TM 9-890

DEPARTMENT TECHNICA[illegible] MANUAL

SEMITRAILER, 5-TON PAYLOAD, 8-TON GROSS, 2-WHEEL (2dt) STAKE AND PLATFORM, 1944 (Trailer Co. of America, Truck Eng. Corp., Olson Mfg. Co.)

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WAR DEPARTMENT • *12 JULY 1944*

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WAR DEPARTMENT
Washington 25, D. C., 12 July 1944.

TM 9-890, Semitrailer, 5-ton Payload, 8-ton Gross, 2-wheel (2dt) Stake and Platform, 1944, is published for the information and guidance of all concerned.

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BY ORDER OF THE SECRETARY OF WAR:

G. C. MARSHALL,
Chief of Staff.

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

DISTRIBUTION: X.

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

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APPENDIX

(2) WAR DEPARTMENT FORM NO. 48 (OLD W.D., Q.M.C. FORM NO. 237). DRIVER'S TRIP TICKET AND PREVENTIVE MAINTENANCE SERVICE RECORD. This form, properly executed, will be furnished the driver when his vehicle is dispatched on non-tactical missions. The driver and the official user of the vehicle will complete, in detail, appropriate parts of this form. These forms need not be issued for vehicles in convoy or on tactical missions. The reverse side of this form contains the driver's daily and weekly preventive maintenance service reminder schedule.

(3) W. D., A.G.O. FORM NO. 461 (OLD W.D., Q.M.C. FORM NO. 260). PREVENTIVE MAINTENANCE SERVICE AND TECHNICAL INSPECTION WORK SHEET FOR WHEELED AND HALF-TRACK VEHICLES. This form will be used for all 1,000-mile (monthly) and 6,000-mile (semiannual) maintenance services, and all technical inspections performed on wheeled or half-track vehicles.

(4) W.D., O.O. FORM NO. 7353, SPOT CHECK INSPECTION REPORT FOR ALL MOTOR VEHICLES. This form may be used by all commanding officers or their staff representatives in making spot-check on all vehicles.

(5) W.D., A.G.O. FORM NO. 458, MWO AND MAJOR UNIT ASSEMBLY REPLACEMENT RECORD. This form will be used by all personnel completing a modification or major unit assembly (landing gear, suspension, axle, etc.) replacement, to record clearly the description of work completed, date, vehicle hours, and/or mileage, and MWO number or nomenclature of unit assembly. Personnel performing the operation will initial in the column provided. Minor repairs, parts and accessory replacements need not be recorded.

(6) W.D., A.G.O. FORM NO. 468, UNSATISFACTORY EQUIPMENT REPORT. Necessity for using this form is determined by the using, or service, troops. Use this form to advise the Chief of Technical Service of any constructional, design, or operational defect. Use it also to recommend modifications of material.

Section II

DESCRIPTION AND TABULATED DATA

3. DESCRIPTION (figs. 1, 2, 3).

a. Physical Description of Semitrailer. This semitrailer is a two-wheeled supply-service-maintaining trailer equipped with a 16 foot length, open top, solid rack, platform body. The semitrailer chassis frame and the body-wide frame consists of fabricated steel sections welded together into an integral frame assembly. Two main

load carrying steel rails run the entire length of the semitrailer chassis. An interchangeable king pin is riveted to the upper fifth wheel plate for coupling to tractor truck (or converter dolly) equipped with standard, universal, interchangeable lower fifth wheel. A retracting-type, landing gear is attached to the frame to support the front end of the semitrailer, when not coupled to tractor truck. A pintle hook is mounted at the rear of the semitrailer. The semitrailer is equipped with heavy-duty tubular axle, dual tires, adequately sized brakes and air-power braking system. The foot pedal, which operates the mechanical foot brake, is located at the rear, to the right, of the semitrailer. The section between the chassis side rails, at the extreme rear of the semitrailer, provides a fully enclosed tool box. Access to this tool box is furnished by a single door located above the pintle hook. The tarpaulin is stored in this tool box. The semitrailer is equipped with lights and reflectors. Accessories consist of special tools, chock blocks, tarpaulin, padlocks for tool box and foot brake pedal, and electric jumper cable and air brake hose lines for second vehicle.

b. Name and Data Plate. The name and data plate, showing serial number, is mounted on the right longitudinal chassis rail, just ahead of the front crossmember.

4. DATA.

a. Model and Make.

Model 516	The Trailer Co. of America
Model 516	Truck Engineering Corp.
Model 516	Olson Manufacturing Co.

b. Semitrailer Dimensions.

Wheelbase, king pin to center of axle	10 ft 0 in.
Length, inside loading space	16 ft ½ in.
Width, inside loading space	7 ft 5½ in.
Width, overall	8 ft 0 in.
Height, to rear floor edge, (light)	4 ft 4⅜ in.
Height, rack sides	4 ft 0 in.
Height, for coupling, at upper fifth wheel plate (light)	3 ft 7¾ in.
Clearance, tractor truck tire (loaded)	4¼ in.
Clearance, semitrailer tires (light)	8 in.
Clearance, landing gear wheels (traveling position)	1 ft 2 in.
Clearance, suspension (light)	1 ft 2 in.

c. Semitrailer Specifications.

Axle, Timken tubular, model 2090, with 72 in. track

Brakes, size 17¼ in. diameter by 4 in. width
Brake Power, Bendix-Westinghouse air power

Coupler, interchangeable upper fifth wheel king pin
Foot Brake, mechanical-type, operated by foot pedal
Landing Gear, manually operated landing gear
Pintle Hook, mounted at rear of semitrailer
Springs, heavy-duty main springs and auxiliary springs
Tool Box, fully enclosed, approximately 68 in. long x 33 in. wide x 16 in. deep
Tires, 900-20, 10 ply, mud and snow tread design, 65-pound air pressure
Tubes, 900-20, standard, heavy-duty type
Wheels, 10 stud, Budd-type, 11¼ in. bolt circle
Body Racks, wood stake and panel construction, rear and side racks removable, front rack stationary
Floor, 1¼ in. thick, finished size, hardwood
Floor Strips, steel skid strips, installed over each floor joint, running the full length of floor.
Tarpaulin, No. 8, olive-drab duck, Ordnance Specs., T-AC-ES 732
Tools, one Budd wheel wrench with handle and one axle spindle nut wrench
Lights, two taillights and six reflectors
Paint, lusterless, olive-drab, Ordnance Specs., ES-680.

d. Capacity.

(1) WEIGHT FIGURES.

Semitrailer weight, unloaded	6,680 lb
Maximum payload, road	10,000 lb
Maximum payload, cross-country	10,000 lb
Maximum gross weight	16,680 lb
Maximum gross weight on fifth wheel	7,000 lb

(2) WEIGHT DISTRIBUTION. This semitrailer is designed to normally transport an evenly distributed load of 10,000 pounds. Take care that the load is evenly distributed and does not greatly exceed 10,000 pounds.

e. Speed. A maximum speed of 35 miles per hour is recommended. However the semitrailer can be towed with full load at a speed, over any type road or terrain, and under all conditions, that would be considered practicable for the tractor truck to which it is coupled.

Section III

TOOLS, PARTS AND ACCESSORIES

5. PURPOSE.

a. The lists which follow are to be used as check lists only. They are not to be used as a basis for requisition.

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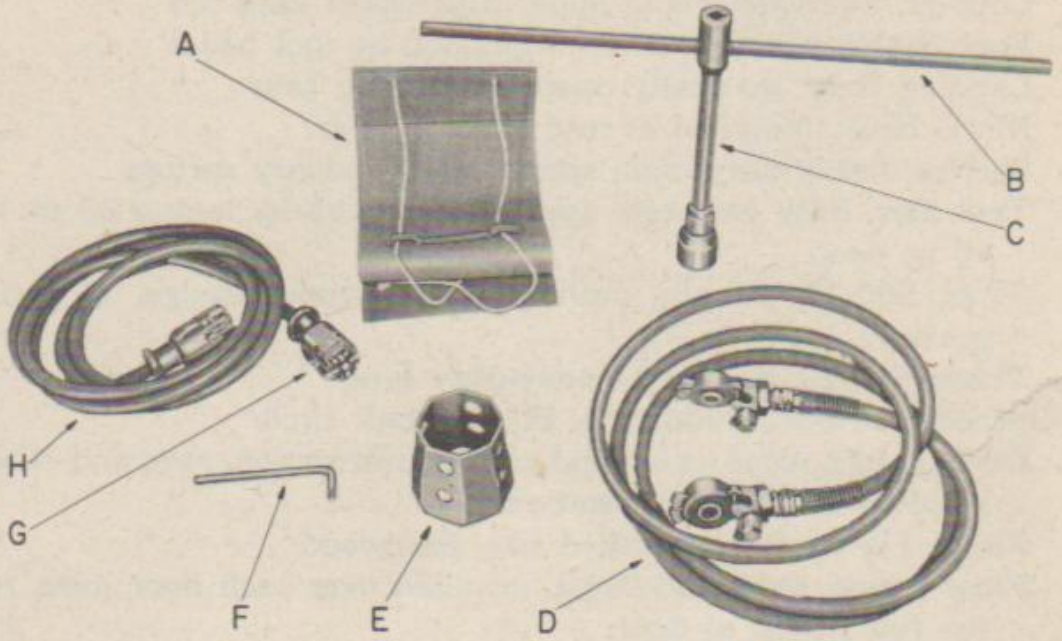

A—TOOL BAG
B—WHEEL STUD NUT WRENCH HANDLE
C—WHEEL STUD NUT WRENCH
D—AIR BRAKE POWER JUMPER HOSE AND COUPLING ASSEMBLY
E—AXLE SPINDLE NUT WRENCH
F—SCREW DRIVER (FOR RECESS-TYPE SCREW)
G—ELECTRICAL JUMPER COUPLING CABLE PLUG
H—ELECTRICAL JUMPER COUPLING CABLE ASSEMBLY

RA PD 337639

Figure 4 — Tools and Equipment Supplied With Vehicle

6. TOOLS AND EQUIPMENT STOWAGE ON VEHICLE.

a. Vehicular (fig. 4).

Item	Number Per Vehicle	Where Carried
BAG, tool	1	In tool box
BLOCK, chock, assemblies	2	On each side of semitrailer
CABLE, coupling, electric jumper, assembly	1	In tool box
HANDLE, wheel stud nut wrench	1	In tool box
HOSE AND COUPLING, jumper, air brake power, assembly	2	In tool box
SCREWDRIVER, (cross-recess type)	1	In tool box
TARPAULIN	1	In tool box
WRENCH, axle, spindle nut	1	In tool box
WRENCH, wheel stud nut	1	In tool box

b. Special Tools. No special tools are required for the maintenance of this trailer.

PART TWO — OPERATING INSTRUCTIONS

Section IV

VEHICLE CONTROLS

7. COUPLING TO TRACTOR TRUCK (figs. 5 and 6).

a. Fifth Wheel Coupling. To couple the semitrailer to a tractor truck, proceed as follows:

(1) Block rear wheels of semitrailer with chock blocks to prevent movement.

(2) Open lower fifth wheel jaws by raising safety latch cover and pulling handle forward toward cab.

(3) Back tractor truck slowly toward front of semitrailer, in line with center line of semitrailer, so king pin will enter the "V" of lower fifth-wheel jaws (fig. 5). Continue backing tractor truck until the fifth wheel has raised front of semitrailer and landing gear wheels off ground.

(4) Accelerate tractor truck speed so as to shove lower fifth wheel under semitrailer with a forceful motion until jaws of lower fifth wheel automatically lock around semitrailer king pin. This will move lower fifth wheel handle into locked position (fig. 6).

b. Air Power Brake Connection.

(1) OPERATION WITH TRACTOR TRUCK.

(a) Disconnect dummy couplings from hose couplings located on semitrailer.

(b) Connect emergency hose (the line directly from the tractor truck compressor to the rear) to semitrailer hose coupling tagged "EMERGENCY". Connect hose by pressing tractor truck coupling, face down, against face of hose coupling on semitrailer (fig. 7). Place gaskets in each hose coupling one over the other, and turn coupling hose cap with downward motion, until stopped by pin in hose coupling. NOTE: *If necessary, the handle of the three-way cock should be moved to its normal position to permit the emergency line hose couplings to be connected.*

(c) Connect service hose (the line directly from the tractor truck hand or foot control to the rear) to semitrailer hose coupling tagged "SERVICE" (fig. 7).

(d) Close cut-out cocks at rear of semitrailer and open those on tractor truck. Cut-out cock is open when handle is at right angles to line (fig. 8).

(2) TESTING. After semitrailer is coupled to tractor truck and air brake connections are made, test coupling by applying semitrailer

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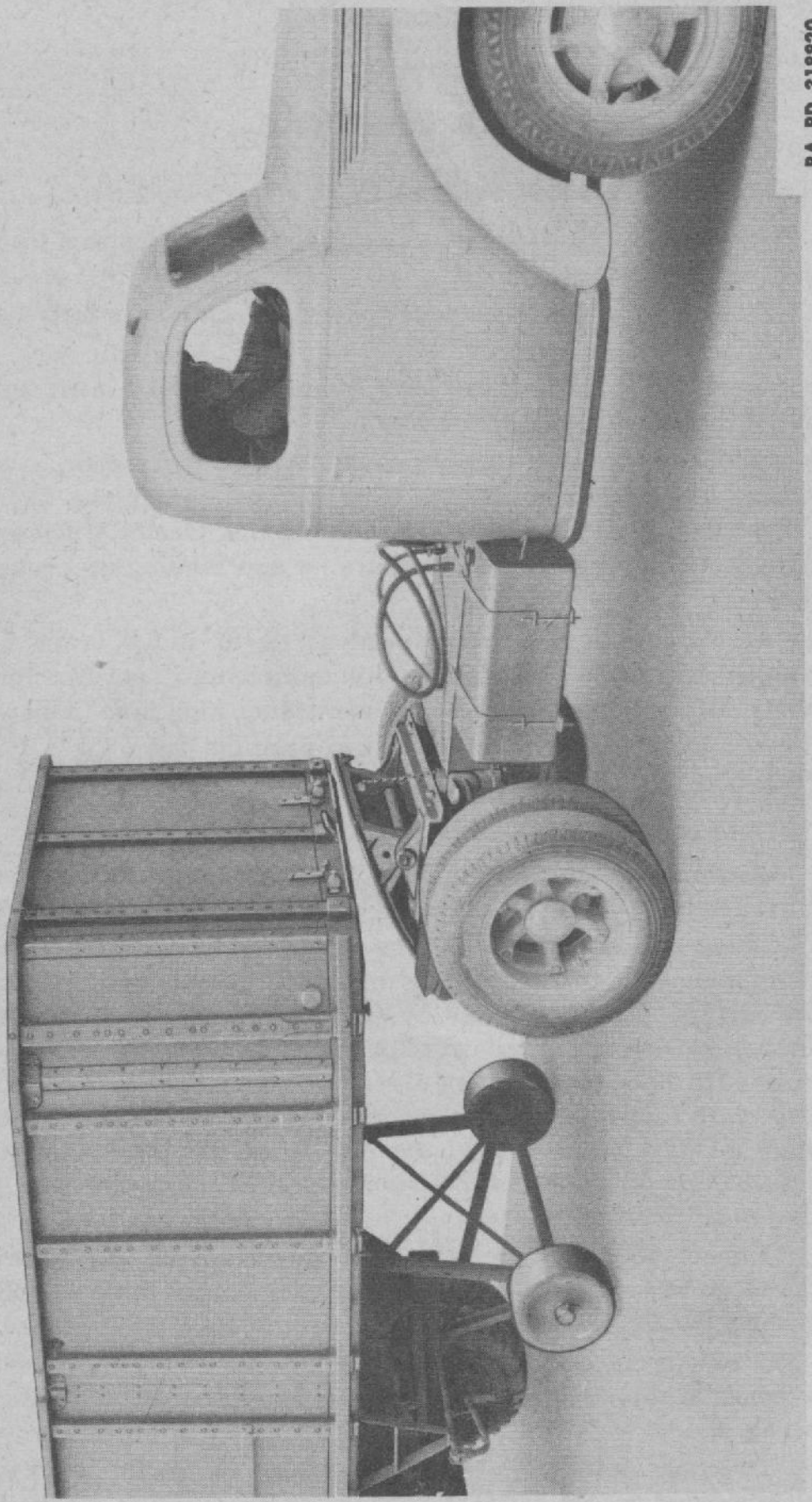

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Figure 5 — Coupling Semitrailer to Tractor Truck

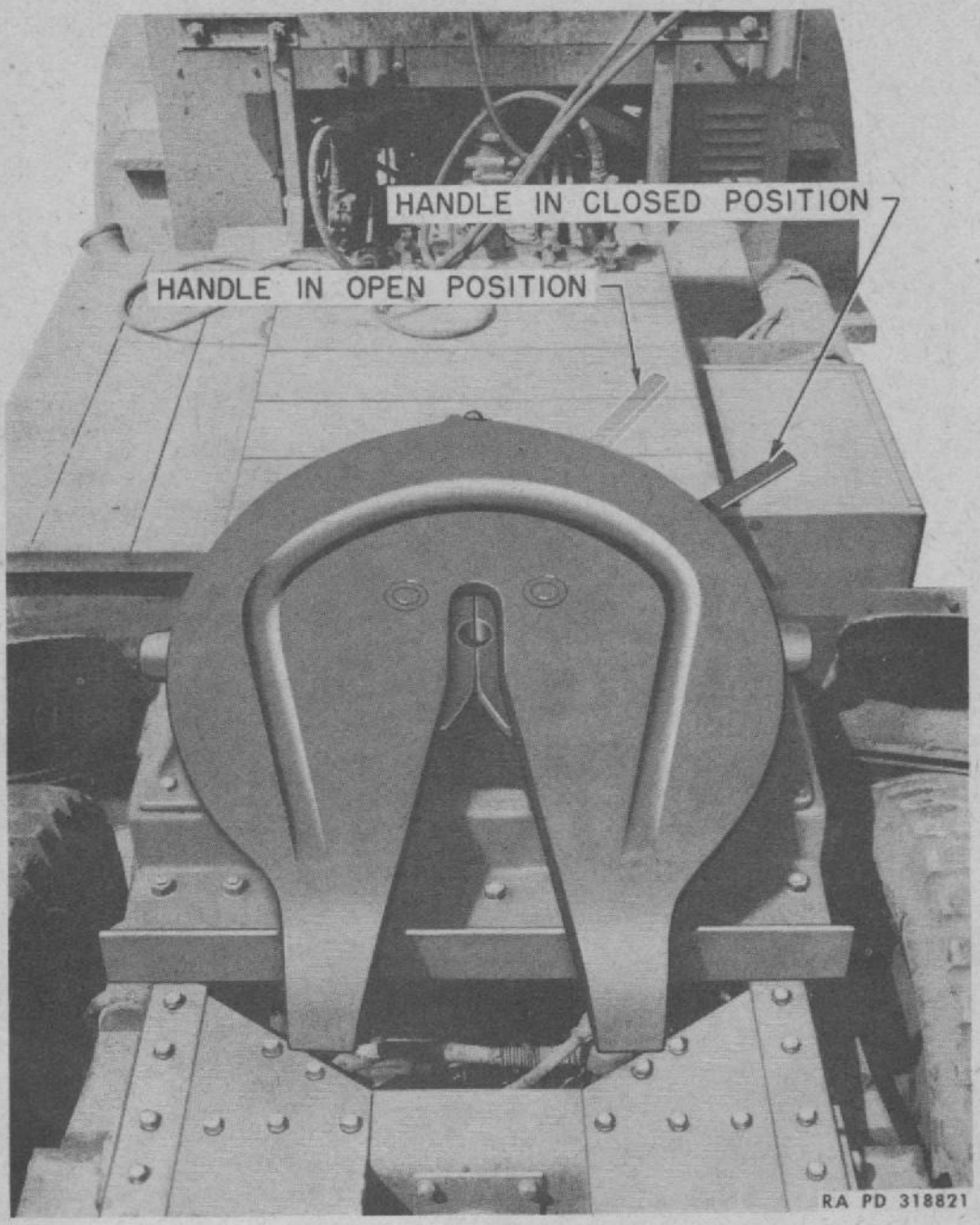

Figure 6 — Lower Fifth Wheel Operating Handle

brakes and driving tractor truck slowly forward until semitrailer wheels slide. Also check application and release of semitrailer brakes.

(3) OPERATION WITHOUT TRACTOR TRUCK. The semitrailer brakes are automatically applied when tractor truck connecting hoses are detached from semitrailer. A three-way cock is mounted at the emergency line outlet at front of semitrailer so that semitrailer brakes can be released, if necessary, when the semitrailer is not connected to a towing vehicle without releasing the air from the semitrailer brake system. Move handle toward emergency hose coupling to

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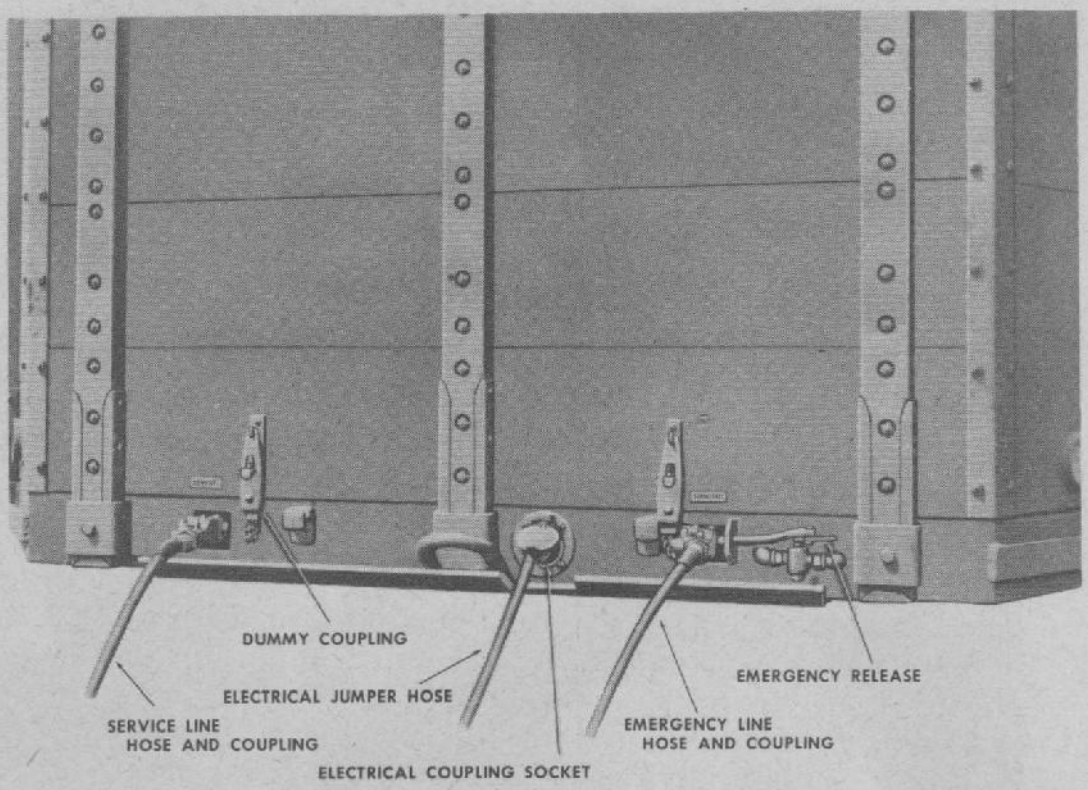


Figure 7 — Air Brake Power and Electrical Connections

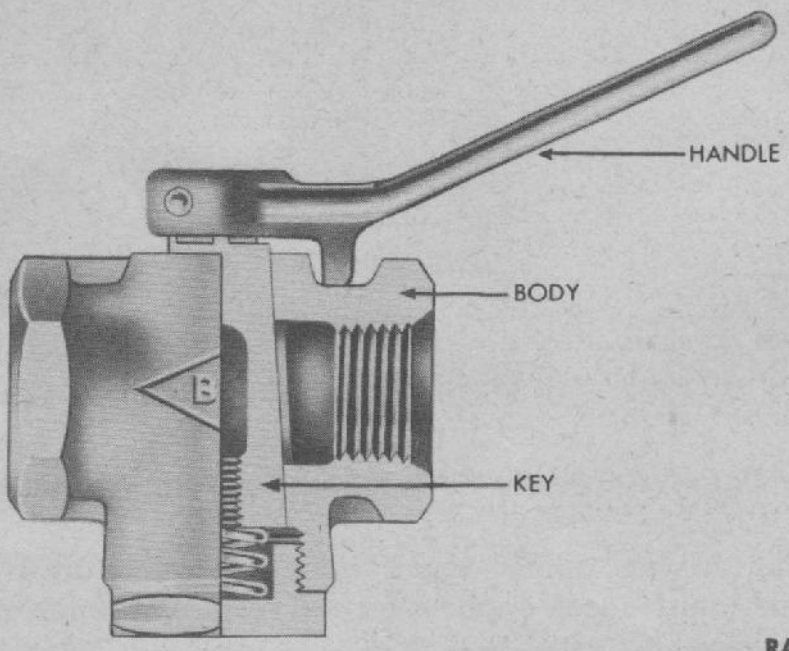


Figure 8 — Cut-out Cock

release brakes. The safety plunger, attached to the handle, is forced into the emergency hose coupling making it impossible to attach emergency hose from tractor truck until the three-way cock handle is returned to its normal position.

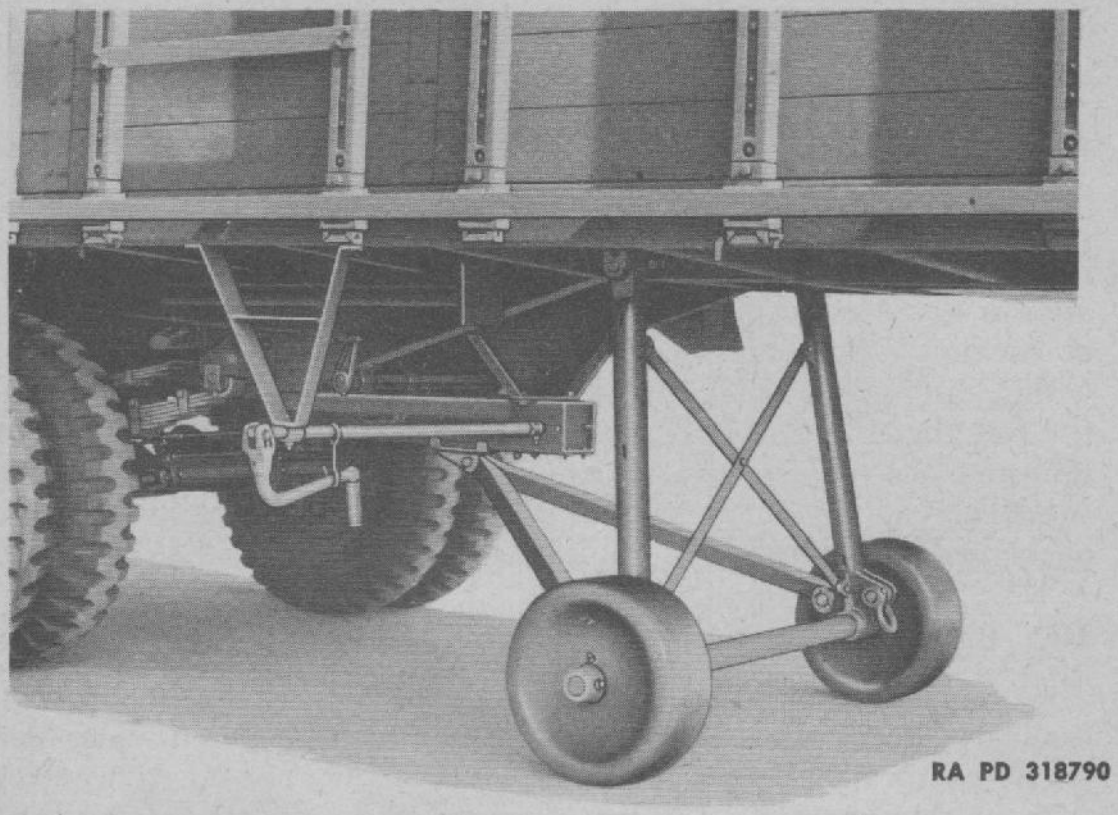


Figure 9 — Landing Gear in Lowered Position

(4) To Connect Another Semitrailer. Connect hose lines from other semitrailer to hose connections located at rear of this semitrailer being sure service and emergency lines from other semitrailer are properly connected to service and emergency line outlets. Open cut-out cocks.

c. Hooking Up Lights.

(1) Connect jumper cable to coupling socket mounted in the front of the semitrailer frame (fig. 7). The plug of the jumper cable can be connected in only one manner since its position is limited by a key.

(2) A blackout switch is mounted on the rear of the semitrailer above the rear coupling socket. There is no "OFF" position on the switch. It is either at "BLACKOUT" position or at standard "LIGHT" position. The switch is operated with a small coin or screwdriver. The flow of current is controlled at the tractor truck.

8. LANDING GEAR OPERATION (fig. 9).

a. The landing gear operating handle is located on the right side of the semitrailer, approximately at the center. Turn crank handle counterclockwise to raise landing gear legs. Be sure to turn crank all the way, so that landing gear will be in the extreme raised, or

lowered, position to prevent damage to landing gear legs, while semitrailer is traveling or when it is being coupled.

b. Turn crank handle clockwise to lower landing gear legs.

9. DRIVING.

a. Drive the tractor-truck-semitrailer combination in the same manner as a straight truck, taking care when braking, turning corners, or backing. When turning corners, the semitrailer rear wheels turn within the turning circle of the tractor truck wheels. This is due to the fact that the tractor truck semitrailer is a "hinged-in-the-middle" unit and has a much smaller turning circle than a straight truck of equal carrying capacity. When backing, steer the tractor truck in the opposite direction to which it is desired that the semitrailer be turned.

10. BRAKING.

a. Apply semitrailer brakes in coordination with tractor truck brakes. Never permit semitrailer brakes to carry entire braking load. Apply semitrailer brakes smoothly and soon enough to stop vehicle without skidding tires. When placing unit in operation, check air pressure on the dash gage of the tractor truck. This pressure should not be less than 80 pounds for proper application. With vehicle moving, apply brakes and check their effectiveness before operating unit at full speed.

11. FOOT BRAKE OPERATION.

a. In addition to air-power brake control, the semitrailer is equipped with a foot-operated mechanical brake. This foot brake is used to control the speed of the semitrailer when moved without being coupled to tractor truck. The foot pedal is located at rear, to the right, of the semitrailer. To operate, (fig. 10), climb up rear of semitrailer, place right foot in foot rest bracket, hold onto rear body racks for support, and operate foot pedal with left foot. There is no stationary applied position of the foot brake; the brake pedal returns to its original position when foot pressure is released.

12. UNCOUPLING THE SEMITRAILER.

a. To uncouple semitrailer from tractor truck proceed as follows:

(1) Place chock blocks in front of semitrailer rear tires to prevent movement.

(2) Lower landing gear wheels.

(3) Disconnect electrical jumper cable from semitrailer coupling socket.

RA PD 318788

Figure 10 — Foot Brake Operation

(4) Close cut-out cocks on tractor truck, and disconnect hose lines. Install dummy hose couplings on semitrailer hose couplings, and couple tractor truck hose couplings to dummy coupling bracket to prevent entrance of dirt into lines.

(5) Move lower fifth wheel handle to open position to relieve tension of fifth wheel jaws on king pin.

(6) Drive tractor truck forward with a quick pull until free and away from semitrailer.

13. PINTLE HOOK OPERATION.

a. The pintle hook, mounted at the rear of semitrailer, is used to attach other vehicles to be towed. To open hook, remove cotter pin and pull locking latch outward and upward.

b. To close pintle hook, slam latch down into its original position and lock with cotter pin.

14. LOADING.

a. This semitrailer is designed to normally transport an evenly distributed load of 10,000 pounds. Take care the load is evenly distributed, and does not greatly exceed 10,000 pounds.

PART THREE — ORGANIZATIONAL MAINTENANCE INSTRUCTIONS

Section V

LUBRICATION

15. LUBRICATION ORDER.

a. Figure 11 prescribes lubrication maintenance for the 5-ton payload, 8-ton gross, stake and platform, 2-wheel, 1944 semitrailer.

b. Lubrication instructions on the order are binding on all echelons of maintenance and there shall be no deviations from these instructions.

c. Service intervals specified on the order are for normal operation conditions. Reduce these intervals under extreme conditions such as excessively high or low temperatures, prolonged periods of high speed, continued operation in sand or dust, immersion in water, or exposure to moisture, any one of which may quickly destroy the protective qualities of the lubricant and require servicing in order to prevent malfunctioning or damage to the materiel.

d. Lubricants are prescribed in the "Key" in accordance with three temperature ranges; above +32° F, +32° F to 0° F, and below 0° F. Determine the time to change grades of lubricants by maintaining a close check on operation of the vehicle during the approach to change-over periods. Ordinarily it will be necessary to change grades of lubricants *only when air temperatures are consistently in the next higher or lower range,* unless malfunctioning occurs sooner due to lubricants being too thin or too heavy.

16. DETAILED LUBRICATION INSTRUCTIONS.

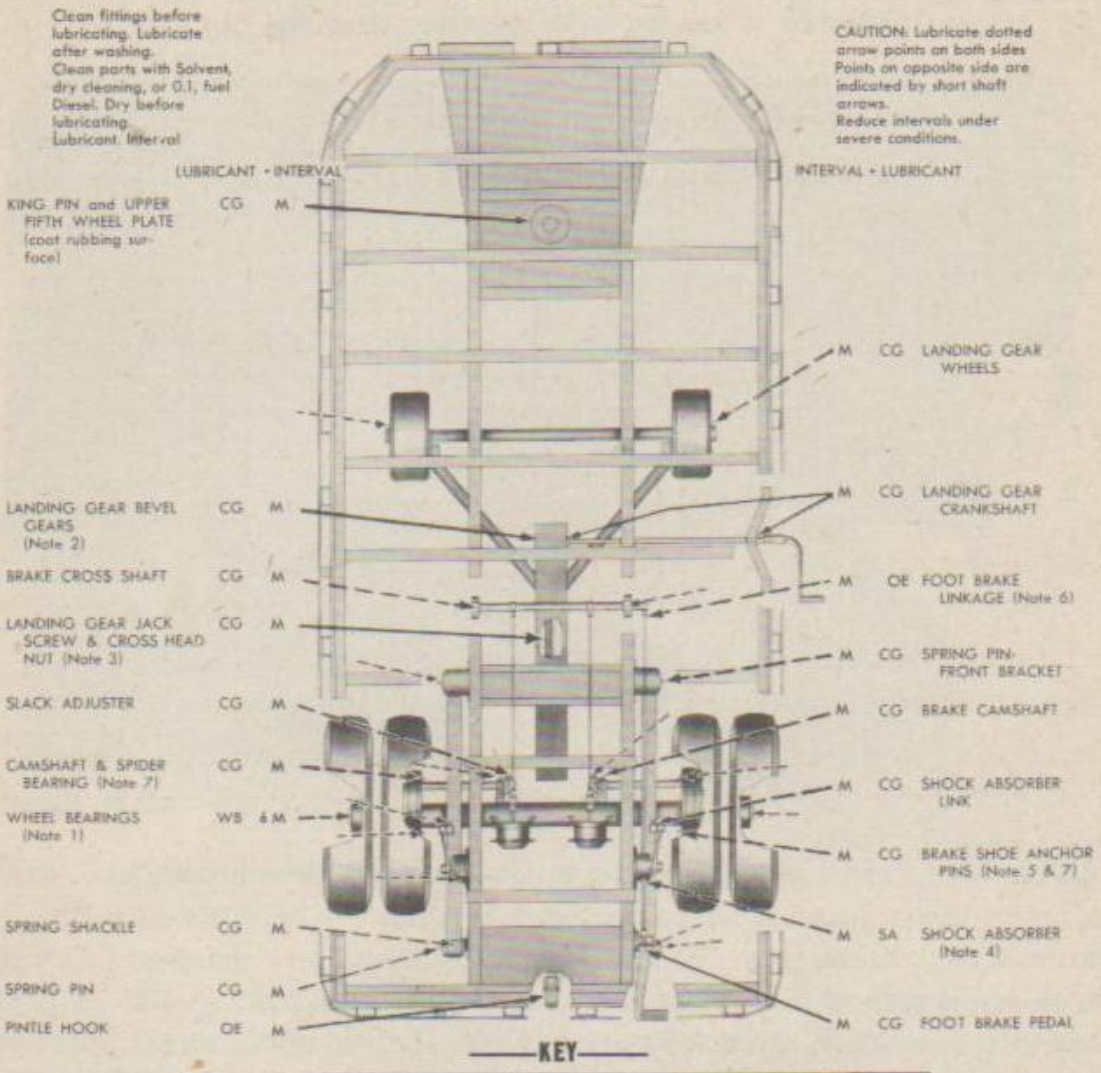
a. Lubrication Equipment. Be sure to clean lubrication equipment both before and after use. Operate lubricating guns carefully and in such manner as to insure a proper distribution of the lubricant.

b. Points of Application.

(1) Lubrication fittings, grease cups, oilers and oil holes are readily accessible on the vehicle. Wipe clean such lubricators and the surrounding surface before lubricant is applied.

(2) Where relief valves are provided, apply new lubricant until the old lubricant is forced from the vent. Exceptions are specified in notes for the Lubrication Order.

LUBRICATION



KEY

LUBRICANTS	Lowest Anticipated Air Temperatures		
	Above +32°F.	+32°F. to 0°F.	Below 0°F.
OE—Oil, Engine	OE SAE 30	OE SAE 10	PS
CG—Grease, general purpose	CG No. 1	CG No. 0	CG No. 0
WB—Grease, general purpose	No. 2—All Temperatures		Intervals M—Monthly 6M—6 Months
PS—Oil, lubricating, preservative, special			
SA—Fluid, shock absorber light			

COLD WEATHER. For lubrication and service Below 0°F, refer to OFSB 6-11

RA PD 318819

Figure 11 — Lubrication Order

c. Cleaning. Use SOLVENT, dry-cleaning, or OIL, fuel, Diesel, to clean or wash all parts. Use of gasoline for this purpose is prohibited. After washing, dry all parts thoroughly before applying lubricant.

d. Lubrication Notes on Individual Units and Parts. The following instructions supplement those notes on the Lubrication Order which pertain to lubrication and service of individual units and parts.

(1) WHEEL BEARINGS. Every 6 months, remove bearing cone assemblies from hub. Wash bearings, cones, spindle and inside of

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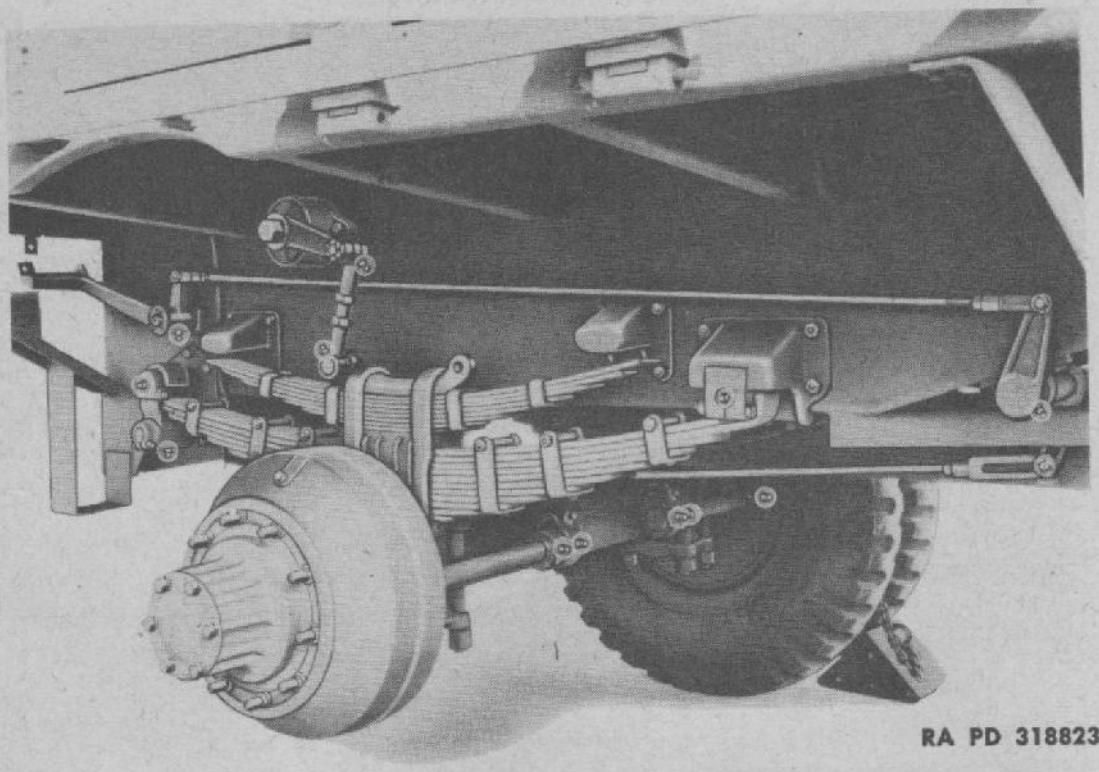

RA PD 318823

Figure 12 — Points of Lubrication on Suspension, Foot Brake, and Axle

hub and dry thoroughly. Do not use compressed air. Inspect bearing races and replace if damaged. Coat the spindle and inside of hub cap with GREASE, general purpose, No. 2 to a maximum thickness of $\frac{1}{16}$ inch only to retard rust. 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 the bearings from dirt and immediately reassemble and replace wheel. Do not fill hub or hub cap. The lubricant in the bearing is sufficient to provide lubrication until the next service period. Any excess might result in leakage into the drum. Adjust bearings in accordance with instructions in paragraph 44 **c** (3).

(2) LANDING GEAR MECHANISM GEARS (fig. 13). Remove the front cover from the jack screw housing and repack the gears and housing with GREASE, general purpose, No. 1 above +32° F, or No. 0 below +32° F.

(3) JACK SCREW AND CROSS HEAD NUT (fig. 17). Additional lubricant can be applied to jack screw and cross head nut by reaching hand through opening in bottom of jack screw housing.

(4) SHOCK ABSORBERS (fig. 12). Every 6,000 miles, remove plug and check level. If fluid is low, refill to plug level with FLUID, shock-absorber, heavy. Disconnect linkage and work arm up and down to force out any trapped air. Refill to plug level if fluid is still low. Replace plug and connect linkage.

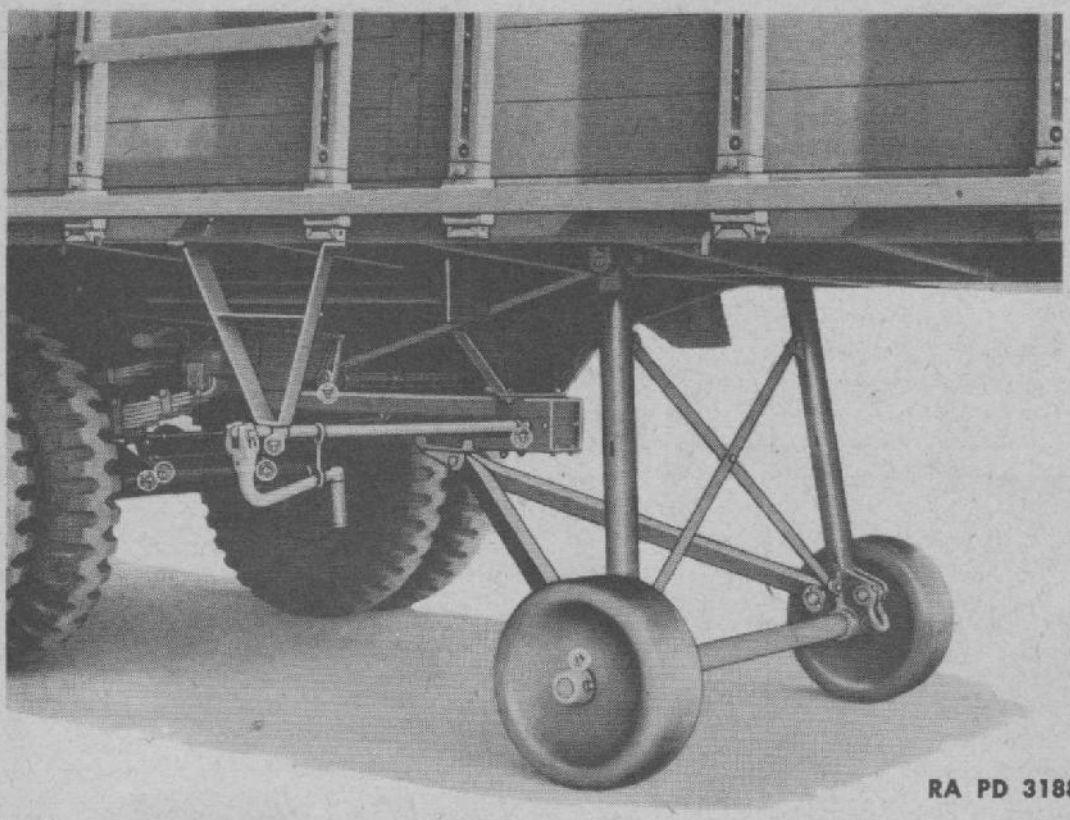

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Figure 13 — Points of Lubrication on Landing Gear

(5) BRAKE SHOE ROLLERS AND CAMS. If semitrailer is subjected to standing for long periods in deep mud or water, remove the wheels after each immersion and clean, inspect and lubricate brake shoe rollers and cams with GREASE, general purpose, No. 1 above +32° F, or No. 0 below +32° F to insure proper brake action.

(6) OIL CAN POINTS. Every 1,000 miles lubricate foot brake linkage, landing gear wheels, pintle hook, attaching pins, clevises, etc., with OIL, engine, SAE 30 above +32° F, SAE 10 +32° F to 0° F, or OIL, lubricating, preservative, special, below 0° F.

(7) ANCHOR PIN AND CAMSHAFT FITTINGS (fig. 14). Every 6,000 miles or at time of wheel bearing lubrication, lubricate anchor pin and camshaft spider bearing fittings sparingly, to prevent excessive lubrication from entering brake mechanism.

e. Reports and Records.

(1) REPORTS. Report unsatisfactory performance of materiel to the Ordnance Officer responsible for maintenance as prescribed in TM 38-250.

(2) RECORDS. A record of lubrication may be maintained in the Duty Roster (W.D. A.G.O. Form No. 6).

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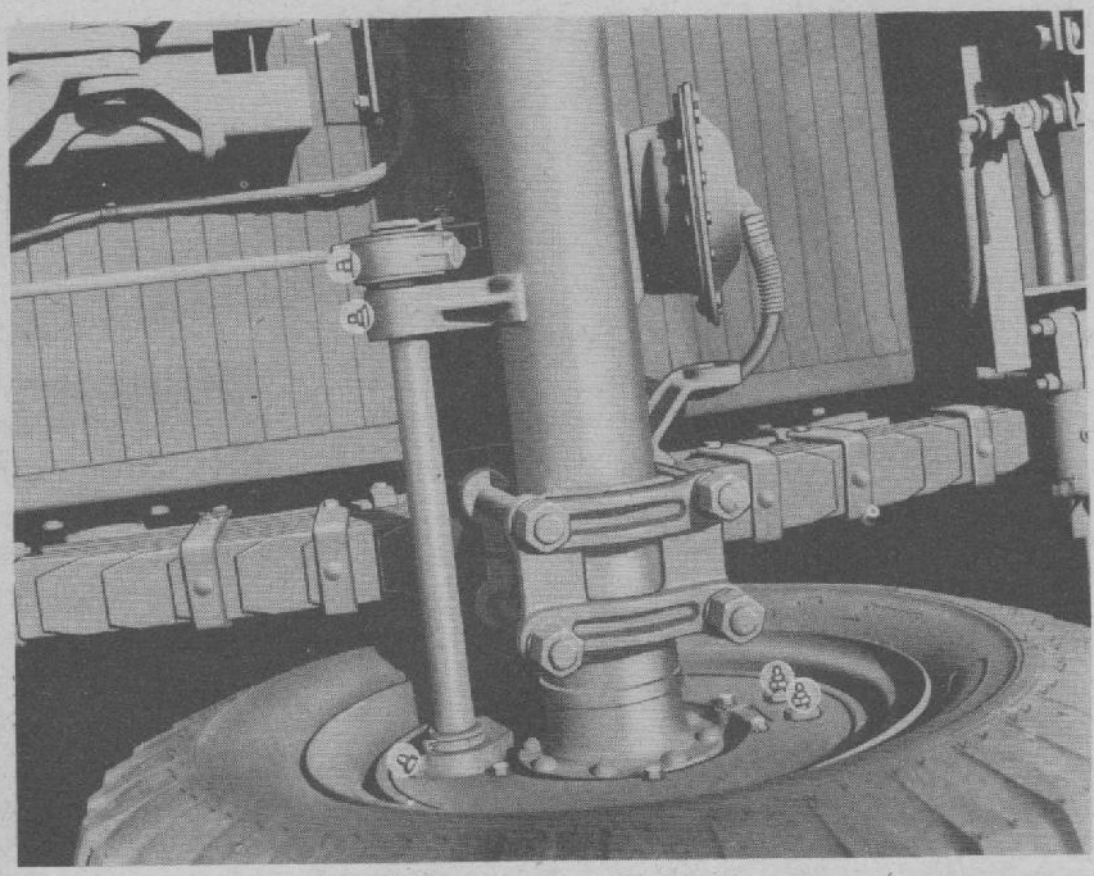

RA PD 318825

Figure 14 — Points of Lubrication on Anchor Pins, Camshaft and Slack Adjuster

Section VI

FIRST ECHELON PREVENTIVE MAINTENANCE SERVICE

17. PURPOSE.

a. To ensure mechanical efficiency, it is necessary that these vehicles be systematically inspected at intervals each day they are operated, and weekly, in order 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 with which

they are related. Certain items listed on the form that do not pertain to the vehicles involved are eliminated from the procedure 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 these vehicles 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 these shown on that form.

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

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

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

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

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

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

18. BEFORE-OPERATION SERVICE.

a. This inspection schedule is designed primarily as a check to see that the vehicles have not been damaged, tampered with, or sabotaged since the After-operation Service was performed. Various combat conditions may have rendered the vehicles unsafe for operation and it is the duty of the driver to determine whether or not the vehicles are in condition to carry out any mission to which they may

be assigned. This operation will not be entirely omitted, even in extreme tactical situations.

b. Procedures. The 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 the exterior of vehicle, attachments, and equipment, for injury caused by tampering, sabotage, collision, falling debris, or shell fire since parking.

(2) ITEM 5, AIR BRAKE TANK. Examine air brake reservoir tank, air lines, and connections for looseness or damage. Listen for air leaks. Drain water from tanks, and close drain cock. Be sure truck to semitrailer air couplings are securely connected, or if not in use, that they are closed and properly supported and that dummy couplings are attached.

(3) ITEM 12, LAMPS (LIGHTS) AND REFLECTORS. Clean all light lenses and warning reflectors and inspect units for looseness or damage. If semitrailer is connected, and tactical situation permits, open and close semitrailer light switches to see if lamps respond properly.

(4) ITEM 13, WHEEL AND HUB NUTS. See that all wheel and hub, assembly and mounting nuts are present and secure.

(5) ITEM 14, TIRES. Be sure all semitrailer tires are properly inflated to 65 pounds (maximum) cool. Remove objects lodged in treads, carcasses, or between duals, and inspect for damage.

(6) ITEM 15, SPRINGS AND SUSPENSIONS. Examine springs and shock absorbers for looseness and damage. Look for excessive spring sag, shifted leaves, and shock fluid leakage.

(7) ITEM 18, TOWING CONNECTIONS. Inspect all towing devices for looseness and damage, particularly pintle draw-bar, retracting spring, latch and locking mechanism.

(8) ITEM 19, BODY, LOAD, AND TARPS. Inspect all body units and mountings for looseness and damage. See that stakes are secure in sockets; that tool box closes and latches properly; and look for broken assembly welds. If loaded, cargo must be properly distributed and secured; and tarpaulin must be in good condition, and correctly installed and lashed, or properly stowed.

(9) ITEM 21, TOOLS AND EQUIPMENT. Be sure all items stowed on semitrailer are present, serviceable, and properly stowed or mounted, and that tool box is closed and locked.

(10) ITEM 25, DURING OPERATION CHECK. The During-operation Service and observation on semitrailer start immediately after the vehicle is put in motion.

FIRST ECHELON PREVENTIVE MAINTENANCE SERVICE

19. DURING-OPERATION SERVICE.

a. While the vehicle is in operation, be on the alert for any unusual noise, such as rattles, knocks, squeals, or hums that may indicate trouble. Observe if there is any abnormal sag, side sway, or drag that might indicate broken suspensions, disconnected towing, or safety, devices, or dragging brakes.

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

(1) ITEM 27, BRAKES. Test semitrailer brakes, independent of truck-tractor brakes, to be sure they are effective, and operate without excessive pull to one side, chatter, or squealing.

(2) ITEM 34, RUNNING GEAR. Be on the alert for any unusual noise or unsatisfactory operating characteristics in wheels, suspension units or landing gear (if in use). During operation of landing gear, observe if there is any excessive looseness, or binding, of operating mechanism.

20. AT-HALT SERVICE.

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

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

(1) ITEM 39, TEMPERATURES. Place hand cautiously on each wheel hub and brake drum to see if they are abnormally hot.

(2) ITEM 42, SPRINGS AND SUSPENSIONS. Inspect springs, suspension units, and shock absorbers for looseness or damage.

(3) ITEM 44, WHEEL AND HUB NUTS. See that all wheel and hub assembly, and mounting, nuts are present and secure.

(4) ITEM 45, TIRES. Inspect all tires for under inflation and damage. Remove objects lodged in treads, carcasses, and from between duals.

(5) ITEM 50, TOWING CONNECTIONS. Inspect all towing and safety connecting devices for looseness or damage. Be sure all locking devices are secure.

(6) ITEM 51, BODY LOAD AND TARP. Inspect all body units and mountings for looseness and damage. See that stakes are secure in sockets; that tool box closes and latches properly; and look for broken assembly welds. If loaded, cargo must be properly distributed and secured, and tarpaulin must be in good condition, and correctly installed and lashed, or properly stowed.

(7) ITEM 52, GLASS. Clean all light and reflector glass and inspect for looseness or damage.

21. AFTER-OPERATION AND WEEKLY SERVICE.

a. After-operation Servicing is particularly important because at this time the driver inspects his vehicles 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 vehicles should be ready to roll again on a moment's notice. The Before-operation Service, with a few exceptions, is then necessary only to ascertain whether or not the vehicles are in the same condition in which they were 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 should remember and consider any irregularities noticed during the day in the Before-operation, During-operation, and At-halt Services. The After-operation Service consists of inspecting and servicing, the following items: (Those items of the After-operation 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 59, LAMPS (LIGHTS) AND REFLECTORS. Clean all units, and inspect them for looseness and damage. If tactical situation permits, open and close light switches to be sure they operate properly, and see if the lamps respond.

(2) ITEM 64, ELECTRICAL WIRING. Examine all accessible wiring and conduits under vehicle for damage, and see that it is properly and securely connected and supported.

(3) ITEM 68, TIRES.

(a) Examine tires for damage and excessive wear. Remove objects lodged in treads and carcasses, and from between duals. Check for low pressures, proper position of valve stems, and presence of valve caps. Inflate to correct pressure, 65 lb (maximum) cold.

(b) Weekly. Replace badly worn or otherwise unserviceable semitrailer tires. Serviceable tires which show abnormal wear should be rotated to other wheel positions. Apparent mechanical defects causing such wear should be reported for attention by higher echelon.

(4) ITEM 69, SPRING AND SUSPENSIONS. Clean out all objects lodged in suspension system or between units and springs; and inspect springs for excessive sag, shifted leaves, loose or damaged clips, shackles, brackets, or shock absorbers. Check shock absorbers for leaks.

(5) ITEM 75, *AIR BRAKE TANK.

(a) Inspect tank on semitrailer for looseness and damage. See that all connections are tight, and that air lines are properly supported so as not to chafe on other vehicle parts. Drain water from tank and close drain cock.

(b) Weekly. Have assistant operate all brake control valves and listen for air leaks. Tighten tank mountings and all connections where leaks are heard. Clean oil from all semitrailer air line rubber hose.

(6) ITEM 77, *TOWING CONNECTIONS.

(a) Examine all tow loops and pintle hook for looseness and damage. Be sure pintle latches properly, and locks securely. Inspect fifth wheel plate and king pin to be sure they are in good condition and well lubricated. If semitrailer is connected to tractor truck, be sure fifth wheel is securely connected and locked, and that brake and wiring connections are tight.

(b) Weekly. Tighten all towing device mounting and assembly nuts securely. Test fifth wheel connecting and locking mechanism for proper operation. Examine pintle hook spring and draw bar for damage.

(7) ITEM 78, BODY, FRAME, AND ATTACHMENTS. Examine entire body for damage or loose parts or broken assembly welds. Be sure all stakes are secure in sockets. Inspect frame for broken welds, loose nuts or rivets, or damaged rails, crossmembers, or brackets. Be sure all landing gear members, and assembly, mounting and lock pins, and bolts, are present and secure. Investigate any unsatisfactory landing gear operating characteristics noted during operation.

(8) ITEM 82, *TIGHTEN.

(a) Tighten loose assembly or mounting nuts or screws indicated as necessary during this inspection.

(b) Weekly. Tighten wheel mounting and hub nuts, spring clip U-bolts, shackles, towing connections, floor skid strips, stake anchor pins or bolts, and any other mounting or assembly nuts or screws, that inspection, or experience, indicates as necessary on a weekly or mileage basis.

(9) ITEM 83, *LUBRICATE AS NEEDED.

(a) Lubricate all points where inspection has indicated, oilcan or hand greasing as necessary.

(b) Weekly. Lubricate all points listed on the vehicle Lubrication Order (par. 15), as requiring weekly attention.

(10) ITEM 84, *CLEAN VEHICLE.

(a) Clean excess dirt, grease, and refuse from interior and exterior of vehicle, particularly from around landing gear, jack screw, and mechanical foot brake operating shafts, and rods.

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

(11) ITEM 85, *TOOLS AND EQUIPMENT.

(a) Check semitrailer tool and equipment stowage lists, paragraph 6, figure 4, to be sure all items are present. See that they are in good condition and properly mounted or stowed.

(b) Weekly. Clean all tools and equipment from rust, dirt or excessive grease. Apply preservatives where necessary and possible. See that cutting edges of tools are sharp, and properly protected; and that all items are properly, and securely, mounted or stowed.

FIRST ECHELON PREVENTIVE MAINTENANCE SERVICE

Section VII

SECOND ECHELON PREVENTIVE MAINTENANCE

22. 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 paragraph (4) or the specific procedures, in paragraph (5) which follows, are required for the correct performance of a preventive maintenance service or for correction of a deficiency, other sections of this manual, 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

light 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 to any supporting member or connection, and usually includes a check to see whether or not the item is in good condition, correctly assembled, secure, or excessively worn. The mechanics must be thoroughly trained in the following explanations:

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

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

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

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

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

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

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

3. Special lubrication. This applies either to lubrication operations that do not appear on the vehicle Lubrication Order, and to

items that do appear on such orders, but should have been performed in connection with the maintenance operations, if those parts had to be disassembled for inspection or service.

4. *Serve.* This usually consists of performing special operations, such as draining and refilling units with oil, and changing or cleaning the air 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, locking and cotter pins provided to secure the tightening.

(e) When conditions make it difficult to perform the complete preventive maintenance procedures at one time, these 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 procedure 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, this numerical sequence of items on the work sheet is followed in the manual procedures, but in some instances there is a deviation for conservation of the mechanic's time and effort.

(5) SPECIFIC PROCEDURES. The procedures for performing each item in the 1,000 miles (monthly) and 6,000 miles (six-month) maintenance procedures which shall occur first, are described in the following chart. Each page of the chart has two columns at its left edge corresponding to the 6,000 mile and the 1,000 mile maintenance respectively. Very often it will be found that a particular procedure does not apply to both scheduled maintenance. 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 those items which require little or no movement of the vehicle.* When a road test is possible, it should be for preferably four, or not over six, miles.

1	1	*Before-operation Inspection.* Perform this inspection as outlined in paragraph 18.
5	5	*Brakes, Service and Emergency Braking Effect, Side Pull, Noise, Chatter, Air Control.* Test semitrailer brakes separately by use of hand control or foot treadle, on truck-tractor, and observe if they are effective. Note any erratic action, side pull, or noise that might indicate uneven brake shoe pressure, dirty linings, or scored drums. Stop semitrailer on a reasonable incline, disconnect emergency line and observe if brakes automatically hold vehicle. Be sure application and safety valve operate properly and application closes fully when pedal pressure or hand application lever is in released position. Test mechanical foot brake on rear of semitrailer to be sure it is effective.
10	10	*Unusual Noises (Attachments, Body, Wheels).* Be on alert during road test for any noise that may indicate loose or damaged attachments mounted on vehicle. Listen particularly for indications of loose wheel mountings. With semitrailer connected and in motion, have assistant listen for any unusual noise on semitrailer from attachments, axles, suspension units or wheels, or body stake panels, that might indicate damage, excessive wear, or inadequate lubrication.
12	12	*Air Brake System Leaks.* Test semitrailer air brakes for leaks with air pressure at governed maximum. With all brakes applied and engine stopped, there should not be a noticeable drop in pressure within one minute. If any pressure drop occurs during this check, test system for leaks by soapsud method.
13	13	*Temperature (Brake Drums, Hubs).* At completion of run, feel brake drums and hubs for abnormally high temperature.

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MAINTENANCE		MAINTENANCE OPERATIONS.
6,000-Mile	1,000-Mile	
		Raise vehicle and block safely.
47	47	*Tires and Rims (Valve Stems and Caps, Condition, Direction, Matching).* Inspect semitrailer tires as follows:
		Valve Stems and Caps. Observe if all valve stems are in good condition and in correct position, and if all valve caps are present, and installed securely. Do not tighten with pliers.
		Condition. Examine all tires for cuts, bruises, breaks, and blisters. Remove embedded glass, nails, and stones. Look for irregular tread wear, watching for any sign of flat spots, cupping, feather edges, and one-sided wear. Remove tires worn thin at center of tread (or other unserviceable tires) and exchange for new or retreaded tires. Any mechanical deficiencies causing such conditions should be determined and corrected or reported. Wheel positions of tires with irregular wear should be changed to even up wear.
		Direction. Directional tires and non-directional tires should not be installed on same vehicle. Directional tires on semitrailer wheels will ordinarily be mounted so that "V" of chevrons will point up when viewed from front of vehicle.
		Matching. With tires properly inflated, inspect them to see if they are matched according to overall circumference and type of tread.
		Rims. All rims and their lock rings or flanges should be in good condition and secure.
		Tighten. Tighten all wheel mounting and hub nuts securely.
47		*Serve.* With semitrailer tires properly inflated to 65 pounds (cool) check overall circumference of all tires. Select tires to be mounted on duals so they will not have differences in overall circumference, exceeding the ¾-inch limits specified in current directives and bulletins. Mount all dual tires with the larger tire outside. The valve stem on inner wheels should point out and the valve stem on outer wheel should point

SECOND ECHELON PREVENTIVE MAINTENANCE

MAINTENANCE	
6,000-Mile	1,000-Mile
		in, and should be opposite each other. CAUTION: *After performing the tire-matching service, do not re-install wheels until wheel-bearing services are completed.*
48		*Rear Brakes (Drums, Supports, Cams, and Shafts).* Inspect semitrailer brakes and service as follows: Remove wheels. NOTE: *On 6000-mile maintenance several wheel bearing and brake items up to 52 are group services and overlap. Perform in best order for economy of time and orderly reassembly.*
		Drums and Spiders. Clean dirt and grease from drums and spiders (supports) keeping solvent away from linings. Examine drums and spiders to see if they are in good condition, securely mounted and if drums are excessively worn or scored.
		Camshafts. See if camshafts are excessively worn; if camshafts operate freely in collar and if shafts and collars are worn.
		Tighten. Tighten hub to drum nuts securely.
	49	*Brake Shoes (Linings, Anchors, Spring).* Examine semitrailer brake linings, without removing drums, through inspection holes, to see that they are not worn enough so that bolt heads will contact drums within next 1,000 miles of operation. If vehicle has been operated in deep water, mud, or loose sand, remove right wheel and drum, and examine lining for damage. If this lining must be replaced, remove all semitrailer wheels, check their brakes, and service as necessary, being sure to clean, lubricate, and adjust all removed wheel bearings as described in paragraph 16 d (1).
49		*Adjust.* Adjust trailer brakes if necessary. With semitrailer wheels and drums removed inspect linings to see if they are in good condition, tightly secured to brake shoes, in good wearing contact with drums, free of dirt or lubricant, and not excessively worn. Also see if shoes are in good condition, properly secured to anchors and retracting springs, and that springs have sufficient tension to return shoes properly to released position. Thickness of lining at most worn

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MAINTENANCE		
6,000-Mile	1,000-Mile	
		point should be enough for at least 1,000 miles of service before bolt heads are likely to contact drums.
		Clean. Clean all dirt and grease from linings with wire brush, cloth, or compressed air.
		Adjust. After subsequent related items to 52 inclusive are completed, adjust brakes by minor method. If new linings have been installed, adjust brakes by major method (par. 51). Adjust slack adjusters so brake chamber push-rod travel is at minimum, approximately ¾ inch.
52	52	*Wheels (Bearings, Seals, Flanges, and Nuts).* Inspect and service as follows:
	52	*Wheels.* Inspect semitrailer wheels to see if they are in good condition and secure.
		Bearings and Seals. Check for looseness of wheel bearing adjustment. Revolve wheels and listen for evidence of dry or damaged bearings. Inspect around flanges and brake supports for lubricant leaks.
		Flanges and Nuts. Note if flanges are in good condition, and if nuts are tightened securely.
52		*Clean.* Disassemble both semitrailer wheel bearings and oil seals. Clean thoroughly in dry-cleaning solvent and examine bearing cups and cones to see if they are in good condition, if machined surfaces they contact are in good condition, and if there is any excessive wear.
52		*Special Lubrication.* When all of the related items are to the point where wheel bearings are to be reinstalled, lubricate bearings according to instructions on Lubrication Order (pars. 15 and 16).
52		*Adjust.* After lubricating wheel bearings, reassemble hub-and-drum assemblies into place, and adjust wheel bearings correctly according to paragraph 44 c (3).
66	66	*Brake Pedal (Mechanical).* Inspect foot-operated mechanical brake pedal, rods, clevises, and pins to see if they are in good condition, correctly and securely assembled and mounted, and not excessively worn.

SECOND ECHELON PREVENTIVE MAINTENANCE

MAINTENANCE		
6,000-Mile	1,000-Mile	
		Be sure retracting spring has tension to fully release brakes when pedal pressure is removed.
70	70	*Air Brake Reservoirs.* See that reservoir on semitrailer is in good condition and secure. Drain off water and close drain cock.
76	76	*Air Brake (Chambers, Rods, Seals, Slack Adjusters).* Examine these items to see if they are in good condition, correctly assembled and secure. Examine chambers and air hose and connections for indications of leaks. Tighten all assembly and mounting nuts or screws, securely.
77	77	*Springs (Seats, Leaves, U-bolts, Hangers, and Shackles).* See if all items are in good condition, correctly assembled and secure. Spring seats and U-bolts should be in place; spring leaves should not be shifted out of their correct position. This may be an indication of a sheared center bolt. Note if deflection of both springs is normal and approximately the same. Test hangers and bolts for excessive wear by means of a pry bar.
		Tighten. Tighten all spring U-bolts securely and uniformly.
78	78	*Shock Absorbers and Links.* Inspect shock absorbers and linkage to see if they are in good condition, securely assembled or mounted; that bodies do not leak, and that linkage connections are not excessively worn.
78		*Serve.* Fill shock absorber bodies with specified fluid (par. 16 d (4)). Work arm several times and add fluid. Repeat this operation until all air is expelled and reservoir is full.
79	79	*Body Mountings.* Inspect all body to frame mountings to be sure they are in good condition and secure.
80	80	*Frame (Side and Crossmembers).* Inspect semitrailer frame, brackets, side rails, and crossmembers to see if they are in good condition, secure, and correctly alined. If the frame appears to be out of line, report condition.
81	81	*Wiring, Conduit, and Grommets.* Observe these items underneath semitrailer to see if they are in good condition, properly supported, connected, and secure.

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MAINTENANCE		
6,000-Mile	1,000-Mile	
83	83	*Brake Lines (Fittings and Hose).* Examine all lines and fittings and air brake hose under semitrailer to see if they are in good condition, securely connected, and supported so lines or hose will not chafe against other vehicle parts.
83		Remove semitrailer air brake relay valve, clean thoroughly with brake fluid and reinstall securely.
85	85	*Vehicle Lubrication.* If due, lubricate all points of semitrailer in accordance with instructions in Lubrication Order, paragraph 15, using only clean lubricant, and omitting items that have received special lubrication during this service. Replace missing or damaged grease fittings or plugs. Keep lubricant containers and dispensers covered except when withdrawing lubricant. Open any clogged passages or fittings holes until lubricant is properly delivered. Wipe off excess lubricant that might drip onto brakes, rubber parts, or soil clothes, or detract from vehicle's good appearance.
		LOWER VEHICLE TO GROUND
91	91	*Lamps (Lights).* Examine all lamp-units or sockets, to be sure they are in good condition, clean, and secure. If tactical situation permits, test all switches to be sure lamps respond properly.
92	92	*Safety Reflectors.* See if they are all present, in good condition, clean, and secure.
100	100	*Body (Panels, Floor and Skid Strips, Stakes, Sockets, Stowage Compartment, Tarpaulin.* Inspect all of the above items to see if they are in good condition and secure. Look particularly for broken assembly welds, and missing or damaged stake anchor pins, or bolts. Remove equipment from stowage compartment, clean thoroughly, and inspect for damage. Be sure stake panel assembly connecting devices are all present, in good condition, and securely fastened. Inspect tarpaulin for damage, and see that it is properly installed and lashed, or securely stowed.
101	101	*Pintle Hook.* Examine pintle to see if it is in good condition and securely mounted to frame. Test pintle

SECOND ECHELON PREVENTIVE MAINTENANCE

MAINTENANCE		
6,000-Mile	1,000-Mile	
		and latch to see if they operate properly; are adequately lubricated; and if lock pin is present and securely attached by chain. Pay particular attention for broken spring or worn draw bar.
124	124	*Tow Hitch.* Inspect semitrailer fifth wheel plate and king pin to see if they are in good condition, well lubricated, and not excessively worn.
125	125	*Air Connections.* Inspect semitrailer air line connections to truck to be sure they are in good condition, not excessively worn, and will couple securely without leaking. See that safety valve on emergency line operates freely and will latch securely. If semitrailer is not connected, be sure dummy couplings are present and connected. If rubber seals are hard or cracked, apply a film of brake fluid to rubber surfaces.
127	127	*Landing Gear (Shafts, Wheels, Supports, Lock Pins, Gears, Crank).* Inspect all of the accessible above units to see if they are in good condition, correctly assembled, properly lubricated, and not excessively worn. Make an operating test to see that crank, gears, and cross head function satisfactorily. Spin wheels to see if they are free. Look particularly for damaged or worn assembly pins or bolts.
127		Remove gear housing dust cover and inspect gears and jack screw to see if they are in good condition, secure and not excessively worn.
127		*Special Lubrication.* Lubricate landing gear according to Lubrication Order, paragraphs 15 and 16.
127		*Tighten.* Tighten all assembly and mounting nuts or screws securely.
		TOOLS AND EQUIPMENT
131	131	*Tools.* Check On-vehicle Stowage List, to see that all tools are present, and see that they are in good condition, clean, and properly, and securely, mounted or stowed. When not in use, chock blocks should be mounted on hooks provided, one on each side of semitrailer; jumper air hose, electric cable, and tarpaulin should be properly stowed in tool box.

MAINTENANCE		
6,000-Mile	1,000-Mile	
133	133	*Decontaminators.* Check to see that decontaminators are in good condition, securely mounted, fully charged, and nozzles free and clean. Inspect refill date on tags. Refill required every three months.
135	135	*Publications.* Be sure vehicle manuals, Lubrication Order, and Form No. 478 are present and properly stowed.
141	141	*Modifications (MWO's Completed).* Inspect semitrailer to be sure that modification work orders have been completed, and enter any MWO's or major unit assembly replacements made at time of this service on W.D., A.G.O. Form No. 478.
142	142	*Final Road Test.* Make a final road test rechecking items 5, 10, 12 and 13. Confine road test to the minimum distance necessary to make proper observations. NOTE: *Correct or report all deficiencies found during final road test.*

Section VIII

TROUBLE SHOOTING

23. SCOPE.

a. This section contains trouble shooting information and tests which can be made in determining the cause of troubles that may develop in the units or systems of the semitrailer. Each symptom of trouble given under the individual unit or system is followed by a list of possible causes of trouble along with possible remedy and the paragraph number in which more complete details will be found.

24. FRAME.

a. Sagging.

Possible Cause	Possible Remedy
Cracked welds.	Reweld (par. 87).
Damaged sections.	Splice and reweld (par. 88 a).
Overload.	Load to rated capacity only.

b. Loose or Difficult Coupling.

Possible Cause	Possible Remedy
Loose coupling.	Replace worn king pin (pars. 86 b and 88 b).
Difficulty coupling semitrailer to truck-tractor.	Replace bent upper fifth wheel plate (pars. 86 b and 88 b).

25. SPRINGS (SUSPENSION) AND SHOCK ABSORBERS.

a. Hard Riding.

Insufficient lubrication.	Lubricate spring shackles and front pins (par. 15).
Dry shock absorbers.	Refill (par. 16 d (4)).
Pins in shackles or front spring bracket frozen or broken.	Remove and clean. Replace if necessary (pars. 37 a (2) and 38 b (1)).
Spring U-bolts loose, causing springs or axle to shift.	Aline axle on spring seats and tighten spring U-clip bolt nuts.
Uneven load distribution.	Distribute load evenly.
Broken spring leaves.	Replace (pars. 91 a and b; 92 b and c).
Broken spring center bolts.	Replace (pars. 91 a and b; 92 b and c).
Broken spring eye or worm-bushing.	Replace (pars. 91 c and 92 a).

b. Excessive Noise.

Worn spring pins, shackle pins or bushings.	Replace with new parts (pars. 37 a (2) and 38 b (1) and 91 c and 92 a).
Loose spring U-clip bolt nuts, causing misalinement of axle and springs.	Aline axle on spring seats and tighten U-clip bolt nuts.

26. AXLE AND BRAKE MECHANISM.

a. Hard Pulling.

Excessive bend in axle.	Replace (par. 45).
Wheel bearings improperly adjusted.	Adjust (par. 44 c (3)).
Worn bearings.	Replace (par. 49).

b. Weak Brakes.

Possible Cause	Possible Remedy
Grease on brake linings.	Replace lining and oil seal (pars. 94 c and 96 c).
Ineffective air power.	Refer to paragraph 55.
Wear of brake lining.	Adjust brakes (par. 51 c).
Worn-out brake lining.	Replace (pars. 94 c and 96 c).

c. Excessive Wear on Brake Lining.

Weak or broken brake shoe return spring.	Replace return spring (pars. 52 c and 53 d).
Slack adjuster adjustment too tight.	Adjust brakes through slack adjuster (par. 51 c).

d. Brake Drag.

Weak or broken brake shoe return spring.	Replace brake shoe return spring (pars. 52 c and 53 d).
Slack adjuster adjustment too tight.	Adjust brakes through slack adjuster (par. 51 c).

e. Grabbing Brake.

Grease-soaked brake linings.	Replace brake lining (pars. 94 c and 96 c).
Cracked or scored brake drum.	Replace brake drum (pars. 52 b and 53 e).
Worn brake lining.	Replace (pars. 94 c and 96 c).

f. Noisy Brakes.

Dirty brake linings.	Clean or replace (pars. 94 c and 96 c).
Loose brake lining bolts.	Replace (par. 96 c).
Drum distorted.	Replace drum (pars. 52 b and 53 e).

27. BENDIX-WESTINGHOUSE AIR POWER.

a. Insufficient Brakes.

Low air pressure in the air brake system (below 80 pounds).	Check air brake system on towing vehicle for low pressure. Check air brake systems on towing vehicle and semitrailer for excessive leakage (par. 55).

TROUBLE SHOOTING

Possible Cause	Possible Remedy
Brake valve delivery pressure from towing vehicle below normal.	Check brake valve delivery pressure on towing vehicle. Adjust brake valve linkage or replace brake valve.
Defective relay emergency valve.	Replace (pars. 57 **c** and **d**).
b. Brakes Apply Too Slowly.	
Low air pressure in the air brake system (below 80 pounds).	Check brake system on towing vehicle.
Brake valve delivery pressure from towing vehicle below normal.	Check brake valve delivery pressure. Adjust brake valve linkage or replace brake valve.
Bent rod in brake chamber.	Straighten rod or replace chamber (pars. 58 **c** and **d**).
Excessive travel in chamber push rod.	Adjust push rod (par. 58 **d**).
Restriction in tubing line.	Service or replace tubing line (pars. 68 **b**, **c** and **d**).
Restriction in hose line.	Service or replace hose line (pars. 67 **b**, **c** and **d**).
Clogged air line filter.	Clean filter (par. 62 **b**).
Excessive leakage with brakes applied.	See subparagraph **i** below.
c. Brakes Release Too Slowly.	
Defective exhaust check valve in exhaust port of relay emergency valve.	Service or replace exhaust check valve (pars. 64 **b**, **c** and **d**).
Restriction in tubing line.	Service or replace tubing line (pars. 68 **b**, **c** and **d**).
Restriction in hose line.	Service or replace hose line pars. 67 **b**, **c** and **d**).
Clogged air line filter.	Clean filter (par. 62 **b**).
Binding cam or binding slack adjuster.	Lubricate and aline properly (par. 15).
Excessive travel in brake chamber push rod.	Adjust push rod (par. 58 **d**).
d. Brakes Do Not Apply.	
Cut-out cocks improperly closed.	Open cut-out cocks (par. 63 **a**).

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Possible Cause	Possible Remedy
Brake system not properly connected to brake system of towing vehicle.	Connect hose couplings correctly (par. 7 **b**).
No air pressure in air brake system.	Charge air brake system.
Restrictions in tubing line.	Service or replace tubing line (pars. 68 **b**, **c** and **d**).
Restriction in hose line.	Service or replace hose line pars. 67 **b**, **c** and **d**).
Clogged air line filter.	Clean filter (par. 62 **b**).
e. Brakes Do Not Release.	
Brake system improperly connected to brake system of towing vehicle.	Connect lines correctly (par. 7 **b**).
Brake valve on towing vehicle in applied position.	Move brake valve to released position.
Relay emergency valve in emergency (semitrailer coupled).	Build up pressure in air brake system if connected to a towing vehicle.
Relay emergency valve in emergency position (semitrailer uncoupled).	Move handle of three-way cock at front of trailer, towards emergency line hose coupling if not connected to towing vehicle.
Cut-out cocks improperly closed.	Open cut-out cocks (par. 63 **a**).
Restriction in tubing line.	Service or replace tubing line (pars. 68 **b**, **c** and **d**).
Restriction in hose line.	Service or replace hose line (pars. 67 **b**, **c** and **d**).
f. Brakes Grab.	
Defective brake valve on towing vehicle.	Service or replace.
Defective relay emergency valve.	Replace (pars. 57 **c** and **d**).
g. Uneven Brakes.	
Leaking brake chamber diaphragm.	Replace brake chamber or brake chamber diaphragm (pars. 58 **c** and **d**).

TROUBLE SHOOTING

h. Excessive Leakage With Brakes Released.

Possible Cause	Possible Remedy
Relay emergency valve leaking.	Replace relay emergency valve (pars. 57 c and d).
Leaking tubing line.	Service or replace tubing line (pars. 68 b, c and d).
Leaking hose line.	Service or replace hose line (pars. 67 b, c and d).
Emergency line cut-out cock at rear of semitrailer open.	Close cut-out cock at rear of semitrailer (par. 63 a).

i. Excessive Leakage With Brakes Fully Applied.

Leaking relay emergency valve.	Replace relay emergency valve (pars. 57 c and d).
Leaking brake chamber diaphragm.	Tighten bolts around diaphragm (par. 58 b (2) (a)).
Leaking brake chamber diaphragm.	Replace diaphragm or brake chamber (pars. 58 c and d).
Leaking tubing line.	Service or replace (pars. 68 b, c and d).
Leaking hose line.	Service or replace (pars. 67 b, c and d).
Service line cut-out cock at rear of semitrailer open.	Close cut-out cock (par. 63 a).
Damaged sealing ring in hose coupling.	Replace sealing ring (pars 66 c and d).

j. Excessive Leakage With Brakes Applied and Relay-emergency Valve in Emergency Position.

Defective relay-emergency valve.	Replace relay-emergency valve (pars. 57 c and d).

k. Excessive Oil and Water Present in the Air Brake System.

Reservoir not being drained daily.	Drain reservoir daily (par. 61 a). Clean system if necessary.
Compressor on towing vehicle passing excessive oil.	Replace compressor.

28. FOOT BRAKE.

a. Failure in Operation.

Broken or worn linkage.	Replace (pars. 71 and 72).
Weak brakes.	Refer to paragraph 26 b.

Possible Cause	Possible Remedy
Excessive wear on brake linings.	Refer to paragraph 26 **c**.
Binding cam or binding slack adjuster.	Lubricate and aline properly (par. 15).

29. WHEELS, TIRES AND TUBES.

a. Excessive Wear and Scuffed Tires.

Tires wearing evenly but too rapidly due to bent axle.	Report to higher authority.
Outside tire wearing.	Report to higher authority.
Inside tire wearing.	Overload.
Rim or wheel bent.	Replace wheel (par. 46).
Low tire pressure.	Keep tires inflated to 65 pounds.

b. Scuffed Tires.

Loose bearings.	Adjust bearings (par. 44 **c** (3)).
Loose wheels.	Tighten (par. 44 **b**).

30. LANDING GEAR.

a. Faulty Operation.

Lack of lubrication.	Lubricate (pars. 15 and 16).
Bent crankshaft.	Straighten or replace (pars. 75 **b** (2) and 75 **c** (1)).
Worn bevel gears.	Replace (pars. 75 **b** (2) and 75 **c** (1)).
Bent jack screw.	Replace (pars. 75 **b** (2) and 75 **c** (1)).
Broken landing gear wheels.	Replace (pars. 75 **b** (1) and 75 **c** (2)).
Bent legs, cross braces or connecting support.	Straighten or replace (pars. 75 **b** (1) and 75 **c** (2)).

31. LIGHTS AND WIRING.

a. No Lights or Dim Lights.

Short in battery in towing vehicle, or corroded battery terminals.	Refer to trouble shooting section of towing vehicle manual.
Broken or burnt-out coupling socket.	Replace (par. 78 **a**).

TROUBLE SHOOTING

Possible Cause	Possible Remedy
Burnt-out taillight units.	Replace (pars. 78 **b** and 78 **c**).
Short in wiring.	Check wiring for short circuit (par. 77).
Loose or dirty terminals.	Clean and tighten (par. 77).
Broken or burnt-out blackout switch.	Replace (par. 78 **d**).
Damaged jumper cable or plug.	Replace.

32. BODY.

a. Damaged Rack Boards.

Load shifting.	Load properly, replace damaged boards.
Side-swiping tree limbs or other objects.	Careful driving. Replace damaged boards.

b. Broken Floor Boards.

Dropping load onto floor.	Careful loading. Replace or patch.
Excessive use of overloaded and heavy-hand truck in loading operations.	Place steel plate in center of floor to act as a runway. Replace boards or patch holes.

c. Loose Racks.

Loose bolts.	Tighten (par. 81).
Loose or damaged hardware.	Tighten or replace (pars. 81 and 82 **b**).

d. Torn Tarpaulin.

Broken rope ties.	Replace ropes. Patch tarpaulin.
Side-swiping limbs or other objects.	Careful driving. Patch tarpaulin.
Exposure.	Roll up and stow in tool box when not in use. Patch holes.

e. Pintle Hook. Faulty Operation.

Worn pintle lock, pintle latch spring, bolts, pins, springs, etc.	Replace worn parts or replace with new pintle hook (pars. 82 **c** and 99 **d**).

f. Chock Blocks. Damage to Wood.

Failure to locate on semitrailer when not in use.	Stow on proper hooks, replace damaged wood (par. 99 **e**).

Section IX

FRAME AND UPPER FIFTH WHEEL

33. FRAME.

a. Description. The purpose of the frame is to provide a foundation for the semitrailer chassis and body. It consists of fabricated steel sections welded together into an integral frame assembly. The springs, shock absorbers, landing gear, foot brake, power system, chock blocks and pintle hook are attached to the frame directly with bolts or to brackets which are bolted to the frame.

b. Maintenance. The frame can be damaged only by extreme overloading or collision or by other accidental causes.

(1) Inspect for cracks in frame or at welds. If the frame is damaged beyond serviceability, notify higher authority.

(2) Inspect and tighten loose bolts.

(3) Replace missing bolts.

34. UPPER FIFTH WHEEL.

a. Description. The standard method of connecting the semitrailer to the tractor truck is by means of the fifth wheel (figs. 5 and 6). A heavy steel plate, called the upper fifth wheel plate, is welded to the under side of the frame at the front end of the semitrailer. This plate serves as the bearing or front end support of the semitrailer, when coupled to the tractor truck. The front end of the plate is turned up to facilitate coupling to the tractor truck lower fifth wheel. A standard, interchangeable king pin is riveted to the upper fifth wheel plate. This pin is the only means of attaching the semi-trailer to the tractor truck and all the pulling force is withstood at this point.

b. Maintenance.

(1) Inspect upper fifth wheel plate and notify higher authority if cracked or unserviceable.

(2) If difficulty in coupling is experienced due to badly damaged upper fifth wheel plate, notify higher authority.

(3) If king pin is damaged, worn, or loose notify higher authority.

(4) Keep upper fifth wheel plate and king pin lubricated with general purpose grease (par. 15).

Section X

SUSPENSION

35. DESCRIPTION AND TABULATED DATA (figs. 15 and 16).

a. Description. The suspension consists of two main springs, two auxiliary springs, and two shock absorbers. The semi-elliptical type main spring consists of 11 leaves held together by six rebound clips and a center bolt. The main spring is shackled at the rear end, and is mounted on a spring seat on the axle, with the center bolt resting in a recess in the spring seat. A malleable iron shroud covers the top and sides of the main spring. The slip end, semi-elliptical type auxiliary spring assembly consists of eight leaves held together by four-clinch type rebound clips and a center bolt. The auxiliary spring is mounted on top of the main spring with the end of the center bolt resting in the recess on top of the main spring shroud. A spring clip seat is located on top of the auxiliary spring. The main and auxiliary spring assemblies, the spring clip seat, shroud, spring seat, and plate are held in position on the axle by heavy U-clip bolts. The shock absorbers are secured to the frame center rails by bolts, and are connected to the spring clip seats by link assemblies.

b. Data.

Main springs—length (center to center of eye)	54 in.
Main springs—width	3 in.
Main springs—thickness of leaves	7/16 in.
Main springs—number of leaves	11
Auxiliary springs—length	41 in.
Auxiliary springs—width	3 in.
Auxiliary springs—thickness of leaves	5/16 in.
Auxiliary springs—number of leaves	8
Shock absorbers—type	Hydraulic
Shock absorbers—make	Houdaille

36. MAINTENANCE (fig. 15).

a. Lubricate front spring pin, shackle pin, cross shaft, and shock absorber link assembly as described in paragraph 15.

b. Replenish shock absorber fluid as described in paragraph 16 d (4).

c. Tighten nuts securing front and rear spring brackets, auxiliary spring pads, and shock absorbers to frame center rail.

d. Tighten nuts on spring shackles, spring shackle collars, and spring cross shaft.

e. Tighten nuts on end of U-clip bolts.

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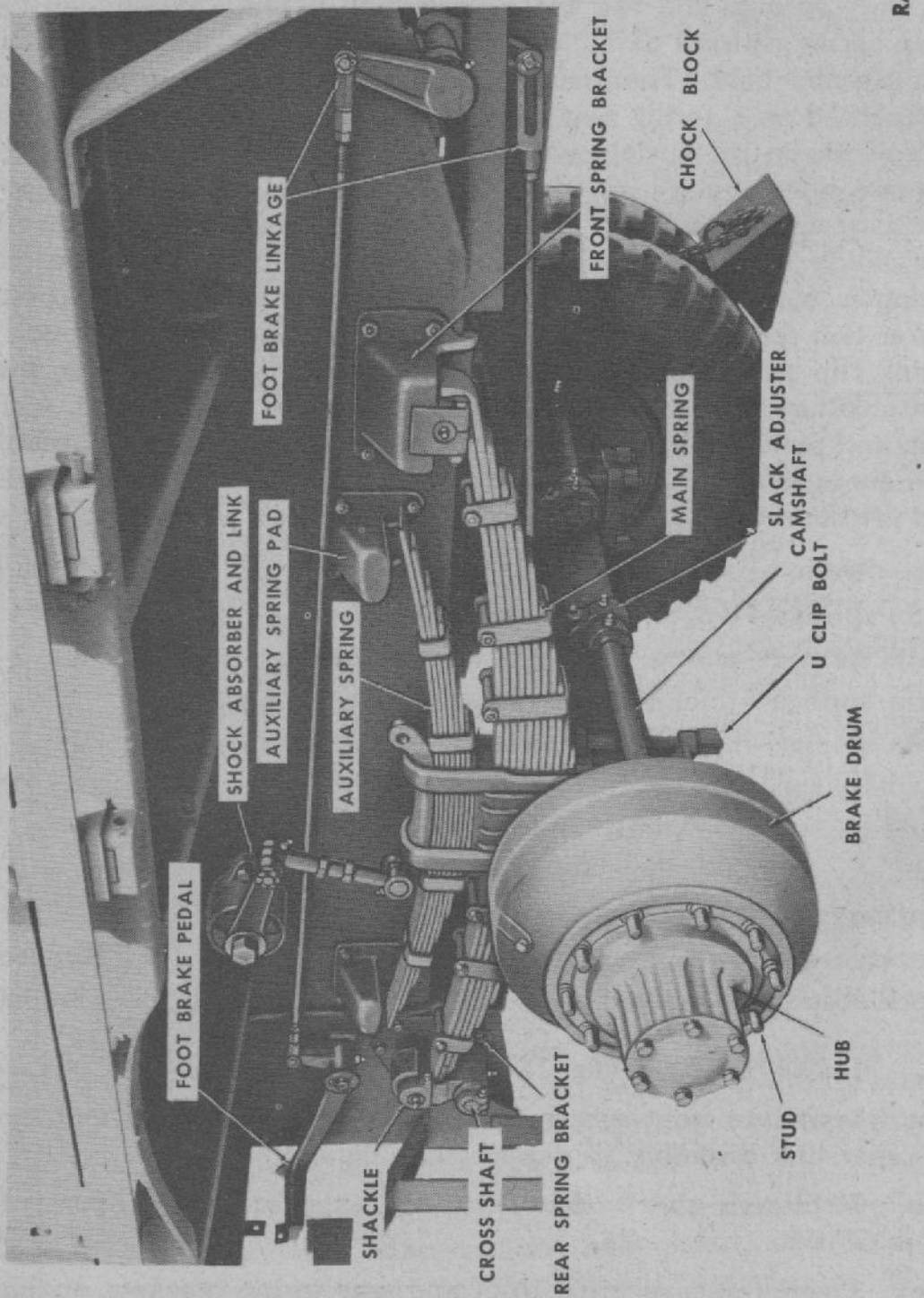

Figure 15 — Springs, Shock Absorber and Foot Brake

f. Inspect springs for broken or damaged leaves, center bolts, and rebound clips. Replace if necessary.

g. Replace worn main spring bushings (par. 91 c), front spring pins, and shackle pins causing excessive play.

h. Check for cracked brackets, seats, auxiliary spring pads, and replace if necessary.

37. SPRINGS.

a. **Removal** (figs. 15 and 16).

(1) AUXILIARY SPRING.

(a) Jack up rear of semitrailer frame if it is loaded.

(b) Remove the four nuts and lock washers from the two U-clip bolts holding auxiliary spring in position. The spring clip plate will drop off when U-clip bolts are removed.

(c) Lift spring clip seat and shock absorber link arm out of way and remove auxiliary spring.

(2) MAIN SPRING. To remove main spring proceed as follows:

(a) Hoist, or jack up, rear of semitrailer frame till tension is relieved from springs.

(b) Remove the four nuts and lock washers from the two U-clip bolts holding main and auxiliary springs in position. The spring clip plate will drop off when U-clip bolts are removed.

(c) Lift spring clip seat and shock absorber link arm out of way, and remove auxiliary spring.

(d) Remove the bolt, lock washer, and nut clamping spring pin in front spring bracket. Drive out pin. Tilt spring toward front of semitrailer.

(e) Remove the bolt, lock washer, and nut clamping shackle pin in spring shackle, and drive out pin.

(f) Lift main spring and shroud off spring seat, and remove from semitrailer.

b. **Installation** (figs. 15 and 16).

(1) MAIN SPRING.

(a) Hoist, or jack up, rear of semitrailer frame enough to relieve tension from springs still on semitrailer.

(b) Position spring seat (noting R.H. or L.H.) on upper spring spring seat adapter which is welded to axle; place main spring on spring seat, fitting center bolt into recess of spring seat; install shroud around main spring fitting recess in shroud over top of main spring center bolt.

(c) Position auxiliary spring on top of main spring shroud.

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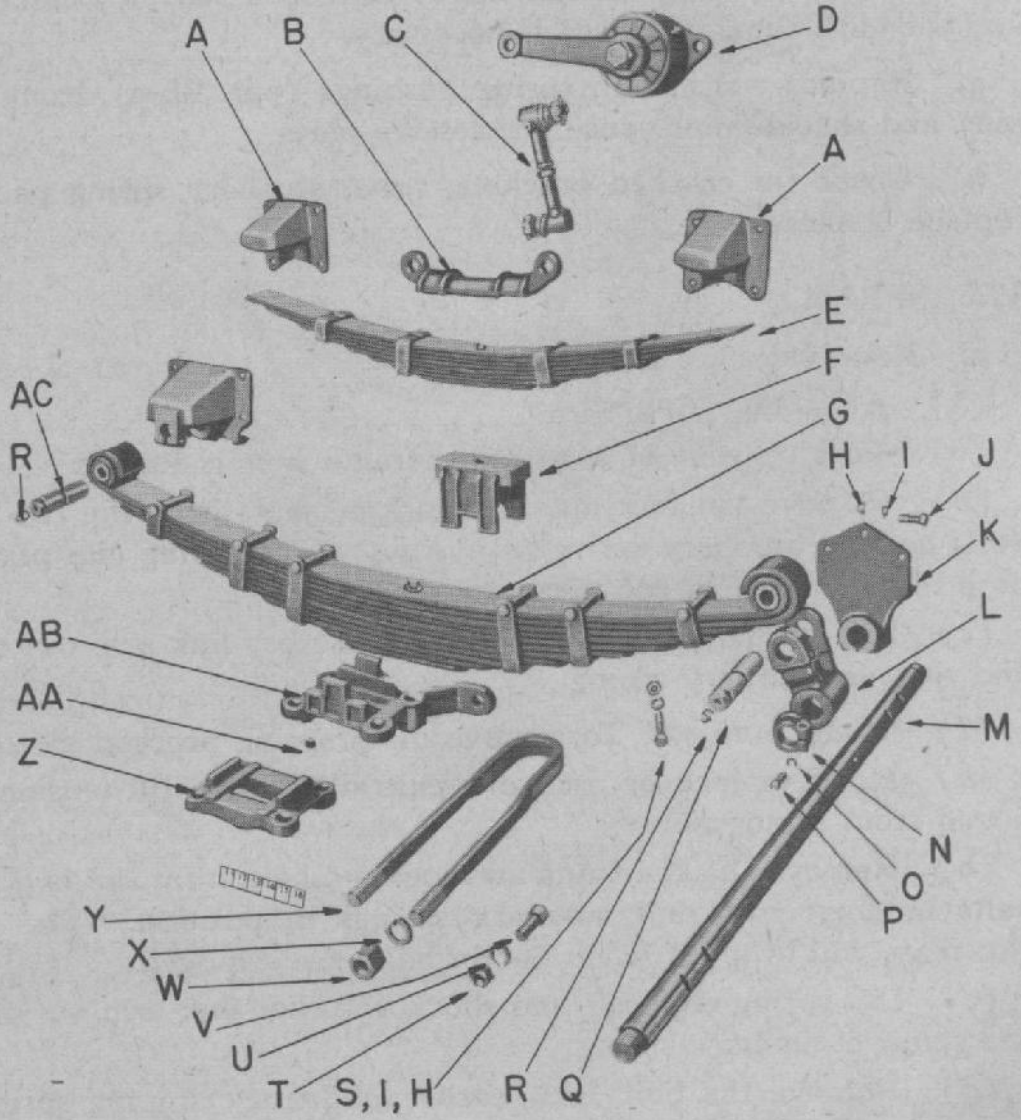

A—AUXILIARY SPRING BRACKET PAD
B— U-CLIP BOLT SEAT
C—SHOCK ABSORBER LINK ASSEMBLY
D—L. H. SHOCK ABSORBER
E—AUXILIARY SPRING ASSEMBLY
F—SPRING SHROUD
G—MAIN SPRING ASSEMBLY
H—NUT
I—LOCK WASHER
J—BOLT
K—SPRING REAR BRACKET
L—SPRING SHACKLE ASSEMBLY
M—SPRING CROSS SHAFT
N—SPRING SHACKLE RETAINING COLLAR
O—LOCK WASHER
P—CAP SCREW
Q—SPRING SHACKLE PIN
R—LUBRICATING FITTING
S—BOLT
T—NUT
U—LOCK WASHER
V—CAP SCREW
W— U-CLIP BOLT NUT
X— U-CLIP BOLT LOCK WASHER
Y— U-CLIP BOLT
Z—SPRING CLIP PLATE
AA—DOWEL PIN
AB—L. H. SPRING SEAT
AC—SPRING FRONT BRACKET PIN

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Figure 16 — Suspension Assembly — Disassembled

(d) Position spring clip seat and shock absorber link arm on top of auxiliary spring.

(e) Install the two U-bolts in groove of clip seat and through holes in spring seat. Install spring clip plate onto U-clip bolts; install lock washers and nuts and tighten.

(f) Position main spring eye in spring shackle and install shackle pin. Install bolt, lock washer and nut, and tighten to clamp pin in shackle.

(g) Position front spring eye into front spring bracket and install spring pin. Install bolt, lock washer and nut, and tighten (to clamp spring pin in place).

(h) Lubricate fittings (par. 15).

(2) AUXILIARY SPRING.

(a) Position auxiliary spring on top of main spring shroud.

(b) Position spring clip seat and shock absorber link arm on top of auxiliary spring.

(c) Install the two U-clip bolts in groove of clip seat and through holes in spring seat. Install spring clip plate onto U-clip bolts; install lock washers and nuts, and tighten.

38. SPRING CROSS SHAFT (fig. 16).

a. Removal.

(1) Hoist, or jack up, rear of semitrailer frame till tension is relieved from springs.

(2) Remove bolts, lock washers, and nuts securing spring shackle stud collars to spring cross shaft and remove collars.

(3) Remove the four bolts, lock washers, and nuts holding spring cross shaft in position. Drive out cross shaft.

b. Installation.

(1) Aline spring shackles and drive cross shaft holes in shackles, and bottom hole in rear spring brackets. Position so that slots in cross shaft are toward ground and line up with bolt holes in rear spring brackets. Install the four bolts, lock washers, and nuts, and clamp spring cross shaft in place.

(2) Install spring shackle stud collars. Install bolts, lock washers, and nuts, and tighten to secure collar on spring cross shaft.

39. SHOCK ABSORBER AND LINK ASSEMBLY (figs. 15 and 16).

a. Removal.

(1) Remove the cotter pin and nut attaching shock absorber link assembly to shock absorber lever.

(2) Remove the two bolts, lock washers, and nuts attaching shock absorber to frame, and remove shock absorber.

(3) To remove shock absorber link assembly only, remove the cotter pins and nuts attaching link to spring clip seat and shock absorber lever.

b. Installation.

(1) Position shock absorber to frame; and install bolts, lock washers, and nuts.

(2) Secure shock absorber link assembly to spring clip seat with nut and cotter pin.

(3) Secure shock absorber link assembly arm to shock absorber lever with nut and cotter pin.

(4) Lubricate fittings (par. 15).

40. COMPLETE SUSPENSION, AXLE AND WHEELS (figs. 15, 16, and 17).

a. Removal. To remove complete suspension, including axles and wheels, proceed as follows:

(1) Hoist, or jack up, rear of semitrailer frame till tension is relieved from springs.

(2) Disconnect foot-brake rods at slack adjusters.

(3) Disconnect air-brake lines at brake chambers.

(4) Disconnect shock absorber link assemblies from spring clip seats.

(5) Remove bolts, lock washers, and nuts securing spring shackle stud collars to spring cross shafts; and remove collars.

(6) Remove the four bolts, lock washers, and nuts holding spring cross shaft in position. Drive out cross shaft, freeing shackle end of springs.

(7) Remove the bolts, lock washers, and nuts clamping the spring pins in front spring brackets. Drive out pins to free front end of springs.

(8) Roll suspension, axle, and tires from under semitrailer.

(9) To remove main springs and auxiliary springs from axle, remove nuts and lock washers from U-clip bolts. Drive U-clip bolts up through seats thus freeing springs.

(10) Remove bolts, lock washers, and nuts clamping the shackle pin in spring shackle and drive out pin.

(11) Complete main springs and auxiliary springs can now be replaced.

b. Installation.

(1) Position main spring eyes in spring shackles, and install shackle pins. Install bolts, lock washers, and nuts through end of shackles, and tighten to clamp pins in shackles.

(2) Insert steel dowels in upper spring seat adapters which are welded to the axle. Position spring seats on adapters. NOTE: *The spring seats are right-hand and left-hand design.* Place main springs on spring seats, fitting ends of center bolts into recess of spring seats; install shrouds around main springs, fitting recess in shroud over top of main spring center bolts.

(3) Position auxiliary springs on top of main spring shrouds.

(4) Position spring clip seat on top of auxiliary spring placing large side of tapered hole away from frame center rail.

(5) Install the two U-clip bolts on each side of springs in grooves of clip seat and through holes in spring seat. Install spring clip plate onto U-clip bolts; install lock washers and nuts, and tighten.

(6) Hoist, or jack up, rear of semitrailer frame. Roll complete suspension into position under semitrailer, and lower frame and aline so that spring shackles, cross shaft, and front spring bracket pins can be installed.

(7) Drive cross shaft through bottom hole in rear spring brackets; position so that slots are toward ground and line up with bolt holes in rear spring brackets. Install the four bolts, lock washers, and nuts, and clamp spring cross shaft in place.

(8) Install spring shackle stud collars with attaching bolts, lock washers, and nuts and tighten.

(9) Position front spring eyes into front spring brackets and install spring pins. Install bolts, lock washers, and nuts, and clamp the spring pin into position by tightening.

(10) Connect shock absorber link assembly to spring clip seats.

(11) Connect air brake lines at brake chambers.

(12) Connect foot brake rods at slack adjusters. Be sure to connect the foot brake yoke, brake chamber yoke, and slack adjuster with the same pin.

(13) Lubricate fittings (par. 15).

(14) Test for serviceability.

41. BRACKETS AND PADS (figs. 15 and 16).

a. Auxiliary Spring Pads.

(1) REMOVAL.

(a) Jack up rear of semitrailer frame, if it is loaded.

(b) Remove the four nuts, lock washers, and bolts from auxiliary spring pad; and remove pad from frame.

(2) INSTALLATION.

(a) Position auxiliary spring pad so holes line up with holes in center frame rail. Install the four special tapered bolts and lock washers and nuts. Tighten till secure.

b. Front Spring Bracket.

(1) REMOVAL.

(a) Jack up rear of semitrailer frame till tension is relieved from springs.

(b) Remove the nut, lock washer, and bolt clamping the spring pin in front spring bracket. Drive out pin.

(c) Remove the six nuts, lock washers, and bolts from front spring bracket, and remove bracket from frame.

(2) INSTALLATION.

(a) Position front spring bracket so holes line up with holes in center frame rail. Install the six special tapered bolts and lock washers, and nuts. Tighten till secure.

(b) Position front spring eye into front spring bracket, and install spring pin. Install bolt, lock washer, and nut, and clamp the spring pin into position by tightening.

(c) Remove jack from underneath frame.

c. Rear Spring Bracket.

(1) REMOVAL.

(a) Jack up rear of semitrailer frame till tension is relieved from springs.

(b) Remove spring cross shaft (par. 38 a).

(c) Remove the five nuts, lock washers, and bolts from rear spring bracket, and remove bracket from frame.

(2) INSTALLATION.

(a) Position rear spring bracket so holes line up with holes in center frame rail. Install the five special tapered bolts, lock washers, and nuts. Tighten till secure.

(b) Install spring cross shaft (par. 38 b).

(c) Remove jack from underneath frame.

Section XI

AXLE, WHEELS, HUBS, BEARINGS, TIRES, AND TUBES

42. DESCRIPTION.

a. The semitrailer is equipped with a tubular trailer axle. The flanges and spindles are integrally welded to form a one piece axle. The camber, based on standard road crown, is forged into the axle at the time of manufacture. The camshaft brackets, brake chamber brackets, and upper and lower spring seat adapters are welded to the axle beam. The tubular axle supports the weight of the semitrailer, keeps the wheels in alinement, and resists the stresses that occur when the brakes are applied. The wheels are pressed steel, ventilated-disk type. Each wheel is fastened to the hub by its own set of cap nuts. The nuts on the right side of the trailer have right-hand threads, and the nuts on the left side of the trailer have left-hand threads. The inner and outer wheel bearings are the same size. The tires and tubes are military-truck type, mud and snow design.

43. DATA.

a. Axle.

Make	Timken-Detroit Axle
Model	T-2090-WM-X-1
Type	Tubular, trailer
Track	72 in.

b. Wheels.

Make	Budd
Type	Disk
Size	20 x 8 in.
Bolt circle	11¼ in.
Number of studs	10

c. Wheel Bearings.

Make	Timken Roller Bearing Co.
Quantity	4
Cone	No. 5557
Cup	No. 5520

d. Tires and Tubes.

Type	Military truck type
Design	Mud & Snow
Size	9 x 20
Ply	10

SEMITRAILER, 5-TON PAYLOAD, 8-TON GROSS, 2-WHEEL (2d1) STAKE AND PLATFORM, 1944
(Trailer Co. of America, Truck Eng. Corp., Olson Mfg. Co.)

44. MAINTENANCE.

a. Axle. If the axle tube or spindles become bent, through extreme overload or shock, replace the axle.

b. Wheels.

(1) Tighten the wheel stud nuts daily for the first 1,000 miles of service to offset "setting in" of clamping surfaces. Use wheel wrench provided for this purpose. Do not use an extension on wrench handle, nor jump on handle. Tighten the wheel stud nuts as follows:

(a) Loosen outer wheel stud nuts (hexagonal nuts).

(b) Tighten opposite inner wheel stud nuts (square nuts) to prevent cocking of wheel on studs.

(c) Tighten outer stud nuts alternately. NOTE: *stud nuts must be tightened in the above manner because the inner and outer wheels are attached to the hub by separate sets of wheel stud nuts.* NOTE: *Never use oil or grease on wheel stud nuts.*

c.. Wheel Bearings.

(1) Clean and lubricate wheel bearings and hubs (par. 16 d).

(2) Inspect bearings and replace if pitted, chipped, or worn (par. 16 d (1)).

(3) ADJUSTMENT.

(a) Jack up axle until wheel is free to turn. Make certain brakes are released.

(b) Remove hub cap by removing the six cap screws, lock washers, and hub cap gasket.

(c) Remove the outer jam nut and pin-type lock washer.

(d) Gradually tighten the inner adjusting nut, turning it up tight against the outer bearing so that the wheel binds, at the same time revolving the wheel to be sure the bearing is functioning properly. Back off the nut enough to allow the wheel to rotate freely, but without end play.

(e) Test the adjustment by taking a bar, placing the end of it between the tire and floor, at the same time holding one finger on the cage of the outer bearing. Work the bar up and down to detect any excessive play or looseness. If there is a barely perceptible shake and the wheel rotates freely, the adjustment is correct.

(f) Replace the pin-type lock washer and outer jam nut. Tighten the nut. Test the adjustment with the bar again, since in tightening the outer jam nut it is possible to jam the nut so tightly against the

inner adjusting nut that the adjustment is destroyed. This extra caution assures normal bearing operation.

(g) Place a light film of general purpose grease over axle spindle and adjusting nuts, position hub cap gasket, and install hub cap. Secure with six lock washers and cap screws. Lower axle and remove jack.

d. Tires and Tubes.

(1) The tire and tube maintenance operations include mounting, inflation, gaging, repairing, and replacement. The operations are equally important and Ordnance instructions should be followed carefully.

(2) The outside diameter of the tires must be the same, within approximately ¼ inch, or excessive tire wear or scuffing will result. "Caliper" the outside diameter to check the dimension after tire is inflated to 65 pounds air pressure.

(3) The 9.00 x 20, 10 ply, mud and snow tread tires are designed to operate at 65 pounds air pressure. An under-inflated tire runs sluggishly, and quickly wears out with too much flexing. However, overinflation weakens the tire pressure and may cause a blowout. All tires must be equally inflated in order to distribute the load.

45. AXLE.

a. Removal (figs. 15, 16 and 17).

(1) Disconnect foot brake rods at slack adjusters.

(2) Disconnect air brake lines at brake chambers.

(3) Remove the eight nuts and lock washers from the four U-clip bolts. The spring clip plates will drop off axle.

(4) Hold the spring seats in position; hoist, or jack up, rear of semitrailer frame to permit axle to drop free of U-clip bolts.

NOTE: *Remove dowel pins from upper spring seat adapters and keep for installation of new axle.*

(5) Roll complete assembly from under axle.

(6) Remove the retaining screws and washers from end of camshaft, and slide off slack adjuster.

(7) Remove yoke and lock nut from end of brake chamber push rod. Remove nuts from studs, and lift off brake chambers.

b. Installation (figs. 15, 16 and 17).

(1) Install brake chambers onto brake chamber brackets welded to axle. Attach nuts on studs, and tighten. Install yoke lock nut on push rod. Install yoke till dimension from mounting face of brake chamber and center of hole in yoke measures 7¼ inches.

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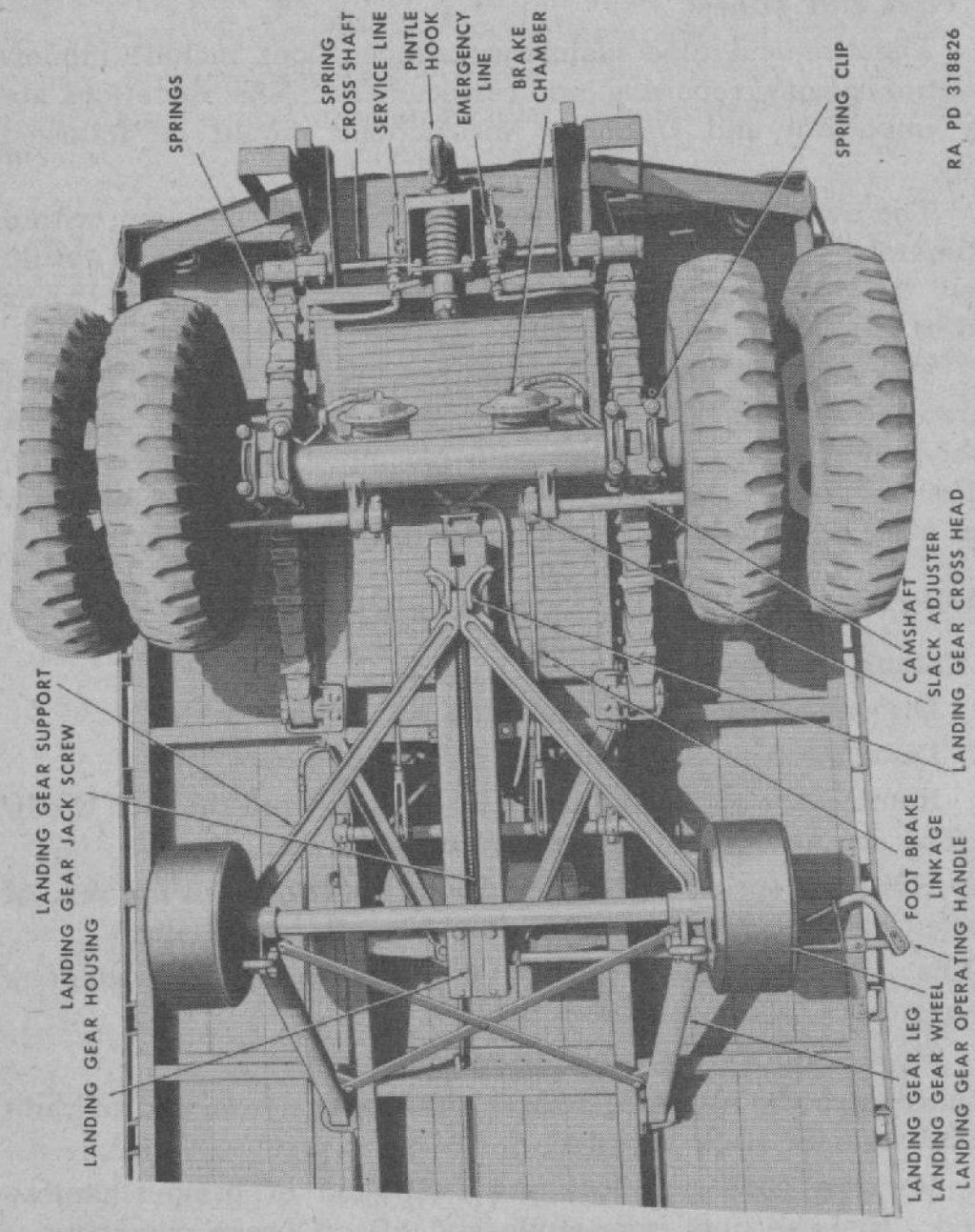

Figure 17 — Undercarriage of Semitrailer

(2) Slide slack adjusters onto ends of camshafts, be sure adjusting nuts face front of semitrailer since the slack adjusters are right-hand and left-hand. Install camshaft retaining washers and screws.

(3) Hoist semitrailer rear frame and roll complete assembly under suspension.

(4) Place dowel pins in upper spring seat adapters.

(5) Lower suspension onto axle, holding spring seats in position on U-clip bolts.

(6) Install spring clip plates onto U-clip bolts and attach with the eight lock washers and nuts. Tighten.

(7) Turn slack adjuster nuts in order to move slack adjusters to line up end hole in slack adjuster bodies with brake chamber yokes.

(8) Line up foot-brake yokes on outside of brake-chamber yokes and slack adjusters. Install pins and cotter pins.

(9) Connect air line hose to brake chambers.

(10) Lubricate suspension and axle fittings (par. 15).

(11) Adjust brakes (par. 51).

(12) Test air brake power for serviceability.

46. WHEELS.

a. Removal (fig. 18).

(1) Partially loosen each of the ten outer and ten inner stud nuts.

(2) Jack up axle until wheels clear ground.

(3) Remove the ten outer stud nuts, and lift off outer wheel.

(4) Remove the ten inner stud nuts, and lift off inner wheel.

b. Installation.

(1) Mount inner wheel on studs, install the sleeve-shaped inner cap nuts, and tighten nuts.

(2) Before installing outer wheel, position wheel so valve stem will be opposite inner wheel valve stem to permit easy inflation of tires.

(3) Mount the outer wheel over the inner cap nuts and install outer cap nuts.

(4) Tighten all nuts with the semitrailer jacked up.

(5) Retighten all cap nuts after running 50 miles after wheel change.

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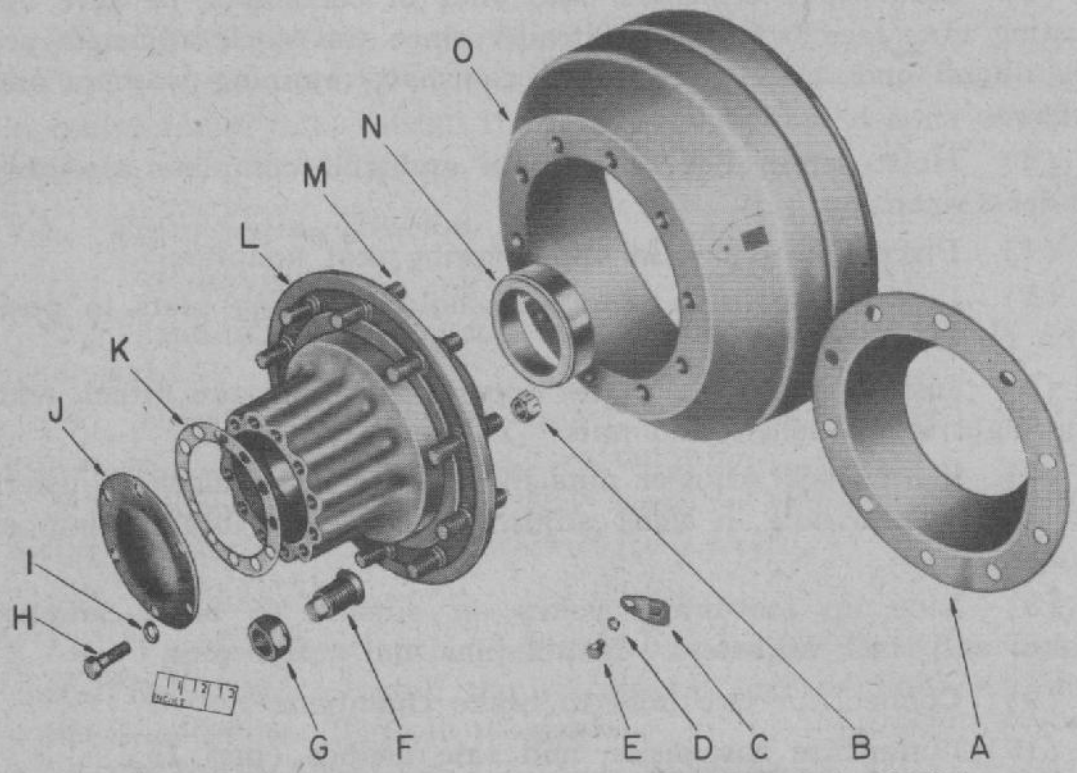

A—BRAKE DRUM OIL SLINGER
B—BRAKE DRUM STUD NUT
C—BRAKE DRUM INSPECTION HOLE COVER
D—LOCK WASHER
E—CAP SCREW
F—WHEEL STUD INNER CAP NUT
G—WHEEL STUD OUTER CAP NUT
H—HUB CAP CAP SCREW
I—HUB CAP LOCK WASHER
J—HUB CAP
K—HUB CAP GASKET
L—WHEEL HUB
M WHEEL STUD
N—WHEEL BEARING CUP
O—WHEEL BRAKE DRUM

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Figure 18 — Hub, Drum, Cups, Studs, and Nuts — Disassembled

47. HUB AND DRUM ASSEMBLY (fig. 18).

a. Removal.

(1) Remove wheels (par. 46 a).

(2) Remove hub cap, outer jam nut, pin-type lock washer, inner adjusting nut, and outer wheel bearing as outlined in paragraph 16 d (1).

(3) Slide the hub and drum assembly straight off the axle.

(4) To separate hub from drum, remove the ten nuts holding drum and drum oil slinger to hub.

b. Installation.

(1) Before installing hub and drum assembly inspect the inner felt retainer, felt washer, oil seal felt, and outer felt retainer. If damaged replace with new parts and install onto axle spindle in order mentioned.

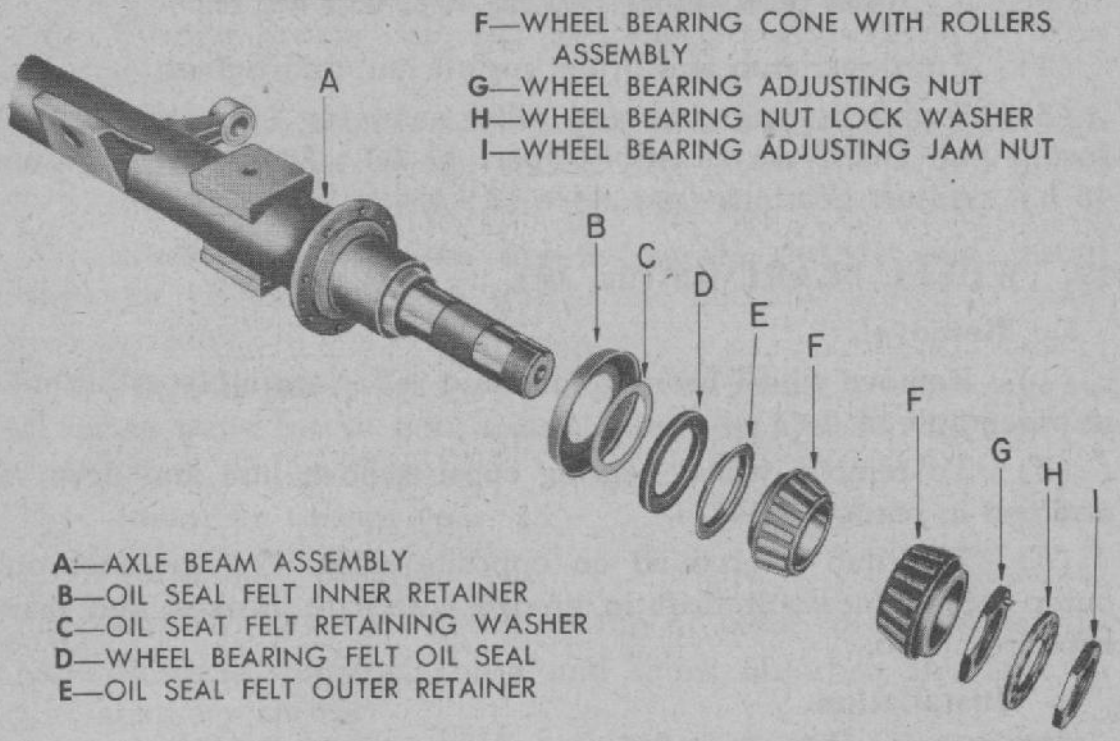

Figure 19 — Axle Beam, Cones, Oil Seals, Adjusting Nuts — Disassembled

(2) Inspect bearing cone and roller assembly; repack or replace if necessary. Install on axle (par. 16 **d** (1)).

(3) Inspect drum oil slinger; clean off grease; replace if damaged.

(4) Install hub and drum onto axle.

(5) Complete installation (par. 16 **d** (1)) and adjust wheel bearings (par. 44 **c** (3)).

43. STUDS (fig. 18).

a. Removal.

(1) Remove broken or worn studs by following procedure in paragraph 47 **a.** It is not necessary to remove drum and oil slinger if only one, or two, studs are to be removed.

(2) Place hub and drum on floor with inside of drum up.

(3) Remove nut from broken stud.

(4) Use a 5/8-inch punch and drive out broken stud.

b. Installation.

(1) Place hub and drum on floor with inside of hub up.

(2) Insert stud in hole, making sure that shoulder on stud will fit into groove in hub after stud is driven into position.

(3) Use copper hammer, and drive stud into position.

(4) Turn over hub and drum; install nut, and tighten.

(5) Install bearing cone and roller assembly (par. 16 d (1)). Install hub and drum assembly (par. 47 b). Install wheels (par. 46 b). Adjust bearings (par. 44 c (3)).

49. WHEEL BEARINGS (fig. 19).

a. Removal.

(1) Remove wheel bearing cone and roller assembly as outlined in paragraph 16 d (1).

(2) To remove wheel bearing cups, remove hub and drum as outlined in paragraph 47 a.

(3) The hub is grooved on opposite sides of both inner and outer cup. Place soft drift in groove, alternate strokes, and drive cups from hub.

b. Installation.

(1) Thoroughly clean hub and cups (par. 16 d (1)).

(2) Do not grease cups before driving them into hub. Strike opposite side of cups when installing.

(3) Install bearing cone and roller assembly (par. 16 d (1)). Install hub and drum assembly (par. 47 b). Install wheels (par. 46 b). Adjust bearings (par. 44 c (3)).

Section XII

BRAKE MECHANISM

50. DESCRIPTION AND TABULATED DATA.

a. Description. The heavy-duty, two-shoe brake used on the semitrailer is operated by the air brake power system or through the foot brake linkage. Both these systems are connected to the slack adjusters which are attached to the serrated ends of the camshafts. The cam and shaft are forged integrally for strength. The motion of the slack adjuster turns the "S" head of the camshaft and pushes the brake shoe toward the brake drum until the brake lining comes into contact with the drum. When the brake pressure is released, the brake return spring pulls the shoe away from the drum to its unoperating position. Each brake shoe is anchored to an individual anchor pin which is locked in position with an anchor pin lock. The camshaft is mounted in the brake spider end equipped with slotted bushing. An oil seal felt and drum oil slinger seals the bearing grease away from the brake lining. Dust shields keep sand, mud, and dust from entering brake mechanism.

b. Data.

Make	Timken-Detroit Axle Co.
Model	T-2090-WM-X-1
Type	Two shoe, double anchor
Size	17¼ x 4
Lining—number of pieces each axle	8
Lining—thickness	3/4 in.
Lining—kit number	TCA-7-A10-1

51. MAINTENANCE.

a. Lubricate all four anchor pins to prevent binding action at brake shoe anchor point. NOTE: *Do not overlubricate (par.* 16 **d** (7) *).*

b. Lubricate bearings at both ends of camshaft. NOTE: *Do not overlubricate (par.* 16 **d** (7) *).*

c. Brake Adjustment. Brake adjustments are made through the slack adjuster on the outer end of the camshaft.

(1) Jack up the semitrailer axle until tires are off ground.

(2) Make certain brake chamber is in "brake-off" position.

(3) Turn slack adjuster adjusting nut until brake lining is tight against drum.

(4) Back slack adjuster nut two or three notches, measured by "clicks" in slack adjuster. This should allow wheel to turn freely.

(5) Repeat this adjusting operation on other slack adjuster, and, under normal conditions, brakes should be equalized. NOTE: *There is 360 degrees adjustment in slack adjuster, thus there is no need to relocate it on camshaft.*

d. Replace brake drums when cracked or badly scored. Heat checking, unless severe, does not call for brake drum replacement.

e. Whenever hubs and drums are removed, inspect oil seal felt and drum oil slinger to determine whether or not grease from bearings is properly sealed away from brake linings. If grease is not properly sealed, replace the oil seal felt and clean the drum oil slinger thoroughly.

f. Replace a weak, or broken, brake shoe return spring.

g. Clean dirty linings, and replace loose ones.

h. Brake Lining. To determine amount of lining left on brake shoe, make visual inspection of lining by removing wheels, and then remove inspection cover plate on drum. NOTE: *Although brass bolts hold lining to shoe, do not permit lining to wear so that head of bolt contacts brake drum.*

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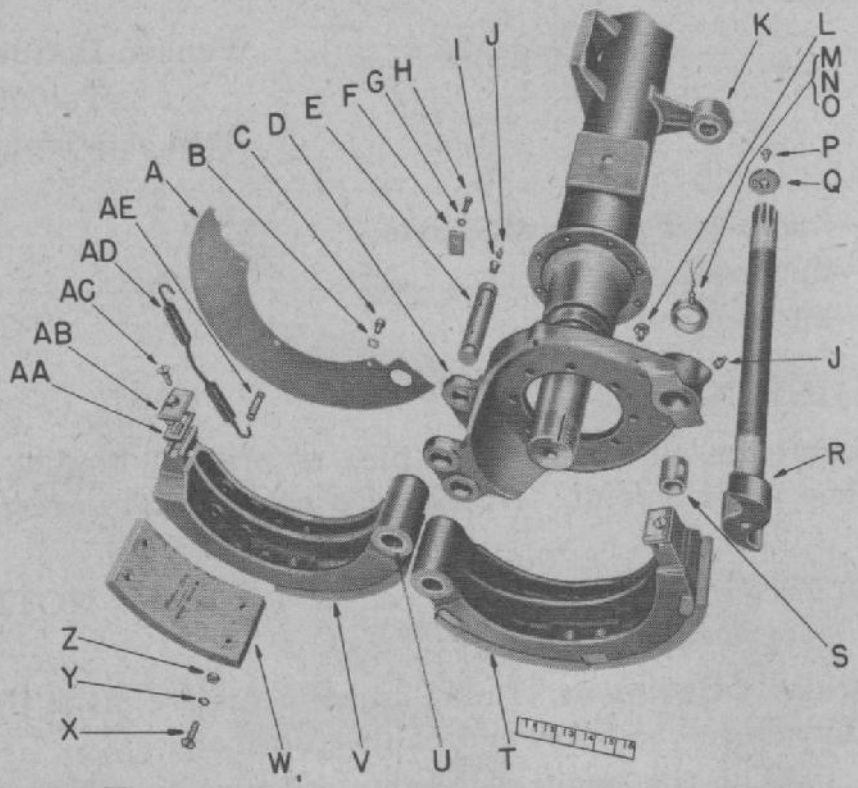

A—DUST SHIELD
B—DUST SHIELD LOCK WASHER
C—DUST SHIELD CAP SCREW
D—BRAKE SPIDER
E—BRAKE SHOE ANCHOR PIN
F—BRAKE SHOE ANCHOR PIN LOCK
G—ANCHOR PIN LOCK LOCK WASHER
H—ANCHOR PIN LOCK CAP SCREW
I—EXCESS GREASE FITTING BUSHING
J—LUBRICATING FITTING
K—BRAKE CAMSHAFT BRACKET
L—BRAKE SPIDER RIVET
M—BRAKE CAMSHAFT COLLAR
N—COLLAR SET SCREW
O—BRAKE CAMSHAFT COLLAR WIRE
P—SLACK ADJUSTER RETAINING WASHER SCREW
Q—SLACK ADJUSTER RETAINING WASHER ASSEMBLY
R—BRAKE CAMSHAFT
S—BRAKE SPIDER BUSHING
T—UPPER BRAKE SHOE ASSEMBLY
U—BRAKE SHOE BUSHING
V—LOWER BRAKE SHOE ASSEMBLY
W—BRAKE SHOE LINING
X—BRAKE SHOE LINING MACHINE SCREW
Y—BRAKE SHOE LINING LOCK WASHER
Z—BRAKE SHOE LINING NUT
AA—BRAKE SHOE CAM WEAR PLATE SHIM
AB—BRAKE SHOE CAM WEAR PLATE
AC—CAM WEAR PLATE MACHINE SCREW
AD—BRAKE SHOE RETURN SPRING
AE—BRAKE SHOE RETURN SPRING PIN

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Figure 20 — Brake Mechanism — Disassembled

i. While brake shoes are removed for inspection or relining, remove and clean the anchor pins.

j. Adjust brake chamber push rod travel to ¾ inch to prevent slow application and releasing of brakes.

52. REMOVAL.

a. Tires, Wheels, Hub, and Drum Assembly (figs. 15 and 18).

(1) To remove tires, wheels, hub and drum as a complete assembly, remove hub cap, outer jam nut, washer lock and inner adjusting nut.

(2) Jack up axle so tires clear floor. Pull wheel assembly off axle spindle. Be careful outer bearing cone does not slip from hub and fall to floor, as this might cause damage to cage.

b. Drum and Oil Slinger (fig. 18).

(1) Follow procedure in above subparagraph **a**.

(2) Place assembly on floor so drum side is up.

(3) Remove the 10 nuts from studs. Lift off oil slinger and brake drum.

c. Brake Shoe (fig. 20).

(1) Follow procedure in above paragraph **a**.

(2) Remove cap screw and washer holding anchor pin lock in position. Slide anchor pin lock from grooves in anchor pins.

(3) Using a soft drift, drive anchor pins from shoe and spider.

(4) Lift out brake shoes and brake shoe return springs.

d. Lining (fig. 20).

(1) Follow procedure in above subparagraphs **a** and **c**.

(2) Remove the four bolts, washers, and nuts holding each brake lining block and brake shoe.

(3) If lining is being removed due to excessive wear, remove all four lining blocks from the two shoes on the same side of the semitrailer. All four linings blocks must be replaced on the one side, in order to permit proper adjustment and obtain braking contact at all possible points on drum.

e. Camshaft (fig. 20).

(1) Follow procedure as in above subparagraph **a**.

(2) Loosen camshaft collar set screw wire and camshaft collar set screw.

(3) Remove camshaft retaining washer screw and washer assembly.

(4) Slide off slack adjuster.

(5) Spread open brake shoes.

(6) Remove camshaft. Use soft drift and strike camshaft from serrated end if necessary, to assist removal. Retain camshaft collar for installation.

f. Dust Shields (figs. 14 and 20). Remove three cap screws and lock washers from the two dust shields located on each side of the semitrailer.

53. INSTALLATION.

a. Dust Shields (figs. 14 and 20).

(1) Straighten dust shields, unless severely damaged.

(2) Position dust shield on brake spider, and install, and tighten, three lock washers and cap screws.

b. Camshaft (fig. 20).

(1) Inspect brake spider bushings. If worn, drive out bushing and replace.

(2) Inspect camshaft bracket bushings. If worn, replace with new camshaft bracket.

(3) With brake shoes spread open, insert serrated end of camshaft (noting right-hand or left-hand) through brake spider opening, install collar onto camshaft, and "feed" end of camshaft through camshaft bracket.

(4) Slide on slack adjuster. Install camshaft retaining washer assembly and screw.

(5) Move camshaft collar next to brake spider, tighten set screw and twist wire around collar, and twist ends of wire together.

(6) Lubricate camshaft bracket and brake spider bushing sparingly with general purpose grease number 1 or 0.

c. Lining (fig. 20).

(1) Install all new brake lining on one side of semitrailer at same time.

(2) Position lining, and install and tighten brass bolts, lock washers, and nuts.

d. Brake Shoe (fig. 20).

(1) Install brake shoe return springs onto spring pins of both brake shoes.

(2) Position shoes in brake spider at anchor end and cam end.

(3) Lubricate anchor pins sparingly with general purpose grease number 1 or 0. Install anchor pins.

(4) Slide anchor pin lock into grooves in anchor pins. Use square end of anchor pin for turning to line up grooves. Install and tighten cap screw and washer.

e. Drum and Oil Slinger (fig. 18).

(1) Place wheel and hub assembly on floor so the inside studs face up.

(2) Position drum on studs. Position drum oil slinger on studs.

(3) Install ten nuts and tighten evenly.

f. Tires, Wheels, Hub and Drum (figs. 15 and 18).

(1) Before installing tires, wheels, hub and drum as an assembly, check to see if bearings are chipped or pitted, and replace if defective.

(2) Repack bearing cone and roller assembly if necessary.

(3) Clean hub and drum with dry-cleaning solvent.

(4) Place thin film of general purpose grease on inside of hub and on axle spindle.

(5) Position inner bearing cone and roller assembly. Install tires, wheels, hub and drum as an assembly.

(6) Position outer bearing cone and roller assembly.

(7) Install inner adjusting nut.

(8) Complete assembly, and adjustment, as outlined in paragraph 44 c (3).

Section XIII

AIR BRAKE POWER SYSTEM

54. PURPOSE AND FUNCTION OF SYSTEM AND COMPONENTS.

a. General. The purpose of the air brake equipment is to provide a means of operating the semitrailer brakes through the medium of compressed air and in conjunction with the air brake system on the truck-tractor towing the semitrailer (fig. 21). Fundamentally the air brake system consists of the air devices necessary to direct and control the flow of the compressed air and those necessary to transform the energy of compressed air into the mechanical force and motion to apply the brakes. The components of this air brake system (fig. 22) and their functions are described in paragraphs 57 to 68 inclusive.

55. TESTING SYSTEM FOR SERVICEABILITY.

a. Preparation. Connect hose lines of tractor truck to semitrailer hose couplings. Start engine and build up air pressure to 100 pounds as registered by dash gage on tractor truck.

b. Leakage Tests.

(1) With engine stopped and brakes released, observe rate of drop in air pressure registered by dash gage. The rate of drop in air pressure must not exceed 3 pounds per minute.

(2) With engine stopped and brakes fully applied, observe rate of drop in air pressure. The rate of drop must not exceed 4 pounds per minute.

(3) Leakage in either of the above tests is the combined leakage in both the air brake system on tractor truck and the air brake system on semitrailer. Leakage in semitrailer air brake system is determined by comparing leakage in above tests with leakage found in similar

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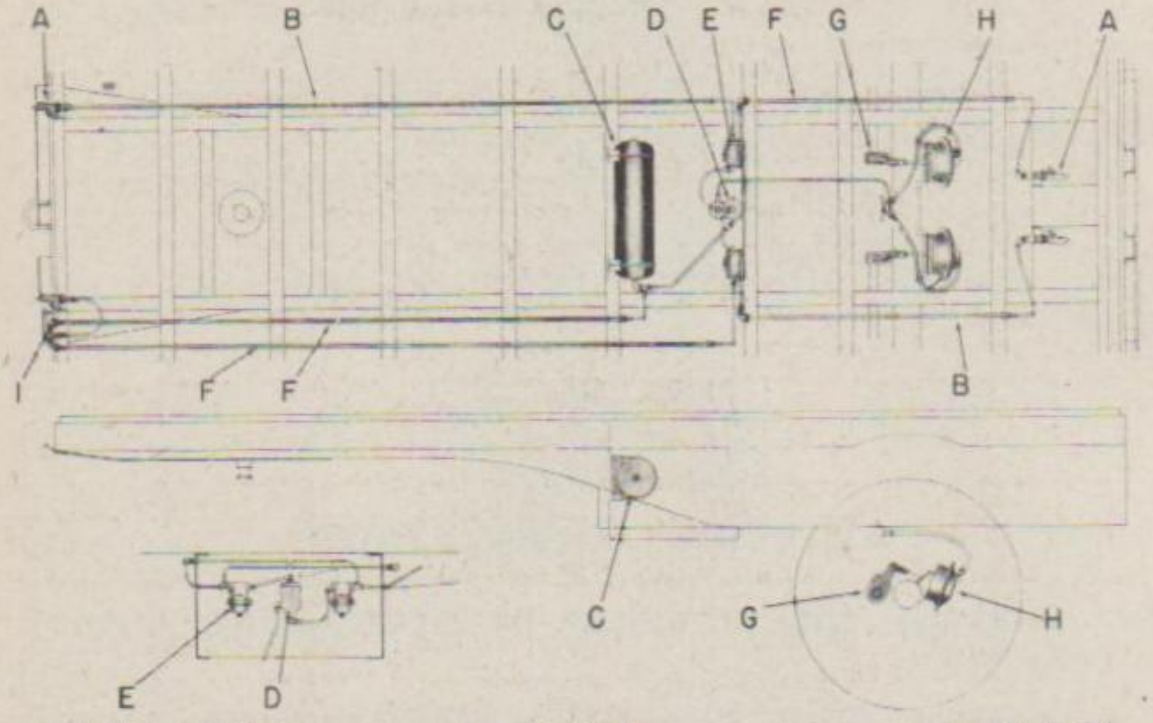

A—HOSE COUPLING
B—SERVICE LINE
C—RESERVOIR TANK
D—RELAY EMERGENCY VALVE
E—AIR FILTER
F—EMERGENCY LINE
G—SLACK ADJUSTER
H—AIR BRAKE CHAMBER
I—EMERGENCY RELEASE

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Figure 21 — Air Power Brake Diagram

tests with cut-out cocks in connecting hose lines closed. If leakage in either of the above tests is excessive, check all units and connections for leakage, and repair or replace.

c. Operating Tests.

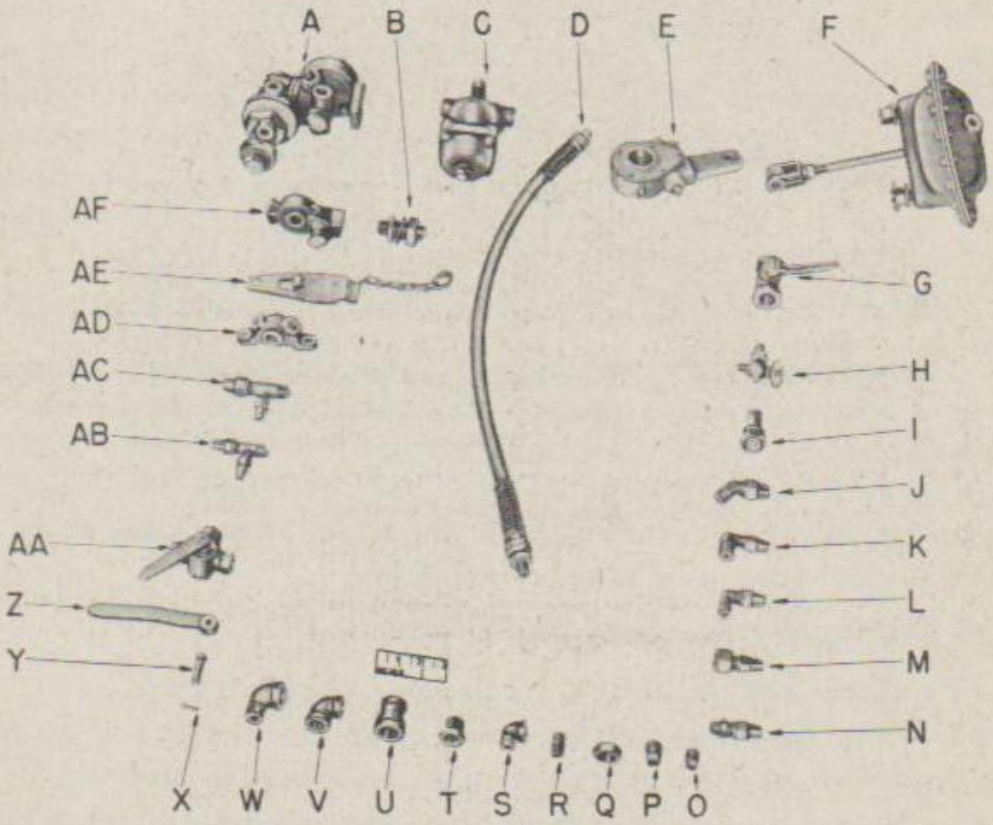
(1) With vehicles moving, apply brakes and check their effectiveness. Check for quick braking response on all wheels during application and release of brakes.

(2) With vehicles stopped, close cut-out cock in emergency line at rear of tractor truck. Disconnect emergency hose line from semitrailer. Be sure semitrailer brakes apply automatically without any noticeable leakage at emergency line hose coupling at front of semitrailer, or at relay-emergency valve.

(3) Move handle of three-way cock, located in emergency line outlet at front of semitrailer, towards emergency line hose coupling, and observe that semitrailer brakes release. Move handle of three-way cock back to normal operating position, and observe that semitrailer brakes apply. Reconnect emergency line and open cut-out cock in tractor truck emergency line. Brakes should release.

(4) Check all units for serviceability, if brake system fails to pass any of the above operating tests.

AIR BRAKE POWER SYSTEM



A—RELAY EMERGENCY VALVE
B—CLAMPING STUD
C—AIR FILTER
D—BRAKE CHAMBER HOSE ASSEMBLY
E—SLACK ADJUSTER
F—AIR BRAKE CHAMBER
G—CUT-OUT COCK
H—RESERVOIR DRAIN COCK
I—EXHAUST CHECK VALVE
J—TUBING ELBOW
K—TUBING ELBOW
L—TUBING ELBOW
M—TUBING CONNECTOR
N—TUBING CONNECTOR
O—RELAY EMERGENCY VALVE PIPE PLUG
P—RELAY EMERGENCY VALVE AND RESERVOIR PIPE PLUG
Q—PIPE LOCK NUT
R—CUT-OUT COCK CLOSE PIPE NIPPLE
S—BRAKE CHAMBER STREET ELBOW
T—CUT-OUT COCK BUSHING
U—SERVICE LINE REDUCING PIPE COUPLING
V—REDUCING ELBOW
W—RESERVOIR STREET ELBOW
X—COTTER PIN
Y—SAFETY PLUNGER PIN
Z—SAFETY PLUNGER
AA—THREE WAY CUT-OUT COCK
AB—TUBING TEE
AC—TUBING TEE
AD—MANIFOLD-TYPE TUBING TEE
AE—DUMMY HOSE COUPLING
AF—AIR LINE HOSE COUPLING

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Figure 22 — Air Power Brake Parts

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56. DATA.

System and make	Bendix-Westinghouse Automotive Air Brake Co.
Reservoir	7 x 24 in.
Tubing	⅜ in. diam
Tubing	½ in. diam
Hose	¾ in. O.D.
Chamber, type-B	7¼ in. from center of yoke pin to face of brake chamber
Slack adjuster	5½ in. lever
Filter	Type-E

57. RELAY-EMERGENCY VALVE (figs. 21, 22 and 23).

a. Description. The function of the relay-emergency valve is to act as a relay station to control the brakes on the semitrailer and also to apply the brakes automatically on the semitrailer should it break away from the tractor truck. The relay valve also speeds up the operation of the trailer brakes during both application and release.

b. Testing for Serviceability (fig. 23).

(1) OPERATING TESTS.

(a) With air brake system charged, apply brakes, and check to be sure brakes on both wheels of semitrailer apply properly.

(b) Release brakes, and check to be sure air pressure is exhausted promptly through exhaust check valve.

(c) With trailer brake system fully charged, close cut-out cock in emergency line on tractor truck and disconnect emergency line from semitrailer. Check to be sure semitrailer brakes apply automatically. Connect emergency line, open cut-out cock on truck-tractor and check to be sure brakes automatically release.

(2) LEAKAGE TESTS.

(a) With brakes released, coat exhaust port of exhaust check valve with soap suds to determine leakage.

(b) With brakes fully applied, coat exhaust port with soap suds to determine leakage.

(c) With relay-emergency valve in emergency position (operating test (subpar. **b** (1) *(c)* above) coat exhaust port with soap suds to determine leakage, also test for leakage at emergency line hose coupling (par. 66 **b**).

(d) Leakage in any of the above tests must not exceed a 3-inch soap bubble in 3 seconds. If excessive leakage is found, replace the emergency-relay valve.

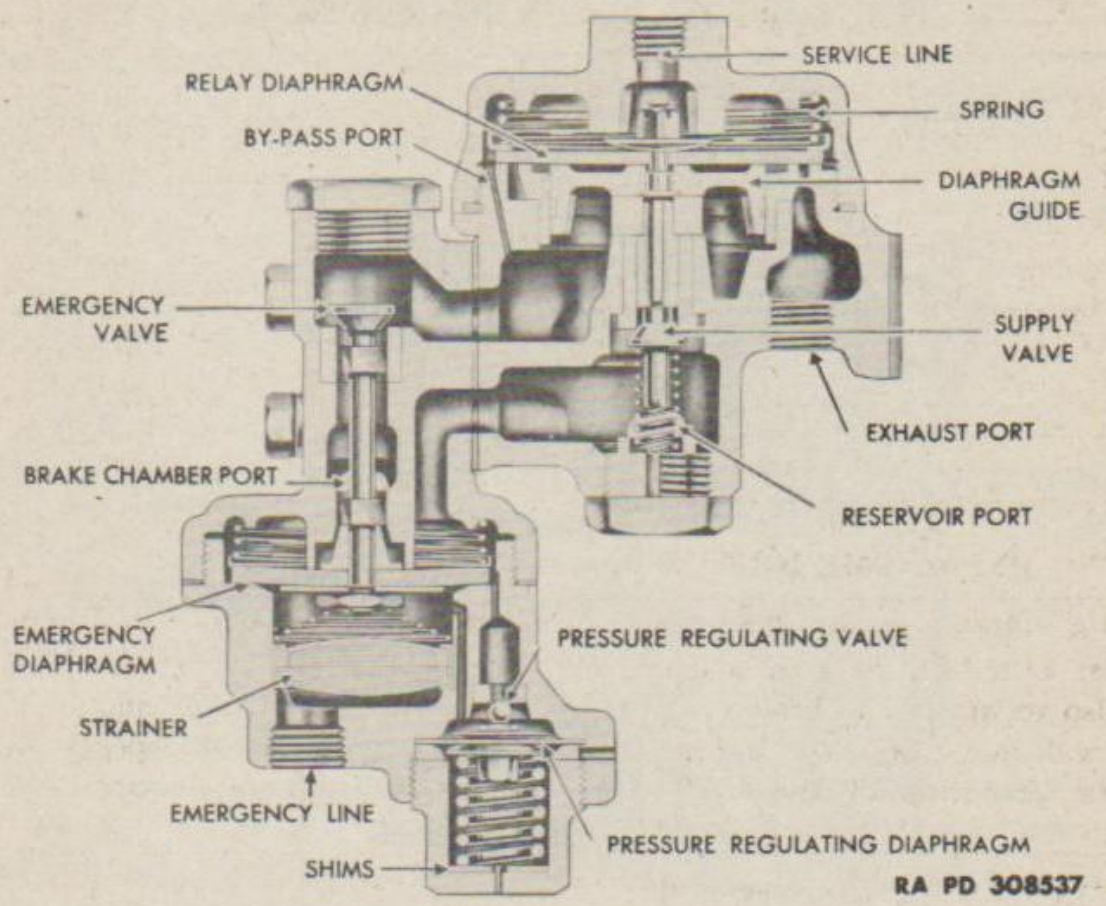

Figure 23 — Relay-emergency Valve —Sectionalized

c. Removal (figs. 21 and 22).

(1) Drain air brake system.

(2) Remove exhaust check valve.

(3) Disconnect air lines.

(4) Remove nut from mounting bolt and remove valve. The mounting bolt is welded to frame.

d. Installation (figs. 21 and 22).

(1) Mount relay-emergency valve in position. Tighten nuts.

(2) Install exhaust check valve in exhaust port (fig. 23).

(3) Connect air lines.

(4) Test valve for serviceability (subpar. **b** above).

58. BRAKE CHAMBER (figs. 21, 22 and 24).

a. Description. The function of the brake chamber is to convert the energy of compressed air into the mechanical force and motion necessary to operate the brakes. One brake chamber is used to operate the brakes on each wheel.

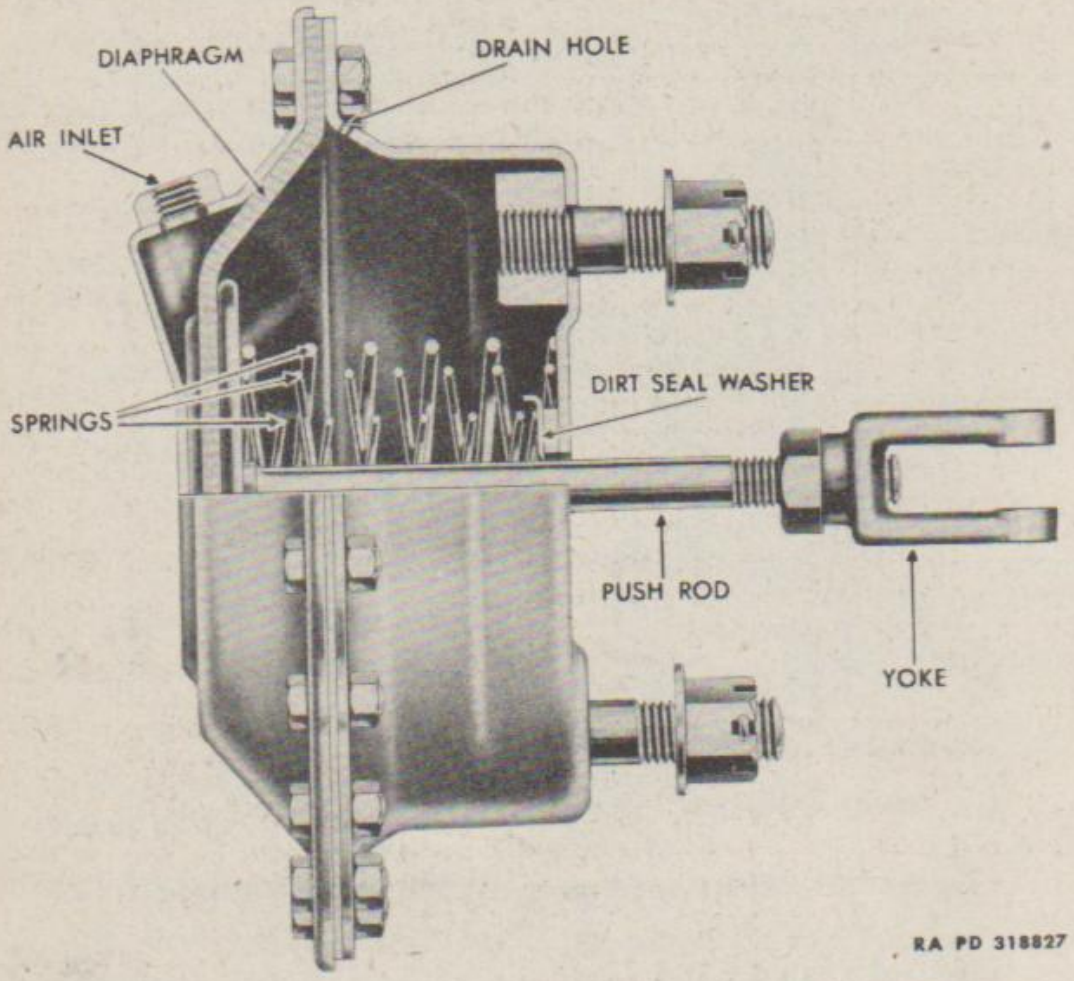

Figure 24 — Brake Chamber — Sectionalized

b. Testing for Serviceability.

(1) OPERATING TESTS.

(a) Apply brakes and observe that brake chamber push rods move out promptly without binding.

(b) Release brakes and observe that brake chamber push rods return to released position promptly without binding.

(2) LEAKAGE TESTS.

(a) With brakes fully applied, coat bolting flanges holding diaphragm in place with soap suds to check for leakage. No leakage is permissible. If leakage is found, tighten flange bolts evenly and sufficiently to prevent leakage. Do not cause the flange to bulge by forcing the nuts too tightly.

(b) With brakes fully applied, check for leakage through diaphragm by coating clearance hole around push rod, and drain holes in nonpressure plate with soap suds. No leakage is permissible. If leakage is found, replace diaphragm.

(c) Excessive push rod travel will cause premature failure of brake chamber diaphragm. When diaphragms are being replaced, check brake chamber release springs, and replace if necessary. Install same type of spring as removed, otherwise uneven braking will result.

c. Removal (figs. 17, 21 and 22).

(1) Disconnect air line.

(2) Disconnect push rod yoke.

(3) Remove nuts from mounting bolts, and remove chamber.

(4) To remove diaphragm, remove all nuts around flange.

d. Installation (figs. 17, 21 and 22).

(1) Install new diaphragm and release springs, if necessary, and replace bolts around flange, and tighten just enough to prevent leakage.

(2) Mount brake chamber in position and attach nuts.

(3) Connect air line.

(4) Connect push rod to slack adjuster.

(5) Adjust brakes (par. 51 **c**).

(6) Apply brakes and be sure push rod is the correct length of 7¼ inches from center of yoke pin to mounting face of brake chamber. If necessary, adjust push rod length by screwing yoke on or off push rod.

(7) Test brake chamber for serviceability (subpar. **b** above).

59. SLACK ADJUSTER (figs. 21, 22 and 25).

a. Description. Slack adjusters consist of a worm and gear enclosed in a body which also serves as an adjustable lever. They provide a quick and easy means of adjusting the brakes to compensate for brake lining wear. During brake operation the entire slack adjuster rotates bodily with the brake camshaft. During brake adjustments the worm moves the gear so as to change the position of the lever arm in relation to the brake camshaft. One slack adjuster is used for the brakes on each wheel.

b. Testing for Serviceability. Adjust brakes (par. 51 **c**), and note brake chamber push rod travel when brakes are applied. Make several brake applications and again check push rod travel. Push rod travel must remain the same as it was after adjustment. If push rod travel increases, or if difficulty is experienced in keeping brakes adjusted in service, replace slack adjuster (subpars. **c** and **d** below).

c. Removal (figs. 17, 21 and 22).

(1) Remove yoke pin holding foot brake yoke and brake chamber yoke to slack adjuster.

(2) Remove retaining screw and washer from end of camshaft and slide off slack adjuster.

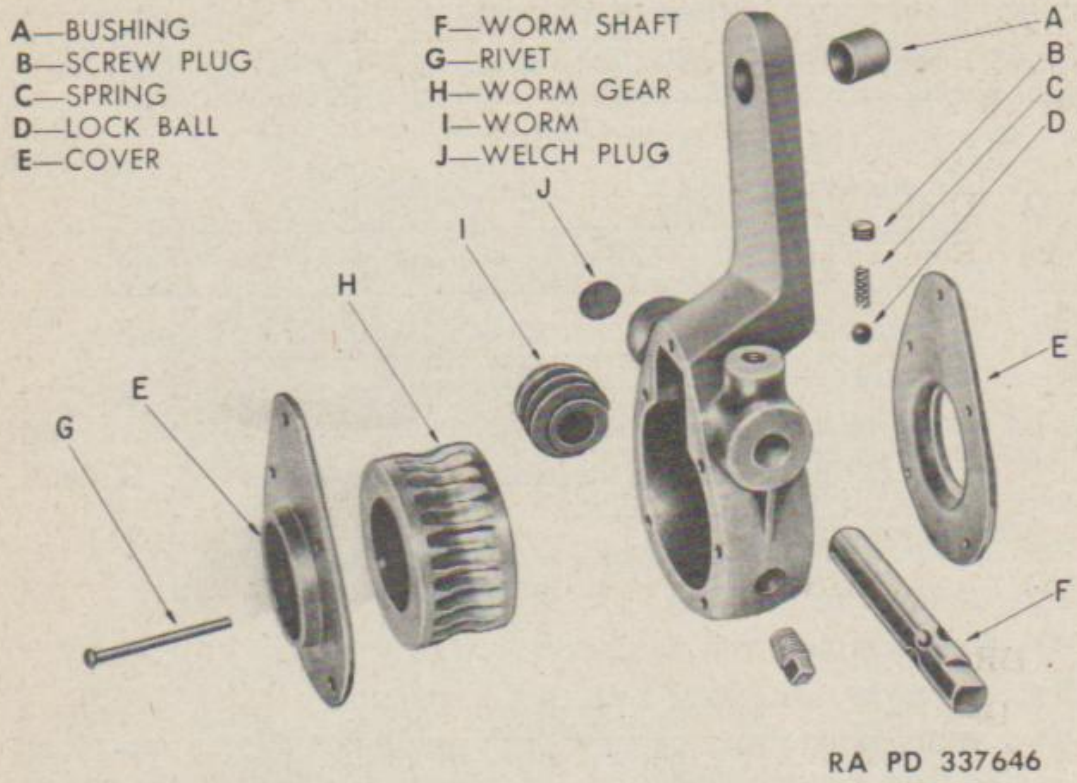

Figure 25 — Slack Adjuster — Disassembled

d. Installation (figs. 17, 21 and 22).

(1) Be sure slack adjuster is the same size and type as one used on opposite side.

(2) Slide on slack adjuster, and install screw and washer.

(3) Insert yoke pin through foot brake yoke, brake chamber yoke, and slack adjuster. Secure with new cotter pin.

(4) Adjust brakes (par. 51 **c**).

(5) Test air brake system for serviceability (par. 55 **c**).

60. RESERVOIR.

a. Description. The function of the reservoir (fig. 21) is to provide a place to store compressed air so there will be an ample supply available for immediate use in brake operation. It also provides storage for sufficient compressed air to permit several brake applications even after the engine has stopped. Another function of the reservoir is to provide a place where the air may cool, and the oil and water vapors condense.

b. Testing for Serviceability (fig. 21).

(1) LEAKAGE TEST. With brake system charged, coat outside of reservoir with soap suds to check for leakage. No leakage is permissible. If leakage is found, replace reservoir.

(2) INSPECTION. Inspect inside and outside surfaces for damage or corrosion. A small flashlight is helpful when inspecting interior. Replace reservoir, if any damage or corrosion that would weaken the reservoir is found.

c. Removal (fig. 21).

(1) Drain air brake system.

(2) Remove air lines, mounting bolts, and reservoir.

d. Installation (fig. 21).

(1) Install new drain cock in reservoir.

(2) Position reservoir so that drain cock opening is at lowest point.

(3) Install mounting blocks, U-bolts and nuts.

(4) Connect air lines.

(5) Test reservoir for serviceability (subpar. **b** above).

61. DRAIN COCK.

a. Description (fig. 22). The drain cock is installed in the bottom of the reservoir for the purpose of draining water from the reservoir. The drain cock is open when the handle is parallel to the body of the drain cock, and closed when it is at right angles to the body. Open drain cock by hand. Do not strike the handle with a hammer, as the cock would become damaged and leakage would develop.

b. Test for Serviceability. With air brake system charged, coat drain cock with soap suds, and check body and key for leakage. Leakage in excess of a 3-inch soap bubble in 3 seconds is not permissible. Leakage is caused by a dirty, or scored key, or body. Leakage due to dirt is corrected by cleaning and applying a thin coating of general purpose grease on the key before assembly. Replace drain cock, if leakage is due to scored key or body.

c. Removal. Unscrew drain cock from reservoir.

d. Installation.

(1) Screw drain cock in bottom of reservoir.

(2) Test for serviceability (subpar. **b** above).

62. AIR FILTER (figs. 21, 22, and 26).

a. Description. Air filters (fig. 26) are used in the service line and the emergency line on the semitrailer to trap any dirt or matter which might get into these lines. The correct flow of the air through the filter is indicated by an arrow cast on the body. Air flowing from the tractor truck to the semitrailer must pass through the filter in the direction indicated by the arrow. Air flowing through the filter read-

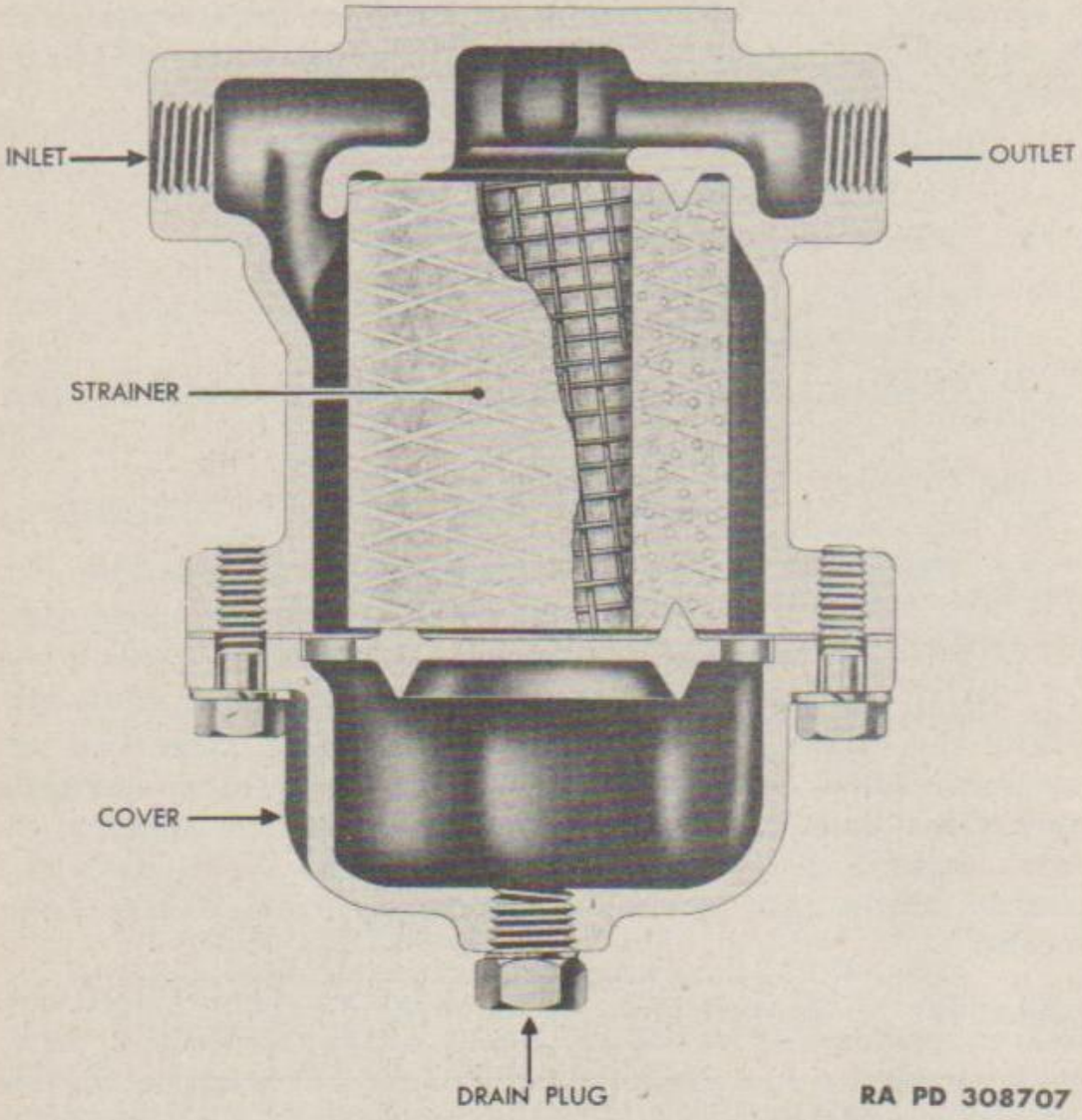

Figure 26 — Air Filter — Sectionalized

ily passes through the strainer but any dirt which might be present in the air stream is stopped by the strainer. Moisture or dirt which may collect in the filter is removed through the drain plug.

b. Testing for Serviceability (fig. 26).

(1) OPERATING TESTS.

(a) Remove cover, and inspect condition of air strainer. Clean strainers by carefully brushing any dust or dirt off the outside. Install new strainer, if old one is covered with an oily or gummy deposit, or if it is very dirty. Always use new gasket, when assembling the filter.

(b) Frequency of cleaning filter, or replacing strainer, depends entirely on operating conditions, and amount of dirt passing into filter.

(2) LEAKAGE TESTS. With brakes applied, coat outside of filter

with soap suds to check for leakage. No leakage is permissible. If leakage is found through walls of filter, replace filter. If leakage is found past gasket between cover and body of filter, tighten cover or install new gasket.

c. Removal (figs. 21 and 22).

(1) Remove air connections.

(2) Remove mounting cap screws.

(3) Remove air filter.

(4) Remove the four cap screws to dismantle the air filter in order to install new strainer or new gasket.

d. Installation (figs. 21 and 22).

(1) Position filter so that the arrow on body points toward air line leading to relay-emergency valve.

(2) Install cap screws.

(3) Connect air lines.

(4) Test air filter for serviceability (subpar. **b** above).

63. CUT-OUT COCK (figs. 8 and 22).

a. Description. Cut-out cocks are used in the service line and the emergency line outlets at the rear of the semitrailer to close off these lines when not in use. Cut-out cocks have a tapered key, ground to the body, to prevent leakage. A passage is provided, through the key, to permit air to flow through, when the key is open. Cut-out cocks are open when the handle is at a 90-degree angle to the body of the cock (fig. 8). Cut-out cocks are closed when handle is parallel with the body of the cock. Stops are provided so that the handle cannot be turned beyond its normal open or closed positions. Do not strike the handle with a hammer as the cock would become damaged and leakage would result.

b. Test for Serviceability.

(1) With brakes applied and cut-out cock closed (rear jumper hose air lines disconnected), coat cut-out cock with soap suds and check body and key for leakage.

(2) With brakes applied and cut-out cock open (rear jumper air hose lines connected) coat cut-out cock with soap suds and check body for leakage.

(3) Leakage in excess of a 3-inch soap bubble in 3 seconds in either of these tests is not permissible. Leakage is caused by a dirty, or scored, key, or body. Leakage due to dirt is corrected by cleaning and applying a light coat of general purpose grease, number 1 or 0, to the key before assembly. Replace cut-out cock, if leakage is due to a scored key or body.

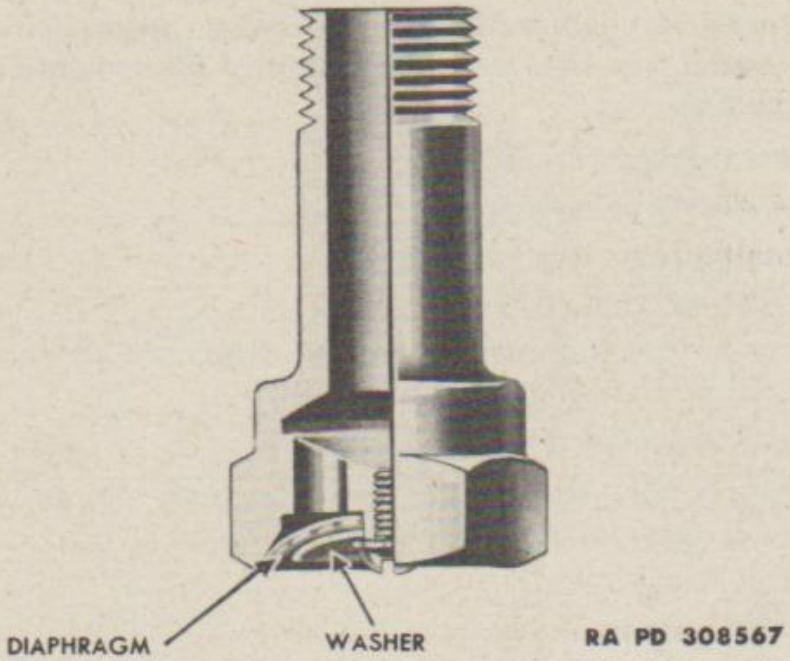

Figure 27 — Exhaust Check Valve

c. Removal.

(1) Remove air connections.

(2) Place wrench on end of cut-out cock being loosened, and turn to remove. Any severe strain put on cut-out cock body, due to using wrench on wrong end of body, will distort body and cause leakage.

d. Installation.

(1) Start cut-out cock installation with hand, and tighten with wrench, placing wrench on end being tightened.

(2) Connect air connections.

(3) Test for serviceability (subpar. b above).

64. EXHAUST CHECK VALVE (figs. 22 and 27).

a. Description. The exhaust check valve is a small rubber diaphragm type of check valve used to prevent dirt and water entering the exhaust port of the relay-emergency valve.

b. Testing for Serviceability (fig. 27). Remove exhaust check valve from relay-emergency valve, and immerse in water the lower half of valve containing diaphragm. Check for leakage of water past diaphragm into check valve. No leakage is permissible. If leakage is found, remove diaphragm and inspect its condition, also condition of diaphragm seat. If leakage is caused by presence of dirt, cleaning

diaphragm and diaphragm seat should correct trouble. If leakage is caused by a defective diaphragm, replace the diaphragm. If leakage is caused by a defective diaphragm seat, replace complete exhaust check valve.

c. Removal. Unscrew exhaust check valve from relay-emergency valve exhaust port (fig. 23).

d. Installation. Screw new exhaust check valve into exhaust port of relay-emergency valve (fig. 23). Test for serviceability (sub-par. **b** above).

65. THREE-WAY COCK (figs. 7, 21 and 22).

a. Description. A three-way cock is installed in the emergency line outlet at the front of the semitrailer (fig. 7) so that semitrailer brakes can be released, if necessary, when the semitrailer is not connected to a towing vehicle, *without releasing the air from the semitrailer brake system.* Move the handle toward the emergency hose coupling to release the brakes. The safety plunger, attached to the handle, is forced into the emergency hose coupling making it impossible to attach the emergency hose line from the tractor truck until the three-way cock handle is returned to its normal operating position. Do not strike the handle with a hammer, as the cock would become damaged and leakage would develop.

b. Testing for Serviceability.

(1) OPERATING TEST (fig. 7). With semitrailer brake system charged, close emergency line cock on towing vehicle, and disconnect emergency line from semitrailer. The semitrailer brakes should apply. Move handle of three-way cock toward emergency line hose coupling. Semitrailer brakes should release.

(2) LEAKAGE TEST. Coat three-way cock with soap suds to check leakage. Leakage in excess of a 3-inch soap bubble in 3 seconds is not permissible. Replace three-way cock, if excessive leakage is found. If leakage is not excessive, move handle of three-way cock back to its normal position, and observe that trailer brakes again apply.

c. Removal.

(1) Remove plunger from three-way cock by removing yoke pin and cotter pin.

(2) Disconnect emergency hose coupling to three-way cock tubing at three-way cock.

(3) Disconnect left-hand inner pipe and left-hand outer pipe at tubing connectors. Loosen pipe lock nuts located near three-way cock and slide both pipes and three-way cock out as an assembly.

(4) Remove connections holding three-way cock to pipes. Place wrench on cock on end being loosened to prevent distortion of body.

d. Installation.

(1) Install connections to three-way cock and insert pipes, attaching shorter pipe to opening closer to emergency hose coupling. "Feed" pipe through holes in front crossmember, tighten lock nuts and connect tubing connectors.

(2) Connect emergency hose coupling to three-way cock tubing at three-way cock.

(3) Install plunger and yoke pin assembly to handle of three-way cock.

(4) Test for serviceability (subpar. b above).

66. HOSE COUPLINGS AND DUMMY COUPLINGS (figs. 21, 22 and 28).

a. Description.

(1) HOSE COUPLING (fig. 28). Hose couplings are installed at the front and rear of the semitrailer for the purpose of connecting the air power line from the tractor truck to the semitrailer (fig. 7) and also relaying this air power to a second unit. When two hose couplings are coupled together, pressure is put on the two rubber gaskets making an airtight seal. The hose couplings are fitted with friction locks. The hose couplings on the semitrailer are tagged either "SERVICE" or "EMERGENCY."

(2) DUMMY COUPLING. Dummy couplings are attached to the semitrailer with a chain (fig. 22). They must be coupled to the hose couplings to prevent dirt from entering the lines when the air power system is not connected for operation.

b. Testing for Serviceability. With hose couplings connected and brakes applied, coat hose couplings with soap suds to check for leakage. No leakage is permissible. Leakage is usually caused by worn, damaged or improperly installed gasket. Install new gasket

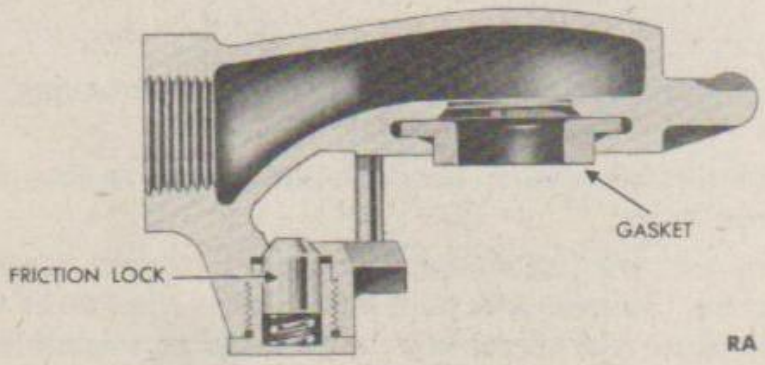

Figure 28 — Hose Coupling — Sectionalized

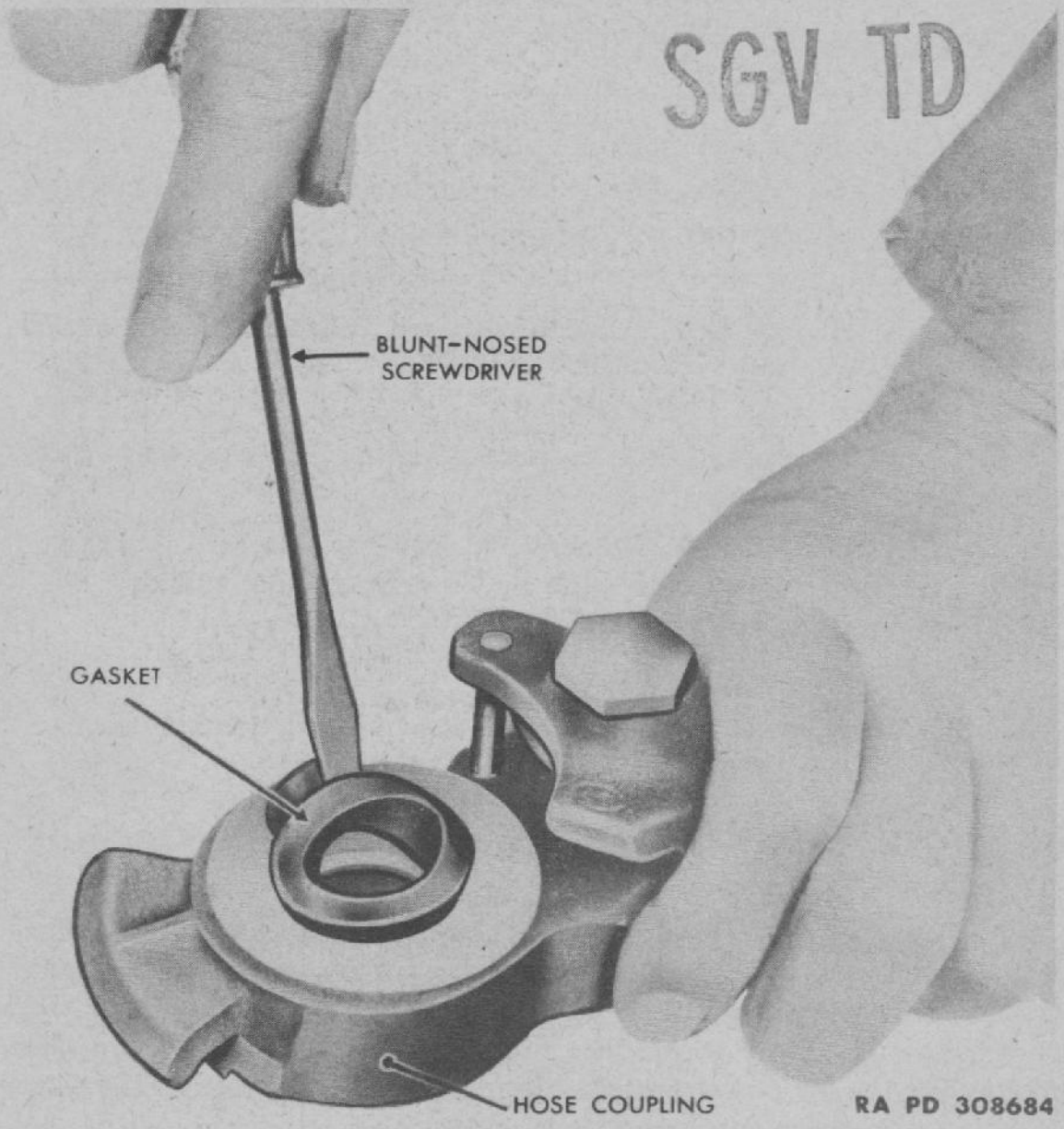

Figure 29 — Installing Hose Coupling Gasket

to stop leakage. If hose coupling has been damaged, replace it (subpars. **c** and **d**, below).

c. Removal.

(1) Remove old gasket by prying it out of hose coupling with screwdriver.

(2) To remove front hose couplings, disconnect pipe from service line, and tubing from emergency line, remove clamping stud nuts, and remove hose couplings and clamping studs as assemblies. Remove clamping studs from hose couplings.

(3) To remove rear hose coupling, place wrench close to threaded end of coupling and turn.

d. Installation (fig. 29).

(1) GASKET.

(a) Clean groove in hose coupling.

(b) Partially collapse gasket with fingers and enter one side of gasket flange into groove in hose coupling.

(c) Use blunt nose of screwdriver to push gasket into place.

(d) The exposed face of gasket will be flat and not twisted or bulged at any point, when properly installed.

(2) FRONT HOSE COUPLING.

(a) Attach clamping stud to hose coupling and insert assembly through hole in frame.

(b) Replace clamping stud nut and tighten.

(c) Connect service line pipe on emergency line tubing.

(d) Test for serviceability (subpar. b, above).

(3) REAR HOSE COUPLING.

(a) Screw hose coupling to clamping stud and tighten.

(b) Test for serviceability (subpar. b, above).

67. HOSE, HOSE ASSEMBLIES, AND HOSE CONNECTORS (figs. 4, 7, 21 and 22).

a. Description. Hose and hose fittings are used to provide flexible air connections between moving air system parts on the semitrailer. All hose assemblies have detachable hose connectors with spring guards. Hose assemblies fitted with hose couplings are used to connect the air power system from tractor truck to semitrailer, and to relay air power to second vehicle.

b. Testing for Serviceability.

(1) OPERATING TEST. If hose line is restricted, remove it, and blow air through hose to clear passage.

(2) LEAKAGE TEST. With brakes applied, coat hose and hose couplings with soap suds to check for leakage. No leakage is permissible. Tighten connectors to check leakage. If this fails to correct leakage, replace the connectors, hose, or both.

c. Removal.

(1) Remove detachable connectors.

(2) Remove connector nuts and pull hose out of connector body. Do not attempt to remove used sleeve from hose.

d. Installation (fig. 30).

(1) Cut piece of hose to required length, at right angles to outside wall of hose. Smooth end of hose.

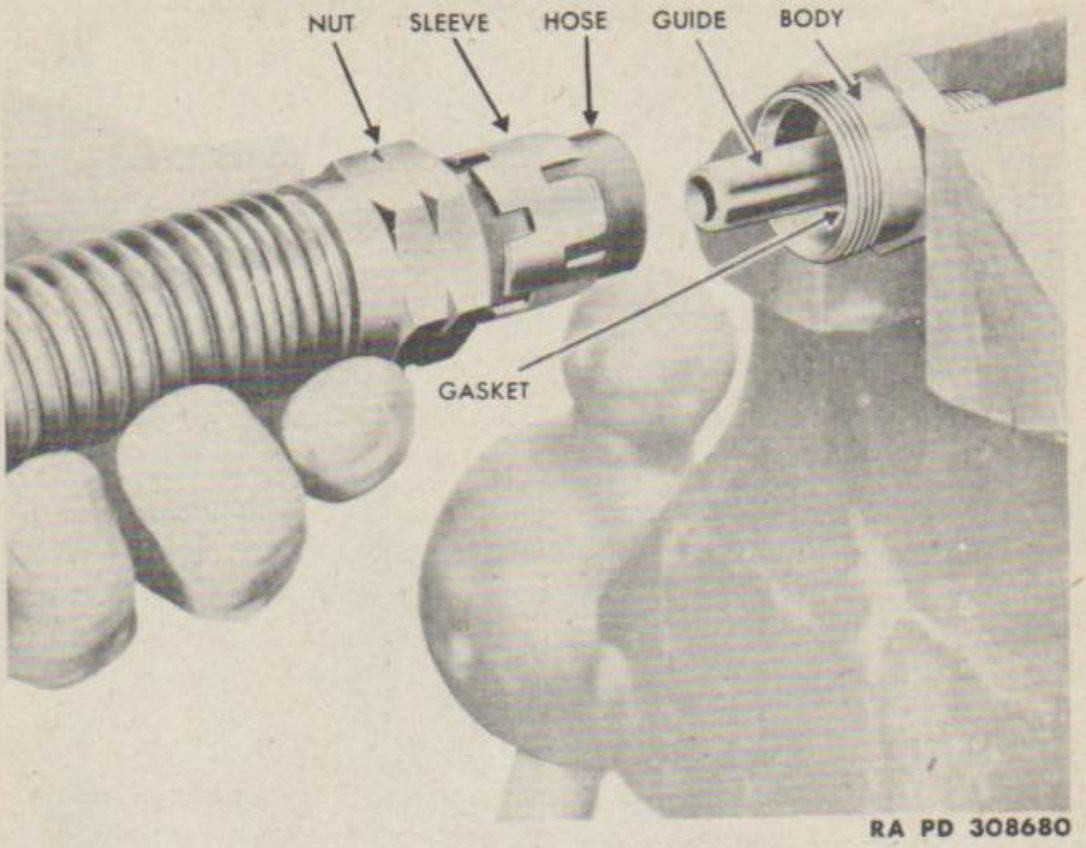

Figure 30 — Placing Hose in Connector Body

(2) "Blow out" hose to remove all cuttings.

(3) Position connector nut and sleeve on hose. Make sure the barbs on the inside of the sleeve point toward the end of the hose being connected.

(4) Position new gasket over end of guide in connector body so that side with removable protector covering will be next to hose. Remove protector covering from gasket and push gasket into bottom of recess in connector body.

(5) Put end of hose in connector body against gasket.

(6) Move sleeve until it is against edge of connector body. Tighten connector nut sufficiently to insure air tight joint.

(7) When installing hose assembly where both ends are permanently connected, the hose coupling at either end is used as a swivel by loosening nut on one of the connectors. Turn hose in loose connector before connector nut is tightened again. This permits installation of hose assembly without kinking or twisting hose.

68. TUBING, PIPE, AND FITTINGS (figs. 21 and 22).

a. Description. Copper tubing and galvanized pipe are used to connect various devices in the air brake system where it is not necessary to use flexible hose. It is important that tubing of the

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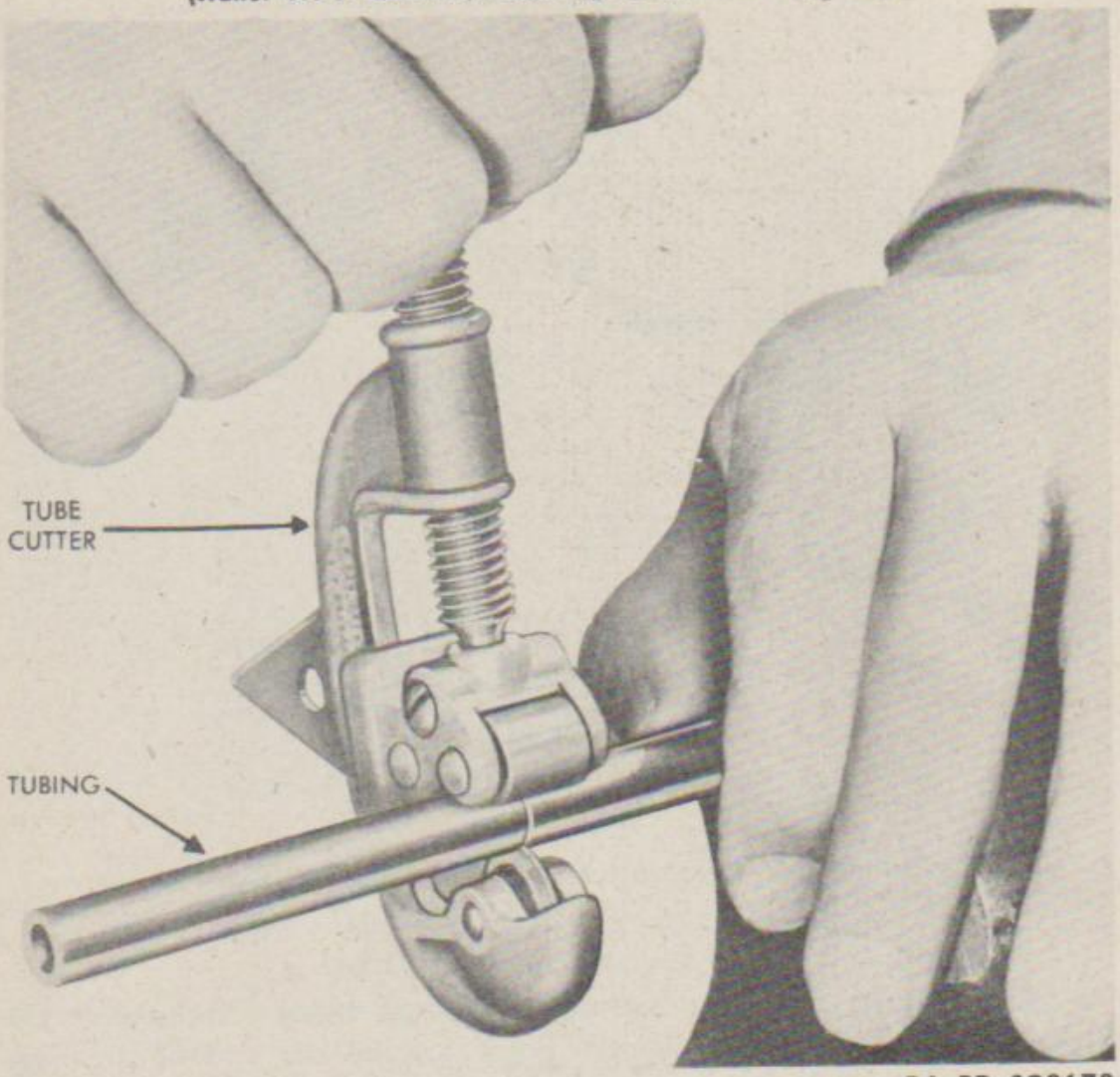


Figure 31 — Cutting Tubing With Tube Cutter (41-C-2825)

correct inside and outside diameter be used in repair, otherwise the operation of the air brake equipment will be seriously affected. Three-piece compression-type tubing fittings are used throughout the system. Flared-type fittings, such as those used in gasoline lines, must not be used in the air brake power system. Standard, galvanized pipe fittings are used throughout the air brake power system.

b. Testing for Serviceability.

(1) OPERATING TESTS.

(a) Inspect tubing or pipe for partial restrictions caused by dents or kinks. Replace if necessary.

(b) If tubing line or pipe line is restricted, remove it, and blow air through it to clear passage.

(2) LEAKAGE TEST. With brakes applied, coat tubing, pipe, and fittings with soap suds to check for leakage. No leakage is per-

missible. Tighten fittings. If this fails to correct leakage, replace the fitting. If leakage is found in tubing or pipe, install new piece.

c. Removal.

(1) Remove defective tubing, or pipe, by removing tubing fittings, or pipe fittings.

(2) Old fittings can be used again, if they are serviceable. However, do not use old sleeve.

d. Installation.

(1) COPPER TUBING (fig. 31).

(a) Cut copper tubing to required length with hacksaw or tube cutter (41-C-2825). Make sure end of tubing is smooth and is cut squarely with tubing wall. Do not climp or partially close ends of tubing. Ream, or file, ends of tubing if necessary.

(b) It is important to "blow out" tubing to remove all cuttings and filings.

(c) Place nut and new sleeve on tubing, and put end of tubing into recess in fitting body.

(d) Hold tubing at bottom of recess and tighten nut until sufficient pressure is placed on sleeve to prevent leakage.

(2) GALVANIZED PIPE.

(a) Cut 3/8-inch galvanized pipe to required length.

(b) Cut 3/8-inch standard pipe threads on each end.

(c) All pipe held rigid to frame with lock nut must also have 3/8-inch lock nut threads cut on one end.

(d) Connect pipe, using galvanized fittings.

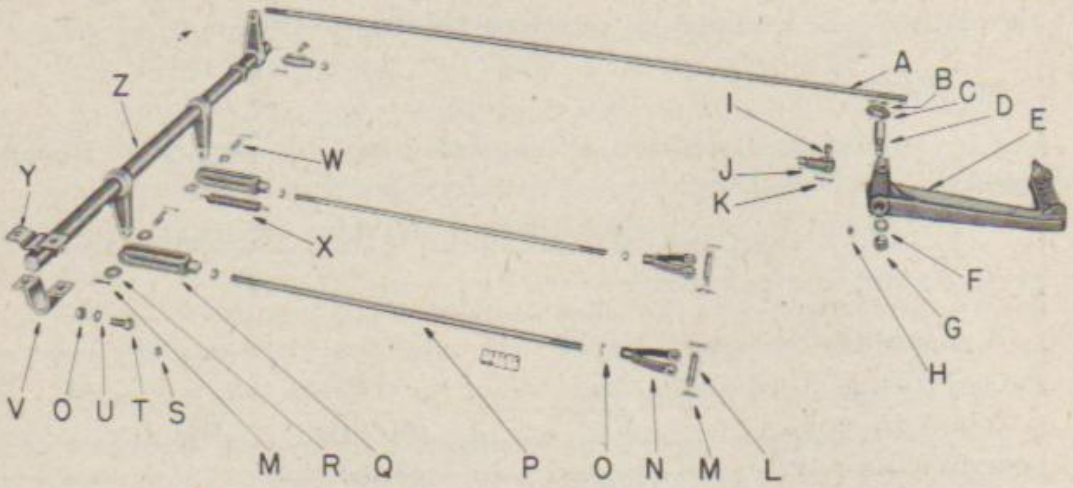
Section XIV

FOOT BRAKE

69. DESCRIPTION.

a. The foot brake is used to control the speed of the semitrailer, when it is moved without being coupled to the tractor truck. It consists of a foot-operating pedal, cross shaft, levers, and rods. This linkage is connected to the slack adjuster. When the foot brake is operated (fig. 10) it moves the slack adjusters and cam shafts to apply the brakes in the same manner accomplished by the air brake system. The brake mechanism parts, including the slack adjusters, are the same as those used for the air brake power system.

SEMITRAILER, 5-TON PAYLOAD, 8-TON GROSS, 2-WHEEL (2dl) STAKE AND PLATFORM, 1944
(Trailer Co. of America, Truck Eng. Corp., Olson Mfg. Co.)



A—PEDAL TO CROSS SHAFT PULL ROD
B—PEDAL STUD COTTER PIN
C—PEDAL STUD WASHER
D—PEDAL STUD
E—FOOT BRAKE OPERATING PEDAL
F—PEDAL STUD LOCK WASHER
G—PEDAL STUD NUT
H—LUBRICATING FITTING
I—ROD END YOKE PIN
J—ROD END YOKE
K—YOKE PIN COTTER PIN
L—WIDE YOKE PIN
M—WIDE YOKE PIN COTTER PIN
N—WIDE YOKE
O—HEXAGONAL NUT
P—CROSS SHAFT TO SLACK ADJUSTER PULL ROD
Q—SLIDING YOKE
R—SLIDING YOKE PIN WASHER
S—LUBRICATING FITTING
T—CAP AND BASE CAP SCREW
U—CAP AND BASE LOCK WASHER
V—CROSS SHAFT END BRACKET CAP
W—SLIDING YOKE PIN
X—FOOT BRAKE RETURN SPRING
Y—CROSS SHAFT END BRACKET BASE
Z—FOOT BRAKE CROSS SHAFT ASSEMBLY

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Figure 32 — Foot Brake — Disassembled

70. MAINTENANCE (fig. 32).

a. If air brake system successfully applies brakes and foot brake fails to do so, the cause of trouble is in linkage between foot pedal and slack adjusters.

b. If foot brake fails to apply brakes, check for broken connection between outer brake rod and cross shaft.

c. One of the two sliding yoke pins connecting inner brake rods to cross shaft could be missing yet semitrailer brakes will apply on one wheel. Replace pin if missing.

d. One of the two clevis pins attaching inner brake rod and brake chamber to slack adjuster could be missing yet semitrailer brakes will apply on one wheel. Replace pin if missing.

e. If pin attaching outer brake rod to foot pedal is missing, the foot pedal assembly will be lost unless it is held to frame by padlock. Replace pin.

f. The foot brake return spring, forces foot pedal back to normal position after foot pressure is released. One end of spring is attached

to frame; the other end of spring is attached to pin holding sliding yoke and inner brake rod to cross shaft. If cotter pin on other end of pin breaks and pin works out of yoke, then the spring will become ineffective. Replace pin.

71. REMOVAL (figs. 15, 17 and 32).

a. Removal of foot brake as a complete assembly will not be necessary. Remove the foot brake linkage as separate parts by removing clevis pins and cotter pins attaching parts together. Remove the cross shaft to which levers and collars are welded, by removing bolts securing cross shaft bracket cap to frame. Remove brake rods attached to yokes on both ends by removing yoke at one end and loosening lock nut at other end and turning rod out of yoke.

72. INSTALLATION (figs. 15, 17 and 32).

a. Install new parts required using new pins, and cotter pins if necessary.

b. Install a standard ½-inch SAE yoke to each end of longer outer brake rod.

c. Install a sliding yoke on end of shorter brake rod attached to lever on cross shaft. See that the other end, which connects to slack adjuster, is equipped with special wide yoke.

d. When installing new rods make sure foot pedal is at highest point before tightening lock nuts at yokes.

e. Install new lubrication fittings in foot pedal and cross shaft bracket cap, if necessary, and lubricate with general purpose grease (par. 16).

Section XV

LANDING GEAR

73. DESCRIPTION.

a. Landing Gear. The landing gear is a retractable support mounted under the front end of the semitrailer to hold it up when it is uncoupled from the tractor truck (fig. 9). The two leg members of the landing gear are attached to frame brackets by pins. These leg members are connected together by cross braces to resist side strain. Two large steel wheels are mounted on the ends of the landing gear axle to facilitate moving the trailer when it is not coupled to tractor truck. A connecting support connects the lower end of each leg to the landing gear lifting mechanism cross head. This cross head con-

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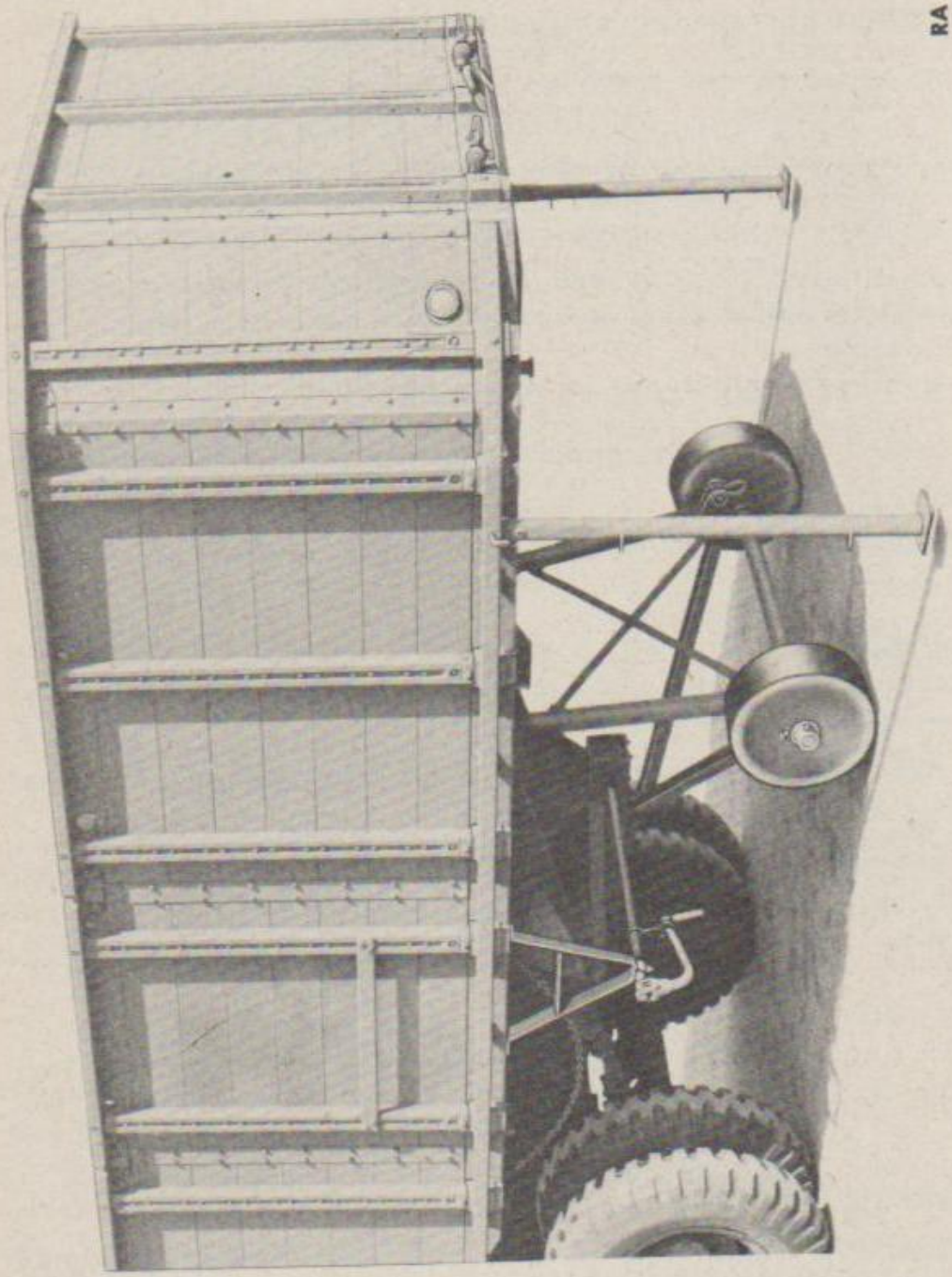

Figure 33 — Auxiliary Support Legs

tains a nut which rides on a jack screw located in a housing between the side rails of the semitrailer frame. Rotation of the jack screw moves the cross head forward or backward (depending on direction of rotation) and thus lowers, or raises, the landing gear wheels. The jack screw is supported by bearings in the housing. It is rotated by a set of bevel gears at the front section of the housing. These gears are turned by the hand-operated crank handle at the end of the crankshaft, which extends out to the right side of the semitrailer. An anchor shackle is attached to the lower end of each leg to attach towing chain in order to move semitrailer without coupling it to tractor truck.

b. Auxiliary Support Legs. The auxiliary support legs are an additional safety feature to be used when loading or unloading semitrailer (fig. 33). After landing gear is lowered, remove auxiliary supports from hooks on each side of trailer and insert mounting pin through hole in skid rail, located approximately 7 inches ahead of king pin. These auxiliary support legs will swing freely about 2 inches from the ground, and will come into contact with the ground only after 4½ tons have been loaded in the extreme front of the semitrailer within a space of 6 feet. Since the rated payload capacity for the semitrailer is 5 ton, based on an evenly distributed load, the above loading condition will develop only in emergency cases or through careless loading. Remove auxiliary support legs from "loading" position, after semitrailer is coupled to tractor truck, and place them back on hooks.

74. MAINTENANCE.

a. Other than periodic lubrication, outlined in paragraph 15, the landing gear seldom requires repair unless the semitrailer has been dropped accidently with the landing gears in the raised position, or the semitrailer has been upset in an accident. Crankshaft, legs, cross braces, or connecting supports can be straightened, if only slightly bent. Replace them, if damaged beyond repair. Replace worn bevel gears, thrust bearings, and bent jack screws.

75. LANDING GEAR ASSEMBLY (figs. 9, 34, and 35).

a. General. Some of the parts can be removed from the landing gear without removing the complete assembly. The nature of the replacement will determine how much of the landing gear must be removed. The procedure, following, for removal and installation, covers the complete landing gear leg assembly and the landing gear lifting mechanism. Most of the steps outlined in the two subparagraphs below on removal and installation can be performed independently of the others. CAUTION: *Do not work on landing gear*

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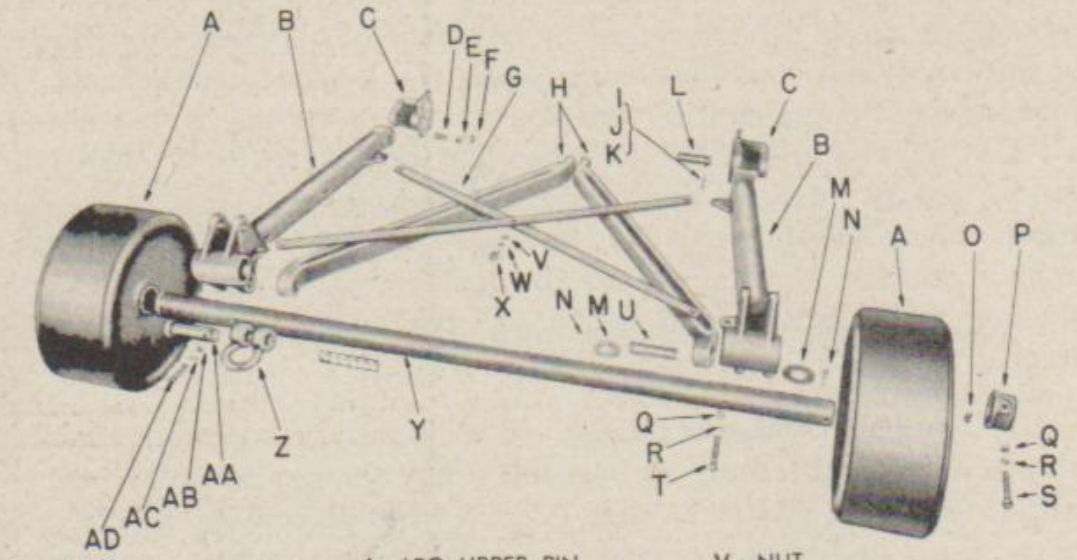

A—WHEEL
B—LEG
C—LEG FRAME BRACKET
D—BOLT
E—LOCK WASHER
F—NUT
G—CROSS BRACE
H—CONNECTING SUPPORT
I—NUT
J—LOCK WASHER
K—BOLT

L—LEG UPPER PIN
M—CONNECTING SUPPORT LOWER PIN WASHER
N—COTTER PIN
O—LUBRICATING FITTING
P—HUB CAP
Q—NUT
R—LOCK WASHER
S—BOLT
T—BOLT
U—CONNECTING SUPPORT LOWER PIN

V—NUT
W—LOCK WASHER
X—BOLT
Y—AXLE
Z—ANCHOR SHACKLE
AA—ANCHOR SHACKLE PIN
AB—NUT
AC—WASHER
AD BOLT

RA PD 337648

Figure 34 — Landing Gear Leg Assembly — Disassembled

assembly unless semitrailer is properly blocked-up at front, or coupled to tractor truck or convertor dolly. Do not use auxiliary support legs for this purpose. The semitrailer brakes must be applied, or the wheels blocked, to prevent movement.

b. Removal.

(1) LANDING GEAR LEG ASSEMBLY (fig. 34).

(a) Remove cotter pins and washers from cross head pin and lower landing gear connecting supports to ground.

(b) Mark with chalk, the hole in which leg frame bracket pins are located, so that legs will be same height when installed.

(c) Remove bolts, nuts, lock washers, and pins securing leg members to frame brackets, and roll complete leg assembly from under semitrailer.

(d) Remove cotter pins, washers, and pins securing connecting supports to bottom of legs.

(e) Remove bolts, nuts, and lock washers attaching cross braces to legs.

(f) Remove bolts, nuts, and lock washers from anchor shackle pins securing shackles to bottom of legs.

LANDING GEAR

A—BOLT
B—LOCK WASHER
C—NUT
D—JACK SCREW HOUSING END
E—JACK SCREW HOUSING ASSY.
F—BOLT
G—LOCK WASHER
H—NUT
I—HOUSING DUST COVER
J—HOUSING FRONT COVER
K—NUT
L—LOCK WASHER
M—BOLT
N—JACK SCREW BEVEL GEAR
O—COTTER PIN
P—JACK SCREW NUT
Q—COTTER PIN
R—SPACING WASHER
S—CRANKSHAFT BEVEL GEAR
T—CRANKSHAFT
U—NUT
V—LOCK WASHER
W—BOLT
X—THRUST BEARING
Y—WOODRUFF KEY
Z—LUBRICATING FITTING
AG—CRANKSHAFT BRACKET ASSY.
AH—JACK SCREW BEARING ASSY.
AI—THRUST WASHER
AJ—CROSS HEAD INSERT NUT
AK—COTTER PIN
AL—SUPPORT TO CROSSHEAD PIN
AM—CROSS HEAD
AN—JACK SCREW
AA—BOLT
AB—HOOK
AC—PLAIN WASHER
AD—HAND CRANK ASSY.
AE—NUT
AF—COTTER PIN

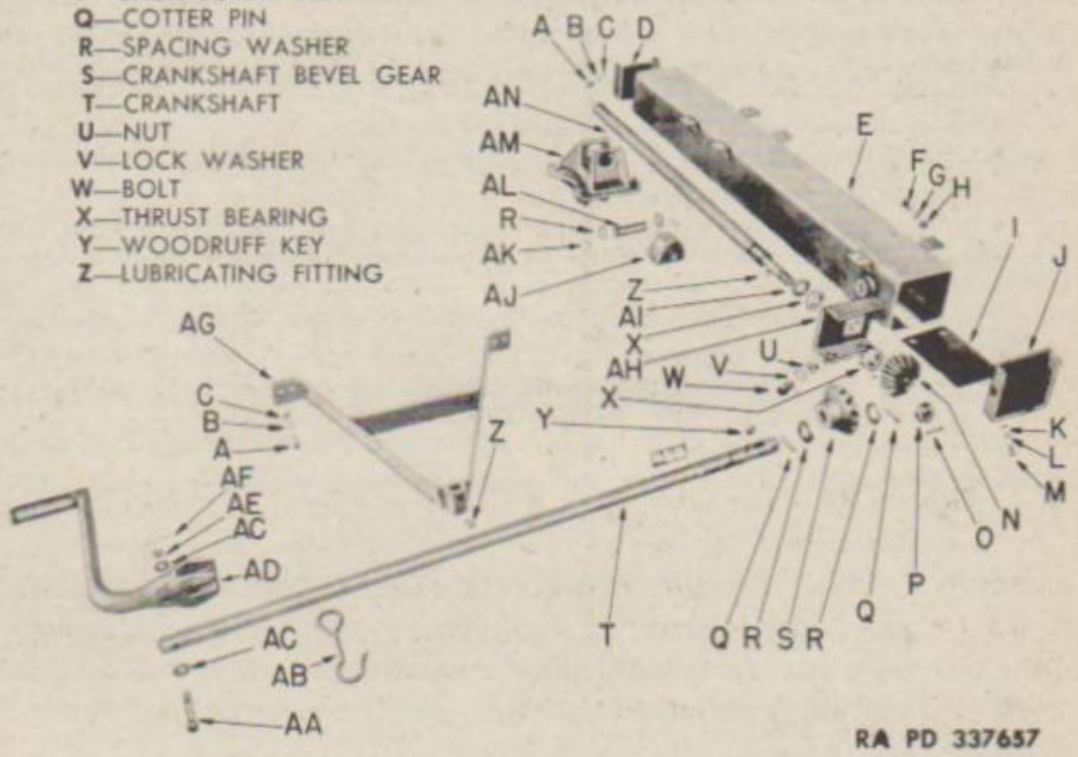

Figure 35 — Landing Gear Lifting Mechanism — Disassembled

(g) Remove bolts, nuts, and lock washers securing hub caps to landing gear axle.

(h) Slide wheels off axle.

(i) Remove bolts, nuts, and lock washers securing legs to axle.

(j) Remove bolts, nuts, and lock washers securing leg brackets to frame. NOTE: *This completes removal of all the landing gear leg assembly parts. No further disassembly is required. Any or all parts can be replaced if inspection reveals damage.*

(2) LANDING GEAR LIFTING MECHANISM ASSEMBLY (fig. 35).

(a) Remove cotter pins and washers from cross head pin and lower landing gear connecting supports to ground.

(b) Remove end from rear of jack screw housing by removing the two attaching bolts, nuts, and lock washers.

(c) Remove dust cover from front of jack screw housing by removing the four bolts, nuts, and lock washers (fig. 17).

(d) Remove cotter pin holding crankshaft to outside edge of bevel gear, and then remove cotter pin on inside of housing. Remove plain washer. Shove crankshaft toward opposite side of housing and remove key. Remove crankshaft bevel gear and pull crankshaft out of housing.

(e) Remove cotter pin and nut holding bevel gear onto jack screw; pry off gear; remove key and thrust washer from jack screw.

(f) Move cross head toward end of housing just enough to permit insertion of hand through opening in bottom of housing (fig. 17). Grip thrust bearing and washer, and remove jack screw, cross head, cross head nut, thrust bearing and washer through rear opening of housing.

(g) Remove handle from crankshaft by removing securing bolt, nut, cotter pin, and washers.

(h) Remove six bolts, nuts, and washers securing jack screw housing to frame.

(i) Remove the four bolts, nuts, and washers attaching jack screw bracket bearing to housing. NOTE: *This completes removal of all the landing gear lifting mechanism assembly parts. No further disassembly is required. Any, or all, parts can be replaced, if inspection reveals damage.*

c. Installation.

(1) LANDING GEAR LIFTING MECHANISM ASSEMBLY (fig. 35).

(a) Insert jack screw bracket bearing in housing and install the four bolts, lock washers, and nuts.

(b) Position jack screw housing and install the six bolts, lock washers, and nuts.

(c) Insert cross head nut in cross head; thread onto jack screw up to boss; install washer, then place thrust bearing on other end of jack screw and move it up to boss; slide cross head onto housing and holding assembly with hand guide jack screw through hole in bracket bearing.

(d) Insert thrust bearing on end of jack screw and install key. Force on jack screw bevel gear. Install jack screw nut and cotter pin.

(e) Secure crank handle assembly to crankshaft with bolt, washers, nut, and cotter pin. "Feed" crankshaft through hole in bracket attached to frame and also through hole in housing, holding washer next to hole in housing.

(f) Install key onto crankshaft. Force on crankshaft bevel gear. Install washer on end of crankshaft. Insert cotter pin on end of crankshaft, and also through crankshaft in back of washer on the outside of housing.

(g) Test operation of bevel gears by turning crank handle. If there is too much play in operation (usually caused by variations in gear sizes) install another washer in front of cotter pin on outside of housing.

(h) Position end of jack screw housing and install two bolts, lock washers, and nuts.

(i) Pack gears and gear housing with general purpose grease, number 1 or 0. Secure dust cover with the four bolts, lock washers, and nuts.

(j) Lubricate jack screw with general purpose grease (par. 16).

(k) Lubricate fitting located in bottom of frame bracket which supports crankshaft (par. 16).

(2) LANDING GEAR LEG ASSEMBLY (fig. 34).

(a) Position leg frame brackets, and secure each to frame with the four bolts, lock washers, and nuts.

(b) Slide legs onto landing gear axle, and secure to axle with bolts, lock washers, and nuts.

(c) Slide wheels and hub caps onto axle and secure with bolts, lock washers, and nuts.

(d) Position anchor shackles in bottom of legs, insert pins and attach with bolts, lock washers, and nuts.

(e) Position cross braces to legs and secure with bolts, lock washers, and nuts.

(f) Secure connecting supports to bottom of legs with bolts, lock washers, and nuts. Be sure other ends of connecting supports come together.

(g) Roll complete landing gear leg assembly under trailer, and position legs in frame bracket holes same as before removal (sub-par. b (1) (above). Install pins and bolts, lock washers, and nuts.

(h) Position the two connecting rods into cross head, install pin, washers, and cotter pins.

(i) Lubricate landing gear wheels through fitting with general purpose grease (par. 16).

(j) Test operation of landing gear. Leave landing gear in lowered position before uncoupling from tractor truck or removing temporary support.

Section XVI

LIGHTS AND WIRING

76. DESCRIPTION.

a. Wiring Diagram. The wiring diagram (fig. 36) shows the complete wiring for the semitrailer, including the location of the tail-lights, coupling sockets, blackout switch, and the reflex reflectors. All wiring is 14 gage, stranded, insulated wire made into harnesses and inserted in conduit.

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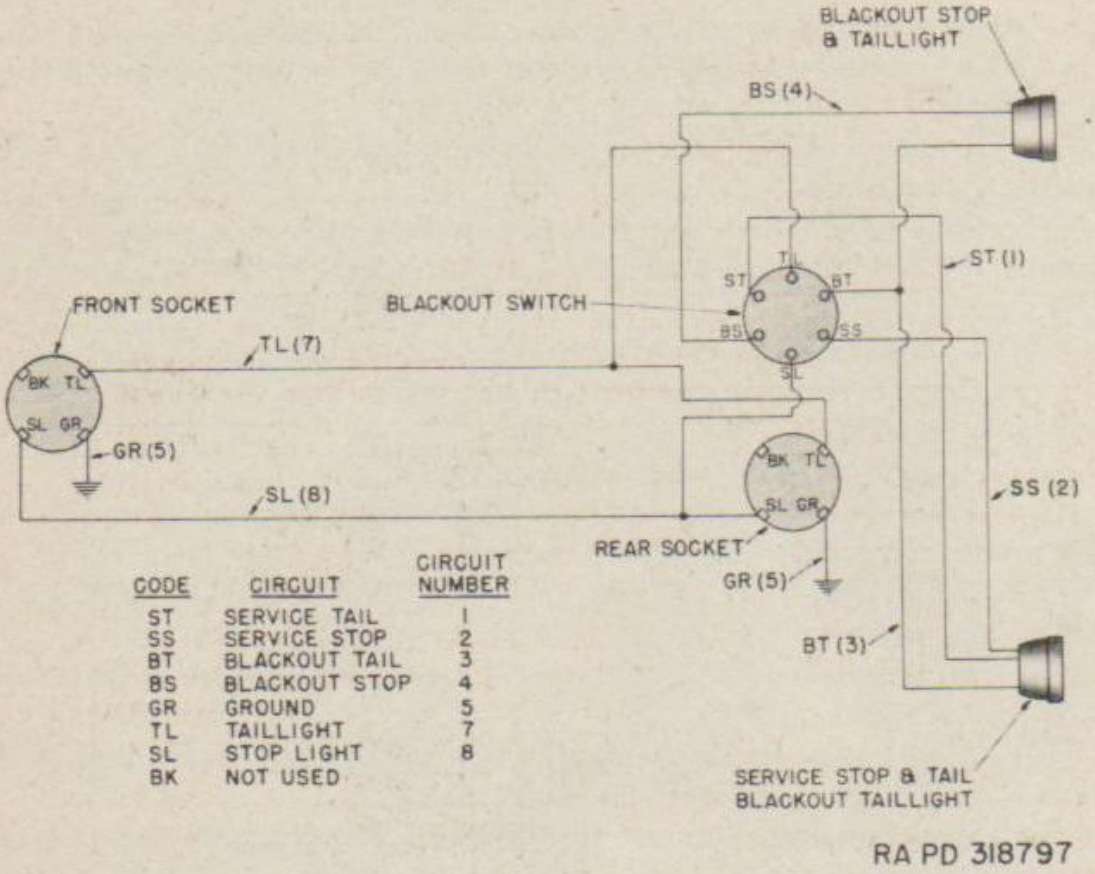


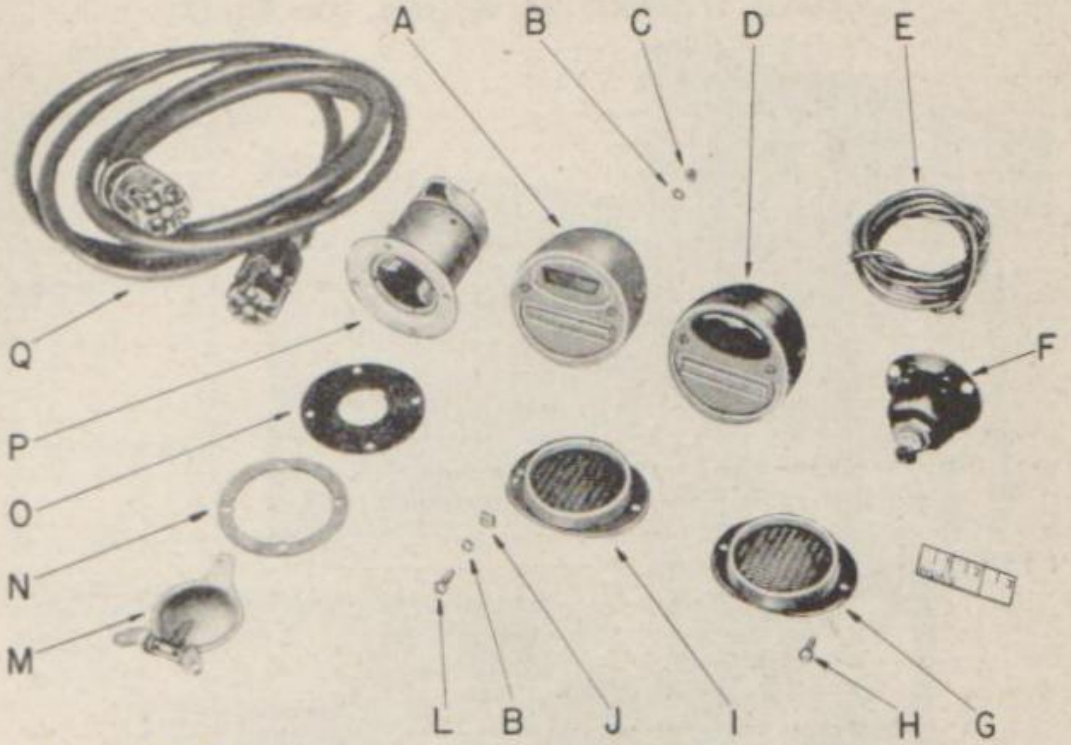
CODE	CIRCUIT	CIRCUIT NUMBER
ST	SERVICE TAIL	1
SS	SERVICE STOP	2
BT	BLACKOUT TAIL	3
BS	BLACKOUT STOP	4
GR	GROUND	5
TL	TAILLIGHT	7
SL	STOP LIGHT	8
BK	NOT USED	

Figure 36 — Electrical Wiring Diagram

b. Coupling Sockets. Current for the semitrailer lighting system is supplied from the tractor truck. The jumper coupling cable, furnished with the tractor truck, must be connected to the coupling socket (fig. 37), located in the frame at the front of the semitrailer (fig. 7). The current is sent also to the coupling socket mounted in the rear crossmember of the semitrailer (fig. 38), and in turn is relayed to a second trailing unit when another electric jumper cable is connected.

c. Taillights. Two taillights (fig. 37) are mounted at the rear of the semitrailer. The left-hand light is a combination blackout taillight and service taillight and stop light (fig. 38). The right-hand light is a combination blackout taillight and stop light (fig. 38). The lens of each taillight is designed to produce two beams. These two beams will merge into a highly visible single beam, when one truck is following a proceeding truck at a specified distance.

d. Blackout Switch. The blackout switch (fig. 37), mounted in the rear crossmember of the semitrailer (fig. 38), controls the current to the taillights. When this blackout switch is in "OFF" position, the service taillight and stop light is the only light receiving current from the tractor truck. When this blackout switch is in operating position



A—BLACKOUT TAIL AND BLACKOUT STOP LIGHT
B—LOCK WASHER
C—HEXAGONAL NUT
D—BLACKOUT TAIL & SERVICE TAIL AND STOP LIGHT
E—ELECTRICAL STRANDED WIRE
F—BLACKOUT SWITCH
G—REFLEX REFLECTOR
H—WOOD SCREW
I—REFLEX REFLECTOR
J—STOVE BOLT NUT
L—STOVE BOLT
M—COUPLING SOCKET COVER
N—SOCKET DUST SEAL RING
O—SOCKET DUST SEAL
P—ELECTRICAL COUPLING SOCKET
Q—ELECTRICAL JUMPER COUPLING CABLE

RA PD 337649

Figure 37 — Electrical Parts

the two blackout taillights and the blackout stop light receive the current.

e. Reflex Reflectors. Two amber reflex reflectors are mounted on each side of the semitrailer at the front (fig. 1). Four red reflex reflectors are mounted at the rear of the semitrailer (fig. 38), two facing the rear, and two facing the side.

77. MAINTENANCE.

a. Examine wiring for breaks, worn or frayed insulation. Replace with new 14 gage, single conductor, stranded wire.

b. Clean all terminal connections.

c. Tighten all wires at terminals and coupling sockets.

d. Remove wires from locations that will cause short circuits.

e. Tighten wiring harness clamps.

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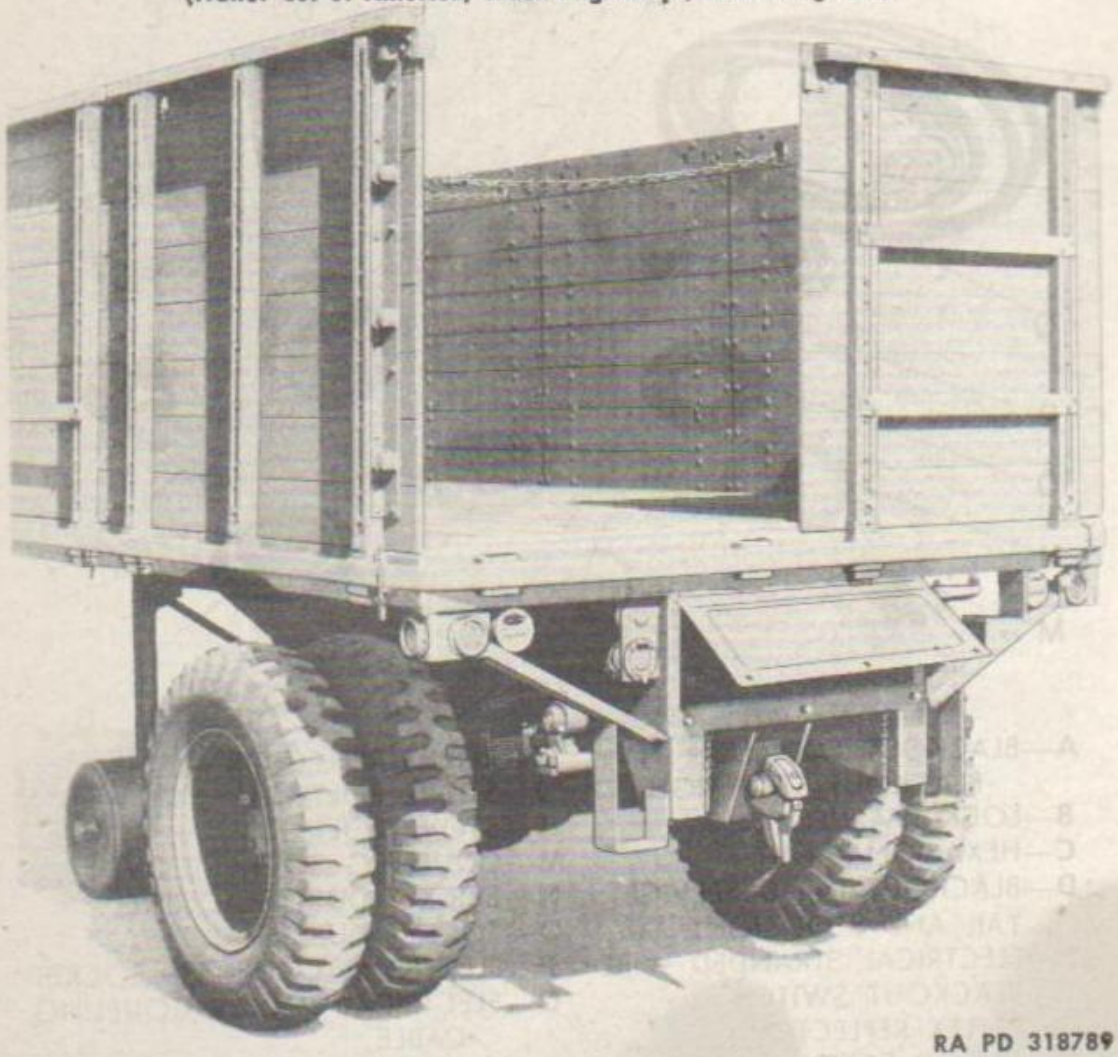

RA PD 318789

Figure 38 — Semitrailer, Stake and Platform — Rear View

f. Test and replace burnt-out sealed beam units in both taillights.

g. Check front and rear coupling sockets, and replace if damaged or burnt-out.

h. Check blackout switch, and replace if damaged or burnt-out.

i. Replace broken reflex reflectors.

78. ELECTRICAL UNITS.

a. Coupling Socket.

(1) REMOVAL.

(a) Disconnect wiring harness from terminals.

(b) Remove the four screws securing coupling socket to frame, and remove coupling socket.

(c) Disconnect ground wire from coupling socket.

(2) INSTALLATION.

(a) Connect wiring harness wire No. 7 to "TL" terminal and wire No. 8 to "SL" terminal.

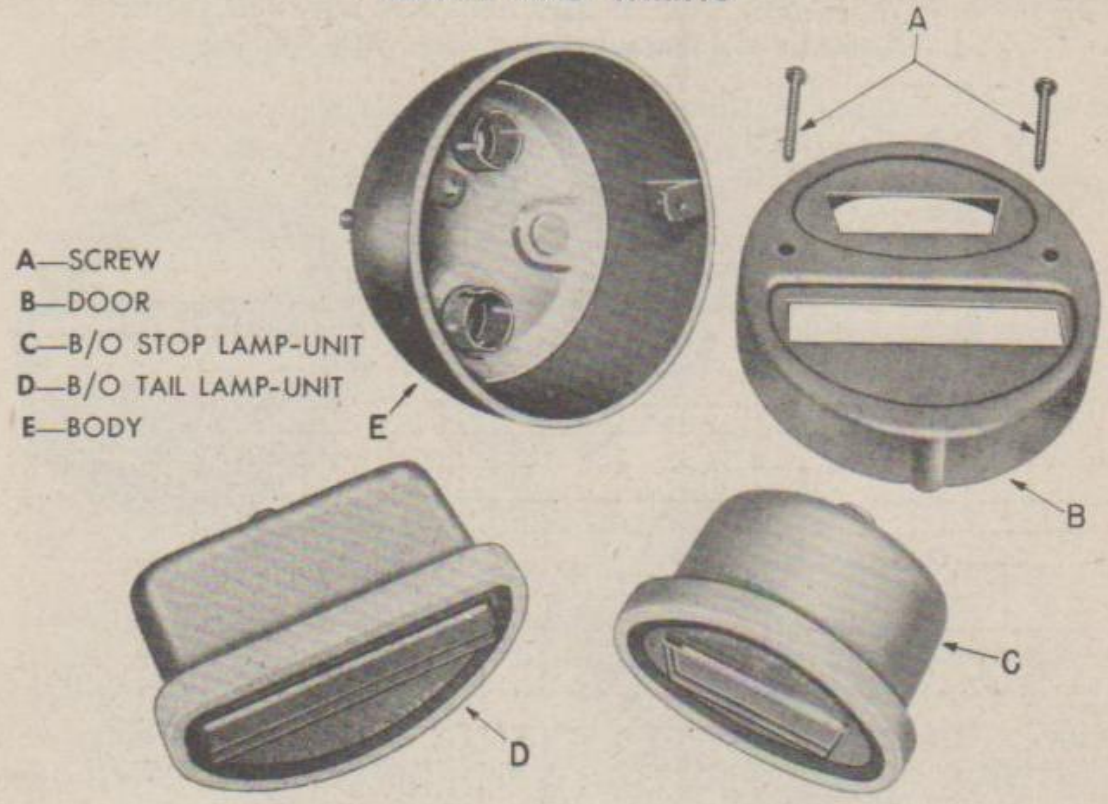

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Figure 39 — Blackout Tail and Blackout Stop Light — Disassembled

(b) Connect ground wire to terminal "GR" and to back of coupling socket.

(c) Position socket and install the four screws through coupling socket flange and frame of semitrailer.

b. Taillight (figs. 39 and 40).

(1) REMOVAL.

(a) Twist ⅛ turn and pull out taillight wire contact plug connectors from taillight sockets.

(b) Remove the two nuts and lock washers holding taillight to bracket, and remove taillight.

(2) INSTALLATION.

(a) Position taillight onto mounting bracket, and install the two lock washers and nuts.

(b) Insert taillight wire contact plug connectors in taillight sockets, and twist ⅛ turn to lock.

c. Lamp-unit (figs. 39 and 40).

(1) REMOVAL.

(a) Remove the two screws from taillight door, and remove door.

(b) Pull sealed lamp-unit out of taillight body.

(2) INSTALLATION.

(a) Insert properly sealed lamp-units in taillight body.

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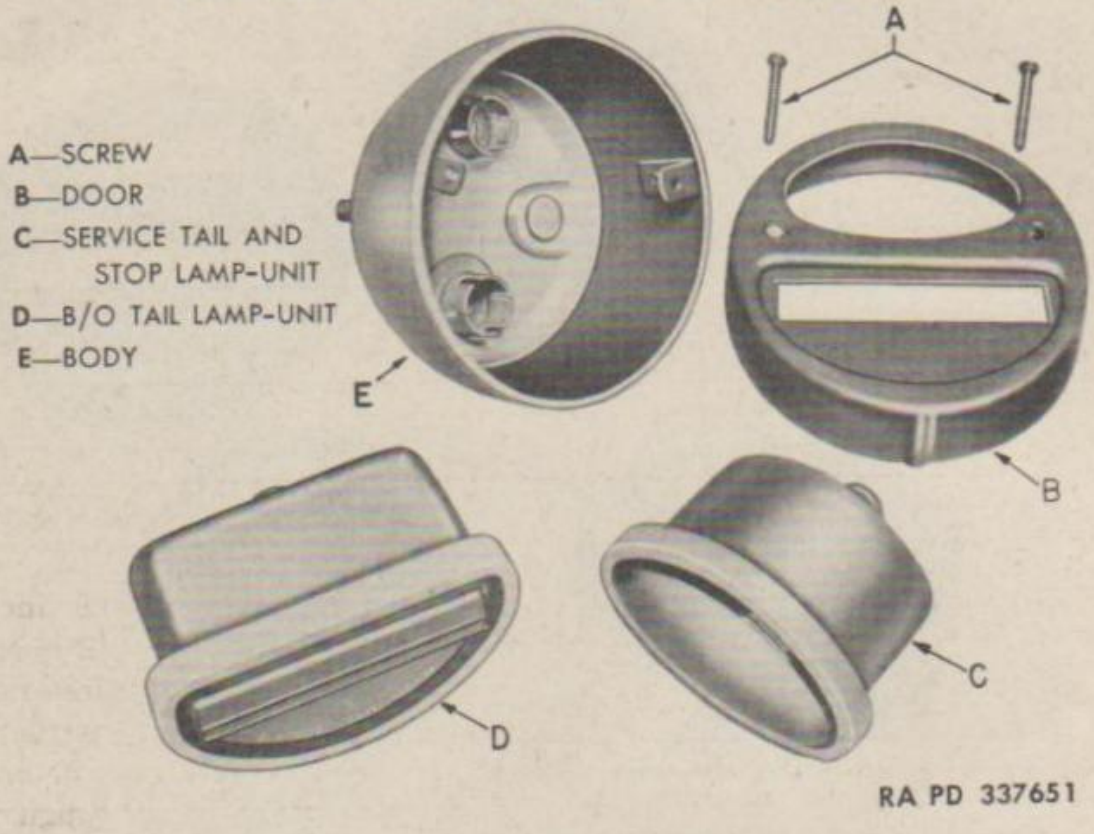

Figure 40 — Blackout Tail and Service Tail and Stop Light — Disassembled

(b) Position door, and install the two screws through door to tail-light body.

d. Blackout Switch (fig. 38).

(1) REMOVAL.

(a) Remove nut from outside end of blackout switch holding switch to bracket and remove switch. Replace nut on switch after removal.

(b) Disconnect wires from blackout switch terminals and tag wires for the purpose of identification at installation.

(2) INSTALLATION.

(a) Connect wires to blackout switch using tags as guide to proper terminal.

(b) Remove nut from end of switch; insert switch through hole in bracket; install nut, and tighten.

e. Reflex Reflectors.

(1) REMOVAL.

(a) Remove wood screws holding amber reflectors to wood panel of body (fig. 1).

(b) Remove stove bolts, washers, and nuts securing red reflectors to mounting brackets on rear of semitrailer (fig. 38).

(2) INSTALLATION.

(a) Position red reflectors to rear mounting bracket, and secure with stove bolts, lock washers, and nuts (fig. 38).

(b) Position amber reflectors to bottom board of front corner rack, and secure with wood screws (fig. 1).

Section XVII

BODY

79. DESCRIPTION (figs. 1, 2, 3 and 38).

a. Body. The semitrailer body is an open top, of stake rack and platform construction. The floor is hardwood and has steel skid strips running longitudinally and spaced approximately 8 inches apart. The racks and stakes are hardwood. The front rack is solid wood construction and permanently mounted. There are three racks on each side of the body. These racks are solid wood construction and can be bolted permanently to the frame outer side rails, or made removable by installing the stake lock pin assemblies through the bottom of the stakes and the stake pockets. The rear racks are solid wood construction and are removable; stake lock pin assemblies hold them in the stake pockets. Both the side center racks and the rear racks are equipped with lift out bars. All racks are joined together at the top with steel rack fastener hooks. Two tie chains are furnished to keep the side racks from bulging when load is placed high against racks. Rope knobs are installed on each rear side rack to strap on load that extends beyond rear of body.

b. Tarpaulin. A tarpaulin, with tie ropes, covers the entire top of the stake and rack body. When not in use, store the tarpaulin in the tool box.

c. Pintle Hook. The pintle hook is mounted at the rear of the semitrailer for the purpose of attaching other vehicles to be towed (fig. 38).

d. Tool Box. The section between the frame center rails, at the extreme rear of the semitrailer, provides a full enclosed tool box. Access to this tool box is furnished by a single door located above the pintle hook (fig. 38).

e. Chock Blocks. Wood chock block assemblies are furnished for the purpose of blocking wheels of semitrailer to prevent movement when coupling or uncoupling, or parking semitrailer (fig. 15). These chock blocks are permanently attached to a chain, and are stored on frame hooks, when not in use.

SEMITRAILER, 5-TON PAYLOAD, 8-TON GROSS, 2-WHEEL (2dl) STAKE AND PLATFORM, 1944
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80. DATA.

Floor—thickness	1¼ in.
Rack—height	48 in.
Panel—thickness	¾ in.
Stakes—dimensions	1¾ x 3 x 53⅞ in.

81. MAINTENANCE.

a. Tighten floor board screws and skid strip screws.

b. Sweep water from floor to prevent boards from rotting.

c. Clean off grease from floor to prevent accidents.

d. Tighten all body bolts.

e. Replace, immediately, missing bolts required to permanently secure racks to frame outer side rail.

f. Tighten all rack fastener hook bolts.

g. Lubricate pintle hook (par. 15) and inspect for excessive wear or loose parts. Tighten or replace.

h. Replace damaged chock block assembly.

i. Replace damaged tarpaulin.

82. BODY COMPONENTS.

a. Rack Assemblies.

(1) REMOVAL.

(a) Remove permanently installed damaged racks by removing the nuts, lock washers and bolts.

(b) Remove stake lock pin assemblies from permanently installed racks, and from the removable rack assemblies.

(c) Lift out racks.

(2) INSTALLATION.

(a) Position proper rack assembly into stake pockets. As rack assembly is lowered into stake pocket, guide rack fastener hooks into each other in order to secure top of rack assembly.

(b) Install stake lock pin assemblies into removable rack assemblies, and also racks which are to be permanently secured.

(c) Install bolts through holes in skid rail, stake pockets, stakes, and outer side rail, and secure with lock washers and nuts.

b. Rack Fastener Hooks.

(1) REMOVAL. Remove bolts and nuts securing damaged rack fastener hook to wood panel of rack assembly.

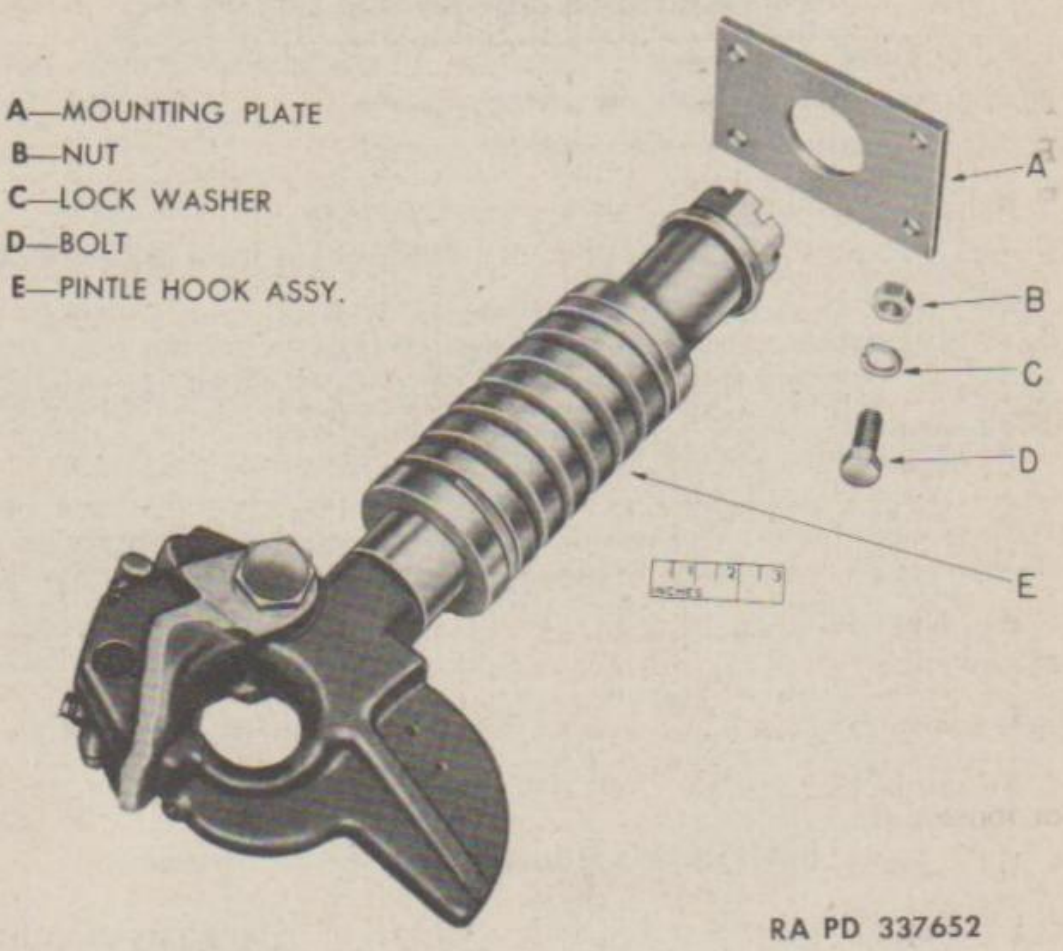

Figure 41 — Pintle Hook and Mounting Parts — Disassembled

(2) INSTALLATION. Position rack fastener hooks to wood panel of rack assemblies. NOTE: *Hooks are right-hand and left-hand.* Install and tighten bolts and nuts.

c. Pintle Hook (figs. 17 and 41).

(1) REMOVAL.

(a) Remove cotter pin, and nut and washer, from end of pintle, and pull pintle hook from pintle mounting.

(b) Remove the four bolts, lock washers and nuts securing mounting plate to frame and remove the two sleeves and spring from pintle hook housing.

(2) INSTALLATION.

(a) Remove the cotter pin, nut, and washer from end of pintle, and slide off the two sleeves and spring.

(b) Insert long end of one sleeve, and short end of other sleeve, into spring. Hold parts together, and place in pintle housing inserting short sleeve end through boss of housing toward rear of trailer.

(c) Install the four bolts, lock washers, and nuts through mounting plate and housing.

(d) Insert pintle hook from rear of semitrailer through housing, spring, and sleeves, and mounting plate.

(e) Install washer, nut, and cotter pin.

d. Chock Blocks.

(1) REMOVAL. Remove chock block chain from hook welded to frame.

(2) INSTALLATION. Install loose end of chain onto hook welded to frame. Install other end of chain, close to chock block, onto second hook securing chock block assembly in place.

PART FOUR — ORDNANCE MAINTENANCE INSTRUCTIONS

Section XVIII

INTRODUCTION

83. SCOPE.

a. Part four contains information for the guidance of the maintenance personnel responsible for the third and fourth echelons of maintenance of this vehicle.

b. The instructions included herein contain description, disassembly, cleaning, inspection, repair, and assembly of the frame, upper fifth wheel, axle, springs, shock absorbers, brake drums, brake linings, brake spiders, landing gear, and body components. Complete maintenance information on power brake system including slack adjuster, is contained in TM 9-1827A.

Section XIX

FRAME AND UPPER FIFTH WHEEL

84. DESCRIPTION.

a. Frame. The frame consists of fabricated and structural steel sections welded together into an integral frame assembly. Two main load carrying steel rails extend the entire length of the semitrailer chassis. The main rails are held in position by a series of crossmembers and outriggers spaced approximately 20 inches apart, and welded. The outer ends of the outriggers are held in position by outer side rails. Steel stake pockets are welded to the outer side rails. A skid rail is welded to the stake pockets along the sides and rear of the semitrailer to protect the stake pockets and stakes. A steel lashing loop is welded to the front of the semitrailer chassis.

b. Upper Fifth Wheel. A heavy steel plate, called the upper fifth wheel plate, is welded to the under side of the frame at the front end of the semitrailer (fig. 42). A standard, interchangeable king pin is riveted to the upper fifth wheel plate. When the semitrailer is coupled to the lower fifth wheel of the tractor truck, the jaws of the lower fifth wheel lock around the king pin. All the pulling force is withstood at the king pin.

85. INSPECTION.

a. In normal operation the frame requires no maintenance except the possibility of cracked welds, or cracked frame members, develop-

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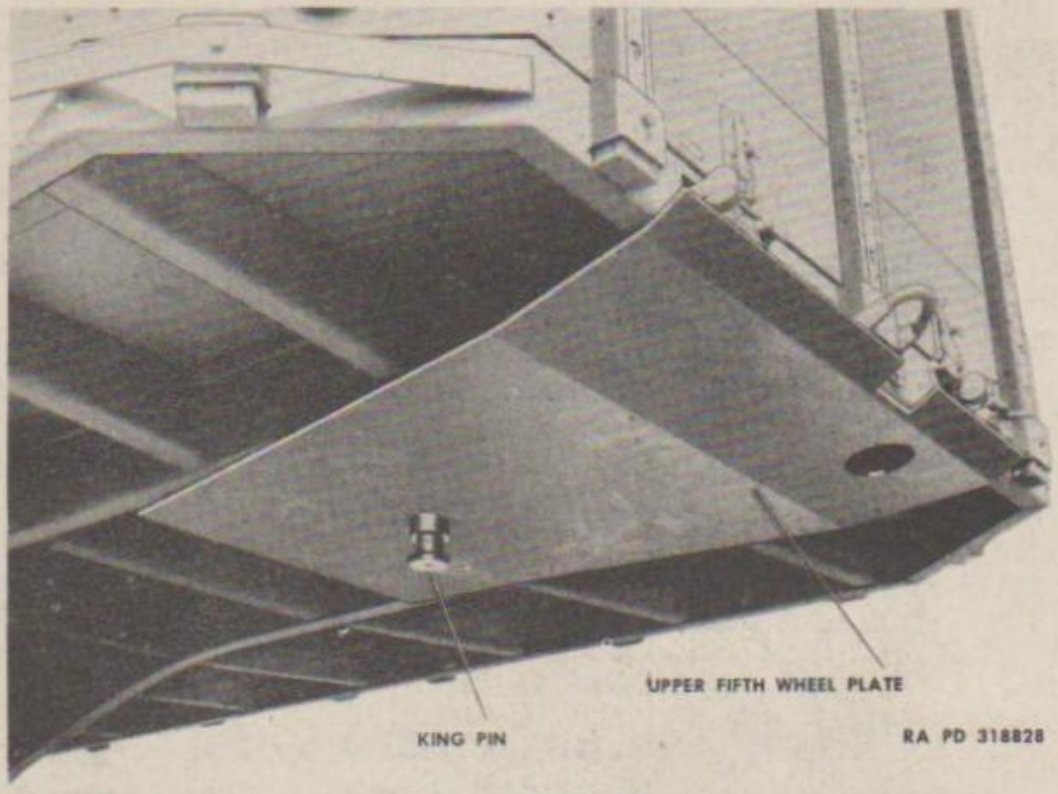


Figure 42 — Upper Fifth Wheel Plate and King Pin

ing from excessive overloads or accidents. The only rivets used in the construction of the model 516 semitrailer are those securing the king pin to the upper fifth wheel plate. Inspect the frame for cracked welds, missing bolts, and loose rivets. Replace upper fifth wheel plate and king pin if damaged enough to prevent coupling.

86. REMOVAL.

a. Frame. Remove damaged sections from frame by cutting across the outside of the damaged section at a 30-degree angle.

b. Upper Fifth Wheel (fig. 42).

(1) Remove upper fifth wheel plate by burning it loose from frame.

(2) Cut loose the eight rivets securing the king pin to the upper fifth wheel plate.

87. REPAIR.

a. To repair cracks in frame members, or to repair broken welds, weld the broken place, and reinforce it with an additional backing plate; arc welded into position.

88. INSTALLATION.

a. Frame.

(1) Cut splice section at a 30-degree angle to fit section removed. By cutting at a 30-degree angle, the cut and the weld are distributed over a greater area and result in a stronger weld.

(2) Back up all spliced joints with a plate or channel reinforcement extending about 6 inches on each side of the joint on the inner side of the splice section. The reinforcing member should be at least as thick as the splice section. The width of the reinforcing plate should be the same as the splice section, unless the splice section is a channel, in which case the overall width of the reinforcing plate should be made to fit inside the channel.

(3) Arc weld the reinforcing member into place.

b. Upper Fifth Wheel (fig. 42).

(1) Bolt new king pin onto upper fifth wheel plate with three ½-inch bolts.

(2) Drive five ½ inch wide by 1¼ inch long, round-head rivets. Rivet heads to be on top side of plate.

(3) Remove the three bolts, and drive the three remaining rivets.

(4) Grind off excess rivet from bottom surface of plate.

(5) Clamp upper fifth wheel into proper position, and arc weld to semitrailer frame.

(6) Grease plate, and king pin, with general purpose grease (par. 16).

Section XX

SPRINGS

89. DESCRIPTION.

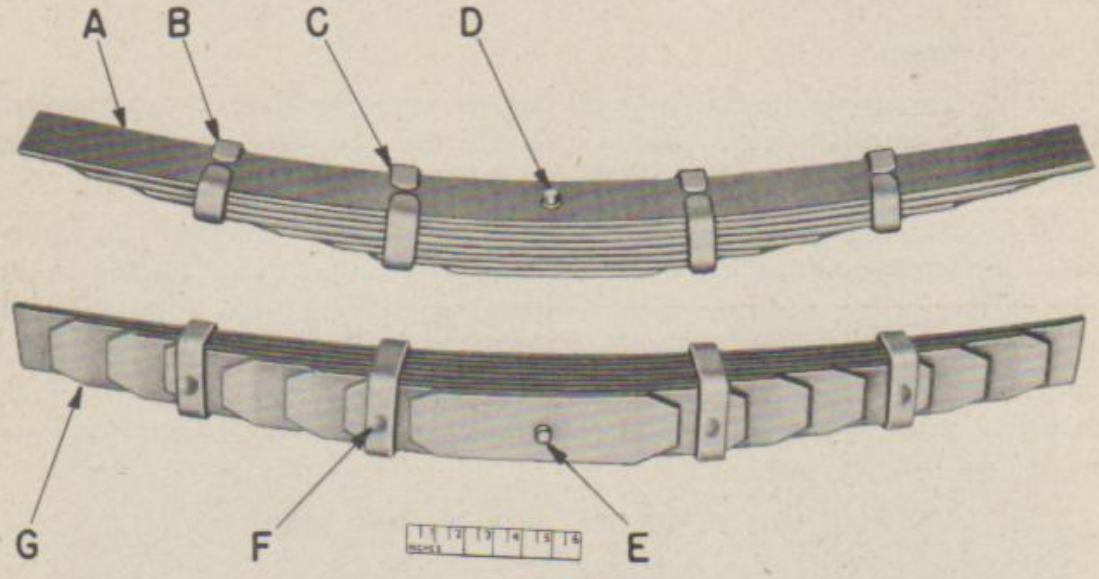
a. Springs. The semi-elliptical type main spring consists of 11 leaves held together by six-bolt type rebound clips and a center bolt. The No. 1 leaf, or top leaf, of the main spring has an eye formed into each end, and is equipped with bronze bushings. The slip end, semi-elliptical type auxiliary spring assembly consists of eight leaves held together by four-clinch type rebound clips and a center bolt. All rebound clips are riveted to the bottom spring leaf which they surround.

90. INSPECTION.

a. Hard riding is caused by broken or frozen front spring pin or rear shackle pin. Remove pins and clean. Replace if broken.

b. Loose spring U-clip bolts cause axle or springs to shift position, resulting in hard riding. Aline all spring assembly parts in proper position on axle and tighten U-clip bolts.

SEMITRAILER, 5-TON PAYLOAD, 8-TON GROSS, 2-WHEEL (2df) STAKE AND PLATFORM, 1944
(Trailer Co. of America, Truck Eng. Corp., Olson Mfg. Co.)



A—NO. 1 LEAF
B—OUTER REBOUND CLIP
C—INNER REBOUND CLIP
D—CENTER BOLT NUT
E—CENTER BOLT
F—REBOUND CLIP RIVET
G—NO. 2 LEAF

RA PD 337654

Figure 43 — Auxiliary Spring

c. Broken spring leaves, spring center bolts, spring eyes, or worn bushings, also cause hard riding. Remove damaged parts from semitrailer, and replace with new parts.

91. DISASSEMBLY.

a. Auxiliary Spring Leaves (fig. 43).

(1) Remove auxiliary spring (par. 37 **a** (1)).

(2) Remove center bolt. The eighth spring leaf will be detached from spring, as it is not surrounded by rebound clip.

(3) Loosen clinch-type rebound clips slightly, and tap first spring leaf out of spring.

(4) Tap second spring leaf out of spring.

b. Main Spring Leaves. To remove first and second leaves of spring proceed as follows: (fig. 44).

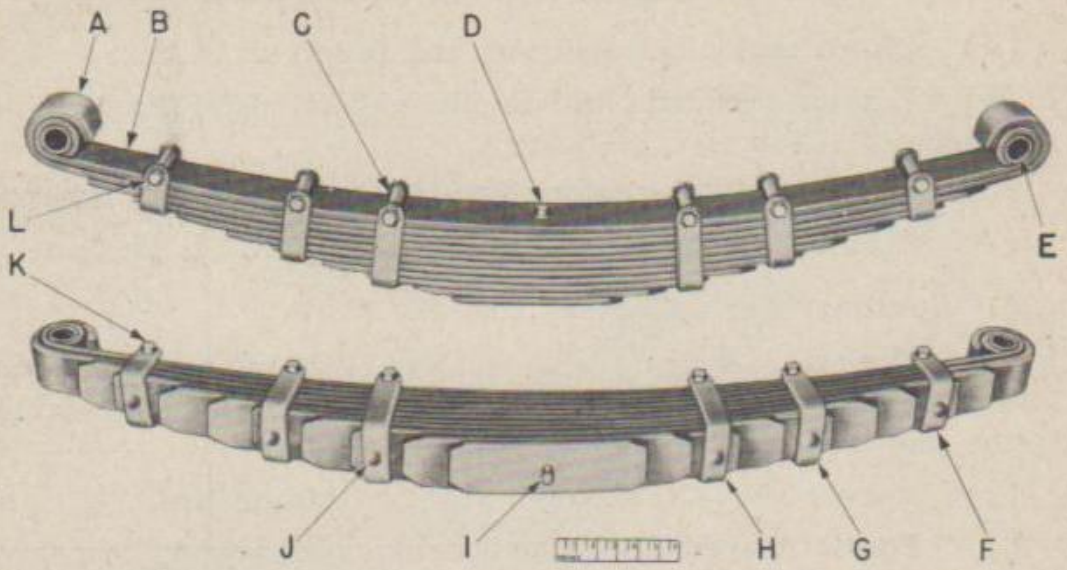
(1) Remove main spring (par. 37 **a** (2)).

(2) Remove shroud from main spring.

(3) Place C-clamp over entire main spring near center bolt and tighten C-clamp.

(4) Remove center bolt and nut.

(5) Remove the six rebound clip nuts, bolts, and spacers.



A—No. 2 LEAF
B—NO. 1 LEAF
C—REBOUND CLIP SPACER
D—CENTER BOLT NUT
E—SPRING EYE BUSHING
F—OUTER REBOUND CLIP
G—INTERMEDIATE REBOUND CLIP
H—INNER REBOUND CLIP
I—CENTER BOLT
J—REBOUND CLIP RIVET
K—REBOUND CLIP NUT
L—REBOUND CLIP BOLT

RA PD 337653

Figure 44 — Main Spring

(6) Release C-clamp and remove first and second spring leaves. NOTE: *The tenth and eleventh spring leaves will be detached also since they are not surrounded by rebound clips.*

c. Main Spring Bushings (fig. 44).

(1) Place main spring on side on small block.

(2) Using blunt tool, drive worn bushing from spring eye of first leaf.

92. ASSEMBLY.

a. Main Spring Bushing (fig. 44).

(1) Position bushing and drive it into eye in first leaf of main spring.

(2) Lubricate after installation (par. 15).

b. Main Spring Leaves (fig. 44).

(1) Position second leaf and the first leaf between rebound clips on main spring, and line up center bolt holes in spring leaves.

(2) Position tenth and eleventh leaves on spring.

(3) Place C-clamp over entire main spring near center bolt and tighten C-clamp.

(4) Install center bolt and nut, and peen end of bolt.

(5) Position rebound clip bolt spacers, and install bolts and nuts and tighten. Peen ends of bolts.

(6) Remove C-clamp before installing main spring on semitrailer.

(7) Install main spring on semitrailer (par. 37 **b** (1)).

c. Auxiliary Spring Leaves (fig. 43).

(1) Slip end of second spring leaf into position on auxiliary spring under outer clinch-type rebound clip; tap end of spring leaf, and guide spring leaf under the other three rebound clips.

(2) Repeat above procedure with first spring leaf.

(3) Position the eighth spring leaf, and install center bolt through center bolt holes of all eight leaves. Install nut and tighten. Peen end of center bolt.

(4) Tap clinch-type rebound clips until they fit tightly around spring leaves.

(5) Install auxiliary spring on semitrailer (par. 37 **b** (2)).

Section XXI

BRAKE SPIDER, DRUM, SHOES, AND LINING

93. DESCRIPTION.

a. The brake spider, riveted to the axle flange, holds the brake shoe in proper alinement with the brake drum. The brake shoe return springs pull the brake shoe away from the drum to its inoperable position after brake pressure is released. The anchor pins hold the heel end of the brake shoes in alinement with the drum. The anchor pins take all the braking thrust, and are the only positive connection between the brake shoes and the axle. When the "S" head of the camshaft turns, it contacts the wear plate secured to the cam end of the brake shoe. The ¾-inch brake shoe lining is bolted to the brake shoe. The end of the brake spider, through which the camshaft rotates, contains a slotted bushing.

94. DISASSEMBLY.

a. General. By following the procedure outlined in paragraph 52, most of the component parts of the brake mechanism can be removed from brake assembly. No further disassembly is required except for the brake spider and brake shoe. NOTE: *All disassembly operations can be made as separate functions.*

b. Brake Shoe Bushings (fig. 20).

(1) Place blunt tool against inside edge of bushing in anchor end of brake shoe, and drive out bushing. NOTE: *There are two bushings in anchor end of each brake shoe.*

c. Brake Lining (fig. 20).

(1) Remove the four brass bolts and lock washers and nuts securing each brake lining block to brake shoe.

(2) If lining is being removed due to excessive wear, remove all four lining blocks from the two brake shoes on the same side of the semitrailer. All four lining blocks must be replaced on the same side of the brake mechanism in order to permit proper adjustment, and obtain braking contact at all possible points on the brake drum.

d. Brake Shoe Cam Wear Plate (fig. 20).

(1) Remove machine screw securing brake shoe cam wear plate to brake shoe.

(2) Lift off cam wear plate and cam wear plate shim.

e. Brake Spider (fig. 20).

(1) Use cold chisel and hammer to cut rivets securing brake spider to axle flange.

(2) Place blunt tool against bushing in camshaft hole end of spider, and drive out bushing.

95. CLEANING, INSPECTION, REPAIR.

a. Cleaning. All parts removed from brake mechanism can be cleaned with dry-cleaning solvent or Diesel fuel oil. After washing, dry all parts thoroughly before inspecting or installing onto semitrailer subassembly.

b. Inspection.

(1) Visual inspection will determine need for replacement parts in most cases.

(2) Inspect for worn bushings in anchor end of brake shoe and cam end of brake spider.

(3) Inspect for scored drum or heat checks in drum.

(4) Inspect for bent brake spider or loose rivets securing spider to axle flange.

c. Repair.

(1) Replacement with new parts, rather than repair of old ones, is recommended for most of the brake mechanism component parts.

(2) The inside of the brake drum (fig. 18) can be turned down $\frac{1}{32}$ to $\frac{1}{16}$ inch on boring mill or large lathe.

SEMITRAILER, 5-TON PAYLOAD, 8-TON GROSS, 2-WHEEL (2dt) STAKE AND PLATFORM, 1944
(Trailer Co. of America, Truck Eng. Corp., Olson Mfg. Co.)

96. ASSEMBLY.

a. Brake Spider (fig. 20).

(1) Position bushing in camshaft hole in brake spider so that slot in bushing will line up with lubricating fitting opening in brake spider.

(2) Drive bushing into brake spider.

(3) Position brake spider to axle flange so that camshaft hole lines up with hole in camshaft bracket on axle.

(4) Rivet spider to axle flange. NOTE: *Spider can be bolted to axle flange if riveting equipment is not available.*

b. Brake Shoe Cam Wear Plate (fig. 20).

(1) Position brake shoe cam wear plate shim onto brake shoe cam end. NOTE: *There are shims of three thicknesses, namely* $\frac{1}{64}$, $\frac{1}{32}$, *and* $\frac{1}{16}$ *inch available to compensate for wear on cam wear plate, "S" head of camshaft, and turning down of inside diameter of brake drum.*

(2) Place cam wear plate over shim, and secure both items with machine screw.

c. Brake Lining (fig. 20).

(1) Install all new brake lining on entire side of semitrailer brake mechanism assembly at the same time.

(2) Position brake lining blocks, install, and tighten brass bolts, and lock washers and nuts.

d. Brake Shoe Bushings (fig. 20).

(1) Position bushing on outer edge of anchor pin hole in brake shoe. Drive bushing flush with edge of opening.

(2) Turn brake shoe over and position second bushing on outer edge of anchor pin hole. Drive bushing flush with edge of opening.

(3) The two bushings will be spaced apart, in the center of the brake shoe to provide for proper lubrication.

e. General. Follow the procedure outlined in paragraph 53 to complete the assembly, lubrication, and adjustment of the brake mechanism.

Section XXII

BODY

97. DESCRIPTION AND DATA (figs. 1, 2, 3 and 38).

a. Description. The semitrailer body is an open-top, stake-rack, and platform construction. The floor and stake-rack assemblies are hardwood. Steel skid strips, spaced approximately 8 inches apart, are imbedded in the floor, and extend longitudinally the full length

of the body. The front stake rack assembly is permanently secured. The three stake-rack assemblies on each side of the body are constructed so that they can be secured permanently or made removable. The rear stake-rack assemblies are removable. A tarpaulin, equipped with tie ropes, covers the entire top of the stake and rack body. A pintle hook is mounted at the rear of the semitrailer for the purpose of attaching other vehicles to be towed. The section between the frame center rails at the extreme rear of the semitrailer, provides a fully enclosed tool box. Access to this tool box is furnished by a single door located above the pintle hook. Wood chockblock assemblies are furnished for the purpose of blocking the wheels of the semitrailer to prevent movement when coupling, uncoupling, or parking semitrailer.

b. Data.

Floor—thickness	1¼ in.
Rack—height	48 in.
Panel—thickness	¾ in.
Stake—dimensions	1¾ x 3 x 53⅞ in.

98. MAINTENANCE AND INSPECTION.

a. Replace broken or damaged floor boards.

b. Replace broken boards in rack panels.

c. Replace broken stakes in rack assemblies.

d. Inspect pintle hook for excessive wear, and replace worn or damaged parts.

e. Replace damaged wood in chockblock assemblies.

f. Repair tarpaulin, if torn, or if rope ties are missing.

99. BODY COMPONENTS.

a. Floor.

(1) REMOVAL.

(a) Remove screws holding floor skids to floor.

(b) Remove screws holding floor boards to steel crossmembers and lift out boards.

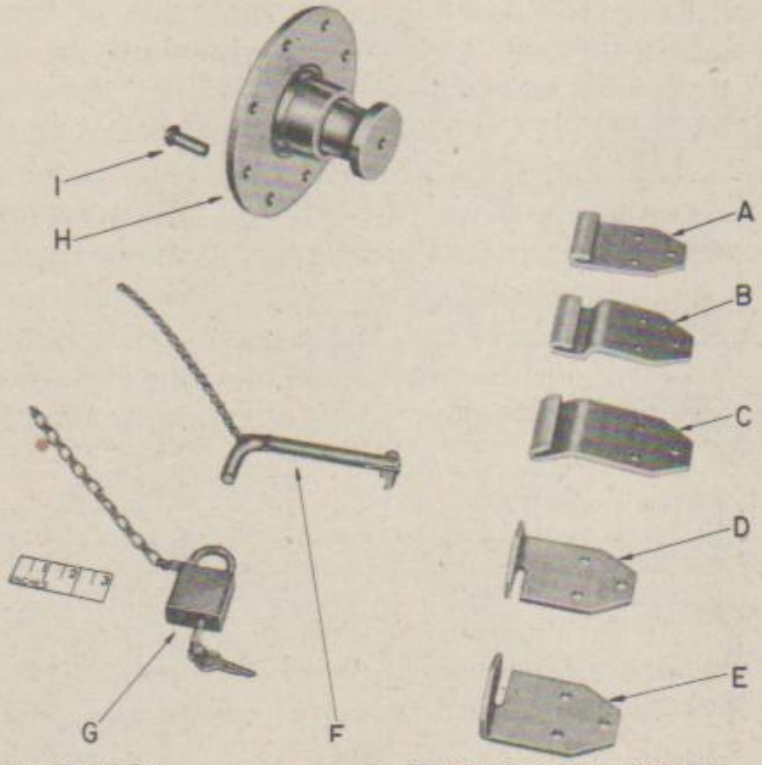
(2) INSTALLATION.

(a) Cut floor board to size, and notch board for steel skid strip.

(b) Fit board in position, and drill through steel crossmember and wood. Drill from underneath, through hole already in crossmember if possible.

(c) Install thread cutting recessed head screws through steel skid strip and floorboard, and secure to crossmembers.

SEMITRAILER, 5-TON PAYLOAD, 8-TON GROSS, 2-WHEEL (2df) STAKE AND PLATFORM, 1944
(Trailer Co. of America, Truck Eng. Corp., Olson Mfg. Co.)



A—RACK SIDE INNER HOOK
B—RACK SIDE OUTER HOOK
C—RACK SIDE FRONT HOOK
D—RACK CORNER RIGHT-HAND HOOK
E—RACK CORNER LEFT-HAND HOOK
F—STAKE LOCK PIN ASSEMBLY
G—TOOL BOX AND FOOT BRAKE PADLOCK
H—UPPER FIFTH WHEEL KING PIN
I—KING PIN RIVET

RA PD 337655

Figure 45 — Body Miscellaneous Parts and King Pin

b. Rack Boards.

(1) REMOVAL.

(a) Remove bolts, washers, and nuts holding broken boards to stakes. Lift out boards.

(b) Remove all bolts, washers, and nuts securing stake to boards and lift off stake.

(2) INSTALLATION.

(a) Cut stake to fit stake pocket and panel. Drill holes through stake and boards, and secure with bolts.

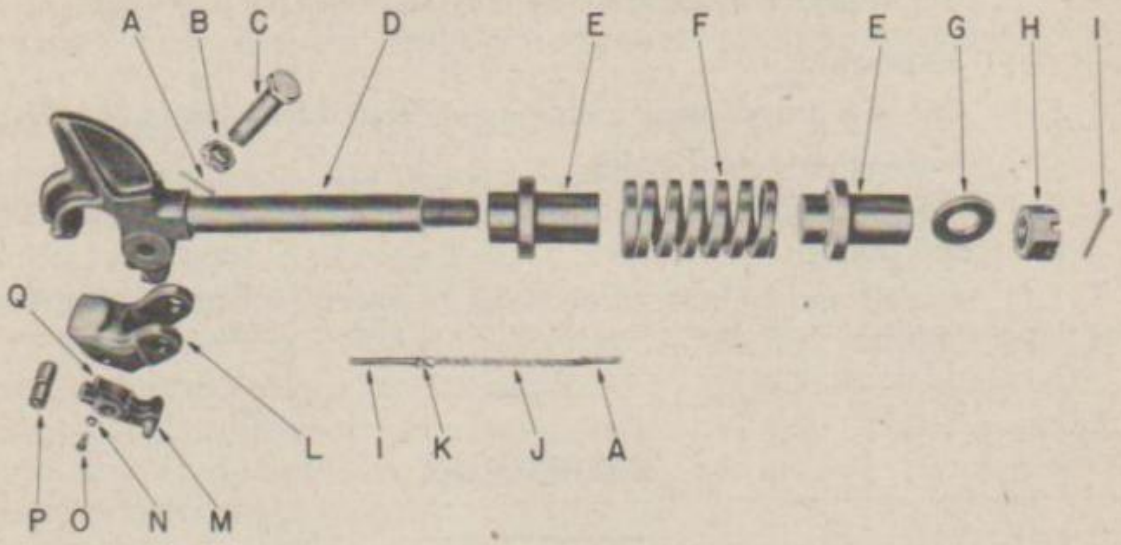
(b) Cut board to size. Drill holes and secure with bolts.

c. Rack Fastener Hooks (fig. 45).

(1) REMOVAL. Remove bolts and nuts securing rack fastener hooks to wood panel.

(2) INSTALLATION. Position rack fastener hooks to wood panel. NOTE: *Hooks are right-hand and left-hand.* Install, and tighten, bolts and nuts.

BODY



A—COTTER PIN
B—HINGE BOLT NUT
C—LOCK HINGE BOLT
D—PINTLE
E—SLEEVE
F—SPRING
G—PINTLE WASHER
H—PINTLE NUT
I—COTTER PIN
J—SAFETY CHAIN
K—SAFETY CHAIN "S" LINK
L—LOCK
M—LATCH
N—LOCK WASHER
O—CAP SCREW
P—LATCH PIN
Q—LATCH SPRING
RA PD 337656

Figure 46 — Pintle Hook — Disassembled

d. Pintle Hook (fig. 46).

(1) DISASSEMBLY.

(a) Remove cotter pin and nut, and washer from end of pintle, and slide off the two sleeves and spring.

(b) To remove latch from pintle, remove cap screw and lock washer and drive out latch pin.

(c) To remove lock from pintle, remove cotter pin and nut from lock bolt, and drive out bolt.

(2) ASSEMBLY (fig. 46).

(a) Position lock over hole in pintle, place light film of general purpose grease, over lock bolt; install bolt, nut, and cotter pin.

(b) Position latch in lock; place light film of general purpose grease, on latch pin; insert latch pin, lock washer, and cap screw.

(c) Slide sleeve onto end of pintle so short boss comes up to back of pintle eye.

(d) Slide on spring.

(e) Slide second sleeve onto end of pintle so long boss extends out of sleeve toward end of pintle.

(f) Install washer, nut, and cotter pin.

e. Chock Blocks.

(1) DISASSEMBLY. Remove the four nuts, washers, and bolts holding wood sections of chock block together; remove chain assembly.

(2) ASSEMBLY.

(a) Cut new board, using undamaged chock-block board as pattern.

(b) Line up and drill holes.

(c) Insert chain loop in cut out in center board, and install bolt, washer, and nut.

(d) Install and tighten three bolts, washers, and nuts along edge of chock block.

APPENDIX

Section XXIII

SHIPMENT AND LIMITED STORAGE

100. GENERAL INSTRUCTIONS.

a. Preparation for domestic shipment of the vehicle is the same, with the exception of minor added precautions, as preparation for limited 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.

101. PREPARATION FOR LIMITED STORAGE.

a. Vehicles to be prepared for limited 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 placed in limited storage, take the following precautions.

(1) LUBRICATION. Lubricate the vehicle completely (par. 16).

(2) TIRES. Clean, inspect, and properly inflate all tires including spares. Replace, with serviceable tires, all tires requiring repairing or retreading. Do not store vehicle 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.

(3) ROAD TEST. The preparation for limited storage will include a road test after the 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 attach a tag in a conspicuous place,

stating the repairs needed, or describing the condition present. A written report of these items will then be made to the officer in charge.

(4) EXTERIOR OF VEHICLE. Remove rust from 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 chains, with medium grade preservative lubricating oil. Close the tailgate.

(5) INSPECTION. Make a systematic inspection just before shipment, or limited storage, to insure 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 in a conspicuous place. Refer to Before-operation Service (par. 18).

(6) BRAKES. Release brakes and chock wheels.

c. Inspection in Limited Storage. Vehicles in limited storage will be inspected weekly for tire failures, evidence of vandalism, tampering, etc.

102. LOADING AND BLOCKING FOR RAIL SHIPMENT.

a. Preparation. In addition to the preparation described in paragraph 101 when ordnance vehicles are prepared for domestic shipment, the following preparation and precautions must be taken:

(1) EXTERIOR. Cover the body of the trailer with the canvas cover supplied as an accessory, or available for use during rail shipment.

(2) RAILROAD BRAKE WHEEL CLEARANCE. Place the vehicle in position with a railroad brake wheel clearance of at least 6 inches. The vehicles will be located on the car in such a manner as to prevent the car from carrying an unbalanced load.

(3) All cars containing ordnance vehicles must be placarded "DO NOT HUMP."

(4) Ordnance vehicles may be shipped on flat cars, end door box cars, side door 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, using permanent end ramps and spanning platforms. Movement from one flat car to another along the length of the train is made possible by crossover plates or spanning platforms. If no permanent end ramp is available, an improvised ramp can be made from railroad ties. Vehicles may be loaded in gondola cars without drop ends by using a crane.

c. Securing Vehicles. In securing or blocking a vehicle, three motions, lengthwise, sidewise, and bouncing, must be prevented. Two

methods for blocking vehicle on freight cars (fig. 47) are given below. NOTE: *All wheel blocking must be located against the outside wheel of the dual.*

(1) FIRST METHOD (FRONT OF VEHICLE). Position supporting frame to the rear of, and against, the kingpin so that crossbeam is at right angles to the trailer frame. Nail one cleat (2- x 4- x 8-in.) to the top of the crossbeam against the outside of the frame on each side, using four 40-penny nails for each cleat (fig. 47). Toe-nail the three supports (fig. 47) to the car floor using 40-penny nails. Toe-nail braces (fig. 47) and nail all cleats to the car floor with 40-penny nails.

(2) FIRST METHOD (REAR OF VEHICLE). Place one block (C, fig. 47) at the front, and one at the rear, of each outside wheel (four blocks (C required). Nail the heel of the block to the car floor with five 40-penny nails, and nail the portion of the block under the tire to the car floor with two 40-penny nails. Place two cleats (D, fig. 47) to the outside of each wheel (four cleats D required). Nail the lower cleat to the car floor with three 40-penny nails, and nail the top cleat to the cleat below with three 40-penny nails.

(3) STRAPPING VEHICLE (fig. 47). Secure vehicle in front (H) and at the side (J) by strapping, consisting of four strands, two wrappings, of No. 8 gage, black annealed wire, passed through the upper section of landing gear, and secure at the stake pockets of the railroad car. Secure center of vehicle (K) by strapping, passing wire around chassis frame and attaching at the closest stake pocket. Secure vehicle at axle (L) by passing wire through opposite openings in the wheels, and attaching at the closest stake pocket of the car. Secure vehicle at the rear by passing wire through the spring shackles (M), and attach at stake pockets of the car. NOTE: *Angularity of strapping at the rear should be approximately 45 degrees.*

(4) SECOND METHOD (FRONT OF VEHICLE). The front of the vehicle is blocked the same as in first method (step (1) above).

(5) SECOND METHOD (REAR OF VEHICLE) (fig. 47). Place one block (F) across the front, and one across the rear of the wheels. Blocks (F) must be at least as long as the over-all width of the vehicle at the car floor. Place cleats (G) against the outside face of the wheels on top of blocks (F). Nail cleats (G) to blocks (F) with 40-penny nails, using two nails at each end of cleat (G). Place cleats (E) against blocks (F), two to the front, and two to the rear, of each outside wheel. Nail each lower cleat to the car floor with three 40-penny nails, then nail each top cleat to the cleat below with three 40-penny nails.

(6) STRAPPING VEHICLE. Strapping is applied in the second method as in step (3) above.

SHIPMENT AND LIMITED STORAGE

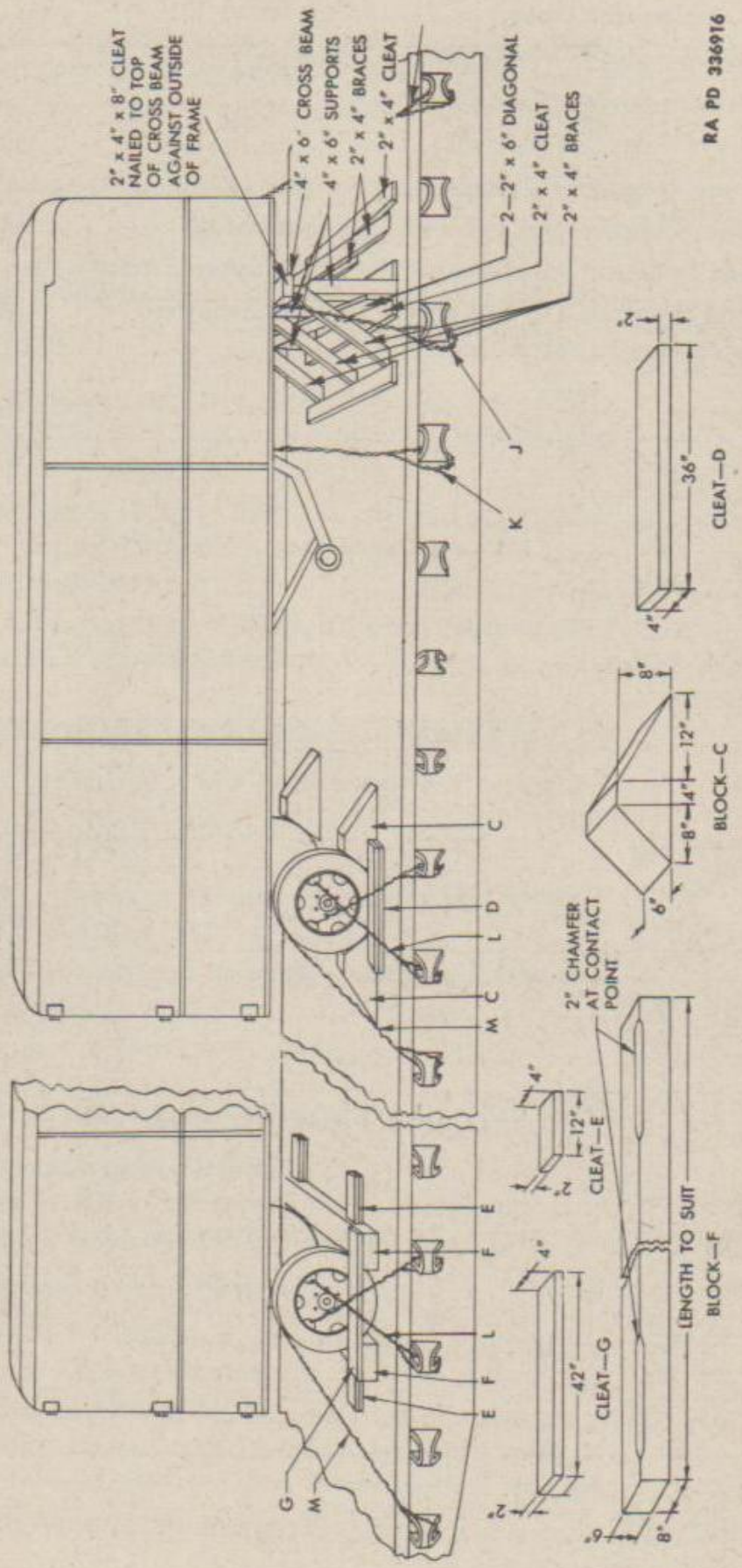


Figure 47 — Blocking Requirements for Rail Shipment

SEMITRAILER, 5-TON PAYLOAD, 8-TON GROSS, 2-WHEEL (2df) STAKE AND PLATFORM, 1944
(Trailer Co. of America, Truck Eng. Corp., Olson Mfg. Co.)

d. Shipping Data.

Length of vehicle (over-all approximate)	17 ft
Width of vehicle (over-all)	8 ft
Height of vehicle (over-all)	8 ft 4⅜ in.
Shipping weight of vehicle	6,680 lb
Volume occupied per vehicle (approximate)	1,139 cu ft
Area of car floor occupied per vehicle (approximate)	136 sq ft
Bearing pressure (lb per sq ft) of area occupied per vehicle (approximate)	49

Section XXIV

REFERENCES

103. PUBLICATIONS INDEXES.

The following publications indexes should be consulted frequently for latest changes to, or revisions of, the publications given in this list of references, and for new publications relating to materiel covered in this manual:

Introduction to Ordnance Catalog (explaining SNL system)	ASF Cat. ORD 1 IOC
Ordnance Publications for Supply Index (index to SNL's)	ASF Cat. ORD 2 OPSI
List of Publications for Training (listing MR's, MTP's, T/BA's, T/A's, and FM's, TM's, TR's and WDLO's concerning training)	FM 21-6
List of Training Films, Film Strips and Film Bulletins (listing TF's, FS's, and FB's by serial number and subject)	FM 21-7
Military Training Aids (listing graphic training aids, models, devices, and displays)	FM 21-8

104. STANDARD NOMENCLATURE LISTS.

Cleaning, preserving, and lubricating materials; recoil fluids, special oils, and miscellaneous related items	SNL K-1
Semitrailer, 5-ton payload, 8-ton gross, 2-wheel (2dt), stake and platform	SNL G-675
Soldering, brazing and welding material; gases and related items	SNL K-2
Tool sets, motor transport	SNL N-19

105. EXPLANATORY PUBLICATIONS.

a. Fundamental Principles.

Military motor vehicles	AR 850-15
Standard military motor vehicles	TM 9-2800

b. Maintenance and Repair.

Automotive brakes	TM 10-565
Basic maintenance manual	TM 38-250
Chassis, body, and trailer units	TM 10-560
Cleaning, preserving, lubricating, and welding materials, and similar items issued by the Ordnance Department	TM 9-850

SEMITRAILER, 5-TON PAYLOAD, 8-TON GROSS, 2-WHEEL (2dt) STAKE AND PLATFORM, 1944
(Trailer Co. of America, Truck Eng. Corp., Olson Mfg. Co.)

Motor vehicle inspections and preventive maintenance services	TM 9-2810
Maintenance and care of pneumatic tires and rubber treads	TM 31-200
Ordnance maintenance: Power brake system (Bendix-Westinghouse)	TM 9-1827A

c. Protection of Materiel.

Camouflage	FM 5-20
Decontamination	TM 3-220
Decontamination of armored force vehicles	FM 17-59
Defense against chemical attack	FM 21-40
Explosives and demolitions	FM 5-25

d. Storage and Shipment.

Ordnance storage and shipment chart, Group G — Major items	OSSC-G
Registration of motor vehicles	AR 850-10
Rules governing the loading of mechanized and motorized army equipment; also major caliber guns, for the United States Army and Navy, on open top equipment, published by Operations and Maintenance Department of Association of American Railroads.	
Storage of motor vehicle equipment	AR 850-18

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PUBLICATIONS DEPARTMENT - RARITAN ARSENAL