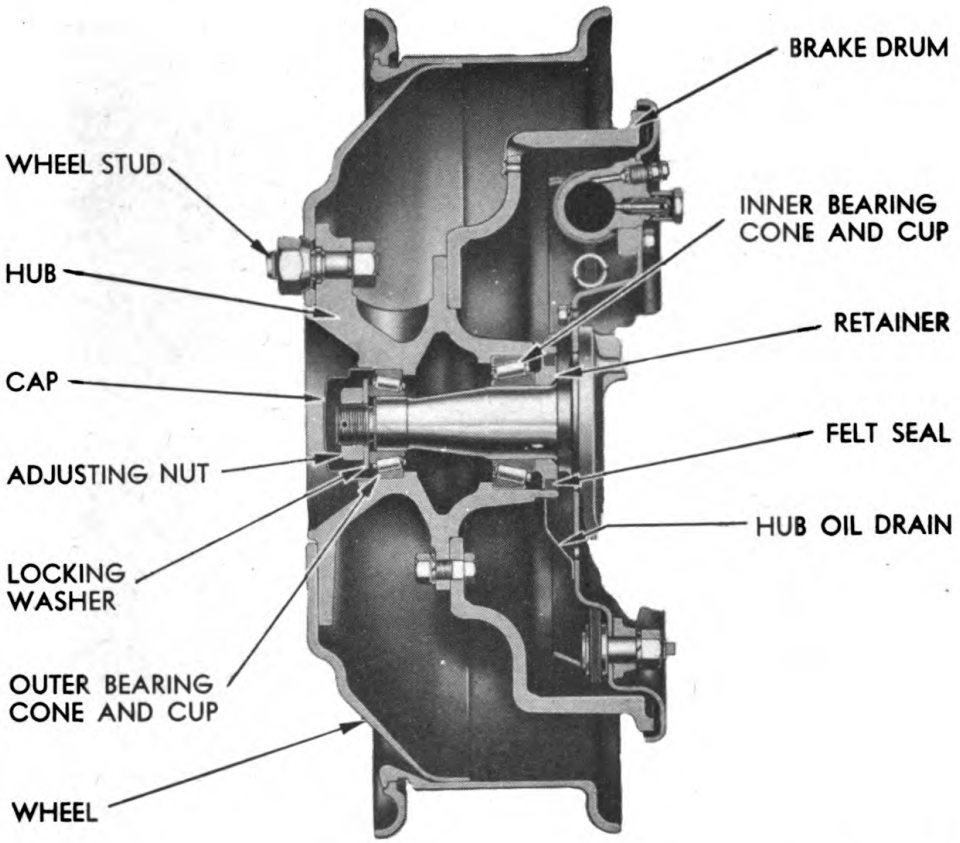


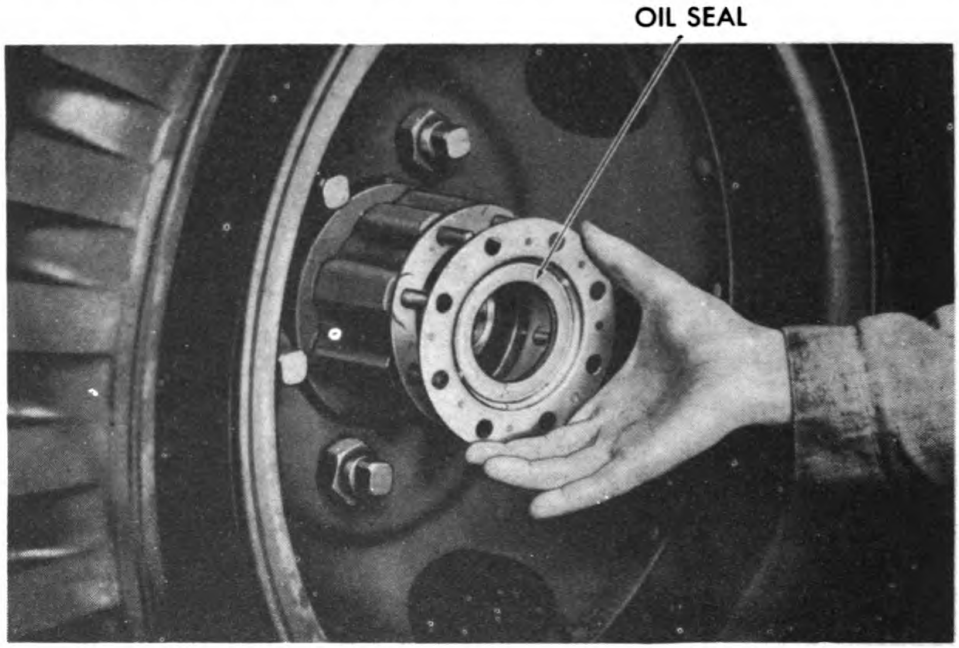
Figure 184—Front Wheel, Hub, and Drum, Cross-sectional View (6x4) (Conventional-type Drum)

washer, and adjusting nut. Adjust wheel bearings (subpar. a above). Install wheel and tire assembly (par. 135 d).

138. REAR HUBS AND DRUMS.

a. Adjustment (Wheel Bearing). Raise the axle and check the amount of sidewise shake of the wheel with the hands. Bearings in correct adjustment will allow a barely perceptible shake of the wheel, and it will turn freely without drag. Eliminate, by means of the brake

shoe take-up cam, any existing shoe contact with the drum. Remove the axle shaft, oil seal assembly, and gasket (fig. 185). Unlock both wheel bearing adjusting nuts, and remove the lock nut and outer lock. Tighten the adjusting nut with the wrench and handle supplied in the vehicle tool set until the wheel binds and, at the same time, rotate the wheel to make sure all bearing surfaces are seating properly (fig. 186). Back off the adjusting nut ⅛ turn, or more if necessary, so that the wheel rotates freely. Lock the adjusting nut with the inner lock. Install the



RA PD 64666

Figure 185—Removing Rear Wheel Hub Outer Oil Seal

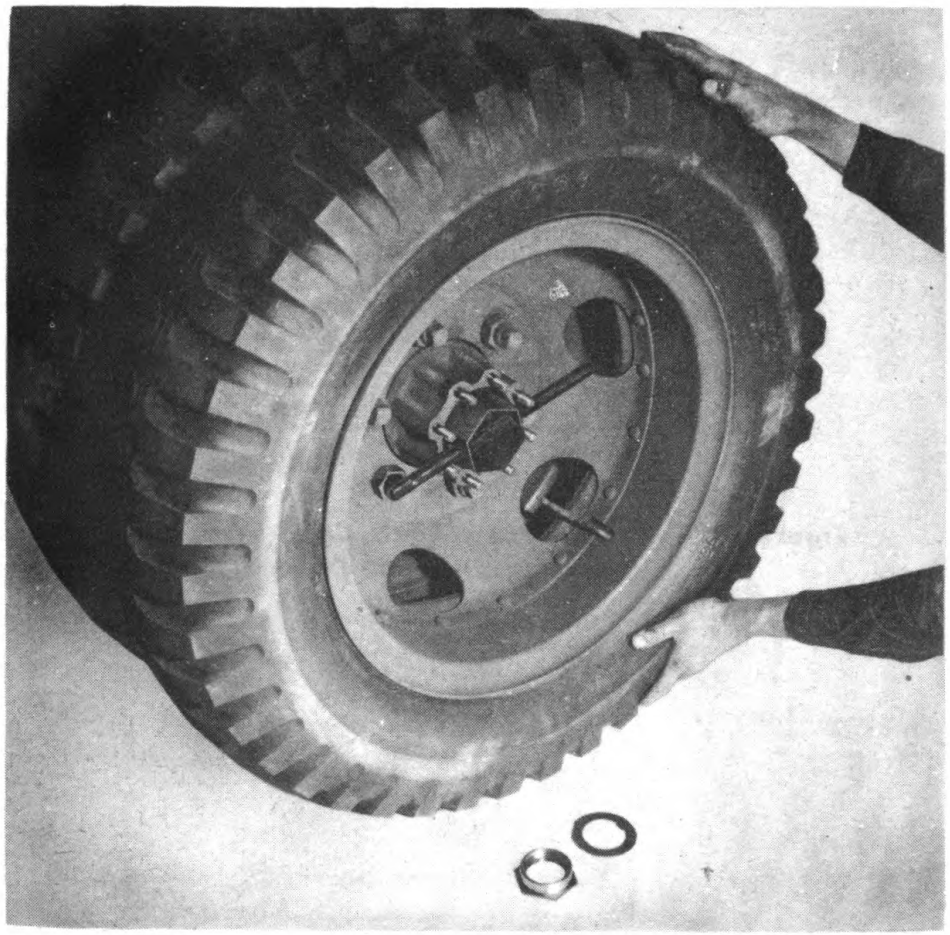
lock and lock nut, and check the adjustment of the bearings. Lock the lock nut, install the oil seal assembly with new gaskets, and the axle shaft (par. 124 b). Lower the axle.

b. Removal of Hub and Drum. Raise vehicle so the tires clear the floor. Remove wheel and tire assemblies (par. 135 a). Remove rear axle shaft, oil seal assembly, and gasket (fig. 185). Unlock and remove the lock nut, locks, and adjusting nut. Slide the hub and drum assembly off the axle housing.

c. Removal of Wheel Bearing Cones and Cups. Lift outer bearing cone from the hub, reach through the hub with a wood block or hammer handle, and force the inner bearing cone and grease washer with retainer from the hub. Pull the bearing cups from the hub with the universal puller.

d. Installation of Wheel Bearing Cones and Cups. Drive wheel bearing cups into the hub, being sure they bottom against the shoulder in hub. Place the inner bearing cone into the inner bearing cup and drive the oil seal retainer into position.

e. Installation of Hub and Drum. Slide the hub and brake drum as an assembly over the axle housing, and install the outer wheel bearing and adjusting nut. Adjust wheel bearings (subpar. a above). Install wheel and tire assembly (par. 135 d). Lower vehicle.



RA PD 310042

Figure 186—Adjusting Rear Wheel Bearings

2½-TON 6x6 TRUCK AND 2½- TO 5-TON 6x4 TRUCK (STUDEBAKER MODELS US 6 AND US 6x4)

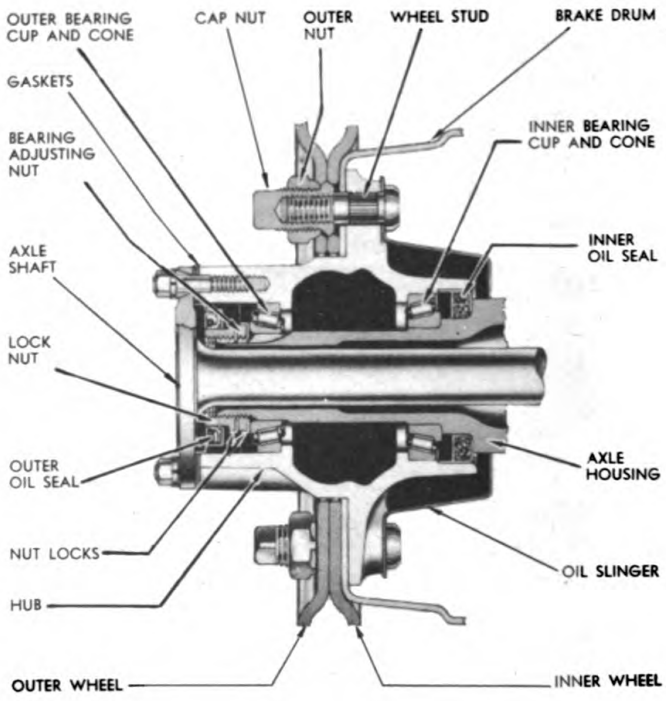


Figure 187—Hub at Rear Wheels, Cross-sectional View (Demountable-type Drum)

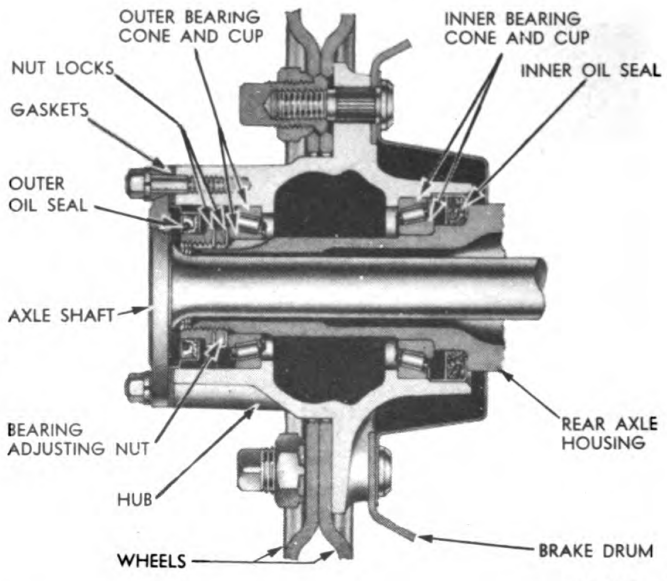


Figure 188—Hub at Rear Wheels, Cross-sectional View (Conventional-type Drum)

Section XXVII

SPRINGS AND SHOCK ABSORBERS

139. DESCRIPTION.

a. Semi-elliptic type springs are used at the front. The forward end of each front spring is mounted in a shackle. Stationary hangers

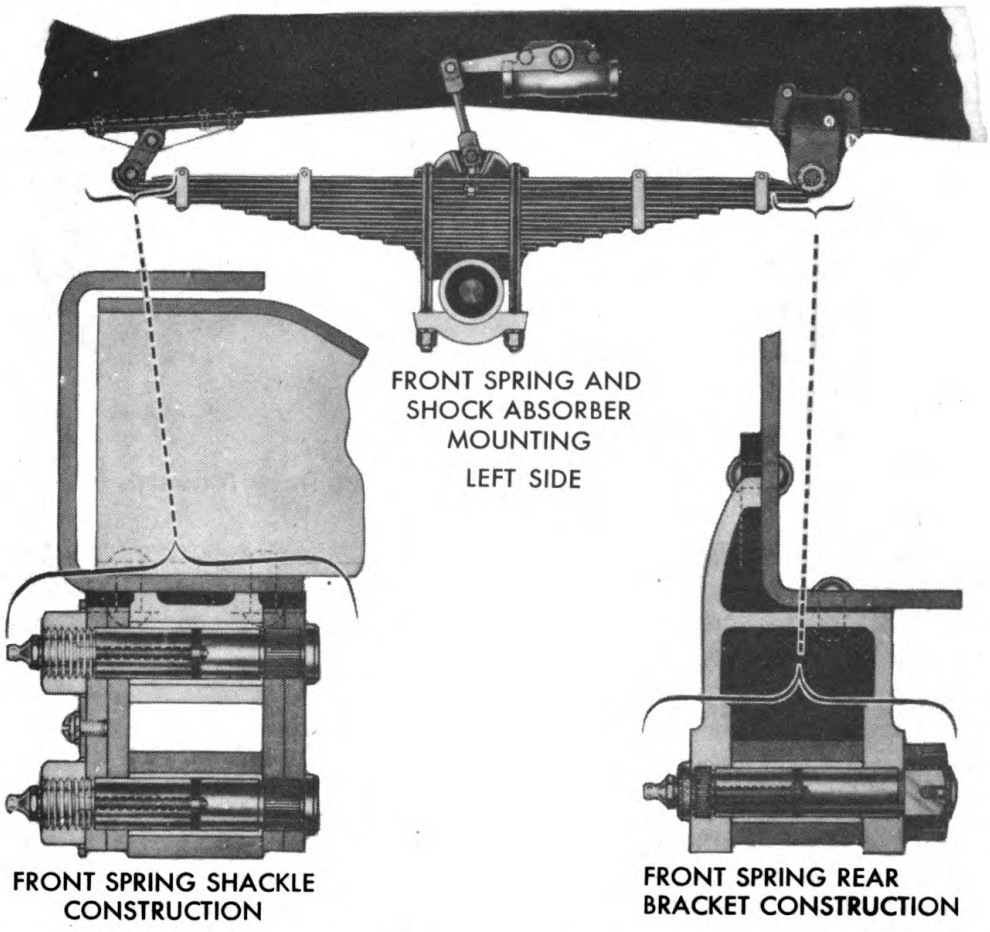
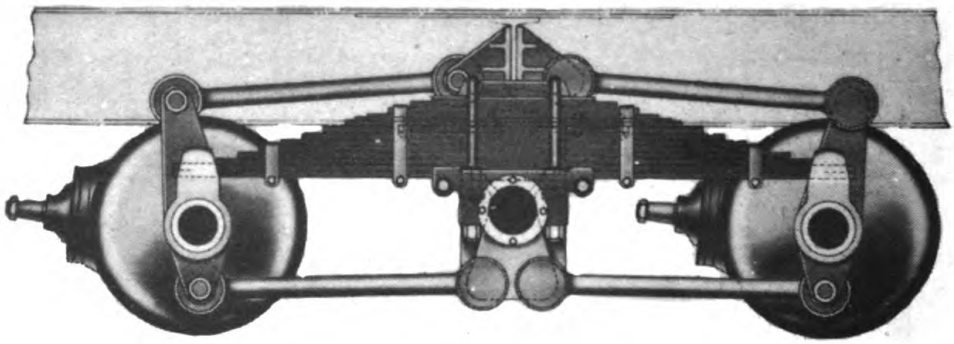


Figure 189—Front Spring Mounting, Cross-sectional View

support the rear end of the front springs. All shackle bolts are serrated under the head to prevent the bolts from turning when pressed into the shackle hanger or shackle plate. The front spring shackle and hinge bolts are drilled through the center (fig. 189) to permit lubrication of

the shackle hanger bushing or spring eye bushing. The rear springs are of the inverted semi-elliptic type. Clips or U-bolts hold the center of the springs to the spring seat, which is carried by tapered roller bearings on the cross bar assembly. The rear spring seats are split and fitted with cross studs and nuts to prevent severe side thrusts from damaging the seats. The spring center bolt head locates it correctly on the spring seat. The ends of the spring ride in anchor straps which are integral with both ends of the two rear axle housings (fig. 190). The anchor straps limit the up-and-down movement of the spring ends, but do not restrict the forward and rearward movement of the springs, as their



RA PD 310047

Figure 190—Rear Spring and Torque Rods Mounting

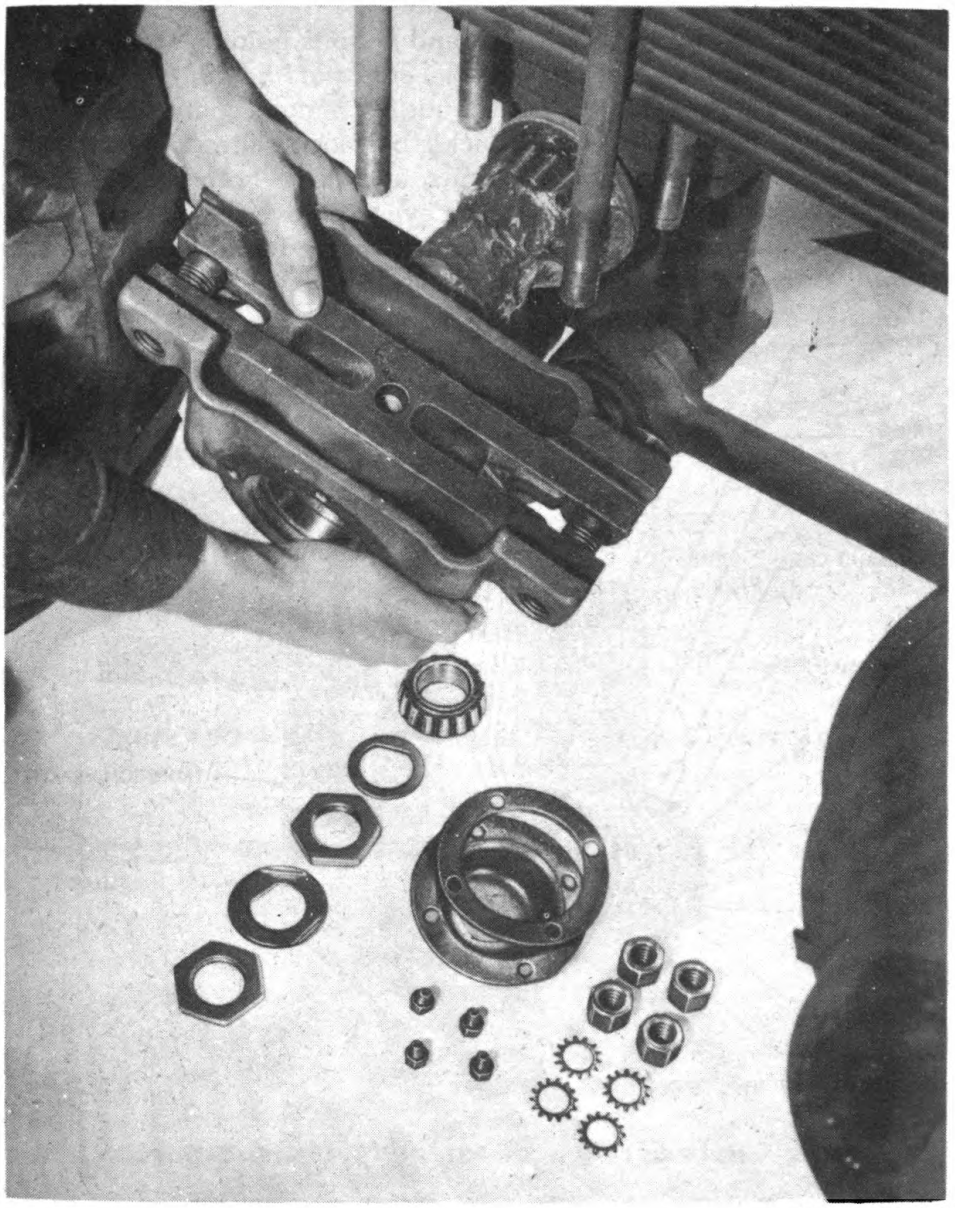
effective length changes during vehicle operation. The drive from the rear axles is transmitted to the vehicle through a system of torque rods. Shock absorbers are used at the front only, and are of the heavy-duty, double-acting type.

140. SPRINGS.

a. Adjustment.

(1) FRONT SPRING SHACKLE AND HANGER BOLTS. To adjust the front spring shackle, remove the shackle bolt lock screw and lock. Tighten the shackle bolt nuts, then back them off about ½ turn to prevent binding. Install the front spring shackle bolt lock and screw. Remove the cotter pin from the front spring rear hanger bolt nut, tighten the nut, then back it off about ½ turn to prevent binding. Install a new cotter pin of the correct size. Tighten spring clips, U-bolts, and center bolts frequently as they must be kept tight.

(2) REAR SPRING SEAT BEARINGS. Raise vehicle frame until ends of rear spring are free in the axle anchor straps on the side to be serviced. Remove the screws holding the bearing cap to the spring seat.



RA PD 319207

Figure 191—Removing Rear Spring Seat

Straighten the bent portion of nut lock, and remove the lock nut and lock. Oscillate the spring seat while tightening the bearing adjusting nut, being careful that it does not bind. Install a new adjusting nut lock, the lock nut (outer), and tighten securely. Bend a portion of nut lock over flats of adjusting nut and lock nut. Place the bearing cap into position with new gasket, and install cover screws.

b. Removal.

(1) FRONT SPRING. Raise front end of vehicle until weight is off

the spring. Take off the U-bolt nuts and U-bolts holding spring to the axle. NOTE: *On 6 x 6 vehicles remove stud nuts holding right spring to axle.* Allow the shock absorber ends to remain connected to the U-bolt plates. Remove the front shackle bolt lock plate screw and lock plate. Remove both shackle bolt nuts, and drive both shackle bolts and side plate out of hanger and spring eye. Remove the cotter pin and castle nut from bolt that holds rear end of spring to hanger. Drive the bolt out of the hanger and spring eye, and remove spring.

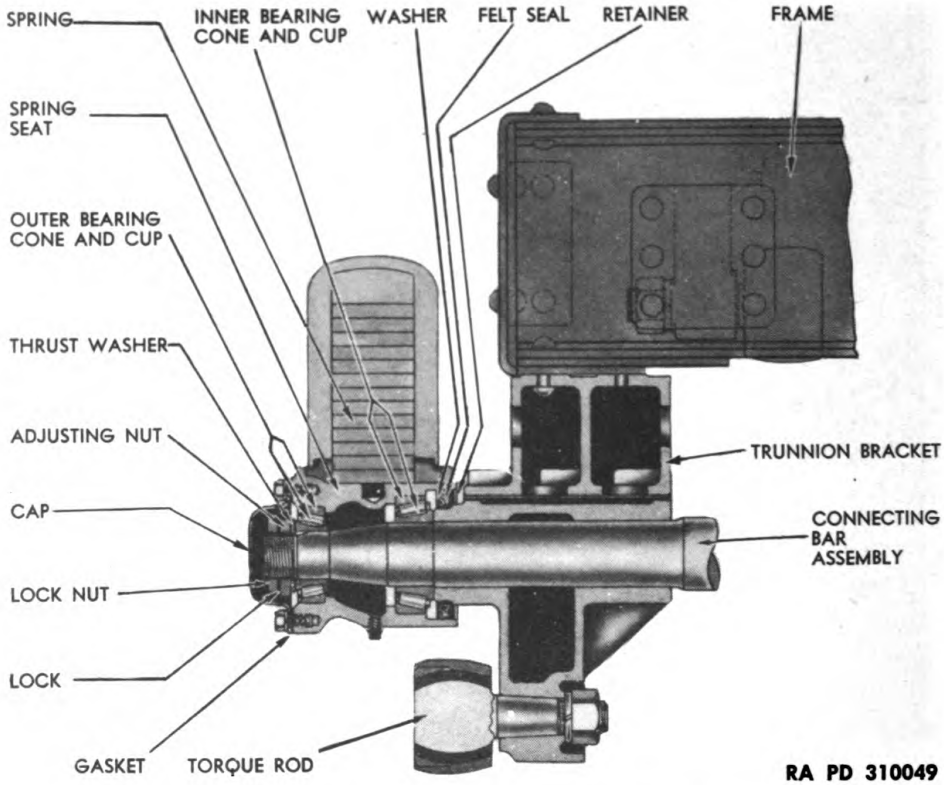


Figure 192—Rear Spring Seat Assembly, Cross-sectional View

(2) REAR SPRING. Raise vehicle until ends of rear spring are free in axle anchor straps. Remove the three torque rods from the forward rear axle (par. 120 f). Remove U-bolt nuts and U-bolts. Loosen spring seat clamp stud nuts. Move nearest end of forward rear axle forward sufficiently to permit front end of spring to slip out of the anchor strap on axle. Remove spring from vehicle by sliding it forward and out of the rearward rear axle anchor strap.

c. Installation.

(1) FRONT SPRING. Place spring in position, install bolt through hanger and rear eye of spring. Install nut on bolt, tighten securely, back off ½ turn, and install a new cotter pin. Install front shackle

SPRINGS AND SHOCK ABSORBERS

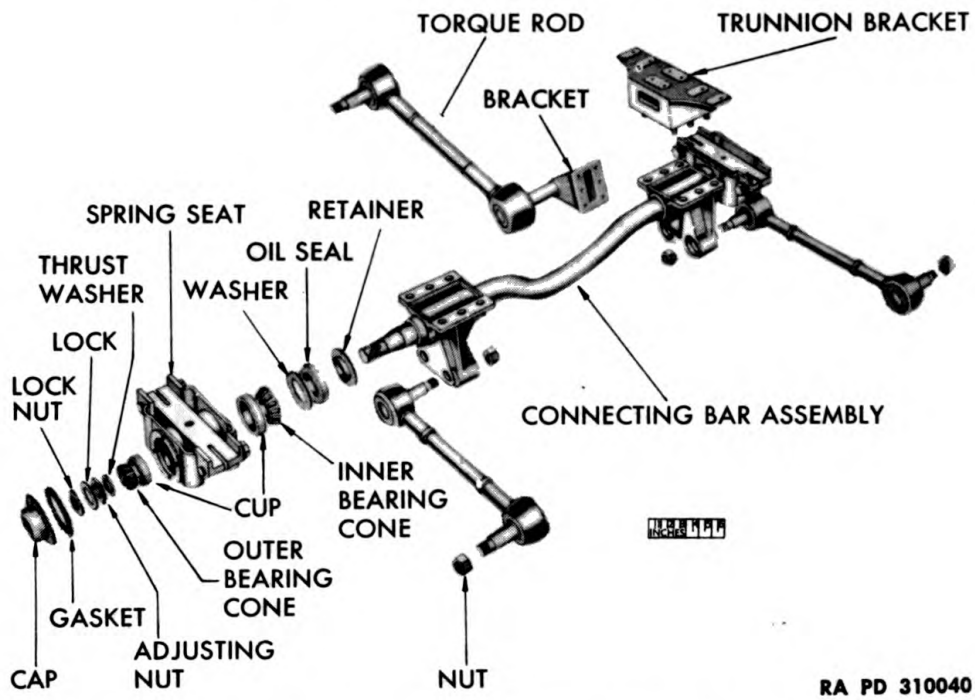


Figure 193—Rear Spring Seat Assembly, Disassembled

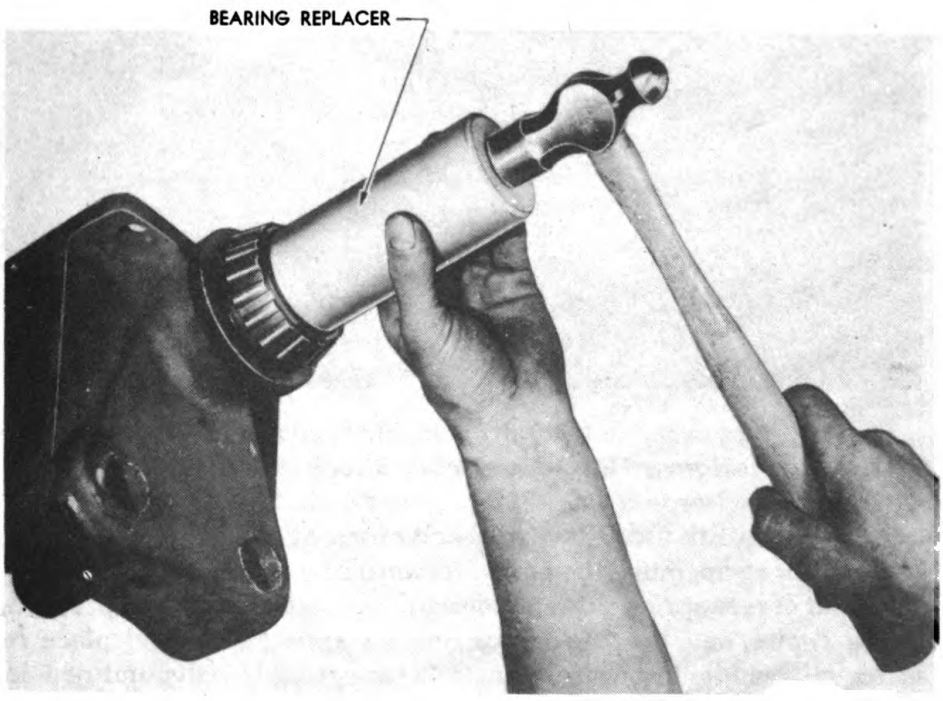
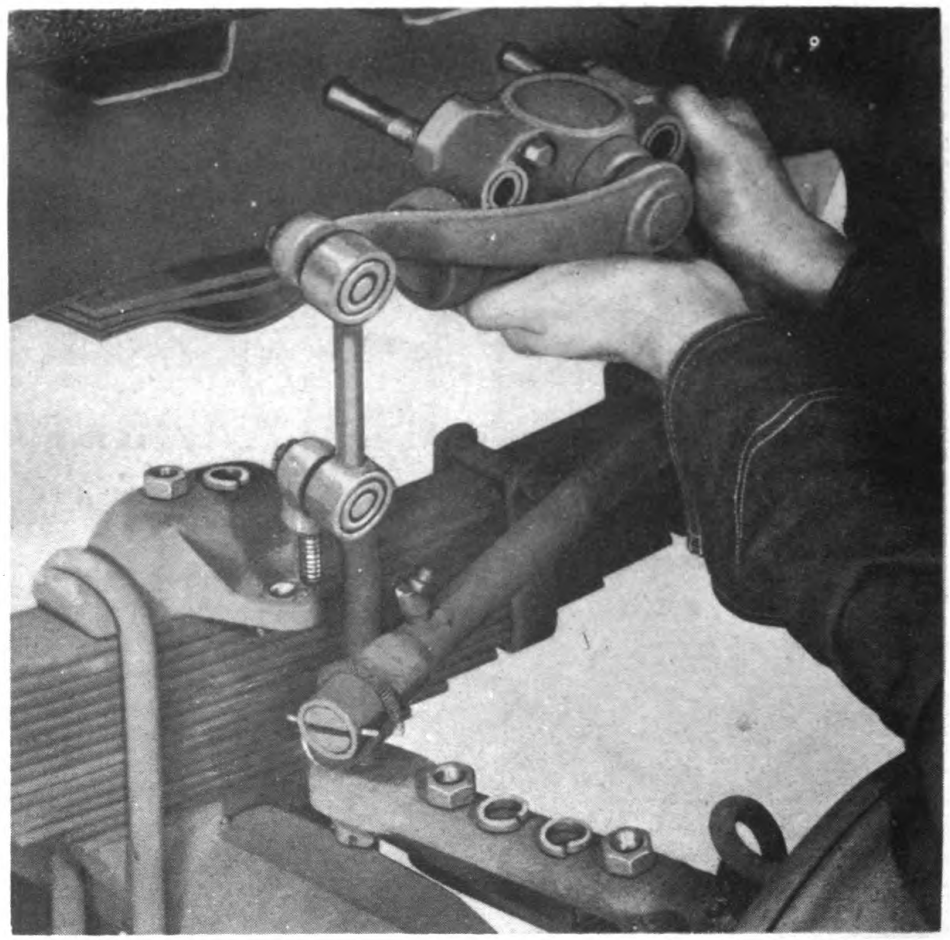


Figure 194—Installing Rear Spring Seat Inner Bearing Cone

bolts and nuts. Tighten shackle bolt nuts, back them off ½ turn, and install lock plate and screw. Lower vehicle and position so spring center bolt head is in recess on axle pad. Install front spring and shock absorber bracket plate, U-bolts, and nuts. Securely tighten the nuts and lower vehicle. NOTE: *On 6 x 6 vehicles install stud nuts that hold right spring to axle.*



RA PD 310132

Figure 195—Removing Shock Absorber

(2) REAR SPRING. Place rear end of spring through rearward rear axle anchor strap, move the end of forward rear axle forward, and enter front end of rear spring through forward rear axle anchor strap. Position spring center bolt head in recess on rear spring seat, and place rear spring clip saddle in position. Install rear spring U-bolts and new lock washers, and tighten U-bolt nuts securely. Tighten spring seat clamp stud nuts, install forward rear axle torque rods (par. 121 **b**), and lower vehicle.

SPRINGS AND SHOCK ABSORBERS

141. REAR SPRING SEAT BEARINGS (figs. 192 and 193).

a. Removal. Raise and block forward rear axle tire and wheel assemblies until they clear the floor on the side to be serviced. Remove both forward rear axle tire and wheel assemblies (par. 135 **a**). Raise the vehicle until the rear spring ends are free in the axle anchor straps, and remove spring U-bolt nuts and U-bolts. Loosen spring seat clamp stud nuts. Remove the screws holding bearing cap to spring seat, and remove spring seat bearing lock nut, lock, and adjusting nut. Lower vehicle until spring seat is free from spring, and slide spring seat assembly off connecting bar (fig. 191). Using the universal puller, remove inner bearing cone from the connecting bar journal. Remove oil seal felt, retainer, and washer. Remove outer and inner bearing cups from the spring seat if they are to be replaced.

b. Installation. Install inner and outer bearing cups in the spring seat, using a suitable replacer. Insert oil seal felt, retainer, washer, and inner bearing cone over the connecting bar journal, and drive into position (fig. 194). Place outer bearing cone in the outer bearing cup, slide the spring seat assembly into position on the connecting bar, install the spring seat bearing adjusting nut, and adjust (par. 140 **a** (2)). Install rear spring clip saddle and U-bolts and nuts, being sure the spring center bolt head is seated properly in the spring seat. Tighten U-bolt nuts and spring seat clamp nuts securely. Install forward and rearward rear axle tire and wheel assemblies (par. 135 **d**). Lower vehicle.

142. SHOCK ABSORBERS.

a. Removal. Disconnect shock absorber link eyebolt from the front spring and shock absorber bracket plate by removing the eyebolt nut. Push shock arm up, take off shock absorber to frame bolt nuts, and remove the shock and link (fig. 195). Remove the nut and pin holding the link to shock absorber, and remove the link.

b. Installation. Assemble link to the shock absorber by installing link pin and nut. Place shock absorber over the shock to frame bolts, install lock washers and nuts, and tighten securely to frame. Push shock link eyebolt through the front spring and shock absorber bracket plate, install the lock washer and nut, and tighten securely. Remove filler hole plug, and fill the reservoir with shock-absorber fluid until the fluid level is even with bottom of filler plug hole. Install filler hole plug and tighten.

2½-TON 6x6 TRUCK AND 2½- TO 5-TON 6x4 TRUCK (STUDEBAKER MODELS US 6 AND US 6x4)

Section XXVIII

STEERING GEAR

143. DESCRIPTION AND TABULATED DATA.

a. Description. The steering gear is of the cam-and-twin-lever type (fig. 196) and is mounted to the frame left-side member. It is connected to the front axle steering arm by a Pitman arm and connecting rod or drag link.

b. Tabulated Data

Type	Cam and twin lever
Make	Ross
Model	TA 21

144. ADJUSTMENT IN VEHICLE.

a. Adjustment of Steering Post Cam Bearings. Remove left fender apron (par. 150 **c**). Remove cotter pin and adjusting plug from rear end of drag link. Unhook ball cover spring, and remove drag link from Pitman arm ball stud. Loosen steering gear cam lever shaft adjusting screw, and remove steering gear housing top cover screws. Turn steering wheel ½ turn from straight-ahead position, and add or remove top cover shims as necessary to obtain correct adjustment. Steering wheel must turn freely when held lightly at the rim with thumb and forefinger with all perceptible end play eliminated. Adjustment shims are available in thicknesses of 0.003 inch and 0.010 inch. Shims must be split in order to add or remove them. Install the top cover with screws and a new gasket. Adjust cam lever shaft (subpar. **b** following).

b. Adjustment of Steering Gear Cam Lever Shaft. After the steering post cam bearing adjustment has been made, adjust the end play of the cam lever shaft. Remove hood left-side panel (par. 61 **b**). Make sure the mark on the steering gear Pitman arm coincides with the mark on the end of the cam lever shaft. Turn the steering wheel from extreme right to extreme left, and count the number of turns; then turn the wheel back exactly halfway and mark the position of the wheel with a piece of tape. Loosen the adjusting screw lock nut, and adjust the screw so a high spot can barely be detected by turning the

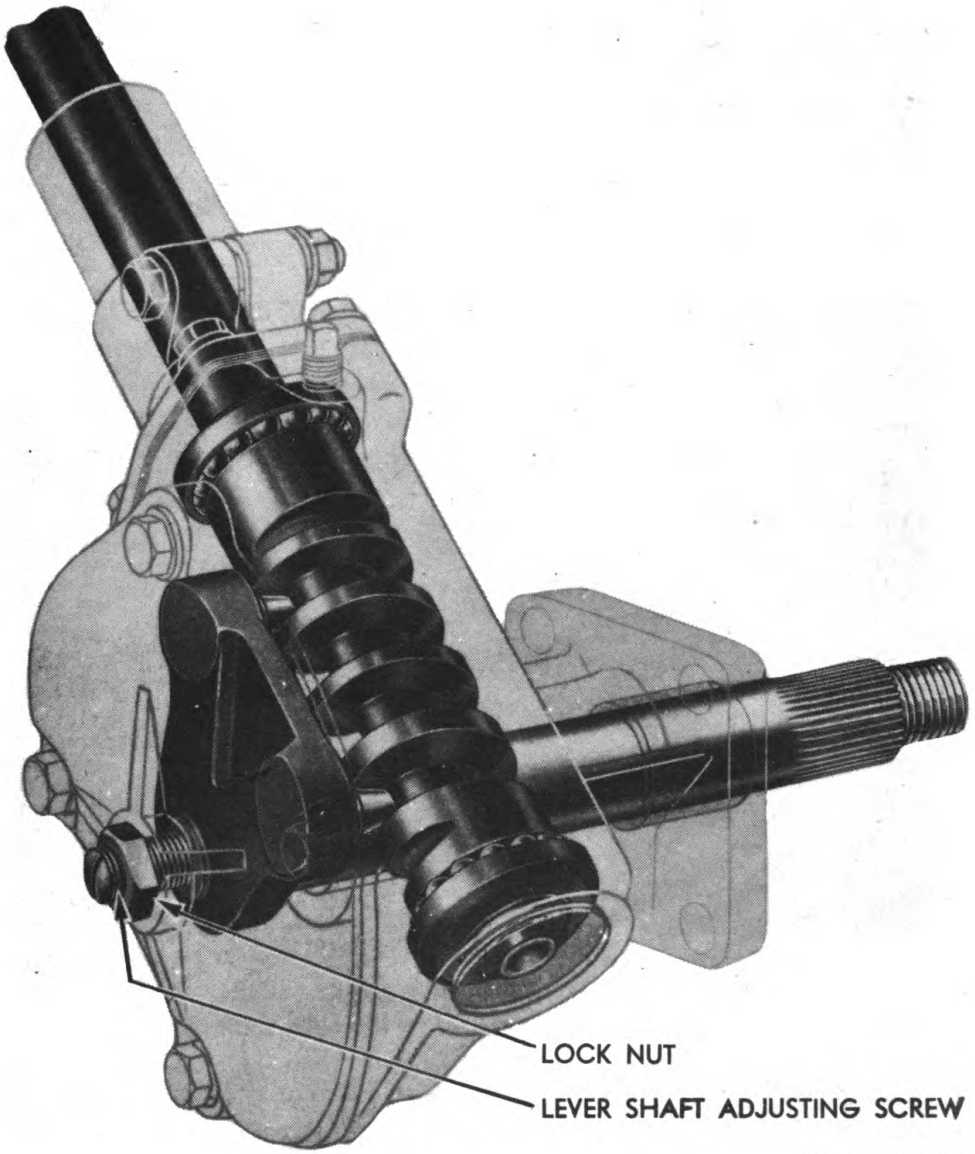


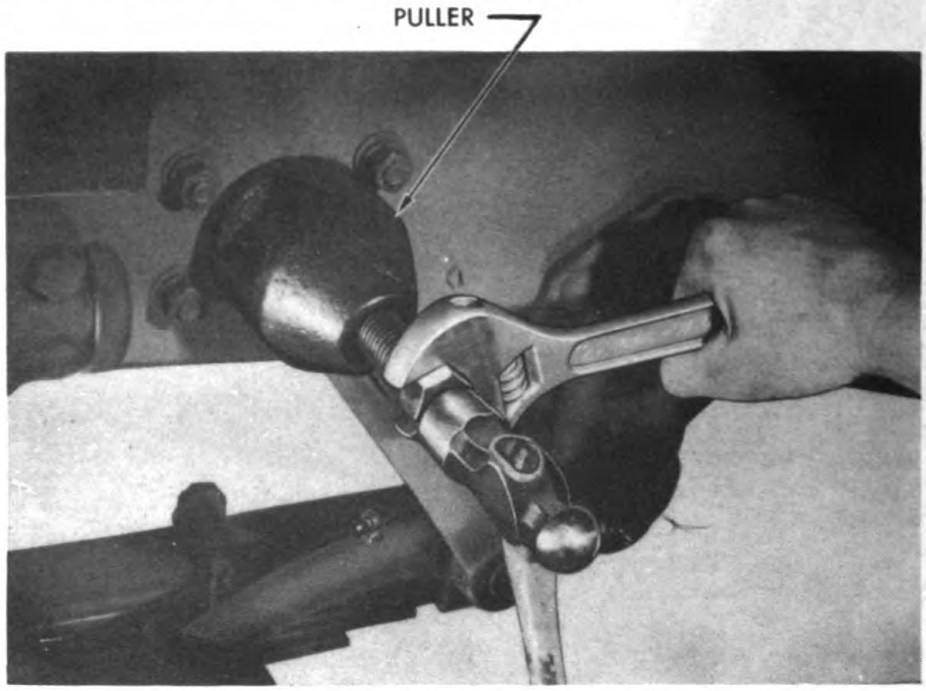
Figure 196—Steering Gear, Phantom View

wheel slightly left and right past its center of travel. Tighten the adjusting screw lock nut securely, and recheck the adjustment. Place the rear end of drag link over Pitman arm ball stud, and install the adjusting plug. Tighten adjusting plug, and back it off ½ turn. Install a new cotter pin and hook ball cover spring holding the cover and felt in position. Install left fender apron (par. 150 **c**) and hood left-side panel (par. 62 **p**).

2½-TON 6x6 TRUCK AND 2½- TO 5-TON 6x4 TRUCK (STUDEBAKER MODELS US 6 AND US 6x4)

145. STEERING ARM (PITMAN).

a. Removal. Remove cotter pin and adjusting plug from rear end of drag link. Unhook spring holding ball cover plate and felt oil seal in place, and remove rear end of drag link from Pitman arm ball stud. Remove the Pitman arm to steering gear cam lever shaft nut and lock washer. Remove steering gear Pitman arm from cam lever shaft with steering gear arm puller (fig. 197).



RA PD 330917

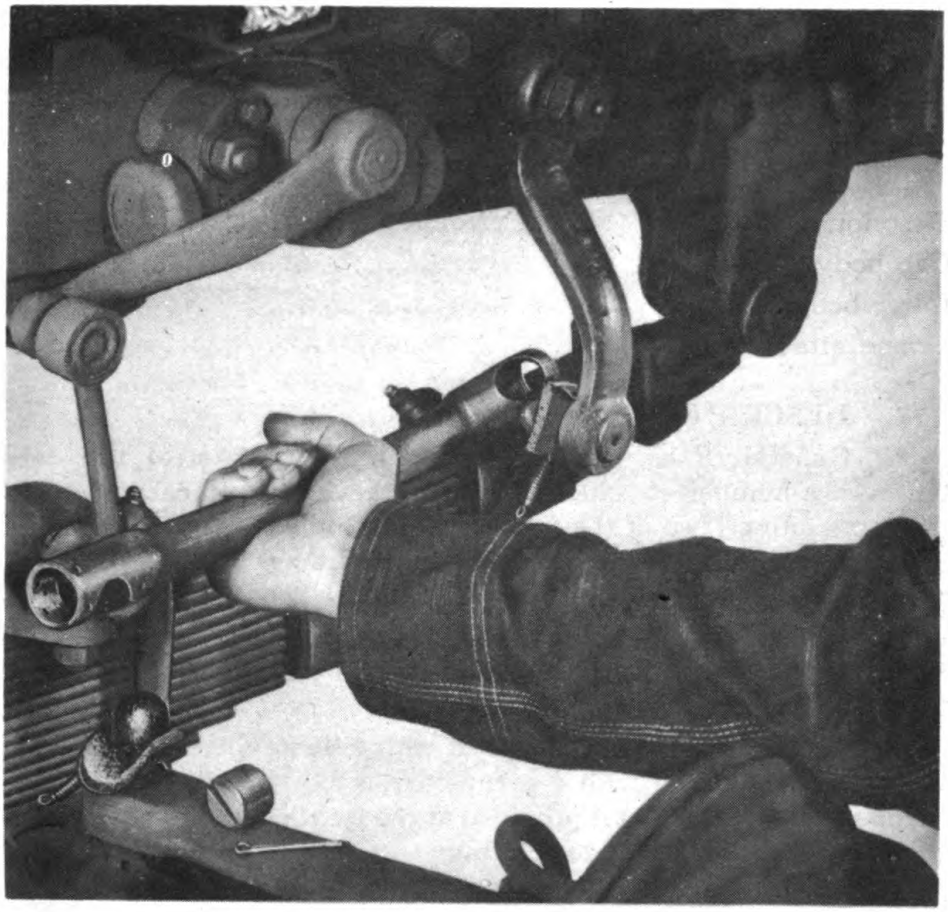
Figure 197—Removing Pitman Arm

b. Installation. Place steering gear Pitman arm in position on cam lever shaft, being sure the mark on Pitman arm coincides with the mark on the end of cam lever shaft. Install the lock washer and nut on cam lever shaft and tighten securely. Install connecting rod on Pitman arm ball joint (par. 146 b).

146. CONNECTING ROD (DRAG LINK).

a. Removal. Remove the cotter pins and adjusting plugs from each end of drag link. Unhook springs that hold ball covers and felt seals in position. Remove drag link from ball studs (fig. 198).

b. Installation. Make certain that connecting rod ball cover and new felt gasket are in position over the ball studs, and place drag link



RA PD 310128

Figure 198—Removing Connecting Rod (Drag Link)

ends on the ball studs. Install adjusting plugs, tighten plugs securely, and back them off ½ turn. Install new cotter pins, and hook the ball cover springs, being sure the new felt gaskets are in position.

2½-TON 6x6 TRUCK AND 2½- TO 5-TON 6x4 TRUCK (STUDEBAKER MODELS US 6 AND US 6x4)

Section XXIX

BODIES AND FRAME ATTACHMENTS

147. DESCRIPTION.

a. Generally, the vehicles are equipped with steel top cabs; however, a number of vehicles produced have soft top cabs. A three-point mounting (two at the front and one to the rear) system is used in attaching either type cab on the vehicle frame.

b. The cargo body is attached to the chassis frame and is not connected to the cab. A folding seat is located in cargo body along each side. Top bows, a tarpaulin top, and an end curtain are furnished to provide protection for troops or cargo.

c. Some vehicles were equipped with either an end or side dump body, which is raised with a pump-operated, hydraulic-type hoist to dump the load. A shield is provided at the front end of body to reduce the possibility of damage to the cab.

d. The frame serves as the structural center of the vehicle, and in addition to supporting the load, it provides and maintains a fixed relationship between other units to assure normal operation. The various bumpers, brackets, hooks, supports, etc., are bolted or riveted to the frame.

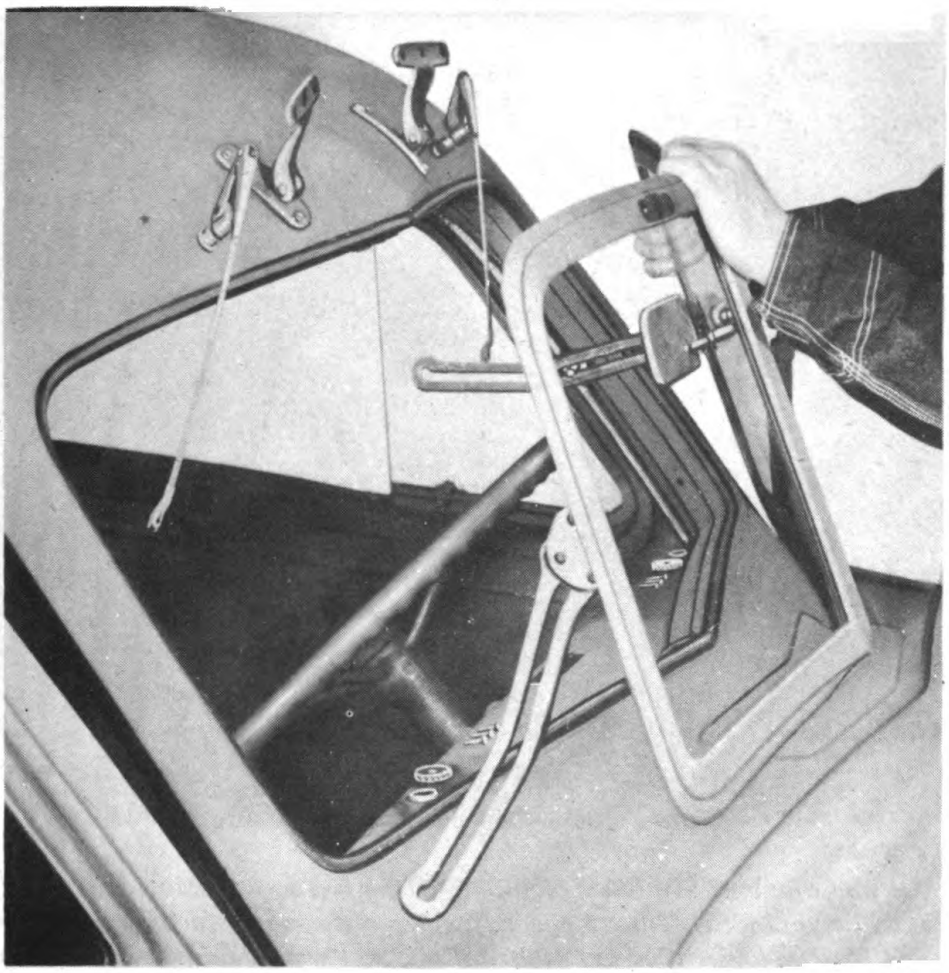
148. CAB BODY.

a. Steel Top Cab.

(1) WINDSHIELD ASSEMBLY REMOVAL. Remove the adjusting arm thumb nuts and washers from studs in pillars. Take out screws that hold adjusting arms to brackets on windshield frame and remove the arms. Remove rear view mirror from windshield center bar. Remove the screws that attach windshield wiper arms to wiper shafts, and lift off the arms and blades. Take out the windshield hinge to frame screws, and remove the windshield assembly (fig. 199).

(2) WINDSHIELD ASSEMBLY INSTALLATION. Place the windshield assembly in position, install windshield hinge to frame screws, and tighten securely. Install windshield adjusting arms over pillar studs, and fasten to brackets on windshield frame with screws. Install washers and thumb nuts on studs in pillar, pull windshield adjusting arms

inward, and push up to close windshield assembly. Tighten thumb nuts, and check alinement of windshield assembly to cab. Place windshield wiper arm in position on wiper shaft, install screw, and tighten securely. Check wiper blade travel, and change position of arm on shaft, if necessary. Install rear view mirror in windshield center bar.



RA PD 310133

Figure 199—Removing Windshield Assembly

(3) SEAT CUSHION REPLACEMENT. Raise front edge of cushion and pull it forward. Disengage hooks on cushion from hooks on seat back and remove cushion (fig. 200). To install, place cushion in cab, swing lower edge of seat back forward, and engage hooks on cushion with hooks on seat back. Push the cushion rearward, and engage holes in cushion frame with pins on seat riser.

b. Soft Top Cab.

(1) WINDSHIELD ASSEMBLY REMOVAL. Disconnect the windshield wiper hose from both wiper motors. Unfasten the left-front corner of top deck from windshield frame. Remove windshield adjusting arm knobs, and spring the arms off studs. Swing the windshield assembly forward to a horizontal position, and slide the assembly to the left until

RA PD 310136

Figure 200—Removing Seat Cushion

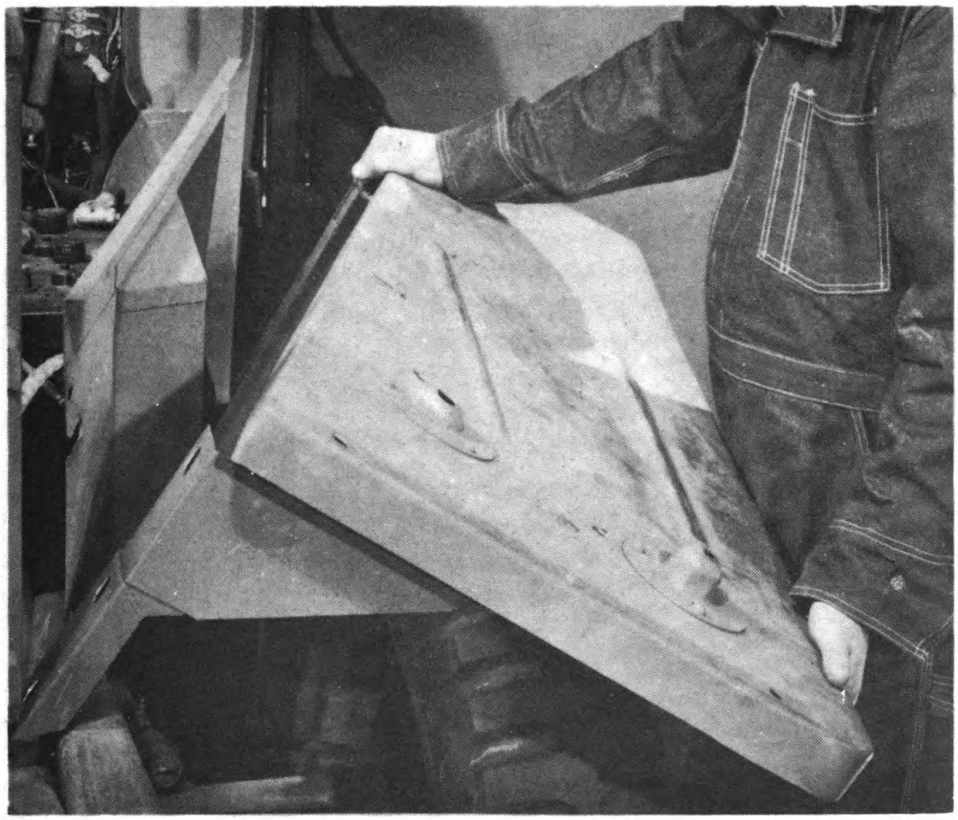
the hinge halves are disengaged. NOTE: *If the windshield assembly is to be replaced, remove the adjusting arms, windshield wiper arms and blades, and wiper motors from original windshield assembly, and install on replacement assembly.*

(2) WINDSHIELD ASSEMBLY INSTALLATION. Insert the right end of the hinge half on the windshield upper channel in the left end of the hinge half on the windshield frame, and slide the assembly to the right until the hinge halves are fully engaged. Aline the windshield assembly in the frame, and spring the adjusting arms over the studs. Install the adjusting arm knobs, pull adjusting arms inward, and push down to close windshield. Tighten the knobs securely, connect hose to both wiper motors, and fasten left-front corner of top deck to windshield frame.

(3) SIDE CURTAIN REMOVAL. Open the side curtain until the flat on lower hinge pin coincides with slot in the lower hinge bracket. Raise the curtain until all hinge pins are out of hinge brackets.

(4) SIDE CURTAIN INSTALLATION. Hold the side curtain at right angles to cab, insert the hinge pins in hinge brackets, and close curtain.

(5) TOP DECK AND BACK CURTAIN REMOVAL. Untie the large rope on each side of cab, and detach it from hook on outside of cab in center



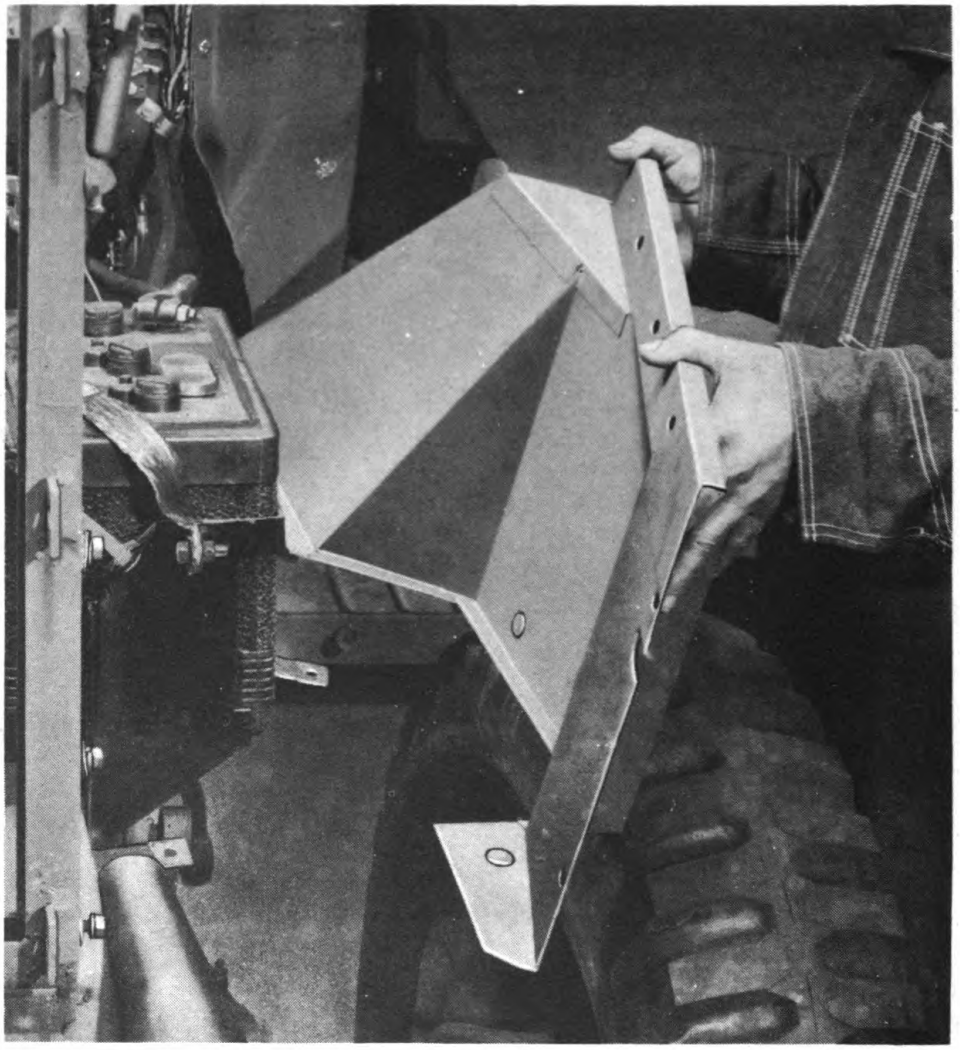
RA PD 310137

Figure 201—Removing Fender

of rear panel. Unfasten the front corners of top deck from upper corners of the windshield frame. Roll or fold the top deck forward, and slide it sidewise out of retainer on top of windshield frame. Untie the small rope on each side of cab, and unhook it from clips inside of cab rear panel. Roll up the back curtain, and fasten it to bow with straps provided for this purpose. Take out the cotter pins from base of bow arms, loosen the wing nuts on outside of cab, and remove the bow with back curtain attached by lifting it up. NOTE: *The back curtain may be removed from the bow by taking out the sheet metal screws.*

(6) TOP DECK AND BACK CURTAIN INSTALLATION. Place the bow with back curtain attached in position, install new cotter pins in base of

bow arms, and tighten wing nuts securely. Loosen straps that fasten curtain to bow, and lower the curtain. Hook the small rope under clips inside cab rear panel, and tie the rope ends on each side of cab. Slide the rolled edge at front of top deck sidewise into retainer on top



RA PD 310138

Figure 202—Removing Left Fender Apron

of windshield frame. Fasten the front corners of top deck to upper corners of windshield frame. Stretch the top deck over bow, and slip large rope under hook on outside of cab in center of rear panel. Tie the rope ends on each side of cab.

(7) SEAT CUSHION REPLACEMENT. Raise the seat, turn the front latch, and pull the cushion forward to remove it. To install, slide the cushion into position, raise the seat, and turn the front latch that holds the cushion in place.

BODIES AND FRAME ATTACHMENTS

149. CARGO BODY.

a. Tarpaulin Removal. Untie the tarpaulin tie ropes from hooks on outside of cargo body. Fold or roll the tarpaulin toward rear and remove from vehicle.

b. Tarpaulin Installation. Install tarpaulin over bows, stretch it into position, and tie the ropes to hooks on outside of cargo body.

c. Removal of Bows. Remove the tarpaulin (subpar. **a** above). Untie end curtain ropes, unlace ropes from bows and eyelets in curtains, and remove both curtains. Pull bows from top of hollow steel stakes to remove them.

d. Installation of Bows. Insert the ends of bows into top of stakes and push down until firmly seated. Install rope through top center eyelet in front curtain so that ends of rope are even. Place front curtain in position on front bow, lace ends of rope around bow and through eyelets, and tie each end of rope in nearest corner. Follow this procedure to install rear end curtain. Install the tarpaulin (subpar. **b** above).

e. Removal of Troop Seats. Untie tarpaulin ropes from hooks on tail gate and lower tail gate. Roll rear end curtain up and fasten to rear bow. Raise troop seats to vertical position, and remove cotter pins and clevis pins from hinges and brackets. Lift seats away from brackets and remove from vehicle.

f. Installation of Troop Seats. Place the seats in position, insert clevis pins through hinges and brackets, and install new cotter pins. Lower seats and rear end curtain into position. Raise tail gate, and fasten tarpaulin tie ropes to hooks on tail gate.

150. FRAME ATTACHMENTS.

a. Bumpers.

(1) FRONT BUMPER REPLACEMENT. Remove nuts and bolts that hold the front bumper in position, and remove bumper. On vehicles equipped with a winch, remove nuts and bolts that fasten the winch cable guide and roller to original bumper, and install guide and roller on replacement bumper. Hold the replacement bumper in position and install all fastening bolts and nuts. Tighten the nuts and bolts securely.

(2) REAR BUMPER REPLACEMENT. Remove the nuts and bolts that fasten the rear bumper to frame and remove bumper. Hold the replacement bumper in position, install all fastening bolts and nuts, and tighten securely to frame.

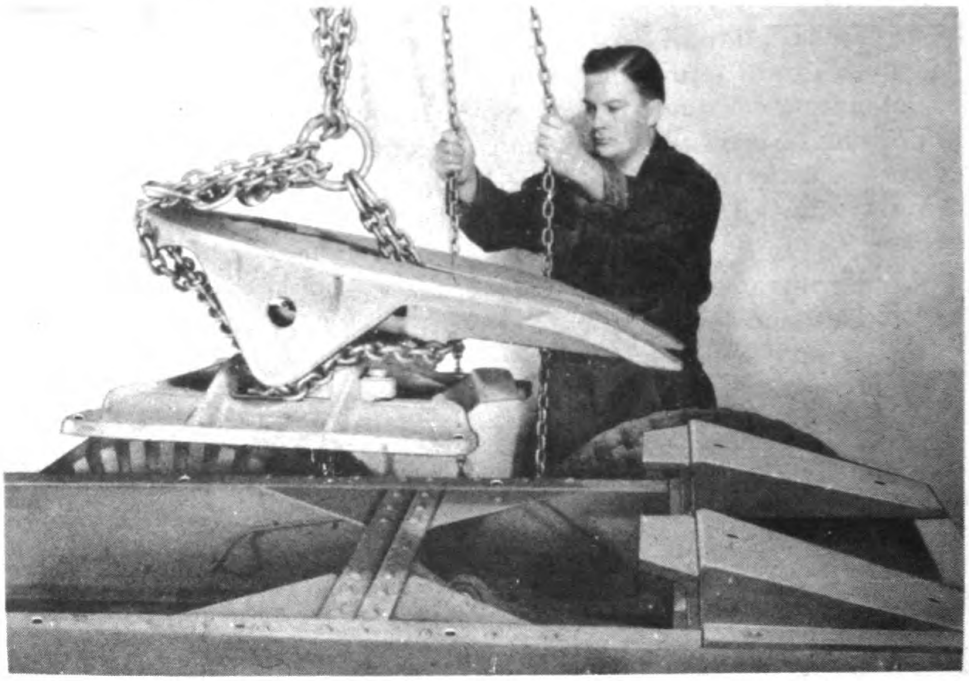
b. Fenders.

(1) REMOVAL. Remove headlight (par. 151 **c**), blackout marker light (par. 153 **b**), and blackout driving light (par. 152 **b**) (on the left fender only). Unfasten marker light wire from fender. Remove the screws, nuts, and bolts that fasten the fender to cab and radiator guard.

2½-TON 6x6 TRUCK AND 2½- TO 5-TON 6x4 TRUCK (STUDEBAKER MODELS US 6 AND US 6x4)

Remove the wing nuts and wing screws that hold the hood side panel and fender apron to fender. Remove fender support to radiator frame screws, and lift fender off the vehicle (fig. 201).

(2) INSTALLATION. Place fender in position and install all bolts, nuts, and screws to assure proper alinement of fender with cab, hood side panel, fender apron, and radiator. Tighten one support to radiator frame screw and a fender to cab screw. Then tighten all remaining screws, bolts, and nuts securely. Fasten marker light wire to fender



RA PD 319208

Figure 203—Removing Fifth Wheel Coupler Assembly (Tractor Truck Model)

with clip. Install headlight (par. 151 d), blackout marker light (par. 153 c), and blackout driving light (par. 152 c) (on left fender only).

c. Fender Apron.

(1) REMOVAL. Remove wing nuts and wing studs that hold fender apron to fender and radiator core bracket. Take out the bolt and nut that fasten apron to dash, disconnect bond straps from apron, and remove apron from vehicle (fig. 202). NOTE: *When removing right fender apron, unfasten wiring harness from clips.*

(2) INSTALLATION. Place fender apron in position, and connect bond straps securely to apron with toothed lock washer between strap and apron. Fasten apron to dash with bolt and nut. Install wing nuts,

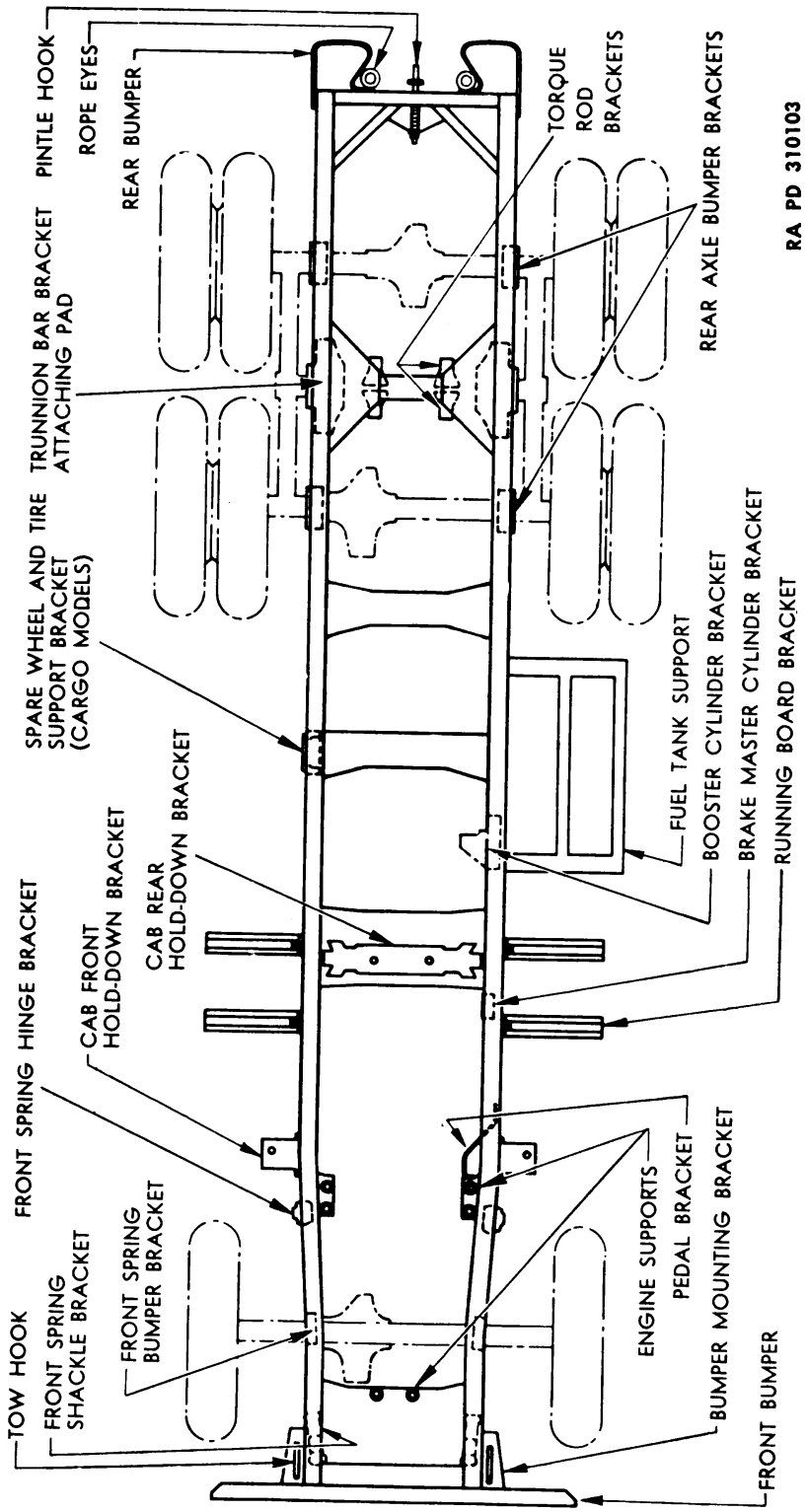


Figure 204—Frame and Brackets (162-inch W.B. Vehicles)

2½-TON 6x6 TRUCK AND 2½- TO 5-TON 6x4 TRUCK (STUDEBAKER MODELS US 6 AND US 6x4)

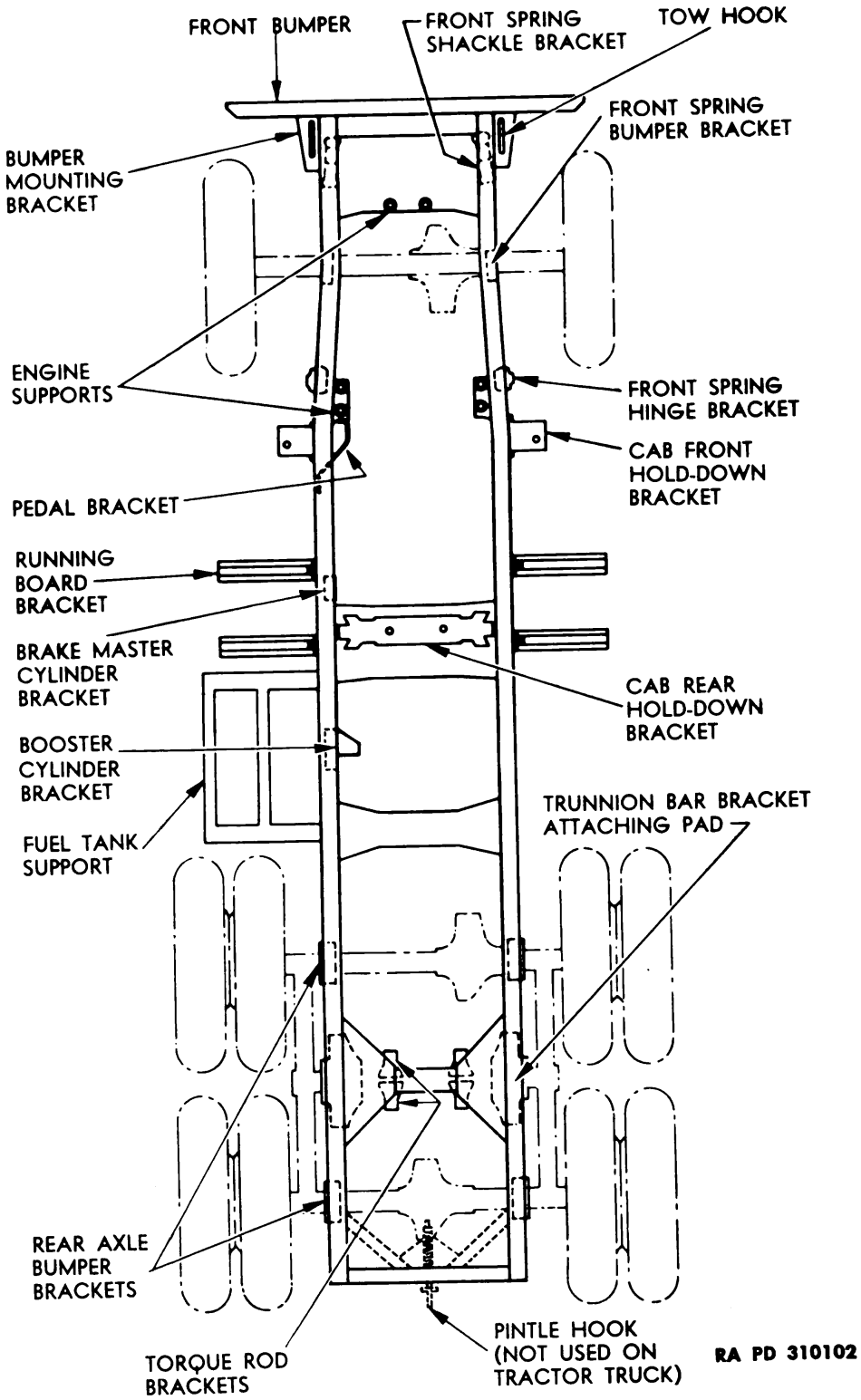
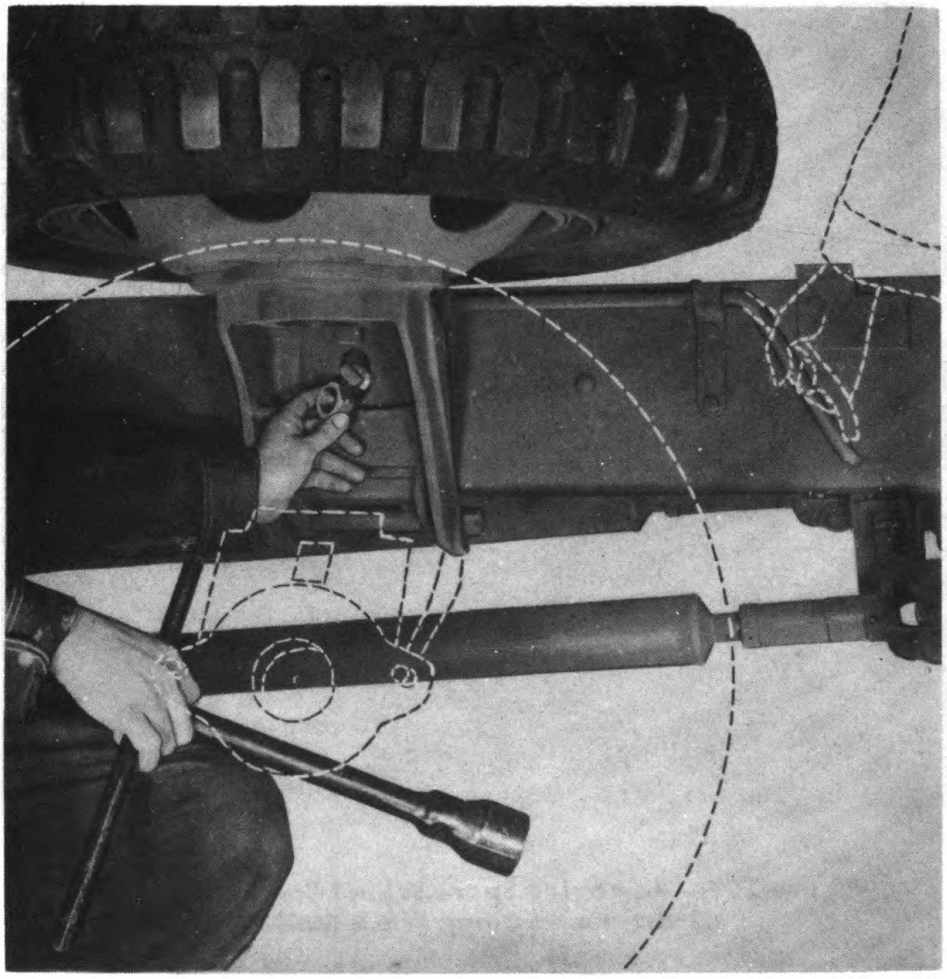


Figure 205—Frame and Brackets (148-inch W.B. Vehicles)

wing studs, and tighten securely. NOTE: *When installing right fender apron, fasten wiring harness in position on apron with clips.*

d. Fifth Wheel Coupler Assembly.

(1) REMOVAL. Remove nuts and bolts that fasten the fifth wheel coupler assembly to frame, and remove from vehicle with a hoist (fig. 203).



RA PD 310143

Figure 206—Removing Spare Wheel and Tire (Cargo Models)

(2) INSTALLATION. Place the fifth wheel coupler assembly in position on frame, and install all bolts and nuts. Tighten the nuts securely.

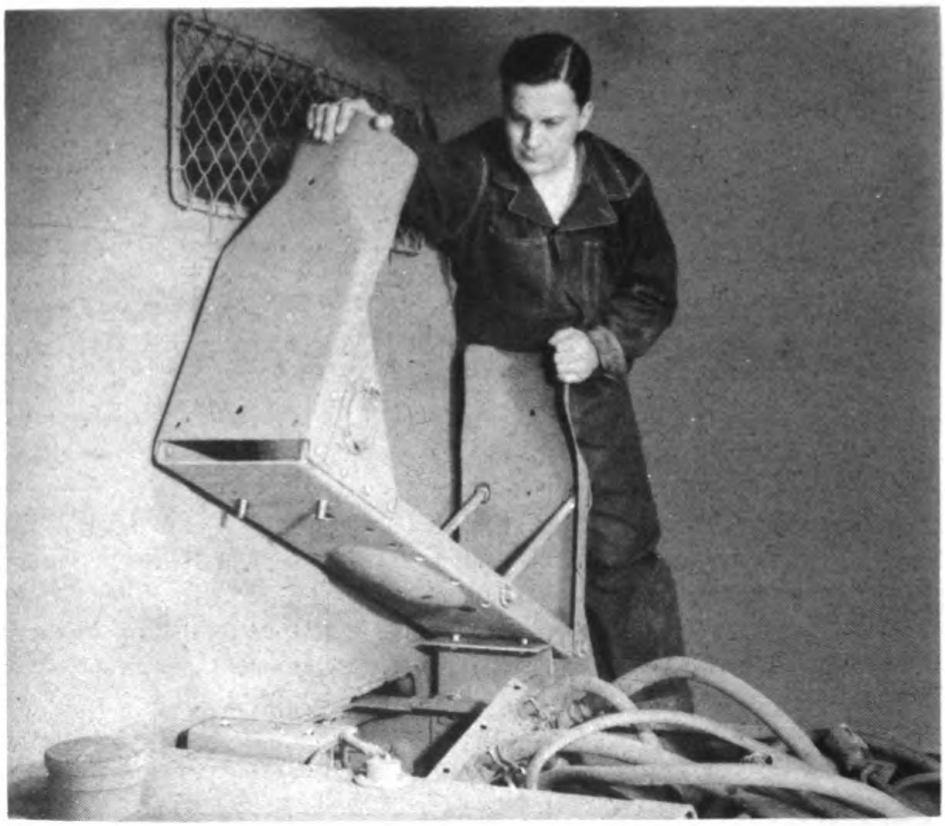
e. Pintle and Towing Hooks.

(1) PINTLE HOOK REMOVAL. Remove the cotter pin, nut, and spacer washer from pintle hook. Pull hook assembly rearward out of frame, leaving spring and sleeves in position.

(2) PINTLE HOOK INSTALLATION. Insert the pintle hook shaft through frame rear cross member, sleeves, and spring. Place spacer over

pintle hook shaft, install nut, and tighten nut until there is enough tension on spring to prevent rattle. Install a new cotter pin.

(3) TOWING HOOK REPLACEMENT. Remove the nuts and bolts that fasten the towing hook in position, and remove the hook. Set the



RA PD 319209

Figure 207—Removing Spare Wheel Carrier Assembly (Tractor and Dump Truck Models)

replacement hook in position, install bolts and nuts, and tighten securely.

f. Running Boards.

(1) REMOVAL. Remove nuts and bolts that fasten running board to brackets and lift running board from brackets (figs. 204 and 205).

(2) INSTALLATION. Place running board in position on brackets, install bolts and nuts, and tighten securely.

g. Spare Wheel Carrier Assembly (Cargo Trucks).

(1) REMOVAL. Remove the clamp stud nut, raise latch control handle, and lower spare wheel to vertical position (fig. 206). Remove nuts that hold wheel to carrier support, and lift off the spare wheel and

tire assembly. Remove the cotter pin, castle nut, hinge stud, and remove carrier support assembly. The carrier support latch assembly is fastened to the frame side rail with bolts and nuts that are accessible for removal.

(2) INSTALLATION. Hold the carrier support assembly in position at support bracket, install hinge stud, and castle nut. Tighten nut to remove end play of hinge stud, and install a new cotter pin. Place the spare wheel and tire assembly in position on carrier support studs, install nuts on studs, and tighten securely. Raise spare wheel until latch engages opening in carrier support, and install clamp stud nut.

h. Spare Wheel Carrier Assembly (Tractor and Dump Trucks).

(1) REMOVAL. Take the nuts off the carrier brace arms, and remove spare wheel and tire assembly. Remove the nuts and bolts that hold the carrier assembly to frame, and lift carrier assembly off the vehicle (fig. 207). Before removing carrier (on tractor trucks), remove clip attaching hose support spring to cab. Remove bolts, nuts, and lock washers attaching shut-off valve mounting bracket to bottom of carrier. Pull trailer light plug from socket and disconnect the wires from inside of trailer light socket located on spare tire carrier.

(2) INSTALLATION. Place carrier assembly in position on frame, install bolts and nuts, and tighten securely. Install the spare wheel and tire assembly in carrier, insert arm braces through holes in arm, install nuts on braces, and tighten securely. Before installing the spare wheel and tire assembly in carrier (on tractor trucks), connect the wiring to inside of trailer light socket and insert light plug. Install the three bolts, nuts, and new lock washers attaching the shut-off valve mounting bracket to bottom of carrier. Install spare wheel and tire, securing as above. Attach the clip fastening hose support spring to cab.

2½-TON 6x6 TRUCK AND 2½- TO 5-TON 6x4 TRUCK (STUDEBAKER MODELS US 6 AND US 6x4)

Section XXX

LIGHTING SYSTEM

151. HEADLIGHTS.

a. Description. Sealed beam headlights as used on some vehicles are mounted on the fenders directly back of the radiator guard. The sealed beam lamp-unit in the light body, which consists of the filament, lens, and reflector, is replaceable only as a complete unit.

b. Adjustment of Headlights. Efficient and safe lighting requires that the headlights be aimed accurately. To aim the headlight beams, locate the vehicle on a level floor squarely facing a focusing screen (41-S-990), placed 25 feet away from the headlights (fig. 208). Position the center line of the screen directly in line with the center line of the vehicle. Measure the height from the floor to the center of the headlight units. Set the horizontal line on the aiming screen 3 inches below the height of the center of the headlights. Measure the distance from the center of the radiator guard to the center of the headlights. Move the vertical beam markers on the screen so that they are the same distance from the screen center line as the headlights are from the vehicle center line. Turn on the headlights, and light the upper beams with the foot switch. With one headlight covered, adjust the other one by loosening the support nut in order to turn the light body. Aim the beam so the hot spot is centered on the horizontal line of the screen and the vertical marker (fig. 209). NOTE: *Smoked glasses are beneficial when attempting to locate the hot spot.* After tightening the headlight support nut, recheck the adjustment. Perform the aiming operation on the other headlight. No adjustment is necessary for the headlight lower beam. If maximum lighting efficiency is to be obtained, the voltage drop in the headlight circuit must never exceed ¾ volt; all connections must be kept clean and tight, and the lens kept clean.

c. Headlight Removal. Raise hood and disconnect the wires from junction block on side of fan shroud. Remove the nut and lock washer that hold headlight to fender. Pull marker light wire out of connector, and remove clip or clips that hold headlight cables to fender. Pull the wires through the hole in fender apron, slide nut and lock washer off

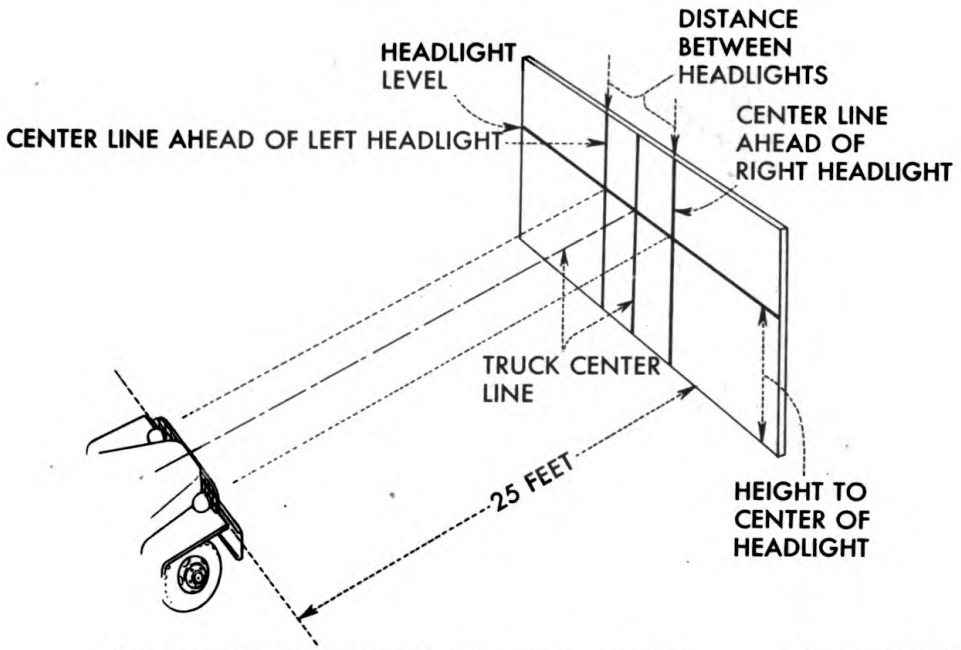
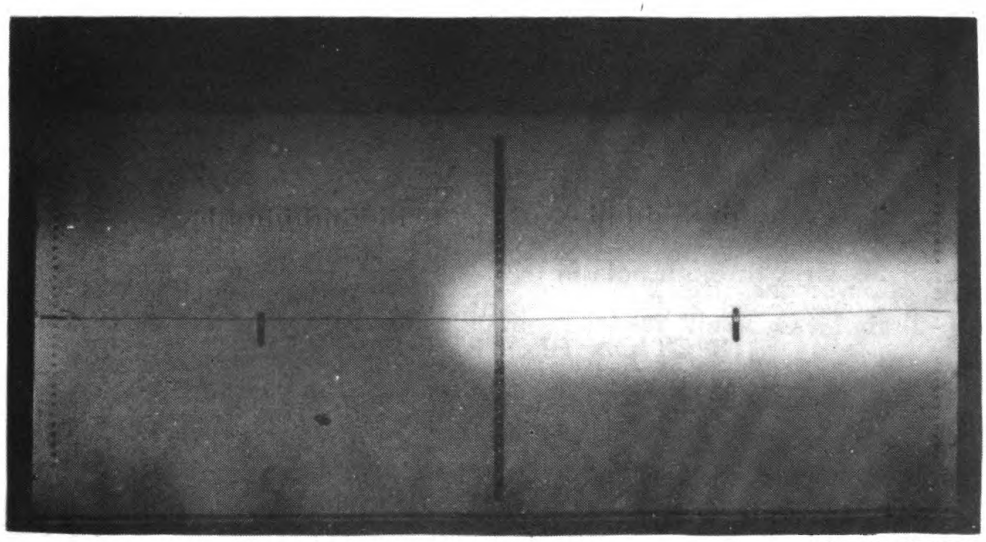


Figure 208—Headlight Aiming Chart

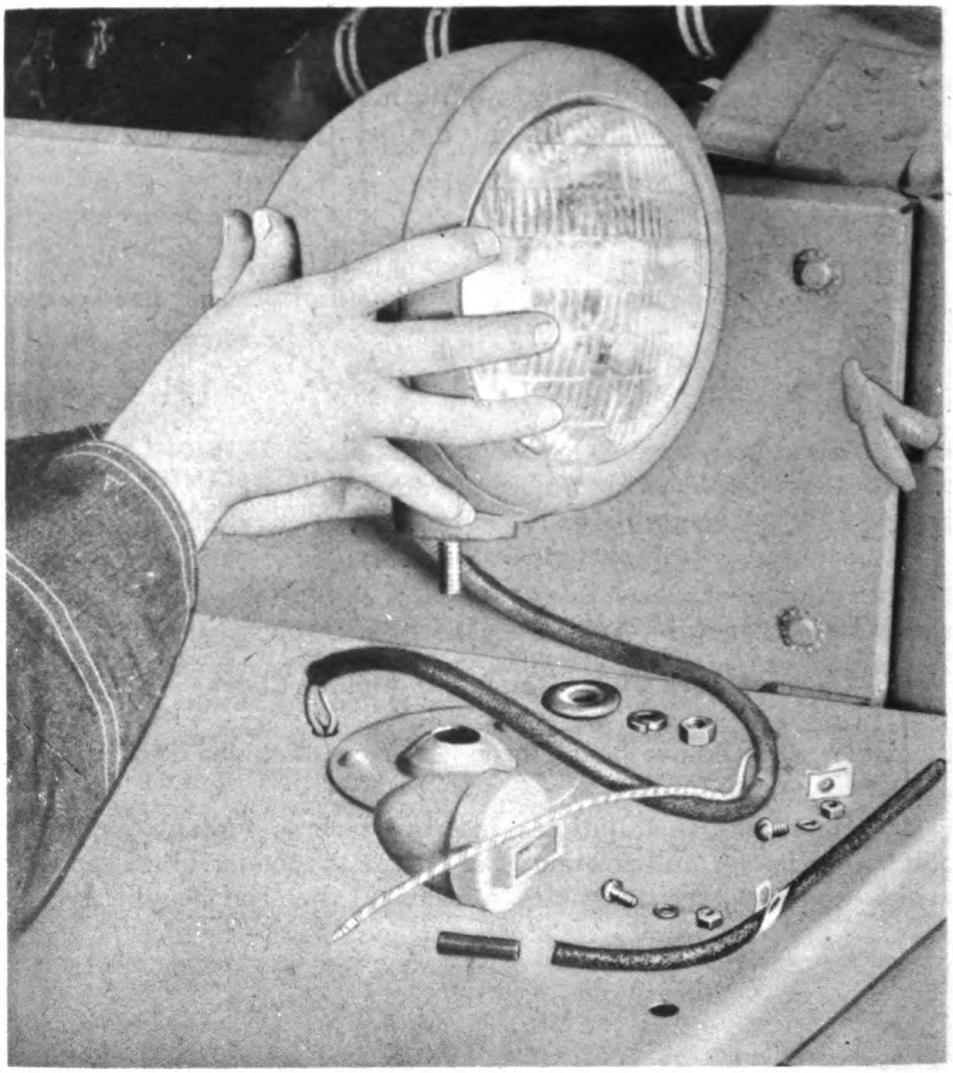
the cables, and remove headlight assembly with cables attached (fig. 210).

d. Headlight Installation. Insert the wires through mounting bolt hole in fender, and position headlight on the fender. Slide the lock washer and nut over the cables, and install them on headlight stud.



RA PD 310053

Figure 209—Lamp Unit Beam Focused on Screen



RA PD 310139

Figure 210—Removing Headlight

Push the wires through hole in fender apron, and connect to junction block. Lower hood and adjust headlight (subpar. **b** above).

JUNCTION BLOCK TERMINALS

Upper terminals—Yellow and yellow with black tracer.

Center terminals—Green and green with yellow tracer.

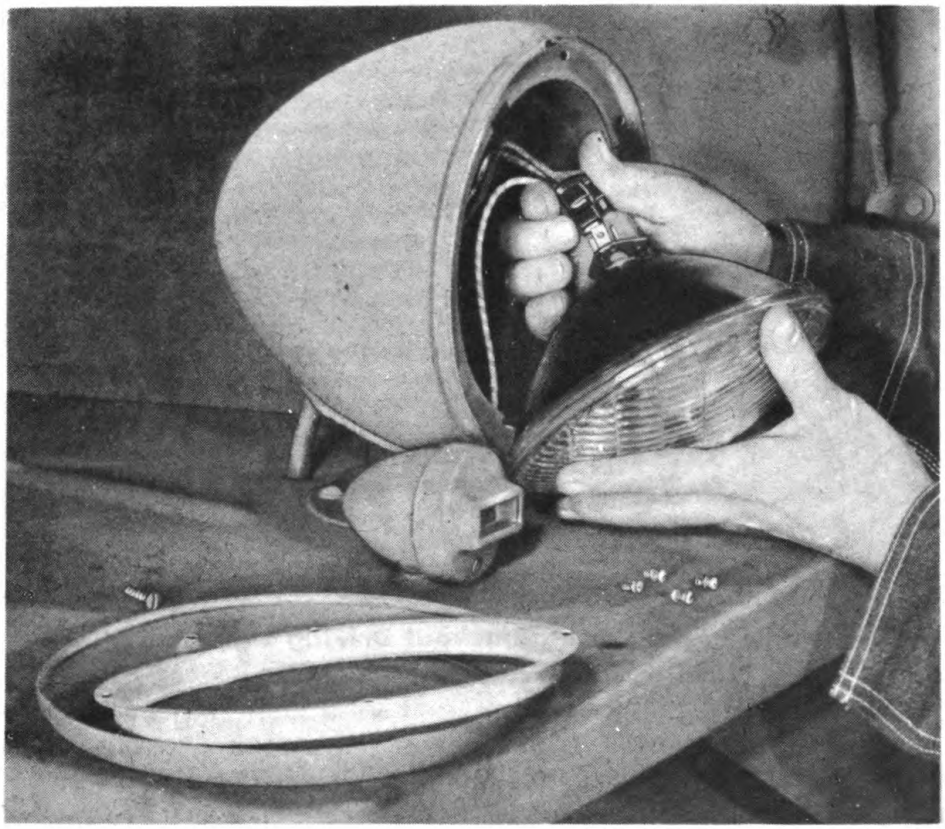
Lower terminals—Brown and oak with black tracer.

e. Headlight Unit Replacement.

(1) REMOVAL OF LAMP-UNIT. Take out clamp screw from bottom of outer rim and remove outer rim. Remove the unit retaining ring

screw and ring. Remove the lamp-unit from body, and pull the wiring plug off prongs at rear of lamp-unit (fig. 211).

(2) INSTALLATION OF LAMP-UNIT. Push the wiring plug on prongs at rear of lamp-unit, and position the unit in the light body. Install the unit retaining ring, and fasten in position with retaining ring screw. Place the outer rim in position, and install the retaining screw.



RA PD 310140

Figure 211—Replacing Lamp Unit

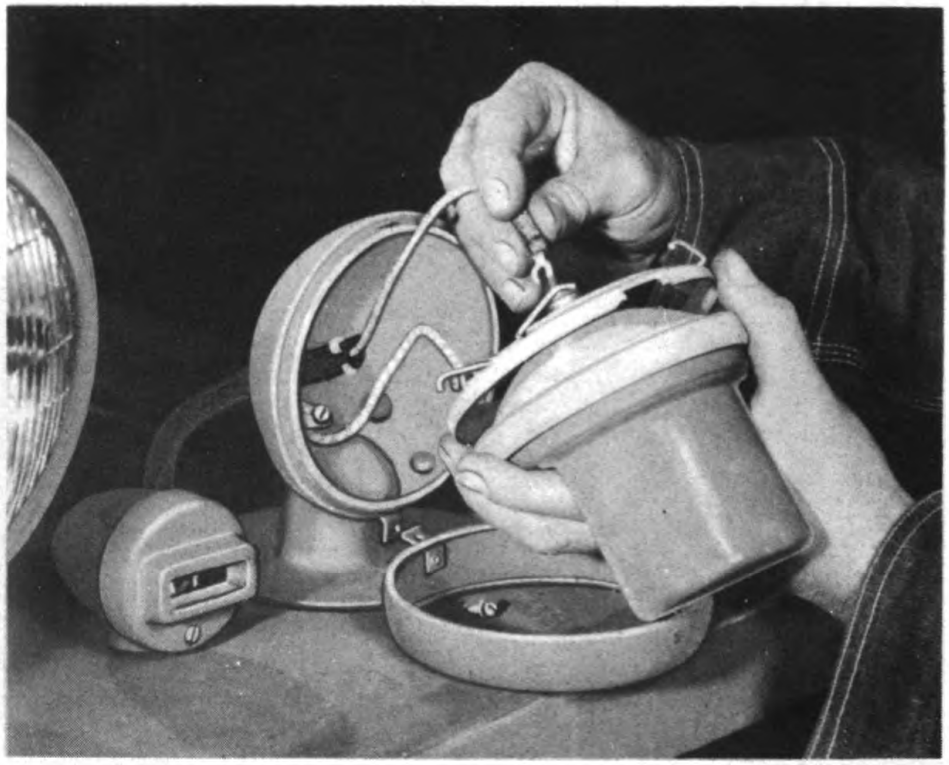
152. BLACKOUT DRIVING LIGHT.

a. Description. The blackout driving light is located on one of the fenders. Its purpose is to furnish a diffused light beam for illumination when necessary to drive under blackout conditions.

b. Blackout Driving Light Removal. Raise hood and disconnect the wire or wires from connector or junction block in the engine compartment. Remove the nut and washer holding light to fender. Remove clip that holds wire to under side of fender, and lift light assembly with wire off the fender.

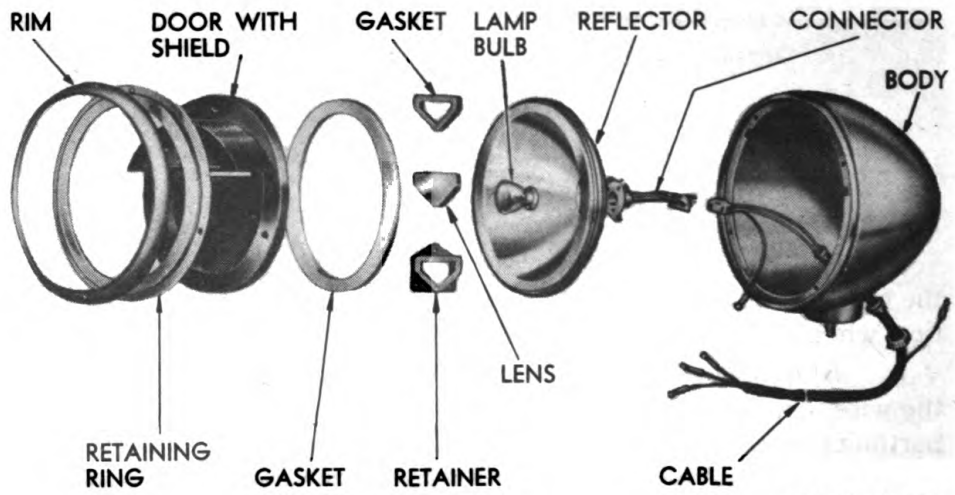
c. Blackout Driving Light Installation. Insert the wire through hole in fender, and position light on the fender. Install the washer and

2½-TON 6x6 TRUCK AND 2½- TO 5-TON 6x4 TRUCK (STUDEBAKER MODELS US 6 AND US 6x4)



RA PD 310141

Figure 212—Replacing Blackout Driving Light Lamp Unit



RA PD 310083

Figure 213—Blackout Driving Light Disassembled (Type Formerly Used on Export Vehicles)

nut on mounting stud and tighten the nut. Push the wire through hole in fender apron, connect wire or wires to connector or junction block in engine compartment, and lower hood.

d. Blackout Driving Light Lamp-unit Replacement.

(1) REMOVAL. Take out the screw and remove rim with lamp-unit from body. Remove the sealed beam lamp-unit and retainer from the rim (fig. 212). Disconnect the wires from terminals. NOTE: *On vehicles of former production remove the door screw and door from body and lamp from socket (fig. 213).*

(2) INSTALLATION. Fasten sealed beam lamp-unit to rim with retainer, and connect wires to terminals. Place retainer and lamp-unit in the body, install screw through rim, and tighten. NOTE: *On vehicles of former production, install lamp in socket, place door on body, and fasten with screw (fig. 213).*

153. BLACKOUT MARKER LIGHT.

a. Description. Blackout marker lights are mounted on the fenders. These lights incorporate a specially designed lens and a colored filter which diffuses the light beam.

b. Blackout Marker Light Replacement. Remove the light mounting base nut, and lift the light up and out of the mounting base after pulling the wire loose from the connector. To install, insert wire through hole in fender and position the light on mounting base; install the mounting base nut, and tighten securely. Connect light wire to connector.

c. Blackout Marker Light Lamp Replacement. Take out the light door screw, remove the door and door seal, push in on the lamp, turn counterclockwise, and remove from socket. Install lamp by pushing in and turning clockwise until the projections on lamp engage slots in socket. Install the door seal and door, and fasten in position with the door screw.

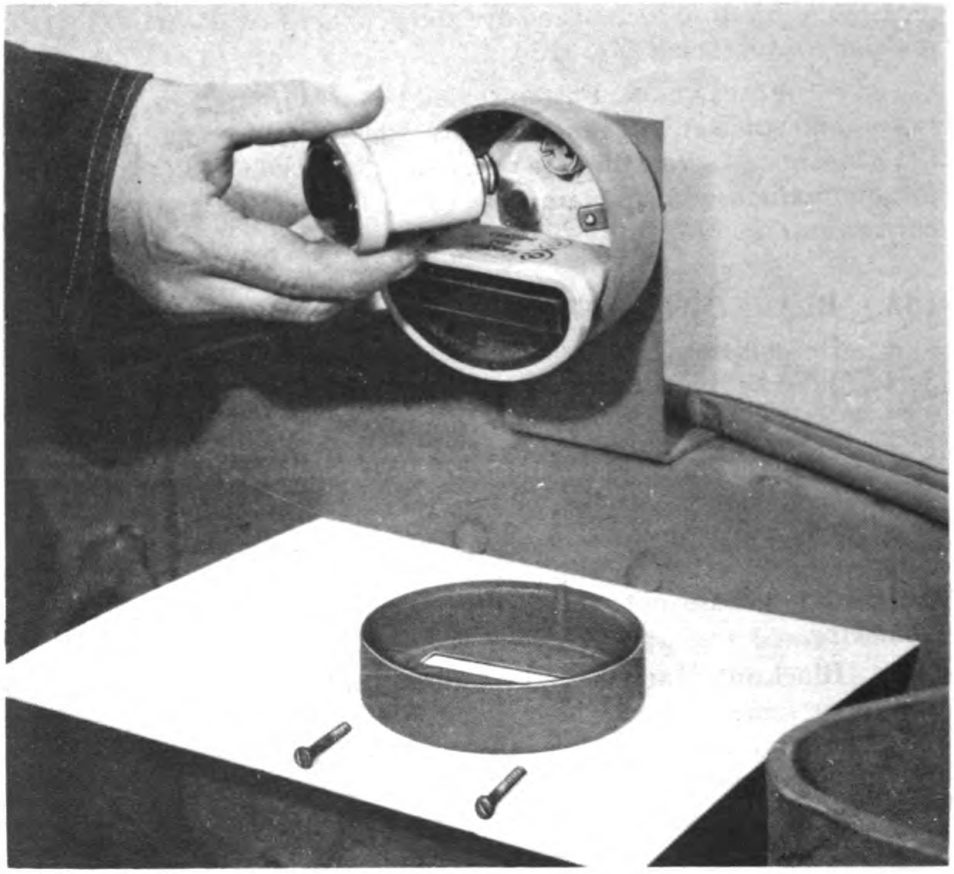
154. SERVICE AND BLACKOUT TAILLIGHTS.

a. Description. The service or blackout taillight is mounted on the rear of the vehicle. The taillight operates from the switch on the dash while the stop light is controlled by the action of the brake pedal in conjunction with a diaphragm switch located on the brake master cylinder. The taillight and stop light will operate only when the main light switch is in one of its three operating positions.

b. Service Taillight Removal. Disconnect taillight wires by pushing in on the wire plugs and turning counterclockwise until the projections on plugs disengage from slots in sockets on taillight. Remove the nuts and washers from bolts holding light in position, and take off the light.

c. Service Taillight Installation. Place taillight in position, install the nuts with lock washers, and tighten securely. Push plugs into sockets on taillight, and turn clockwise until projections engage slots in light body sockets.

d. Service Taillight Lamp-unit Replacement. Remove the door retaining screws and take off the door. Pull lamp-units out of their



RA PD 310142

Figure 214—Replacing Lamp in Service Taillight

sockets in body. Place new lamp-units in position, install the door, and door fastening screws (fig. 214).

e. Blackout Taillight. The only difference between the service taillight and blackout taillight is in the upper lamp-unit and the shape of door openings. Therefore, the replacement instructions apply to both types.

155. LIGHTING SWITCHES (figs. 215, 216 and 217).

a. Description. A selection of either the service or the blackout lights is provided for in the four-position main light switch. All lights

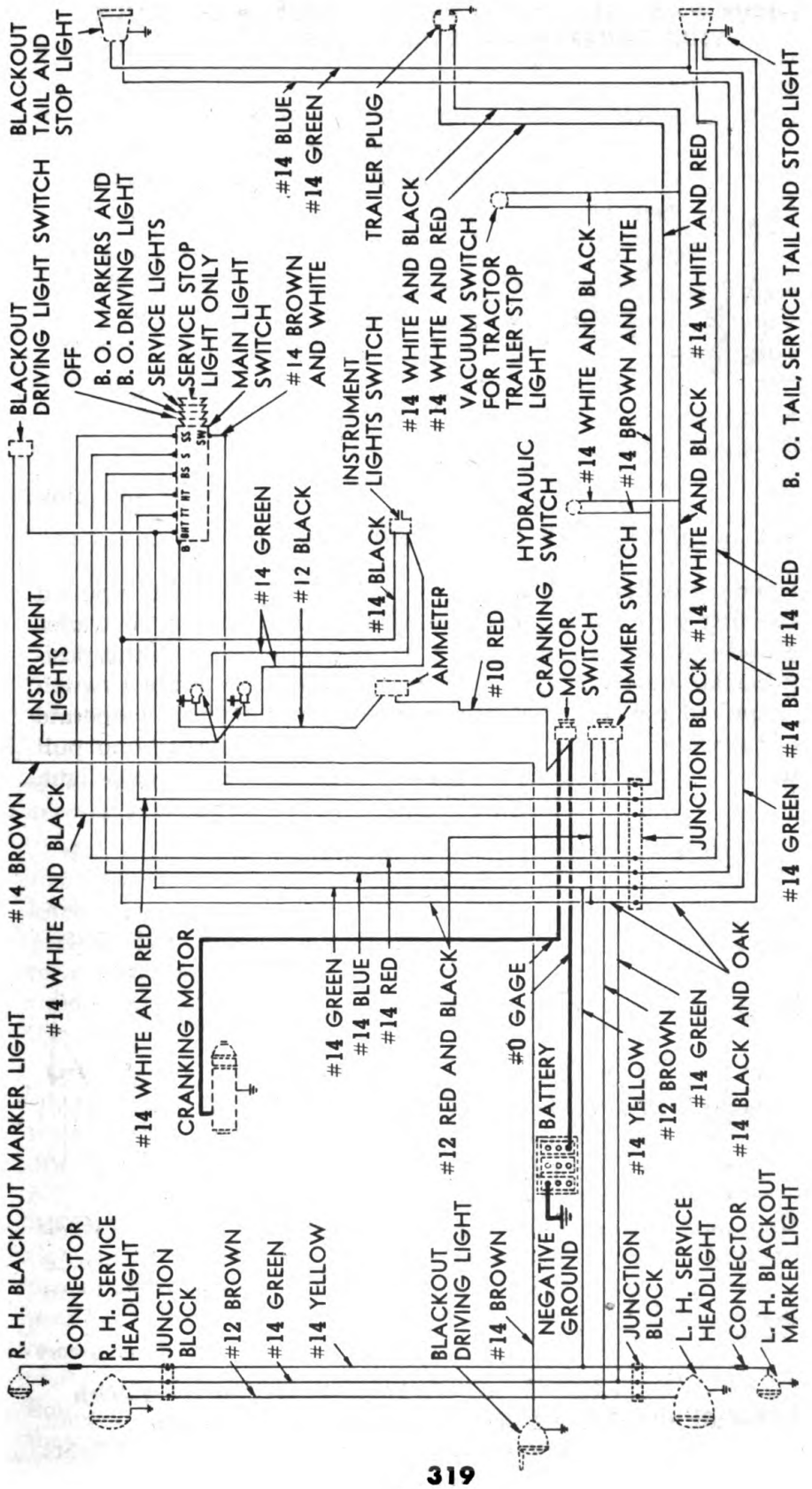


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Figure 215—Lighting Circuit Wiring Diagram

2½-TON 6x6 TRUCK AND 2½- TO 5-TON 6x4 TRUCK (STUDEBAKER MODELS US 6 AND US 6x4)

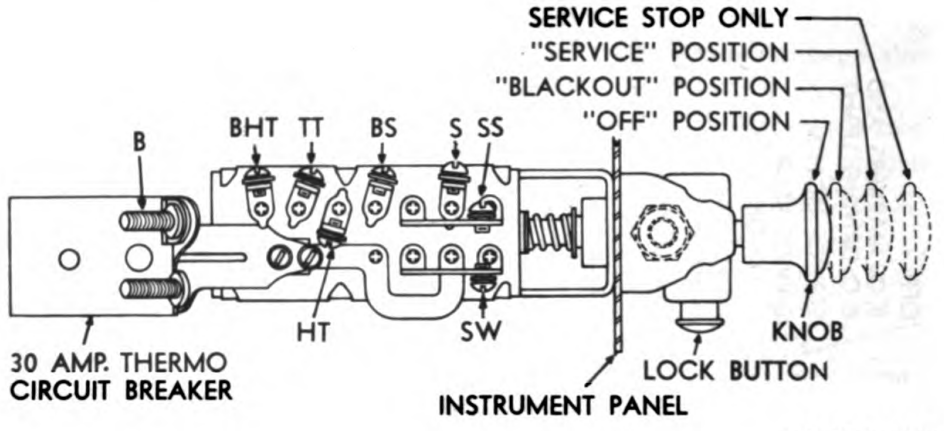

Figure 216—Main Lighting Switch

are off when the switch knob is in all the way. When the knob is pulled out to the first stop, the blackout taillight, trailer taillight (if trailer is used), and marker lights are turned on. With the switch in this position, the blackout driving light will burn if its separate control switch button is pulled outward; also, the blackout stop light will operate when a brake application is made. Press the latch stop in and pull knob out to second stop for operation of headlights, service stop light,

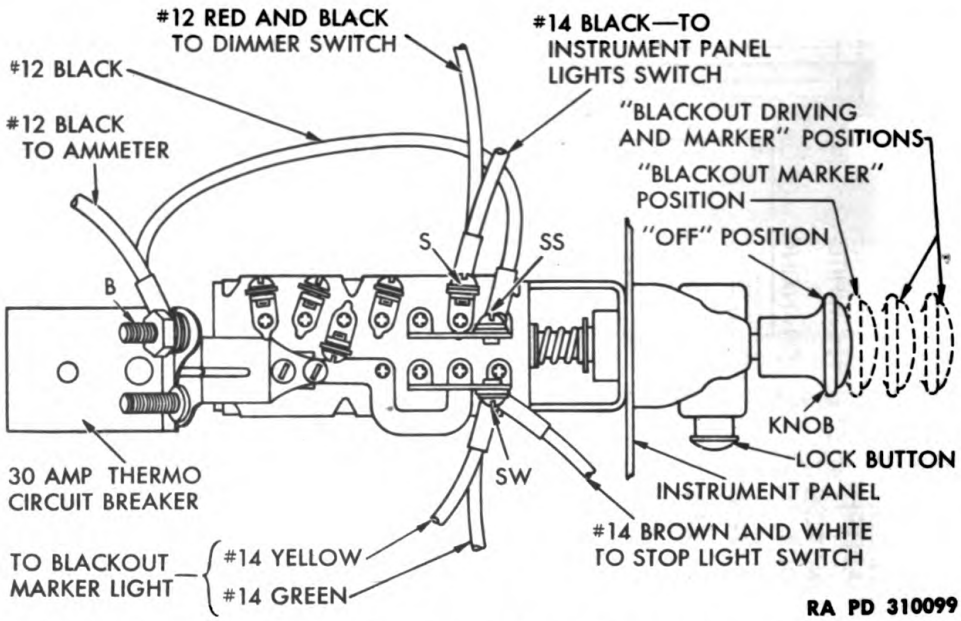

Figure 217—Main Switch and Wiring Connections Used With Blackout Driving Light Only (Former Production Vehicles for Export)

and taillight. Pulling panel lights switch knob outward will turn panel lights on when main lighting switch is in the second stop position. The service stop light only is available for daytime use when the knob is pulled outward to the third stop.

b. Main Light Switch (fig. 216).

(1) REMOVAL. Disconnect wires from switch, and mark them in some manner to facilitate installation. Take out the small set screw in light switch knob and unscrew knob. Loosen dog-point release screw in bottom of service light release, hold release button in, and remove release by pulling outward. Take off hex nut which holds switch to panel and remove switch.

(2) INSTALLATION. Place switch in position against the panel, making sure that bonding washer is in position; install the holding nut, and tighten securely. Place the release in position on switch shaft, and tighten the dog-point screw. Connect wires to proper terminals on switch, and tighten screws securely. Screw control knob on shaft, and tighten set screw.

c. Headlight Foot Switch.

(1) REMOVAL. Take out screws holding the switch to cab floor, and remove wires in such a manner that they can be installed on replacement switch in their proper location.

(2) INSTALLATION. Install the wires on switch, and tighten securely to the terminals. Place the switch in position, install the holding screws, and tighten.

d. Instrument Panel Lights Switch. To remove the instrument light switch, disconnect the wires, loosen set screw holding control knob, and unscrew the knob. Remove hex holding nut and washer, and pull switch out from the rear. To install, connect wires securely to the terminals, and place the switch in position. Install the washer, and tighten with hex holding nut. Screw the knob in position, and tighten the set screw.

e. Stop Light Switch for Vehicle. To remove the switch, pull wires from terminals, and unscrew switch from the fitting at rear of brake master cylinder. If care is used to avoid pressure on brake pedal during the removal, little or no brake fluid will leak out of fitting. NOTE: *It is well to have the replacement switch available for immediate installation; install it as soon as the original is removed.* Before tightening the switch securely, make sure master cylinder fluid is at proper level, and have an assistant depress the brake pedal. While pedal is held depressed, watch brake fluid coming out around threads on switch. When the fluid flows in a solid stream and no bubbles are visible, tighten the switch securely. Fill master cylinder with correct fluid to proper level. Push the wire connections into the terminals until they seat firmly.

2½-TON 6x6 TRUCK AND 2½- TO 5-TON 6x4 TRUCK (STUDEBAKER MODELS US 6 AND US 6x4)

f. Stop Light Switch for Tractor Trailer (Vacuum).

(1) REMOVAL. The tractor trailer stop light switch is located in the power booster vacuum line at the trailer shut-off valve located on bottom of spare wheel and tire carrier. To remove the switch, disconnect the wires from their terminals, loosen the hose clamp and pull the hose from end of switch. Unscrew switch from fitting.

(2) INSTALLATION. Apply white lead on threads, and screw switch into fitting. Slip the hose over end of switch, position clamp, and tighten clamp screw. Install wires on switch terminals and tighten nuts.

g. Blackout Driving Light Switch (On Vehicles so Equipped) (fig. 217).

(1) REMOVAL. Loosen set screw holding control knob and unscrew knob. Disconnect wires from switch, and mark them to simplify installation on replacement switch. Take off hex nut holding switch to instrument board, and remove switch from rear of board.

(2) INSTALLATION. Connect wires securely to terminals on switch. Install switch on instrument board, and tighten hex holding nut. Screw control knob on switch shaft, and tighten set screw.

Section XXXI

INSTRUMENTS

156. GENERAL (figs. 218 and 219).

a. The gages and panel lights are grouped in a panel mounted in the center of the instrument board. The panel and instruments can be removed as an assembly by taking out the holding screws after discon-

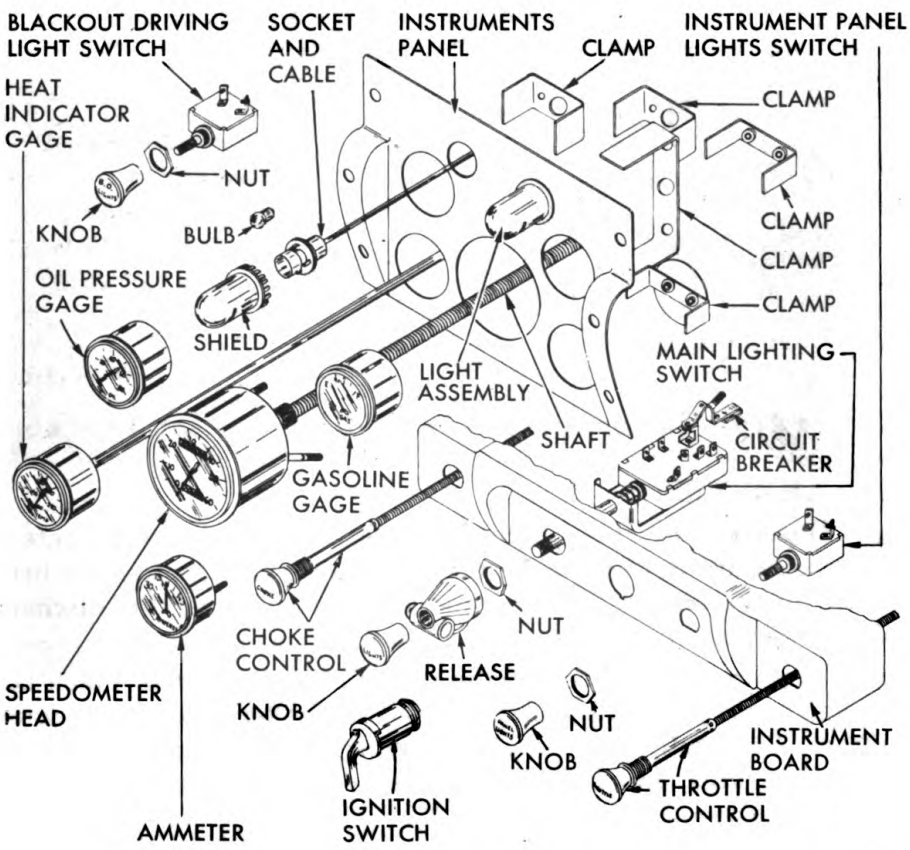

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Figure 218—Instruments and Panels

necting the various wires, speedometer cable, and oil pressure gage pipe; and removing the heat indicator element from the cylinder head. Before attempting removal of any instruments, be sure to disconnect the ground cable from the battery terminal. Identify all disconnected electrical wiring in such a manner that there will be no possibility of incorrect connections when installing instruments.

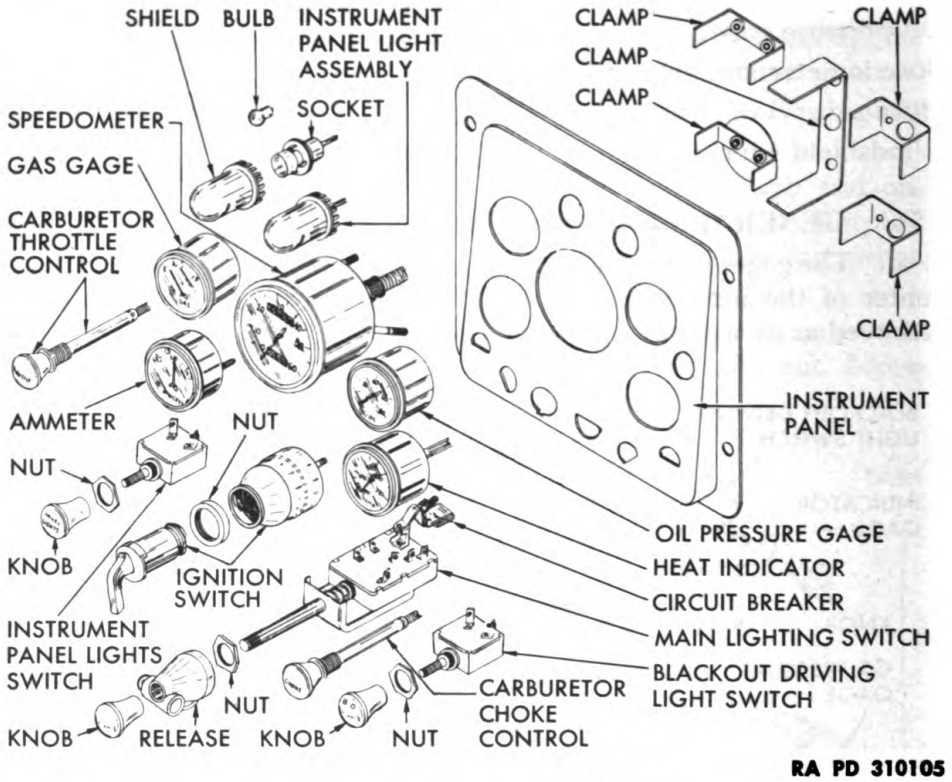


Figure 219—Instruments and Panel (Used with Soft Top Cab)

157. AMMETER.

a. Description. The ammeter indicates the discharge rate of current being drawn from the battery, the rate at which current is being supplied to the battery by the generator, and whether the discharge load or generator charging rate is predominating.

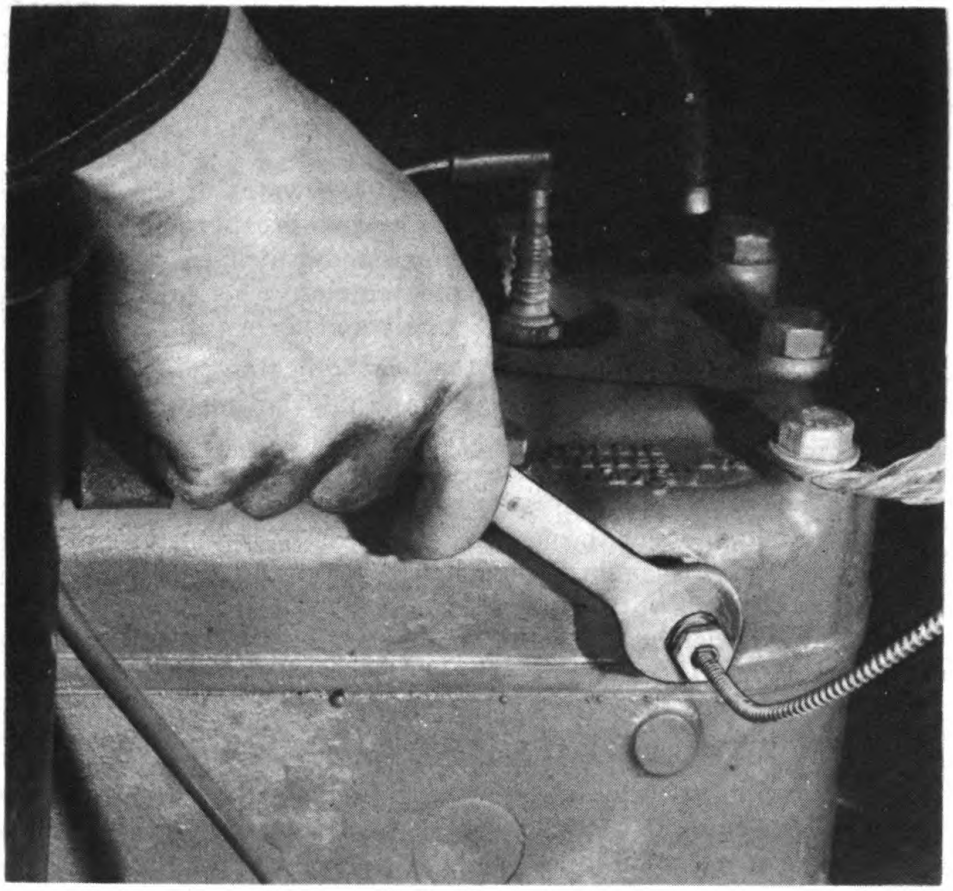
b. Replacement. Remove the nuts and lock washers which hold the clamp to the panel, disconnect wires from the terminals, and remove ammeter. To install, place the ammeter in position in the panel; install clamp, wires, nuts, and new lock washers and tighten securely.

158. FUEL GAGE.

a. Description. The fuel gage indicates the amount of fuel in the tank after the ignition switch is turned to the "ON" position. The

fuel gage circuit is protected by a circuit breaker which will automatically open the electrical circuit from the battery in the event of trouble in the gage or its connecting wires.

b. Dash Unit Replacement. Disconnect the wires, take off clamp nuts, and remove gage from panel. To install, place gage in position in panel, and install clamp and nuts. Connect wires to correct terminals.



RA PD 319211

Figure 220—Disconnecting Engine Heat Indicator

c. Tank Unit Replacement. Disconnect wire from terminal, and disconnect fuel line from fitting. Remove screws holding tank unit to tank, and remove unit by lifting out of tank. To install, place a new gasket coated with gasket sealer in position, insert unit into tank, and fasten with holding screws. Connect wire to terminal, and connect fuel line to fitting.

d. Testing Tank Unit. If the gasoline gage does not register correctly, disconnect the tank unit wire and connect the unit wire to a tank unit known to be accurate. Ground the test unit to the vehicle with a

jumper wire. Turn the ignition switch to the "ON" position and, while watching the dash fuel gage, move the float of the test unit up and down by hand. If the dash gage does not register properly, inspect the circuit between test unit and dash gage terminals, and correct any defects found. If circuit is found to be satisfactory, failure of dash gage to respond correctly to movement of test unit indicates the need for replacement of the dash gage (subpar. b above). If dash unit does respond to position changes of float on test unit, replace the tank unit (subpar. c above).

159. HEAT INDICATOR.

a. Description. The temperature of the water in the engine is indicated by the engine heat indicator. This gage is calibrated in degrees Fahrenheit. The normal operating range under average conditions is between 140° to 180 F. Should the temperature rise appreciably above 180° F, stop the engine immediately and correct the cause.

b. Replacement. To remove the heat indicator, remove the element from cylinder head by unscrewing the nut from adapter (fig. 220). CAUTION: *Do not kink or bend the tube sharply.* Remove the dash grommet, and pull tube through the dash. Take off nuts holding gage clamp to the panel, and remove the gage. To install the heat indicator, insert tube and element through panel and dash, and install the dash grommet. Position gage on the panel, and install the clamp nuts. Coat the adapter threads with white lead, screw the element nut into the adapter in cylinder head, and tighten securely. CAUTION: *Do not bend or kink the tube.*

160. OIL PRESSURE GAGE.

a. Description. The oil pressure gage indicates the pressure at which oil is being circulated through the lubricating system of the engine. At a speed of 35 miles per hour with oil of the proper quality and viscosity, a normal reading of 35 to 40 should show on the gage. If the oil pressure falls to zero, or drops appreciably during operation of the engine, stop the engine immediately and determine the cause of pressure failure. Report any appreciable difference in oil pressure readings, or any erratic action of the indicator.

b. Replacement. With engine stopped, disconnect oil pressure pipe from gage fitting, remove clamp nuts holding gage to panel, and remove the gage. To install, place the gage in position, install clamp with nuts, and connect oil pressure pipe to gage fitting.

161. SPEEDOMETER AND DRIVE ASSEMBLY.

a. Description. The speedometer indicates the road speed of the vehicle in miles per hour. The indicator hand is specially treated

and finished so that its position may be observed during vehicle operation under conditions of complete darkness. An odometer, incorporated at the top of the speedometer face, registers the number of miles the vehicle has been driven. The trip mileage indicator on the lower portion of the speedometer face may be set back to zero by turning the control stem on the back of the speedometer case.

b. Speedometer Head Replacement. To remove speedometer from instrument panel, disconnect flexible shaft assembly by taking off the shaft to head fastening nut, and pull driving core out of opening in speedometer head. Remove the wing nuts holding clamp to instrument panel, and pull the head out of panel. To install, place the speedometer head in position, and install the clamp and wing nuts. Insert flexible shaft core into opening in speedometer head drive shaft, and fasten the flexible shaft assembly to head with shaft to head fastening nut.

c. Flexible Shaft Assembly Replacement. To remove speedometer flexible shaft assembly, disconnect the shaft to head fastening nut, and pull shaft driving core from opening in speedometer head drive shaft. Disconnect the flexible shaft assembly from transfer case. Remove the holding clips from shaft. Take shaft grommet out of dash, and pull speedometer head end of shaft through hole in dash. To install, connect shaft to transfer case, and push speedometer head end of shaft through hole in dash. Install the dash grommet, and fasten shaft in position with clips. Insert the driving core of flexible shaft assembly into speedometer head drive shaft, and fasten securely with the nut.

162. HORN.

a. Description. The vibrator-type horn is mounted on the dash under the hood, and the horn button is located in the center of the steering wheel. The horn circuit is protected by a circuit breaker which will automatically open the electrical circuit from the battery if the switch, horn, or connecting wires fail to function properly.

b. Replacement. To remove the horn, take out screws holding horn to dash bracket. Remove plate with threaded holes, and lift horn from bracket. Disconnect wires from terminals on horn, making certain of their respective location in order to properly connect wires when horn is installed, and remove horn. Connect wires to replacement horn, position horn on bracket, and install the holding screws into tapped holes in top fastening plate.

163. WINDSHIELD WIPERS.

a. Steel Top Cab.

(1) DESCRIPTION. Two vacuum-type windshield wipers are used. They are controlled by push-pull buttons mounted on each wiper body. To operate the wiper, pull the button out, and push button in to stop the wiper.

2½-TON 6x6 TRUCK AND 2½- TO 5-TON 6x4 TRUCK (STUDEBAKER MODELS US 6 AND US 6x4)

(2) REMOVAL. Remove the windshield wiper arm and blade assembly. Take off one section of windshield garnish moulding, and remove tacks that hold the head lining to nailing strip. Disconnect vacuum tube from wiper motor, and pull the head lining down to provide access for removal of nuts from mounting screws. Remove nuts from mounting screws, take off the wiper motor outer fastening nut, and remove the motor.

(3) INSTALLATION. Place the wiper motor in position, and install the washers and outer fastening nut. Install lock washers and nuts on wiper motor mounting screws and tighten securely. Connect vacuum tube to wiper motor and fasten head lining to nailing strip with tacks. Install the garnish moulding section, and fasten the wiper arm and blade assembly on wiper motor shaft. Make certain that the arm is positioned to permit a full stroke on the windshield glass.

b. Soft Top Cab.

(1) DESCRIPTION. Two vacuum-type windshield wipers are attached to the windshield upper channel, and are controlled by a push-pull button on each wiper body. Pull the button out to start the wiper and push button in to stop it.

(2) REMOVAL. Remove the wiper arm and blade assembly. Pull vacuum hose from wiper body, take out wiper body to windshield upper channel attaching screws, and remove wiper body.

(3) INSTALLATION. Place wiper body in position on windshield upper channel, and securely tighten attaching screws. Connect vacuum hose to wiper motor fitting, and install wiper arm and blade assembly. Check the blade travel for full stroke on windshield glass.

Section XXXII

POWER TAKE-OFF

164. DESCRIPTION AND TABULATED DATA.

a. Description. The power take-off unit is mounted on the left side of the transmission, and drives the winch and/or hoist pump through connecting drive shafts on vehicles so equipped. The operation of the power take-off is governed by means of control levers in the cab. For winch control see paragraph 167. For hoist pump control see paragraph 178.

b. Data.

Make	Spicer	Detroit Harvester
Model (with winch)	YR6S	6100-6
(with winch and hoist)	YAG6M	
Speeds on winch:		
Pulling	2	2
Reverse	1	1
Neutral	2	1
Speed on hoist	1	
Drive	From transmission	From transmission
Control	Shift levers in cab	Shift lever in cab

165. ADJUSTMENT IN VEHICLE.

a. Winch-equipped Vehicles. The only external adjustment to the power take-off involves setting the linkage connecting the unit with the shift lever. Remove the clevis pin holding the adjustable linkage rod in position. Move the shift lever as necessary to engage lock within the driver's compartment which holds the shift lever in "NEUTRAL." Work the power take-off shifting mechanism at the unit until the sliding gear is in the neutral position nearest rear of power take-off unit. Change the effective length of the adjustable linkage rod by turning clevis until the clevis pin hole is in alinement with hole in shift shaft eye. Install the clevis pin and a new cotter pin.

b. Hoist-equipped Vehicles. Adjustment of controls for the power take-off is accomplished by means of a clevis on operating rod attached to shift shaft. Remove cotter pin, clevis pin, and loosen clevis lock nut. Adjust length of rod so that shift shaft can be moved into the fully engaged or disengaged position without binding. Install clevis pin and a new cotter pin, and tighten clevis lock nut.

2½-TON 6x6 TRUCK AND 2½- TO 5-TON 6x4 TRUCK (STUDEBAKER MODELS US 6 AND US 6x4)

166. POWER TAKE-OFF CONTROLS AND LINKAGE.

a. Winch-equipped Vehicles.

(1) DESCRIPTION. The power take-off used on vehicles equipped with a winch has a shift lever located just to the left of transmission shift lever. It is connected to the power take-off shift shaft by means of adjustable control rods and a relay lever located on frame cross member support. The power take-off has "HIGH", "LOW", "REVERSE", and two "NEUTRAL" positions. It must be shifted to the proper position or speed as required for operation of the winch. When the winch is not in use, the power take-off shift lever must be locked in "NEUTRAL" with the lock which is pivoted on the seat riser.

(2) REMOVAL. Disconnect operating rods by taking out cotter pins from clevis pins, and remove the clevis pins and rods. Remove shift lever assembly from the transmission as outlined in paragraph 102 **c**. Loosen the transfer case "LOW" and "HIGH" shift operating lever clamp screw, and remove the lever and Woodruff key. Slide power take-off shift lever off the transfer case control and shift lever shaft.

(3) INSTALLATION. Place the power take-off shift lever on the transfer case control and shift lever shaft. Install transfer case "LOW" and "HIGH" shift operating lever and Woodruff key on shaft. Properly position operating lever, and tighten the clamp screw. Reinstall the shift lever assembly as outlined in paragraph 102 **d**. Place the operating rods with adjustable clevises in position, and install the clevis pins. Install new cotter pins after the rods have been adjusted as outlined in paragraphs 102 **b** and 165 **a**.

b. Hoist-equipped Vehicles.

(1) DESCRIPTION. The power take-off on vehicles equipped with a hoist has a control lever placed in the cab back of the driver's feet. To engage power take-off for pump operation, disengage engine clutch, pull up on right control lever, and release clutch pedal. To stop pump operation, disengage clutch, push right control lever down, and release clutch pedal.

(2) REMOVAL. Disconnect and remove the operating rod by removing cotter pin and clevis pin from each end. Disconnect control rod by removing cotter pin and clevis pin at cross shaft lever, take ball off the control rod, and pull rod down through floor. To remove cross shaft, take out cotter pin from end of shaft, and remove flat washer and bell crank. Loosen clamp screw, remove lever, and pull out shaft.

(3) INSTALLATION. Place cross shaft in support, install lever, and tighten clamp screw. Be sure lever is in same position as it was originally. Install bell crank, washer, and a new cotter pin. Install control rod through floor, connect to cross shaft lever with clevis pin and new cotter pin, place ball on rod, and tighten. Install operating rod with clevis pins and new cotter pins. Adjust linkage (par. 165 **b**).

Section XXXIII

WINCH

167. DESCRIPTION AND TABULATED DATA (fig. 221).

a. Description. The power winch on models so equipped, is mounted on the front end of the vehicle. Power for operating the winch is obtained from the engine through the power take-off unit (par. 164). A drive shaft connects the power take-off unit to the winch. A hand-operated sliding clutch at the right side of the winch drum controls the engagement or disengagement of the drum. Winch pulling speeds are based on a maximum engine speed of 1,000 revolutions per minute, which is not to be exceeded while the winch is in operation.

b. Data.

Winch make	Heil
Model	125S
Drive	From power take-off at transmission
Drive shaft make	Spicer or Cleveland

168. ADJUSTMENT IN VEHICLE.

a. Worm Shaft Brake Adjustment. The tension on the brake spring can be increased by tightening the adjusting nut under the brake housing. This adjustment will be necessary if the load on the winch cable slips when the power take-off is in "NEUTRAL." Tighten the adjusting nut ½ turn at a time, and lock with the lock nut. If slippage still occurs, tighten the adjusting nut another ½ turn. On completing the adjustment, make sure that the lock nut is tightened securely. It is possible that the brake will heat up, even though it is in correct adjustment. Whenever it is not possible to hold the hand on the brake housing because of heat developed, release the brake adjustment slightly.

b. Shifter Bracket Brake Adjustment. The purpose of the drag brake is to prevent the drum from overrunning when the cable is unwound by hand. To adjust the shifter bracket brake, move the shift yoke handle to the right as far as possible. Insert a screwdriver or wedge between the drag brake and the head of the tension bold, moving it outward sufficiently to permit loosening the lock nut, and loosen

2½-TON 6x6 TRUCK AND 2½- TO 5-TON 6x4 TRUCK
(STUDEBAKER MODELS US 6 AND US 6x4)

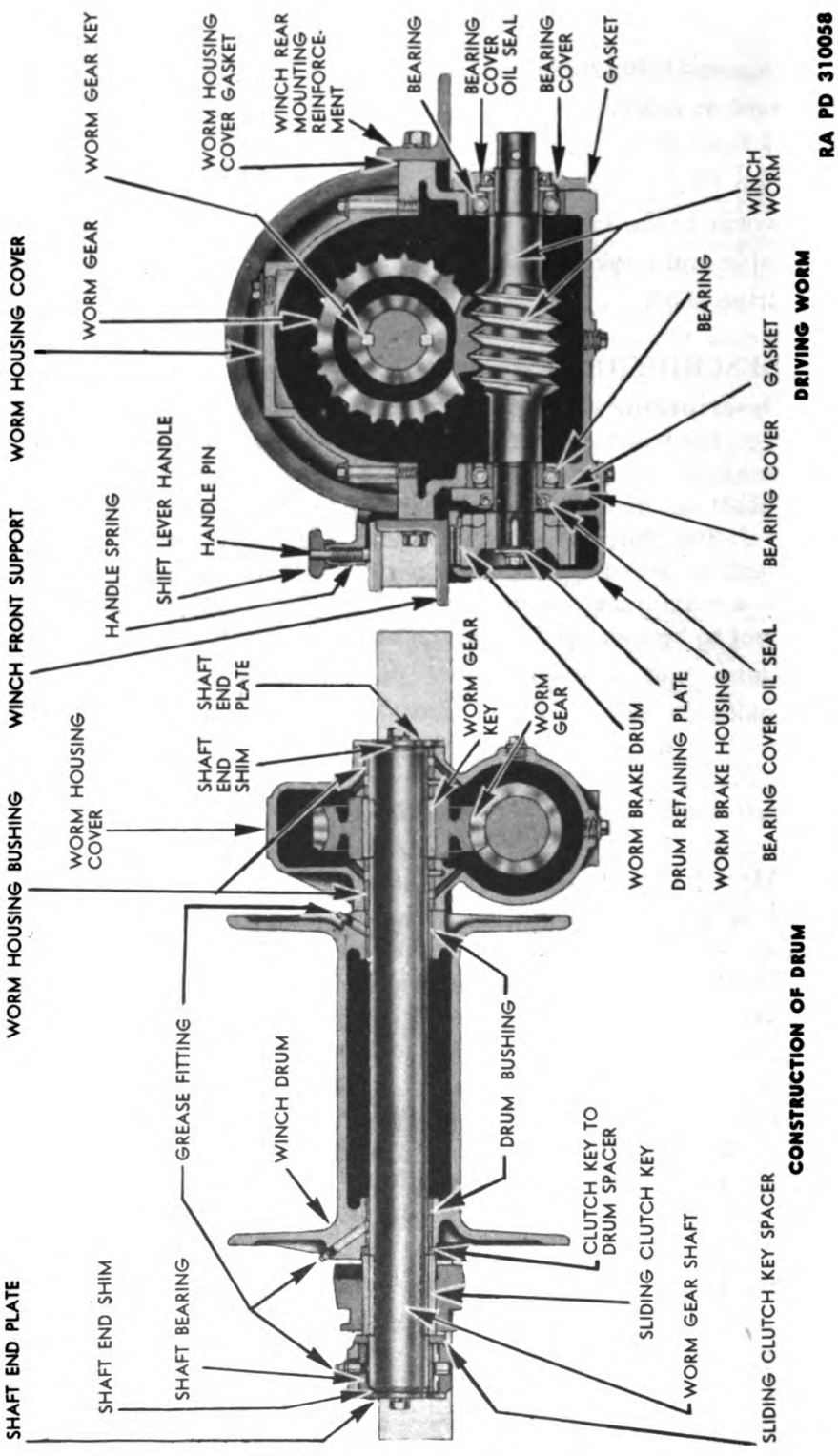


Figure 221—Cross-sectional Views of Winch

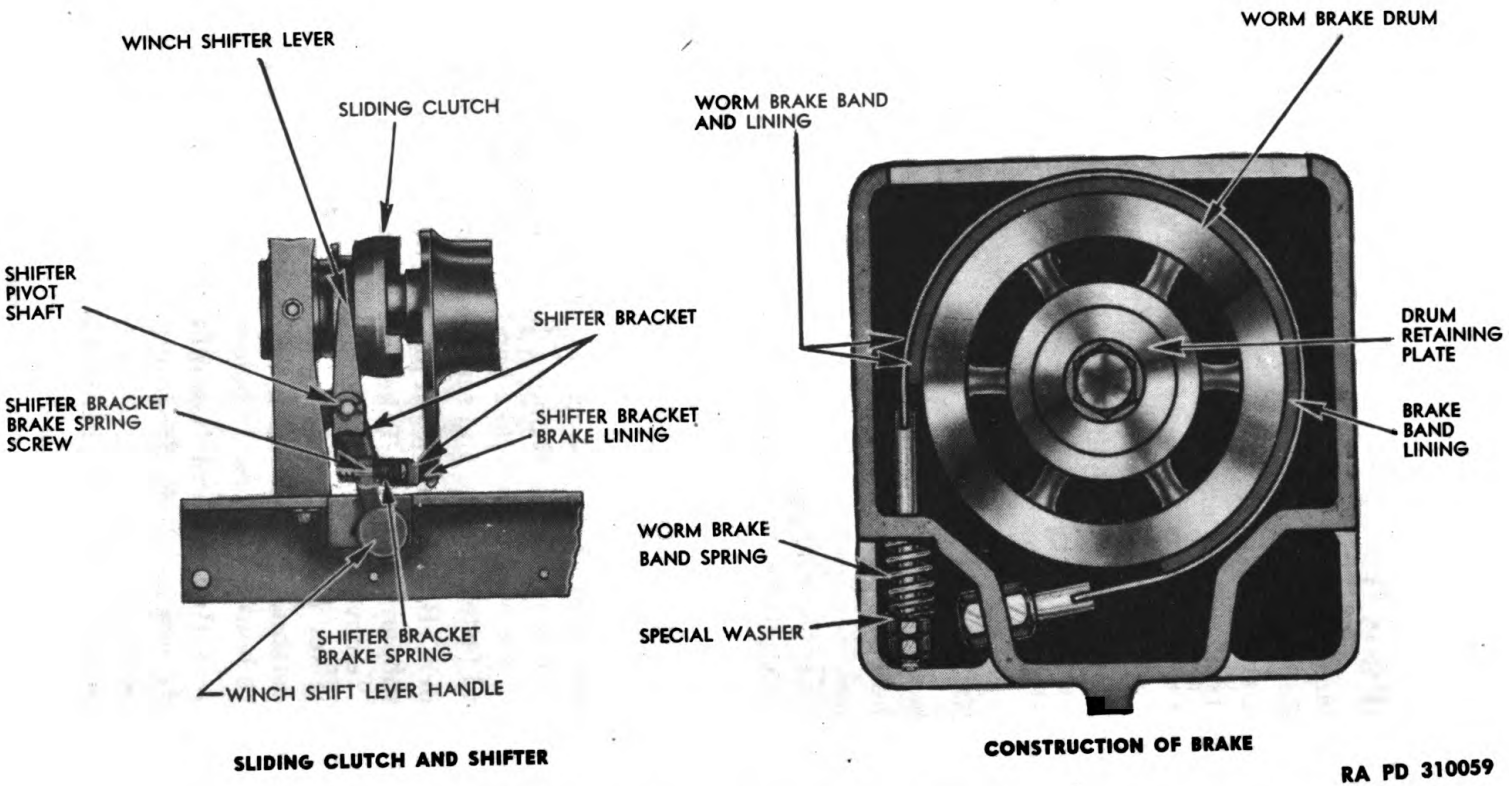


Figure 222—Winch Clutch and Brake

the adjusting nut. Test the brake adjustment and, if satisfactory, tighten the lock nut. Repeat the procedure if the initial adjustment is not satisfactory.

169. REMOVAL.

a. Place rope sling around winch and support weight of winch with a hoist. Remove drain plug from bottom of gear case on left side, drain lubricant, and install plug. Disconnect drive shaft from winch worm shaft by removing cotter pin, shear pin, and slide flange rearward off the worm shaft. Lower front end of shaft to floor. Remove bolts, nuts, and lock washers, holding front angle support to clips on frame side extension. Remove bolts, nuts, lock washers, and cap screws that hold rear of winch to frame front cross member. Lift winch, move it forward, and out of frame extensions.

170. INSTALLATION.

a. Place winch in position by using hoist. Install bolts, nuts, and lock washers in front support angle and clips on frame side extension. Install bolts, nuts, lock washers, and cap screws through frame front cross member and into rear of winch. Tighten all bolts, nuts, and screws securely. Install drive shaft flange on winch worm shaft, shear pin, and new cotter pin. Install proper amount of lubricant (par. 24 c (6)).

171. WINCH WORM BRAKE BAND AND DRUM (fig. 222).

a. Worm Brake Band Assembly Removal. Remove winch assembly (par. 169). Take out screws, and remove brake housing from front end of worm housing. Remove the locking nut, adjusting nut, and spring from the end of the brake band adjusting screw. Take the nut off the band fastening bolt, and remove the band from the drum.

b. Worm Brake Drum Replacement. Remove worm brake housing (subpar. a above). Take out the lock screw, drum retaining plate, and remove drum. To install the drum, place it on the worm shaft so the key enters the keyway in drum hub. Place the retaining plate in position, install the lock screw, and tighten securely. Install worm brake housing (subpar. c below).

c. Worm Brake Band Assembly Installation. Place band in position on drum, install the nonadjustable end of band in position, and fasten securely with lock nut. Push the adjusting screw end of band through opening in the housing, and install the spring and adjusting nut. Install the brake housing, and fasten securely with screws. Install winch assembly (par. 170). Adjust the brake as outlined in paragraph 168 a.

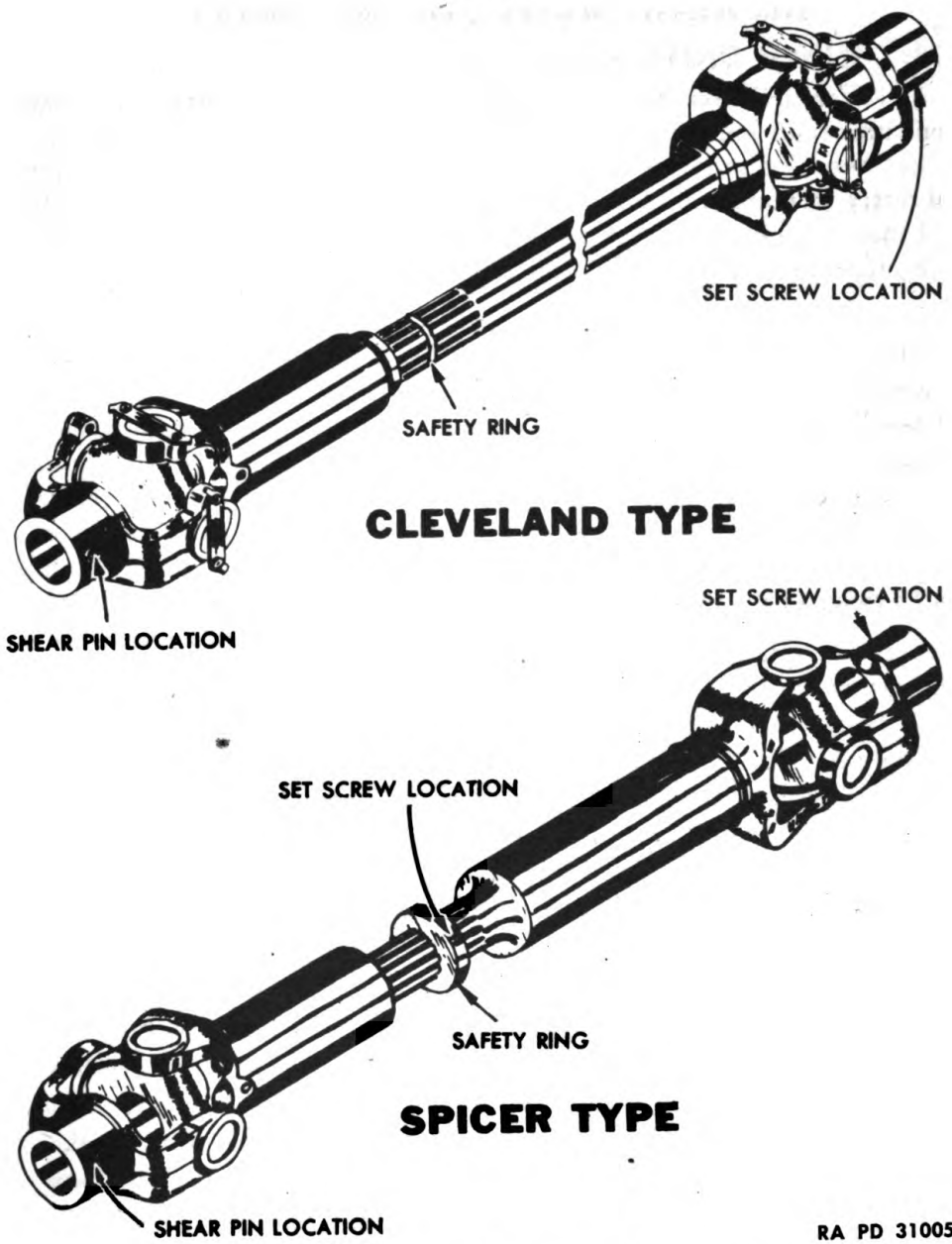


Figure 223—Winch Drive Shaft with Joints

172. WINCH CABLE AND HOOK ASSEMBLY.

a. Winch Cable Replacement. Unhook cable and chain from tow hook and pull cable from drum. Loosen nuts on U-bolt ends which extend through drum flange, and pull cable end from U-bolt. To install cable, insert the end through U-bolt on drum flange, tighten the U-bolt nuts, and run winch slowly to wind cable on drum. Make certain that cable is well lubricated (fig. 46) and winds evenly on the drum.

2½-TON 6x6 TRUCK AND 2½- TO 5-TON 6x4 TRUCK (STUDEBAKER MODELS US 6 AND US 6x4)

173. WINCH DRIVE SHAFT (fig. 223).

a. Winch Drive Shaft Replacement. Remove cotter pin from front universal joint flange shear pin, and pull out the pin. Loosen the socket head set screw in rear flange, and remove the drive shaft with universal joints assembly. To install, place the assembly in position, and install socket head set screw in the rear flange. Install shear pin in front flange with a new cotter pin.

Section XXXIV

DUMP BODY OPERATING UNITS

174. DESCRIPTION AND TABULATED DATA (fig. 224).

a. Description. A drive shaft and universal joint assembly is used to transmit power from the power take-off to the pump assembly mounted on the frame left side member. The pump forces the fluid, when the pump valve is open, through a high pressure hose line to the hoist cylinder. The hoists used on these vehicles are single-cylinder types. On the rear dump body, a cast iron cylinder is used, the piston rod being connected to a cross shaft having levers which operate the linkage attached to the body. The side dump body uses a steel cylinder, and the piston rod is connected directly to the body.

b. Tabulated Data.

Drive shaft with universal joints ..... Blood Bros.
Pump Heil-AA-165
Hoist ..... Heil

175. HOIST PUMP DRIVE SHAFT.

a. Removal. Remove socket head set screw holding front universal joint flange on power take-off shaft. Drive out tapered pin holding the rear universal joint flange on pump shaft, and move rear portion of drive shaft forward on slip joint to remove rear universal joint flange from pump shaft. Slide front universal joint flange off power take-off shaft, and remove complete drive shaft assembly.

b. Installation. Install Woodruff key in keyway on power take-off shaft, slide front universal joint flange on shaft, making sure key is in position, and tighten socket head set screw securely. Slip rear universal joint flange on pump shaft. Aline holes and drive tapered pin into flange and pump shaft. Lubricate universal joints and slip joint through fittings provided.

176. HOIST PUMP ASSEMBLY.

a. Removal. Raise the body to maximum height, and block body securely. Disconnect pump valve control rod from bell crank on pump by removing cotter pin and clevis pin. Drive out tapered pin holding drive shaft rear universal joint flange on pump shaft, and slide flange off pump shaft. Place container under hose lines at rear of pump, and

disconnect both hose from pump, allowing all fluid to drain from hoist cylinder through hose. Remove bolts, nuts, and washers holding pump bracket on frame side member, and remove pump with bracket.

b. Installation. With body raised and blocked securely, attach pump and bracket to left side member with bolts, nuts, and washers. Connect both hose lines to union adapters on rear of pump. Install drive

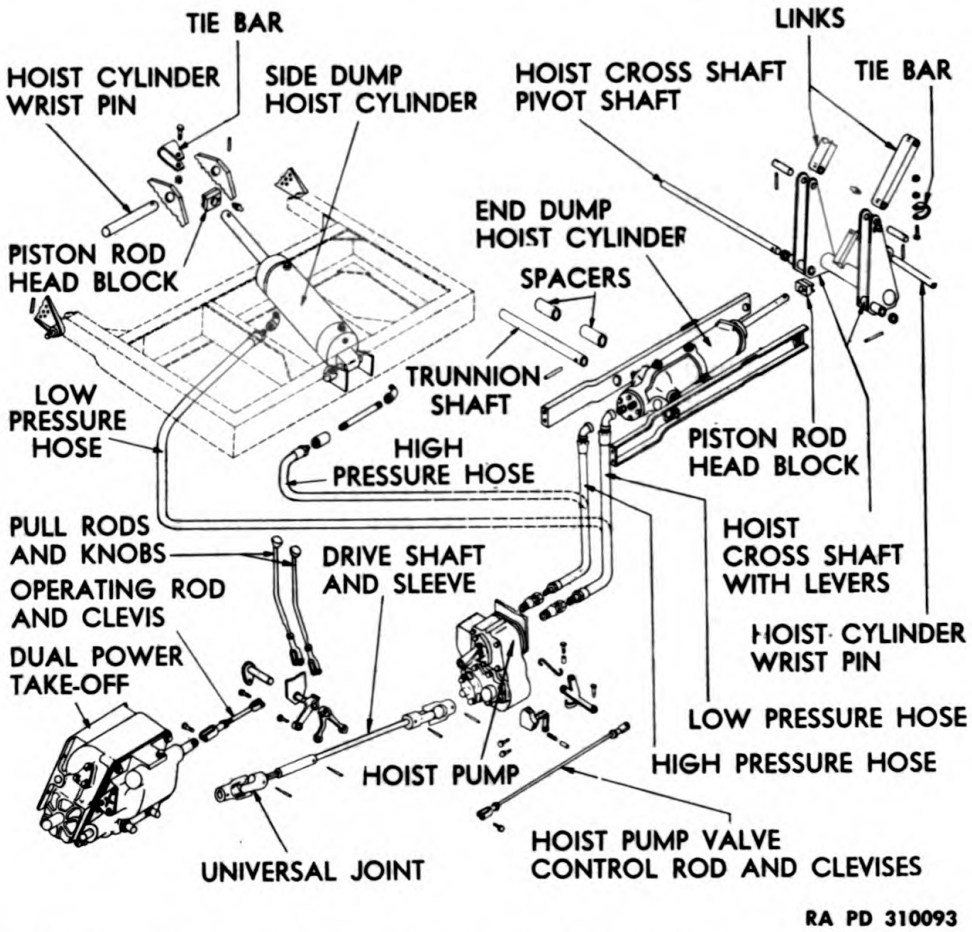


Figure 224—Dump Body Operating Mechanisms, Disassembled

shaft rear universal joint flange on pump shaft, aline holes in flange and pump shaft, and drive tapered pin into flange and shaft. Raise pump valve control rod to bell crank on pump, insert clevis pin, and a new cotter pin. Refill hoist cylinder to capacity with proper grade of new engine oil (par. 177 **c**). Adjust linkage (par. 178 **b**).

177. HOIST CYLINDER ASSEMBLY.

a. Removal. Raise the body to maximum height and block securely. Disconnect hose from pump, remove hose from cylinder, and

DUMP BODY OPERATING UNITS

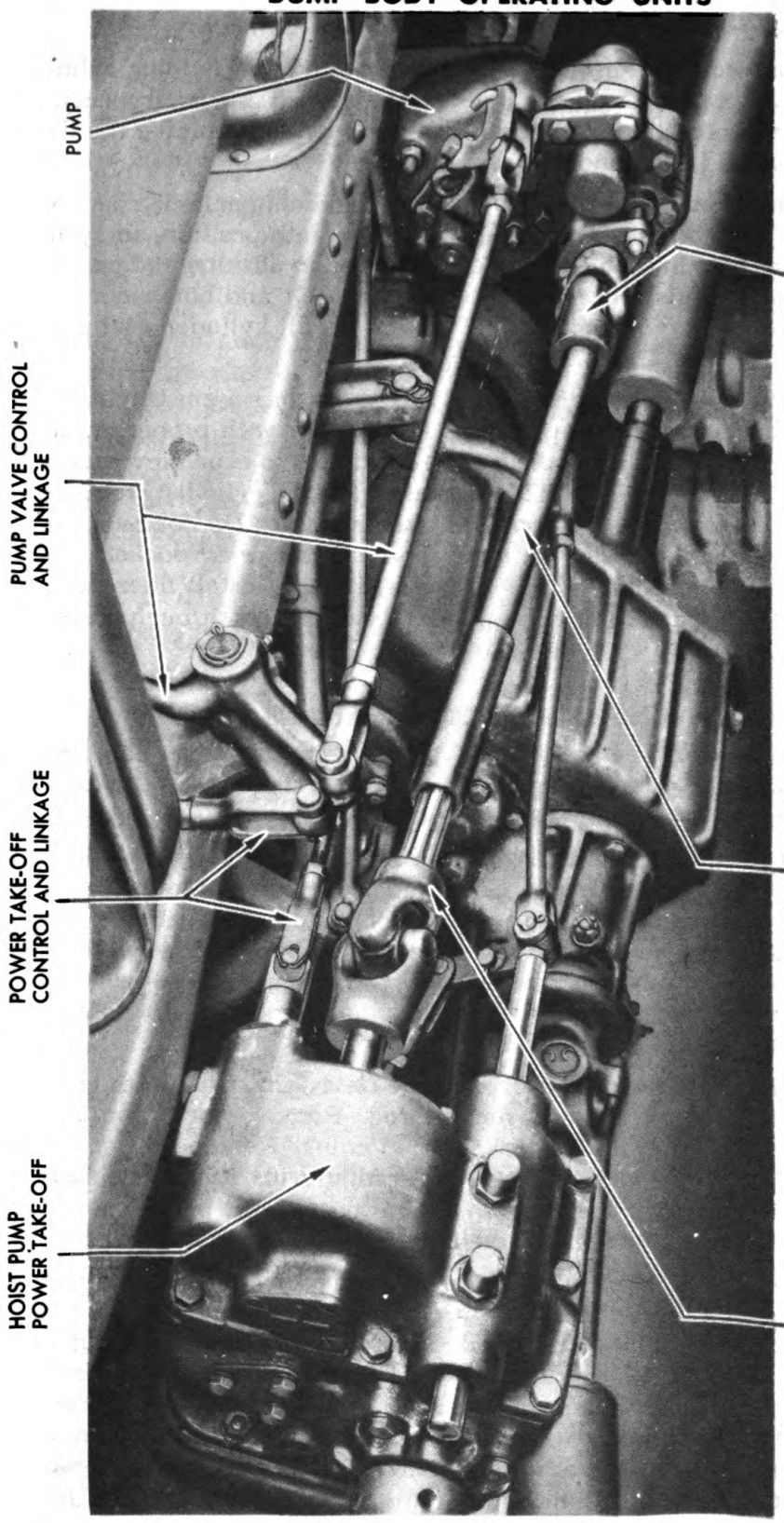


Figure 225—Dump Body Operating Units and Linkage

drain fluid into container. Take out groove locking pins holding cylinder pivot pin in frame. Drive the pivot pin through frame until spacers and cylinder can be slipped off pivot pin. Remove bolt holding the tie bar to piston rod block, and remove cylinder.

b. Installation. Place cylinder in position, alining holes in spacers and cylinder with holes in frame. Slip pivot pin into position, and put groove locking pins in each end. Place piston rod in position and piston rod block against wrist pin. Attach tie bar to block, and bolt securely. Connect hose to cylinder and pump fittings. Refill cylinder (subpar. **c** following).

c. Fill Hoist Cylinder. Raise body to ½ its maximum height (if body is down), remove filler plug, and fill cylinder with proper grade of engine oil. Lower and raise the body a few times to expel any excess oil through filler plug hole. NOTE: *Excess oil in the cylinder prevents the body from completely lowering to chassis frame. Do not race the engine while expelling the oil or it will foam and make air pockets, resulting in poor operation.* Wipe off excess oil, and install filler plug. Lubricate pivot pin and hoist operating shafts and levers through grease fittings (par. 24).

178. HOIST PUMP CONTROL AND LINKAGE (fig. 225).

a. Description. The hoist pump control is located in the cab, and is connected to the pump with a bell crank and rod. The rod is provided with an adjustable clevis at one end.

b. Adjustment. If the body will not remain in a fully raised position, remove the cotter pin and clevis pin from adjustable clevis on pump valve control rod. Loosen clevis lock nut, and adjust the rod length so that pump valve will fully open and close with movement of control in cab. Install clevis pin and new cotter pin, and tighten lock nut. If adjusting the length of pump valve control rod does not correct the condition, replace pump assembly (par. 176).

c. Removal. Remove cotter pins and clevis pins from both ends of pump valve control rod and remove rod. Remove cotter pin and clevis pin from hoist pump control and bell crank. Remove cotter pin and flat washer from end of control operating cross shaft, and slide bell crank off the shaft. Remove ball from top of hoist pump control in cab, and drop control through the floor.

d. Installation. Push hoist pump control up through floor, and slip bell crank on cross shaft. Install clevis pin and a new cotter pin in hoist pump control clevis and bell crank. Place ball on hoist pump control in cab. Place plain washer over end of cross shaft, and insert new cotter pin through hole in shaft end. Attach the pump valve control rod to bell crank lever on pump by inserting clevis pin and a new cotter pin, making sure the adjustable clevis is on the front end of rod. Adjust length of pump valve control rod (subpar. **b** above).

Section XXXV

NEW VEHICLE RUN-IN TEST

179. PURPOSE.

a. When a new or reconditioned vehicle is first received at the using organization, it is necessary for second echelon personnel to determine whether or not the vehicle will operate satisfactorily when placed in service. For this purpose, inspect all accessories, 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 least 50 miles as directed in AR 850-15, paragraph 25, table III, according to procedures in paragraph 181 below.

180. 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 serious nature to the attention of the supplying organization.

181. RUN-IN TEST PROCEDURES.

a. Preliminary Service.

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

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(4) BATTERY. Make hydrometer and voltage test of battery, and level electrolyte to ⅜ inch above plates with distilled or clean water, if necessary.

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

(6) ACCESSORIES AND BELT. See that accessories such as carburetor, generator, regulator, cranking motor, distributor, water pump, fan, and oil filter, are securely mounted, and that fan and generator drive belt is in good condition and adjusted to have ½- to 1/16-inch finger-pressure deflection.

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

(8) TIRES. See that all tires, including spare, are properly inflated to 55 pounds (cool); that stems are in correct position, and all valve caps present and finger-tight. Remove objects lodged in treads and carcasses and between duals, and inspect for damage.

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

(10) FENDERS AND BUMPERS. Examine fenders, splash guards, and bumpers for looseness and damage.

(11) TOWING CONNECTIONS. Examine all towing shackles and pintle hook for looseness and damage, and see that pintle latch operates properly and locks securely.

(12) BODY AND TARPAULINS. See that all cab and body mountings are secure. Inspect attachments, hardware, glass, doors, tail gate, and release and locking mechanism to see that they are in good condition, secure, and operate properly. See that cab soft top and cargo body tarpaulins and curtains are properly installed, securely fastened, and not damaged. Dump bodies must be in proper alinement with frame, and correctly assembled and mounted. Test hydraulic body hoist for proper oil level; and see that there are no oil leaks at pump, cylinder, or lines. See that fifth wheel (on vehicles so equipped) is properly assembled, in good condition, and securely mounted. Be sure trailer connecting mechanism operates properly and latches securely. See that 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.

NEW VEHICLE RUN-IN TEST

(13) WINCH. Inspect winch for damage, secure mountings, and oil leaks. Test winch clutch mechanism for proper operation. Test drag brake to see if it holds drum from spinning and as cable is unwound; inspect it for wear, damage, and adequate lubrication. Test winch automatic brake by placing vehicle at top of steep incline, and attaching cable to another vehicle at bottom. While drawing towed vehicle up hill, release engine clutch; if towed vehicle backs down hill, brakes need adjustment. Start lowering vehicle down hill with winch; throw out engine clutch. If towed vehicle does not stop, or drifts more than 1 or 2 inches, brake needs adjustment. See paragraph 168. After test, rewind cable evenly and tightly on drum and as winding, clean cable thoroughly and apply a film of engine oil.

(14) LUBRICATE. Perform a complete lubrication of the vehicle, covering all intervals, according to the instructions on the Lubrication Guide (par. 24), except gear cases, wheel bearings, and other units covered in preceding procedures. 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 to 18 during lubrication.*

(15) SPRINGS AND SUSPENSIONS. Inspect front shock absorbers, front and rear springs, rear bogie suspension spring seats, and torque rods to see if all are in good condition, correctly assembled and secure, and not leaking excessively.

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

(17) PROPELLER SHAFTS, CENTER BEARING, VENTS. Inspect all shafts, universal joints, and center bearing (pillow block) to see if they are in good condition, correctly assembled, alined, secure, and not leaking excessively at seals or vents. Be sure vent passages are not clogged.

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

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

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

(21) INSTRUMENTS.

(a) Oil Gage. Immediately after engine starts, observe if oil pressure is satisfactory. NOTE: *Normal operating pressure, hot, is 30 to 40 pounds.* Stop engine if pressure is not indicated in 30 seconds.

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

(c) Temperature Gage. Engine temperature should rise gradually during warm-up to normal operating range, 140° to 180°F.

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

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

(23) HORN AND WINDSHIELD WIPERS. See that these items are in good condition and secure. If tactical situation permits, test horn for proper operation and tone. Determine if wiper arms will operate through their full range, and see 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) 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, coolant, and brake fluid leaks. Trace any found to source, and correct or report them to designated authority.

(27) TOOLS AND EQUIPMENT. Check tools and vehicle stowage lists, section VIII, 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 maximum indicated on the caution plate should be avoided during the test.*

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

(2) BRAKES, FOOT AND HAND. Test service brakes to see if they stop vehicle effectively without side pull, chatter, or squealing; and observe if pedal free travel before meeting resistance is ½-inch mini-

mum. Parking brake should hold vehicle on a reasonable incline with 1/3 ratchet travel in reserve. Observe if the vacuum brake booster operates properly to assist in service brake application. CAUTION: *Avoid long application of brakes until shoes become evenly seated to drums.*

(3) CLUTCH. Observe if clutch operates smoothly without grab, chatter, or squeal on engagement, or slippage when fully engaged, under load. See that pedal has 1-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.*

(4) TRANSMISSION AND TRANSFER. Gearshift mechanism should operate easily and smoothly, and gears should operate quietly and not slip out of mesh. Test front axle declutching, and power take-off mechanism (on vehicles so equipped) for proper operation.

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

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

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

(8) Halt vehicle at 10-mile intervals for services in items (9) to (11) below.

(9) BRAKE BOOSTER OPERATION. Stop engine. Apply brakes several times to dispel all vacuum in system. Make a light brake application with the left foot, and hold in applied position. Start engine. If system is operating satisfactorily, the pedal will be pulled downward. Remove foot from pedal, and allow engine to idle a few seconds. Stop engine, and again apply brakes. Pedal should require no more physical effort for the same pedal travel than when engine is operating.

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

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

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Section XXXVI

SHIPMENT AND TEMPORARY STORAGE

182. GENERAL INSTRUCTIONS.

a. Preparation for domestic shipment of the vehicle is the same, with the exception of minor added precautions, as preparation for temporary storage. Preparation for shipment by rail includes instructions for loading the vehicle, blocking necessary to secure the vehicle on freight cars, and other information necessary to properly prepare the vehicle for domestic rail shipment. For more detailed information and for preparation for indefinite storage, refer to AR 850-18.

183. PREPARATION FOR TEMPORARY STORAGE.

a. Vehicles to be prepared for temporary storage are those ready for immediate service, but not used for less than 30 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, take the following precautions:

(1) LUBRICATION. Lubricate the truck completely (par. 24).

(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 compound 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 thorough service battery (par. 84).

(4) TIRES. Clean, inspect, and properly inflate all tires, including spares. Replace with serviceable tires all tires requiring repairing or retreading. Do not store rubber-tired 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 tires under any circumstances.

(5) ROAD TEST. The preparation for limited storage will include a road test after the battery, cooling system, and lubrication service, to check on the 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.

(6) FUEL IN TANKS. It is not necessary to remove fuel from the vehicle 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 VEHICLE. Remove rust appearing on any part of the vehicle exterior 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 preservative lubricating oil. Close firmly all doors, latches, windows, and windshields. Top must be in place, raised, and secured, all curtains in place, and windshield closed. Make sure paulins are in place and firmly secured. Leave rubber floor mats, when provided, in an unrolled position on the floor; not rolled or curled up. Equipment such as fire extinguishers will remain in place on the vehicle.

(8) INSPECTION. Make a systematic inspection just before shipment or temporary storage to insure 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. 19).

(9) BRAKES. Release brakes and chock the wheels.

c. Inspections in Limited Storage. Vehicles in limited storage will be inspected weekly for condition of battery and, in case of anticipated freezing weather, for condition of cooling system. If water is added to the 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. If freezing temperature is expected, add the proper quantity of antifreeze compound to cooling system to afford protection from freezing.

184. LOADING AND BLOCKING FOR RAIL SHIPMENT.

a. Preparation. In addition to the preparation described in paragraph 182, when ordnance vehicles are prepared for domestic shipment, the following precautions will be taken:

(1) EXTERIOR. Cover the body of the vehicle with the canvas cover which is supplied as an accessory, or is available for use during rail shipment.

(2) 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.

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(3) BRAKES. The hand brake must be set and the transmission placed in neutral after the vehicle has been placed in position, with a brake wheel clearance of at least 6 inches (fig. 226). The vehicles will be located on the car in such a manner as to prevent the car from carrying an unbalanced load.

(4) All cars containing ordnance vehicles must be placarded "DO NOT HUMP."

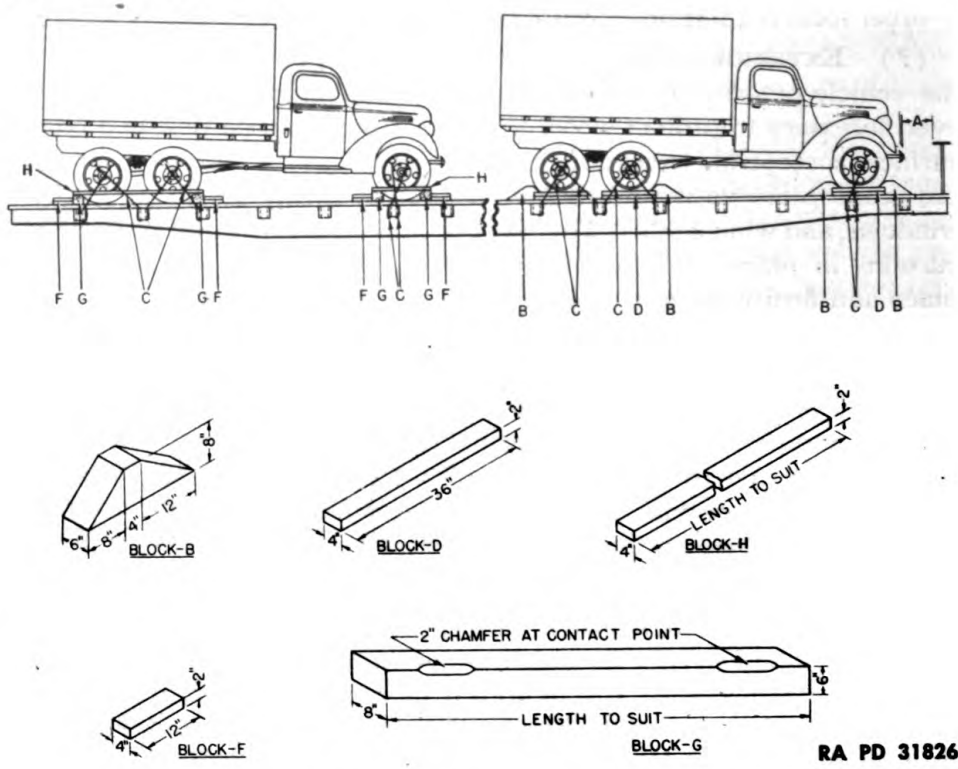

Figure 226—Blocking Requirements for Securing Truck to Railroad Car

(5) 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 flatcar to another along the length of the train is made possible by cross-over 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 box 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. Two methods for blocking six-wheel trucks on freight cars (fig. 226) are given below. NOTE: *All blocking must be located against the outside wheel of the dual.*

(1) FIRST METHOD (fig. 226). Locate eight blocks "B", one to the front and to the rear of each front wheel, to the front of each forward rear wheel, and to the back of each rearward rear wheel. Nail the heel of each block to the car floor with five 40-penny nails, and toe-nail the portion of each block under the tire to the freight car floor with two 40-penny nails. Locate two cleats "D" against the outside face of each wheel. Nail the lower cleat "D" to the freight car floor with three 40-penny nails, and the top cleat to the cleat below with three 40-penny nails. Pass four strands, two wrappings, of No. 8 gage, black annealed wire ("C", figure 226) through the holes in the wheels, and pass through the stake pockets. Tighten wires enough to remove slack. NOTE: *When a box car is used, this strapping must be applied in 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) SECOND METHOD (fig. 226). Place two blocks "G", one to the front and one to the rear of the front wheels. Place two blocks "G", one to the front of the forward rear wheels, and one to the back of the rearward rear wheels. NOTE: *Blocks "G" must be at least 8 inches wider than the over-all width of the vehicle at the freight car floor.* Locate 16 cleats "F", 2 against blocks "G" to the front and rear of each blocked wheel. Nail lower cleats to freight car floor with five 40-penny nails, then nail top cleat "F" to lower cleat "F" with five 40-penny nails. Position four cleats "H", one over two cleats "G", and against the outside of each blocked wheel. Nail each end of cleat "H" to cleats "G" with three 40-penny nails. Pass four strands, two wrappings, of No. 8 gage, black annealed wire ("C", fig. 226) through the holes in the wheels, and pass through the stake pockets. Tighten wires enough to remove slack. NOTE: *When a box car is used, this strapping must be applied in 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.*

d. Shipping Data.

Length, over-all	(cargo w/winch)	22 ft 1 3/16 in.
	(cargo wo/winch)	20 ft 10 5/8 in.
	(tractor)	17 ft 8 7/16 in.
	(dump w/winch)	19 ft 11 9/16 in.
	(dump wo/winch)	18 ft 9 in.
Width, over-all	(cargo)	7 ft 4 in.
	(tractor)	7 ft 2 3/4 in.
	(dump)	7 ft 4 in.

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Height, over-all	(6x6 to top of cab)	7 ft 3 in.
	(6x4 to top of cab)	7 ft 2 in.
	(to top of bows)	8 ft 10 1/16 in.
	(to top of shield on dump body)	7 ft 7 3/8 in.
Shipping weight per vehicle		
	(6x6 cargo wo winch)	9,875 lb
	(6x4 cargo w winch)	10,165 lb
	(6x4 cargo wo winch)	9,555 lb
	(6x4 tractor)	8,190 lb
	(6x6 dump w winch)	10,760 lb
	(6x6 dump wo winch)	10,150 lb
Approximate floor area occupied per vehicle		
	(cargo w winch)	161 sq ft
	(cargo wo winch)	153 sq ft
	(tractor)	128 sq ft
	(dump w winch)	147 sq ft
	(dump wo winch)	137 sq ft
Approximate volume occupied per vehicle		
	(cargo w winch)	1,433 cu ft
	(cargo wo winch)	1,362 cu ft
	(6x6 tractor)	928 cu ft
	(6x4 tractor)	914 cu ft
	(dump w winch)	1,138 cu ft
	(dump wo winch)	1,060 cu ft

REFERENCES

STANDARD NOMENCLATURE LISTS.

Truck, 2½-ton (6 x 4 and 6 x 6) Studebaker	SNL G-630
Cleaning, preserving and lubricating 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
Current Standard Nomenclature Lists are listed above.	
An up-to-date list of SNL's and other publications is maintained in the Index to Ordnance Publications	OFSB 1-1

EXPLANATORY PUBLICATIONS.

General.

List of publications for training	FM 21-6
Military motor vehicles	AR 850-15
Driver's manual	TM 10-460
Standard military motor vehicles	TM 9-2800

Related Technical Manuals.

Ordnance maintenance: 2½-ton 6 x 6 truck and 2½- to 5-ton 6 x 4 truck (Studebaker models US 6 and US 6 x 4)	TM 9-1807

Maintenance and Repair.

Basic maintenance manual	TM 38-250
Automotive electricity	TM 10-580
Chassis, body, and trailer units	TM 10-560
Automotive power transmission units	TM 10-585
Automotive brakes	TM 10-565
The internal combustion engine	TM 10-570
Automotive lubrication	TM 10-540
Electrical fundamentals	TM 1-455
Motor vehicle inspections and preventive maintenance services	TM 9-2810
Fuels and carburetion	TM 10-550
Maintenance and care of pneumatic tires and rubber treads	TM 31-200
Cleaning, preserving, lubricating and welding materials and similar items issued by the ordnance department	TM 9-850

Protection of Materiel.

Camouflage	FM 5-20
Explosives and demolitions	FM 5-25
Defense against chemical attack	FM 21-40
Decontamination of armored force vehicles	FM 17-59
Chemical decontamination materials and equipment	TM 3-220

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Storage and Shipment.

Registration of motor vehicles	AR 850-10
Storage of motor vehicle equipment	AR 850-18
Ordnance field storage and shipment chart, group G—major items	OSSC-G
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.	

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