

WAR DEPARTMENT

TECHNICAL MANUAL



**7-TON SEMITRAILER, PANEL CARGO
(EDWARDS, GRAMM, AND NABORS)**

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7-TON SEMITRAILER, PANEL CARGO

(EDWARDS, GRAMM, AND NABORS)

Prepared under the direction of the
 Chief of Ordnance

(with the cooperation of Edwards Iron Works, Inc.,
 Gramm Truck & Trailer Corp., and W. C. Nabors Company)

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PART I—OPERATING INSTRUCTIONS

Section I

INTRODUCTION

	Paragraph
Scope	1

1. SCOPE.

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

b. In addition to a description of the 7-ton Semitrailer, Panel Cargo, this manual contains technical information required for the identification, use and care of the materiel. The manual is divided into two parts:

(1) Part I, containing sections I through VII, is for the information and guidance of the operating personnel of the using arm. It contains a description of controls and equipment, operating instructions, driver preventive maintenance, and lubrication instructions.

(2) Part II, containing sections VIII through XX, is for the using arm charged with the responsibility of doing maintenance work within their jurisdiction. These sections contain descriptions of major units, trouble shooting, and instructions for making minor adjustments, repairs or unit replacement.

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

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Section II

DESCRIPTION AND TABULATED DATA

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2. DESCRIPTION (figs. 1, 2, 3, and 4).

a. General. The 7-ton semitrailer, panel cargo (2DT) is a two-wheel utility vehicle having dual tires. A spare wheel and tire is carried on a bracket attached to the front of the body. A retracting-type landing gear is attached to the frame, and is operated by a worm screw and hand crank, which is located on the right center side. Auxiliary supports are attached to both sides of the frame forward. The body, which is mounted on a steel frame, is of the open-top panel type, with a maximum payload of 14,000 pounds. The frame is carried on a one-piece axle through a slip-end, semi-elliptical spring suspension. Two combination blackout tail and stop lights are installed on the rear.

b. Braking. The braking for the trailer is done by means of internal expanding, vacuum-operated power brakes, located on each of the inner dual wheels. The brakes are controlled through the tractor-trailer brake linkage system by an operating valve located on the tractor and operated by the driver through foot pedal or hand brake.

c. Towing. The semitrailer is towed by a tractor-truck equipped with a fifth wheel coupling. The upper fifth wheel for this coupling, consisting of a plate and kingpin, is attached to the front end of the trailer.

3. DIFFERENCES AMONG MODELS.

a. Semitrailer models D-11-B, SC-600, and 2-GC have the same outward appearance. Semitrailer models D-11-B and SC-600 have tubular axles, while model 2-GC has a solid, rectangular axle. The only other differences are in the manufacture of working parts, and do not affect the methods of maintenance by the using arms.

4. DATA.

a. Physical Characteristics.

Weight, empty (approximately)	5,530 lb
Maximum payload	7 tons
Height of bed, empty	51½ in.
Height of bed, loaded	48¾ in.
Length, over-all (not including spare tire)	198 in.

DESCRIPTION AND TABULATED DATA

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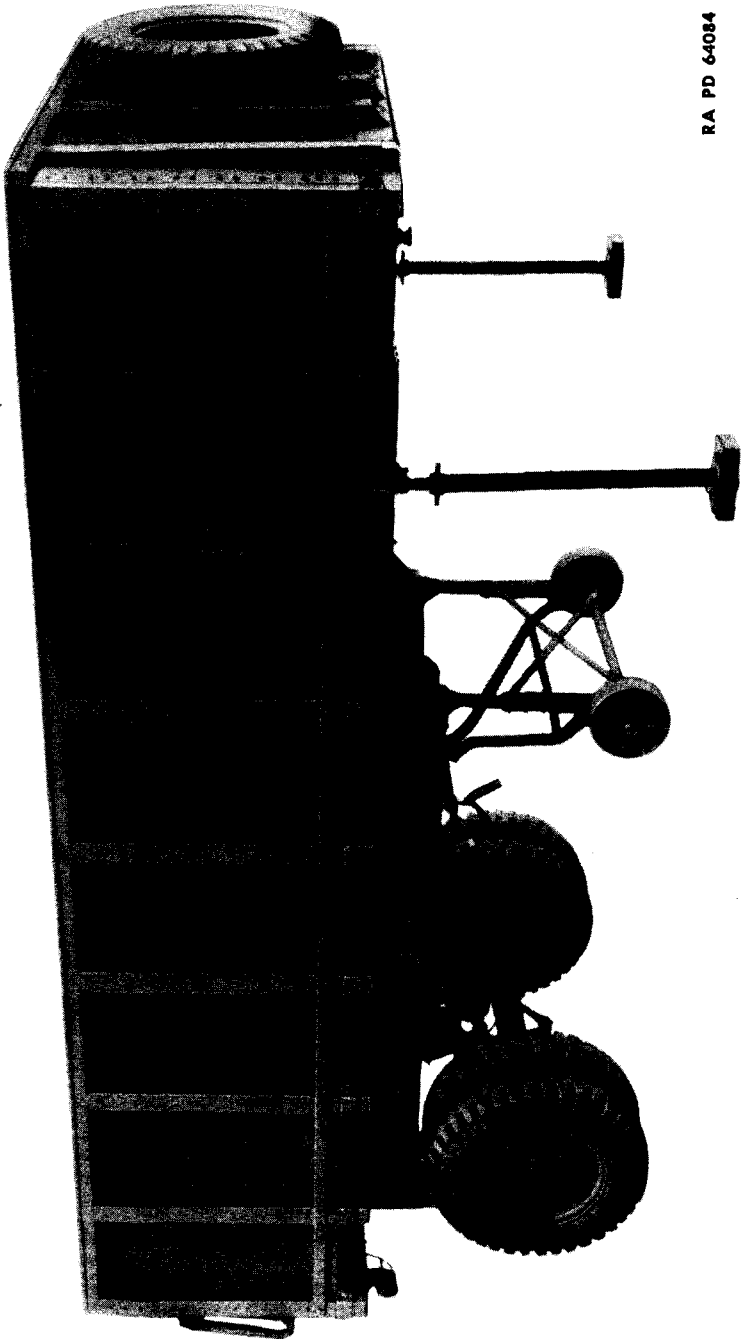
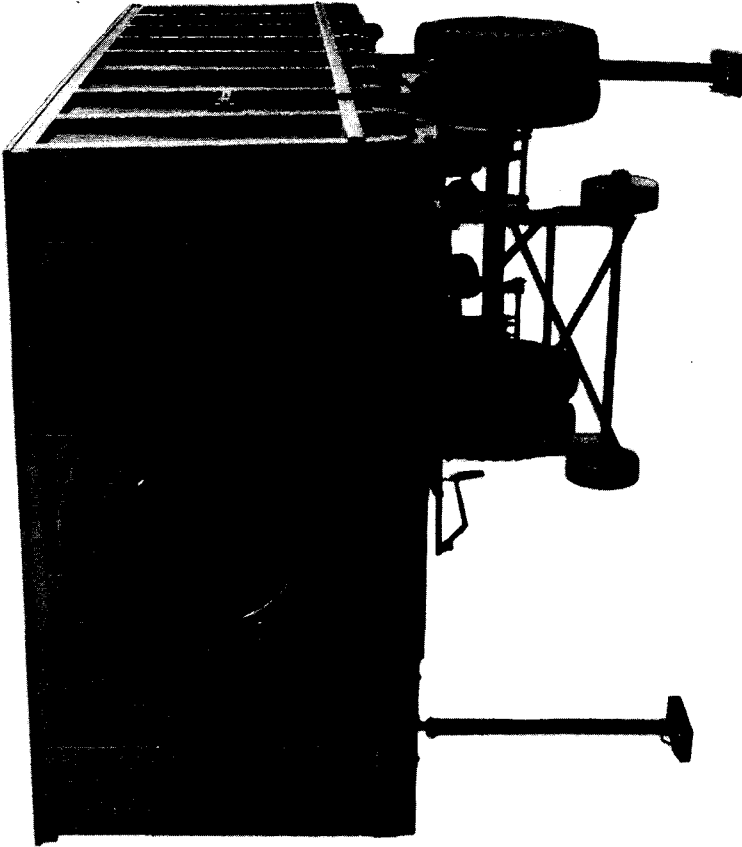


Figure 1—7-Ton Semitrailer, Panel Cargo—Right Side

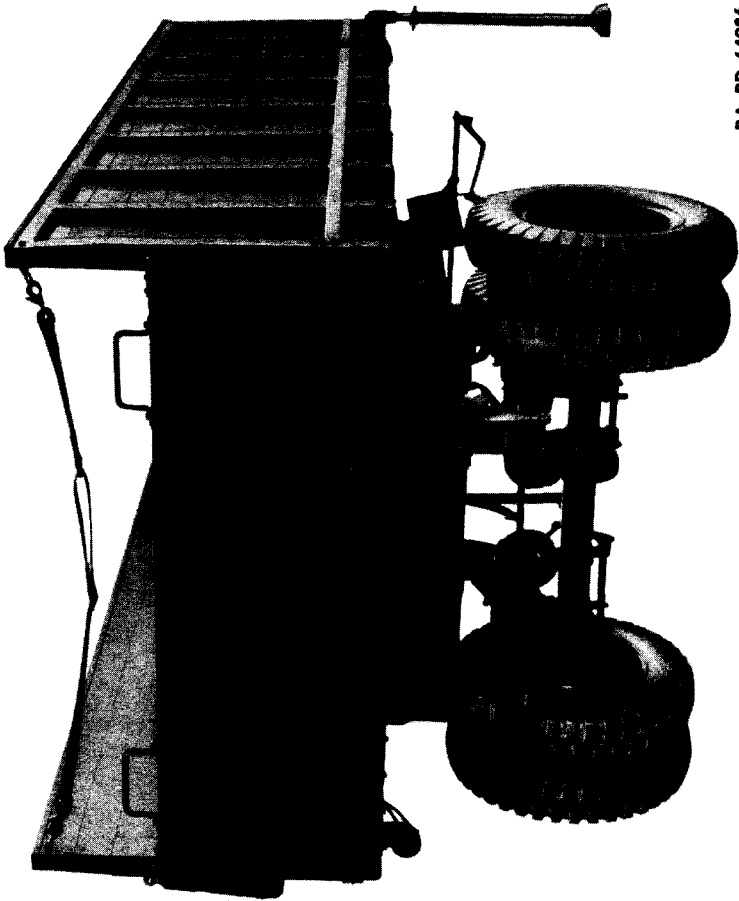
7-TON SEMITRAILER, PANEL CARGO



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Figure 2—7-Ton Semitrailer, Panel Cargo—Front

DESCRIPTION AND TABULATED DATA



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Figure 3—7-Ton Semitrailer, Panel Cargo—Rear

7-TON SEMITRAILER, PANEL CARGO

Width, over-all	91½ in.
Height, over-all	94 in.
Ground clearance	14 in.
Wheel tread	66¾ in.
Maximum towing speed	45 mph

b. Tires.

Number	5
Size	7.50-20/34-7
Type	Regular
Number of plies	10
Air pressure carried	75 psi

c. Brakes.

Type	Internal-expanding (Duo Servo)
Diameter	17¼ in.
Width	4 in.

Section III

CONTROLS AND OPERATION

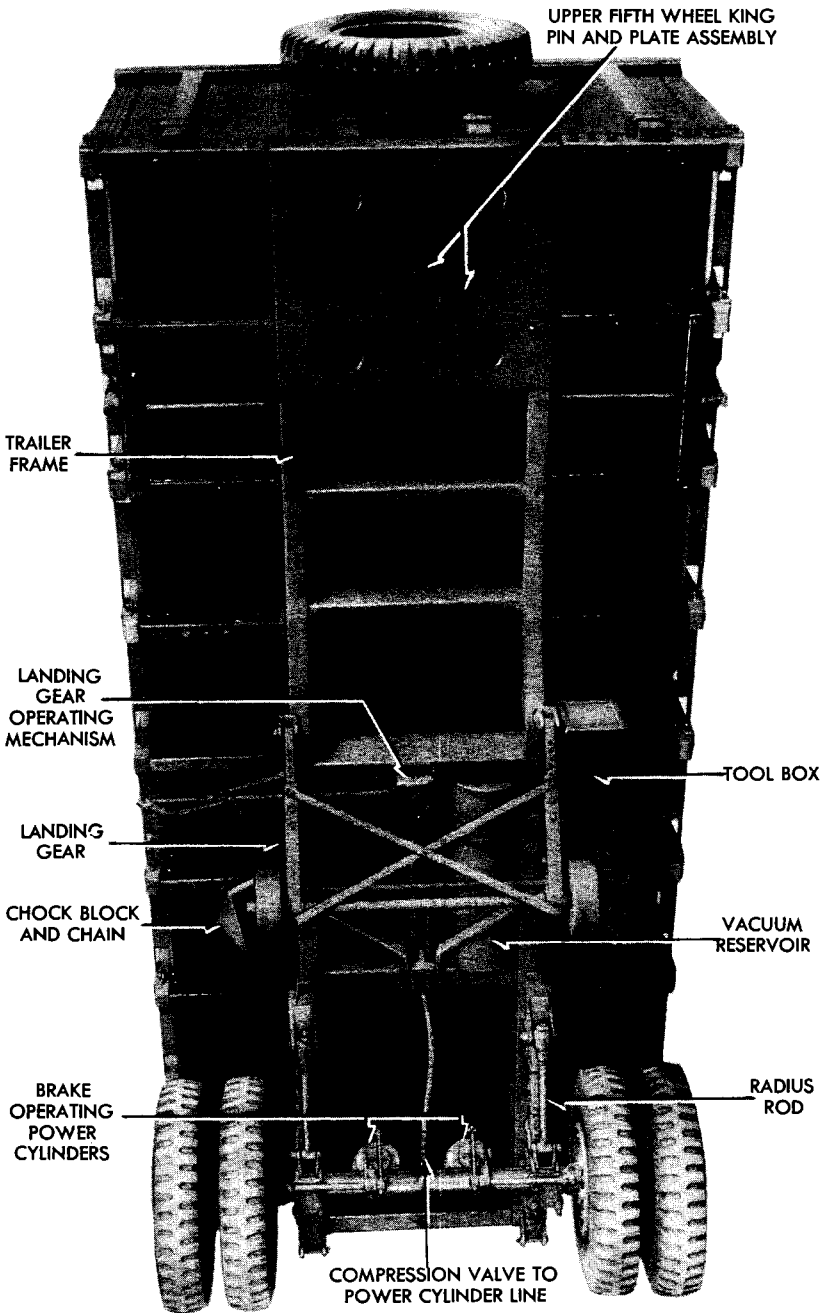
	Paragraph
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5. GENERAL INFORMATION ON CONTROLS.

a. Landing Gear. The hand crankshaft for the landing gear is held in the disengaged position on a hook and is located at the right side of the trailer near the center. To operate it, remove from hook, swing the crank upward, and when the hole in the crank is lined up with the shaft, push the crank onto the shaft. Lowering the landing gear is accomplished by turning the crank handle clockwise; raising is accomplished by turning the crank handle counterclockwise. To disengage crank, reverse procedure for engaging crank. When turning the landing gear crank, be sure to turn it as far as possible without overstrain until the stops are hit, so the landing gear will be in full raised or lowered position, and thus prevent damage to support legs when traveling or coupling (figs. 1 and 2). In the full engaged position, this landing gear is designed to have the landing gear legs slightly forward of the vertical position. In this position, the back braces are in tension. However, when the landing gear legs are slightly to the rear of the vertical position, the back braces are in compression, which may result in back brace failure. If any difficulty is experienced in coupling a trailer to a tractor, the landing gear legs should be adjusted to the proper length, by means of adjustment provided, so that the trailer will start up the ramp without the necessity of jacking up the trailer (par. 64 c).

b. Auxiliary Supports. Auxiliary supports are attached to both sides of the body frame near the front of the trailer. They are lowered by loosening wing nut on latch retainer, allowing latch to swing free. Pull legs away from body, and, as the legs swing down, continue to pull them away from the body until the chain at the top of the leg is tight, to provide maximum clearance for the tractor tires. The base plate, which is chained to the support leg, is placed directly under the leg on the ground. Adjust length of leg by screwing handle clockwise to allow approximately two inches clearance between base plate and lower leg, so that weight of body and load is distributed on landing gear and auxiliary supports when tractor-truck is uncoupled. The auxiliary supports are raised by reversing this procedure. The latch must then be inserted in the retainer, and wing nut tightened. Be sure that the auxiliary supports are always in the down position when the trailer

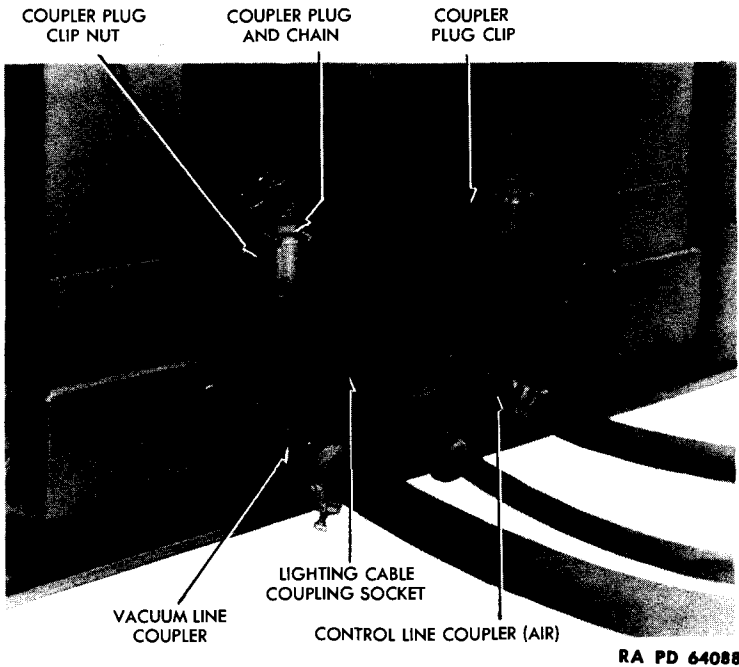
7-TON SEMITRAILER, PANEL CARGO



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Figure 4—7-Ton Semitrailer, Panel Cargo—Bottom

CONTROLS AND OPERATION



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Figure 5—Brake and Light Couplings

is uncoupled from the tractor-truck, and that they are secured in the raised position when traveling (figs. 1 and 26).

c. Brake and Light Connections.

(1) To connect the vacuum power brakes, remove the dummy plugs in the brake line connections on the trailer just beneath the spare tire on the front, and insert the two hose lines with male couplings on the free ends which are attached to the back of the tractor cab. The hose line on the right side of the center of the tractor is the vacuum feed line; and must be inserted in the vacuum line coupler which is on the right front side of the trailer. The hose line on the left side of the center of the tractor is the brake control line and must be inserted in the control line coupler on the left front side of the trailer (fig. 5). After making the hose connections with the trailer, the valves on the tractor are opened to allow the trailer brakes to function when the tractor brakes are applied. Do not open valves until the connections are complete.

(2) Before disconnecting the tractor, be extremely careful to close the valves in the hose lines on the tractor and to disconnect the hose

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lines. Insert the dummy plugs into the brake line coupling to prevent dirt entering the brake system.

(3) To connect the lights, insert plug on light jumper cable of tractor into center socket below spare tire on front of trailer (fig. 5).

d. Emergency Brakes. The emergency brake application is automatic in the event of the vehicle breaking away from the tractor-truck. Under such circumstances, the control line connections between trailer and tractor are, of course, broken. The breaking of these lines allows air to rush into the control parts of the relay and applies the brakes automatically.

6. TOWING OPERATIONS.

a. Coupling to Towing Vehicle. Place chock blocks in *back* of wheels. Make sure fifth wheel jaw handle is in opened position, that is, forward toward cab and held in place by the plunger lock latch. Check to see that the plunger lock rod is visible; this assures that the jaws are open. Slowly back the tractor-truck into position under the trailer until the fifth wheel picks up the front end of the trailer. Accelerate the tractor-truck until the upper fifth wheel kingpin automatically locks itself into the lower fifth wheel jaws, moving the fifth wheel jaws to the closed position. Make sure the trailer kingpin is safely engaged in the fifth wheel jaws. This may be verified by noting the plunger lock rod which must not extend beyond the plunger lock latch but must be covered by it. Next connect the two brake lines and the jumper cable for the lights. Raise the landing gear and auxiliary supports (par. 5).

b. Uncoupling from Towing Vehicle. Place chock blocks in *front* of rear wheels. Lower landing gear and auxiliary supports and disconnect brake connections and light cable. Disengage kingpin from fifth wheel jaws by swinging the plunger lock latch to one side and pulling the operating handle forward toward the cab until it snaps into place. Note that the plunger lock rod comes out of the hole under the latch and holds the plunger lock latch open. Move the tractor-truck sharply forward to free the kingpin and move the fifth wheel from under the trailer.

7. LOADING.

a. Proper load distribution is important to load riding, operating conditions and life of the trailer. Therefore, the load should be as equally distributed as possible, and the trailer should never be loaded beyond the rated capacity. With the load equally distributed, approximately 46 percent of the load is on the tractor-truck fifth wheel, and 54 percent on the trailer axle, on Models D-11-B and SC-600. On Model 2-GC, approximately 42 percent of the load is on the tractor-truck fifth wheel and 58 percent on the trailer axle.

Section IV

OPERATION UNDER UNUSUAL CONDITIONS

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Operation in snow, ice, or mud.....	10

8. OPERATION IN EXTREME HEAT OR COLD.

a. No special preparations are necessary for operation under these conditions other than the proper use of lubricants. For proper lubrication under these conditions, refer to Lubrication Guide, figure 6.

9. OPERATION IN SAND OR DUST.

a. Conditions of extreme sandy or dusty operation necessitate frequent inspection, cleaning, and lubricating of the trailer working parts.

10. OPERATION IN SNOW, ICE, OR MUD.

a. When operating on roads covered with snow, ice, or in muddy areas, chains should be attached to the trailer wheels. The trailer brakes, under these conditions, should be applied slightly ahead of the towing vehicle brakes to prevent, if possible, skidding or jackknifing of the trailer.

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Section V

PREVENTIVE MAINTENANCE INSPECTIONS

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Inspection during halt	12
Inspection after operation	13
Weekly inspection	14
Monthly inspection	15

11. PRE-OPERATION INSPECTION.

- a. If not in use, see that chock blocks are attached in the proper place.
- b. See that tires are inflated to 75 pounds, including spare tire. Keep both tires of dual pairs as evenly matched as possible.
- c. Check and tighten any loose wheel stud cap nuts; look for grease leaks, broken or missing parts.
- d. See that the brakes are operating and holding. Inspect tail and service lights.
- e. Examine springs for broken leaves, loose or missing clips, or loose spring to axle U-bolts. Examine radius rods for loose or missing parts.
- f. Check landing gear for broken or loose parts, and see that worm and gearing is lubricated.
- g. Inspect the fifth wheel kingpin and plate on the trailer. See that the lower plate and locking jaws on the tractor-truck are in good order and well lubricated. Inspect for worn, loose, or broken parts.

12. INSPECTION DURING HALT.

- a. Look under the trailer for grease leaks.
- b. Inspect tires for inflation, cuts, and embedded objects.
- c. Feel brake drums and wheel hub for evidence of overheating.

13. INSPECTION AFTER OPERATION.

- a. After operation, inspection should be made similar to that made before operations, but more thorough and detailed. Defects that cannot be corrected should be reported to the next higher authority. In addition to points covered in paragraph 11, the following points should be covered:
 - (1) Feel brake drums and hubs for overheating.

PREVENTIVE MAINTENANCE INSPECTIONS

- (2) Remove all foreign matter, wires, nails, stones, or glass from tires, or from between tires.
- (3) Examine body for loose sections and broken stakes or slats.

14. WEEKLY INSPECTION.

- a. Inspect for damaged, broken, or missing parts.
- b. Inspect brake system—vacuum reservoir and all connections, wiring, terminals, and lights. Tighten all connections on vacuum braking system. Replace damaged parts. Replace broken lamps and burned-out bulbs.
- c. Inspect brake operation by application of brakes after hook-up with tractor-truck. Examine brakes for damaged, broken, or missing parts.
- d. Inspect body for broken rack sections, latches, loose or broken floor boards. Tighten all body bolts.
- e. Inspect and tighten loose landing wheels, attaching bolts, cross brace, back braces, wheels, and axle shaft. See that the landing wheels operating mechanism is secure and operating freely.
- f. Inspect suspension for loose, broken, or missing parts.
- g. Refer to Lubrication Guide and lubricate the following points: front and rear spring hangers, radius rod pins, radius rod front connectors, landing wheel pins, gear box, and worm bearing.

15. MONTHLY INSPECTION.

- a. Weekly check will be repeated, and in addition, the following:
 - (1) Repack landing wheel worm screw with grease.
 - (2) Lubricate landing wheels.
 - (3) Remove wheel and hubs from axle, and inspect the bearings for wear. Inspect oil seals for proper sealing. Thoroughly clean, in SOLVENT, dry-cleaning, all bearing cups and cones. When assembling, replace with grease, according to Lubrication Guide.
 - (4) Inspect the following brake parts for adjustment or replacement of defective parts:
 - (a) Brake shoes.
 - (b) Brake shoe return springs.
 - (c) Brake shoe linings.
 - (d) Frozen shoes due to rust.
 - (e) Loose rivets and wear.
 - (f) Cam levers.
 - (g) Brake drums.
 - (5) Check brake BK vacuum power line, as outlined in paragraph 44 d.

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Section VI

LUBRICATION

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Detailed lubrication and service instructions for using arms	18
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16. GENERAL.

a. The following lubrication instructions for the semitrailer are published for the information and guidance of all concerned, and supersede all previous instructions.

b. **References.** Materiel must be lubricated in accordance with the latest instructions, contained in technical manuals and/or ordnance field service bulletins. Reference is made to General Instruction Section (OFSB 6-1), for additional lubrication information, and to Product Guide Section (OFSB 6-2) for the latest approved lubricants.

17. LUBRICATION GUIDE.

a. Lubrication instructions for all points to be serviced by the using arms are shown in Lubrication Guide (fig. 6), which specifies the types of lubricants required and the intervals at which they are applied. Supplementary instructions appear in the notes.

18. DETAILED LUBRICATION AND SERVICE INSTRUCTIONS FOR USING ARMS.

a. **Intervals.** The semitrailer is a towed vehicle not equipped with odometer or hour meter. It is therefore important that the using arms establish adequate record systems for these vehicles in order to ensure that they are lubricated at the proper intervals shown on Lubrication Guide.

b. **Wheel Bearings.** Wheel bearings must be lubricated at intervals shown on Lubrication Guide.

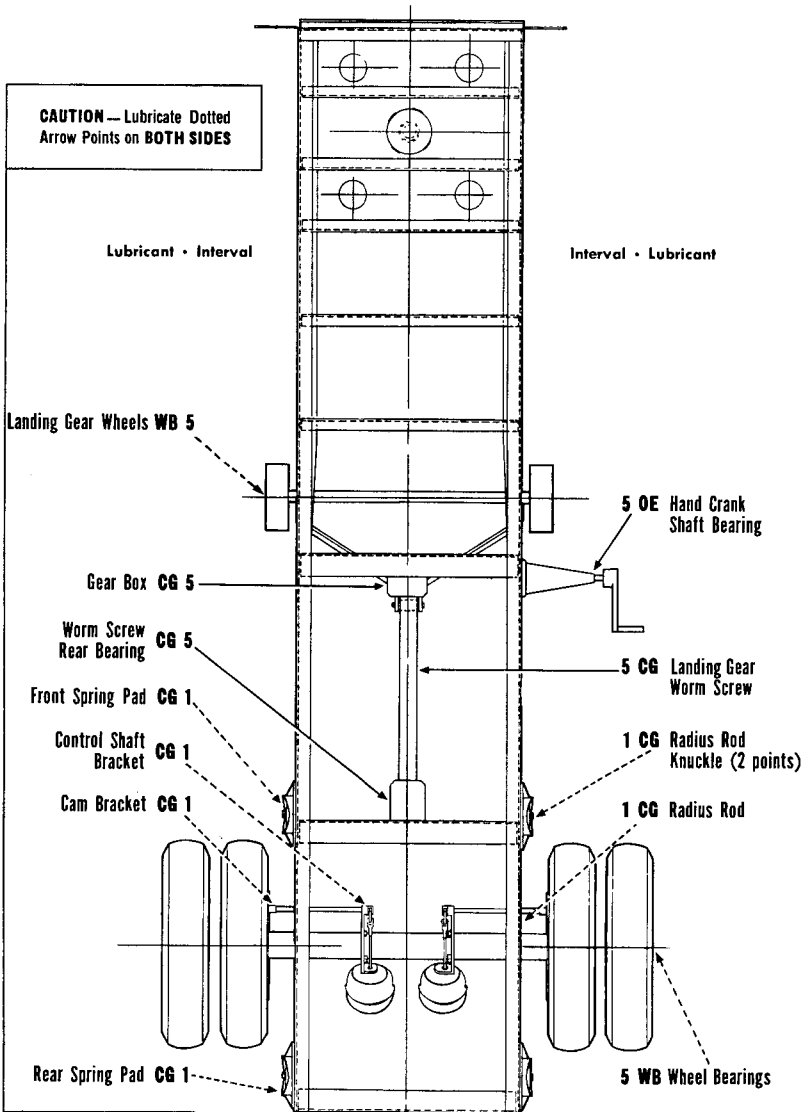
(1) Remove wheel and bearings. Wash bearings and interior of hub with SOLVENT, dry-cleaning.

(2) Pack new GREASE, general purpose, No. 2, into bearings only, and replace.

(3) Tighten adjusting nut until wheel binds. Back off nut slightly until wheel spins freely without side play.

(4) Insert new cotter pin and replace hub cap.

LUBRICATION



CAUTION — Lubricate Dotted Arrow Points on **BOTH** SIDES

Lubricant • Interval

Interval • Lubricant

KEY

LUBRICANTS	
OE—OIL, Engine, SAE 30	WB—GREASE, General Purpose No. 2
CG—GREASE, General Purpose No. 1 (above +32°)	
No. 1 or No. 0 (+32° to +10°)	
No. 0 (below +10°)	

INTERVALS
1—1,000 Miles or Every Month
5—5,000 Miles or Every 5 Months

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Figure 6—Lubrication Guide

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19. REPORTS AND RECORDS.

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

b. Records. A complete record of lubrication servicing will be kept for the materiel.

c. Cold Weather. For lubrication and service below -10F refer to OFSB 6-11.

Section VII

TOOLS AND EQUIPMENT STOWAGE ON VEHICLE

	Paragraph
Introduction	20
Tools and equipment.....	21

20. INTRODUCTION.

The materiel indicated herein includes tools for general care and maintenance, and Motor Book for Ordnance Vehicles (O.O. Form 7255) to record the vehicle history. Tools, when not in use, should be stored in the places or receptacles provided.

21. TOOLS AND EQUIPMENT.

BLOCK, chock

HAMMER, ball peen, 1¼ in.

PLIERS, gas, 6-in.

WRENCH, axle bearing nut
(on Models D-11-B and SC-
600. Combination axle bear-
ing nut and hub cap on 2-GC
only).

WRENCH, brake-adjusting

WRENCH, wheel nut (with
handle), 1¼ in.

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PART II—MAINTENANCE INSTRUCTIONS

Section VIII

MAINTENANCE ALLOCATION

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Allocation of maintenance	23

22. SCOPE.

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

23. ALLOCATION OF MAINTENANCE.

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

SECOND ECHELON: Line organization regiments, battalions, companies, detachments, and separate companies (first and second echelons).

THIRD ECHELON: Ordnance light maintenance companies, ordnance medium maintenance companies, ordnance divisional maintenance battalions, and ordnance post shops.

FOURTH ECHELON: Ordnance heavy maintenance companies, and service command shops.

FIFTH ECHELON: Ordnance base regiments, ordnance bases, arsenals, and manufacturer's plants.

SERVICE: (Including preventive maintenance) par 23 a (1) and (2) AR 850-15. Consists of servicing, cleaning, lubricating, tightening bolts and nuts, and making external adjustment of subassemblies or assemblies and controls.

MAINTENANCE ALLOCATION

- REPLACE:** Par. 23 a (4) AR 850-15. Consists of removing the part, subassembly or assembly from the vehicles and replacing it with a new or reconditioned or rebuilt part, subassembly or assembly, whichever the case may be.
- REPAIR:** Par. 23 a (3) and (5) in part. AR 850-15. Consists of making repairs to, or replacement of the part, subassembly or assembly that can be accomplished without completely disassembling the subassembly or assemblies, and does not require heavy welding, or riveting, machining, fitting and/or alining or balancing.
- REBUILD:** Par. 23 a (5) in part and (6) AR 850-15. Consists of completely reconditioning and replacing in serviceable condition any unserviceable part, subassembly, or assembly of the vehicle, including welding, riveting, machining, fitting, alining, balancing, assembling and testing.

	ECHELONS			
AXLE	2nd	3rd	4th	5th
Axle assembly—replace	X			
Axle assembly—repair		X		
Axle assembly—rebuild			E	X
Bearing, wheel—service and/or replace	X			
Drums, brake—replace	X			
Hub assemblies—replace	X			
Hub assemblies—repair		X		
Hub assemblies—rebuild			X	
Hub and drum assemblies—replace	X			
Retainers, wheel grease—replace	X			
Rod assemblies, torque—adjust and/or replace	X			
Rod assemblies, torque—repair		X		
BODY				
Body assembly—replace	X			
Body assembly—repair		X		
Body assembly—rebuild			E	X
Carrier, tire—replace	X			
Carrier, tire—repair		X		
Chains—replace	X			
Chains—repair		X		
Chocks—replace	X			
Gate, tail—replace	X			
Gate, tail—repair		X		

See explanatory notes on page 23.

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ECHELONS

2nd 3rd 4th 5th

BODY (Continued)

Marker unit, reflex—replace	X			
Racks, sides and end—replace	X			
Racks, sides and end—repair		X		
Racks, sides and end—rebuild			X	
Support, auxiliary—replace	X			
Support, auxiliary—repair		X		
Support, auxiliary—rebuild			X	
Tarpaulin—replace	X			
Tarpaulin—repair		E	X	

BRAKE

Chamber assemblies, brake diaphragm—replace	X			
Chamber assemblies, brake diaphragm—repair	E	X		
Chamber assemblies, brake diaphragm—rebuild			X	
Cleaner, air—service and/or replace	X			
Cleaner, air—repair		X		
Controls and linkage—service and/or replace	X			
Controls and linkage—repair		X		
Lines and connections—replace	X			
Lines and connections—repair	E	X		
Reservoir, air—service and/or replace	X			
Reservoir, air—repair		X		
Shoe assemblies—service and/or replace	X			
Shoe assemblies—repair (reline)		X		
Valves—replace	X			
Valves—repair		X		
Valves—rebuild			E	X

ELECTRICAL GROUP

Cable, jumper—replace	X			
Cable, jumper—repair		X		
Conduits and wiring—replace	X			
Conduits and wiring—repair		X		
Lamp assemblies—replace	X			
Lamp assemblies—repair		X		

FRAME

Frame assembly—repair		X		
Frame assembly—rebuild			E	X
Spring assemblies, suspension—replace	X			
Spring assemblies, suspension—repair		X		
Spring assemblies, suspension—rebuild			E	X

See explanatory notes on page 23.

MAINTENANCE ALLOCATION

	ECHELONS			
	2nd	3rd	4th	5th
SUPPORT, DOLLY				
Support components, dolly—replace	X			
Support components, dolly—repair		X		
Support components, dolly—rebuild			X	

TIRES

Casings and tubes—replace	X			
Casings—repair			E	X
Tubes, inner—repair	E	E	X	

VEHICLE ASSEMBLY

Trailer assembly—service	X			
Trailer assembly—rebuild (with serviceable unit assemblies)			X	E

WHEELS

Wheels—replace	X			
Wheels—rebuild			E	X

NOTE: Operations allocated will normally be performed in the echelon indicated by "X".

Operations allocated to the echelons indicated by "E" may be accomplished by the respective echelons in emergencies only.

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Section IX

ORGANIZATION SPARE PARTS AND ACCESSORIES

	Paragraph
Spare parts and accessories	24

24. SPARE PARTS AND ACCESSORIES.

a. Spare Parts. A set of organization spare parts is supplied to the using arms for field replacement of those parts most likely to become broken, worn, or otherwise unserviceable. The set is kept complete by requisitioning new parts for those used. Organization spare parts are listed in pertinent standard nomenclature lists.

b. Accessories. Accessories include tools and equipment required for such disassembling and assembling as the using arms are authorized to perform, and for the cleaning and preservation of such tools and equipment. Accessories should not be used for purposes other than as prescribed, and when not in use should be properly stored.

Section X

TIRES, WHEELS, HUBS, WHEEL BEARINGS, AND BRAKE DRUMS

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Hub and bearing maintenance	34
Bearing and bearing cup installation	35
Hub and drum assembly installation	36
Bearing adjustment	37

25. WHEEL, TIRE AND AXLE DESCRIPTION AND TABULATED DATA.

a. **Description.** The wheels are of the pressed steel ventilated type, and have a 20-inch disk and 7-inch rims. Each wheel is fastened to its hub by a separate set of nuts. The stud nuts on the wheels on the right-hand side of the trailer all have right-hand threads, and the stud nuts of the wheels on the left-hand side have left-hand threads. The inner dual wheel is individually held by the inner cap nuts. The outer wheel slips over the inner cap nuts and is independently held by the outer nuts. Each wheel and hub assembly is mounted on the spindle by two opposed tapered roller bearing assemblies. The tires are 7.50 x 20, 10-ply, and have the snow tread design. The tubular axles on models D-11-B and SC-600 have hub caps with gaskets mounted with screws. The wheel bearing thrust washers on these axles are positioned with wheel bearing inner nuts and wheel bearing outer nuts, locked with the same tongued nut lock. The rectangular axle on model 2-GC has a threaded hub cap. The wheel bearing thrust washer on this axle is adjusted by means of a wheel bearing nut secured by a cotter pin.

b. Tabulated Data.

Wheels:

Make	Budd
Type	Ventilated disk
Rim	R.H. on 20 x 7-in. rim
Number of studs	6
Tread66 $\frac{3}{4}$ -in.

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Tires:

Size 7.50 x 20 in.
Number of plies 7
Air pressure carried 75 psi
Tread Snow

Wheel Bearings:

Make Timken
Type Roller

Inner Bearing:

Cone and roller assembly TD560S
Cup TD552A

Outer Bearing:

Cone and roller assembly TD419
Cup TD414

26. WHEEL AND TIRE TROUBLE SHOOTING.

a. Wobbly Wheels.

Possible Cause	Possible Remedy
Loose studs.	Tighten or replace.
Improper bearing adjustment.	Adjust (par. 37).
Damaged bearings.	Replace bearings (pars. 33 and 35) Adjust bearings (par. 37).

b. Scuffed Tires.

Underinflation.	Inflate to 75 pounds pressure.
Bent axle.	Replace axle (pars. 59 and 60). Aline axle (par. 54).

c. Air Leakage.

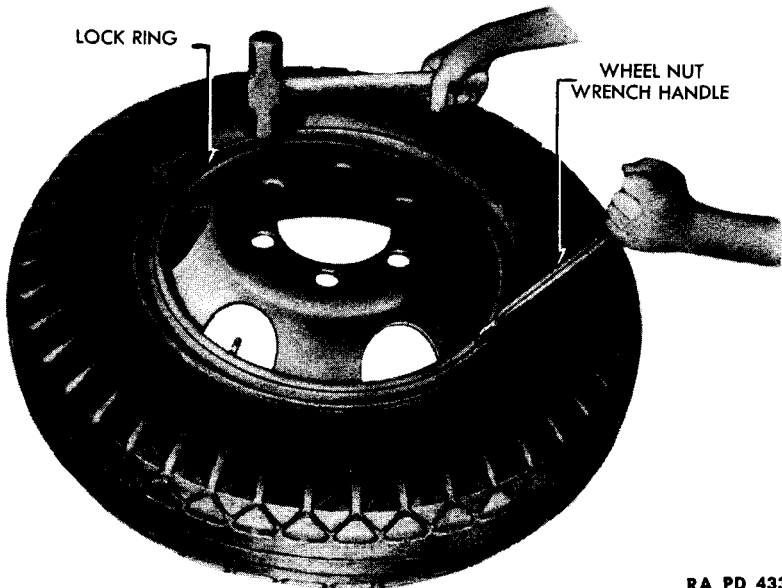
Valve cap missing.	Install new cap.
Valve cap seat broken.	Replace valve cap.
Valve core loose or damaged.	Tighten or replace core.
Torn or punctured tube.	Repair tube.

27. WHEEL AND TIRE ASSEMBLY REMOVAL.

a. Loosen Wheel Stud Nuts. Loosen all stud nuts on each disk wheel.

b. Jack Up Trailer. Place jack under axle near wheels to be removed. Place chock blocks in front and rear of opposite set dual wheels. Raise jack until tires are free from ground.

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RA PD 43305

Figure 7—Removing Tire Lock Ring

c. **Remove Wheels and Tire Assembly.** Place a greased board under the wheels to be removed and lower jack until tires rest lightly on the board. Remove outer wheel nuts from inner wheel hub stud nuts, and pull outer wheel and tire assembly off along greased board. Remove inner wheel stud nuts and pull inner wheel and tire assembly off along greased board.

28. WHEEL AND TIRE ASSEMBLY INSTALLATION.

a. **Install Wheel and Tire Assembly.** While the vehicle is still jacked up, slide inner wheel and tire assembly into position on hub. Install stud nuts and tighten opposite stud nuts alternately until all are wrench tight. Roll outer wheel into position with valve stem opposite inner wheel valve stem and mount the outer wheel and tire assembly over the inner wheel stud nuts. Install outer wheel nuts and tighten wheel nuts alternately until all are wrench tight. Lower and remove jack. Re-tighten all wheel stud nuts after running 50 miles under load after wheel and tire assembly installations.

29. TIRE REMOVAL.

- a. **Remove Wheel and Tire Assembly.** Proceed as in paragraph 27.
- b. **Remove Tire.** Place wheel and tire assembly flat on floor with lock ring up. Remove valve cap and valve core and deflate tire inner

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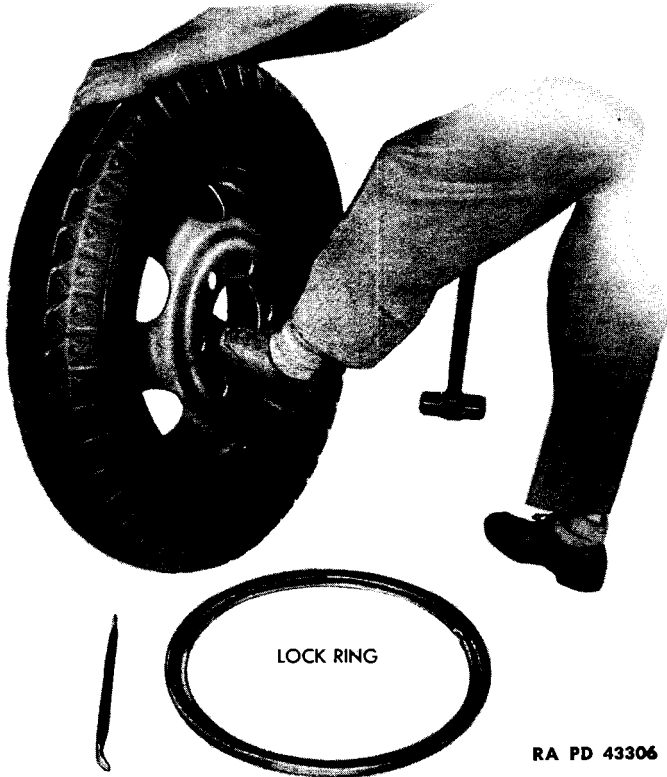


Figure 8—Removing Tire from Wheel

tube completely. Insert proper tire iron in the slot provided in the lock ring and pry down while tapping the opposite side of the lock ring. Work the lock ring off with tire irons, and remove. Stand the tire on its tread. With hands on outside edge, shove the rim away from the tire with the foot at the edge opposite the valve stem. Pull the tire off, so that the valve stem comes straight out. Pull inner tube out of tire casing (figs. 7 and 8).

30. TIRE MAINTENANCE.

a. Tires and Tubes. Tires should be repaired in accordance with conventional methods. Punctures and tears causing exposure of cord or fabric should be repaired by vulcanizing. Holes in inner tubes should be repaired by cold patching. Hot patching or vulcanizing should not be attempted. Tires must be inflated equally and not operated when underinflated. Before pumping air into tubes, depress valve momentarily to let air blow out any dirt in the valve. Keep caps on valves to prevent entrance of foreign matter. Oil and grease have a harmful effect

TIRES, WHEELS, HUBS, WHEEL BEARINGS, AND BRAKE DRUMS

on rubber, and every attempt should be made to keep these substances from coming in contact with rubber equipment.

31. TIRE INSTALLATION.

a. **Install Tire on Wheel.** Install valve core in valve stem of inner tube and insert inner tube in tire casing. Slip tire and tube assembly into position over wheel rim guiding the valve stem into hole in rim and push tire onto rim. Place lock rim assembly in position and work snap ring over edge of wheel. Be sure that the valve stem points outward and that tire tread faces proper direction. Inflate tire to correct pressure (75 pounds) and install valve cap. **CAUTION:** When inflating tire, wrap a length of chain loosely around the tire at two points. This will prevent the lock ring, if it is not securely fastened, from springing up and causing injury.

b. **Install Wheel and Tire Assembly.** Proceed as in paragraph 28.

32. HUB AND DRUM ASSEMBLY REMOVAL.

a. **Remove Wheel and Tire Assembly.** Place chock blocks in front and rear of opposite wheels to act as brakes and jack up axle sufficiently for wheels to clear ground. Remove wheel and tire assembly as outlined in paragraph 27.

b. **Release Vacuum Brakes.** Unscrew cap on bottom of vacuum tank (fig. 4) to release vacuum.

c. **Remove Hub Cap and Bearing Nuts.**

(1) **MODELS D-11-B AND SC-600.** Remove hub cap retaining screws and lift off hub cap and gasket. Avoid damaging gasket. Straighten tongues on nut lock and remove wheel bearing outer nut, nut lock, inner nut and thrust washer from spindle.

(2) **MODEL 2-GC.** Loosen and unscrew hub cap using cap wrench and hammer. Turn in a counterclockwise direction. Remove cotter pin, bearing nut and slotted washer.

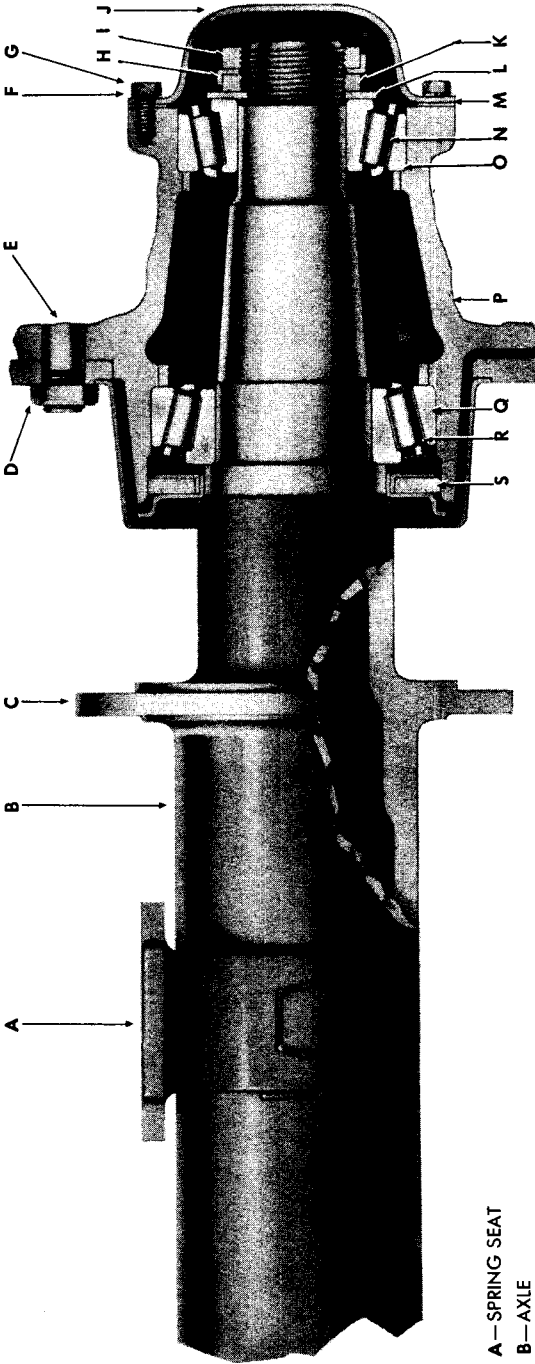
d. **Remove Hub and Drum Assembly.** Grasp the drum and pull forward until the hub and drum assembly is free from the axle spindle. Carefully support hub and drum while removing to avoid damage to the oil seal.

33. BEARING AND BEARING CUP REMOVAL.

a. **Remove Bearings.** Remove outer bearing cone and roller assembly from hub. Remove inner bearing from spindle. Inspect oil seal and replace if torn or otherwise damaged.

b. **Remove Bearing Cup.** Place hub assembly on wood block with

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- A—SPRING SEAT
- B—AXLE
- C—AXLE FLANGE
- D—HUB STUD NUT
- E—HUB STUD
- F—HUB CAP CAP SCREW LOCK WASHER
- G—HUB CAP CAP SCREW
- H—WHEEL BEARING NUT LOCK
- I—WHEEL BEARING OUTER NUT

- J—HUB CAP
- K—WHEEL BEARING INNER NUT
- L—WHEEL BEARING THRUST WASHER
- M—HUB CAP GASKET
- N—OUTER BEARING CONE AND ROLLERS
- O—OUTER BEARING CUP

- P—HUB
- Q—INNER BEARING CUP
- R—INNER BEARING CONE AND ROLLERS
- S—WHEEL BEARING OIL SEAL

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Figure 9—Axle, Hub and Bearing Assembly

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bearing cup to be removed facing down. Insert drift into hub opening and rest lower end of drift on inside shoulder or edge of bearing cup. Drive the drift on edge of cup. Move lower end of drift across to opposite edge of cup and strike drift again. By alternating in this manner, the cup will come out straight with the cup bore, and danger of wedging the cup in the bore of the hub will be minimized. Be careful not to drive lower end of drift into hub metal.

34. HUB AND BEARING MAINTENANCE.

a. Clean inner and outer cups and cone and roller assemblies with SOLVENT, dry-cleaning.

b. Inspect the bearing rollers for pits, chipping, and wear. Replace bearing cone and roller assembly, if rollers are damaged or worn.

c. Inspect the inner and outer bearing cups in hub assembly for wear, pits, and scratches. If any one of these is evident, replace the cups (par. 35 a).

d. Inspect hub studs and replace any studs which have stripped threads or other damage.

e. Inspect brake drums for scoring. If drums are scored, they must be turned smooth; report to ordnance personnel.

f. Inspect oil seal for wear. Always replace defective oil seal with new one.

g. Hand-pack inner and outer cone and roller assemblies with GREASE, general purpose, No. 2.

35. BEARING AND BEARING CUP INSTALLATION.

a. **Install Bearing Cups.** Remove all old grease from inside hub and drum assembly and clean hub bore with SOLVENT, dry-cleaning. Dry and place hub on wooden block. Start new bearing cup square with the bore, having the smaller inside diameter placed so that it will be on the inside when cup is in place. Place a piece of hardwood over the cup face and drive cup in until flush with outer edge of hub. Place old cup over the new one and drive new cup in until it is absolutely tight with the cup bore flange. Be sure that new cup is properly seated, because if not, it will alter the distance between the bearing center and prevent proper reassembly of the wheel. Fill the space in the hub between the two bearing cups with GREASE, general purpose, No. 2.

b. **Install Bearings.** Remove all old grease from axle spindle and clean spindle with SOLVENT, dry-cleaning. Clean outer and inner bearing cone and roller assemblies with SOLVENT, dry-cleaning, dry and hand pack with GREASE, general purpose, No. 2. Install outer bearing in hub and inner bearing on spindle.

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36. HUB AND DRUM ASSEMBLY INSTALLATION.

a. **Install Hub and Drum Assembly.** Slide hub and drum assembly onto axle spindle and push into position, carefully supporting it to avoid damage to the oil seal.

b. **Install Bearing Nuts and Hub Caps.**

(1) **MODELS D-11-B AND SC-600.** Install thrust washer, inner nut, nut lock and outer nut. Adjust bearings as described in paragraph 37. Bend tongues of nut lock to secure inner and outer nuts. Install hub cap and gasket and retain with lock washers and screws. Be careful not to damage gasket.

(2) **MODEL 2-GC.** Install slotted washer and bearing nut. Adjust bearings as described in paragraph 37. Insert new cotter pin and spread flat against nut. Screw hub cap on and tighten securely using hub cap wrench and hammer.

c. **Install Wheel and Tire Assembly.** Install wheel and tire assembly (par. 28) and remove jack.

d. **Reestablish Vacuum in Brakes.** Replace cap on bottom of vacuum tank (fig. 4) to reestablish vacuum.

37. BEARING ADJUSTMENT.

a. **Jack Up Vehicle.** Place chock blocks in front and rear of opposite dual wheels to act as brakes. Place jack under axle near wheels to be removed. Raise jack until tires are free from ground.

b. **Release Vacuum Brakes.** Unscrew cap on bottom of vacuum tank (fig. 4) to release vacuum in braking system so wheels can be turned.

c. **Test Bearing Adjustment.** With hands, test sidewise shake of wheels. Properly adjusted bearings allow only a perceptible shake of the wheel and also allow it to turn properly.

d. **Adjust Bearings.**

(1) **MODELS D-11-B AND SC-600.** Remove hub cap (par. 32 c (1)). Bend tongues of nut lock and remove outer nut and nut lock. Tighten inner wheel bearing nut until wheel binds, rotating wheel during this operation to insure that all surfaces are in contact. Back off inner nut $\frac{1}{8}$ turn, or more, until wheel rotates freely. Install nut lock and outer nut. Crimp tongues of nut lock to secure inner and outer nuts.

(2) **MODEL 2-GC.** Remove hub cap (par. 32 c (2)). Straighten cotter pin prongs and remove with pliers. Tighten wheel bearing nut until wheel binds, rotating to insure that all surfaces are in contact. Back off wheel bearing nut and insert cotter pin through slot in nut

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and hole in axle at first position that permits free rotation of wheel. Spread cotter pin flat against edges of nut.

e. **Check Adjustment.** Follow procedure outlined in paragraph 37 c, install hub cap (par. 36 b), lower wheels to ground and remove jack.

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Section XI

BRAKES

	Paragraph
Description and tabulated data	38
Trouble shooting	39
Maintenance and adjustments	40
Brake shoe assembly removal	41
Brake shoe assembly installation	42

38. DESCRIPTION AND TABULATED DATA (fig. 10).

a. **Description.** This brake is the two-shoe, double-anchor type, self-energizing in both directions. The actuation of these brakes is through the brake operating system of the trailer, which is connected with the braking system of the towing vehicle and controlled by it. The connections are made by female couplers at the front of the trailer.

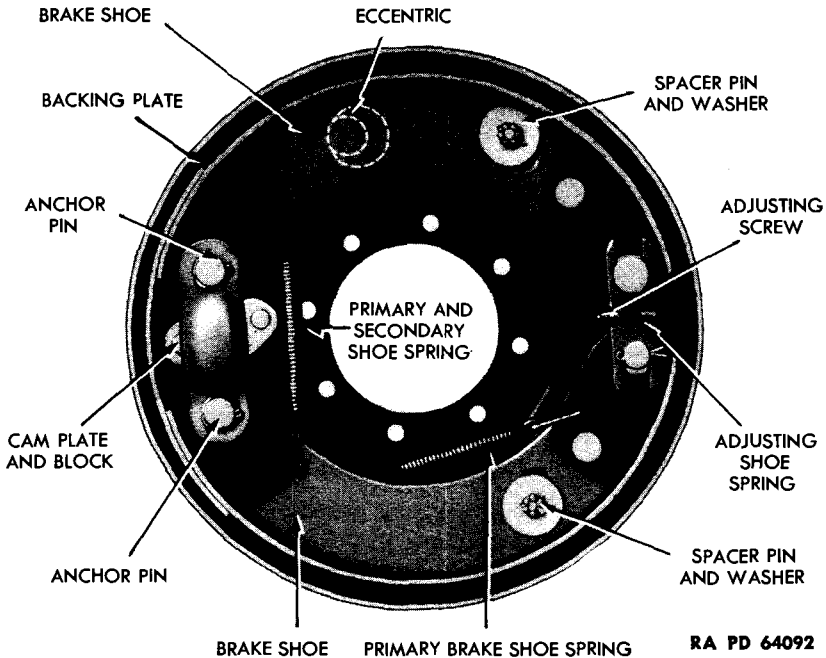


Figure 10—Brake Shoe Assembly

b. **Operation.** The brake shoes in the off position are against their cams, free from any contact with the drum, permitting the wheels to rotate freely. The cam in this brake has an extended shaft with a lever at its end which, in turn, is connected to the vacuum power unit. When a vacuum is created in the power unit, the lever and cam shaft are

BRAKES

rotated, operating the brake cam. This will spread the shoes against the drum for braking action. The brake shoe return springs and the return spring in the power unit will release the brakes when the vacuum of the power unit is depleted. When the brake linkage is in the fully released position, the brake shoes must rest against their anchors. Conventional brake lining is riveted to the shoes.

c. Data.

Make.....Bendix two-shoe, double-anchor brakes
 ModelDSDA rod
 Brake size.....17¼ in. x 4 in.
 Lining size.....4 in. x 3/8 in. x 18½ in.
 Kit number.....42467
 Brake operating system.....Bendix BK vacuum system

39. TROUBLE SHOOTING.

a. Check Brakes of Towing Vehicle First. It is assumed that the brake system of the towing vehicle is performing properly before making any of the following checks on the trailer (see towing vehicle manual). Operation of the trailer brakes is dependent upon the proper operation of the brake system on the towing vehicle.

b. No Brakes.

Possible Cause	Possible Remedy
Oily or greasy lining.	Replace brake shoes (pars. 41 and 42).
Lining worn.	Replace brake shoes or adjust (pars. 41, 42 and 40 c).
Misadjustment.	Readjust.
Bearings for extended cam frozen.	Free up and lubricate.
Power equipment not functioning.	Follow procedure on power brakes (par. 44).

c. Brakes Do Not Release.

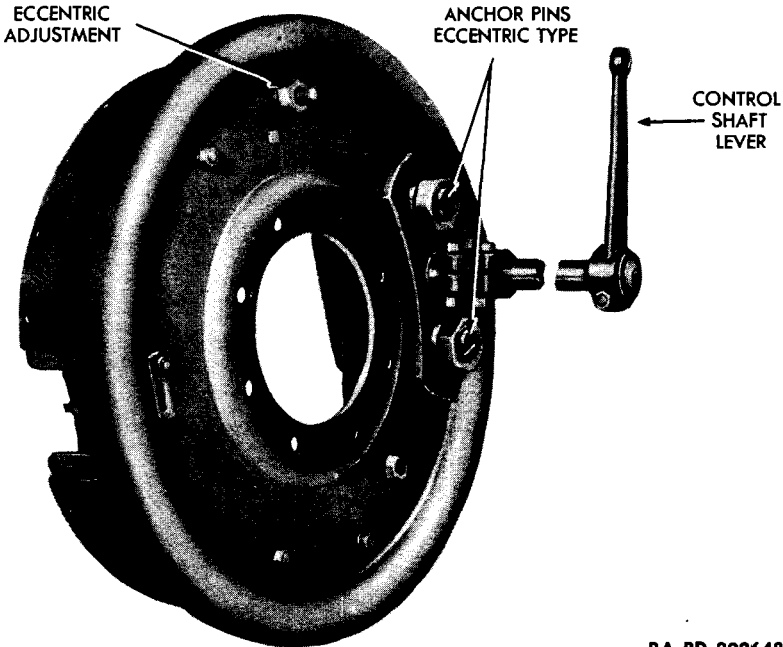
Misadjustment.	Reset shoes against their anchors, and adjust.
Extended cam bearing frozen.	Free up and lubricate.
Broken shoe return springs.	Replace.
Vacuum power brake equipment not functioning.	Follow procedure on power brakes (par. 44).

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40. MAINTENANCE AND ADJUSTMENTS.

a. Maintenance.

(1) The proper functioning of the brake system is of vital importance. A freely operating brake control system permits the shoes to return completely against their anchor pins at all times when the brakes are released. When taking up linkage or backlash caused by wear, care



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Figure 11—Brake Backing Plate and Parts

must be taken to insure that the shoes return against their anchors, and the cam block is free between the shoe ends. The return springs are provided to return the shoes to the released position, and weak or broken spring must be replaced.

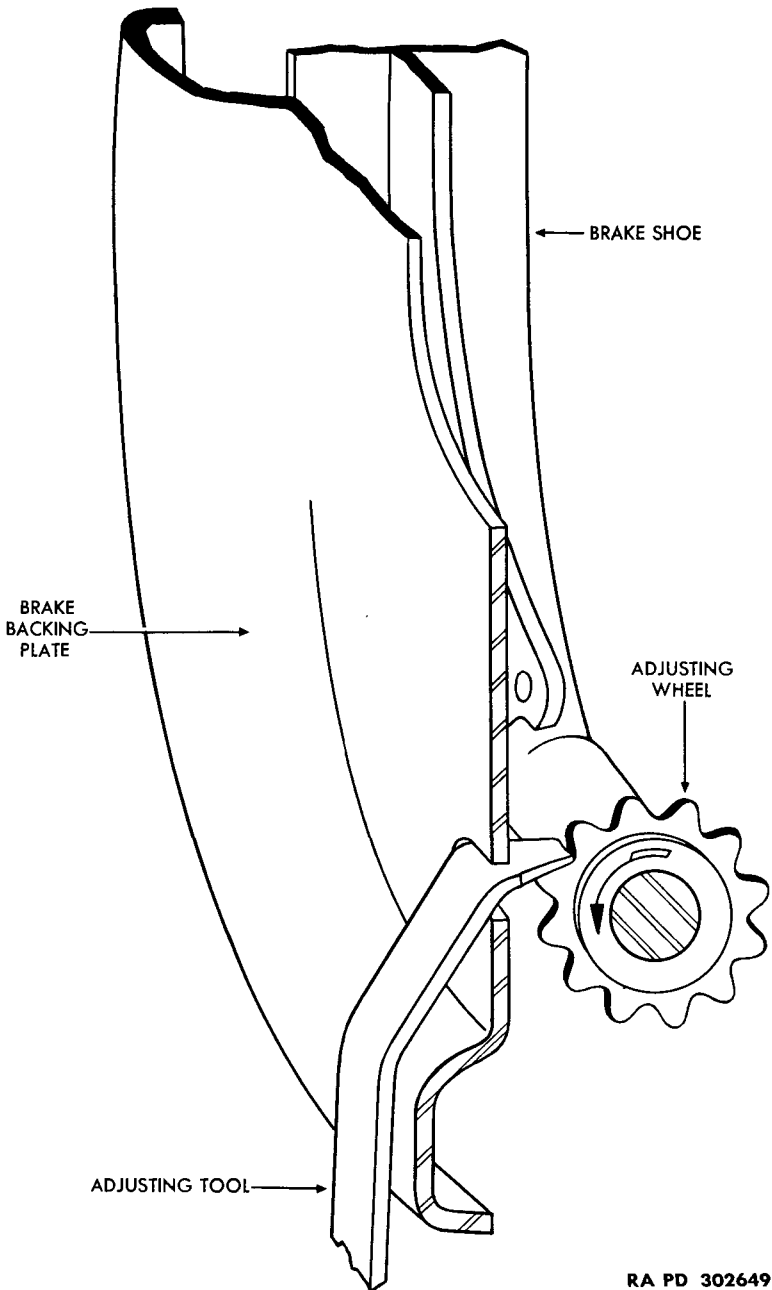
(2) **POINTS TO BE INSPECTED.** See that the brake linkage is properly lubricated and free from brake drag. The spring clips holding the axle to the chassis springs must be tight, and the wheel bearings must be properly adjusted to prevent drag due to loose bearings.

(3) **LINING RENEWAL.** When lining renewal is required, use new shoes with lining attached.

b. Major Adjustments.

(1) **GENERAL.** Major adjustment procedure should be followed when new shoes are installed on the trailer.

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Figure 12—Brake Adjustment
37

7-TON SEMITRAILER, PANEL CARGO**(2) PROCEDURE.**

(a) *Jack Up Trailer.* Remove wheel and tire assembly as in paragraph 27.

(b) *Disconnect Power Unit Pull Rod.* Remove cotter pin in clevis pin, and disconnect power unit pull rod from camshaft lever by pulling free.

(c) *Adjust Anchor Lock Nuts.* Loosen the anchor lock nuts, and rotate the anchors with Bendix special tool, or suitable tool, so that the long side of the anchor ends face each other. Tighten the anchor nuts slightly, but not enough to keep from moving the eccentric if desired. **NOTE:** The end nut of each anchor pin is longer on one side of the screwdriver slot. This long end corresponds to the high side of the eccentric section of the anchor pin of the shoe web.

(d) *Remove Adjusting Hole Covers.* Loosen nut and move adjusting screw hole cover to one side to allow for insertion of screw adjusting tool. Remove feeler gage hole cover plate from drum.

(e) *Adjust Clearance* (fig. 11). Loosen eccentric adjuster lock nut. Check the shoe lining to drum clearance with the use of a feeler gage inserted through the feeler gage hole in the drum (the shoes against which the eccentric operates should be adjusted first, as in paragraph 40 c). A check of 0.008-inch lining to drum clearance at the anchor end, and 0.014-inch lining to drum clearance at the adjusting end of this shoe indicates a properly positioned shoe. The 0.008-inch and 0.014-inch clearance can be obtained by rotating the anchor and turning the shoe eccentric. **NOTE:** Rotating the anchor so that the long end moves toward the axle will increase the clearance between the lining and the drum at the anchor end, and decreases the clearance at the adjusting end. Rotating the anchor so that the long end moves away from the axle causes the opposite condition. When the 0.008-inch and 0.014-inch clearances are obtained, tighten the anchor down tight by tightening nuts on anchor pins, taking care not to change the position of the anchor.

(f) *Tighten Eccentric Lock Nut.* Tighten eccentric lock nut, taking care not to change the eccentric position (fig. 11).

(g) *Adjust Opposite Shoe Position.* The opposite shoe position is obtained by rotating the shoe anchor and turning the adjusting screw until the same (0.008-inch and 0.014-inch) anchor end and adjusting end, respectively, clearances are obtained. Tighten anchor nut down tight, taking care not to change the position of the anchor. **NOTE:** Rotating the adjusting screw does not affect the position of the shoe against which the shoe eccentric operates until the adjustment screw moves the opposite shoe against the drum, provided the shoe hold-down pin washer is not too tight against the shoe web.

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(h) *Adjust Cam.* Rotate the adjustment screw with screwdriver or tool until drum cannot be rotated by hand (fig. 12). Remove all slack and lost motion of cam by moving power cylinder levers toward the power chamber without moving the shoe off the anchors. Power cylinder rod clevis pin hole should just line up with clevis pin hole in lever. Back off adjustment screw until brake is free of lining drag.

(i) *Replace Adjusting Hole Covers.* Replace adjusting hole cover and drum feeler gage hole cover.

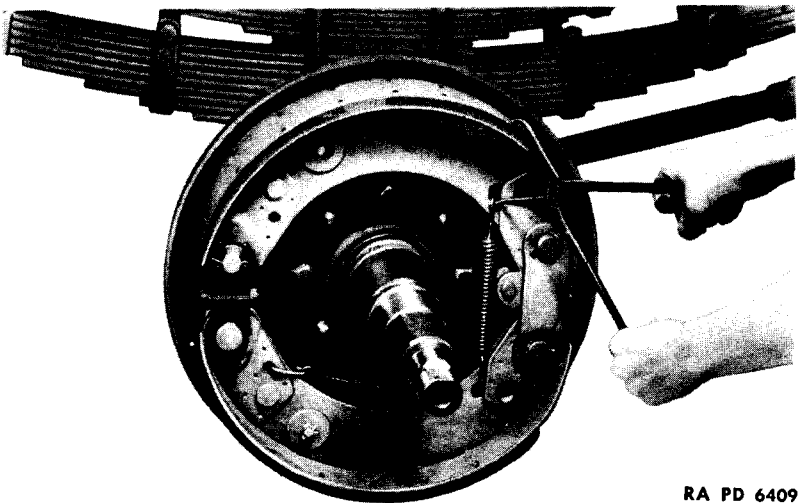
(j) *Install Wheels and Tires.* Install wheel and tire assembly, and lower vehicle, as in paragraph 28 a.

c. Minor Adjustments for Wear.

(1) **GENERAL.** There are two adjustments in this braking system to compensate for brake lining wear:

(a) *The Eccentric Adjustment* (fig. 11). Centralizes the brake shoes in the brake drum.

(b) *The Adjusting Screw* (fig. 12). Takes up the clearance between the brake lining and the drum.



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Figure 13—Removing Brake Shoe Return Spring

(2) **PROCEDURE.**

(a) *Jack Up Trailer* (par. 27 b).

(b) *Adjust Eccentric.* Loosen the eccentric adjustment lock nut and rotate the eccentric in the direction of forward wheel rotation until the brake drags, and then rotate the eccentric in the opposite direction until the drum is just free of lining drag.

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(c) *Tighten Eccentric Lock Nut.* Hold eccentric in position and tighten eccentric lock nut. Be sure that the eccentric position is not disturbed when locking the lock nut.

(d) *Adjust Adjusting Screw.* Loosen screw on adjusting hole cover, and move cover enough to open adjusting hole. Insert screwdriver, and turn the adjusting screw (notched wheel) until brakes drag. Then back off adjusting screw until wheel is just free of lining drag (fig. 12).

(e) Replace adjusting screw hole cover, and lower vehicle to the ground, as in paragraph 28.

(f) Test brakes for balance. (If one wheel is tighter than the other, loosen up on the tight wheel. This will prevent a dragging brake in operation.) NOTE: When adjusting brakes for lining wear, never take up on the power unit pull rod.

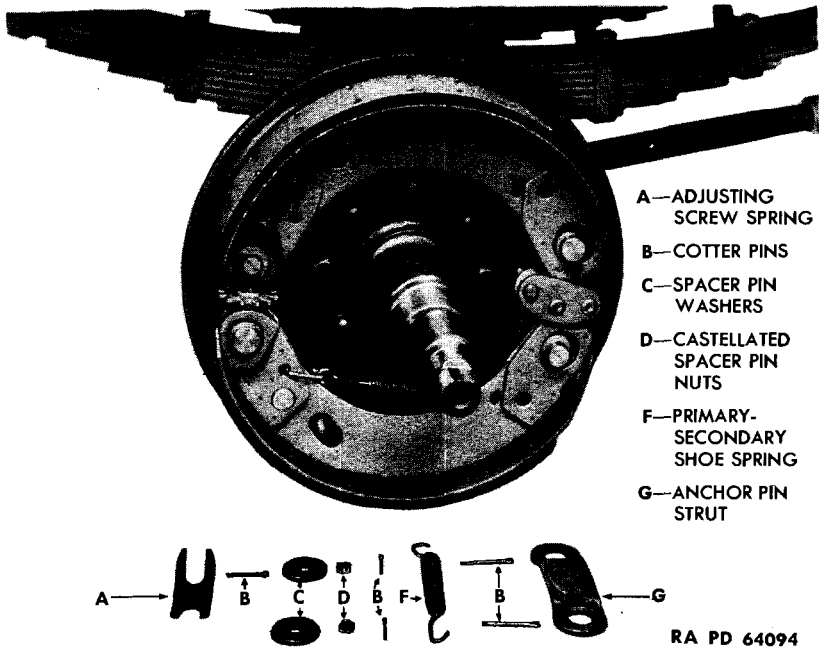


Figure 14—Brake Shoe Assembly Ready for Removal

41. BRAKE SHOE ASSEMBLY REMOVAL.

a. **Remove Wheel and Tire Assembly.** Jack up vehicle, and remove wheel and tire assembly as in paragraph 27.

b. **Remove Spring Hook and Spring.** Place hooked-end tong of spring tongs into end of primary-secondary shoe spring. Place other

BRAKES

end of tongs in rivet hole in brake lining. Compress tongs enough to lift spring hook out of shoe (fig. 13). Then remove spring.

c. **Remove Anchor Pin Strut and Spacer Pin Washers.** Remove cotter pins from anchor pins. Then lift off anchor strut. Remove cotter pins from castellated nuts on spacer pins. Remove nuts and lift off spacer pin washers (fig. 14).

d. **Remove Shoe Assembly.** Remove cotter pin in adjusting screw spring. Remove adjusting screw spring. Roll shoe assembly off backing plate, unhooking primary spring during operation.

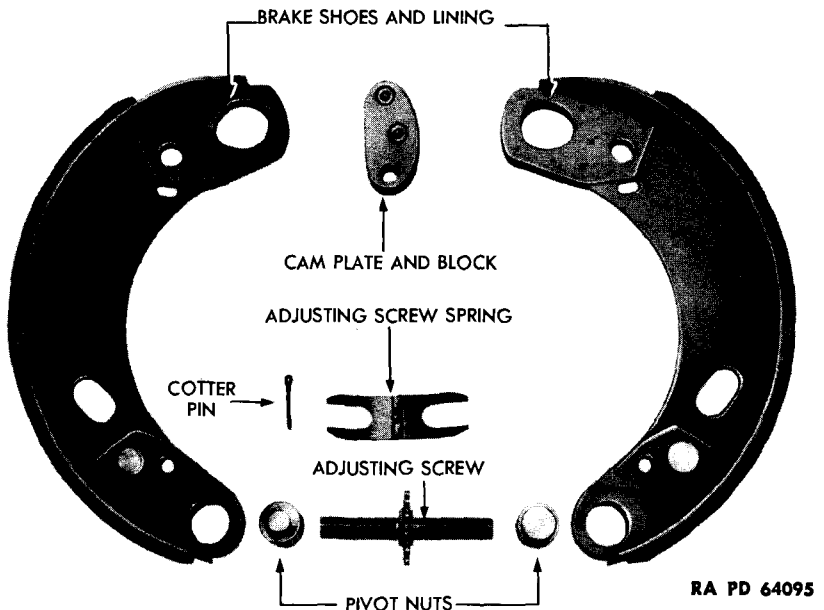


Figure 15—Brake Shoe Assembly Disassembled

e. **Remove Shoes.** Unhook primary shoe return spring from shoe assembly, and remove. Spread shoes apart and remove cam assembly. Lay brake shoe assembly flat on a bench, with adjusting screw end of shoes toward you. Turn adjusting screw (away from operator) until pivot nuts are free. Remove pivot nuts and separate shoes (fig. 15).

42. BRAKE SHOE ASSEMBLY INSTALLATION.

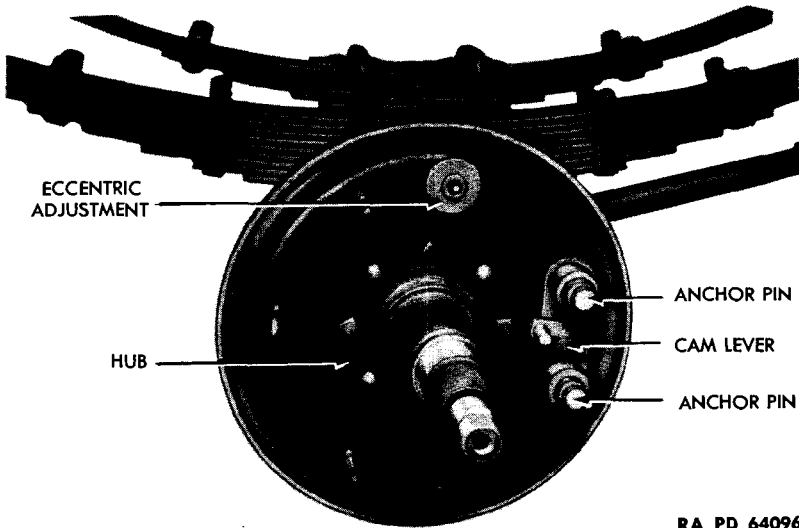
a. **Position Brake Shoes.** Place the shoes on a bench or flat surface so that the anchor pin holes in shoes are away from you (primary shoe is at right).

b. **Lubricate Adjusting Screw.** Lubricate pivot nuts and the threads on the adjusting screw.

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c. **Install Adjusting Screw.** Pick up pivot nut that has cotter pin hole in one end, and insert in secondary shoe at left, with cotter pin hole end up. Insert the other pivot nut (with undercut shoulder) in primary shoe at right, with shoulder end up. Thread adjusting screw into both pivot nuts (turning towards the operator) to full travel of threads—left-hand thread at left, right-hand thread at right.

d. **Install Cam Assembly.** Place cam assembly in position (curved side toward primary shoe).



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Figure 16—Brake Backing Plate Installed

e. **Install Shoe Assembly.** Hook primary shoe return spring to shoe assembly. Remount shoe assembly to backing plate, hooking return spring to spring anchor during this operation (fig. 16). **NOTE:** Before remounting, however, lubricate all frictional points: where pivot nuts bear against backing plate; where shoe webs contact rest pins and at the end of the eccentric adjustment; on the cam between the cam plates where the ends of the shoes enter the cam, and also the cam pin on the inside lever. But do not overlubricate any point, as excessive lubricant may work onto the lining and cause erratic brake action. Position adjusting screw spring; insert and spread cotter pin. Position anchor pin strut. Insert and spread cotter pins, curling cotter pins around anchor pins. Install spacer pin washers and nuts. Adjust nuts loosely. With spring tongs, install primary-secondary shoe spring. Tighten spacer pin castelated nuts just as the spacer pin washers can be turned with your fingers. Then insert cotter pins and spread.

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f. Test Spacer Pin Washers. Loosen eccentric lock nut and rotate shoe eccentric until shoe is bearing against the lowest point of the eccentric. If, during this operation, the shoes do not shift easily, there may be too much friction at the spacer pin washers, and readjustments must be made (par. 40).

g. Adjust Brakes. Follow procedure outlined in paragraph 40 b.

h. Install Tire and Wheel Assembly. Reassemble tire and wheel assembly and lower jack (par. 28).

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Section XII

BRAKE OPERATING SYSTEM

	Paragraph
Description and data for system.....	43
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Maintenance and adjustments.....	45
Female couplings	46
Vacuum reservoir	47
Check valve	48
Conversion valve air cleaner.....	49
Conversion valve	50
Power cylinder	51

43. DESCRIPTION AND DATA FOR SYSTEM.

a. **Description.** The brake operating system is attached to the frame of the trailer and the trailer axle. It controls the action of the brakes and provides for their automatic application in the event of a breakaway of the trailer from the towing vehicle. The principal parts consist of two control lines, two female couplers, a vacuum reservoir, a check valve, an air cleaner, a conversion valve and two power cylinders.

(1) OPERATION.

(a) *Normal Braking Operation.* The brake operating system controls the operation of the brake shoes. The action is comparable to that of an electric relay system opening or closing a switch to start and stop an electric motor. The two control lines are connected to the braking system of the tractor-truck (which controls the braking operation on the trailer). Female couplers at the front of the trailer connect the tractor-trailer control lines. The line at the right is the constant vacuum line. The line at the left is the control line. Air is removed from the reservoir creating a vacuum for reserve. Air and vacuum are controlled by a conversion valve which in turn is controlled by the tractor brake system. Two diaphragm power chambers, located on the axle, actuate the brakes by a camshaft connection (fig. 17).

(b) *Emergency Braking Operation.* A check valve in the right-hand line provides for automatic brake application by trapping the vacuum in the reservoir. This valve is spring loaded in the open position for normal operation. A breakaway causes the valve to close and, as the left line is broken, air rushes to the conversion valve actuating it to the full applied position.

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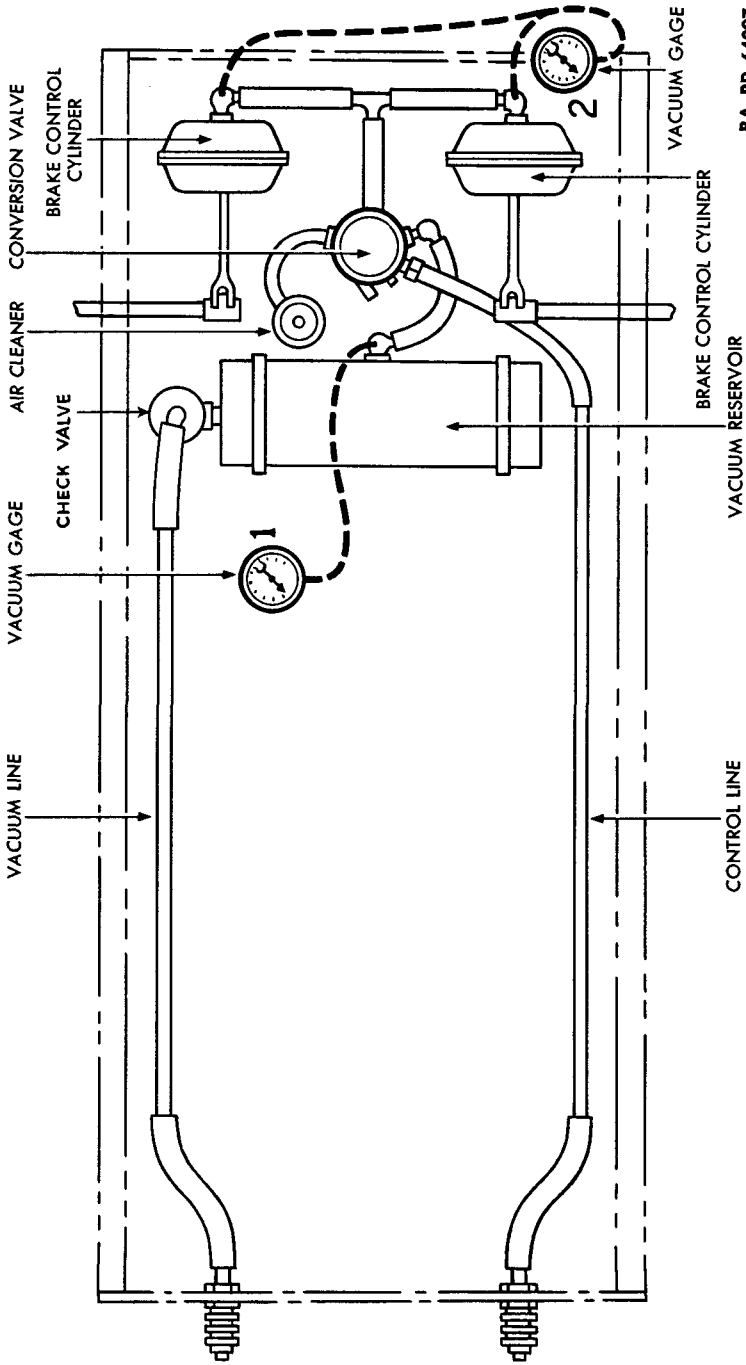


Figure 17—Brake System Vacuum Test Diagram

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b. Tabulated Data.

Type of system.....	Bendix BK vacuum
Air cleaner	Remote type
Check valve	PT
Vacuum reservoir	Standard
Conversion valve	SPC-PC
Power cylinder (diaphragm type).....	D64

44. TROUBLE SHOOTING.

a. Check System of Towing Vehicle First. It is assumed that the following trailer tests will be made only **AFTER** the tractor unit has been checked and found satisfactory. It is also assumed that originally the tractor-trailer combination in question operated satisfactorily together (refer to towing vehicle manual).

b. No Brakes, or Insufficient Brakes.

Possible Cause	Possible Remedy
Restriction in line between conversion valve and power cylinders.	Remove restriction or replace.
Restriction in line between conversion valve and vacuum reservoir.	Remove restriction or replace.
Restriction in control line between conversion valve and front end of trailer.	Remove restriction or replace.
Restriction in constant vacuum line.	Remove restriction or replace.
Defective conversion valve.	Replace.
Broken diaphragm in power unit.	Replace.
Defective check valve.	Replace.

c. Brakes Do Not Release.

Conversion valve not functioning.	Replace.
Air cleaner clogged.	Clean.
Restriction in control line between conversion valve and front end of trailer.	Remove restriction or replace.
Restriction in vacuum line between conversion valve and power cylinders.	Remove restriction or replace.

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d. **Testing the Vacuum Power System.** Test the trailer power system by using two vacuum gages and the necessary fittings for connecting the test gages into the vacuum lines as indicated in figure 17.

(1) Connect gage number 1 into vacuum reservoir line behind check valve, maintaining normal system connections.

(2) Connect gage number 2 into line between conversion valve and power cylinder, preferably at cylinder end, maintaining normal connections between the cylinders and valve.

(3) Repeat test for each cylinder. For example: Install gage number 2 in line to one cylinder; run tests; then install gage number 2 in line of other cylinders and repeat test. This is necessary because the line to one cylinder may be restricted, while the lines to the other cylinder may be in good condition.

(4) Start engine and run at a reasonable idling speed for at least one minute. Make a normal brake application noting gage readings. Gage number 1, except for a noticeable fluctuation as pedal is being depressed, should record full manifold vacuum at all times. During a complete brake application, gage number 2 should indicate a rise in vacuum from zero to approximately 65 or 70 percent of reservoir vacuum, as indicated by gage number 1.

(a) Failure of gage number 1 to return to manifold vacuum, after fluctuation when brakes are applied, indicates a faulty PT check valve, or restriction in the vacuum line.

(b) Failure of gage number 2 to show an increase in vacuum during application indicates a faulty conversion valve or a restriction in the trailer control line, or in the line between the conversion valve and the chamber being tested.

(c) Release brakes. Gage number 2 should return to a zero reading. Failure of gage number 2 to return to zero indicates faulty conversion valve operation in release or a restriction in the trailer control line. NOTE: If the tractor is equipped with a hand control valve, as well as a foot control valve, check for pedal operation and then check for hand control operation.

45. MAINTENANCE AND ADJUSTMENTS.

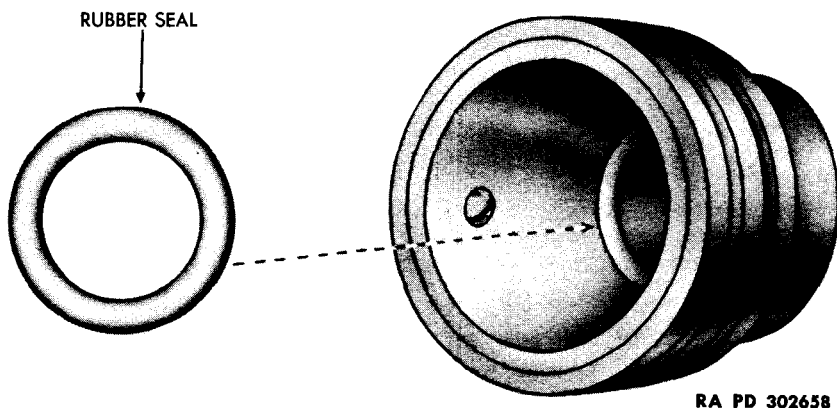
a. **Air Cleaner.** Disassemble the air cleaner for cleaning and inspection once a month (pars. 49 b and 49 c).

b. **Tighten Bolts.** Check and tighten all bolts of the braking system at periodic intervals of not over three months (fig. 17).

c. **Check Brake Operating Parts.** Check the brake operating parts, consisting of the diaphragms and linkage for freedom of movement, correction of misalignment, and for freeing up as required

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d. **Check Travel of Power Cylinder Piston Rod.** When the travel of the power chamber exceeds 3 inches on full power the brake shoe should be adjusted (par. 40 c).



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Figure 18—Female Coupling

46. FEMALE COUPLINGS.

a. **Description.** There are two female couplings located on the front of the trailer that connect the power brake system of the trailer to power brake system of the towing tractor. The only parts of the female couplers subject to wear are the rubber rings at the rear of the couplers which form a seal between the male coupling of the tractor and the female coupling of the trailer (fig. 18).

b. **Rubber Ring Removal.** The old ring is removed with a sharp-pointed instrument.

c. **Rubber Ring Installation.** The new rubber ring is installed in the female couplers by rolling it in with the fingers until it falls into position in its recess or groove at the back of the coupler.

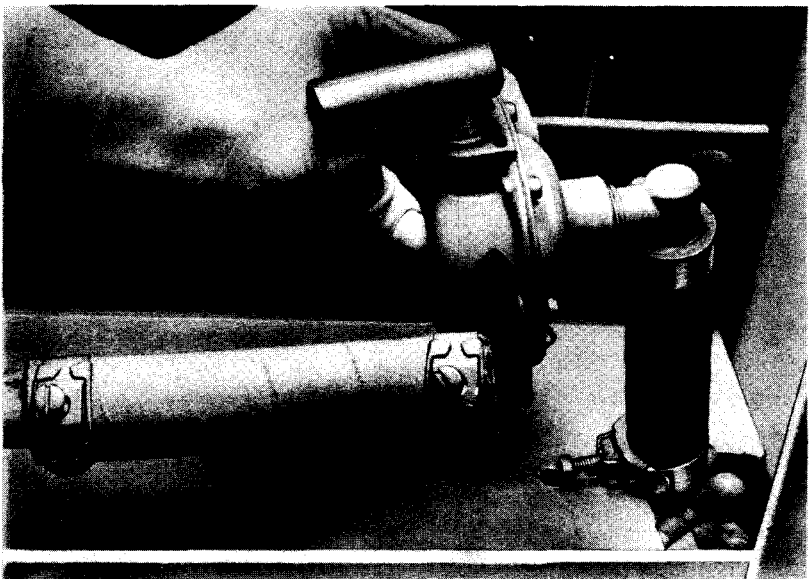
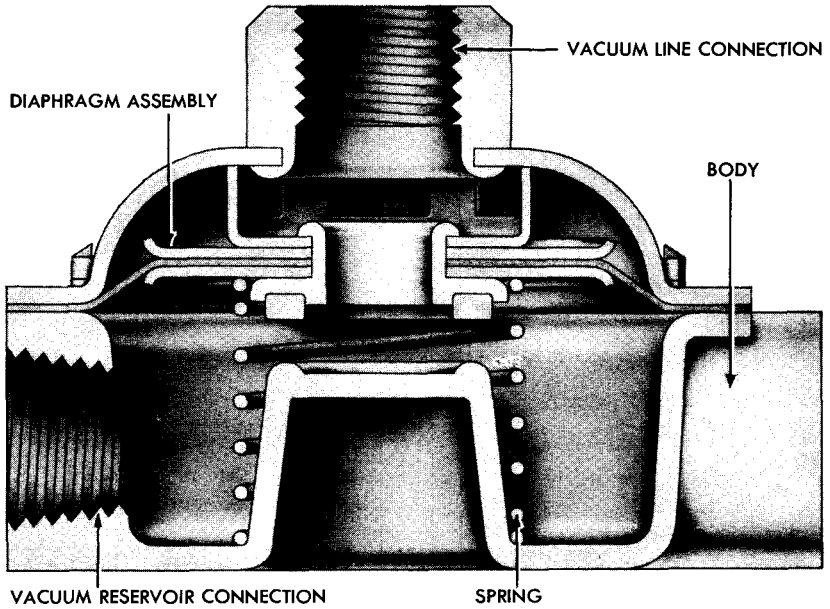
47. VACUUM RESERVOIR.

a. **Description.** The vacuum reservoir is located under the trailer frame between the two main crossmembers.

b. **Operation.** It acts as a reservoir of vacuum on the trailer which is drawn upon for normal brake application, or for breakaway emergency brake application. The vacuum reservoir is merely a sealed container and does not require any service repair parts.

c. **Vacuum Reservoir Removal.** Loosen screws in the hose clamps at each end of the reservoir connecting the reservoir with the control lines. Pull rubber hoses free of the male hose nipples. Unscrew nuts on the two bolts in the two brackets holding the reservoir in place. Remove bolts, pull brackets apart and lift reservoir out.

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Figure 19—Check Valve

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d. **Vacuum Reservoir Installation.** Position reservoir in brackets and force brackets as close together as possible. Insert bracket bolts and screw nuts back on tight. Replace rubber hoses on male hose nipples. Tighten screws in hose clamps.

48. CHECK VALVE (fig. 19).

a. **Description.** The check valve in the right vacuum line is mounted on one of the trailer frame crossmembers and does not function at all in normal braking operation. It does, however, provide for automatic emergency application of the brakes in case the trailer should break away from its towing tractor.

b. **Operation.** The check valve is spring loaded in the open position for normal operation. In accidental breakaway, causing hoses to part, air enters right-hand line and strikes internal diaphragm, closing valve, thereby trapping vacuum in reservoir. Air entering the left-hand line actuates conversion valve to the fully applied position.

c. Check Valve Removal.

(1) **MODELS NO. D-11-B AND SC-600.** On the opposite side of the crossmember from the check valve, unscrew nuts on the bolt holding the check valve to the crossmember. Loosen screw in hose clamp above and slightly in front of these nuts. Loosen screw in hose clamp at front of check valve and pull hose free of male hose nipple. Hold check valve with left hand and reach under crossmember with right hand, pulling rubber hose and valve free.

(2) **MODEL NO. 2-GC.** Loosen hose clamp on check valve and disconnect hose. Unscrew check valve from vacuum reservoir.

d. Check Valve Installation.

(1) **MODELS NO. D-11-B AND SC-600.** With the left hand lift check valve with rubber hose into position, and slide section of hose through opening in crossmember. Place right hand under crossmember and guide hose onto male coupler, at the same time fitting bolt on check valve into position. Replace nuts on bolt and tighten. Replace hose in front of check valve on male hose nipples. Tighten screws in both hose clamps.

(2) **MODEL NO. 2-GC.** Screw check valve onto vacuum reservoir. Replace hose on hose nipple on check valve and tighten hose clamp.

49. CONVERSION VALVE AIR CLEANER.

a. **Description.** The conversion valve air cleaner is a dry-type cleaner having a curled hair filter element, and is connected to the air inlet of the conversion valve.

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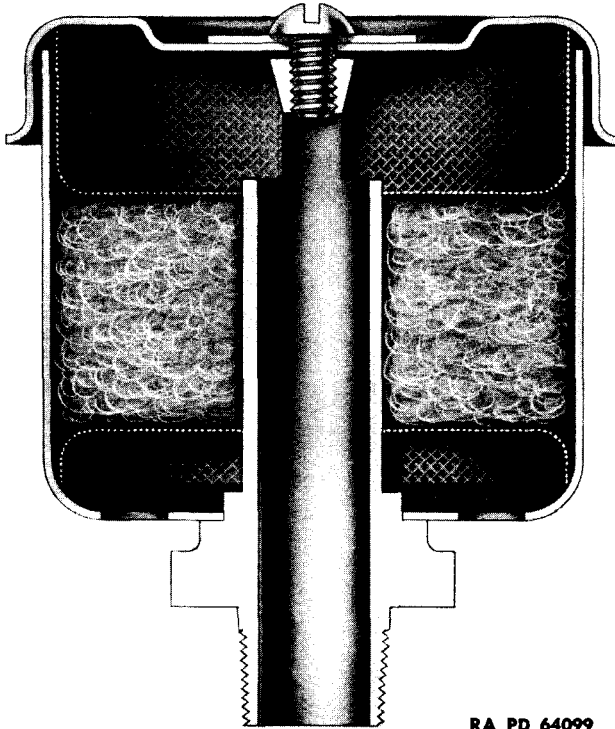


Figure 20—Conversion Valve Air Cleaner—Cross-Section

b. Operation. The air cleaner filters the outside air admitted to the system through a thickness of curled hair, and protects the inside working parts of the system from dust and foreign matter.

c. Air Cleaner Removal.

(1) MODELS NO. D-11-B AND SC-600. Unscrew lock nut on elbow at bottom of air cleaner and lift off. The air cleaner is disassembled by unscrewing screw at top and lifting out parts.

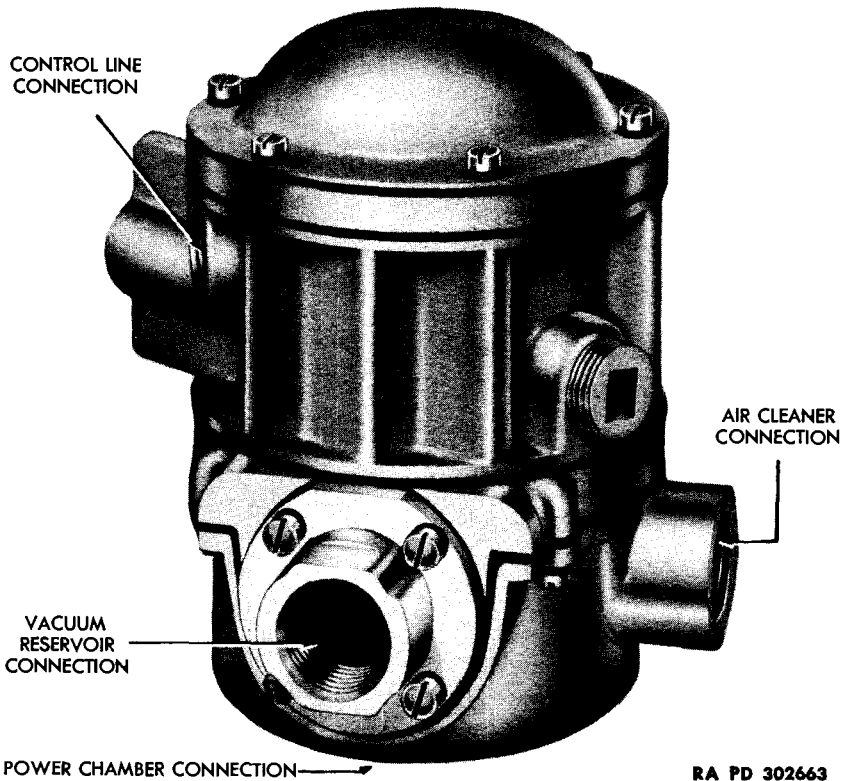
(2) MODEL NO. 2-GC. Loosen hose clamp and remove hose from nipple on air cleaner. Remove air cleaner by removing bolts attaching it to crossmember.

d. Air Cleaner Installation.

(1) MODELS NO. D-11-B AND SC-600. Place air cleaner on elbow and screw lock nut tight.

(2) MODEL NO. 2-GC. Bolt air cleaner to crossmember and reinstall hose on hose nipple. Tighten hose clamps.

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Figure 21—Conversion Valve

50. CONVERSION VALVE.

a. **Description.** The conversion valve is installed between the power cylinder diaphragm and the vacuum reservoir. It controls the air vacuum actuating the power diaphragms in the application of the brake shoes.

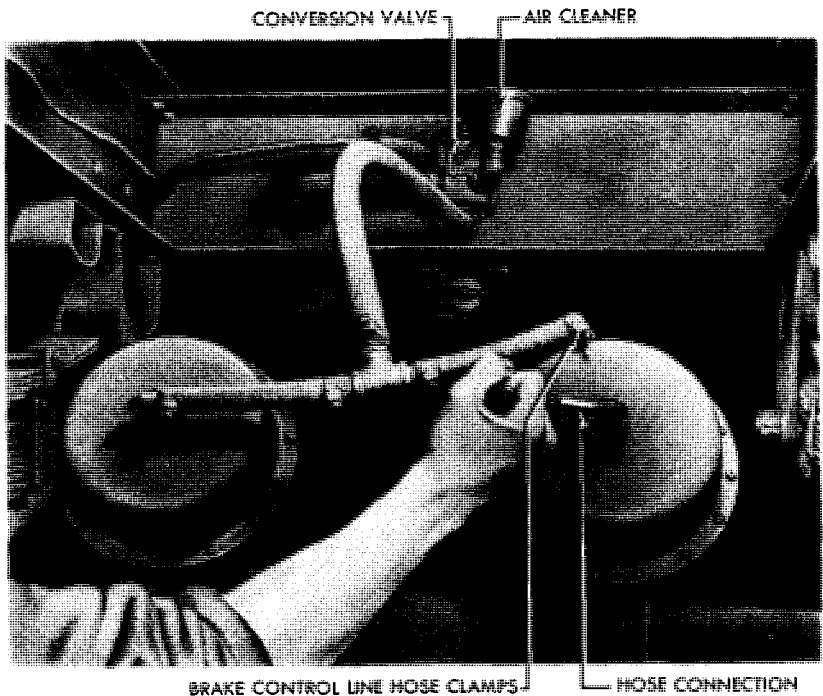
b. **Operation.** There are two separate diaphragm chambers in the conversion valve. Each chamber is divided into an upper and lower compartment by a flexible diaphragm. The upper compartment is the constant vacuum side and is connected to the constant vacuum line. The lower compartment is the control side and is connected to the control line, as well as to the power cylinders. When the brakes are applied, air is admitted to the chamber immediately below the top diaphragm through the control line. This forces the diaphragm upward to close the atmospheric port and open the vacuum port. As the vacuum port opens, a direct passage is established between the power chambers and the vacuum reservoir. With the vacuum port open, vacuum builds up on the lower side of the diaphragm to provide a downward force. When the forces acting downward on the lower diaphragm chamber balance the

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forces acting upward on the upper diaphragm, the valve seeks its holding position (both valves closed). This balancing action continues until the trailer brakes are fully applied.

c. **Conversion Valve Removal.** Remove air cleaner (par. 49 c). Loosen screws in hose clamp at bottom of conversion valve and two hose clamps on side. Pull hoses free from male hose nipples. Unscrew nut on bolt attaching conversion valve to rear main crossmember and pull off.

d. **Conversion Valve Installation.** Place conversion valve on bolt through rear main crossmember; replace nut and tighten. Replace three hose connections on male hose nipples and tighten screws in hose clamps. Install air cleaner (par. 49 d).



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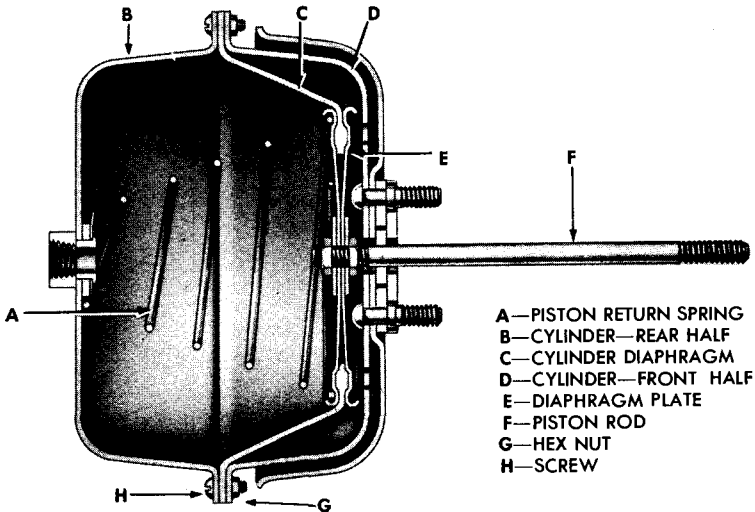
Figure 22—Removing Power Cylinder Diaphragm Cover Screws

51. POWER CYLINDER

a. **Description.** There are two power cylinders located on the axle which actuate the brake shoes by a camshaft connection.

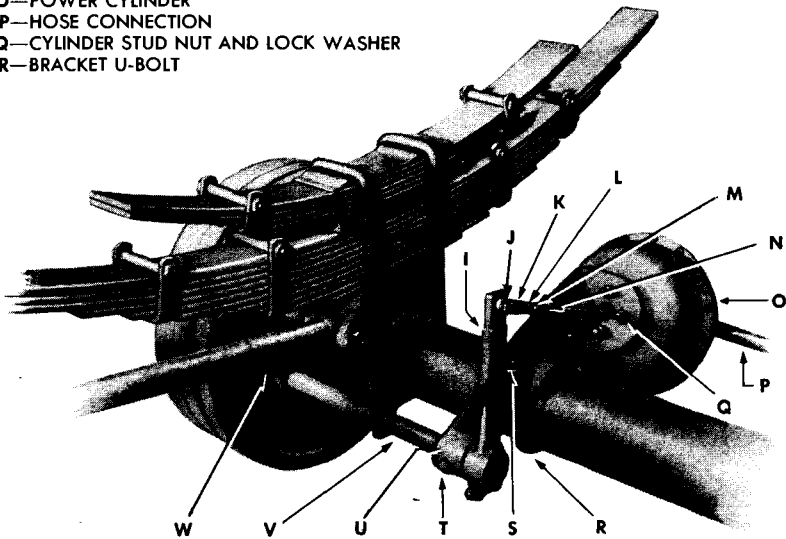
b. **Operation.** The power cylinder consists of two pressed steel housings, a diaphragm and a diaphragm rod. The diaphragm divides the power cylinder into two chambers. The chamber at the pull rod end is the atmospheric chamber, and is open to atmospheric pressure

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- I—CONTROL SHAFT LEVER
- J—CLEVIS PIN AND COTTER
- K—ROD END YOKE
- L—CONNECTOR TO YOKE WASHER
- M—HEXAGON CONNECTOR
- N—HEX NUT
- O—POWER CYLINDER
- P—HOSE CONNECTION
- Q—CYLINDER STUD NUT AND LOCK WASHER
- R—BRACKET U-BOLT

- S—BRACKET U-BOLT NUT, LOCK WASHER
AND FLAT WASHER
- T—LUBRICATION PLUG
- U—DIAPHRAGM BRACKET
- V—AUXILIARY CAMSHAFT
- W—CAMSHAFT COUPLING



RA PD 64101

Figure 23—Brake Power Cylinder and Linkage

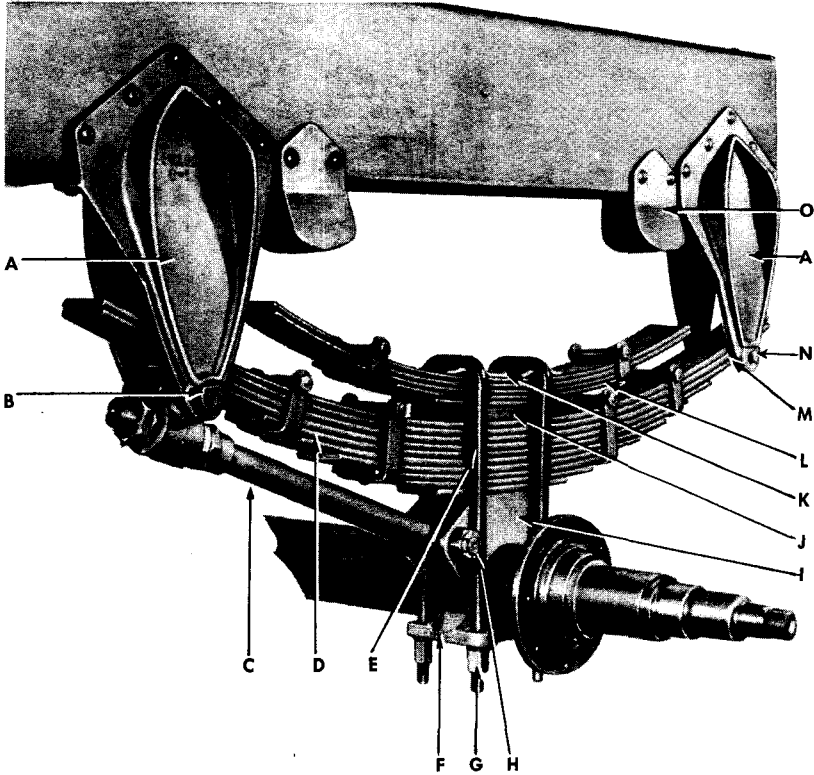
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at all times through holes in the housing. The chamber at the opposite end is the vacuum chamber, and is connected by hose to the conversion valve. A dust shield is attached to the housing at the diaphragm rod end to prevent direct entrance of dirt or water into the atmospheric chamber. A conical spring in the vacuum chamber insures full return of the diaphragm to its released position. When the brakes are applied, vacuum is present in the vacuum chamber. The degree of vacuum built up determines the power for brake application, and actuates the cam-shaft connection applying the brake shoes. **NOTE:** The only service part ordinarily required is the diaphragm, which is subject to deterioration with age.

c. Power Cylinder Removal. Remove cotter pin in clevis pin and the yoke at end of pull rod. Remove clevis. Remove four nuts and lock washers attaching power cylinder to mounting bracket and remove power cylinder.

d. Power Cylinder Installation. Insert piston rod through the mounting bracket and mount the power cylinder on mounting bracket with lock washers and nuts. Adjust pull rod yoke to line up with control shaft lever by removing all slack and lost motion at cam. This is accomplished by moving the power lever towards power cylinder without removing the shoe from the anchors. Connect yoke to cam lever with yoke pin and cotter pin (par. 40 **b** (2) (*h*)).

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- | | |
|--------------------------|--|
| A—SPRING HANGARS | I—SPRING SEAT |
| B—FRONT RADIUS ROD BOLTS | J—SPRING SPACER PLATE |
| C—RADIUS ROD | K—UPPER SPRING PLATE |
| D—MAIN SPRING ASSEMBLY | L—HELPER SPRING ASSEMBLY |
| E—U-BOLTS | M—REAR SPRING HANGER SPACER |
| F—LOWER SPRING PLATE | N—HANGER SPACER BOLT, NUT
AND LOCK WASHER |
| G—SPRING U-BOLT NUTS | O—AUXILIARY SPRING PAD |
| H—REAR RADIUS ROD BOLT | |

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Figure 24—Suspension System

Section XIII

SUSPENSION

	Paragraph
Description and tabulated data	52
Trouble shooting	53
Axle alinement	54
Radius rod removal	55
Radius rod installation	56
Spring leaf removal	57
Spring leaf installation	58
Axle removal	59
Axle installation	60

52. DESCRIPTION AND TABULATED DATA (fig. 24).

a. Suspension. The trailer frame is carried on the axle through slip end, semi-elliptical type springs with helper springs. The suspension assembly includes radius rods, spring, and axle attachment parts, as well as the spring hangers which are attached to the frame.

b. Axle.

(1) **MODELS D-11-B AND SC-600.** The axle is of tubular construction and is positively cambered to prevent uneven tire wear. The spring seats and brake-backing plate flanges are welded to the axle.

(2) **MODEL 2-GC.** The axle is of solid, rectangular construction and is positively cambered to prevent uneven tire wear. Brake-backing plate flanges are welded to the axle. The spring seats are detachable and are positioned by dowel pins pressed into drilled holes in the axle.

c. Springs. The springs are eyeless or shackless, consisting of the main spring of ten leaves, a spacer plate, and five overload spring leaves. All main spring leaves are assembled as one unit by the center bolt and four spring clips. Overload springs are also assembled as one unit by the center bolt and two spring clips. The top overload spring leaf contacts the wear plate directly under the frame. The top main spring leaves contact the spring hanger which holds the springs in alinement. The springs are mounted on the spring seats and held in position by pressure plates and four U-bolt assemblies (fig. 24).

d. Radius Rod. The radius rod assembly is fully adjustable and consists of the radius rod, knuckle, bolts, washers, sleeves, and nut. The rod front and knuckle is bolted to the front spring hanger and the rod rear end to spring seats. Adjustment of the radius rods positions the axle and keeps it in proper alinement. The axle rises and falls within the radius of the rod. Braking effort is transmitted to the trailer frame through the radius rods.

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e. Data.

(1) AXLE.

(a) Models No. D-11-B and No. SC-600.

Make Standard Force and Axle Co.
 Model A-11-NI
 Track 66¾ in.
 Center diameter 4½ in. tubular
 Spindle ends 1⅝ in. outer—2⅞ in. inner

(b) Model No. 2-GC.

Make W. C. Nabors Co.
 Model GC
 Track 67 in.
 Dimensions 3½ in. x 3 in. (solid)
 Spindle ends 1⅝ in. outer—2⅞ in. inner

(2) SPRINGS.

Make Makemont
 Model SP-509-SP-510
 Number of leaves 10 leaf main—5 leaf auxiliary
 Leaf thickness mains—¾ in. x 3 in.—auxiliary—⅝ in. x 3 in.

(3) RADIUS ROD.

Make Edwards
 Model 7-30

53. TROUBLE SHOOTING.

a. Springs Noisy.

Possible Cause	Possible Remedy
Springs dry.	Lubricate spring.
Broken spring leaf.	Replace broken leaf (pars. 57 and 58).
Springs out of line.	Check and tighten U-bolt hanger assemblies (par. 58 b).
Center bolt loose.	Tighten center bolt nut (par. 58 a).
Clip bolts loose.	Tighten clip bolt nuts (par. 58 a).
U-bolt nuts loose.	Tighten U-bolt nuts (par. 58 b).
Center bolt sheared.	Remove spring and replace center bolt (pars. 57 and 58).

SUSPENSION

b. Trailer Weaves.

Possible Cause	Possible Remedy
Axle nut loose.	Tighten and adjust wheel bearings (par. 35).
Axle out of line.	Check radius rod for worn bushings, loose adjusting nuts, and aline axle (par. 54).
Axle bent.	Replace axle (pars. 59 and 60).
Spring assembly loose.	Tighten all nuts. Aline axle (pars. 54 and 58).
Radius rod loose.	Tighten all nuts (par. 56).

54. AXLE ALINEMENT.

a. **Level Trailer.** Pull trailer onto a level surface; lower parking gear and auxiliary parking gear and disconnect from tractor.

b. Remove Hub Caps.

(1) MODELS NOS. D-11-B AND SC-600. Remove retaining screws and lift off hub cap to expose center point in end of axle.

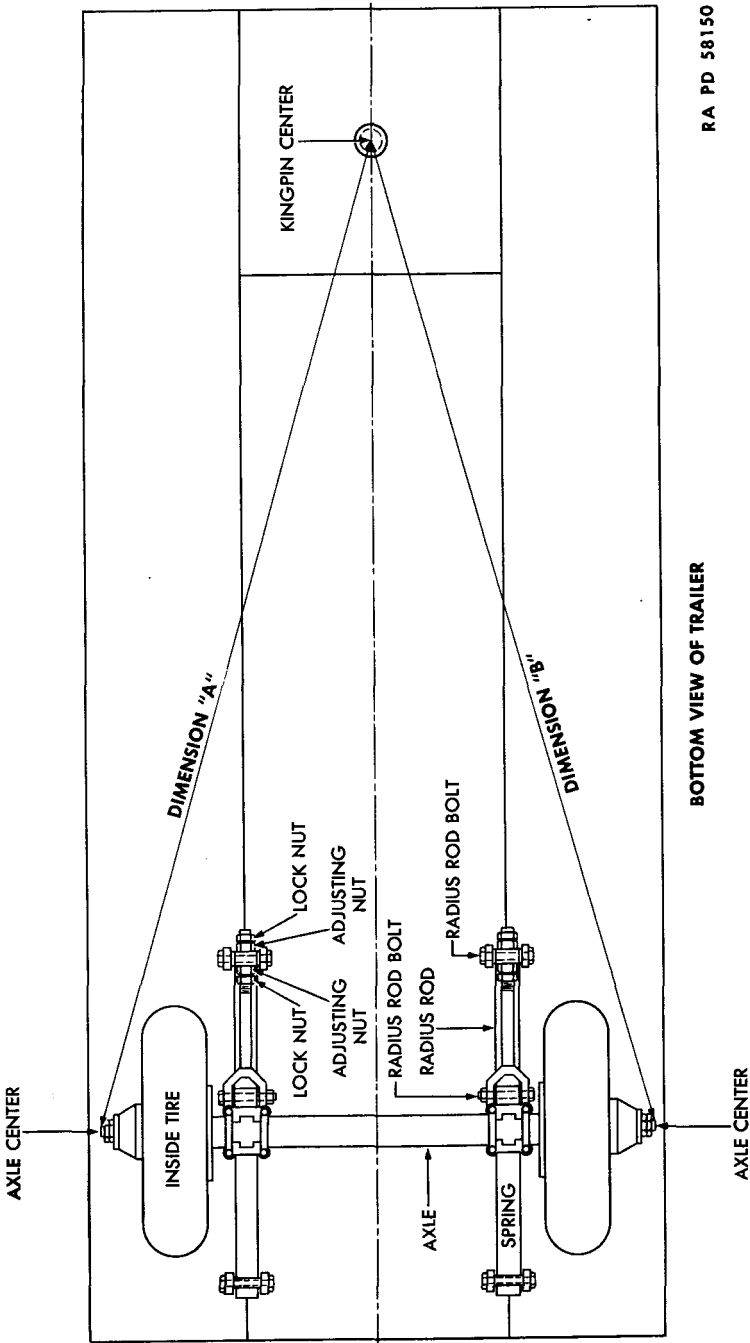
(2) MODEL NO. 2-GC. Unscrew hub cap with hub cap wrench and hammer to expose center point in end of axle.

c. **Remove Outer Wheels.** Remove outer wheels only (par. 27). Lower vehicle to ground.

d. **Check Axle Alinement** (fig. 25). Drop a plumb line from center point of each end of axle and make a mark on the floor directly under each center point. Drop a plumb line from the center point of the kingpin and make a mark. Measure the distance "A" and "B", of the points established on the floor, with a measuring tape. Distances "A" and "B" must be equal or within $\frac{1}{8}$ inch. NOTE: The floor, or ground, must be level for an accurate check. Inspect the spring assemblies for damaged parts, and spring bolts and nuts for tightness, before proceeding, as these parts must be in correct position, and the bolts holding the spring assemblies to the axle must be tight.

e. **Adjust Axle Alinement.** NOTE: If difference in alinement dimensions ("A" and "B", fig. 25) is greater than $\frac{1}{8}$ inch, the axle must be shifted slightly relative to the kingpin. This is accomplished by adjusting length of radius rods to alter dimensions ("A" or "B", fig. 25). To shorten distance ("A" or "B", fig. 25) loosen lock and adjusting nuts at front of rod knuckle, and draw up on adjusting nut at rear of rod knuckle. Alternate above procedures until the difference between ("A"

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BOTTOM VIEW OF TRAILER

Figure 25—Axle Alining Diagram

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and "B", fig. 25) measures $\frac{1}{8}$ inch or less. After correct adjustment, tighten loose adjusting and lock nuts on rods.

f. Install Hub Cap.

(1) MODELS NOS. D-11-B AND SC-600. Install hub cap; insert retaining screws; and tighten.

(2) MODEL NO. 2-GC. Screw hub cap on and tighten securely with hub cap wrench and hammer.

g. Install Outer Wheels. Proceed as in paragraph 28.

55. RADIUS ROD REMOVAL.

a. **Jack Up Vehicle.** Lower parking gear to extreme lowered position. Lower auxiliary parking gear. Place blocks in front and behind dual wheels opposite side to be serviced. Jack frame high enough to relieve tension on spring. **BLOCK UP FRAME SO THAT IT IS SAFE TO WORK UNDER THE VEHICLE.**

b. **Remove Radius Rod.** Remove cotter pin, and castellated nut, from front radius rod bolt. Tap out bolt. Remove cotter pin and castellated nut from radius rod rear bolt. Tap out bolt. Remove radius rod assembly (fig. 24).

56. RADIUS ROD INSTALLATION.

a. **Install Radius Rod** (fig. 24). Place radius rod assembly in position so that rod yoke holes line up with hole in spring seat boss. Tap bolt into hole. Install castellated nut on bolt and tighten nut. Lock nut with cotter pin and bend back cotter pin. Position radius rod so that rod knuckle hole lines up with front spring hanger holes and install bolt. Install castellated nut on bolt and tighten nut. Install cotter pin in nut and bend back cotter pin. Remove blocking; lower trailer; and remove jack. Adjust axle alinement (par. 54).

57. SPRING LEAF REMOVAL.

a. **Jack Up Frame.** Proceed as in paragraph 55 a.

b. **Remove Spring Assembly.** Remove nut and lock washer from rear spring hanger bolt. Tap out bolt (drift and hammer), and remove spacer. Remove U-bolt nuts from U-bolts and pull U-bolts from spring pressure plates. Remove spring pressure plates. Lift overload spring assembly until center bolt nut is free of recess, and remove. Slide main spring assembly rearward, until front end is free of hanger, and lower to ground (fig. 24).

c. **Remove Spring Leaf.** Remove nuts from spring clip bolts and pull out bolts and spacers. Remove nut from spring center bolt and pull out center bolt. Remove broken leaf.

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58. SPRING LEAF INSTALLATION.

a. Install Spring Leaf. Assemble spring leaves with new leaf in position; line up leaf holes and insert new center bolt. Clamp all leaves together. Tighten C-clamp until center bolt nut can be started on center bolt threads. Tighten center bolt nut. Install spring clip bolts, spacers, and nuts. Tighten clip bolt nuts. Remove C-clamp.

b. Install Spring Assembly. Slide main spring assembly forward until front end enters front spring hanger; then rearward, until both hangers straddle spring ends. Position main spring on spring seat with spring center bolt nut in spring seat recess. Place spring center plate in position on top of main spring assembly. Position overload spring assembly on spring center plate with center bolt nut in recess. Install pressure plates and U-bolts; tighten U-bolt nuts. Lower trailer. Slide spacer on spring hanger bolt, and install bolt in rear spring hanger. Install washer and nut on bolt. Tighten nut. Remove jack and blocks. Aline axle (par. 54).

59. AXLE REMOVAL.

a. Raise Rear End of Trailer. Lower landing gear and auxiliary landing gear to extreme lowered positions. Raise rear end of trailer by using chain hoist with chain wrapped around rear of frame. Raise unit just high enough to relieve the tension on the springs and block up frame.

b. Remove Brake Control Line Connections. Loosen screw in hose clamp, and pull hose free from connection.

c. Remove Rear Spring Hanger Bolt and Disconnect Radius Rod at Axle. Remove nut and lock washer from rear spring hanger bolt (fig. 24). Tap out bolt and remove spacer. Remove nut from radius rod rear bolt. Tap out bolt and remove. Detach rear of radius rod from spring seat boss.

d. Remove Axle Spring and Wheel Assembly. Raise trailer frame with chain hoist slightly higher, and roll axle, brake, spring and wheel assembly from under frame.

e. Remove Spring Assembly from Axle.

(1) **MODELS NOS. D-11-B AND SC-600.** Remove U-bolt nuts from U-bolts, and pull U-bolts out of spring pressure plates and spring seats. Remove pressure plate from springs. Lift springs from spring seats and lower to ground.

(2) **MODEL NO. 2-GC.** Proceed as in paragraph 59 e (1). After springs are removed, remove spring seats, and be certain that dowel pins are firmly pressed in the axle so that they will not be misplaced.

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- f. **Remove Hub and Drum Assembly.** Proceed as in paragraph 32.
- g. **Remove Oil Seal and Inner Bearing Assembly.** Remove inner bearing cone and roller assembly from axle. Clean inner bearing cone and roller assembly with SOLVENT, dry-cleaning. Dry bearing and pack by hand with GREASE, general purpose, No. 2. Drive oil seal off axle and remove from spindle.
- h. **Remove Brake Shoe Assembly.** Proceed as in paragraph 41.
- i. **Removal of Brake Camshaft Controls.** Remove (right and left) two nuts, washers and bolts from camshaft coupling. Remove camshaft coupling.

60. AXLE INSTALLATION.

- a. **Install Brake Shoe Assembly.** Install brake shoe assembly according to procedure in paragraph 42. Install coupling. Position auxiliary camshaft. Install bolts, hammers and nuts. Tighten nuts.
- b. **Install Brake Control Line Connections.** Replace the nuts connecting brake control lines with the backing plate and tighten.
- c. **Install Oil Seal and Inner Bearing Assembly.**

(1) MODELS NOS. D-11-B AND SC-600. Slide new oil seal over spindle and tap seal against axle shoulder. Slide inner bearing cone and roller assembly over spindle and tap bearing assembly tight against oil seal.

(2) MODEL NO. 2-GC. Fit new felt in groove in oil seal, or replace with complete new oil seal, if old one shows signs of wear, and slide oil seal over spindle. Tap against axle shoulder. Slide inner bearing cone and roller assembly over spindle and tap bearing assembly tight against oil seal.

- d. **Install Wheel and Hub Assembly.** Proceed as in paragraph 37.

- e. **Install Spring Assembly on Axle.**

(1) MODELS NOS. D-11-B AND SC-600. Place main spring assembly in position on spring seat with center bolt nut resting in seat recess. Place spring center plate on top of main spring assembly, and place overload spring in position with center bolt nut resting in recess. Insert U-bolts through spring plates and spring seat. Install and tighten U-bolt nuts (fig. 24).

(2) MODEL NO. 2-GC. Set spring seats on axle, fitting them over dowel pins; then proceed with axle assembly as in paragraph 60 e (1).

- f. **Install Axle, Spring, and Wheel Assembly.** Roll axle, brake spring, and wheel assembly into position under trailer frame. Lower trailer part way and guide front ends of springs into front spring hangers. Lower trailer frame further until rear spring hangers straddle the top main spring leaves, and the spring hanger lower wear plates contact the spring top main leaf.

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g. Remove Blocking and Chain Hoist. Remove blocking. Lower chain hoist, and remove chain from rear of frame. Retighten all U-bolt nuts.

h. Connect Radius Rods and Rear Spring Hanger Bolts. Install bolt and spacer in rear spring hanger. Install lock washer and nut on hanger bolt and tighten nut. Position disconnected end of radius rod so that rod holes line up with hole in spring seat boss. Connect rod to seat boss with bolt. Install castellated nut on rod bolt and tighten nut. Lock nut with cotter pin and bend back cotter pin.

i. Aline Axle. Proceed as in paragraph 54.

Section XIV
LANDING GEAR

	Paragraph
Description and tabulated data	61
Trouble shooting	62
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Maintenance and adjustments	64
Installation	65

61. DESCRIPTION AND TABULATED DATA.

a. Description. The landing gear is attached to the underside of the frame near the center and is used as a temporary support, or whenever the trailer is uncoupled from the tractor. The landing gear legs are adjustable for height to accommodate variations with which the trailer may be required to operate.

b. Operation (fig. 26). The landing gear is operated through a worm screw and miter gears by a hand crank, located on the right side of the trailer. Remove crank handle from carrier hook; swing upward and, when the hole in the crank is lined up with the shaft, push crank onto shaft. Lower wheels by turning crank in a clockwise direction and raise wheels by turning in counterclockwise direction. The trailer should never be moved along the ground with the landing gear wheels down. They should always be in retracted position before the trailer is set in motion.

c. Tabulated Data.

Model	1-LG
Type	Retractable
Make	Dayton

62. TROUBLE SHOOTING.

a. Landing Gear Operates Hard.

Possible Cause	Possible Remedy
Lack of grease in gear housing.	Lubricate
Dry hand crank bearings.	Oil
Bowed screw box housing.	Straighten or replace.
Bent back or cross braces.	Straighten or replace.

b. Landing Gear Will Not Operate.

Miter gears not in mesh.	Adjust
Miter gear teeth stripped.	Replace
Hand crankshaft coupling bolts sheared.	Replace

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- A—CRANK ARM
- B—CRANK HOLDER
- C—CRANK BRACKET (OUTBOARD BEARING)
- D—CRANKSHAFT
- E—WORM SCREW HOUSING
- F—HANGER BRACKET PIN
- G—FRAME HANGER BRACKET
- H—CRANK SHAFT COUPLING
- I—MITRE GEAR COVER
- J—UPPER LEGS
- K—LEG NUTS AND BOLTS
- L—LOWER LEG
- M—BACK BRACE PIN AND COITER
- N—WHEELS
- O—CRANK HANDLE
- P—BACK BRACE NUT AND SCREW
- Q—BACK BRACES
- R—HUB CAP, BOLT, NUT AND LOCK WASHER
- S—HUB CAP
- T—CROSS BRACE
- U—BACK BRACE ASSEMBLY
- V—CROSS BRACE NUT
- W—CROSS BRACES
- X—AXLE

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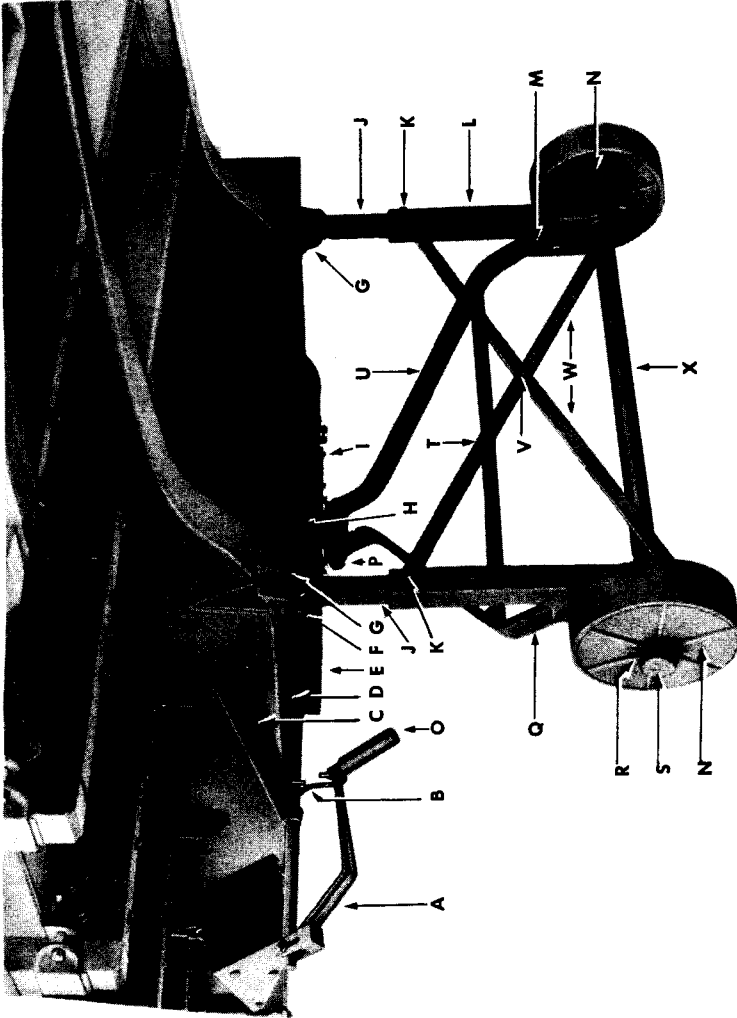


Figure 26—Landing Gear

LANDING GEAR

63. REMOVAL.

a. **Remove Back Braces.** Remove nuts, washers, and bolt from screw nut assembly. Remove cotter pin and pin from lower leg. Remove braces (fig. 26).

b. **Remove Legs from Frame Brackets.** Remove cotter pins from each bracket pin and tap out pins. The landing gear assembly may then be removed from the brackets.

c. **Remove Upper Leg from Lower Leg.** Remove three nuts, washers, and bolts holding leg in position. Remove legs.

d. **Remove Wheels.** Remove bolts, nuts, and lock washers from hub caps, holding bolt head with wrench. Slide wheels from axle.

e. **Remove Axle.** Loosen axle clamping bolts at the lower end of the leg and drive out axle.

f. **Remove Cross Braces.** Remove nuts, lock washers, and bolts, attaching cross braces to legs, and remove braces. NOTE: Cross braces may be separated by removing center bolt.

64. MAINTENANCE AND ADJUSTMENTS.

a. Clean all parts in SOLVENT, dry-cleaning.

b. Inspect all parts for fractures. Check back braces, cross braces, leg assemblies, and axle for distortion. Straighten, or replace, defective parts. Replace all worn hanger pins. Inspect threads on bolts and nuts, and replace if stripped or burred.

c. The landing gear legs should be adjusted for length so that they are not more than two inches off the ground when the tractor-truck and trailer are coupled on level ground. This adjustment is made by removing the leg adjusting bolts and replacing them into holes which give the proper adjustment.

65. INSTALLATION.

a. **Install Cross Braces.** Place the cross braces on the legs so that the bolt holes line up, and install bolts, nuts, and lock washers. NOTE: Do not tighten cross brace bolts solid until axle has been installed (fig. 26).

b. **Install Axle.** Drive axle through the leg clamp bearings so that the axle extends the same distance on each side of the legs. Tighten clamp bolts.

c. **Install Leg on Frame Brackets.** Position the legs in frame brackets. Insert and tap bracket pin through bracket and leg bearing, and install cotter pins.

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d. Install Upper Leg on Lower Leg. Position upper leg into lower leg. Insert bolts. Install nuts and tighten.

e. Install Wheels. Slide wheels on axle. Position hub cap on axle so that bolt holes line up, and install bolts, nuts, and lock washers.

f. Install Back Braces. Position back braces on screw nut assembly, and install bolt, washer, and two nuts. Position lower brace to lower leg. Insert pin. Install cotter pin.

Section XV

LANDING GEAR OPERATING MECHANISM

	Paragraph
Description	66
Trouble shooting	67
Removal	68
Maintenance	69
Installation	70

66. DESCRIPTION.

a. **Description.** The landing gear operating mechanism is attached on the underside of the two central frame crossmembers. The principal parts consist of a hand crank, hand crankshaft, coupling, a long worm screw and nut, with a guide bracket attached, which is connected to the landing gear back braces. A pair of miter gears, one gear on the hand crankshaft, the other on the worm screw shaft, provides the means for rotating the worm screw (fig. 26).

b. **Operation.** Turning the crank handle in either direction rotates the worm screw. The nut and guide brackets, which are connected to the landing gear back braces, follow the thread of the worm screw, thereby raising or lowering the landing gear, depending on the direction of rotation.

67. TROUBLE SHOOTING.

a. Refer to paragraph 62.

68. REMOVAL.

a. **Remove Gear Housing Cover Plate.** Remove nuts from cover plate studs and lift off cover plate (fig. 26).

b. **Remove Hand Crank Connecting Sleeve, Crank, and Shaft.** Remove bolt, nut and lock washer from each end of the sleeve. Pull hand crank and shaft from bearing and remove sleeve from miter gear shaft.

c. **Remove Hand Crank Miter Gear, Thrust Bearing, and Shaft.** Drive taper pin from gear hub and drive shaft from gear. The thrust bearing, sleeve, gear and shaft are then removed.

d. **Remove Miter Gear, Thrust Bearing, and Sleeve from Worm Shaft.** Remove jam nut from end of worm screw shaft, and drive out the gib key from the gear hub. The gear, thrust bearing, and sleeve may then be removed by tapping the gear off the end of the worm screw.

e. **Remove Worm Screw Rear Thrust Bearing, Worm Screw, and Guide Bracket.** Remove bolt, nut, and lock washer at rear of worm screw housing. Push the worm screw back until the thrust bearing is out of the housing and remove bearing from end of worm screw. Then pull the worm screw and guide bracket from the housing.

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f. Remove the Guide Bracket from Worm Screw. Hold the guide bracket and turn the worm screw until bracket is free from the worm screw.

69. MAINTENANCE.

a. Inspect the following parts and replace if defective or worn beyond operating limits.

- (1) Clean all parts in **SOLVENT**, dry-cleaning.
- (2) Inspect miter gear and worm gear teeth for cracked, chipped, or broken teeth, and replace defective gears.
- (3) Inspect thrust bearing and sleeve for wear and bent worm screw.
- (4) Inspect worm screw teeth and worm screw nut threads.
- (5) Inspect hand crank for bent handle and shaft. **NOTE:** The worm screw and gear housing is one piece welded to the frame and can only be removed by burning the weld loose.

70. INSTALLATION.

a. Install Guide Bracket on Worm Screw. Start the guide bracket nut on the worm screw, and holding the bracket, turn worm screw until bracket is at front end of screw (fig. 26).

b. Install Worm Screw, Guide Bracket, and Rear Thrust Bearing in Housing. Place the thrust bearing on the rear end of the worm screw and slide the worm screw and bracket assembly in the housing until the thrust bearing lines up with the bolt holes in the housing. Secure rear thrust bearing by installing bolt, nut, and lock washer, through rear end of housing.

c. Install Miter Gear, Thrust Bearing, and Sleeve on Worm Screw. Place the sleeve, thrust bearing, and gear on the front end of the worm screw, lining up the keyway on the worm screw shaft and gear hub. Install gib key and secure with jam nut.

d. Install Hand Crank Miter Gear, Thrust Bearing Sleeve and Shaft. Place the thrust bearing and sleeve on the shaft and install in hole in gear housing. With the gear teeth in mesh, tap the gear on the end of the shaft at the same time lining up the taper pin holes in the gear hub and shaft. Secure by inserting and driving home taper pin.

e. Install Hand Crank Connecting Sleeve, Crank and Shaft. Slide the connecting sleeve on the gear shaft, and the hand crankshaft through the bracket bearing. Install crank holder on hand crankshaft and enter the hand crankshaft in the connecting sleeve. Line up the bolt holes and install bolts, nuts, and lock washers.

f. Install Gear Housing Cover Plate. Position cover plate on the gear housing studs and install nuts.

Section XVI

AUXILIARY SUPPORTS

	Paragraph
Description and tabulated data	71
Trouble shooting	72
Leg removal	73
Leg installation	74

71. DESCRIPTION AND TABULATED DATA (fig. 27).

a. Description. The auxiliary landing gear is located on both sides of the trailer near the front, and is used to help support the load whenever the trailer is detached from the tractor. The legs are adjustable for height on a jack screw to accommodate variations with which the trailer may be required to operate.

b. Operation. Each auxiliary support is operated by unscrewing the wing nut and releasing the latch holding it upright against the body, and pulling it away from the body until the chain at the top of the leg is tight, to provide maximum clearance for the tractor tires. Swing leg down. Place base plate directly under ball socket of leg, so leg will fit it when fully lowered. Adjust leg to desired length before uncoupling tractor, making sure it is approximately two inches off the base plate, so that the auxiliary supports will not carry the entire load when trailer is uncoupled from tractor. Raise by reversing procedure.

c. Tabulated Data.

ModelD-81881 Make.....Edwards

72. TROUBLE SHOOTING.

a. Auxiliary Support Operates Hard.

Possible Cause	Possible Remedy
Lack of grease on jack screw	Grease
Leg bent or damaged	Straighten or replace

73. LEG REMOVAL.

a. Remove Lower Leg. Unscrew wing nut and release latch holding leg upright against body. Pull away from body, keeping leg in upright position. Grasp the top of the lower leg with the left hand, helping to clear the chain and base plate. Turn leg clockwise on jack screw until disassembled (fig. 27).

74. LEG INSTALLATION.

b. Install Lower Leg. Hold upper leg with jack screw in vertical position. Fit lower leg on jack screw and turn counterclockwise (fig. 27). Push into body. Replace latch and tighten wing nut.

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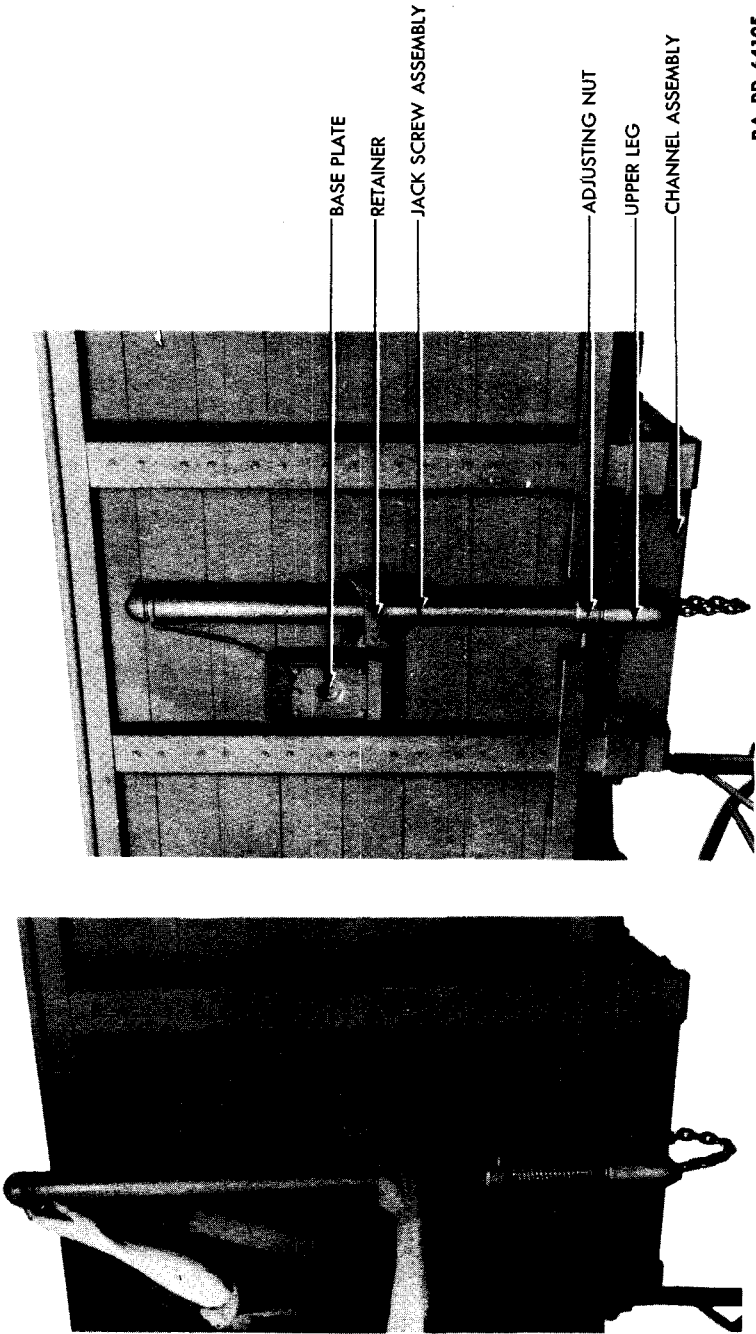


Figure 27—Auxiliary Supports

Section XVII

ELECTRICAL SYSTEM

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Maintenance for system.....	77
Blackout combination tail and stop light removal.....	78
Blackout combination tail and stop light installation.....	79
Blackout combination tail and stop light sealed lamp removal... ..	80
Blackout combination tail and stop light sealed lamp installation	81

75. DESCRIPTION AND TABULATED DATA (fig. 28).

a. Description. The wiring diagram shows the complete wiring for the trailer, including the location of lights. Two combination blackout stop and taillights are located at rear of the trailer. Each light has two sealed lamp units which can be replaced by removing the screws on the light door. The trailer electrical system functions through the electrical system of the towing tractor-truck, and a female socket mounted in the center of the front crossmember of the trailer provides the connection.

b. Tabulated Data for System.

(1) COMBINATION BLACKOUT STOP AND TAILLIGHT.

Make: KD — Type: OMO8243X — Model: 951-I-6.

(2) SEALED LAMP UNITS.

Make: KD — Model: Lower 8040 — Upper 8041.

(3) COUPLING SOCKET.

Make: Warner — Type: Elec. — Model: 3604.

76. TROUBLE SHOOTING FOR SYSTEM.

a. Dim or No Lights.

Possible Cause	Possible Remedy
Loose or dirty terminals	Clean and tighten
Leak in wires	Check entire circuit for broken insulation
Discharged battery in towing vehicle	Replace battery in towing vehicle
No current from towing vehicle	Check wiring
Lamps burned out	Replace sealed lamp units

77. MAINTENANCE FOR SYSTEM.

a. General. Repair consists of replacement of defective parts of the electrical system with serviceable parts.

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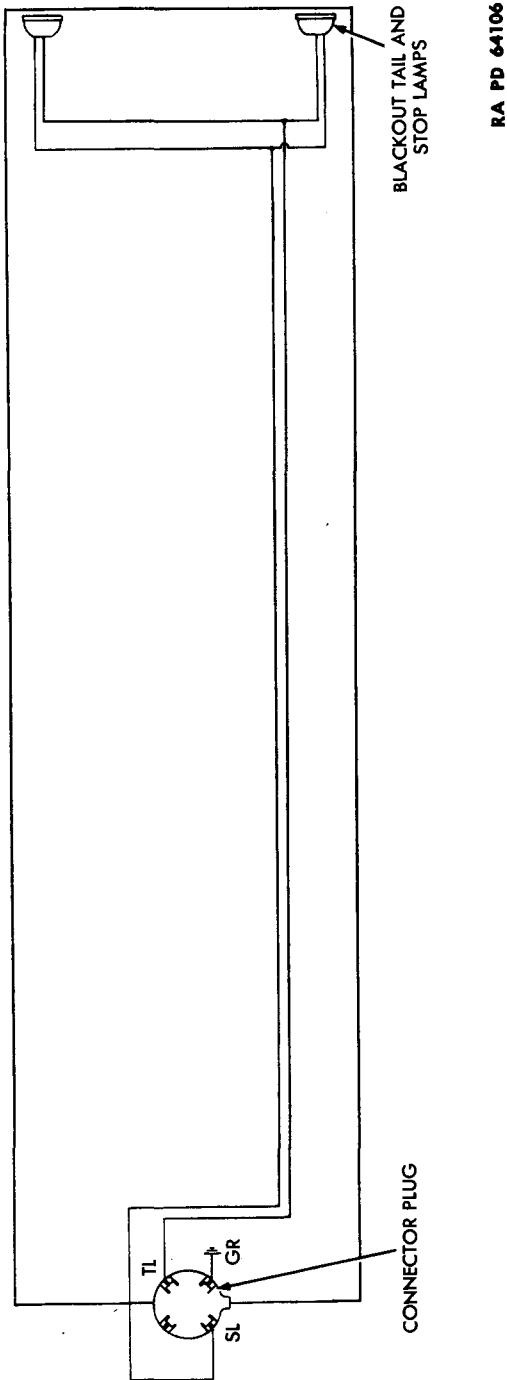


Figure 28—Wiring Diagram

ELECTRICAL SYSTEM

b. Wiring Circuit.

- (1) Examine wiring for breaks, worn or frayed insulation.
- (2) Inspect wires for loose terminal and socket plugs.
- (3) See that wires are in their proper location to eliminate the possibility of chafing, and tighten loose wire-holding clips.

c. Coupling Socket.

- (1) Inspect wire terminals for loose connection at terminal posts.
- (2) Place tractor-truck electric cable plug in trailer coupling socket. Turn on light switch in tractor-truck and see if contact has been made.
- (3) Inspect cable plug connection.

78. BLACKOUT COMBINATION TAIL AND STOP LIGHT REMOVAL.

a. **Disconnect Wires.** Unlock the red (stop) plug from the upper socket of the lights by a twist to the left and disconnect. Unlock black (tail) plug from lower socket of the lights similarly and disconnect.

b. **Remove Light Assembly.** Remove nuts and lock washers from studs attaching light to bracket and lift light assembly from bracket.

79. BLACKOUT COMBINATION TAIL AND STOP LIGHT INSTALLATION.

a. **Install Light Assembly.** Position the light assembly on bracket and secure with stud nuts and lock washers.

b. **Connect Wires.** Insert red (stop) plug in upper socket of light and lock with twist to the right. Insert black (tail) plug in lower socket of lights and similarly lock.

80. BLACKOUT COMBINATION TAIL AND STOP LIGHT SEALED LAMP REMOVAL.

a. **Remove Cover.** Remove the screws attaching light cover to light body and remove.

b. **Disconnect Wires.** Proceed as in paragraph 78.

c. **Remove Lamp Units.** Slide sealed lamp units from lamp body.

81. BLACKOUT COMBINATION TAIL AND STOP LIGHT SEALED LAMP INSTALLATION.

a. **Install Lamp Units.** Slide sealed lamp units into position in light body.

b. **Install Cover.** Position cover on light body, lining up screw holes and secure with screws.

c. **Connect Wires.** Proceed as in paragraph 79.

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Section XVIII

SPARE WHEEL AND CARRIER

	Paragraph
Description	82
Maintenance	83

82. DESCRIPTION.

a. The spare wheel and tire is bolted to a steel bracket mounted on the stakes at the front of the body. Three studs and nuts on the bracket secure the spare wheel and tire to the bracket (fig. 2).

83. MAINTENANCE.

a. Precaution should be taken to see that the nuts holding the steel bracket to the stakes and those holding the spare wheel and tire to the bracket are kept tight at all times.

Section XIX

BODY

	Paragraph
Description	84
Maintenance	85
Body panel removal	86
Body panel installation	87
Tailgate removal	88
Tailgate installation	89
Floor board removal	90
Floor board installation	91

84. DESCRIPTION (fig. 29).

a. The body is of the cargo type. The main parts consist of a platform or bed, front and side panel assemblies, and a tailgate, bolted together. The side panels are made in one section having nine support stakes. The front is also a single panel with four support stakes having the same construction as the side panels. The body panels are held in position on the platform by the stakes, which fit into stake clamps located on the ends of the outriggers and bolsters. Rear corner angle braces and front post angles, held by bolts, join the front and side sections firmly together. The tailgate is attached to the platform by mainpins running through hinges.

85. MAINTENANCE.

a. Examine flooring for broken or damaged boards. Tighten all body bolts and stake clamps. Examine angle braces and stake clamps for loose or broken parts, and missing bolts. Inspect for broken body panels.

86. BODY PANEL REMOVAL (fig. 30).

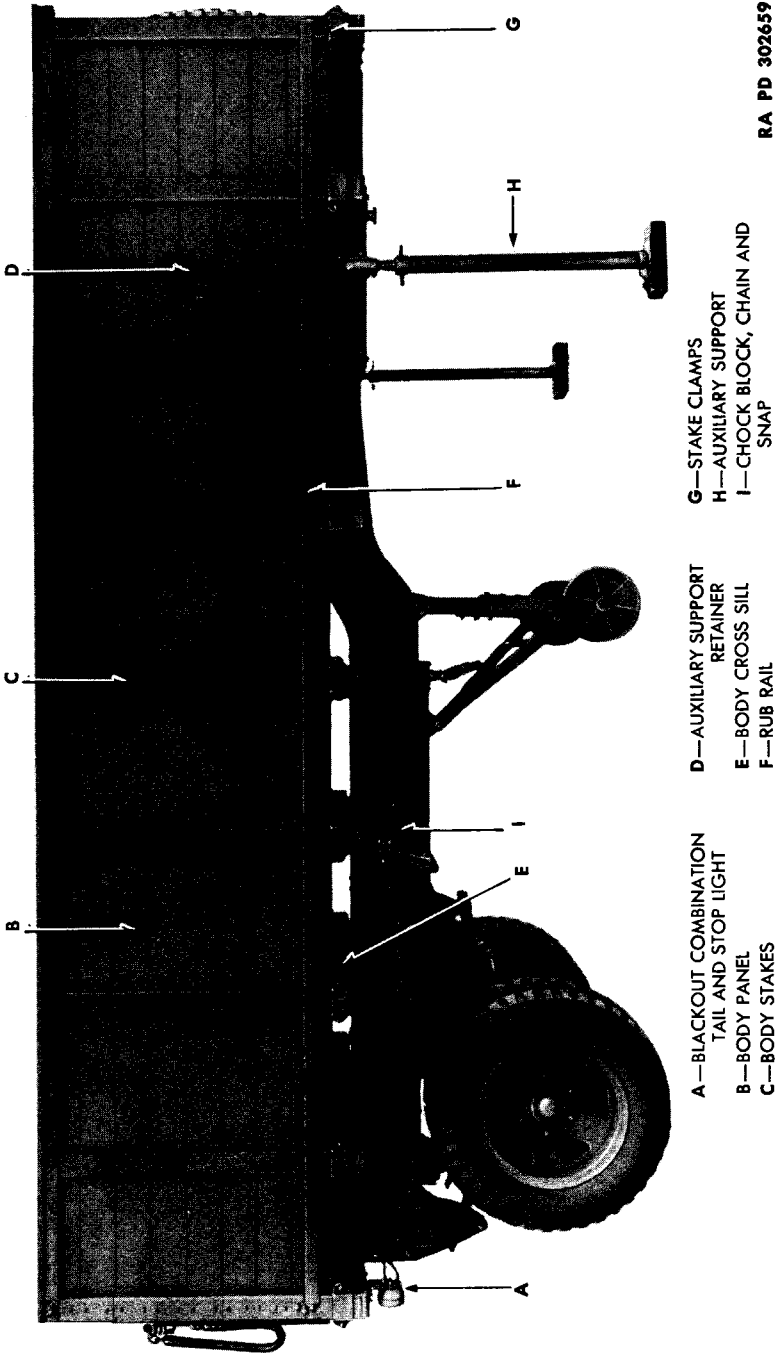
a. **Release Rear Corner Angle Braces.** Unscrew nuts and free rear corner angle braces.

b. **Free Front Post Angles.** Remove nuts and bolts from right- and left-hand front post angles.

c. **Remove Stake Clamp Bolts.** Unscrew nuts and remove all clamp bolts of side panels except those at each corner.

d. **Remove Side Panels.** Two men are required for this operation; one at the front and one at the rear. Remove nuts and clamp bolts from front corner stake. While man at front steadies panel, remove bolts from rear corner stake. Lift side panel and lower to ground. Repeat operation on opposite side.

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A—BLACKOUT COMBINATION
TAIL AND STOP LIGHT
B—BODY PANEL
C—BODY STAKES

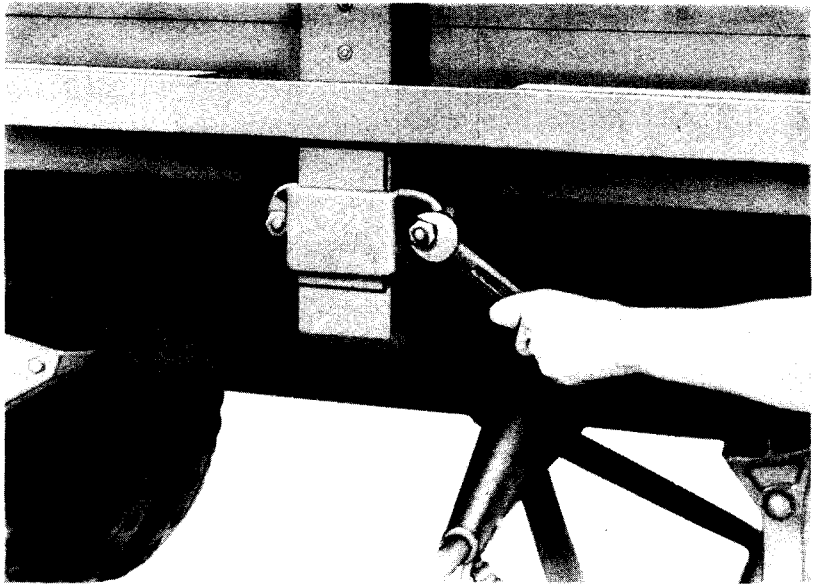
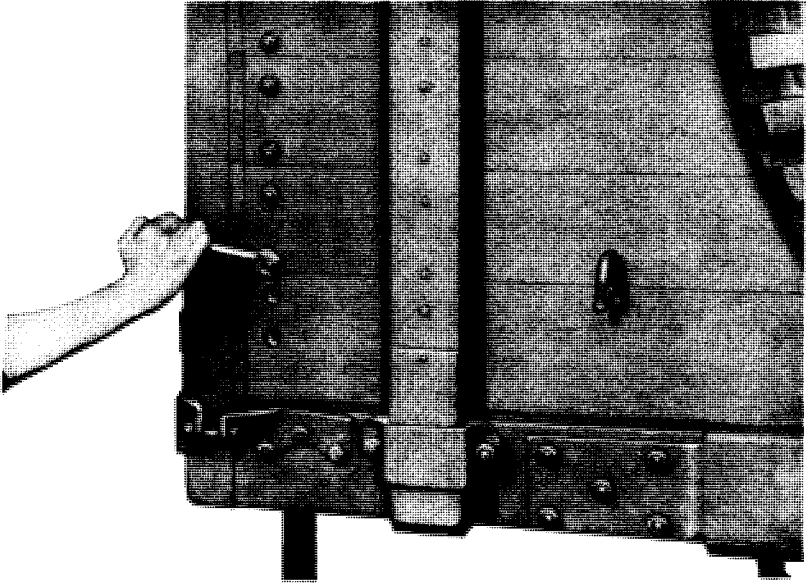
D—AUXILIARY SUPPORT
RETAINER
E—BODY CROSS SILL
F—RUB RAIL

G—STAKE CLAMPS
H—AUXILIARY SUPPORT
I—CHOCK BLOCK, CHAIN AND
SNAP

RA PD 302659

Figure 29—Body Installed

SPARE WHEEL AND CARRIER



RA PD 64107

Figure 30—Body Panel Removal

7-TON SEMITRAILER, PANEL CARGO

e. **Remove Front Panel.** Remove nuts and clamp bolts holding front panel in position. Lift front panel out of pockets and lower to ground.

87. BODY PANEL INSTALLATION.

a. **Install Front Panel.** Be sure front panel stake clamps are in place. Position front panel, replace bolts and nuts and tighten.

b. **Install Side Panels.** Lay side panel on ground with stakes up. See that each clamp plate is fitted on the stake and located $\frac{1}{4}$ inch above the bottom of the stake reinforcing plate. Lift side panel into place with one man at each end. Install end stake clamp bolts first. Then install intermediate stake clamp bolts. Tighten nuts. Repeat on opposite side.

c. **Bolt Angle Braces.** Install nuts on bolts of rear corner angle braces and secure by tightening.

d. **Install Front Post Angles.** Bolt sides to front panel by installing bolts and nuts in right and left hand front post angles. Tighten.

e. **Secure Stake Pockets.** Secure stakes firmly by tightening all nuts on all stake pockets.

88. TAILGATE REMOVAL.

a. **Remove Tailgate.** Remove tailgate chain pins from tailgate lugs and free chains. Pull cotter pins in mainpin and remove mainpin from hinge, being sure to hold tailgate during this operation so it will not drop of its own weight and be damaged. Lift off tailgate.

89. TAILGATE INSTALLATION.

a. **Install Tailgate.** Position tailgate fitting hinge sections on tailgate and on platform together. Push mainpin through hinge. Install cotter pins and crimp to secure. Replace tailgate chain pins in tailgate lugs to hold chain in place.

90. FLOOR BOARD REMOVAL.

a. **Remove Tailgate.** Remove tailgate as in paragraph 88 a.

b. **Remove Tailgate Hinge and Threshold Assembly.** Unscrew nuts on bolts holding tailgate hinge and threshold assembly to bolster and remove bolts. Lift off tailgate hinge and threshold assembly.

c. **Remove Wear Strips and Floor Board.** Unscrew nuts and remove bolts projecting through skid strips and bolsters underneath body. Also unscrew nuts and remove bolts projecting through wood flooring.
NOTE: If board to be removed is located over upper fifth wheel plate,

BODY

unscrew and remove wood screws from that portion of the floor. Pry floor wear strips loose and lift out. Pry floor boards loose and lift out.

91. FLOOR BOARD INSTALLATION.

a. Install Floor Board and Wear Strips. Place all floor boards in position on top of bolsters and outriggers of platform assembly. Place floor wear strips in position on the floor slots.

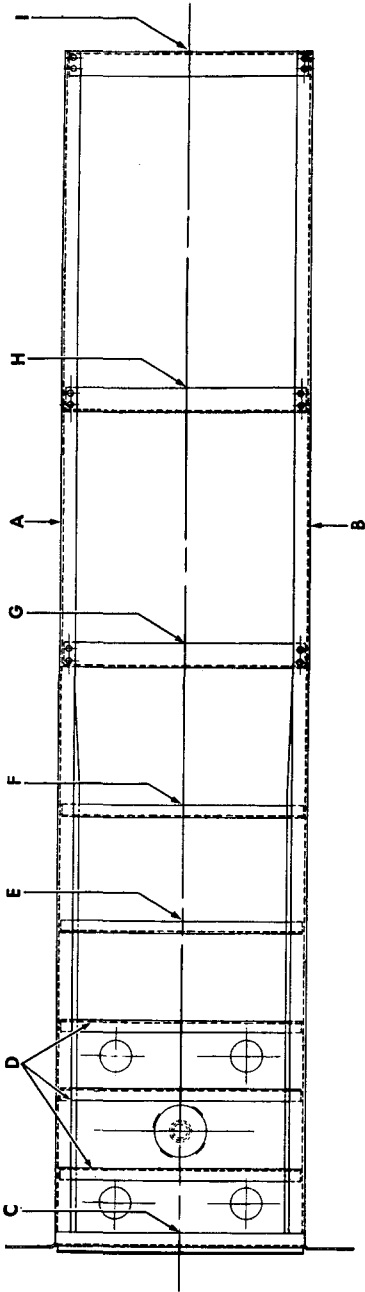
b. Install Floor Platform on Chassis. Install bolts which extend through wood flooring; attach nuts and tighten. Also insert bolts which project through skid strips and bolsters underneath body; attach nuts and tighten. **NOTE:** If board to be replaced is over upper fifth wheel plate, replace wood screws and tighten.

c. Install Tailgate Hinge and Threshold Assembly. Attach screws and tighten.

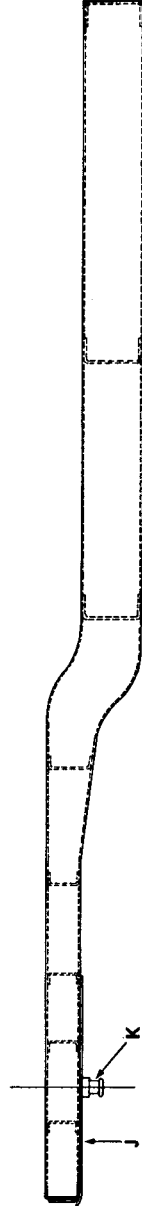
d. Install Tailgate. Install tailgate as in paragraph 89 a.

e. Stake Nuts. Stake all nuts on under side of platform.

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- | | |
|--|-------------------------------|
| A — SIDE RAIL (RIGHT) | F — CROSSMEMBER AHEAD OF DROP |
| B — SIDE RAIL (LEFT) | G — CROSSMEMBER AT DROP |
| C — FRONT CROSSMEMBER | H — CROSSMEMBER AT SPRING PAD |
| D — CROSSMEMBER OVER FIFTH WHEEL PLATE | I — CROSSMEMBER REAR |
| E — CROSSMEMBER AHEAD OF TAPER | J — FIFTH WHEEL PLATE |
| | K — KING PIN |



RA PD 64108

Figure 31—Frame Assembly

Section XX

FRAME

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Frame description	92
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Upper fifth wheel description	94
Upper fifth wheel maintenance	95

92. FRAME DESCRIPTION (fig. 31).

a. The purpose of the frame is to provide a foundation for the trailer. It is constructed of pressed steel, riveted and welded together. Attached to the frame are the brackets for the springs, radius rods and landing gear, as well as the body crossmembers, outriggers and the upper fifth wheel plate and kingpin.

93. FRAME MAINTENANCE.

a. The frame can be damaged only by extreme overloading or collision or by other accidental means.

(1) Inspect frame for cracks in frame or at welds. When found, notify ordnance personnel.

(2) Inspect landing gear for loose or missing bolts.

94. UPPER FIFTH WHEEL DESCRIPTION.

a. The upper fifth wheel is composed of a kingpin welded or riveted to a pick-up plate, which, in turn, is welded to the frame.

95. UPPER FIFTH WHEEL MAINTENANCE.

a. Inspect upper fifth wheel plate for cracks. When found, notify ordnance personnel.

b. Inspect upper fifth wheel kingpin for wear. Inspect kingpin flange for broken weld.

7-TON SEMITRAILER, PANEL CARGO

REFERENCES

STANDARD NOMENCLATURE LISTS.

- 7-ton Semitrailer Panel Cargo (Edwards Iron Works) SNL G-544
 - 7-ton Semitrailer Panel Cargo (Gramm Truck & Trailer Corp.) SNL G-595
 - 7-ton Semitrailer Panel Cargo (W. C. Nabors Company) SNL G-546
 - Cleaning, preserving and lubricating materials, recoil fluids, special oils, and miscellaneous related items.. SNL K-1
 - Soldering, brazing and welding materials, gases and related items SNL K-2
 - Tool sets—motor transport SNL N-19
- Current Standard Nomenclature Lists are listed above.
 An up-to-date list of SNL's is maintained as the "Ordnance Publications for Supply Index"..... OPSI

EXPLANATORY PUBLICATIONS.

- List of publications for training FM 21-6

Automotive Materiel.

- Automotive brakes TM 10-565
- Automotive electricity TM 10-580
- Chassis, body, and trailer units TM 10-560
- Military motor vehicles AR 850-15
- Motor transport FM 25-10
- Motor transport inspections TM 10-545
- The motor vehicle TM 10-510

Camouflage.

- Camouflage FM 5-20
- Camouflage painting of vehicles and equipment FM 5-21

Care and Preservation.

- Cleaning, preserving, lubricating, and welding materials and similar items issued by the Ordnance Department TM 9-850
- Chemical decontamination materials and equipment.. TM 3-220
- Decontamination of Armored Force vehicles FM 17-59

REFERENCES

- Fire prevention, safety precautions, accidents TM 10-360
- Defense against chemical attack FM 21-40
- Explosives and demolitions FM 5-25

Maintenance and Repair.

- Detailed lubrication instructions for ordnance materiel. OFSB 6-Series
- Echelon system of maintenance TM 10-525
- Fire prevention, safety precautions, accidents TM 10-360
- Maintenance and care of pneumatic tires and rubber
treads TM 31-200
- Maintenance and repair TM 10-520
- Ordnance maintenance procedure: Materiel inspection
and repair TM 9-1100

Storage and Shipment.

- Registration of motor vehicles AR 850-10
- Rules governing the loading of mechanized and motor-
ized army equipment, also, major caliber guns, for
the United States Army and Navy, on open top
equipment Published by Operations and Main-
tenance Department of Association of American
Railroads.
- Storage of motor vehicle equipment AR 850-18
- Ordnance field service storage and shipment chart—
group G major items OSSC-6

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TM 9-882

7-TON SEMITRAILER PANEL CARGO

[A.G. 300.7 (6-3-43)]

BY ORDER OF THE SECRETARY OF WAR:

G. C. MARSHALL,
Chief of Staff.

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Major General,
The Adjutant General.

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