

TM 9-898

WAR DEPARTMENT TECHN

N5-61

**22-TON PAYLOAD, 6-WHEEL,
LOW-BED TRAILER
(FRUEHAUF MODEL CPT-22)**

RESTRICTED DISSEMINATION OF RESTRICTED MATTER

—No person is entitled solely by virtue of his grade or position to knowledge or possession of classified matter. Such matter is entrusted only to those individuals whose official duties require such knowledge or possession. (See also paragraph 23b, AR 380-5, 15 March 1944.)

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WAR DEPARTMENT
Washington 25, D. C., 28 April 1945

TM 9-898, 22-ton payload, 6-wheel, low-bed trailer (Fruehauf model CPT-22) is published for the information and guidance of all concerned.

[A.G. 300.7 (26 April 45)]

BY ORDER OF THE SECRETARY OF WAR:

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Chief of Staff.

OFFICIAL:

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The Adjutant General.*

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

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PART ONE

INTRODUCTION

Section I

General

1. SCOPE.

a. These instructions* are published for the information and guidance of all concerned. They contain information on operation and maintenance of the equipment, as well as descriptions of the major units and their functions in relation to the other components of this vehicle. They apply only to the 22-ton payload, 6-wheel, low-bed trailer (Fruehauf Model CPT-22), and are arranged in five parts: Part One, Introduction; Part Two, Operating Instructions; Part Three, Maintenance Instructions; Part Four, Auxiliary Equipment; and Part Five, Repair Instructions.

b. The appendix at the end of the manual contains instructions for shipment and limited storage, and a list of references including standard nomenclature lists, technical manuals, and other publications applicable to the vehicle.

2. RECORDS.

a. Forms and records applicable for use in performing prescribed operations are listed below with a brief explanation of each:

(1) W.D., A.G.O. FORM NO. 9-74, ARMY MOTOR VEHICLE OPERATOR'S PERMIT. This form will be issued by commanding officers of posts, camps, stations, or organizations, to all operators of military vehicles who have passed the driver's examination (TM 21-300) and are qualified to drive the particular vehicles noted on the permit.

(2) WAR DEPARTMENT LUBRICATION ORDER. War Department Lubrication Order No. 9-898 prescribes lubrication maintenance for this vehicle. A lubrication order is issued with each vehicle and is to be carried with it at all times.

(3) STANDARD FORM NO. 26, DRIVER'S REPORT-ACCIDENT, MOTOR TRANSPORTATION. One copy of this form will be kept with the vehicle at all times. In case of an accident resulting in injury or property damage, it will be filled out by the driver on the spot, or as promptly as practical thereafter.

(4) WAR DEPARTMENT FORM NO. 48, DRIVER'S TRIP TICKET AND PREVENTIVE MAINTENANCE SERVICE RECORD. This form, properly

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

executed, will be furnished to the driver when his vehicle is dispatched on a nontactical mission. The driver and the official user of the vehicle will complete in detail appropriate parts of this form. These forms need not be issued for vehicles in convoy or on tactical missions. The reverse side of this form contains driver's daily and weekly preventive maintenance service reminder schedule.

(5) W.D., A.G.O. FORM NO. 478, MWO AND MAJOR UNIT ASSEMBLY REPLACEMENT RECORD. This form, carried with the vehicle, will be used by all personnel completing a modification or major unit assembly replacement to record clearly the description of work completed, date, vehicle hours and/or mileage, and MWO number or nomenclature of unit assembly. Personnel performing the operation will initial in the column provided. Minor repairs, parts, and accessory replacements will not be recorded.

(6) W.D., A.G.O. FORM NO. 460, PREVENTIVE MAINTENANCE ROSTER. This form will be used for scheduling and maintaining a record of motor vehicle maintenance operations.

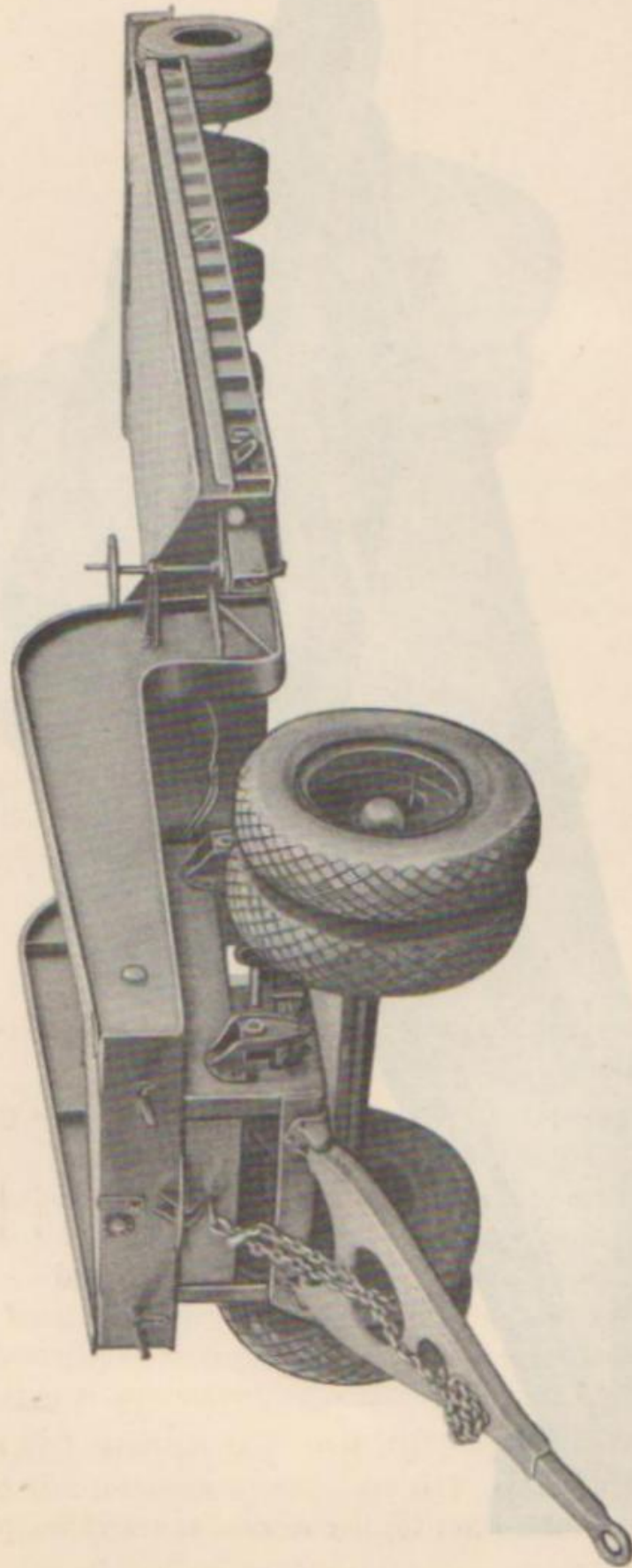
(7) W.D., A.G.O. FORM NO. 6, DUTY ROSTER. This form, slightly modified, can be used for scheduling and maintaining a record of vehicle maintenance operations, if W.D., A.G.O. Form No. 460 is not available. It may be used for lubrication records.

(8) W.D., A.G.O. FORM NO. 461, PREVENTIVE MAINTENANCE SERVICE AND TECHNICAL INSPECTION WORK SHEET FOR WHEELED AND HALF-TRACK VEHICLES. This form will be used for all monthly and semi-annual maintenance services and all technical inspections performed on wheeled or half-track vehicles.

(9) W.D., A.G.O. FORM NO. 9-70, SPOT-CHECK INSPECTION REPORT FOR ALL MOTOR VEHICLES. This form may be used by all commanding officers or their staff representatives in making spot-check inspections on all vehicles.

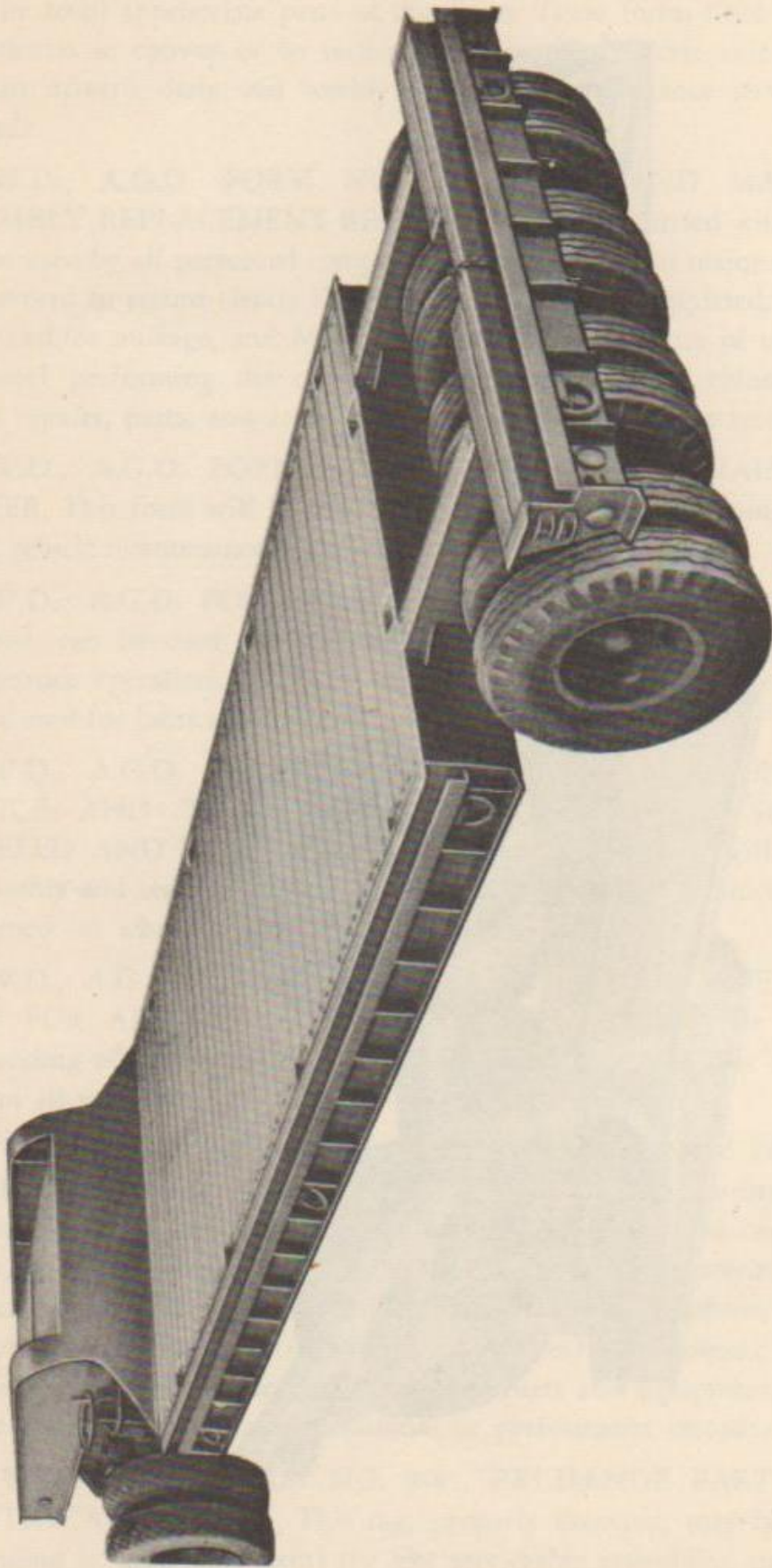
(10) W.D., A.G.O. FORM NO. 468, UNSATISFACTORY EQUIPMENT RECORD. This form will be used for reporting manufacturing, design, or operational defects in materiel with a view to improving and correcting such defects, and for use in recommending modifications on materiel. This form will not be used for reporting failures, isolated materiel defects, or malfunctions of materiel resulting from fair wear and tear or accidental damage; nor for the replacement, repair, or the issue of parts and equipment. It does not replace currently authorized operational or performance records.

(11) W.D., A.G.O. FORM NO. 9-81, EXCHANGE PART OR UNIT IDENTIFICATION TAG. This tag, properly executed, may be used when exchanging unserviceable items for like serviceable assemblies, parts, vehicles, and tools.



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Figure 1—22-ton Payload, 6-wheel, Low-bed Trailer— $\frac{3}{4}$ Front View



RA PD 341676

Figure 2—22-ton Payload, 6-wheel, Low-bed Trailer— $\frac{3}{4}$ Rear View

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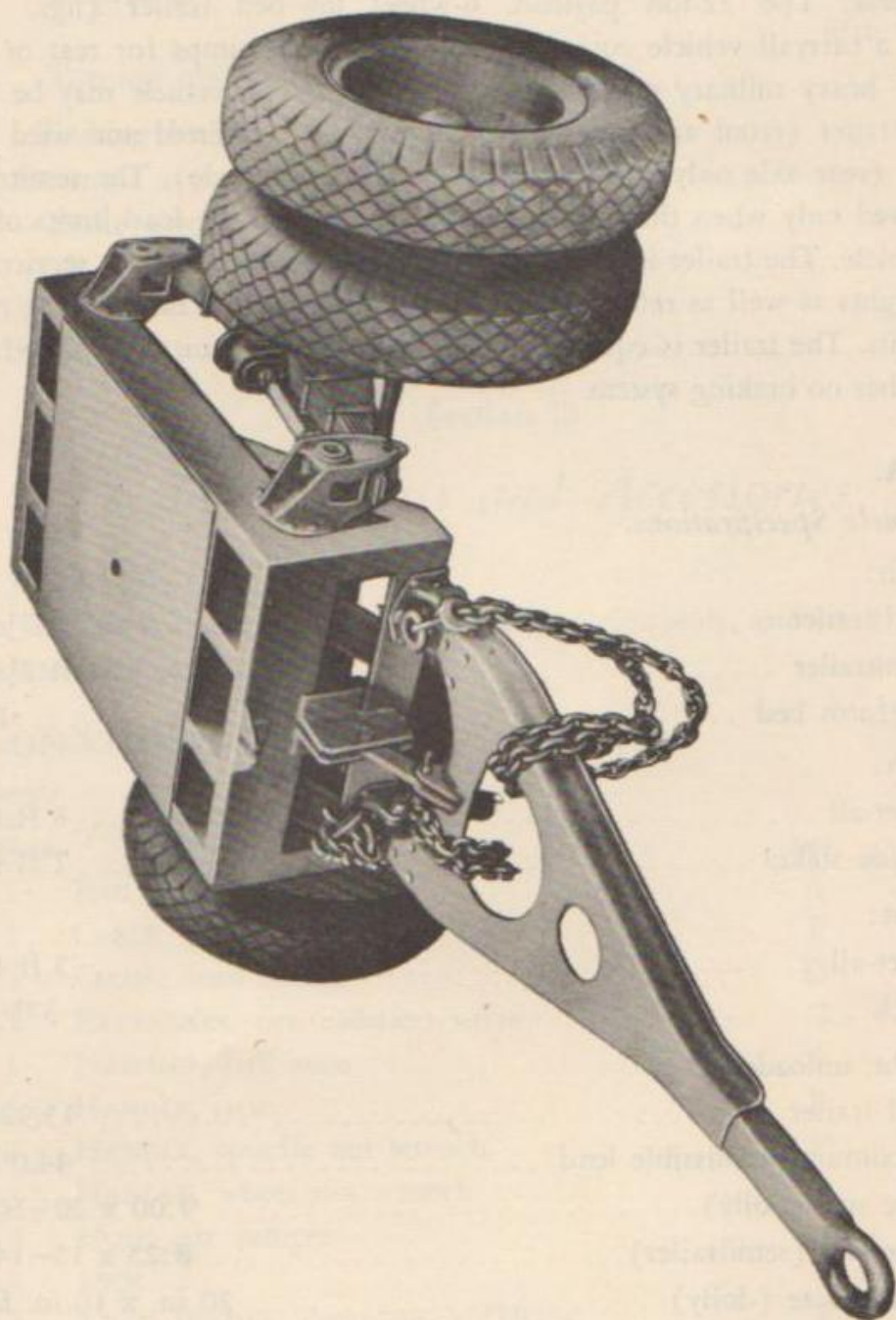


Figure 3—Dolly for Model CPT-22 Trailer

Section II

Description and Data

3. DESCRIPTION.

a. General. The 22-ton payload, 6-wheel low-bed trailer (figs. 1, 2 and 3) is a carryall vehicle equipped with detachable ramps for rear or side loading of heavy military equipment and supplies. The vehicle may be used as a full trailer (front and rear axles), or may be converted and used as a semitrailer (rear axle only and fifth wheeled towing vehicle). The semitrailer can be towed only when the total load does not exceed the load limits of the towing vehicle. The trailer is equipped with a complete set of both service and blackout lights as well as reflex marker units. The dolly has no lights or reflex marker units. The trailer is equipped with air brakes and suitable connections. The dolly has no braking system.

4. DATA.

a. Vehicle Specifications.

Length:

Full trailer	36 ft 7 $\frac{1}{4}$ in.
Semitrailer	31 ft 2 $\frac{1}{2}$ in.
Platform bed	18 ft

Width:

Over-all	8 ft 6 in.
Inside stakes	7 ft 9 in.

Height:

Over-all	5 ft 6 in.
Deck	37 $\frac{1}{2}$ in.

Weight, unloaded:

Full trailer	13,920 lb
Maximum permissible load	44,000 lb
Tire size (dolly)	9:00 x 20-10 ply
Tire size (semitrailer)	8:25 x 15-14 ply
Wheel size (dolly)	20 in. x 10 in. Budd
Wheel size (semitrailer)	15 in. x 7 in. Budd
Tire inflation (dolly)	65 lb
Tire inflation (semitrailer)	85 lb
Ground clearance	10 in.
Tread (dolly)	27 $\frac{7}{8}$ in.
Tread (semitrailer)	69 in.

b. Performance.

Allowable speed 20 mph
Departure angle 45 deg

Towing facilities:

Full trailer Drawbar
Semitrailer Kingpin or upper
fifth wheel plate
Turning circle 24 ft

c. Towing Vehicle Requirements.

Electrical system 6 volts
Brake system Air

Section III

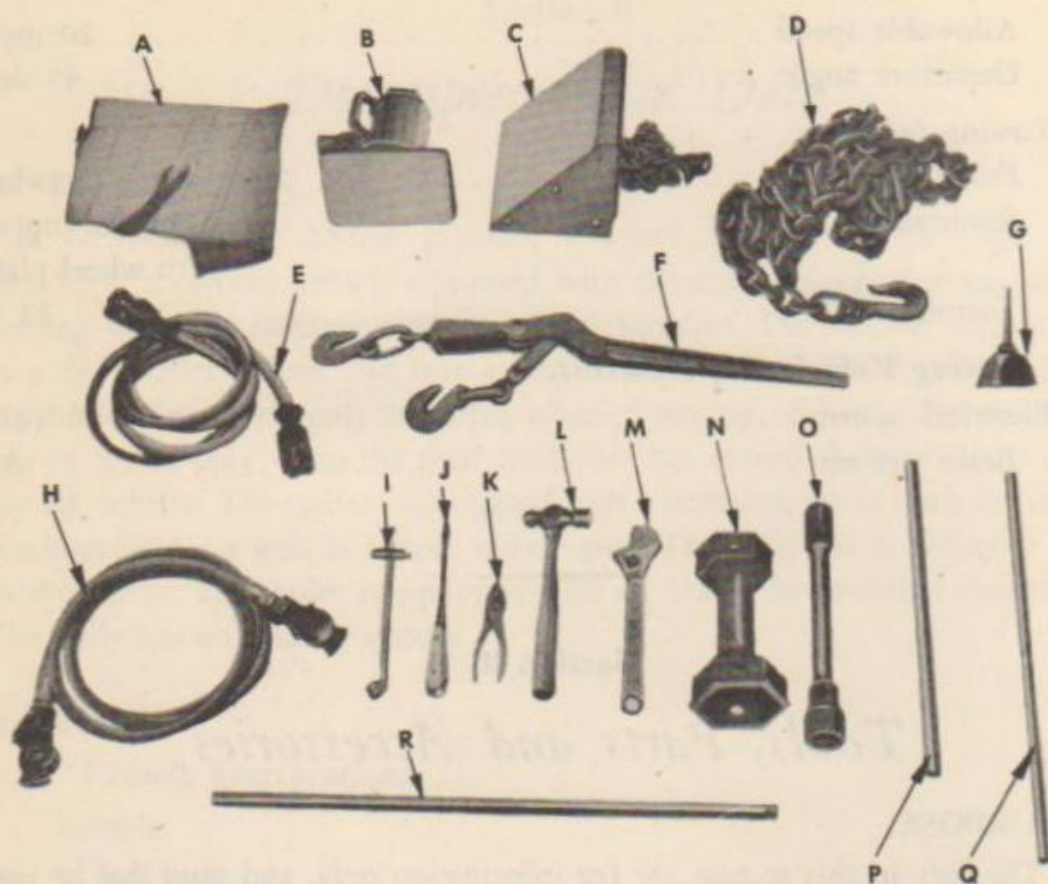
Tools, Parts and Accessories

5. PURPOSE.

a. The lists in this section are for information only, and must not be used as a basis for requisition.

6. ON-VEHICLE TOOLS (fig. 4).

Quantity per Vehicle	Item	Key	Storage Location
1	BAG, tool	A	Tool box
1	CABLE, jumper	E	Tool box
3	CHAIN, load binder	D	Tool box
1	EXTENSION, tire inflation valve	I	Tool box
1	HAMMER, ball-peen	L	Tool box
1	HANDLE, jack	R	Tool box
1	HANDLE, spindle nut wrench	P	Tool box
1	HANDLE, wheel nut wrench	Q	Tool box
2	HOSE, air jumper	H	Tool box
2	JACK	B	Tool box
3	LOAD BINDER, complete, w/HOOK	F	Tool box
1	OILCAN	G	Tool box
1	PLIERS, combination, 6-in.	K	Tool box
1	SCREWDRIVER, 10-in.	J	Tool box
1	WRENCH, crescent, 10-in.	M	Tool box
1	WRENCH, spindle nut	N	Tool box
1	WRENCH, wheel nut	O	Tool box

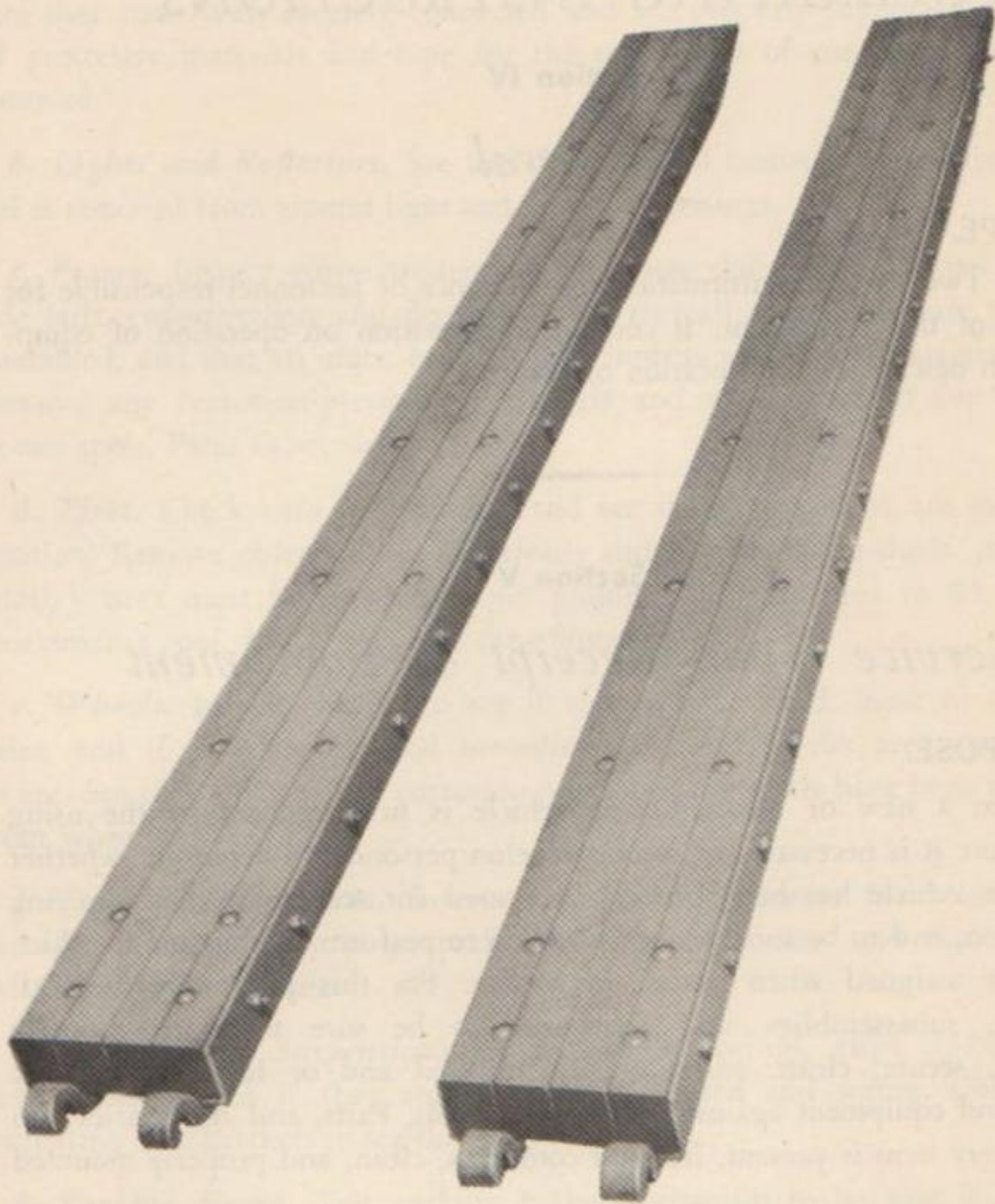


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Figure 4—Tools and Equipment

7. ON-VEHICLE EQUIPMENT (figs. 4 and 5).

Quantity per Vehicle	Item	Key	Storage Location
2	BLOCK, chock, w/CHAIN.....	C	Left side, tire removal cavity; right side, underneath right rear corner ahead of axle.
1	CATALOG, Ordnance standard nomenclature list		Tool box
1	MANUAL, technical		Tool box
2	RAMP, loading		Cargo deck



RA PD 341742

Figure 5—Ramps

PART TWO

OPERATING INSTRUCTIONS

Section IV

General

8. SCOPE.

a. Part Two contains information for guidance of personnel responsible for operation of this equipment. It contains information on operation of equipment, with description and location of controls.

Section V

Service Upon Receipt of Equipment

9. PURPOSE.

a. When a new or reconditioned vehicle is first received by the using organization, it is necessary for second echelon personnel to determine whether or not the vehicle has been properly prepared for service by the supplying organization, and to be sure it is in condition to perform any mission to which it may be assigned when placed in service. For this purpose inspect all assemblies, subassemblies, and accessories to be sure they are properly assembled, secure, clean, and correctly adjusted and/or lubricated. Check all tools and equipment against section III (Tools, Parts, and Accessories), to be sure every item is present, in good condition, clean, and properly mounted or stowed.

b. Whenever practicable, the first echelon personnel (driver) will assist in the performance of these services.

10. CORRECTION OF DEFICIENCIES.

a. Deficiencies disclosed during the course of these services will be treated as follows:

- (1) Correct any deficiencies within the scope of the maintenance echelons of the using organization before the vehicle is placed in service.
- (2) Refer deficiencies beyond the scope of the maintenance echelons of the using organization to a higher echelon for correction.
- (3) Bring deficiencies of a serious nature to the attention of the supplying organization through proper channels.

11. SPECIFIC PROCEDURES.

a. Electrical Wiring. Examine all accessible wiring and conduits to be sure they have been securely connected and are properly supported. See that all protective materials and tape for the prevention of corrosion have been removed.

b. Lights and Reflectors. See that all tape and corrosion-preventive material is removed from around light and reflector openings.

c. Frame. Inspect entire trailer and converter dolly frame, center beams, side rails, crossmembers and flooring to see that all components are properly assembled, and that all units, brackets, attachments and connections are secure. Remove any corrosion-preventive materials and examine paint for damage or rust spots. Paint as necessary.

d. Tires. Check tires for damage, and see that valve stems are in correct position. Remove objects lodged in treads and from between duals. All front (dolly) tires must be inflated to 65 pounds and rear tires to 85 pounds (maximum) cool. Install all valve caps finger-tight.

e. Wheels. Inspect wheels to see if they are damaged, loose or tight on axles, and if all assembly and mounting nuts and screws are present and secure. See that all rust- and corrosion-preventive materials have been removed from wheel surfaces.

f. Towing Connections. Inspect drawbar and lunette for looseness or damage. Be sure dolly is properly connected to trailer, and that kingpin locking plates are secure.

g. Springs and Suspensions. Inspect dolly springs, clips, U-bolts and radius rods to see if they are properly assembled and secure. Check rear oscillating axle brackets to see that they are secure.

h. Parking Brake. Test parking brake mechanism to be sure it operates properly. Inspect handwheel, levers, long and short equalizer bars, return spring and pull rods for damage or distortion, and see that all connections are secure. Be sure operating shaft is properly mounted, and that handwheel and mounting bracket are secure.

i. Tools, Parts, and Accessories. Check against section III (Tools, Parts, and Accessories) to see that all items are present. All items must be in good operating condition. See that all items are properly mounted or stowed.

j. Vehicle Publications and Reports.

(1) PUBLICATIONS. See that vehicle Operator's Manual, Lubrication Order, and W.D., A.G.O. Form No. 478 (MWO and Major Unit Assembly Replacement Record), are in the vehicle, legible, and properly stowed. NOTE:

U.S.A. registration number and vehicle nomenclature must be filled in on Form No. 478, for new vehicles.

(2) REPORTS. Report general condition of the vehicle to designated individual in authority.

Section VI

Controls and Operation

12. CONTROLS AND OPERATING EQUIPMENT.

a. Controls.

(1) DRAWBAR LOCK (fig. 6). The drawbar lock consists of a plate welded to the drawbar which may be pinned to matching plates welded on the dolly. The lock stabilizes the position of the drawbar when towing the dolly alone. The drawbar must not be locked when the full trailer is used.

(2) DOLLY LOCK (fig. 6). A pin-type lock is chained to the front of the trailer. The dolly is locked in a straight-ahead position with the trailer when the pin is inserted in matching holes in the dolly and trailer lock-plates. It is used only when backing the full trailer, in order to prevent the combination from jackknifing. The dolly lockpin is carried in the trailer tool compartment when not in use.

(3) BLACKOUT SWITCH (fig. 6). The blackout switch is located on the semitrailer front crossmember next to the coupling socket. The switch is operated by means of a coin, key, or screwdriver. It is either at the blackout position or at the service position. There is no "OFF" position. The trailer lights must be turned off at the towing vehicle. The face of the blackout switch has an arrow pointing to the blackout position.

(4) PARKING BRAKE (fig. 6). A hand-operated parking brake is provided to set the brakes when the trailer is uncoupled from the towing vehicle. It is operated by means of a handwheel mounted at the left front corner of the trailer cargo deck. Turning the handwheel clockwise applies the brakes, and turning it counterclockwise releases the brakes.

(5) CHOCK BLOCKS (figs. 7 and 8). Two chock blocks are supplied with the trailer. They must be placed under the rear wheels, on the downgrade side, to prevent the vehicle from moving when the brakes are not applied. The right side chock block is held by a snap hook under the right rear corner of the cargo deck, ahead of the rear wheels. The left side chock block is stowed in the tire removal cavity at the center of the trailer rear crossmember. Both chock blocks are held by a chain, welded to the trailer frame, to prevent loss.

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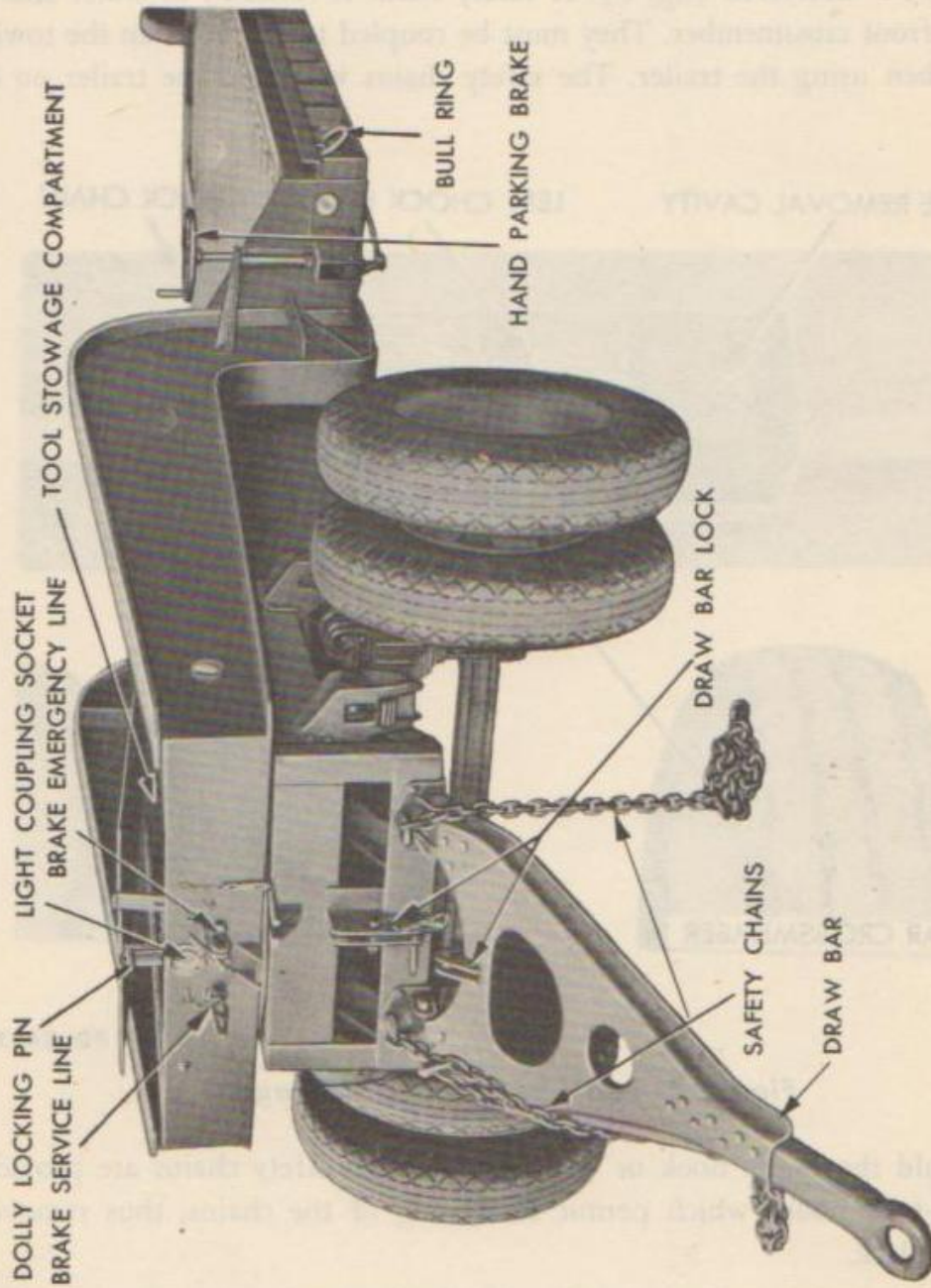
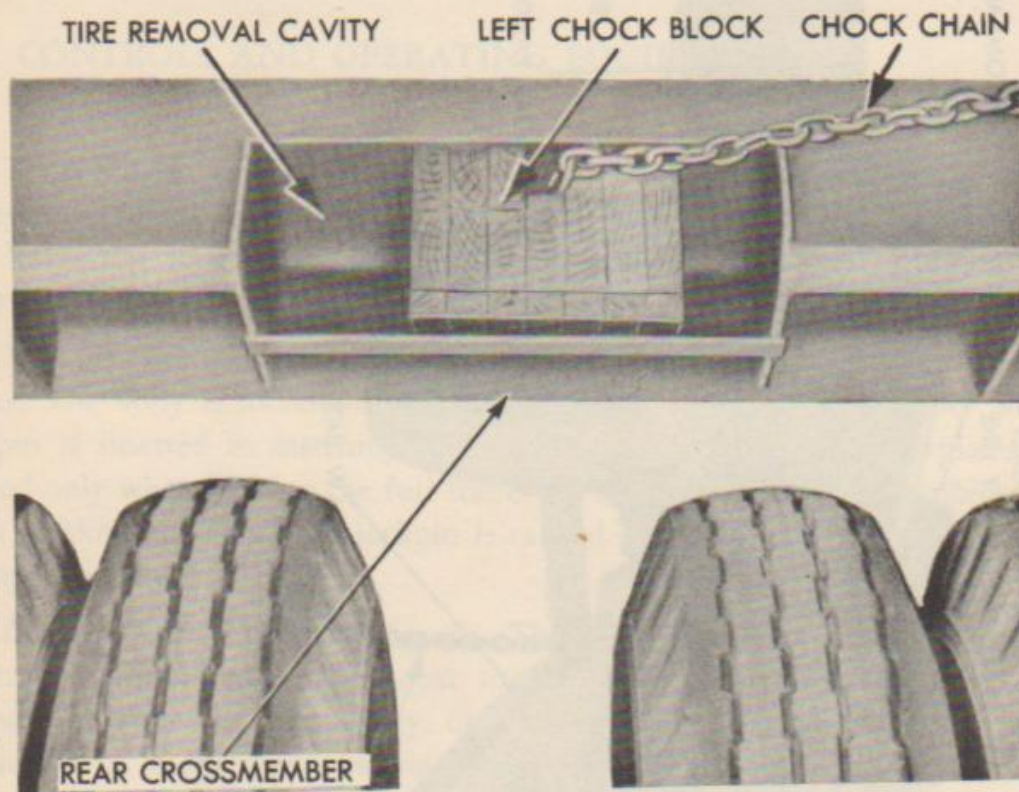


Figure 6—Controls

b. Operating Equipment.

(1) **DRAWBAR** (fig. 6). The trailer is equipped with a drawbar which is attached to the front crossmember of the dolly. A lunette eye is riveted to the drawbar and provides the means of coupling the trailer to the pintle hook of a towing vehicle.

(2) **SAFETY CHAINS** (fig. 6). A safety chain is fastened to either side of the dolly front crossmember. They must be coupled to eye bolts on the towing vehicle when using the trailer. The safety chains will hold the trailer on the



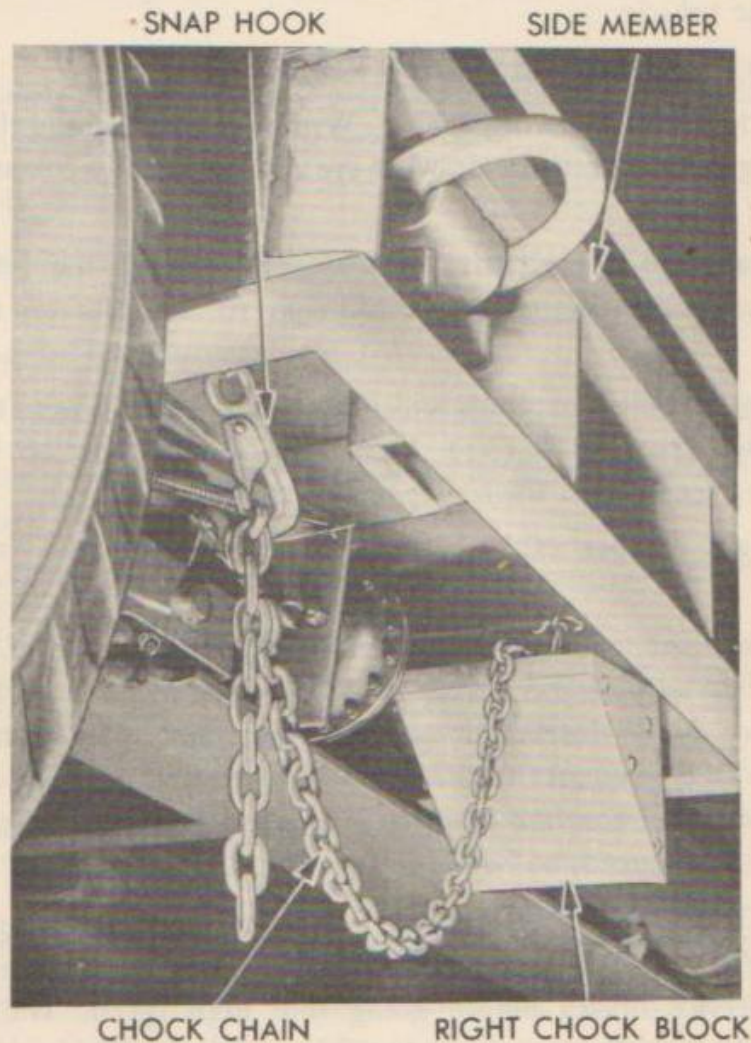
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Figure 7—Left Chock Block Stowage

road, should the pintle hook or drawbar fail. The safety chains are provided with grab-type hooks which permit shortening of the chains, thus removing the excess slack.

(3) **AIR JUMPER HOSES AND COUPLINGS** (fig. 6). Two identical jumper hoses are provided with the trailer for transmitting compressed air from the towing vehicle to the trailer braking system. One hose must be coupled between the service coupling on the towing vehicle and the service coupling on the trailer. The trailer service coupling is located on the right side of the semitrailer front crossmember. The other jumper hose must be coupled between the emergency coupling on the towing vehicle and the

emergency coupling on the trailer. The trailer emergency coupling is located on the left side of the semitrailer front crossmember. The couplings are marked "SERVICE" and "EMERGENCY" respectively. Dummy couplings are provided with the trailer. One is chained to the trailer at both the service and emergency couplings. Dummy couplings are used to prevent dirt and foreign matter from entering the trailer brake system when the jumper hoses are not in use. These must be removed before coupling the jumper hoses, and hung on the hooks at front of trailer.



RA PD 341746

Figure 8—Right Chock Block Stowage

(4) LIGHT JUMPER CABLE AND COUPLING SOCKET (fig. 6). The jumper cable is the electrical line between the towing vehicle and the trailer. It must be plugged into the trailer coupling socket and into a similar socket at the rear of the towing vehicle. The trailer coupling socket is located near the center of the semitrailer front crossmember. Incorrect insertion of the

plug-end on the jumper cable is prevented by a guide bar on the plug which must mate with the guide slot in the coupling socket.

13. OPERATION AS A FULL TRAILER.

a. Service Upon Receipt of Equipment. Before a new or reconditioned vehicle is placed in service, be sure that the services described in paragraphs 9, 10, and 11 have been performed.

b. Before-operation Services. Perform the operations in paragraph 30 before using the vehicle.

c. Coupling Full Trailer to Towing Vehicle.

(1) Open pintle hook on towing vehicle. With one man holding the drawbar, back the towing vehicle until the drawbar-eye and the pintle hook are engaged. Lock the pintle hook.

(2) Make certain the safety chains are threaded through the front hole in drawbar plate. Couple the safety chain hooks to the eyes on the towing vehicle.

(3) Remove the dummy couplings and couple air jumper hoses from towing vehicle to trailer (par. 12 *b* (3)). Open the cut-out cocks on the towing vehicle, allowing air to enter the trailer brake system.

(4) Couple light jumper cable between towing vehicle and trailer (par. 12 *b* (4)).

(5) Release the hand parking brake. CAUTION: *Make certain the service brakes are applied on both the towing vehicle and the trailer prior to releasing the hand parking brake.* Inspect air and electrical connections to make certain they are secure. Make certain the chock blocks have been removed from under trailer wheels and that they are in place in their storage position (figs. 7 and 8). The trailer is now ready to be transported.

d. Driving Truck and Full Trailer. Before starting the towing vehicle in motion, release the service brake. After placing trailer in motion, check the operation of service brakes before going into high speed. The truck and trailer combination, either as a tractor-truck and semitrailer or full trailer, is driven in much the same manner as the straight truck. When turning corners care should be taken to allow for the fact that the semitrailer wheels turn inside the turning circle of the truck. This is because the semitrailer truck is a hinged-in-the-middle unit. When making a right-hand turn at an intersection, continue forward to approximately the center of the crossroad, then cut truck sharply to the right. When backing the semitrailer, the truck should be steered in the opposite direction to which it is desired that the trailer be turned. Should it become necessary to back the full trailer a great distance, lock the dolly lock to prevent the trailer from jackknifing (par. 12 *a* (2)).

Controls and Operation

e. Stopping the Trailer. The brake system of the vehicle, whether full trailer or semitrailer, is operated from the towing vehicle, with the exception of the parking brake. When stopping the trailer or semitrailer from the cab of the towing vehicle, even if the trailer brakes are not operated by the same lever or pedal as the towing vehicle's brake system, apply the brakes of the trailer or semitrailer simultaneously with those of the towing vehicle so as not to overload the brakes of the trailer. Maximum braking efficiency will be obtained if the brakes are applied to a point just short of the skidding point.

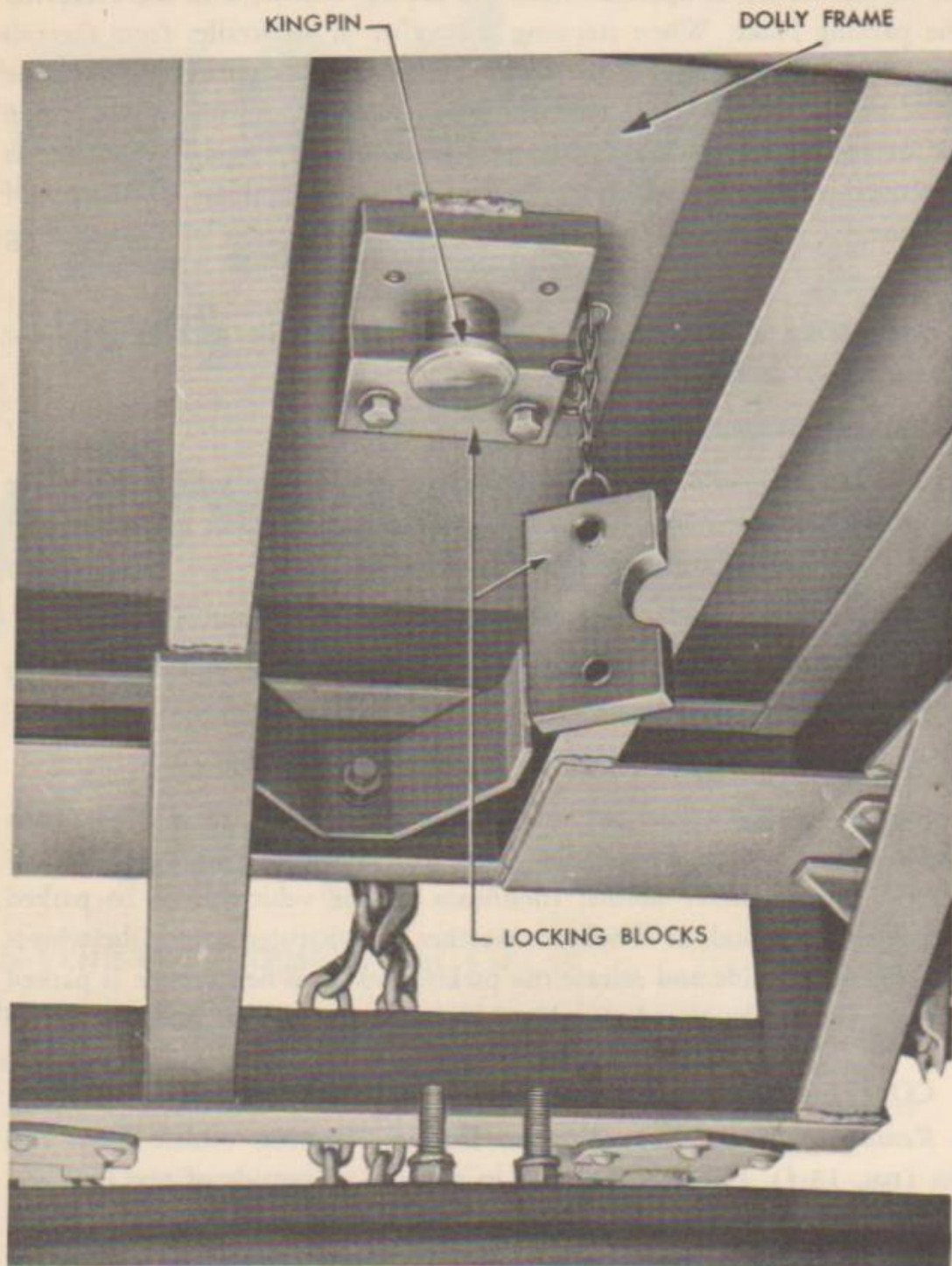
f. Uncoupling Trailer from Towing Vehicle. Set the parking brake, or chock the wheels on the downgrade side.

- (1) Uncouple safety chains.
- (2) Close the two cut-out cocks at the rear of the towing vehicle. Uncouple both jumper hoses, and insert dummy couplings on the trailer to prevent dirt from entering the braking system (par. 12 *b* (3)).
- (3) Remove jumper cable plug from coupling socket at front of trailer.
- (4) Open pintle hook, lift drawbar-eye out of pintle hook, and move towing vehicle forward.
- (5) Stow jumper hoses and jumper cable in tool compartment.

g. Parking Full Trailer. Set the parking brake (par. 12 *a* (4)). Then uncouple towing vehicle from trailer. This will suffice for parking on reasonably level ground under normal conditions. If the vehicle is to be parked for an extended period, or if subzero weather is anticipated, chock the wheels on the downgrade side and release the parking brake. When vehicle is parked on a slope, the chocks must be used in addition to the parking brake.

14. CONVERTING FULL TRAILER TO SEMITRAILER.

a. Removing Dolly from Trailer. Uncouple towing vehicle from full trailer (par. 13 *f*). Place chock blocks in position on outside of rear tires and apply the hand parking brake. Place one hydraulic jack and blocking under each side of trailer main frame as shown in figure 10. Release kingpin by removing four cap screws and lock washers, securing locking blocks to dolly apron plate (fig. 9). Place upright blocking under front end of dolly to prevent dolly from pivoting on the axle. Jack up the front of the semitrailer on both sides just enough to relieve pressure from the dolly, and move the dolly toward the rear of the trailer about 1 inch to release the kingpin. Then jack up the front of the semitrailer 3 or 4 more inches, or until the kingpin is completely out of the dolly, allowing the dolly to be moved away from the semitrailer.



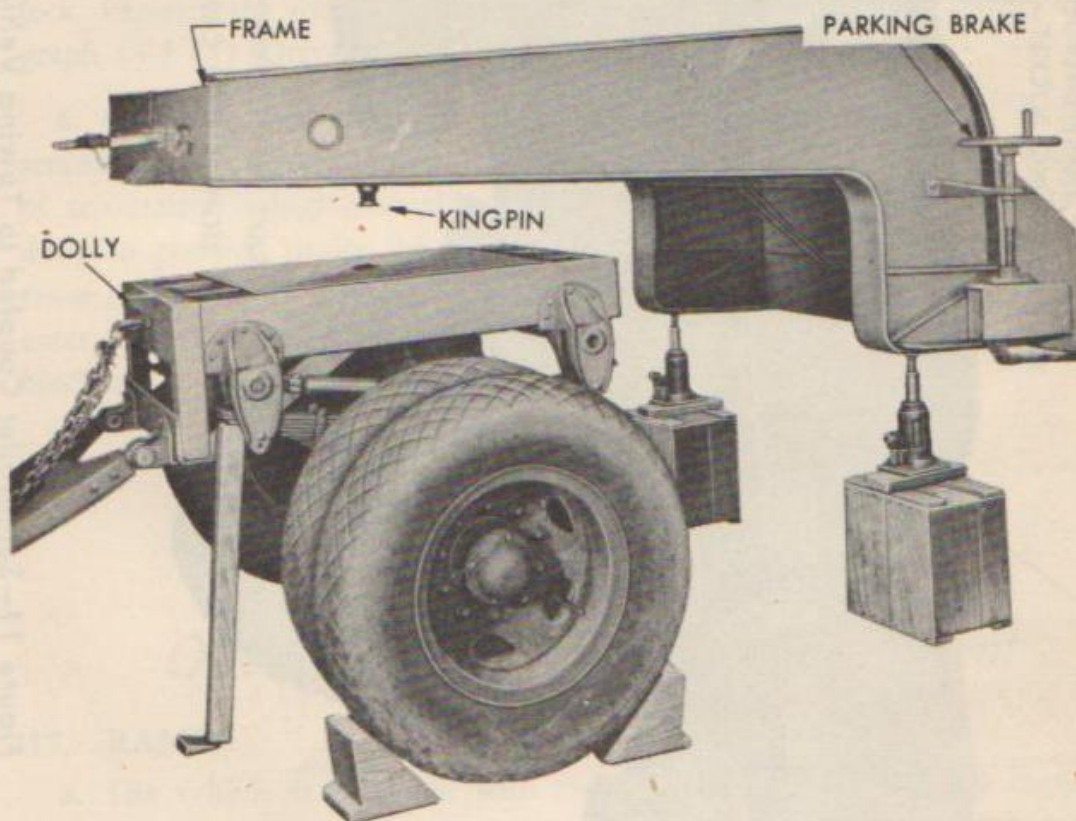
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Figure 9—Kingpin Locking Plates

b. Coupling Semitrailer to Towing Vehicle (fig. 11). The main frame may be coupled to any towing vehicle equipped with a fifth wheel. For instructions on coupling, refer to the technical manual relating to the towing vehicle, as there are several types of fifth wheels. Back towing vehicle into position in front of semitrailer apron plate. CAUTION: *Semitrailer is supported on*

Controls and Operation

hydraulic jacks. Be careful not to bump towing vehicle against the semitrailer. Make certain the semitrailer is jacked high enough to allow the fifth wheel to pass under the semitrailer apron plate. Back the towing vehicle under the semitrailer so that the kingpin engages the "V" in the lower fifth wheel. Lower the two hydraulic jacks under the semitrailer allowing part of the semitrailer weight to rest on the fifth wheel. Continue backing towing vehicle until the locking mechanism on the fifth wheel engages the kingpin. NOTE: Check coupling by trying to move towing vehicle forward. If coupling is complete, movement of the semitrailer will be extremely difficult. Remove the two hydraulic jacks and blocking from under semitrailer frame. Make all necessary connections between semitrailer and towing vehicle (par. 13 c (3), (4) and (5)).



RA PD 341738

Figure 10—Semitrailer in Raised Position

15. OPERATION AS A SEMITRAILER.

a. Service Upon Receipt of Equipment. Before a new or reconditioned vehicle is placed in service, be sure that the services described in paragraphs 9, 10 and 11 have been performed.

b. Before-operation Services. Perform the operations in paragraph 30 before using the vehicle.

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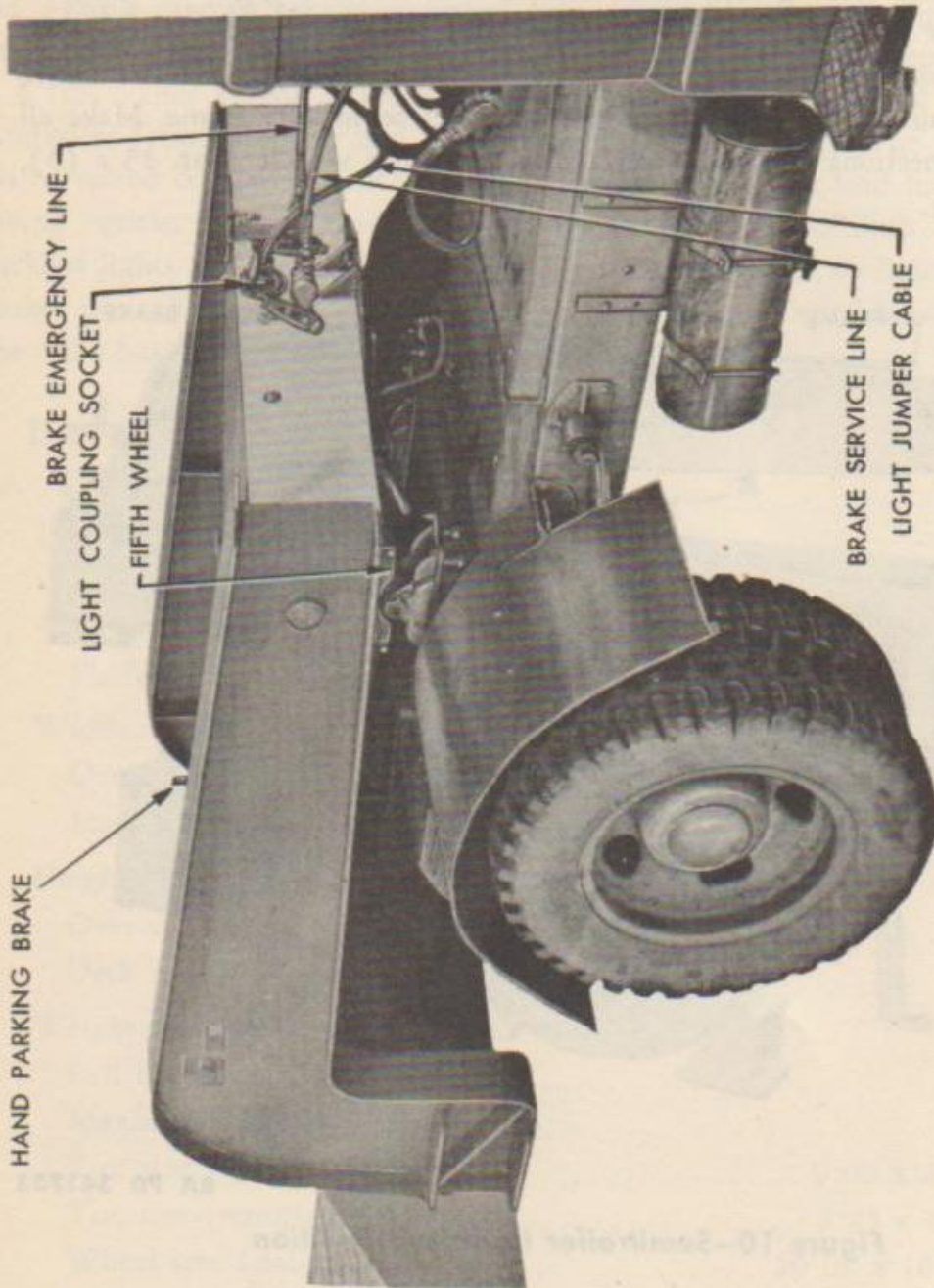


Figure 11—Semitrailer Coupled to Towing Vehicle

Operation of Auxiliary Equipment

c. Driving Truck and Semitrailer. The combined truck and semitrailer is driven in the same manner as the truck and full trailer (par. 13 *d*), except that the dolly lock is not used when backing.

d. Braking Truck and Semitrailer. The combined truck and semitrailer is brought to a stop in the same manner as the truck and full trailer (par. 13 *e*).

16. CONVERTING SEMITRAILER TO FULL TRAILER.

a. Uncoupling Semitrailer from Towing Vehicle. Refer to the technical manual relating to the towing vehicle for instructions on operation of the fifth wheel lock. Securely block front end of semitrailer with local material. NOTE: Jack front end of cargo deck up in order to block semitrailer. Its weight must be removed from towing vehicle fifth wheel. Set parking brakes and chock wheels to prevent motion of the semitrailer. Release fifth wheel lock. Perform the instructions of paragraph 13 *f*, with the exception of paragraph 13 *f* (4). Drive towing vehicle from under semitrailer.

b. Coupling Semitrailer to Dolly. Make sure parking brake is set on semitrailer and chock blocks are in proper position. Make certain the front of semitrailer is high enough to permit the dolly to clear the kingpin. Roll dolly in position under the semitrailer apron plate so that the kingpin will enter hole in dolly plate. Lower the two hydraulic jacks, allowing kingpin to enter hole. Lock kingpin with locking blocks (fig. 9). Remove jacks and blocking.

Section VII

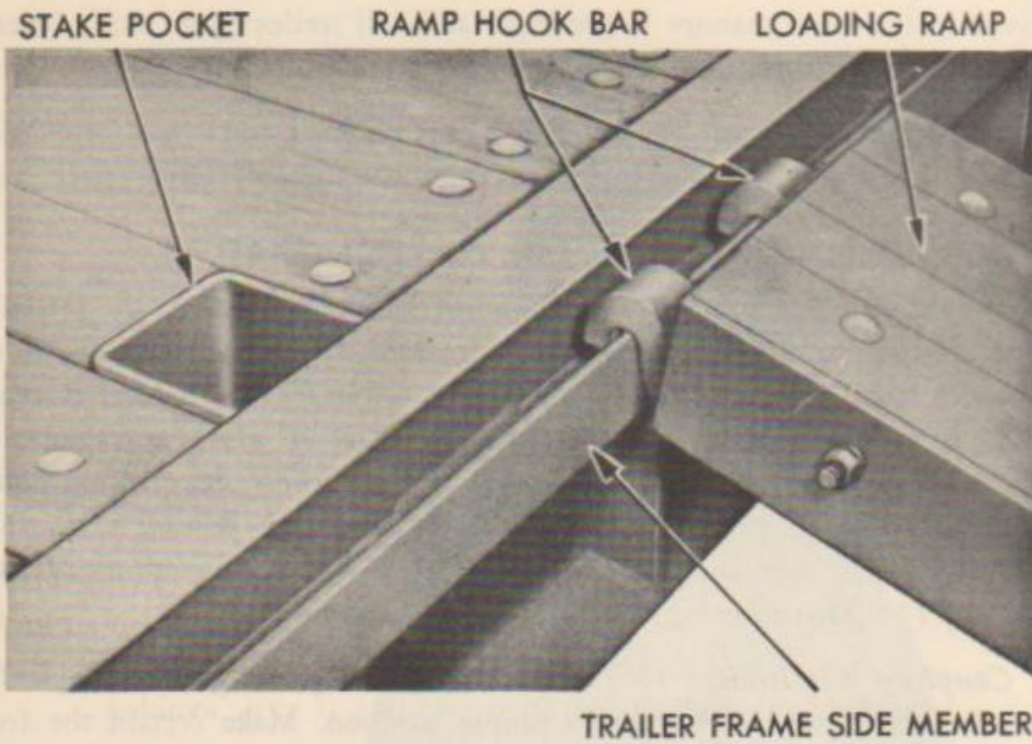
Operation of Auxiliary Equipment

17. RAMPS.

a. The vehicle is provided with two 12-foot ramps which are carried on the trailer cargo deck. The ramps are provided with the two hook bars at the upper end and a bevel edge at the lower end. The ramps may be attached to the special channel rail in the trailer side or rear frame members (fig. 12). To set ramps in position, rest the hook bars on the rail in the desired place. The lower ends of the ramps should rest flat on the ground when in use.

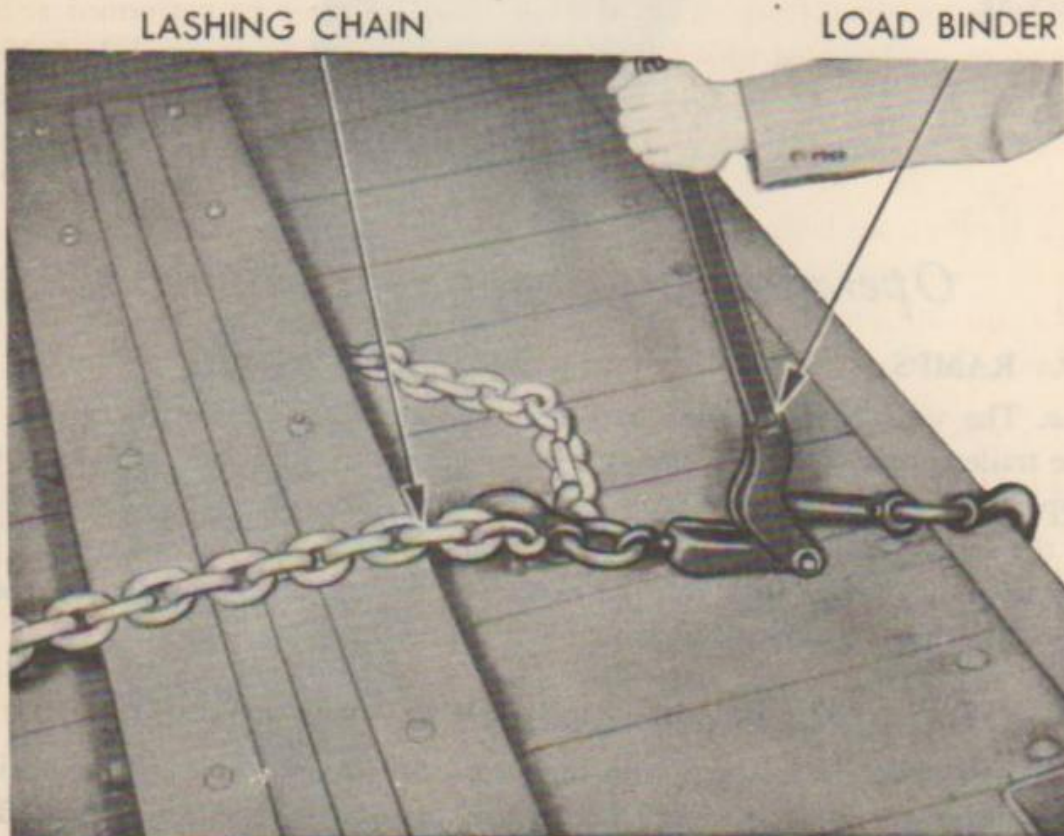
18. LOAD BINDERS AND LASHING CHAINS.

a. The trailer is provided with three load binder and three lashing chains. The chains are used to secure the load in position on trailer platform. The load binders are used to take up the excess slack in the lashing chains (fig. 13) to lash the load down. Thread lashing chain through selected bull ring, and



RA PD 341748

Figure 12—Ramps in Loading Position



RA PD 341749

Figure 13—Releasing Load Binder

loop end of chain and hook into nearest link. Drape lashing chain over the load. Attach one hook of load binder to top flange on opposite side of trailer. Pull slack out of lashing chain and attach other hook of load binder to lashing chain. Tighten lashing chain by moving the load binder lever toward yoke. Pull handle of load binder away from yoke to release chain.

Section VIII

Operation Under Unusual Conditions

19. EXTREME COLD.

a. Operation. Subzero temperatures affect both metals and lubricants. Therefore, operation of equipment in subzero temperatures presents problems that demand special precautions. Extremely careful servicing is required if poor performance and complete functional failure is to be avoided.

b. Lubrication. Lubrication Order No. 9-898 and figures 15 and 16 prescribe lubrication maintenance for this trailer. Lubrication in cold weather requires no special attention other than strict adherence to section XII. Places requiring No. 2 general purpose grease are lubricated with this lubricant at all temperatures. If repacking of wheel bearings must be performed at temperatures so low that thorough hand packing cannot be accomplished, No. 0 general purpose grease may be used until the temperature returns to 0°F or above. Places for which No. 0 general purpose grease is specified, are lubricated with the same lubricant at all except very low temperatures. When the temperature becomes so low that No. 0 grease is unsatisfactory, No. 00 O.D. grease may be used until the temperature becomes such that No. 0 grease is again satisfactory. Oilcan points, where engine oil is specified for 0°F and above, will use special preservative lubricating oil.

c. Maintenance.

(1) **FRAMES AND METAL PARTS.** Inspect vehicle frequently. Shock resistance, and resistance against breaking, is greatly reduced at low temperatures. Operation of vehicle on hard frozen ground causes jolting which may result in screws breaking or nuts jarring loose. Do not move vehicle from a warm place into subzero temperature unless necessary.

(2) **WIRING.** Check, clean and tighten all connections. Be sure that no short circuits are present.

(3) **BRAKES.** Freezing may cause brakes to stick or bind when vehicles are parked at subzero temperatures. A blowtorch may be used to warm frozen brakes when vehicle must be moved. Parking vehicle with brakes released will

eliminate most of the binding. Under these circumstances, be sure to block wheels, or otherwise prevent vehicle from moving.

20. DUSTY CONDITIONS.

a. Operation of the trailer under extreme sand or dust conditions necessitates frequent inspection, cleaning and lubrication of moving parts.

21. SUBMERSION.

a. *General.* After fording, stop vehicle at once (if tactical situation permits) and remove all water from working parts of the vehicle. Clean body cavities of dirt and sediment. Lubricate vehicle (par. 28). Check action of brakes. Remove wheels, clean and lubricate.

b. *Salt Water.* If vehicle is submerged in salt water, immediate servicing must be done, or electrical equipment and metal parts will be damaged to such an extent that major repairs will be necessary. Only by prompt and thorough cleaning can parts be salvaged: In all cases of salt water submersion, notify higher authority.

22. SNOW, ICE OR MUD.

a. When vehicle must be operated on extremely slippery roads or deep mud, skid chains are to be attached to the trailer wheels. Caution must be exercised when stopping. Apply trailer brakes ahead of towing vehicle brakes. This has the effect of holding trailer away from towing vehicle and minimizes the tendency of the trailer to skid or jackknife.

Section IX

Demolition to Prevent Enemy Use

23. GENERAL.

a. Destruction of the vehicle, when subject to capture or abandonment in combat zone, will be undertaken by the using arm only when, in the judgment of the military commander concerned, such action is necessary.

b. The instructions which follow are for information only. The conditions under which destruction will be effected are command decisions in each case, according to the tactical situation.

c. If destruction is resorted to, the vehicle must be so badly damaged that it cannot be restored to a usable condition in the combat zone, either by repair or cannibalization. Adequate destruction requires that all parts essential to the

operation of the vehicle may be destroyed or damaged beyond repair. Equally important, the same essential parts must be destroyed on all like vehicles so that the enemy cannot piece together a complete operating unit by using several damaged units.

24. DETAILED INSTRUCTIONS.

a. The following instructions contain several methods of demolition for this trailer, in the order of their effectiveness.

(1) METHOD NO. 1. Place 2-pound TNT charges inside each set of wheels, above the axles. Insert tetryl nonelectric caps with at least 5 feet of safety fuze in each charge. Ignite the fuzes and take cover. CAUTION: *If the charges are prepared beforehand and carried in the vehicle, keep the caps and fuzes separated from the charges until they are to be used.*

(2) METHOD NO. 2. Ignite an M14 incendiary grenade under each tire, or deflate tires and destroy them with an ax, pick, or machine gun fire. Pour spare gasoline over each tire and ignite. Fire on vehicle, using antitank, tank, or other artillery, or antitank rockets or grenades. If a good fire is started, the vehicle may be considered as destroyed.

(3) METHOD NO. 3. Smash the lights, reflectors, light switches, sockets, air lines, and brake operating units. Place an M14 incendiary grenade under each tire or deflate tires and destroy them with an ax, pick, or machine gun fire. Pour gasoline over the entire unit. Ignite the incendiary grenades, or, if not used, ignite the vehicle by other means.

PART THREE

MAINTENANCE INSTRUCTIONS

Section X

General

25. SCOPE.

a. Part Three contains information for the guidance of the personnel of the using organizations responsible for the maintenance (first and second echelon) of this equipment. It contains information for the performance of the scheduled lubrication and preventive maintenance services, as well as a description and maintenance of the major systems and units and their functions in relation to other components of the equipment.

Section XI

Special Organizational Tools and Equipment

26. TOOLS AND EQUIPMENT.

- a.* No special tools are required to service the vehicle.
- b.* ORD 6, SNL G-27, Section 2, furnishes information on standard tools available to service the vehicle.

Section XII

Lubrication

27. LUBRICATION ORDER.

a. Reproduction of War Department Lubrication Order LO 9-898 (fig. 14) prescribes first and second echelon lubrication maintenance.

b. A lubrication order is placed on or is issued with each item of materiel and is to be carried with it at all times. In the event the materiel is received without a copy, the using arm shall immediately requisition a replacement in conformance with instructions and lists in FM 21-6.

c. Instructions on the Lubrication Order are binding on all echelons of maintenance and there shall be no deviations.

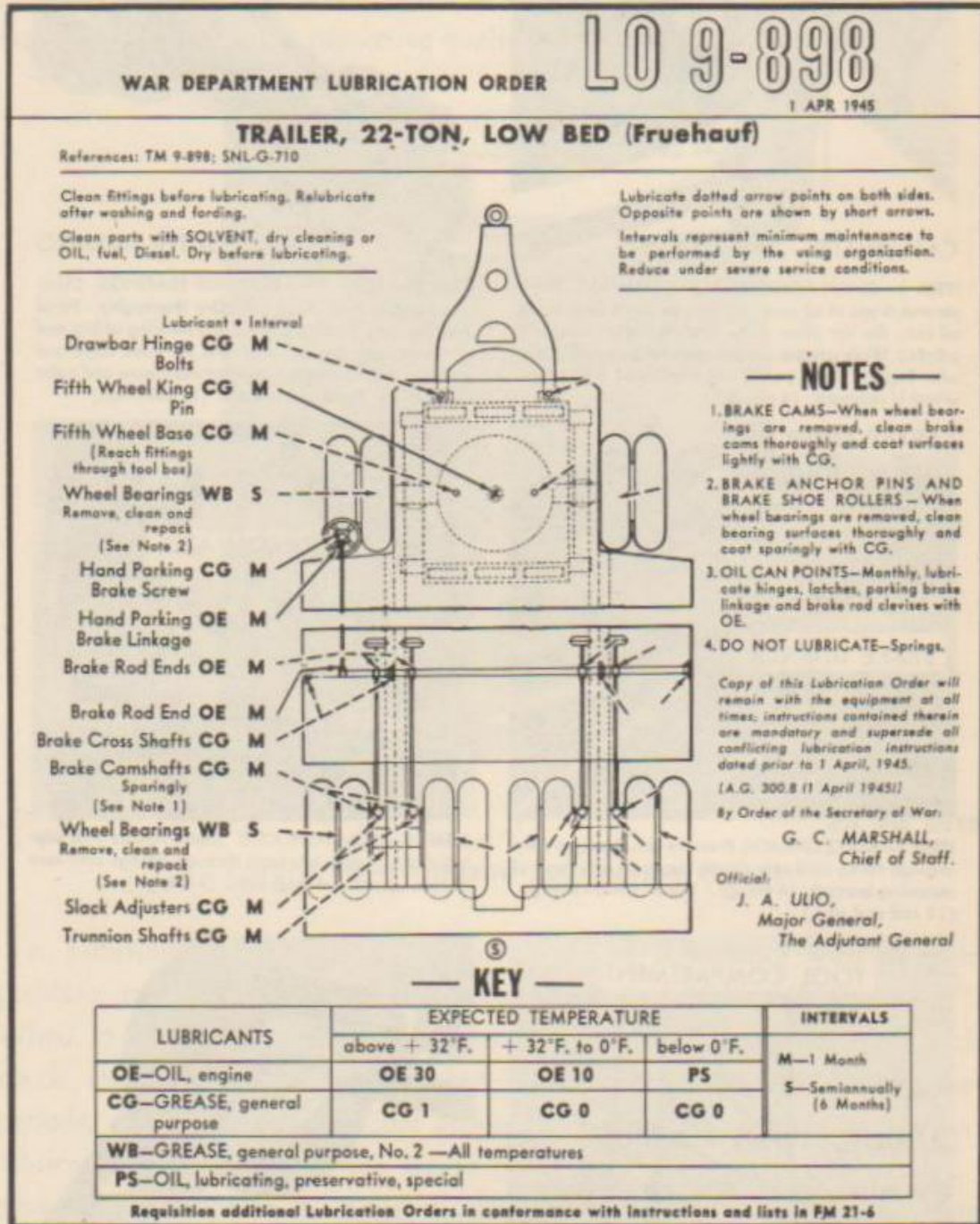
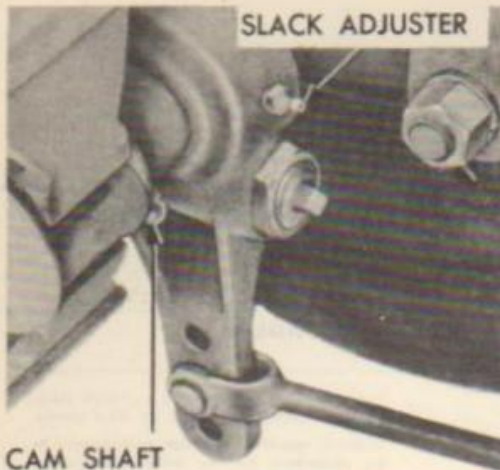
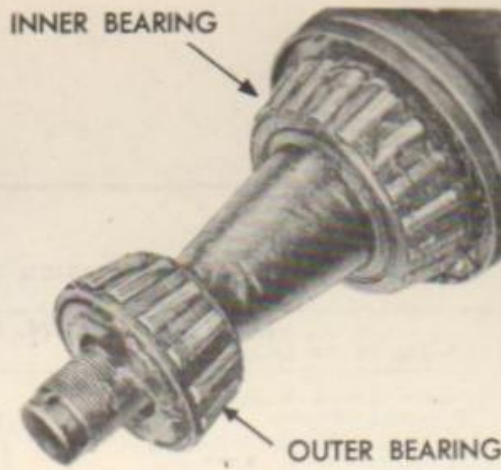


Figure 14—Lubrication Order



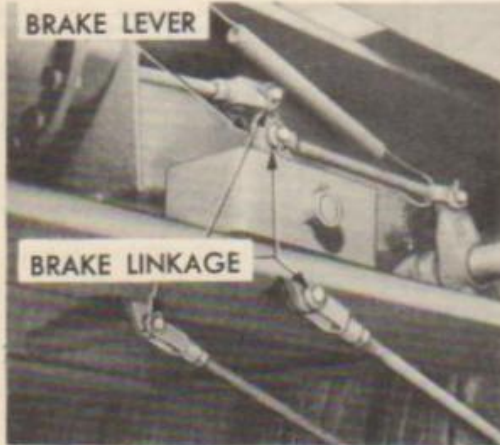
CAM SHAFT

ITEM 1—SLACK ADJUSTER AND CAMSHAFT. Place several drops of oil around frame eccentric pins, using oil can. Do not allow oil to flow on brake lining. (4 points.) Work grease around top and bottom surface with finger. These points are lubricated only when wheel is removed. (4 points.)



OUTER BEARING

ITEM 2—FRONT AND REAR HUB BEARINGS. Clean bearing and hub in solvent. Dry thoroughly. Hand pack bearing, forcing grease into bearing at big end of rollers until grease comes out between cage and rollers. Coat the space in hub between inner and outer cup with $\frac{1}{8}$ " layer of lubricant. (12 bearings.)



BRAKE LINKAGE

ITEM 3—BRAKE LINKAGE. Pressure gun. Apply grease through fitting until new grease shows on outer end of mounting bracket. (4 fittings.) Use oil can on linkage. (12 rod end pins.)



TRUNNION AXLE

ITEM 4—TRUNNION AXLE. Clean fittings with wiping cloth. Apply lubricant through fittings until new grease appears at inner side. (2 fittings.)



TOOL COMPARTMENT

FIFTH WHEEL UPPER PLATE

ITEM 5—FIFTH WHEEL PLATE. Fifth wheel plate fittings are in tool compartment. Use pressure gun. (3 fittings.)

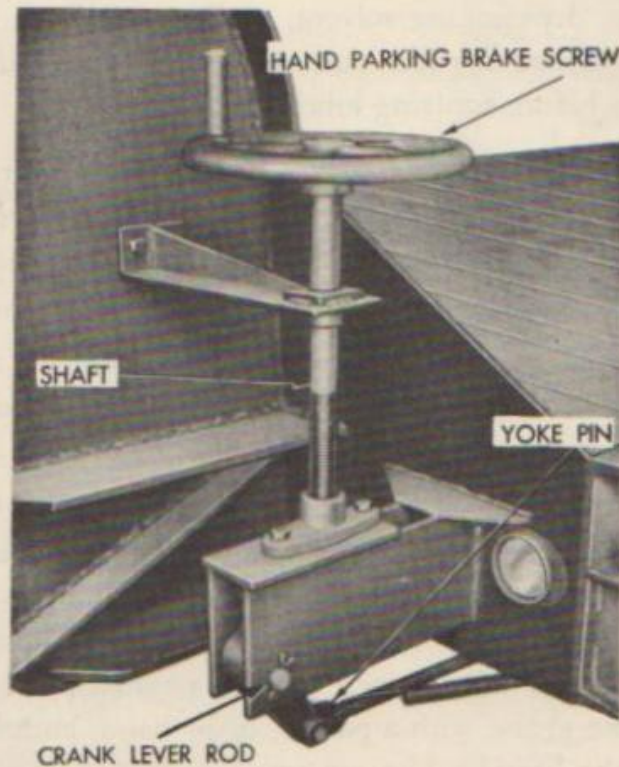


DRAW BAR HINGE

ITEM 6—FRONT GEAR. Clean fittings with wiping cloth. Apply lubricant through fittings until new grease appears at inner side. (2 fittings.)

Figure 15—Localized Lubrication Points

d. Service intervals specified on the Lubrication Order represent minimum maintenance to be performed by the using organization. These intervals will be reduced under severe service conditions such as excessively high or low temperatures, prolonged periods of high-speed operation, continued operation in sand or dust, immersion in water or exposure to moisture, any one of which may quickly destroy the protective qualities of the lubricant.



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Figure 16—Localized Lubrication Points

e. Lubricants are prescribed in the "Key" in accordance with three temperature ranges, "above $+32^{\circ}\text{F}$," " $+32^{\circ}\text{F}$ to 0°F ," and "below 0°F ." When to change grades of lubricants is determined by maintaining a close check on operation of the materiel during the approach to change-over periods, especially during initial action. Sluggish starting is an indication of lubricants thickening and the signal to change to grades prescribed for the next lower temperature range. Ordinarily it will be necessary to change grades of lubricants *only when air temperatures are consistently in the next higher or lower range.*

28. DETAILED LUBRICATION INSTRUCTIONS.

a. *Lubrication Equipment.* Operate lubricating guns carefully and in such a manner as to ensure a proper distribution of the lubricant.

b. Points of Application.

(1) Lubrication fittings, grease cups, oilers and oilholes can be readily located by reference to the Lubrication Order. Wipe clean such lubricators and the surrounding surface before lubricant is applied.

(2) Always wipe clean metal surfaces on which a film of lubricant must be maintained by manual application, before the film is renewed.

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

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

(1) KINGPIN AND UPPER FIFTH WHEEL PLATE. When disassembled or removed, clean the old lubricant from bearing surfaces and lubricate the kingpin and upper fifth wheel plate with general purpose grease. Apply lubricant by hand application to all points of wear.

(2) WHEEL BEARINGS. Semiannually, remove bearing cone assemblies from hub. Wash bearings, cones, spindle and inside of hub and dry thoroughly. Do not use compressed air. Inspect bearing races and replace if damaged. Coat the spindle and inside of hub and hub cap with general purpose grease to a maximum thickness of $\frac{1}{16}$ inch only to retard rust. Lubricate bearings with general purpose grease with a packer, or by hand, kneading the lubricant into all spaces in the bearing. Use extreme care to protect the bearings from dirt and immediately reassemble and replace wheel. Do not fill hub or hub cap. The lubricant in the bearing is sufficient to provide lubrication until the next service period. Any excess might result in leakage into the drum. Adjust bearings in accordance with instructions in paragraph 74 c.

e. Reports and Records.

(1) Report unsatisfactory performance of materiel to the Ordnance officer responsible for maintenance as prescribed in TM 37-250.

(2) A record of lubrication may be maintained in the Preventive Maintenance Roster (W.D., A.G.O. Form No. 460).



Don't be a dope!
**CHECK
EQUIPMENT CAREFULLY!**

For ignoring his pintle hook lock
Joe Dope has his "fanny in hock".
The result of such failure
Left truck without trailer.
This "Guest" didn't bother to knock!

Section XIII

Preventive Maintenance Services

29. GENERAL INFORMATION.

a. Responsibility and Interval. Preventive maintenance services as prescribed by AR 850-15 are a function of using organization echelons of maintenance, and their performance is the responsibility of the commanders of such organizations. These services consist generally of before-operation, during-operation, at-halt, after-operation, and weekly services performed by the driver, and the scheduled services to be performed at designated intervals by organizational maintenance personnel.

b. Definition of Terms. The general inspection of each item applies also to any supporting member or connection, and is generally a check to see whether the item is in good condition, correctly assembled, secure, or excessively worn.

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

(2) The inspection of a unit to see that it is "correctly assembled" is usually an external visual inspection to see whether it is in its normal assembled position in the vehicle.

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

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

30. DRIVER MAINTENANCE (FIRST ECHELON).

a. Purpose. To ensure mechanical efficiency it is necessary that the vehicle be systematically inspected at intervals each day it is operated and weekly, so defects may be discovered and corrected before they result in serious damage or failure. Certain scheduled maintenance services will be performed at these designated intervals. Any defects or unsatisfactory operating characteristics beyond the scope of first echelon to correct must be reported at the earliest opportunity to the designated individual in authority. The services set forth

Preventive Maintenance Services

in paragraphs 31, 32, and 33, are those performed by the driver before operation, during operation, at halt, and after operation and weekly.

b. Use of W.D. Form No. 48. Driver preventive maintenance services are listed on the back of "Driver's Trip Ticket and Preventive Maintenance Service Record" W.D., Form No. 48, to cover vehicles of all types and models. Items peculiar to this vehicle but not listed on W.D., Form No. 48, are covered in manual procedures under the items with which they are related. Certain items listed on the form that do not pertain to this vehicle are eliminated from the procedures as written into the manual. Every organization must thoroughly school each driver in performing the maintenance procedures set forth in this manual, whether they are listed specifically on W.D., Form No. 48 or not. The items listed on W.D., Form No. 48 that apply to this vehicle are expanded in this manual to provide specific procedures for accomplishment of the inspections and services. The services are arranged to facilitate inspection and conserve the time of the driver, and are not necessarily in the same numerical order as shown on W.D., Form No. 48. The item numbers, however, are identical with those shown on that form.

31. BEFORE-OPERATION SERVICE.

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

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

(1) ITEM 1, TAMPERING AND DAMAGE. Examine the exterior of vehicle, attachments, and equipment, for injury caused by tampering, sabotage, collision, falling debris, or shell fire since parking.

(2) ITEM 5, AIR BRAKE TANK AND AIR FILTERS. Examine air brake reservoirs, filters, air lines, and connections for looseness or damage. If connected to tractor-truck, listen for air leaks, drain water from reservoirs and close drain cocks. Be sure truck-to-trailer air couplings are securely connected; or, if not in use, that they are closed and properly supported, and that dummy couplings are attached.

(3) ITEM 12, LAMPS (LIGHTS) AND REFLECTORS. Clean all light lenses and warning reflectors, and inspect units for looseness or damage. If

trailer is connected, and tactical situation permits, open and close trailer light switches to see if lamps respond properly.

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

(5) ITEM 14, TIRES. Be sure all tires are properly inflated to 65 pounds front (dolly), and 85 pounds rear (maximum) when cool. Remove all objects lodged in treads or carcasses, and from between the duals. Inspect tires for damage, see that valve stems are in good condition and in correct position, and be sure all valve caps are finger-tight.

(6) ITEM 15, SPRINGS AND SUSPENSIONS. Examine converter dolly radius rods, springs, spring clips and U-bolts for looseness or damage. Look for excessive spring sag and broken or shifted leaves.

(7) ITEM 18, TOWING CONNECTIONS. Inspect drawbar and lunette assembly for looseness or damage. See that drawbar-to-dolly lock pin is secure, or, if not in use, that it is properly stowed. Be sure converter dolly is properly connected to trailer, and that kingpin locking device is secure. Inspect rear bull rings for looseness or damage.

(8) ITEM 19, FRAME (DOLLY AND PLATFORM) AND LOAD. Inspect all trailer and converter dolly frame beams, side and crossmembers, brackets and attachments for looseness or damage. Examine platform floorboards to be sure they are secure, and look for broken or splintered boards. See that any load carried is properly distributed and secure.

(9) ITEM 21, TOOLS, PARTS, AND ACCESSORIES. Be sure that all vehicle tools, spare parts and accessory items are present (see section III), in good condition and properly mounted or stowed.

(10) ITEM 23, DRIVER'S PERMIT AND FORM 26. The driver must have his operator's permit on his person. He must see that the vehicle technical manuals, Lubrication Order, and Forms No. 26, 48 and 478 are present, legible, and properly stowed.

32. DURING-OPERATION SERVICE.

a. Observations. While vehicle is in motion, listen for any sounds such as rattles, knocks, squeals, or hums that may indicate trouble. Be alert for odors indicating overheated components or units such as brakes, or other trouble. When brakes are used, or the vehicle turned, consider this a test and note any unsatisfactory or unusual performance.

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

Preventive Maintenance Services

- (1) ITEM 27, BRAKES. While the towing vehicle and trailer are in motion, test the operation of the trailer brakes independently to see if they are effective, and if they will stop the vehicle without pull to one side, or excessive noise.
- (2) ITEM 34, RUNNING GEAR. Be alert at all times during operation for any unusual noise or unsatisfactory operating characteristics in the wheels, suspension units or tires, that might indicate looseness, damage, inadequate lubrication or underinflated tires.
- (3) ITEM 51, FRAME AND LOAD. Be alert for any side sway, sag, or erratic tracking of the trailer that might indicate damage to frame members, shifting of load, or improperly connected towing devices.

33. AT-HALT SERVICE.

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

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

- (1) ITEM 39, TEMPERATURES (HUBS AND DRUMS). Cautiously hand-feel each wheel hub and brake drum to see if they are excessively hot.
- (2) ITEM 42, CONVERTER DOLLY SPRINGS AND SUSPENSIONS. Inspect springs, suspensions, and radius rods for indications of looseness or damage.
- (3) ITEM 44, WHEEL AND HUB NUTS. Inspect all wheel and hub mounting or assembly nuts to be sure they are all present and secure.
- (4) ITEM 45, TIRES. Inspect all tires for underinflation and damage. Remove any objects lodged in treads or carcasses, and from between duals.
- (5) ITEM 50, TOWING CONNECTIONS. Examine air and electric connections, and converter dolly-to-trailer connection and locking device to be sure they are in good condition and secure.
- (6) ITEM 51, FRAME AND LOAD. Inspect entire frame, converter dolly and platform assemblies for looseness or damage. Be sure load is properly distributed and secured.
- (7) ITEM 52, GLASS. Wipe off all light and reflector glass and inspect units for looseness or damage.

34. AFTER-OPERATION AND WEEKLY SERVICE.

a. Purpose. After-operation servicing is particularly important because at this time the driver inspects the vehicle to detect any deficiencies that may have developed, and to correct those he is permitted to handle. He should promptly report results of the inspection to the designated individual in authority. If this schedule is performed thoroughly, the vehicle should be ready to roll again on a moment's notice. The Before-operation Service, with a few exceptions, is then necessary only to ascertain whether the vehicle is in the same condition in which it was left upon completion of the After-operation Service. The After-operation Service should never be entirely omitted, even in extreme tactical situations, but may be reduced to the bare fundamental services outlined for the At-halt Service, if necessary.

b. Procedures. When performing the After-operation Service the driver must remember and consider any irregularities noticed in the Before-operation, During-operation, and At-halt Services. The After-operation Service consists of inspecting and servicing the following items. Those items of the After-operation that are marked by an asterisk (*) require additional Weekly Services, the procedures for which are indicated in step (b) of each applicable item.

(1) ITEM 59, LAMPS (LIGHTS) AND REFLECTORS. Clean all units, and inspect them for looseness and damage. If tactical situation permits, open and close light switches to be sure they operate properly, and see if the lamps respond.

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

(3) ITEM 68, *TIRES.

(a) Examine all tires for damage and excessive wear. Remove objects lodged in treads, carcasses, and between duals. Check for low pressure, proper position of valve stems and presence of valve caps. Inflate tires to correct pressure, 65 pounds front (dolly), and 85 pounds rear (maximum) cool. **WARNING:** *Any pressure picked up during operation must not be removed.*

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

(4) ITEM 69, CONVERTER DOLLY SPRINGS AND SUSPENSIONS. Clean out all objects lodged in suspension system or between units and front springs, and inspect for excessive spring sag, shifted or broken leaves, loose or damaged clips, or radius rods or brackets. Be sure radius rod adjusting

lock nuts are secure. Examine rear oscillating axle trunnion mountings to be sure they are in good condition and secure.

(5) ITEM 75, *AIR BRAKE TANK AND FILTERS.

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

(b) *Weekly*. Have assistant operate all brake control valves, and listen for air leaks. Tighten reservoir mountings and all connections where leaks are heard. Clean oil from all trailer to towing vehicle air line rubber hose. Drain sediment and water from both air line filters.

(6) ITEM 77, TOWING CONNECTIONS. Be sure all tow hitch and air and electrical connections are in good condition and secure.

(7) ITEM 78, FRAME AND LOAD. Inspect all trailer and converter dolly frame members, platform floor, and all attachments or brackets to see that they are in good condition and securely assembled and mounted. Any loaded cargo or equipment must be properly distributed and secured.

(8) ITEM 82, *TIGHTEN.

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

(b) *Weekly*. Tighten all wheel mounting and hub nuts, spring clips, U-bolts, rear trunnion shaft pinch bolt nuts, towing connections and assembly nuts or screws that experience or inspection indicate as necessary on a weekly basis.

(9) ITEM 83, *LUBRICATE AS NEEDED.

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

(b) *Weekly*. Lubricate all points listed on the vehicle Lubrication Order (fig. 14), or in the notes (par. 28) as requiring weekly attention.

(10) ITEM 84, *CLEAN VEHICLE.

(a) Clean all excess dirt and grease from entire converter dolly and trailer, particularly around wheels, suspensions, and brake operating mechanism.

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

(11) ITEM 85, *TOOLS, PARTS AND ACCESSORIES.

(a) Be sure that all vehicle tools, spare parts and accessory items are present (see section III), in good condition and properly mounted or stowed.

(b) *Weekly.* Clean all tools, and items of vehicle equipment, and see that all items are serviceable. Mount or stow them properly and securely.

35. ORGANIZATIONAL MAINTENANCE (SECOND ECHELON).

a. Frequency. The frequency of preventive maintenance services outlined herein is considered a minimum requirement for normal operation of vehicles. Under unusual operating conditions such as extreme temperatures, severe dust, sandy or extremely wet terrain, it may be necessary to perform certain maintenance services more frequently.

b. First Echelon Participation. The driver should accompany his vehicle and assist the mechanics while periodic second echelon preventive maintenance services are performed. Ordinarily the vehicle should be presented for a scheduled preventive maintenance service in a reasonably clean condition; that is, it should be dry, and not caked with mud or grease to such an extent that inspection and servicing will be seriously hampered. However, the vehicle should not be washed or wiped thoroughly clean, because certain types of defects, such as cracks, leaks, and loose or shifted parts or assemblies, are more evident if the surfaces are slightly soiled or dusty.

c. Sources of Additional Information. If instructions other than those contained in the general procedures in subparagraph *d*, or the specific procedures in subparagraph *i*, which follow, are required for proper performance of a preventive maintenance service or for correction of a deficiency, they may be secured from other sections of this manual or from the designated individual in authority.

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

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

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

e. Definition of Terms. Refer to paragraph 29 *b*.

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

- (1) **ADJUST.** Make all necessary adjustments in accordance with the pertinent section of this manual, special bulletins, or other current directives.
- (2) **CLEAN.** Clean units of the vehicle with dry-cleaning solvent (SD) to remove excess lubricant, dirt, and other foreign material. After the parts are cleaned, rinse them in clean solvent and dry them thoroughly. Take care to keep the parts clean until reassembled and be certain to keep cleaning solvent away from rubber or other material which it will damage. Clean the protective grease coating from new parts since this material is usually not a good lubricant.
- (3) **SPECIAL LUBRICATION.** This applies both to lubrication operations that do not appear on the vehicle Lubrication Order and to items that do appear on the order but should be performed in connection with the maintenance operations if parts have to be disassembled for inspection or service.
- (4) **SERVE.** This usually consists of performing special operations, such as replenishing battery water, draining and refilling units with oil, and changing or cleaning the oil filter, air cleaner, or cartridges.
- (5) **TIGHTEN.** All tightening operations should be performed with sufficient wrench torque (force on the wrench handle) to tighten the unit according to good mechanical practice. Use a torque-indicating wrench where specified. Do not overtighten, as this may strip threads or cause distortion. Tightening will always be understood to include the correct installation of lock washers, lock nuts, lock wire, or cotter pins provided to secure the tightening.

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

b. Work Sheet. The numbers of the preventive maintenance procedures that follow are identical with those outlined on W.D., A.G.O. Form No. 461 which is the "Preventive Maintenance Service Work Sheet for Wheeled and Half-track Vehicles." Certain items on the work sheet that do not apply to

this vehicle are not included in the procedures in this manual. In general, the numerical sequence of items on the work sheet is followed in the manual procedures, but in some instances there is deviation for conservation of the mechanic's time and effort.

i. Specific Procedures. The procedures for performing each item in monthly and semiannual maintenance procedures are described in the following chart. Each page of the chart has two columns at its left edge corresponding to the semiannual and the monthly maintenance respectively. Very often it will be found that a particular procedure does not apply to both scheduled maintenances. In order to determine which procedure to follow, look down the column corresponding to the maintenance due, and wherever an item number appears, perform the operations indicated opposite the number.

ROAD TEST

MAINTENANCE	
6-Month	Monthly
1	1
5	5
10	10
12	12

NOTE: *When the tactical situation does not permit a full road test, perform those items which require little or no movement of the vehicle. When a road test is possible, it should be for preferably 4 and not over 6 miles.*

1 **Before-operation Service.** Perform this inspection as outlined in paragraph 31.

5 **Brakes, Service and Emergency (Braking Effect, Side Pull, Noise, Chatter, Air Control).** Test trailer brakes separately by use of hand control or foot treadle, on truck-tractor, and observe if they are effective. Note any erratic action, side pull or noise that might indicate uneven brake shoe pressure, dirty linings or scored drums. Stop trailer and disconnect emergency line and observe if brakes automatically hold vehicle.

10 **Unusual Noises (Frame, Converter Dolly, Attachments, Wheels).** Be on the alert during road test for any noise that may indicate loose or damaged attachments mounted on converter dolly and trailer. Listen particularly for indications of loose wheel mountings. Have assistant listen for any unusual noises in axles, suspension units or towing connections that would indicate looseness, damage or inadequate lubrication.

12 **Air Brake System Leaks.** Test trailer air brakes for leaks with air pressure at governed maximum. Refer to tractor-truck technical manual. With all brakes applied and engine stopped, there should not be a noticeable drop in pressure within one minute. If any pressure drop occurs during this

MAINTENANCE		
6-Month	Monthly	
13	13	<p>check, test system for leaks by soapsuds method (par. 47). Open drain cocks on trailer air reservoirs and drain condensation.</p> <p>Temperature (Brake Drums, Hubs). At completion of run, cautiously hand-feel brake drums and hubs for abnormally high temperatures.</p>
<p>MAINTENANCE OPERATIONS Raise Vehicle and Block Safely</p>		
47	47	<p>Tires and Rims. See that valve stems are in correct position and undamaged, and that all caps are present and well seated (finger-tight). Examine all tires for cuts, bruises, breaks, blisters, and irregular wear. Also inspect all rims and flanges for good condition and security.</p> <p><i>Tighten.</i> Tighten all wheel inner and outer mounting nuts. Replace missing or damaged nuts.</p>
47		<p><i>Serve.</i> With trailer front and rear tires properly inflated to 65 pounds front (dolly), 85 pounds rear (cool), check over-all circumferences of tires to be mounted on duals. The difference in over-all circumference must not exceed the 3/4-inch limits as specified. CAUTION: Do not reinstall wheels until wheel bearing services are complete.</p>
48		<p>Brakes (Service). On the semiannual maintenance service, the several wheel bearing and brake items, numbers 48, 49, and 52, are group services in which there will be some overlap. Perform these services in the best order for economy of time and effort and for orderly reassembly. Remove hubs and drums (par. 72, fig. 46), and inspect and service brakes as follows:</p> <p>Drums and Supports. Clean all dirt and grease from inside of drums and from supports (spiders) and from brake operating mechanisms. CAUTION: Keep cleaning solvent away from brake linings. Inspect drums for scored inside surfaces and cracks or distortion. Tighten hub to drum nuts securely (fig. 46).</p> <p>Cams and Shafts. Examine cams and wear plates for excessive wear (fig. 35). Make sure camshafts are free and that shafts or bearings are not excessively worn.</p>
	49	<p>Brake Shoes. Without removal of the wheels, hubs or drums, examine the brake lining to see if it is in good condition and not excessively worn. If the vehicle has been</p>

Maintenance Instructions

MAINTENANCE		
6-Month	Monthly	
		operated in deep water, mud or loose sand, remove the outer right rear wheel hub and drum assembly. Examine the linings for damage. If this lining must be replaced, remove all wheels and inspect and service their brakes as necessary. Be sure to clean, lubricate and adjust all removed wheel bearings as described in paragraphs 28 and 74.
49		<p>While trailer wheels and drums are removed, inspect the linings to see if they are in good condition, correctly secured to brake shoes and in good wearing contact with the drum, free of dirt or lubricant and not excessively worn. Also see that shoes are in good condition, properly secured to the anchors and retracting spring, and observe if springs have sufficient tension to return shoes properly to released position. Thickness of lining at the most-worn point should be enough for at least 1000 miles of service before the rivets are likely to contact drums.</p> <p><i>Clean.</i> Clean all dirt or grease from linings with wire brush, cloth or compressed air.</p> <p><i>Adjust.</i> After subsequent related items to 52 inclusive are completed, adjust the slack adjusters so diaphragm pushrod travel is at minimum (par. 46).</p>
50	50	Radius Rods. Examine radius rods on converter dolly to see that they are in good condition, correctly assembled and secure. Shake the rods to test them for excessive wear. Be sure adjusting nuts are tight and locked.
50		Remove the front end of the radius rods and inspect the rubber mountings to see if they are in good condition. If the rubber appears to be hard or cracked, apply a few drops of hydraulic brake fluid. Reassemble securely.
52	52	Rear Wheels (Bearings, Nuts, Spindles). Examine the wheels to see if they are in good condition, properly assembled and secure. Look particularly for bent flanges and for rust spots. Spin the wheels and observe if there are any indications of run-out and test the bearings for indications of looseness, dryness or damage.
	52	<i>Serve.</i> If the vehicle has been operated in deep water, mud or loose sand, remove the outer rear wheel hub and drum assembly and check the bearing lubricant for con-

Preventive Maintenance Services

MAINTENANCE		
6-Month	Monthly	
52		<p>tamination. If contaminated, remove bearings from all wheels and service in the same manner as for semiannual procedure following (see paragraph 74).</p> <p><i>Serve.</i> Disassemble all wheel bearings. Clean them thoroughly with dry-cleaning solvent and examine them to see if they are in good condition and not excessively worn. Examine the axle spindles to be sure that they are in good condition and not excessively worn. As bearings are re-assembled and wheel and hub assemblies replaced, proceed as follows:</p> <p><i>Special Lubrication.</i> Lubricate the wheel bearings according to instructions in Lubrication Order (fig. 14, par. 28).</p> <p><i>Adjust.</i> Adjust wheel bearings according to instructions in paragraph 74 and replace hub caps securely.</p>
56	56	<p>Front (Converter Dolly) Spring (Clips, Leaves, U-bolts and Brackets). Inspect all applicable items to see if they are in good condition, correctly assembled and secure. Look particularly for loose or missing rebound clips, broken or shifted spring leaves, and excessive sag. Observe if the deflection of both springs is normal and approximately the same.</p> <p><i>Tighten.</i> Tighten all spring U-bolts and rebound clips and brackets securely.</p>
60	60	<p>Front Wheels (Bearings, Nuts, Spindles). Inspect and service in same manner as for rear wheels, item 52.</p>
60	60	<p><i>Serve.</i> Inspect and service in same manner as for rear wheels, item 52.</p>
70	70	<p>Air Brake Reservoirs and Filters. Inspect these units for loose mountings and connections and for indications of damage or leaks. Open reservoir drain cocks and drain off water and sediment.</p>
	70	<p><i>Clean.</i> Remove drain plugs from bottom of air filters (fig. 24), and drain off any accumulated sediment or water.</p>
70		<p><i>Serve.</i> Renew elements in air filters and renew gaskets (par. 51).</p>
76	76	<p>Air Brakes (Chambers, Rods, Seats, Slack Adjusters and Equalizer Bars). Examine all applicable items to see if they are in good condition, correctly assembled and secure. Be</p>

MAINTENANCE	
6-Month	Monthly
80	80
81	81
83	83
83	
91	91
92	92
103	103
124	124

sure slack adjusters are properly adjusted, according to paragraph 46. See that chambers and air hose connections and rubber dirt seals are in good condition. Look for indications of leaks. Pay particular attention to see that equalizer bars and guides, operating rods and connections are not distorted or excessively worn. Tighten all assembly and mounting nuts and screws securely (see fig. 18).

80 80 Frame (Main, Side and Crossmembers). Examine trailer and convertér dolly frame members to see that they are in good condition. Look particularly for broken assembly welds and loose or damaged brackets or attachments. Also look to see that skid rails and bull rings are intact, and that platform boards are not broken or splintered. If the frame appears to be out of alinement, report condition to designated individual in authority.

81 81 Wiring, Conduit, and Grommets. Observe these items underneath trailer to see if they are in good condition, properly supported, connected, and secure (see fig. 51).

83 83 Brake Lines (Fittings and Hose). Examine all lines and fittings under trailer to see if they are in good condition, securely connected, and supported so that lines will not chafe against other vehicle parts.

83 Remove trailer air brake relay valve, clean thoroughly with brake fluid, and reinstall securely (par. 49, fig. 22).

91 91 Lamps (Lights). Examine all light units or sockets, to be sure they are in good condition, clean, and secure. If tactical situation permits, test all switches to be sure lamps respond properly.

92 92 Safety Reflectors. See if they are all present, in good condition, clean and secure.

103 103 Paint and Markings. Examine paint of entire trailer. Look for bright and shiny spots, oil and grease, rust, scratches or bare spots. Make sure markings and identifications are legible.

124 124 Tow Hitch (Kingpin and Lock Plates, Upper and Lower Fifth Wheel Plates, Drawbar, Lunette and Lock). Inspect the trailer upper and lower fifth wheel plates to see that they

Preventive Maintenance Services

MAINTENANCE		
6-Month	Monthly	
124		<p>are secure. Examine the drawbar and lunette assembly to see that they are in good condition, properly assembled and that the lockpin is properly installed or stowed.</p> <p>Chock the rear wheels, then place the hydraulic jacks under the frame of the trailer and raise until the weight is released from the kingpin connections. Loosen the kingpin lock mechanism and disconnect the converter dolly from the trailer (par. 14). Examine the kingpin and locking mechanism for excessive wear.</p> <p><i>Special Lubrication.</i> Before reassembling the converter dolly to the trailer, thoroughly hand-grease kingpin and plate surfaces with general purpose grease, see paragraph 28. Reassemble the converter dolly to the trailer properly and securely and remove the jacks.</p>
125	125	<p>Air and Electric Connections. Inspect trailer air lines and electric connections to truck to be sure they are in good condition, not excessively worn, and will couple securely without leaking. If trailer is not connected, be sure dummy couplings are present and connected. If rubber seals are hard or cracked, apply a film of hydraulic fluid to rubber surfaces.</p>
126	126	<p>Safety Devices (Chains, Chock Blocks). Inspect safety chains and chock blocks and attaching chains to see if they are in good condition and secure. Chock blocks, when not in use, should be properly stowed to snap fastener on frame (fig. 8).</p>
128	128	<p>Front and Rear Axles. Inspect front (converter dolly), axle assembly, and rear (trailer) oscillating trunnion assemblies, to see that they are in good condition, properly assembled and secure. Be sure trunnion shafts are free and that shafts or bearings are not excessively worn, and that shaft pinch bolts are tight.</p>
130	130	<p>Parking Brakes (Wheel, Shaft, Lever, Equalizer Bars, Guides, and Return Springs). Inspect all applicable items to see that they are in good condition, correctly assembled and securely mounted or connected. Be sure all equalizer bars and guides are not bent and that they are operating</p>

MAINTENANCE	
6-Month	Monthly
85	85
131	131
135	135
141	141
142	142

freely. See that return springs are intact and have sufficient tension. Make an operating test of the parking brake mechanism to be sure all components function properly.

Vehicle Lubrication. If lubrication is due, proceed according to instructions and specifications in Lubrication Order (sec. XII). Refer to notes (par. 28, and figs. 14, 15, and 16). Omit only those items that have received attention in the foregoing procedures. Replace missing or damaged grease fittings.

TOOLS AND EQUIPMENT

Tools. Check all vehicle tools against section III (Tools, Parts, and Accessories) to be sure all items are present, in good condition, clean and properly mounted or stowed.

Publications and Form No. 26. Be sure vehicle technical manuals, Lubrication Order and Form No. 26 and Form No. 478 are present, legible and properly stowed.

Modifications (MWO's Completed). Inspect trailer and converter dolly to be sure any modification work orders have been completed, and enter any MWO's or major unit assembly replacements made at time of this service on W.D., A.G.O. Form No. 478.

Final Road Test. Make a final road test, rechecking items 5, 10, 12, and 13. Confine road test to the minimum distance necessary to make proper observations. *NOTE: Correct or report to designated authority all deficiencies found during final road test.*

Section XIV

Trouble Shooting

36. GENERAL.

a. This section contains trouble shooting information and tests which can be made to help determine the causes of some of the troubles that may develop in use under average conditions. Each symptom of trouble given under the individual unit or system is followed by a paragraph on the possible causes of the trouble.

37. SERVICE BRAKE SYSTEM.

a. Symptoms. The following trouble shooting instructions apply only if the symptom is present after the trailer is properly coupled to a towing vehicle whose brake application system is operating correctly. For instructions on trouble shooting and repair in the brake system of the towing vehicle, refer to the 100-series technical manual relating to that vehicle.

b. No Brakes. Make certain air jumper hose tagged "SERVICE" is coupled to connections on trailer tagged "SERVICE." Service is on the right side of trailer (par. 12 *b* (3)). See that cut-out cocks at the rear of the towing vehicle are open. Make sure that the brake air pressure as indicated by the pressure gage on the instrument panel of the towing vehicle is no less than 60 pounds. See that the drain cocks on both the trailer and the towing vehicle are closed. Check brake adjustment (par. 46). Observe whether or not relay emergency valve is functioning by listening for exhaust upon release of brakes. Replace relay emergency valve if necessary (par. 49). Operate brakes, observing whether or not air chamber is functioning properly. If not, replace chamber diaphragm or chamber assembly, as required (par. 48).

c. Slow Brake Application or Release. Make sure that brake air pressure is greater than 60 pounds. Apply brakes and check for leakage from lines and connections by listening for escaping air. If air leaks are not apparent, and slow leakage is suspected, check further for leaks (par. 47). Make sure that there are no restrictions in the tubing and air lines. Replace or repair air lines if necessary (par. 52). See that air cleaner is not clogged. Clean, if clogging is present (par. 51 *c*). Check freedom of action of brake shoes, camshaft and brake linkage. Lubricate if necessary (par. 28).

d. Brakes Do Not Release. Be sure that the brakes are released at the towing vehicle, and that the parking brake is released. If the brakes were applied when the towing vehicle was uncoupled, open the drain cock at the air reservoir. If the service line was uncoupled from the towing vehicle before the emergency line, the relay emergency valve will be in the emergency

position. Equalize the pressure on the emergency system by building up pressure in the towing vehicle or by opening the drain cock at the air reservoir. Make sure the cut-out cocks on the towing vehicle are fully open. Check all lines and bases for restrictions or closures. Repair or replace damaged lines (par. 52). See that all joints are properly lubricated (par. 28).

e. Intermittent Brakes. Be sure wheel bearings are in adjustment. Adjust if necessary (par. 74 *c*). Check brake adjustment and adjust if necessary (par. 46). Remove hub and drum (par. 73 *b*), and examine drum for excessive wear and lack of concentricity. Replace drum if necessary (par. 73). Examine brake linings for presence of grease or oil, and make sure that linings are of the proper type. If linings are incorrect, or if they are excessively oily, replace the shoes (par. 56).

f. One or More Brakes Running Hot. Be sure that parking brake is fully released. Check brake adjustment (par. 76). See that none of the brake linkage is bent or broken. Make sure that cam, anchor pin, and linkage pins are properly lubricated (par. 28). Inspect the internal brake assembly, being sure that the return spring is not broken or damaged. Replace the components of the internal brake if necessary (par. 56). Inspect the brake drum inner surface for evidence of excessive wear or lack of concentricity with the hub. Replace if necessary (par. 73).

g. Drop in Air Pressure. Check hose couplings to be sure that gaskets are in good condition. Replace gasket if necessary (par. 54 *b*). Check connections for leaks with soapy water. Tighten leaky connections until leak disappears. Observe operation of relay emergency valve and replace if necessary (par. 49). Check for leakage at chamber diaphragm edge by using soapy water. If leakage is present, tighten the pressure plate against the diaphragm. Be sure that the air chamber is not damaged. If damaged, replace the chamber (par. 48).

b. Noisy Brakes. Make sure that brake drum is not distorted. If it is out-of-round, or not concentric, replace the drum (par. 73). Examine the brake shoes for loose or excessively dirty linings. If linings are faulty, replace the shoes (par. 56).

i. Excessive Oil or Water in Air System. Drain the air reservoir through the drain cock daily. This will prevent accumulated excessive water or oil; it must be cleaned by blowing out all lines, and cleaning all units. Refer to the instructions regarding the unit assemblies for directions on cleaning. If the fluid in the trailer air system is oil, and greater than normal accumulation is present, the compressor at the towing vehicle is passing oil into the system. See the trouble shooting section on the compressor in the 100-series technical manual pertaining to the towing vehicle.

38. PARKING BRAKE SYSTEM.

a. No Brake. Check all linkage for broken or damaged components. Replace any defective items (pars. 60 *b* and 61 *b*). Make sure that all links are properly connected. Be sure that the keys are in place under the levers on the cross shaft.

b. Handwheel Does Not Turn or Turns Hard. Examine the threads on the screw shaft and in the threaded bracket. Replace the defective units. Be sure the handwheel screw shaft is straight. Replace the handwheel if necessary (pars. 60 *a* and 61 *a*). Make sure that all joints are properly lubricated (par. 28). Examine linkage for bent components and replace defective parts (pars. 60 and 61).

c. Brake Does Not Release. Be sure that service brake is released at the towing vehicle, and that the emergency feature of the relay emergency valve is not operating. Examine linkage for bent or otherwise damaged components, and replace defective parts (pars. 60 and 61). Make sure that all joints are properly lubricated (par. 28).

39. FRONT SUSPENSION.

a. Shifted or Broken Spring Leaves. Examination of springs will disclose this defect. If leaves are shifted or broken, replace the spring (par. 64).

b. Uneven or Hard Riding. Examine springs for shifted or broken leaves, and replace defective units (par. 64). Make sure that the load is distributed evenly on the trailer. Be sure that the spring has not lost its arch. Replace spring if it has become flat (par. 64).

c. Excessive Noise. Examine springs for broken or shifted spring leaves and for broken or damaged rebound clips. Replace spring if defective (par. 64). Be sure that U-bolt nuts are tight.

d. Trailer Leaning or Tipping. Make sure the load is distributed evenly on the trailer. If, after redistributing the load, the trailer still leans, a defective spring is indicated. Examine springs to determine which is defective and replace (par. 64).

40. FRONT AXLE.

a. Trailer Wheels Do Not Follow Those on Towing Vehicle. Be sure the axle is in alinement. Realine if necessary (par. 63 *f*).

b. Inner Tires Wearing Excessively. Be sure wheel stud nuts are tight. Check wheel bearing adjustment (par. 74 *c*). Check axle camber (par. 63 *c*). If not proper, replace axle. Notify higher authority (par. 63 *a*) before making this replacement. Check axle spindle for bend (par. 63 *c*). If not proper, replace axle. Notify higher authority (par. 63 *a*) before making this replacement.

c. Outer Tires Wearing Excessively. Be sure that dual tires are properly matched. The axle may have too much camber. Check camber, and replace axle if incorrect (par. 63). Notify higher authority before making this repair:

d. All Four Tires Wearing Unevenly and Cupping. Make sure the axle is in proper alinement and realine if necessary (par. 63 *f*). If this does not correct the condition, replace the axle (par. 63). Notify higher authority before making this repair (par. 63 *a*).

41. REAR UNDERCONSTRUCTION.

a. Inner Tires Wearing Excessively. Make sure dual tires are properly matched. If condition is not corrected, replace the trunnion axle (pars. 67 and 68). Notify a higher authority before making this repair (par. 67 *a*).

b. Outer Tires Wearing Excessively. Make sure that dual tires are properly matched. If tires are matched, replace trunnion axle (pars. 67 and 68). Notify a higher authority before making this repair (par. 67 *a*).

c. All Four Tires Wearing Unevenly and Cupping. Be sure that the bolts which attach the rear underconstruction to the frame are tight. Make sure that the trunnion shaft bushings are in place and that the shaft fits without looseness in the bushings. If worn bushings are indicated, or if no other cause is found, replace the trunnion axle (pars. 67 and 68). Notify a higher authority before making this repair (par. 67 *a*).

d. Rear End of Trailer Weaves. Make sure that the bolts which attach the rear underconstruction to the frame are tight. Examine the trunnion shaft bushings to be sure that they are in place and that the shaft fits tightly in the bushings. If the bushings are defective, replace the trunnion axle (pars. 67 and 68). Notify a higher authority before making this repair (par. 67 *a*).

e. Excessively Rough Riding. Be sure that the load is distributed evenly on the trailer. Check the trunnion axle and shaft to be sure that the trunnion shaft is not frozen in the bushings. If the shaft is frozen, replace the trunnion axle and shaft (pars. 67 and 68). Notify a higher authority before making this repair (par. 67 *a*).

42. WHEELS, HUBS, DRUMS AND TIRES.

a. Wobbly Wheel. Make sure that the wheel nuts are uniformly tight and that the wheel is not cocked on the studs. Check for loose or stripped studs. Replace hub (par. 73 *b*) and refer to higher authority if studs are damaged. Examine the bearings for wear or other damage. Replace the bearings if necessary (par. 74). If the condition is not corrected, replace the axle (front axle, par. 63; trunnion axle, pars. 67 and 68). Notify a higher authority before replacing either axle.

Trouble Shooting

b. Hot Hub. Be sure that hub bearings are properly lubricated (par. 28). Examine bearings and cups for excessive wear or chipping. Replace defective parts (pars. 73 *d* and 74). Make sure wheel bearings are properly adjusted (par. 74 *c*).

c. Undue Tire Wear. Be sure tires are always inflated to 65 pounds, front (dolly), and 85 pounds, rear. Distribute the load evenly over the trailer, so that all the tires carry a portion of the load. If the condition persists, refer to axle trouble shooting (pars. 40 and 41).

d. Oil or Grease in Brake Drum or on Outside of Wheel. Clean and properly lubricate the hub (par. 28). If condition is repeated, examine the hub for cracks, and replace if necessary (pars. 72 and 73). Be sure that the grease retainers are not saturated or damaged. Replace if necessary (pars. 72 and 73).

e. Noisy Operation. Be sure that bearings are properly adjusted (par. 74 *c*). If condition is not corrected, examine the bearings for chipping and excessive wear. Replace if necessary (par. 74). Be sure that the bearings are properly lubricated (par. 28).

43. FRAME.

a. Trailer Leaning or Tipping. Be sure that the load is evenly distributed on the trailer. Examine the springs for breakage or loss of arch and replace spring assemblies if necessary (par. 64). Examine the structure for bent or broken members. If structural damage is found, notify a higher authority.

b. Drawbar Binds. Be sure that drawbar hinge pins are lubricated (par. 28). Check hinge pins for straightness, and replace if necessary (par. 77). Check the hinge brackets on the drawbar, and if damaged, replace the drawbar (par. 77). If the hinge brackets on the dolly are damaged, notify a higher authority.

c. Full Trailer Will Not Turn. Make sure that the dolly is not locked with dolly locking pin. Examine the frame for structural damage. Examine kingpin backing plate for bend, as well as structural members. Since the kingpin is riveted in place, a damaged kingpin is structural damage. Notify a higher authority if such damage is found.

d. Loose Coupling. Be sure that the pintle hook on the towing vehicle is in good condition. Check the drawbar hinge brackets and lunette for loose riveting. If looseness is found, replace the drawbar (par. 77). Examine the dolly hinge brackets and the kingpin on the main frame for loose riveting. If damage is found, notify a higher authority.

44. ELECTRICAL SYSTEM.

a. Failure of One Lamp to Light When Other Lamps Are Lit. Be sure the lamp-unit is not burned out, broken or loose in its socket. Replace

the lamp-unit if necessary (pars. 84 or 85). Examine the wiring back to the base for broken or grounded wires. Replace damaged section (par. 83).

b. Lights Dim. Be sure that the lenses are clean and free of foreign matter. Make sure that all connections are tight, and that the points of connection are clean and free of corrosion. Check the battery in the towing vehicle, making certain that it is fully charged (refer to pertinent 100-series technical manual on the towing vehicle).

c. Blackout System Fails to Operate or Service System Fails to Operate. A damaged blackout switch is indicated (par. 83). Replace the switch (par. 87) if necessary.

d. No Lights. Be sure that the jumper cable is connected properly and is tight in its sockets. Check the jumper cable with a test lamp to be sure that no wires are broken or short circuited. Replace the jumper cable if defective. Examine the coupling socket for damage or corrosion. If damaged, the coupling socket must be replaced (par. 86). Also examine the coupling socket on the towing vehicle. Treat it the same as the similar socket on the trailer. For replacement of the towing vehicle socket, refer to the pertinent 100-series technical manual on the towing vehicle.

Section XV

Service Brakes

45. DESCRIPTION AND DATA.

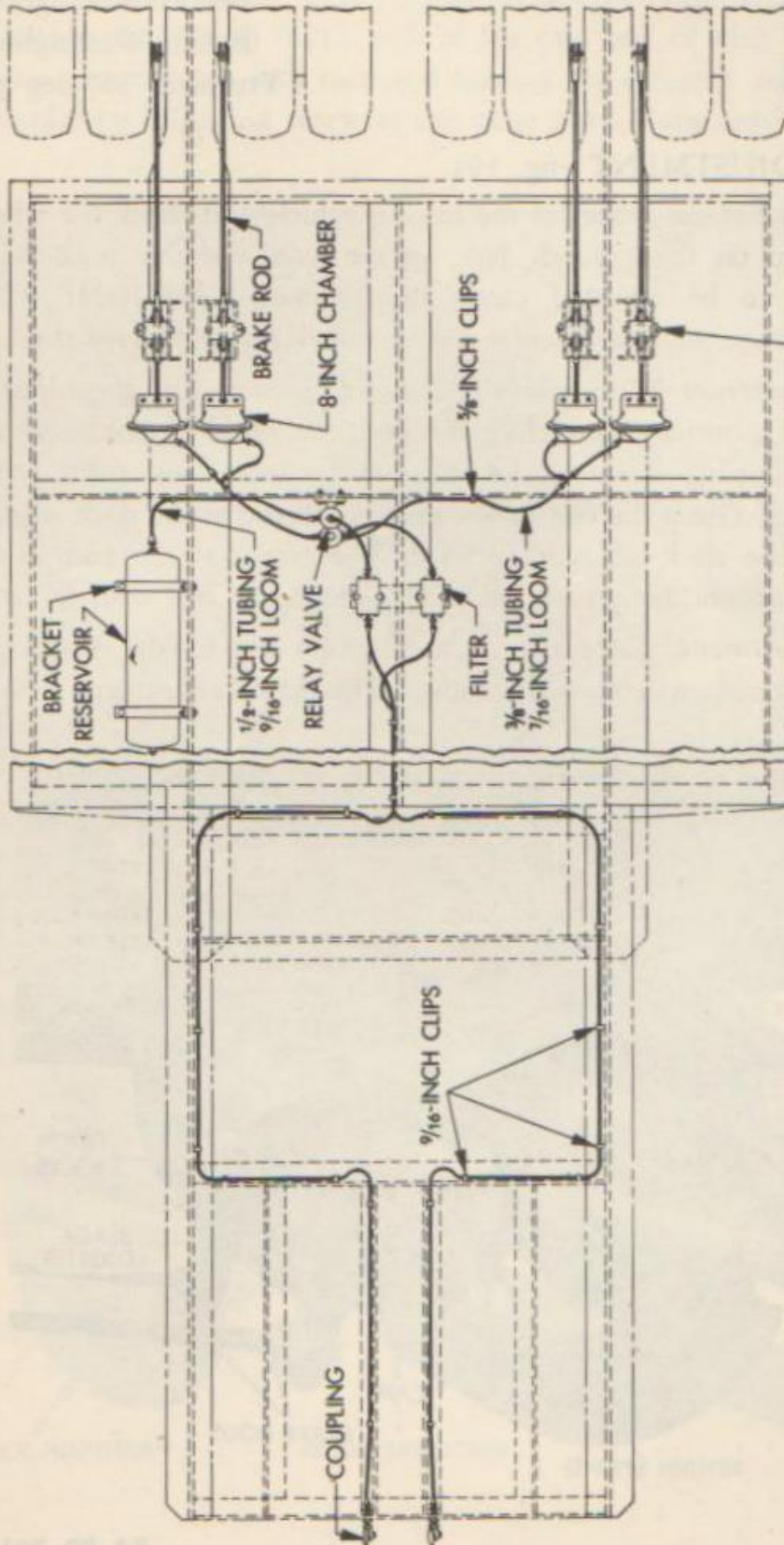
a. Description. The brakes are of the heavy-duty, mechanical, internal-expanding, two-shoe, anchor-pin type, operating on the cam and lever principle. The cams are integral with the camshafts. The cams are carried on bearings. The slack adjusters are of the 360-degree type, and permit rapid and proper adjustment of the brakes. The brakes are actuated by four air chambers which are mounted on the main frame side rails. Emergency break-away features are built into the emergency-relay valve which will hold the trailer for a limited time should the trailer break away from the towing vehicle. An air cleaner is installed in both the emergency and the service air lines. The brakes are controlled by a foot or hand control at the towing vehicle.

b. Data.

Service Brakes:

Make	Fruehauf
Type	Two-shoe, internal-expanding
Size	12½ x 4 in.

RA PD 341708



SGV TD

Figure 17—Service Brake System Diagram

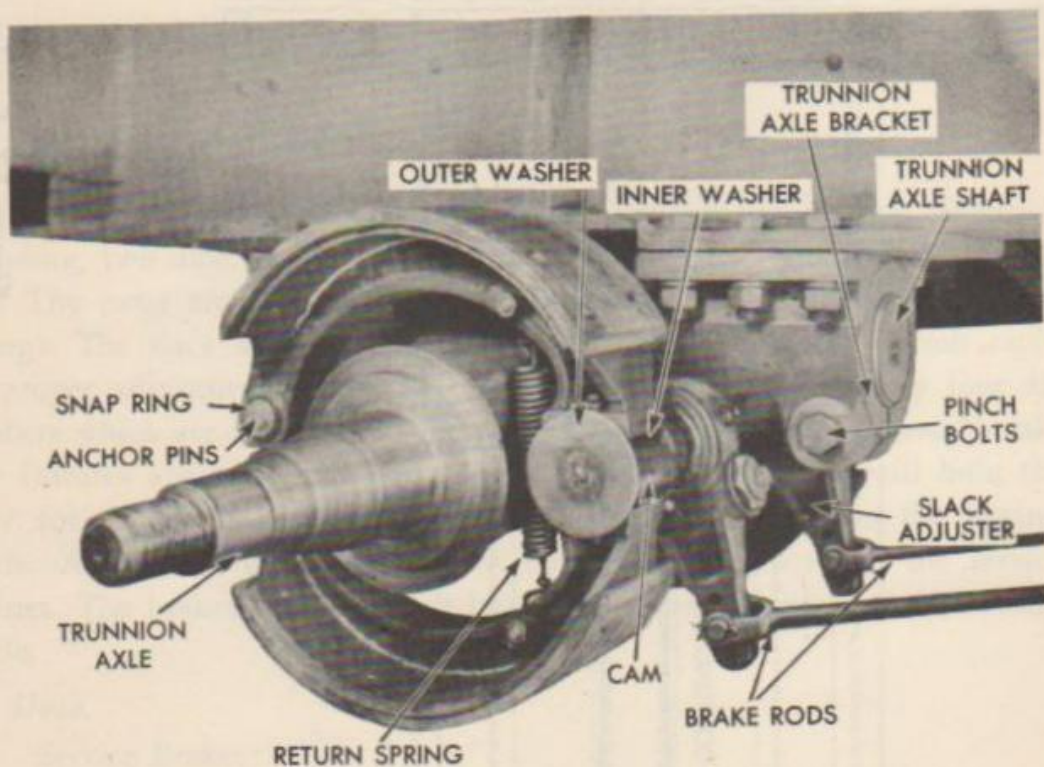
Operating pressure	Min. 60 lb
Copper air lines	$\frac{3}{8}$ in. and $\frac{1}{2}$ in. dia
Relay-emergency valve	Bendix-Westinghouse
Brake chamber	Bendix-Westinghouse
Air cleaner	Bendix-Westinghouse
Air reservoir	Bendix-Westinghouse
Slack adjuster	Fruehauf, 360-deg type

46. BRAKE ADJUSTMENT (fig. 19).

a. Preparation. Release brakes at the towing vehicle and chock the wheels which will remain on the ground. Jack up the axle assembly until wheel containing brake to be adjusted clears the ground. CAUTION: *When jacking axle assembly, place jack under rear crossmember to prevent slippage.*

b. Minor Adjustment. With brakes in released position, turn the adjusting screw on the slack adjuster counterclockwise until the wheel cannot be turned. Then turn the adjusting screw clockwise until the wheel just turns freely, usually two notches. Grasp the end of the brake push rod at the slack adjuster and try pulling the slack adjuster forward. The travel at the end of the slack adjuster must not be greater than $1\frac{3}{4}$ inches or less than $\frac{3}{4}$ inch.

c. Major Adjustment. Since the slack adjusters are of the 360-degree type, minor adjustment will normally suffice. The major adjustment is made

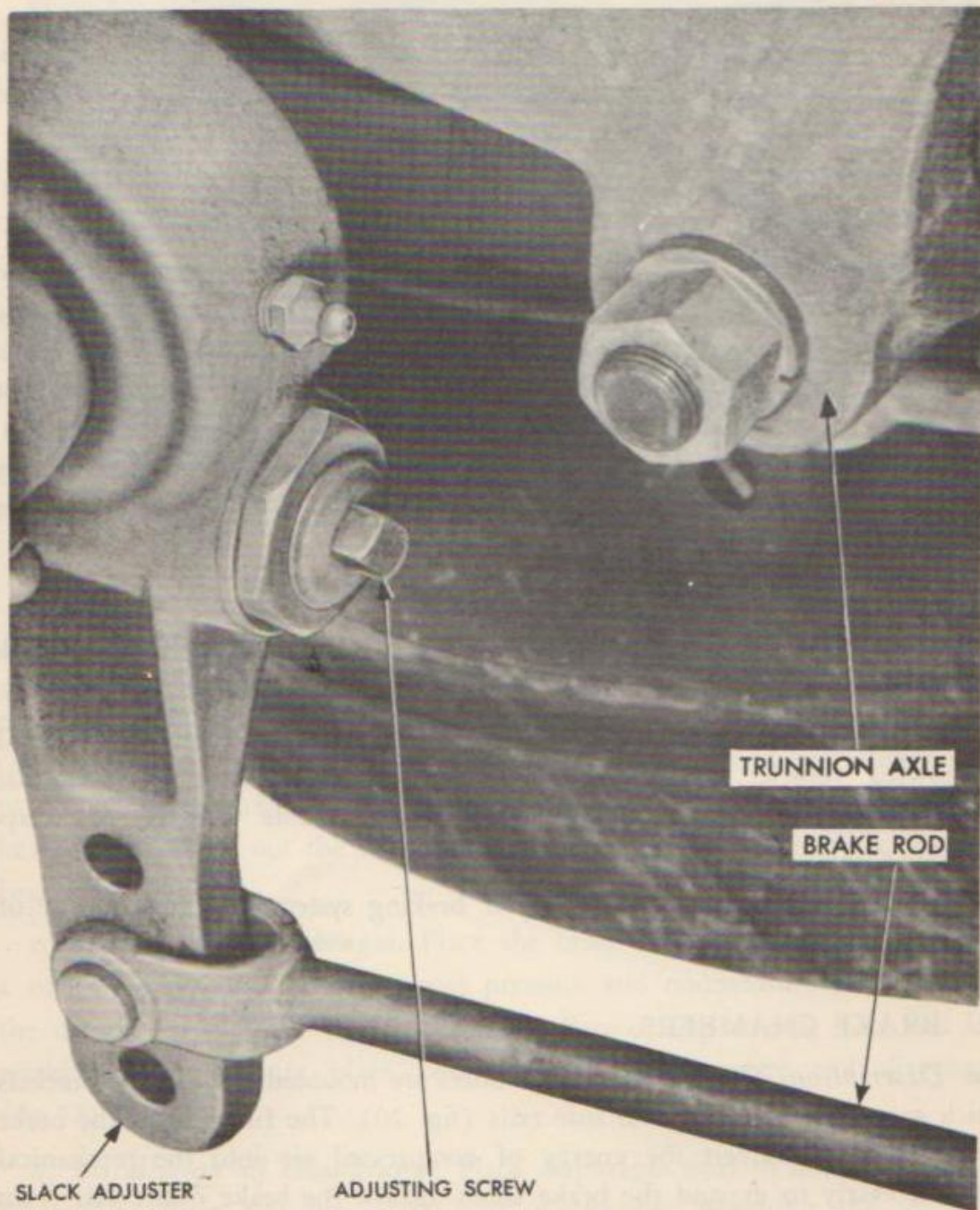


RA PD 341740

Figure 18—Internal Brake Assembly

Service Brakes

only after refacing the drum, relining the brake shoes, or when the brake drums or anchor pins have been disturbed. The brake may be adjusted by turning the eccentric anchor pins with the shoes in place. Make sure the brakes are fully released, and check the clearance between the lining and the drum with a feeler gage. Clearance should range from 0.010 inch at the anchor pin end to 0.015 inch at the cam end of each shoe. Adjust, by loosening anchor pin lock nuts and turning the eccentric anchor pin and the slack adjuster adjusting screw at the same time. Turn until the shoe is cen-



RA PD 341709

Figure 19—Brake Adjusting Screw

tered in the drum and the lining surface is making contact with the drum. Then install the above clearances by turning the anchor pins and backing off the slack adjuster. Tighten anchor pin lock nuts.

47. TEST FOR SERVICEABILITY.

a. Preparation. Connect jumper hoses from towing vehicle to trailer (par. 12 *b* (3)). Start engine, and build up air pressure to 100 pounds as registered by the pressure gage on the dashboard of the towing vehicle.

b. Leakage Tests.

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

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

(3) Leakage in the above tests is the combined leakage of both trailer and towing vehicle air systems. Trailer air system leakage is found by comparing results of the above tests with results of similar tests made with the cut-out cocks at the towing vehicle closed. If excessive leakage is indicated by these tests, check all units and connections for leakage (pars. 48 through 54). Repair or replace defective systems. Defective units may be detected by applying soapy water to the suspected unit. Bubbling will indicate presence of leaks.

c. Operating Tests.

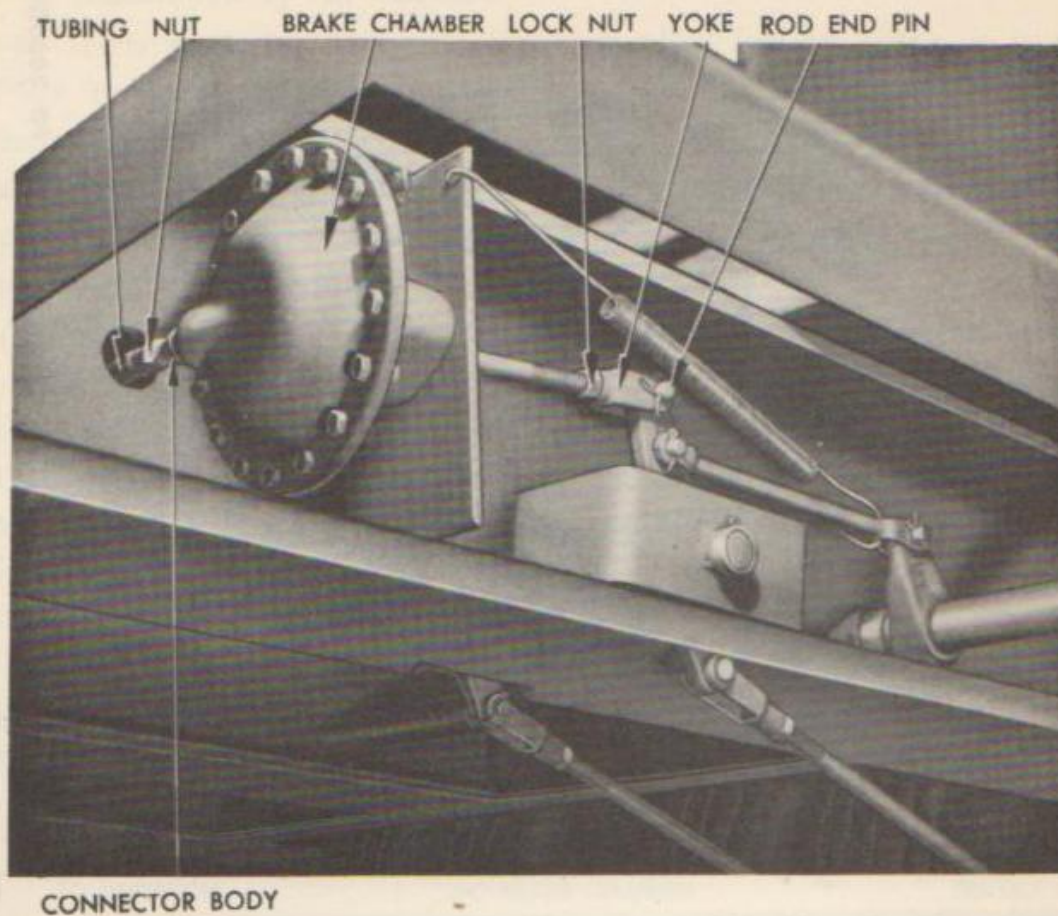
(1) With vehicles moving, apply brakes and check their effectiveness. Check for quick response on all wheels during application and release of brakes.

(2) With vehicle stopped, close the cut-out cock to the emergency line of the towing vehicle. Disconnect the emergency jumper hose. Be sure that trailer brakes apply automatically without noticeable leakage at relay-emergency valve.

(3) Check all units for serviceability if braking system fails to pass any of the above operating tests.

48. BRAKE CHAMBERS.

a. Description. The four brake chambers are mounted on separate brackets which are welded to the main side rails (fig. 20). The function of the brake chambers is to convert the energy of compressed air into the mechanical force necessary to expand the brake shoes against the brake drum. Air from the relay-emergency valve enters the port at the top of the chamber. This exerts a pressure against the diaphragm which moves the push rod forward to rotate the slack adjuster and camshaft.



RA PD 341710

Figure 20—Brake Chamber—Installed

b. Removal. Place brake control in the released position. Screw connector nut from connector body. Pull the air line off connector body. Remove the cotter pin from rod end pin at lever. Drive out rod end pin. Remove the two nuts, lock washers, and spacers holding the chamber to the mounting bracket. Now, lift out the brake chamber. Remove connector body from the brake chamber.

c. Removal of Diaphragm. Place the brake chamber in a vise and draw a nail or other sharp object across pressure and nonpressure plate edges at the diaphragm to mark it for reassembly. Remove cap screws, nuts, and lock washers from pressure plate, and remove pressure plate and diaphragm (fig. 21).

d. Installation of Diaphragm. Place diaphragm next to nonpressure plate (fig. 21). Place pressure plate over diaphragm, matching the markings which were placed on the chamber edge prior to disassembly. Install cap screws, nuts, and lock washers, and tighten. Do not tighten so tight as to cause the diaphragm to bulge at the chamber edge.

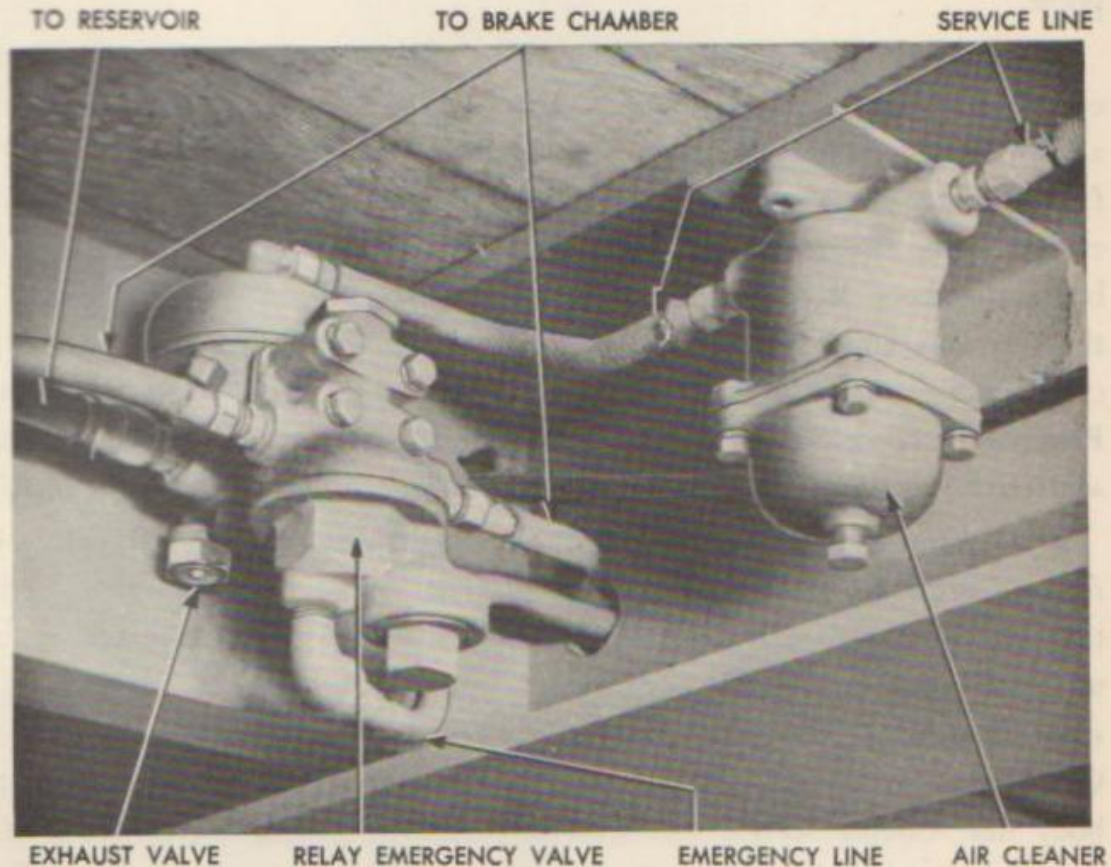
e. Installation of Air Chamber.

(1) Screw connector body into brake chamber, making certain it is tight. Place the brake chamber in position on the mounting bracket (fig. 20). Secure chamber to bracket, using two spacer nuts, cap screws, lock washers and nuts. Place a light film of grease over rod end pin. Couple chamber push rod yoke to lever with the rod end pin and cotter pin. Place the proper air line on the connector nut.

(2) Test for leaks as follows: Apply the brakes. Cover connector body and connector nut with soapy water. If leakage is indicated by the appearance of bubbles, tighten connector body and connector nut until leak disappears. Coat the diaphragm edge with soapy water, and if leaks are detected, tighten the pressure plate screws until the leak disappears.

49. RELAY-EMERGENCY VALVE.

a. Description. The relay-emergency valve is located on the underside of the trailer frame, ahead of the rear underconstruction (fig. 22). It is bolted to the crossmember. The relay-emergency valve serves as a relay



RA PD 341750

Figure 22—Relay-emergency Valve and Air Cleaner—Installed

station to speed up the application or release of the trailer brakes. It also provides a means of applying the trailer brakes in case of failure of the towing vehicle air system or accidental disengagement of the trailer from the towing vehicle. Its function is to operate so as to deliver and maintain the same air pressure in the trailer brake chambers as is delivered by the control valve on the towing vehicle.

b. Maintenance. Replace the relay-emergency valve if any of the tests described below indicate a faulty valve.

(1) LEAKAGE TESTS ON SERVICE SYSTEM. With brakes released, cover exhaust port with soapsuds. Repeat with brakes applied. A 3-inch bubble in three seconds is the maximum permissible leakage.

(2) EMERGENCY FEATURE TESTS. With full pressure in trailer reservoir, disconnect emergency line between towing vehicle and trailer. Trailer brakes should apply automatically. This feature should be checked daily.

(3) LEAKAGE TESTS ON EMERGENCY SYSTEM. With the emergency line hose removed, and valve in emergency position, cover emergency line hose coupling with soapsuds. Also cover valve exhaust port with soapsuds. A 3-inch bubble in three seconds is the maximum permissible leakage at either point.

c. Removal. Shut off the air supply to trailer by closing the two cut-out cocks at towing vehicle. Open drain cock at bottom of reservoir tank, allowing all air to drain from trailer brake system. Remove tubing nut from tubing elbow at the service line. Remove tubing nut from tubing elbow at the emergency line. Disconnect the two air lines leading to the brake chambers. Remove the tubing nut from the 1/2-inch line that runs to the reservoir tank. Remove the two bolts holding relay-emergency valve to crossmember and lift the valve out. Remove the three connector bodies. Remove the two elbows. CAUTION: *When screwing out the tees and elbows, use wrench against the unthreaded portion to prevent damaging of the threads.*

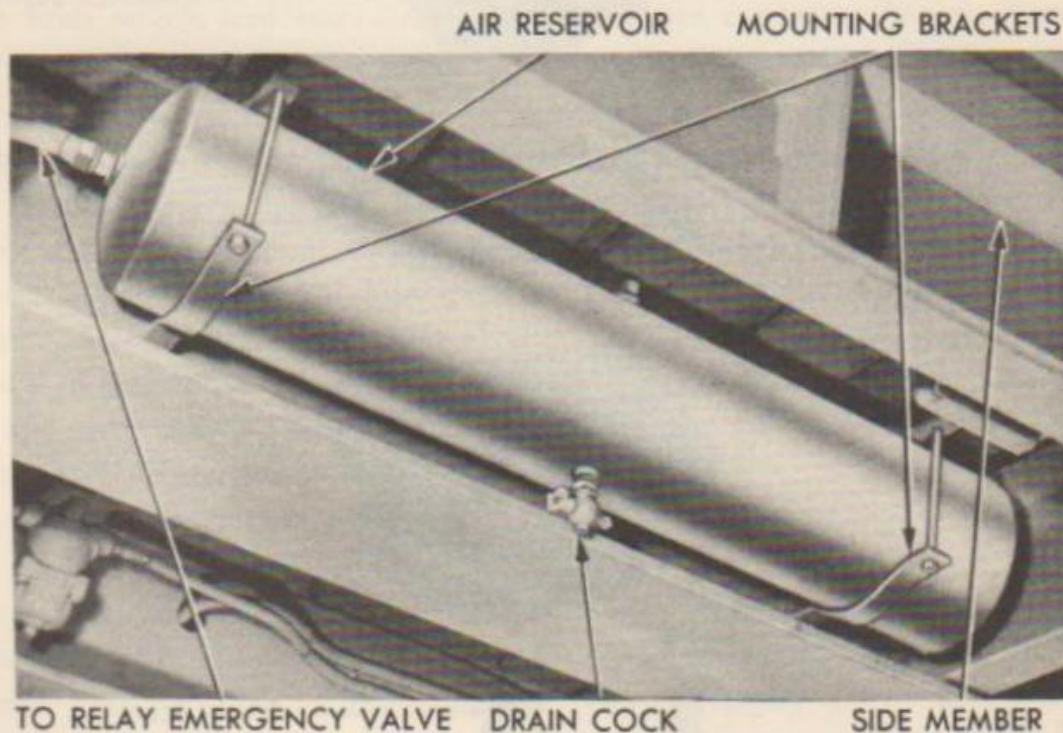
d. Installation (figs. 17 and 22). Coat the threaded portion of all valve fittings with shellac. Install the fitting into relay-emergency valve. Secure the relay-emergency valve to trailer crossmember, using two cap screws, lock washers and nuts. NOTE: *The word "top" is embossed on top of relay-emergency valve. When installing valve make certain the word "top" is up.* Couple the two air lines from brake chamber to connector body and tighten body nut. Couple service line to fitting at top. Couple emergency line to fitting at bottom. Couple the 1/2-inch line to the 1/2-inch body. Close drain cock at bottom side of reservoir. Open the two cut-out cocks at towing vehicle. Test all fittings and connectors for leaks (par. 49 *b*).

50. AIR RESERVOIR.

a. Description. One air reservoir is provided. It is located on the right inner side of the main side rail, ahead of the rear wheels (fig. 23). The reservoir stores a surplus supply of air for operation of relay-emergency valve and brake chambers.

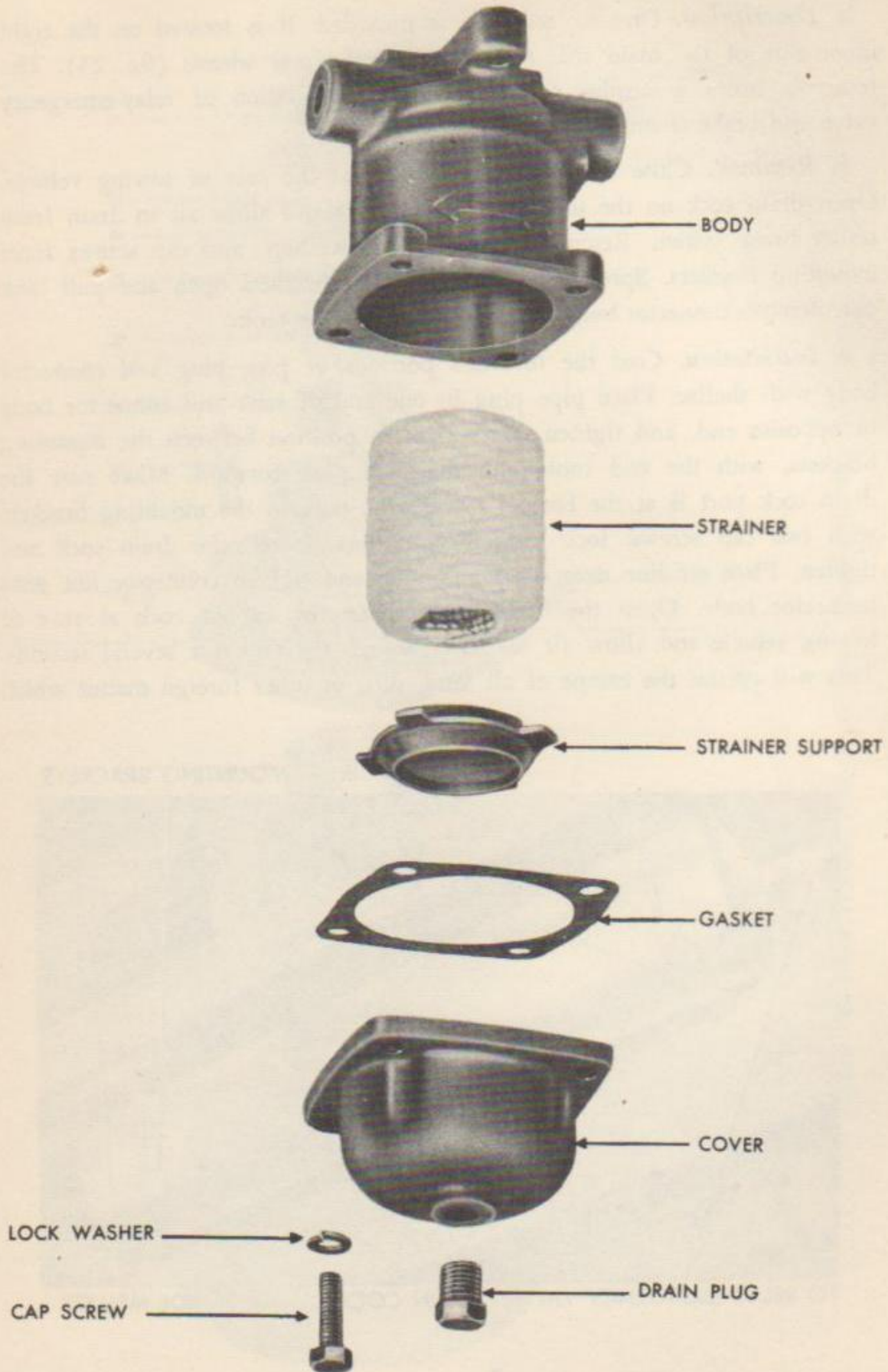
b. Removal. Close the two cut-out cocks at the rear of towing vehicle. Open drain cock on the underside of reservoir and allow air to drain from trailer brake system. Remove two nuts, lock washers, and cap screws from mounting brackets. Spread the four mounting brackets open and pull tank out. Remove connector body and pipe plug from the tank.

c. Installation. Coat the threaded portions of pipe plug and connector body with shellac. Place pipe plug in one end of tank and connector body in opposite end, and tighten. Place tank in position between the mounting brackets, with the end containing the pipe plug forward. Make sure the drain cock port is at the bottom. Secure the tank in the mounting brackets with two cap screws, lock washers, and nuts. Install the drain cock and tighten. Place air line over connector body and tighten connector nut onto connector body. Open the drain cock. Open the cut-out cock at rear of towing vehicle and allow air to blow through the tank for several seconds. This will permit the escape of all sand, dirt, or other foreign matter which



RA PD 341747

Figure 23—Air Reservoir—Installed



RA PD 308711

Figure 24—Air Cleaner—Disassembled

may have accumulated in the tank. Close drain cock and check for leaks by applying soapy water to pipe plug, tubing connector, and drain cock. Tighten fittings until leakage disappears.

51. AIR CLEANER.

a. Description. Two air cleaners are mounted ahead of the trunnion axle, near the channel crossmember (fig. 22). One cleaner is in the emergency air line and one cleaner is in the service air line. Air cleaners consist of a strainer mounted in a housing (fig. 24). They are designed to prevent dirt, water, and other foreign matter from entering the relay-emergency valve. No adjustment is necessary to maintain efficient functioning of the cleaner. However, cleaners must be drained every 1,000 miles; disassembled and thoroughly cleaned every 6,000 miles.

b. Draining Air Cleaner. Close the service and emergency cut-out cocks at rear of towing vehicle. Remove drain plug from bottom of air cleaner (fig. 24). Open cut-out cocks at rear of towing vehicle and allow air to blow out of cleaner for several seconds. Close cut-out cocks. Replace drain plug and open cut-out cocks.

c. Cleaning. Remove the two cap screws holding cover to body. Remove strainer support and pull strainer out of body. Wash strainer in dry-cleaning solvent and replace.

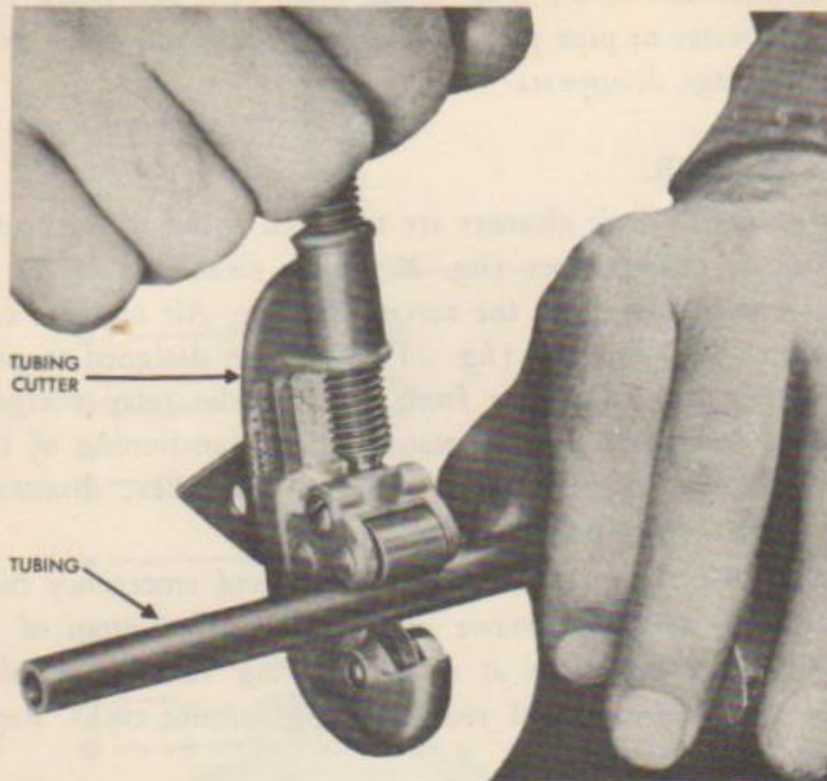
d. Removal. Close cut-out cocks at rear of towing vehicle. Disconnect two lines which lead into cleaner body. Remove connector bodies. Remove the two cap screws holding cleaner to mounting bracket and lift cleaner out.

e. Installation. Place cleaner in position on mounting brackets. Install two cap screws but do not tighten. Install the two connector bodies on the air cleaner. Couple the two air lines to the connector bodies and tighten the two cap screws holding cleaner to mounting bracket. Open cut-out valves at rear of towing vehicle, and test tubing connectors for leaks, using soapy water. Should leaks occur, tighten tube connector bodies and nuts. NOTE: When installing air cleaner, it is very important that the arrow embossed on the outer side be pointing toward the air line which runs to the rear of unit. Open cut-out valves at rear of towing vehicle.

52. LINES, TUBING AND CONNECTIONS.

a. Description. Two flexible air lines with couplings attached are used between trailer and towing vehicle. Air lines are of $\frac{3}{8}$ -inch metal tubing except line between air reservoir and relay-emergency valve, which is of $\frac{1}{2}$ -inch metal tubing.

b. Inspection. If evidence is found indicating that brake chambers are not functioning properly, check all tubing lines for dents, kinks, or other restrictions. Remove tubing line at the two ends and blow through it. Make



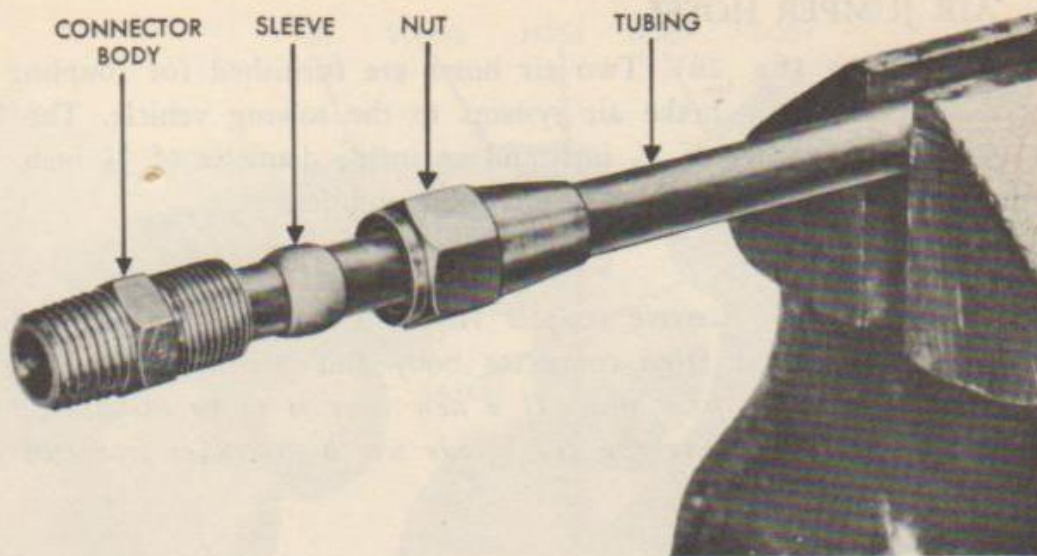
RA PD 308678

Figure 25—Cutting Tube to Length, using Tool (41-C-2825)

certain the air passes through the tubing. Inspect tubing for partial restrictions caused by dents and sharp bends. Replace tubing if necessary.

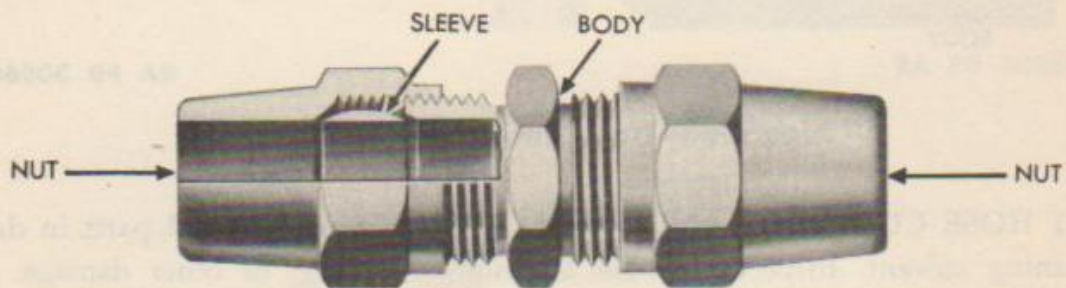
c. Leakage Tests. Place the brakes in the applied position with the minimum air pressure at 60 pounds. Coat all tubing lines and fittings with soapy water. Leakage is not permissible. Leakage at the tubing nut or body can be corrected by tightening. If this fails to correct the leakage, the tubing, tubing fitting, or both, must be repaired or replaced.

d. Tubing Repair. No attempt should be made to repair 1/2-inch tubing. Replace the entire line if damaged. Cut out damaged section of tube with a hacksaw, tubing cutter (fig. 25) or other suitable tool. Care must be exercised to prevent metal filings from entering the air line. When the section has been removed, lower the open ends to permit filings to fall out. Cut a length of new tubing the same length as the piece which was removed. Place tubing union nuts and sleeves (fig. 26) over the exposed ends of tubing. Place the repair piece in position, and insert exposed tubing ends into tubing union bodies. Tighten the nuts down on the bodies, thus forcing sleeves to clamp tightly against tubing (fig. 27). Test for leaks by applying soapy water to the joint. Tighten until leaks disappear.



RA PD 308677

Figure 26—Tubing and Fitting Ready for Assembly



RA PD 308612

Figure 27—Tubing Union—Sectional View

e. Tubing Removal. Close cut-out cocks at rear of towing vehicle. Open drain cock on underside of reservoir. Allow all air to drain from trailer brake system. Remove the nuts from each end of the damaged tube. Pry open the clips holding tubing to the frame and pull tubing and loom out.

f. Tubing Installation. Thread copper tubing through loom. Install the line, forming it to fit the trailer frame. Place tubing connector nut over tubing. Place sleeve over tubing. Holding tubing firmly and straight, place end of tubing into tubing connector body into recess of connector body, and tighten the connector nut. **NOTE:** *It is very important that care be used when bending and forming tubing to fit frame. A sharp bend will kink tubing and retard brake application and release. Keep dirt and other foreign matter out of tubing.* Make certain all lines are properly anchored to frame members, using tubing clips. Close drain cock on reservoir. Open cut-out cocks at rear of towing vehicle.

53. AIR JUMPER HOSES.

a. Description (fig. 28). Two air hoses are furnished for coupling the service and emergency brake air systems to the towing vehicle. The hose has an outside diameter of $\frac{3}{4}$ inch and an inside diameter of $\frac{3}{8}$ inch. The hoses are detachable from the hose coupling assemblies.

b. Hose Repair.

(1) **DISASSEMBLY.** Remove coupler from hose end by turning counterclockwise. Remove nut from connector body and pull hose out. **NOTE:** Do not remove sleeve from hose. If a new hose is to be installed, use a new sleeve. Do not remove the hose guide which protrudes from the connector body.



RA PD 308607

Figure 28—Hose and Hose Connector

(2) **HOSE CLEANING AND INSPECTION.** Clean all metal parts in dry-cleaning solvent. Inspect hose for abrasions, swelling, or other damage. If hose is damaged, replace with new hose, sleeve and gasket. Spring, nut and body must be used again unless they are damaged.

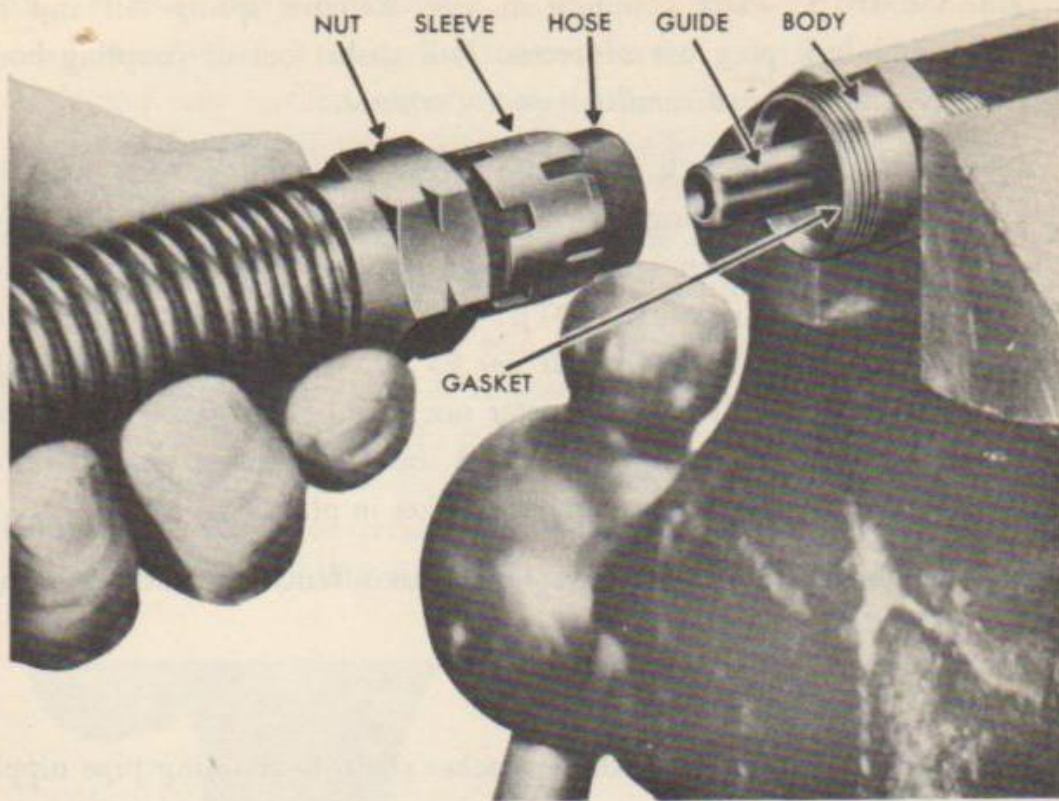
(3) **HOSE ASSEMBLY.** Cut hose to the desired length. **CAUTION:** When cutting hose, make certain the cut is smooth and square across the hose. Make certain no foreign matter is in the hose. Position nut and spring on hose. Position sleeve on hose with the barbs toward the short end of hose (fig. 29). Place gasket over hose guide with the protector cover toward the outer side. Remove the protector cover from the gasket. Shove the hose over hose guide in connector body, making certain the hose is completely down into the recess. Tighten the nut to connector body.

54. HOSE COUPLINGS.

a. Description (fig. 30). Two hose couplings are mounted on the front crossmember of the semitrailer, and four are used on the air hoses, one on each end of the two jumper hoses.

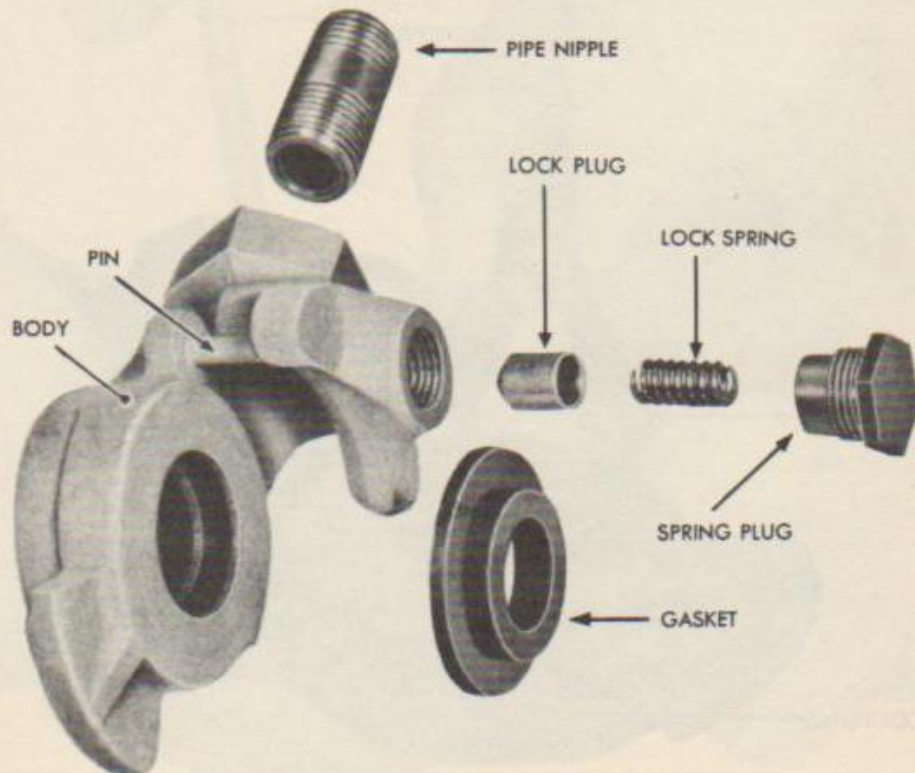
b. Coupling Repair.

(1) **REMOVAL.** Turn hose coupling counterclockwise, and remove.



RA PD 308680

Figure 29—Placing Hose in Connector Body



RA PD 308584

Figure 30—Hose Coupling—Disassembled

(2) **DISASSEMBLY.** Place coupling in vise. Remove spring nut and lift spring lock and lock plug out of recess. Pull gasket out of coupling body.

NOTE: *If gasket is in good condition do not remove.*

(3) **ASSEMBLY.** Install lock plug into recess in coupling body with the pointed end down. Place spring into recess in lock plug and install the spring plug. If the gasket has been removed, clean out the groove into which the flange of the hose coupling fits. **NOTE:** *The groove must be scraped thoroughly; otherwise the new gasket will not go into its proper place.* Partially collapse gasket with the fingers and enter one side of the gasket flange into the groove of the coupling (fig. 31). Then use a blunt-nose screwdriver or similar instrument to complete pushing the gasket in place (fig. 32).

(4) **INSTALLATION.** Thread pipe nipple into female threads and turn clockwise until tight.

c. Dummy Coupling Replacement.

(1) **REMOVAL.** Unfasten clip which attaches chain to coupling pipe nipple. Remove dummy coupling.

(2) **ATTACHMENT.** Fasten chain slip to pipe nipple.



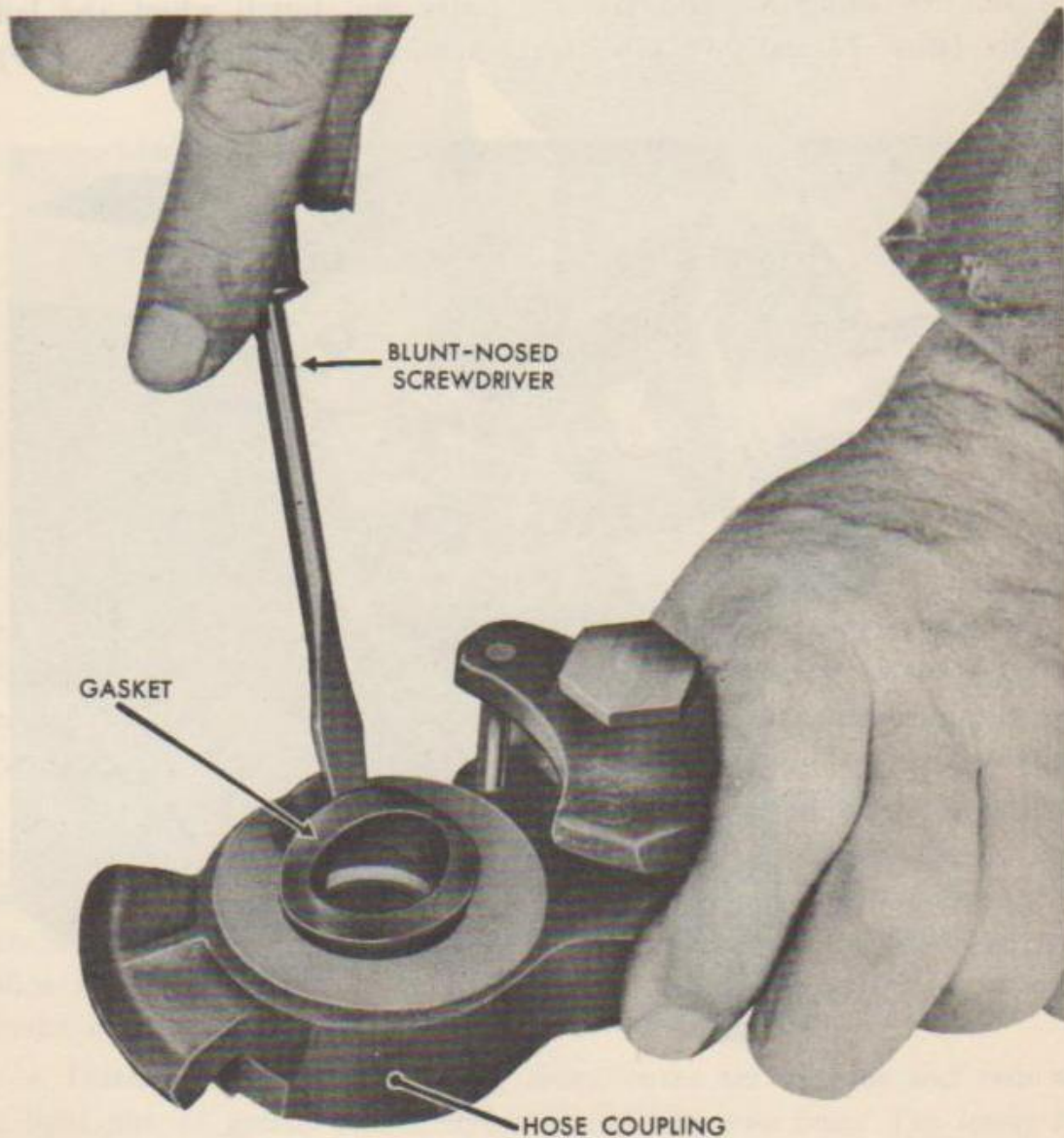
RA PD 308685

Figure 31—Installing Hose Coupling Gasket (Step 1)

55. SLACK ADJUSTERS.

a. Description. The slack adjuster acts as a lever and also provides a quick and easy method of adjusting brakes. The slack adjuster is mounted on end of a camshaft and is attached to the brake chamber. When the brakes are applied the air enters brake chamber. The slack adjuster is moved forward, rotating the camshaft, thus expanding the brake shoes. The trailer is equipped with four slack adjusters, which are identical in construction.

b. Removal. Remove wheel, hub, and drum assembly (pars. 72 and 73). Remove brake rod from slack adjuster by removing cotter pin and rod end pin. Using a $\frac{3}{4}$ -inch wrench, pull up on nut which holds the slack adjuster to the camshaft, thus raising the cam. Place an 8 $\frac{1}{2}$ -inch piece of wood between the two shoe return spring bolts (fig. 33). Now lower the cam. Remove the nut holding the slack adjuster to the camshaft and remove the



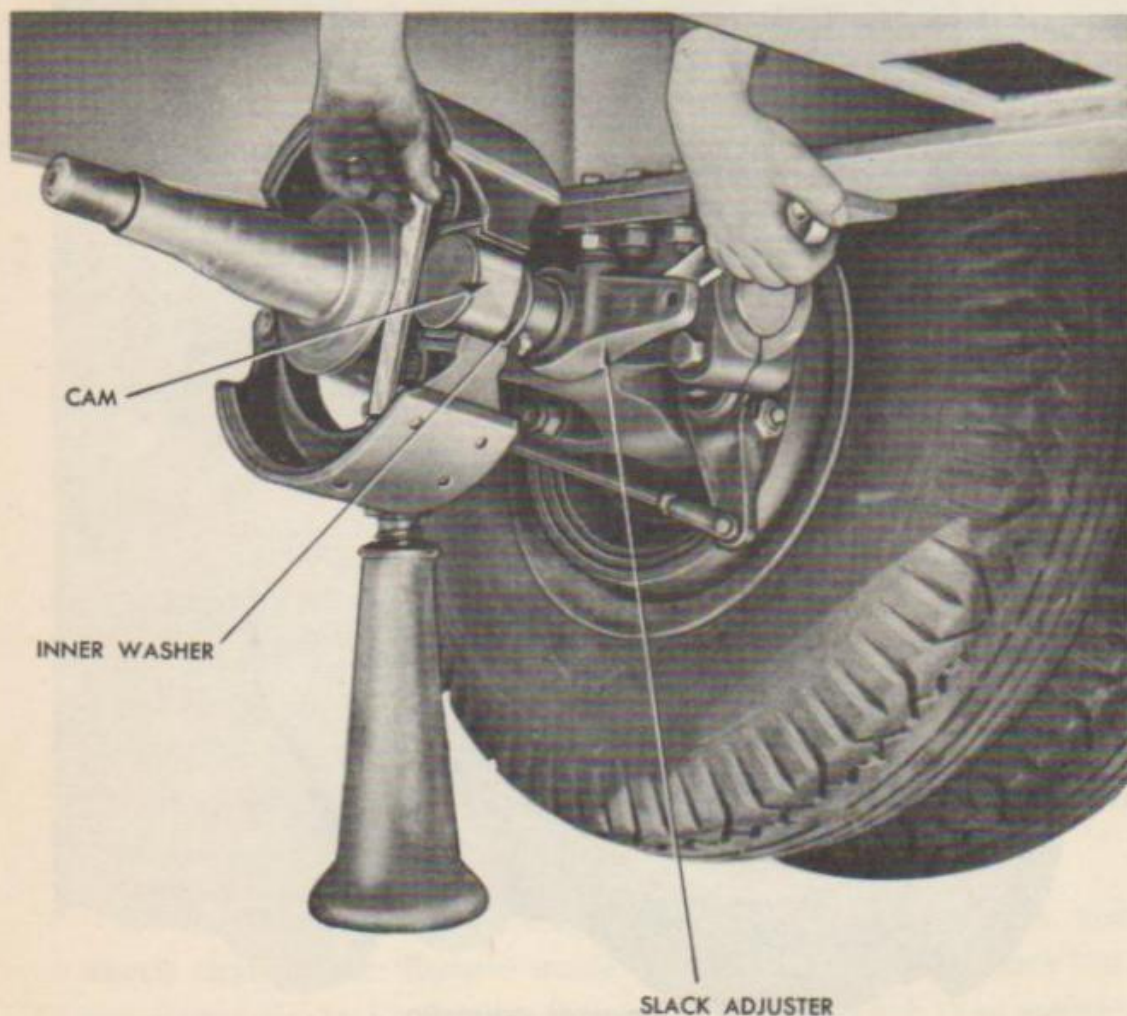
RA PD 308684

Figure 32—Installing Hose Coupling Gasket (Step 2)

lock washer and the plain washer from the camshaft. Pull slack adjuster off camshaft, while tapping the camshaft toward the outer axle spindle (fig. 34).

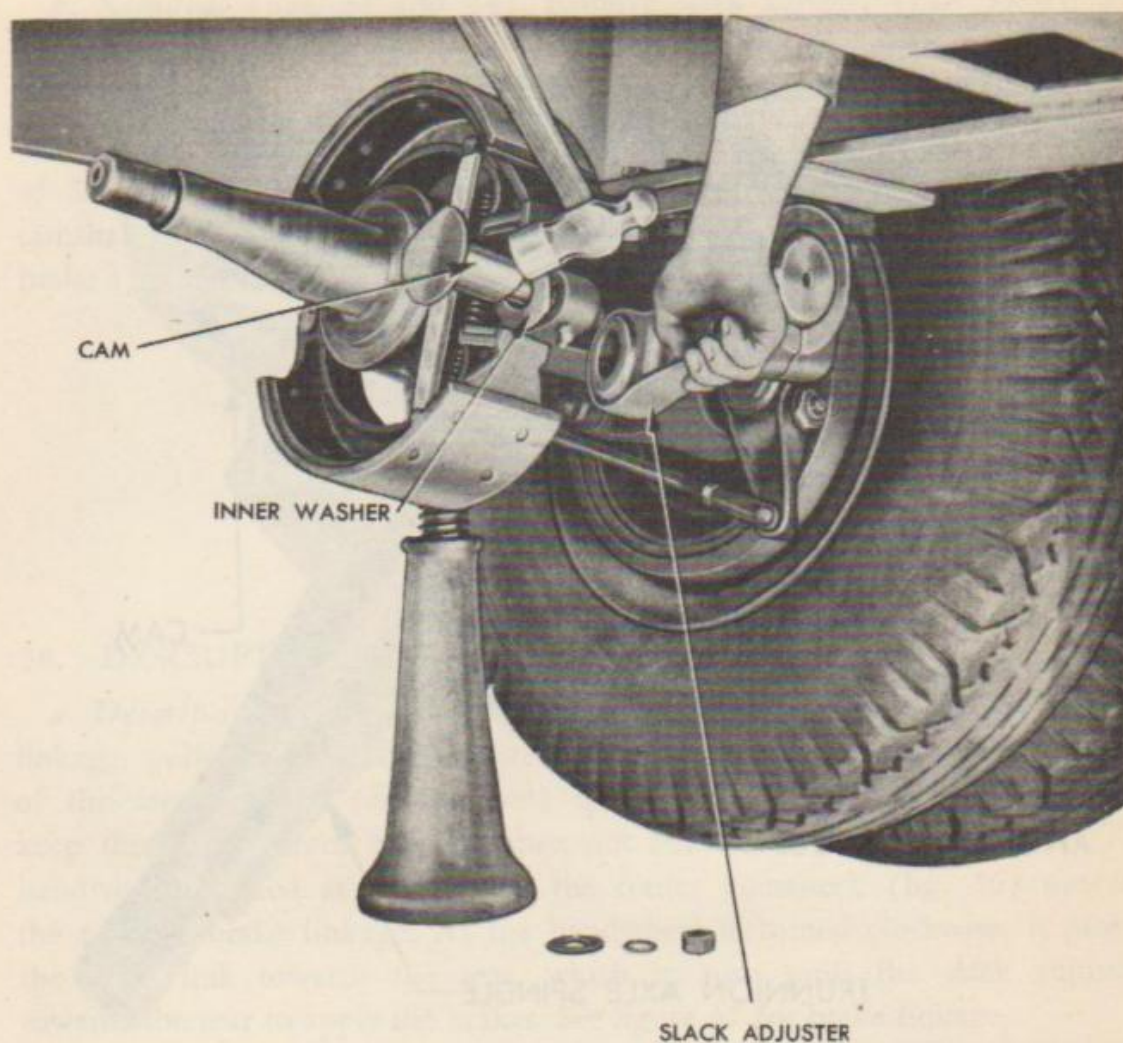
c. Test. Place the arm end of slack adjuster in a vise with the adjusting screw up. Try turning the adjusting screw with an 8-inch wrench. If the adjusting screw fails to turn, replace the slack adjuster. After testing worm assembly, place a 1/2-inch rod end pin through bushing. If pin is extremely loose, replace slack adjuster.

d. Installation. With the camshaft inserted through the slack adjuster, place plain washer and lock washer over camshaft. Then place slack adjuster on camshaft, while tapping cam into position under brake shoes. Place slack adjuster retaining nut on end of camshaft and tighten. With cam in lowered position, turn adjusting nut on slack adjuster until arm end of slack adjuster is in a nearly vertical position, pointing downward. Assemble brake rod to slack adjuster, using rod end pin and cotter pin. Install wheel and hub assembly (pars. 72 and 73). Give brake a minor adjustment (par. 46 *b*).



RA PD 341727

Figure 33—Removing Slack Adjuster



RA PD 341728

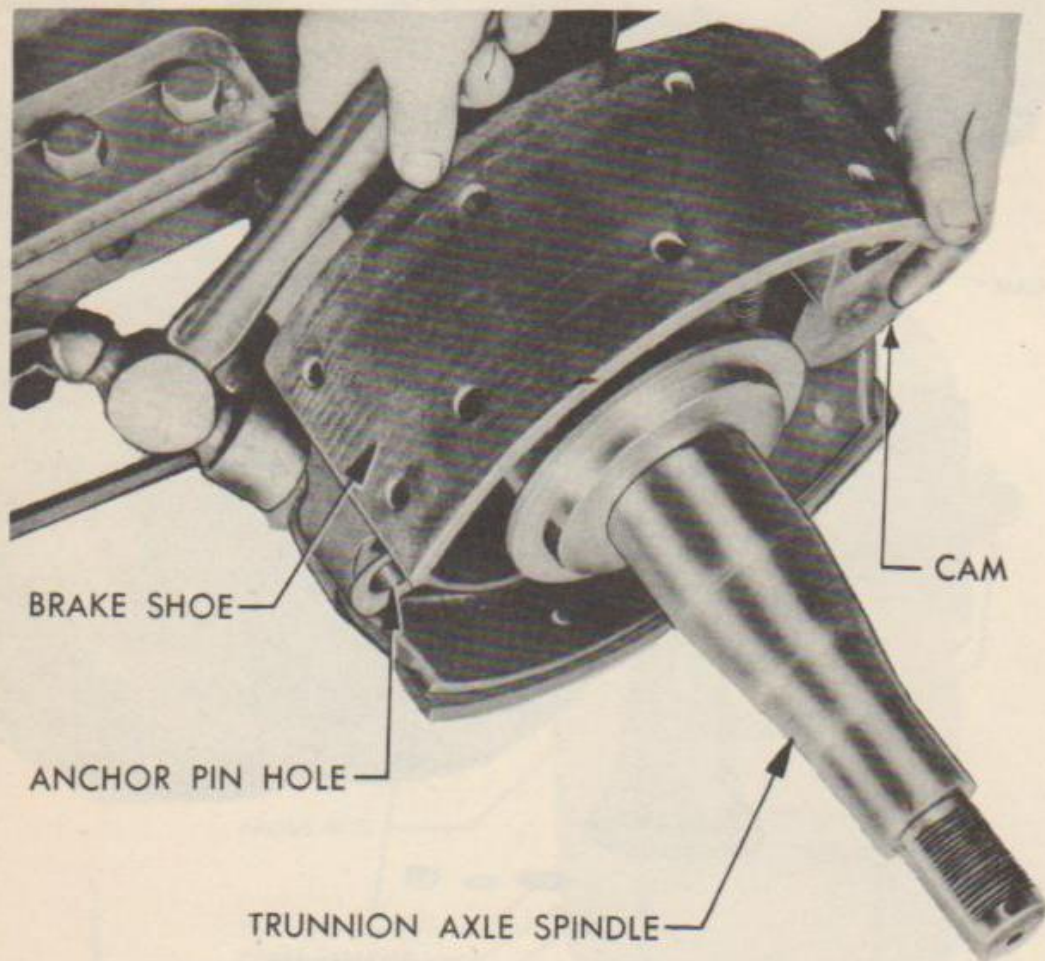
Figure 34—Removing Slack Adjuster and Cam

56. BRAKE SHOES AND ANCHOR PINS.

a. Description. The brake shoes are equipped with wear plates which rest against the cam. It is against these plates that the cam exerts force. Each brake shoe has one $\frac{5}{16}$ -inch lining block secured to the shoe with nine $\frac{3}{16}$ -inch rivets. The shoes are mounted on eccentric anchor pins to permit adjustment.

b. Removal (fig. 35). Remove wheel, hub, and drum assembly (pars. 72 and 73). Pry snap rings from the two anchor pins with two screwdrivers. Raise cam end of the top shoe and rest it on outer cam washer. Tap the anchor pin end of shoe off the anchor pin with a hammer. Then tap lower shoe off the anchor pin. Remove the two bolts holding return spring to brake shoes.

c. Installation. Before replacing shoes, cover anchor pins and cam with a light film of grease. Attach return spring with two bolts. Tap lower shoe onto anchor pin, with upper shoe in position for assembly. Then tap upper shoe onto the anchor pin. Place washers and snap rings on anchor pins.



RA PD 341726

Figure 35—Removing Brake Shoes

If snap rings have been damaged in removal, replace with new snap ring, or bend ring back into its original shape. Install wheel, hub, and drum assembly (pars. 72 and 73). Give brake a major adjustment (par. 46 c).

d. Anchor Pin Replacement.

(1) REMOVAL. Remove brake shoes. Remove two locking nuts from the anchor pins and lift out the pins.

(2) INSTALLATION. Place pin into the anchor pin hole. Install two locking nuts and tighten. Install brake shoes. Give brakes a major adjustment (par. 46 c).

57. BRAKE CAMSHAFT.

a. Description. The cam is forged integral with the camshaft. When turned by the action of the brake chambers or the parking brake, it forces the brake shoes against the drum, thus applying the brakes. The camshaft is carried by a needle bearing mounted in the trunnion axle.

b. Removal (figs. 33 and 34). Remove slack adjuster (par. 55 *b*). Tap camshaft out of bearing with a hammer. Remove inner washer from camshaft.

c. Installation. Place inner washer on camshaft. CAUTION: *Bevel side of inner washer must face towards cam head or outside of wheel.* Place camshaft through needle bearing. Install slack adjuster (par. 55 *d*). Give brake a major adjustment (par. 46 *c*).

Section XVI

Parking Brake

58. DESCRIPTION AND DATA.

a. Description. The parking brake is a mechanical device which, through linkage, pulls on the slack adjusters to apply the brakes. It is independent of the service brake (air-operated) system. The parking brake is used to keep the vehicle from moving when not attached to a towing vehicle. The handwheel, located at the left of the trailer gooseneck (fig. 36) operates the parking brake linkage. As the handwheel is turned clockwise, it pushes the main link towards the rear, which in turn pulls the slack adjusters towards the rear to apply the brakes. See figure 37 for brake linkage.

b. Data.

(1) HANDWHEEL.

Wheel diameter 12 in.
Thread size 1 $\frac{1}{4}$ -7 NC-2

(2) MAIN LINK.

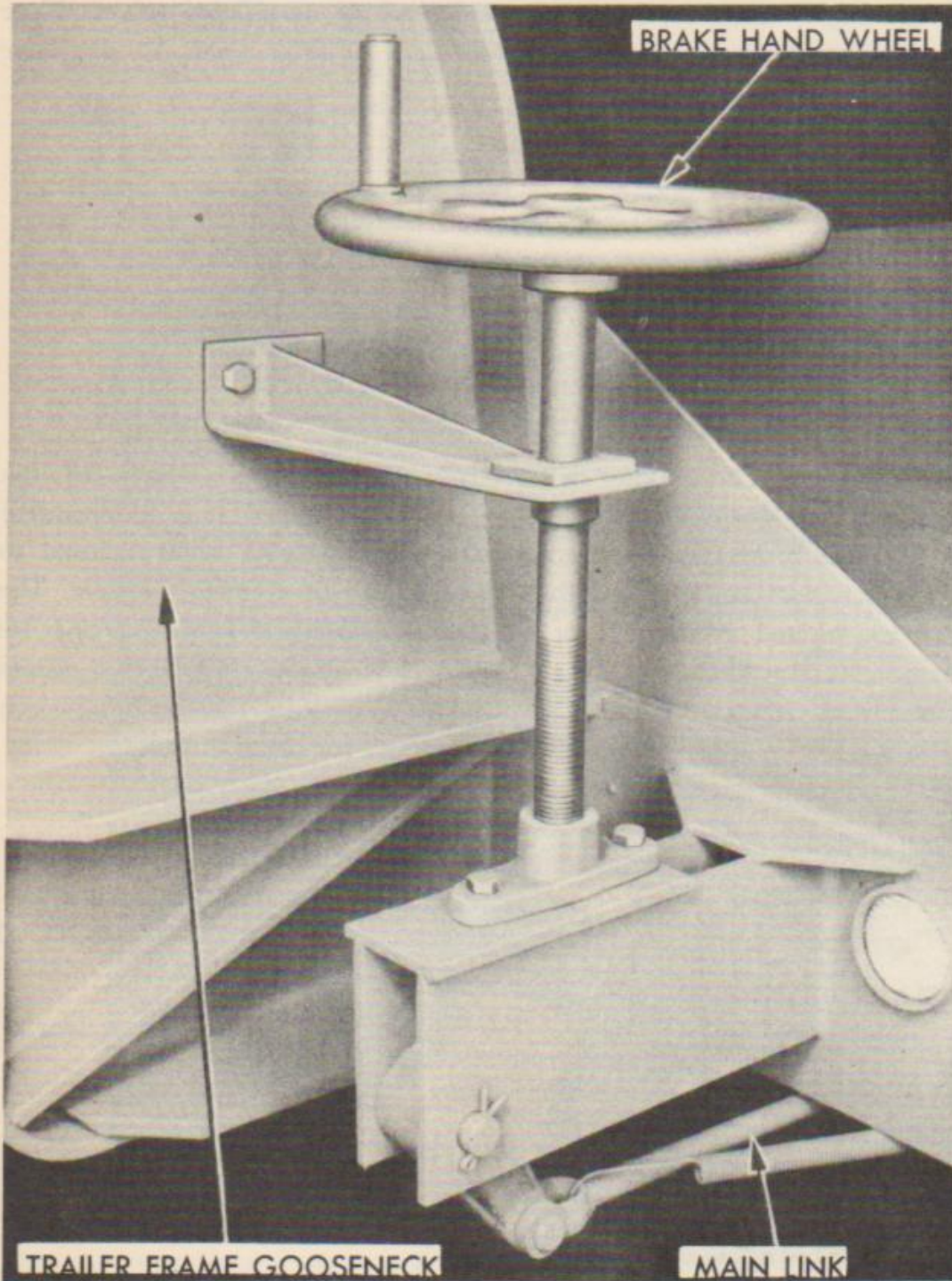
Length 18 ft 4 in.

(3) CROSS SHAFT.

Length 80 $\frac{7}{16}$ in.
Diameter 1 $\frac{1}{2}$ in.

59. ADJUSTMENT.

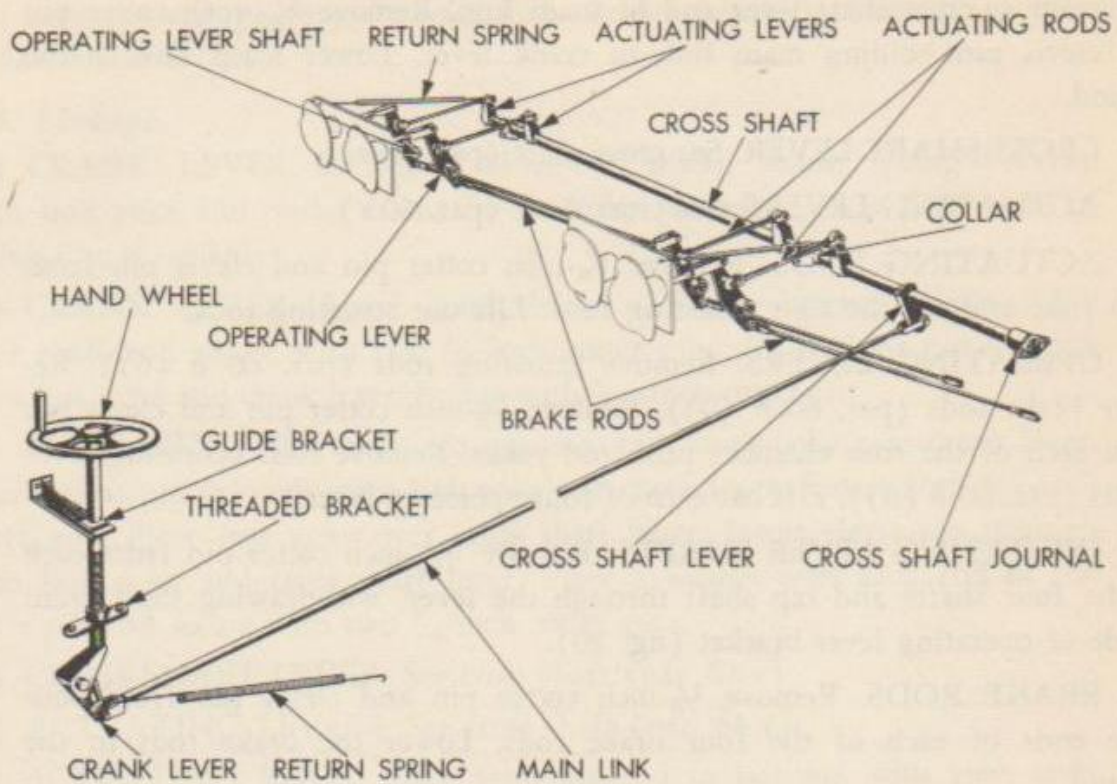
a. NOTE: Prior to making adjustment, inspect all linkage to make certain the rods are not bent, which may cause uneven braking. The adjustment of the parking brake is to make all linkage uniform in length and is accomplished by the following procedure: With the brakes released and the handwheel well up in its bracket, remove the cotter pins, washers and pin from the slip yoke at the rear of the main link (fig. 37). Loosen the jam nut on



RA PD 341751

Figure 36—Hand Brake Wheel

Parking Brake



RA PD 341752

Figure 37—Parking and Service Brake Linkage

the back of the slip yoke and screw the slip yoke to a position where the end of the slot is over the hole in the cross shaft lever. Install the pin, washers and cotter pins.

60. REMOVAL.

a. Handwheel. Remove 1/4-inch square head set screw from handwheel collar. Turn counterclockwise until handwheel is free. Lift out through guide bracket. If the threads are so severely damaged that the wheel cannot be removed in this fashion, remove the two bolts holding threaded bracket to frame bracket, and the two bolts holding guide bracket to gooseneck. Remove the assembly.

b. Linkage (fig. 37).

(1) CRANK LEVER RETURN SPRING. Remove return spring by twisting spring ends out of spring holes in trailer frame and main link yoke.

(2) CRANK LEVER. Remove two 1/4-inch cotter pins from crank pin. Tap crank pin out of frame bracket with a hammer. Remove 5/32-inch cotter pin and clevis pin holding crank lever to main link. Pull crank lever out of frame bracket.

(3) MAIN LINK. Remove two $\frac{3}{16}$ -inch cotter pins, two washers, and clevis pin at cross shaft lever end of main link. Remove $\frac{5}{32}$ -inch cotter pin and clevis pin holding main link to crank lever. Lower main link to the ground.

(4) CROSS SHAFT LEVER. See cross shaft (par. 60 c).

(5) ACTUATING LEVERS. See cross shaft (par. 60 c).

(6) ACTUATING RODS. Remove $\frac{1}{8}$ -inch cotter pin and clevis pin from both yoke ends of the four actuating rods. Lift out actuating rods.

(7) OPERATING LEVERS. Remove actuating rods (par. 60 b (6)). Remove brake rods (par. 60 b (9)). Remove $\frac{1}{8}$ -inch cotter pin and clevis pin from each of the four chamber push rod yokes. Remove four operating lever shafts (par. 60 b (8)). Lift out each of four operating levers.

(8) OPERATING LEVER SHAFTS. Remove $\frac{3}{16}$ -inch cotter pin from each of the four shafts and tap shaft through the lever, withdrawing shaft from inside of operating lever bracket (fig. 20).

(9) BRAKE RODS. Remove $\frac{1}{8}$ -inch cotter pin and clevis pin from both yoke ends of each of the four brake rods. Lower the brake rods to the ground.

(10) BRAKE ROD RETURN SPRINGS. Remove the two return springs by twisting spring ends out of spring holes in the trailer frame.

c. Cross Shaft (fig. 37). Remove parking brake main link (par. 60 b (3)). Remove four actuating rods (par. 60 b (6)). Remove five $\frac{3}{8}$ -inch pinch bolts, nuts, and lock washers from actuating levers and cross shaft lever. Loosen two $\frac{1}{4}$ -inch square head, cone point set screws, holding collars to the shaft. Withdraw shaft from hole in left side of trailer frame. CAUTION: *When withdrawing cross shaft, make sure the five $\frac{1}{4}$ -inch No. 22 Woodruff keys locating the four actuating levers and cross shaft lever to the shaft are not lost.* It may be necessary to tap levers and collars along the cross shaft as it is withdrawn. Removing the cross shaft will also remove the cross shaft lever, four actuating levers, and two collars.

d. Cross Shaft Journals. Remove the cross shaft (par. 60 c). Remove two $\frac{1}{4}$ -inch bolts, nuts and lock washers holding each of the three cross shaft journals to the trailer frame.

61. INSTALLATION.

a. Handwheel. Bolt the guide bracket to the left gooseneck with two $\frac{1}{4}$ -inch bolts, nuts and lock washers. Bolt the threaded bracket to the front of the cargo deck frame with two $\frac{1}{4}$ -inch bolts, nuts and lock washers. Insert handwheel shaft through guide bracket and handwheel collar, and screw into threaded bracket. Turn handwheel until brakes are set. Release brakes fully by turning handwheel counterclockwise. Insert $\frac{1}{4}$ -inch set

Parking Brake

screw in handwheel collar and tighten. CAUTION: *Make sure handwheel will turn far enough to fully release the brakes before tightening set screw in handwheel collar.*

b. Linkage.

(1) CRANK LEVER RETURN SPRING. Install return spring between main link yoke and trailer frame in the holes provided. Twist hook ends of spring into these holes.

(2) CRANK LEVER. Insert crank lever in frame bracket. Insert crank lever shaft and secure with two $\frac{1}{4}$ -inch cotter pins. Place clevis pin through main link yoke and crank lever. Secure with $\frac{5}{32}$ -inch cotter pin.

(3) MAIN LINK. Place link into position with front yoke over crank lever. Insert clevis pin through main link yoke and crank lever. Secure with $\frac{5}{32}$ -inch cotter pin. Place rear yoke over cross shaft lever. Insert clevis pin through main link yoke and cross shaft lever. Place a washer over each end of the clevis pin and secure with two $\frac{1}{4}$ -inch cotter pins.

(4) CROSS SHAFT LEVER. See cross shaft (par. 61 c).

(5) ACTUATING LEVERS. See cross shaft (par. 61 c).

(6) ACTUATING RODS. Place actuating rod in position with yoke ends over actuating lever and operating lever. Insert clevis pin in each end of the four actuating rods. Secure with $\frac{1}{8}$ -inch cotter pin.

(7) OPERATING LEVERS. Place an operating lever on each of four brackets. Install the four operating lever shafts (par. 61 b (6)). Place brake chamber push rod yoke over operating lever and pin to top hole in this lever with a $\frac{1}{2}$ -inch clevis pin. Secure with $\frac{1}{8}$ -inch cotter pin. Install brake rod (par. 61 b (9)) to bottom hole in each lever. Install actuating rod (par. 61 b (6)) to hole between operating lever shaft and brake chamber push rod in each lever.

(8) OPERATING LEVER SHAFTS. Place each shaft behind the four operating levers and insert through lever and bracket. Secure each shaft with $\frac{3}{16}$ -inch cotter pin.

(9) BRAKE RODS. Place a brake rod in position between each of the four operating levers and slack adjusters. Insert a clevis pin through the lower rod yoke and middle hole in the slack adjuster. Secure with $\frac{1}{8}$ -inch cotter pin. Insert a clevis pin through upper rod yoke and the lower hole in the operating lever. Secure with $\frac{1}{8}$ -inch cotter pin.

(10) BRAKE ROD RETURN SPRINGS. Install return spring between actuating rod yoke end (at actuating lever) and air chamber bracket in the holes provided. Brake rod return springs are attached to the two outside brake chamber brackets.

c. Cross Shaft. Insert cross shaft through hole on left side of trailer frame. When cross shaft is through the trailer frame side member, insert

cross shaft lever, one actuating lever, and one collar over the shaft. Move cross shaft through the next frame member and insert one actuating lever over the shaft. Move cross shaft through the third (center) frame member and insert one actuating lever over the shaft. Move cross shaft through the next frame member and insert one collar and one actuating lever over the cross shaft. Move the two collars into position beside the cross shaft journals and tighten the 1/4-inch square head set screws. Install a 1/4-inch No. 22 Woodruff key under each of the five levers. Tap the levers into position, directly in line with their respective rods. Install a 3/8-inch pinch bolt, nut and lock washer on the five levers and tighten. NOTE: *Cross shaft lever points towards the ground and the four actuating levers point away from the ground.* Install the four actuating rods (par. 61 *b* (6)). Install the main link (par. 61 *b* (3)).

d. Cross Shaft Journals. Place one journal in position against the inside of the trailer frame left side channel member. Secure to channel with two 1/4-inch bolts, nuts and lock washers. Place one journal in position against each of the two side trailer frame I-beams. The journals must face the outside of the trailer. Secure each journal with two 1/4-inch bolts, nuts and lock washers.

Section XVII

Front Underconstruction

62. DESCRIPTION AND DATA.

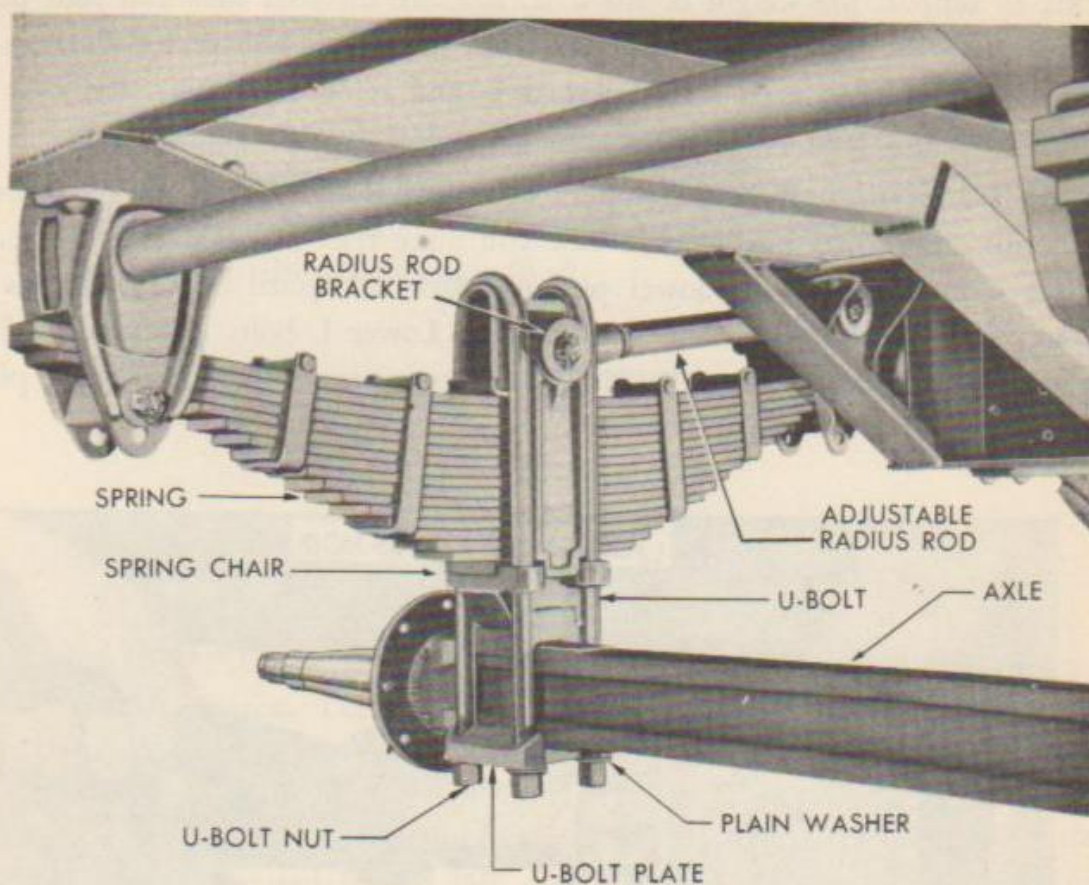
a. Description (fig. 38). The front underconstruction is mounted on the dolly at the spring hangers. It consists of two springs, one adjustable and one nonadjustable radius rod, the front axle, as well as their component and attaching parts.

b. Data.

(1) SPRINGS:

Make	Fruehauf
Model	801069
Weight	153 lb
Length	46 in.
Number of leaves	16
Width	3 1/2 in.

Front Underconstruction



RA PD 341714

Figure 38—Front Underconstruction

(2) AXLE:

Make	Fruehauf
Model	55316
Tread	69 in.
Size	3 in. x 4 1/4 in.
Dowel centers (top)	42 in.

63. AXLE.

a. Obtain authority for replacement of the axle with a new or rebuilt unit, and those tools needed for the operation which are not carried in the second echelon, from a higher echelon of maintenance. Information as to what tools are necessary for the operation may also be received from the higher echelon of maintenance.

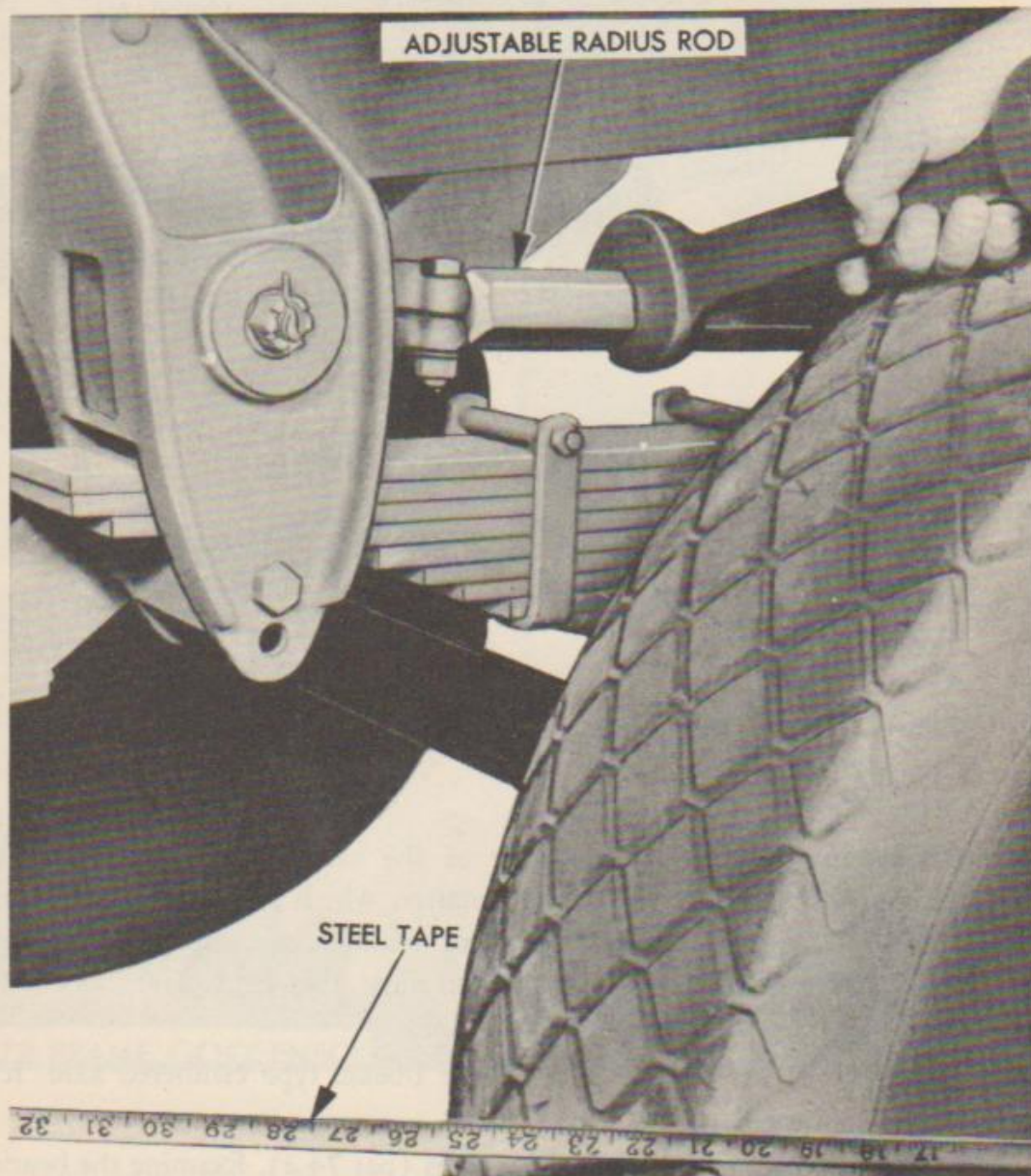
b. Description. The axle is a one-piece I-beam type cambered axle. It is held in place by four hardened steel U-bolts.

c. Inspection. Remove the wheel bearings (par 74 *a*). Examine the bearing surfaces for scoring. If the bearing surfaces are damaged, replace the axle.

d. Removal. Couple chain hoist to front crossmember of dolly. Remove wheel and hub assembly as one unit (par. 72 *b*). Place jack under center of

axle to support the weight of the axle. Remove the four nuts and four plain washers of the four U-bolts. Tap down on the two U-bolt plates. Pull up on the two U-bolts at each side, lower jack, and remove the axle. Remove the two riser blocks and dowel pins from each end of the axle.

e. Installation. Place jack under center of dolly. Install the two dowel pins into the dowel pin holes in axle and place riser blocks over dowel pins. Place axle on jack with dowel pins up. Jack axle until the dowel pins in riser block enter hole in the spring chair. Lower U-bolts and place U-bolt plates over U-bolts. Secure axle to suspension assembly using eight plain



RA PD 341753

Figure 39—Alining Axle

washers and eight U-bolt nuts. Check axle alinement (par. 63 *f*) and install wheel and hub assembly (par. 72 *c*).

f. Alinement (fig. 39). Remove wheel and hub assemblies (par. 72 *b*). Place a center punch mark in the center of drawbar 1 inch back from the eye. Using a steel tape, measure the distance from center punch mark on drawbar eye to outer end of axle spindle on both sides. The measurement should be identical. If an adjustment is required, use the adjustable radius rod. Loosen the two pinch bolts on the rod and turn the spacer to move the spindle on that side forward or backward as required. Once the required adjustment has been secured, tighten down the pinch bolts on the adjustable radius rod to fix the axle in position. Replace wheel and hub assembly (par. 72 *c*).

64. SPRINGS.

a. Description. The springs are leaf-type, slip-end, and of 16 leaves each. They are made of silico-manganese steel. Data on springs will be found in paragraph 62 *b* (2).

b. Removal. Couple chain hoist to front of dolly, using a spread chain. Hoist vehicle until weight is relieved from springs. Remove four plain washers and four U-bolt nuts from the U-bolts, and pull U-bolts out of spring chair. Pull up on radius rod bracket until the bracket clears the spring. Remove cotter pin, nut and plain washer from spring bolt at each end of spring. Drive out the two spring bolts and remove spring.

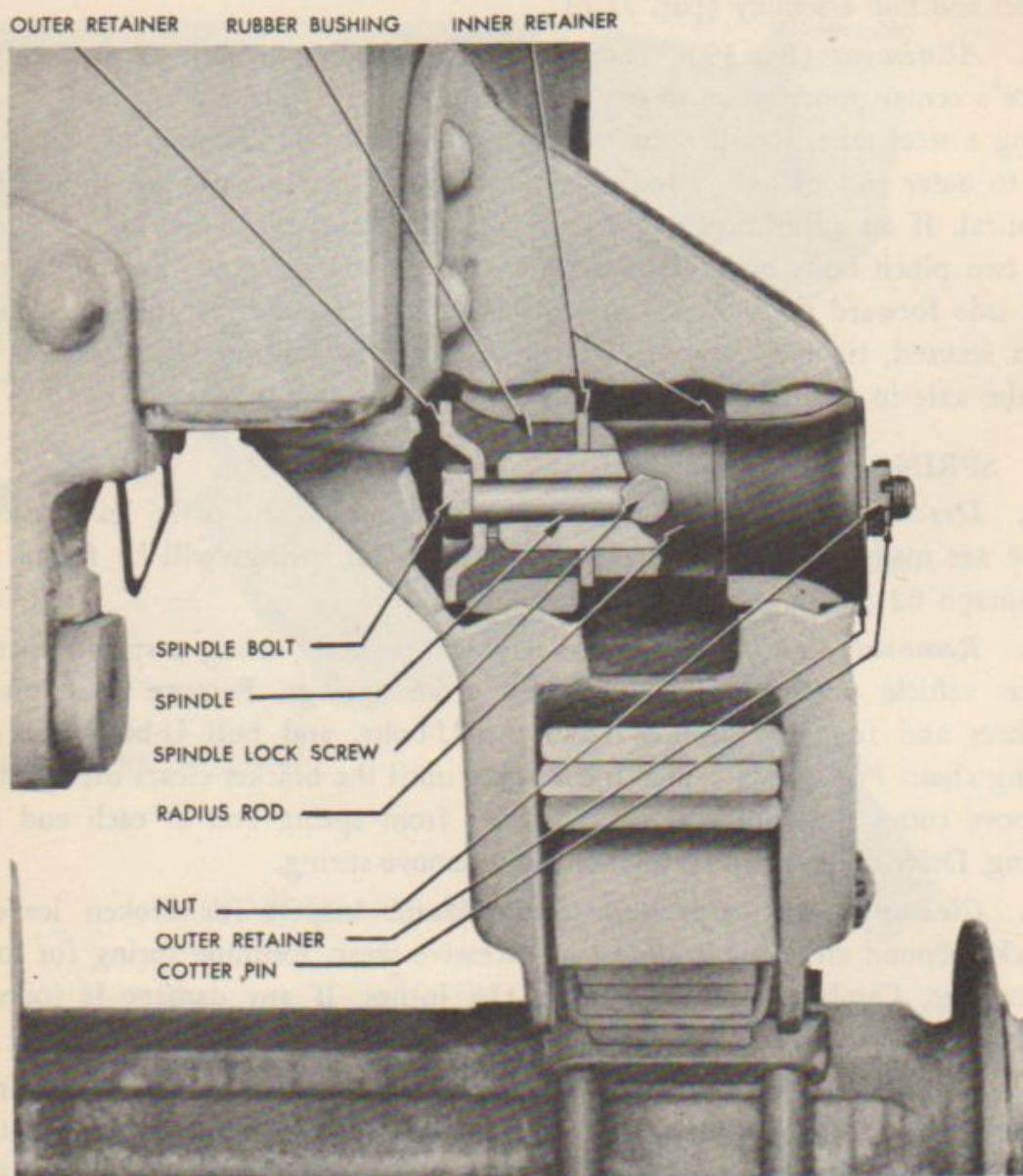
c. Cleaning and Inspection. Steam clean. Inspect for broken leaves. Check rebound clips for breakage or excessive wear. Examine spring for loss of camber. Camber must be at least 1½ inches. If any damage is found, replace the spring assembly.

d. Installation. Place spring on spring chair, making certain the spring center bolt is seated in cavity, and that nuts in spring clip are toward outer side of trailer. Straddle radius rod bracket over spring. Secure spring to axle using two U-bolts, four plain washers and four U-bolt nuts. NOTE: *Tighten U-bolt nuts using a wrench with a 36-inch minimum leverage.* Aline axle (par. 63 *f*).

65. RADIUS RODS.

a. Description (fig. 38). The radius rods connect the front spring hangers with the spring chairs. They keep the chair, and thus the axle, from moving along the spring. Two radius rods are provided. The left one is adjustable in length and is used to aline the axle (par. 63 *f*).

b. Removal (fig. 40). Remove spindle lock screw. Pull cotter pin from spindle bolt, remove nut and drive the spindle bolt out of spindle. With a ¾-inch drift, drive out the spindle. Pull out the two rubber bushings and retrieve inner retainers. Repeat the same operations on opposite end of radius rod and remove the radius rod. Remove two nuts and two lock



RA PD 341724

Figure 40—Radius Rod Assembly—Sectional View

washers from the two $\frac{1}{2}$ -inch pinch bolts. Drive out the pinch bolts. Turn off the two rod-ends. NOTE: *Rod-ends have left- and right-hand threads.*

c. **Installation.** Place radius rod spacer in vise. NOTE: *Radius rod spacer is provided with right-hand threads on one end and left-hand threads on the opposite end. The rod-ends are threaded right or left, and are marked with the letter "R" indicating right or "L" indicating left.* Install radius rod-ends. Install the two $\frac{1}{2}$ -inch pinch bolts, lock washers and nuts, but do not tighten. Place radius rod in position on front spring hanger and radius rod bracket. Place the two inner retainers in position on each of the radius rods

Rear Underconstruction

(fig. 40). Aline hole in radius rod-end with hole in the two inner retainers, and install the spindle. With a pair of pliers turn the spindle to aline spindle lock screw hole; install the spindle lock screw. Insert the two rubber bushings into cavity. Place outer retainer washer over spindle bolt and install spindle bolt into spindle. Place outer retainer over end of spindle bolt, install nut and tighten. Install cotter pin. If difficulty is encountered when installing the outer retainer and nut, compress the rubber bushing using a C-clamp, or other similar device. CAUTION: *Do not use oil in rubber bushings.* Couple opposite end of radius rod to radius rod bracket in exactly the same manner as the spring hanger end. The radius rod on opposite end is installed in exactly the same manner. Check axle alinement (par. 63 f).

d. Adjustment. The left radius rod adjustment is made only to aline the axle. Refer to paragraph 63 f.

Section XVIII

Rear Underconstruction

66. DESCRIPTION AND DATA.

a. Description (fig. 41). The trailer is equipped with two rear underconstruction assemblies. One underconstruction is mounted on the right side of the vehicle and the other is mounted on the left side. Both underconstructions are identical and all parts are interchangeable. The trunnion axle is of the oscillating type. The trunnion shaft is held to the main frame by two mounting brackets which permits one set of wheels to pass over an obstacle while the remainder of the wheels remain on the ground.

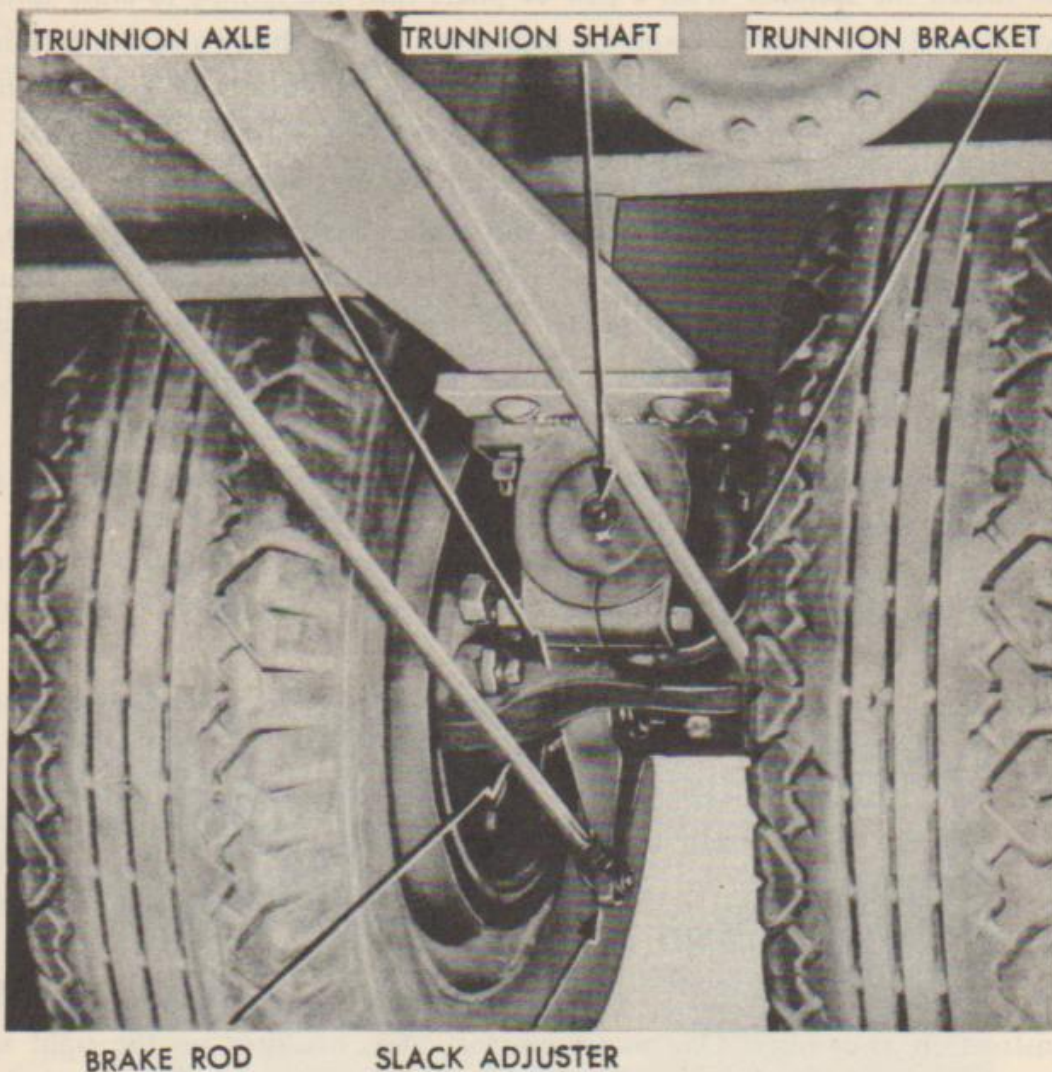
b. Data.

(1) TRUNNION AXLE.

Make	Fruehauf
Weight	176 lb
Quantity per trailer.....	2

(2) TRUNNION SHAFT.

Make	Fruehauf
Weight	57 lb
Quantity per trailer.....	2



RA PD 341729

Figure 41—Rear Underconstruction

67. REMOVAL AND DISASSEMBLY.

a. Authority. Obtain authority for replacement of the trunnion axle with a new or rebuilt unit, and those tools needed for the operation which are not carried in the second echelon, from a higher echelon of maintenance. Information as to what tools are necessary for the operation may also be received from the higher echelon of maintenance.

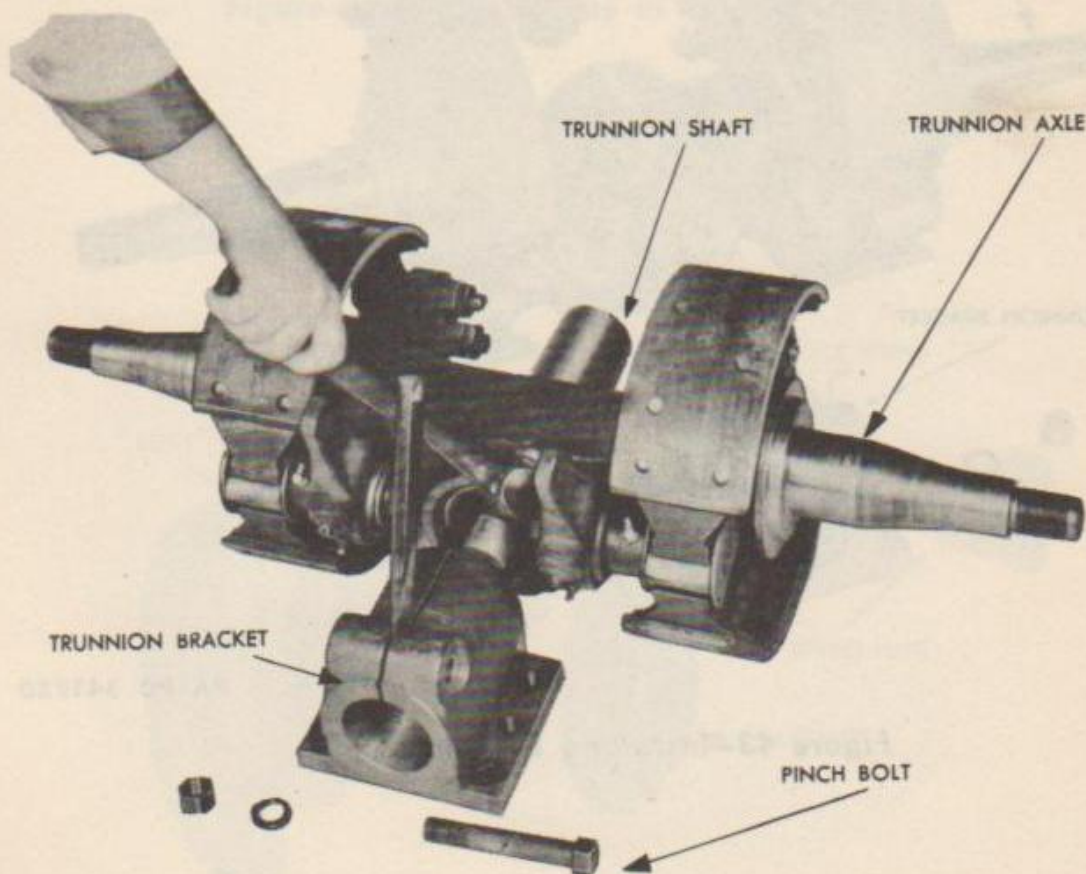
b. Removal. Place jack under rear crossmember and jack unit until wheels clear ground. Remove inside wheels (par. 71 *b*). Remove inside hub and drum (par. 73 *b*). Remove the outside wheel and hub as an assembly (par. 72 *b*). Place a second jack under center of trunnion axle assembly. **CAUTION:** *Make certain jacks are on a solid footing where no slippage can take place. Dis-*

connect the brake rods at the slack adjusters (par. 60 *b* (9)). Remove the twelve $\frac{5}{8}$ -inch nuts, lock washers and cap screws which hold the trunnion axle brackets to the frame. With two men holding firmly to the trunnion axle, have the third man pull jack from under trunnion axle. Lower the assembly to the ground.

c. Disassembly. Remove rear underconstruction (par. 67 *b*). Remove the $\frac{5}{8}$ -inch pinch bolt, nut and lock washer holding each bracket to the trunnion shaft. Drive a chisel into the slot to release bind of brackets against the trunnion shaft (fig. 42). Pull trunnion shaft out of trunnion axle. Remove brake shoes (par 56 *b*). Remove slack adjuster (par. 55 *b*). Remove brake camshaft (par. 57 *b*).

68. CLEANING AND INSPECTION.

a. Steam clean. Check bushings in trunnion axle for excessive wear. If worn beyond 3.625 inches, replace trunnion axle. Examine trunnion axle shaft bearing surfaces for excessive wear. If badly scored, replace the trunnion axle. Examine the trunnion shaft for excessive wear. If badly scored, replace the trunnion shaft.



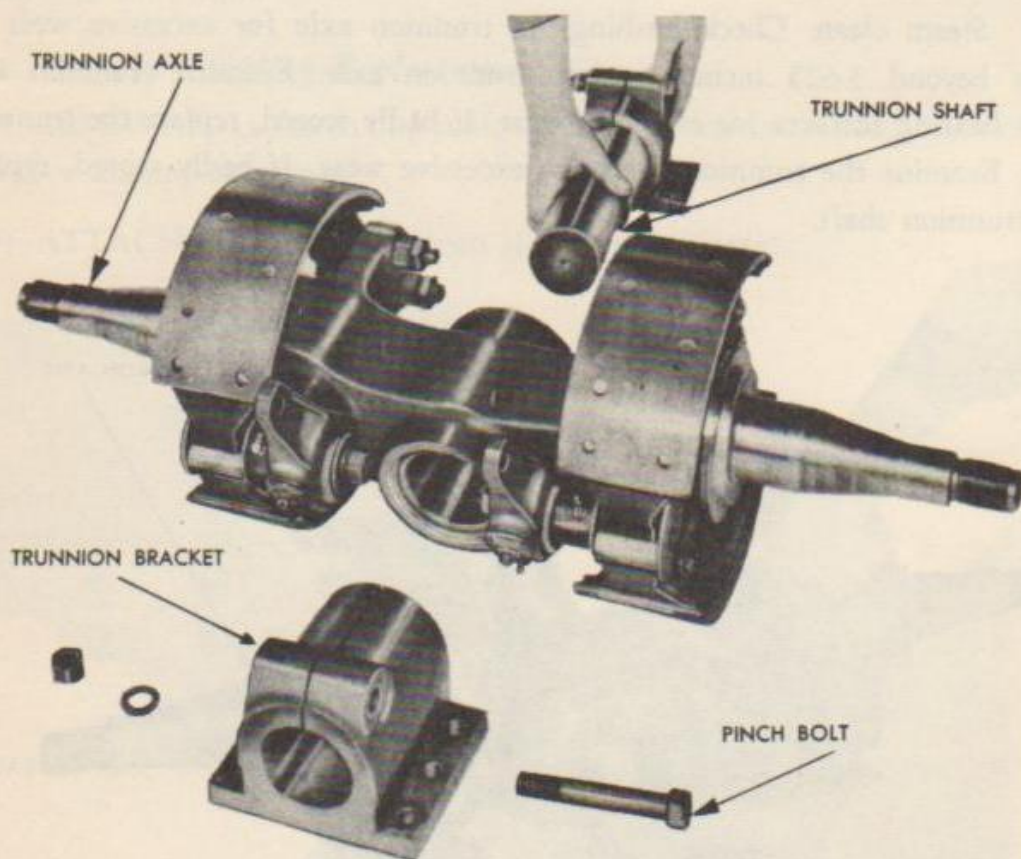
RA PD 341741

Figure 42—Removing Trunnion Shaft Bracket

69. ASSEMBLY AND INSTALLATION.

a. Assembly. Insert camshaft (par. 57 *c*) and assemble slack adjuster to camshaft (par 55 *d*). Assemble brake shoes (par. 56 *c*). Insert trunnion shaft through trunnion axle (fig. 43). Tap on trunnion shaft brackets. Install two $\frac{5}{8}$ -inch pinch bolts, lock washers and nuts in brackets and tighten.

b. Installation. Have two men lift trunnion axle assembly into position under frame and have a third man place a jack under the center of trunnion axle. Insert twelve $\frac{5}{8}$ -inch cap screws through brackets and frame, install 12 lock washers and nuts, and tighten. Connect the brake rods to the slack adjusters (par. 61 *b* (9)). Give brakes a major adjustment (par. 46 *c*). Lubricate the underconstruction (par. 28). Install outside wheel and hub assembly (par. 72 *c*). Install inside hub and drum assembly (par. 73 *c*). Install inside wheel and tire assembly (par. 71 *c*). Remove jacks.



RA PD 341730

Figure 43—Installing Trunnion Shaft

Section XIX

Wheels, Hubs, Drums and Tires

70. DESCRIPTION AND DATA.

a. Description. The trailer is equipped with four tires at the front and eight at the rear. The wheels are of the ventilated, pressed-steel type. Each wheel is fastened to the hub by a separate set of nuts. The stud nuts on the wheels on the right side have right-hand threads. The inner dual wheels are individually held to the hub by inner cap nuts. The outer wheel fits over the inner nuts and is independently held to hub by outer nuts. The hub assemblies are mounted on the axle spindle and tapered roller bearings. The drums are fastened to the inner end of rear wheel studs. The front hubs are not interchangeable with the rear hubs.

b. Data.

(1) WHEELS.

Make	Budd
Model	37610
Quantity	12
Size	15 x 7

(2) REAR HUB.

Make	Fruehauf
Model	801260
Outer cup	Timken 5358
Inner cup	Timken 5720
Outer bearing	Timken 5320
Inner bearing	Timken 5752

(3) FRONT HUB.

Make	Fruehauf
Model	801066
Outer cup	Timken 5521
Inner cup	Timken 5720
Outer bearing	Timken 5565
Inner bearing	Timken 5752

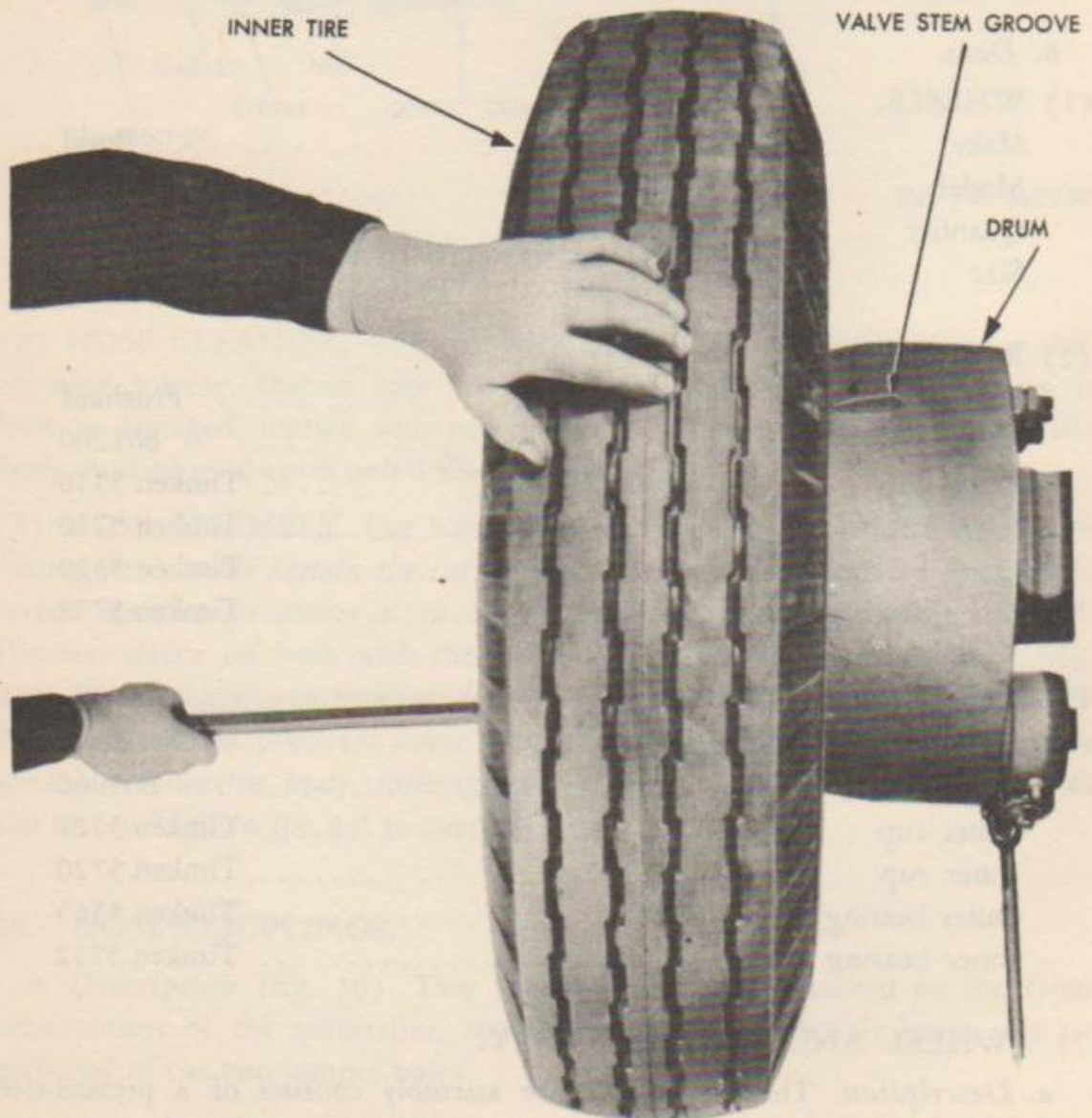
71. WHEEL AND TIRE ASSEMBLY.

a. Description. The wheel and tire assembly consists of a pressed-steel wheel, tire lock ring, tube and tire. Each assembly is secured to the wheel hub by six cap nuts.

b. Removal. With large end of wheel wrench loosen the six outer nuts from the inner nuts. Block the wheel on opposite side and jack up the axle until wheel clears the ground. Continue removing outer nuts and lift the outer wheel and tire assembly off hub. Remove the six inner nuts using small end of wheel wrench and lift inner wheel and tire assembly off wheel studs. NOTE: The inside rear tires are lifted out from the rear wheel space, at the recess in the trailer rear crossmember (fig. 7).

c. Installation.

(1) INNER WHEEL AND TIRE ASSEMBLY. Place inner wheel and tire assembly over wheel studs. CAUTION: When installing rear inner wheel, make certain that valve stem fits into groove in drum (fig. 44). Secure inner wheel to hub with six inner nuts. NOTE: Use nuts marked "L" on the hub toward the left of the vehicle, nuts marked "R" on the hub toward the right



RA PD 341732

Figure 44—Installing Rear Inner Wheel and Tire Assembly

of the vehicle. Tighten inner nuts sufficiently to hold wheel in place. Then successively tighten opposite nuts to prevent cocking of wheel on hub pilot and studs. Place block under wheel and finish tightening.

(2) OUTER WHEEL AND TIRE ASSEMBLY. Place the outer wheel over the inner nuts with the valve stem located opposite the valve stem of the inner wheel. This will provide ample room for inflation of tires. Install six outer nuts making certain the convex surface of the nut contacts the wheel. Successively tighten opposite nuts to prevent cocking of the wheel on the hub, pilot and inner nuts. Place a block under wheel and finish tightening. Remove the blocking and jacks.

72. WHEEL AND HUB ASSEMBLY.

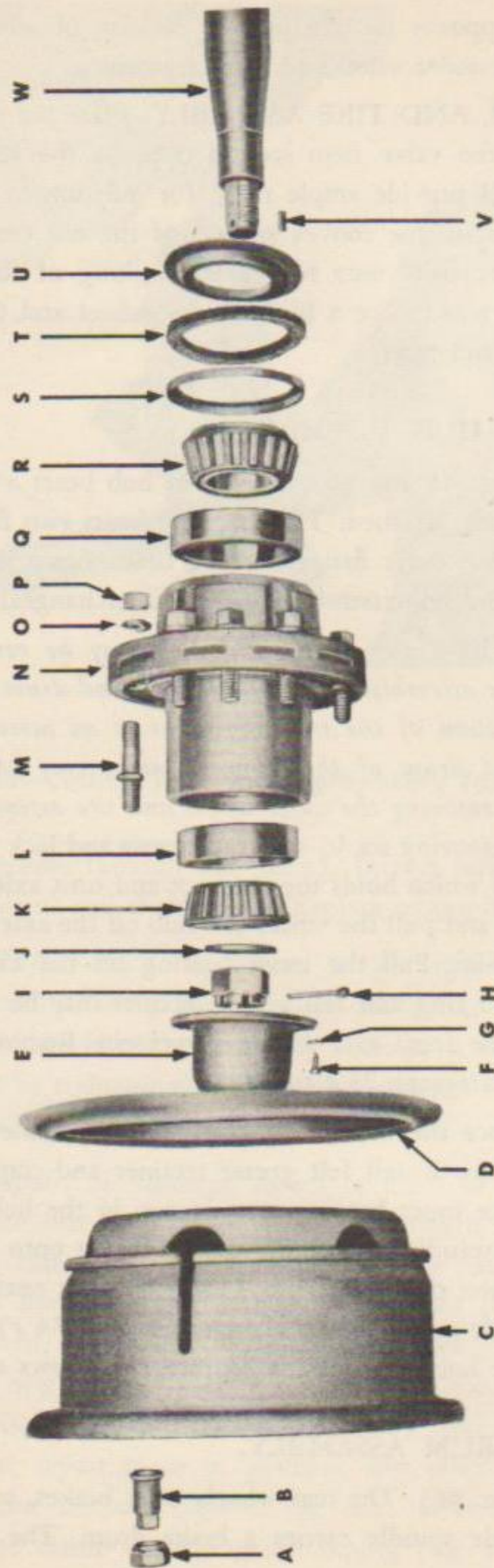
a. Description (figs. 45 and 46). The front hub bears a single flange, to which the dual tires are attached. The rear hub bears two flanges. The dual tires are attached to the outer flange and the brake drum is attached to the inner flange. Wheel and hub assemblies are not interchangeable.

b. Removal. NOTE: *Dual wheels and hub may be removed from the front axle as an entire assembly. Dual wheels, hub and drum may be removed from the outside location of the trunnion axles as an assembly. The inside inner wheel, hub and drum of the trunnion axles may be removed as an assembly, only after removing the outer wheel and tire assembly (par. 71 b).* Remove hub cap by removing six 1/4-inch cap screws and lock washers. Remove the 1/4-inch cotter pin which holds the axle nut and turn axle nut off spindle. Lift off the D-washer and pull the wheel and hub off the axle spindle. Remove outer bearing from hub. Pull the inner bearing off the axle spindle, after which the compression ring and felt grease retainer may be removed. A dust shield is pinned to the front axle with a dowel pin. Remove the dowel pin and dust shield. See paragraph 73 *c* and *d*.

c. Installation. Place the dust shield over the front axle spindle and pin to axle with dowel pin. Install felt grease retainer and compression ring on the axle spindle. Place inner bearing cone in cup in the hub. Place hub and wheel onto the axle spindle. Install the outer bearing onto the axle spindle. Push cone into the outer cup in the hub. Place D-washer next to outer bearing and thread on the axle nut. Adjust the bearings (par. 74 *c*). Install axle nut cotter pin. Install the hub cap with six 1/4-inch cap screws and lock washers.

73. HUB AND DRUM ASSEMBLY.

a. Description (fig. 46). The rear wheels carry brakes, so the inner wheel on each trunnion axle spindle carries a brake drum. The brake drums are interchangeable.



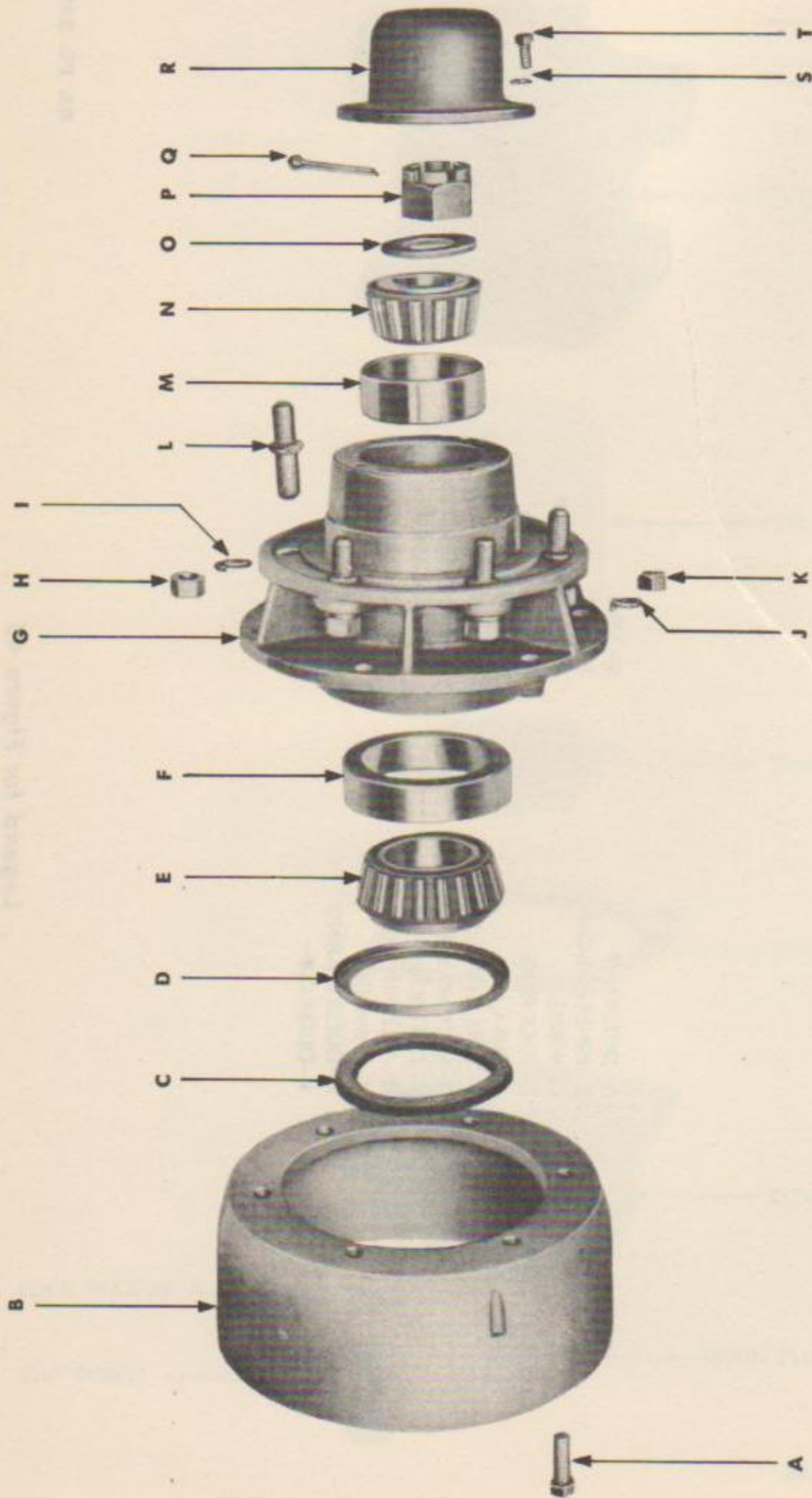
RA PD 349616

Figure 45—Front Wheel and Hub Assembly—Disassembled

RA PD 3496168

- A-OUTER NUT
- B-INNER NUT-CAP
- C-WHEEL
- D-LOCK RING
- E-HUB CAP
- F-BOLT, 1/4 IN.-20 x 1 IN.
- G-LOCK WASHER, 1/4 IN.
- H-COTTER PIN
- I-AXLE NUT
- J-D-WASHER
- K-OUTER BEARING
- L-OUTER CUP
- M-STUD
- N-HUB
- O-LOCK WASHER
- P-NUT
- Q-INNER CUP
- R-INNER BEARING
- S-COMPRESSION RING
- T-FELT WASHER
- U-DUST COLLAR
- V-DOWEL PIN
- W-AXLE

Legend for Figure 45



RA PD 341734

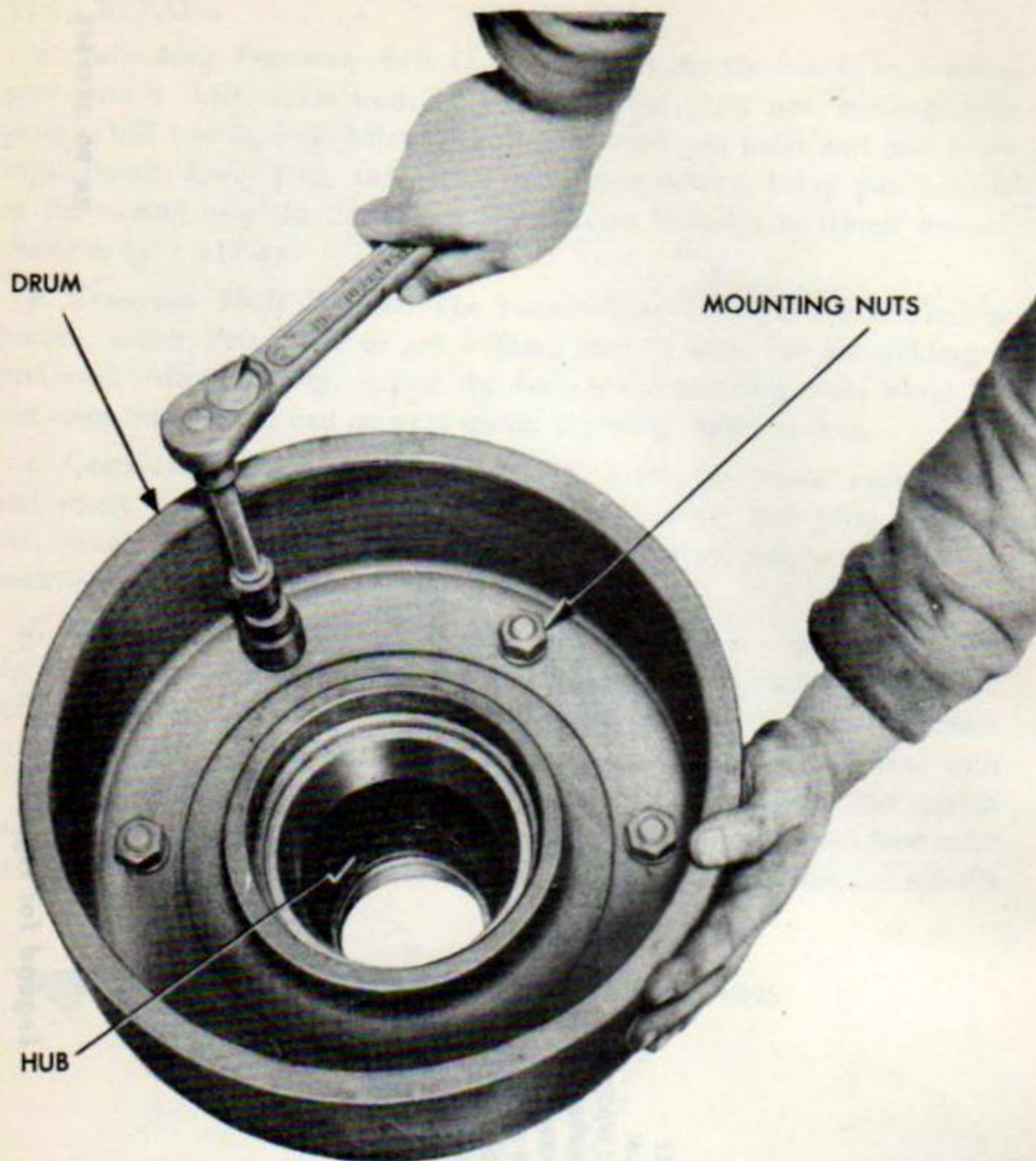
Figure 46—Rear Wheel, Hub and Drum Assembly—Disassembled

Wheels, Hubs, Drums and Tires

RA PD 341734B

- | | |
|---------------------------|-----------------------|
| A—BOLT | K—NUT |
| B—DRUM | L—STUD |
| C—FELT WASHER | M—CUP BEARING |
| D—COMPRESSION RING | N—CONE BEARING |
| E—BEARING | O—D-WASHER |
| F—CUP BEARING | P—NUT |
| G—HUB | Q—COTTER PIN |
| H—NUT | R—HUB CAP |
| I—LOCK WASHER | S—LOCK WASHER |
| J—LOCK WASHER | T—BOLT |

Legend for Figure 46

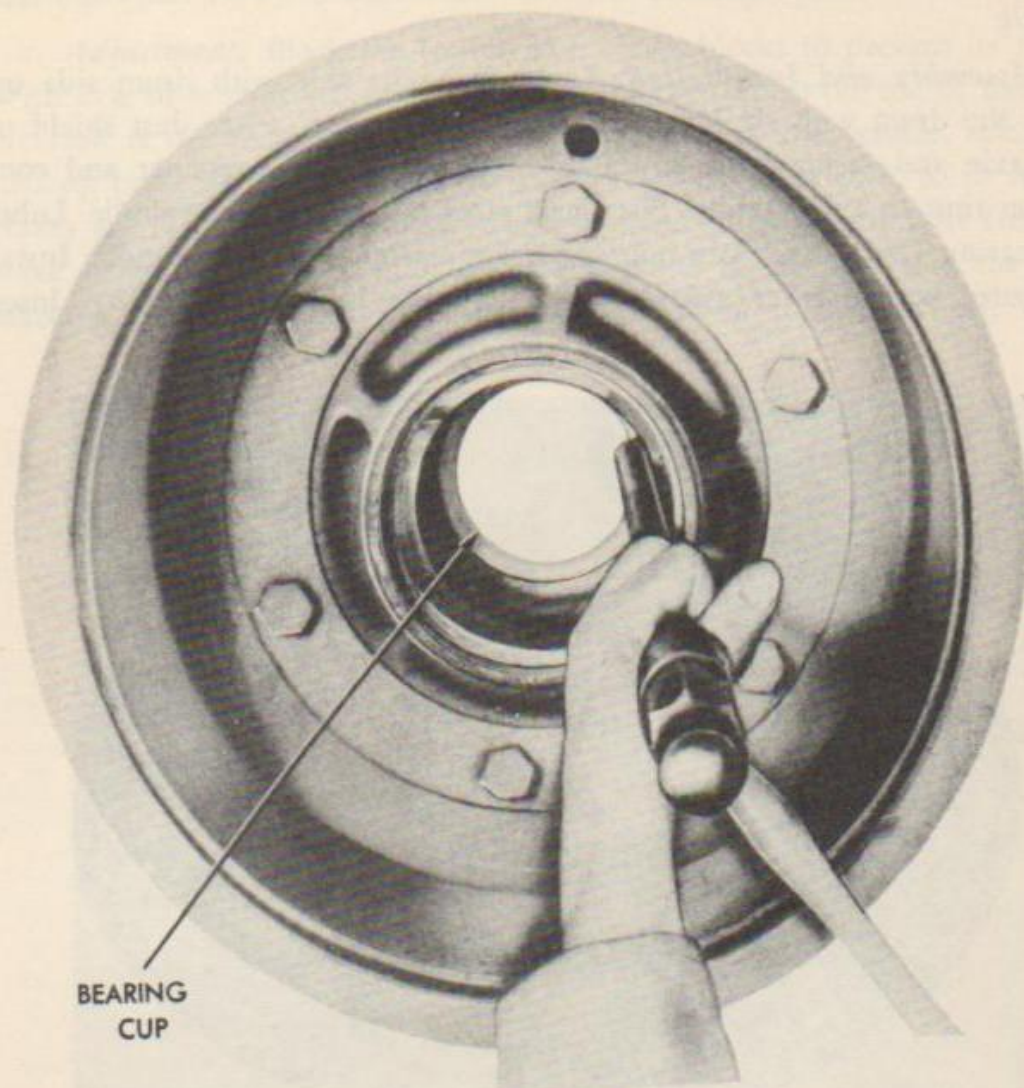


RA PD 341737

Figure 47—Removing Brake Drum

b. Removal. Remove wheel and hub assemblies (par. 72 *b*). Remove wheel and tire assemblies (par. 71 *b*). Remove six bolts, nuts and lock washers which hold the drum to the hub and lift off drum (fig. 47).

c. Inspection. Inspect bearings for chips, pits, damaged rollers and excessive wear. If a bearing is defective, replace bearing and bearing cup. If cup is defective, replace bearing and bearing cup. Inspect felt for excessive wear or oversaturation. Replace felt if necessary. Examine hub for cracks, broken, or loose studs. Replace if damaged. Examine inner surface of drum. If badly scored, replace drums. Lubricate bearings (par. 28).



RA PD 341646

Figure 48—Removing Bearing Cups***d. Bearing Cup Replacement.***

(1) **REMOVAL** (fig. 48). Remove wheel and hub assembly (par. 72 *b*). Place wheel on its side, and place a soft steel bar on the inside shoulder or edge of the cup to be removed. Using a heavy hammer, hit first on one side of the cup and then the other. By alternating in this manner, the cup will come out straight with the cup bore. Danger of wedging of the cup in the bore is minimized.

(2) **INSTALLATION**. Lay the hub on its side. Start the new cup square with the bore so that its smallest inside diameter will be on the inside when it is replaced. With a piece of hardwood or soft steel over the cup, drive it in until it is flush with the hub. Then place the old cup over the new one and drive the new cup further in, until it is absolutely tight with the cup bore flange. If this step is not performed carefully, the distance between the

bearing centers will be altered, preventing proper reassembly of the hub to the axle.

e. Assembly and Installation. Lay hub on its side with drum side up. Install the drum with six bolts, nuts and lock washers. Place dust shield on front axle and secure with dowel pin. Place felt grease retainer and compression ring on axle spindle. Place new inner bearing on axle spindle. Lubricate bearing (par. 28). Place hub and drum assembly on axle spindle. Install new outer bearing over axle spindle. Lubricate bearing (par. 28). Insert



RA PD 335744

Figure 49—Removing Tire Lock Ring

bearing into its cup and push hub and drum assembly against axle flange. Install D-washer next to outer bearing and thread on the axle nut. Adjust the wheel bearings (par. 74 *c*). Secure axle nut with $\frac{1}{4}$ -inch cotter pin. Install hub cap with six cap screws and lock washers. Install wheel and tire assembly (par. 71 *c*).

74. WHEEL BEARINGS.

a. Removal. Remove wheel and hub assembly (par. 72 *b*). Lift outer bearing out of its cup in the hub. Pull inner bearing off the axle spindle. Remove the cups from the hub (par. 73 *d*).

b. Installation. Install cups in the hub (par. 73 *d*). Place new inner bearing cone in position on axle spindle. Install hub (par. 73 *e*). Place new

outer bearing cone over axle spindle and push into position in cup. Adjust bearings (par. 74 c). Install wheel and tire assembly (par. 71 c).

c. Adjustment. Block the trailer with chock blocks to prevent its rolling. With axle or trunnion assembly jacked or blocked up so the tire of the wheel involved is not touching the ground or any part of the vehicle, release the parking brake and open the service brake reservoir drain cock, to be sure the brakes are fully released. Rotate wheel by hand to make sure it is free from brake drag. Remove the hub cap. Remove the cotter pin from the wheel bearing adjusting nut and wheel spindle. While rotating wheel, tighten



RA PD 335745

Figure 50—Removing Tire from Wheel

wheel bearing adjusting nut with wheel bearing adjusting wrench until wheel begins to bind. Check wheel for movement on spindle by attempting to pry the wheel back and forth on the spindle. If end play is evident, tighten wheel bearing adjusting nut until it can no longer be tightened without using force. This will take up slack still remaining. Back adjusting nut off three turns, then tighten again while revolving the wheel by hand. Stop tightening when wheel begins to bind or until a slight drag on wheel is evident. Back off nut one-sixth turn or slightly farther, if necessary, to line up cotter pin hole. Install cotter pin and hub cap. Try making wheel wobble by pulling and pushing on tire. If movement is more than barely noticeable, replace bearings and bearing cups (par. 74 a and b) and repeat bearing adjustment. Close brake reservoir drain cock and lower vehicle to the ground.

75. TIRES AND TUBES.

a. Demounting. Remove wheel and tire assembly (par. 71 *b*). Place wheel on ground with valve stem up. Permit the air to escape from the tire by removing the core from the valve stem. Then insert a tire tool in the slot provided for the purpose on the rim and pry down while tapping the opposite side of the rim with a hammer (fig. 49). Stand tire on edge and shove the wheel out of tire (fig. 50).

b. Repair of Tubes. For information on repair of synthetic tubes, refer to TM 9-1868.

c. Mounting. Place wheel on ground with valve stem slot up. Place the tire over wheel rim at a 45-degree angle and insert the valve stem into the wheel, making certain the valve stem will be facing up after it enters the wheel. Lower tire over wheel. Equally space three 2 by 4 by 4-inch wood blocks under rim of wheel. Place lock ring over tire. With a tire tool, force section of lock ring opposite pry notch down into wheel gutter. Tap the lock ring into position at the same time prying on ring. Inflate tire with several pounds of air pressure. Tap lock ring to make certain lock ring is properly seated. **CAUTION:** *Wrap two safety chains loosely around two different points of the tire prior to inflation. This safeguards against possible serious injury should the outer lock ring let go during inflation.*

Section XX

Frame

76. DESCRIPTION.

a. The frame of the full trailer is divided into two parts, a dolly frame and a main frame or cargo frame. The cargo frame carries the rear underconstruction and the dolly frame carries the front underconstruction. Both frames are of welded steel construction, with minor parts welded or riveted in position. Parts whose replacement is relatively frequent are bolted or screwed to the frame. The trailer is floored with 2¼-inch thick oak planking which is bolted to the frame.

77. DRAWBAR.

a. Description. The drawbar is of pressed steel construction, with two hinge brackets and a 3-inch eye riveted in position.

b. Removal. Remove two 1-inch nuts and lock washers which retain hinge bolts. **CAUTION:** *Support drawbar while removing hinge bolts to prevent injury to threads.* Remove drawbar.

c. Installation. Position drawbar in front of dolly with hinge holes alined. Insert hinge bolts. Install lock washers and nuts.

78. CHOCK BLOCKS AND CHOCK CHAINS.

a. Description. The chock blocks are laminated wooden blocks which are placed under a rear dual wheel to prevent the trailer from moving. One is stapled to a chain which is tack welded to the left side of the rear cross-member of the trailer. The other is stapled to a chain which is secured to right side member of the trailer by a snap hook.

b. Removal. With a portable grinder, grind off the link which is welded to the left side of the trailer. Grind the crossmember smooth so that no raised portion remains. The right chock block and chain may be removed by opening the snap hook on the trailer frame.

c. Installation. Clamp the last link in the chain in position on the cross-member. Tack weld, remove the clamp, and build welded section up so that chain is fastened securely. Welding may be done with either electric arc or gas.

79. SAFETY CHAINS.

a. Description. Two safety chains are provided with the vehicle. They are made of $2\frac{13}{32}$ -inch links. On one end of each chain is welded a $1\frac{7}{8}$ -inch (inside diameter) eye bolt. On the other end is welded a grab hook. The assemblies measure 118 inches from the front crossmember on which they are mounted.

b. Removal. Remove the 1-inch nut and lock washer from the eye bolt. These are inside of the crossmember to which the chain is attached. Pull eye bolt out of the frame. Pull chain out of the guide on the drawbar.

c. Installation. Thread chain through the guide on the drawbar. Place eye bolt through hole in frame crossmember. Install 1-inch nut and lock washer.

80. REFLEX MARKER UNITS.

a. Description. Six amber reflex markers are mounted on the sides of the trailer, two at the front end of the gooseneck, four at the front of the cargo deck. Four red reflex markers are mounted on the sides of the trailer, two facing to the rear at the end of the cargo deck and two facing the sides at the back end of the cargo deck. There are no reflex marker units on the dolly.

b. Removal. Remove two nuts and lock washers from the inside of the member to which the unit is attached. Pull marker out with its two cap screws.

c. Installation. Place marker unit in position with the two cap screws inserted into the frame. Install two lock washers and nuts to inside of frame member.

81. FLOORING.

a. Description. The flooring of the trailer deck is 2¼-inch thick oak planking. It extends from the gooseneck to the rear wheels, which are uncovered. The rear crossmembers are filled with 2-inch oak planking.

b. Removal. Remove nuts and ½-inch carriage bolts. Pry out planking.

c. Installation. Cut planking to fit. Drill ½-inch holes for carriage bolts. Place planking in position on trailer and drive carriage bolts. Install nuts on underside of trailer and tighten.

Section XXI

Electrical System

82. DESCRIPTION AND DATA.

a. Description. The electrical circuit diagram (fig. 51) illustrates all of the electrical circuits on the vehicle. Each of the separate circuits is composed of wire having distinctively colored insulation. A key to the circuit identified by each color is given on the wiring diagram. The lighting consists of four service marker lights, four blackout marker lights, one combination service tail and stop light and blackout taillight, and one blackout tail and stop light. Electrical controls consist of one 4-pole coupling socket and one blackout switch. There are no lights on the dolly.

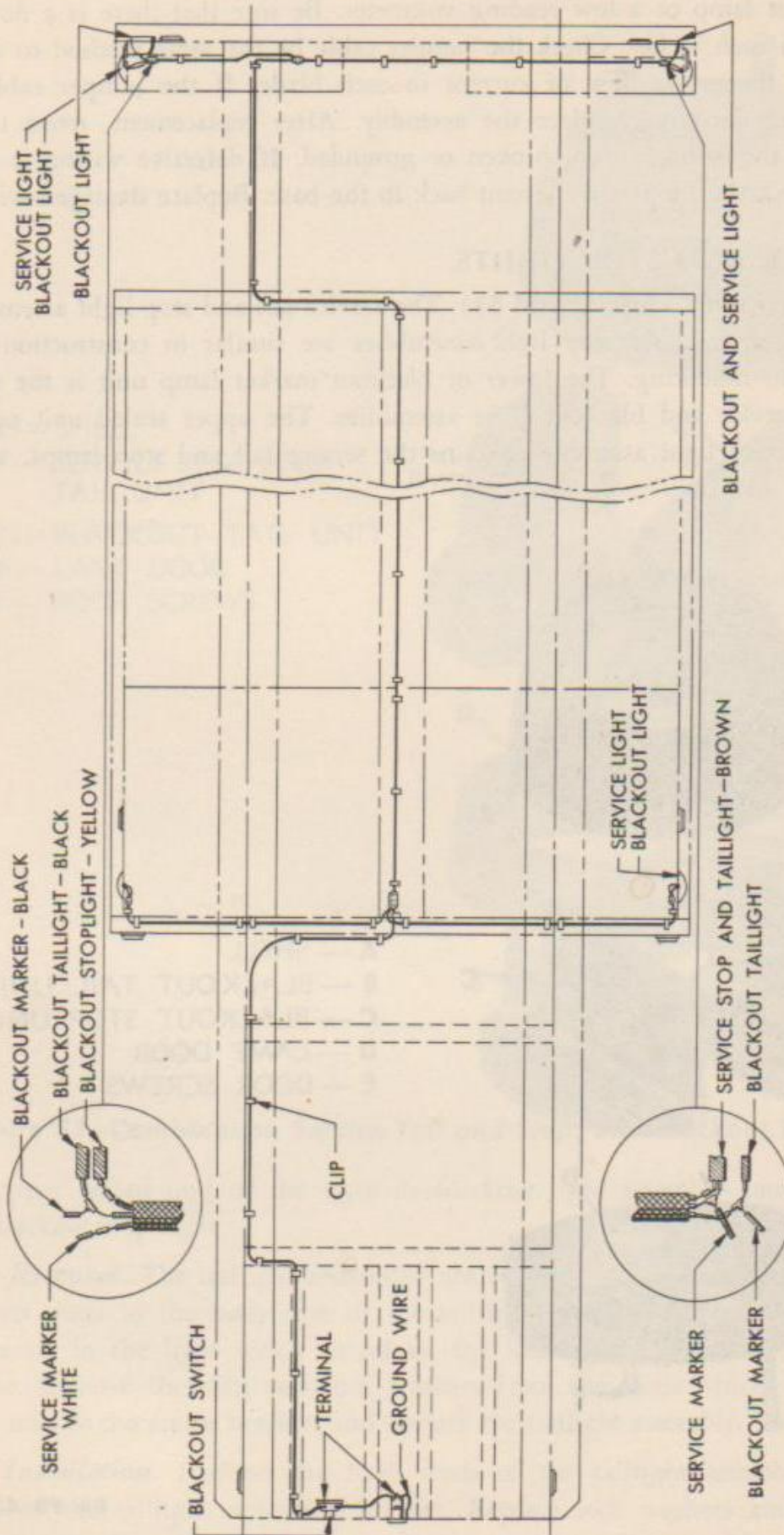
b. Data.

Voltage	6-8 volts
Candlepower of blackout marker lamps	1½ cp
Candlepower of service marker lamps	1½ cp
Candlepower of blackout tail and stop lamps	3 cp
Candlepower of service tail and stop lamps	21-3 cp

83. TESTS.

a. Preliminary Tests. With trailer coupled to a towing vehicle, and the blackout switch in the service position, turn on the trailer lights at the towing vehicle. Check to be sure all service lights are burning. If any blackout lights are burning, the wiring is improperly installed. See wiring diagram (fig. 51) for correct installation. If, when the wiring is properly connected, blackout lights still burn, rewire the blackout switch (par. 87 c). Now turn the blackout switch to the blackout position and repeat test for blackout lights. Apply the brakes and be sure that the proper stop lights operate for each position of the blackout switch.

Electrical System



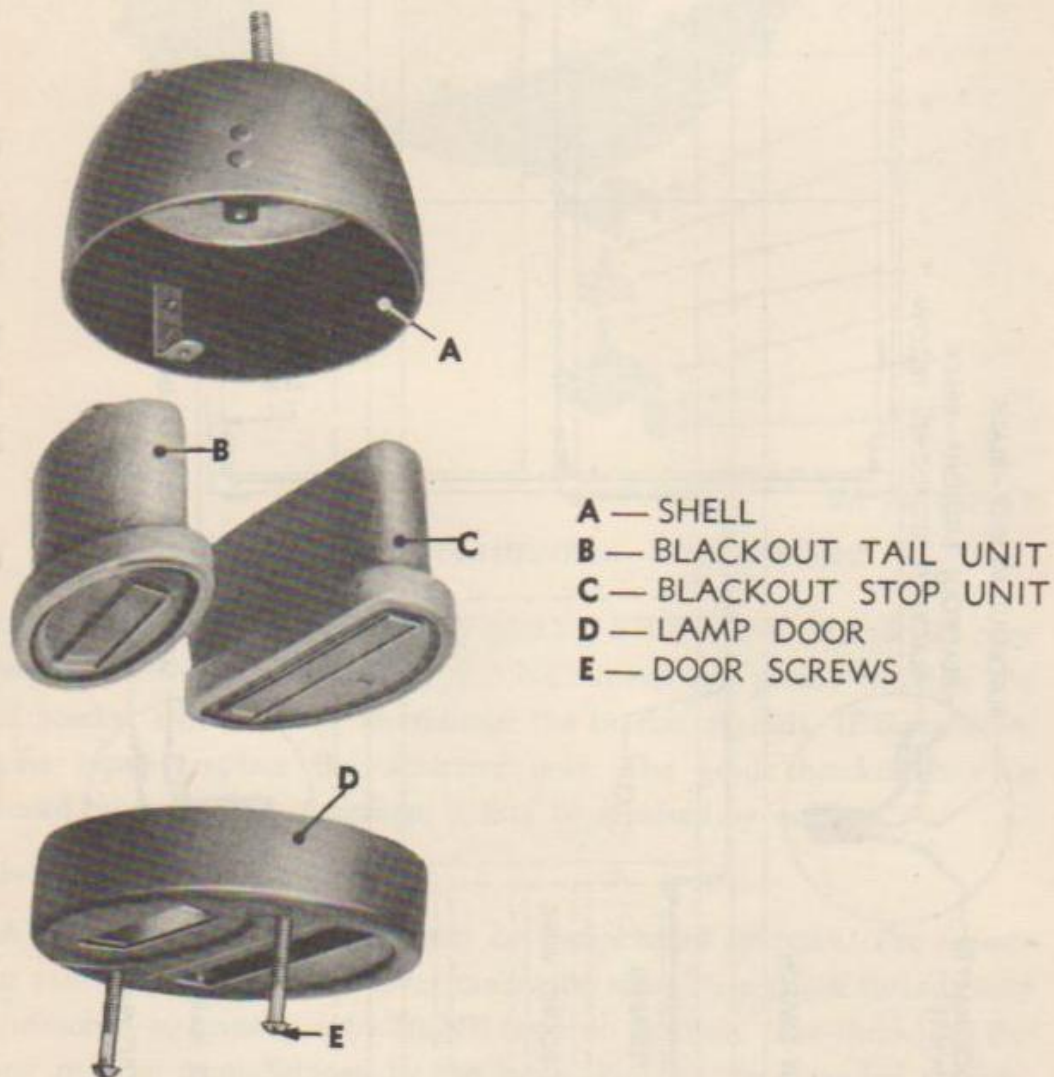
RA PD 341754

Figure 51—Trailer Wiring Diagram

b. Localized Tests. Remove inoperative lamp-units, and check the sockets with a test lamp or a low reading voltmeter. Be sure that there is a flow of current in each socket. Check the jumper cable by the same method to make sure that there is a flow of current in each blade. If the jumper cable or sockets are defective, replace the assembly. After replacement, retest to be sure that the wiring is not broken or grounded. If defective wiring is indicated, check the inoperative circuit back to the base. Replace damaged wiring.

84. TAIL AND STOP LIGHTS.

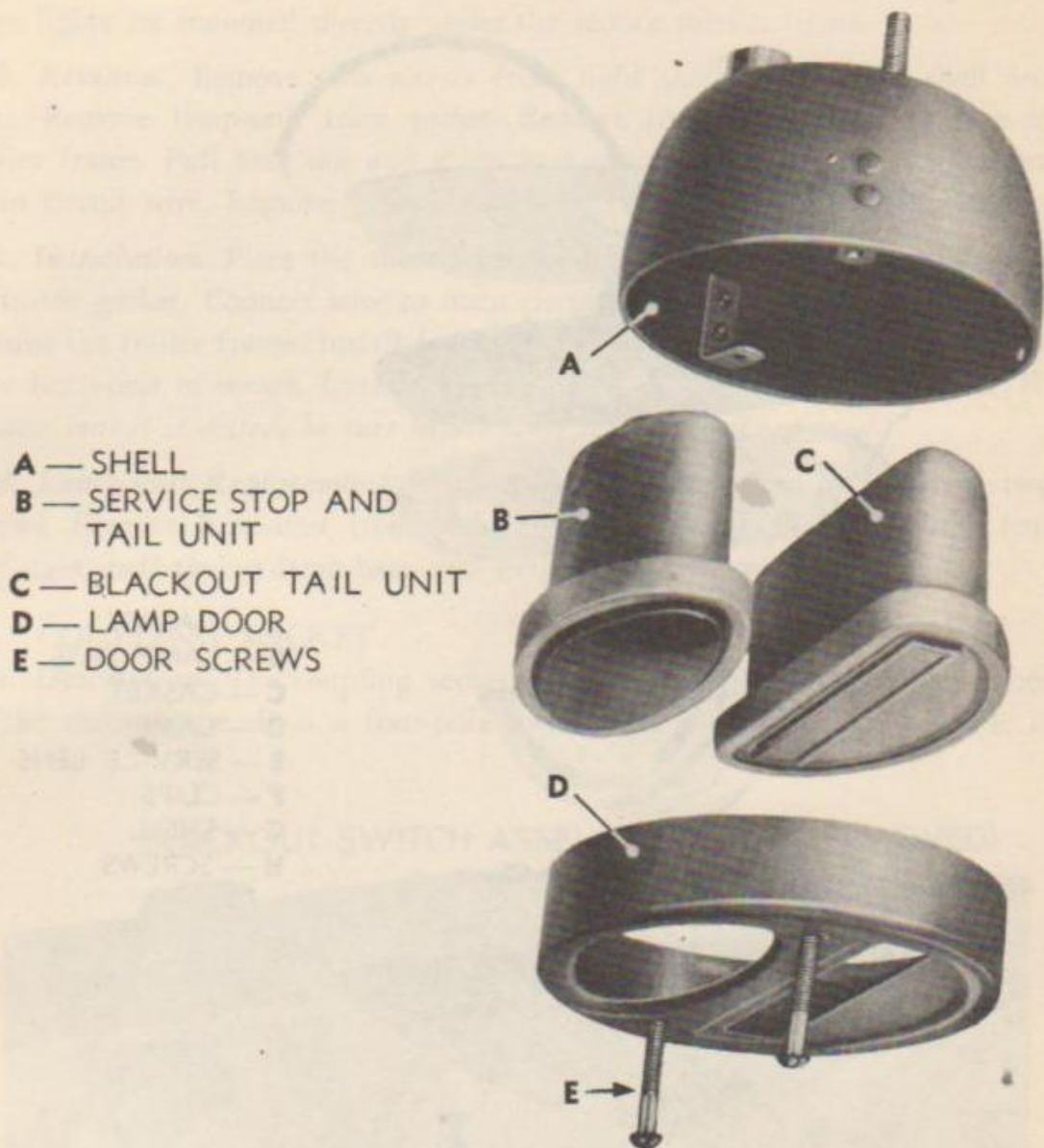
a. Description. (figs. 52 and 53). The service tail and stop light assemblies and blackout tail and stop light assemblies are similar in construction and identical in mounting. The lower or blackout marker lamp unit is the same in both service and blackout light assemblies. The upper sealed unit of the left or service light assembly contains the service tail and stop lamps, while



- A — SHELL
- B — BLACKOUT TAIL UNIT
- C — BLACKOUT STOP UNIT
- D — LAMP DOOR
- E — DOOR SCREWS

RA PD 43278

Figure 52—Combination Blackout Tail and Blackout Stop Light



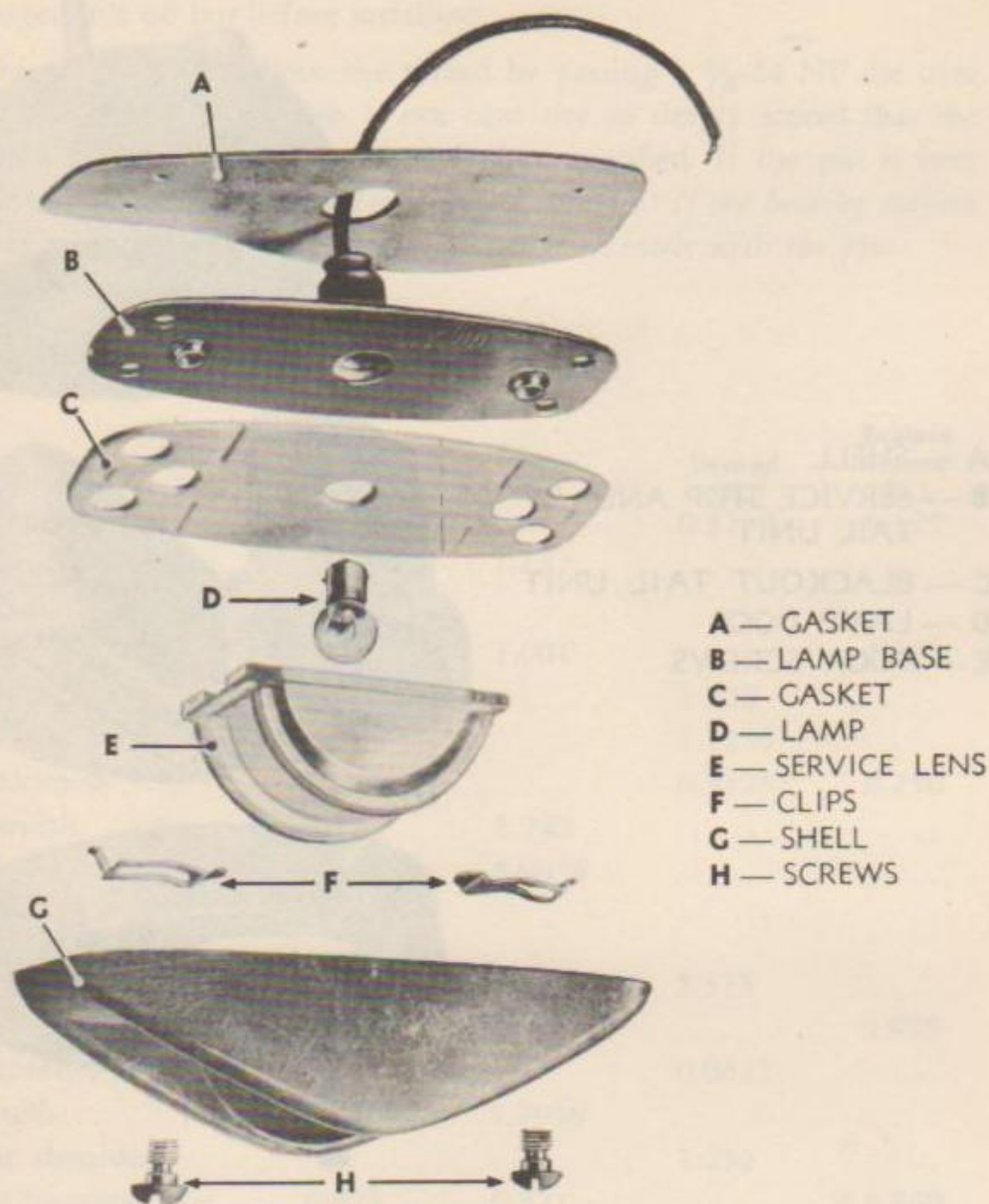
RA PD 43277

Figure 53—Combination Service Tail and Stop, and Blackout Taillight

the upper sealed unit of the right or blackout light assembly contains only the blackout stop light.

b. Removal. The taillight assemblies are attached to a trailer frame bracket by two studs in the body case of the taillight unit. Turn the taillight wire connector in the light socket to release the lock pins and pull out the connector. Remove the nuts and lock washers from the studs which secure the light unit to the frame bracket, and remove the taillight assembly.

c. Installation. Position the fixed studs of the taillight assembly in the holes of the taillight mounting bracket. Replace lock washers and nuts on mounting studs and secure.



- A — GASKET
- B — LAMP BASE
- C — GASKET
- D — LAMP
- E — SERVICE LENS
- F — CLIPS
- G — SHELL
- H — SCREWS

RA PD 43275

Figure 54—Clearance Light—Disassembled

d. Lamp-unit Replacement (either unit). Remove two screws from front cover of taillight, and remove the cover from the body case of the light assembly. Slide the sealed lamp-unit from the case of the light. Internal lamps of a sealed unit are not replaceable. Replace a damaged unit. Insert new unit into body, position cover, and secure cover retaining screws.

85. MARKER LIGHTS.

a. Description (fig. 54). Both blackout and service marker light assemblies are identical except for the lenses. The service marker light lenses are amber

or red. The blackout marker light lenses are blue or red. The blackout clearance lights are mounted directly under the service marker lights.

b. Removal. Remove two screws from light shell and remove shell and lens. Remove lamp-unit from socket. Remove four screws holding base to trailer frame. Pull base out and disconnect short wire attached to base from main circuit wire. Remove gasket from between lamp base and trailer frame.

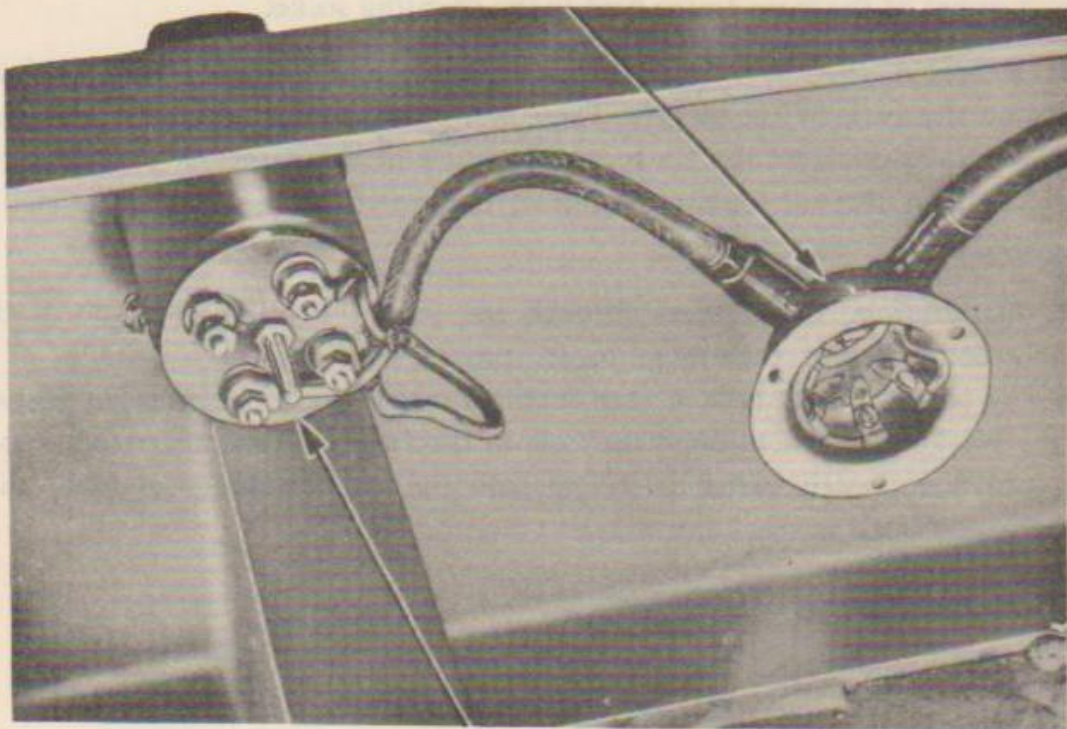
c. Installation. Place the short wire connected to lamp base through hole in inside gasket. Connect wire to main circuit wire and press base in position against the trailer frame. Install four screws to hold lamp base to frame. Place new lamp-unit in socket. Install lens and light shell with two screws. NOTE: *If new lens is installed, be sure to use same color lens as removed.*

d. Lamp-unit Replacement. Remove light shell and lens by removing two screws. Remove lamp-unit from socket. Install new lamp-unit. Position lens and light shell against lamp base, and secure with two screws.

86. COUPLING SOCKET.

a. Description. The coupling socket is mounted on the front crossmember of the main frame. It is a four-pole socket into which the jumper cable is

BLACKOUT SWITCH ASSEMBLY (COVER REMOVED)



COUPLING SOCKET ASSEMBLY (COVER REMOVED)

RA PD 341755

Figure 55—Coupling Socket and Blackout Switch Assemblies
with Covers Removed

plugged to energize the trailer electrical system. A guide slot in the socket must mate with a guide bar on the jumper cable plug before the plug may be inserted, thus preventing improper coupling.

b. Removal (fig. 55). Open the tool box and remove nut and lock washer from coupling socket cap. Pull cap off case. Remove two nuts and cupped washer from each of the terminals to which a wire is attached. Remove the wires. Remove the four mounting screws, nuts and lock washers which hold socket body to trailer frame. Pull socket through and out of the front of the frame.

c. Installation. Place coupling socket in hole in front crossmember and secure with four screws, lock washers and nuts. Be sure the jumper alignment slot is at the bottom. Place wires on terminals. Each terminal is marked to facilitate proper connection. Place cupped washer over each terminal and secure wires to terminals with two nuts. Place cap over back mounting stud. Install lock washer and nut, and tighten into place.

87. BLACKOUT SWITCH.

a. Description. The blackout switch is a two-position switch which diverts the flow of current into either the service light system or the blackout light system. There is no "OFF" position of the switch. It is located on the front crossmember of the main frame next to the coupling socket.

b. Removal (fig. 55). Remove three screws, nuts and lock washers from cover on the back of the switch. These can be reached through the tool box. Remove six wires from the six terminals and pull the wires out of the switch body. Remove the nut from the front of the switch body, and remove switch through the tool compartment.

c. Installation. Insert wires through the proper holes in the side of the switch body. Secure each wire to its proper terminal. Each wire is of a different color, and the base of each terminal is marked. Place threaded portion of the blackout switch through the hole in the front crossmember from inside the tool box. Fasten switch to frame with the nut. Install cover plate with three screws, lock washers and nuts.

PART FOUR

AUXILIARY EQUIPMENT

Section XXII

General

88. SCOPE.

a. Due to the use for which this trailer was designed, no items of auxiliary equipment are present.

PART FIVE
REPAIR INSTRUCTIONS

Section XXIII

General

89. SCOPE.

a. General. These instructions are published for the information and guidance of personnel responsible for third and higher echelons of maintenance on this equipment. They contain information on the maintenance which is beyond the scope of the tools, equipment or supplies normally available to the using organizations.

b. Repair Instructions to be Found in Other Manuals. Instructions for repair of certain assemblies and components of this vehicle are found in other manuals as described in the following table. Information on these assemblies and components are not covered in this manual.

Assembly	TM Reference	Section
(1) Brake Chamber	TM 9-1827A	Chapter 6, Section I
(2) Relay-emergency Valve	TM 9-1827A	Chapter 5, Section III
(3) Exhaust Check Valve	TM 9-1827A	Chapter 8, Section III
(4) Drain Cock	TM 9-1827A	Chapter 9, Section II
(5) Air Reservoir	TM 9-1827A	Chapter 12, Section II
(6) Air Cleaner	TM 9-1827A	Chapter 12, Section III
(7) Tire Casing	TM 9-1868	

Section XXIV

Trouble Shooting

90. GENERAL.

a. This section contains trouble shooting information and tests which may be made to help determine the causes of difficulties which have been referred to higher than second echelons of maintenance. The remedies required are those normally performed by ordnance maintenance personnel. Further tests on defective assemblies, intended to isolate the defective part in the assembly, together with the proper repairs, are given here.

91. SERVICE BRAKE SYSTEM.

a. Intermittent Brakes. Be sure that brake drum is not out-of-round. See paragraph 124 *b* for tolerances on drum dimensions. If drum is out-of-round, and can be brought within proper tolerances, repair (par. 123 *b*).

b. Slack Adjuster Inoperative. Lubricate slack adjuster (par. 28). If adjusting screw fails to turn, disassemble (par. 97) and inspect components. Replace the defective parts.

92. FRONT AXLE.

a. Inner Tires Wearing Excessively. Check the axle for bend and for proper camber (par. 111). If bent or out of camber, repair the axle (par. 112).

b. Outer Tires Wearing Excessively. Check the axle for too much camber (par. 111). If out of camber, repair the axle (par. 112).

c. Uneven Tire Wear and Cupping. Check the axle for bend (par. 111), and if bent, repair (par. 112).

93. REAR UNDERCONSTRUCTION.

a. One of Dual Tires Wearing More Rapidly Than Other. Check the trunnion axle for bend (par. 115), and if bent, repair (par. 116).

b. Uneven Tire Wear and Cupping. Check trunnion axle for bend (par. 115), and if bent, repair (par. 116).

94. WHEELS, HUBS, DRUMS AND TIRES.

a. Wobbly Wheel. Check axle spindle for bend (pars. 111 and 115), and if bent, repair the axle (pars. 112 and 116). Examine the wheel to be sure it is not bent (par. 119). Replace the wheel if it is not true. Be sure that all the wheel studs are straight and undamaged. If any damage is found or if any of the studs are cocked, replace the defective studs (par. 122 *b*).

b. Undue Tire Wear. See the section on axle trouble shooting for instructions on locating the cause of undue tire wear.

c. Noisy Operation. Examine the axle spindle bearing surfaces for wear. Refinish if machining can be performed within the tolerances specified in paragraph 113.

Section XXV

Slack Adjuster

95. DESCRIPTION AND DATA.

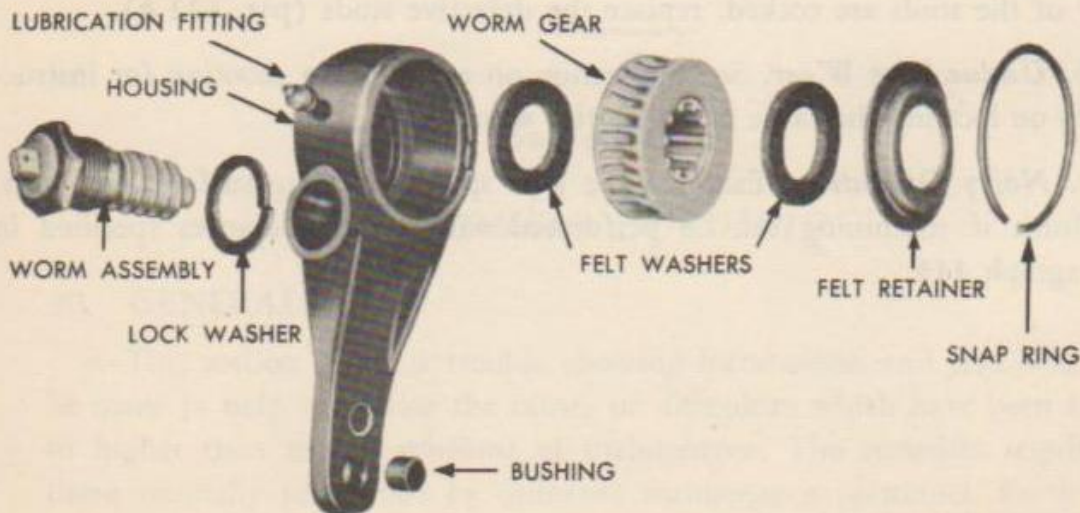
a. Description (fig. 56). The slack adjusters act as brake levers, and also provide a quick and easy method of adjusting the brakes. The adjustment feature consists of a worm gear, splined to fit over the camshaft, and a worm. The worm turns the body of the adjuster in relation to the gear when the adjuster is on the camshaft, thus rotating the lever arm to compensate for brake lining wear.

b. Data.

Make	Fruehauf Trailer Company
Model	51430
Weight	2 ³ / ₄ lb
Length of leverage	6 in.
Quantity per trailer	4
Lever arm bushing length	1/2 in.
Lever arm bushing inside diameter	0.502 in.
Lever arm bushing outside diameter	0.627 in.

96. TEST.

a. Place the arm end of the slack adjuster in a vise with the adjusting screw up. Try turning adjusting screw with an 8-inch wrench. If adjusting screw fails to turn, this indicates that the assembly lacks lubrication, that a tooth is stripped on the worm gear, or that the worm is broken. Replace



RA PD 57416

Figure 56—Slack Adjuster—Disassembled

Slack Adjuster

worn or defective parts. After testing the worm assembly, insert a 1/2-inch rod end pin into the bushing. If the pin is extremely loose, replace the bushing.

97. **DISASSEMBLY, CLEANING, INSPECTION AND ASSEMBLY.**

a. Disassembly (fig. 56). Screw worm assembly counterclockwise and remove worm assembly and lock washer from housing. NOTE: *Do not disassemble the worm assembly.* Pry snap ring out of housing. Lift out felt retainer, outer felt washer, gear and inner felt washer. Remove the lubricating fitting. Press the bushings out of the slack adjuster arm if they are to be replaced.

b. Cleaning and Inspection. Remove excess grease from parts and wash in dry-cleaning solvent. Inspect the worm gear for broken teeth and excessive wear. Examine the worm assembly for cracks, broken or stripped teeth, wear and damaged threads. Check felt washers for wear and evidence of disintegration. Replace the defective parts.

c. Assembly. Press bushing into slack adjuster arm. Place several drops of engine oil on the felt washers and work the oil into the washers. Install one felt washer in the housing cavity. Coat the surface of the gear with No. 1 general purpose grease. Install worm gear in housing next to inner felt. Place outer felt over the gear and install the felt retainer over the felt. Secure the entire installation with the snap ring, being sure that the snap ring is fully seated in its groove in the housing. Place the arm end of the housing in a vise with the worm assembly hole up. Coat the surface of the worm with general purpose grease No. 1. Install lock washer over the worm assembly and screw into the slack adjuster housing. Install lubrication fitting and with a grease gun fill the housing with grease (par. 28).

98. **FITS AND TOLERANCES.**

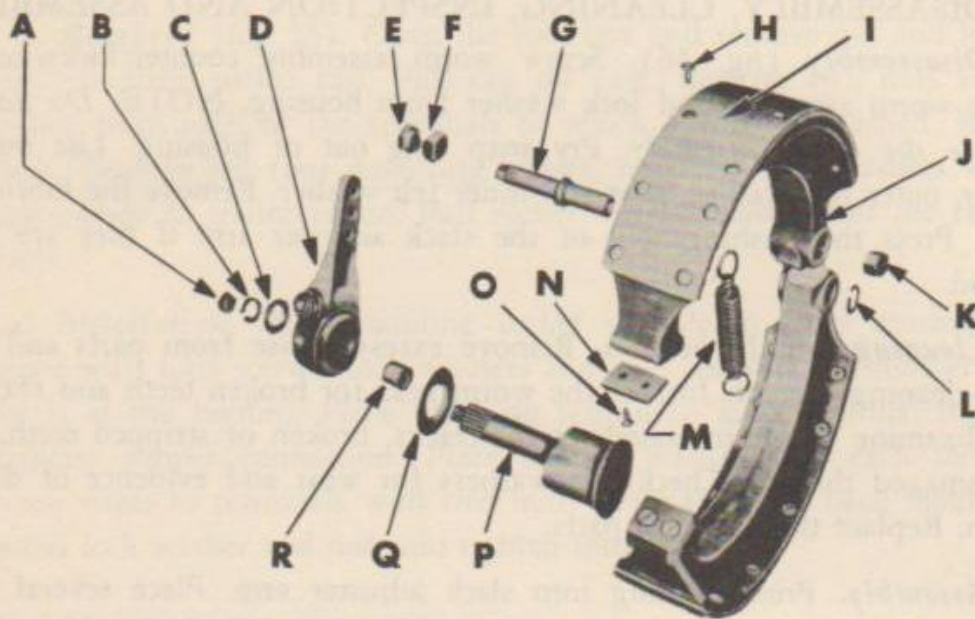
<i>a. Arm Bushing.</i>	Minimum (in.)	Maximum (in.)
Ream diameter	0.501	0.503
Outside diameter	0.626	0.628

Section XXVI

Brake Assembly

99. **DESCRIPTION AND DATA.**

a. Description (fig. 57). The brakes are of the two-shoe internal expanding type, operated by cam. The brake shoes are mounted on eccentric anchor pins



RA PD 341756

Figure 57—Brake Assembly—Disassembled

to permit preliminary adjustment of shoes when repairing the assembly. The opposite ends of the shoes are equipped with replaceable cam seats and are held against the cam by a coil spring which joins the two shoes. The camshaft is provided with a 360-degree slack adjuster. Camshaft is carried in a needle bearing to prevent drag.

b. Data.

(1) INTERNAL BRAKES.

Make	Fruehauf Trailer Company
Model	SP PL 1060
Weight	62 lb
Quantity used	4
Diameter of shoes	12½ in.
Width of shoes	4 in.

(2) LININGS.

Material	Raybestos
Thickness	5/16 in.
Rivet size	3/16 in.
Number of rivets	9
Number of linings per shoe	1

- | | |
|--------------------------|------------------------------|
| A —NUT | J —BRAKE SHOE |
| B —LOCKWASHER | K —ANCHOR PIN BUSHING |
| C —PLAIN WASHER | L —LOCK RING |
| D —SLACK ADJUSTER | M —RETURN SPRING |
| E —OUTER LOCK NUT | N —WEAR PLATE |
| F —INNER LOCK NUT | O —WEAR PLATE SCREW |
| G —ANCHOR PIN | P —CAMSHAFT |
| H —LINING RIVET | Q —INNER CAM WASHER |
| I —BRAKE LINING | R —NEEDLE BEARING |

RA PD 341756B

Legend for Figure 57

100. BRAKE ASSEMBLY REPAIR.

a. Brake Lining Replacement. Place the shoe across an open vise with the lining up. Drive the rivets out with a $\frac{3}{16}$ -inch long-tapered punch. Wash shoe with dry-cleaning solvent and clean the surface with a stiff wire brush. Place new linings in position on shoe, making sure that the holes in the lining are over the corresponding holes in the shoe. Clamp the lining in place with two C-clamps. Install five rivets; remove the C-clamps and install the remaining rivets.

b. Anchor Pin Bushing Replacement. Press bushing out and press in the replacement bushing. Ream the bushing for 1.001 inch minimum to 1.002 inch maximum inside diameter.

c. Cam Seat Replacement. The cam seat is replaced by removing the two cap screws and lifting the cam seat from the shoe. Then place a new cam

seat in position on the shoe and install the two flathead cap screws. Be sure the heads do not project beyond the surface of the seat. If the screw head slot is damaged, file off bur before installing.

d. Anchor Pin Repair. Clean the thread by passing a 7/8-24 NF die over the threaded section. Be sure pin is not bent nor so deeply scored that the defects cannot be removed within the tolerance specified. If the pin is bent or deeply scored on the bearing surface, replace. NOTE: *If the bearing surface of the pin is to be refinished, remember that it is eccentric with the pin.*

101. FITS AND TOLERANCES.

a. Brake Shoes and Linings.

	Max. (in.)	Min. (in.)	Desired (in.)	Replace Beyond (in.)
Lining thickness			0.3125	0.125
Bushing outside diameter...	1.128	1.127		
Bushing ream diameter (after assembly)	1.002	1.001		1.004
Bushing length			1.750	
Brake shoe bushing hole			1.1255	
Cam seat thickness			0.3125	0.250
Cam seat width	1.752	1.748		
Shoe radius (less lining)...	5.9083	5.9038		

b. Anchor Pins.

Length			5.375	
Bearing diameter	0.999	0.997		0.995
Bearing eccentricity			0.0625	
Bearing length	1.7969	1.7959		
Diameter at shoulder			1.250	
Diameter at trunnion axle...	0.873	0.871		0.860
Thread size			7/8-14 NF-2	
Tread length (full thread)...			1.3125	

Section XXVII

Service Brake System

102. GENERAL.

a. For information on the repair and overhaul of the brake chambers, relay-emergency valve, exhaust check valve, drain cock, air reservoir, and air cleaner, refer to TM 9-1827A (see paragraph 89 *b*).

Section XXVIII

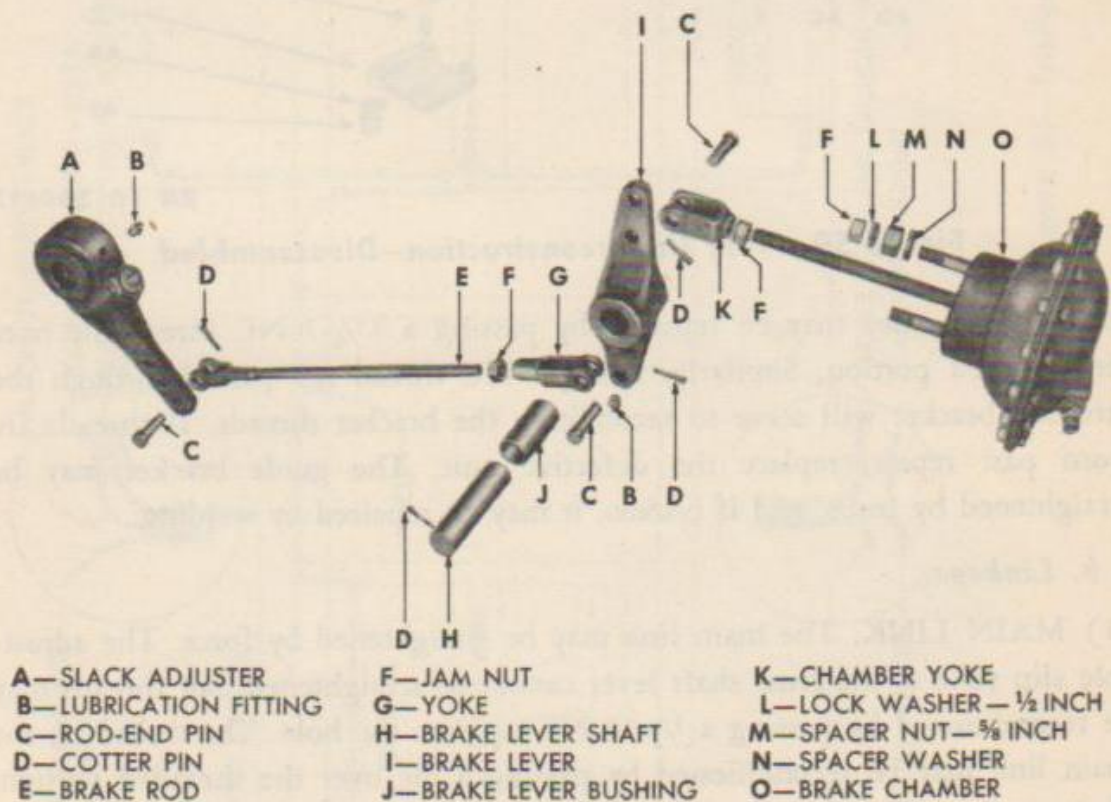
Service and Parking Brake Linkage

103. DESCRIPTION.

a. All rods, including the parking brake main link, are 1/2-inch diameter. The yokes at the end or ends are fixed by a 1/2-inch clevis pin and a 1/8-inch cotter pin. When properly lubricated, there should be free rotation about each joint. Actuating the air brake will move the service brake rods as well as members of the parking brake linkage except the main link and crank lever (fig. 37). The operating levers are bushed to ride freely on their shafts. The cross shaft is supported in three journals which prevent drag at this point.

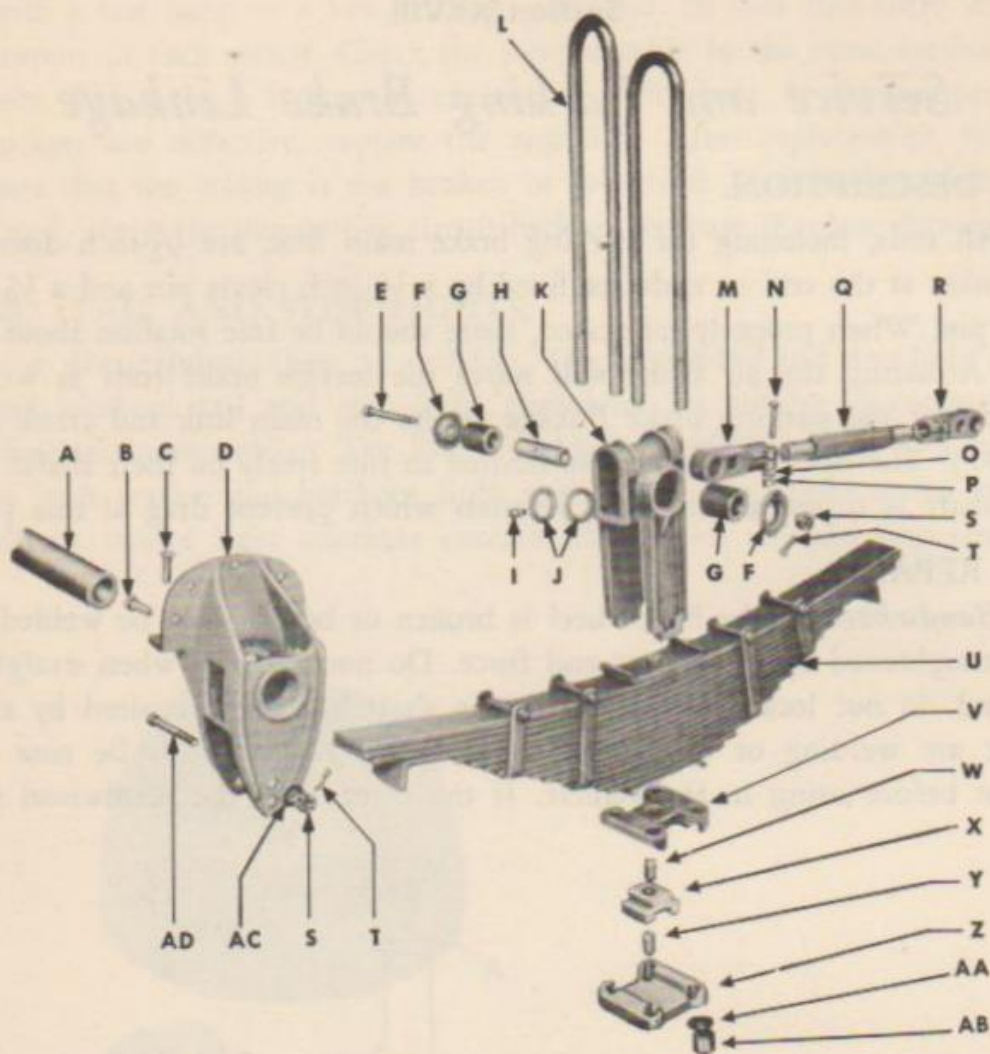
104. REPAIR.

a. *Handwheel.* If the handwheel is broken or bent it may be welded and then straightened by using heat and force. Do not overheat when straightening, and do not localize heat. When the shaft has been repaired by either electric arc welding or by gas welding, it may be distorted. Be sure it is straight before using in the vehicle. If the threads on the handwheel shaft



RA PD 341711

Figure 58—Brake Chamber and Linkage—Partially Disassembled



RA PD 349617

Figure 59—Front Underconstruction—Disassembled

are damaged, they may be repaired by passing a $1\frac{1}{4}$ -7 NC thread die over the threaded portion. Similarly, a $1\frac{1}{4}$ -7 NC thread tap passed through the threaded bracket will serve to recondition the bracket threads. If threads are worn past repair, replace the defective unit. The guide bracket may be straightened by force, and if broken, it may be repaired by welding.

b. Linkage.

(1) MAIN LINK. The main link may be straightened by force. The adjustable slip yoke at the cross shaft lever cannot be straightened, but threads may be reconditioned by passing a $\frac{1}{2}$ -20 NF tap into the hole. The thread on the main link may be reconditioned by passing a die over the threaded portion. If the jam nut is damaged, replace.

(2) RODS AND YOKES. These parts may be straightened cold in a straightening press. Yokes may be spread or closed by heat and force.

Service and Parking Brake Linkage

- A—CROSS SHAFT
- B—RIVET
- C—RIVET
- D—SPRING HANGER
- E—SPINDLE BOLT
- F—OUTER RETAINER WASHER
- G—RUBBER BUSHING
- H—SPINDLE
- I—SET SCREW
- J—INNER RETAINER WASHER
- K—RADIUS ROD BRACKET
- L—U-BOLT
- M—RADIUS ROD END (Right Hand)
- N—BOLT
- O—LOCK WASHER
- P—NUT
- Q—RADIUS ROD ADJUSTING SCREW
- R—RADIUS ROD END (Left Hand)
- S—CASTLE NUT
- T—COTTER PIN
- U—SPRING
- V—SPRING CHAIR
- W—AXLE DOWEL PIN
- X—RISER BLOCK
- Y—AXLE DOWEL PIN
- Z—U-BOLT PLATE
- AB—U-BOLT NUT
- AC—PLAIN WASHER
- AD—BOLT

RA PD 349617B

Legend for Figure 59

(3) OPERATING LEVERS. The two bushings may be replaced in the operating lever, when badly worn. Press the old bushing out and put a new one in. Be sure the grease port in the lever is not blocked by the bushing.

(4) CROSS SHAFT JOURNALS. The bushings in the journals must be replaced when badly worn. Press old bushing out of bracket and press new bushing into place. Make sure grease port in new bushing lines up with lubrication fitting hole in bracket.

105. FITS AND TOLERANCES.

<i>a. Handwheel Shaft.</i>	Max. (in.)	Min. (in.)	Desired (in.)	Replace Beyond (in.)
Thread size			1 1/4 7NC-2	
Diameter (nominal)	1.250	1.247		
Diameter at handwheel	0.998	0.992		
Diameter handwheel pin hole	0.376	0.374		
Length			18.125	
 <i>b. Operating Levers.</i>				
Bushing hole diameter	1.1255	1.1245		
Clevis pin holes (3)			0.5156	
Grease fitting hole			1/8-27 Briggs pipe tap	
Bushing outside diameter	1.128	1.127		
Bushing ream diameter (after assembly)	1.003	1.000		1.005

Repair Instructions

	Max. (in.)	Min. (in.)	Desired (in.)	Replace Beyond (in.)
Bushing length (two required)			0.8125	
<i>c. Cross Shaft Journals.</i>				
Bushing hole diameter	1.876	1.874		
Bushing outside diameter	1.879	1.877		
Bushing ream diameter (after assembly)	1.511	1.509		1.515

Section XXIX

Front Suspension

106. DESCRIPTION.

a. The front suspension includes the springs, radius rods and attaching parts for the axle (fig. 59). The front underconstruction holds the front axle to the dolly frame.

107. SPRINGS.

a. Description. The leaf type springs are composed of 16 leaves, bound together by four rebound clips and one center bolt and nut. Springs are made of hardened silico-manganese spring steel.

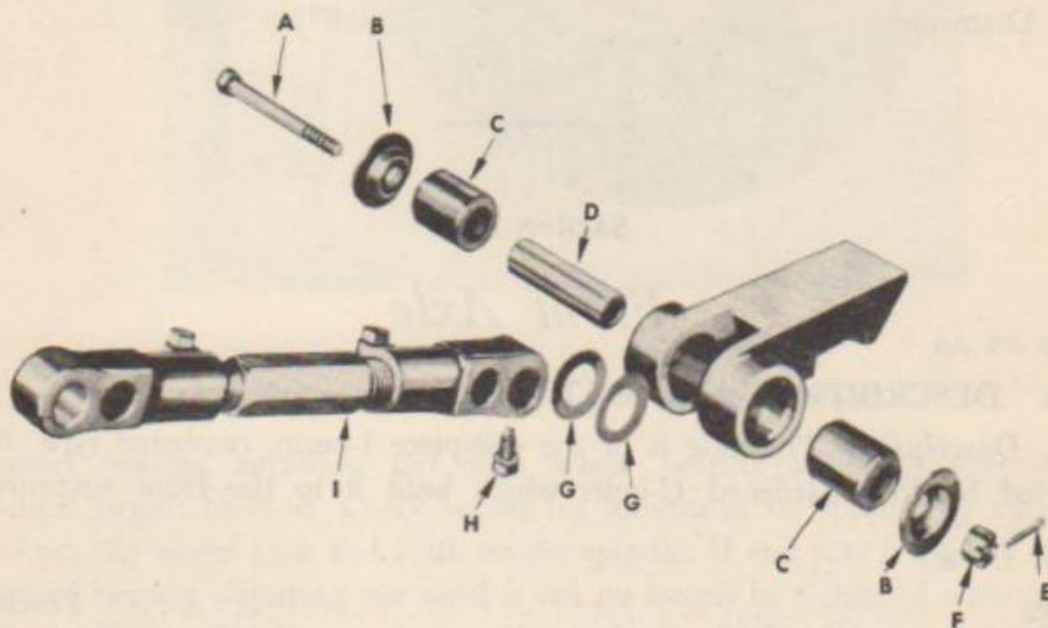
b. Disassembly (par 64 *d*). Place spring across two wood horses. Place a C-clamp about three inches from center bolt and tighten the C-clamp. With a hand grinder grind off the peened end of spring center bolt. Remove nut from spring center bolt. With a 3/8 x 10-inch steel rod drive spring center bolt out of spring. Remove four nuts from the four rebound clips. Drive out the four rebound bolts and remove the rebound clip spacers. Remove the C-clamp from the spring.

c. Repair. Tap rebound clips with a hammer to detect loose rivets. If rivets are loose, heat the head of the rivet with an acetylene torch and rivet from the opposite side with a ball peen hammer until rivets are tight. Replace broken rebound clips by riveting new clips in position. NOTE: *Two different size rebound clips are used. When installing new clips, make certain the proper clip is used on the proper spring leaf.* With a wire brush remove all rust scale from top and bottom surface of each spring leaf.

d. Assembly (par. 64 *d*). Place main leaf and wrap leaf assembly with the arch up across two wood horses. Continue building up the spring, starting with the longest leaf and ending with the shortest leaf. Make certain each spring center bolt hole is in alinement with each other. Shove a $\frac{3}{8}$ -inch rod down through the spring center bolt holes to make certain the holes are in alinement, and that shifting of the leaves will not take place when the C-clamp is installed. Install C-clamp and tighten, compressing the leaves. Remove the $\frac{3}{8}$ -inch rod from spring center bolt hole. Place shear plate on bottom and top of spring, and install spring center bolt. Install nut on spring center bolt and tighten. Peen the end of the bolt to prevent nut from becoming loose. Place clip spacer between each of the rebound clips. Secure spacer to clips using bolt and nut. Place two punch marks at end of bolts to prevent nut from becoming loose.

108. RADIUS RODS.

a. Description (par. 65 *a*). The radius rods are not of the same type. Right radius rod is a simple rod, the left is a turnbuckle type. Rotation in one



A—SPINDLE BOLT
B—OUTER BUSHING RETAINER
C—RUBBER BUSHING
D—RADIUS ROD SPINDLE
E—COTTER PIN

F—NUT
G—INNER BUSHING RETAINER
H—SET SCREW
I—RADIUS ROD ASSEMBLY

RA PD 341725

Figure 60—Radius Rod—Disassembled

direction expands the length and in the other direction contracts the length. This is to facilitate axle alinement.

b. Repair. Disassemble by removing rod ends (par. 65 *b*). Note that one end is left-hand and the other right-hand thread. Clean threads by passing a long tap into the rod and by passing a die over the rod ends. If straightening of the rod is required, use heat and force. Do not heat beyond a dull red, and do not localize the heat. The straightening must be performed prior to cleaning the threads. NOTE: *When cleaning threads, be sure that the proper left- and right-hand taps and dies are used.* Do not attempt straightening the rod ends of the adjustable radius rod.

109. FITS AND TOLERANCES.

	Desired (in.)	Replace Beyond (in.)
<i>a. Springs.</i>		
Camber	2.5625	1.500
<i>b. U-bolts.</i>		
Length	20.125	.....
Thread size	7/8-14 NF-2	.....
Diameter	0.875	.....

Section XXX

Front Axle

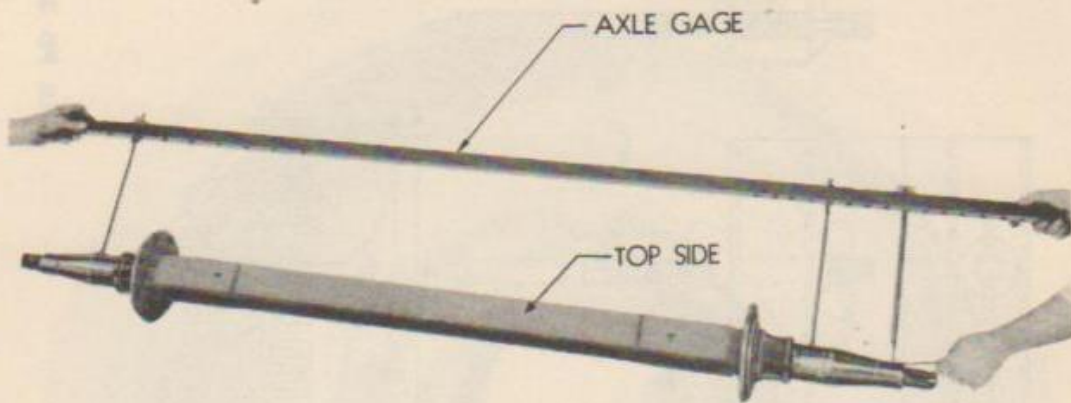
110. DESCRIPTION AND DATA.

a. Description. The axle is of the one-piece I-beam, cambered type. It is carried by four hardened U-bolts which hold it to the front suspension.

b. Data.

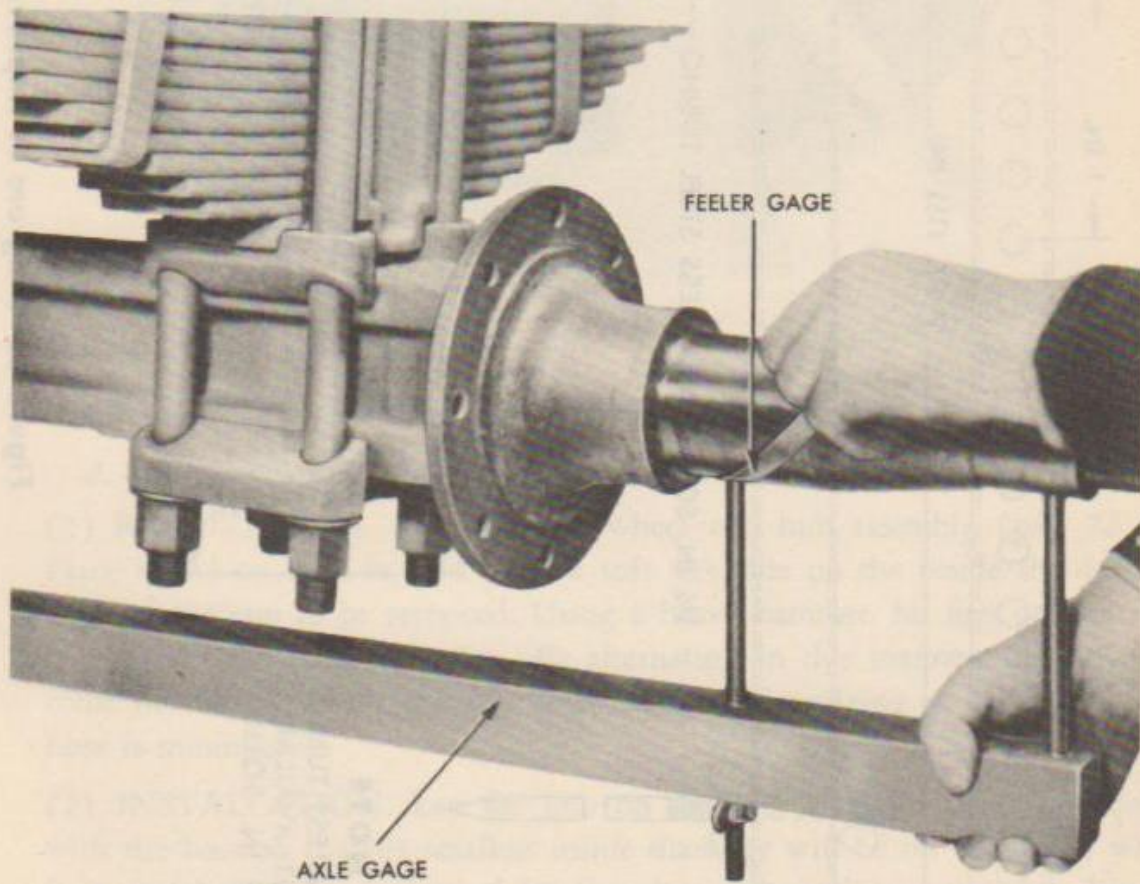
Make	Fruehauf
Model	PL-3005-8
Size	3 in. x 4 1/4 in.
Tread	69 in.
Outer spindle diameter	1.993 in.
Inner spindle diameter	2.878 in.
Spindle thread size	1 1/2-12 SAE
Outer bearing	Timken No. 5565
Inner bearing	Timken No. 5752

Front Axle



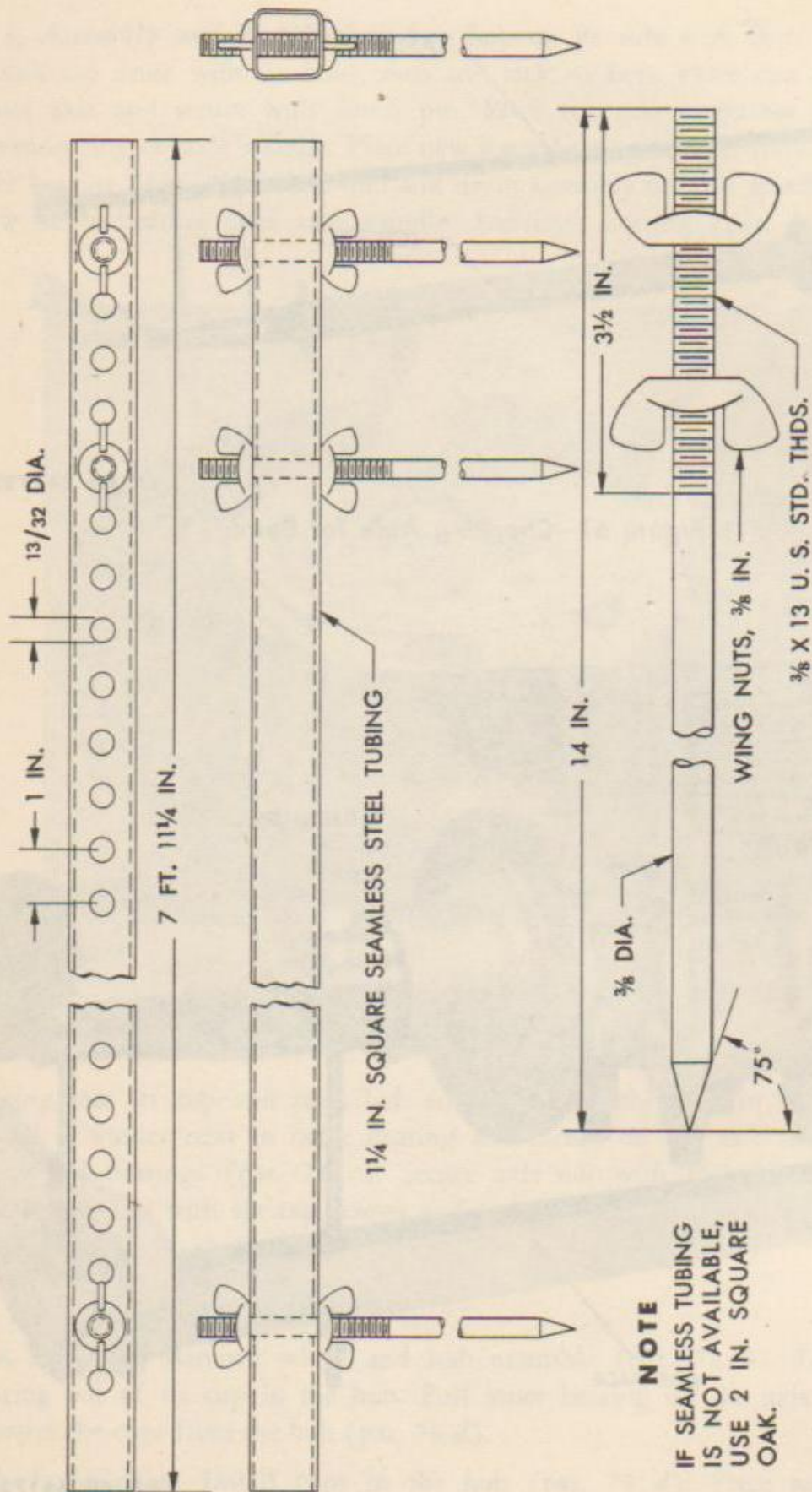
RA PD 341722

Figure 61—Checking Axle for Bend



RA PD 341723

Figure 62—Checking Axle for Camber



NOTE
IF SEAMLESS TUBING IS NOT AVAILABLE, USE 2 IN. SQUARE OAK.

RA PD 341763

Figure 63—Diagram of Improved Axle Gage

Front Axle

111. INSPECTION.

a. Checking Axle for Bend (fig. 61). NOTE: *Inspection is performed with the aid of special inspection tools* (fig. 63). Place the axle gage in position on front side of the axle. With the single-pronged end held firmly against the inner spindle surface, adjust the double prongs on the opposite end of the gage until they contact the inner and outer spindle surfaces. Move the gage over to the rear side of the axle. If either of the two prongs fails to make contact, a bent spindle is indicated. Use a feeler gage to determine the amount of bend. If it is in excess of 0.002 inches, replace the axle. If no bend is found in one spindle, turn the gage end for end and repeat the inspection procedure without disturbing the setting of the prongs. If there is clearance at either inner or outer spindle surface in excess of 0.002 inches, repair the axle (par. 112).

b. Checking Axle for Camber (fig. 62). NOTE: *Inspection is performed with the aid of special inspection tools* (fig. 63). Set points of axle gage in the same manner as when checking for bend (par. 111 *a*). Place gage directly under axle. Clearance will exist between the inner prong of the double-pronged end and the inner spindle surface. Clearance must not exceed 0.080 inch or be less than 0.060 inch. If camber is not within proper limits, repair the axle (par. 112).

112. REPAIR.

a. The axle may be straightened, or bent to the proper camber by the use of force and heat. CAUTION: *Heat in furnace to not more than 800 degrees Fahrenheit.* Remove from furnace and apply force by means of jacks and chains. After straightening, reheat in furnace to 850 degrees Fahrenheit for two hours. Cool in still air. After heat treating, clean the spindles of scale by machining. Be sure that machining does not proceed beyond the minimum tolerances on the various diameters. The spindle threads may be cleaned by passing a 1½-SAE thread die over the thread.

113. FITS AND TOLERANCES.

	Max. (in.)	Min. (in.)	Desired (in.)	Replace Beyond (in.)
Diameter of spindle bearing surface (outer)	1.9998	1.9988	.....	1.9980
Diameter of spindle bearing surface (inner)	2.8748	2.8738	.....	2.8715
Spindle threads			1½-12 SAE	

Section XXXI

Rear Underconstruction

114. DESCRIPTION AND DATA.

a. Description (fig. 64). The rear underconstruction includes two trunnion shafts and four brackets which hold the two trunnion axles to the trailer frame. There are no springs in the rear underconstruction. The axles are of molybdenum steel.

b. Data.

(1) TRUNNION AXLE.

Make	Fruehauf
Model	53407
Tread	27 ⁷ / ₈ in.
Outer spindle diameter	1.8745 in.
Inner spindle diameter	2.874 in.
Spindle thread size	1 ¹ / ₂ -12 SAE
Outer bearing cup	Timken No. 5320
Outer bearing cone	Timken No. 5358
Inner bearing cup	Timken No. 5720
Inner bearing cone	Timken No. 5752

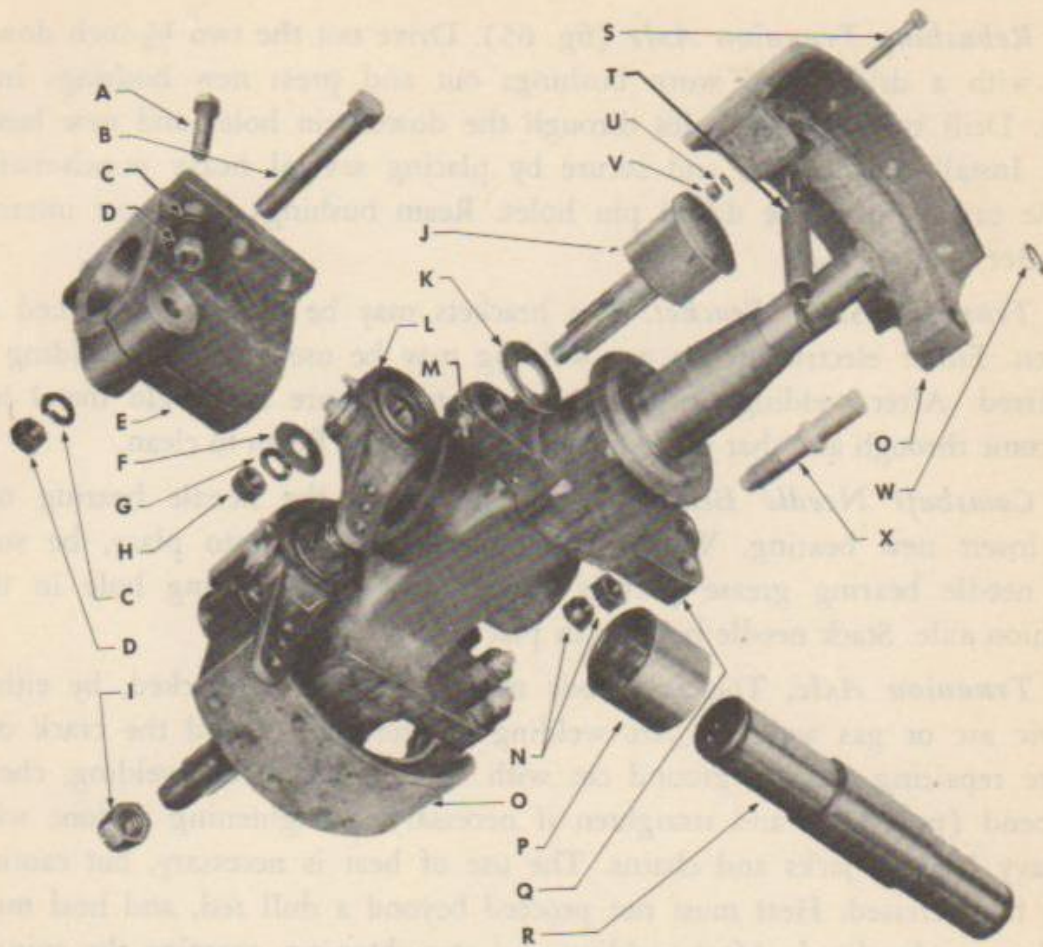
(2) TRUNNION SHAFT.

Length	19.250 in.
End diameter	2.985 in.
Center diameter	3.496 in.

115. CLEANING AND INSPECTION.

a. Disassemble and steam clean. Check trunnion shaft bushings for excessive wear and chipping. If badly chipped, or if worn beyond 3.485 inches, replace the two bushings (par. 116 *a*). Place a finger in the camshaft needle bearing and try rotating the rollers. If the rollers are difficult to move, replace the needle bearing (par. 116 *c*). Examine trunnion axle for cracks or similar damage. If cracked, repair by welding. Examine the center section of the trunnion shaft for excessive wear. If badly worn or scored, replace. Check the trunnion axle for bend. The same method is used in checking bend on the trunnion axle as is used on the front axle, except that axle gage is adjusted to shorter lengths (fig. 63). Refer to paragraph 111 for directions on checking for bend.

*Rear Underconstruction



RA PD 341731

Figure 64—Rear Underconstruction—Partially Disassembled

- | | |
|--------------------|-------------------------|
| A—BOLT | M—LUBRICATION FITTING |
| B—BOLT | N—ANCHOR PIN LOCK NUT |
| C—PLAIN WASHER | O—BRAKE SHOE ASSEMBLY |
| D—NUT | P—TRUNNION AXLE BUSHING |
| E—MOUNTING BRACKET | Q—TRUNNION AXLE |
| F—PLAIN WASHER | R—TRUNNION SHAFT |
| G—LOCK WASHER | S—BOLT |
| H—NUT | T—BRAKE RETURN SPRING |
| I—SPINDLE NUT | U—LOCK WASHER |
| J—BRAKE CAM | V—NUT |
| K—BRAKE CAM WASHER | W—LOCK RING |
| L—SLACK ADJUSTER | X—BRAKE ANCHOR PIN |

RA PD 341731B

Legend for Figure 64

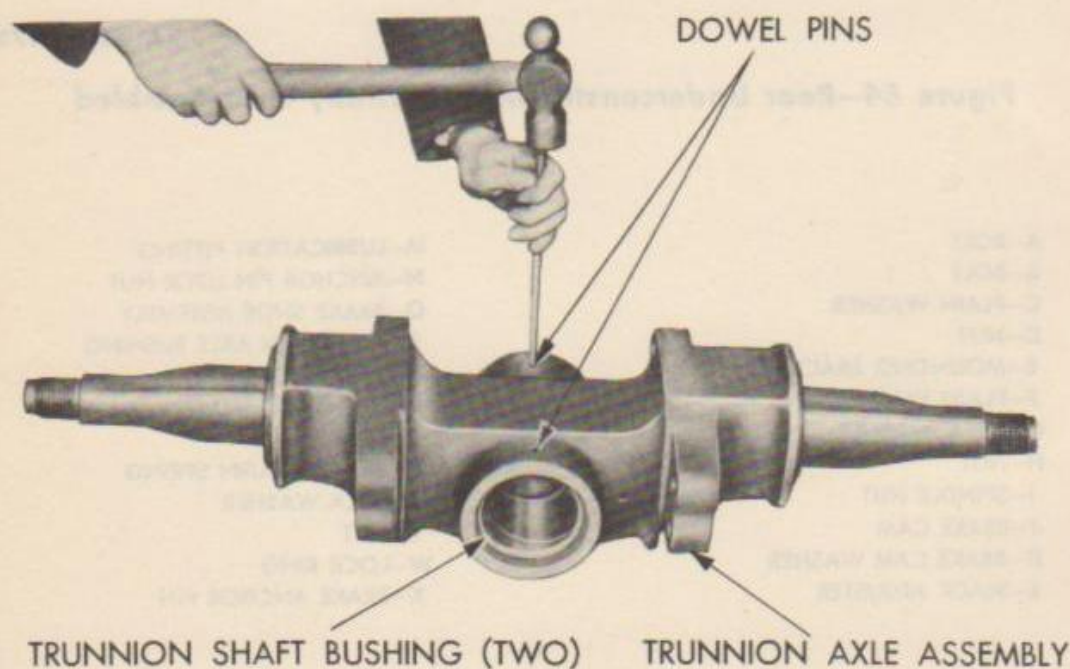
116. REPAIR.

a. *Rebushing Trunnion Axle* (fig. 65). Drive out the two 1/4-inch dowel pins with a drift. Press worn bushings out and press new bushings into place. Drill two 1/4-inch holes through the dowel pin holes and new bushings. Install dowel pins, and secure by placing several heavy punch-marks in the casting near the dowel pin holes. Ream bushings to correct internal diameter (par. 117 a).

b. *Trunnion Shaft Bracket*. The brackets may be welded if cracked or broken. Either electric arc or gas welding may be used, but arc welding is preferred. After welding, inspect the bore to be sure that weld metal has not come through and that no weld spatter is present. Ream to clean.

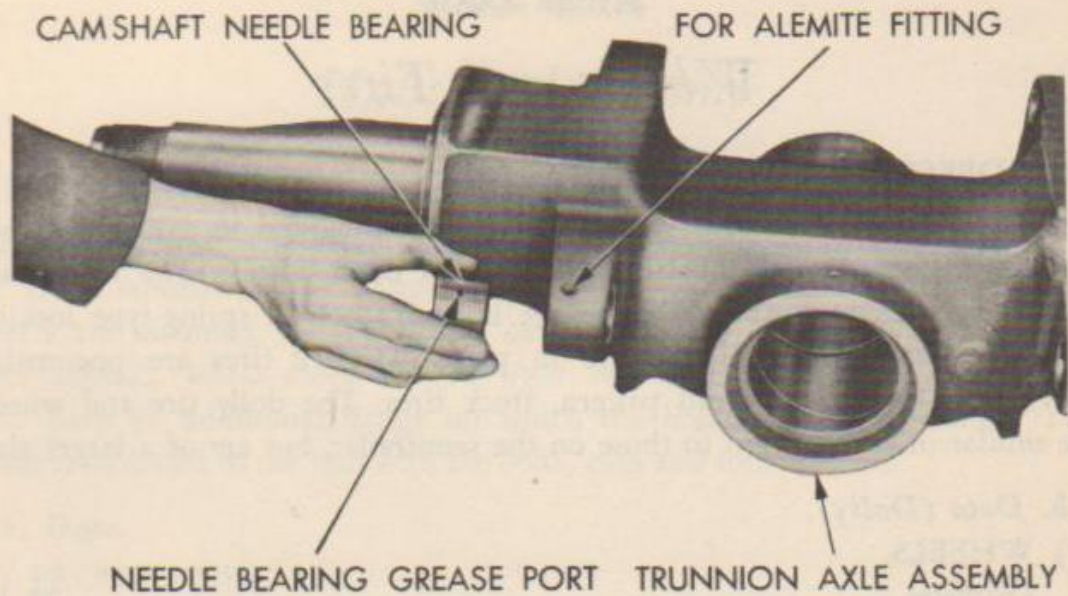
c. *Camshaft Needle Bearing* (fig. 66). Press the needle bearing out and insert new bearing. When pressing new bearing into place, be sure that needle bearing grease port is alined with grease fitting hole in the trunnion axle. Stack needle bearing in place.

d. *Trunnion Axle*. The axle body may be welded if cracked, by either electric arc or gas welding. Arc welding is preferred. Grind the crack out before repairing and fill ground cut with weld metal. After welding, check for bend (par. 115) and straighten if necessary. Straightening is done with a heavy I-beam, jacks and chains. The use of heat is necessary, but caution must be exercised. Heat must not proceed beyond a dull red, and heat must not become localized. After welding and straightening, examine the spindle



RA PD 341757 -

Figure 65—Removing Trunnion Shaft Bushing Dowel Pins



RA PD 341758

Figure 66—Installing Camshaft Needle Bearing

bearing surfaces for weld spatter and scale. Clean by machining the spindle bearing surface. Make sure lubrication hole and cavity inside trunnion shaft hole are not restricted by weld metal or spatter. Install new trunnion shaft bushings (par. 116 *a*), and new camshaft needle bearings (par. 116 *c*).

117. FITS AND TOLERANCES.

	Max. (in.)	Min. (in.)	Desired (in.)	Replace Beyond (in.)
<i>a. Trunnion Axle.</i>				
Bushing hole diameter.....	4.000	3.998	.....	.....
Camshaft bearing hole diameter..	1.250	1.248	.....	.....
Anchor pin hole diameter.....	0.877	0.875	.....	.....
Outer spindle bearing diameter..	1.8748	1.8743	.....	1.8735
Inner spindle bearing diameter..	2.8745	2.8735	.....	2.8715
Bushing outside diameter.....	4.010	4.005	.....	.....
Bushing ream diameter.....	3.503	3.500	.....	3.625
Spindle threads			1½-12 SAE	
<i>b. Trunnion Shaft.</i>				
Center diameter	3.497	3.495	.....	3.485
<i>c. Trunnion Bracket.</i>				
Shaft hole diameter	3.000	2.990	.....	3.050

Section XXXII

Wheels and Tires

118. DESCRIPTION AND DATA.

a. Description. Each dual wheel assembly is mounted to a hub. The six dual wheels are divided into six inner and six outer wheels. The wheels are completely interchangeable although the hubs are not. A spring-type locking ring is provided to hold the tire in place. The 12 tires are pneumatic, heavy-duty, commercial tread pattern, truck tires. The dolly tire and wheels are similar in construction to those on the semitrailer, but are of a larger size.

b. Data (Dolly).

(1) WHEELS.

Diameter	20 in.
Width	10 in.
Manufacturer	Budd

(2) TIRES.

Number per vehicle	4
Size	9.00 x 20-10-ply
Inflation	65 lb

c. Data (Semitrailer).

(1) WHEELS.

Diameter	15 in.
Width	7 in.
Manufacturer	Budd

(2) TIRES.

Number per vehicle	12
Size	8.25 x 15 in.
Inflation	85 lb
Ply	14

119. WHEEL.

a. Inspection. Lay the outside of the wheel without a tire on a flat floor. If it can be rocked, the wheel is not true and must be rebuilt. It must also be rebuilt if, on checking several diameters, it is found to be out-of-round.

b. Repair. If the wheel is bent or out-of-round, it may be straightened by using jacks, chains and a heavy I-beam. If the rim has become detached at any point from the mounting ring, it may be joined by riveting.

120. TIRE REPAIR.

a. Casing. Refer to TM 9-1868 for instructions and information on repair of synthetic tire casings.

Section XXXIII

Hubs and Drums

121. DESCRIPTION AND DATA.

a. Description. The front hubs are single flanged, since they carry only the front wheels. In the flange are mounted six studs on which the dual wheels are mounted. NOTE: *Studs on the left side of the trailer bear left-hand threads, while those on the right bear right-hand threads.* The rear hubs have an additional flange on which the brake drum is mounted. The drum is mounted to the hub with six bolts, nuts and lock washers.

b. Data.

(1) FRONT HUBS.

Outer cup bore	5.593 in.
Inner cup bore	5.116 in.

(2) REAR HUBS.

Outer cup bore	3.9823 in.
Inner cup bore	5.593 in.

(3) DRUMS.

Outside diameter	13 ³ / ₄ in.
Inside diameter	12 ¹ / ₂ in.
Diameter at hub	9 in.
Width of braking surface	4 ¹ / ₄ in.
Total width	5 ¹ / ₂ in.

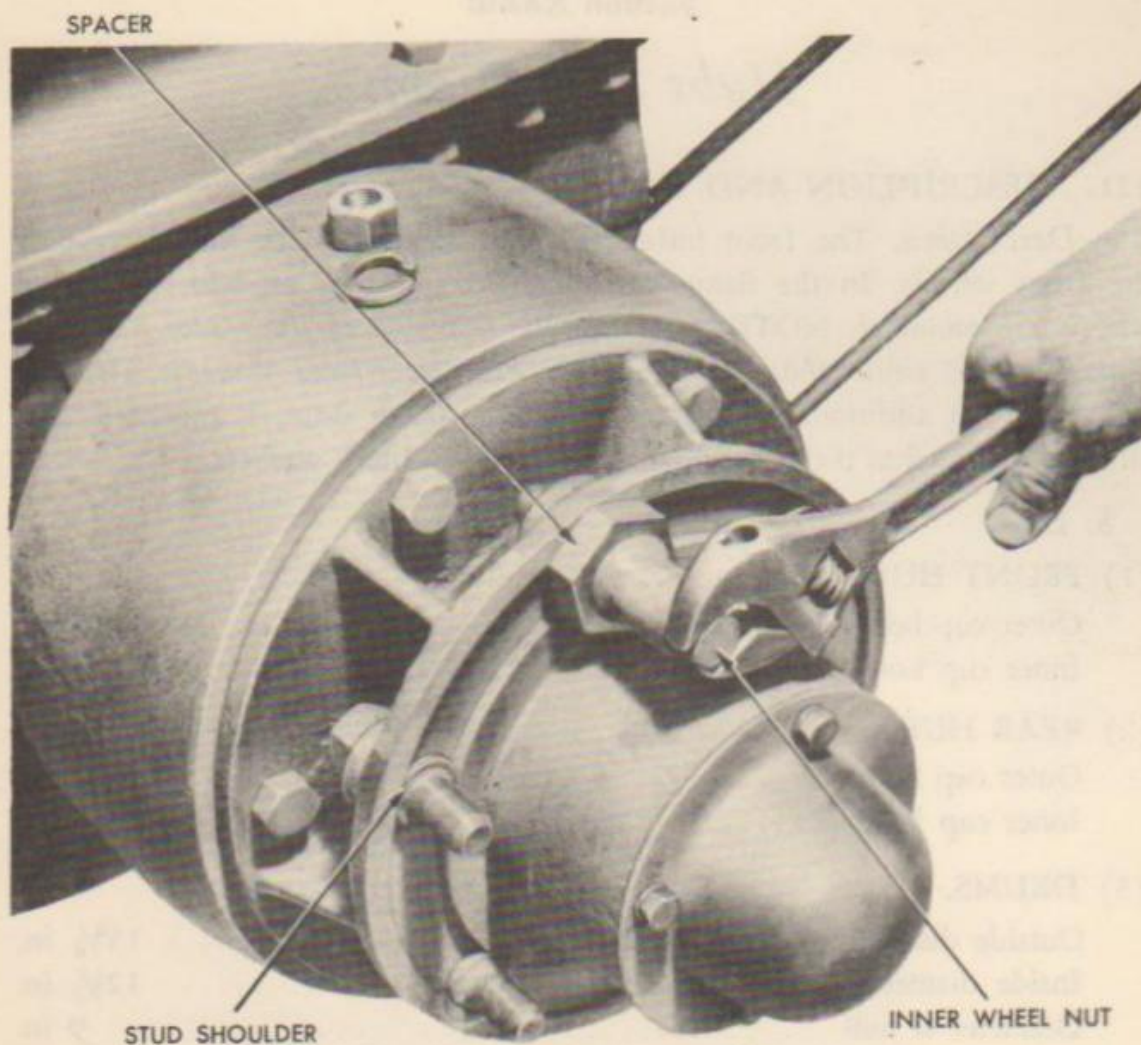
122. HUB ASSEMBLY.

a. Description. The hubs are one-piece iron castings. The hub caps are steel stampings, retained by four cap screws and lock washers to the hub.

b. Wheel Stud Replacement.

(1) REMOVAL (fig. 66). Remove nut and lock washer from stud. Place a spacer over the stud on the wheel side, making sure that the inside diameter of the spacer is sufficient to permit the shoulder of the stud to pass through. Install inner wheel nut and tighten until stud is drawn out of hub.

(2) INSTALLATION. NOTE: *Studs for the left hubs are marked "L," and those for the right hubs are marked "R." Be sure that the studs of the proper type are used.* Place stud in position in stud hole, making sure that shoulder on the stud will meet the groove in the hub when it is driven into place. Drive stud into hole with a copper hammer. Install lock washer and nut. Tighten studs.



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Figure 67—Removing Wheel Studs

c. Hub Repair. If hubs have been cracked, they may be repaired by electric arc or gas welding. Electric arc welding is preferable. Remove cups (par. 73 *d*) and grind out crack. If it goes into the interior, lay a strip of copper against the rear side to hold the weld metal while welding. Fill the ground cavity with weld metal. Ream both cup bores to remove any spatter or scale. Pull copper backing away from weld. Install new cups.

123. DRUMS.

a. Description. The drum should be replaced if cracked. Drum can be refaced, if inside diameter will remain less than 12.525 inches, when scoring is the only damage.

b. Repair. Inspect the braking surface for deep scoring. Measure several diameters across the braking surface. If drum is out-of-round, straighten by using force. Heat may be employed, but usually will not be necessary. If the

diameter, measured to check the straightening, is less than 12.515 inches, the drum may be refaced. Place it in a lathe and take a 0.010-inch cut across the braking surface. If drum is worn beyond 12.525 inches inside diameter, it must be replaced.

124. FITS AND TOLERANCES.

	Max. (in.)	Min. (in.)	Replace Beyond (in.)
<i>a. Front Hub.</i>			
Outer bearing cup bore	5.1171	5.1151	5.119
Inner bearing cup bore	5.594	5.592	5.598
<i>b. Rear Hub.</i>			
Outer bearing cup bore	5.594	5.592	5.598
Inner bearing cup bore	3.9833	3.9813	3.986
<i>c. Drum.</i>			
Braking surface diameter	12.510	12.490	12.525
Diameter at hub	9.001	8.998	9.006

Section XXXIV

Dolly Frame

125. DESCRIPTION AND DATA.

a. Description. The dolly frame is a one-piece welded structure. Four spring hanger brackets and two drawbar hinge brackets are riveted to the dolly. The dolly frame carries a kingpin lock which is locked when the semitrailer is attached.

b. Data.

Width	36 in.
Length	54 in.
Height	42 in.
Distance between drawbar hinge centers	23 ³ / ₈ in.

126. DRAWBAR.

a. Description (fig. 68). The drawbar is of pressed steel construction. One lunette and two hinge brackets are riveted to the structure. The drawbar is coupled to the towing vehicle when the full trailer is in use. A locking device is welded to the drawbar rear member, between the hinge brackets. The drawbar is 57 inches long from the center of the lunette eye to the hinge line. The hinge bracket centers are 23³/₈ inches apart.

RA PD 341744

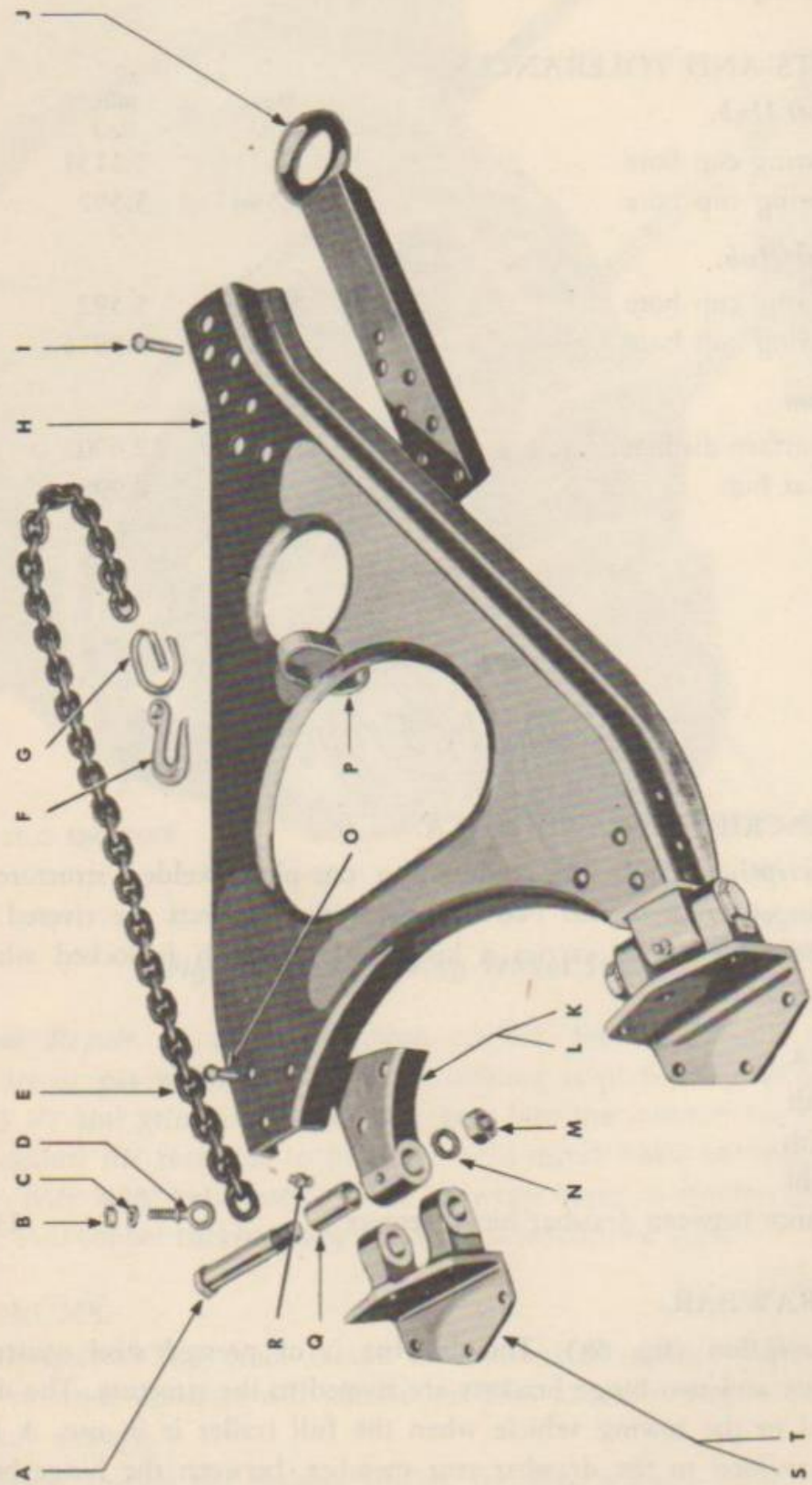


Figure 68—Drawbar Assembly—Disassembled

Dolly Frame

RA PD 341744B

- A—DRAW BAR BOLT
- B—NUT
- C—LOCK
- D—BOLT
- E—SAFETY CHAIN
- F—SAFETY CHAIN HOOK
- G—COLD SHUT
- H—DRAW BAR PLATE
- I—RIVET
- J—DRAW BAR EYE
- K—HINGE (Left Hand Illustrated)
- L—HINGE (Right Hand)
- M—NUT
- N—LOCK WASHER
- O—RIVET
- P—SAFETY CHAIN GUIDE
- Q—HINGE BUSHING
- R—LUBRICATION FITTING
- S—HINGE BRACKET (Left Hand Illustrated)
- T—HINGE BRACKET

Legend for Figure 68

b. Lunette Replacement.

(1) REMOVING RIVETS. Cut inner and outer heads of rivets with cutting torch equipped with a No. 2 tip. Blow rivets out with flame, thus cleaning the hole. Remove slag with a $\frac{3}{8}$ -inch, long-tapered punch and hammer. Tap the lunette off the drawbar with a hammer.

(2) BOLTING AND REAMING. Bolt the new lunette eye into position with three $\frac{5}{8}$ -inch bolts and nuts. Draw the lunette tight to the drawbar with the bolts. Ream the four remaining holes with a $2\frac{1}{32}$ -inch tapered reamer.

(3) RIVETING. Drive four rivets without removing the bolts. Rivets must be driven hot, as proper heading may only be accomplished with an air-riveting hammer and bucking bars. Length of the rivet is determined by the condition, or oversize, of the hole. Ordinarily, $1\frac{1}{4}$ inches of stock, projecting past the surface on which the driven head will rest, is sufficient for proper heading. If a collar forms on the first rivet, the remaining rivets must be shortened by $\frac{1}{8}$ inch. If the first driven head is not full and down, $\frac{1}{8}$ inch is added to the remaining rivets. Before making changes in the length of rivets, inspect the driven head to be sure that rivet is properly bucked. Be sure that head is snug all around. Remove bolts and finish riveting.

c. Hinge Bracket Replacement. Replacement of the drawbar hinges is accomplished in the same manner as the lunette replacement (par. 126 *b*). Since the hinge bracket rivets are $\frac{7}{16}$ -inch diameter, smaller than those used on the lunette, ream only to $1\frac{5}{32}$ inch and use $\frac{7}{16}$ -inch bolts as retainers. It is recommended that the hinge brackets be riveted only after the drawbar hinge brackets are bolted to the drawbar, and inserted in the dolly hinge brackets. The clearance between the hinge brackets on the drawbar and dolly is so small that assembly may be impossible if riveting is not done with the hinge pins holding the brackets in position. Not as much stock will, projecting past the surface on which the driven head will rest, ordinarily suffice for $\frac{7}{16}$ -inch rivets.

d. Repair. If bent, the drawbar may be straightened by the use of force. The use of heat is recommended, but do not heat beyond a dull red. When straightening, pay careful attention to the distance between the hinges. Both the lunette and the dolly lock must center between the hinges. If breakage occurs, welded repairs are permissible. Electric arc welding is recommended, although gas may be used.

127. SPRING HANGERS AND DRAWBAR HINGES.

a. Description. The four spring hangers hold the front underconstruction to the dolly frame. They are riveted to the dolly. The spring hangers are cast iron. The two drawbar hinges support the drawbar, permitting lunette to move up or down, but not sideways. They are forged steel. The hinges are riveted to the dolly frame.

Dolly Frame

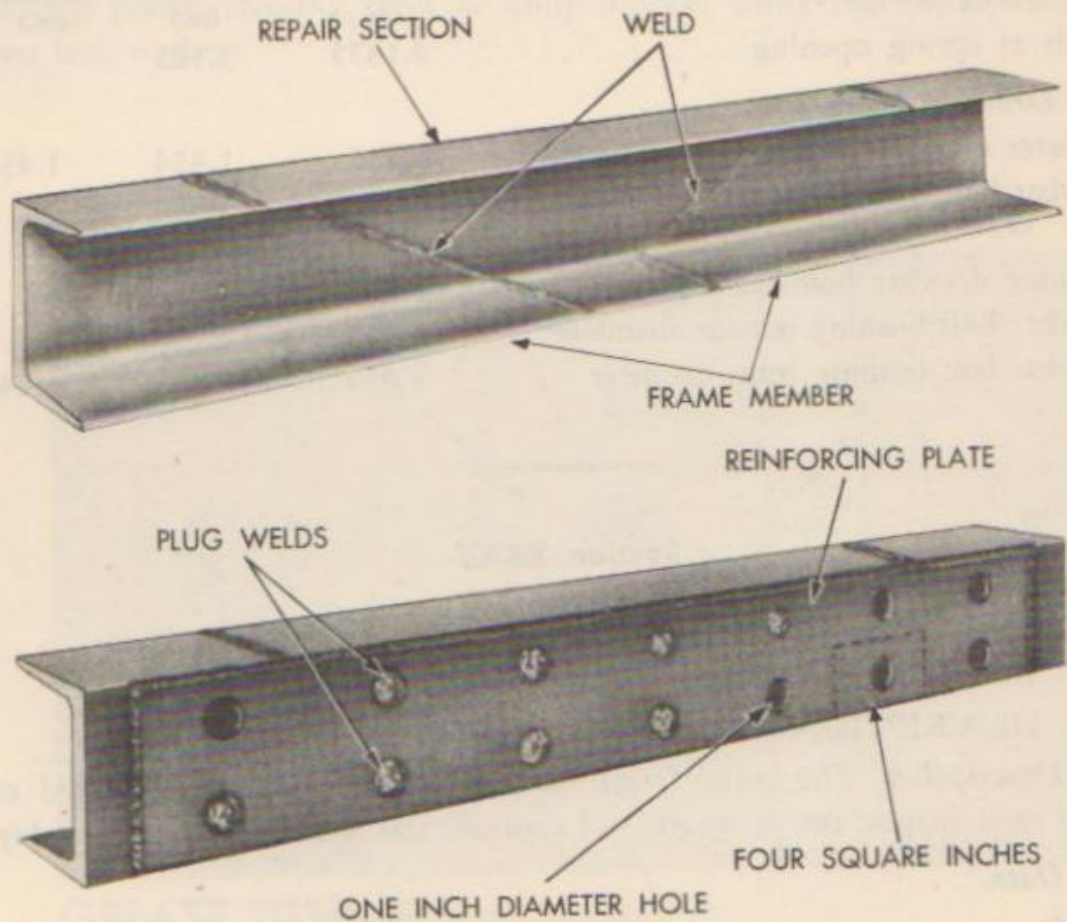
b. Removal. Removal of rivets and riveted parts is outlined in paragraph 126 *b* (1). The procedure for removing the spring hangers and the drawbar hinges is similar to this procedure.

c. Repair. The drawbar hinges may be straightened by the use of force and heat. If a spring hanger has become damaged, it must be replaced.

d. Installation. Installation of riveted assemblies is outlined in paragraph 126 *b* (2) and (3). When riveting the spring hangers into place, drive the vertical rivets first. These are $\frac{1}{2}$ -inch rivets. The holes should be reamed to $\frac{17}{32}$ inch. Allow $1\frac{1}{8}$ inches of rivet stock beyond the surface for heading. The drawbar hinges are retained by $\frac{7}{16}$ -inch rivets. Refer to paragraph 126 *c* for instructions regarding $\frac{7}{16}$ -inch riveting.

128. FRAME.

a. Description. The frame is constructed of channels, I-sections, angle sections and plates. The subsections are welded together to form the assembly.



RA PD 341760

Figure 69—Typical Spliced Frame Member

b. Member Repair.

(1) Frame members may be straightened by use of a heavy I-beam, jacks and chains. Use of heat is recommended. Do not heat beyond a dull red and do not localize heating. Severely bent or twisted members should be cut out and replaced.

(2) Replacement of frame members is accomplished by cutting across each end of the damaged section at an angle of about 30 degrees to the longest dimension and inserting a splice section cut at the same angle (fig. 69). Weld in splice section. Cutting at an angle permits welding to be distributed over a greater area. Make a reinforcement plate that will extend about six inches beyond the welded joints of the channel. With a cutting torch, put a 1-inch diameter hole in every four square inches of space on the reinforcement plate. Tack weld plate to back side of channel. Plug weld through the holes to the repaired member. Weld all-around reinforcement. Use of preheating and postheating to a dull red is recommended when welding on reinforcement plate or channel repair section.

129. FITS AND TOLERANCES.

	Max. (in.)	Min. (in.)	Replace Beyond (in.)
<i>a. Spring Hangers.</i>			
Width at spring opening.....	3.1875	3.125	....
<i>d. Drawbar Hinges.</i>			
Diameter of drawbar bolt.....	1.436	1.434	1.430
Drawbar bolt thread size.....		1-14 NF-3	
Diameter drawbar bolt bushing hole.....	1.750	1.748	....
Drawbar bolt bushing outside diameter.....	1.753	1.750	....
Drawbar bolt bushing ream diameter.....	1.434	1.433	1.440

Section XXXV

Main Frame

130. DESCRIPTION AND DATA.

a. Description. The main frame or semitrailer frame is constructed of rolled steel shapes, cut to length and contour, and welded into an assembly.

b. Data.

Length	26 ft 7 in.
Length of cargo deck frame.....	18 ft
Width of cargo deck frame.....	8 ft 6 in.
Length of gooseneck	8 ft 8 in.

Main Frame

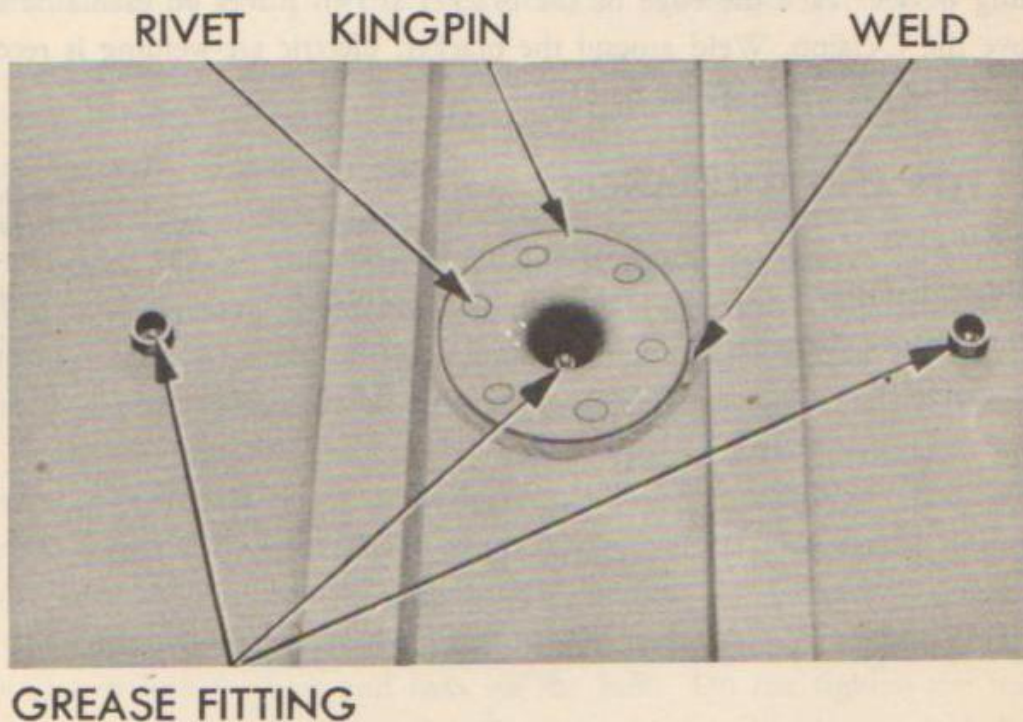
131. KINGPIN.

a. Description. The kingpin is a standard-size pin, which is welded into the main frame at the bottom of the tool box (fig. 70).

b. Removal. Remove all tools and equipment from tool compartment. With an acetylene torch cut all welds around flange of kingpin, using care not to cut into the apron plate. CAUTION: *Set the hand parking brake and place chock blocks under the front and rear side of dolly tires.* Remove the four cap screws and lock washer securing kingpin locking plates to underside of kingpin. Drive the kingpin up, using a sledge hammer, and remove kingpin.

c. Repair. After the kingpin has been removed, clean the welded area on top of apron plate with a portable grinder. Do not grind into the apron plate. If kingpin is damaged it must be replaced. Do not attempt to build up the worn surface with welding and remachining.

d. Installation. Insert kingpin through apron plate on semitrailer and dolly. Make certain the kingpin flange is contacting the apron plate and that no foreign matter is under surface. Weld the kingpin in position, making a $\frac{1}{4}$ x $\frac{1}{4}$ -inch continuous weld around the flange. Install the two locking plates, securing them to dolly member using two cap screws and two lock washers.



RA PD 341759

Figure 70—Kingpin—Installed

132. FRAME MEMBERS.

a. Repair. The members of the main frame are repaired in the same manner as those on the dolly frame (par. 128 *b*). Due to the fact that the members are heavier, stronger forcing equipment will be necessary. **CAUTION:** *Before making any repair requiring heat, remove the surrounding flooring to avoid charring.*

b. Member Replacement. Frame members are not usually replaced. They are generally repaired as in paragraph 132 *a*.

133. BULL RINGS.

a. Description. The bull rings act as attaching points for the load binder lashing chains. They are mounted on the side rails of the main frame. Ring brackets are welded onto the frame. The rings are four inches wide and made of 3/4-inch diameter steel rod, bent to shape.

b. Removal. With an acetylene torch, grind out the weld at bracket edges and tap the bull ring and bracket free. After the bracket and ring have been removed, clean the weld area with the grinder, but do not grind into the structural member.

c. Installation. Lay the ring in the bracket as it is to be installed. Place the assembly into position on the trailer and fasten with a C-clamp or other holding device. Tack the edge of the bracket at two places on each side and remove the C-clamp. Weld around the bracket. Electric arc-welding is recommended, but gas welding may be used.

134. FITS AND TOLERANCES.

<i>a. Kingpin.</i>	Max. (in.)	Min. (in.)	Replace Beyond (in.)
Shoulder diameter	2.9219	.....	2.7813
Locking groove diameter	2.0	.....	1.8750
Rivet diameter	0.5	.....	.....

Section XXXVI

*Jumper Cable, Coupling Socket, and
Blackout Switch*

135. JUMPER CABLE.

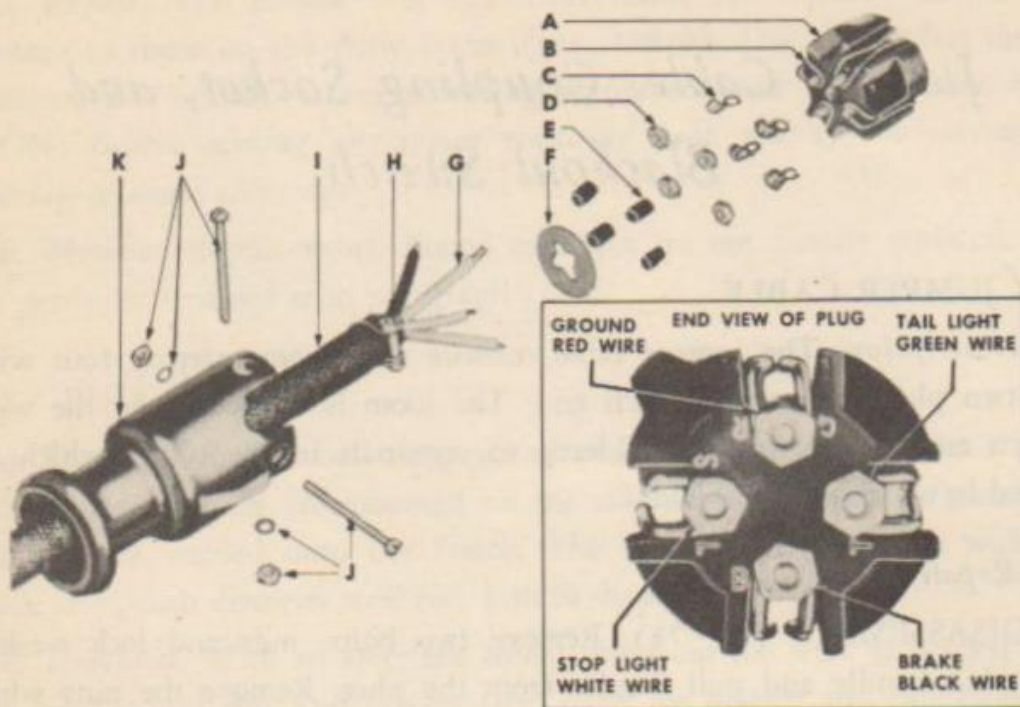
a. Description. The jumper cable consists of a loom carrying four wires with two plugs mounted at each end. The loom is clamped over the wires at each end. The wires are soldered to terminals in the plugs, which are covered by an insulating shield.

b. Repair.

(1) DISASSEMBLY (fig. 71). Remove two bolts, nuts and lock washers from plug handle and pull handle from the plug. Remove the nuts which hold the terminals to the plug. Unsolder the wires from the four terminals. Pull the insulating sleeve and insulating washer from the four wires.

(2) INSPECTION. With a test lamp, check each wire to make sure it is not grounded or broken. If cable is defective, replace it. Examine the plug, shield, and other insulating parts for breakage. If damaged, replace.

(3) ASSEMBLY. Cut cable to length. Slide the cable through a plug handle. Remove $1\frac{1}{2}$ inches of the outer cover of cable, exposing the individually insulated wires. Remove $\frac{3}{16}$ inch of insulation from each of the four wires. Install cable clamp as close to the end of the cable outer cover as possible. Slip all the wires through the insulating sleeves on the wires. Solder the wires to the terminals, and slide the insulating sleeves down over the soldered ends of the terminals. Place terminal on bolts in plug end. The plug is marked at each terminal bolt for proper assembly. Refer to figure 51 for wire color code. Install nuts over terminals and tighten. Bend the terminals up at a 90-degree angle after installing. This permits the plug handle to slide down over the plug. Slide plug handle over plug, being sure the key on the plug handle matches the key on the plug end. Install two bolts through the plug handle and the lug on the plug end. Install two lock washers and nuts on the bolts. Do not tighten the nuts to such an extent as to cause the handle or the plug to become cracked. Repeat this procedure at the opposite end. The cable is installed as needed. See paragraph 12 *b* (3).



- | | |
|----------------------|---------------|
| A—PLUG END | G—WIRES |
| B—TERMINAL CLIP | H—CABLE CLAMP |
| C—TERMINALS | I—CABLE COVER |
| D—NUTS | J—BOLT |
| E—INSULATING SLEEVES | K—PLUG HANDLE |
| F—INSULATING WASHER | |

RA PD 340980

Figure 71—Jumper Cable—Assembly Sequence

136. COUPLING SOCKET.

a. Description. The coupling socket consists of a set of blades which insert into the receptacles of the jumper cable plug. The blades are mounted in a covered case with terminal bolts and nuts, all insulated from the case by an insulating plate and an insulating insert.

b. Disassembly (fig. 72). Remove nut and lock washer, securing wiring harness ground and coupling socket assembly cover cap, and remove the ground terminal and the assembly cap. Remove the double nuts which secure the four terminal stud caps, and remove the terminal caps and wiring terminals from the terminal studs of the jumper cable coupling socket. Remove the retaining nuts at the base of each of the four terminal studs of the coupling socket assembly. Remove the retaining nuts at the base of the

Jumper Cable, Coupling Socket, and Blackout Switch

main assembly center bolt. Remove the lock washers from terminal studs and assembly center bolt. Complete the disassembly of the main unit of the coupling socket by pulling out the center assembly bolt and removing the insulating sleeve and contact blades from the case of the coupling socket.

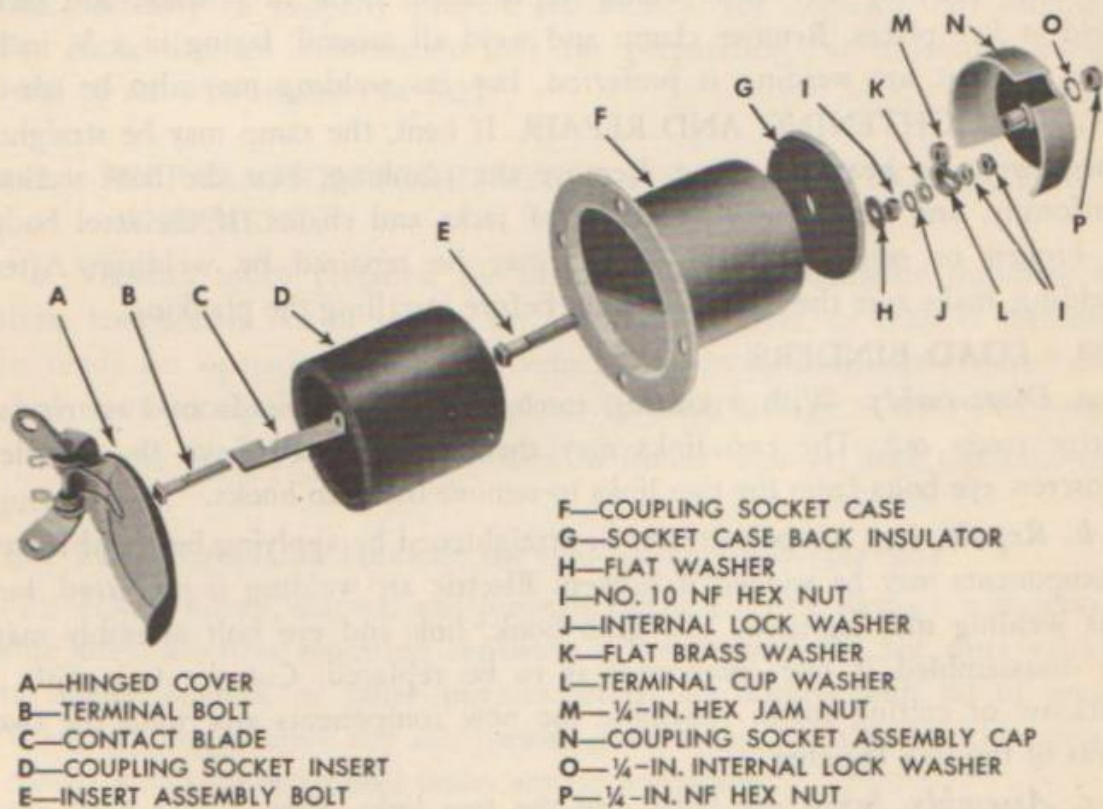
c. Inspection and Repair. Examine all threads for damage. Check blades for corrosion. Clean or replace if necessary.

d. Assembly. Reassemble the jumper cable coupling socket by reversing the procedure followed in disassembling.

137. BLACKOUT SWITCH.

a. Description. The blackout switch consists primarily of a switch case containing a terminal block supporting six terminal connectors and terminal connector screws. Each terminal is identified (fig. 51) so that lighting wires can be readily connected to the proper switch terminal. The face and control key of the switch is protected from dirt and exposure to rain and water by a circular cover attached by a swivel pin to the upper rim of the switch face.

b. Disassembly. Complete disassembly of the switch is not practical. A defective switch must be replaced.



RA PD 335768

Figure 72—Coupling Socket Assembly—Disassembled

Section XXXVII

On-vehicle Equipment

138. RAMPS.

a. Description. The ramps are each 12 feet long and $11\frac{5}{8}$ inches wide. Each ramp consists of a welded steel body and two oak planks cut to fit into the body. The planks are retained by $\frac{1}{2}$ -inch diameter carriage bolts installed vertically and 12-inch bolts installed laterally. Two hook bars are welded to the steel body for attaching the ramp in the proper position on the trailer side rail.

b. Repair.

(1) PLANKING REPLACEMENT. Remove nuts, lock washers and vertical carriage bolts. Remove nuts, lock washers and lateral bolts, and lift out planks. Cut new planking to fit. Clamp into position in the ramp. Invert the ramp and drill $\frac{1}{2}$ -inch holes for carriage bolts through the bolt holes already in the steel body. Similarly, from the side of the ramp, drill the planking for the lateral bolts. Install bolts, nuts and lock washers. Remove clamps.

(2) HOOK BAR REPLACEMENT. Remove planking. Remove the hook bar by grinding out the weld around the bar. CAUTION: *Do not grind into the steel body of the ramp.* Clamp replacement hook in position and tack weld at five places. Remove clamp and weld all around, laying in a $\frac{5}{8}$ -inch fillet. Electric arc welding is preferred, but gas welding may also be used.

(3) STRAIGHTENING AND REPAIR. If bent, the ramp may be straightened by using heat and force. Remove the planking, heat the bent section uniformly, and apply force by means of jacks and chains. If the steel body is broken or otherwise damaged, it may be repaired by welding. After welding, make sure the body is straight before installing the planking.

139. LOAD BINDERS.

a. Disassembly. With a cutting torch, remove the heads of two rivets. Drive rivets out. The two links may then be separated from the handle. Unscrew eye bolts from the two links to remove the grab hooks.

b. Repair. Any component may be straightened by applying heat and force. Components may be welded if broken. Electric arc welding is preferred, but gas welding may be used. The grab hook, link and eye bolt assembly may be disassembled if one component is to be replaced. Cut the link with a hacksaw or cutting torch. Assemble the new components and weld the two ends of the link together.

c. Assembly. Screw eye bolts into the two links. Peen a cold head onto rivet holding link in handle. Peen a cold head onto rivet holding the yoke link in place. Be sure the heads of both rivets are full and down. If a driven head is defective, remove the rivet and drive a new one.

Section XXXVIII

Special Tools and Equipment

140. PURPOSE.

- a.* No special tools or equipment are required or issued with this vehicle.

APPENDIX

Section XXXIX

Shipment and Limited Storage

141. GENERAL INSTRUCTIONS.

a. Preparation for domestic shipment of the vehicle is the same, with the exception of minor added precautions, as preparation for limited storage. Preparation for shipment by rail includes instructions for loading the vehicle, blocking necessary to secure the vehicle on freight cars, and other information necessary to properly prepare the vehicle for domestic rail shipment. For more detailed information and for preparation for indefinite storage, refer to AR 850-18 and FM 9-25.

142. PREPARATION FOR LIMITED STORAGE OR DOMESTIC SHIPMENT.

a. Vehicles to be prepared for limited storage or domestic shipment are those temporarily out of service for less than 30 days, or vehicles that must be ready for operation on call. If vehicles are to be indefinitely stored after shipment by rail, they will be prepared for such storage at their destination.

b. If the vehicles are to be placed in limited storage, take the following precautions:

(1) LUBRICATION. Lubricate the vehicle completely (par. 28).

(2) TIRES. Clean, inspect, and properly inflate all tires. Replace with serviceable tires, all tires requiring repairing or retreading. Do not store vehicles on floors, cinders, or other surfaces which are soaked with oil or grease. Wash off immediately any oil, grease, gasoline, or kerosene which comes in contact with tires or air hose under any circumstances.

(3) ROAD TEST. The preparation for limited storage will include a road test after the lubrication service to check on the general condition of the vehicle. Correct defects noted in the vehicle operation before the vehicle is

stored or attach a tag in a conspicuous place, stating the repairs needed or describing the condition present. A written report of these items will then be made to the officer in charge.

(4) EXTERIOR OF VEHICLE. If practicable, remove rust appearing on the vehicle exterior with flint paper. Repaint painted surfaces whenever necessary to protect wood or metal. Coat exposed polished metal surfaces susceptible to rust, such as chains, with light rust-preventive compound.

(5) INSPECTION. Make a systematic inspection just before shipment or limited storage, to insure that all above steps have been covered, and that the vehicle is ready for operation on call. Make a list of all missing or damaged items and attach it in a conspicuous place. Refer to Before-operation Service (par. 31).

(6) BRAKES. Release brakes and chock wheels.

c. Inspection in Limited Storage. Vehicles in limited storage will be inspected weekly for tire failures, evidence of vandalism, tampering, etc.

143. LOADING AND BLOCKING FOR RAIL SHIPMENT.

a. Preparation. In addition to the preparation described in paragraph 142 when vehicles are prepared for domestic shipment, the following preparation and precautions must be taken:

(1) Place the vehicle in position with a railroad brake wheel clearance of at least 6 inches. Locate it on the car in such a manner as to prevent the car from carrying an unbalanced load.

(2) All cars containing ordnance vehicles must be placarded "DO NOT HUMP."

(3) Ordnance vehicles may be shipped on flat cars, end-door box cars, side-door cars, or drop-end gondola cars, whichever type car is the most convenient.

b. Facilities for Loading. Whenever possible, load and unload vehicles from open cars, using permanent end ramps and spanning platforms. Movement from one flat car to another along the length of the train is made possible by cross-over plates or spanning platforms. If no permanent end ramp is available, an improvised ramp can be made from railroad ties. Vehicles may be loaded in gondola cars without drop ends by using a crane.

c. Securing Vehicles. In securing or blocking a trailer, three motions, lengthwise, sidewise, and bouncing must be prevented. Two methods for blocking vehicle on freight cars (fig. 73) are given below. Turn dolly around so that drawbar is under trailer bed.

(1) METHOD 1 (fig. 73). Locate 12 blocks (C), one to the front and one to the rear of each wheel. NOTE: Place blocks against outside tire of dual wheels. Nail the heel of each block to the car floor with five 40-penny nails,

Shipment and Limited Storage

and toenail that portion of the block under the wheel to the floor with two 40-penny nails. Locate two cleats (D) against the outside face of each wheel. Nail the lower cleat (D) to the freight car floor with three 40-penny nails, and the top cleat to the cleat below with three 40-penny nails. Pass four strands, two wrappings of No. 8 gage, black, annealed wire (L) through the four outside wheels and through stake pockets on the freight car. Pass four strands, two wrappings of No. 8 gage, black, annealed wire (J) through bull rings at the rear of the trailer to each side of freight car through the nearest stake pockets. Pass four strands, two wrappings of No. 8 gage, black, annealed wire (K) through the forward side rings to stake pockets at each side of the freight car. Tighten all wires enough to remove slack. Block drawbar as shown in M, figure 73. Locate two blocks, one on each side of lunette, and nail each to car floor with three 30-penny nails. Locate third cleat crosswise over lunette, and nail to cleats and car floor with two 40-penny nails at each end.

(2) METHOD 2 (fig. 73). Place four blocks (F), one to the front and one to the rear of each wheel. These blocks are to be at least 8 inches wider than the over-all width of the vehicle at the car floor. Locate 16 cleats (E), two to the front and two to the rear of each outside dual wheel, against block (F). Nail lower cleat to the car floor with five 40-penny nails, then nail the top cleat (E) to the lower cleat with five 40-penny nails. Position four cleats (G) over blocks (F) against each outside wheel. Nail each end of cleat (G) to block (F) with three 40-penny nails. Pass four strands, two wrappings of No. 8 gage, black, annealed wire (L) through the four outside wheels and through stake pockets on the freight car. Pass four strands, two wrappings of No. 8 gage, black annealed wire (J) through bull rings at the rear of the trailer to each side of the freight car through the nearest stake pockets. Pass four strands, two wrappings, of No. 8 gage, black, annealed wire (K) through the forward side rings to stake pockets at each side of the freight car. Tighten all wires enough to remove slack. Block drawbar as shown in (N), figure 73. Pass a 1-inch piece of No. 14 B.W. gage, hot rolled steel through lunette and under two blocks alongside lunette. Nail each end of steel strap to car floor with two 30-penny nails. Nail the blocks to the car floor with four 30-penny nails.

d. Shipping Data.

Length (over-all)	30 ft 11½ in.
Width (over-all)	8 ft 6 in.
Height (over-all)	5 ft 10 in.
Weight	13,920 lb
Area of car floor occupied by vehicle (approx.)	263.5 sq ft
Volume occupied per vehicle (approx.)	1,554 cu ft

Section XL

References

144. PUBLICATIONS INDEXES.

The following publications indexes should be consulted frequently for latest changes to or revisions of the publications given in this list of references and for new publications relating to materiel covered in this manual:

Introduction to Ordnance Catalog (explains SNL system)	ASF Cat. ORD-1 IOC
Ordnance Publications for Supply Index (index to SNL's)	ASF Cat. ORD-2 OPSI
Ordnance Major Items and Combinations and Pertinent Publications (alphabetical listing of Ordnance major items with available publications pertaining thereto, including TM's, OFSTB's, WDTB's, FSMWO's, MWO's, and ASF catalogs)	SB 9-1
List of Publications for Training (lists MTP's, TR's, TC's, FM's, TM's, WDTB's, Firing Tables and Charts and Lubrication Orders)	FM 21-6
List of Miscellaneous Publications (lists MP's, MWO's, SB's, RR's, and War Department Pamphlets)	WD Pamphlet 12-6
List of Training Films, Film Strips and Film Bulletins (lists TF's, FS's, and FB's by serial number and subject)	FM 21-7
Military Training Aids (lists graphic training aids, models, devices and displays)	FM 21-8

145. STANDARD NOMENCLATURE LISTS.

a. Vehicular.

Trailer, 22-ton payload, low bed (Fruehauf model CPT-22)	SNL G-710
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b. Maintenance.

Cleaning, preserving and lubricating materials: recoil fluids, special oils, and miscellaneous items	SNL K-1
Lubricating equipment, accessories and related dispensers	SNL K-3

References

Soldering, brazing and welding material, gases and related items	SNL K-2
Tool sets, for Ordnance service command automotive shops	SNL N-30
Tool sets (common), specialists' and organizational ...	SNL G-27 (Section 2)
Tool sets (special), automotive and semi-automotive ..	SNL G-27 (Section 1)

146. EXPLANATORY PUBLICATIONS.

a. Fundamental Principles.

Basic maintenance manual	TM 37-250
Care and maintenance of ball and roller bearings	TM 37-265
Driver's manual	TM 21-305
Driver selection and training	TM 21-300
Electrical fundamentals	TM 1-455
Military motor vehicles	AR 850-15
Motor vehicle inspections and preventive maintenance service	TM 9-2810
Ordnance service in the field	FM 9-5
Precautions in handling gasoline	AR 850-20
Standard military motor vehicles	TM 9-2800

b. Maintenance and Repair.

Cleaning, preserving, lubricating and welding materials and similar items issued by the Ordnance Department	TM 9-850
Maintenance and care of pneumatic tires and rubber treads	TM 31-200
Ordnance maintenance: Power brake systems (Bendix-Westinghouse)	TM 9-1827A

c. Protection of Materiel.

Camouflage	FM 5-20
Chemical decontamination, materials and equipment ...	TM 3-220
Decontamination of armored force vehicles	FM 17-59
Defense against chemical attack	FM 21-40
Explosives and demolitions	FM 5-25

d. Storage and Shipment.

Ordnance company, depot	FM 9-25
Ordnance packing and shipping (posts, camps, and stations)	TM 9-2854
Ordnance storage and shipment chart, Group G—major items	SB 9-OSSC-G
Protection of ordnance materiel in open storage	SB 9-47
Registration of motor vehicles	AR 850-10
Rules governing the loading of mechanized and motorized army equipment, also major caliber guns, for the United States Army and Navy, on open top equipment published by Operations and Maintenance Department of Association of American Railroads.	
Storage of motor vehicle equipment	AR 850-18

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