# TM 9-881



# GENERATOR TRAILERS M7 AND M18; DIRECTOR TRAILERS M13, M14, AND M22; AND MOUNT TRAILER M17

## (Component of Multiple Cal. .50 Machine Gun Carriage, M51)



**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 23*b*, AR 380-5, 15 March 1944.)

*WAR DEPARTMENT* *22 DECEMBER 1944*

TM 9-881 GENERATOR TRAILERS M7 AND M18; DIRECTOR TRAILERS M13, M14, AND M22; AND MOUNT TRAILER M17

*WAR DEPARTMENT TECHNICAL MANUAL*

*TM 9-881*



*This manual supersedes TM 9-881, 5 September 1942 and Changes No. 1, 31 December 1943.*

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WAR DEPARTMENT

Washington 25, D. C., 22 December 1944

TM 9-881, Generator Trailers M7 and M18; Director Trailers M13, M14, and M22; and Mount Trailer M17 (Component of Multiple Cal. .50 Machine Gun Carriage, M51), is published for the information and guidance of all concerned.

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BY ORDER OF THE SECRETARY OF WAR:

G. C. MARSHALL,

*Chief of Staff.*

OFFICIAL:

J. A. ULIO,

*Major General,*

*The Adjutant General.*

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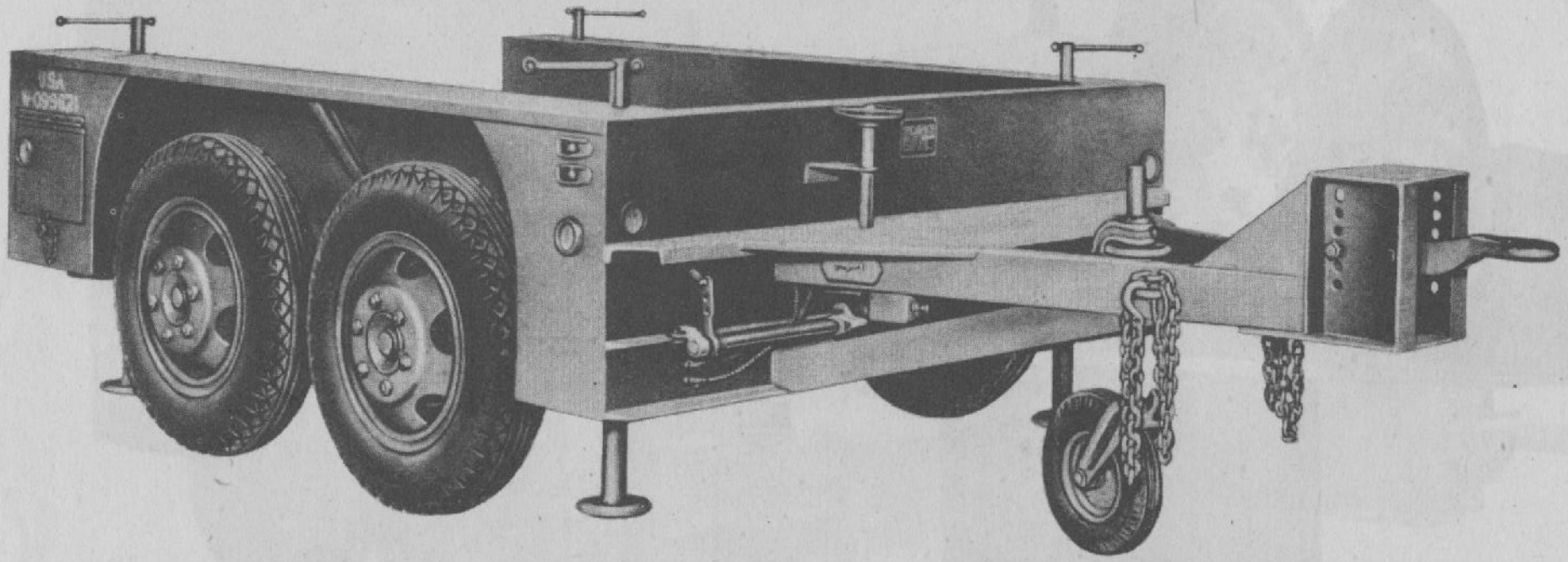

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***Figure 1—Generator Trailer M7 (Fruehauf Trailer Co.)***

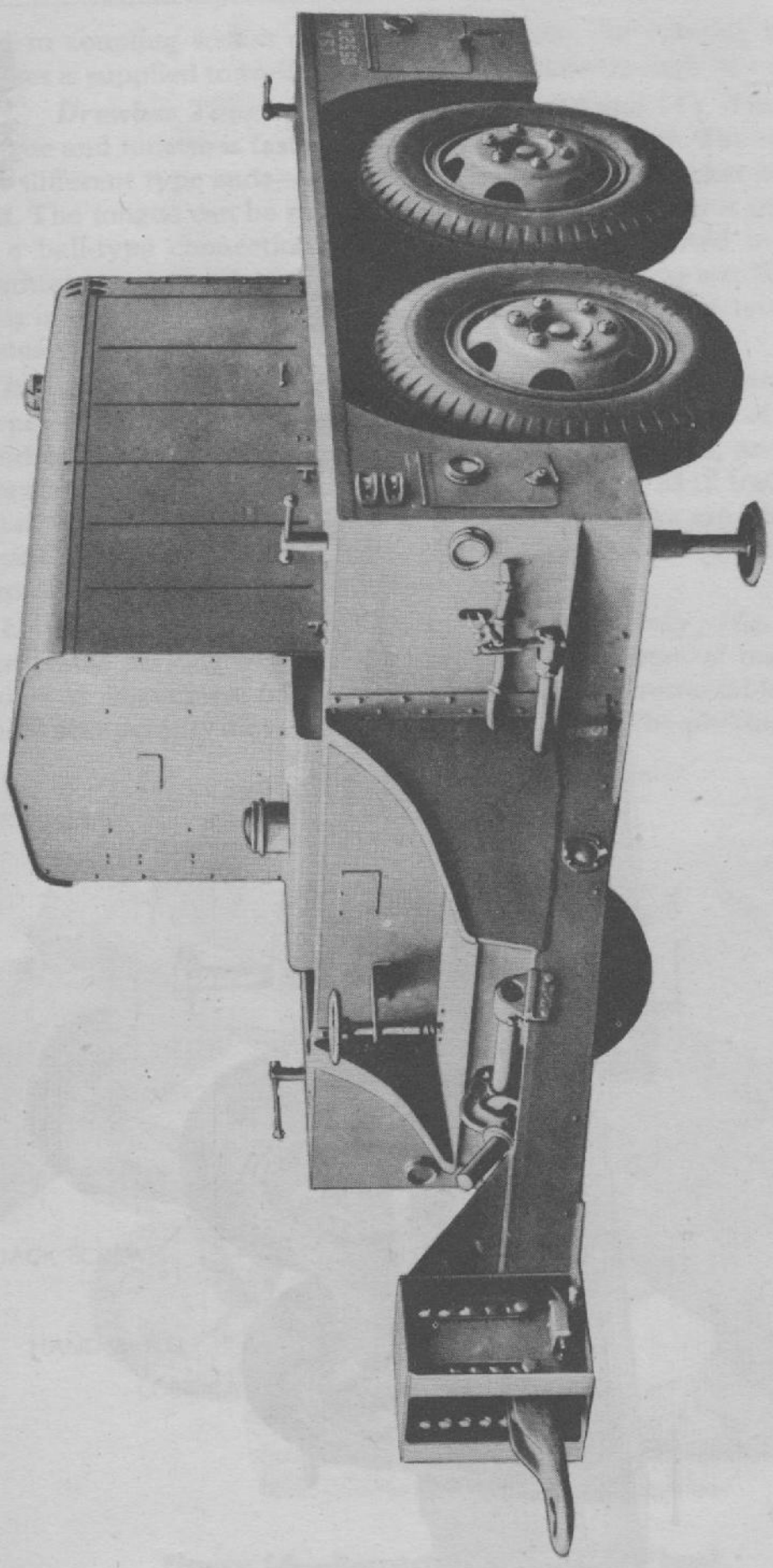

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*Figure 2—Generator Trailer M7 with Generator (J. G. Brill Co.)*

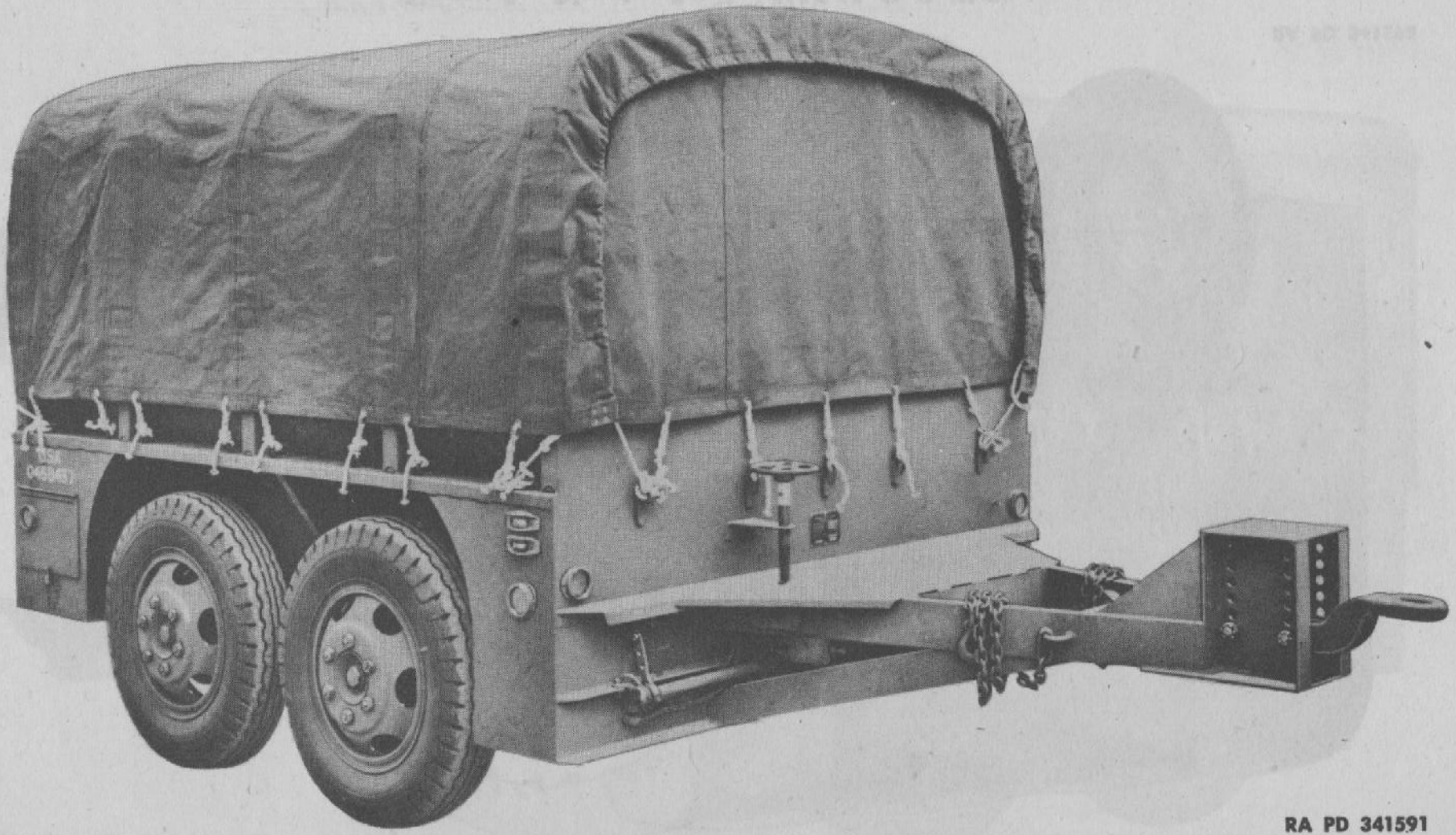

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*Figure 3—Director Trailer M13 (Fruehauf Trailer Co.)*

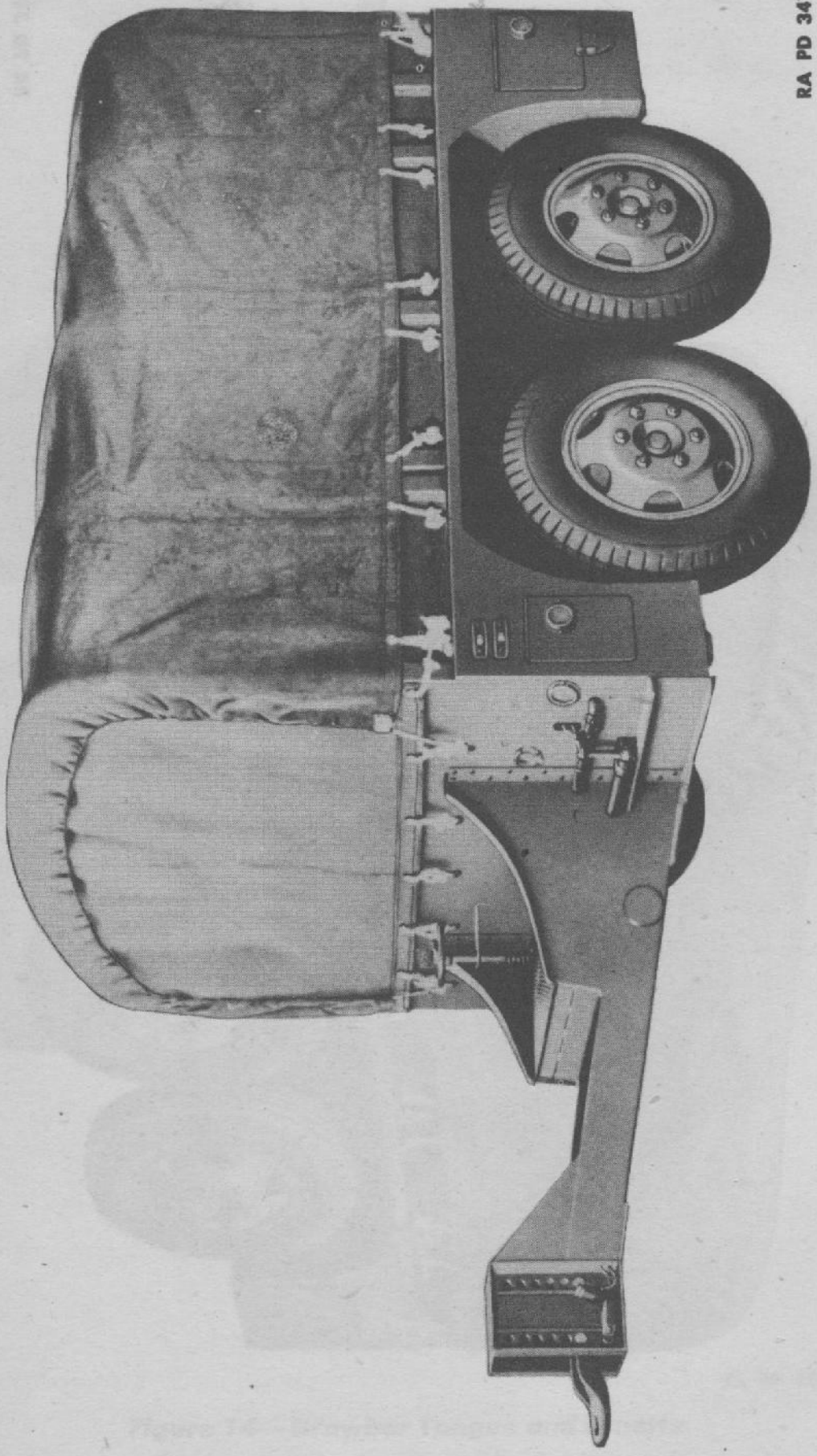

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Figure 4—Director Trailer M13 (J. G. Brill Co.)

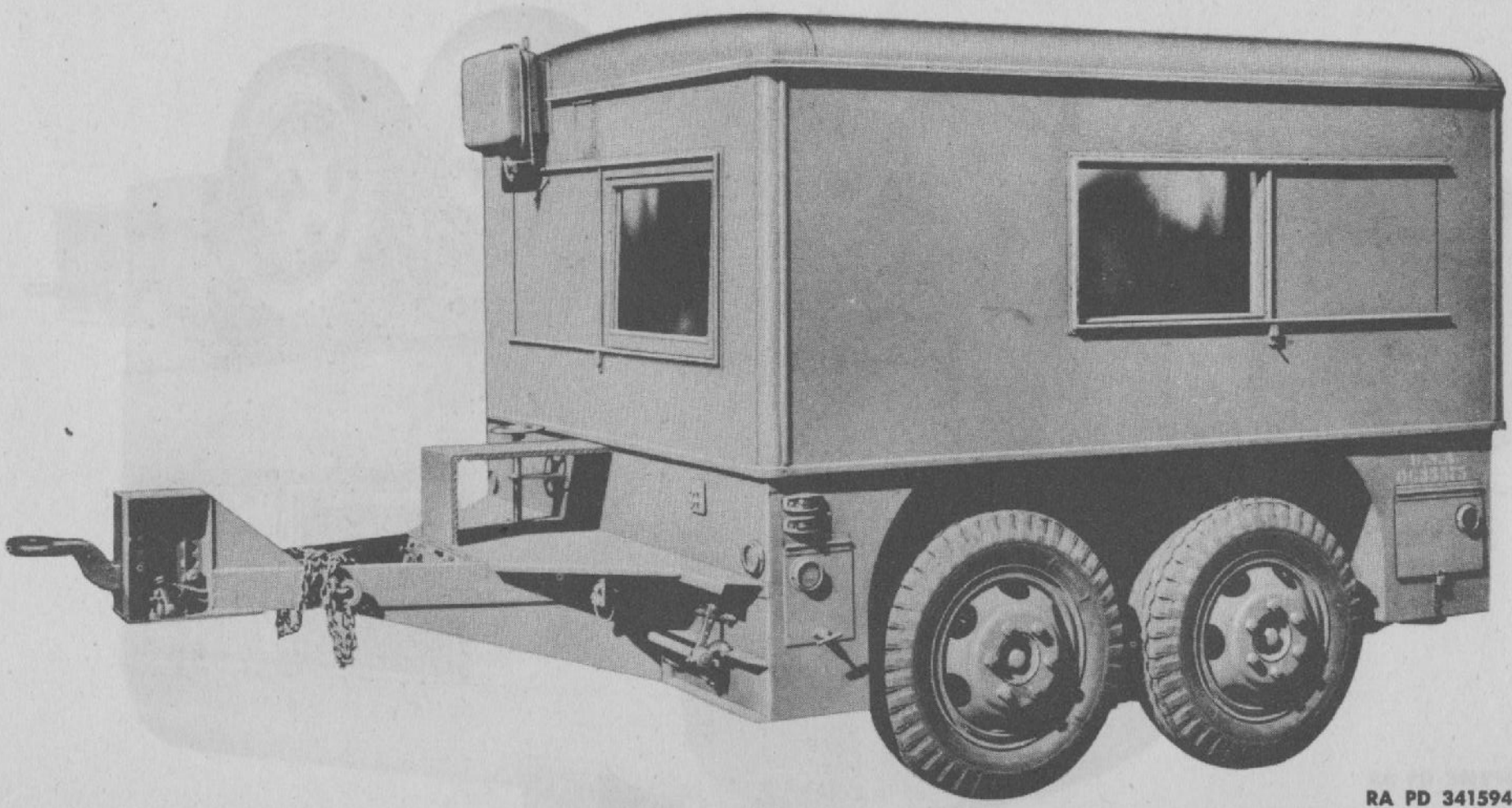

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*Figure 5—Director Trailer M14 (Fruehauf Trailer Co.)*

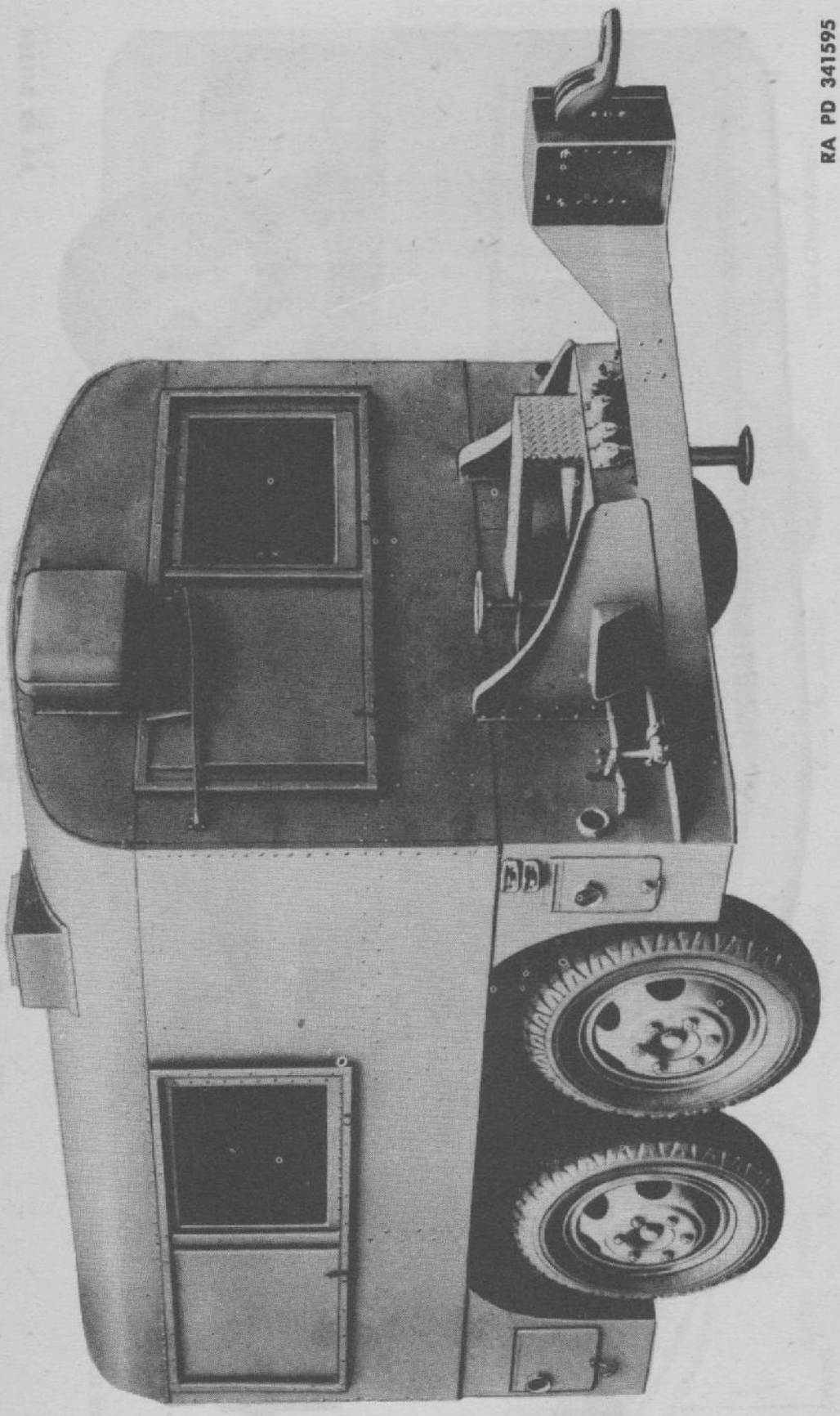

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*Figure 6—Director Trailer M14 (J. G. Brill Co.)*

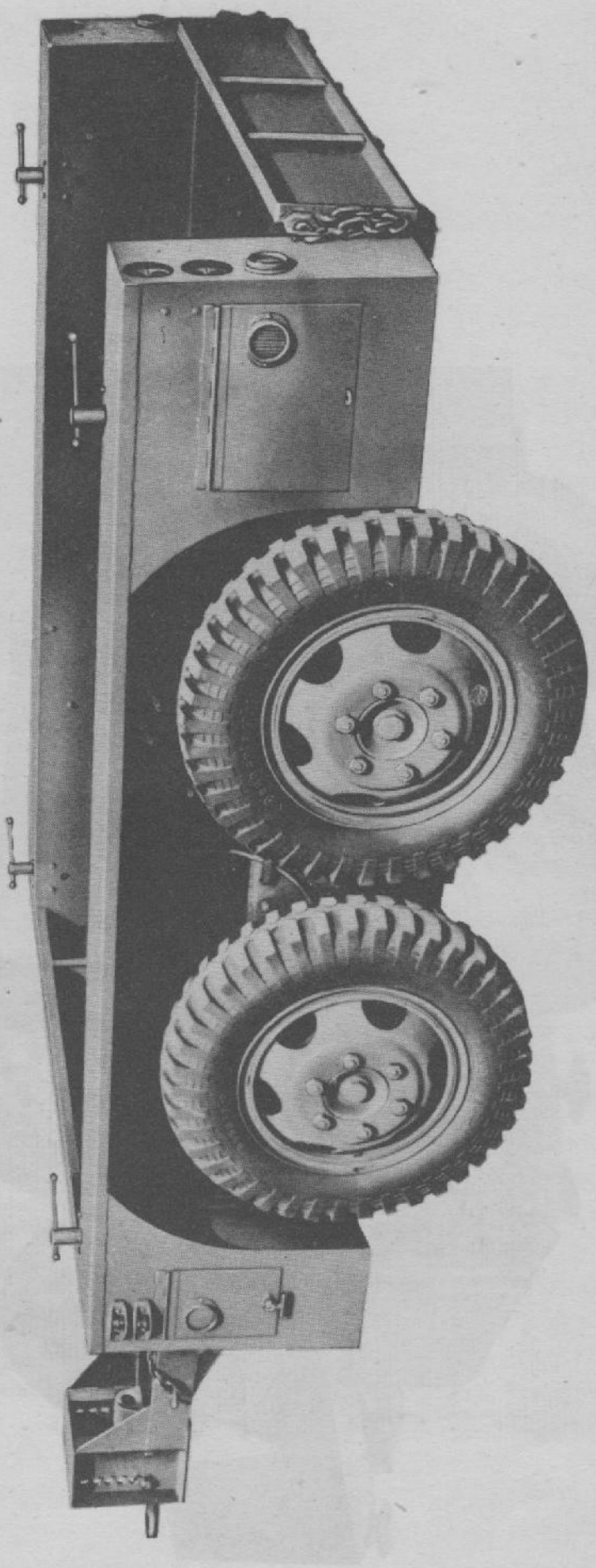

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*Figure 7—Mount Trailer M17*

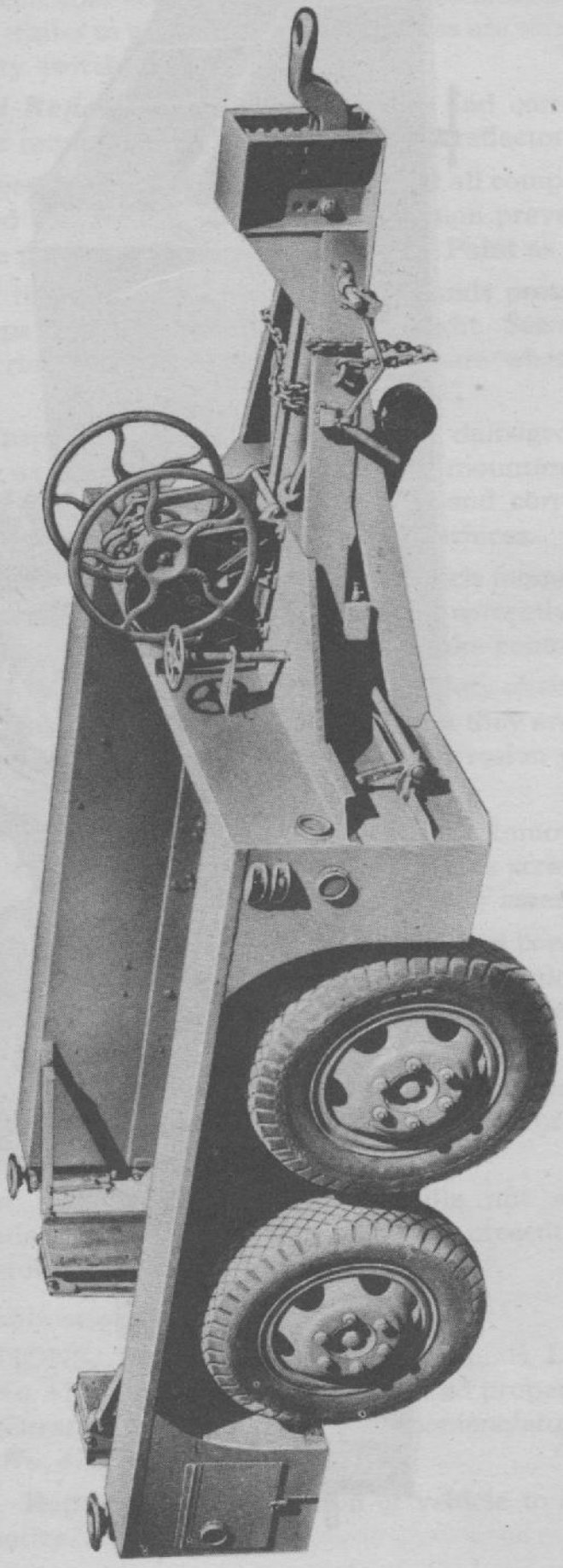

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Figure 8—Generator Trailer M18

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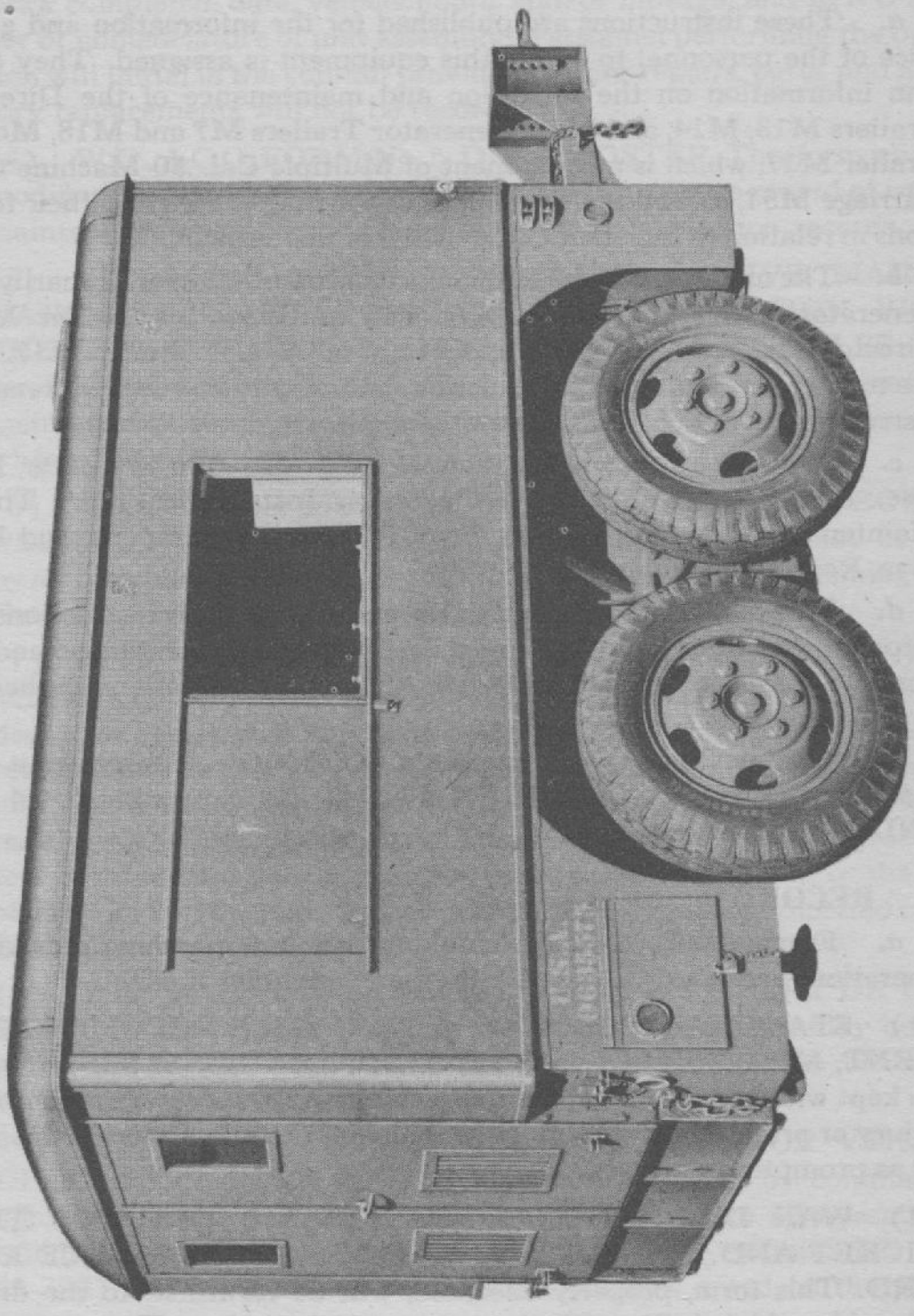

Figure 9—Director Trailer M22

This manual supersedes TM 9-881, 5 Sept 1942 and Changes No. 1, 31 December 1943.

# PART ONE—INTRODUCTION

## Section I

## GENERAL

### 1. SCOPE.

*a.* These instructions are published for the information and guidance of the personnel to whom this equipment is assigned. They contain information on the operation and maintenance of the Director Trailers M13, M14, and M22, Generator Trailers M7 and M18, Mount Trailer M17, which is a component of Multiple Cal. .50 Machine Gun Carriage M51, as well as descriptions of the major units and their functions in relation to the other components of this vehicle.

*b.* The maintenance instructions in this manual cover primarily the Generator Trailer M7, but apply also to Generator Trailer M18, Director Trailers M13, M14, and M22 and Mount Trailer M17. All the trailers are similar in construction, and operation and maintenance instructions are identical unless otherwise stated.

*c.* The instructions in this manual 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.

*d.* 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.

*e.* The stock and part numbers which appear throughout the manual are extracted from ORD 7, SNL G-221, November, 1944 and SNL G-223, November, 1944.

### 2. RECORDS.

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

(1) 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.

(2) WAR DEPARTMENT FORM No. 48, DRIVER'S TRIP TICKET AND PREVENTIVE MAINTENANCE SERVICE RECORD. This form, properly executed, will be furnished to the driver when his vehicle is dispatched on nontactical missions. The driver and the official user of the vehicle will complete in detail appropriate parts of this form. These forms need not be issued for vehicles in convoy or on tactical missions. The reverse side of this form contains the driver's

daily and weekly preventive maintenance service reminder schedule.

(3) W.D., A.G.O. FORM No. 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.

(4) W.D., A.G.O. FORM No. 6, DUTY ROSTER. This form, slightly modified, will be used for scheduling and maintaining a record of vehicle maintenance operations. It may be used for lubrication records.

(5) 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 1,000 mile (monthly) and 6,000 (semiannual) maintenance services and all technical inspections performed on wheeled or half-track vehicles.

(6) 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.

(7) W.D., A.G.O. FORM No. 468, UNSATISFACTORY EQUIPMENT REPORT. 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 of 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.

(8) 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, subassemblies, parts, vehicles and tools.

(9) W.D., A.G.O. FORM No. 7360, 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 vehicles noted on the permit.

(10) WAR DEPARTMENT LUBRICATION ORDER. War Department Lubrication Orders Nos. 115, 161, 803, and 804 prescribe lubrication maintenance for this vehicle. A Lubrication Order is issued with each vehicle and is to be carried with it at all times.

Section II

# DESCRIPTION AND DATA

## 3. DESCRIPTION.

*a. General.* The underconstruction of all six types of trailers is of the rocker-arm type, designed to assure four-wheel ground contact on uneven terrain. The trailers are provided with built-in lift jacks which support the load and permit leveling of trailer body when parked. The jacks establish firm ground contact, and remove tension from trailer springs. The trailer brakes and lights are operated electrically from the towing vehicle. The electrical brakes are provided with an emergency break-away switch which will automatically set the brakes, should the trailer break away from the towing vehicle.

*b. Generator Trailer M7* (figs. 1 and 2). The Generator Trailer M7 is designed specifically to carry the Generating Units M7, M7A1, M15, M15A1, and M18. Provisions are made to secure these generating units to the trailer floor.

*c. Director Trailers M13, M14, and M22* (figs. 3, 4, 5, 6, and 9). Director Trailers M13 and M14 are basically the Generator Trailer M7, altered to carry the Directors M9 and M10. Trailers M13, M14, and M22 are almost identical in construction. The main difference between these three trailers is that Trailer M13 is equipped with a canvas cover. No heater or blower is installed in the M13. Trailer M14 is provided with a heater and blower fan and solid-type body. These differences do not affect maintenance by the using arms except in the case of the light wiring, which is different for each model. This manual applies to Trailers M13 and M14 as manufactured by Fruehauf Trailer Company and J. G. Brill Company. Unless otherwise specified, maintenance information supplied applies to all models of both manufacturers. The M22 is the M14 with slight changes in the hook-up of the heater.

*d. Mount Trailer M17* (fig. 7). The Mount Trailer M17 is basically the Generator Trailer M7 slightly altered to carry the Multiple Cal. .50 Machine Gun Mount M45. Brackets are provided for carrying spare gun barrels in clamps on the front wall of the trailer. Two ammunution chest brackets in each corner of the trailer permit carrying eight ammunition chests, in addition to the four chests on the guns of the M45 turret. Multiple Cal. .50 Machine Gun Carriage M51 is Mount Trailer M17 with Multiple Cal. .50 Machine Gun Mount M45 mounted on it.

*e. Generator Trailer M18* (fig. 8). The Trailer M18 is similar to the M7. It is equipped with a hand winch for loading and unloading the generator set. Two fold-up type ramps are fastened to its rear crossmember and a retractable support wheel is attached to the front of the drawbar.

## 4. DATA.

### *a. Specifications.*

Length, over-all:
- M7 ..... 16 ft 3⅞ in.
- M13 ..... 16 ft 1⅞ in.
- M14 ..... 16 ft 1⅞ in.
- M17 ..... 16 ft 1⅞ in.
- M18 ..... 16 ft 6¼ in.
- M22 ..... 16 ft 1⅞ in.

Width, over-all (all trailers) ..... 8 ft

Height, over-all:
- M7 and M17 ..... 3 ft 6 in.
- M18 ..... 5 ft 3 in.
- M13 ..... 8 ft 4 in.
- M14 ..... 8 ft 1 in.
- M22 ..... 8 ft 1 in.

Height at drawbar—adjustable (all trailers) ..... 24¼ in. to 32¼ in.

Wheels
- Size ..... 20 in. x 5⅛ in.
- Type ..... R.H. rim

Tires
- Size ..... 7.50 x 20 in.
- No. of plies ..... 12
- Tread type ..... Standard Highway
- Inflation pressure ..... 55 lb
- Tread (center-to-center) ..... 84 in.

Weight of vehicle:
- M7 ..... 4,150 lb
- M13 ..... 7,850 lb
- M14 ..... 8,900 lb
- M17 ..... 4,520 lb
- M18 ..... 4,000 lb
- M22 ..... 8,900 lb

Ground clearance (lowest point) ..... 9¼ in.

### *b. Performance.*

Allowable speed ..... 60 mph

Towing facilities ..... Any vehicle equipped with pintle hook

Turning circle ..... 17 ft

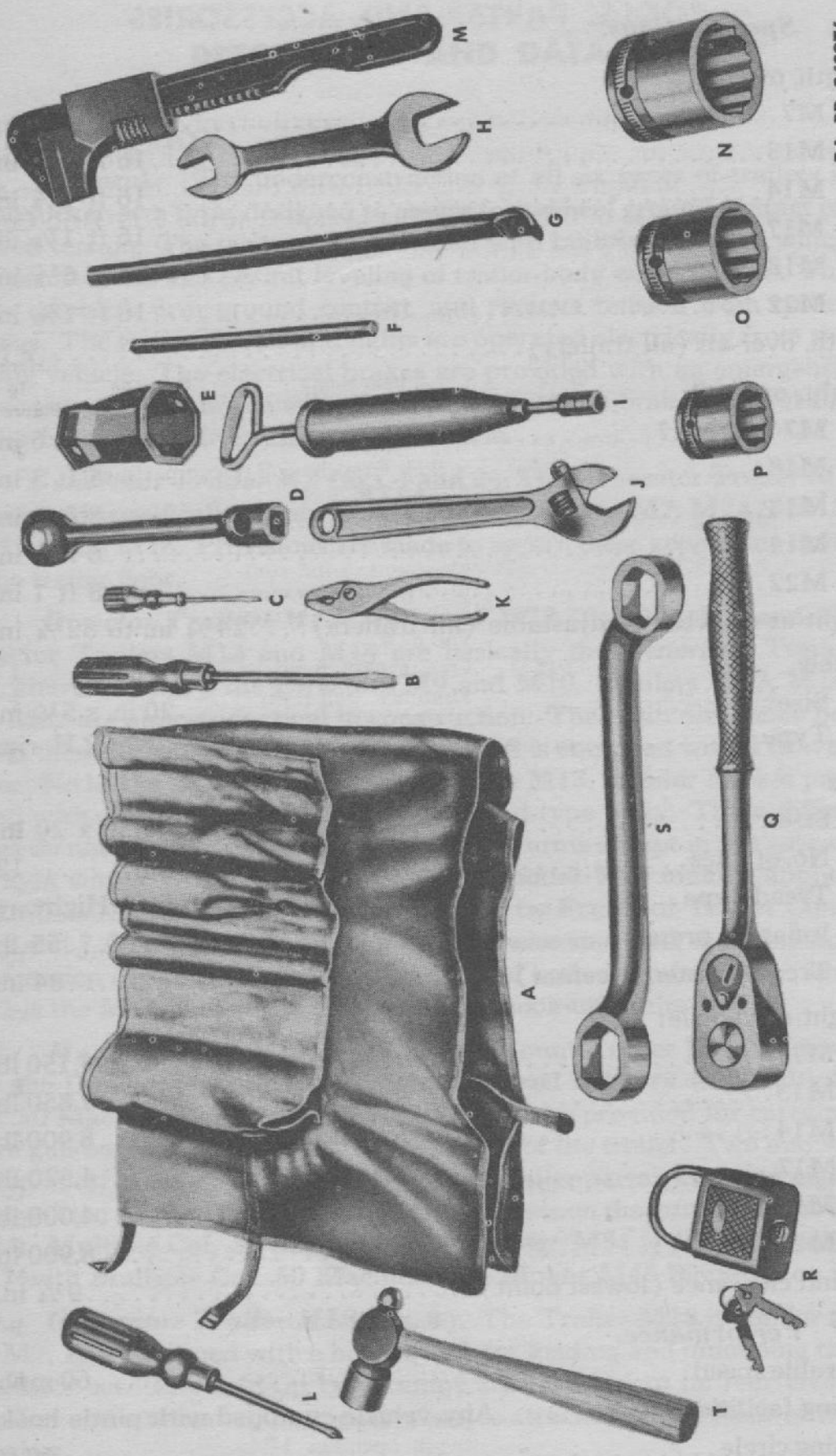


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*Figure 10—On-vehicle Tools*

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. Tools issued with the Fruehauf trailer are illustrated in figure 10. Tools issued with the J. G. Brill trailer are identical with those of Fruehauf trailer except that the J. G. Brill Company does not supply the 8-inch common screwdriver.

## 6. ON-VEHICLE TOOLS (fig. 10).

| Quan. Per Vehicle | Vehicle | Official Stock Number | Item Name | Stowage Location | Reference to Figure 10 |
|---|---|---|---|---|---|
| 1 | All | 41-B-155-75 | Bar (handle) cross, socket wrench, solid, 1½ x 12 in. | Rear left compartment | F |
| 1 | M13, 14, 22 | 58-E-200-65 | Extinguisher, fire, portable, carbon dioxide, hand, 4 lb., complete with wall bracket and trigger-operated valve | " | |
| 1 | All | 41-G-1334 | Gun, grease, hand | " | I |
| 1 | M7, 17, 18, 22 | | Hammer, ball peen | " | T |
| 1 | All | 41-H-1541-900 | Handle, wrench, wheel nut combination tire tool | " | G |
| 2 | All | | Lock, tool compartment | " | R |
| 1 | M7, 13, 14, 22 | 41-P-1650 | Pliers, comb., slip-joint, wire cutting, 6-in. | " | |
| 1 | All | | Pliers, comb., 7-in., thin nose | " | K |
| 1 | All | 41-R-2705-85 | Roll, tool, canvas, empty, 7-pocket, 39 x 24-in. | " | A |
| 1 | Fruehauf Vehicles | 41-S-1106 | Screwdriver, common, 8-in. | " | B |
| 1 | M13 only | | Screwdriver, cross recess | " | L |
| 1 | M13, 14, 18 22 | 41-S-1225 | Screwdriver, electrician's | " | C |
| 1 | All | 41-W-487 | Wrench, adjustable | " | J |
| 1 | All except M17 | | Wrench, auto | " | M |
| 1 | M13, M14 | | Wrench, box-end, ⅞-in. | " | S |
| 1 | All | | Wrench, tubular, malleable iron double-end, hexagon and octagon openings 1 21/32- and 29/32-in. | " | E |

| Quan. Per Vehicle | Vehicle | Official Stock Number | Item Name | Stowage Location | Reference to Figure 10 |
|---|---|---|---|---|---|
| 1 | M13, 14, 22 | 41-W-639-232 | Wrench, box, single-end, hexagon opening, 57/64-in., 7 3/4-in. long | Rear Compartment | |
| 1 | M18 only | | Wrench, reversible ratchet handle | " | Q |
| 1 | All | 41-W-3837-25 | Wrench, wheel nut | " | D |
| 1 | M18 only | | Wrench, 9/16-in. socket | " | P |
| 1 | M13,14,17, 22 | 41-W-1419-83 | Wrench, 5/8-in. with 7/8-in. open end | " | H |
| 1 | M18 only | | Wrench, 3/4-in. socket | " | O |
| 1 | M18 only | | Wrench, 1 5/16-in. socket | " | N |

## 7. ON-VEHICLE EQUIPMENT.

| Quan. Per Vehicle | Vehicle | Item Name |
|---|---|---|
| 1 | All | Book, ORD 7-8-9, SNL G-221 |
| 1 | All | Book, Technical Manual TM 9-881 |
| 1 | M7, 13, 14, 22 | Cable, coupling, 12 ft. long |
| 1 | M7, 13, 14, 22 | Controller, w/clamp, assembly |
| | All | Envelope, waterproof, 13 x 18-in. |

## 8. ON-VEHICLE SPARE PARTS.

| Quan. Per Vehicle | Vehicle | Item Name | Official Stock Number |
|---|---|---|---|
| 3 | M13, 14, 22 | Nut, regular, hex.,s-fin., S., 3/8-24NF-2 | H001-0718023 |
| 3 | M13, 14, 22 | Screw, cap, hex-hd., S., 3/8-24NF-2 x 1 1/4-in. | H001-1013246 |
| 4 | M7, 13, 14, 22 | Seal, grease | FF 535674 (Mfr. part number) |
| 3 | M13, 14, 22 | Washer, lock, reg., S., 3/8-in. | H001-1518009 |

# PART TWO—OPERATING INSTRUCTIONS

## Section IV

## GENERAL

### 9. 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 and instruments.

## Section V

## SERVICE UPON RECEIPT OF EQUIPMENT

### 10. 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 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 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.

### 11. 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 maintenance echelons of the using organization before vehicle is placed in service.

(2) Refer deficiencies beyond the scope of 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.

### 12. SPECIFIC PROCEDURES.

*a.* ***Electrical Wiring.*** Examine all accessible trailer 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 from wiring connections. Be sure dry-

cell battery has been connected and, if trailer is connected to prime mover, see that all trailer to prime mover connections are secured properly and that safety switch operates correctly.

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

***c. Body.*** Inspect entire trailer body to see that all components are properly assembled and secure. Remove all corrosion preventive material and examine paint for damage or rust spots. Paint as necessary.

***d. Tires.*** All tires must be inflated to 55 pounds pressure when cool. All valve caps must be present and finger-tight. See that spare wheel and tire carrier is properly mounted, and spare wheel and tire are secure.

***e. Wheels.*** Inspect wheels to see if they are damaged and correctly adjusted on axles. Be sure 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. Brakes.*** Apply hand brakes and safety switch momentarily to see that both brakes hold trailer securely and release correctly. Remove all tape and corrosion preventive material from brake controls.

***g. Towing Connections.*** Examine drawbar, safety chains, lunette, and all trailer to prime mover connections to see that they are correctly assembled and supported. Remove all tape and corrosion preventive material from towing connections.

***h. Corner Lift Jacks and Retractable Wheels.*** Remove all tape and corrosion preventive material from corner lift jack screws and retractable wheels. See that corner lift jacks are correctly assembled.

***i. Springs and Suspensions.*** Remove all tape and corrosion preventive material from springs, rocker plates, rocker arm fulcrum bearings, truss bars, gib plates, and wear plates, and be sure they are properly and securely assembled.

***j. Hand Winch.*** Remove all tape and corrosion preventive material from hand winch controls and see that winch is correctly and securely assembled.

***k. Tools and Equipment.*** Be sure spindle nut and wheel wrenches, load binders, jumper cable, and ramps are present and properly mounted or stowed.

***l. Vehicle Publications and Reports.***

(1) PUBLICATIONS. The vehicle technical manuals, Lubrication Order, and Form No. 478 must be present, legible, and properly stowed. NOTE: *U.S.A. registration numbers and vehicle nomenclature must be filled in on Form No. 478 for new vehicles.*

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

Section VI

# CONTROLS AND OPERATION

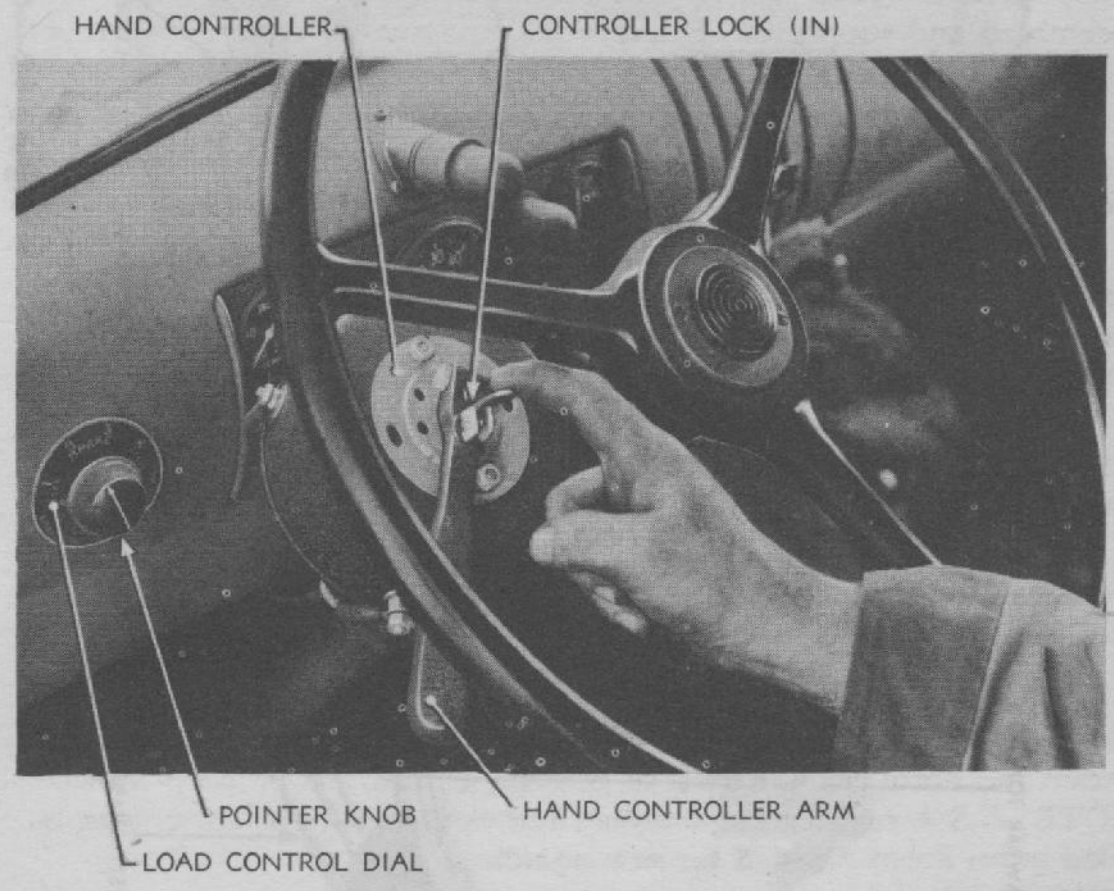
## 13. CONTROLS.

*a.* ***Hand Controller*** (fig. 11). The service brake controller is clamped to steering column of towing vehicle. Brakes are applied by pulling down on hand controller arm; the further down the arm is moved, the more severe is the brake application.

*b.* ***Controller Lock*** (fig. 11). The hand controller lock pin is located at base of hand controller arm. Pushing in on the hand controller lock pin locks hand controller arm and brakes in the applied position. *Do not use controller lock for parking brake.*

*c.* ***Blackout Switch*** (fig. 12). The blackout switch is located on the right of the drawbar near the body proper. Service lights operate with the switch plunger in the "OUT" position. Blackout lights operate with the switch plunger in the "IN" position. There is no "OFF" position. Flow of current is controlled by the light switch on towing vehicle.

*d.* ***Hand Brake*** (fig. 12). The hand brake is located near the center of the unit at the point where trailer body and drawbar meet. Turning the wheel down or clockwise applies the brakes. The hand brake can be used as a parking brake or as a supplement to towing vehicle brakes,




RA PD 43253

***Figure 11—Electric Brake Hand Controller***

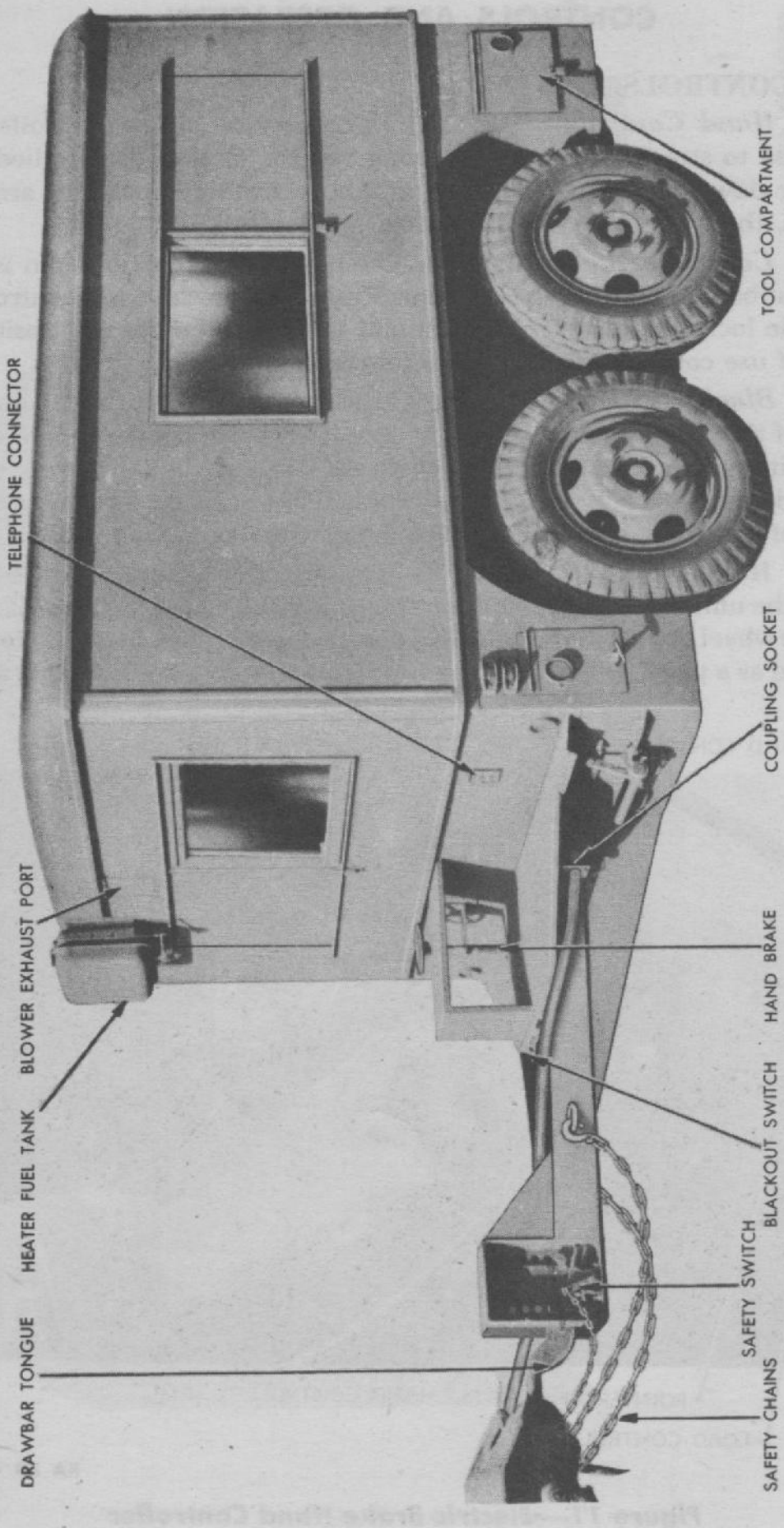



***Figure 12—Controls***

when descending extremely long or steep grades. On some units a ratchet-type hand lever is used. Pulling this lever forward applies the brake.

*e. Light and Service Brake Coupling Socket* (fig. 12). The trailer is equipped with a socket for plugging in the electrical jumper cable from towing vehicle to conduct electricity for use in lighting and brake application. This socket is located on left side of trailer, underneath drawbar member.

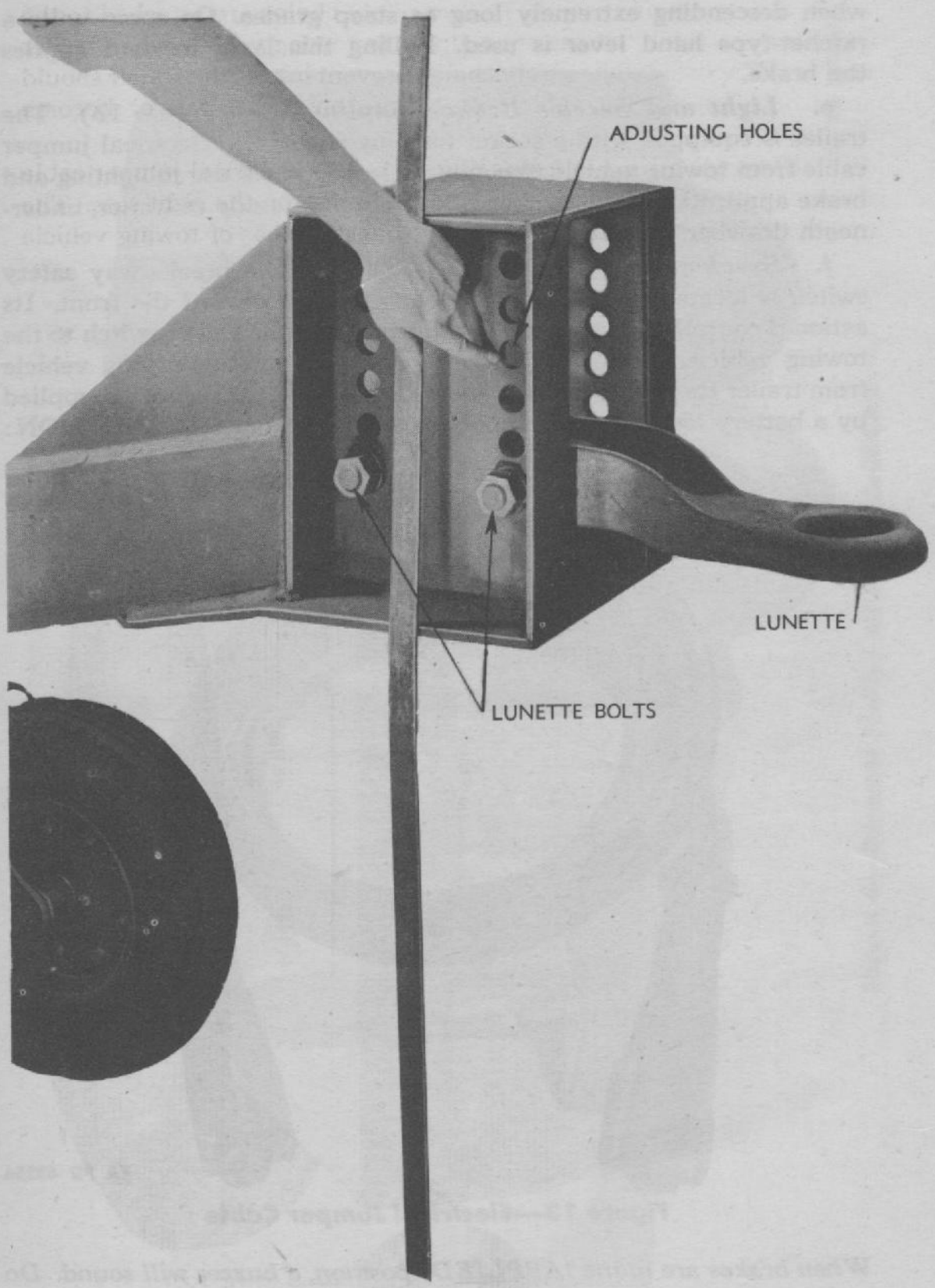
*f. Break-away Safety Switch* (fig. 12). The break-away safety switch is located on the left drawbar member, toward the front. Its action is controlled by a chain which runs from the safety switch to the towing vehicle. Accidental disengagement or pulling towing vehicle from trailer throws this switch and sets the brakes. Current is supplied by a battery located in a compartment at left front side. CAUTION:

RA PD 43256

**Figure 13—Electrical Jumper Cable**

*When brakes are in the "APPLIED" position, a buzzer will sound. Do not use this brake as a parking brake.*

*g. Telephone Connector (Trailer M14 only)* (fig. 12). A telephone connector panel is installed on left front side of body. The telephone connector panel consists of four terminals, which extend through trailer body, permitting telephone to be connected on inside of trailer.

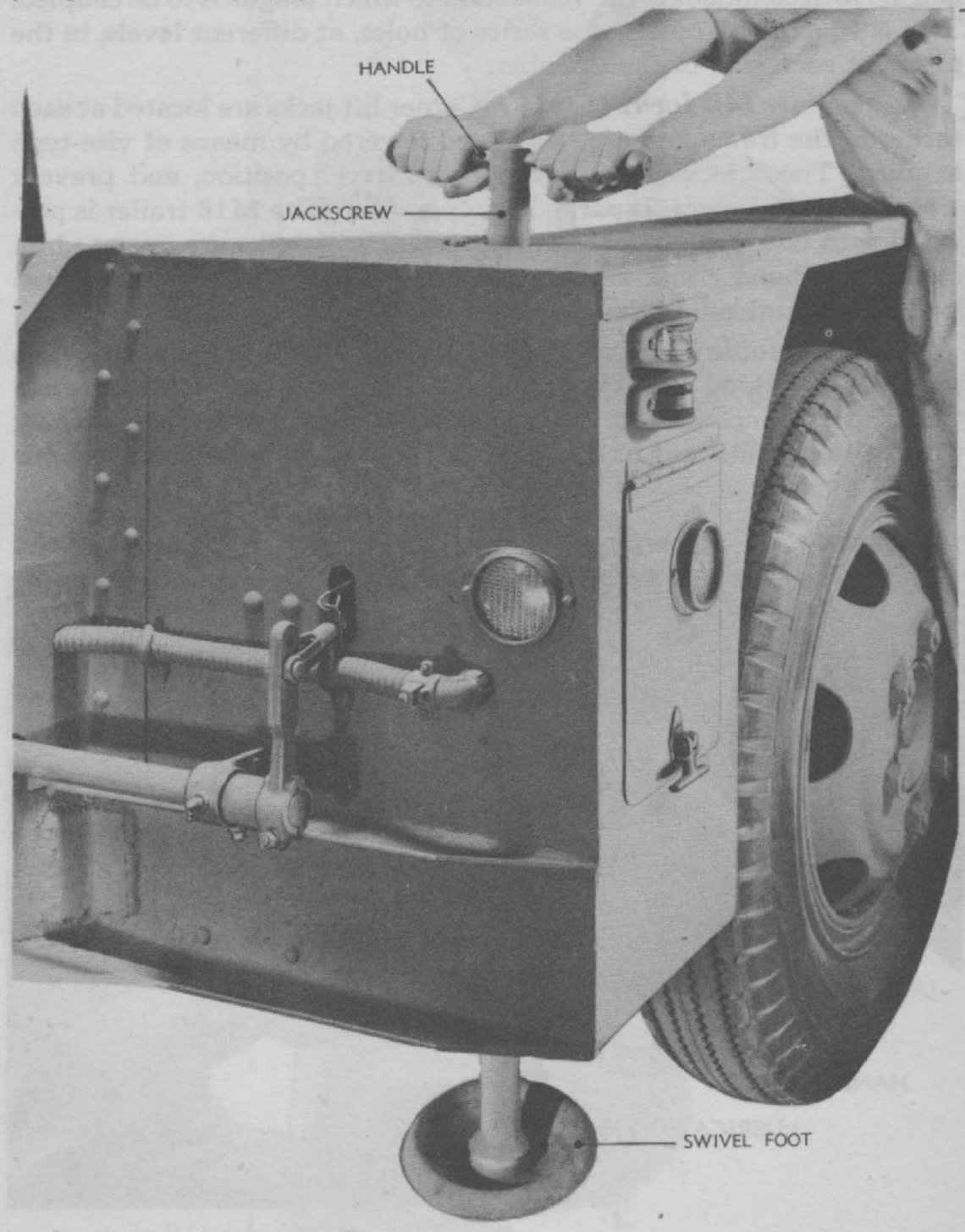



RA PD 43254

***Figure 14—Drawbar Tongue and Lunette***

***h.*** ***Safety Chains*** (fig. 12). Two safety chains are attached to the drawbar. The safety chains are coupled to towing vehicle when trailer is being transported. The safety chains prevent loss of the trailer should pintle hook on towing vehicle or tongue on trailer fail or become disengaged.

***i.*** ***Electrical Jumper Cable*** (fig. 13). The electrical jumper cable is stowed in the tool compartment near the rear on the right side. The jumper cable is plugged into coupling socket at rear of towing vehicle




RA PD 344619

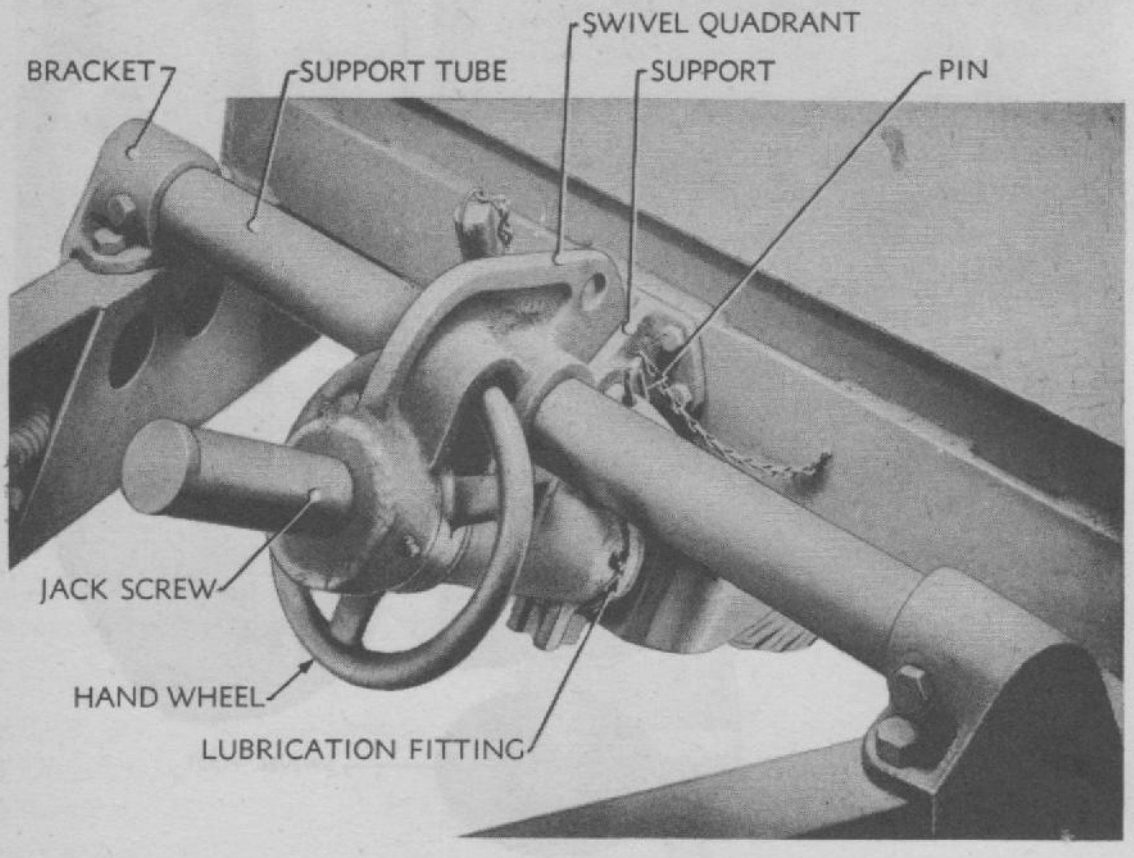
***Figure 15—Corner Lift Jacks***

and to coupling socket on trailer. Electricity for running lights and brakes is supplied to trailer from towing vehicle through this cable.

*j. Drawbar Tongue and Lunette* (figs. 12 and 14). The drawbar tongue and lunette is fastened to front end of drawbar. The tongue has two different type ends—a lunette at one end and a socket at opposite end. The tongue can be reversed to accommodate either a pintle hook or a ball-type connection. The lunette can be adjusted to different heights to accommodate the connection to which tongue is to be coupled. This is effected by means of a series of holes, at different levels, in the plates at each side of the drawbar.

*k. Corner Lift Jacks* (fig. 15). Corner lift jacks are located at each corner of the frame and are raised and lowered by means of vise-type handles. These jacks hold the unit in a level position, and prevent vibration when vehicle is parked for operation. The M18 trailer is provided with two leveling jacks at the rear. These jacks are operated by means of a hand crank and are used to support rear of trailer when loading and unloading the generator set.

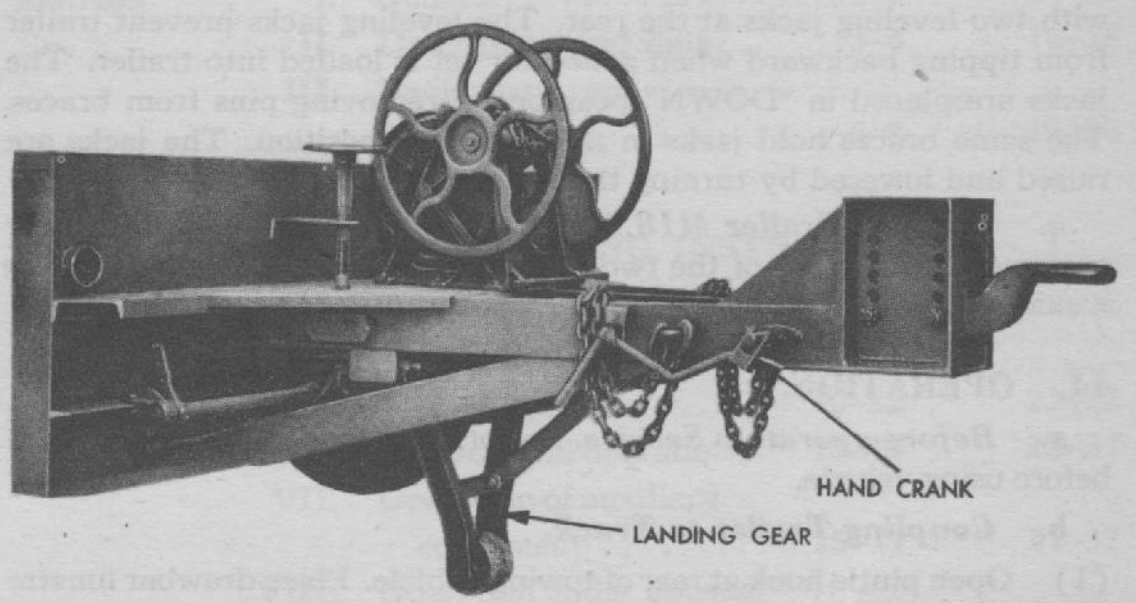
*l. Retractable Parking Wheel (Trailer M7 Only)* (fig. 16). The retractable parking wheel is provided to support front of trailer when trailer is uncoupled from towing vehicle. The retractable parking wheel also permits movement of trailer by hand. The parking wheel is




RA PD 43250

***Figure 16—Retractable Parking Wheel***

fastened to a support tube at the rear of the drawbar. The parking wheel is raised and lowered by turning the hand wheel. When trailer is coupled to towing vehicle, the parking wheel is folded back and held in the "UP" position by a pin and swivel quadrant which also holds it in the "DOWN" position when trailer is uncoupled.




RA PD 340974

***Figure 17—Landing Gear***

***m. Landing Gear (Trailer M18 Only)*** (fig. 17). The landing gear is attached to an I-beam located in the center of the drawbar. The landing gear is lowered to support front of trailer when trailer is uncoupled. The landing gear is placed in the raised position when trailer is coupled to towing vehicle. The hand crank for raising and lowering the landing gear is permanently attached to operating shaft. The crank is held in the disengaged position on a hook which is attached to the frame on the right side of the trailer. To operate, remove crank from hook and engage crank on operating shaft. Lowering the landing gear is accomplished by turning the crank clockwise; raising is accomplished by turning the crank counterclockwise. To disengage crank, pull crank off operating shaft, turn crank in toward trailer body, and hang crank on hook. When raising landing gear make sure it is raised to its maximum travel so that support leg will not become damaged when traveling. When lowering landing gear make certain it is lowered until stop is reached.

***n. Interior Lighting (Trailer M14 and M22 Only).*** Lighting for trailer interior is provided by 6- to 8-volt and 110-volt body lights. The 110-volt current is supplied from the generating unit when director is being operated. The 6-volt lights obtain current from the battery of towing vehicle. The lights are turned on and off by the rotary switch located on each light.

*o. Blackout Facilities (Trailers M14 and M22 Only).* Each window of trailer body is provided with a blackout panel. To black out vehicle, unlatch each blackout panel and slide into position over window.

*p. Leveling Jacks (Trailer M18 Only).* The trailer is provided with two leveling jacks at the rear. The leveling jacks prevent trailer from tipping backward when generator set is loaded into trailer. The jacks are placed in "DOWN" position by removing pins from braces. The same braces hold jacks in the "DOWN" position. The jacks are raised and lowered by turning the hand crank (fig. 20).

*q. Ramps (Trailer M18 Only).* The ramps are hinged to rear crossmember and are of the two-piece fold-up type. They are used as a skid to load and unload generator set (fig. 20).

## 14. OPERATION.

*a. Before-operation Service.* Perform the service in paragraph 29 before using vehicle.

*b. Coupling Trailer to Truck.*

(1) Open pintle hook at rear of towing vehicle. Place drawbar lunette in pintle hook and lock hook. Prior to coupling trailer to towing vehicle, adjust drawbar lunette height to height of pintle hook on towing vehicle. Hook safety chain on right side of drawbar to eye on left side of towing vehicle, making sure to cross chains under drawbar. Hook safety chain on left side of drawbar to eye on right side of towing vehicle, and cross safety chain under drawbar. Connect electrical jumper cable from socket on towing vehicle to socket on drawbar of trailer. Connect break-away safety switch chain from lever on safety switch to truck. The safety switch is off when lever is back of the center position. CAUTION: *Do not couple break-away safety switch too short. Allow ample slack in chain for turning. Make certain chain will have free movement, thus preventing brakes from being accidentally applied.* Raise leveling jacks and make certain chain and snap are snapped into jack operating shaft to prevent jack from vibrating to "DOWN" position.

(2) On trailer M7, place retractable parking wheel in fold-up position, making certain pin is installed and keyed (fig. 16).

(3) On trailer M18, wind up the landing gear until stop is reached, and place hand crank in clip at side of trailer frame.

(4) Release hand brake.

*c. Driving Truck and Trailer.* The towing vehicle with trailer is driven in much the same manner as towing vehicle alone. Test operation of trailer brakes before stepping up to full operating speed. Test operation of lights. When turning corners, care should be taken to allow for the fact that trailer rear wheels turn inside the turning radius

of towing vehicle. When backing, the towing vehicle should be steered in the opposite direction to which it is desired that the trailer be turned. CAUTION: *Be sure jacks are up at all times to avoid damaging the jacks.*

*d. Stopping Truck and Trailer.* The trailer brakes must be applied in coordination with towing vehicle brakes. Never permit trailer brakes to carry entire braking load. Such abuse will result in rapid lining wear and greatly reduce life of trailer brakes. Apply trailer brakes easily and release brakes when they grab, as a grabbing brake is not operating with maximum efficiency. For maximum efficiency, keep tires just short of the skidding point. The load control is normally set at number one, or light position. When operating conditions are severe and loads heavy, the load-control switch must be advanced to insure adequate braking. When stopping truck and trailer for a short period, set trailer brakes by locking hand control in applied position. This is accomplished by releasing pin on hand controller arm (fig. 11). When parking trailer for an extended period, set hand brake.

*e. Disconnecting Truck from Trailer.*

(1) Set hand brake on trailer. Disconnect electrical jumper cable between towing vehicle and trailer. Disconnect break-away safety switch chain from safety switch and make certain the safety switch lever is toward rear of trailer.

(2) On trailer M7, pull cotter pin from quadrant pin and pull pin from swivel quadrant, allowing retractable parking wheel to move to "DOWN" position. Pin the retractable landing wheel in "DOWN" position. Turn hand wheel until wheel contacts the ground (fig. 16).

(3) On trailer M18, lower the landing gear. Turn hand crank clockwise until stop is reached.

(4) On trailers M13, M14, M17, and M22, lower the four corner lift jacks until entire weight of vehicle rests on jacks (fig. 15).

(5) Open pintle hook on towing vehicle and lift lunette out of pintle hook.

*f. Parking.* When parking trailers, make certain that hand brakes are applied. Turn hand wheel, which is located at right front side, clockwise until stop is reached. NOTE: *Do not use break-away safety switch as a parking brake. Do not set break-away safety switch when parking trailer as this will deplete the hot-shot battery.*

## Section VII

## OPERATION OF AUXILIARY EQUIPMENT

### 15. BLOWER (Trailers M14 and M22 Only).

*a. Operation* (fig. 18). The blower is attached to front panel inside of trailer body. The blower damper, located on left side of unit, is adjustable through a threaded shaft. The blower exhaust port is pro-

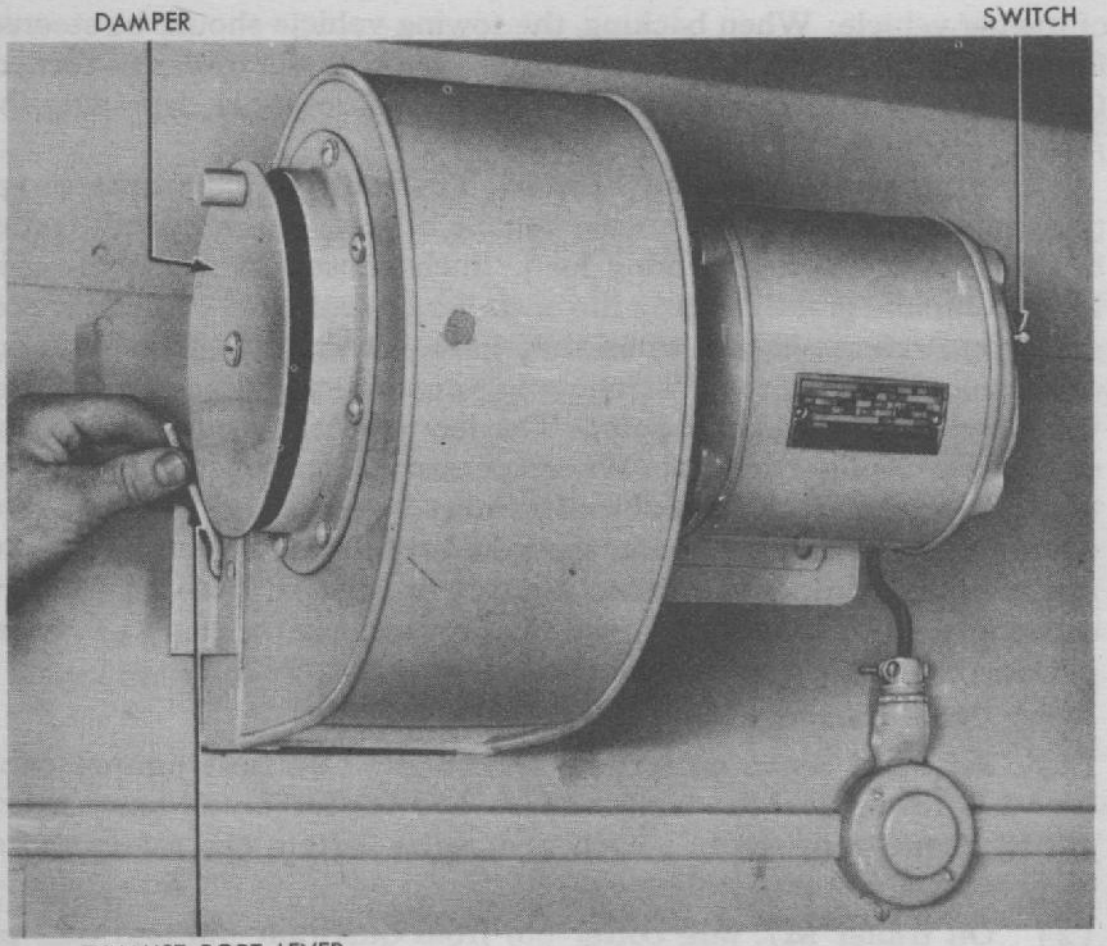



***Figure 18—Blower Operation***

vided with a lever which enables the operator to open exhaust port from inside of trailer. The purpose of the blower is to furnish proper ventilation in the trailer. To operate blower, open exhaust port by pulling down exhaust port lever, and start blower motor by turning its switch to "ON" position. Open blower damper to desired position. The damper governs amount of air passing through the blower, and must not be left in a closed position while blower is being operated. CAUTION: *Do not operate blower if louvers which are built into the rear doors are clogged with mud, ice, or other foreign matter. Keep louvers clean to permit circulation of air in trailer.* When blower is not in use, keep exhaust port lever in closed position and damper closed.

## 16. HEATER (Trailers M14 and M22 Only).

*a.* The heater is located on inside of trailer on right front side (fig. 19). It is a gasoline fuel type, operated with natural or forced draft. Forced-draft operation is provided by a 110-volt electric motor. A gasoline fuel tank is provided for heater operation and is located on outer side of trailer front bulkhead. The heater is manually lighted

with a lighting swab which is attached to heater housing. The heater output is controlled by a fuel control valve which enables the operator to select the desired amount of heat. The following instructions for operation of heater must be thoroughly understood before any attempt is made to put heater in operation.

(1) PRESTARTING. Fill fuel tank which is located on outer side of trailer front bulkhead (fig. 12). Use gasoline with or without tetraethyl lead. Open shut-off cock at bottom of tank by turning it counterclockwise. NOTE: *When heater is to be operated for the first time, or if fuel line has been disconnected and reconnected, or fuel tank has become empty, the fuel line will require bleeding to remove air bubbles.*

(2) BLEEDING FUEL LINE. Place fuel valve in the "OFF" position. Open bleeder cock located near fuel valve by turning it counterclockwise. Catch escaping gasoline in a rag or can. Close bleeder cock after fuel flows steady and all air bubbles have been removed from the fuel line.

(3) SAFETY INSTRUCTIONS.

*(a) Lighting.* CAUTION: *Do not attempt to relight fire too soon after shutting heater off, or after flame failure.* If fuel valve has been opened, close it. Turn on the fans, and place draft control rod, which is located on left side of heater, in the "FORCED DRAFT" position. This will shorten the waiting time for burner to cool off, and will clear combustion chamber of vaporized gas. After a few minutes of waiting, the burner should be cool enough to permit relighting of heater. Make certain fan switch is in the "OFF" position before relighting heater. Any amount of liquid in a slightly warm burner will puff when ignited. This puffing condition is a natural characteristic and is entirely safe. However, do not have your face too close to the open door when relighting heater.

*(b) Floor Duct.* The air entrance to floor duct under trailer body must always be kept fully open. Ice or frost formations must be removed. Drifting snow, accumulating under or around trailer in a manner which would impair free movement of ample quantities of air to floor duct, must also be removed. If vehicle has been moved over muddy ground, floor duct must be examined and, if necessary, cleaned before heater is put into service.

*(c) Flue Ventilator.* The flue exhaust ventilator, located on roof of vehicle, may be covered by some object, or may have been damaged (smashed). Partial closing of this vent would smother the flame and require immediate correction. Ice or snow accumulated on roof of vehicle will plug the small holes in flue ventilator, or entirely cover the ventilator. This condition would seriously interfere with lighting of fire and warming up of heater because of flue gases being unable to escape. Clean flue ventilator openings of snow, dirt, ice, and other foreign matter.

*(d) Flue Outlet Duct.* The flue outlet duct may have become obstructed with soot from previous improper operation of heater. Remove flue ventilator and brush or scrape the soot formation from flue duct. Examine and clean flue ventilator before installation.

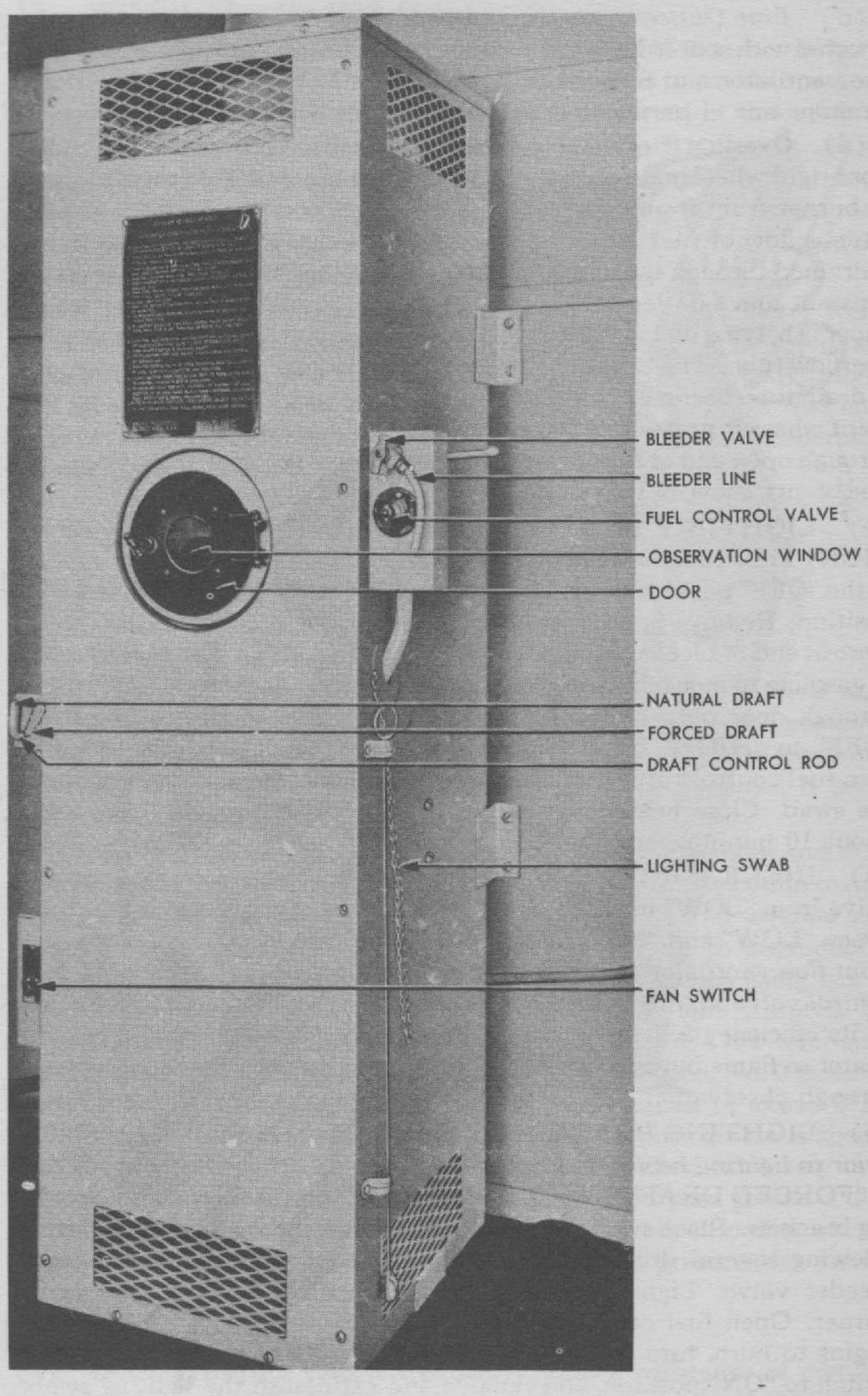
*(e) Overflow Drain Tube.* The overflow drain tube is located under front right wheel housing. The drain tube prevents fuel on lower surface of burner from forming a pool greater than 3/16 inch in depth. A continuous flow of fuel, which would otherwise cause burner to overflow, is drained through the overflow tube, thereby maintaining the pool at a constant and safe level. If paper is used to light the fire, particles of paper ash, lying on lower surface of burner, may eventually obstruct the overflow tube. The tube must be kept open throughout its entire length. If drain tube becomes blocked, run a piece of wire up the tube from the point where it passes to outside of vehicle. If no wire is available, blow through open end of tube. Be sure that outer end of tube is always kept free of dirt, snow, or ice.

(4) LIGHTING HEATER WITH NATURAL DRAFT. CAUTION: *Prior to lighting heater, read step (3), above.* Place fan switch in the "OFF" position. Turn draft control rod to "NATURAL DRAFT" position. Remove lighting swab from its mounting brackets and place swab at end of bleeder tube. Open bleeder valve, allowing several drops of gasoline to moisten swab, and then close valve. Light swab and insert through door onto bottom of burner. Open fuel control valve from "OFF" to "HIGH" by turning clockwise. When fuel begins to burn, turn fuel control valve to "LOW" position, then remove and extinguish the swab. Close heater door and allow fuel to remain at "LOW" for about 10 minutes, until heater warms up.

(5) INCREASING HEAT. To increase the heat, open fuel control valve from "LOW" to "MEDIUM" position, or to any desired point between "LOW" and "MEDIUM." NOTE: *If thin black smoke appears from flue ventilator outer doors, decrease flow of fuel by closing fuel control valve slightly until smoke clears.* Never allow heater to smoke, as its efficiency will be impaired by soot formations. Always operate heater so flame burns just below smoke point. Inspect flame by looking through observation window.

(6) LIGHTING HEATER WITH FORCED DRAFT. CAUTION. *Prior to lighting heater, read preceding step (3).* Set draft control rod to "FORCED DRAFT" position. Remove lighting swab from its mounting brackets. Place swab at end of bleeder line and open bleeder valve, allowing several drops of gasoline to moisten swab, and then close bleeder valve. Light swab and insert through door onto bottom of burner. Open fuel control valve from "OFF" to "HIGH". When fuel begins to burn, turn fuel control valve to "LOW" position. Turn fan switch to "ON" position, and remove and extinguish the lighting swab.

(7) SHUTTING OFF HEATER. Turn fuel valve to "OFF" position. After fire has gone out, pull fan switch to "OFF" position.




RA PD 82084

***Figure 19—Heater Controls***

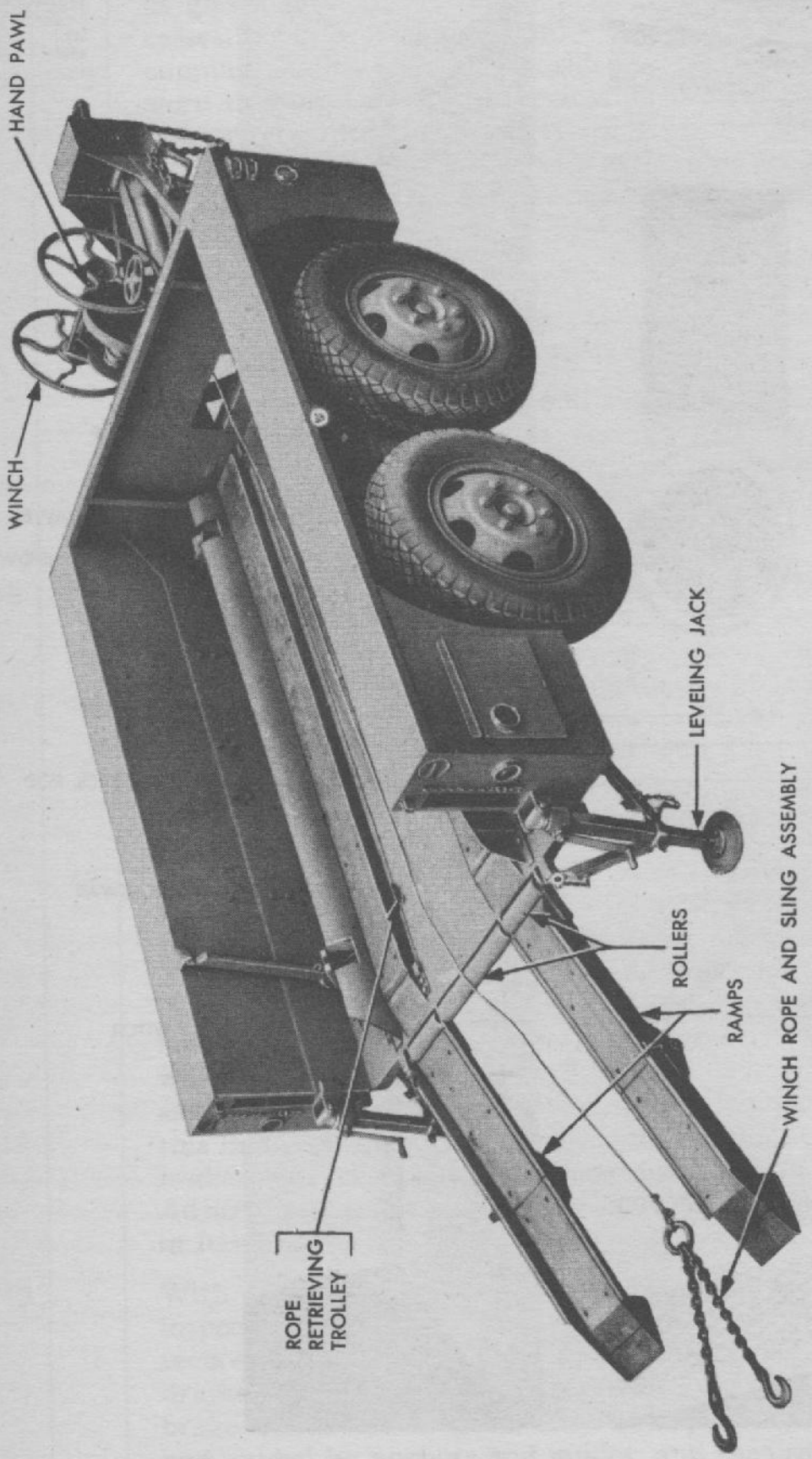



***Figure 20—Winch and Wire Rope Controls for M18***

## 17. WINCH (Trailer M18 Only).

*a. Description* (fig. 20). The winch is fastened to drawbar in front of trailer front bulkhead. The purpose of the winch is to enable operator to load and unload generator set which is transported in this vehicle.

*b. Loading.* Place ramps and leveling jacks in "DOWN" position (par. 13 *p* and *q*). Release hand pawl on winch and pull rope and sling from winch drum. Fasten sling to rings at rear end of generator set (rear end of generator set is opposite end from radiator). Turn handwheel on winch clockwise until generator is pulled into trailer.

*c. Unloading.* Pass rope and sling assembly under trailer from front to rear, making certain the rope contacts two rollers which are attached to drawbar. Put sling assembly on hook on retrieving trolley, pull sling under generator, and fasten sling to the two rings at rear end of generator. Turn handwheel on winch clockwise, and pull generator set out of trailer.

### Section VIII

# OPERATION UNDER UNUSUAL CONDITIONS

## 18. COLD WEATHER CONDITIONS.

*a. General.* Since subzero temperatures affect both metals and lubricants, operation of equipment at subzero temperatures presents problems that demand special precautions. Extremely careful servicing from both operating and maintenance personnel is required if poor performance and total functional failure are to be avoided.

*b. Lubrication.* Lubrication Orders Nos. 115, 161, 803, and 804 and figures 21, 22, 23, and 24 (section XII) prescribe lubrication maintenance for this trailer. Lubrication of the trailer in cold weather requires no special attention other than rigid adherence to instructions in section XII. Lubricate wheel bearings and grease cups using No. 2 general purpose grease with same lubricant at all temperatures. If repacking of wheel bearings must be performed at such a low temperature that thorough hand-packing cannot be accomplished, No. 0 general purpose grease may be used until temperature returns to above 0°F. Lubricate all other places where No. 0 general purpose grease is specified above 0°F with the same grease below 0°F. When extremely low temperatures are encountered and No. 0 general purpose grease is not satisfactory, O.D. grease No. 00 may be used. For oilcan points where engine oil is prescribed for above 0°F, use special preservative lubricating oil.

*c. Maintenance.*

(1) BODY. Inspect vehicle frequently. Shock resistance of metals, or resistance against breaking, is greatly reduced at extremely low temperatures. Operation of vehicles on hard, frozen ground causes strain

and jolting which 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 has a tendency to cause brakes to stick or bind when vehicles are parked at subzero temperatures. A blowtorch may be used to warm up 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 movement of vehicle.

## 19. DUSTY CONDITIONS.

*a.* Operation of trailer under extreme sand and dust conditions necessitates frequent inspection, cleaning, and lubrication of trailer working parts.

## 20. SUBMERSION.

*a.* After fording, stop vehicle at once (if tactical situation permits), and remove all water from working parts of vehicle. Clean body cavities of dirt and sediment and lubricate (par. 26 *c* and *d*). Check action of brakes. Make sure hot-shot battery is dry and not short circuited. Remove wheels (par. 79 *a*), clean, and lubricate.

### Section IX

# DEMOLITION TO PREVENT ENEMY USE

## 21. GENERAL.

*a.* Destruction of vehicle when subject to capture or abandonment in the 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 operation of the vehicle be destroyed or damaged beyond repair. Equally important, the same essential parts must be destroyed on all like vehicles so that the enemy cannot construct one complete operating unit from several partially damaged ones.

## 22. DETAILED INSTRUCTIONS.

***a. Methods.*** The following instructions give three methods of demolishing this trailer in the order of their effectiveness.

***b. Method No. 1.*** Place 2-pound TNT charges inside each wheel over the axle. Insert tetryl nonelectric caps with at least 5 feet of safety fuze in each charge. Ignite fuzes and take cover. CAUTION: *If charges are prepared beforehand and carried in the vehicle, keep caps and fuzes separated from charges until they are to be used.*

***c. Method No. 2.***

(1) 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.

(2) Fire on the vehicle, using tank, antitank, or other artillery, or antitank rockets or grenades.

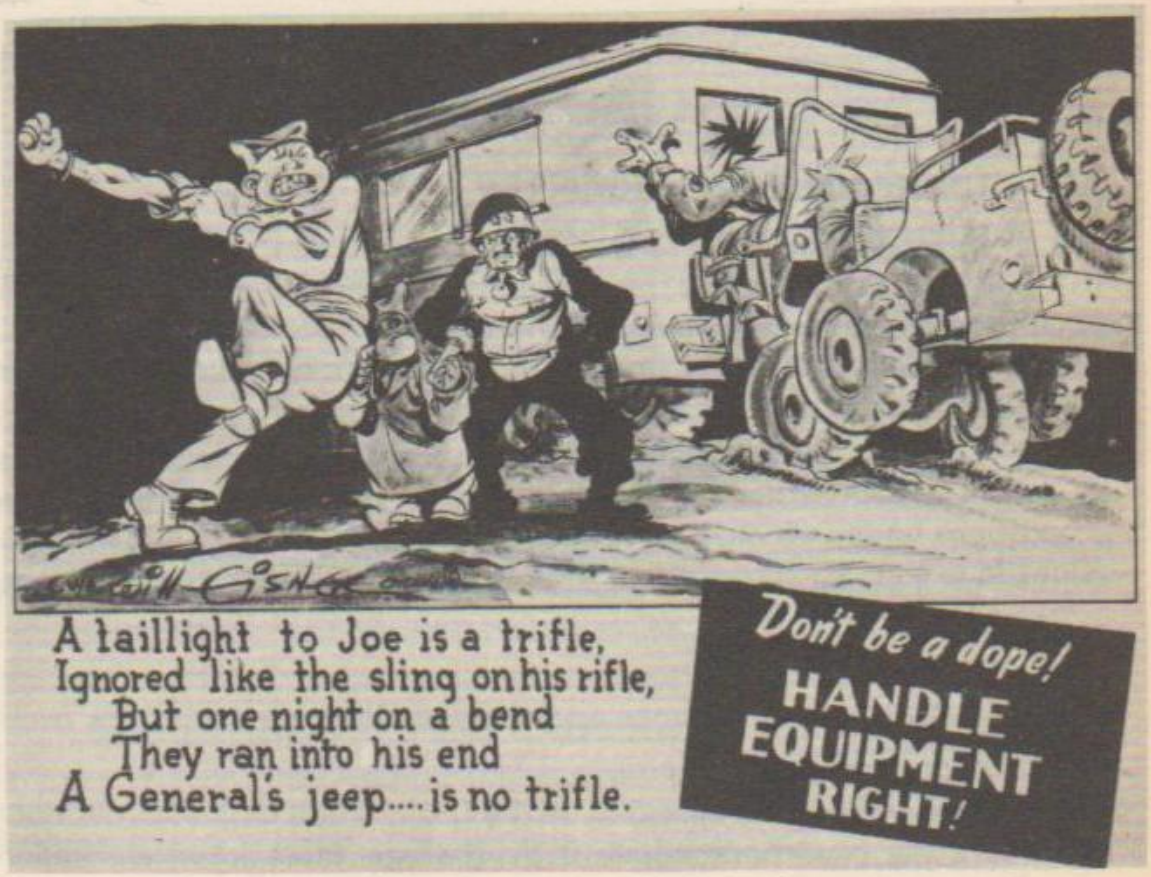
***d. Method No. 3.***

(1) Smash lights, reflectors, jumper cable and socket, and flexible lines.

(2) Place an M14 incendiary grenade under each tire or deflate tires and destroy them with an ax, pick, or machine-gun fire.

(3) Pour gasoline or oil over entire unit.

(4) Ignite incendiary grenades, or if not used, ignite vehicle by other means.



# PART THREE—MAINTENANCE INSTRUCTIONS

## Section X

## GENERAL

### 23. 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 performance of scheduled lubrication and preventive maintenance services, as well as description and maintenance of major systems and units and their functions in relation to other components of the equipment.

## Section XI

## SPECIAL ORGANIZATIONAL TOOLS AND EQUIPMENT

### 24. SPECIAL TOOLS AND EQUIPMENT.

*a.* No special tools are required to service these vehicles.

*b.* ORD 6 SNL G-27, Section 2, furnishes information on common tools available to service these vehicles.

## Section XII

## LUBRICATION

### 25. LUBRICATION ORDER.

*a.* Reproductions of War Department Lubrication Order Nos. 155, 161, 803 and 804 (figures 21, 22, 23 and 24) prescribe first and second echelon lubrication maintenance above 0°F. For lubrication below 0°F, refer to Section VIII. NOTE: *Refer to Lubrication Order No. 804 for lubrication instructions for M22 trailer.*

*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 vehicle is received without a Lubrication Order, the using arm shall immediately requisition a replacement from an Adjutant General Depot. See lists in FM 21-6.

*c.* Lubrication instructions on the Lubrication Order are binding on all echelons of maintenance and there shall be no deviations from these instructions.

*d.* Service intervals specified on the Lubrication Order are for normal operating conditions above 0°F. Reduce these intervals under

extreme conditions such as excessively high or low temperatures, prolonged periods of high speed, continued operation in sand or dust, immersion in water, or exposure to moisture, any one of which may quickly destroy the protective qualities of the lubricant and require servicing in order to prevent malfunctioning or damage to the materiel. Extend intervals when vehicle is not in use.

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

## 26. DETAILED LUBRICATION INSTRUCTIONS.

*a. Lubrication Equipment.* Each piece of materiel is supplied with lubrication equipment adequate to maintain the materiel. Be sure to clean this equipment, both before and after use. Operate lubricating guns carefully and in such a manner as to insure a proper distribution of the lubricant. If lubrication fitting valves stick and prevent the entrance of lubricant, remove fitting and determine cause. Replace broken or damaged lubricators. If lubricator cannot be replaced immediately, cover hole with tape as a temporary expedient to prevent the entrance of dirt.

*b. Points of Application.*

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

(2) Where relief valves are provided, apply new lubricant until old lubricant is forced from the vent.

(3) Always wipe metal surfaces clean on which a film of lubricant must be maintained by manual application, before 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) BRAKE ANCHOR PINS AND BRAKE SHOE ROLLERS. At intervals of wheel bearing lubrication, clean bearing surfaces thoroughly, and lubricate sparingly with engine oil SAE 30 above +32°F, and SAE 10 below +32°F.

No. 155

# WAR DEPARTMENT LUBRICATION ORDER

WAR DEPARTMENT WASHINGTON 25, D. C., 1 JUNE 1944

## TRAILER, GENERATOR, M7

### (TRAILER FOR UNIT, GENERATING, M-18)

SNL G-221. For detailed instructions, refer to TM 9-881.

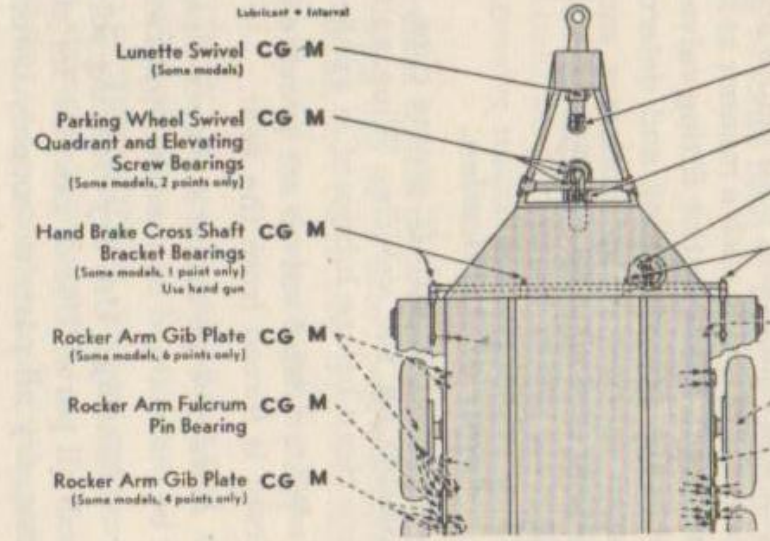
Clean all parts with SOLVENT, dry cleaning or OIL, fuel, Diesel.

Clean fittings before lubricating. Lubricate after washing.

**Requisition replacement Lubrication Orders from the Commanding Officer, Fort Wayne Ordnance Depot, Detroit 32, Michigan.**

Service intervals are based on actual operation under normal conditions above 0°F. Reduce under extreme conditions. Extend when not in use.

Lubricate dotted arrow points on both sides.



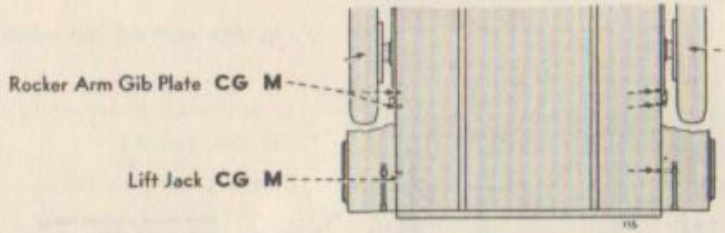
Lubricant ✦ Interval

- Lunette Swivel (Some models) — CG M
- Parking Wheel Swivel Quadrant and Elevating Screw Bearings (Some models, 2 points only) — CG M
- Hand Brake Cross Shaft Bracket Bearings (Some models, 1 point only) Use hand gun — CG M
- Rocker Arm Gib Plate (Some models, 6 points only) — CG M
- Rocker Arm Fulcrum Pin Bearing — CG M
- Rocker Arm Gib Plate (Some models, 4 points only) — CG M

Interval ✦ Lubricant

- M CG Lunette Socket (Some models)
- M CG Parking Wheel Bearings
- M CG Hand Brake Screw Bearing
- M CG Hand Brake Cross Shaft Bracket Bearings Use hand gun
- M CG Lift Jack
- 6M WB Wheel Bearings Remove, clean and repack
- 6M CG Enclosed Hand Brake Cables Remove inner cable from conduit and coat lightly with No. 0

RA PD 344124




TRAILER, GENERATOR, M7

**NOTE**— See Reverse Side for lubrication of GENERATING UNIT, M18

## —NOTES—

THIS SIDE ONLY

OIL CAN POINTS—Monthly, lubricate Hinges, Latches, Lunette Swivels (some models), Parking Wheel Anchor Pin, Lunette Socket (some models), Parking Wheel Hanger Bearing, Hand Brake Ratchet, Linkage, Exposed Cables and Clevises with OE.

DO NOT LUBRICATE—Springs.

DISASSEMBLED PERIODICALLY BY ORDNANCE PERSONNEL—Shock Absorbers (some models). (Refer to TM 9-881.)

*Copy of this Lubrication Order will remain with the equipment at all times; instructions contained therein are mandatory and supersede all conflicting lubrication instructions dated prior to 1 June 1944.*

BY ORDER OF THE SECRETARY OF WAR:

G. C. MARSHALL,
*Chief of Staff.*

OFFICIAL:

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

## —KEY—

THIS SIDE ONLY

| LUBRICANTS | LOWEST ANTICIPATED AIR TEMPERATURE | | |
|---|---|---|---|
| | above +32°F. | +32°F. to 0°F. | below 0°F. |
| OE—OIL, engine | SAE 30 | SAE 10 | PS |
| CG—GREASE, general purpose | No. 1 | No. 0 | No. 0 |
| WB—GREASE, general purpose, No. 2 | | | INTERVALS M—Monthly 6M—6 months |
| PS—OIL, lubricating, preservative, special | | | |

**No. 155** [NOT TO BE REPRODUCED in whole or in part without permission of the Office of the Chief of Ordnance.] CHEK-CHART

RA PD 344124B

***Figure 21—Lubrication Order for Generator Trailer M7***

No. 161

# WAR DEPARTMENT LUBRICATION ORDER

WAR DEPARTMENT WASHINGTON 25, D.C., 29 MAY 1944

## TRAILER, MOUNT, M17

## (TRAILER FOR CARRIAGE, MULTIPLE CAL. .50 MACHINE GUN, M51)

SNL G-217, G-221. For detailed instructions, refer to TM 9-881.

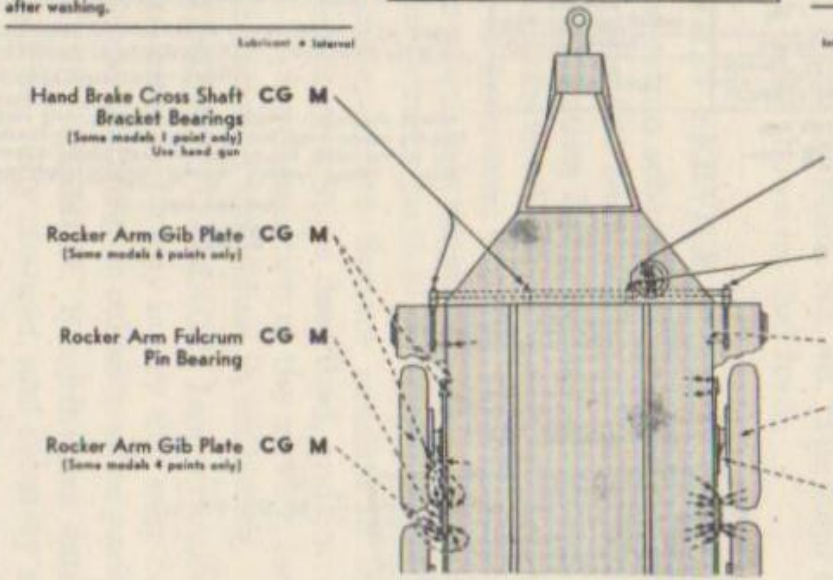
Clean all parts with SOLVENT, dry cleaning or OIL, fuel, Diesel.
Lubricate dotted arrow points on both sides. Clean fittings before lubricating. Lubricate after washing.

**Requisition replacement Lubrication Orders from the Commanding Officer, Fort Wayne Ordnance Depot, Detroit 32, Michigan.**

Service intervals are based on actual operation under normal conditions above 0°F. Reduce under extreme conditions. Extend when not in use.

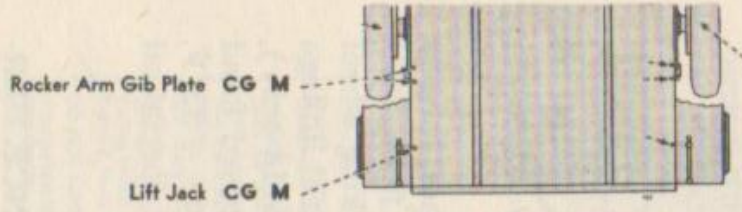
Lubricant ● Interval

Interval ● Lubricant



- Hand Brake Cross Shaft Bracket Bearings — CG M (Some models 1 point only) Use hand gun
- Rocker Arm Gib Plate — CG M (Some models 6 points only)
- Rocker Arm Fulcrum Pin Bearing — CG M
- Rocker Arm Gib Plate — CG M (Some models 4 points only)
- M CG Hand Brake Screw Bearing (Some models) (Some models are equipped with lever type hand brake)
- M CG Hand Brake Cross Shaft Bracket Bearings Use hand gun
- M CG Lift Jack
- 6M WB Wheel Bearings Remove, clean and repack
- 6M CG Enclosed Hand Brake Cables Remove inner cable from conduit and coat lightly with No. 0

RA PD 344126




## NOTES

**This Side Only**

OIL CAN POINTS — Monthly, lubricate Hinges, Latches, Lunette Swivels, Lunette Socket (some models), Hand Brake Ratchet, Linkage, Exposed Hand Brake Cables and Clevises with OE.

DO NOT LUBRICATE — Springs.

DISASSEMBLED PERIODICALLY BY ORDNANCE PERSONNEL — Shock Absorbers (some models) (Refer to TM 9-881).

*Copy of this Lubrication Order will remain with the equipment at all times; instructions contained therein are mandatory and supersede all conflicting lubrication instructions dated prior to 29 May 1944.*

BY ORDER OF THE SECRETARY OF WAR:

G. C. MARSHALL,
*Chief of Staff.*

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

## KEY

| LUBRICANTS | LOWEST ANTICIPATED AIR TEMPERATURE | | |
|---|---|---|---|
| OE—OIL, engine | above +32°F. | +32°F. to 0°F. | below 0°F. |
| Crankcase | SAE 30 | SAE 10 | See TB ORD 126 |
| Other Points | SAE 30 | SAE 10 | PS |
| CG—GREASE, general purpose | No. 1 | No. 0 | No. 0 |
| WB—GREASE, general purpose, No. 2 | | | **INTERVALS** 25—25 hours D—Daily W—Weekly M—Monthly 6M—6 months |
| PS—OIL, lubricating, preservative, special | | | |

**COLD WEATHER:** For Lubrication and Service below 0°F., refer to TM 9-222, TM 9-881, TB ORD 126 and OPSB 6-5.

**No. 161** [NOT TO BE REPRODUCED in whole or in part without permission of the Office of the Chief of Ordnance.] CHEK-CHART

SGV TD

RA PD 344126B

**Figure 22—Lubrication Order for Mount Trailer M17**

(2) ENCLOSED HAND BRAKE CABLES. Every 6 months, remove inner cables from conduit, clean thoroughly, and coat sparingly with general purpose grease No. 0. CAUTION: *Do not fill conduit.*

(3) BRAKE CAMS. At intervals of wheel bearing lubrication, clean brake cams thoroughly and coat surfaces lightly with general purpose grease No. 1 above +32°F, and No. 0 below +32°F.

(4) WHEEL BEARINGS (EXCEPT PARKING WHEEL). Every 6 months, 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 spindle and inside of hub and hub cap with general purpose grease No. 2 to a maximum thickness of 1/16 inch only to retard rust. Lubricate bearings with general purpose grease No. 2 with a packer or by hand, kneading lubricant into all spaces in the bearing. Use extreme care to protect bearings from dirt and immediately reassemble and replace wheel. 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 79 *c*.

(5) WINCH CABLE (TRAILER M18 ONLY). After each use, clean and oil with used crankcase oil or engine oil SAE 30 above +32°F, SAE 10 from +32°F to 0°F, and lubricating, preservative, special oil below 0°F. If cable has not been used, coat outer coils weekly. Monthly, unwind entire cable, clean, and oil.

(6) OILCAN POINTS. Monthly, lubricate hinges, latches, lunette swivels (some models), lunette sockets (some models), floor bolts (some models), parking wheel anchor pin (M7 only), parking wheel hanger bearing (M7 only), parking wheel and parking wheel linkage (M18 only), lift jack linkage (M18 only), ramp rollers (M18 only), winch dog and lock (M18 only), hand brake ratchet, exposed hand brake cables, and clevises with engine oil SAE 30 above +32°F, SAE 10 from +32°F to 0°F, and lubricating, preservative, special oil below 0°F.

(7) SPRINGS. Do not lubricate.

(8) DISASSEMBLED PERIODICALLY BY ORDNANCE PERSONNEL.

*(a) Shock Absorbers (some models).* Every 6 months, disassemble and refill Monroe-type refillable shock absorbers with light shock absorber fluid.

*e. Reports and Records.*

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

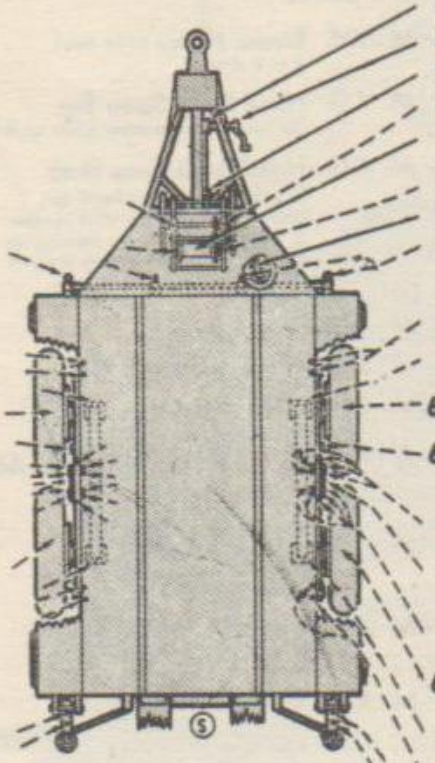
(2) A record of lubrication may be maintained in the Duty Roster (W.D., A.G.O. Form No. 6).

# WAR DEPARTMENT LUBRICATION ORDER No. 803

WAR DEPARTMENT, WASHINGTON 25, D. C., 9 SEPTEMBER 1944

## TRAILER, GENERATOR, M18

SNL G-221 — For detailed instructions, refer to TM 9-881



Interval • Lubricant

- M CG Parking Wheel Crank Shaft Brg.
- M CG Parking Wheel Crank Shaft
- M CG Parking Wheel Shaft Support Brg.
- M CG Winch Shaft Brgs.
- W OE Winch Cable — Clean and oil (See Note)
- M CG Winch Drum Brg.
- M CG Hand Brake Screw Brg.
- M CG Hand Brake Cross Shaft Bracket Brgs. Use hand gun (Some models 3 points only)
- M CG Rocker Arm Gib Plate
- M CG Spring Wear Plate — Clean and coat
- 6M WB Wheel Bearings — Remove, clean and repack
- 6M CG Enclosed Hand Brake Cables — Remove inner cable from conduit and coat lightly with No. 0
- M CG Rocker Arm Gib Plate (Some models, 4 points only)
- M CG Rocker Arm Fulcrum Pin Bearing
- M CG Rocker Arm Gib Plate (Some models, 4 points only)
- 6M WB Wheel Bearings — Remove, clean and repack
- M CG Spring Wear Plate — Clean and coat
- M CG Rocker Arm Gib Plate
- M CG Lift Jack Bearing
- M CG Lift Jack Worm

### NOTES and KEY

Clean fittings before lubricating. Lubricate after washing. Clean parts with SOLVENT, dry cleaning, or OIL, fuel, Diesel. Dry before lubricating.

Reduce intervals under severe operating conditions. Extend when not in use.

Lubricate dotted arrow points on both sides. Opposite points are shown by short arrows.

WINCH CABLE—After each use, clean and oil with used crankcase oil or OE. Weekly, coat outer coils. Monthly, unwind entire cable, clean and oil.

OIL CAN POINTS — Monthly, lubricate Hinges, Latches, Lift Jack Linkage, Ramp Rollers, Winch Dog and Lock, Lunette Swivels, Parking Wheel and Parking Wheel Linkage, Hand Brake Ratchet, Linkage, Exposed Hand Brake Cables and Clevises with OE.

DO NOT LUBRICATE—Springs.

DISASSEMBLED PERIODICALLY BY ORDNANCE PERSONNEL — Shock absorbers (some models) (Refer to TM 9-881)



*Copy of this Lubrication Order will remain with the equipment at all times: instructions contained therein are mandatory and supersede all conflicting lubrication instructions dated prior to 9 September 1944.*

*By Order of the Secretary of War:*
*G. C. Marshall, Chief of Staff.*

*Official:*
*J. A. Ulio, Major General,*
*The Adjutant General.*

Requisition additional Lubrication Order from Adjutant General Depot. See lists in FM 21-6.

| LUBRICANTS | LOWEST ANTICIPATED AIR TEMPERATURES | | |
|---|---|---|---|
| | above +32°F. | +32°F. to 0°F. | below 0°F. |
| OE—OIL, engine | SAE 30 | SAE 10 | PS |
| CG—GREASE, general purpose | No. 1 | No. 0 | No. 0 |
| WB—GREASE, general purpose, No. 2 | | | INTERVALS W—Weekly M—Monthly 6M—6 Months |
| PS—OIL, lubricating, preservative, special | | | |

RA PD 344127

**Figure 23—Lubrication Order for Generator Trailer M18**

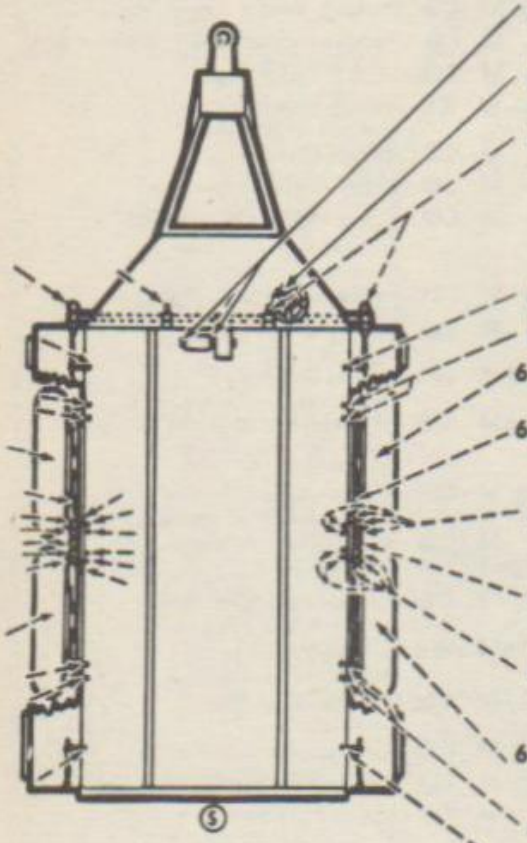
# WAR DEPARTMENT LUBRICATION ORDER No. 804

**WAR DEPARTMENT, WASHINGTON 25, D. C., 9 SEPTEMBER 1944**

## TRAILER, DIRECTOR, M13, M14

SNL G-221

For detailed instructions, refer to TM 9-881



| Interval | Lubricant | |
|---|---|---|
| M | OE | Blower Motor (M14 only) 6 to 8 drops |
| M | CG | Hand Brake Screw Brg. (To reach, remove cover plate on M14) |
| M | CG | Hand Brake Cross Shaft Bracket Brgs. Use hand gun (Some M13 and all M14 models, 3 points only) (Center bearing on M14 reached through hole in cover plate) |
| M | CG | Lift Jack |
| M | CG | Rocker Arm Gib Plate |
| 6M | WB | Wheel Bearings Remove, clean and repack |
| 6M | CG | Enclosed Hand Brake Cables Remove inner cable from conduit and coat lightly with No. 0 |
| M | CG | Rocker Arm Gib Plate (Some M13 and all M14 models, 4 points only) |
| M | CG | Rocker Arm Fulcrum Pin Bearing |
| M | CG | Rocker Arm Gib Plate (Some M13 and all M14 models, 4 points only) |
| 6M | WB | Wheel Bearings Remove, clean and repack |
| M | CG | Rocker Arm Gib Plate |
| M | CG | Lift Jack |

### NOTES and KEY

Clean fittings before lubricating. Lubricate after washing. Clean parts with SOLVENT, dry cleaning, or OIL, fuel, Diesel. Dry before lubricating.

Reduce intervals under severe operating conditions. Extend when not in use.

Lubricate dotted arrow points on both sides. Opposite points are shown by short arrows.

OIL CAN POINTS—Monthly, lubricate Hinges, Latches, Lunette Swivels, Lunette Socket (some models), Floor Bolts, Hand Brake Ratchet, Linkage, Exposed Hand Brake Cables and Clevises with OE. DO NOT LUBRICATE—Springs.

DISASSEMBLED PERIODICALLY BY ORDNANCE PERSONNEL — Shock Absorbers (Some models). (Refer to TM 9-881)

*Copy of this Lubrication Order will remain with the equipment at all times; instructions contained therein are mandatory and supersede all conflicting lubrication instructions dated prior to 9 September 1944.*

*By Order of the Secretary of War:*
*G. C. Marshall, Chief of Staff*

*Official:*
*J. A. Ulio, Major General,*
*The Adjutant General*

Requisition additional Lubrication Order from Adjutant General Depot. See lists in FM 21-6.

| LUBRICANTS | LOWEST ANTICIPATED AIR TEMPERATURES | | |
|---|---|---|---|
| | above +32°F. | +32°F. to 0°F. | below 0°F. |
| **OE**—OIL, engine | SAE 30 | SAE 10 | **PS** |
| **CG**—GREASE, general purpose | No. 1 | No. 0 | No. 0 |
| **WB**—GREASE, general purpose, No. 2 | | | **INTERVALS** **M**—Monthly **6M**—6 Months |
| **PS**—OIL, lubricating, preservative, special | | | |



RA PD 344125

***Figure 24—Lubrication Order for Director Trailers M13, M14 and M22***

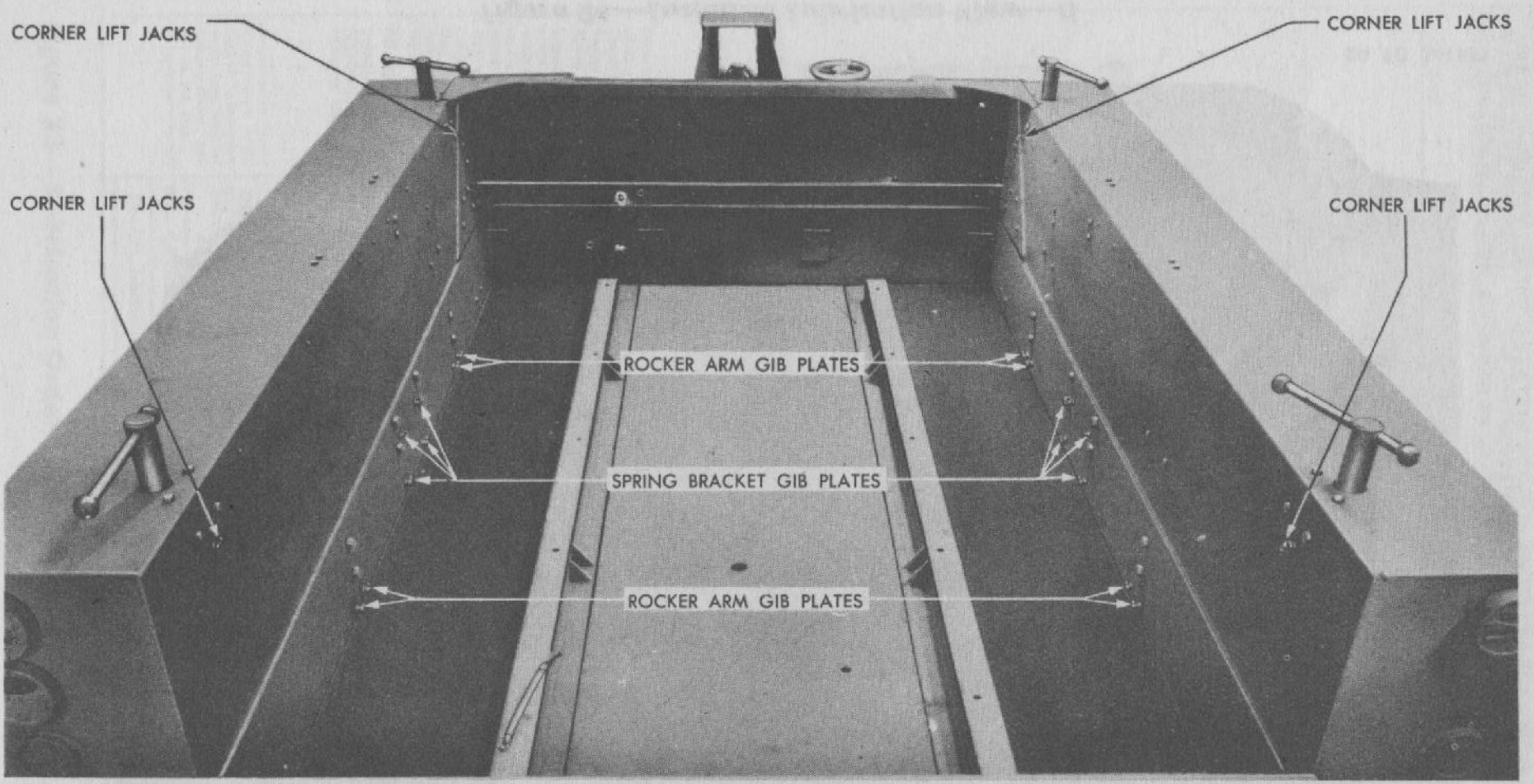



***Figure 25—Localized Lubrication View—A***

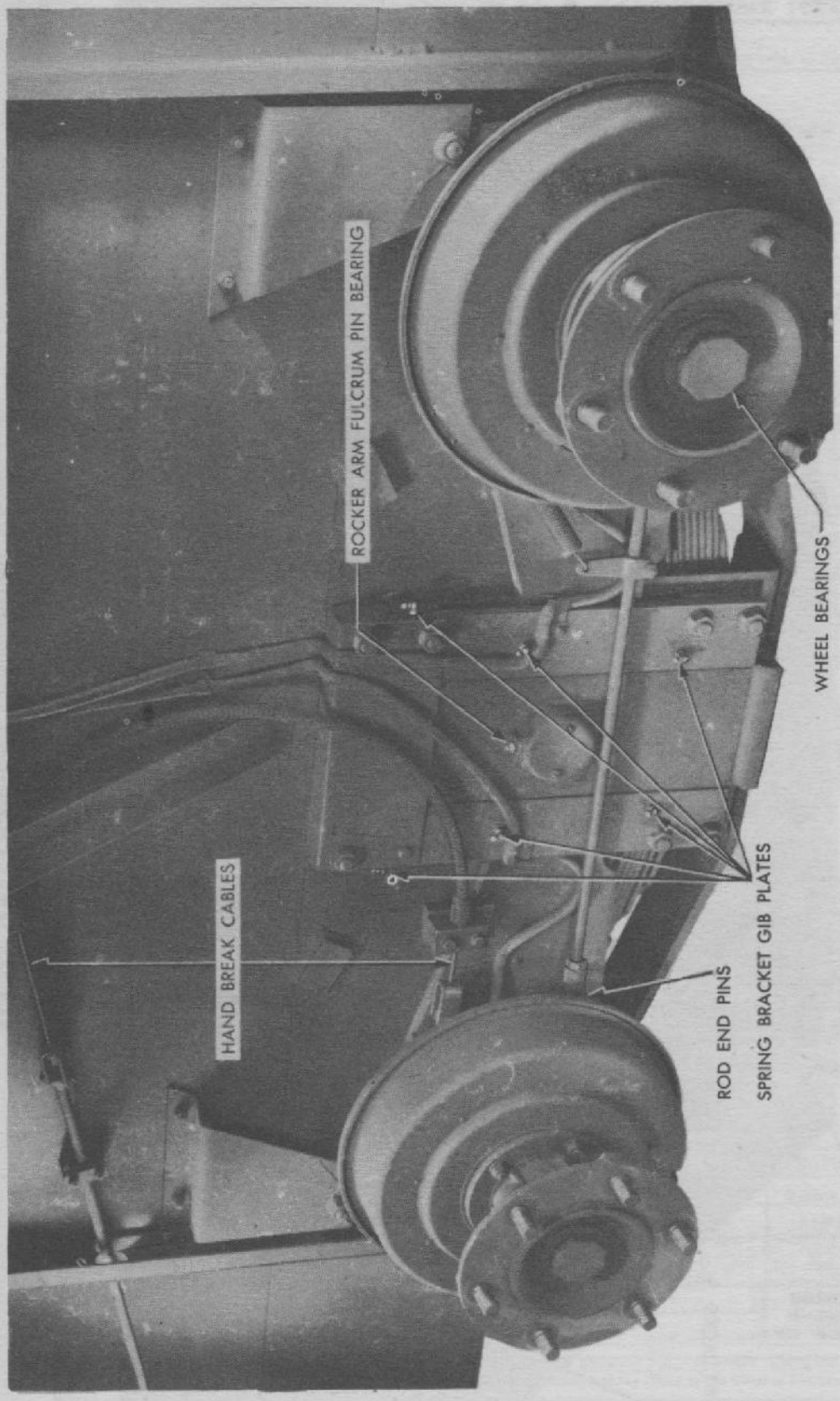
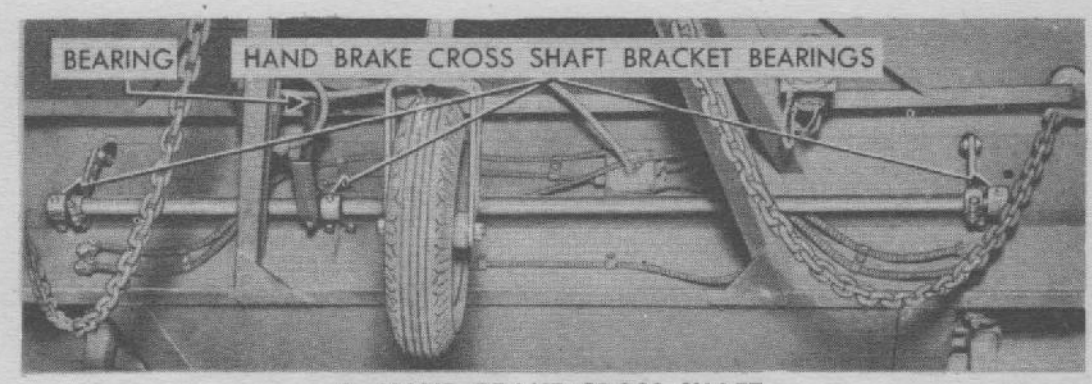
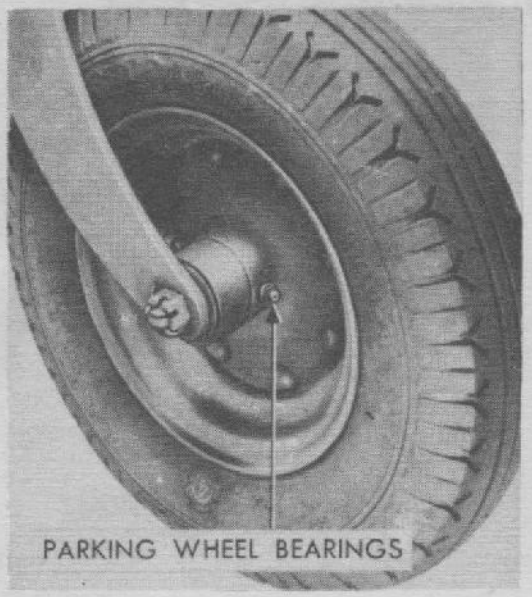


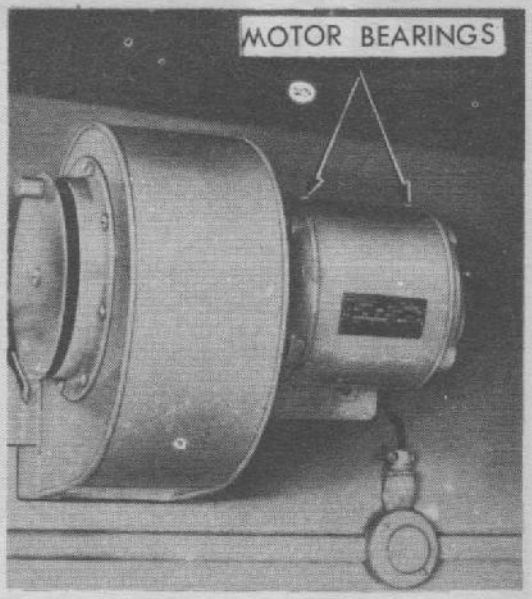

***Figure 26—Localized Lubrication View—B***



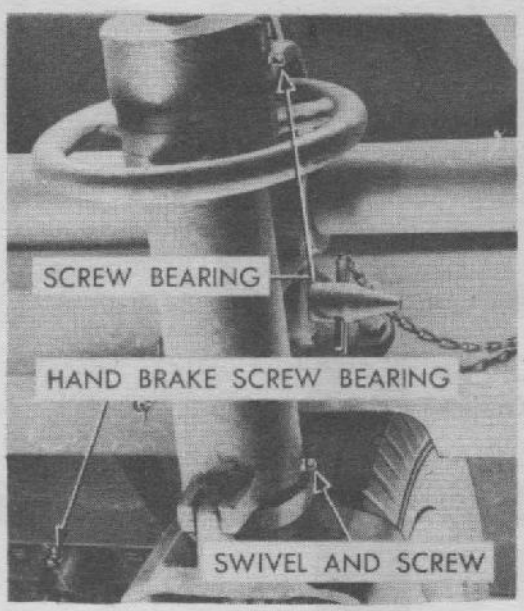

A—HAND BRAKE CROSS SHAFT



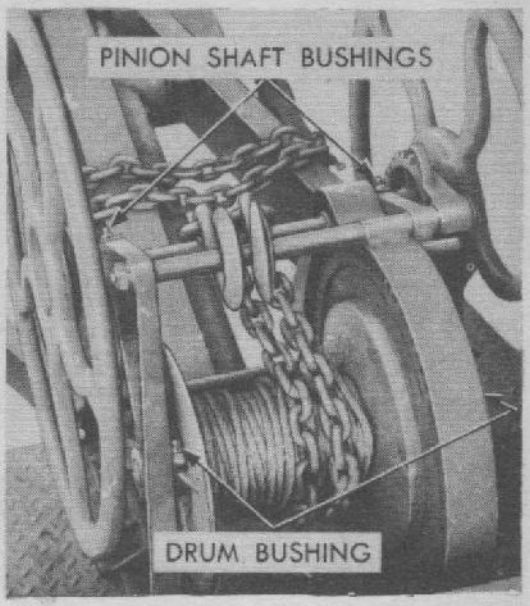

B—PARKING WHEEL




C—BLOWER MOTOR



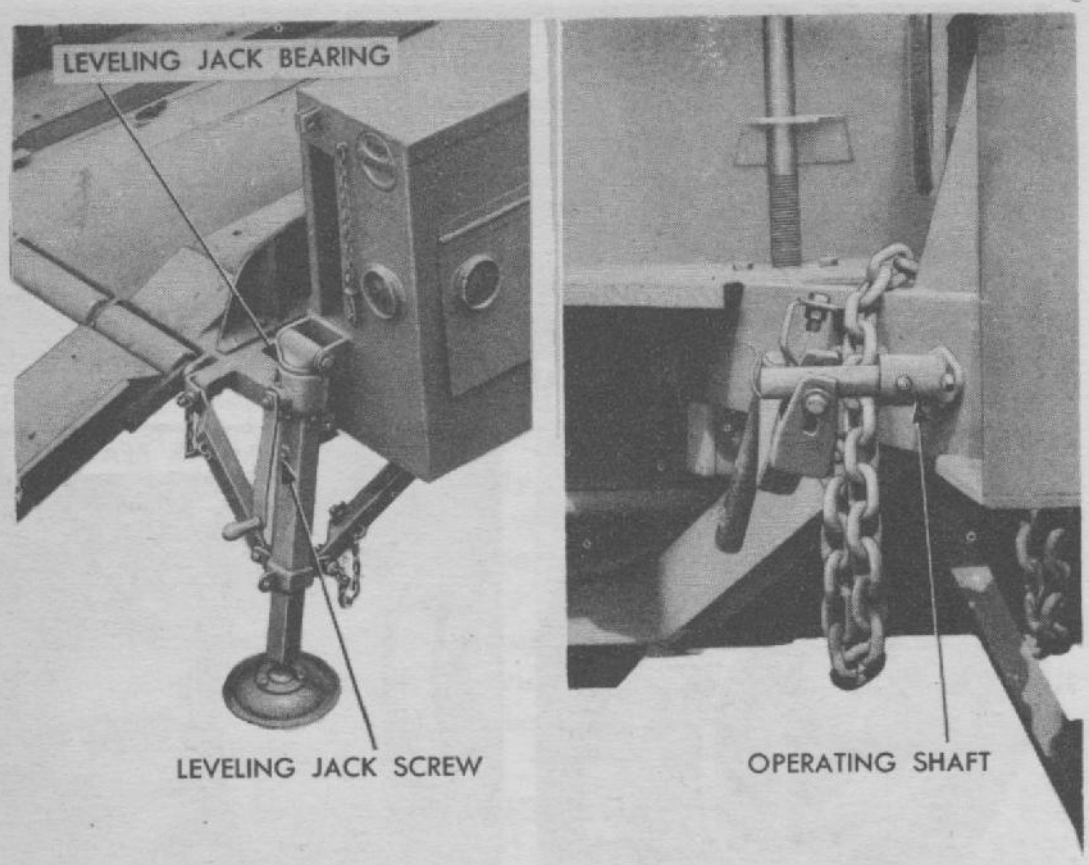

D—PARKING WHEEL ASSEMBLY




E—HAND WINCH

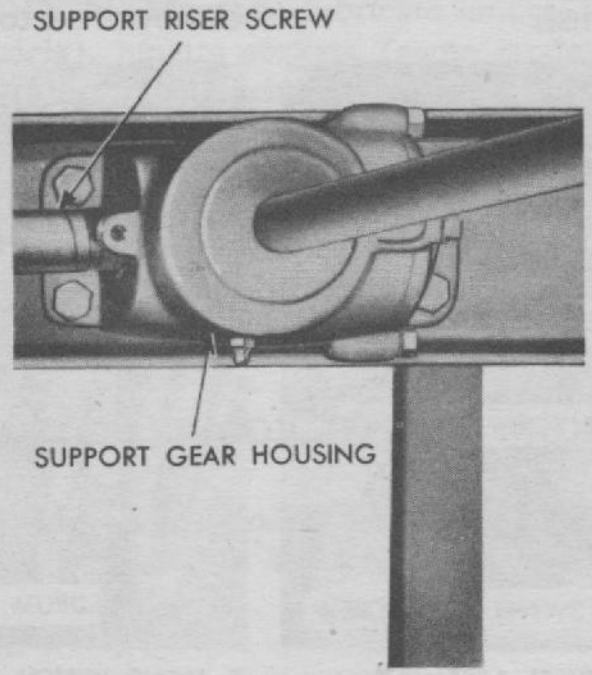
RA PD 341582

***Figure 27—Localized Lubrication Views—C***




A—LEVELING JACK

B—SUPPORT OPERATING SHAFT




C—SUPPORT GEAR HOUSING

RA PD 341583

***Figure 28—Localized Lubrication Views—D***

Section XIII

# PREVENTIVE MAINTENANCE SERVICES

## 27. 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 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.

## 28. DRIVER MAINTENANCE (First Echelon).

*a. Purpose.* To insure 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 correction must be reported at the earliest opportunity to designated individual in authority. The services set forth in paragraphs 29,

30, 31 and 32 are those performed by the driver Before-operation, During-operation, At-halt, 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" 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.

## 29. BEFORE-OPERATION SERVICE.

*a. Purpose.* This inspection schedule is designed primarily as a check to see that vehicle has not been damaged, tampered with, or sabotaged since the After-operation Service was performed. Various combat conditions may have rendered vehicle unsafe for operation and it is the duty of the driver to determine whether 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 procedure described, and correcting or reporting any deficiencies. Upon completion of the service, results will be reported promptly to designated individual in authority.

(1) ITEM 1, TAMPERING AND DAMAGE. Inspect trailer in general, its equipment, and attachments, for any injury that may have been caused by tampering, sabotage, shell fire, or collision since parking.

(2) ITEM 2, FIRE EXTINGUISHER. Examine fire extinguisher to see that it is in good condition, fully charged, and securely mounted. Full charge on $CO_2$-type extinguishers can only be determined by having the cylinders weighed. Contents of $CC1_4$ extinguishers can be determined by removing filler plug.

(3) ITEM 12, LAMPS (LIGHTS) AND REFLECTORS. Inspect all lamps and reflectors for looseness and damage. Clean lenses. If trailer is attached to towing vehicle and tactical situation permits, operate light switch to see that lamps respond properly.

(4) ITEM 13, WHEEL NUTS. Examine wheels and hubs to be sure assembly and mounting nuts are present and secure.

(5) ITEM 14, TIRES. Inspect tires for underinflation and damage. Remove any objects embedded in treads or carcasses. Correct pressure is 55 pounds (cool).

(6) ITEM 15, SPRINGS AND SUSPENSIONS. Examine springs, rocker arms, rocker arm fulcrum bearings, truss bars, gib plates, and wear plates to see that they are in good condition, correctly assembled, and securely mounted.

(7) ITEM 18, TOWING CONNECTIONS. Inspect drawbar, safety chains, lunette, and prime mover to trailer electrical connections to see that they are in good condition, correctly assembled, and securely mounted. If trailer is connected to prime mover, see that all electrical connections are correctly made, properly locked and supported. See that lever on safety switch is in the "OFF" position. NOTE: *If buzzer sounds, this indicates that switch is in the applied position.* Be sure safety chains are securely attached.

(8) ITEM 19, BODY LOAD, PAULIN, CAMOUFLAGE NET, AND CORNER LIFT JACKS. Examine body for damage, loose mounting of assembly nuts or screws, and broken welds. On bodies so equipped, inspect bows, tailgates, tailgate chains and hinges, side panes and paulins to see that they are in good condition, correctly assembled, and securely mounted. See that paulins and camouflage nets are in good condition, properly lashed, or stowed. Inspect corner lift jacks to see that they are in good condition, securely mounted, and that they operate properly. Examine retractable landing wheel on M7 and retractable support on M18 to see that they operate properly, are in good condition, and securely mounted.

(9) ITEM 20, DECONTAMINATOR. Check decontaminator to see that it is fully charged and securely mounted.

(10) ITEM 21, TOOLS AND EQUIPMENT. Check tools and equipment against vehicle stowage list (pars. 6, 7, and 8) to see that they are all present, serviceable, and properly stowed.

(11) ITEM 23, VEHICLE PUBLICATIONS AND FORM No. 478. The vehicle operator's manuals, Lubrication Order and Form No. 478 (MWO and Major Unit Assembly Replacement Record), must be with the vehicle, legible, and properly stowed.

## 30. 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). When brakes are used or the vehicle is 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.

(1) ITEM 27, FOOT AND HAND BRAKES. During operating, when trailer electric brake control on prime mover is applied or the hand brake operated, observe if trailer brake action appears to be satisfactory.

(2) ITEM 34, RUNNING GEAR. While trailer is in motion, be on the alert for any unusual noise, excessive sag, sway, or drag that would indicate damage, looseness, excessive wear, or inadequately lubricated or tight wheel bearings, loose wheels, or underinflated tires.

(3) ITEM 35, BODY. While trailer is in motion, observe if there is any indication of loose body or equipment to body mounting bolts, nuts, or screws or broken body welds. NOTE: *Body corner jacks must be in correct raised position and properly locked when not in use.*

(4) ITEM 36, GUN, GENERATOR AND/OR DIRECTOR, MOUNTINGS. While gun, generator, or director is in operation, observe if there are any indications of loose base to body mounting nuts or screws.

## 31. 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. At each halt, hand-feel each wheel hub and brake drum for overheating.

(2) ITEM 42, SPRINGS AND SUSPENSIONS. Inspect springs and suspensions for any unusual sag, damage, or looseness.

(3) ITEM 44, WHEEL NUTS. Examine all wheel mounting nuts to see that they are all present and secure.

(4) ITEM 45, TIRES. Inspect tires for damage and underinflation, and remove any objects imbedded in treads and carcasses.

(5) ITEM 50, TOWING CONNECTIONS. Examine all towing devices and connections to see that they are in good condition, properly connected, and securely locked.

(6) ITEM 51, BODY, PAULIN, AND CAMOUFLAGE NET. Inspect body for damage, loose mounting of assembly nuts or screws and

broken welds. Be sure gun, director, or generator base is secure to trailer floor. Inspect paulins and camouflage net for damage and see that they are properly installed and lashed or properly stowed.

## 32. 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 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 during the day in Before-operation, During-operation, and At-halt Services. The After-operation Service consists of inspecting and servicing the following items. Those items of the After-operation 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, LAMP AND REFLECTORS. Clean light and warning reflector lenses and examine units for looseness and damage. See that lamp connections are clean and secure.

(2) ITEM 60, FIRE EXTINGUISHER. Examine fire extinguisher to see that it is in good condition, fully charged, and securely mounted. Refer to item 2 in Before-operation Service.

(3) ITEM 61, DECONTAMINATOR. Inspect decontaminator to see that it is in good condition, fully charged, and securely mounted.

(4) ITEM 62, *BATTERY.

*(a)* Examine hot-shot battery to see that it is securely connected and mounted.

*(b) Weekly.* Inspect battery terminals to see that they are clean and securely connected.

(5) ITEM 64, *ELECTRICAL WIRING, SWITCHES, AND FUSE PANEL.

*(a)* Inspect accessible electrical wiring, safety switch, and fuse panel to see that they are in good condition, securely connected and mounted. See that lever on safety switch is in the "OFF" position. NOTE: *If the buzzer sounds, this is an indication that switch is in the applied position.*

*(b) Weekly.* Examine safety switch and fuse panel to see that switch is operating properly and fuses are clean and firmly connected.

(6) ITEM 68, *TIRES.

*(a)* Inspect tires for damage and remove all objects lodged in carcasses or treads. Inflate to 55 pounds maximum (cool).

*(b) Weekly.* Report excessively worn or otherwise unserviceable tires for repair or replacement. Apparent mechanical deficiencies causing such wear should be reported for attention by higher echelon. Rotate worn but serviceable tires if necessary.

(7) ITEM 69, *SPRINGS AND SUSPENSIONS.

*(a)* Examine springs, rocker arms, rocker arm fulcrum bearings, truss bars, gib plates, and wear plates to see that they are in good condition, correctly assembled, and securely mounted.

*(b) Weekly.* Inspect springs for broken or shifted leaves.

(8) ITEM 77, *TOWING CONNECTIONS.

*(a)* Inspect drawbar and all towing connections to see that they are in good condition, correctly assembled, and securely mounted.

*(b) Weekly.* Examine drawbar, safety chains, and emergency brake chain connections.

(9) ITEM 78, BODY, PAULIN, AND CAMOUFLAGE NET. Examine body for damage, loose mounting of assembly nuts or screws and broken welds. Be sure gun, generator, or director base is secure to trailer floor. Inspect paulin and camouflage net to see that they are in good condition and securely lashed or stowed.

(10) ITEM 79, *WINCH.

*(a)* On M18 model only, examine hand-operated winch to see that it is in good condition, securely mounted, and that pawl engages in ratchet wheel securely.

*(b) Weekly.* Inspect entire length of cable for flat or rusty spots or broken strands. Clean cable and oil lightly as cable is rewound evenly on winch drum.

(11) ITEM 82, *TIGHTEN.

*(a)* Tighten all trailer assembly or attachment mounting nuts or screws found loose during this inspection.

*(b) Weekly.* Tighten wheel mounting nuts, suspension bracket, spring and truss bar nuts securely.

(12) ITEM 83, *LUBRICATE.

*(a)* Lubricate all points of trailer indicated on Lubrication Order as requiring daily lubrication.

*(b) Weekly.* Lubricate all points of trailer indicated on Lubrication Order as requiring lubrication on a weekly or mileage basis.

(13) ITEM 84, *CLEAN VEHICLE.

*(a)* Clean all excess mud, dirt, and grease from entire trailer.

*(b) Weekly.* Wash vehicle if facilities and tactical situation permit. If washing is not practicable, wipe off as clean as possible and look for rust or bright spots in paint that may cause glare or reflection. Be sure vehicle markings, unless covered for tactical reasons, are legible.

## 33. 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 the 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 surfaces are slightly soiled or dusty.

***c. Sources of Additional Information.*** If instructions other than those contained in general procedures in subparagraph ***d,*** or 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 lubricant should be wiped over 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 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 27 ***b.***

*f. Special Services.* These are indicated by repeating the item number 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 vehicle with dry-cleaning solvent to remove excess lubricant, dirt, and other foreign material. After parts are cleaned, rinse them in clean solvent and dry them thoroughly. Take care to keep 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 which 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 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 times 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.

*h. 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 the 1000-mile (Monthly) and 6000-mile (6-month) maintenance procedures, whichever shall occur first, are described in the following chart. Each page of the chart has two columns at its left edge corresponding to the 6000-mile and the 1000-mile maintenance respectively. Very often it will be found that a particular procedure does not apply to both scheduled maintenances. In order to determine which procedure to follow, look down the column corresponding to the maintenance due, and wherever an item number appears, perform the operations indicated opposite the number.

## ROAD TEST

| MAINTENANCE | |
|---|---|
| 6,000 Mile (6-Month) | 1,000 Mile (Monthly) |
| | |
| 1 | 1 |
| 5 | 5 |
| 10 | 10 |
| 13 | 13 |
| 47 | 47 |

NOTE: *When tactical situation does not permit a full road test, perform those items which require little or no movement of vehicle. When a road test is possible, confine it to from 3 to 5 miles.*

BEFORE-OPERATION INSPECTION. Before making the road test, perform the Before-operation Service as outlined in paragraph 29.

BRAKES. With trailer in motion, test service brakes by operation of controls on prime mover, observing if they operate effectively and if there is any indication of side pull, noise, or chatter. Stop vehicle and test parking brakes. Observe if control mechanism operates properly and prevents vehicle from moving.

UNUSUAL NOISE (ATTACHMENTS, BODY AND WHEELS). Observe if there is any unusual noise from trailer attachments, such as body, doors, side panels, also trailer suspension units and wheels that might indicate looseness, damage, inadequate lubrication or underinflated tires.

TEMPERATURES (BRAKE DRUMS AND HUBS). After completion of road test, cautiously hand-feel each brake drum and wheel hub for indication of overheating.

TIRES AND RIMS. Inspect and service as follows:

VALVE STEMS AND CAPS. Observe if valve stems are in good condition and in correct position, and see that valve caps are present.

CONDITION. With tires properly inflated to 55 pounds (maximum) (cool), examine them for cuts, bruises, breaks, and blisters. Remove any objects such

| MAINTENANCE | |
|---|---|
| 6,000 Mile (6-Month) | 1,000 Mile (Monthly) |

as glass, nails, or stones embedded in treads or carcasses. Look for irregular tread wear, such as flat spots, cupping, feather edge, or one-sided wear. Remove tires worn thin or otherwise unserviceable and exchange for new or retreaded tires. If tires are worn unevenly, but still serviceable, change wheel positions to even wear. Apparent mechanical deficiencies that will cause tire wear should be corrected or reported.

MATCHING. Tires with different types of tread or with differences in over-all circumferences in excess of ¾ inch should not be used on the same vehicle.

RIMS. Inspect wheel rims and side rings to see that they are in good condition and secure. NOTE: *If wheels have been removed, do not reinstall them until wheel bearing and brake service items 48, 49, and 52 have been performed.*

48 — BRAKES (DRUMS, SUPPORTS, MAGNETS, ARMATURES). Remove wheels, hubs, and drums. Inspect brake drums to see if they are in good condition and secure to hubs. Look particularly for excessive scoring or distortion. Examine supports (backing plates) for looseness or damage. Be sure that magnets and armatures are in good condition, clean, and correctly assembled. Also see that magnet connections are secure.

49 — BRAKE BANDS (LININGS, ANCHORS, WEBB BUSHINGS, AND RETRACTING SPRINGS). Examine brake linings through inspection openings to see if they are so worn that the rivet heads may contact the drums in the next 1000 miles of operation. If trailer has been operated in water, mud, loose sand or dirt which may have entered the drums, remove one wheel and drum assembly and inspect linings for damage. If this lining must be replaced, also replace linings on all brakes and lubricate wheel bearings (par. 26 *d* (4)). Adjust bearings as outlined for 6000-mile maintenance in item 52 below.

49 — With wheel hub and drum assemblies removed (fig. 93), inspect linings to see if they are in good condition, securely riveted to bands, in good wearing contact with drums, and not oil-soaked or excessively worn. See that brake bands are in good condition, properly secured and guided by anchors and guides, and that retracting springs have sufficient tension to return bands to correct released position. Thickness of brake linings above

| MAINTENANCE | | |
|---|---|---|
| 6,000 Mile (6-Month) | 1,000 Mile (Monthly) | |
| | | rivet heads must be sufficient for at least 1000 miles of operation. |
| | | CLEAN. Clean linings and operating mechanism with a brush and blow off with compressed air. |
| | | ADJUST. When performing item 52, adjust wheel bearings according to instructions in paragraph 79 *c*. |
| 51 | 51 | SPRINGS, SEATS AND FULCRUM BEARINGS. Inspect spring brackets, fulcrum bearings, gib plates, and truss bars (fig. 64) to see that they are in good condition, correctly assembled, and securely mounted. |
| | | SPECIAL LUBRICATION. Lubricate fulcrum bearings according to Lubrication Order, paragraph 26. |
| | 52 | WHEELS, BEARINGS, AND SEALS. Inspect wheels to see if they are in good condition. Revolve wheels and observe any indication of bearing looseness or dry or damaged bearings. See that grease is not leaking around hub cap and tighten wheel mounting nuts and hub cap securely. |
| 52 | | Remove wheel bearings and oil seals (fig. 94), wash thoroughly in dry-cleaning solvent, and inspect bearing cups, cones, rollers, and oil seal for damage or excessive wear. Replace as necessary. |
| | | SPECIAL LUBRICATION. When all related items are performed to a point where bearings are to be reinstalled, lubricate according to instructions in Lubrication Order, paragraph 26. |
| | | ADJUST. Adjust wheel bearings to specifications in paragraph 79 *c*, and be sure spindle nuts and hub caps are secure. |
| 79 | 79 | BODY MOUNTINGS. Inspect all body to frame mounting nuts or welds to be sure they are secure. Be sure all equipment base mounting nuts are present and secure. |
| 80 | 80 | FRAME. Inspect frame rails and crossmembers to see if they are in good condition and secure. |
| 81 | 81 | WIRING, CONDUITS, SWITCH AND FUSE BLOCK. Examine all electrical wiring, conduits, and support clips to see that they are in good condition, securely mounted, and connected. Operate switch to see that buzzer responds, and inspect fuse block to see that all fuses are in good condition and securely connected. |
| 85 | 85 | VEHICLE LUBRICATION. Perform a complete lubrication service on trailer according to Lubrication |

| MAINTENANCE | |
|---|---|
| 6,000 Mile (6-Month) | 1,000 Mile (Monthly) |
| | | Order, paragraphs 25 and 26. Omit only those items that have been lubricated or serviced during performance of the foregoing specific procedures. Replace missing or damaged lubrication fittings. |
| 87 | 87 | WINCH. On M18 only (fig. 97), examine winch to see that it is in good condition and securely mounted, and that pawl engages in ratchet wheel securely. Inspect entire length of cable for flat or rusty spots or frayed strands. |
| | | CLEAN. Clean cable with light oil and apply a thin coating of oil as cable is rewound on winch drum evenly. |
| 89 | 89 | TRACTOR TO TRAILER WIRING CONNECTIONS. Observe prime mover to trailer wiring to see that it is in good condition and securely fastened to clips, springs, and brackets so that it will not chafe or interfere with moving parts. See that connections are in good condition and lock securely. |
| 91 | 91 | LAMPS (LIGHTS) TAIL, MARKER, STOP, AND BLACKOUT. Wipe off lenses and inspect all lamp assemblies to see that they are in good condition and secure. If tactical situation permits, operate switch on prime mover to see that all lamps respond properly. |
| 92 | 92 | SAFETY REFLECTORS. Clean all safety reflectors and examine units to see that they are in good condition and securely mounted. |
| 100 | 100 | BODY (PANELS, DOORS, TAILGATE AND CHAINS, SOCKETS, BOW TOPS, PAULINS, END CURTAINS, SEATS, AND STOWAGE COMPARTMENTS). Examine all these items to see if they are in good condition and securely mounted, lashed, or connected. Be sure hinges and latches operate properly and are free, but not excessively worn. Look for missing or loose assembly bolts, nuts, or screws and broken welds. Clean out stowage compartments. |
| 103 | 103 | PAINT AND MARKINGS. Inspect paint on entire trailer to see that it is in good condition, paying particular attention to any bright spots that might cause glare or reflection. Inspect trailer markings and identification for legibility. |
| 124 | 124 | TOW HITCH (LUNETTE AND TONGUE). Examine lunette and tongue to see that they are in good condition, securely assembled, and mounted. |
| 124 | | TIGHTEN. Tighten all lunette and tongue mountings and assembly bolts securely. Pay particular attention to lunette height adjusting bolt nuts. |

| MAINTENANCE | | |
|---|---|---|
| 6,000 Mile (6-Month) | 1,000 Mile (Monthly) | |
| 125 | 125 | ELECTRIC CONNECTIONS. Inspect prime mover to trailer electric connections to see that they are in good condition, securely supported, and connected. |
| 126 | 126 | SAFETY DEVICES (CHAIN SWITCH AND BATTERY). Examine these items to see that they are in good condition, securely mounted, and connected to prime mover and trailer. Examine switch to see that lever moves freely. When operating safety switch lever, observe whether buzzer sounds and if brake shoes can be heard to contact the drums. With trailer connected to prime mover and vehicles moving, apply safety switch lever and observe whether brakes hold trailer. If brakes do not hold, replace battery and tighten all connections. CAUTION: *Safety chain must have sufficient slack to allow trailer to turn without applying trailer brakes through safety switch.* |
| 127 | 127 | LANDING GEAR. Lower and raise corner lift jacks to see that they operate properly, are in good condition, and securely mounted. Examine retractable landing wheel on M7 and retractable landing support on M18, to see that they operate properly, are in good condition, and securely mounted. |
| 130 | 130 | PARKING BRAKES. Apply trailer parking brakes and observe whether they operate properly, hold the vehicle securely, and if brake mechanism releases when brake handwheel is in raised position. |
| 131 | 131 | TOOLS. Check to see that all tools and equipment (see On-vehicle stowage list, par. 6) are present, in good condition, and properly mounted or stowed. |
| 132 | 132 | FIRE EXTINGUISHERS. See that fire extinguisher is in good condition, fully charged, and securely mounted. |
| 133 | 133 | DECONTAMINATOR. Examine decontaminator to see that it is in good condition, fully charted, and securely mounted. |
| 134 | 134 | FIRST AID KIT. Be sure first aid kit is in good condition and that all items are present and properly packed. |
| 141 | 141 | MODIFICATIONS. Inspect trailer to be sure all modification work orders have been completed and |

| MAINTENANCE | |
|---|---|
| 6,000 Mile (6-Month) | 1,000 Mile (Monthly) |
| 142 | 142 |

entered on Form No. 478. Enter any modifications or major unit assembly replacements made at time of this service.

FINAL ROAD TEST. After completion of maintenance operations, road test the trailer to be sure all services performed are satisfactory. NOTE: *Correct or report any deficiencies found during final road test.*

## Section XIV

# TROUBLE SHOOTING

### 34. 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 list of possible causes of the trouble. The tests necessary to determine which one of the possible causes is responsible for the trouble are explained after each possible cause.

### 35. BRAKES.

*a. No Brakes or Intermittent Brakes.*

(1) JUMPER CABLE NOT CONNECTED. Connect jumper cable between towing vehicle and trailer (par. 14 *b*).

(2) BROKEN OR DAMAGED WIRE. Check amperage (par. 48 *a*). Install new wire if necessary. All splices or joints must be soldered when making a permanent repair.

(3) POOR CONNECTIONS. Check, clean, and tighten all connections at brakes, controller, resistor, load control, and coupling sockets.

(4) DEFECTIVE PLUG OR SOCKET. Check plug and socket for loose connections, dirty or corroded blades, or broken bakelite insert in socket. Replace damaged parts (par. 54).

(5) CONTROLLER DEFECTIVE. See paragraph 47.

(6) MAGNET SHORTED. With magnet removed from backing plate, check magnet (par. 50 *d* (1)).

(7) MAGNET BURNED OUT. Check magnet (par. 50 *d* (1)).

*b. Weak Brakes.*

(1) WORN OUT LINING. The brake lining may be worn to the full extent of magnet travel. Replace band and lining assembly (par. 49).

(2) WORN BRAKE DRUM. Replace brake drum (par. 79).

(3) GLAZED MAGNET FACING. If magnet facing is glazed, replace magnet and armature (par. 50).

(4) GREASY MAGNET FACING. Remove grease from magnet facing with dry-cleaning solvent. If this is not effective, replace magnet and armature (par. 50).

(5) GREASY BRAKE LINING. Replace lining and band assembly (par. 49).

(6) BROKEN WIRE IN INSULATION. Check entire wiring system (par. 47).

(7) INCORRECT ARMATURE DEPRESSION. See paragraph 50 *h*.

(8) INSUFFICIENT CURRENT. Insufficient current may be due to poor connections at the brakes, sockets, plugs, controller, load controller, starter motor, or ground connections. Check, clean, and tighten.

*c. Grabbing Brakes.*

(1) LOOSE WHEEL BEARINGS. Tighten wheel bearings (par. 79 *c*.

(2) STICKY OR GREASE-SOAKED LINING. Replace band and lining assembly (par. 49).

(3) DRUM OUT OF ROUND. Replace drum (par. 79 *a* (2) and 79 *b* (3)).

(4) LINING LOOSE ON BAND. Replace or tighten rivets.

(5) BROKEN OR WEAK BAND RETURN SPRING. Replace return spring (par. 49).

(6) CONTROLLER BURNED OUT. Check brake controller on towing vehicle (par. 47 *a*).

(7) CONTACT ARM IN CONTROLLER PITTED. Smooth out contact arm with fine flint paper.

(8) CONTACT BLADES IN CONTROLLER BENT. Straighten blades with thin-nosed pliers.

(9) BUSHING WORN IN MAGNET. Refer to higher authority.

(10) BROKEN OR WEAK BAND RETURN SPRING. Replace spring (par. 49).

(11) LOOSE OR BROKEN INTERNAL PARTS. Remove wheel and hub assembly and check internal braking parts for sound condition. Replace broken parts (par. 79).

*d. Noisy Brakes.*

(1) LOOSE OR WORN WHEEL BEARINGS. Replace or adjust wheel bearings (par. 79 *c*).

(2) DRUM OUT OF ROUND. Replace drum (par. 79 *a* (2) and 79 *b* (3)).

(3) DRUM SCORED. Replace drum (pars. 79 *a* (2) and 79 *b* (3)).

(4) LINING LOOSE ON BAND. Replace band assembly (par. 49).

## 36. UNDERCONSTRUCTION.

*a. Uneven Riding.*

(1) BROKEN SPRING LEAVES. Replace spring (par. 61).

(2) TIRES NOT PROPERLY INFLATED. Inflate tires to 55 pounds pressure (cool).

(3) UNEVEN LOAD DISTRIBUTION. Distribute load evenly.

(4) SHOCK ABSORBERS NOT FUNCTIONING PROPERLY. Replace shock absorber.

*b. Excessive Noise.*

(1) GIB WEAR PLATES WORN IN ROCKER ARM. Replace wear plates.

(2) GIB WEAR PLATE WORN IN SPRING HANGER. Replace wear plates.

(3) BOLTS HOLDING SPRING TO SPRING HANGER NOT TIGHT. Tighten bolts.

(4) BROKEN SPRING LEAVES. Replace spring (par. 61).

(5) BOLTS HOLDING TRUSS BAR NOT TIGHT. Tighten truss bar bolts.

(6) BOLTS HOLDING GIB WEAR PLATE AND GIB WEAR PLATE SPACERS TO TRAILER BODY NOT TIGHT. Tighten all bolts holding plates and spacers.

## 37. WHEELS AND HUBS.

*a. Wobbly Wheels.*

(1) LOOSE WHEEL STUD NUTS. Tighten nuts.

(2) INNER OR OUTER WHEEL BEARINGS BURNED OUT. Replace wheel bearings (par. 79).

(3) BENT SPINDLE ON ROCKER ARM. Report to higher authority.

(4) IMPROPER WHEEL BEARING ADJUSTMENT. Adjust bearings (par. 79 *c*).

(5) UNDUE TIRE WEAR. Improper inflation of tires. Inflate tires to 55 pounds pressure (cool).

## 38. HEATER (M14 and M22 Only).

*a. Lighting and Fuel Flow Difficulties.*

(1) AIR BUBBLES IN FUEL LINE. Bleed fuel line (par. 16 *a* (2)).

(2) FUEL TANK EMPTY. Fill fuel tank (par. 16 *a* (1)).

(3) DIRTY FUEL FILTER. Clean filter (par. 65 *d*).

(4) WATER IN FUEL. Water in fuel is the result of temperature change which causes condensation within tank. Remove fuel and refill using new fuel.

(5) FLUE BLOCKED. Remove flue and clean. Make certain that flue is not blocked with ice or snow.

(6) DIRTY FUEL CONTROL VALVE. Replace fuel control valve (par. 64).

(7) SHUT-OFF COCK CLOSED ON FUEL TANK. Open shut-off cock.

(8) HEATER PUFFS OR BACKFIRES. See safety instructions (par. 16 *a* (3)).

*b. Incomplete Combustion.* If trouble is encountered in maintaining complete (smokeless) combustion, the cause may be due to any one or more of the following conditions:

(1) FUEL CONTROL VALVE NOT WORKING PROPERLY. Replace fuel valve (par. 64).

(2) DRAFT CONTROL ROD. The draft control rod may not be all the way to the right in "FORCED DRAFT" position. Throw rod left to "NATURAL DRAFT" position and then right to "FORCED DRAFT" position. The air inlet shutter should snap into position when draft control rod is turned. If shutter does not close tight, it would indicate that shutter spring is out of place or broken, or that shutter has become damaged. In either case, report to higher authority.

(3) DIRTY OR DAMAGED FLUE VENTILATOR. Remove flue, and clean or replace. Make certain that flue is not blocked with ice or snow.

*c. Flooded Burner.*

(1) FUEL VALVE OPEN TOO WIDE. Do not turn fuel valve completely to "ON" position when lighting and warming up.

(2) FUEL VALVE LEFT OPEN. Make certain that fuel valve is closed while fire is not lighted.

(3) FUEL VALVE OUT OF ADJUSTMENT. Adjust fuel valve by removing handle and reinstalling so that stop is reached with valve closed.

(4) OVERFLOW DRAIN TUBE CLOGGED. Make certain tube is open (par. 16 *a* (3) *(e)* ).

**39. LANDING GEAR (Trailer M18 Only).**

*a. Difficult to Operate.*

(1) INSUFFICIENT LUBRICATION. Lubricate (see par. 26).

(2) BENT CONNECTING ROD. Replace bent connecting rod (par. 59).

(3) BENT LEG ASSEMBLY. Replace bent leg assembly (par. 59).

**40. WINCH (Trailer M18 Only).**

*a. Drum Will Not Revolve When Handwheel is Turned.*

(1) SHEARED WOODRUFF KEY IN PINION GEAR. Report to higher authority.

(2) SHEARED WOODRUFF KEY IN HANDWHEEL AND PINION GEAR SHAFT. Report to higher authority.

(3) BROKEN TEETH ON PINION GEAR. Report to higher authority.

**41. CORNER LIFT JACKS (Trailers M7, M13, M14, M17, and M22).**

*a. Difficult to Operate.*

(1) LACK OF LUBRICATION. Lubricate (see par. 26).

(2) BENT TUBING. Replace corner lift jack (par. 57 *a*).

(3) BENT SCREW IN TUBING. Replace jack (par. 57 *a*).

**42. LEVELING JACKS (M18 Only).**

*a. Jack Will Not Raise or Lower When Hand Crank is Turned.*

(1) DRIVE PIN SHEARED IN GEAR. Install new pin.

(2) TEETH BROKEN ON GEAR. Replace jack (par. 57 *b*).

(3) BROKEN PINION GEAR. Replace jack (par. 57 *b*).

*b. Difficult to Operate.*

(1) LACK OF LUBRICATION. Lubricate (see par. 26).

(2) BENT INNER TUBE. Replace jack (par. 57 *b*).

(3) GEAR CAP TOO TIGHT. Replace jack (par. 57 *b*).

**43. ELECTRICAL SYSTEM (LIGHTS)**

*a. Lights Will Not Burn.*

(1) JUMPER CABLE NOT PLUGGED INTO TRAILER FROM TOWING VEHICLE. Install jumper cable.

(2) LIGHT SWITCH AT TOWING VEHICLE IN "OFF" POSITION. Turn switch on.

(3) BATTERY AT TOWING VEHICLE NOT SUFFICIENTLY CHARGED. Check battery on towing vehicle.

(4) NO CURRENT FROM TOWING VEHICLE. Check wiring on towing vehicle.

(5) BROKEN OR DAMAGED WIRES. Check wiring system for broken or damaged wires and replace if defective.

*b. Dim Light.*

(1) DIRTY OR CORRODED CONTACT BLADES IN COUPLING SOCKET OR JUMPER CABLE. Clean the blades.

(2) DIRTY LENS. Clean the lens.

(3) BATTERY AT TOWING VEHICLE NOT SUFFICIENTLY CHARGED. Check battery on towing vehicle.

(4) DIRTY OR CORRODED LAMP SOCKETS. Remove lamp-unit and clean.

*c. One or More Lights Will Not Burn.*

(1) BURNED-OUT LAMP-UNIT. Replace lamp-unit.

(2) BROKEN WIRE. Check wires for damage and replace if defective.

(3) DAMAGED LIGHT ASSEMBLY. Replace light assembly.

(4) DIRTY OR CORRODED LAMP SOCKET. Remove lamp-unit and clean.

**44. BLOWER (M14 and M22 Only).**

*a. Blower Will Not Run.*

(1) INSUFFICIENT VOLTAGE. Make certain that 110-volt power is used.

(2) DAMAGED SWITCH. Refer to higher authority.

(3) FIELD GROUNDS IN MOTOR. Refer to higher authority.

(4) NO VOLTAGE. Check for voltage at motor terminals with lamp or voltmeter. Check blower fuse.

(5) EXCESSIVE LOAD. Make certain hub on fan does not rub against bell in motor. If fan hub is binding, loosen set screw and tap fan free of motor bell.

*b. Noisy.*

(1) MOTOR OUT OF ALINEMENT. Loosen four cap screws holding motor to stand and place motor in alinement.

(2) SET SCREW LOOSE IN FAN. Tighten set screw.

(3) FAN NOT CENTERED ON MOTOR SHAFT. Loosen four cap screws which hold motor to stand and shift motor until proper alinement is obtained.

**45. RETRACTABLE PARKING WHEEL (M7 Only).**

*a. Difficult to Operate.*

(1) LACK OF LUBRICATION. Lubricate (see par. 26).

(2) BENT SCREW. Replace assembly (par. 58).

(3) DAMAGED BEARING IN QUADRANT. Report to higher authority.

Section XV

# SERVICE BRAKES

## 46. DESCRIPTION AND DATA.

*a. Description.* The trailer is provided with four brake assemblies. The brakes are of the electric type and are controlled and operated from a controller mounted on the steering post or dash of towing vehicle. The controller permits current to flow through the magnet, thus energizing magnet and causing it to cling to the revolving armature which is attached to drum. When this happens, brake lining is forced outward against drum, causing wheel to stop revolving (fig. 29). A break-away safety switch is attached to drawbar on trailer and a chain is attached between safety switch and towing vehicle. Should trailer become accidentally disengaged from towing vehicle, the safety switch will apply the brakes. The safety switch energizes brake system from a hot-shot battery on trailer.

*b. Data.*

(1) BRAKE ASSEMBLY.

Make.....Warner Electric Brake Company
Size.....14 in. x 2 in.
Model..... 50471 Left-hand front
50470 Right-hand front
50473 Left-hand rear
50472 Right-hand rear

(2) CONTROLLER.

Make.....Warner Electric Brake Company
Model.....4209HS with 2858

## 47. CONTROLLER.

*a. Checking Amperage at Controller* (fig. 30).

(1) Do not check amperage at controller if towing vehicle is not connected to trailer. Connect ammeter in series with the controller as illustrated in figure 30. With the arm in the "OFF" position if amperage is indicated, the controller is defective.

(2) Move controller arm to full "ON" position. If amperage reading is 11.2 minimum or 14.8 maximum, controller is in good condition. If no reading is obtained with controller arm in "ON" position, reverse ammeter wires. If ammeter now indicates the required amperage, the controller is defective. If no amperage is indicated, check system for open circuit.

(3) Hold controller arm in full "ON" position and take ammeter reading at brakes (par. 48 *a*).

(4) If controller does not check properly, tighten terminals on controller and clean controller contact arm and blades with fine abrasive cloth. If this does not correct controller conditions, replace controller.

*b. Removal.* Mark two wires at hand controller to facilitate reassembly and remove two wires. Remove two nuts, lock washers, and cap screws from steering post mounting bracket and lift controller off steering post (fig. 30).

*c. Installation.* Position controller on right side of steering post with controller arm up. Fasten controller to steering post, using steering post clamp, two cap screws, nuts, and lock washers. Prior to installing the two wires, make certain the position of controller does not affect operation or movement of driver's arms or legs. Secure the two wires to two terminals, using nuts and lock washers.

## 48. BRAKE ASSEMBLY.

*a. Checking Amperage at Brake Assembly* (fig. 31). Disconnect either wire from terminals on backing plate of brake assembly. Connect one lead of ammeter to brake terminal and other ammeter lead to wire which was removed. Apply brake by moving controller to full "ON" position. NOTE: *If towing vehicle is equipped with a load control, be sure load control is on full capacity.* The amperage reading must be between 2.8 minimum and 3.7 maximum. Slight variation in amperage reading is acceptable. If brakes do not check with above specifications, check for broken wires, loose connections, or poor contact. If wiring is in sound condition, replace brake assembly (see following subpar. *b*).

*b. Removal* (fig. 32). Jack trailer until either front or rear wheel clears the ground. Remove wheel and hub assembly as one unit (par. 79). Mark the two wires which are attached to brake terminals on backing plate for correct reassembly and remove wires. Remove rod end pins from parking brake rods. Remove eight bolts, nuts and lock washers that hold brake assembly to flange or rocker arm spindle and lift brake assembly off spindle. Remove cap screw, nut, and lock washers from brake cam and tap hand brake lever off cam.

*c. Installation.* Install hand brake lever on camshaft. Position brake assembly on flange of rocker arm spindle and secure it in position, using eight bolts, nuts, and lock washers. Install wires on brake terminals on brake backing plate, taking care to connect wires to proper terminals marked at disassembly. Lubricate rod end pins and fasten hand brake rods to camshaft lever, using rod end pins and cotter pins. Install wheel and hub assembly (par. 79). NOTE: *Turn wheel to check for free movement of wheel.* If drag is felt, this indicates parking camshaft lever has not been properly installed. Remove parking cam lever and install lever on next spline forward. Adjust hand brake (par. 56 *d*).

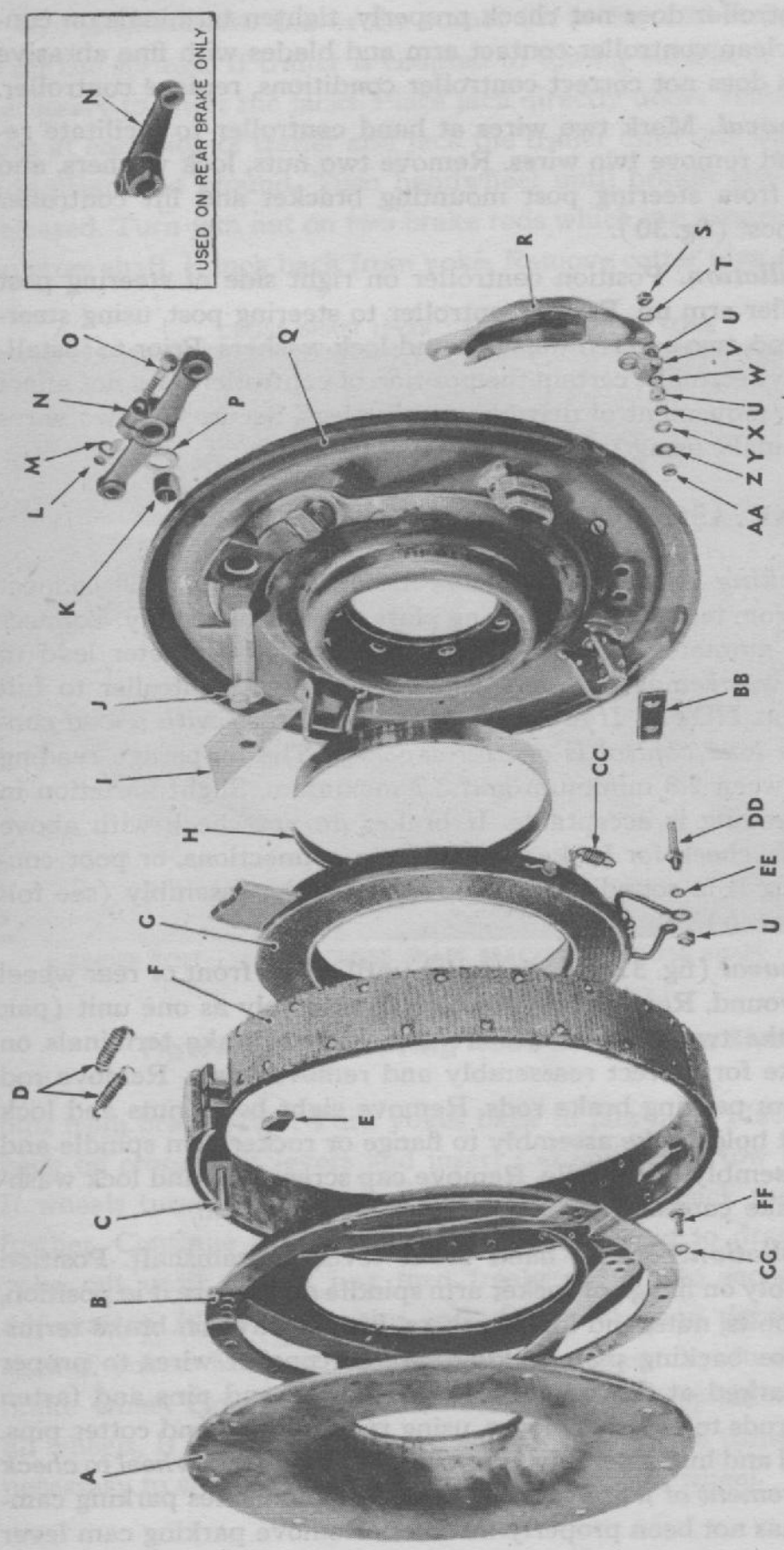



***Figure 29—Internal Brake Assembly—Partially Disassembled***

A—GUARD
B—ARMATURE ASS'Y (RIGHT AND LEFT)
C—PIN
D—SPRING
E—BLOCK
F—BAND W/LINING ASS'Y
G—MAGNET ASS'Y
H—BUSHING
I—CAM
J—SHAFT
K—BUSHING
L—NUT
M—WASHER
N—LEVER (FRONT AND REAR)
O—SCREW
P—RING
Q—PLATE
R—GUARD (LEFT AND RIGHT)
S—NUT
T—WASHER
U—NUT
V—TERMINAL
W—WASHER
X—WASHER
Y—WASHER
Z—INSULATOR
AA—INSULATOR
BB—INSULATOR
CC—SPRING
DD—STUD
EE—WASHER
FF—SCREW
GG—WASHER

RA PD 50117B

**Legend for Figure 29**

## 49. BRAKE BAND.

***a. Removal*** (figs. 33 and 34). Remove wheel and hub assembly (par. 79). Remove two return springs, spread brake band assembly open, and life brake band assembly off guides.

***b. Installation*** (figs. 33 and 34). Position brake band into guides on brake backing plate and couple the two return springs. Install wheel and hub assembly (par. 79).

## 50. ARMATURE AND MAGNET.

***a. Magnet Removal*** (figs. 35 and 36). Remove wheel and hub


***Figure 30—Checking Amperage at Controller***

assembly (par. 79). Remove nuts from cable lugs. Remove magnet support springs and lift magnet off backing plate.

***b. Armature Removal*** (fig. 36). Remove cap screw and lock washers holding armature to drum and lift out armature and grease slinger.

***c. Cleaning.*** Wipe all dust and other foreign matter from magnet, using a clean cloth. Wash armature in dry-cleaning solvent. Clean all corrosion from wire end of magnet and terminals.

*d. Testing.*

(1) MAGNET. Connect a low-reading ammeter and battery in series with the magnet as shown in figure 38. NOTE: *When testing, touch battery wire to magnet shell momentarily. If magnet has a dead short it will damage the ammeter if connection is made for any length of time.* If any amperage is indicated on ammeter, magnet is shorted. The short may be in magnet contact wire assembly, or coil may be shorted in magnet shell. A short in magnet contact assembly may be

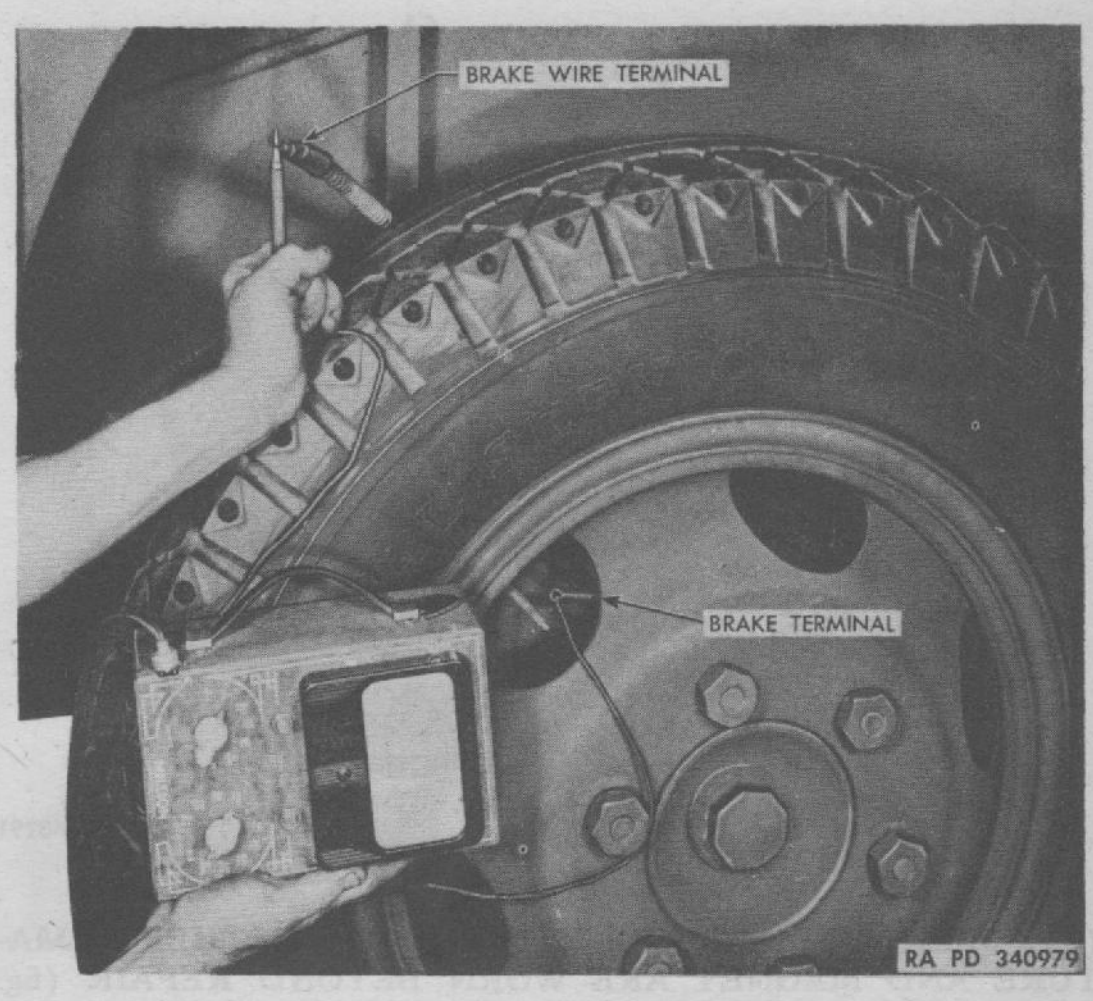



***Figure 31—Checking Amperage at Brakes***

corrected by replacing contact assembly (see following subpar. *e*). If magnet still shorts with a new magnet wire contact assembly, the short is in magnet coil and complete magnet assembly MUST be replaced. NOTE: *A new armature may be used with an old magnet. But, a new magnet MUST NOT be used with an old armature.*

*(a)* Connect magnet as shown (fig. 39) and take ammeter reading. Check amperage reading against amperage shown on name plate spotwelded to magnet. A variation of 10 per cent from amperage on name plate is permissible. The amperage on name plate is the amperage that magnet should show if tested with exactly 6 volts and magnet is at

a temperature of approximately 70°F. If the magnet is hot when tested, the resistance in magnet coil is increased and amperage reading may be lower than that shown on name plate. A reverse condition would be found if magnet is cold when tested.

(2) CHECKING MAGNET AND ARMATURE. Inspect magnet face for excessive glaze or grease. If magnet is grease-coated, wash with dry-cleaning solvent. Should magnet face be glazed, replace magnet.

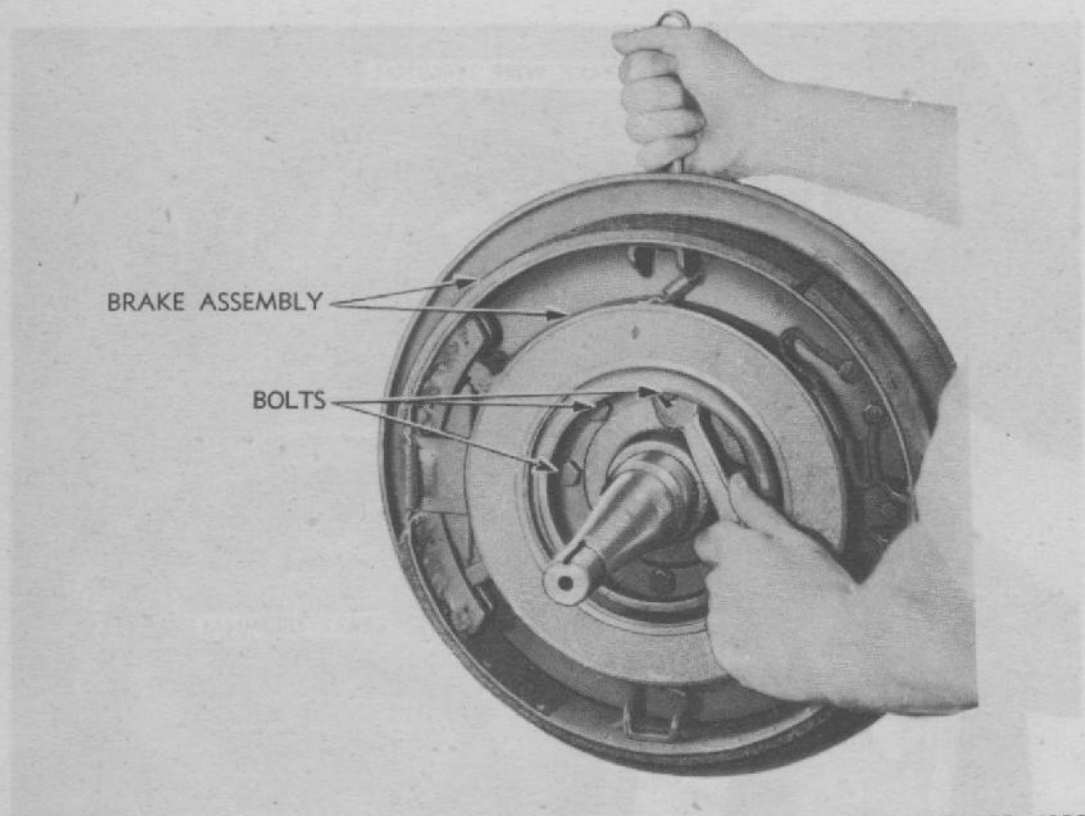
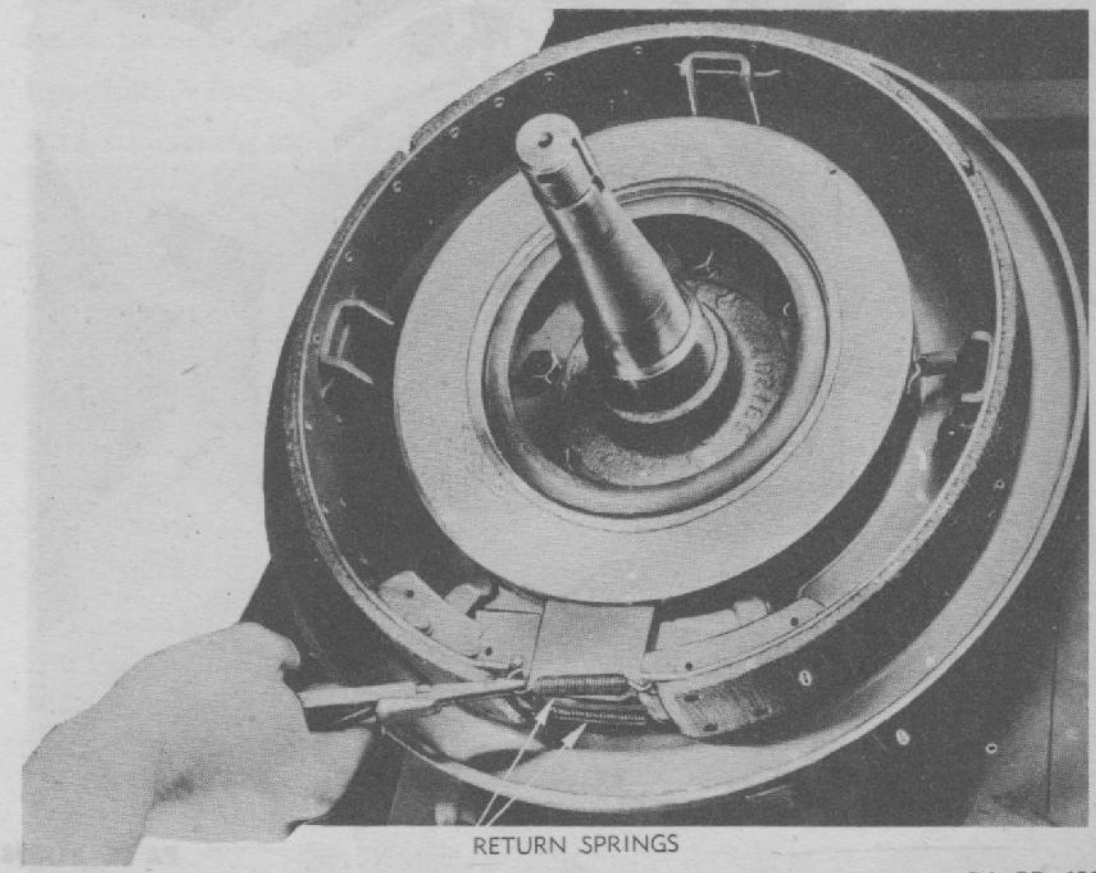



***Figure 32—Removing Brake Assembly***

(3) MEASUREMENTS TO DETERMINE WHETHER ARMATURE AND MAGNET ARE WORN BEYOND REPAIR (fig. 40). Measure the over-all height of magnet and armature. Replace with a new magnet if height is 1 3/32 inch or less. NOTE: *Under normal operation the magnet poles will wear two grooves in armature face slightly wider than magnet poles* (fig. 41). *This wear is natural, insures proper contact, and does not require any attention unless severe. Erratic wear is caused by loose wheel bearing or loose mounting bolt in drum.* Check magnet bushing. This bushing when new is 1/16 inch thick. Check thickness of bushing and if it is worn to a thickness of less than 1/32 inch, replace magnet (par. 50 *a* and *f*).

(4) MEASURING ARMATURE DEPRESSION. Checking of armature depression cannot be performed until brake assemblies are mounted on rocker arm (subpar. *h* below).

*e. Replacing Magnet Wire Contact Assembly* (fig. 42). Use soldering iron to melt solder on terminals. With a screwdriver, open the copper clips that are pinched against the wires coming from magnet coil, and bend two wires so that coil wires point away from magnet shell. Spread steel clips that hold assembly on magnet shell. Release insulator and wire under wire clips. Replace old contact assembly with new one. Bend steel clips tight against the fibre block. This may be done by tapping clips lightly with a hammer. Bend wire clips against two insulated wires. Fit the wires from coil into copper clips and




RA PD 43264

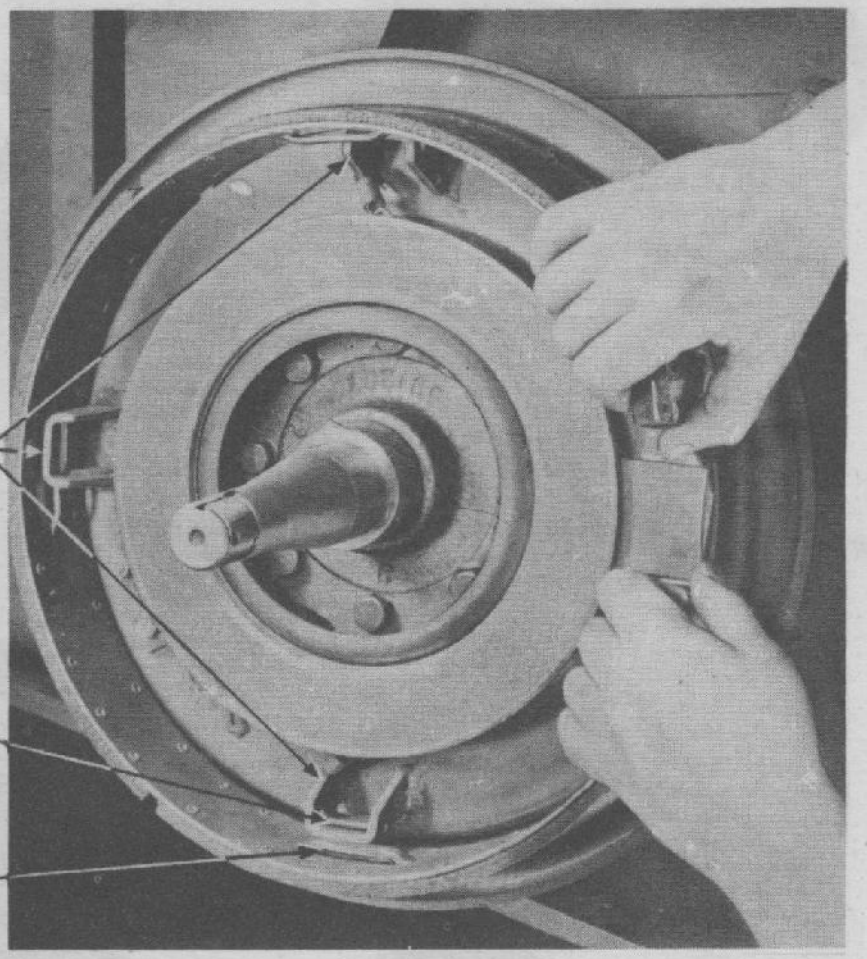
***Figure 33—Removing Brake Band Return Spring***

pinch clips together. Solder coil wires into copper clips. CAUTION: *Be sure no solder is splattered so as to short the coil wires to magnet shell.*

*f. Magnet Installation.* Position magnet over rocker arm spindle. Place lug on magnet between ends of brake shoes and fasten magnet return springs (fig. 36). Secure the two wires to terminals on magnet (fig. 35). Prior to installing hub and wheel assembly see following subparagraph *h.*

*g. Armature Installation.* Place grease slinger into brake drum. Place armature over grease slinger and aline hole in armature with

holes in grease slinger and drum. Fasten armature and grease slinger to drum, using cap screws and lock washers (fig. 37). Prior to installing wheel and hub assembly see following subparagraph ***h***. NOTE: *There are right and left armatures. When installing the armature, make certain the right armatures are used on the right side and left armatures on the left side. The armatures can be identified by "RH" and "LH"*



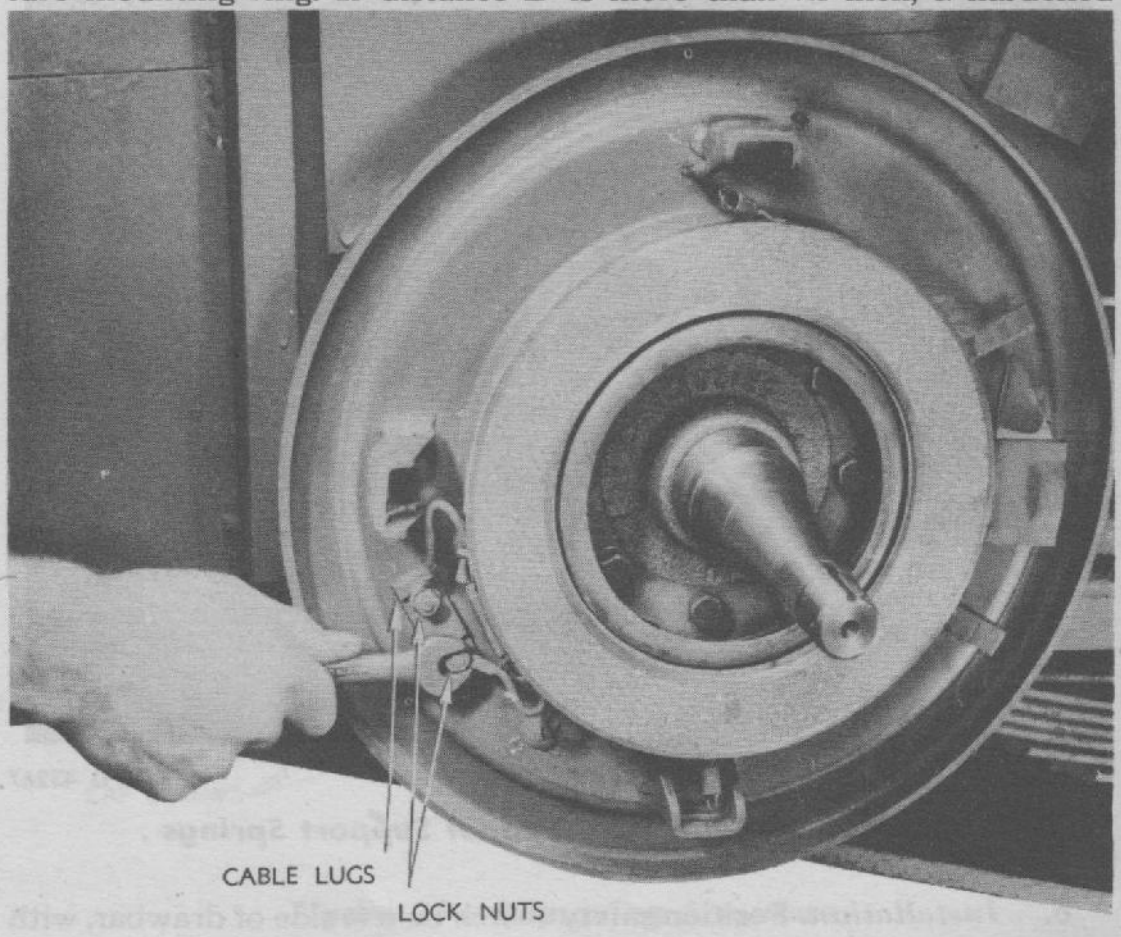

RA PD 341598

**Figure 34—Removing Brake Band**

*stamped on face, or No. 4824 is the right and No. 4825 the left. The hubs can be identified by letter stamped on outer face of studs. Studs marked with letter "L" indicate left-hand hub, studs marked with letter "R" are right-hand hubs.*

***h. Measuring Armature Depression.*** The armature should contact the magnet and be depressed approximately 5/32 inch after hub and drum assembly is installed on rocker arm. Using gage (41-G-16, component of tool-set, 41-T-3366-50) loosen both thumb screws and place short end of gage against magnet facing (fig. 43). Push adjust-

able rod against bearing shoulder and tighten thumb screw on gage frame. Slide collar against frame and tighten thumb screw in collar. Wedge armature segments away from drum at three places (fig. 44). Place inner bearing in hub. Place long ends of gage against armature face and loosen thumb screw in gage frame. Push adjustable rod against wheel bearing. Be sure bearing is snug against bearing race in hub. Tighten thumb screw in gage frame. **NOTE:** *The distance D, from collar to gage, is the distance the armature segments will be depressed when hub and drum are assembled on axle. This distance must be* $\frac{9}{64}$ *inch* $\pm$ $\frac{1}{64}$ *inch, and can be checked with a scale.* If distance D is less than $\frac{1}{8}$ inch, space out the armature by using spacers under armature mounting ring. If distance D is more than $\frac{5}{32}$ inch, a hardened




RA PD 43266

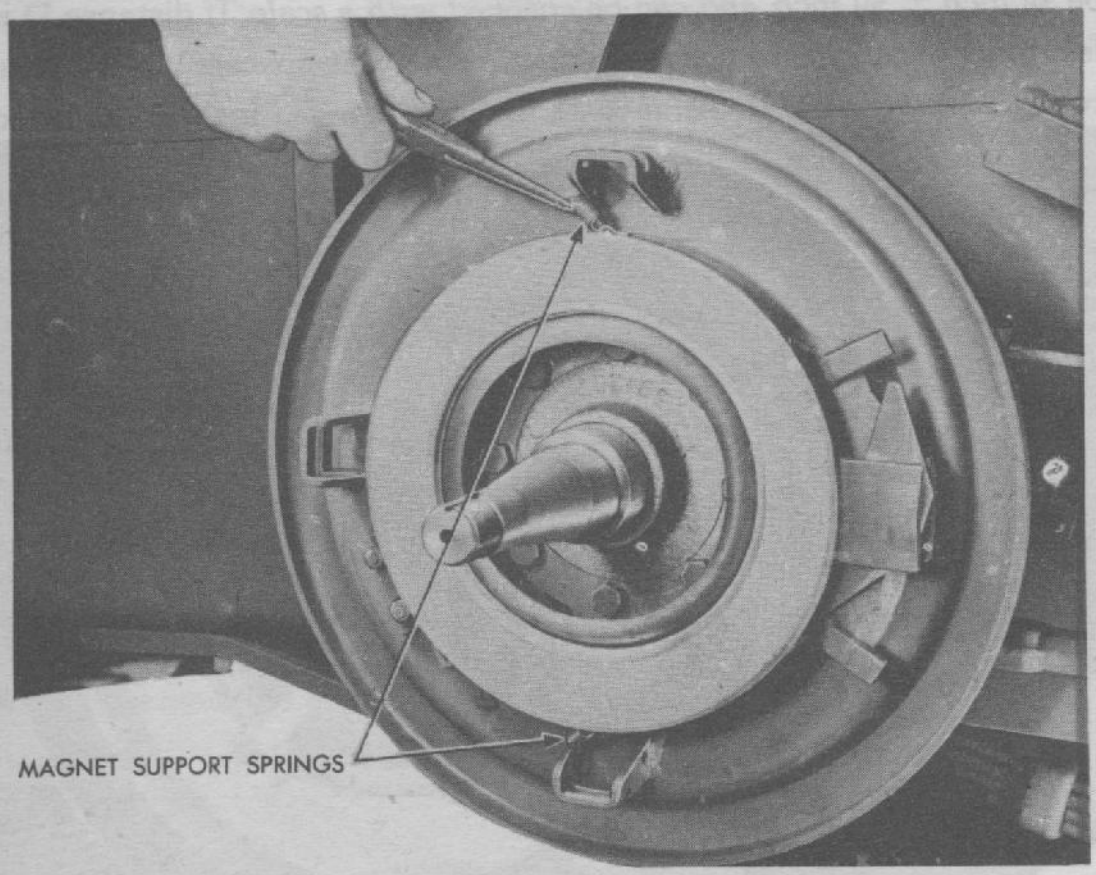
***Figure 35—Disconnecting Wires at Magnet***

spacer must be used between bearing and bearing shoulder on the axle. If armature depression is checked and found to be $\frac{1}{16}$ inch, use one layer (three) of $\frac{1}{16}$-inch spacers, and one layer of $\frac{1}{32}$-inch spacers under armature mounting ring. This would increase armature depression from

1/16 inch to the required 5/32 inch. In checking the depression, be sure the bearing is snug against bearing race in hub, and armature disk is wedged away from armature mounting ring. CAUTION: *In assembling, do not allow grease, however slight, to touch any part of brake.* Install wheel and hub assembly (par. 79).

## 51. BREAK-AWAY SAFETY SWITCH.

*a.* ***Removal.*** Pull safety chain from safety switch lever. Remove nut holding the two wires to terminals and lift off wires. Remove two nuts, cap screws, and lock washers holding safety switch to draw bar.




RA PD 43267

***Figure 36—Removing Magnet Support Springs***

***b.*** ***Installation.*** Position safety switch on left side of drawbar, with the word "OFF" toward rear of trailer. Secure safety switch to drawbar, using two cap screws, nuts, and lock washers. Secure the two wires to two terminals, using two nuts.

## 52. ADJUSTMENT.

***a.*** ***Adjustment.*** The electric brake requires no adjustment. The magnet travel is sufficient to permit lining to function until worn down

to rivet heads. At this point the magnet comes against an automatic stop that prevents worn lining from scoring drum.

## 53. ELECTRICAL JUMPER CABLE.

*a. Description.* The jumper cable is coupled between a coupling socket on towing vehicle and a coupling socket on front of trailer. The cable is made up of four wires, three of them controlling the lights and one wire controlling the brakes.

*b. Removal.* Pull jumper cable out of coupling socket at rear of towing vehicle. Pull opposite end out of coupling socket at front of trailer.

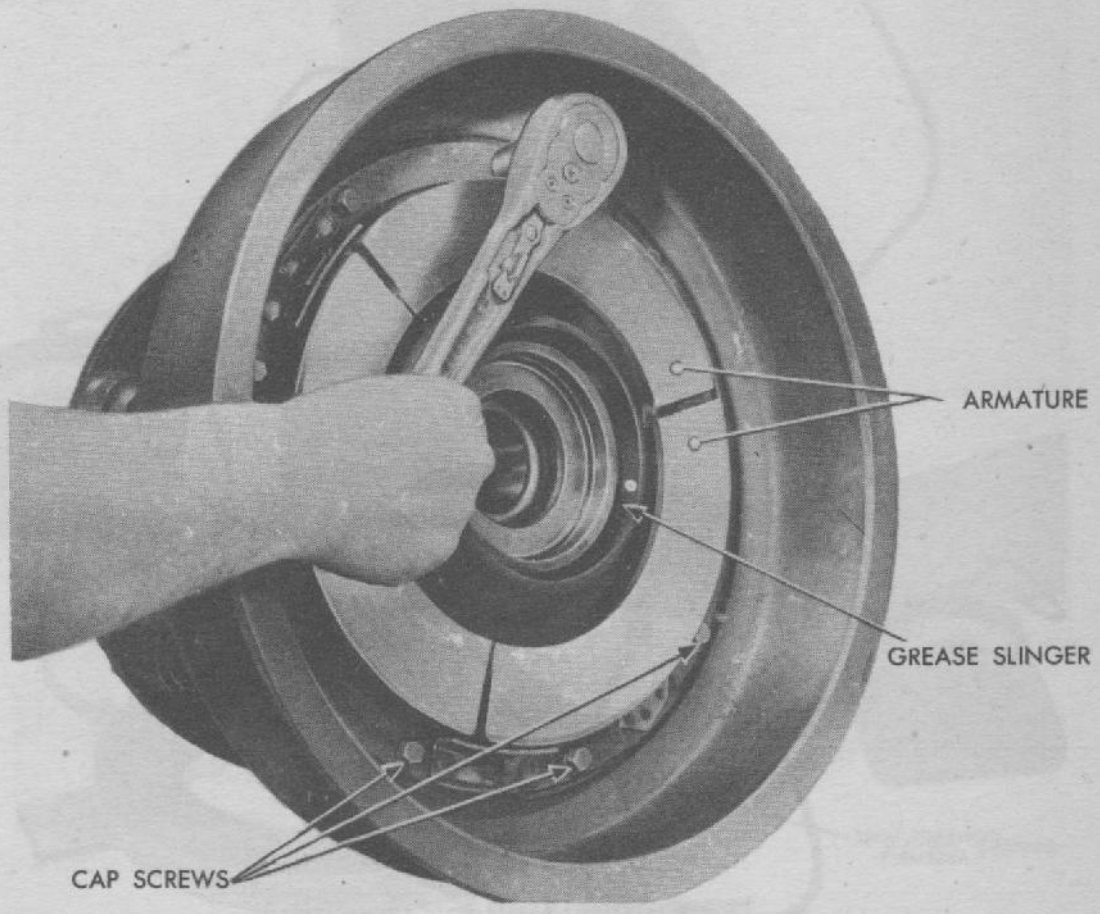



***Figure 37—Removing Armature***

*c. Disassembly* (fig. 45). Remove two bolts (J) from plug handle, and pull handle from plug end (A). Remove nuts (D) which hold terminals (C) to plug. Unsolder wires (G) from four terminals. Pull the insulating sleeves (E) and insulation washer (F) off wires.

*d. Inspection and Cleaning.* Inspect all terminals for sound condition. Clean all corrosion off terminals.

*e. Assembly* (fig. 45). Remove outer cover of cable (I) 1½ inches back from end, exposing individual rubber-covered wires (G). Remove insulation from wires (G) 3/16 inch back from end. Slide cable cover (I) through plug handle (K). Assemble cable clamp (H) as close to end of cable as possible. Slip all wires (G) through insulating washer (F). Slide insulating sleeves (E) on wires (G). Solder terminals (C) on wires (G), and slide insulating sleeves (E) down over soldered ends of terminals (C). Place terminals (C) on clips (B) in plug end (A). Check wire color code and markings on plug end (A). NOTE: *Make sure connections are correct.* Tighten nuts (D) down on terminals (C).

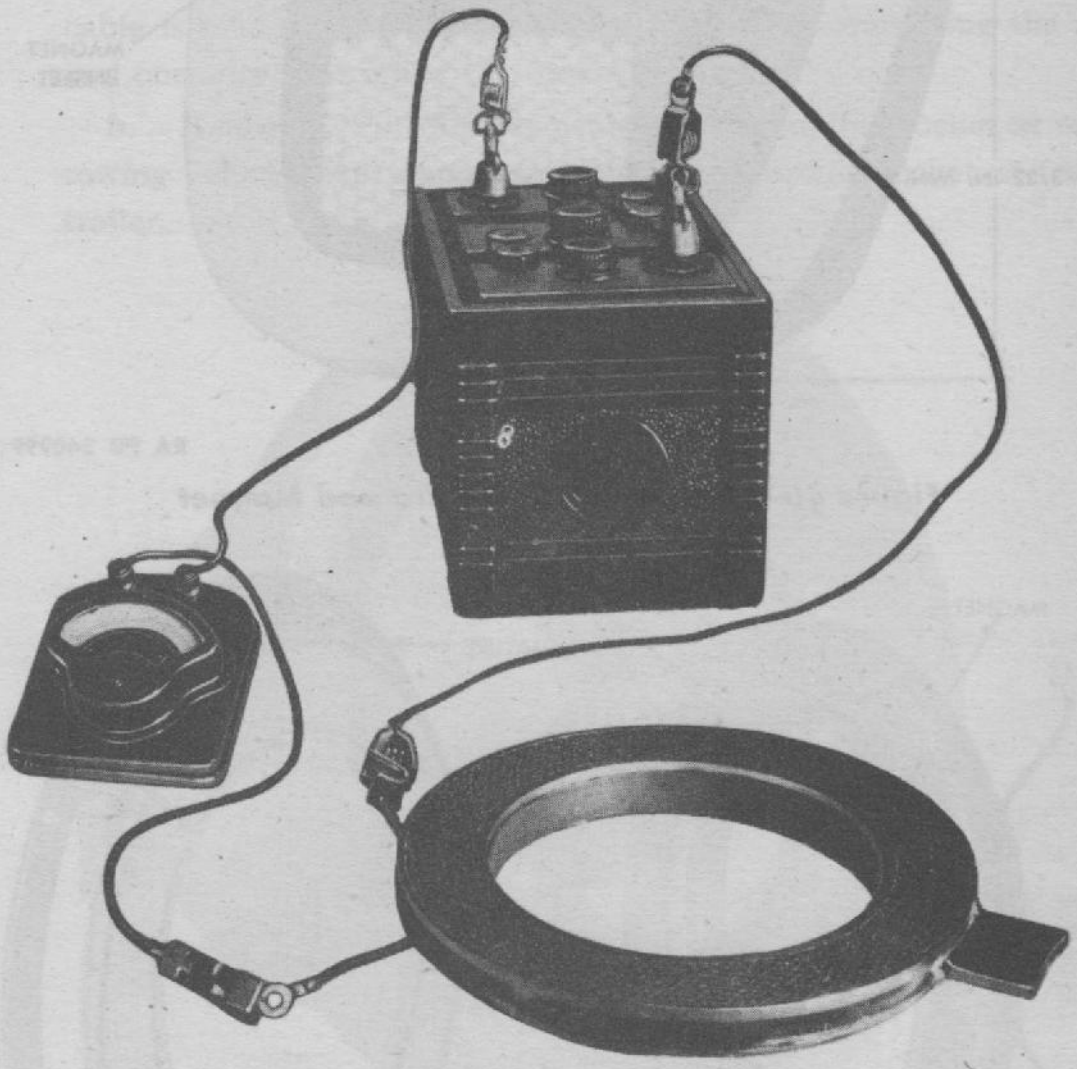

RA PD 340997

***Figure 38—Checking Magnet for Short***

Bend terminals (C) up at a 90-degree angle after tightening nuts (D). If this is not done, plug handle (K) will not slide down over wires. Slide plug handle (K) down to plug end (A). Turn plug handle (K) so bolt in cable clamp (H) will not rest on top of either of the two lugs inside of plug handle. Be sure key on plug handle matches with

key on plug end. Assemble bolts (J) through plug handle (K) and plug end (A) to held them together.

*f.* ***Installation.*** Open cover at coupling socket on towing vehicle, and install jumper cable. Install opposite end of jumper cable into coupling socket on trailer.



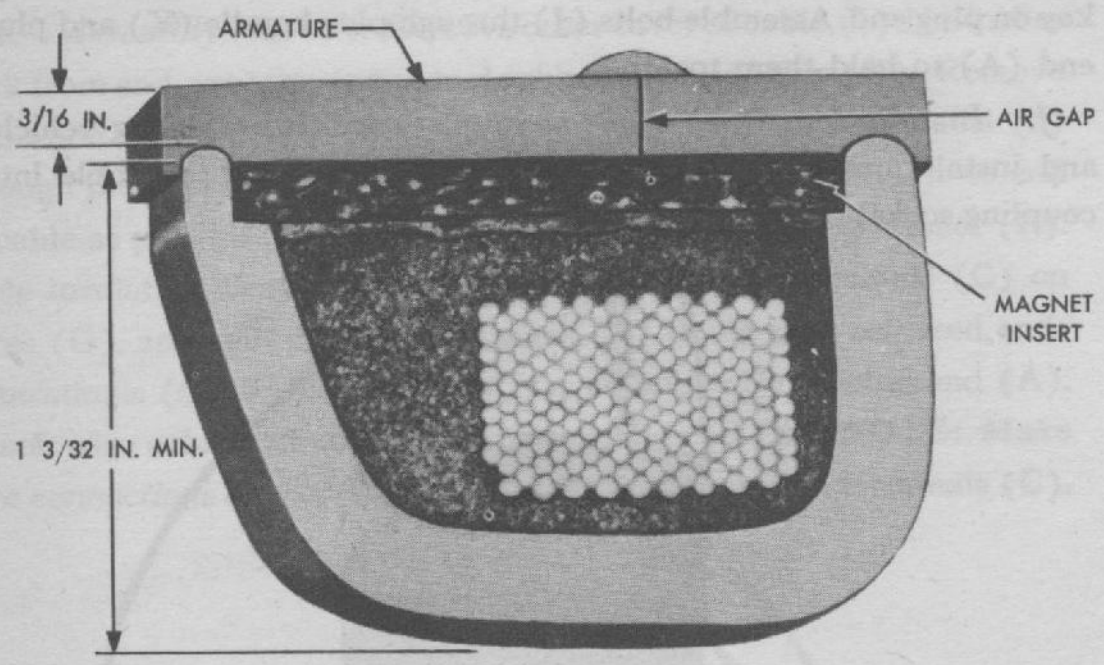
RA PD 340998

***Figure 39—Checking Magnet***

## 54. COUPLING SOCKET.

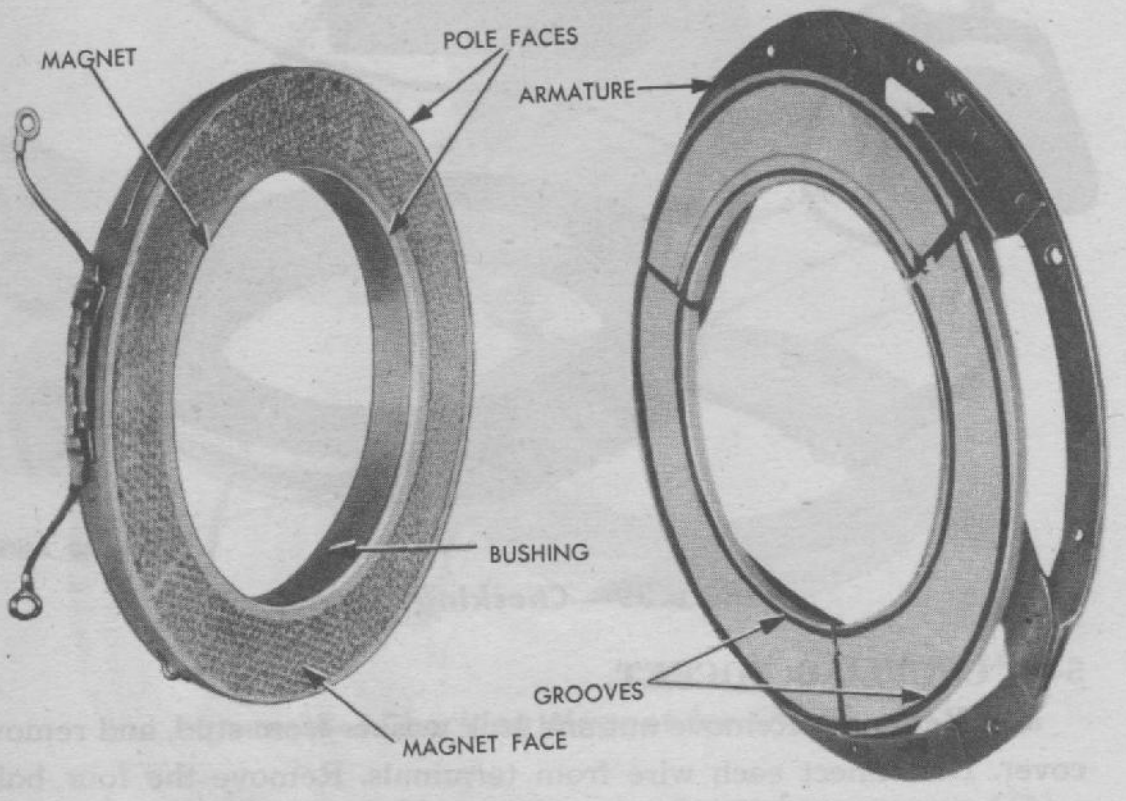
*a.* ***Removal.*** Remove nut and lock washer from stud, and remove cover. Disconnect each wire from terminals. Remove the four bolts holding coupling socket to trailer crossmember and remove coupling socket.

*b.* ***Disassembly*** (fig. 46). Remove nuts, washers, and lock washers from terminal bolts. Lift off fiber insulator and pull out insert, bolts, and blades.



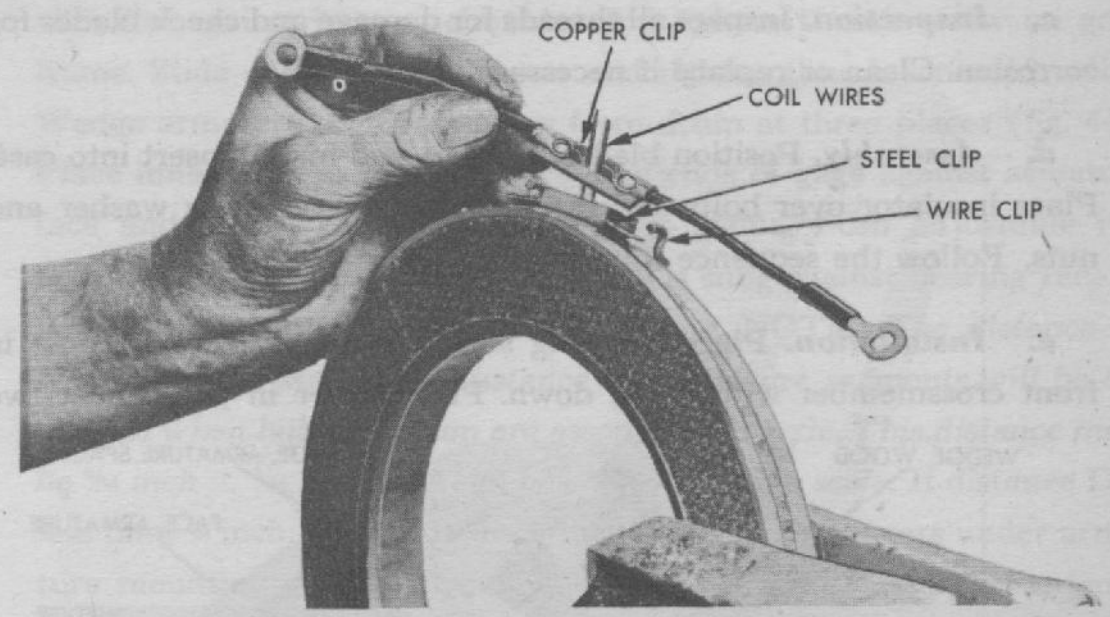

RA PD 340999

***Figure 40—Measuring Armature and Magnet***



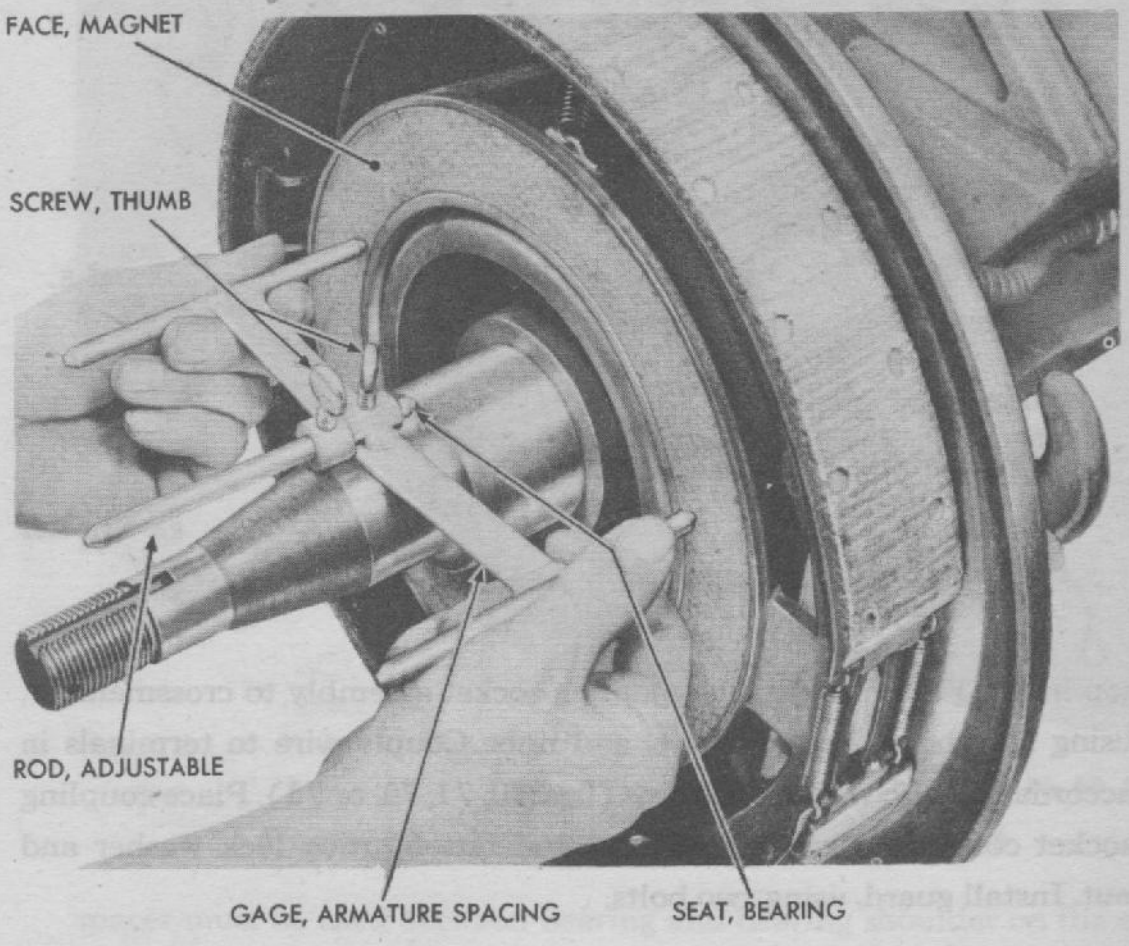

RA PD 341001

***Figure 41—Magnet and Armature***




RA PD 341002

***Figure 42—Replacing Magnet Contact Wire Assembly***



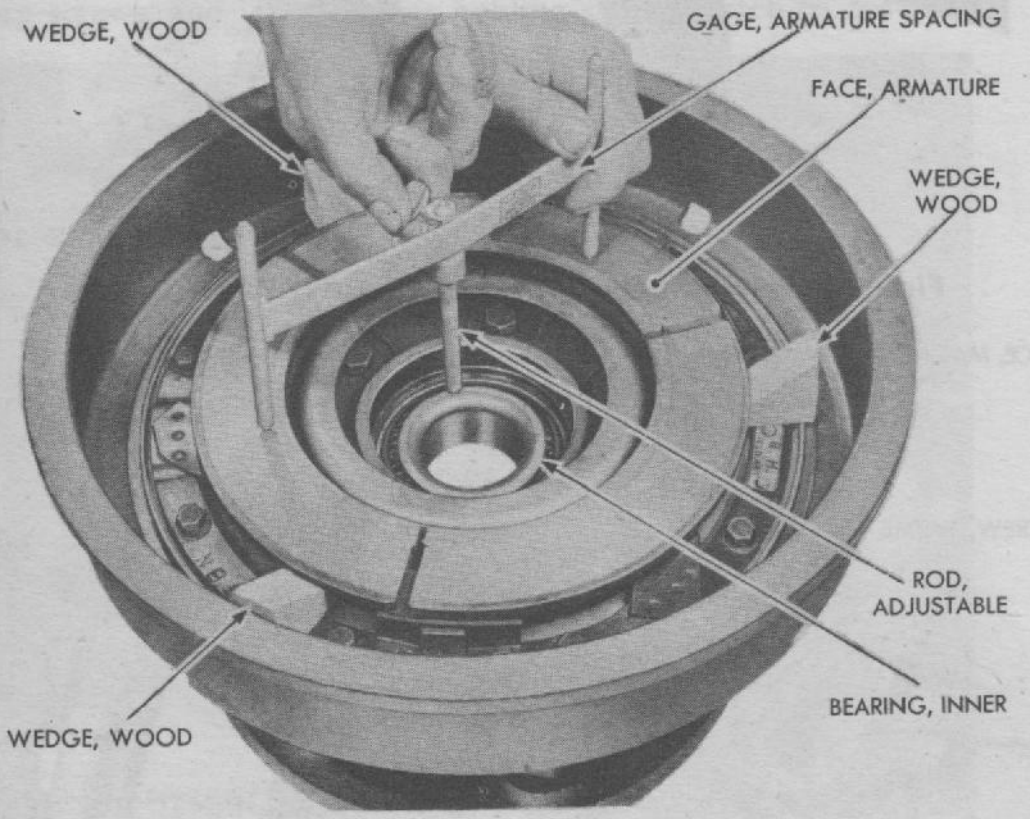

RA PD 14584

***Figure 43—Checking Magnet Depression***

*c.* ***Inspection.*** Inspect all threads for damage and check blades for corrosion. Clean or replace if necessary.

*d.* ***Assembly.*** Position blades in insert and install insert into case. Place insulator over bolts and fasten bolts to case, using washer and nuts. Follow the sequence illustrated in figure 46.

*e.* ***Installation.*** Place coupling socket assembly through hole in front crossmember with guide down. Place cover in position at two



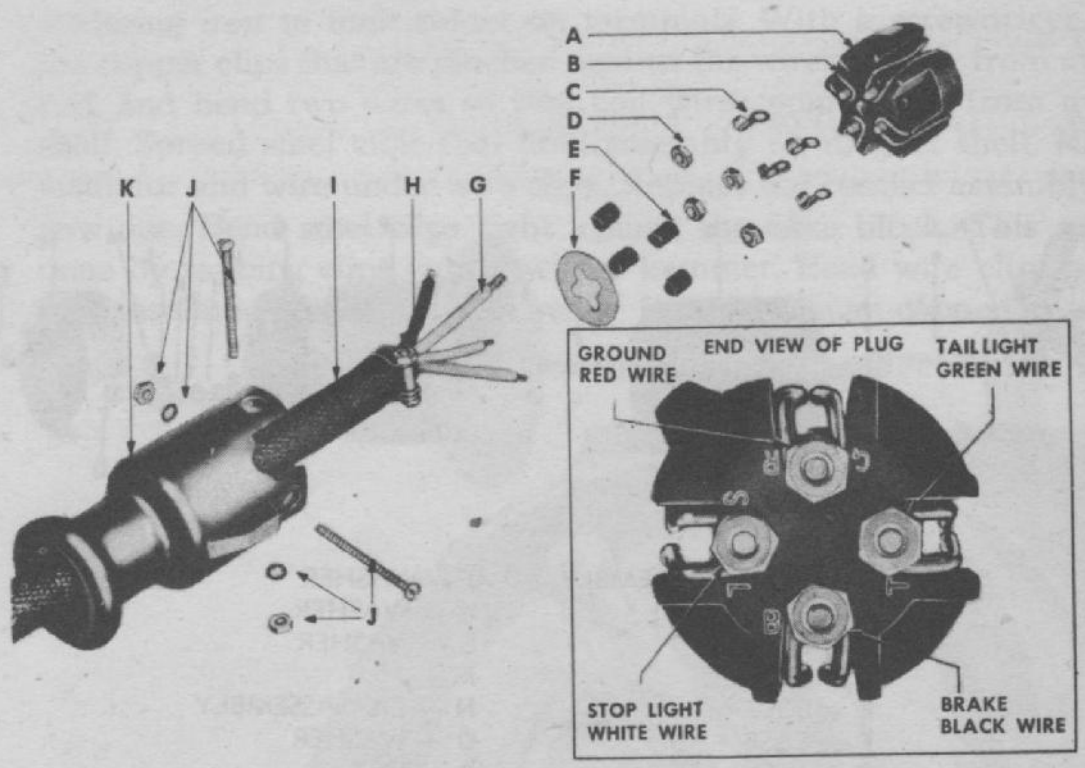

RA PD 14602

***Figure 44—Checking Armature Depression***

top holes. Fasten cover and coupling socket assembly to crossmember, using four bolts, lock washers, and nuts. Couple wire to terminals in accordance with wiring diagrams (figs. 70, 71, 72, or 73). Place coupling socket cover over coupling socket and fasten, using lock washer and nut. Install guard, using two bolts.

## 55. SIX-VOLT HOT-SHOT BATTERY.

*a.* ***Description.*** A hot-shot battery is located in front left compart-




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

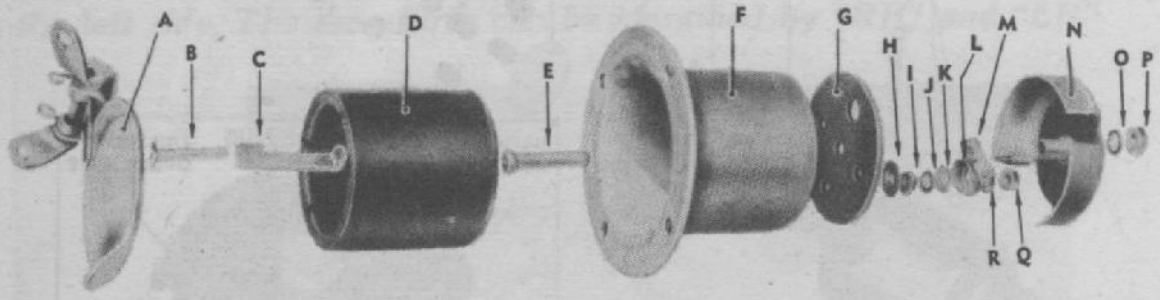
RA PD 340980

***Figure 45—Electrical Jumper Cable Connection***

ment. The battery is connected in circuit with break-away safety switch to supply current to the four brakes on trailer when trailer is accidentally disconnected from towing vehicle.

*b.* ***Removal.*** Remove thumb screws from battery terminals, lift off two wires, and remove battery from compartment.

*c.* ***Installation.*** Position battery in compartment with the positive (+) sign toward front of trailer. Place ground wire on terminal marked by a minus (—) sign. Connect hot-shot wire to terminal marked with a plus (+) sign.




**A** — COVER ASSEMBLY
**B** — BOLT
**C** — BLADE
**D** — INSERT
**E** — BOLT
**F** — CASE
**G** — INSULATOR
**H** — WASHER
**I** — NUT
**J** — WASHER
**K** — WASHER
**L** — WASHER
**M** — NUT
**N** — CAP ASSEMBLY
**O** — WASHER
**P** — NUT
**Q** — NUT
**R** — NUT

RA PD 90028

***Figure 46—Coupling Socket—Disassembled***

## Section XVI

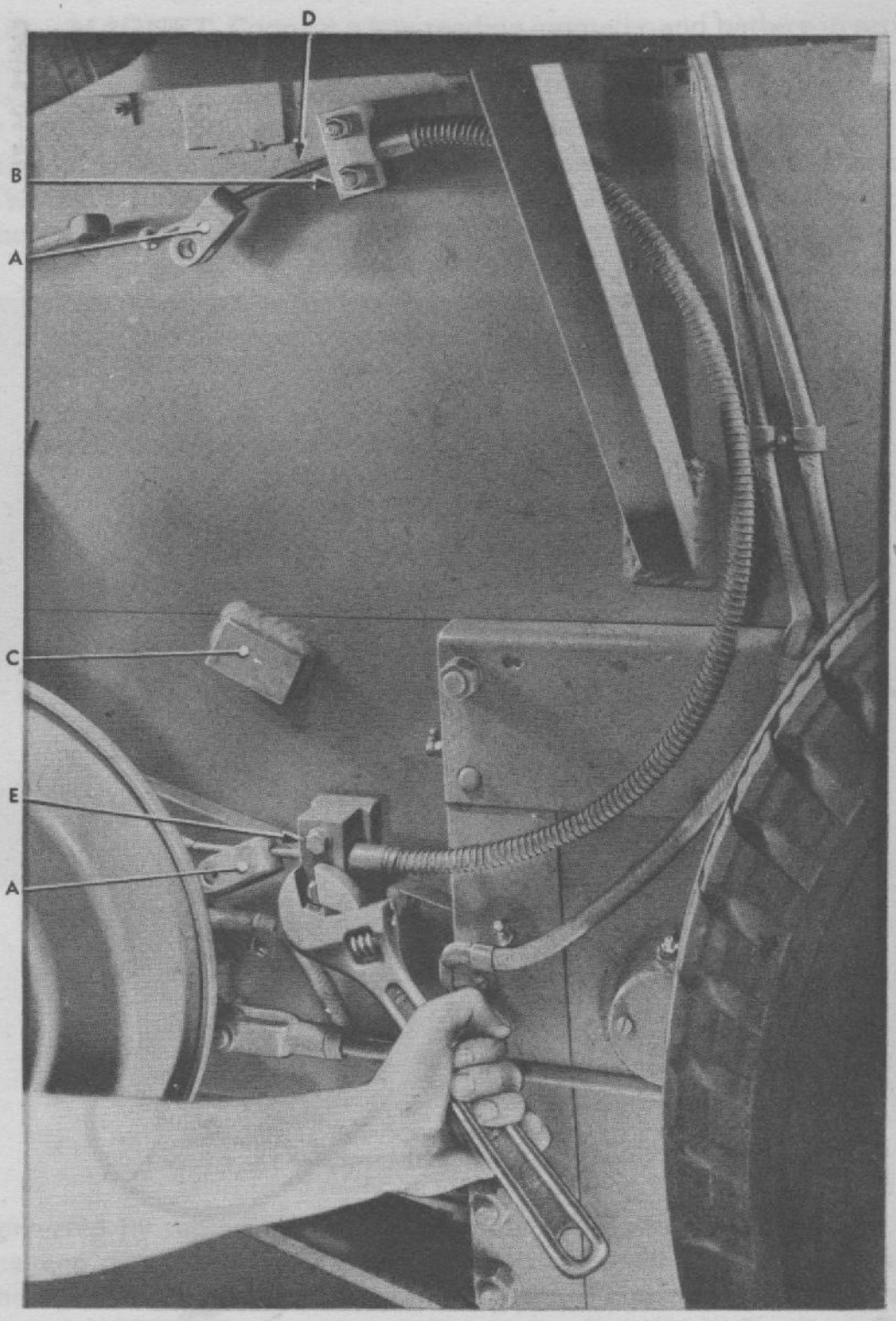
## HAND BRAKE

### 56. HAND BRAKE.

*a. Description.* The hand brake is manually operated by means of a screw which is threaded through a bracket nut and acts upon a bell crank and cross shaft. A combination of brake rod and levers actuates the same brake bands as does the electric brake system, but acts independently of it.

*b. Removal.*

(1) CABLE AND ROD ASSEMBLIES (figs. 47 and 48). Jack up front of trailer using leveling jacks at front of vehicle or a hydraulic jack. Remove wheel and tire assembly from front hub. Remove cotter




A — CLEVIS
B — CABLE ANCHOR
C — STOP
D — BRAKE CABLE
E — ANCHOR BOLT

RA PD 43280

***Figure 47—Cable Removal***

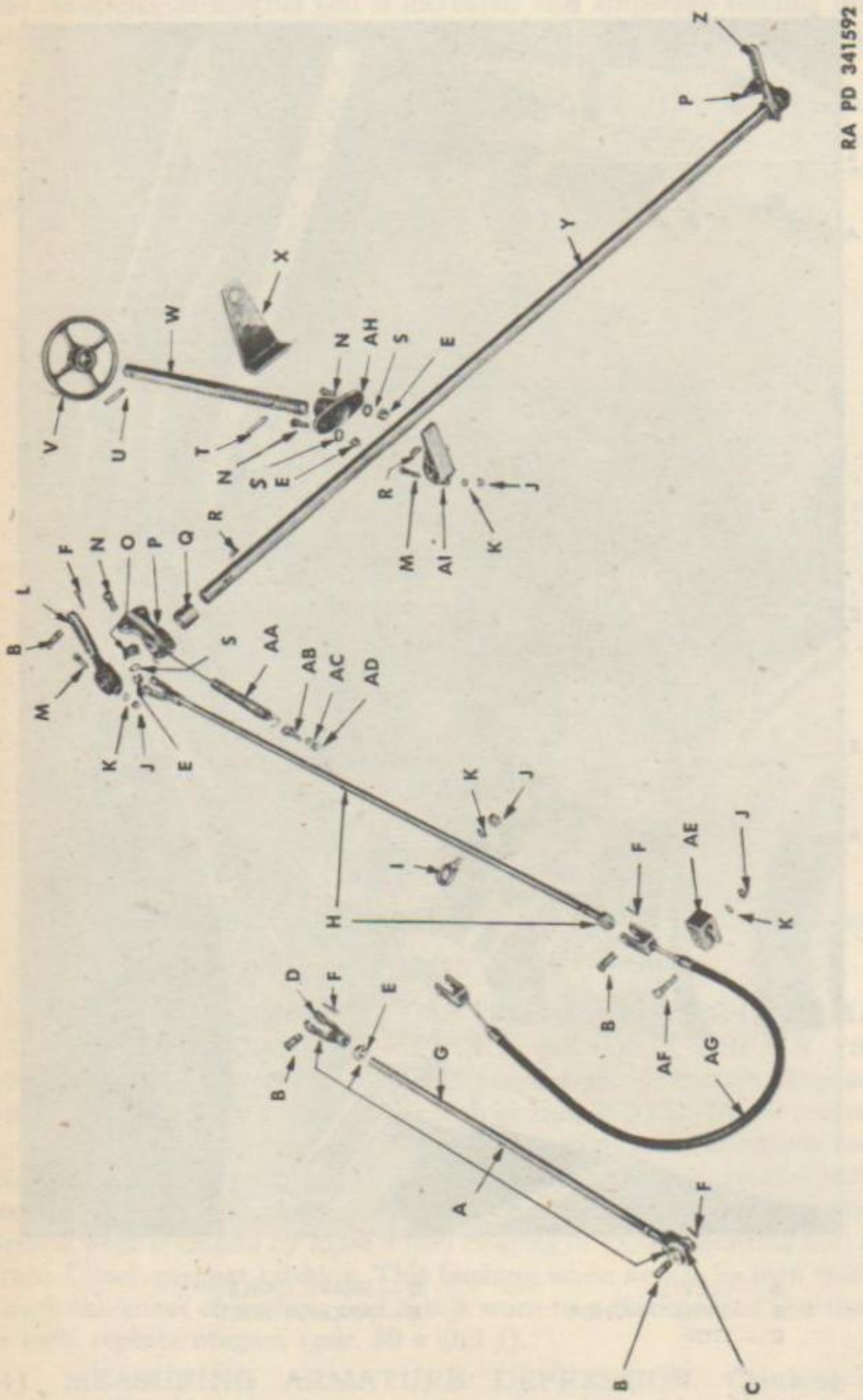



*Figure 48—Hand Brake—Disassembled*

A—BRAKE ROD ASSEMBLY

B—ROD END PIN

C—YOKE

D—ADJUSTING YOKE

E—NUT

F—COTTER PIN

G—ROD

H—BRAKE ROD ASSEMBLY

I—EYE BOLT GUIDE

J—NUT

K—LOCK WASHER

L—BRAKE LEVER

M—CAP SCREW

N—CAP SCREW

O—WEDGE WASHER

P—CROSS SHAFT BRACKET

Q—BUSHING

R—WOODRUFF KEY

S—LOCK WASHER

T—STOP PIN

U—DRIVE PIN

V—HAND WHEEL

W—HAND BRAKE SCREW

X—SCREW BRACKET

Y—CROSS SHAFT

Z—BRAKE LEVER

AA—RETURN SPRING

AB—EYE BOLT

AC—LOCK WASHER

AD—NUT

AE—CABLE ANCHOR

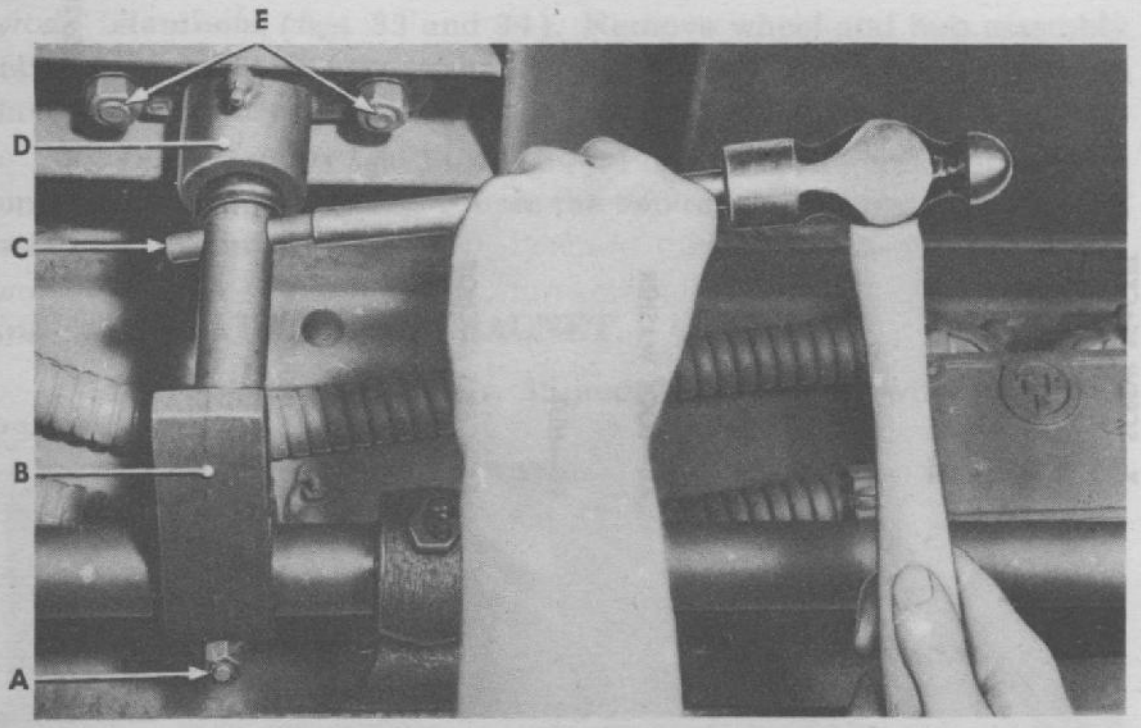
AF—CAP SCREW

AG—CONDUIT AND CABLE ASSEMBLY

AH—SCREW BRACKET

RA PD 341592B

**Legend for Figure 48**




A—BINDER BOLT
B—APPLICATION LEVER
C—STOP PIN
D—BRACKET NUT
E—BRACKET CAP SCREWS

RA PD 340983

***Figure 49—Removing Screw and Hand Wheel***

pins from each end of rod and drive out rod end pins. Loosen anchor bolts that hold brake cable to anchor plate at each end of cable assembly and remove cable.

(2) HANDWHEEL AND CROSS SHAFT ASSEMBLY. Drive out the stop pin at underside of handwheel (fig. 49). Turn handwheel counterclockwise until handwheel is removed. Remove two nuts, lock washers, and bolts holding bracket to trailer decking. Disconnect pull-back yoke spring (fig. 50). Remove rod end pin holding brake rod to cross shaft lever. Remove nuts, lock washers, and cap screws from three cross shaft bearings and lift out cross shaft (fig. 51). NOTE: *When removing cross shaft on trailer manufactured by J. G. Brill Co., it will be necessary to remove end lever and loosen pinch bolts in application lever, then pull cross shaft out of drawbar assembly.* Loosen cap screws in brake levers and tap levers off shaft. Remove three Woodruff keys.

*c. Installation.*

(1) HANDWHEEL AND CROSS SHAFT ASSEMBLY (fig. 48). Fasten two cross shaft brackets on front of trailer bulkhead using

cap screws, nuts, and lock washers, but do not tighten. Place cross shaft through one bracket, thread application lever on shaft and shove cross shaft on through the bracket on opposite side. NOTE: *Place collar over end of cross shaft on J. G. Brill trailers only.* Install three Woodruff keys in keyways on cross shaft. Install the two levers and application lever in cross shaft at Woodruff keys. Tighten cap screws and nuts in levers and cross shaft brackets. Fasten screw bracket to underside of trailer decking, using two nuts, a lock washer, and cap screw. Turn handwheel and screw into bracket and force the drive pin into

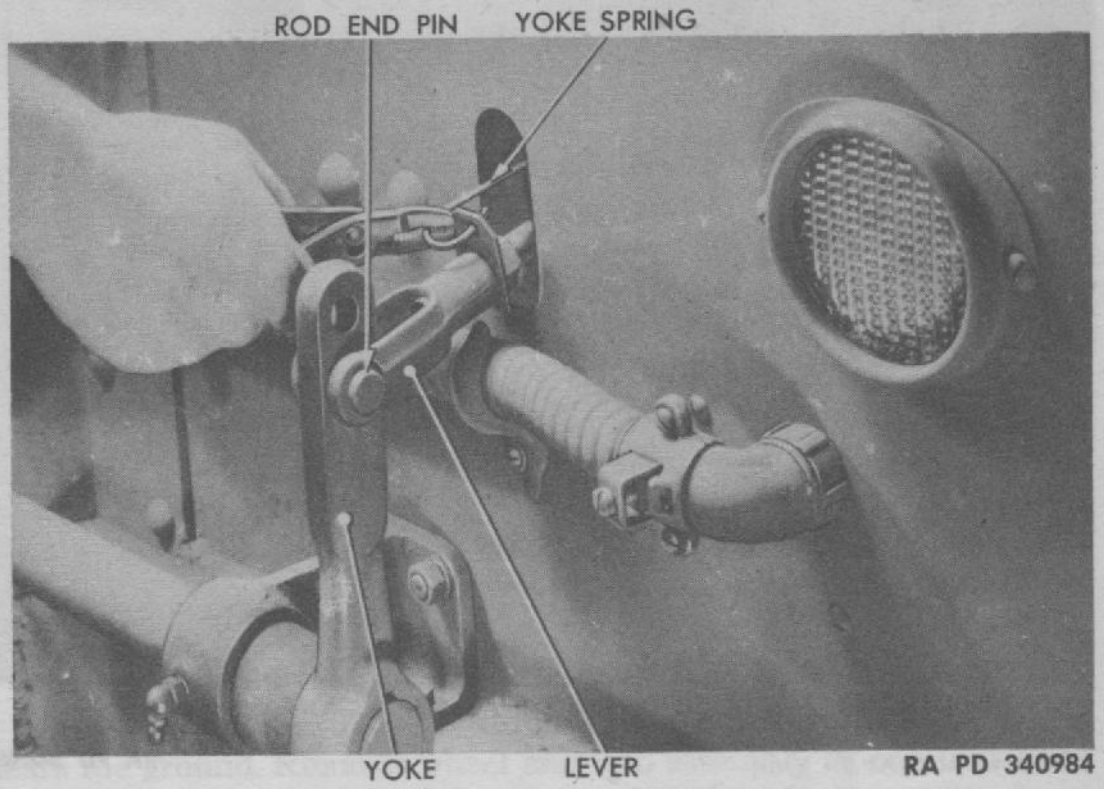
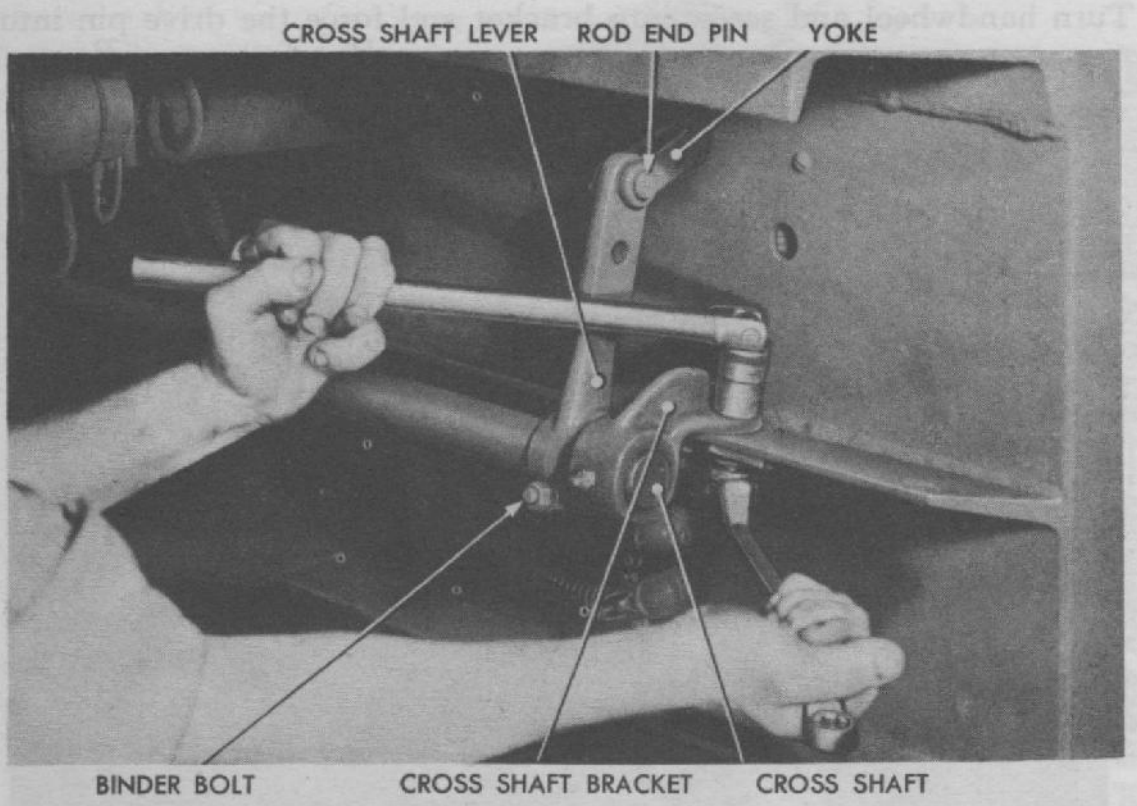



***Figure 50—Removing Pull-back Spring***

screw to prevent screw from coming out (fig. 49). Test the operation of the cross shaft by moving cross shaft to the applied and released positions by hand. The cross shaft must move freely. If a bind is felt, tap brackets one way and then the other until bind is eliminated.

(2) CABLE AND ROD ASSEMBLY. Place cable anchor at each end of brake cable. Fasten cable anchors to side of trailer body using two cap screws (fig. 47). Fasten lower end of cable to brake lever on inner side of brake assembly using rod end pin and cotter pin. Place brake rod through slot at front of trailer and fasten brake rod to lever using rod end pin and cotter pin. Fasten pull-back yoke spring to clip on brake rod and I-bolt (fig. 50). Install wheel and hub assembly (par. 79) and remove jacks.

*d. Adjustment.* Lower the corner lift jacks until weight of body is off the springs. If trailer is coupled to towing vehicle, it will not be necessary to lower the jacks. Place jack directly under center of rocker arm at each side of trailer and jack the trailer until one wheel at each side clears the ground. Turn handwheel until brakes are completely released. Turn jam nut on two brake rods which are attached to levers on cross shaft, ¼ inch back from yoke. Remove cotter pins and rod end




RA PD 340985

***Figure 51—Removing Hand Brake Cross Shaft***

pins from brake lever. Turn yokes back to jam nuts. Place two yokes back on cross shaft levers and insert rod end pins. Now turn wheels. If wheels turn freely, remove rod end pins and back the yokes still further. Continue this process until wheels begin to drag. Now turn yoke out until wheels just turn freely enough to secure a perfect adjustment. Place cotter pins in rod end pins and tighten jam nuts against yokes. Make a final test of adjustment by turning parking brake wheel clockwise until brakes are fully applied. Try turning all wheels. If one or more of the wheels can still be turned, it will be necessary to shorten up on the brake rods at that wheel.

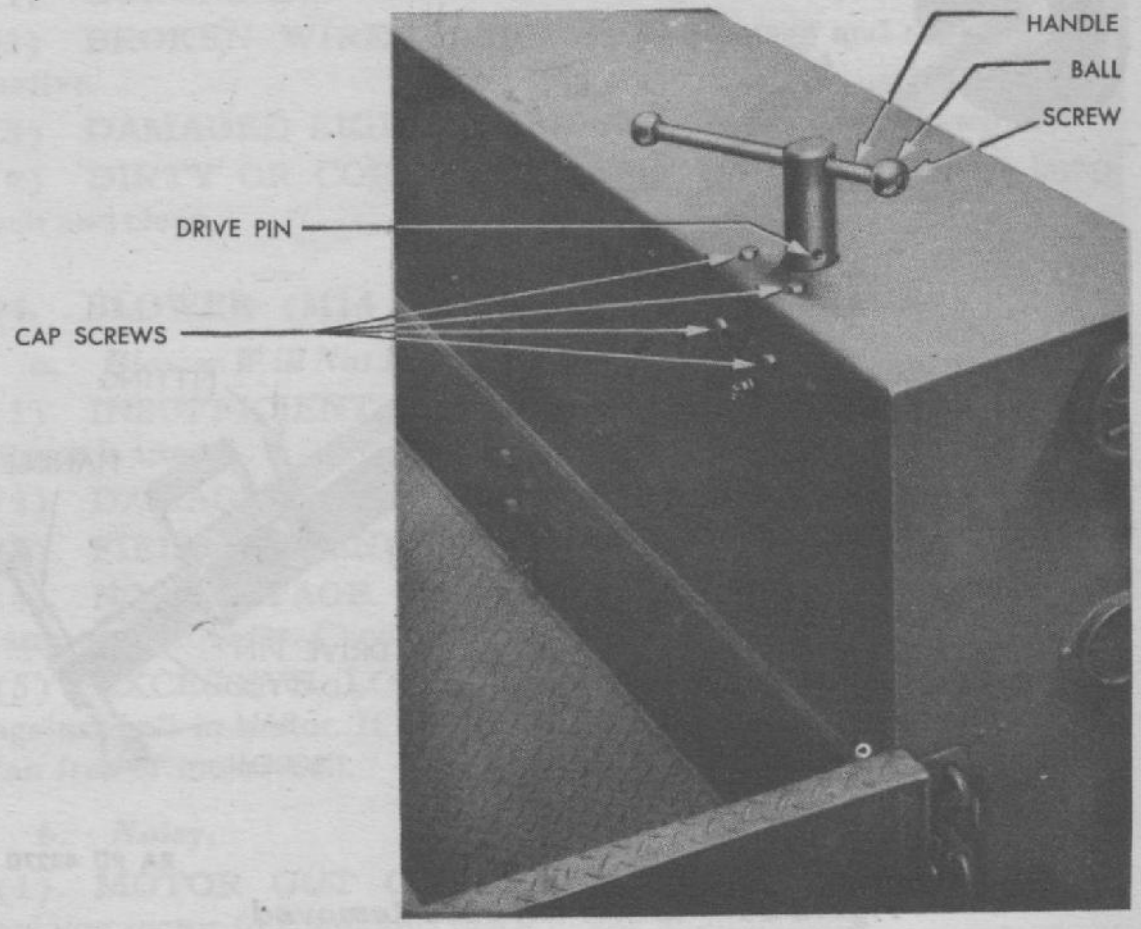
Section XVII

# CORNER LIFT JACKS, LEVELING JACKS, RETRACTABLE PARKING WHEEL, AND LANDING GEAR

## 57. CORNER LIFT JACKS AND LEVELING JACKS.

### *a. Corner Lift Jacks.*

(1) DESCRIPTION. Corner lift jacks are used on all trailers except the M18. The trailers are equipped with a corner lift jack located at




RA PD 340986

***Figure 52—Corner Lift Jack Installed***

each of the four corners of trailer bed. They are operated by means of vise-type handles. Each jack is equipped with a universal foot pad which is capable of self-adjustment to uneven terrain.

(2) REMOVAL (figs. 52 and 53). Remove screw from end of handle, tap off ball, and pull handle out of adapter. Drive out pin holding adapter to screw. Remove eight cap screws holding jack to trailer and lift out jack.

(3) INSTALLATION. Position jack next to trailer body and aline holes in jack clamps with mounting holes in trailer body. Install eight

cap screws, lock washers, and nuts. Tighten nuts. Place adapter over screw end, aline hole in screw with hole in adapter, and fasten adapter to screw using drive pin.

*b. Leveling Jack (Trailer M18 Only).*

(1) DESCRIPTION (figs. 20 and 54). The leveling jacks are attached to the right and left side of the trailer rear crossmember with hinge brackets which permit swinging the jack assembly into the

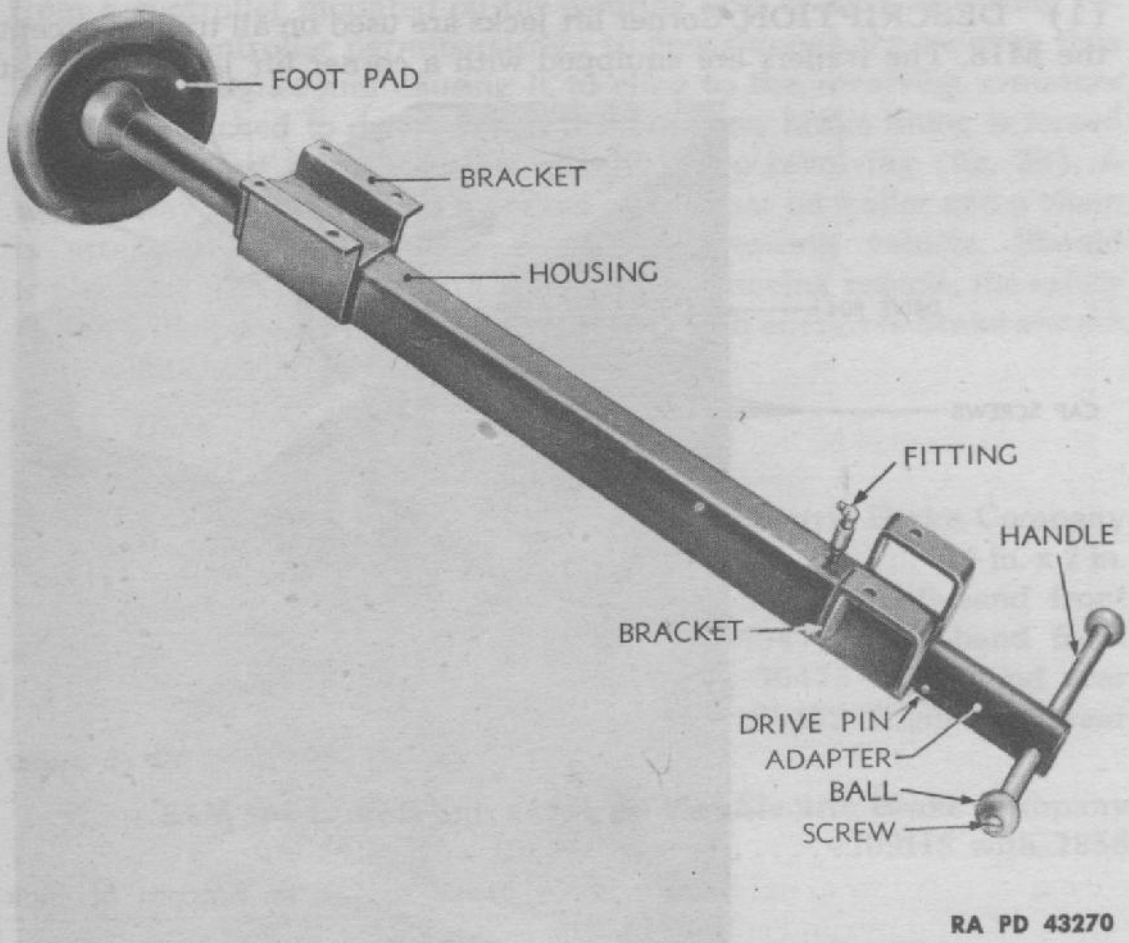



***Figure 53—Corner Lift Jack Removed***

up or down position. The jacks are held in position by a brace and rod end pin which are attached to chains to prevent loss. The jack consists of inner support tube with foot pad attached by ball joint, drive gear, outer casing and gear housing, lifting screw, pinion gear, and hand crank. The jack hand crank is attached to the pinion gear which contacts the drive gear at end of lifting screw. The lifting screw is housed in the outer casing and raises or lowers the inner support tube.

(2) REMOVAL. Pull cotter pin from rod end pin at inner brace. Pull cotter pin from hinge pin and drive out hinge pin. Remove the jack.

(3) INSTALLATION. Aline hole in top of jack with hole in mounting bracket. Install hinge pin. Secure hinge pin to mounting bracket

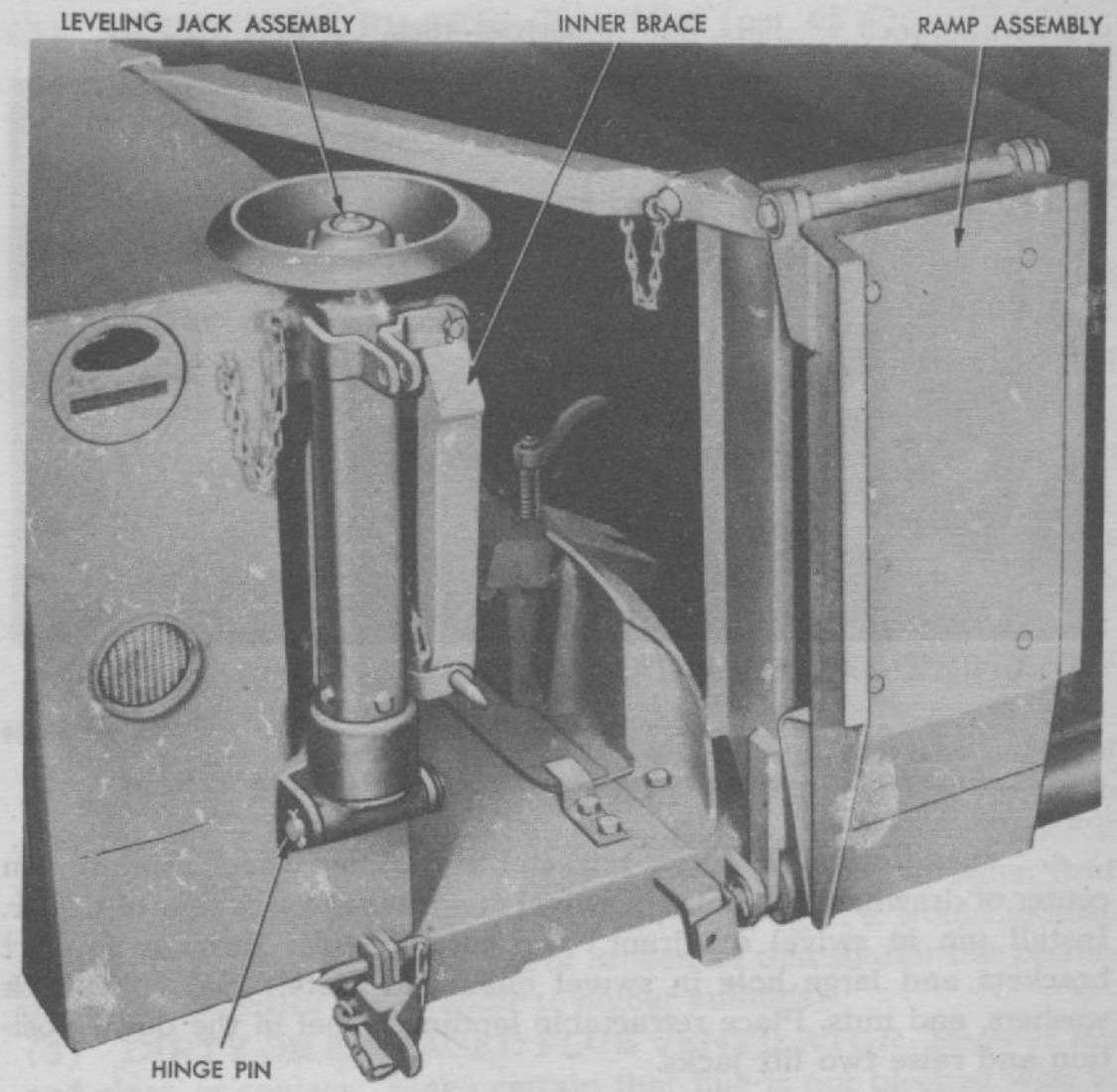



***Figure 54—Leveling Jacks and Ramps for M18***

using two cotter pins. Secure inner brace to lug at bottom of jack using rod end pin and cotter pin.

## 58. RETRACTABLE PARKING WHEEL (Trailer M7 Only).

*a. Description.* The retractable parking wheel assembly serves as an additional support member for the generator trailer and is attached to the drawbar. The parking wheel is held in the up (running) or down (parking) position by means of a pin. The height of the parking wheel is adjusted by means of a worm which is actuated by a handwheel at the top of the unit.

*b. Removal* (fig. 55). Lower the two front lift jacks until weight is removed from parking wheel. Remove pin from swivel quadrant. Remove two bolts, nuts, and lock washers which secure support tube in support tube brackets. Drive out support tube and lift out retractable parking wheel assembly.


RA PD 43289

***Figure 55—Removing Retractable Parking Wheel***

*c.* ***Installation.*** Position retractable parking wheel assembly in center of drawbar with holes in swivel quadrant towards rear of trailer. Install pin in swivel quadrant. Tap support tube through support brackets and large hole in swivel quadrant. Install two bolts, lock washers, and nuts. Place retractable landing wheel in the down position and raise two lift jacks.

## 59. LANDING GEAR (Trailer M18 Only).

*a.* ***Description.*** The landing gear is attached to the underside of the drawbar and supports the front of the trailer when trailer is disconnected from towing vehicle. The landing gear is of the fold-back type, operated by a hand crank located on the right side of the drawbar. The leg of the landing gear is provided with a single wheel.

*b.* ***Removal.*** Place a wood horse across front of drawbar to support the trailer. Place landing gear in down position by turning hand crank. Place screwdriver under hinge pin lock ring at connecting rod and pry lock ring off. Pry lock ring off two hinge pins in landing gear, drive three hinge pins out, and remove landing gear. Remove two bolts from axle, tap axle out of leg, and remove wheel.

*c.* ***Installation.*** Lubricate landing gear (par. 26). Place wheel into end of landing gear, install axle, and secure axle with two cap screws and nuts. Peen end of bolt to prevent loosening. Fasten landing gear to drawbar frame using two hinge pins and lock rings. Couple connecting rod to slide bracket using hinge pin, plain washers, and lock rings. Place support in down position and remove wood horse.

## Section XVIII

# UNDERCONSTRUCTION

## 60. DESCRIPTION.

*a. Description.* The underconstruction is of rocker arm type and is parallel to main frame members. To permit vertical movement, the wheel spindles are welded to rocker arms which pivot on roller-type bearings mounted in the spring hanger assemblies. The ends of rocker arms are held to the frame by gib plates and are fitted with wear plates. The springs are secured to the underside of the hangers.

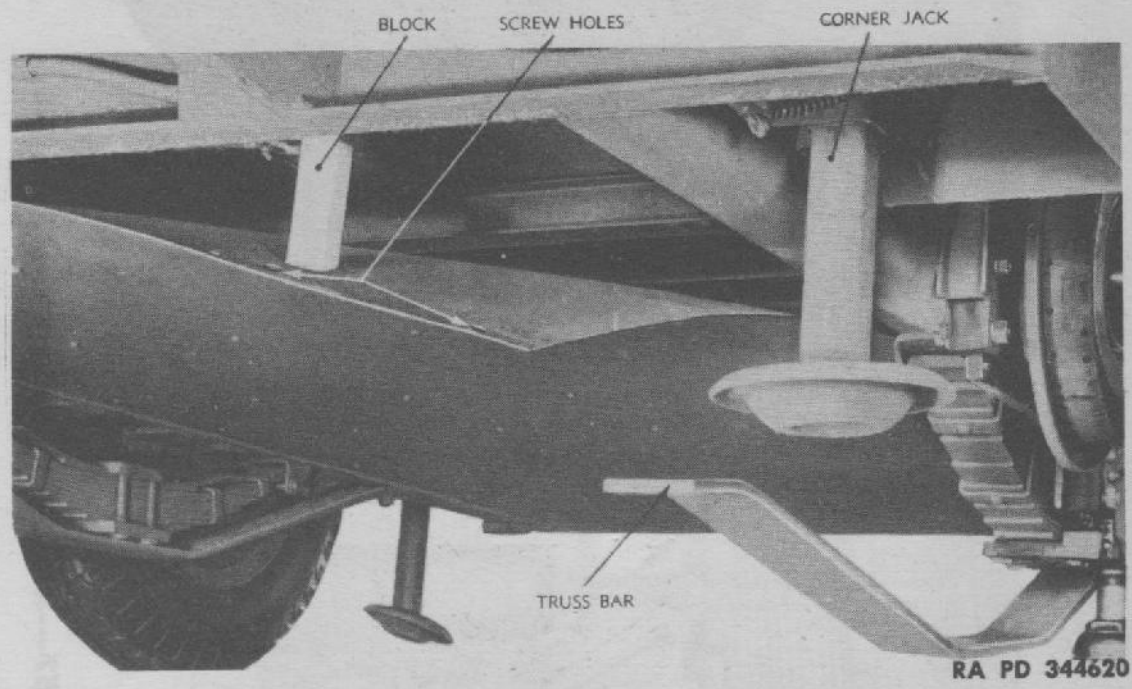



***Figure 56—Truss Bar and Pan***

*b. Data.*

Make . . . . . Fruehauf Trailer Co. & J. G. Brill Co.
Model (Fruehauf) . . . . . SK 8520
Quantity per trailer . . . . . 2

## 61. SPRINGS.

*a. Description.* The springs are of the eyeless or shackleless type. They are equipped with an overload leaf which contacts wear plates bolted to underside of side frame. The spring is held in alinement by means of two combination wear plates and spring brackets. The spring is held to center spring hanger assembly by means of a plate and four spring bolts with lock washers and sleeve nuts. A steel truss bar, running directly under the spring, serves to strengthen and stiffen the whole underconstruction and, at the same time, protect the spring itself.

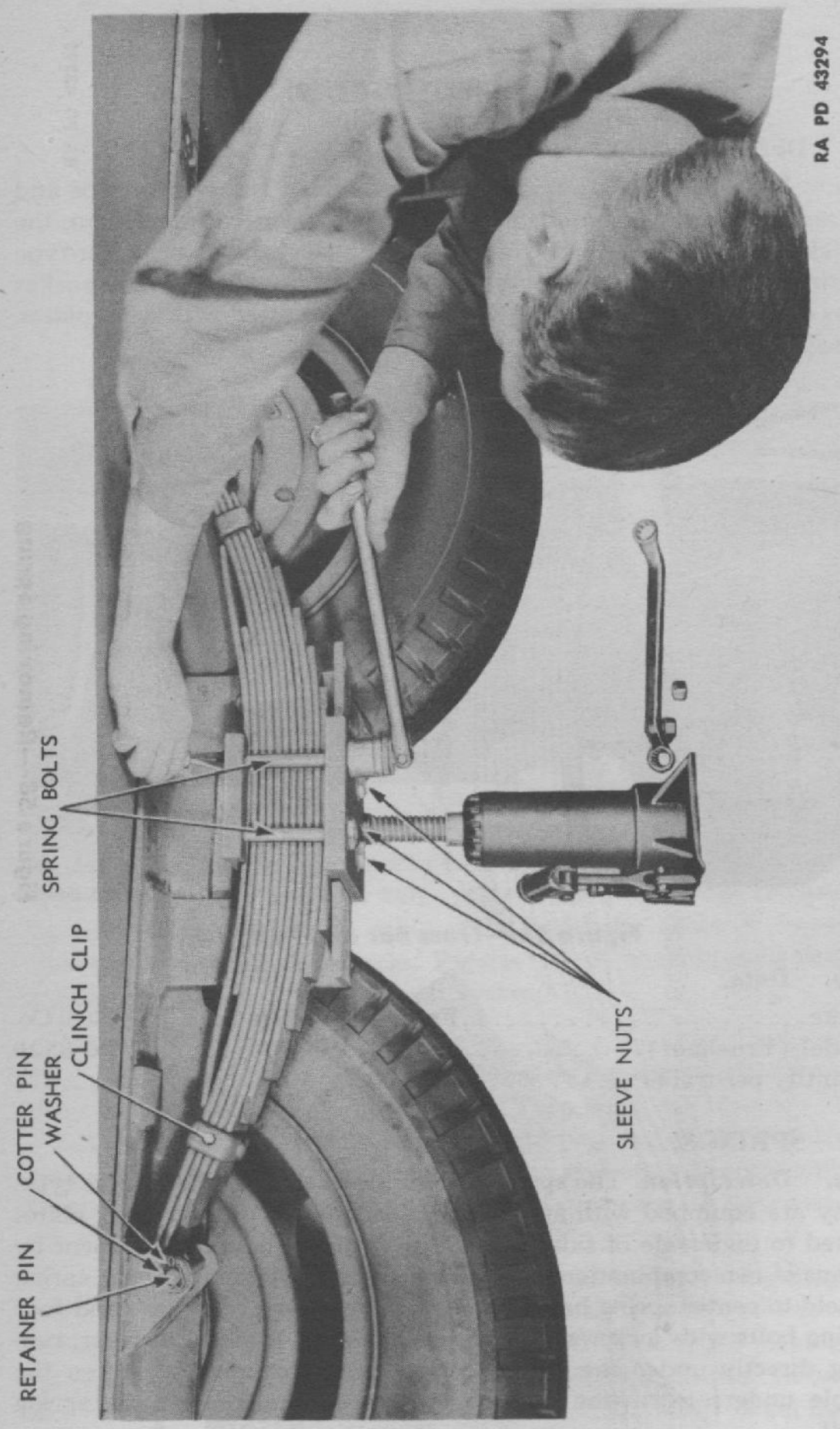
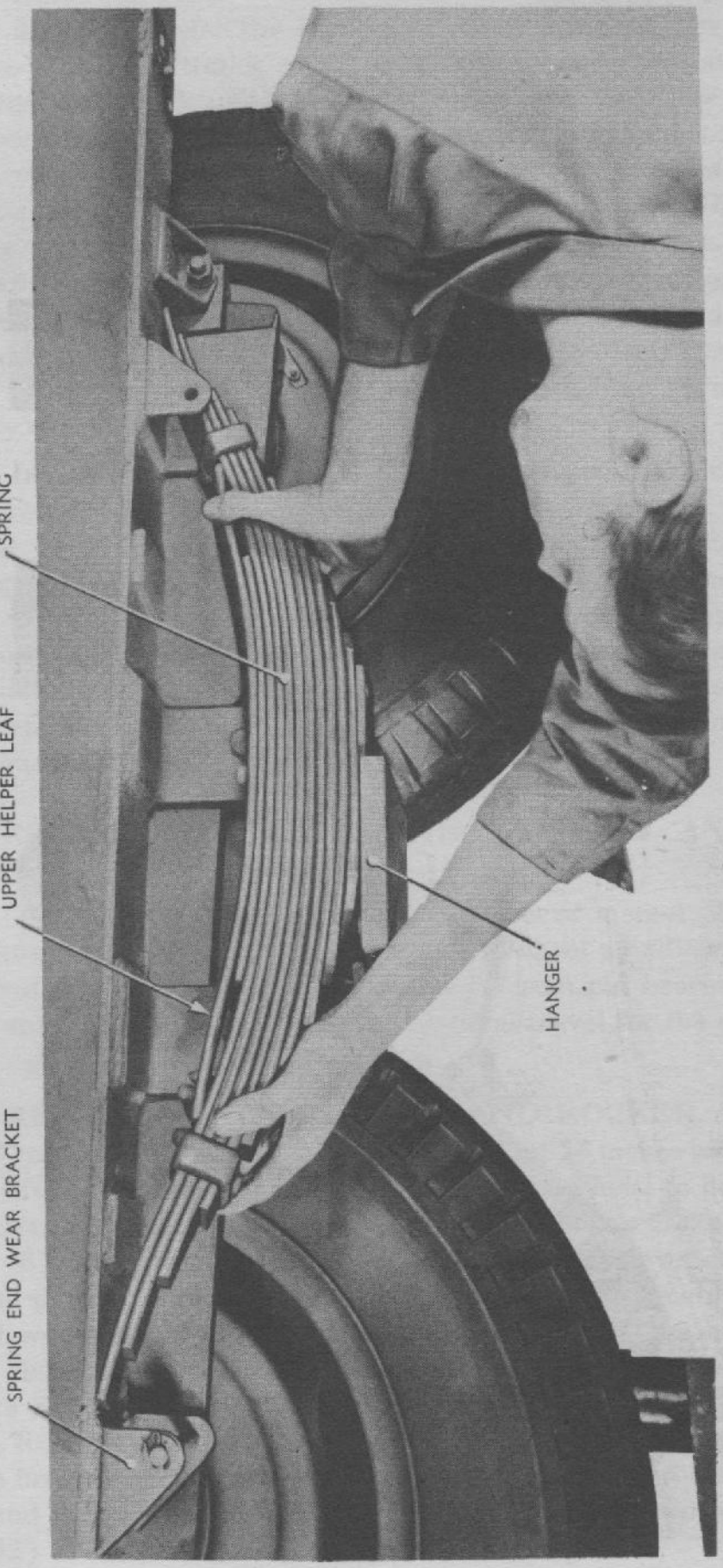
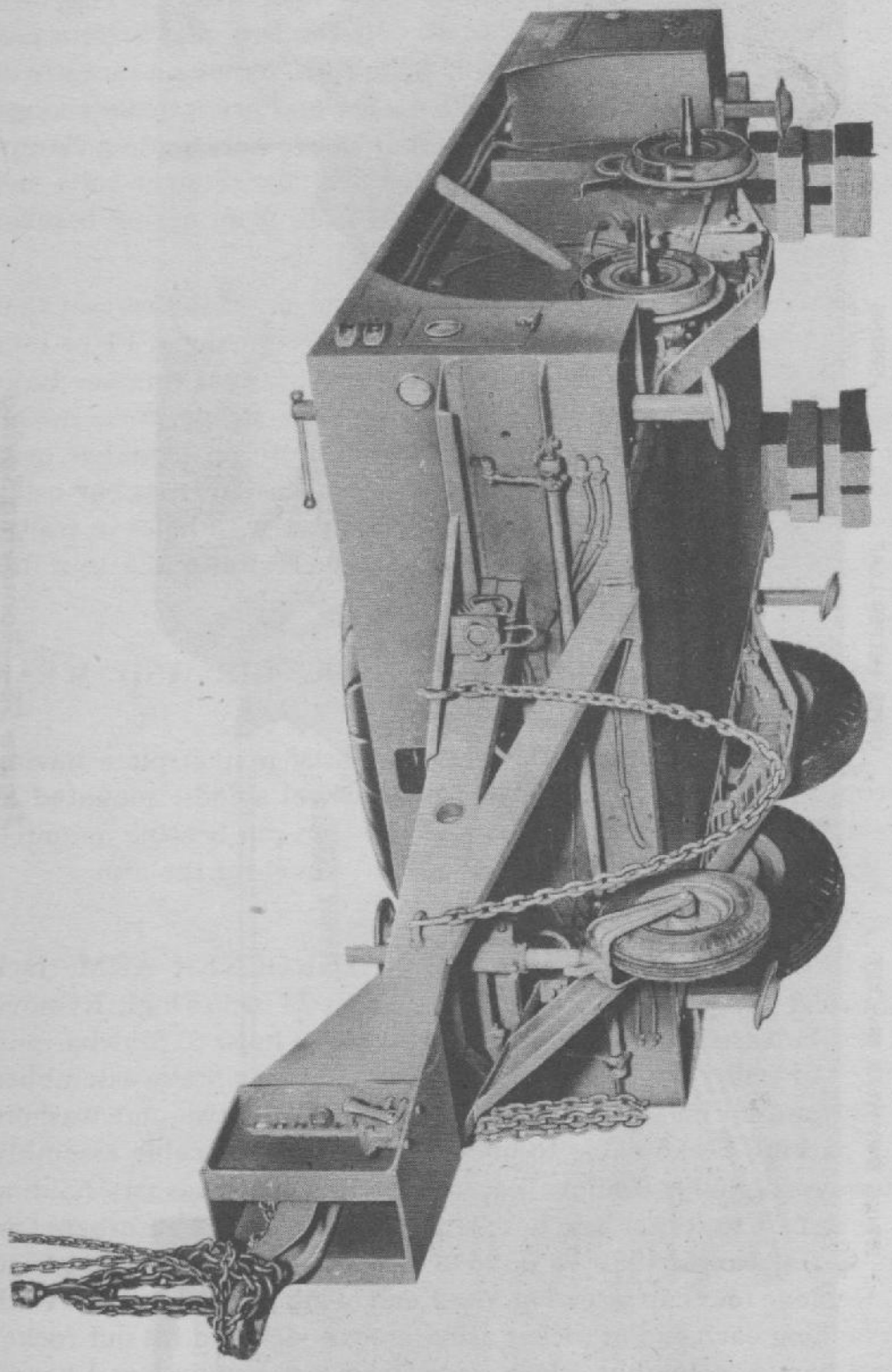



***Figure 57—Removing Spring Retainer Bolts***




RA PD 43295

*Figure 58—Removing Spring*



RA PD 341014

*Figure 59—Blocking and Hoisting Trailer*

*b. Removal.* Place about 12 inches of blocking under pad on each corner lift jack. Lower the four jacks about 5 inches. Use hydraulic jacks to jack M18 trailer as lift jacks are not installed on the M18. Place hydraulic jack under center of rocker arm and raise jack until it supports weight of rocker arm. Remove four nuts and lock washers which secure ends of truss bar to frame and remove truss bar (fig. 56). NOTE: *The heads of truss bar bolts are between floor and bottom pan and are welded to prevent turning. If bolts turn, remove a number of screws from bottom pan near ends of truss bar and pry it down enough to get a wrench on bolt heads.* Remove four sleeve nuts holding clamping plate and spring to spring hanger. Remove four retainer bolts and spring plate (fig. 57). Remove spring bolt from front spring bracket and pry spring forward and then out (fig. 58).

*c. Installation.* Place spring on spring hanger. Make certain that spring center bolt is seated in center hole of spring hanger. Place four retainer bolts in spring plate and place the plate and retainer bolts over spring. Clamp spring to hanger using four sleeve nuts. Install spring bolt in bracket at front end of spring. Position truss bar over four bolts that protrude from trailer frame and fasten truss bar using lock washers and nuts. Aline holes in bottom pan with holes in trailer crossmembers and install screws. Remove jack. Raise the four lift jacks and remove blocking.

## 62. ROCKER ARM, SPRING HANGER, GIB AND WEAR PLATES.

*a. Description.* The rocker arm consists of a steel plate having a fulcrum pin welded at its center and a wheel spindle mounted at each end. The rocker arm pivots on the fulcrum pin bearing mounted in the spring hanger which provides vertical travel for the arm.

*b. Removal.*

(1) REMOVE SPRING HANGER AND ROCKER ARM. Jack rear of trailer and place on solid cribbing about 24 inches high. Remove wheel and hub assembly (par. 79). Couple chain hoist to drawbar and hoist front of trailer about two feet (fig. 59). Remove brake assemblies (par. 48) and spring (par. 61 *b*). Remove cap screws and washers holding parking brake cable to anchor plate, and lift cable assembly out of way (fig. 60). Remove cap screws and lock washers holding shock absorbers to rocker arm brackets and lift off shock absorbers (on trailers Serial No. 054959 to 055648 and No. 0100533 to 0101036 only). Remove four cap screws at lower end of gib plates (fig. 61). With a man holding each end of rocker arm, remove jack and lift out rocker arm and hanger assembly. Place rocker arm across two wood horses (fig. 62) and lift hanger assembly off rocker arm.

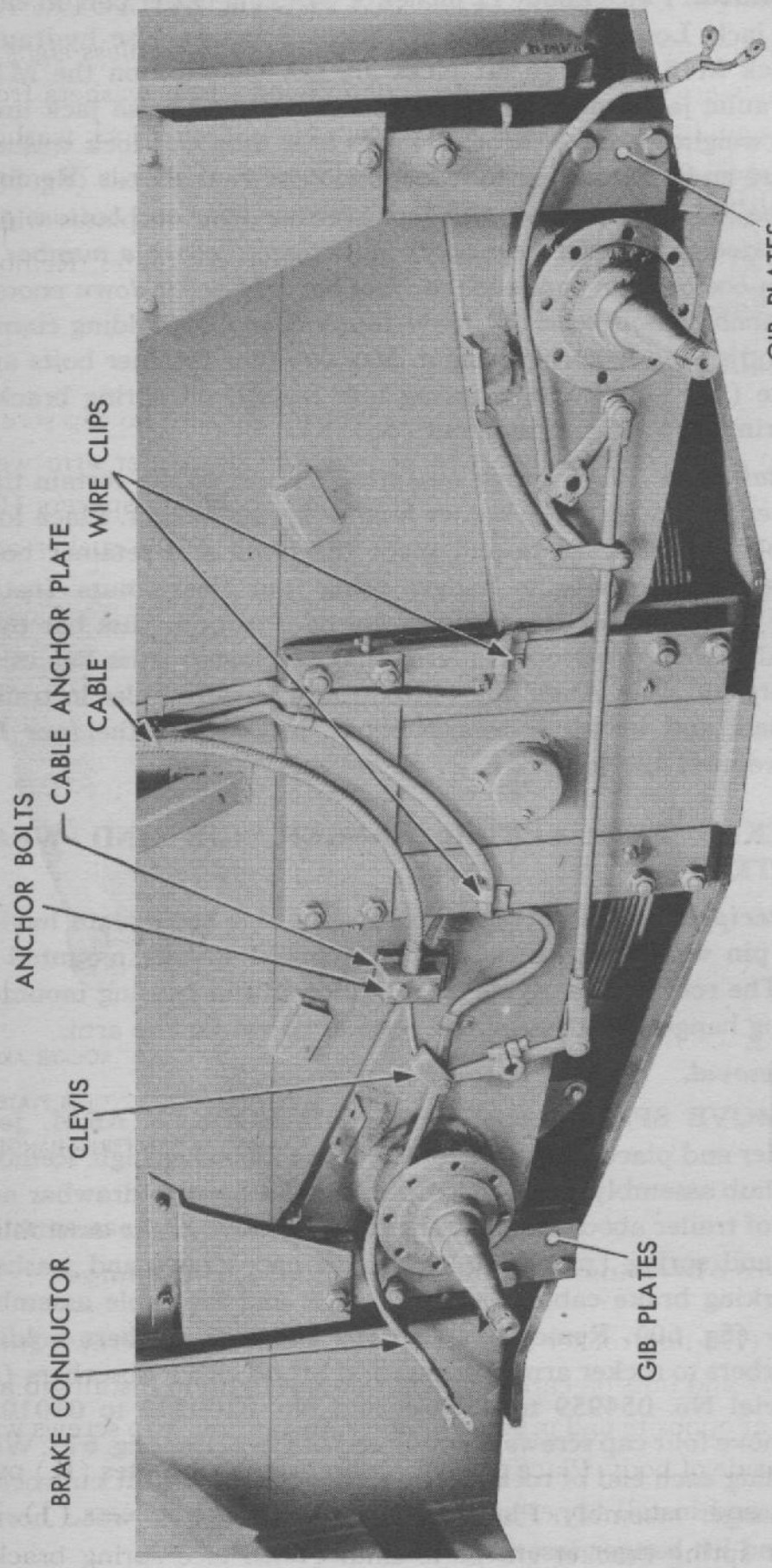
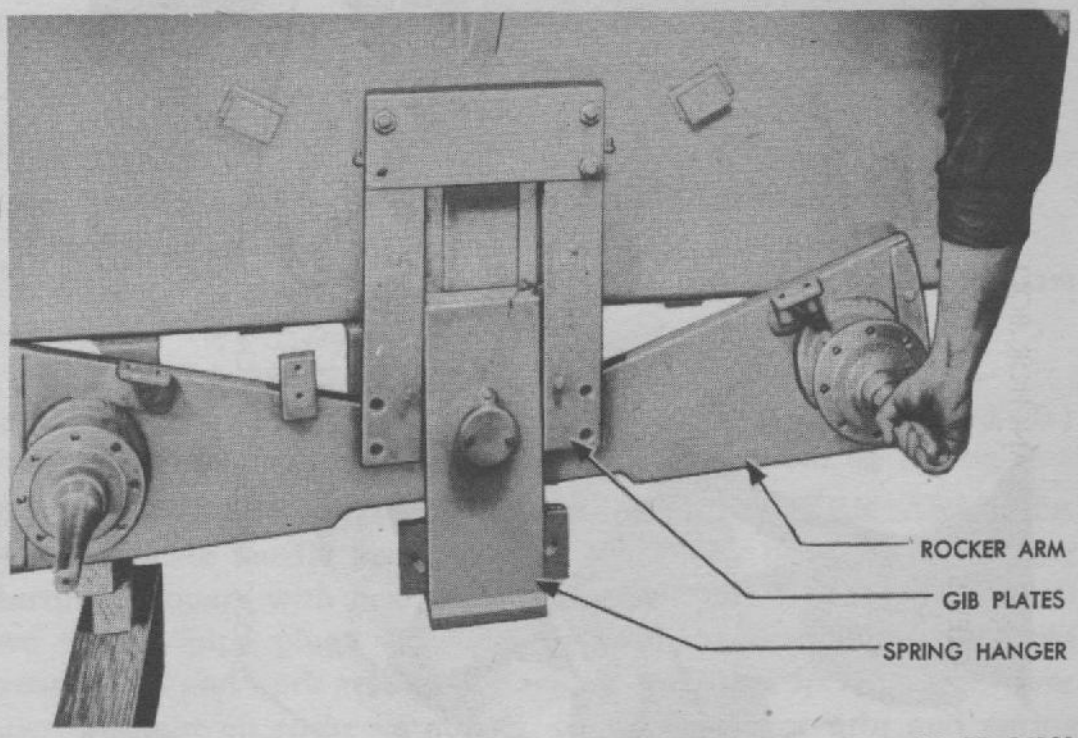



***Figure 60—Side View of Underconstruction***

(2) REMOVE GIB AND WEAR PLATES (fig. 64). NOTE: *The gib plate shims are welded in position. Do not remove unless signs of extreme wear are evident.* Remove four nuts and lock washers from brake cable guard and pull out guard. Remove nuts and lock washers holding mud guard to trailer body and remove mud guards. Remove cap screws, nuts, and lock washers from rocker arm gib plates which are located at each end of assembly, and remove gib plates. Remove all spacers and shims.

*c. Installation.*

(1) GIB AND WEAR PLATES (fig. 64). Install two cap screws (L) in two top holes in inner side of body. Place rocker arm wear plate (H) over cap screws. Place upper rocker gib plate spacers (G) over cap screws. Place shim (F) over cap screws. Place rocker arm




RA PD 341016

***Figure 61—Removing Rocker Arm and Spring Hanger***

wear plate (H) and rocker arm gib plate (A) over cap screws. Intall lock washers and nuts on cap screws but do not tighten. Install gib and wear plate at opposite end in same manner. Install four cap screws with heads on inside of body. Place two spring bracket wear plates (K) over cap screws and install upper spring bracket gib plate spacers (J). Install upper spring bracket gib plate shim (F). Place spring bracket

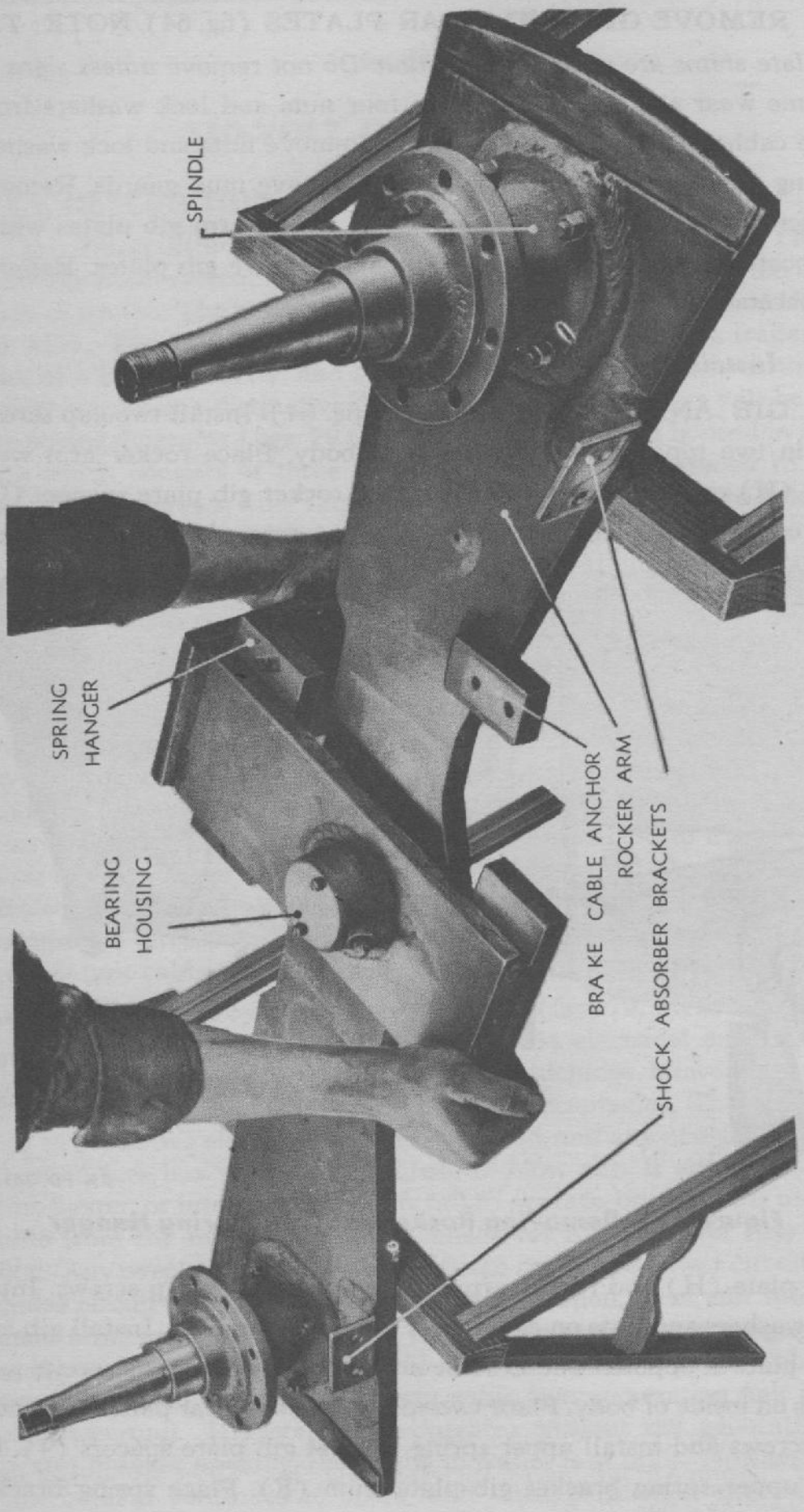
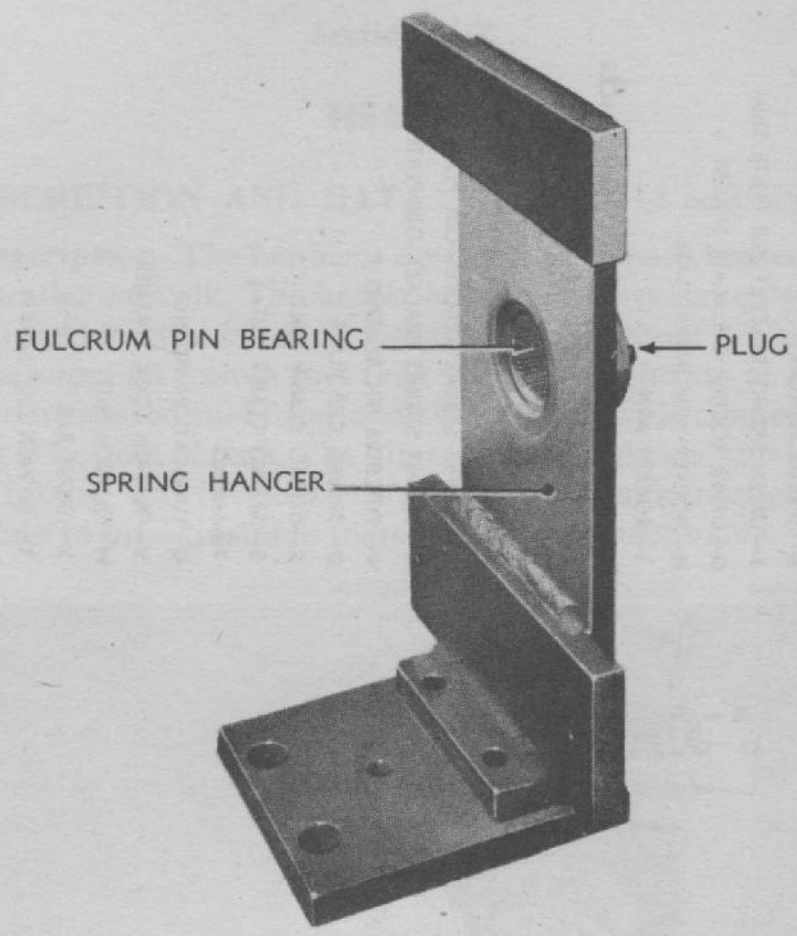



***Figure 62—Removing Spring Hanger***

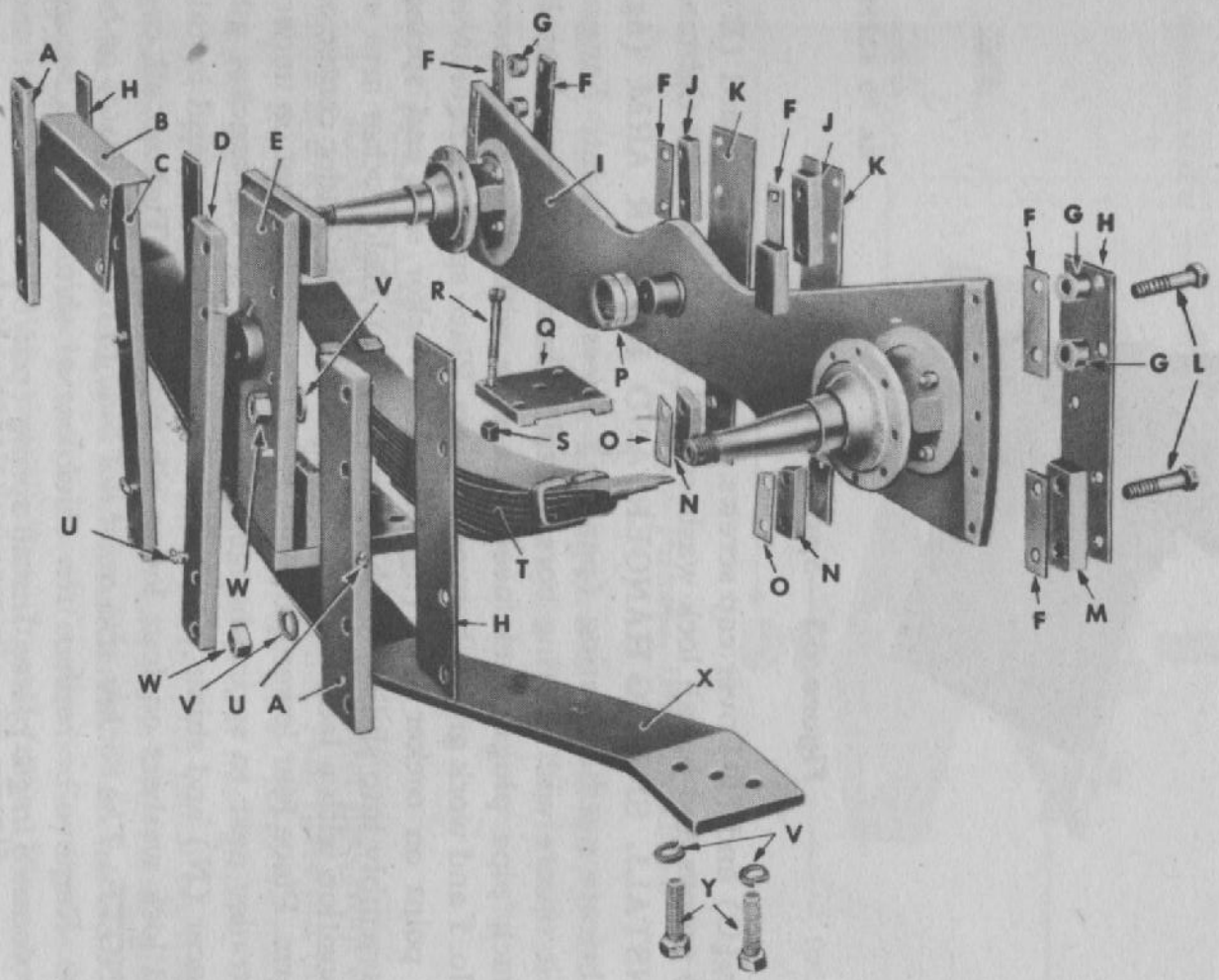



RA PD 43298

***Figure 63—Spring Hanger***

gib plate (C) and (D) over cap screws. Place brake cable guard (B) over cap screws and install lock washers and nuts but do not tighten.

(2) INSTALL SPRING HANGER AND ROCKER ARM (fig. 64). Lubricate needle bearing (par. 26). Press bearing into hanger starting it square with bearing bore. Install lubrication fitting. Install two ⅛ inch pipe plugs. Pack needle bearing with general purpose grease No. 1 and work grease between rollers. Place spring hanger over fulcrum point on rocker arm (fig. 62). Lift rocker arm and spring hanger assembly into sliding mechanism (fig. 61). Hold rocker arm in the up position with a jack or blocking placed directly under center of rocker arm. Place four lower gib plate bolts through bracket on underside of trailer next to spring hanger. Place lower spring bracket gib plate spacer (N) and shims (O) between two wear plates, and install nuts and lock washers on four lower gib plate bolts. Tighten all cap screws. NOTE: *The rocker arm must not bind in the wear plates or be too loose. Remove or replace the thickness of shim stock to secure proper tolerance in gib plates.* Install spring (par. 61 *c*) and wheel and hub assembly (par. 79 *b*).




A—ROCKER ARM GIB PLATE
B—BRAKE CABLE GUARD
C—SPRING BRACKET GIB PLATE (RIGHT REAR)
D—SPRING BRACKET GIB PLATE (RIGHT FRONT)
E—SPRING HANGER
F—UPPER SPRING BRACKET GIB PLATE SHIM
G—UPPER ROCKER GIB PLATE SPACER
H—ROCKER ARM WEAR PLATE
I—ROCKER ARM
J—UPPER SPRING BRACKET GIB PLATE SPACER
K—SPRING BRACKET WEAR PLATE
L—CAP SCREW
M—LOWER ROCKER ARM GIB PLATE SPACER
N—LOWER SPRING BRACKET GIB PLATE SPACER
O—LOWER SPRING BRACKET GIB PLATE SHIM
P—FULCRUM PIN BEARING
Q—SPRING CLIP PLATE
R—SPRING CLAMP BOLT
S—SPRING CLAMP NUT
T—SPRING
U—LUBRICATION FITTING
V—⅝-INCH LOCK WASHER
W—⅝-INCH NUT
X—TRUSS BAR
Y—⅝-INCH CAP SCREW

RA PD 341017

***Figure 64—Underconstruction—Disassembled***

## Section XIX

# HEATER

## 63. DESCRIPTION AND DATA (Trailer M14 and M22).

*a. Description.* The heater is designed as a space heater and is located on trailer catwalk. The heater employs a vaporizing-type burner and is designed to burn gasoline, either with or without tetraethyl lead. The fuel is supplied from a fuel tank located on outside of front bulkhead. A combination fuel filter and sediment bowl is connected to the fuel outlet at bottom of tank. The filter is connected to heater by a length of copper tubing. The fuel flows by gravity from tank through fuel filter and fuel line to an adjustable metering-type control valve.

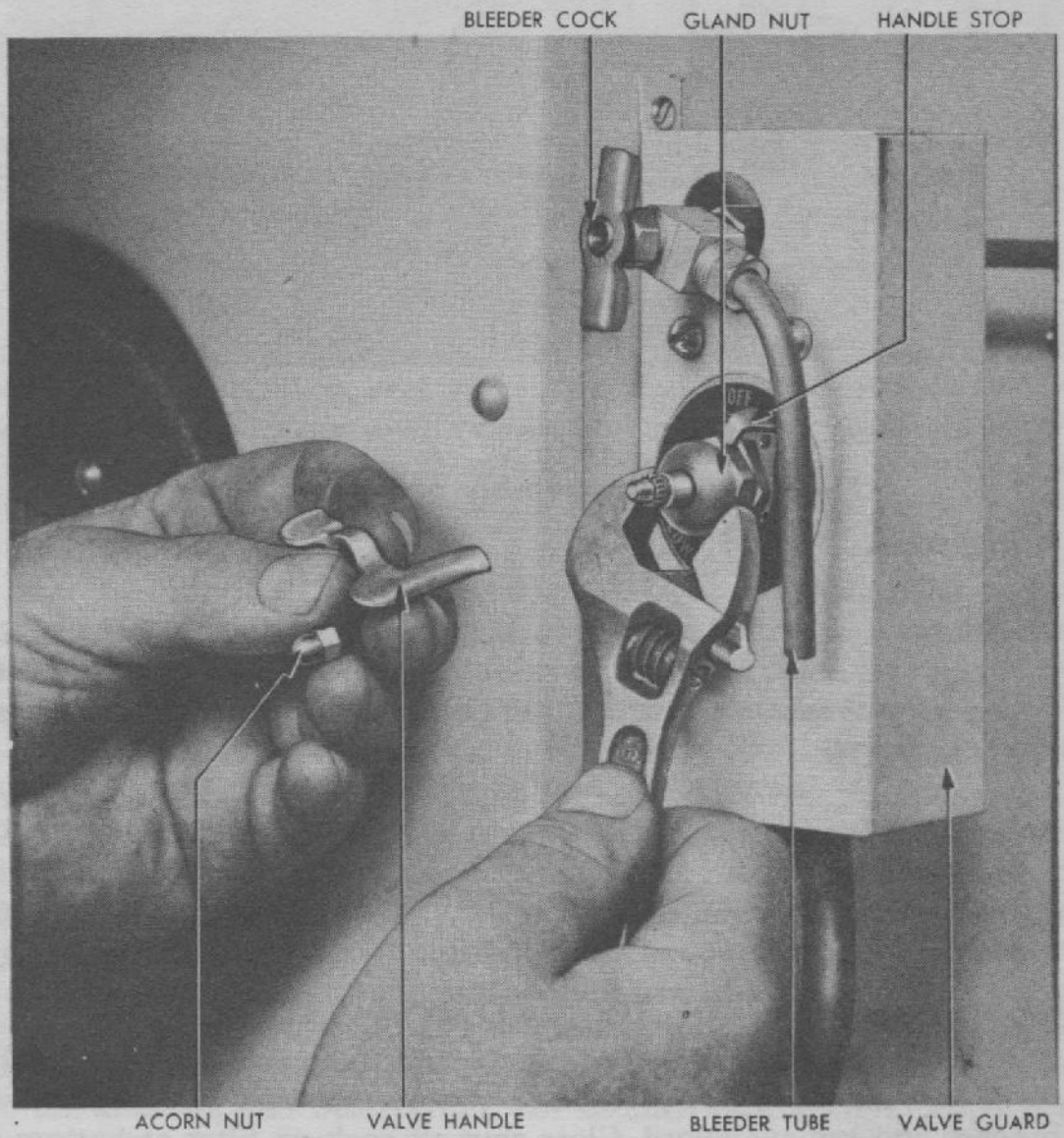
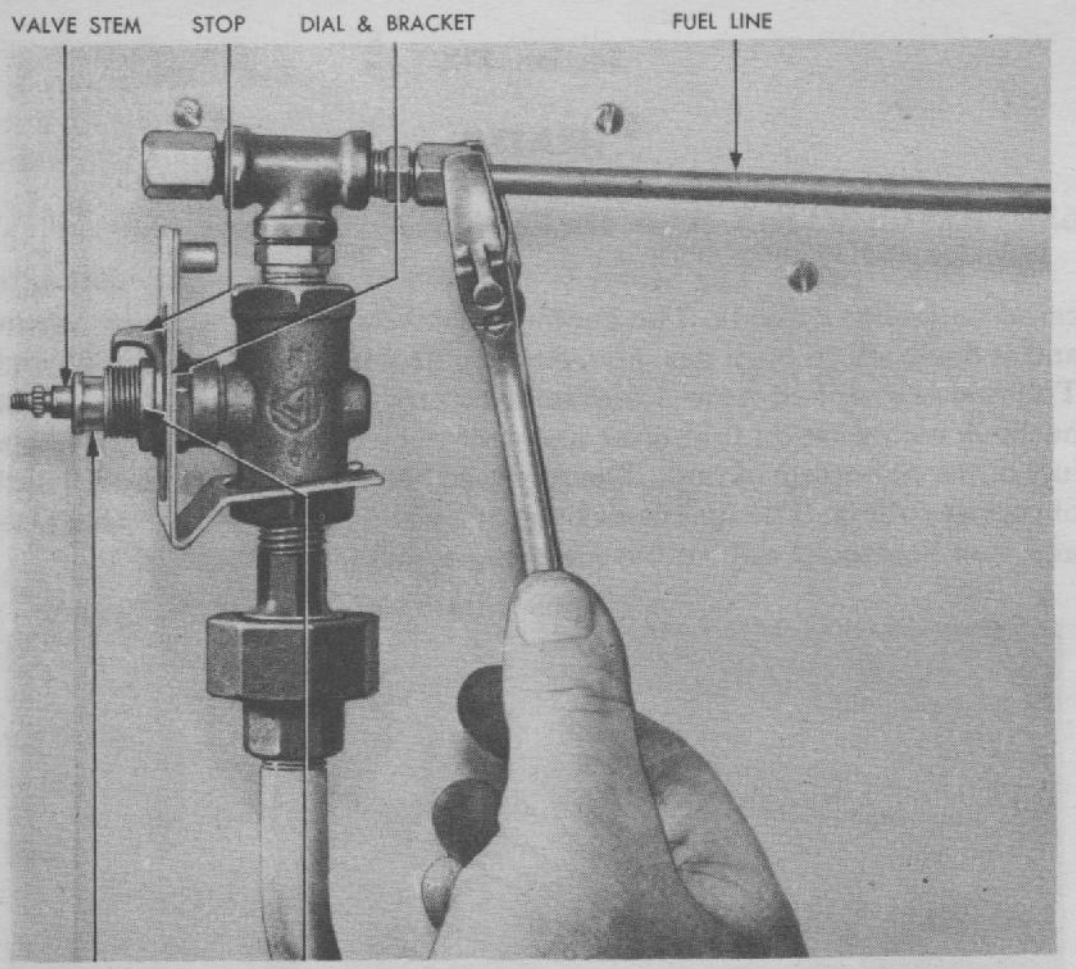



***Figure 65—Removing Control Valve***




RA PD 82096

***Figure 66—Disassembly of Control Valve***

*b. Data.*

(1) GENERAL.

Make.....Evans Products Co.
Model.....203845
Capacity of fuel tank.....6½ gal.

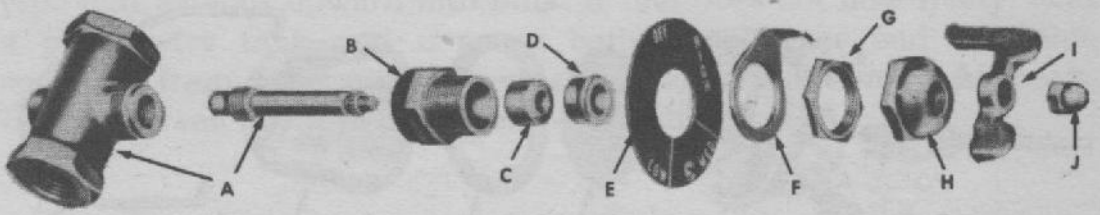
(2) MOTOR.

Make.....General Electric
Model.....KCP25FRK8138696
Horsepower.....1/20
Revolutions per minute.....2800
Phase.....Single

## 64. FUEL CONTROL OR METERING VALVE.

*a. Removal* (fig. 65). Remove bleeder tube and bleeder cock by turning counterclockwise. Remove two screws that fasten guard to bracket and remove guard. Close shut-off cock on filter at bottom of fuel tank. Disconnect fuel line on inner side of control valve. Unscrew the union and remove control valve.

*b. Disassembly* (figs. 65 and 66). NOTE: *All repairs, cleaning, and disassembly of control valve can be accomplished without removing it from heater.* If control valve is mounted on heater, shut off fuel supply at fuel tank. Mark exact position of valve handle when stem is closed and also the position of the stop. Unscrew acorn nut and remove handle by tapping it gently. Remove the gland nut and pull out gland. Unscrew lock nut and lift off the stop. Remove bracket with dial plate. Remove bushing and carefully remove valve stem. CAUTION: *Handle valve stem carefully as the tip of needle is very easily bent.* The packing is located inside the bushing and can be fished out if necessary.




A—BODY AND STEM
B—BUSHING
C—PACKING
D—GLAND
E—DIAL PLATE
F—STOP
G—LOCK NUT
H—GLAND NUT
I—HANDLE
J—ACORN NUT

RA PD 340977

***Figure 67—Control Valve—Disassembled***

*c. Assembly* (fig. 67). Place valve stem into body and screw into position. Place bushing over valve stem and screw into place. Place bracket and dial plate over valve stem and install the stop. Place gland into cavity on valve stem and install gland nut. Install valve handle as marked in disassembly. Fasten in position using acorn nut.

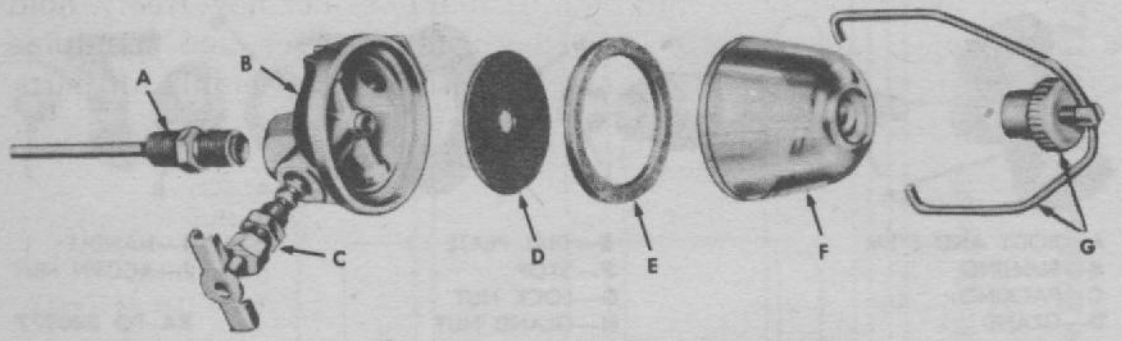
*d. Installation* (figs. 65 and 66). Position control valve on union and tighten the union. Couple gas line to tee at top of control valve and tighten. Fasten guard to bracket using two screws. Screw bleeder cock into valve, making certain the drain end of the valve is at about a 45-degree angle and pointing down. Place flare nut over bleeder tube and install tube. Open shut-off cock at fuel tank.

*e. Cleaning* (fig. 67). The fuel control valve consists of a movable needle in an orifice. The orifice (a small hole) may become obstructed by small particles of dirt but can usually be cleared by the following procedure: Unscrew acorn nut that holds handle in place, then loosen handle slightly without removing it. Pull handle out slightly on valve stem splines so that when stem is turned, the handle clears the stop. By turning the valve stem in and out (moving the needle in and out of the orifice), the obstruction can usually be forced through the orifice. When removing the handle, first note position of handle when valve is closed, replace handle in identical position. Do not use metal or abrasive material to clean valve stems, needle, or seat. Do

not use a cloth as cloth will leave lint inside parts which will obstruct orifice when valve is assembled. The most suitable material would be a piece of soft wood. The parts must be washed in dry-cleaning solvent.

*f. Adjustment.*

(1) FUEL FLOW CANNOT BE SHUT OFF ENTIRELY. If valve handle was loosened and removed in order to free valve orifice of dirt particles, the valve stem probably was not entirely closed when handle was put back on. This would allow too great a fuel flow at all settings of valve and would make it impossible to shut off flow when valve handle was turned to "OFF" position because of the handle




A—STANDPIPE
B—COVER
C—VALVE
D—SCREEN
E—GASKET
F—BOWL
G—BAIL AND SCREW

RA PD 341022

***Figure 68—Filter Assembly—Disassembled***

pointer striking the stop. This would prevent shoulder of valve stem from making a contact with valve seat. If this is found to be the case, remove acorn nut and then handle. Turn valve stem to the right (clockwise) until entirely closed. Place handle on splines of stem so handle pointer is at "OFF" position, but does not touch stop. Install and tighten acorn nut.

(2) NO CONTROL OVER FUEL FLOW. If fuel valve has been opened to some settings above low, and it is discovered that fuel flow cannot be controlled or reduced, even by closing valve to "OFF" or slightly less, it is probable that the needle has been broken, badly bent, or pushed too far into stem at some time when valve was torn down for servicing or was being reassembled. If this is found to be the case, replace entire valve as outlined in steps above.

## 65. FILTER.

*a. Removal.* Drain fuel from fuel tank. Disconnect fuel line at tank, and unscrew filter.

*b. Disassembly* (fig. 68). Unscrew knurled knob at bottom of bail, swing bail to one side, and remove filter bowl. Then, remove filter bowl gasket and filter screen.

*c. Assembly.* Screw cover into fuel tank and connect fuel line. Place filter screen into cavity of cover, place gasket next to screen, and install bowl. Place bail into grooves in cover and fasten bowl using the knurled knob at end of bail.

*d. Cleaning.* The filter can be cleaned and installed on tank. A dirty fuel filter will restrict the flow of fuel, and must be cleaned if sediment is visible at bottom of filter bowl. Close shut-off cock on filter cover (turn clockwise). Unscrew knurled knob at bottom of bail, swing bail to one side, and remove filter bowl. Remove filter bowl gasket and filter screen. Wash bowl and screen in clean gasoline. Before reassembling the parts, open shut-off cock enough to flush standpipe that extends upward into tank. If fuel does not flow freely, hold a pail under tank and unscrew both filter cover and standpipe assembly from tank. After cleaning in gasoline, reassemble all parts. Be sure screen is put in place before gasket.

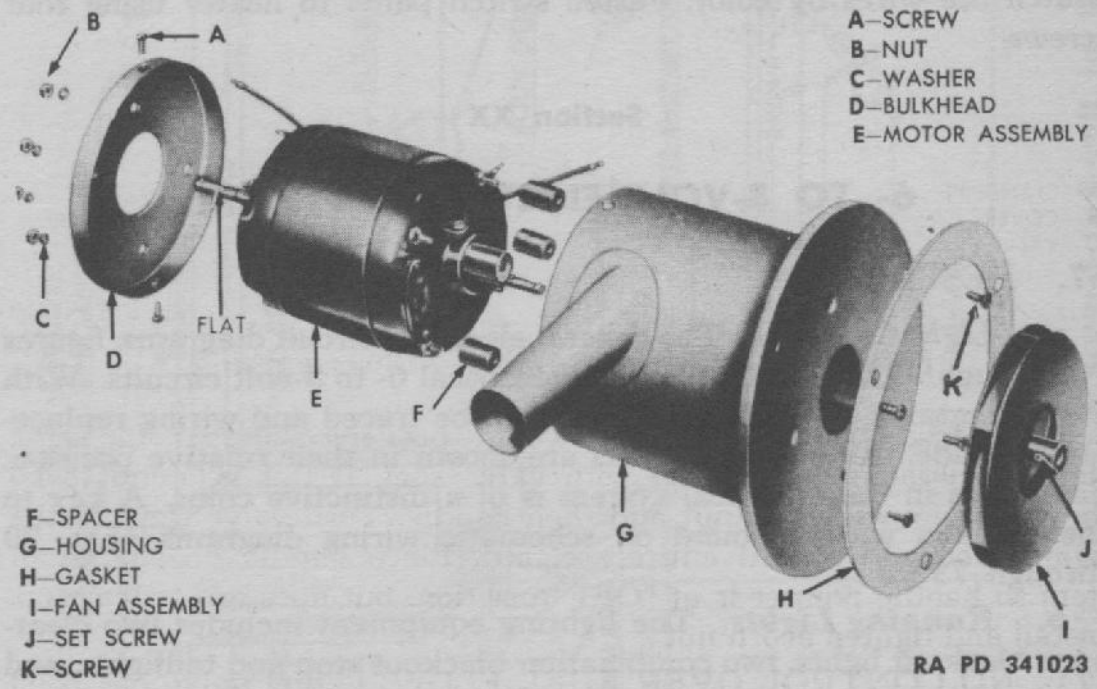



***Figure 69—Heater Blower—Partially Disassembled***

## 66. BLOWER (fig. 69).

*a. Removal.* Shut off the 110-volt current by pulling main switch in front left corner of trailer. Remove four screws holding switch panel to heater housing. Disconnect four wires by pulling bullet terminals on ends of wires from connecting sleeves. Remove screws holding front panel to heater and remove front panel. Remove circulating fan by loosening set screw and pulling fan straight down and off the motor shaft. Remove fan inlet ring by loosening two screws at front, then pulling ring straight out. Remove three screws holding blower assembly

to combustion chamber bottom bulkhead. Remove blower assembly. Remove nuts and two screws from bulkhead and remove bulkhead. Remove four screws from top of housing and pull motor out of housing. Screw four spacers off motor studs.

*b. Installation.* Screw one spacer on each of studs that project from motor studs. Install motor assembly in housing and pull wire leads out of tube which extend from housing. Aline holes in spacers with holes at top of housing and install four screws, thus securing motor to housing. Place bulkhead over end of housing and fasten in place using nuts and screws. Fasten blower assembly to combustion chamber using three screws. Place inlet ring over end of motor shaft and fasten it to heater using two screws. Place fan on motor shaft and tighten set screw in fan hub. Position front panel on heater, aline holes in panel with holes in heater, and install and tighten all screws. Connect four wires by inserting bullet terminals into connector sleeves. Match the wires by color. Fasten switch panel to heater using four screws.

## Section XX

# 6- TO 8-VOLT ELECTRICAL SYSTEM

## 67. DESCRIPTION.

*a. Light Currents.* The general electrical circuit diagrams, figures 70 through 73, illustrate all of the electrical 6- to 8-volt circuits. With these diagrams, the various circuits can be traced and wiring replacements made. All electrical units are shown in their relative position. Each wire in the electrical system is of a distinctive color. A key to these colors will be found on schematic wiring diagrams (figs. 70 through 73).

*b. Running Lights.* The lighting equipment includes two clearance blackout lights, two combination blackout stop and taillights, and one combination service stop and taillight and blackout taillight.

(1) The combination service stop and taillight and blackout taillight, and the blackout stop and taillight are mounted at left rear side of trailer. The other blackout stop and taillight is mounted at right rear side of trailer.

(2) The lens on each blackout taillight is designed to produce two beams. This design is such that when one towing vehicle is following a preceding trailer at a specified safe distance, these two beams will merge into a single highly visible beam.

(3) To insure the accuracy of construction necessary to produce this effect, lamp is soldered to lens retainer, and lens and filter are crimped to retainer to form a complete unit.

(4) Trailers M14 and M22 are provided with two dome lights.

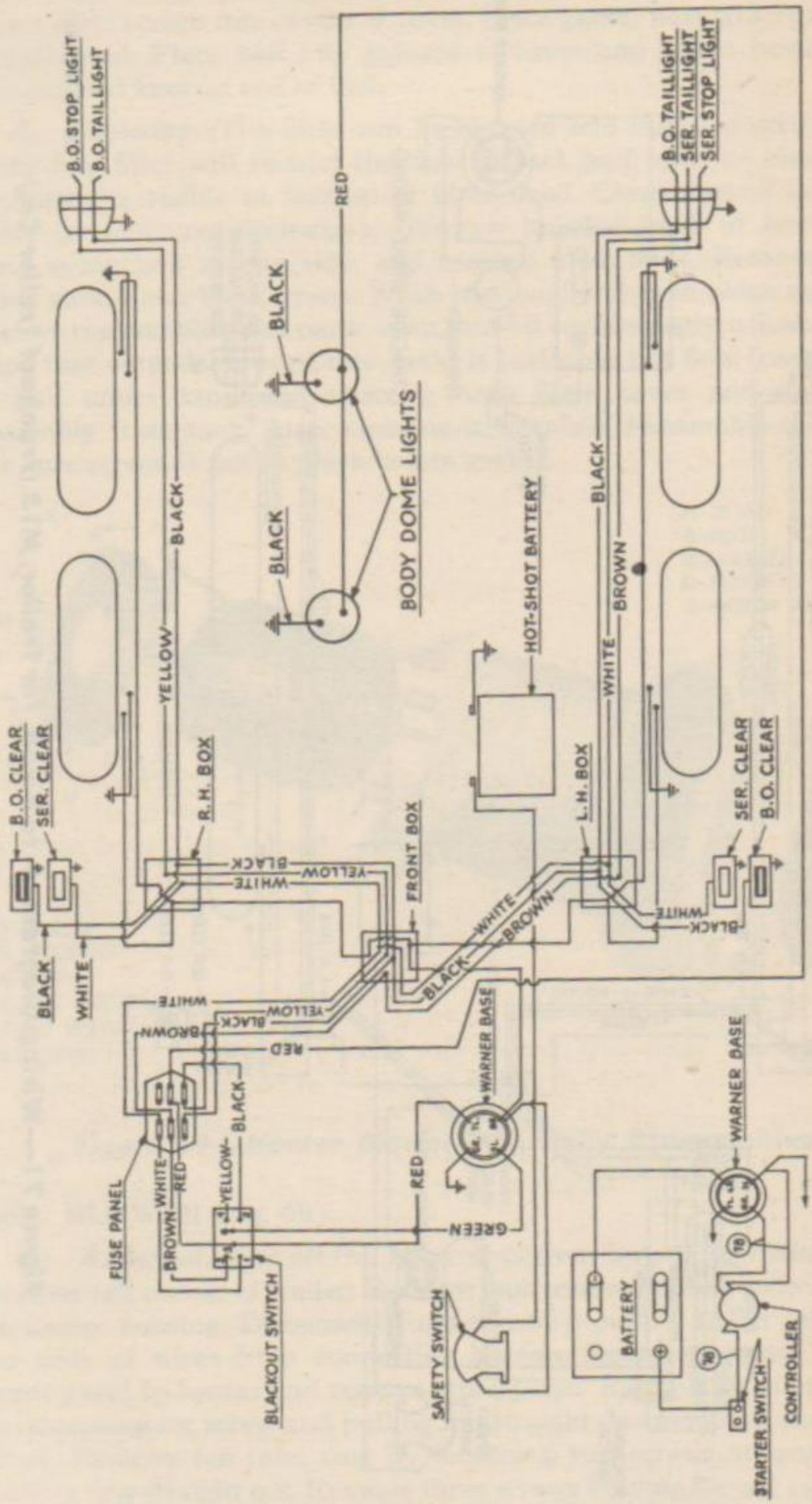



**Figure 70—Wiring Diagram 6- to 8-volt, for Trailer, M14 (Fruehauf Trailer Co.) and Trailer, M22 (J. G. Brill Co.)**

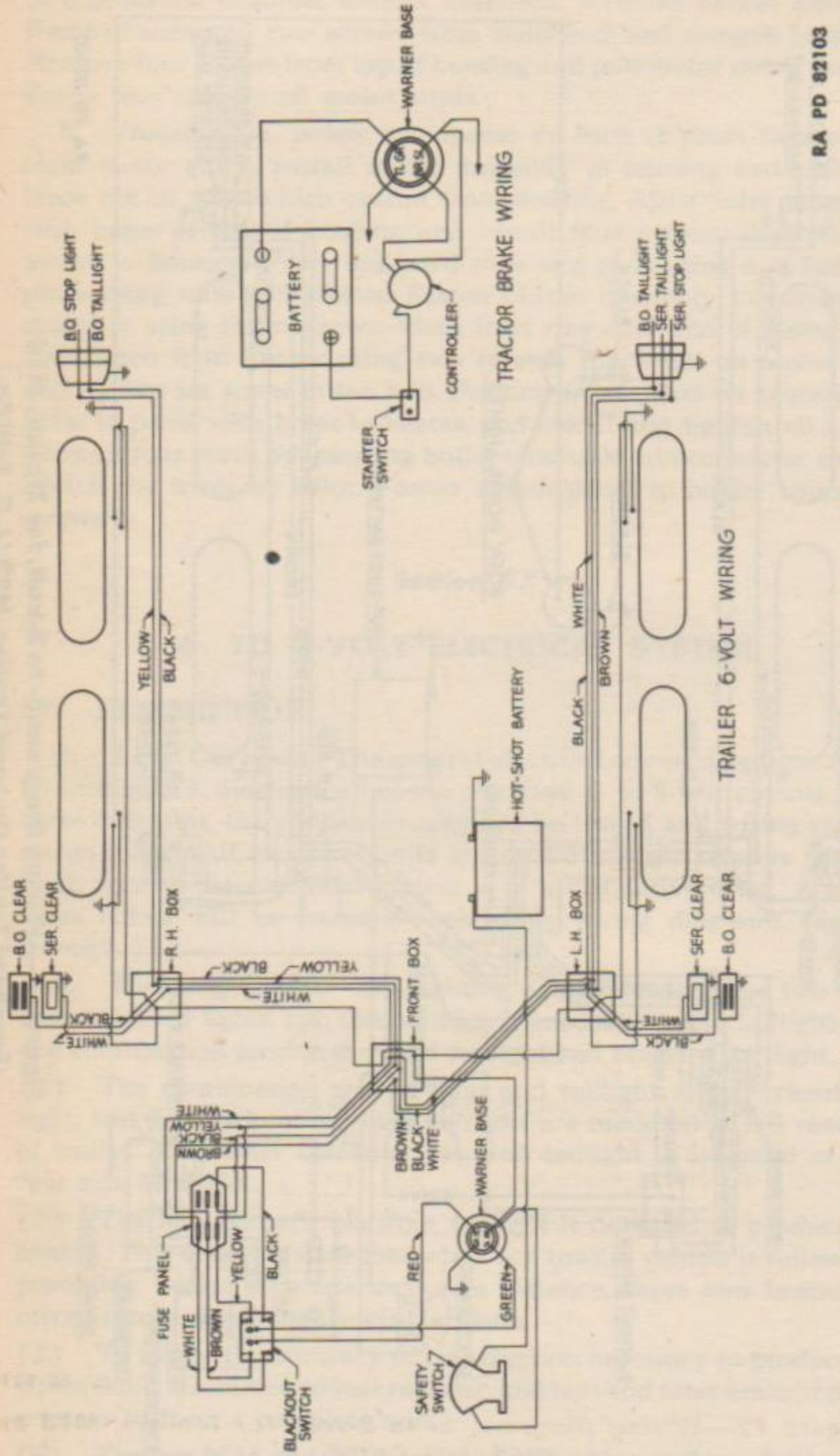
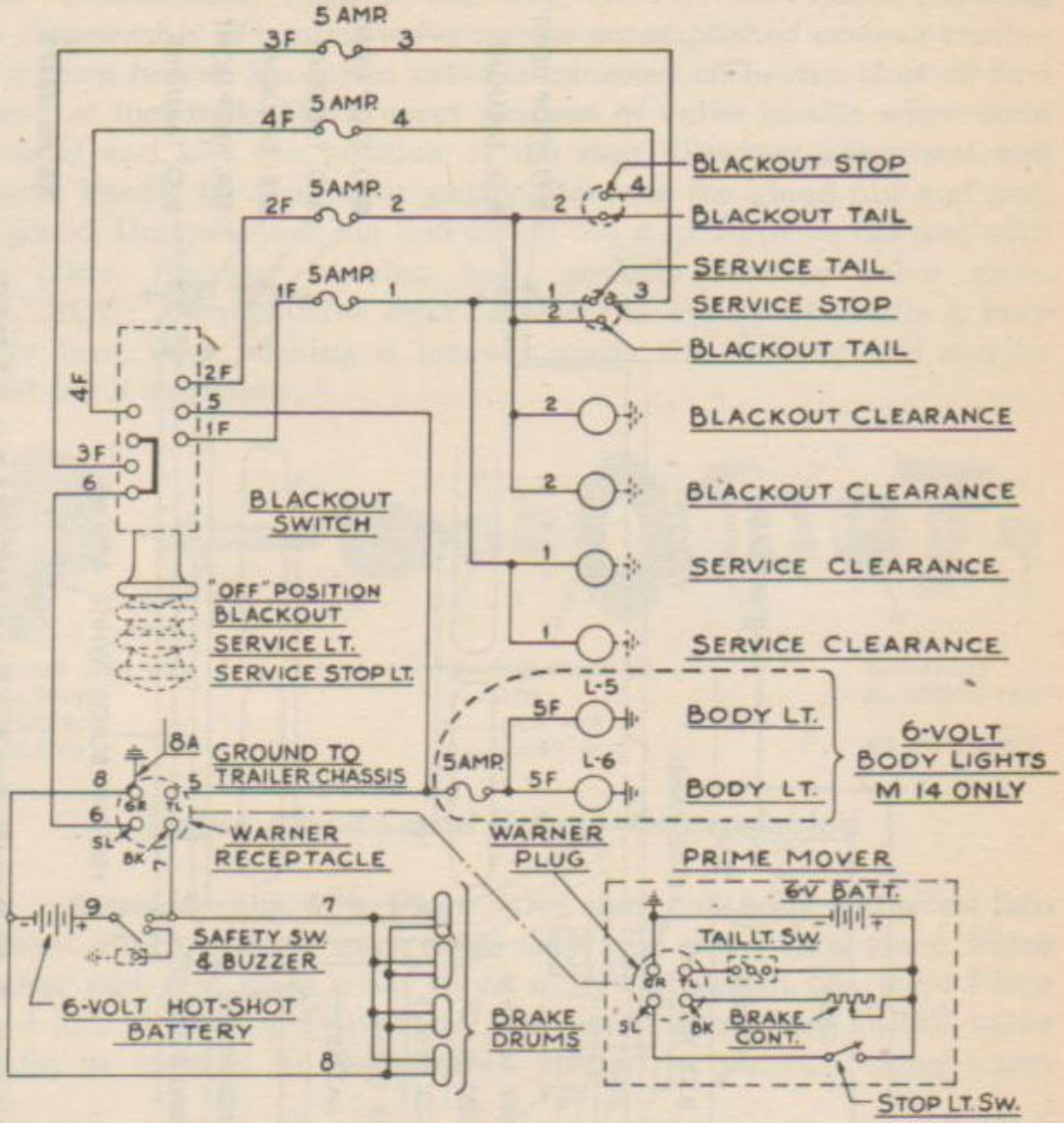



*Figure 71—Wiring Diagram, 6- to 8-volt, for Trailer, M13 (Fruehauf Trailer Co.)*




| WIRE # | COLOR | WIRE # | COLOR | |
|---|---|---|---|---|
| 1 OR 1F | BLACK (WHITE TRACER) | 7 | BLACK | TWIN CONDUCTOR |
| 2 OR 2F | GREEN (RED TRACER) | 8 | RED | |
| 3 OR 3F | NATURAL (GREEN TRACER) | 7A | BLACK | |
| 4 OR 4F | ORANGE | 9 | GREEN (YELLOW TRACER) | |
| 5 | BLACK (YELLOW TRACER) | 8A | RED | HOT-SHOT BATT. LEADS |
| 6 | BROWN (RED TRACER) | 9A | BLACK | |
| | | 5F | RED | |

RA PD 82104

**Figure 72—Wiring Diagram, 6- to 8-volt, for Trailers, M13 and M14 (J. G. Brill Co.)**

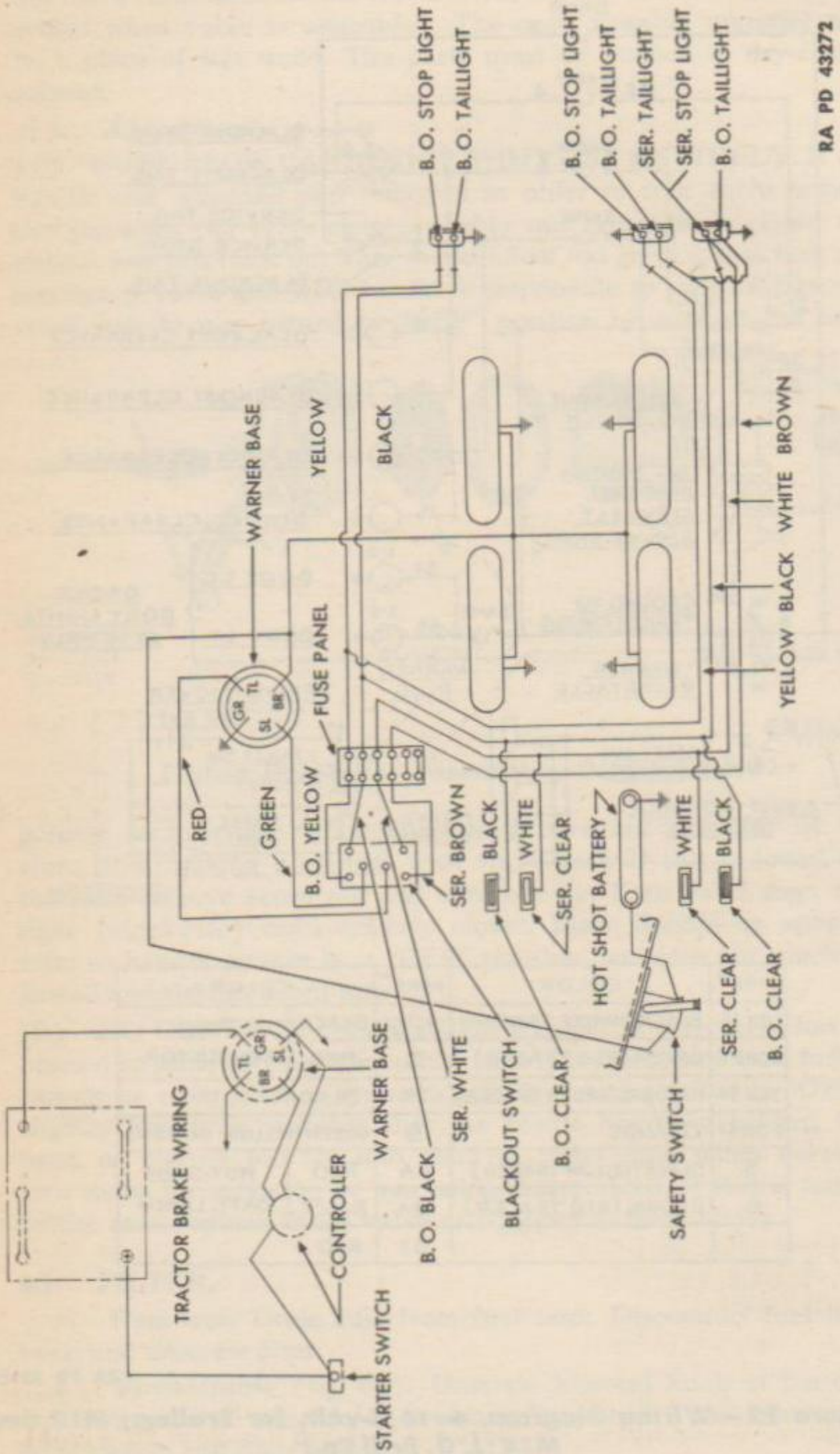



**Figure 73—Wiring Diagram, 6- to 8-volt, for Trailers, M7, M17, and M18**

## 68. TESTING LIGHTING CIRCUIT.

*a.* Battery and wiring system of towing vehicle will not be discussed in this section. Source of current will hereafter be considered as being the jumper cable socket at rear of towing vehicle. To locate trouble, start at the socket. The fundamental principle of trouble shooting is the elimination of one possible source of trouble after another until the trouble has been localized, as follows:

(1) Turn light switch to "ON" position. Place foot brake in "APPLIED" position. Test each light blade in socket at rear of towing vehicle with a low-reading voltmeter or test light. Assuming that there is a flow of current in each light blade, plug jumper cable into socket. Test the flow of current at opposite end of jumper cable. If current flows through jumper cable, it may be assumed that jumper cable is in good condition.

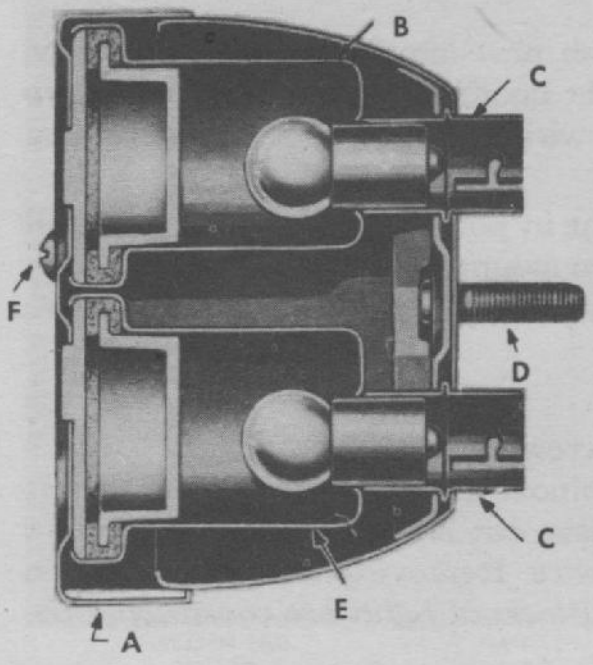
(2) Remove lamps from light sockets. Test each light terminal. If current fails to flow through any of these terminals, it indicates defective wiring or a defective blade in socket which leads to terminal. If current flows through socket, it indicates socket is in good condition. Continue to make similar tests throughout the trailer until source of trouble is located.

## 69. LIGHTS.

*a.* ***Taillights*** (figs. 74 and 75).

(1) REMOVAL.

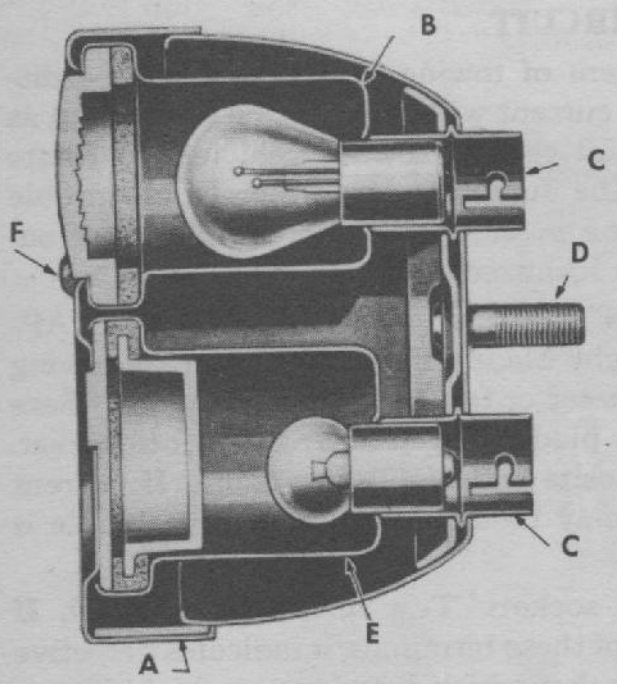
*(a) Individual Lamp-units.* Disconnect cable at rear of lamp-unit in conventional manner, turning counterclockwise and then pulling plug




A LIGHT DOOR
B BLACKOUT STOP LIGHT LAMP-UNIT
C LAMP SOCKET IN BODY
D MOUNTING STUD
E BLACKOUT TAILLIGHT LAMP-UNIT
F COVER SCREW

RA PD 344489

***Figure 74—Combination Blackout Tail and Blackout Stop Light***




A LAMP AND LENS UNIT COVER
B SERVICE STOP AND TAILLIGHT LAMP-UNIT
C LAMP SOCKET IN BODY
D MOUNTING STUD
E BLACKOUT TAILLIGHT LAMP-UNIT
F COVER SCREW

RA PD 344488

***Figure 75—Combination Service Tail and Stop and Blackout Taillight***

from socket. Remove two screws from light door, and lift door from body. Pull defective lamp-unit from light body.

*(b) Light Assembly.* Disconnect cables at rear of light by turning plugs counterclockwise and pulling out. Remove nuts and lock washers from two mounting screws in rear of light. Lift light from frame.

(2) INSTALLATION.

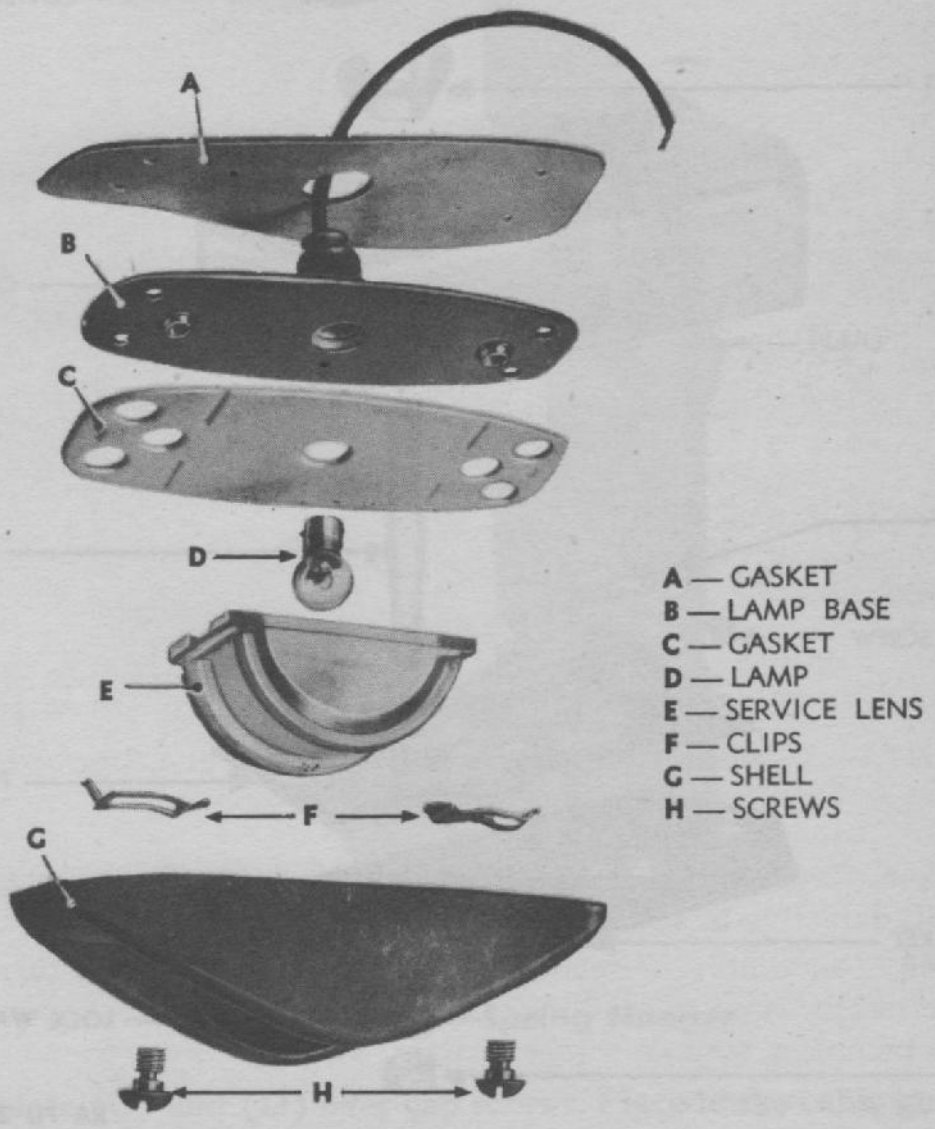
*(a) Individual Lamp-unit.* Push new lamp-unit into light body, pushing plug into socket. Place light door in position, and install two screws and lock washers. Connect wiring at rear of light, insert plug and turn clockwise.

*(b) Light Assembly.* Place light in position on frame, and install nuts and lock washers on each of two mounting screws. Connect cables at rear of light, insert plugs and turn clockwise. Test lights to assure proper connection.

***b. Clearance Lights*** (fig. 76).

(1) REMOVAL. Remove two screws from light shell and remove shell. Remove lens and lamp and remove gasket. Remove four screws holding base to side panel. Pull base out and disconnect short wire attached to base from main circuit wire. Remove gasket from between lamp base and side panel. NOTE: *Blackout lights are constructed the same as the clearance lights.*

(2) INSTALLATION. Place the short wire connected to lamp base through hole in inside gasket. Connect wire to main circuit wire and




RA PD 43275

***Figure 76—Clearance Light—Disassembled***

tape the connection. Screw lamp base and gasket to side panel. Place center gasket on lamp base and place lamp in its socket. Place lens over lamp, and fasten metal clips and light shell in place using two screws.

*c. Dome Lights (Trailers M14 and M22 Only).*

(1) REMOVAL (fig. 85). Turn screw on light door several revolutions counterclockwise and open door. Turn lamp out of socket. Place a screwdriver under lens retainer ring and pry ring out of door, freeing lens. Remove four screws holding light to mounting bracket and pull light from bracket. Remove tape from wire splice and lift light assembly off trailer wall.

(2) INSTALLATION. Splice two wires in lamp socket to two wires which protrude from light mounting bracket, and tape splice making certain all exposed wire is properly taped. Place the light in position on

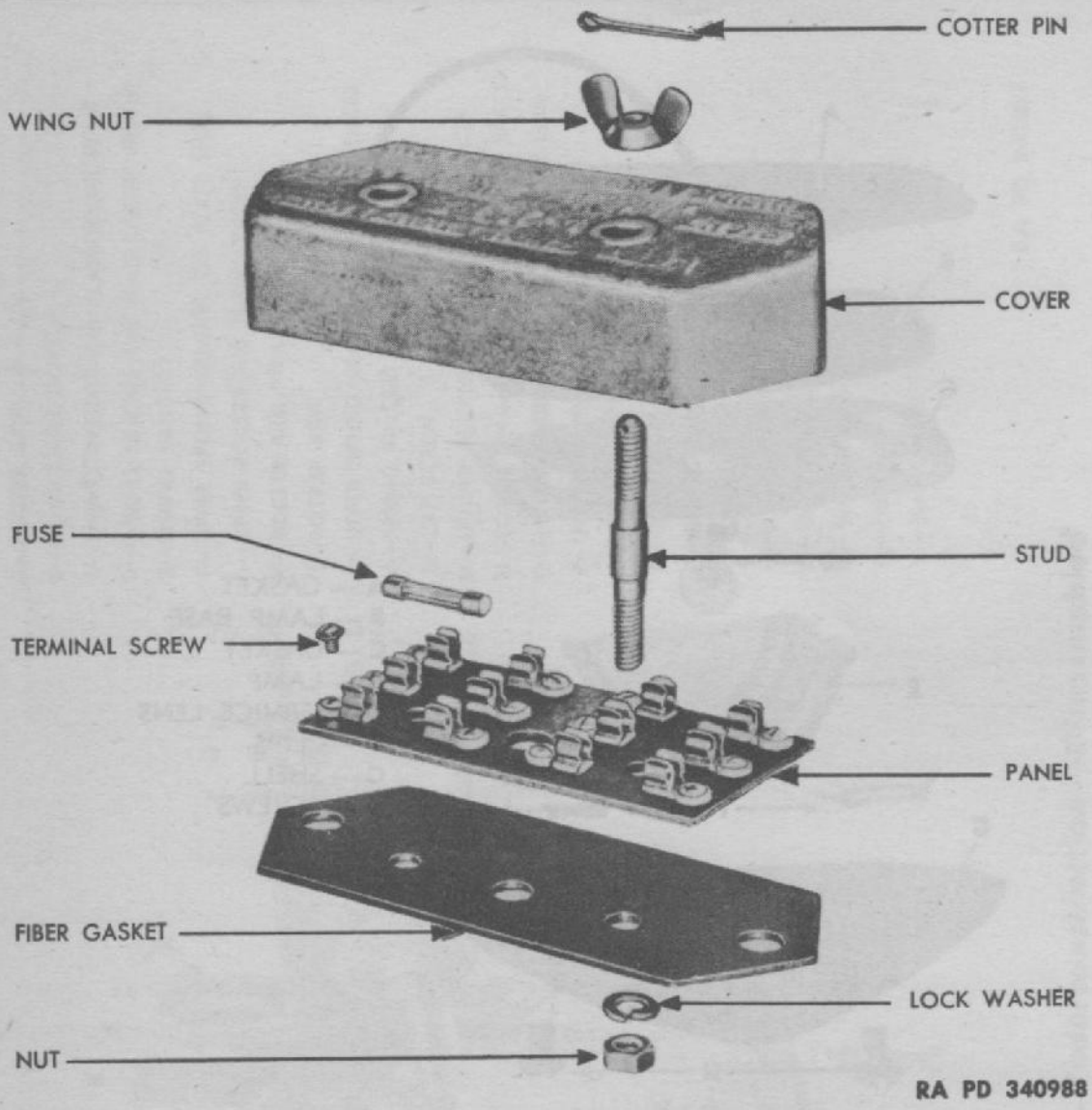



***Figure 77—Fuse Panel—Disassembled***

bracket and install four self-tapping screws. Install lamp in lamp socket making certain it is turned all the way in. Place lens in position on door, securing it with lens retainer. Close door and fasten using screw provided in door.

## 70. FUSE PANEL.

*a.* ***Removal*** (figs. 77 and 78). Remove cotter pins from studs. Remove two wing nuts and lift cover off panel. Pull fuses out of retainer clips. Remove terminal screw and lift off wires. Remove nut and lock washer from two studs, and remove panel and fiber gasket.

*b.* ***Installation.*** Position fiber gasket and panel on trailer front crossmember. Aline holes and insert two studs with cotter pin to outer side. Secure studs using lock washers and nuts. Place wire through hole in center of panel and attach wires to terminals. See figures 70, 71, 72 and 73 for proper wire installation. Install fuses. Place cover over studs and install wing nuts and cotter keys.

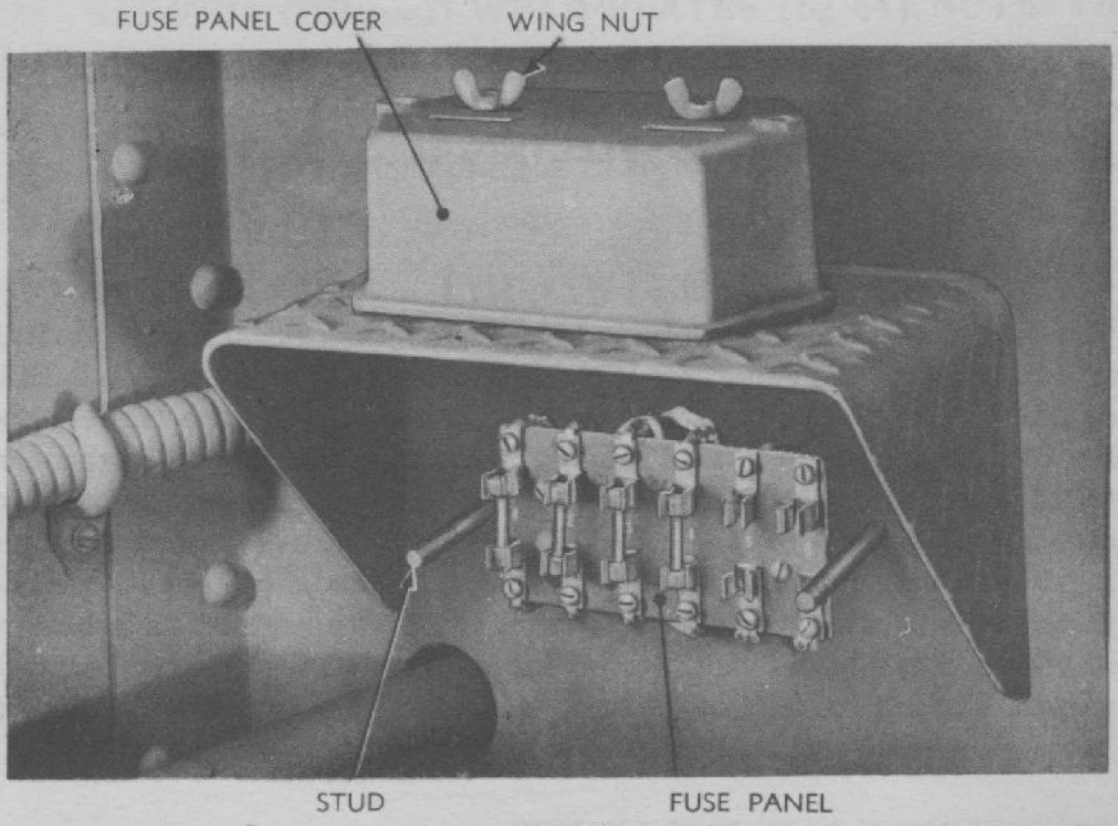



***Figure 78—Fuse Panel with Cover Removed***

## 71. BLACKOUT SWITCH.

***a. Removal.*** Remove four screws and four lead washers from switch cover, and remove cover and cover gasket. Loosen set screw in switch knob and pull knob off switch. Remove cap screw and lock washer from lock body and pull body off shaft. Remove two screws at front of switch box and pull switch assembly out of switch box. Remove the wires of each terminal.

***b. Installation.*** Connect each wire to switch terminals. NOTE: *Each wire is of a different color and each terminal is marked with a number; see figures 70, 71, 72, and 73 for proper hook-up.* Place switch assembly in switch box. Fasten switch assembly to switch box using two screws at front. Place lock body over end of lock shaft and fasten lock body to shaft using cap screw and lock washer. Fasten knob to shaft using set screw. Fasten cover and cover gasket to switch box using four lead washers and four screws.

## 72. ELECTRICAL JUMPER CABLE AND JUMPER CABLE SOCKET.

***a. General.*** The electrical jumper cable and jumper cable socket are used in conjunction with electrical brake system. See paragraphs 53 and 54 for removal and installation instructions.

## Section XXI

# 110-VOLT ELECTRICAL SYSTEM

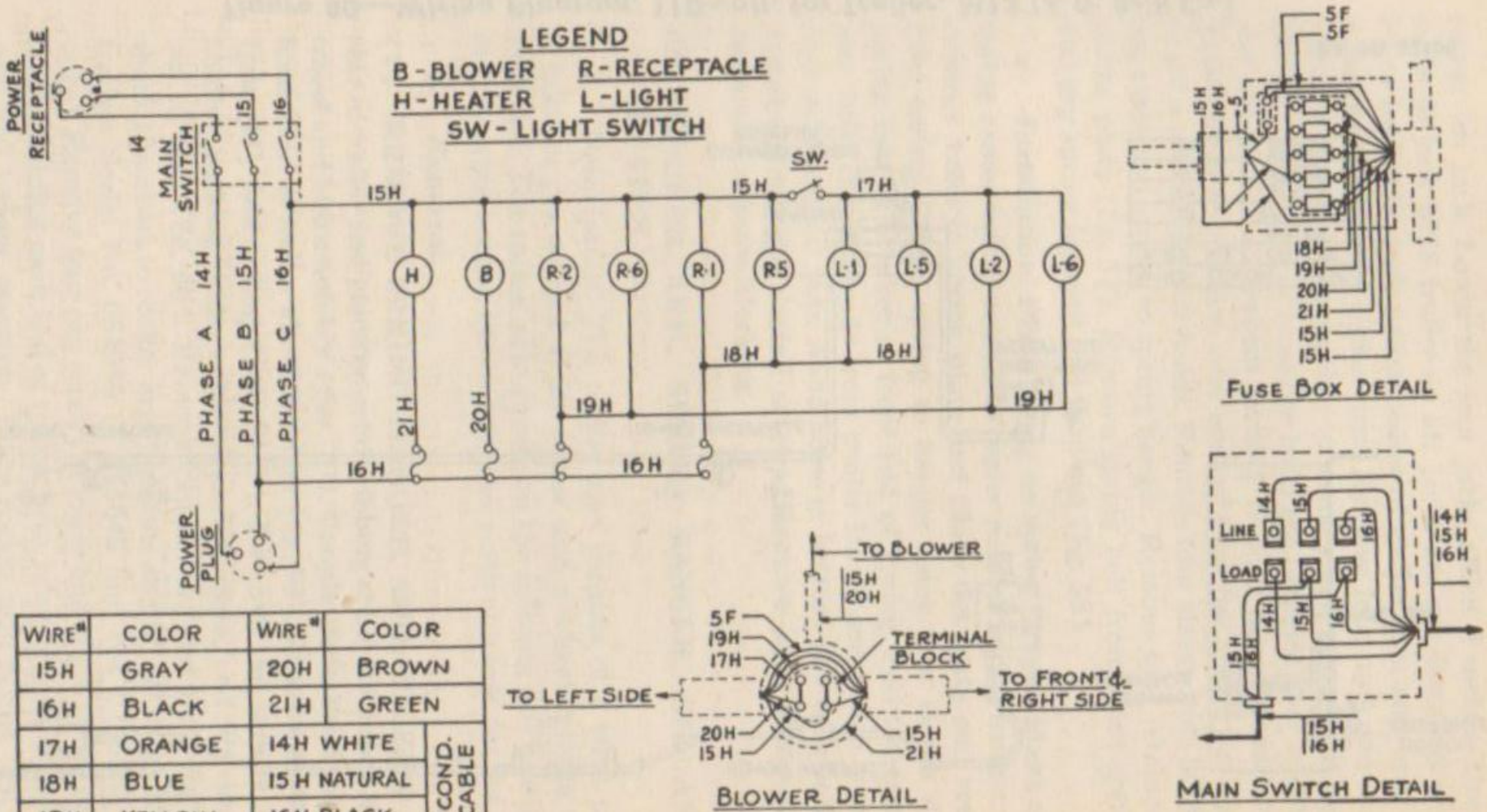
### 73. DESCRIPTION.

*a. Description (Trailers M13, M14, and M22 Only).* The 110-volt electrical system is energized from a generator unit located on outside of trailer. The generator is not a component of trailers M13, M14, or M22. The 110-volt electrical units furnished with the trailers consist of a blower, heater, and four light fixtures. Each wire in the electrical system is a distinctive color. A key to these colors will be found on wiring diagrams (figs. 79 through 83). The wire is housed in moulding which consists of three pieces: base, which is fastened to trailer panels with screws; fiber retainer clips, which fit into base to hold wires in alinement; and capping, which snaps over base to form a cover for wiring. Fittings consist of take-off tees, external elbows, and canopies. The 6- and 110-volt body wiring is housed within moulding.

### 74. WIRING AND MOULDINGS.

*a. Electrical System (Trailer M13)* (figs. 80 and 82). Interior receptacles are supplied with 110-volt current from generating unit. Wires from the exterior 3-pole power receptacle connect into a fuse box located in cable compartment as illustrated in figure 84. The cable furnishing power to director power unit is connected to the live side of fuse block. The cable furnishing power to the two 110-volt body receptacles is connected to fused side of fuse block. Any overload in interior receptacle circuit will burn out a fuse, while an overload in director power unit cable will cause circuit breaker of generating unit to open.

*b. Electrical System (Trailer M14)* (figs. 79, 81, and 83). Power from generating unit is utilized to provide electrical energy for the 110-volt electrical system. This system includes blower fan, heater, 110-volt interior body lights, and 110-volt receptacles. The cables leading to the above electrical fixtures are fused, and any overload in circuit beyond fuse box would cause a fuse to blow out. If either the blower fan, heater, or interior body lights fail to operate, or current is not available from the inside receptacles, check for a burned-out fuse in fuse box. Any overload caused in the unfused portion of power circuit would cause circuit breaker on generating unit to open. If circuit breaker of generating unit opens, due to an overload in system, remove generating unit cable from exterior receptacle of trailer. Remove power cable from power unit M8 and connect power cable from generating unit directly to power unit. If system now operates without the generating unit circuit breaker opening, the wiring in trailer is at fault. However, if circuit breaker continues to open, fault must be located elsewhere. All




| WIRE# | COLOR | WIRE# | COLOR | |
|---|---|---|---|---|
| 15H | GRAY | 20H | BROWN | |
| 16H | BLACK | 21H | GREEN | |
| 17H | ORANGE | 14H WHITE | | 3 COND. CABLE |
| 18H | BLUE | 15H NATURAL | | |
| 19H | YELLOW | 16H BLACK | | |

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***Figure 79—Wiring Diagram, 110-volt, for Trailer, M14 (J. G. Brill Co.)***

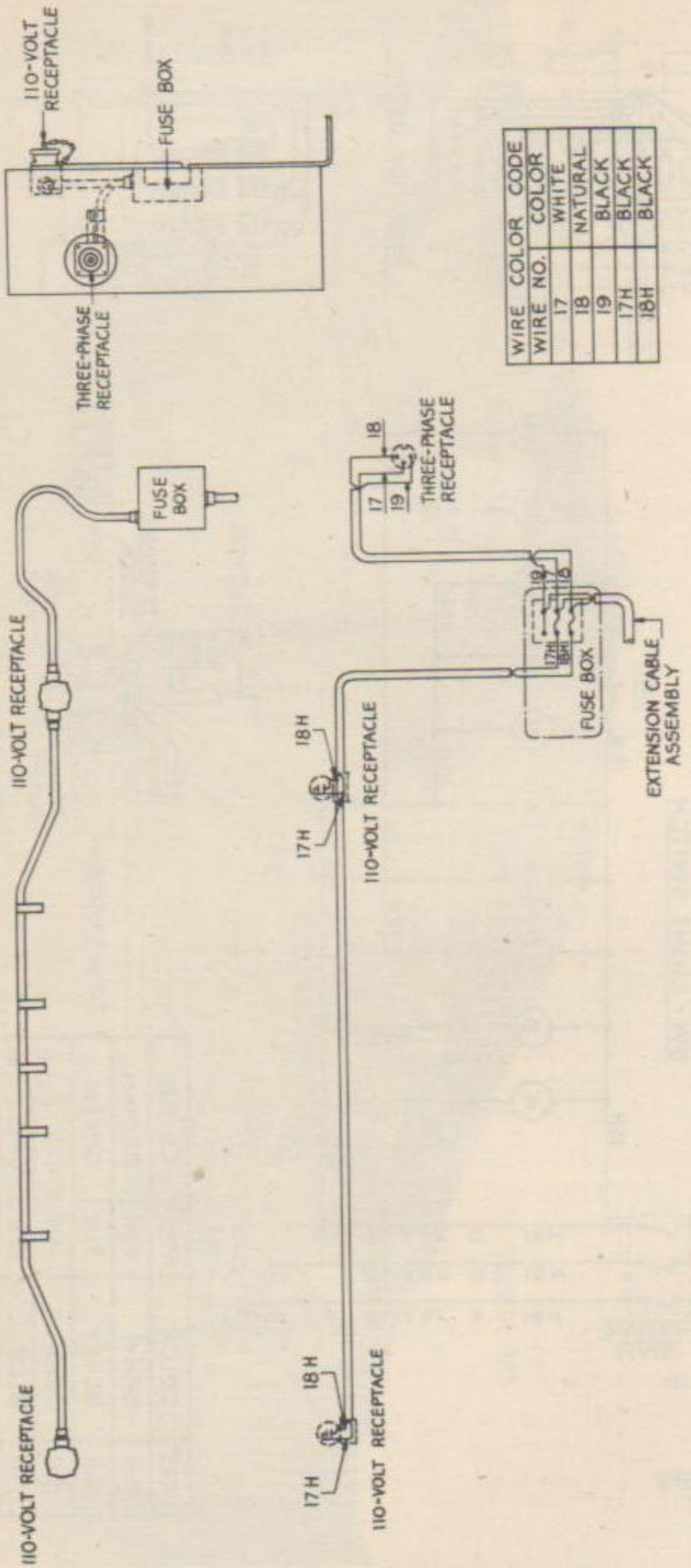


*Figure 80—Wiring Diagram, 110-volt, for Trailer, M13 (J. G. Brill Co.)*

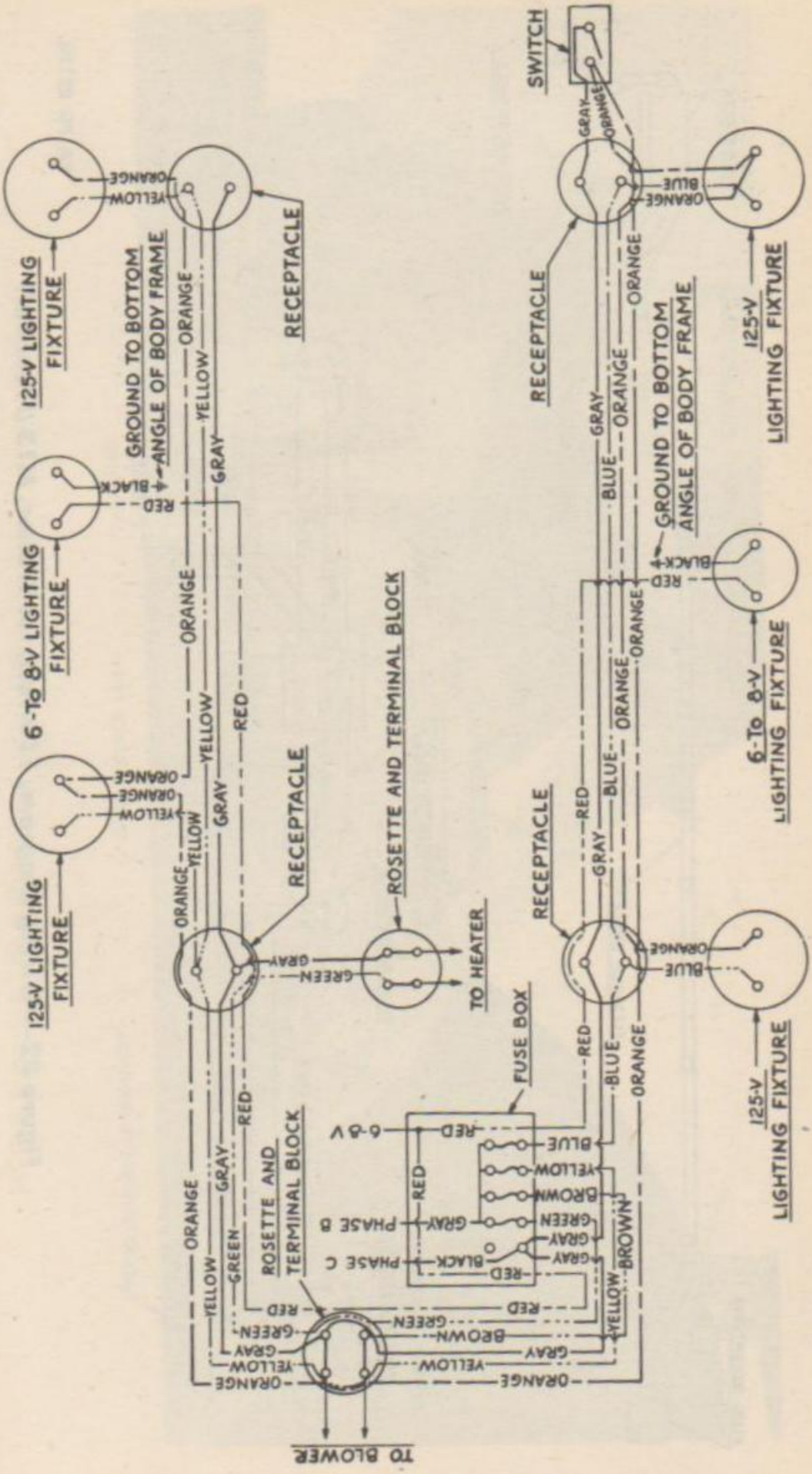


Figure 81—Wiring Diagram, 110-volt, for Trailer, M14 (Fruehauf) and Trailer, M22 (J. G. Brill Co.)

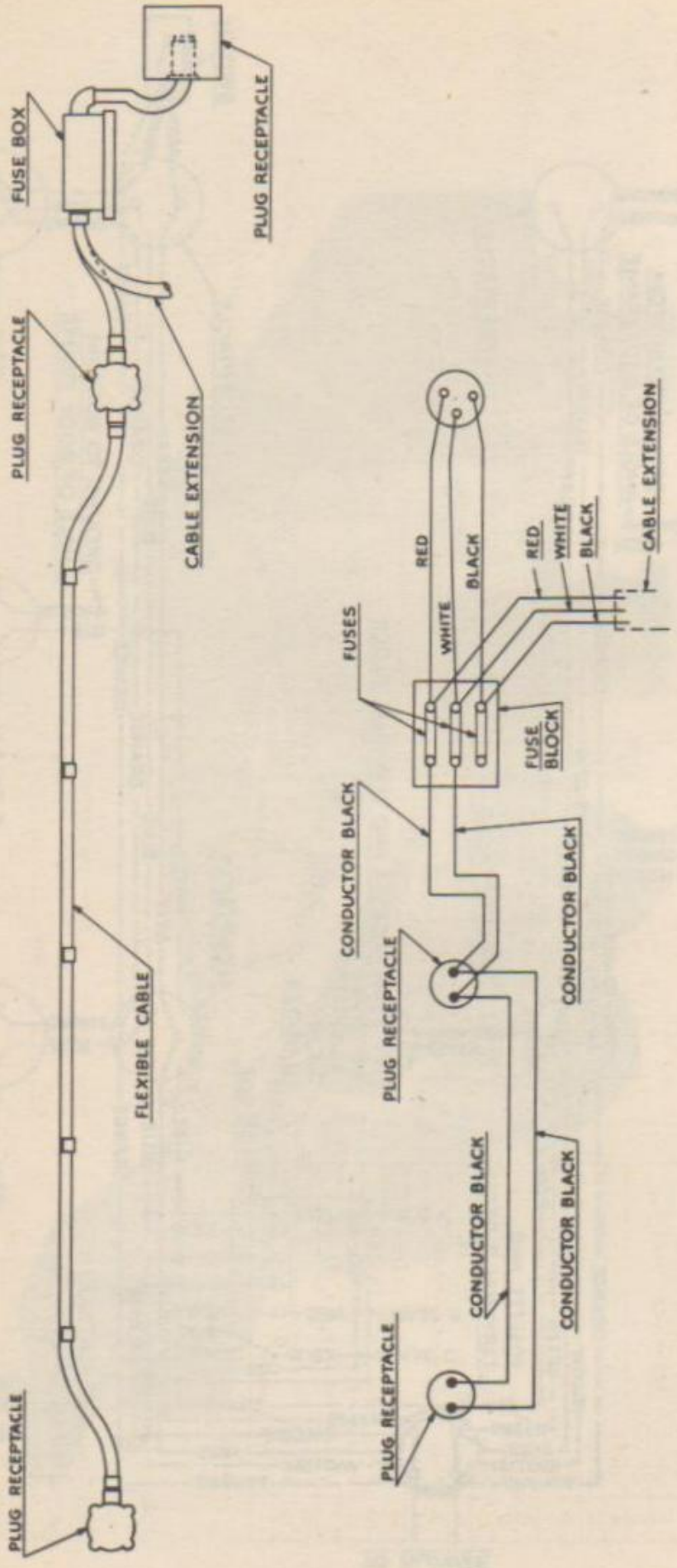


*Figure 82—Wiring Diagram, 110-volt, for Trailer, M13 (Fruehauf)*

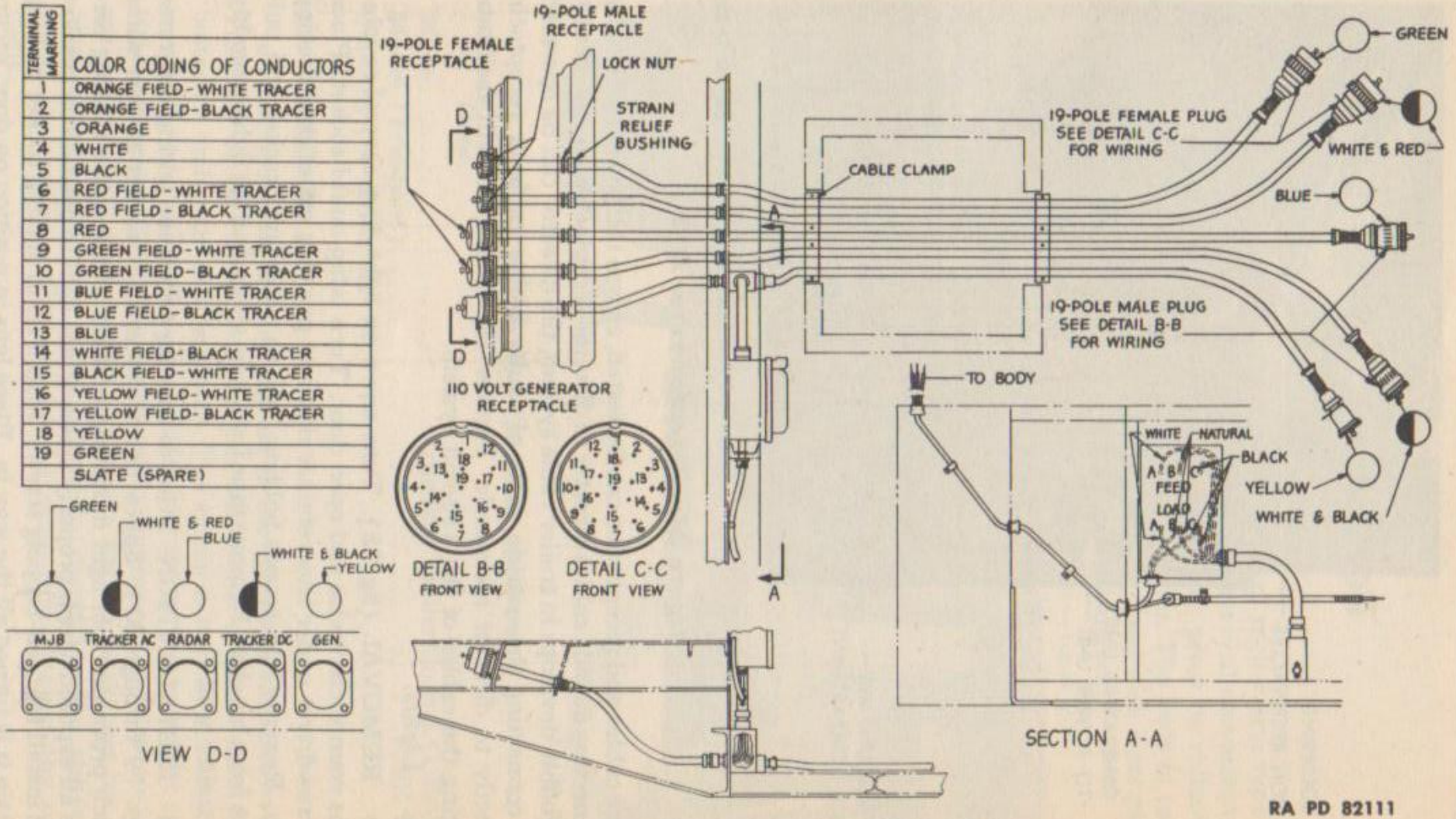


**Figure 83—Cable Assembly Diagram for All M14 and M22 Trailers**

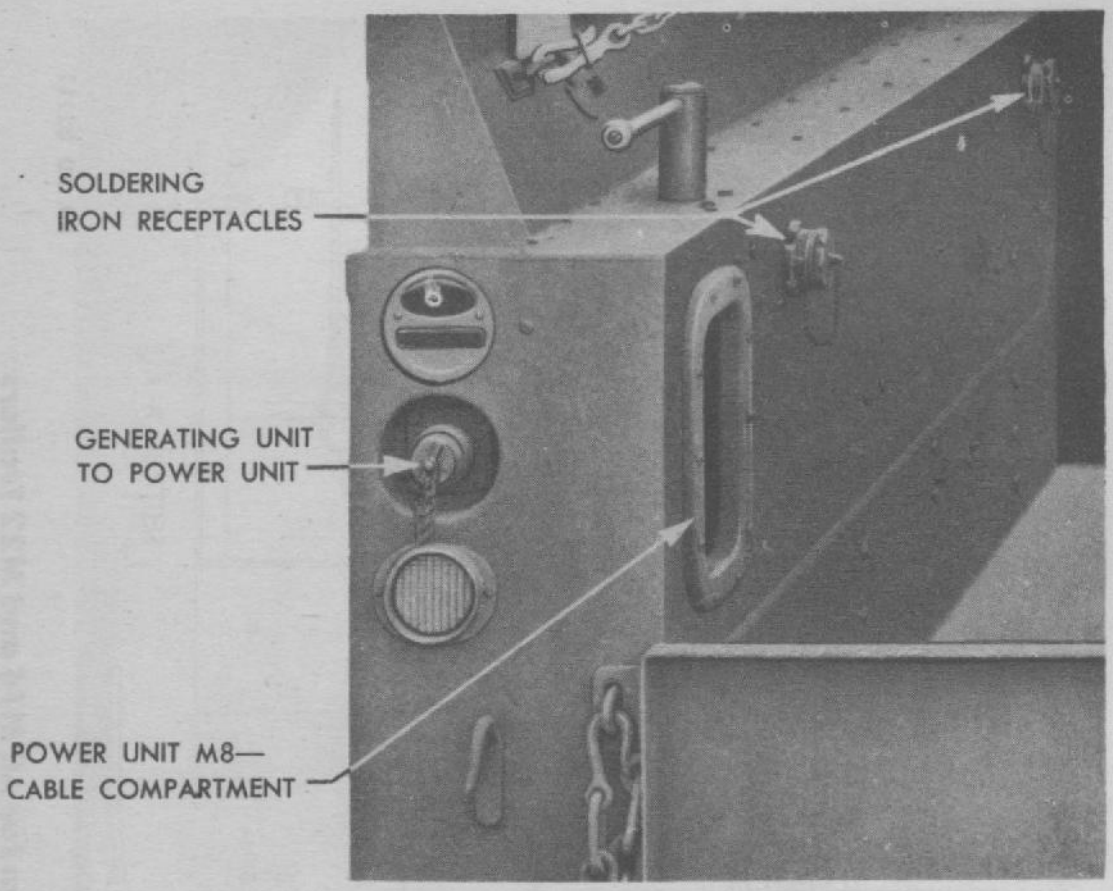


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***Figure 84—Receptacles for M13***

other cables and receptacles can be tested, as was the power system, by connecting outside cables directly to director receptacles. In emergency, if trouble develops in trailer cable system, the director can be operated by connecting the outside cable of faulty trailer cable or receptacle directly to director receptacle. Figures 79, 81 and 83 will facilitate tracing the cables of the 110-volt system.

*c. Lights.*

(1) REMOVAL (fig. 85). Turn screw on light door several revolutions counterclockwise and open door. Turn lamp out of socket. Place a screwdriver under lens retainer ring and pry ring out of door freeing lens. Remove four screws holding light to mounting bracket and pull light from bracket. Remove tape from wire splice and lift light assembly off trailer wall.

(2) INSTALLATION. Prior to splicing wires, see wiring diagrams (figs. 79 through 82). Splice two wires in light socket to two wires which protrude from light mounting bracket. Tape splice making certain all exposed wire is properly taped. Place light in position on bracket and install four self-tapping screws. Install lamp in lamp socket making certain it is turned all the way in. Place lens in position on door, secur-

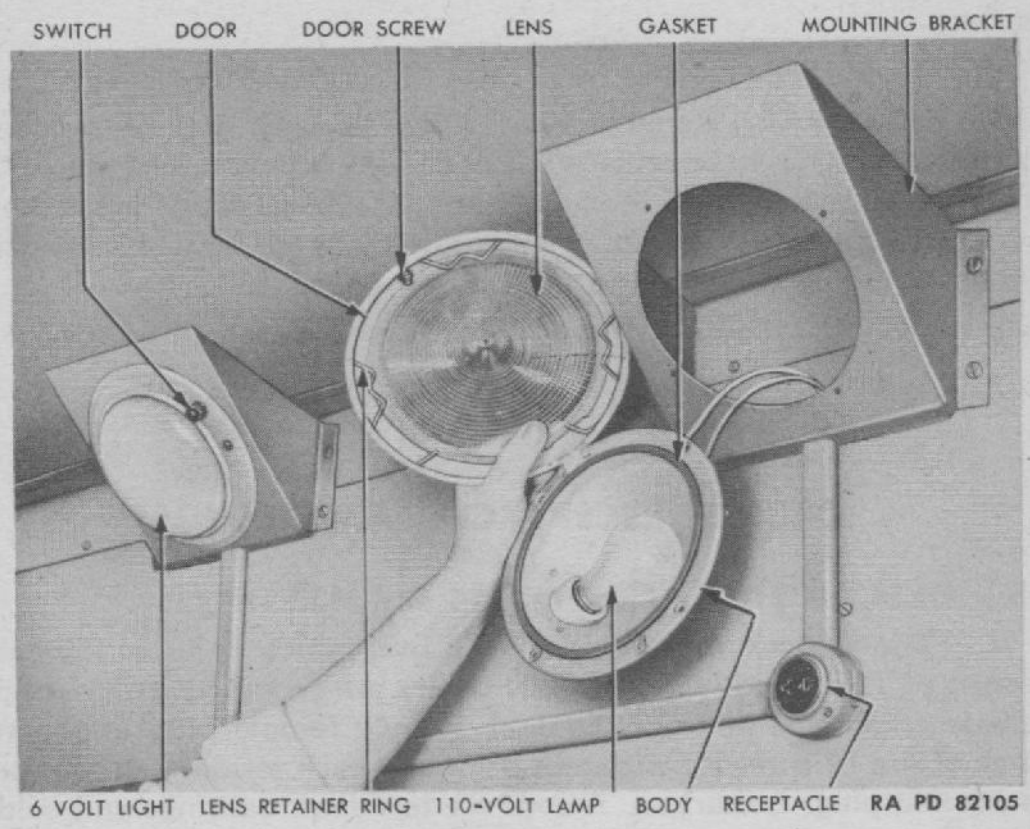



***Figure 85—Removing 110-volt Light Assembly***

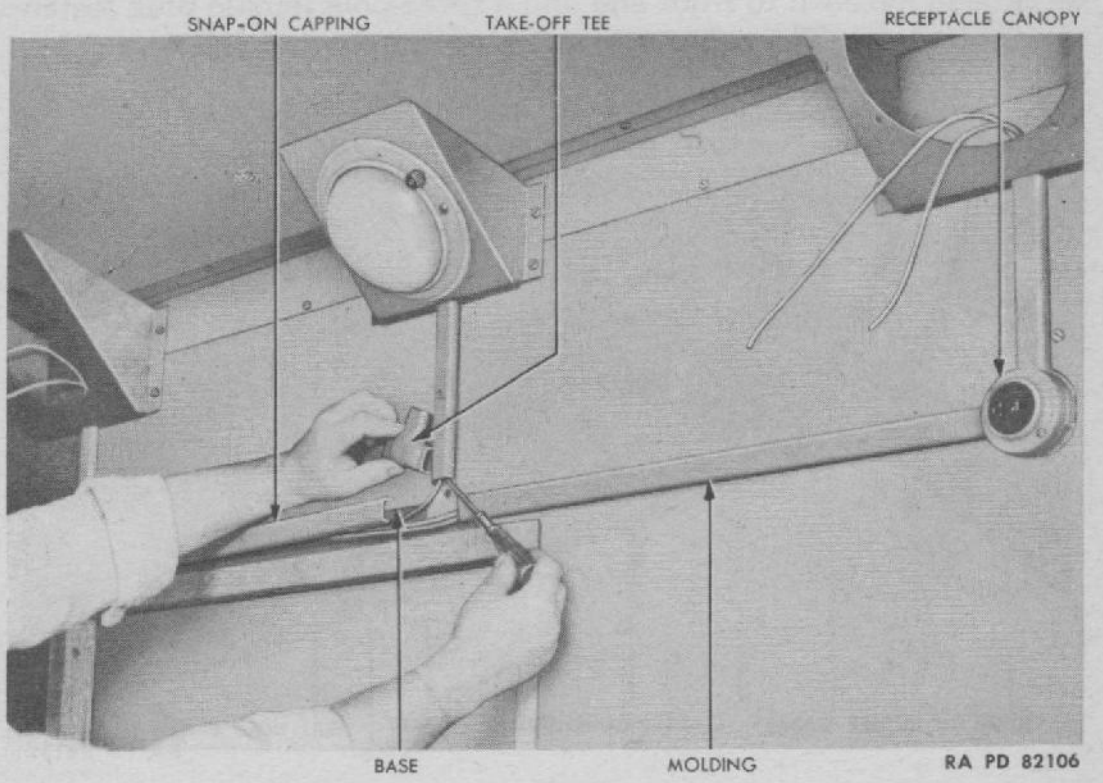



***Figure 86—Removing Moulding***

ing it with lens retainer. Close door and fasten, using screw provided in door.

*d. Moulding* (fig. 86).

(1) REMOVAL. Remove two fittings at each end of section of moulding which is to be replaced. The canopy is held to receptacle base with two screws, take-off tees, and external elbows which are removed by inserting screwdriver under end and prying off. Place screwdriver under moulding capping and pry cap off base.

(2) INSTALLATION. Reverse procedure in step (1) above.

## Section XXII

# CABLES, RECEPTACLE, AND PLUGS

### 75. DESCRIPTION (Trailers M14 and M22 Only).

*a.* The vehicles are provided with five cables. Four of the cables consist of 19 individual wires. The cables are provided with a 19-pole female receptacle at the front and 19-pole female plug at the rear. Each of the 19 wires is a different color and each terminal in the receptacles and plugs is marked. A code for terminal markings and color is given in cable assembly diagram (fig. 83). Each female receptacle is marked with a color code and female plug at opposite end has same markings. One cable consists of three wires having a three-pole female receptacle fastened to front end and a three-pole female plug fastened to opposite end. The receptacle and plug are painted yellow.

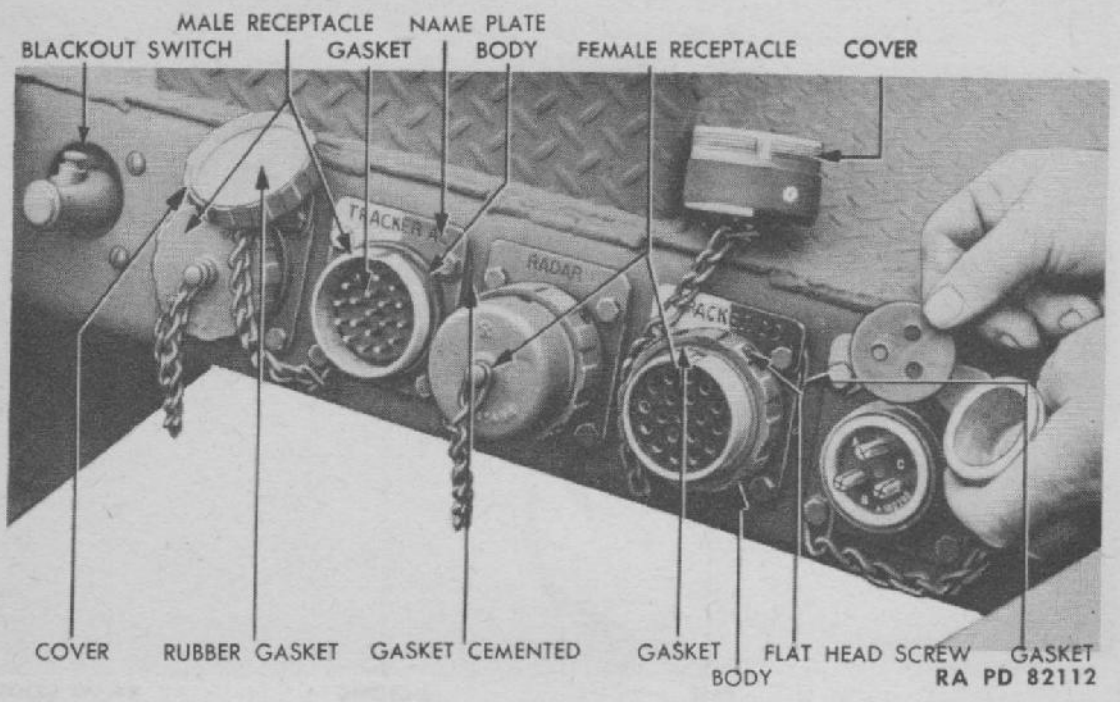



***Figure 87—Receptacles Mounted at Front of Trailer***

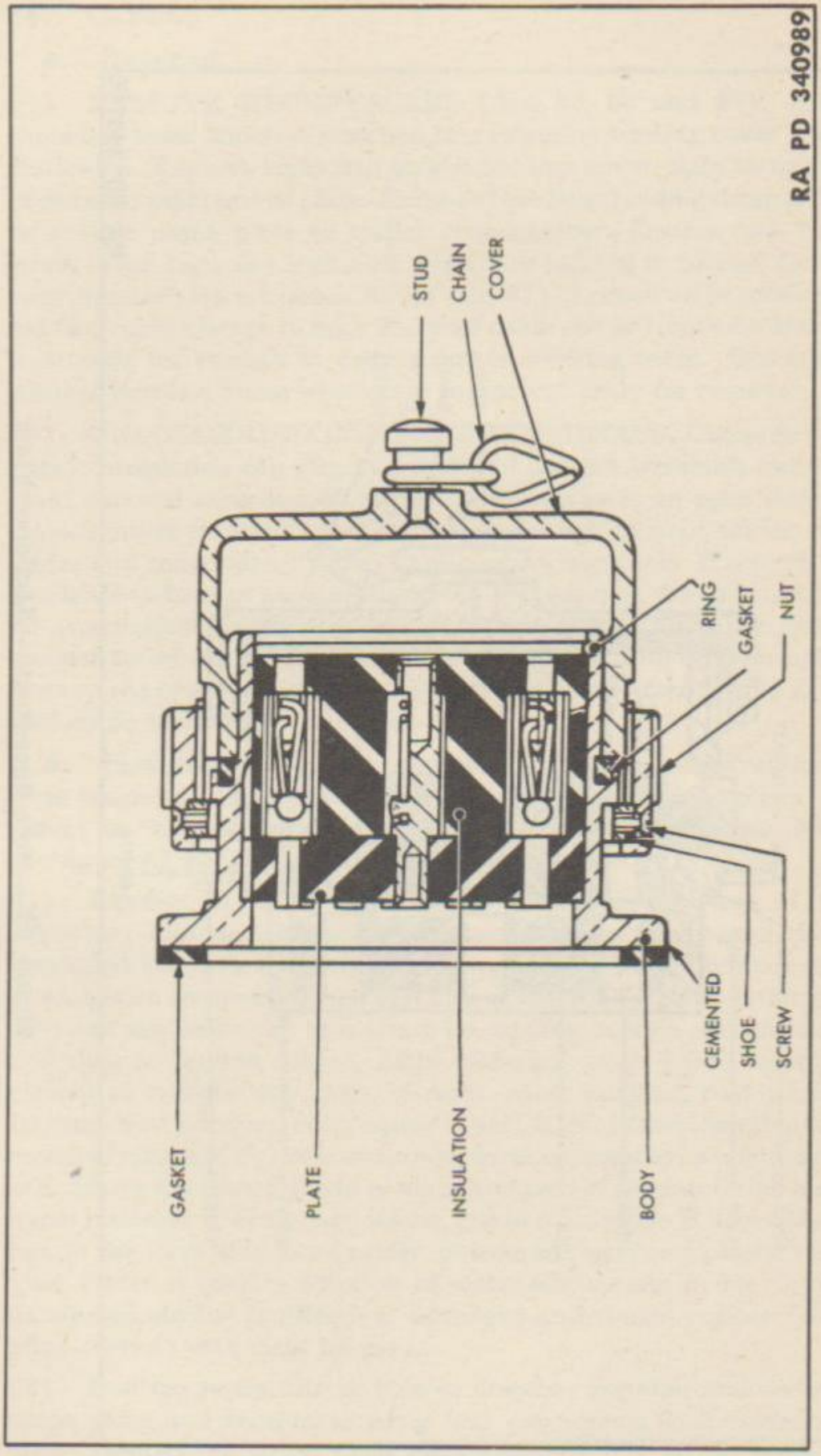



***Figure 88—Female Receptacle—Sectional View***

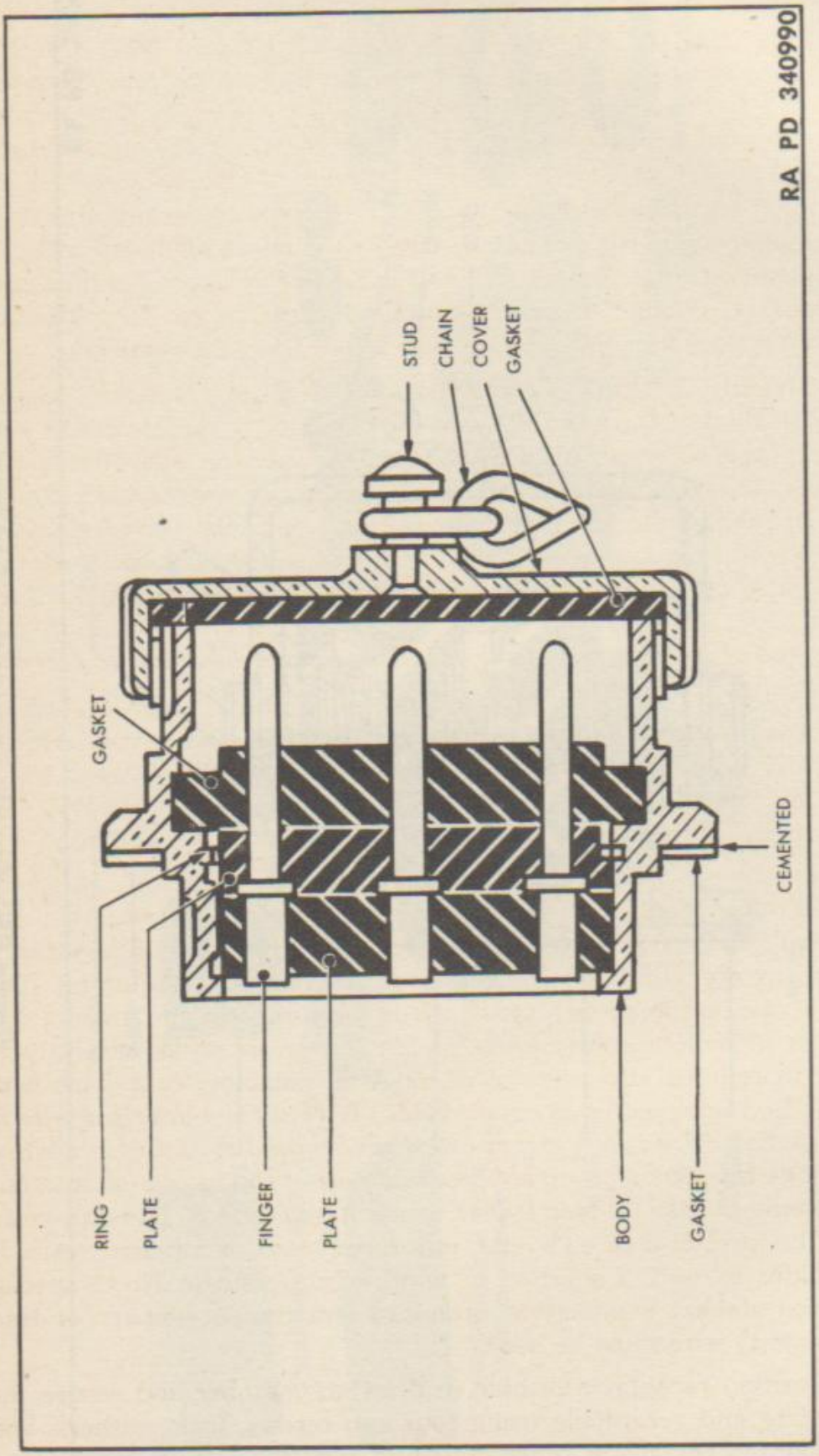



*Figure 89—Male Receptacle—Sectional View*

## 76. CABLE.

*a. Removal.*

(1) REMOVE RECEPTACLES (figs. 87, 88 and 89). Remove threaded cover which is attached to a chain by turning cover counterclockwise. Remove eight cap screws holding cover plate to underside of drawbar and remove plate. Remove four bolts holding receptacle and receptacle name plate to trailer crossmember. Loosen two bushing strain relief clips and lock nuts which are located in second and third crossmembers from front of trailer (fig. 87). Loosen eight screws holding two cable clamps to floor and pull cable out at front of trailer until it extends far enough to permit ample working room. Unsolder the contact terminal wires which free gasket and body for removal.

(2) UNSOLDERING CONTACT TERMINALS. Cut each wire at base of insulation cap (fig. 90) and pull contact terminals out of cap. Hold exposed wire end of contact terminals over an open flame and allow contact terminals to become hot enough to melt solder. Shake solder and remainder of wire out of contact terminals. If a torch is not available to furnish an open flame for unsoldering, the same work can be accomplished with a soldering copper. CAUTION: *Do not hold contact terminals over flame too long. Overheating of terminals will destroy the characteristics of the metal and cause terminal to corrode.* Pull cable toward rear of trailer.

*b. Installation.* Thread cable through hole in front crossmember from inside to outside. Place cable through drawbar member. Place gasket and body over end of cable. Solder wire to terminals. NOTE: *See figure 83 for diagram and color code of wires.*

(1) Remove 5/16 inch of insulation on each of the 19 wires. It is very important that each wire be exactly the same length and that the insulation being removed be the same length. The individual strands of each wire are then twisted together at the ends prior to tinning. The 19 wires can be tinned as a group by dipping in resin and alcohol flux and then in molten solder. After soldering, wash joints carefully in alcohol to remove any trace of resin. After washing, coat joint with Glyptal, Red Lacquer, or its equal. CAUTION: *When inserting wire in terminal contacts, do not leave any of wires exposed at base of insulating cap. Shove the tinned group of wires and part of the insulation into terminal contacts.* Use tin-lead solder, grade A, or grade B. Use only resin flux in the form of a cored solder, powdered resin, or a plastic resin. If solid solder is used, a solution of water-white resin in No. 1 special denatured alcohol is effective. Standard and tinned copper (or lead alloy-coated) wire must be used.

(2) Position receptacle in hole in drawbar member and secure the name plate and receptacle using four cap screws, lock washers, and nuts. Tighten the strain relief clips and nuts located on second and

third member. Install cover plate on underside of drawbar using eight cap screws and eight lock washers.

## 77. PLUGS.

*a. Removal* (figs. 90, 91, and 92). Grasp follower firmly in left hand, hold plug housing in right hand, and turn until end of spring ring is visible through slot in follower. Work end of spring ring out of follower and continue turning until follower becomes separated from housing. Separate concave washer from grommet and pull grommet out of

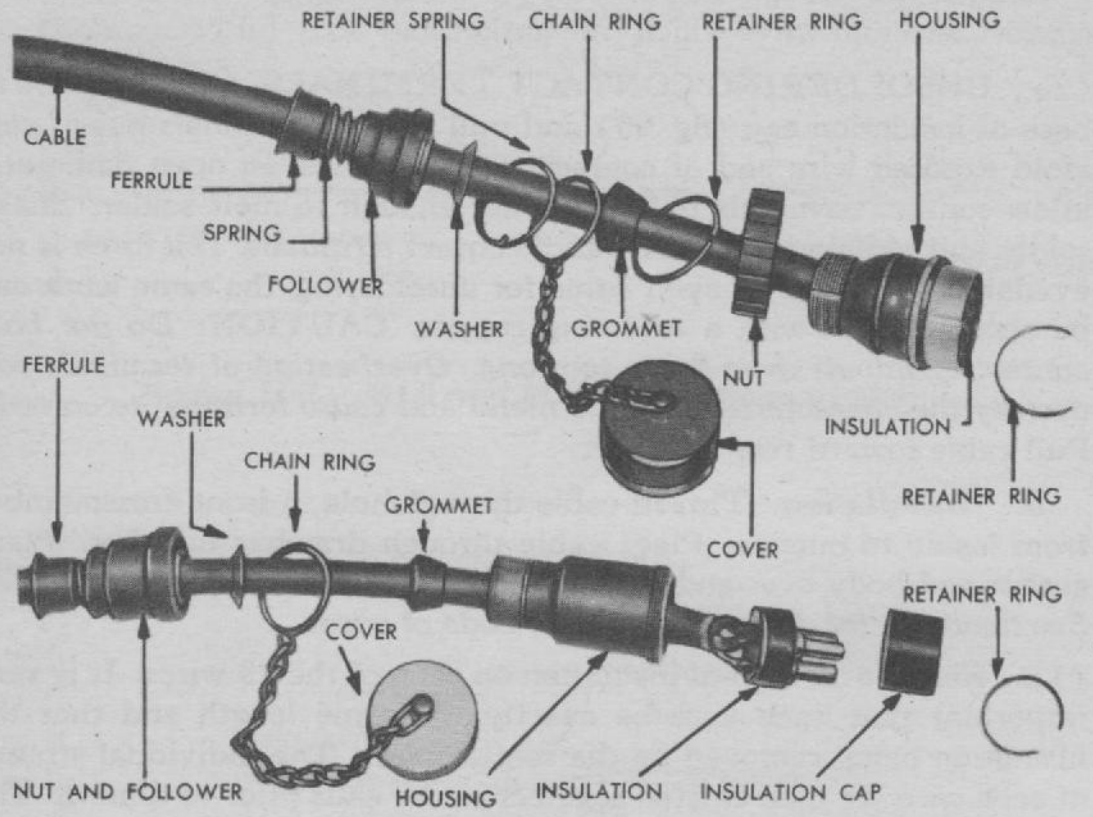



***Figure 90—3-pole and 19-pole Plug Assembly—Disassembled***

housing. Place screwdriver under nut retainer ring and pry ring off housing. Remove cover by turning counterclockwise. Place small screwdriver under insulating cap retainer ring and pry ring out of housing. Unsolder each of the 19 wires and remove insulation (par. 76 *a* (2)).

*b. Installation.* Place ferrule and follower assembly over end of cable. Place cone and washer, retainer spring, chain ring, grommet, retainer ring, and nut over end of cable (fig. 90). Solder wires to terminal contact points (par. 76 *b*, and fig. 78).

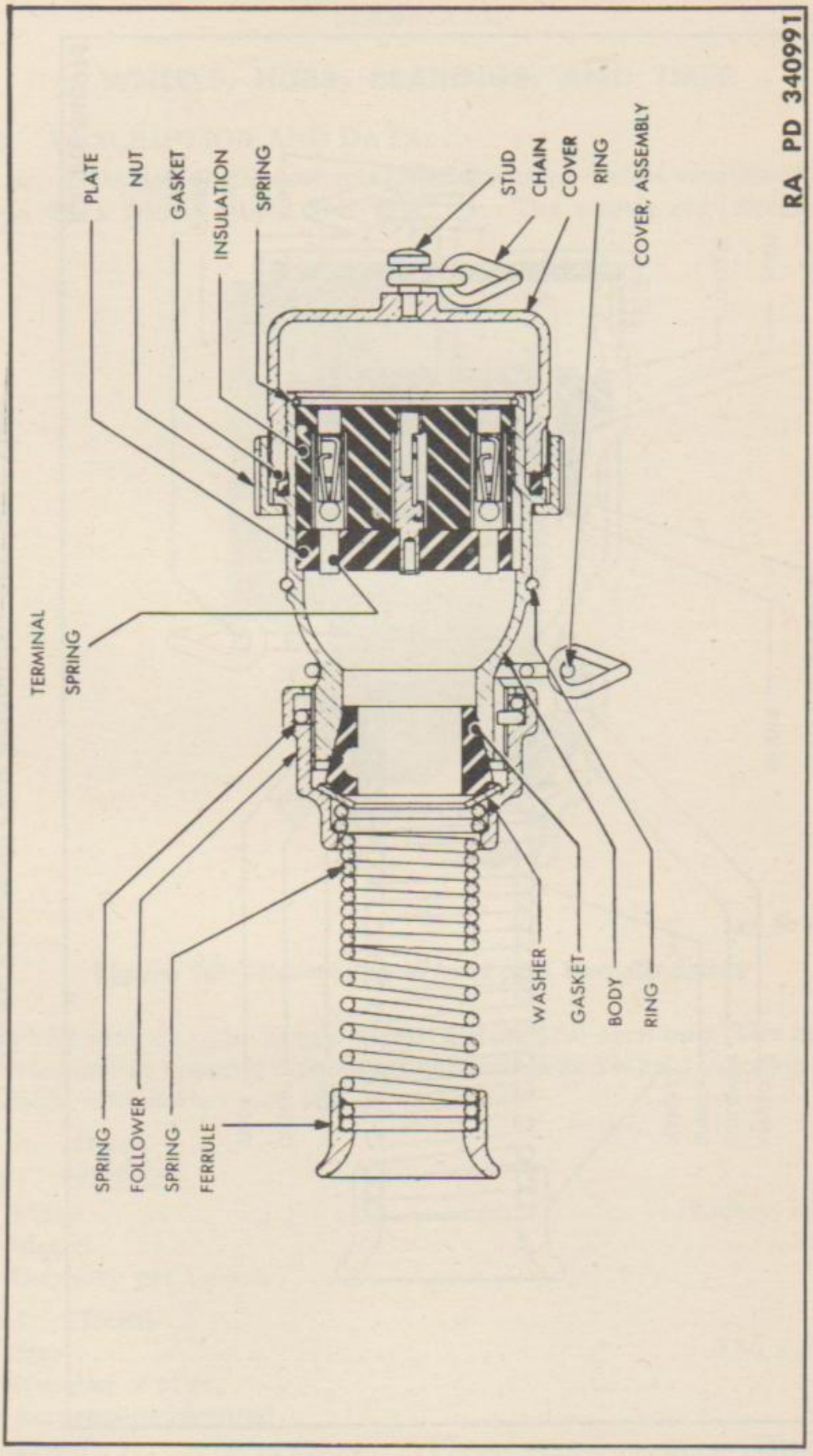



***Figure 91—Female Plug Assembly—Sectional View***

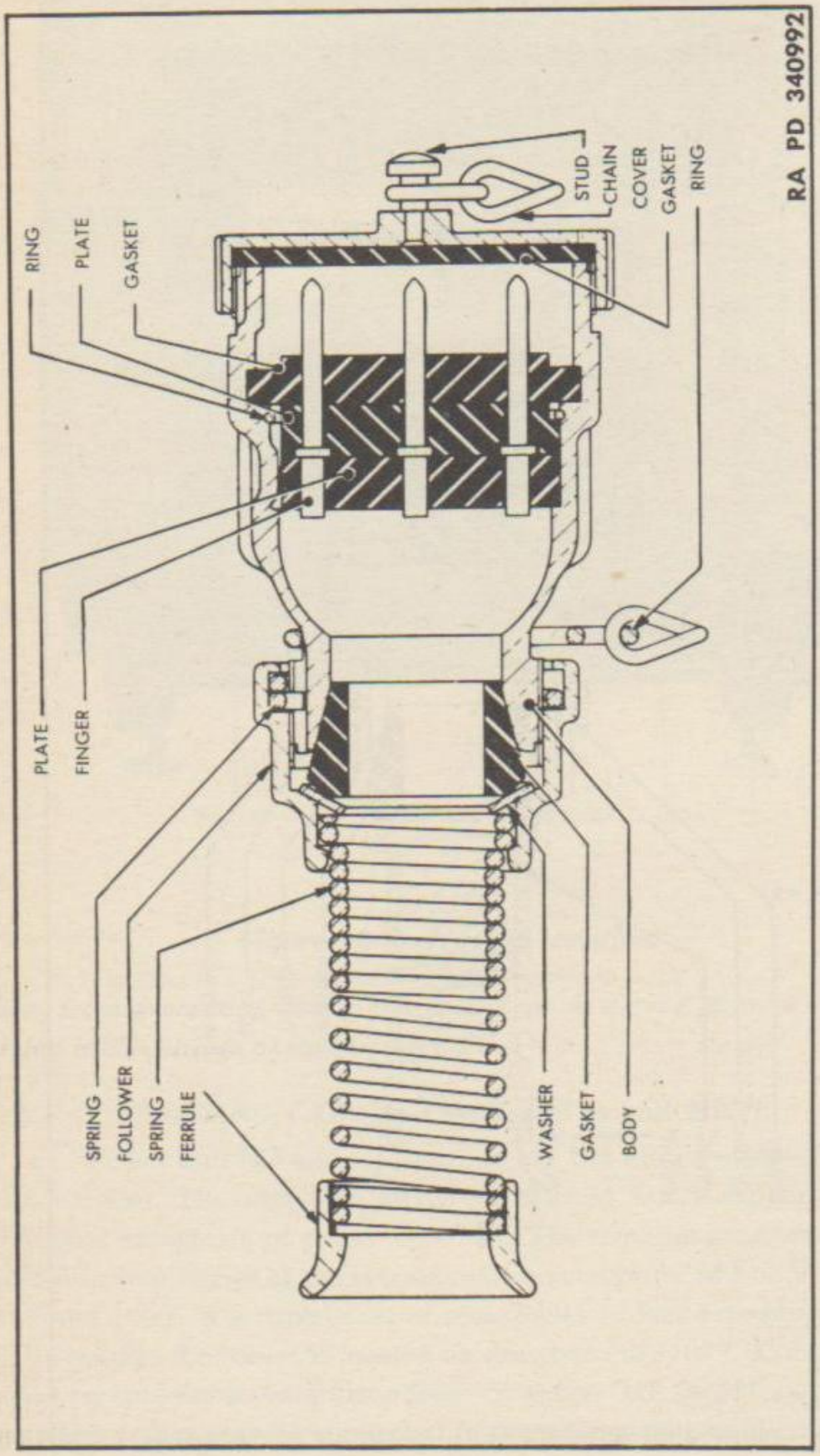


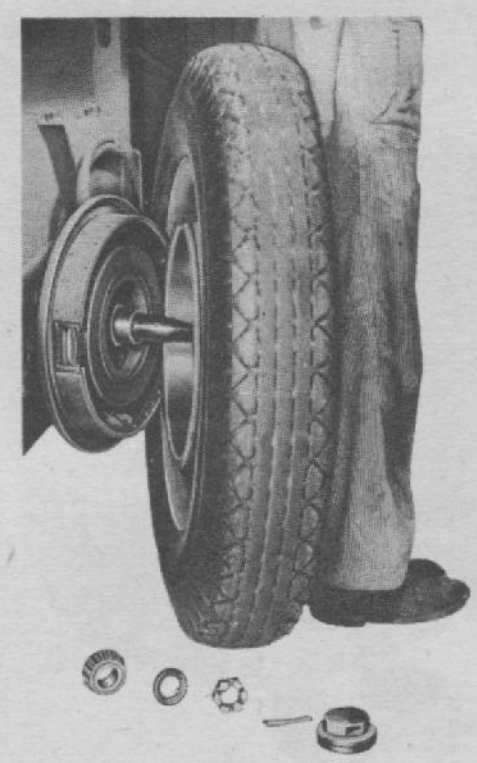

Figure 92—Male Plug Assembly—Sectional View

Section XXIII

# WHEELS, HUBS, BEARINGS, AND TIRES

## 78. DESCRIPTION AND DATA.

*a. Description.* The wheels are of the pressed-steel ventilated-disk type, 20- x 7-inch, 6-hole, and "RH" rim. The wheels are fastened to



RA PD 43303

***Figure 93—Removing Wheel and Tire Assembly***

the hub with six nuts. Single wheels are used on each hub. The hub is carried on two opposed tapered roller bearings and is held to rocker arm spindle with slotted nuts and cotter pin.

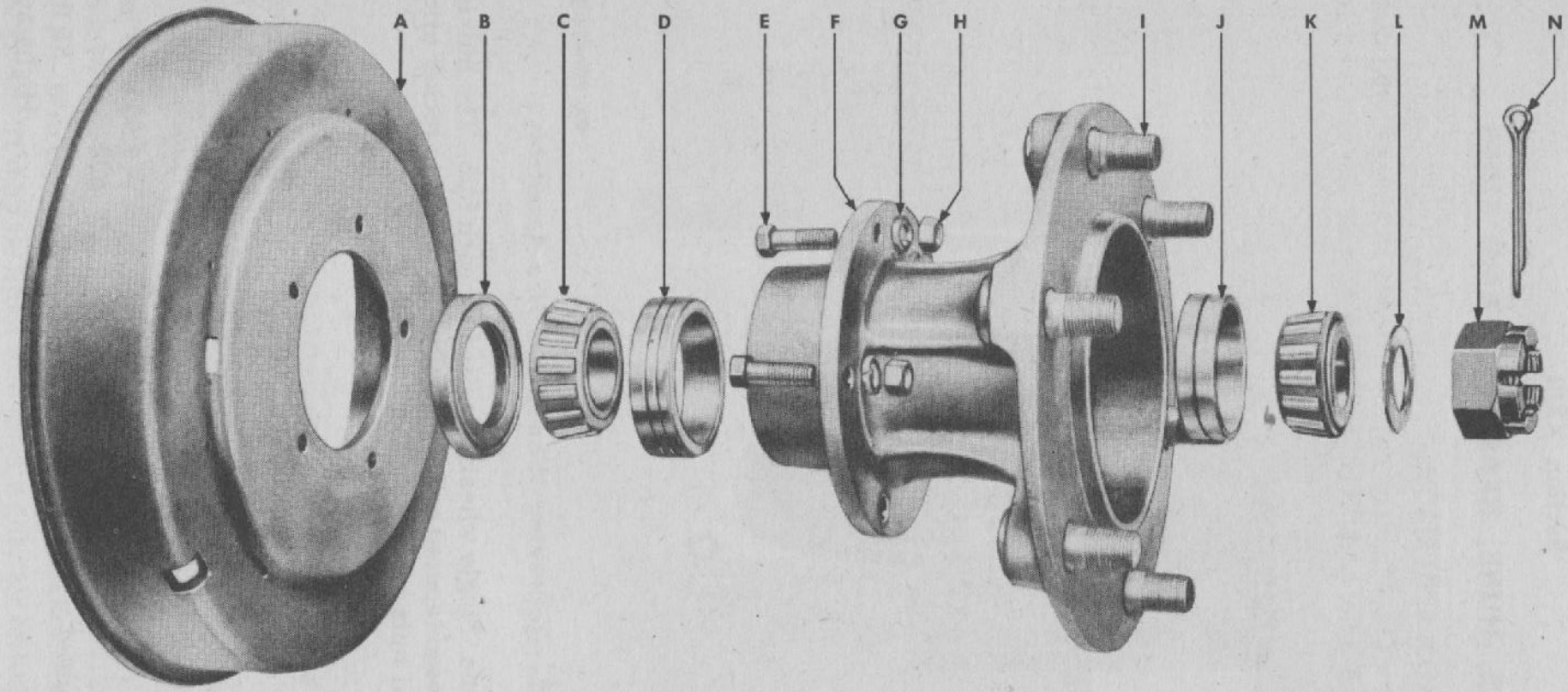
*b. Data.*

(1) WHEELS.

| | |
|---|---|
| Make | Kelsey Hayes |
| Model | 25497 |
| Quantity per vehicle | 4 |

(2) TIRES.

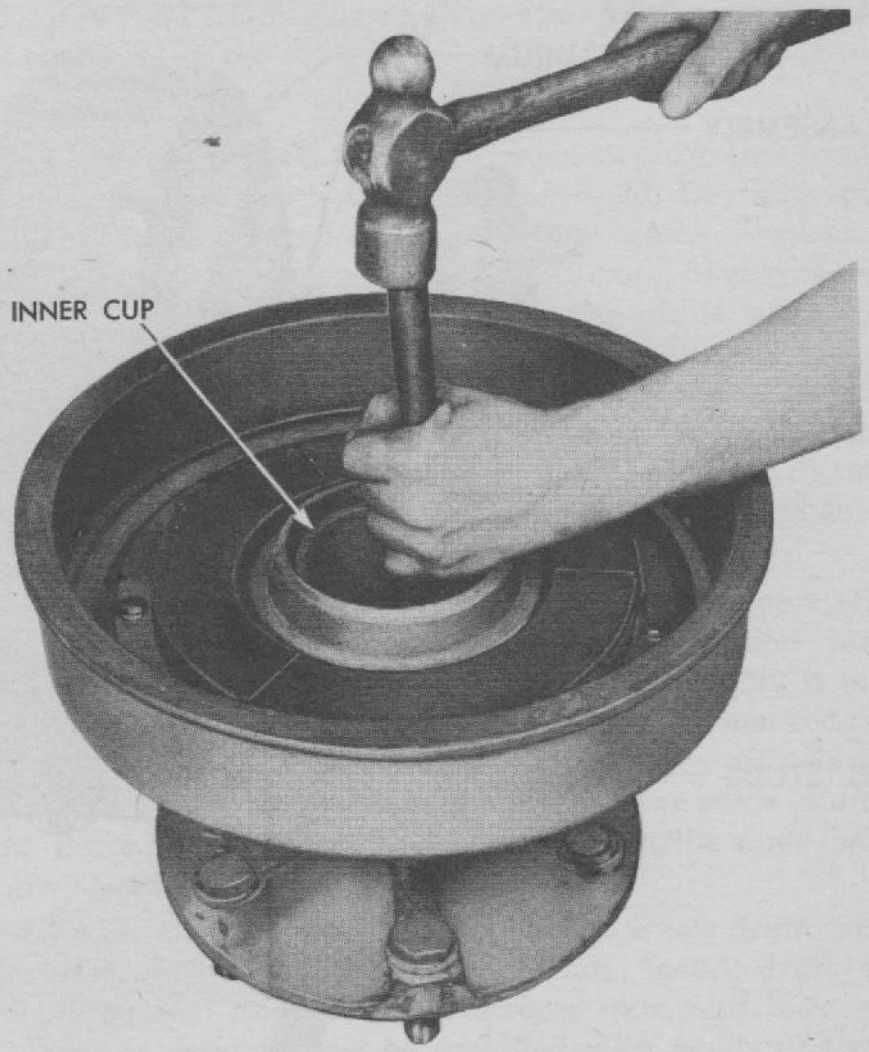
| | |
|---|---|
| Size | 7.50 x 20 in. |
| Number of plies | 8 |
| Air pressure required | 55 lb |
| Tread | Highway |




**A**—BRAKE DRUM
**B**—OIL SEAL
**C**—INNER BEARING
**D**—INNER CUP
**E**—CAP SCREW
**F**—HUB
**G**—LOCK WASHER
**H**—NUT
**I**—STUD
**J**—OUTER CUP
**K**—OUTER BEARING
**L**—WASHER
**M**—SPINDLE NUT
**N**—COTTER PIN

**RA PD 340993**

***Figure 94—Hub and Drum Assembly—Disassembled***




RA PD 340994

***Figure 95—Removing Bearing Cup***

(3) BEARINGS.

| | |
|---|---|
| Make | Timken |
| Type | Roller |
| Number (inner) | 3578 |
| (outer) | 2558 |

## 79. WHEEL AND HUB ASSEMBLY.

### *a. Removal.*

(1) REMOVE WHEEL AND TIRE ASSEMBLY (fig. 93). Loosen six stud nuts which hold wheel and tire assembly to hub. Jack trailer by placing hand jack under rocker arm or use corner lift jacks. Remove six stud nuts and lift wheel and tire assembly off hub. NOTE: *Wheel stud nuts marked with letter "R" turn counterclockwise to remove, and nuts marked with letter "L" turn clockwise.*

(2) REMOVE HUB AND DRUM ASSEMBLY (fig. 94). With hub cap wrench furnished with trailer, remove hub cap by turning

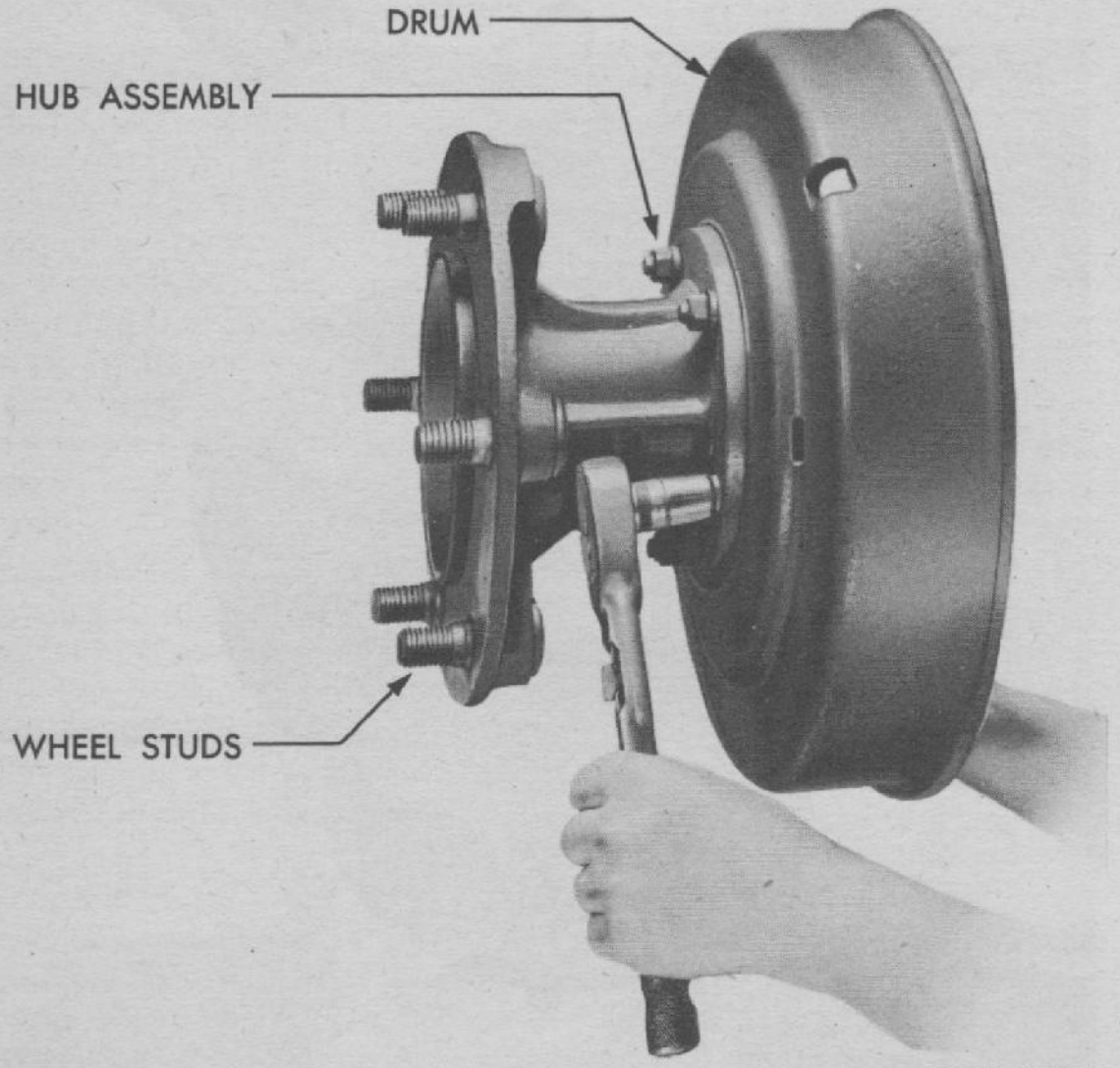



***Figure 96—Removing Drum***

counterclockwise. Pull cotter pin from rocker arm spindle nut, and turn off spindle nut. Remove outer bearing and washer by pulling out on hub. Lift hub and drum assembly off rocker arm spindle.

(3) **REMOVE BEARINGS** (fig. 95). Place hub on floor with drum down and tap inner seal and bearing out of hub. Place a soft steel bar on inside shoulder of cup. Using a heavy hammer, hit first one side of the cup and then the other. Alternating in this manner makes cup come out straight with cup bore, and danger of wedging cup in bore is minimized. Turn hub over and remove opposite cup in the same manner.

(4) **REMOVE ARMATURE.** Remove nine cap screws and lock washers which hold armature to brake drum. Lift grease slinger and armature off drum.

(5) **REMOVE DRUM** (fig. 96). Remove five cap screws, nuts, and lock washers holding drum to hub and lift off drum.

(6) REMOVE STUDS. Place hub on end. With a copper hammer, drive out six wheel studs.

*b. Installation.*

(1) INSTALL BEARING CUPS. Remove all old grease from inside hub, and clean hub bore with dry-cleaning solvent. Dry hub and place on wood block. Inspect cups for pits, chips, and cracks. Replace cups if necessary. Start new bearing cup square with bore, having the smaller inside diameter placed so that it will be on the inside when cup is in place. Place a piece of hardwood over cup face and drive cup in until flush with outer edge of hub. Place old cup over new one and drive in new cup until it is absolutely tight with cup bore flange. Be sure that new cup is properly seated, because if not, it will alter the distance between bearing centers and prevent proper reassembly of wheel. Swab two bearing cups with general purpose grease.

(2) INSTALL STUDS. The studs come in right- and left-hand threads and are marked with an "R" indicating right-hand threads or with an "L" indicating left-hand threads. If hub assembly is intended for right side of vehicle, make certain that studs are all marked with the letter "R" or vice versa. Place studs into stud holes with flat side of studs in alinement with groove in face of hub. Drive studs in until stop is reached. Since hubs are identical in construction, the studs determine whether they become right- or left-hand.

(3) INSTALL DRUM AND ARMATURE. Place drum on hub so that holes in drum line up with holes in hub. Install drum on hub. Fasten drum to hub using five cap screws, nuts, and lock washers. NOTE: *The cap screws must be installed with heads in the drum.* Tighten drum evenly to prevent cocking on drum pilot. Position grease slinger in hub. Place armature on top of grease slinger. Aline holes in grease slinger and armature with holes in drum. Secure the two assemblies to drum using nine cap screws and lock washers. NOTE: *There are right- and left-hand armatures. When installing the armature, make certain the right-hand ones are used on right side and the left-hand ones on left side. The armatures can be identified by "RH" and "LH" stamped on face, or No. 4824 is the right, and No. 4825 the left. The hubs can be identified by letter stamped on outer face of studs. Studs marked with letter "L" indicate left-hand hub, studs marked with letter "R" are right-hand hubs.*

(4) INSTALL HUB AND DRUM ASSEMBLY AND BEARINGS. Check bearings for pits, chips, and excessive wear. Check grease seal for wear. Replace if necessary. NOTE: *Four extra grease seals are furnished with each trailer. The grease seals are stowed in left front compartment.* Lubricate bearings (par. 26 *d* (4). Place inner bearing in hub. Place grease seal next to inner bearing and tap grease seal until seal contacts inner bearing. Make certain the free lip on grease seal is facing the bearing. Lift drum and hub assembly on rocker arm spindle.

Place outer bearing in hub. Place washer next to bearing and install spindle nut. Adjust hub bearing (subpar. *c* below), and install cotter pin and hub cap.

(5) INSTALL WHEEL AND TIRE ASSEMBLY. Place wheel and tire assembly over six studs in hub and secure with six stud nuts. NOTE: *Stud nuts are marked with the letter "L" or "R" which indicate left- or right-hand threads.* Make certain the nuts with letter "R" are used on hub on right side of vehicle, and nuts with letter "L" are used on left side of vehicle. Tighten nuts sufficiently to hold wheel firmly in position. Successively tighten opposite nuts to prevent cocking of wheel on hub pilot and studs. Place block under wheel and continue tightening.

*c. Adjustment.*

(1) CHECK HUB BEARING FOR ADJUSTMENT. Jack axle until tire clears ground. Test sidewise shake of wheel with hands or with a bar under tire. If bearings are correctly adjusted, shake of wheel will be just perceptible and wheel will turn freely with no drag. If bearing adjustment is too tight, bearings will become overheated. Loose adjustment will cause pounding. Brakes must be in fully released position when checking adjustment.

(2) ADJUSTMENT. Jack axle until wheel clears the ground and rotate wheel to make certain it turns freely. Remove hub cap. Pull cotter pin from axle nut. With axle nut wrench, tighten nut until wheel binds. At the same time rotate wheel to make certain all surfaces are in contact. Back nut off about ⅙ turn or more if necessary, making sure wheel rotates freely. Check hub bearing for end play (step (1) above). Install cotter pin and hub cap.

## 80. TIRES.

*a. Removal.* Remove tire and wheel assembly (par. 79 *a* (1)) and remove valve cap and valve core, allowing all air to escape from inner tube.

*b. Demounting.* Refer to TM 31-200.

*c. Mounting.* Refer to TM 31-200. Install valve core. Turn tire so removable flange is down, and inflate to 55-pound pressure. CAUTION: *Never fully inflate tire with flange facing up. The flange may blow off causing serious injury.*

*d. Installation.* Install tire and wheel assembly (par. 79 *b* (5)).

## Section XXIV

## BODY

## 81. DESCRIPTION.

*a. Trailers M14 and M22 Only.* The body is of van-type construction and is square at both ends. The inner and outer panels are made of tempered masonite, and the roof is all metal with compressed seam. Front and rear roof caps are formed of one-piece sheet steel.

The body is insulated between inner and outer panels with two inches of fiber glass. The body is provided with five windows having blackout panels installed on each window. Two full-length doors are provided at rear of body. The body frame is an integral part of the trailer bed. The construction of beds for trailers M7, M13, M14, M17, M18, and M22 is similar.

*b. Trailers M7, M17, M13, and M18 Only.* These trailers have no bodies. The frame and its component parts are of an all-welded construction. The frame consists of several crossmembers, two main members and a bed of formed and bent sheet steel. The only part requiring service is the tailgate. The M13 is provided with wood bows and a tarpaulin cover.

## 82. WINDOW GLASS.

*a. Removal.* Remove screws from glass retainer mouldings. Place screwdriver under glass and pry and work glass panel out of frame.

*b. Installation.* Coat outer surface of window frame with caulking compound to insure a weathertight fit. Install glass, position four retainer mouldings next to glass and install screws in moulding.

## 83. REAR DOOR.

*a. Removal.* Place door in open position. Remove screws from hinge and lift door off body post.

*b. Installation.* Position door to door frame. Aline holes in hinge with holes on inner side of post and install three screws. Try opening and closing the door and check for free movement. If door binds, place small wedge between door and tailgate and install remaining screws.

## 84. LOCK ASSEMBLY.

*a. Removal.* Remove screw from handle on inner side of door and tap handle off. Pull outer handle and rod out of door lock. Remove four nuts and lock washers from lock on inner side. Remove clamp plate from top and bottom latch and lift lock assembly off door. With a long tapered punch, drive out four bolts from lock and two bolts at bottom and top of door.

*b. Installation.* Position lock assembly over handle hole. Fasten lock to door using four round-head bolts, lock washers, and nuts. Fasten bottom and top latch to door using clamp plate, bolts, lock washers, and nuts. Place several drops of oil on outer door handle shaft and install handle. Install inner handle to shaft using screw.

## 85. LOUVER.

*a. Removal.* Remove screws holding louver to door. Tap louver out of frame.

*b. Installation.* Place louver in door and fasten in position from outer side with twelve binding-head screws.

## Section XXV

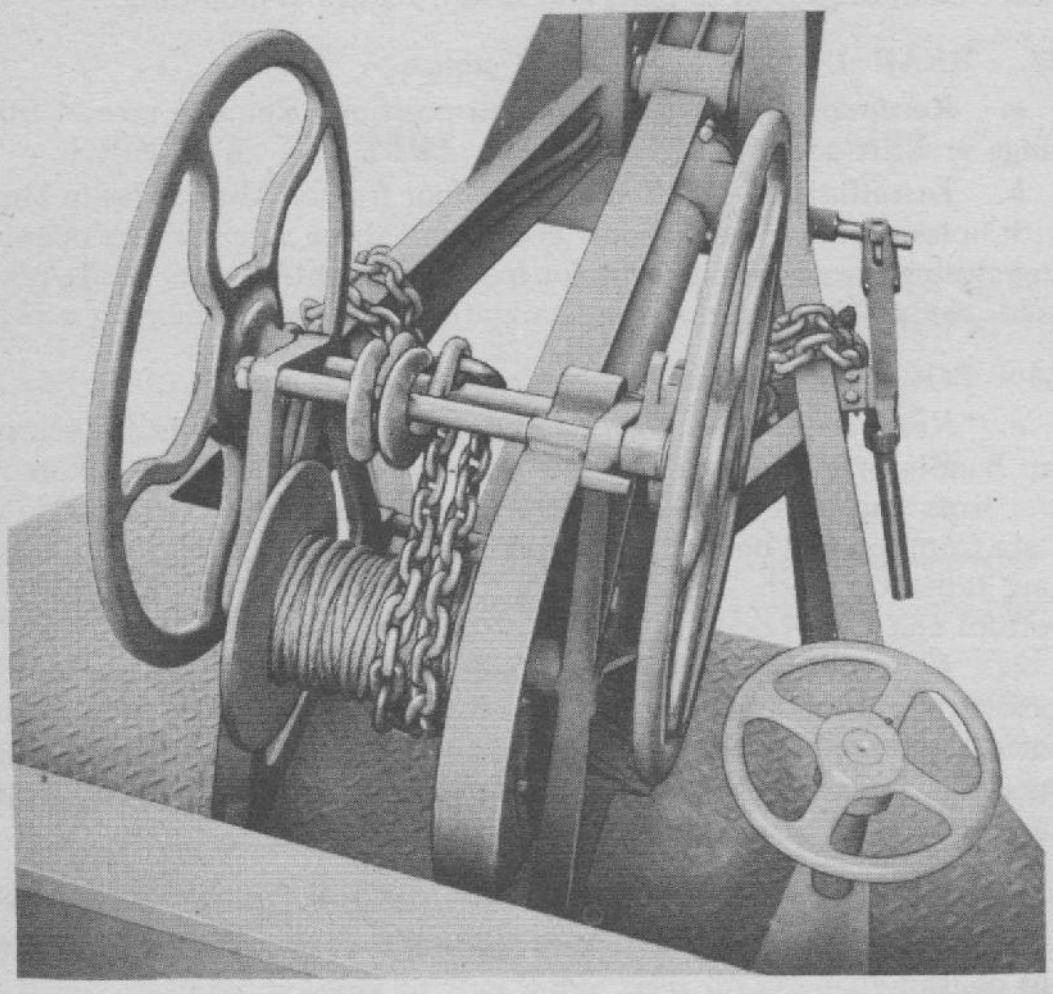
# HAND WINCH

## 86. DESCRIPTION AND DATA.

*a. Description* (fig. 97). The hand winch is mounted on the drawbar decking of the trailer M18 only. The winch is manually operated by two handwheels. The handwheel on the right side is provided with a ratchet and pawl which lock the load on the winch. A 4-inch drum is used.

*b. Data.*

| | |
|---|---|
| Wire rope diameter | 5/16 in. |
| Wire rope length | 30 ft |
| Winch make | Braden Winch Co. |
| Winch model | 2H-003 |



RA PD 341019

*Figure 97—Winch Assembly*

## 87. REMOVAL.

*a.* Remove six cap screws, nuts, and lock washers holding winch to drawbar decking and lift the assembly off trailer.

## 88. INSTALLATION.

*a.* Position winch on trailer decking with pawl toward right side of trailer. Aline holes in winch frame with holes in trailer decking and secure winch to decking with four cap screws, nuts, and lock washers.

# PART FOUR—AUXILIARY EQUIPMENT

## Section XXVI

## GENERAL

### 89. SCOPE.

*a.* Part Four contains information for guidance of personnel responsible for operation of this equipment. It contains only the information necessary for using personnel to properly identify, connect, and protect the auxiliary equipment while being used or transported with the main equipment. Detailed instructions on this equipment are contained in separate technical manuals.

*b.* Part Four contains the above information on Director Trailers M13, M14, and M22, Generator Trailers M7 and M18, and Mount Trailer M17.

## Section XXVII

## DIRECTOR TRAILERS M13, M14, AND M22

### 90. GENERAL.

*a.* Detail instructions for inspection, disassembly, assembly, maintenance, and repair of Power Unit M8, Tracker M2 with Tripod M12, and Altitude Converter M2 are contained in TM 9-1671B. The wiring schematic diagrams for all units are contained in TM 9-1671C.

### 91. INSTALLATION OF DIRECTOR UNITS.

*a.* ***Uncrating.*** Director M9 or M10, with all tools and accessories, is packed in a single shipping crate. First step in the removal procedure is to block crate about 6 inches off ground, making sure blocks do not in any way interfere with bolt heads protruding from bottom of crate. Remove entire bottom row of nails. Using two long crowbars and blocking, first pry up one end of crate and then the other. Locate position of cable reel in box corner and pry crate up high enough to permit a man to gain entrance into box with extension cord, heavy shears, and hammer. Straps extending from cable reel to crate top should first be cut. Next, platform holding smaller cable reels on opposite corner of box should be knocked off with a hammer. Top of crate is now ready for removal (fig. 98). This can be done with hoist and spread chain, or

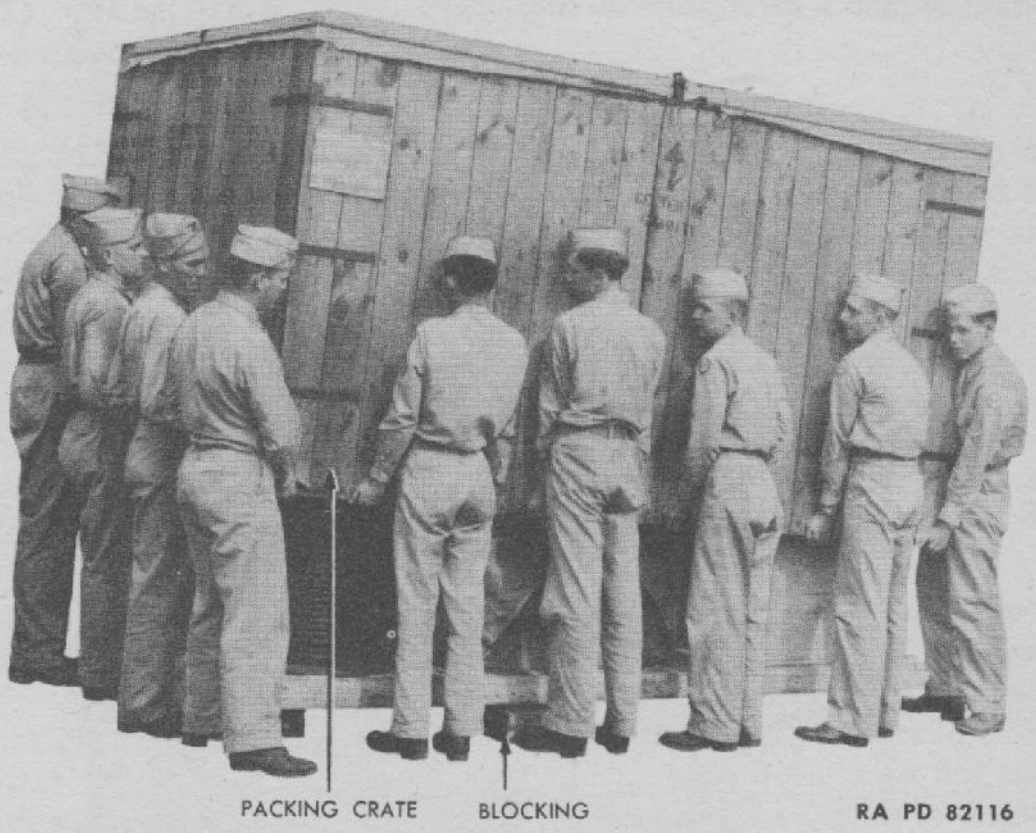



***Figure 98—Uncrating***

by 20 men, equally spaced around crate. Simply remove bolts to free all components of director from base of crate. CAUTION: *Make sure end is adequately blocked before permitting man to crawl inside partially opened crate.*

***b. Altitude Converter and Power Unit Installation.*** Remove eight cap screws in top of power unit M8, and use them to fix altitude converter in place. Bolt altitude converter in place so instrument panel faces left side of trailer when in position. Receptacles on power unit must face rear of trailer (fig. 99). A hoist is normally used when installing equipment in M13 trailer. However, if hoisting facilities are not available, the units can be carried into place by hand. NOTE: *Before installing equipment, put all leveling jacks in "DOWN" position to stabilize unit.*

(1) Eight men are ordinarily employed to carry the power unit and altitude converter units. This assembly is carried by means of two porter bars which are furnished with this equipment. The porter bars are passed through two handles at the side of power unit and held in place by pins passed through handles and bars (fig. 100). White marks

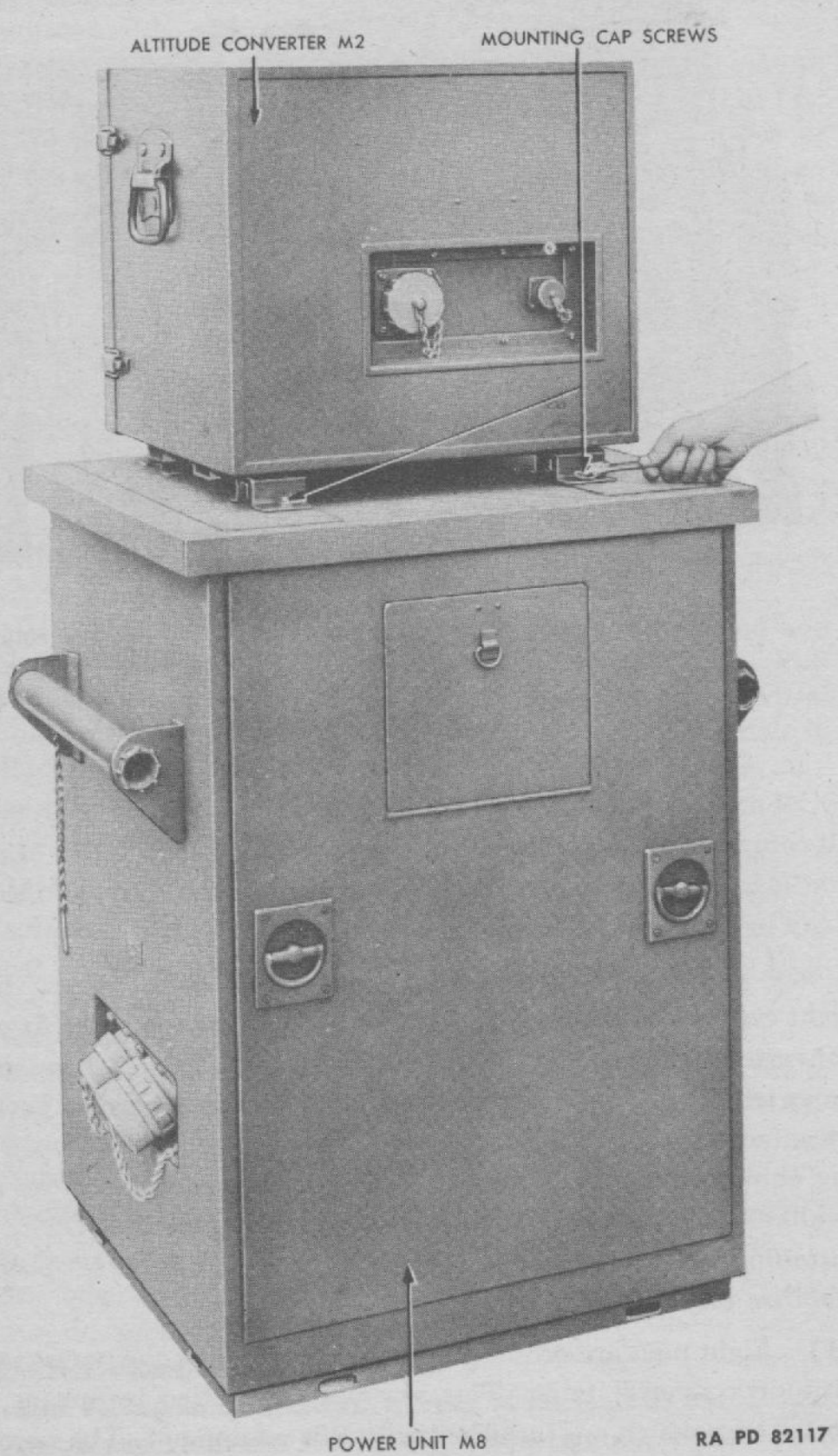



***Figure 99—Bolting Altitude Converter to Power Unit***


***Figure 100—Installing Altitude Converter***

on bars assist in alining pin holes. Pins must all be secured in place before attempting to lift power unit and altitude converter.

(2) Remove eight cap screws and lugs from power unit mounting base (fig. 101). Place cable assembly toward right and left side of mounting base to prevent interference with rolling of power unit. Remove cap screw, washers, and lugs from computer anchoring positions. Place two rollers at rear of trailer floor about 24 inches apart. Place altitude converter and power unit assembly on two rollers (fig. 100), and roll the power unit up to its mounting base. Remove one roller. Tip unit up in position on base. Lock in position by means of

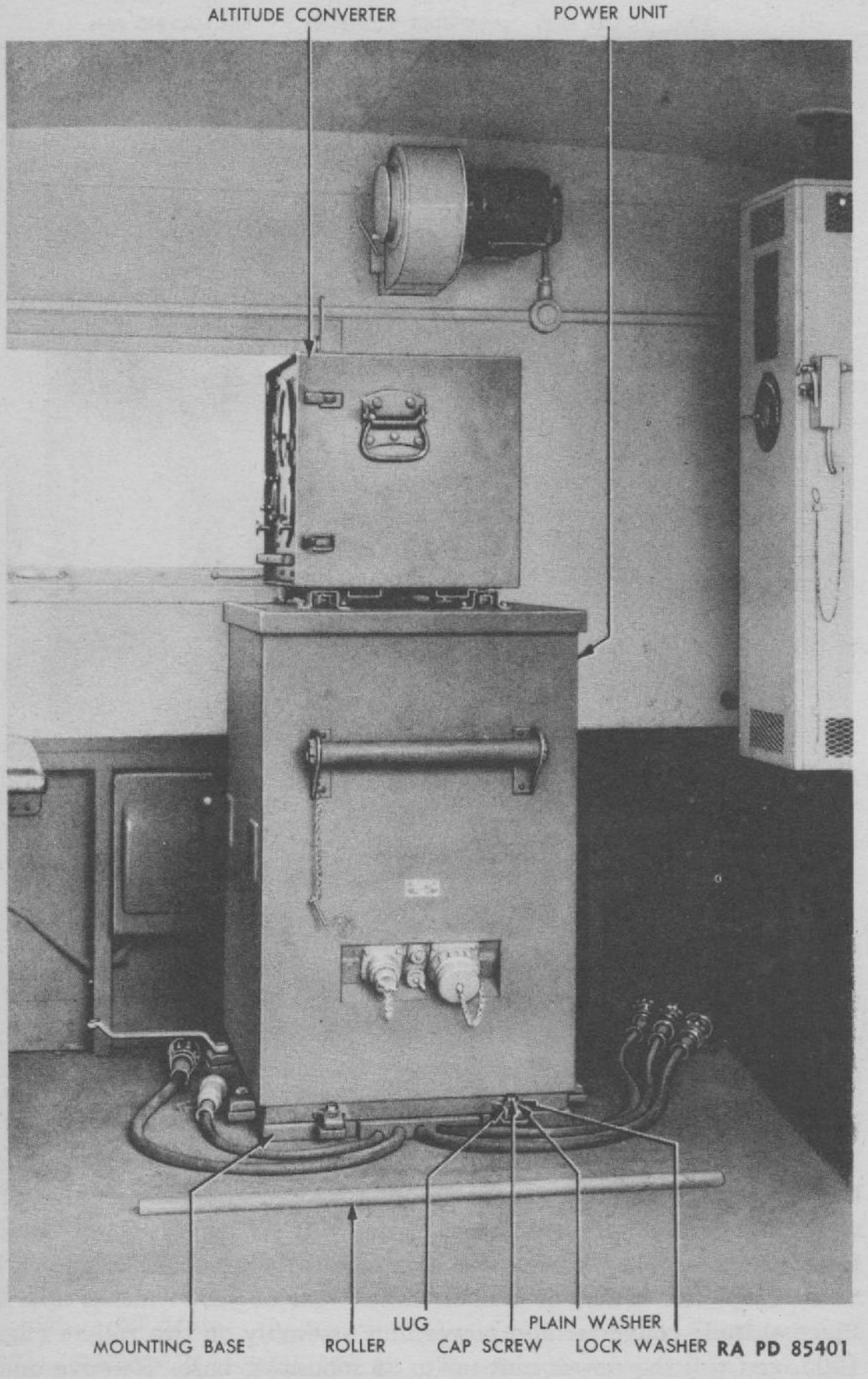



***Figure 101—Altitude Converter and Power Unit Installed***

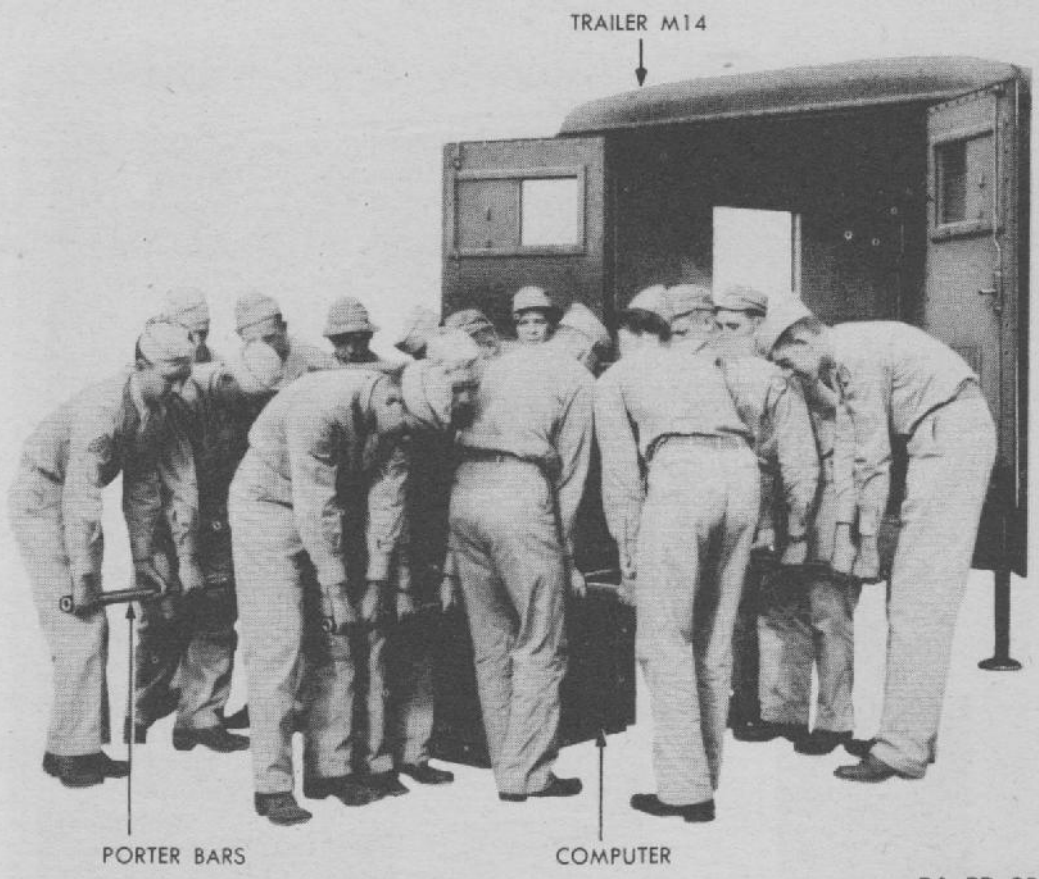


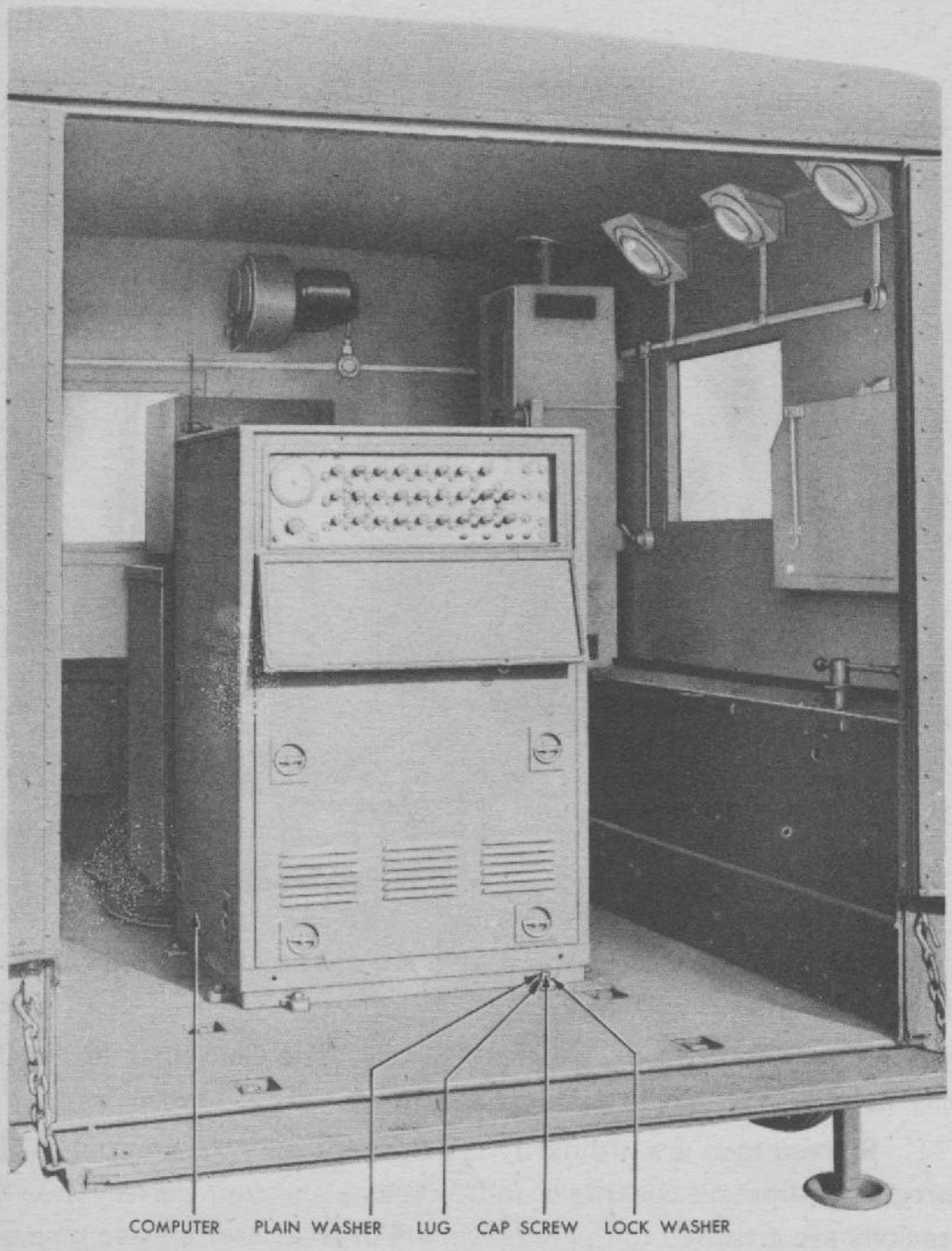

***Figure 102—Installing Computer***

lugs, plain washers, lock washers, and cap screws. CAUTION: *Do not allow power unit to rest on cables.*

*c. Computer M3 or M4 Installation.* The Computer M3 or M4 may be placed in M13 trailer by means of hoist.

(1) Sixteen men are ordinarily required to carry the computer. The carrying equipment consists of four brackets and four porter bars. The brackets are attached to the four corners of computer by two screws in each bracket, and are joined together by chains. The screws are so located that each bracket can be attached to computer only in its proper place. The two brackets which are attached to the side of computer on which cable receptacles are located are marked "PLUG SIDE." The porter bars are passed through loops on carrying brackets. Four loops are provided on each bracket so that bars may be placed either parallel or at right angles to each other, whichever is most convenient. Each bar is held in place by a pin.

(2) Sixteen men lift computer onto trailer tailgate (fig. 102). Porter bars at right angles to door are removed. Using remaining bars, lift




RA PD 85403

***Figure 103—Computer Installed***

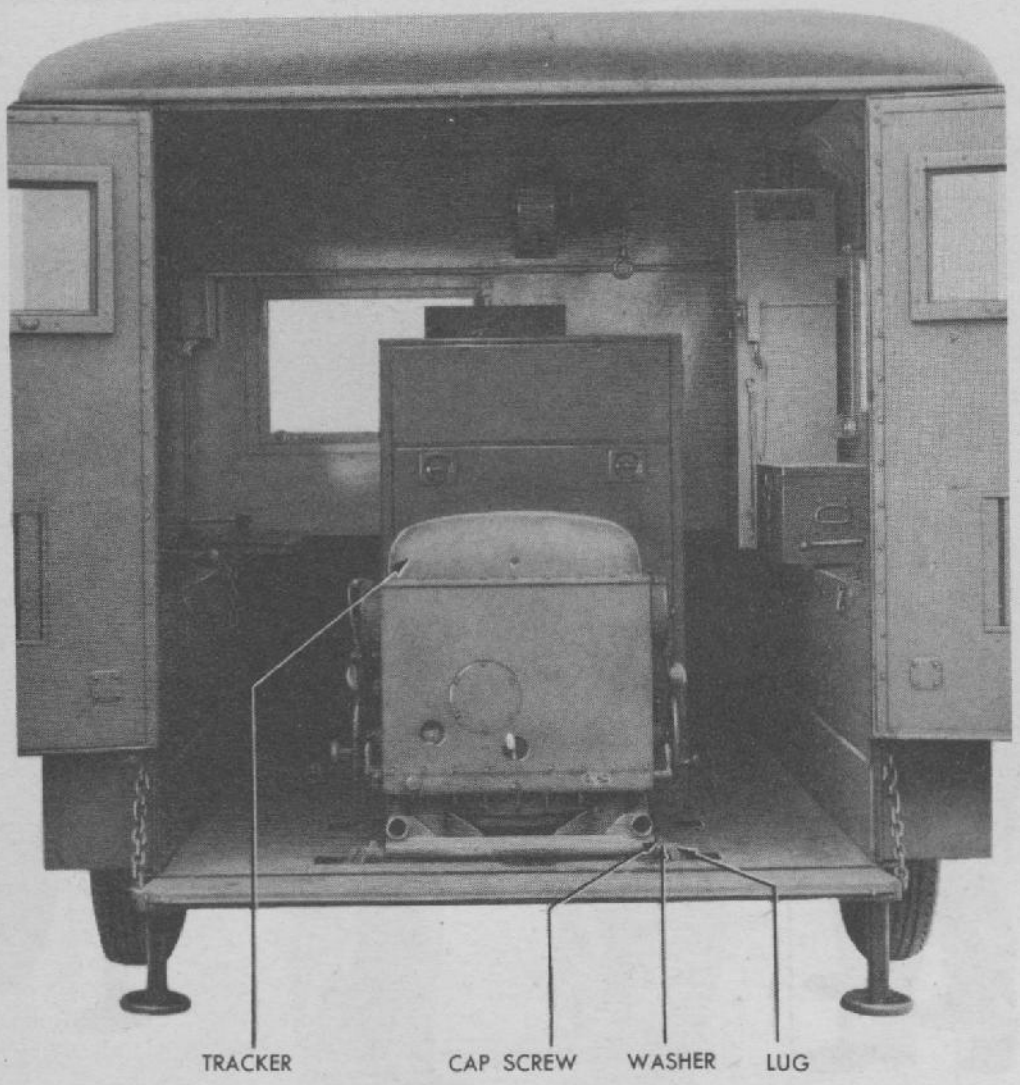
computer onto roller previously placed on floor. Pull porter bars back in mounts and use as levers to help steer computer into position. Fasten computer to floor by means of lugs, plain washers, lock washers, and cap screws (fig. 103).

*d. Tracker Installation* (fig. 104). Tracker, less tripod, is carried in trailer. It may be lifted into M13 trailer by means of a hoist, or car-


***Figure 104—Installing Tracker***

ried into position on both units through use of porter bars. Tracker is fastened to trailer floor with four lugs. The lugs are attached to chains which in turn are welded to trailer floor. Four pockets are provided in trailer floor in which tracker lugs are kept when not in use (fig. 105).

(1) There is only one exterior receptacle on M13 trailer and it is located on left rear side of body frame (fig. 84). Generating unit to power unit cable is inserted in this plug. Power unit cable is found in cable compartment, and is plugged into receptacle at left-hand side of power unit M8 (fig. 106). Connection of remaining cables is covered in TM 9-671. NOTE: *Cables should not be connected or disconnected with power unit on. Care should be exercised in connecting cables (yel-*



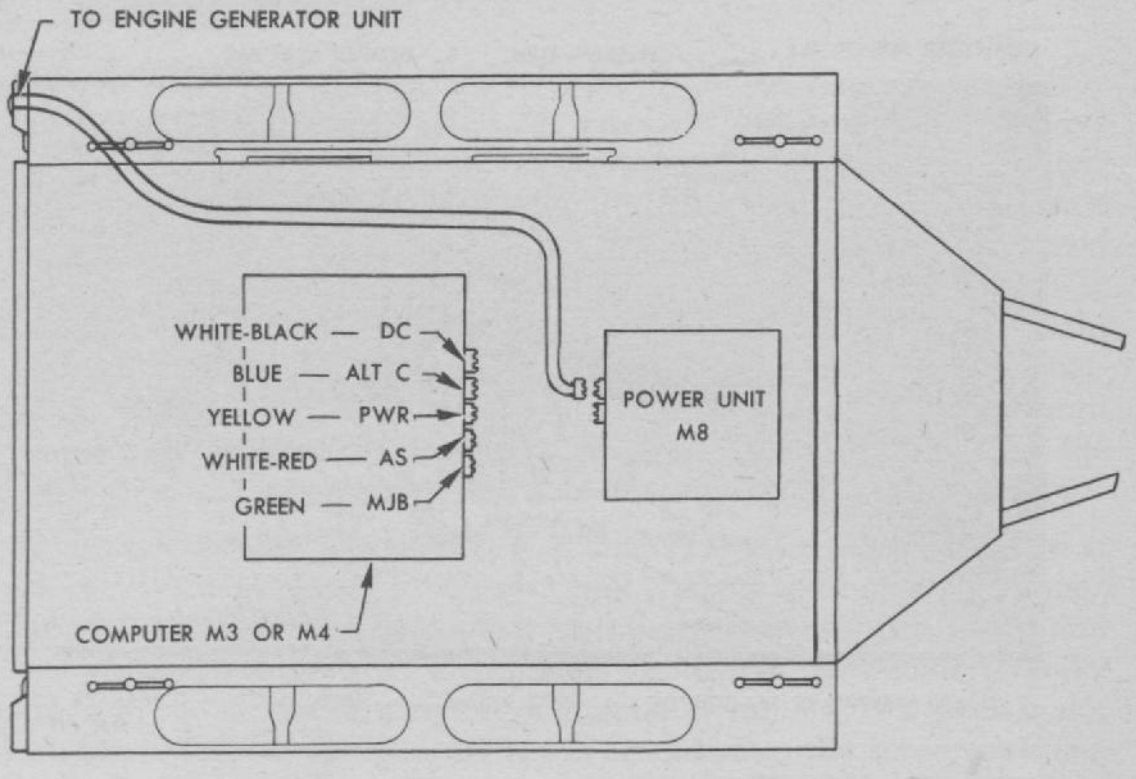

RA PD 85405

***Figure 105—Tracker Installed***

*low) from generating unit to power unit, as no alining grooves are provided in the fittings of these cables.*

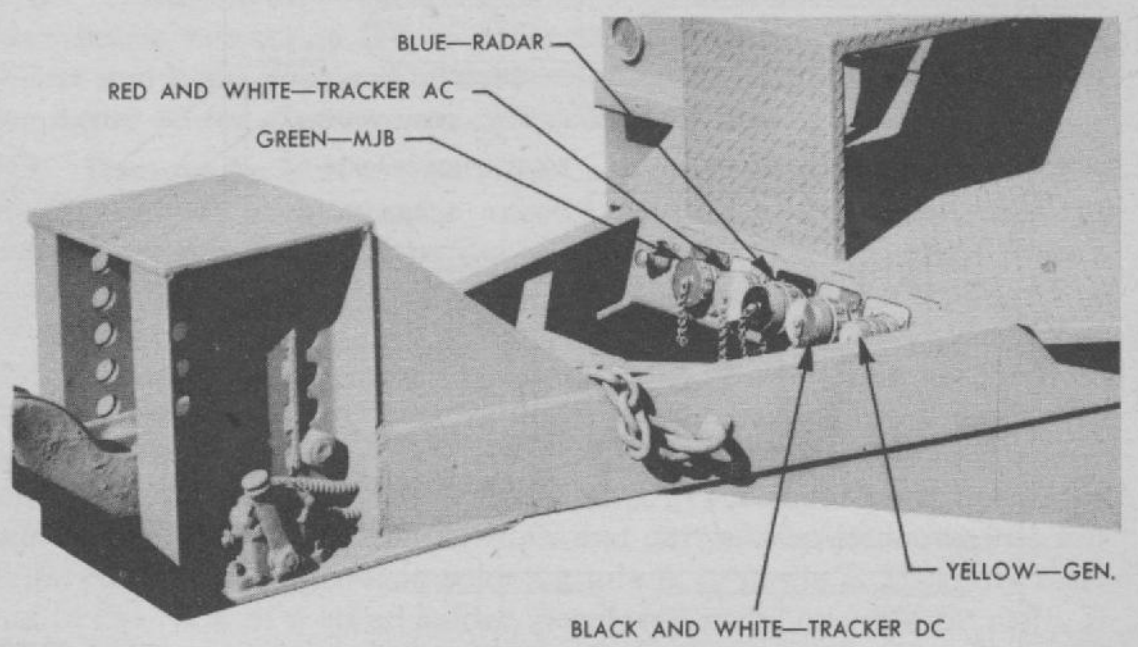
## 92. CONNECTING CABLES (Trailer M14 and M22).

*a.* Power unit M8 and computer M3 or M4 are permanently fixed inside trailer. The cable with yellow cap marked "GEN" is plugged into left-hand receptacle of power unit M8. The remaining cables are inserted in receptacles of the proper color on computer M3 or M4 (figs. 107 and 109). A complete set of receptacles to facilitate plugging to units outside the trailer is located on drawbar (fig. 107). Considering these receptacles as extensions from computer M3 or M4 and power unit M8, cables may be connected in accordance with cable diagrams found in TM 9-671.




RA PD 82086

***Figure 106—M13 Cable Hook-Up Diagram***




RA PD 82087

***Figure 107—M14 and M22 Outside Receptacles***

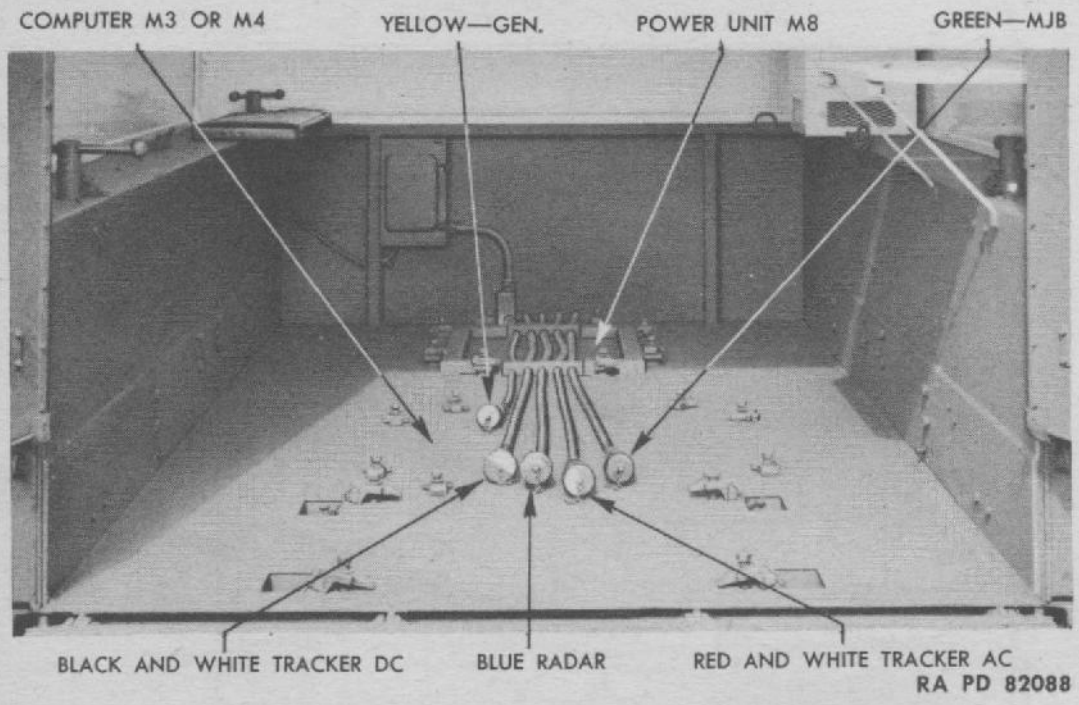



***Figure 108—M14 and M22 Inside Receptacles***

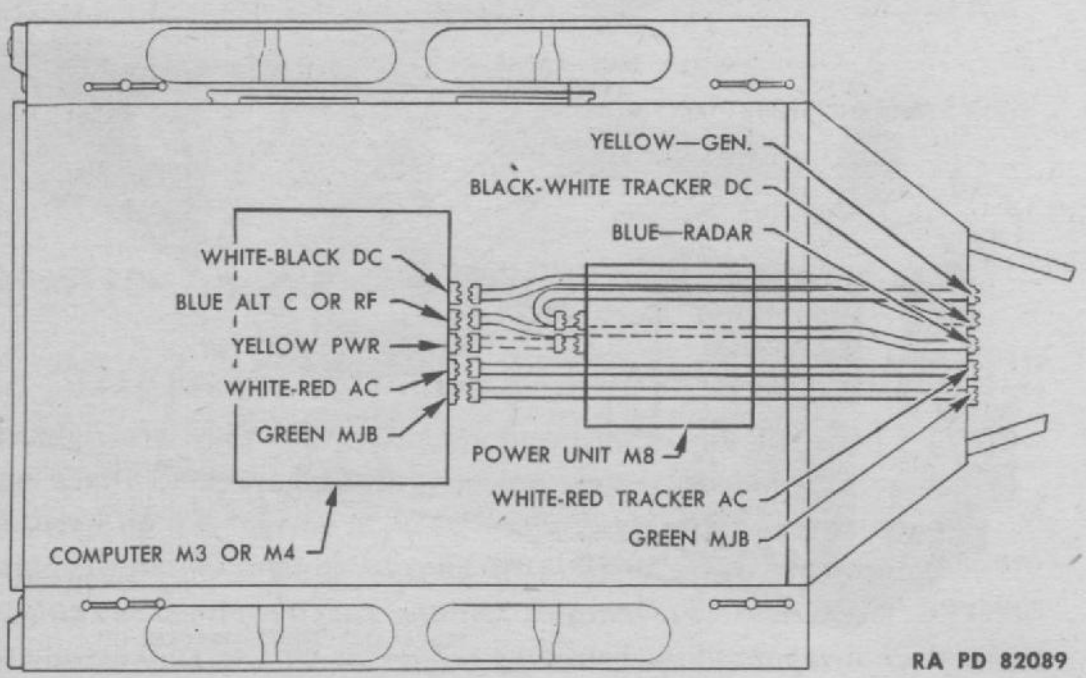



***Figure 109—M14 and M22 Cable Hook-up Diagram***

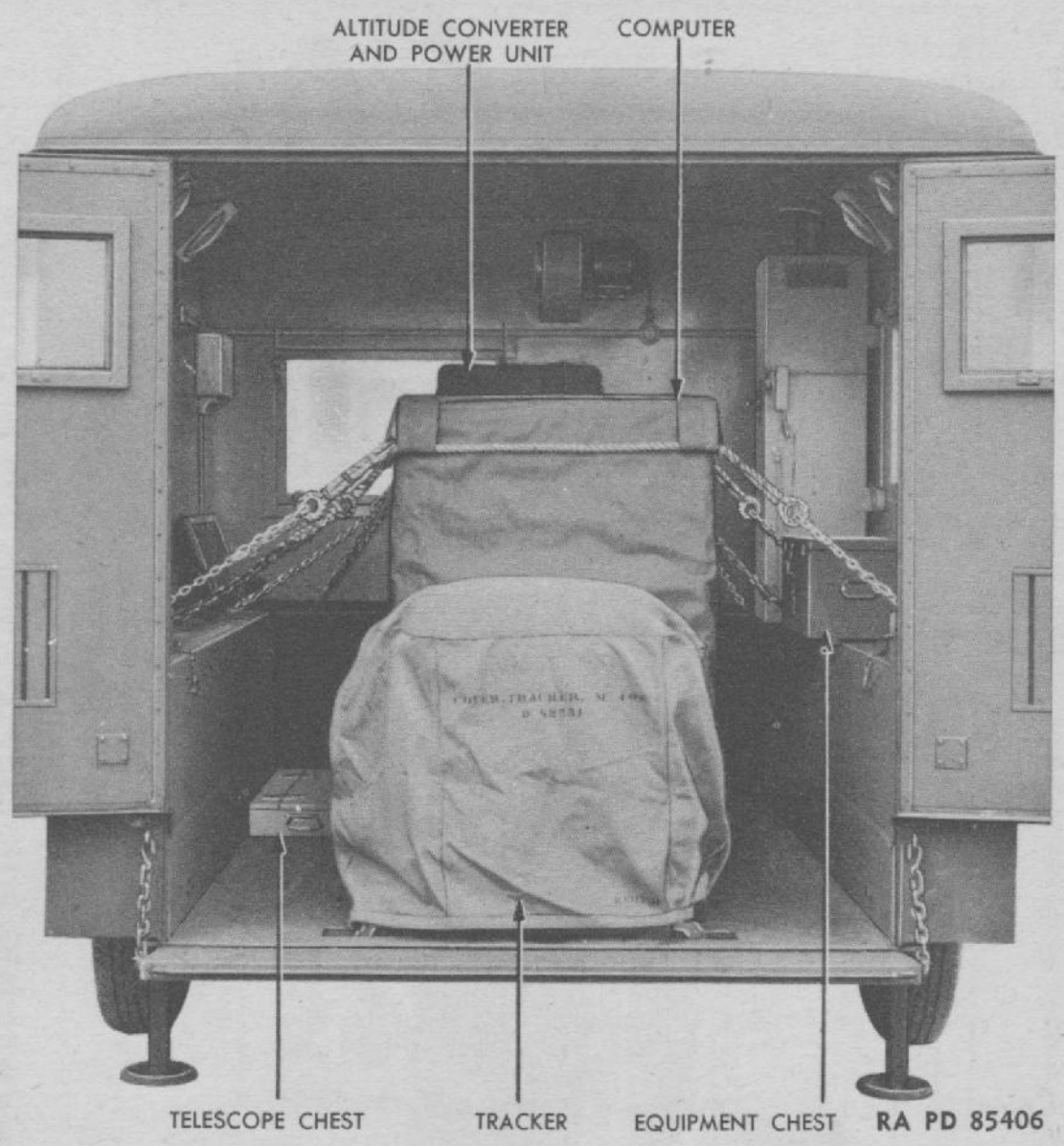



***Figure 110—Equipment Used in M13, M14, and M22 Trailers***

## 93. PREPARATION FOR TRAVEL (figs. 110 and 111).

*a.* Check all lug screws and make certain they are tight. Place covers on altitude converter, power unit, and tracker. Place harness over each cover. Fasten guy chain to each corner eye on harness and lash equipment down using bull rings provided on trailer catwalk. NOTE: *Each harness and cover is marked as to position and equipment for which it is intended.* Equipment chest is carried on catwalk and is secured by four lugs. Two light extensions, four extension cords, and short cable assemblies are stowed in right and left side tool compartment. The telescope chest can be carried in towing vehicle or placed on floor of trailer. All equipment illustrated in figure 112 is stowed in towing vehicle.

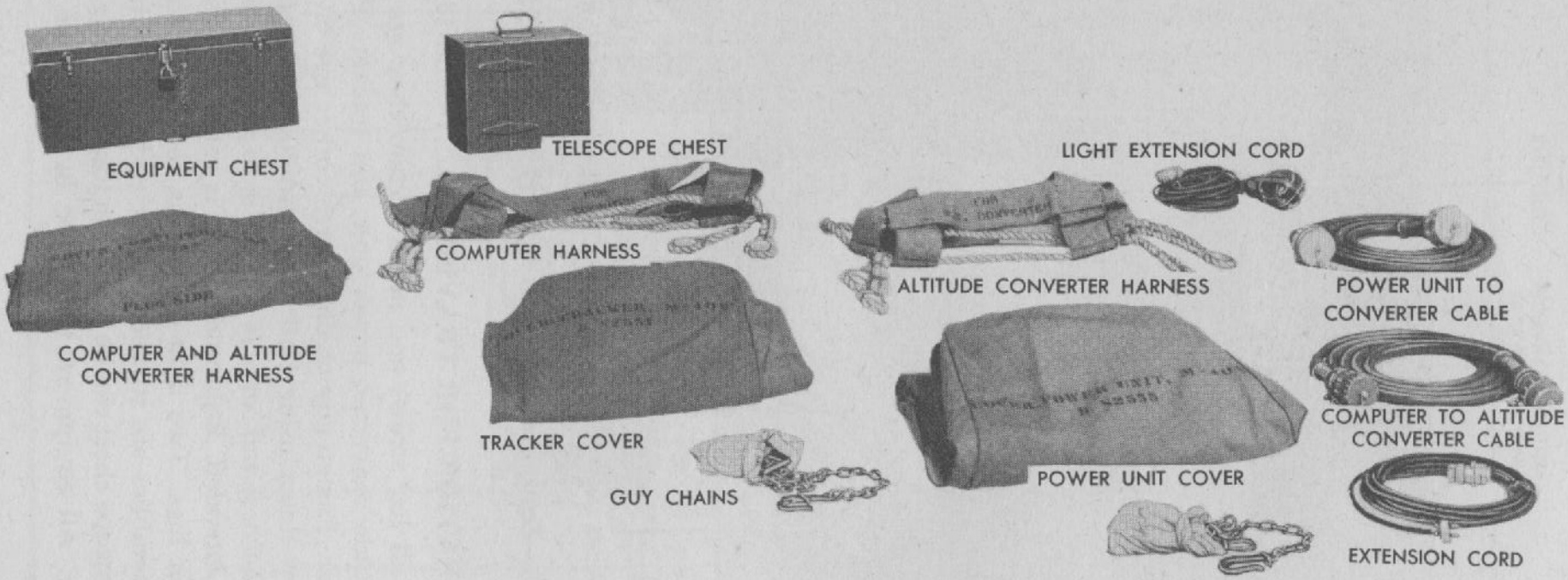



***Figure 111—Equipment Used with M13, M14, and M22 Trailers (Stowed on Trailer)***

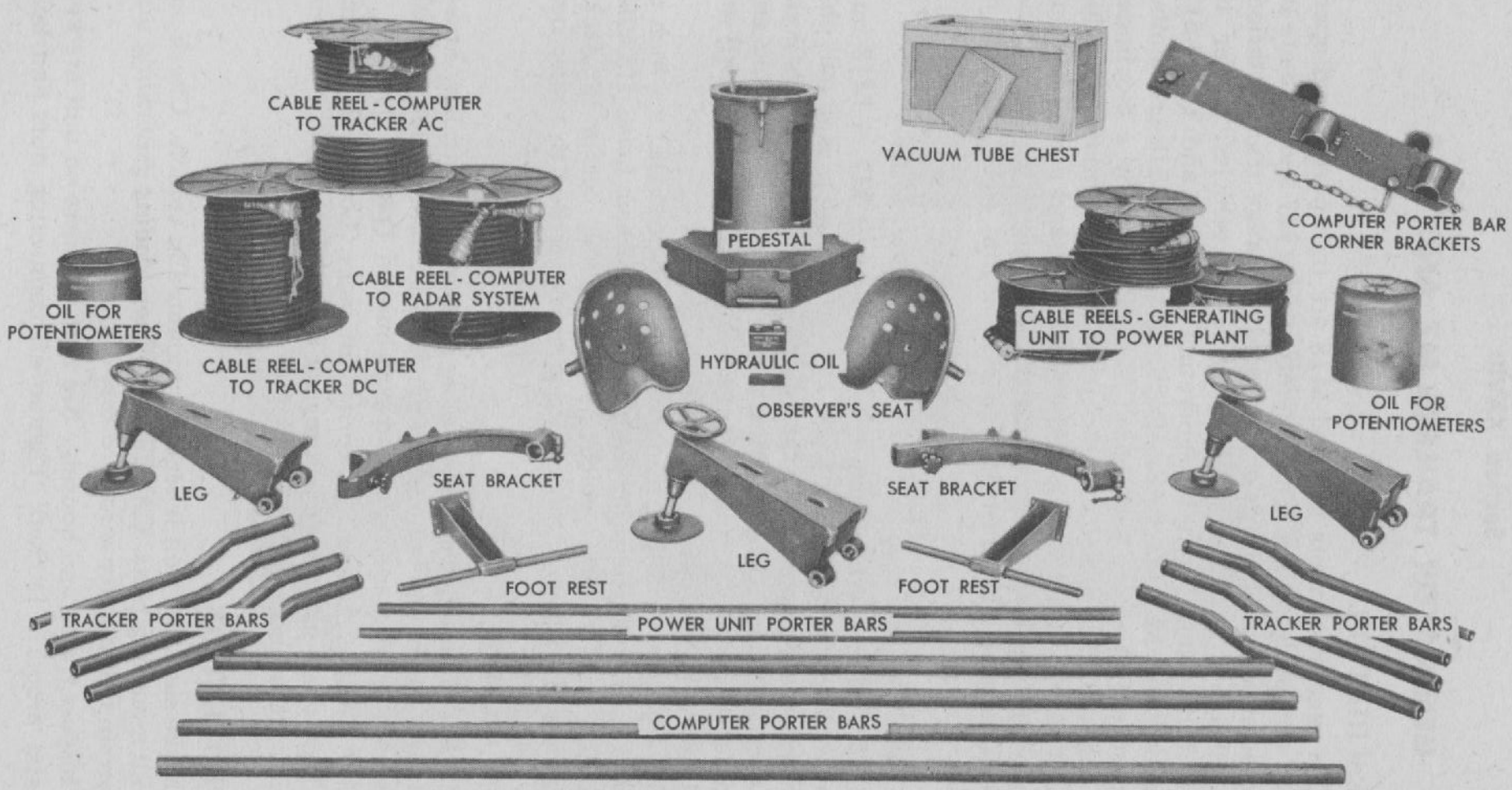



***Figure 112—Equipment Used with M13, M14, and M22 Trailers (Stowed on Towing Vehicle)***

Section XXVIII

# GENERATOR TRAILERS M7 AND M18

## 94. DESCRIPTION.

*a.* The generating units M7 and M18 are transported and operated in M7 and M18 trailers. The generating units M7 and M18 are to be protected against all hazards encountered in storage, transportation, washing, cleaning, painting, and servicing of vehicles. Refer to TM 9-618 for technical data on generating unit M18 and TM 9-617 for generating unit M7. The generating units M7 and M18 are similar in construction. They are self-contained and driven by a 6-cylinder gasoline engine. Their principal components are an alternator, gasoline engine, instrument panel with necessary controls, and a steel housing assembly with steel doors which afford access to engine, generator, and control box. Figure 113 illustrates generating unit M18 mounted in M7 trailer.

## 95. LOADING.

*a. M18 Trailer.* When loading generating unit M7 or M18 into M18 trailer, lower two leveling jacks at rear of trailer. Remove pins which hold two ramps up. Lower ramps and install two pins to prevent ramps from buckling. Couple chain which is attached to cable and fasten generating unit to trailer tracks using four clamps which are fastened to track rails.

*b. M7 Trailer.* The M7 trailer is not provided with a winch or loading ramps. Load generating set using a 5-ton chain hoist. If trailer is uncoupled from towing vehicle, lower the four corner lift jacks. Fasten generating set using lugs and lug nuts attached to trailer bed.

## 96. UNLOADING.

*a. M18 Trailer.* Lower two leveling jacks at rear of trailer. Lower the ramps. Loosen four clamps which hold generating set to track. Fasten sling assembly to trailer and pull unit off (par. 17 *c*).

*b. M7 Trailer.* Lower four corner lift jacks. Loosen clamp nuts. Fasten 5-ton chain hoist to generating set frame. Hoist unit 2 feet and pull trailer from under generating set.

## 97. PROTECTION.

*a.* Make sure that unit is securely mounted in vehicle. Check and tighten all mounting bolts. CAUTION: *When loading generating unit, make certain the radiator is toward rear of trailer.*

*b.* Inspect frame and housing. See that all doors on unit are kept closed and properly latched. Tighten all connecting nuts and bolts

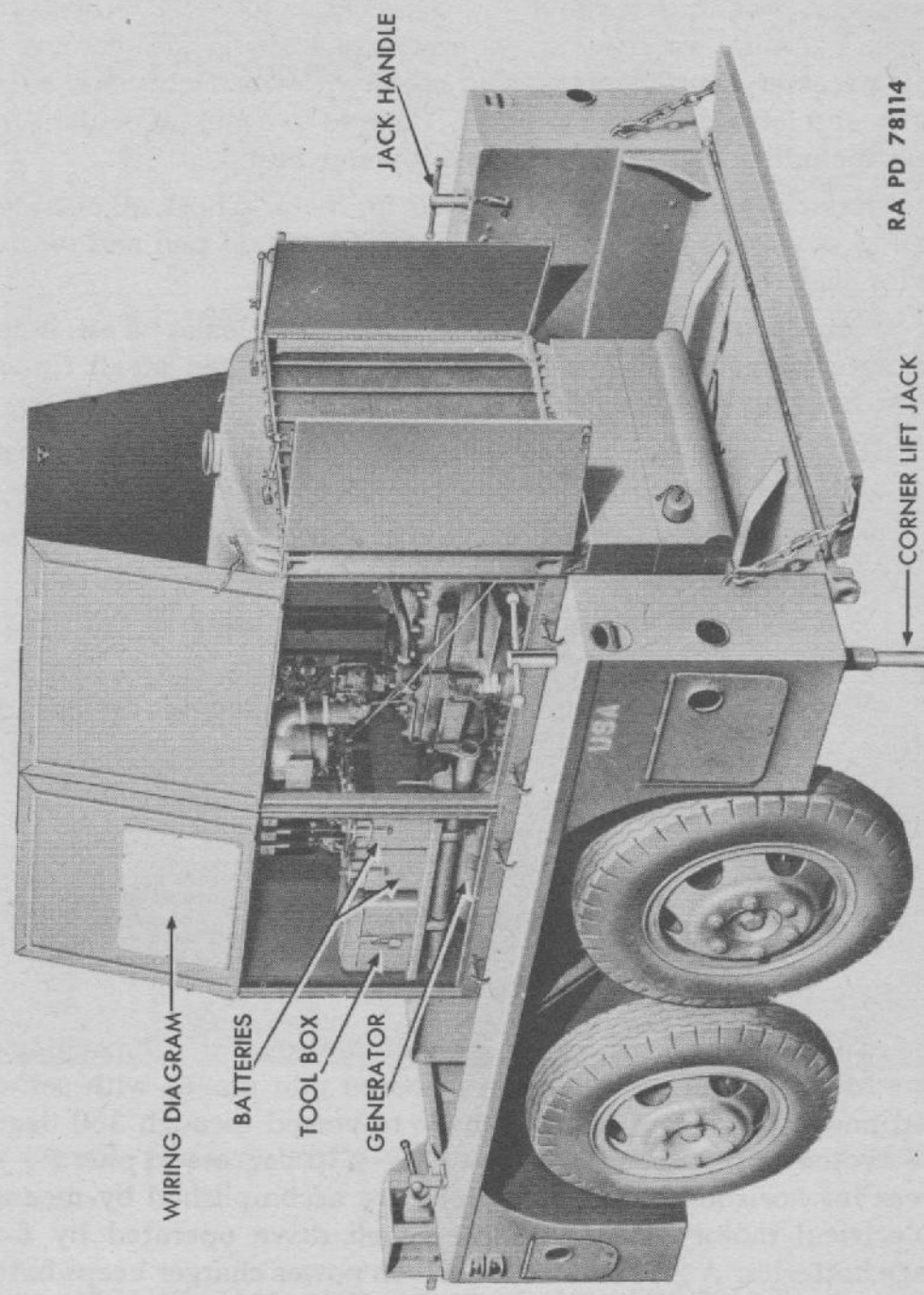



***Figure 113—Generating Unit M18 Mounted in Trailer M7***

holding doors and panels to frame and radiator housing. Inspect muffler mounting bracket and tighten any loose bolts and nuts. See that muffler outlet pipe is sealed watertight.

*c.* Check radiator coolant antifreeze strength for temperature to be encountered. Examine radiator and connections for signs of leakage or damage. Examine water pump for cracks or leaks. Drain cooling system, if necessary, by opening drain cocks at lower right-hand side of radiator and left side of motor block. Be sure to drain all coolant from system including hose connections and water pump.

*d.* Examine fuel tank and fuel lines for leaks. Check all outside oil lines and connections for cracks or leaks. Check oil pan and oil drain plug for leaks.

*e.* Inspect battery for corrosion, cracks, or leaks. Test battery electrolyte strength and level. Keep battery charged at all times to prevent freezing at all temperatures.

*f.* Inspect alternator and instrument panel, and see that all instruments and panel mounting bolts and connections are secure.

*g.* While cleaning vehicle, make sure that spray of cleaning solution does not wet the unit.

*h.* While painting vehicle, be careful that paint is not sprayed onto unit.

*i.* When fording a stream, be sure that the unit is above fording depth of stream.

## Section XXIX

# TRAILER MOUNT M17

## 98. DESCRIPTION.

*a.* The M17 trailer is a component of multiple cal. .50 machine gun mount M45. It is a power-driven armored gun mount with self-contained power unit. The mount can be traversed through 360 degrees and elevated through an arc of minus (—) 10 degrees to plus (+) 90 degrees for horizontal. These motions are accomplished by means of an electrical motor-driven variable speed drive operated by 6-volt storage batteries. A gasoline motor-driven power charger keeps battery charged. Four Browning cal. .50 machine guns are armament for mount. These solenoid-operated guns are fired by switches mounted in control handles located directly in front of gunner's seat. The mount is controlled in speed and direction by control handles which can be swung in vertical or horizontal arcs or combinations of both.

*b.* For detailed instructions regarding operation and maintenance of gun mount, refer to TM 9-223.

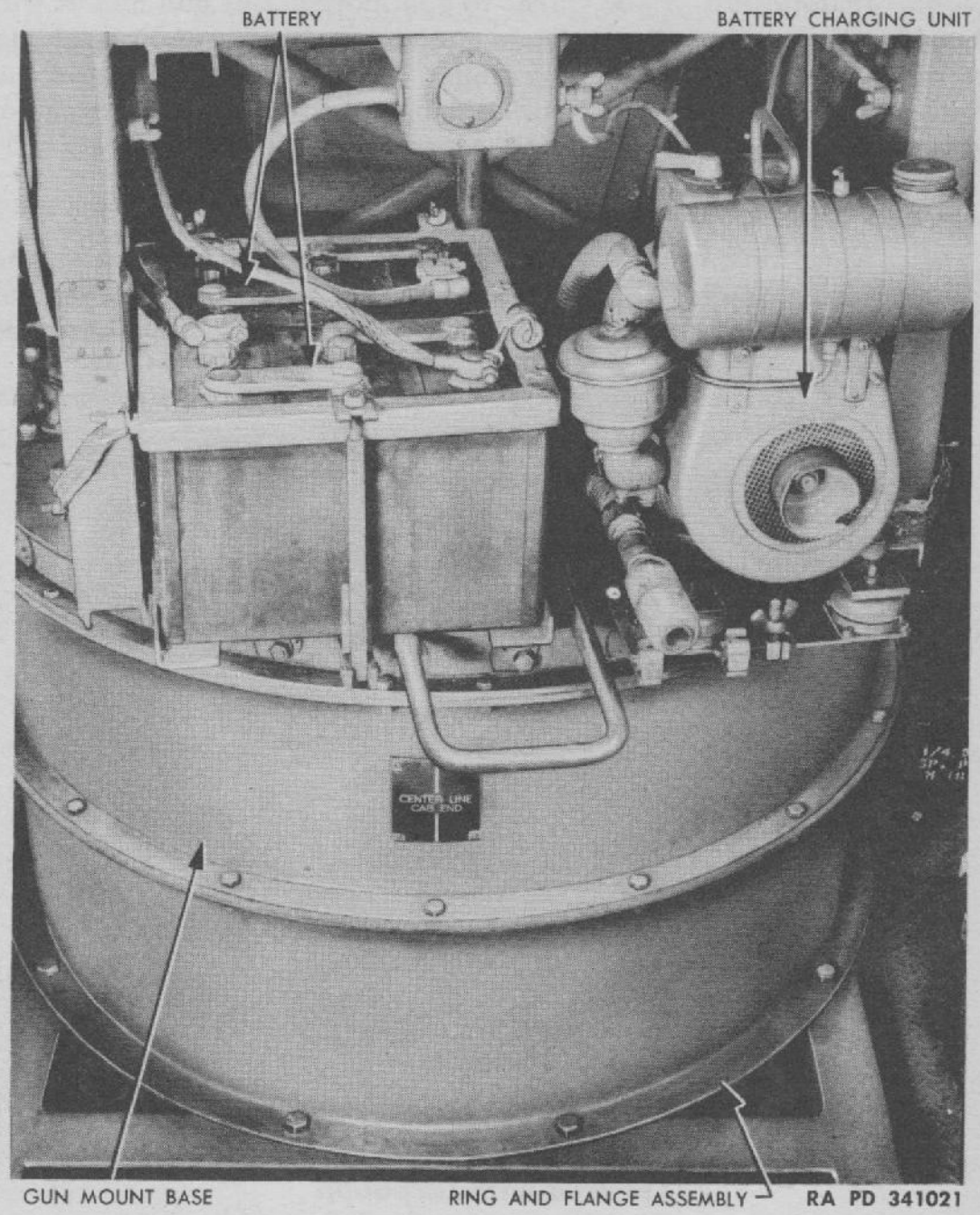



***Figure 114—Multiple Cal. .50 Machine Gun Mount M45 in Trailer M17***

## 99. MOUNT M45 AND TRAILER MOUNT M17.

*a. Removal of Gun Mount from M17 Trailer* (fig. 114). Lower four corner lift jacks to prevent trailer from tipping. Remove eight nuts, lock washers, and cap screws holding gun mount to turret ring and flange assembly on trailer body. With hoist of 1½-ton or greater capacity, lift gun mount several inches and pull trailer forward from under mount.

***b. Installation.*** Back trailer to gun mount. Lift gun mount with hoist high enough to clear tailgate and ammunition containers at rear of trailer. Back trailer under gun mount. Install mount on flange of ring assembly. Lower the hoist to bring flange of trailer to meet flange on gun mount. Aline holes and install cap screws and nuts. Uncouple hoist.

## 100. PROTECTION OF MOUNT.

***a.*** Never operate the mount without starting the gasoline engine-driven power charger unless in extreme emergency. The storage batteries will be quickly drained of power if this precaution is not observed.

RA PD 70764

***Figure 115—Multiple Cal. .50 Machine Gun Mount M45—Covered with Tarpaulin***

***b.*** Do not hold mount at a tilt beyond a maximum angle of 10 degrees from horizontal. Momentary tipping will have no adverse effect on the power drive, but a sustained tilt will allow oil to run out of drive differentials, thus damaging the gearing.

***c.*** Except during action, keep firing circuit switch on "SAFE" position with red plastic guard closed over switch. This is an important precaution because guns may be fired without operating power drive.

***d.*** The operator must be careful not to have his head out over control handles or between sight and armor when operating mount. If operator is in this position and depresses the guns, the sight bracket will strike the back of his head. Keep head behind the sight at all times.

*e.* Cover mount with tarpaulin provided when mount is not in use or during travel (fig. 115).

*f.* Make sure that mount is securely fastened to trailer. Check and tighten all mounting bolts.

*g.* Follow rigorously the inspection and preventive maintenance instructions given in TM 9-223.

*h.* Examine fuel tank and fuel lines for leaks. Check all outside oil lines and connections for cracks or leaks. Check oil pan and oil drain plugs for leaks.

*i.* Inspect battery for corrosion, cracks or leaks. Test battery electrolyte strength and level. Keep battery charged at all times to prevent freezing at all temperatures.

*j.* When fording a stream, make certain the unit is above fording depth of stream.

# PART FIVE—REPAIR INSTRUCTIONS

## Section XXX

## GENERAL

### 101. SCOPE.

*a.* These instructions are published for 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 using organizations.

## Section XXXI

## TROUBLE SHOOTING

### 102. BRAKES.

*a. Weak Brakes*

(1) GLAZED MAGNET FACING. Machine magnet face. See paragraph 113.

(2) GREASY MAGNET FACING. Remove grease with dry-cleaning solvent. If this is not effective, machine magnet (par. 113).

(3) WORN MAGNET BUSHING. Replace bushing (par. 113).

### 103. UNDERCONSTRUCTION.

*a. Uneven Riding.*

(1) BROKEN SPRING LEAVES. Replace or repair spring (par. 137 *b* (3)).

(2) GIB WEAR PLATE WORN IN SPRING HANGER. Replace wear plates (pars. 138 *a* and 139 *a*).

(3) BROKEN SPRING LEAVES. Replace or repair spring (pars. 138 and 139).

### 104. WHEEL AND HUBS.

*a. Wobbly Wheels.*

(1) BENT SPINDLE ON ROCKER ARM. Check rocker arm for bend (par. 137 *a* (4)).

### 105. HEATER (M14 and M22 Only).

*a. Incomplete Combustion.*

(1) DIRTY OR DAMAGED FLUE VENTILATOR. Remove, clean, or replace flue (par. 148).

(2) INSUFFICIENT DRAFT. Inspect for bent shutter and straighten if necessary.

**106. LANDING GEAR (M18 Only).**

*a. Difficult to Operate.*

(1) BENT CONNECTING ROD. Remove bent connecting rod and straighten (par. 120).

(2) BENT LEG ASSEMBLY. Remove leg assembly. Straighten or replace (par. 120).

**107. WINCH (M18 Only).**

*a. Drum Will Not Revolve When Hand Wheel is Turned.*

(1) SHEARED WOODRUFF KEY IN PINION GEAR. Remove pinion gear shaft and replace Woodruff key (par. 142).

(2) BROKEN TEETH ON PINION GEAR. Replace pinion gear (pars. 143 and 145).

**108. CORNER LIFT JACKS (M7, M13, M14, M17, and M22).**

*a. Difficult to Operate.*

(1) BENT SCREW TUBING. Replace or repair tubing (par. 129).

**109. LEVELING JACKS (M18 Only).**

*a. Jack Will Not Rise or Lower When Hand Crank is Turned.*

(1) DRIVE PIN SHEARED IN GEAR. Install new pin (pars. 133-135).

(2) TEETH BROKEN ON GEAR. Remove cap and replace gear (pars. 133-135).

*b. Difficult to Operate.*

(1) BENT INNER TUBE. Replace inner tube (pars. 133-135).

(2) GEAR CAP TOO TIGHT. Loosen set screw in gear cap and turn gear cap counterclockwise.

**110. RETRACTABLE PARKING WHEEL (M7 Only).**

*a. Difficult to Operate.*

(1) BENT SCREW. Replace assembly (pars. 125-127).

(2) DAMAGED BEARING IN QUADRANT. Replace bearing (pars. 125-127).

## Section XXXII

## INTERNAL BRAKE MECHANISM

**111. DESCRIPTION AND DATA.**

*a. Description* (fig. 29). The trailers M7, M13, M14, M17, M18, and M22 are all provided with the same type internal brake assembly.

Each trailer is equipped with four brake assemblies. The brakes are made in right- and left-hand assemblies, and front and rear assemblies. The front brake can be identified by the double-type parking brake lever which is attached to cam, and the rear brake assembly has a single-type lever. The difference between the right and left brakes is the armature. All parts are interchangeable throughout the trailers except armature and brake levers.

*b. Data.* See paragraph 46 *b*.

### 112. BRAKE DRUM.

*a. Repair.* Brake drums that are heat-checked and scored need not be replaced. Reface inside diameter. Brake drums have an original inside diameter of 14.000 inches, ± 0.005 inch. Repair scored or out-of-round drums by refacing drum in suitable drum trueing machine. The maximum inside diameter after machining must not exceed 14.030 inches. NOTE: *In order to assure the concentricity of the inside circumference of drum with regard to bearing center in hub, always mount drum on hub with which it is to be used before machining. Machine the drum while it is secured to hub.*

### 113. MAGNET.

*a. Refacing Magnet.* Place magnet in lathe and machine 0.007 to 0.010 inch from insert friction facing. Do not face metal surface adjoining friction facings. If 0.010 inch has been removed from friction facing and there is still evidence of glaze, friction facing must be undercut until all glaze is removed. NOTE: *After machining friction facing, measure the over-all height of magnet and armature. If height is* $1\frac{3}{32}$ *inch or less, discard magnet.*

*b. Rebushing Magnet.* Old bushing can be removed by driving a prick punch between magnet shell and bushing. Install new bushing by placing magnet (magnet insert facing down) on a clean bench. Place bushing squarely on top of magnet and gradually drive bushing into magnet. Bushing must be seated ¼ inch below level of magnet surface that is away from bench. Rough edges caused by driving bushing into magnet can be smoothed out by tapping them with a ball peen hammer.

## Section XXXIII

## BODY AND FRAME

### 114. DESCRIPTION.

*a.* The body frame of trailers consists of pressed-steel members and is an integral part of chassis. The sides of body form wheel housing. At each end of wheel housing are tool compartments. The bodies of the M14 (Fruehauf Trailer Co.) and M22 (J. G. Brill Co.) are

identical. The body of the M14 built by J. G. Brill Co. is of all metal and rivet construction.

## 115. ROOF REPAIR (M14 and M22).

*a. Repairing Small Holes.* Using round-headed metal screws, fasten a galvannealed steel patch with a lap of 3 inches over hole. Place screws at 1-inch intervals around patch, 1 inch from edge. A thin layer of caulking compound directly under each screw will seal against water. Solder around edge of patch to complete seal. NOTE: *Do not use caulking compound before soldering. Caulking compound will flow when heat is applied and make soldering difficult.*

*b. Replacing Damaged Sections.* Even when damage is severe, only that portion of roof which actually requires it need be replaced, inasmuch as the roof is built up in sections locked together by coin-pressed seams. Remove drip moulding around damaged sections (fig. 116). Pull nails holding damaged section to body plus two sections on either side. Freeing additional sections provides more working room and prevents roof panel from kinking while replacements are being made. Using pliers and screwdriver, open coin-pressed seams holding damaged roof sections in place. With a piece of 4-inch steel channel under joint from end to end, put new sections into place and seal up seam. Use a rubber mallet working against a piece of oak or similar hard wood. Bend side ends of new section forming it to roof bows. Tack panel in place. Secure drip moulding to trailer body. See screw chart (par. 118).

## 116. BODY PANELS.

*a. Repairing Small Holes in Body Panels.* When body panels become damaged, it is not necessary to replace complete panel. Cut a mineral composition board or a sheet metal patch large enough to lap 2 inches over hole. Place a coat of caulking compound around inner edge of patch. Screw into place at 1-inch intervals around patch, ½ inch from edge (par. 115).

*b. Removal.* (figs. 116 and 117). Place screwdriver under snap-on moulding and pry off. Remove screws from moulding retainer and lift retainer off body panel. Remove screws holding drip moulding to roof panel and lift drip moulding off trailer. Pull nails holding roof panels to outside body panels. Remove screws holding blackout panel guide assembly to panel, remove screws holding latch, and lift guide assembly off panel. Remove two screws holding each corner moulding. Remove screws holding oak moulding. Pull nails out of outside corner panels. Remove screws from outside body panel and pull panel off.

*c. Installation.* Position panel on trailer body members. Secure panel to center members only. Install corner panels and nail into position, placing nails about 4 inches apart. Fasten oak moulding to body

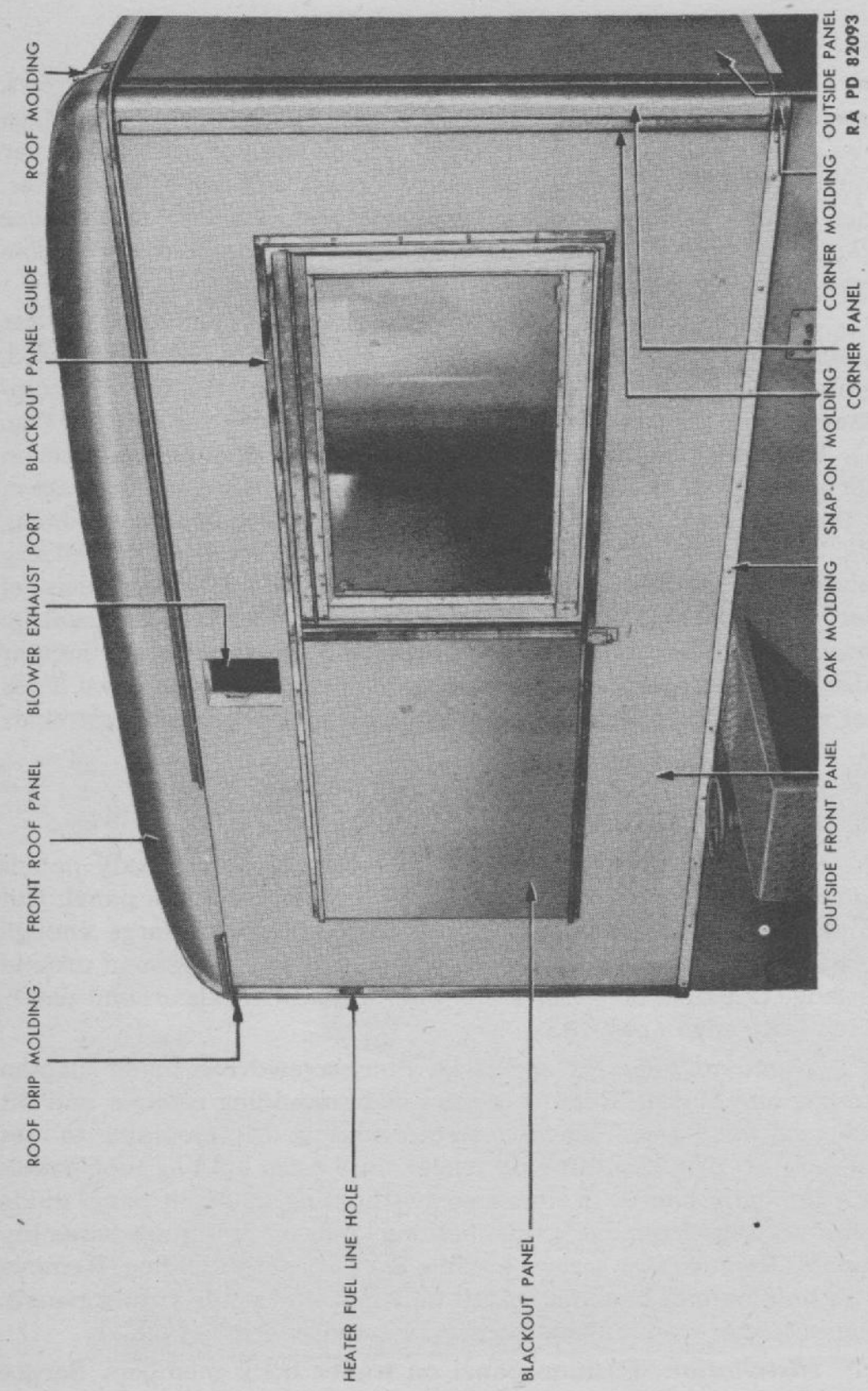



***Figure 116—Front View of Body Panels***

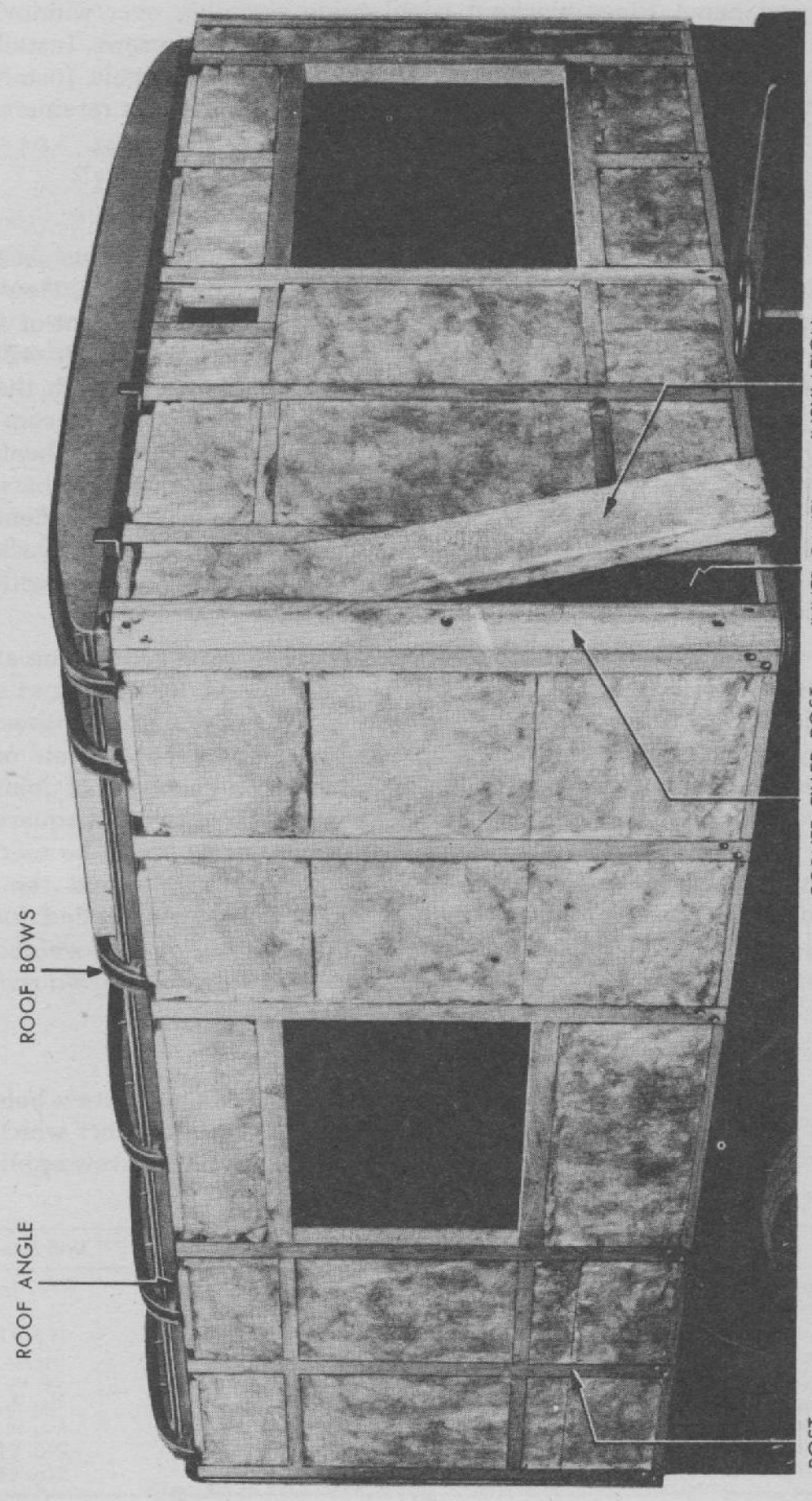



**Figure 117—Body and Roof Panels Removed**

frame and panel. Place blackout panel guide assembly over window frame and secure guide to panel and body frame, using screws. Install blackout panel. Fasten drip moulding to roof and body panels. Install all metal moulding retainers and place snap-on moulding over retainers. Paint all metal and new body parts.

## 117. FRAME REPAIR.

*a. General.* Due to the exceptionally rugged design of frame used in these trailers, very little attention is required for maintenance. However, trailers which have been upset, or in a collision or accident of a major nature, may have bent or twisted crossmembers which will require attention. Frame members may be straightened through the use of a heavy I-beam, jacks, and chains. The use of heat is recommended, provided the metal is not heated beyond a dull red heat. Extreme heat weakens structural characteristics of frame members. Severely bent and twisted members must be cut out and replaced. Bent sheet metal can be bumped out in much the same manner as truck fenders. Severely damaged sections must be cut and replaced with new sections.

*b. Member Repair.* Cut across the outside of damaged section at a 30-degree angle, insert spliced section, and arc-weld. By cutting at a 30-degree angle, the cut and weld are distributed over a greater area, resulting in a stronger weld. Back up all spliced joints with a plate or channel reinforcement extending about 6 inches on each side of joint on inner side of channel. Put a 1 inch diameter hole in every 4 square inches of space on splice plate or channel. These holes are to be used for plug welding. Whenever possible, all section splices and reinforcements should be arc-welded. This method is recommended for all frame repairs. NOTE: *A 1-inch plug-welding hole should be welded solid with bare welding rod. For remainder of welding use a coated rod.*

## 118. FITS AND TOLERANCE.

*a. Screw and Drill Chart.* Use of proper screws and screw hole size is absolutely essential to sound body assembly. The chart which follows gives type and size of screw, required drill size, and screw application.

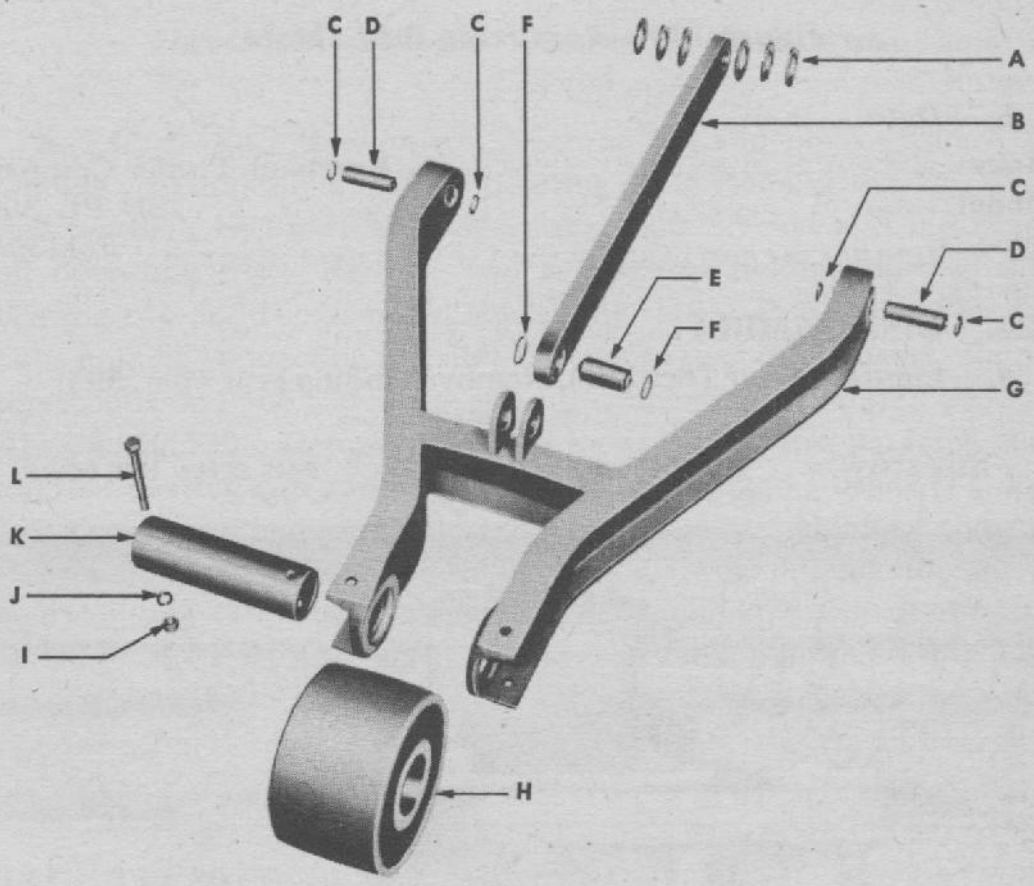
| Application | Type and Size of Screw | Drill Size |
|---|---|---|
| Blackout panel guide assembly to panel | No. 8, $\frac{3}{4}$-in. binding head, self-tapping | 5/22 in. |
| Drip moulding to panel | No. 10, 1-in. binding head, self-tapping | No. 21 |
| Blackout panel bolt | No. 6, $\frac{1}{2}$-in. flat head, wood | $\frac{1}{16}$ in. |
| Roof moulding to bow | No. 14, 1-in. round head, self-tapping | $\frac{7}{32}$ in. |
| Oak moulding to panel | No. 19, 1-in. oval head, self-tapping | $\frac{11}{64}$ in. |
| Door hinge to door | No. 10, 1-in. flat head, wood | $\frac{11}{64}$ in. |
| Louvre to rear door | No. 10, $\frac{3}{4}$-in. binding head | No. 21 |
| Moulding to rear door | No. 19, $\frac{3}{4}$-in. flat head | No. 21 |

## Section XXXIV

# LANDING GEAR

## 119. DESCRIPTION AND DATA.

*a.* ***Description*** (fig. 118). The landing gear is used on trailer M18 only. The landing gear is attached to the underside of the drawbar, and supports the front of the trailer when trailer is disconnected from towing vehicle. The leg of the landing gear is provided with a single wheel.




A—WASHER
B—CONNECTING ROD
C—SMALL LOCK RING
D—LONG HINGE PIN
E—SHORT HINGE PIN
F—LARGE LOCK RING
G—LEG
H—WHEEL
I—NUT
J—LOCK WASHER
K—SUPPORT AXLE
L—CAP SCREW

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***Figure 118—Landing Gear—Disassembled***

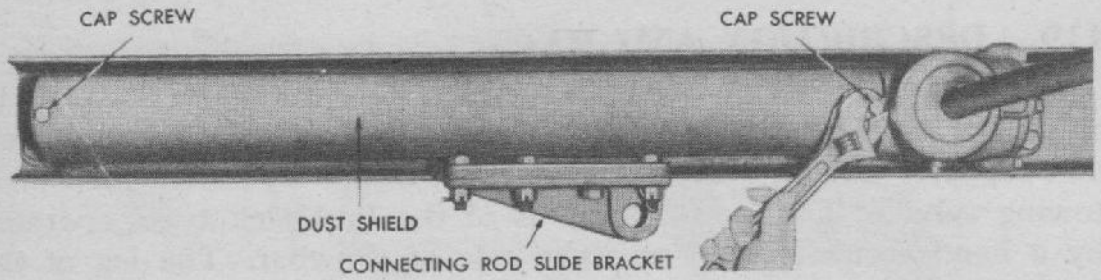


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***Figure 119—Removing Dust Shield***

*b. Data.*

Make.....Fruehauf Trailer Company
Model.....SP PL 3098
Type.....Fold-back

## 120. DISASSEMBLY.

*a. Landing Gear* (fig. 118). Remove landing gear (par. 59).

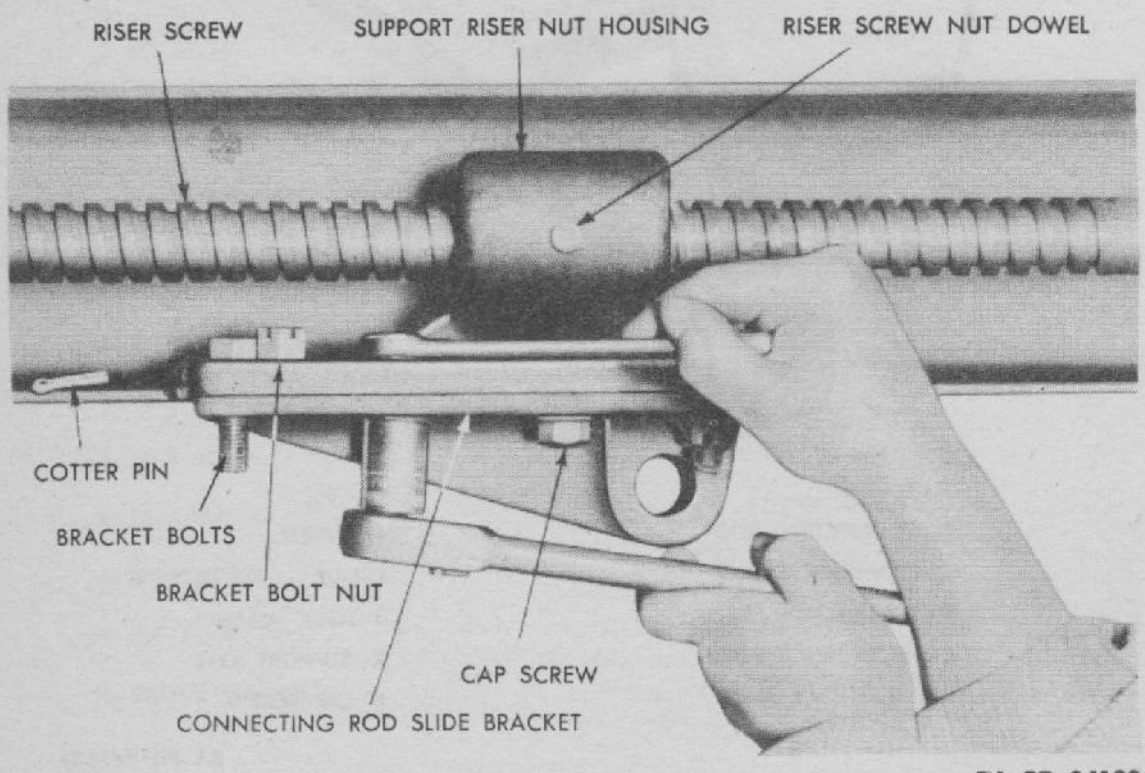


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***Figure 120—Removing Slide Bracket***

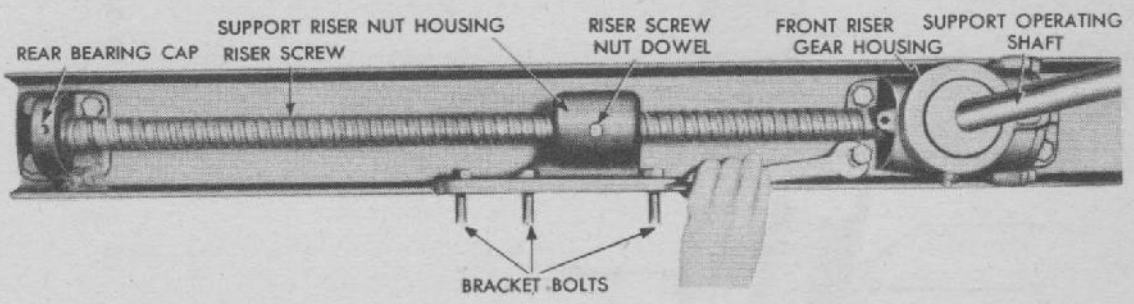


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***Figure 121—Support Operating Mechanism***

***b. Operating Mechanism.*** Remove nut and plain washers from landing gear and tap crank off operating shaft. Remove two cap screws, lock washers, and nuts from operating shaft bracket and tap bracket off operating shaft. Remove two cap screws holding dust shield to bearing cap and remove dust shield (fig. 119). Pull cotter pins from bolts holding connecting rod slide bracket to riser nut housing. Remove three bolts and one cap screw and lift connecting rod slide bracket off I-beam (fig. 120). Remove four nuts, lock washers, and cap screws holding rear bearing cap and front riser gear housing to I-beam (fig. 121). Lift riser screw and component parts off I-beam. Remove three cap screws and lock washers from bearing cap. Tap bearing cap off riser gear housing. Pull riser screw and gear assembly out of riser gear housing. Pull operating shaft and gear assembly out of riser gear housing. With a long tapered 3/8-inch drift, drive out pins holding gear to riser screw and operating shaft. Turn riser nut housing off riser screw and lift out riser screw nut.

## 121. CLEANING AND INSPECTION.

***a. Cleaning.*** Remove all grease from riser gear housing. Wash all parts in dry-cleaning solvent.

***b. Inspection.*** Turn riser screw nut on riser screw to check the thread and ease of operation. If nut fails to turn easily, look for bur on screw threads and remove burs with file. Place operating shaft in operating shaft bushing and check for excessive bushing wear. If it is loose, replace bushing. Check three bearings for sound condition. Inspect two gears for worn teeth and replace gears if necessary.

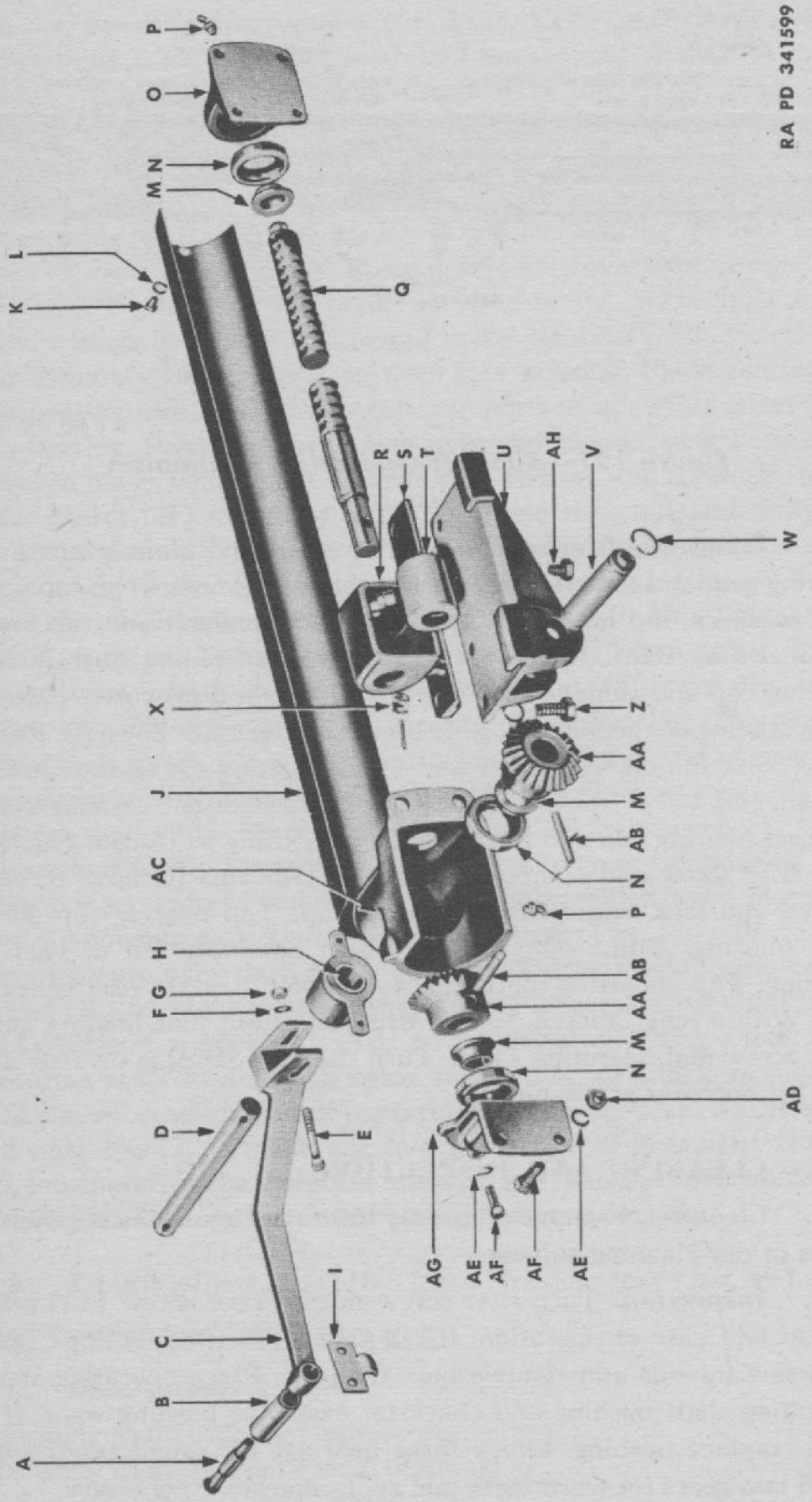



*Figure 122—Support Operating Mechanism—Disassembled*

A PIN
B HANDLE
C CRANK
D SHAFT
E BOLT
F WASHER
G NUT
H CLIP
I BRACKET ASSEMBLY
J SHIELD
K BOLT
L WASHER
M SLEEVE
N BEARING
O CAP
P FITTING
Q SCREW
R PIN
S HOUSING
T NUT
U BRACKET
V PIN
W RING
X NUT
Y PIN
Z BOLT
AA GEAR
AB PIN
AC HOUSING
AD NUT
AE WASHER
AF BOLT
AG CAP
AH BOLT

RA PD 341599B

**Legend for Figure 122**

## 122. ASSEMBLY.

*a. Operating Mechanism* (fig. 122). Place gear (AA) over end of operating shaft (D) with teeth end toward end of shaft. Aline hole in shaft with hole in gear and install drive pin (AB). Place sleeve (M) over end of operating shaft and tap sleeve down until it contacts gear. Place bearing (N) over end of operating shaft with concave surface next to sleeve. Place riser gear housing (AC) over end of operating shaft. NOTE: *Make certain the bearing fits into bearing cavity in riser gear housing.* Place gear (AA) over end of riser screw (Q) with teeth toward threads on riser screw. Aline hole in riser screw with hole in gear and install drive pin (AB). Place screw and gear assembly through hole in riser gear housing. Place bearing (N) into bearing cap (AG) with concave surface up. Place sleeve (M) into bearing. Position bearing cap over end of riser gear housing and fasten in place, using three ⅜-inch lock washers and three cap screws. Place dowel (R) into riser nut (T). Place riser nut and dowel into cavity in riser nut housing (S). Place three drilled bolts into riser nut housing. Screw connecting rod bracket onto riser screw. Position assembly on I-beam and insert operating shaft into hole at right side of drawbar. Secure riser gear housing to I-beam, using four cap screws, nuts, and lock washers. Place sleeve (M) over end of riser screw with flat surface toward threads. Place bearing (N) over rear end of riser screw. Place rear bearing cap (O) over end of riser screw and bolt rear bearing cap to I-beam, using four cap screws (AF), lock washers, and nuts. Place connecting rod slide bracket (U) under I-beam and secure connecting rod bracket to riser nut housing (AC), using one cap screw and three drilled bolts which were placed into riser nut housing prior to installation on I-beam (fig. 120). Place a light film of grease over riser screw and install dust shield, using two cap screws (K) and lock washers (fig. 119). Place operating shaft bracket (H) over end of operating shaft with lubrication fitting down. Fasten operating shaft to drawbar, using two cap screws, lock washers, and nuts. Fasten crank to end of operating shaft, using plain washers, bolts, and nuts. NOTE: *Turn crank to test for ease of operation. If bind is felt, tap operating shaft bracket one way and then the other until bind is eliminated.* Lubricate four lubrication fittings (par. 26).

*b. Landing Gear* (fig. 118). Install landing gear (par. 59).

## 123. FITS AND TOLERANCE.

*a. Description.*

Operating shaft bushing (outside diameter) . . . . . 1.252 in.
Operating shaft bushing (ream diameter) . . . . . 1.006 in.
Operating shaft bushing (length) . . . . . 1 1/16 in.

Section XXXV

# RETRACTABLE PARKING WHEEL

## 124. DESCRIPTION AND DATA.

*a. Description.* The retractable parking wheel is used on the M7 trailer only. Two types of wheels are used. The solid-spoke type without tires, and the pressed-steel type with pneumatic tires. The two different type wheels are interchangeable. The assembly consists of a threaded fork which is housed in a quadrant. A threaded handwheel is attached to threaded section of fork which permits operator to lower or raise the wheel. The fork assembly is carried on a tapered roller bearing which permits ease of operation.

*b. Data.*

Make.....Saginaw Tool and Stamping
Fruehauf trailer part No.....53579

## 125. DISASSEMBLY (fig. 123).

*a.* Place swivel quadrant in vise. Remove set screw holding screw housing to swivel quadrant. Turn screw housing out of swivel quadrant. Drive out pin from screw end of fork and screw assembly. Turn handwheel counterclockwise until screw is turned out of handwheel. Lift fork and screw assembly out of swivel quadrant. Remove cotter pin from wheel bolt and remove nut. With a long tapered punch, drive out wheel bolt. Remove oil seals, oil seal washers, and wheel bearings. Remove lubrication fittings from wheel and swivel quadrant.

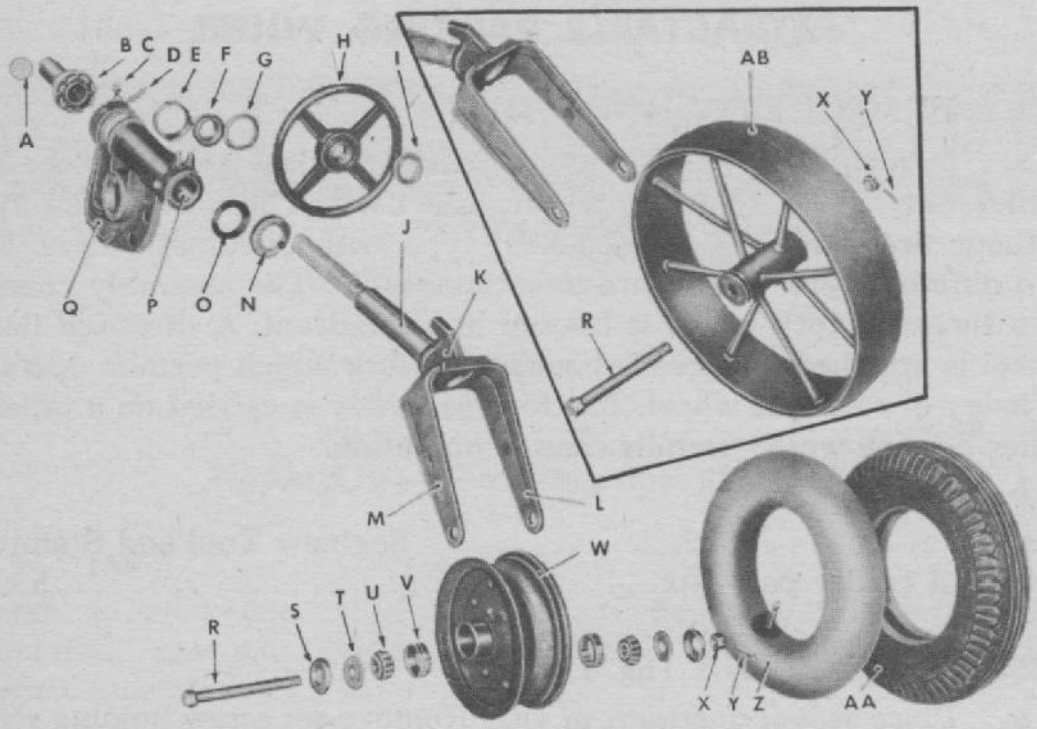
## 126. CLEANING AND INSPECTION.

*a. Cleaning.* Steam-clean all parts or wash with dry-cleaning solvent.

*b. Inspection.* Check threads on inside of handwheel for sound condition. Turn handwheel onto screw end of fork and check for burs and ease of operation. If burs are found, remove with file. If handwheel fails to turn easily, the screw is bent. Place screw on wood block and straighten. Inspect bearings for chipped rollers. Inspect oil seals for excessive wear. Check bearing caps in wheel and swivel quadrant for chips and cracks and replace if defective. Make certain the lubrication fitting holes are open and threads are in good condition.

## 127. ASSEMBLY.

*a.* Place cap over end of screw with cupped side up. Place washer over end of screw. Install bearing in slot and upper end of swivel quadrant. Place oil seal next to bearing. Place handwheel next to oil




A—HOUSING CAP

B—HOUSING AND NUT ASSEMBLY

C—SET SCREW

D—DRIVE PIN

E—BEARING CUP

F—BEARING

G—UPPER BEARING SEAL

H—HAND WHEEL

I—SWIVEL QUADRANT THRUST WASHER

J—JACK SCREW

K—FORK BLOCK

L—RIGHT FORK

M—LEFT FORK

N—GREASE SEAL FELT

O—GREASE SEAL CAP

P—BUSHING

Q—SWIVEL QUADRANT

R—WHEEL AXLE

S—OIL SEAL

T—OIL SEAL WASHER

U—BEARING

V—CUP

W—WHEEL

X—NUT

Y—COTTER PIN

Z—INNER TUBE

AA—4.00 X 8 FOUR-PLY TIRE

AB—WHEEL

RA PD 341008

***Figure 123—Retractable Parking Wheel—Disassembled***

seal. Place washer under handwheel. Place a light film of grease over surface of screw and install screw and fork assembly into swivel quadrant. Turn handwheel until screw passes on through swivel quadrant. Install ¼-inch drive pin into end of screw. Turn housing into swivel quadrant and lock housing pin in position, using set screw. Place wheel bearings in hub. Place oil seal washer next to bearing and oil seal next to oil seal washer. Install wheel into fork. Aline center of hub with holes in fork end and install wheel bolt, nut, and cotter pin. NOTE: *When tightening nut on wheel bolt, turn wheel until slight bind is felt. Then back the nut off one turn.*

## Section XXXVI

# CORNER LIFT JACKS

### 128. DESCRIPTION AND DATA.

*a. Description.* Corner lift jacks are used on the M7, M13, M14, M17, and M22 trailers. The jacks are installed at each corner of vehicle. The assembly consists of an outer housing and inner tube. The inner tube moves up and down in the housing through a screw which is turned by hand from the catwalk on trailer body. An oscillating pad is provided at bottom end of jack. The pad is fastened to a ball and socket which permits the pad to oscillate. The lift jacks are used to level the trailer and prevent spring vibration when trailer is parked for operation of equipment carried in the trailer.

*b. Data.*

Make ..... Saginaw Tool and Stamping
Housing model (right-hand) ..... 7523-8B RH
Housing model (left-hand) ..... 7523-8B LH

NOTE: *All parts of the right- and left-hand corner lift jack assemblies are interchangeable except the housings. The housings are the only right- and left-hand parts.*

### 129. DISASSEMBLY (figs. 124 and 125).

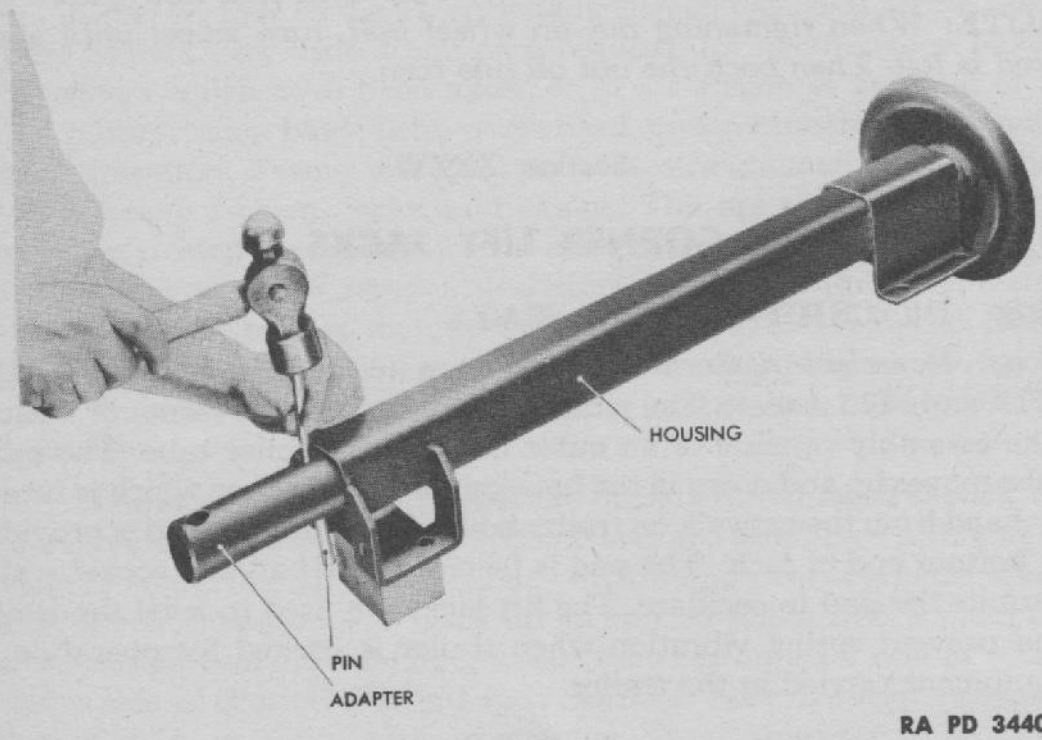
*a. Tubing Assembly.* Remove screw from ball at end of handle and pull handle out of adapter. With a long tapered ¼-inch punch, drive out pin in adapter. Tap adapter off screw. Turn retractable screw counterclockwise until stop pin can be sighted through hole at top end of housing. Drive out stop pin and continue turning screw until inner tube is free of housing. Tap end of screw out of housing then drive bearing off screw.

*b. Screw Nut.* Do not remove screw nut if not damaged. With a cutting torch, remove the weld from square washer at end of tubing, grind the slag off tubing, and remove washer and nut.

## 130. CLEANING AND INSPECTION.

*a. Cleaning.* Clean all parts in dry-cleaning solvent. Remove all rust and other foreign matter from screw, using wire brush.

*b. Inspection.* Check threads on screw for burs and remove burs with file. Check housing and inner tube for bend. Replace badly bent tubing and housing. If slight bend is noticed, straighten, using hammer and heat.



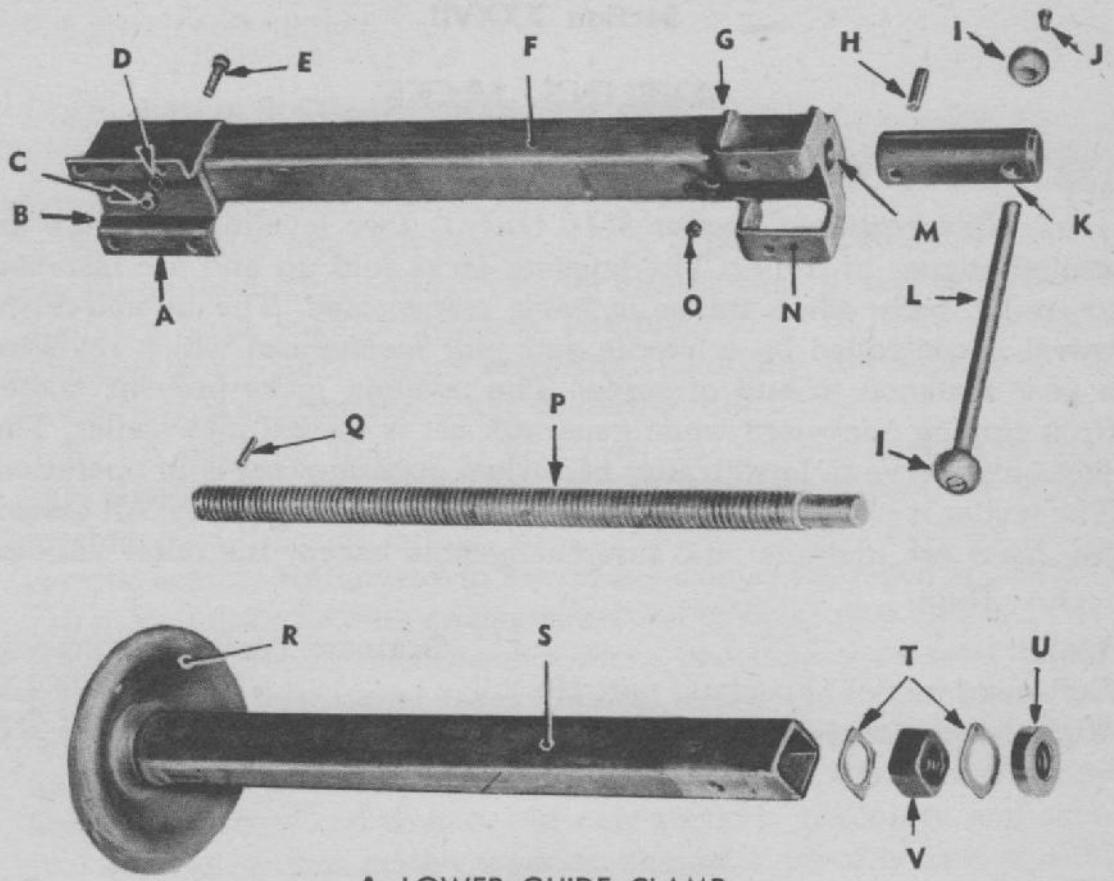

RA PD 344072

***Figure 124—Removing Drive Pin from Adapter***

## 131. ASSEMBLY (figs. 124 and 125).

*a. Screw Nut.* If screw nut has been removed, place square washer in tubing. Place screw nut next to washer. Place five thicknesses of paper on top of screw nut to serve as a shim and to prevent screw nut from binding after square washer is welded to inner tubing. Place square washer over screw nut and tack weld in position at four sides.

*b. Tubing Assembly.* Pack bearing with general purpose grease (par. 26). Coat threaded surface of retractable screw with grease. Turn retractable screw into screw nut at end of channel guide. Continue turning the screw until hole in screw is in alinement with hole in tubing. Install stop pin through hole in tubing and into screw. Place bearing over end of screw and place spacer next to bearing. Put screw in housing with end of screw projecting out of housing. Place adapter over end of screw. Aline hole in screw with hole in adapter and fasten the two units, using drive pin. Place handle through adapter and fasten ball on end of handle with screw. Place center punch mark in screw head to prevent screw from turning out.







**A**–LOWER GUIDE CLAMP
**B**–LOWER GUIDE SPACER
**C**–NUT
**D**–LOCK WASHER
**E**–CAP SCREW
**F**–CHANNEL GUIDE
**G**–UPPER GUIDE CLAMP
**H**–ADAPTER DRIVE PIN
**I**–SCREW
**J**–HANDLE BALL
**K**–HANDLE ADAPTER
**L**–HANDLE
**M**–CHANNEL SPACER
**N**–UPPER GUIDE CLAMP
**O**–LUBRICATION FITTING
**P**–RETRACTABLE SCREW
**Q**–STOP PIN
**R**–LEG PAD
**S**–TUBE CASING
**T**–SQUARE WASHER
**U**–THRUST BEARING
**V**–SCREW NUT

RA PD 341009

***Figure 125—Corner Lift Jack—Disassembled***

## Section XXXVII

# LEVELING JACKS

## 132. DESCRIPTION AND DATA.

*a. Description (Trailer M18 Only).* Two leveling jacks are installed at rear of trailer. The leveling jacks fold up and are fastened to trailer body when trailer is being transported. The up-and-down travel is controlled by a handle and gear mechanism which revolves a gear fastened to end of screw. The leveling jacks prevent trailer from tipping backward when generator set is loaded into trailer. The jacks also serve to level trailer bed when generator set is in operation. The trailer is provided with a right- and left-hand assembly. All assembly parts are identical and interchangeable except the outer casings.

*b. Data.*

Make.....Saginaw Tool and Stamping
Left-hand model (Fruehauf part No.).....55394-LH
Right-hand model (Fruehauf part No.).....55395-RH

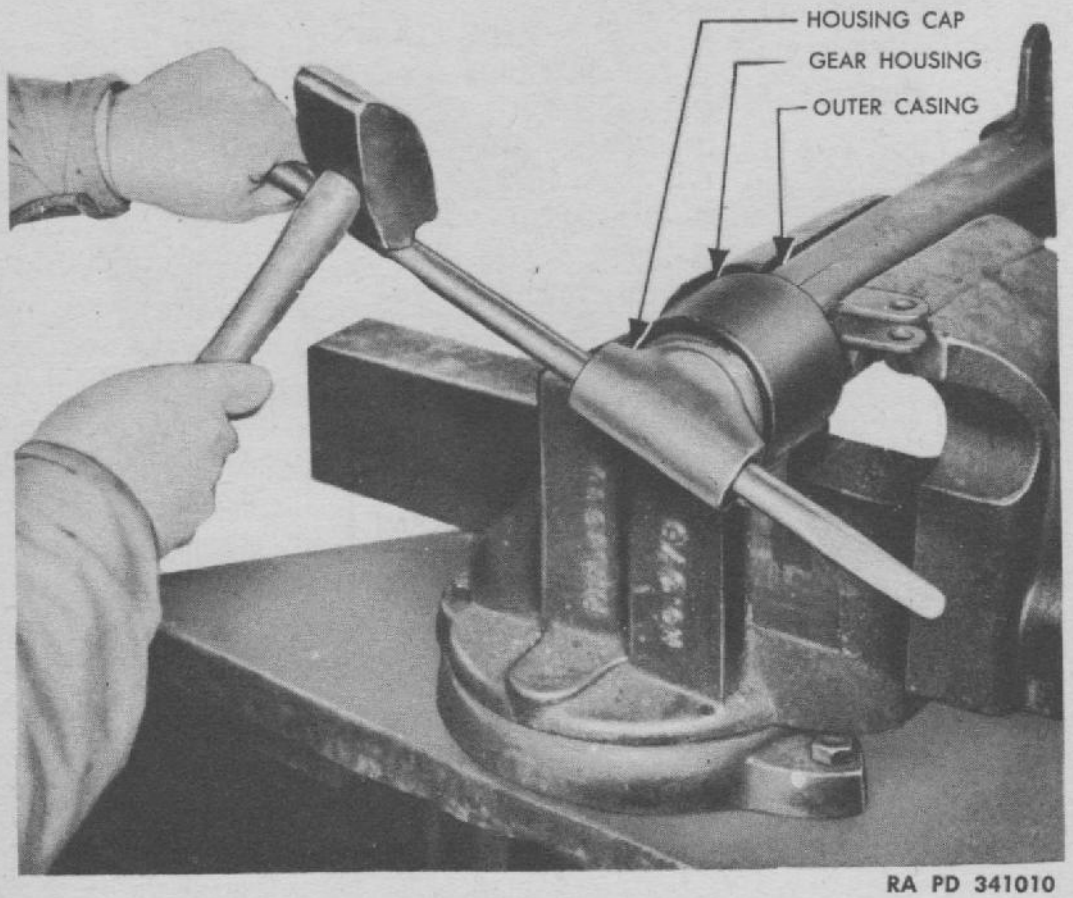



***Figure 126—Removing Housing Cap***

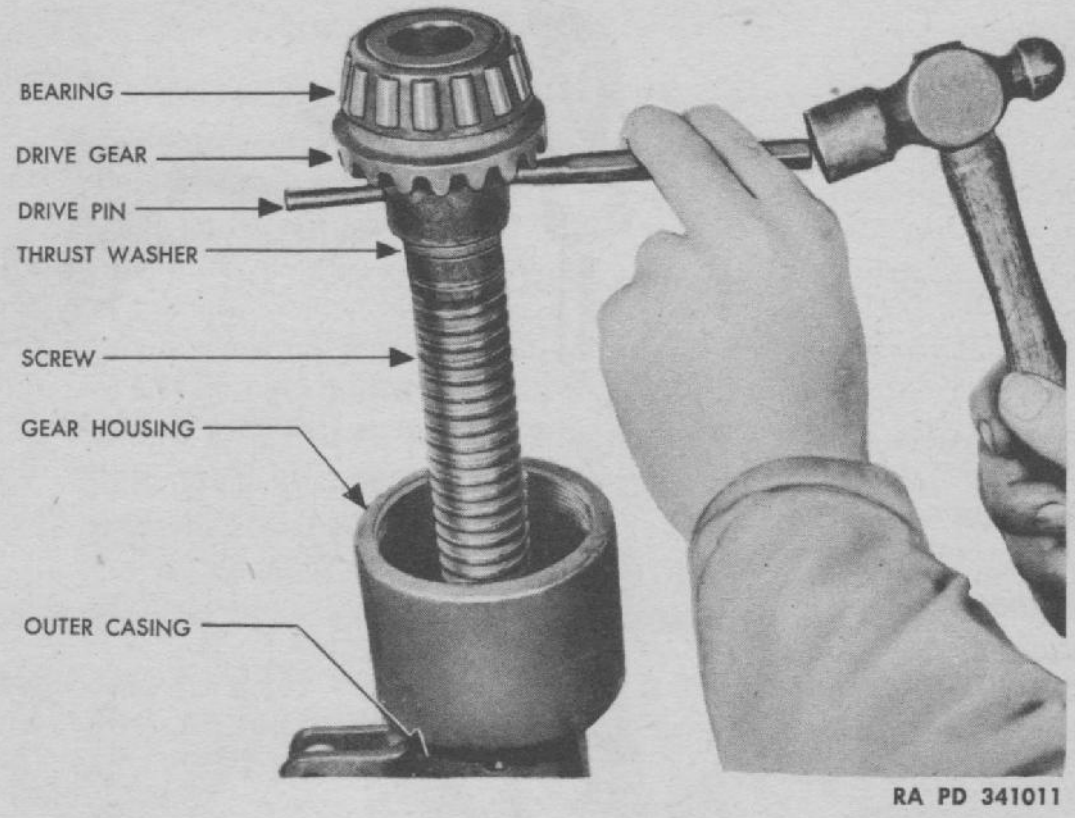


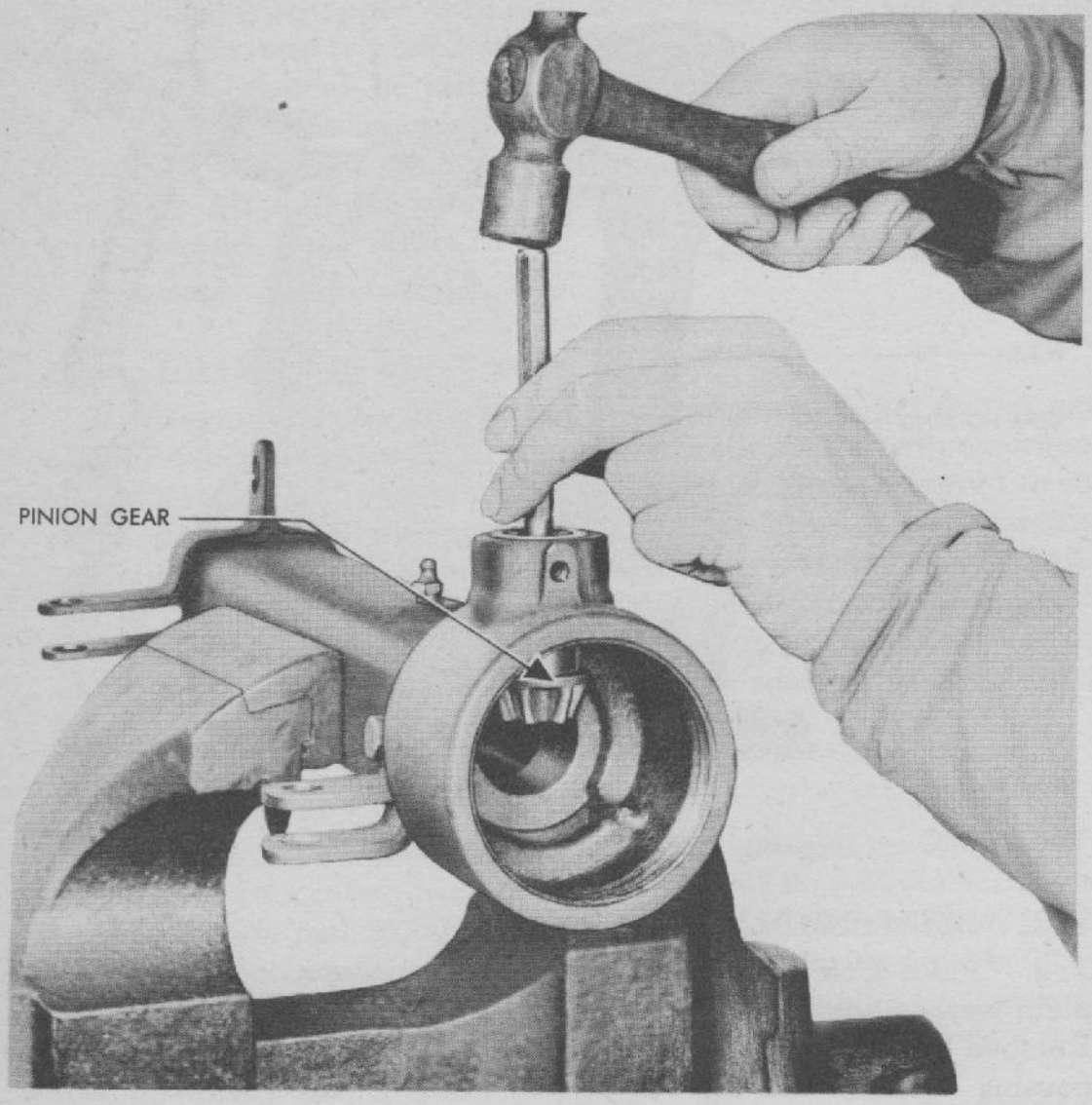

***Figure 127—Removing Drive Gear***

## 133. DISASSEMBLY.

*a.* Place jack assembly in vise. Remove screw, lock washer, and plain washer holding crank handle to crank gear and tap handle off. Remove screw from side of gear housing. Place steel bar in hole in housing cap and turn cap out of gear housing (fig. 126). Pull screw several inches out at top of housing. With a long tapered ¼-inch punch, force drive pin out of gear (fig. 127) and tap gear and bearing off screw. Remove thrust washer and lift screw and inner tube from outer casing. Remove screw and lock washer from gear housing and tap pinion gear out of gear housing (fig. 128). Slide inner tubing out toward bottom of jack. Turn screw counterclockwise until stop pin is visible through hole in inner tubing. With a long tapered ¼-inch punch, drive out the stop pin and continue turning screw out of inner tubing. Do not remove bushing from gear housing unless pinion gear is loose in housing. Press bushing out if necessary. Remove four cap screws and lock washers from underside of gear housing and tap gear housing out of outer casing. Mark side of gear housing and casing so that brace brackets and gear housing come at the correct angle when reassembled.

## 134. CLEANING AND INSPECTION.

*a.* ***Cleaning.*** Steam clean or wash all parts in dry-cleaning solvent.




RA PD 341012

***Figure 128—Removing Pinion Gear***

***b. Inspection.*** Place inner tubing in outer casing and check for free movement. If inner tubing binds, this indicates that either the inner tubing or casing is bent. Place a straightedge on side of inner tubing and casing to determine which is bent. Replace if unserviceable. Inspect pinion and drive gear for damaged teeth and signs of excessive wear, and replace if unserviceable.

## 135. ASSEMBLY (fig. 129).

*a.* Coat surface of screw with general purpose grease (par. 26). Turn screw into top end of inner tube until stop pin hole is visible through hole in inner tube. Drive stop pin into screw. Place gear housing in casing, matching the marks which were placed on the two parts before disassembly. Install four cap screws and lock washers. Place pinion gear in cavity of gear housing. Place hand crank on end of pinion

gear and fasten in place, using plain washer, lock washer, and screw. Place inner tubing into casing from bottom and pull screw out at top. Place thrust washer over end of screw. Place gear over end of screw and fasten gear to screw, using drive pin (fig. 127). Lower the screw into gear housing, making certain the teeth mesh. Place bearing over end of screw, fill gear housing with general purpose grease (par. 26), and screw gear cap into gear housing (fig. 126). CAUTION: *Do not tighten gear cap too tight.* When tightening gear cap, turn crank handle continuously and tighten gear cap. When slight bind is felt on crank handle, turn gear cap off until hole in gear cap is at right angles with square section on casing. Lock gear cap to gear housing, using screw and lock washer.

## Section XXXVIII

# UNDERCONSTRUCTION

### 136. DESCRIPTION.

*a. Description* (fig. 60). The underconstruction is of the rocker arm type, parallel to the main frame, and identical for all vehicles. Some of the early models of the M17 were equipped with shock absorbers which were fastened to the rocker arm. The rocker arm assemblies are mounted on each side of the trailer and are fastened to hangers which permit vertical movement. The underconstruction is held in alinement by gib plates at the spring hanger and at each end of the rocker arm. The spring is fastened to the underside of the hanger. Spindles are welded to each end of the rocker beam. Single wheels are mounted to each spindle.

### 137. CLEANING AND INSPECTION.

*a. Cleaning.* Steam all parts or wash in dry-cleaning solvent.

*b. Inspection.*

(1) WEAR PLATES. Check wear plates for excessive wear.

(2) NEEDLE BEARING. Inspect needle bearing for sound condition. Place finger inside of bearing and try rotating the needles. If needles fail to rotate, replace bearing assembly.

(3) SPRING. Inspect spring for broken leaves. Check top leaf for excessive wear and if worn, replace leaf. Check rebound clips for cracks and breakage. Tap rebound clips with hammer to detect loose rivets. If rivets are loose, heat head of rivet with an acetylene torch and drive rivet from opposite side with a ball peen hammer until rivets are tight. Replace broken rebound clips by riveting new clips in position.

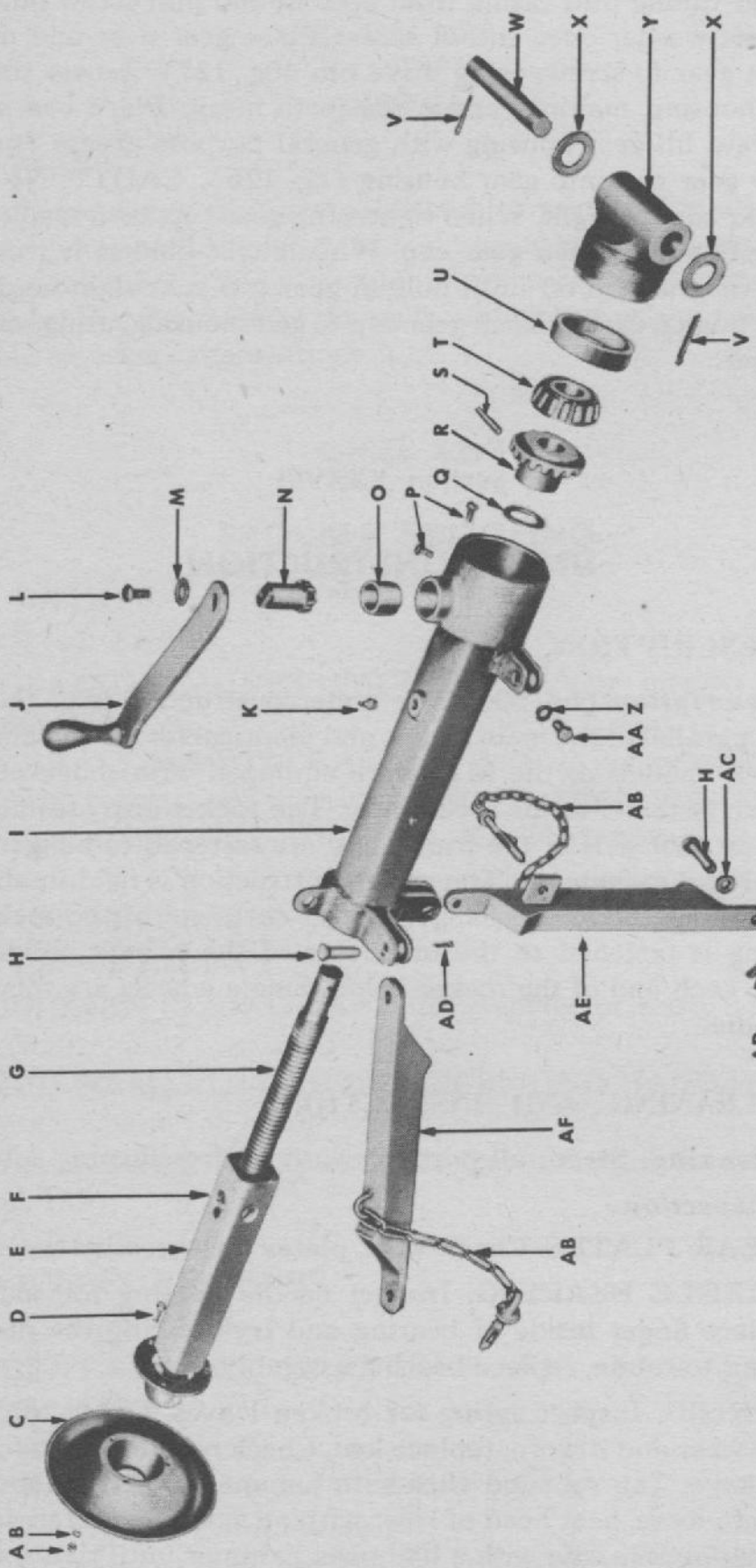



*Figure 129—Leveling Jack—Disassembled*

A—NUT

B—LOCK WASHER

C—PAD

D—CAP SCREW

E—INNER TUBING

F—STOP PIN

G—SCREW

H—ROD END PIN

I—OUTER CASING AND GEAR HOUSING

J—CRANK HANDLE

K—LUBRICATION FITTING

L—SCREW

M—PLAIN WASHER

N—PINION GEAR

O—PINION BUSHING

P—SCREW

Q—THRUST WASHER

R—DRIVE GEAR

S—DRIVE PIN

T—BEARING

U—BEARING CUP

V—COTTER PIN

W—HINGE PIN

X—PLAIN WASHER

Y—HOUSING CAP

Z—LOCK WASHER

AA—CAP SCREW

AB—PIN AND CHAIN ASSEMBLY

AC—PLAIN WASHER

AD—COTTER PIN

AE—RIGHT HAND BRACE ASSEMBLY

AF—LEFT HAND BRACE ASSEMBLY

RA PD 341588B

***Legend for Figure 129***

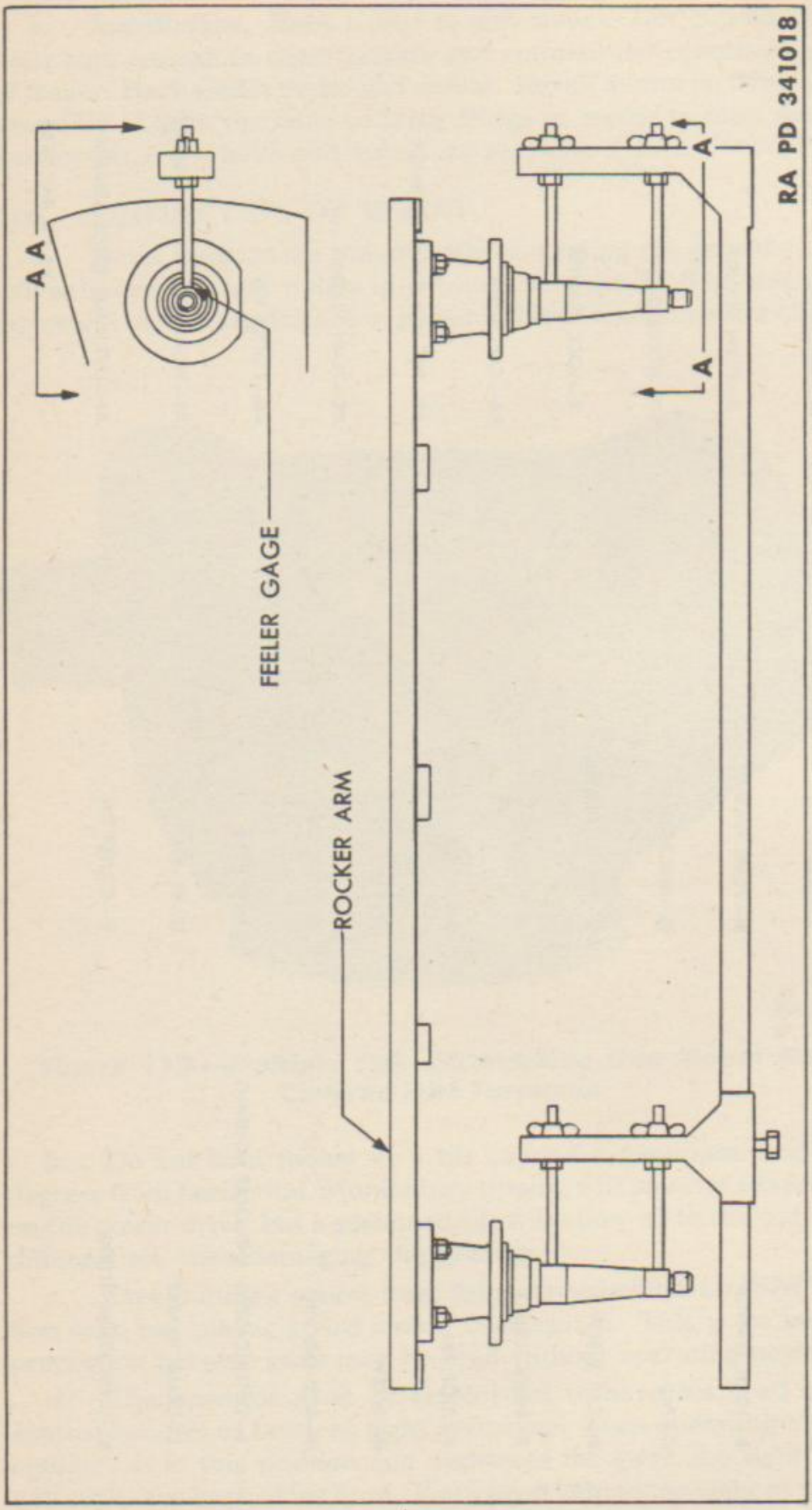
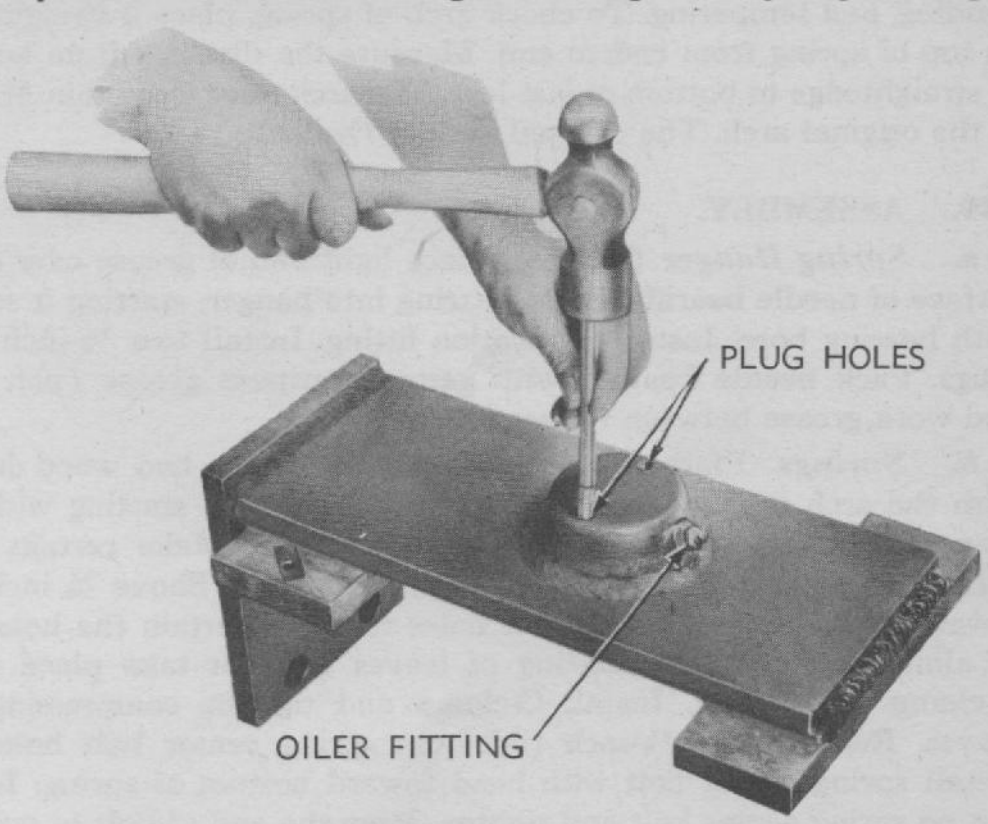



***Figure 130—Checking Rocker Arm Alinement***

(4) ROCKER ARM. Check inner and outer surfaces where wheel bearings contact spindle by placing bearings on spindle and testing for excessive play. Replace rocker arm if wheel bearings appear extremely loose.

*(a) Checking Alinement* (fig. 130). Place rocker arm in vise. Place gage against rocker arm spindles and adjust four prongs on gage until prongs contact inner and outer wheel bearing surfaces on both spindles. Without disturbing the setting of the prongs, turn gage




RA PD 43299

***Figure 131—Removing Fulcrum Pin Bearing***

end for end and place prongs of gage against opposite sides of spindle bearing surfaces. Check contact of prongs with bearing surfaces. If there is a clearance greater than 0.010 inch between spindle surface and end of one or more prongs, straighten rocker arm. Rocker arm can be straightened cold by placing the assembly in a power press. Do not attempt to straighten spindles.

## 138. DISASSEMBLY.

*a. Spring Hanger* (figs. 63 and 131). Do not remove fulcrum pin bearing if bearing is in sound condition. Remove two pipe plugs from bearing housing. With a long tapered ¼-inch punch, drive out fulcrum pin bearing through pipe plug holes by driving through one hole and then the other.

*b. Springs.* Place spring across two wood horses. Place a C-clamp about 3 inches from spring center bolt and tighten C-clamp. With a hand grinder, grind off the peened end of spring center bolt and remove nut from spring center bolt. With a 3/8- x 10-inch steel rod, drive spring center bolt out of spring. Heat two clips with a heating torch and spread the clips open. Remove C-clamp. When springs have lost some of their arch, resilience, or elastic properties, replace them with new ones. Do not attempt to restore spring camber or arch by heating, bending, and tempering. To check arch of spring, place a straightedge on top of spring from end to end. Measure the distance from bottom of straightedge to bottom of last leaf. The arch must be within 5/8 inch of the original arch. The original arch is 7 3/16 inch.

## 139. ASSEMBLY.

*a. Spring Hanger* (fig. 63). Place light film of grease over outer surface of needle bearing. Press bearing into hanger, starting it square with bearing bore. Install lubrication fitting. Install two 1/8-inch pipe plugs. Pack needle bearing with general purpose grease (par. 26), and work grease between rollers.

*b. Springs.* Place main leaf assembly across two wood horses with the arch up. Continue building up the spring, starting with the longest leaf and ending with the shortest leaf. Make certain each spring center bolt is in alinement with each other. Shove 3/8-inch rod down through spring center bolt holes to make certain the holes are in alinement, and that shifting of leaves will not take place when C-clamp is installed. Install C-clamp and tighten, compressing the leaves. Remove the 3/8-inch rod from spring center bolt hole and install spring center bolt with head toward bottom of spring. Install nut on spring center bolt and tighten. Peen the end of bolt to prevent nut from becoming loose. Heat the clip and bend ends around top leaf.

## 140. FITS AND TOLERANCE.

*a. Gib Plates.* Space between gib plate bracket and side rail maximum tolerance is 1/16 inch. Total allowable clearance between edge of gib plate and spring hanger is 1/32 inch.

*b. Rocker Arm Spindles.* Diameter of inside bearing surface is 1.7498 inch maximum, 1.7493 inch minimum. Diameter of outside bearing surface is 1.1877 inch maximum, 1.1868 inch minimum.

### Section XXXIX

# HAND WINCH

## 141. DESCRIPTION.

*a. Description.* The hand winch consists of two handwheels, a rachet and pawl, a drum gear and pinion gear, two frames with a

drum cable and chain assembly. The handwheels and pinion gear are mounted on the pinion gear shaft. The pinion gear engages the larger gear attached to the cable drum. The handwheel is provided with a ratchet which engages a pawl that locks the load on the winch. For ease of operation, two handwheels, one each side, are mounted on winch.

**142. REMOVAL** (fig. 97).

*a.* Remove winch assembly (par. 87).

**143. DISASSEMBLY** (fig. 132).

*a.* Remove cap screw and retainer washer holding each handwheel to pinion gear shaft and tap off two handwheels.

*b.* Remove nut and lock washer from upper tie bolt and remove pawl.

*c.* Remove nut and washers from remaining three tie bolts and pull tie bolt and spacers from two frames.

*d.* Remove cable drum gear guard and lift out drum and gear assembly. Remove four cap screws and lock washers holding gear to cable drum.

*e.* Remove lubrication fittings from drum and frames.

**144. CLEANING AND INSPECTION.**

*a.* Clean all parts with dry-cleaning solvent and dry thoroughly.

*b.* Inspect pinion gear for broken teeth and excessive wear. Replace gear if necessary. Check teeth on drum gear for cracks and damage, and replace if necessary. Place pinion gear shaft into bushing in frame, move pinion gear shaft with an up-and-down motion, and check bushings for excessive play. Replace bushings if excessive play is present.

**145. ASSEMBLY** (fig. 132).

*a.* Position drum gear on cable drum, aline holes, and fasten drum gear to cable drum, using four cap screws and lock washers.

*b.* Position spacer between two frames at front, position front end of gear next to spacer, and install tie bolt.

*c.* Place lock washer and nut on tie rod but do not tighten. Position spacer between two frames, install longest tie bolt through frame at left side, and pass tie rod through spacer and gear guard.

*d.* Place pawl sleeve over tie rod and place pawl over sleeve. Place plain washer over tie rod and install lock washer and nut. Install tie rod and spacer at rear side of winch and secure tie rod to frame, using lock washer and nut. Tighten all tie rod nuts.

*e.* Install handwheel keys in pinion gear shaft. Install handwheel with ratchet over right side of winch and tap in position. Install handwheel on left side of pinion gear. Secure both handwheels in position,

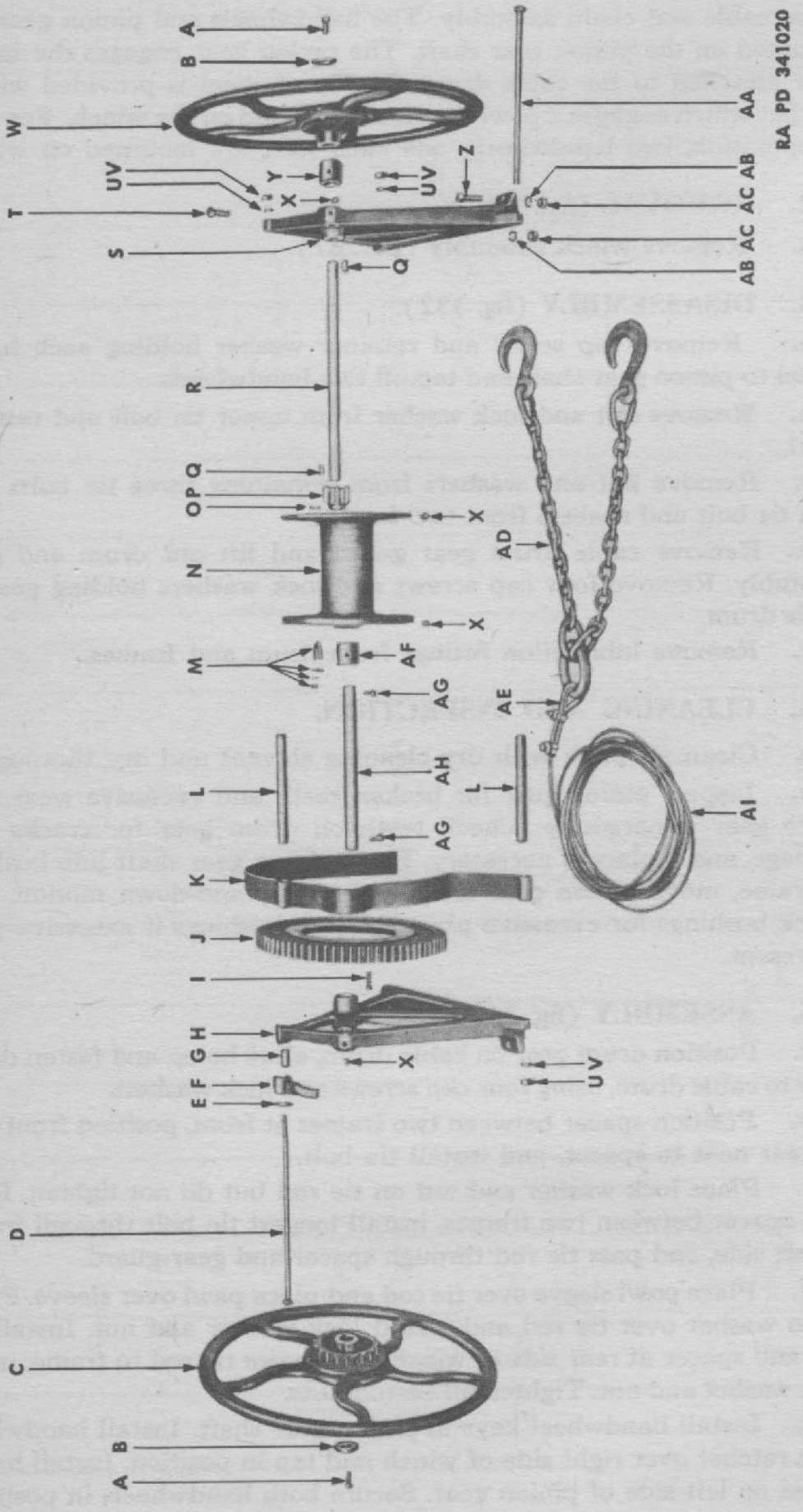



*Figure 132—Winch Assembly—Disassembled*

A—CAP SCREW

B—HAND WHEEL RETAINER WASHER

C—HAND WHEEL AND RATCHET

D—UPPER TIE BOLT

E—PLAIN WASHER

F—RATCHET PAWL

G—PIVOT SLEEVE

H—LEFT FRAME

I—CAP SCREW

J—CABLE DRUM GEAR

K—GEAR GUARD

L—WINCH FRAME SPACER

M—U-BOLT CABLE CLAMP

N—DRUM

O—RIVET

P—PINION GEAR

Q—WOODRUFF KEY

R—PINION GEAR SHAFT

S—RIGHT FRAME

T—SET SCREW

U—PLAIN WASHER

V—NUT

W—HAND WHEEL

X—LUBRICATION FITTING

Y PINION SHAFT BUSHING

Z—CAP SCREW

AA—LOWER TIE BOLT

AB—LOCK WASHER

AC—NUT

AD—CHAIN ASSEMBLY

AE—CABLE THIMBLE

AF—DRUM BUSHING

AG—SET SCREW

AH—SPACER

AI—CABLE

RA PD 341020B

## *Legend for Figure 132*

using retainer washers and cap screws. Install lubrication fittings and lubricate (par. 26).

**146. INSTALLATION** (fig. 97).

*a.* Install winch assembly (par. 88).

## Section XL

## HEATER

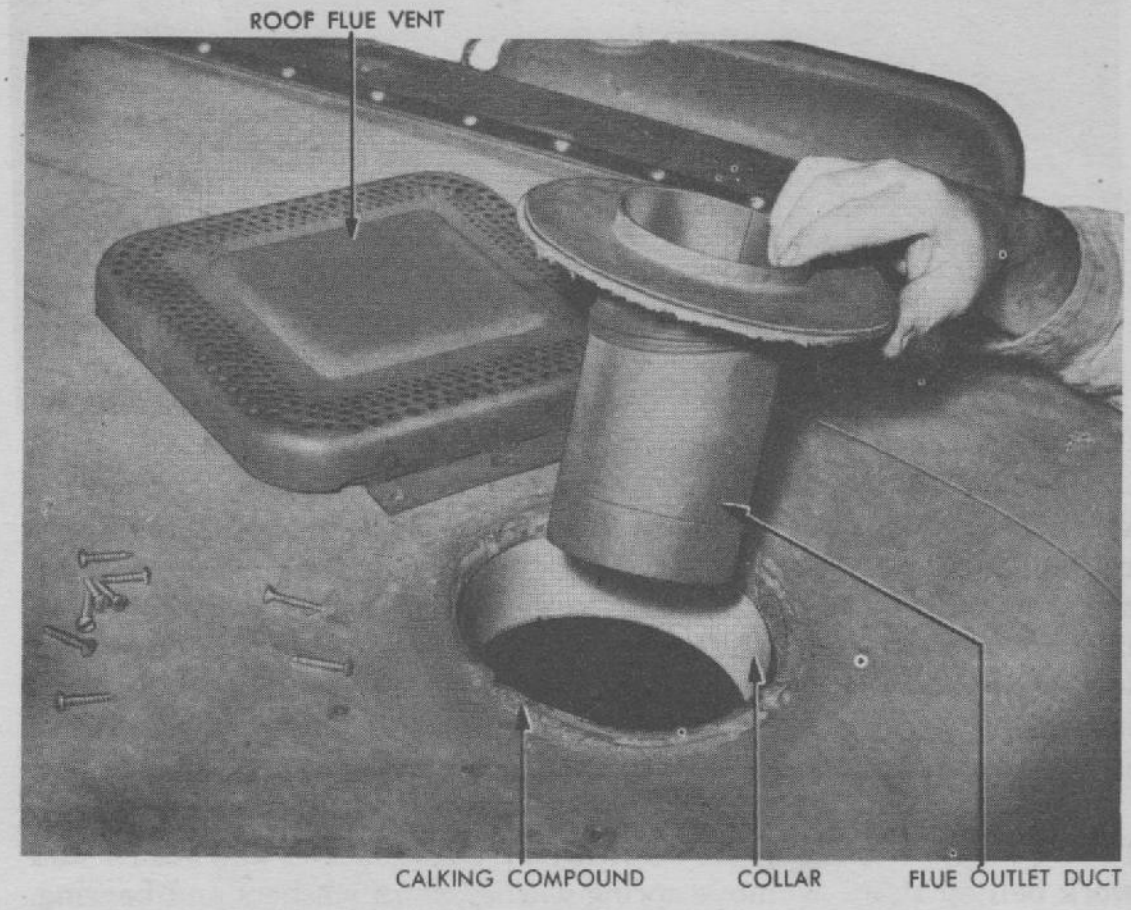
**147. DESCRIPTION.**

*a.* ***Description.*** The heater is installed in the M14 and M22 trailers only. The heater is mounted in the front right corner of the vehicle. The fuel is supplied to the heater from a fuel tank located on outside of trailer body. The heater can be operated with natural or forced draft. A 110-volt 1/20-horsepower motor operates a fan which supplies the forced draft.

**148. HEATER.**

*a.* ***Remove Vent and Flue Outlet Duct*** (figs. 133 and 134). Remove four screws holding flue exhaust ventilator to roof assembly. Remove four screws holding exhaust flue to roof and lift off flue.


***Figure 133—Removing Vent and Flue Outlet Duct***




RA PD 82097

***Figure 134—Removing Flue Outlet Duct***

***b. Remove Draft Intake Duct and Heater.*** Remove one screw and two bolts from draft intake duct and trailer wheel housing and pull out the draft intake duct (fig. 135). If generator unit is coupled to trailer, pull main switch. Remove two screws holding canopy cover to canopy base, disconnect two motor wires from canopy base, and remove two clips holding motor wires to body panel (fig. 136). Disconnect fuel line at control valve by turning nut clockwise. Remove the 12 screws holding heater assembly to trailer decking and body panels. Pull toward rear of trailer and lift heater off catwalk.

## 149. DISASSEMBLY.

***a. Burner and Blower Assembly*** (fig. 137). NOTE: *The heater assembly can be totally disassembled without removing the heater from the trailer.* If heater is to be disassembled in the trailer make certain the main switch is pulled. Remove motor and blower assembly (par. 51 *a*). Remove fuel valve guard and remove fuel control or metering


***Figure 135—Removing Draft Intake Duct***

valve (par. 49 *a*). Remove burner inlet nipple by turning nipple counterclockwise with a pipe wrench. Take out combustion chamber after removing four mounting screws. Remove eight screws holding combustion chamber bottom bulkhead, and remove bulkhead. Six screws are located under the lower edge of the shield. Remove the six screws holding the burner assembly in place. Remove burner assembly by working it downward and pulling it from bottom of combustion chamber.

*b.* ***Motor*** (fig. 140). Remove four nuts from studs holding front bell to motor frame. Insert screwdriver between bell and frame and work bell off shaft. Remove spring washer, shim washers and bearing. Remove four nuts from studs holding rear bell to motor frame. Separate bell from frame by prying with screwdriver. Remove washers and bearing from shaft and pull rotor out of field.

## 150. CLEANING AND INSPECTION.

*a.* ***Cleaning.*** Brush outer surface of burner pot to remove dust that may have accumulated around air ports. Remove ash, dust, or other deposits from inside of burner that may partially obstruct burner air ports. Make certain overflow drain tube in bottom of burner pot is open and clean. Wash motor bearings in dry-cleaning solvent.

*b.* ***Inspection.*** Inspect upper and lower ring in burner pot for cracks and warping. Replace if necessary. Inspect flue for sound condition. Check threads in burner pot inlet for sound condition. Retap threads if necessary. Inspect motor bearing for excessive wear.

## 151. ASSEMBLY.

*a.* ***Motor*** (fig. 138). Pack motor bearings with general purpose grease (par. 26). Place bearing over rear end of shaft on rotor. Place washers next to bearing and place rotor into frame and field assembly.

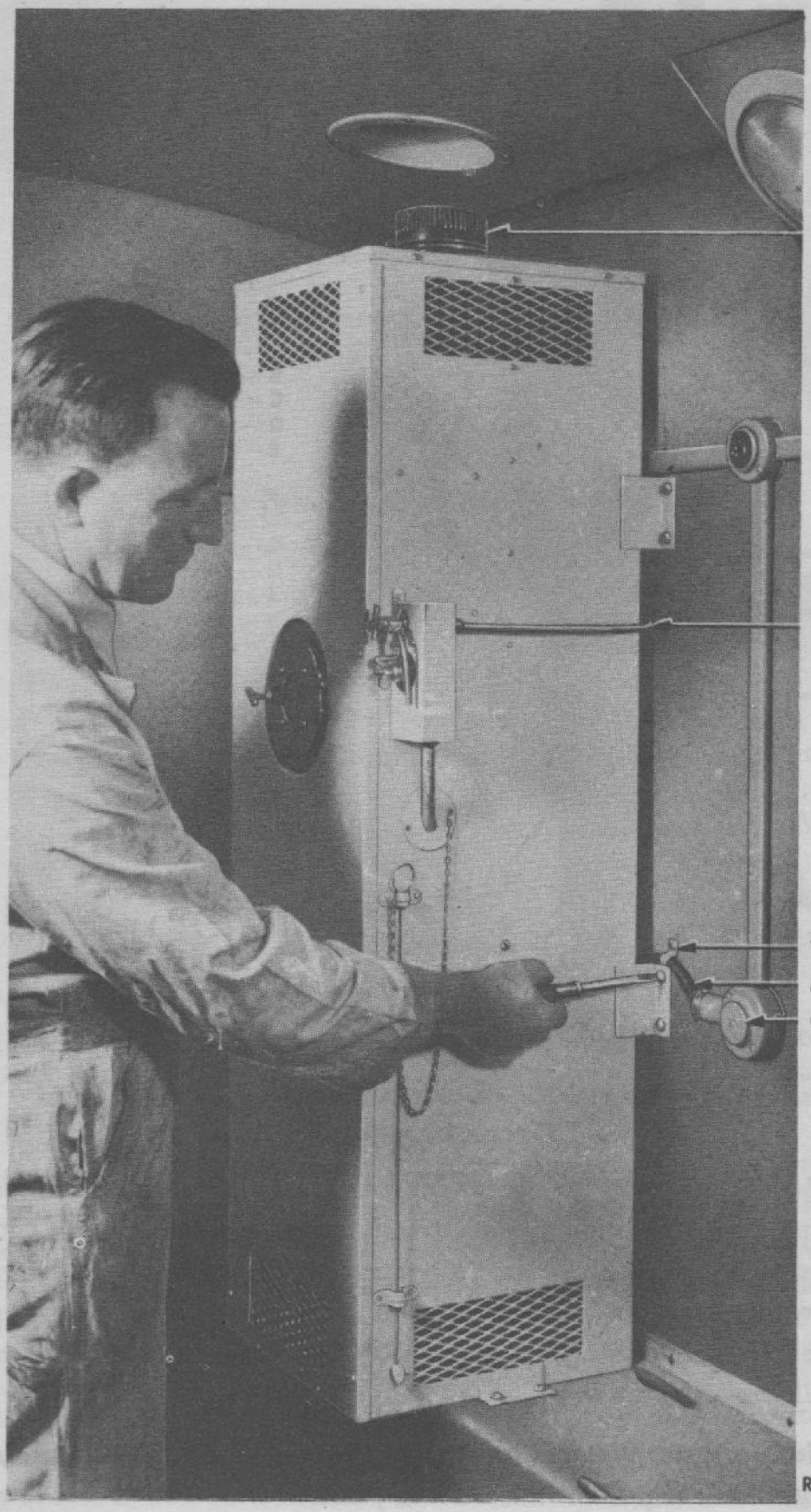
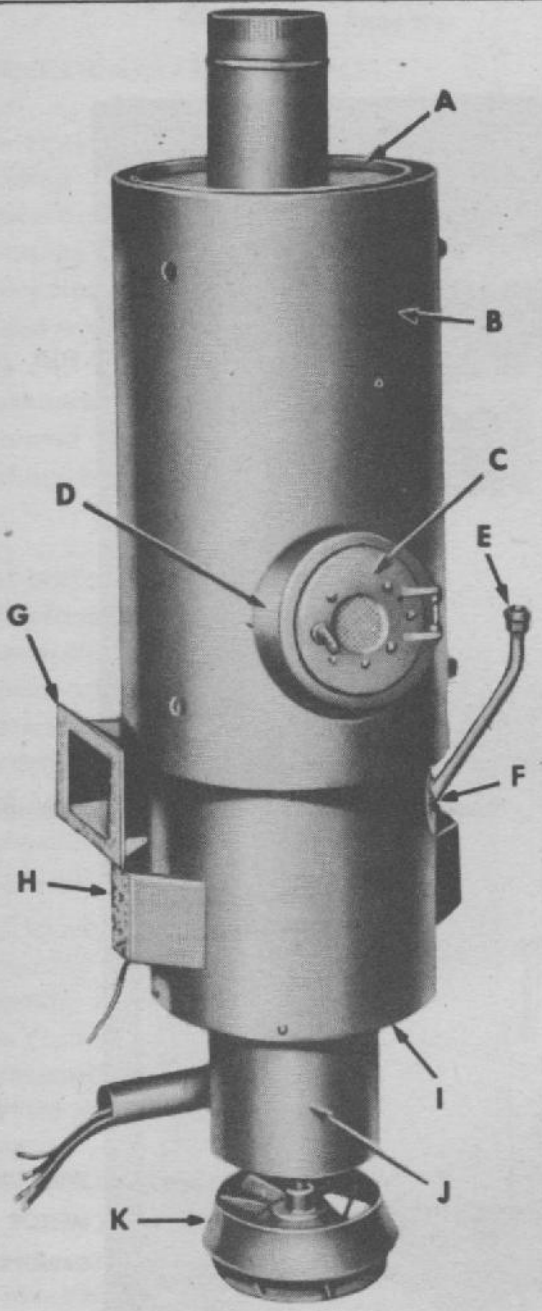



***Figure 136—Disconnecting Heater***




A— CHAMBER
B— SHIELD
C— DOOR ASSEMBLY
D— FRAME
E— NIPPLE
F— FERRULE, GASKET, SCREW
G— GASKET
H— GASKET
I— BULKHEAD
J— BLOWER ASSEMBLY
K— FAN ASSEMBLY

RA PD 341587

***Figure 137—Heater Combustion Chamber, Blower, and Circulating Fan***

Aline holes in bell with four studs on frame and install bell, securing bell to frame with four nuts. Place bearing over opposite end of rotor shaft. Install shim washers next to bearing. Place spring washer next to shim washers. Place bell over end of rotor shaft. Aline holes and secure bell to frame with four nuts. NOTE: *Make certain insulators are installed over studs in frame.*

*b. Burner and Blower Assembly* (figs. 139 and 140). Position lower ring in burner pot and secure it in position with screws and lower ring mounting clips. Place upper ring over burner pot and fasten to

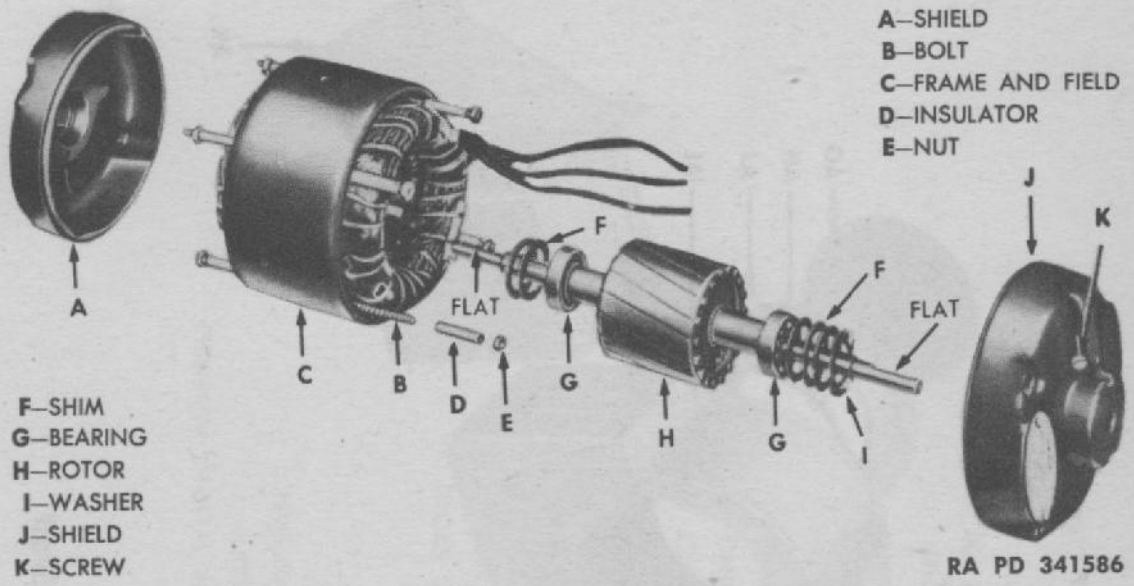



***Figure 138—Heater Motor—Disassembled***

flange with four screws. Work the burner assembly up into combustion chamber. Fasten burner assembly to combustion chamber with six screws. Fasten combustion chamber to heater, using two screws at each side of heater. Install burner inlet nipple by turning nipple clockwise with a pipe wrench. Install motor and blower assembly (par. 51 *b*).

## 152. INSTALLATION.

### *a. Mount Heater on Catwalk.*

(1) Position heater on catwalk. Install the 12 screws holding heater assembly to decking and body panels, but do not tighten.

(2) Position heater intake duct over port above wheel housing (fig. 135). Secure the intake duct to metal panel, using one screw and two bolts.

(3) Coat underside of flange on exhaust flue with knife-grade caulking compound. Place exhaust flue over flue outlet on trailer roof and secure it to the roof with four screws (fig. 134). Place flue exhaust ventilator over flue outlet and secure the exhaust ventilator to the roof with four screws.

(4) Connect fuel line to control valve. Connect the two motor wires to canopy base (fig. 136). Install two clips holding wire to moulding and tap moulding cover over wire. Secure canopy cover to canopy base with a screw. Tighten the 12 screws holding heater to body panels and decking.

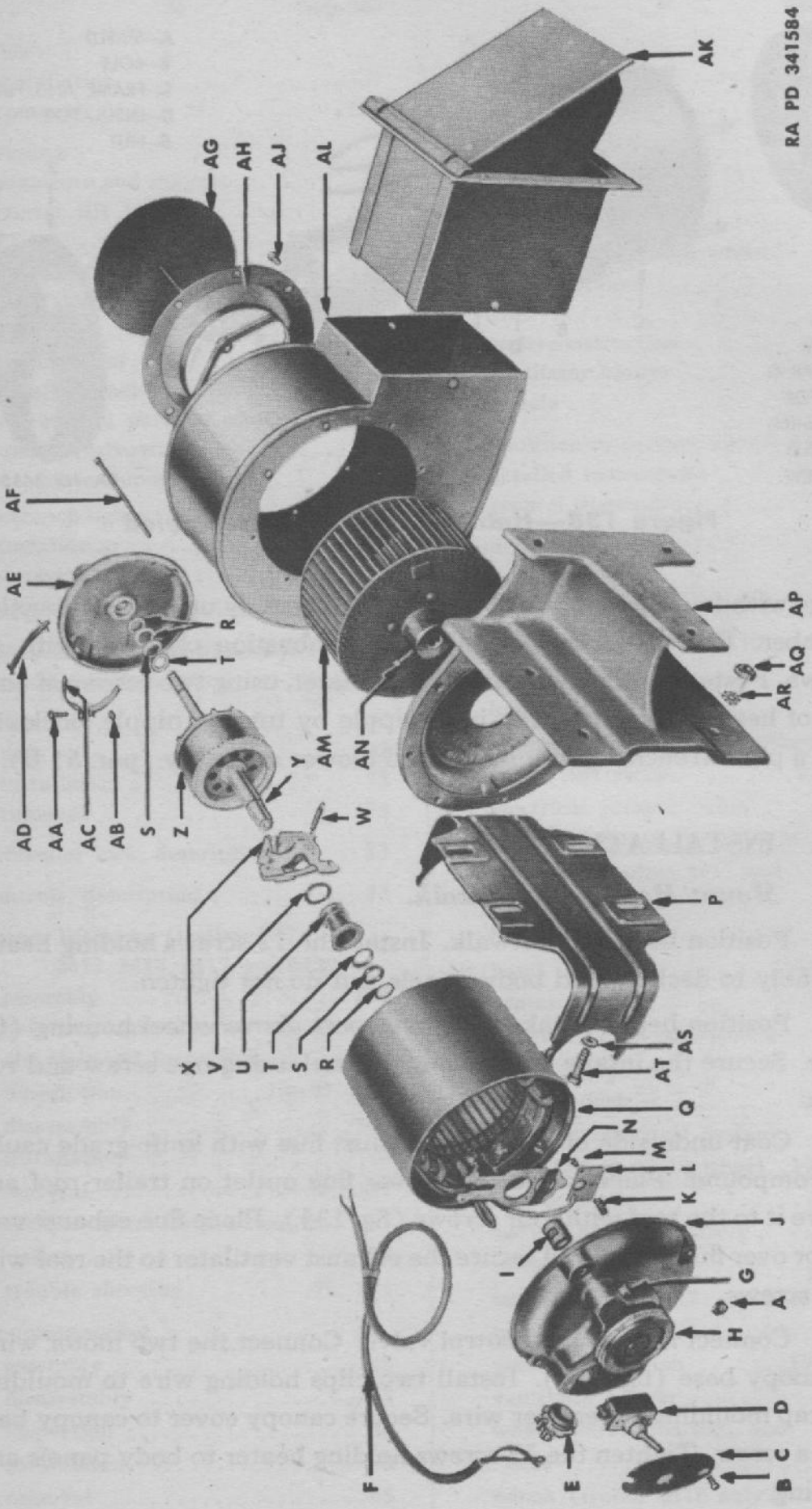



**Figure 139—Ventilator Blower—Disassembled**

A—NUT
B—COVER SCREW
C—SWITCH COVER
D—SWITCH ASSEMBLY
E—WIRE CONNECTOR
F—WIRE
G—OILER
H—MOUNTING RING
I—BEARING
J—SWITCH END BELL
K—MOVING CONTACT SPRING
L—STATIONARY CONTACT
M—SCREW
N—MOVING CONTACT
P—MOTOR MOUNTING BASE
Q—FRAME AND FIELD
R—THRUST WASHERS
S—RETAINER WASHER
T—RETAINER
U—SWITCH HUB
V—SWITCH HUB FELT WASHER
W—GOVERNOR WEIGHT SPRING
X—GOVERNOR WEIGHT ASSEMBLY
Y—ROTOR SHAFT
Z—ROTOR AND FAN
AA—SCREW
AB—NUT
AC—CLAMP
AD—OILER AND SPOUT
AE—FAN END BELL
AF—BOLT
AG—DAMPER PLATE
AH—OUTER FLANGE
AJ—SCREW
AK—EXHAUST DUCT ASSEMBLY
AL—FAN HOUSING
AM—FAN ASSEMBLY
AN—SET SCREW
AP—STAND
AQ—NUT
AR—LOCK WASHER
AS—PLAIN WASHER
AT—CAP SCREW

RA PD 341584B

**Legend for Figure 139**

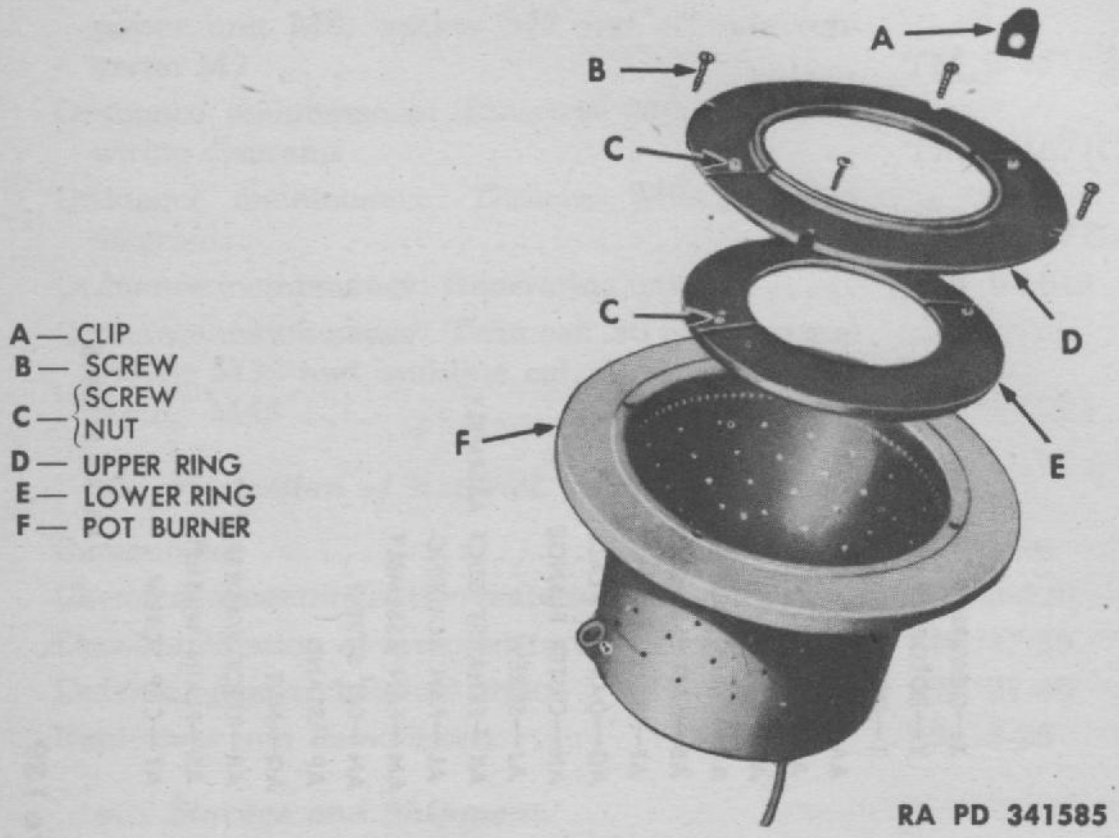



***Figure 140—Burner Assembly—Disassembled***

Section XLI

## VENTILATOR BLOWER

### 153. DESCRIPTION AND DATA.

*a. Description.* A blower is provided in the M14 and M22 trailers and is mounted in the front bulkhead. The blower is used as a ventilator and is driven by a 110-volt electric motor. The exhaust port is provided with a hinged cover located on outside of trailer and is controlled from the inside. A damper is attached to blower intake and is mounted on a threaded shaft. The blower output is controlled by the damper.

*b. Data.*

(1) BLOWER.

Make ..... Ilg Electric Company
Model (with motor) ..... ET-HO-17

(2) MOTOR.

Make ..... Wagner Electric Corporation
Type ..... RB
Horsepower ..... ⅛
Revolutions per minute ..... 1725
Voltage ..... 110
Cycles ..... 60

## 154. REMOVAL.

*a.* Remove blower assembly (par. 66 *a*).

## 155. DISASSEMBLY INTO SUBASSEMBLIES (fig. 140).

*a.* Loosen set screw (AN) in fan assembly hub. Remove four cap screws (AT), plain washers, lock washers, and nuts holding motor mounting bracket (P) to blower assembly. Pull motor out of fan hub.

## 156. INSPECTION, TEST, AND CLEANING.

*a. General.* The following inspection, test, and cleaning instructions are to be accomplished either before or after motor is disassembled or when motor is being assembled. The purpose of inspections prior to disassembly is to detect defects in performance which may be corrected when motor is disassembled or when it is being assembled. The inspections determine the corrections to be made.

*b. Motor Running Hot.*

(1) If motor has been running very hot or produces shock when touched, test for field ground with test lamp across field leads and frame. If grounded, replace frame and field assembly.

(2) Test for tight bearings by turning rotor shaft by hand. Lubricate bearings. If lubricating does not help, replace bearings.

(3) Check fan assembly on blower to make certain the hub on fan does not contact bell on motor which may cause overload on motor. If motor is overloaded, loosen set screw holding fan to motor shaft, tap fan away from bell and tighten set screw.

*c. Noisy Motor or Blower.*

(1) If motor is not in proper alinement with blower, loosen screws which hold motor to mounting bracket and shift motor until proper alinement is accomplished and no drag takes place between fan housing, fan hub, and motor.

(2) Inspect all screws and bolts in blower assembly and make certain they are tight.

(3) Check shaft in rotor for wobble, sprung shaft, or unbalanced condition. Replace rotor and shaft assembly if unserviceable.

(4) Check for excessive end play by moving shaft with an in-and-out motion. If play is detected, remove play by installing extra thrust washer on shaft.

*d. Miscellaneous Inspections.*

(1) Check switch for good condition and operation. Make certain the screws which secure the switch to bell are tight.

(2) Examine motor leads for broken wires. Check insulation for frayed and broken condition. Replace wires or repair them with friction tape and rubber tape.

## 157. DISASSEMBLY.

*a. Motor* (fig. 139). Remove screw and nut from clamp (AC) and lift motor off motor mounting base. Remove four nuts from bolts (AF) holding two bells (AE and J) to motor frame and pull out four bolts. Place screwdriver between bells and frame and separate frame from bells. Press bearings from bells. Pull rotor and fan assembly (Y and Z) out of frame and field (Q). Raise up on both governor weight springs and pull hub (U), retainer, and washer off rotor shaft. Remove thrust washers and retainer washer from opposite end of shaft. Place rotor and governor weight assembly in arbor press, shim up between rotor and governor weight assembly, and press rotor (Z) out of governor weight assembly (X). Remove two screws (B) from switch cover (C) and pull switch (D) out of bell. Disconnect two wires from switch.

*b. Blower.* Remove eight screws (AJ) from outer flange (AH). Remove outer flange from fan housing. Remove eight screws from stand (AP) and detach stand from fan housing. Lift fan assembly (AM) out of fan housing (AL).

## 158. ASSEMBLY (fig. 139).

*a. Motor.* Install wire (F) into opening at switch end of bell (J) and pull end out of switch cavity. Attach two leads to terminals on switch (D). Install switch (D) in cavity of bell. Place switch cover (C) over switch and secure switch and cover to bell, using two screws (B). Thread wire connector (E) over end of wire (F) and screw connector into bell. Tighten clamping screw in connector (E). Tap bearings into bells (J and AE). If stationary contact (L) has been disconnected from fields, connect wires and solder. Place switch hub felt washer (Y) into governor weight assembly (X). Press governor weight assembly (X) on shaft (Y) until stop is reached. Open governor weight springs and place switch hub into switch. Place retainer (T) over shaft next to switch hub. Place retainer washer (S) next to retainer. Place thrust washer (R) next to retainer washer. Place rotor assembly into frame and field (Q). Place retainer (T), retainer washer (S), and thrust washers (R) over end of shaft. Position fan end bell (AE) over shaft, aline holes in fan end bell, frame, and field assembly with holes in switch end bell, and fasten the three assemblies together, using four bolts (AF) and nuts (A). Place motor assembly into motor mounting base (P). Fasten motor to mounting base, using four clamps (AC), two screws (AA), and nuts (AB).

*b. Blower.* Mount motor on stand, using four cap screws, lock washers and nuts. Do not tighten the mounting bolts. Place fan assembly over end of motor shaft. Position fan housing over fan assembly and secure the fan assembly to stand with eight screws. Fasten outer flange to housing with eight screws. Screw damper plate over end of screw with knob toward outer side. Install the screw into outer flange. Turn fan assembly by hand and check the distance between hub on fan

assembly with opening in stand. Aline the fan assembly in the housing by moving the motor on the stand. Tighten the four screws holding motor to stand.

### 159. INSTALLATION.

*a.* Install blower assembly (par. 66 *b*).

## APPENDIX

### Section XLII

## SHIPMENT AND LIMITED STORAGE

### 160. 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.

### 161. PREPARATION FOR LIMITED STORAGE.

*a.* Vehicles to be prepared for limited storage are those ready for immediate service but not used for less than 30 days. If vehicles are to be indefinitely stored after shipment by rail, they will be prepared for such storage at their destination.

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

(1) LUBRICATION. Lubricate the vehicle completely (par. 26).

(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 time permits, remove rust from any part of the vehicle exterior with flint paper. Repaint painted surfaces whenever necessary to protect wood or metal. Coat exposed polished metal surfaces susceptible to rust, such as chains, with medium grade preservative lubricating oil. Close the tailgate, and rear doors.

(5) INSPECTION. Make a systematic inspection just before shipment or limited storage, to ensure 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. 29).

(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.

## 162. LOADING AND BLOCKING FOR RAIL SHIPMENT.

*a. Preparation.* In addition to the preparation described in paragraph 161 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. 141) are given below. NOTE: *All wheel blocking must be located against the outside wheel of the dual.* The methods given below are for the generator trailer M7. Blocking for the other trailers is the same or very similar.

(1) FIRST METHOD. After locating trailer on freight car, lower landing wheel so drawbar is horizontal (fig. 141). Pass four strands, two wrappings, of No. 8 gage, black annealed wire (C) from lunette eye to each side of freight car through nearest stake pocket, and tighten

enough to remove slack. Locate four blocks (B) one to the front of each forward wheel and one to the rear of each rearward wheel. Nail the heel of each block to the car floor with five 40-penny nails, 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 (J) through the wheels and through stake pockets on the freight car. Pass four strands, two wrappings, of No. 8 gage, black annealed wire from eyes at rear of trailer to each side of freight car through nearest stake pockets. Tighten wire enough to remove slack.

(2) SECOND METHOD. After locating trailer on freight car, lower landing wheel so drawbar is horizontal (fig. 141). Pass four strands, two wrappings of No. 8 gage, black annealed wire (C) from lunette eye to each side of freight car through nearest stake pocket, and tighten enough to remove slack. Locate two blocks (G), one to the front of the forward wheels, and one to the rear of the rearward wheels. NOTE: *These blocks (G) must be at least 8 inches wider than the over-all width of the vehicle at the car floor.* Locate eight cleats (F), two against blocks (G) to the front and rear of each blocked wheel. Nail lower cleats to freight car with five 40-penny nails, then nail top cleat (F) to lower cleat (F) with five 40-penny nails. Position two cleats (H) one over two blocks (G) against outside of each blocked wheel. Nail each end of cleat (H) to blocks (G) with three 40-penny nails. Pass four strands, two wrappings, of No. 8 gage, black annealed wire (J) through the wheels and through stake pockets on the freight car. Pass four strands, two wrappings, of No. 8 gage, black annealed wire from eyes at rear of trailer to each side of freight car through nearest stake pockets. Tighten wire enough to remove slack.

*d. Shipping Data.*

(1) GENERATOR TRAILER, M7.

| | |
|---|---|
| Length, over-all | 195⅞ in. |
| Width, over-all | 96 in. |
| Height, over-all | 42 in. |
| Shipping weight | 4,150 lb |
| Area of car floor occupied per vehicle | 130.58 sq ft |
| Volume occupied per vehicle | 457 cu ft |
| Bearing pressure (lb per sq ft of area occupied per vehicle) | 32 |

(2) GENERATOR TRAILER, M18.

| | |
|---|---|
| Length, over-all | 198¼ in. |
| Width, over-all | 96 in. |
| Height, over-all | 63 in. |
| Shipping weight | 4,000 lb |

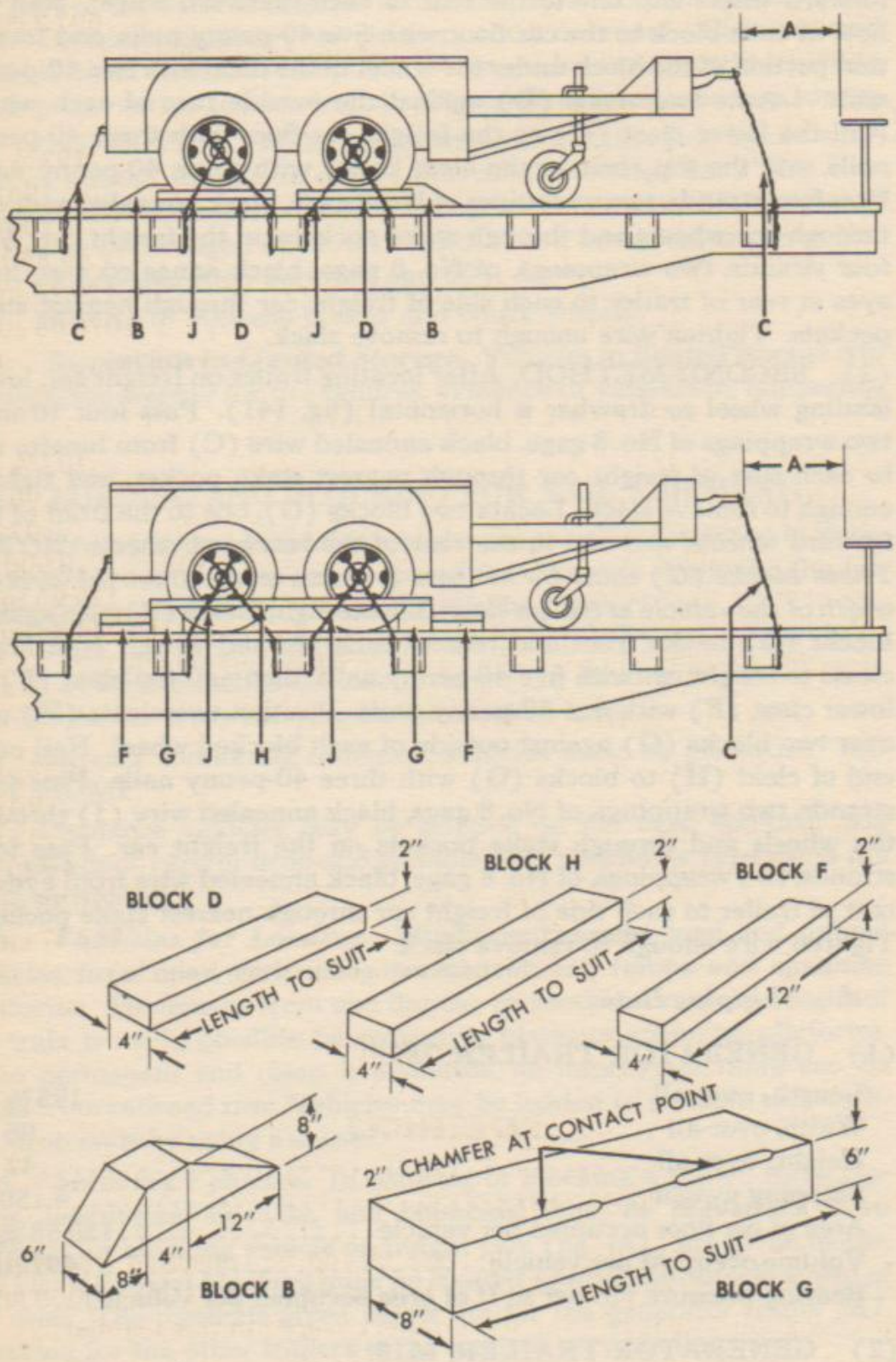



***Figure 141—Blocking Requirements for Rail Shipment***

Area of car floor occupied per vehicle . . . . . 132.8 sq ft
Volume occupied per vehicle . . . . . 697.2 cu ft
Bearing pressure (lb per sq ft of area occupied per vehicle) . . . . . 38

(3) DIRECTOR TRAILER, M13.

Length, over-all . . . . . 193⅞ in.
Width, over-all . . . . . 96 in.
Height, over-all . . . . . 100 in.
Shipping weight . . . . . 7,850 lb
Area of car floor occupied per vehicle . . . . . 129.25 sq ft
Volume occupied per vehicle . . . . . 1076.65 cu ft
Bearing pressure (lb per sq ft of area occupied per vehicle) . . . . . 61

(4) DIRECTOR TRAILER, M14 AND M22.

Length, over-all . . . . . 193⅞ in.
Width, over-all . . . . . 96 in.
Height, over-all . . . . . 97 in.
Shipping weight . . . . . 8,900 lb
Area of car floor occupied per vehicle . . . . . 129.25 sq ft
Volume occupied per vehicle . . . . . 1044.34 cu ft
Bearing pressure (lb per sq ft of area occupied per vehicle) . . . . . 70

(5) MOUNT TRAILER, M17.

Length, over-all . . . . . 193⅞ in.
Width, over-all . . . . . 96 in.
Height, over-all . . . . . 42 in.
Shipping weight . . . . . 4,520 lb
Area of car floor occupied per vehicle . . . . . 129.25 sq ft
Volume occupied per vehicle . . . . . 452.37 cu ft
Bearing pressure (lb per sq ft of area occupied per vehicle) . . . . . 32

## Section XLIII

# REFERENCES

## 163. PUBLICATIONS INDEXES.

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

*a.* Introduction to ordnance catalog (explaining ASF Cat. SNL system) . . . . . ORD-1 IOC

*b.* Ordnance publications for supply index (index ASF Cat. to SNL's) . . . . . ORD-2 OPSI

*c.* List of publications for training (listing MR's, MTP's, T/BA's, T/A's, WDTB's, FM's, TM's, TR's, Numbered Pamphlets, Lubrication Orders, MWO's, and SB's concerning training) ..... FM 21-6

*d.* List of Training Films, Film Strips and Film Bulletins (listing TF's, FS's, and FB's by serial number and subject) ..... FM 21-7

*e.* Military Training Aids (listing graphic training aids, models, devices, and displays) ..... FM 21-8

## 164. STANDARD NOMENCLATURE LISTS.

### *a. Trailers and Related Equipment.*

| | |
|---|---|
| Carriage, multiple cal. .50 machine gun, M51 ..... | SNL G-217 |
| Director, A.A., M9 (for 90-mm A.A. gun mount) ... | SNL F-243 |
| Director, A.A., M10 (for 120-mm A.A. gun mount) | SNL F-243 |
| Trailer, director, M13 ..... | SNL G-221 |
| Trailer, director, M14 ..... | SNL G-221 |
| Trailer, director, M22 ..... | SNL G-221 |
| Trailer, generator, M7 ..... | SNL G-221 |
| Trailer, generator, M8 ..... | SNL G-221 |
| Unit, generating, M7 ..... | SNL F-226 |
| Unit, generating, M7A1 ..... | SNL F-226 |
| Unit, generating, M15 ..... | SNL F-226 |
| Unit, generating, M15A1 ..... | SNL F-226 |
| Unit, generating, M18 ..... | SNL F-291 |

### *b. Maintenance.*

| | |
|---|---|
| ORD 5, cleaning, preserving, and lubrication materials, recoil fluids, special oils, and miscellaneous related items ..... | SNL K-1 |
| ORD 6, tools, maintenance, for repair of automatic guns, automatic gun antiaircraft material, automatic and semiautomatic cannon, and mortars ... | SNL A-35 |
| ORD 6, ordnance maintenance sets ..... | SNL N-21 |
| Soldering, brazing and welding materials, gases, and related items ..... | SNL K-2 |
| ORD 6, tools, maintenance, for repair of automotive vehicles ..... | SNL G-27 |
| Tool sets—for ordnance service command automotive shops ..... | SNL N-30 |

## 165. EXPLANATORY PUBLICATIONS.

### *a. Fundamental Principles.*

| | |
|---|---|
| Ammunition, general | TM 9-1900 |
| Basic maintenance manual | TM 38-250 |
| Browning machine gun, cal. .50, HB, M2 | FM 23-65 |
| Chassis, body, and trailer units | TM 10-560 |
| Driver's manual | TM 10-460 |
| Driver's selection and training | TM 21-300 |
| Instruction guide, small arms data | TM 9-2200 |
| Range regulations for firing ammunition for training and target practice | AR 750-10 |
| Military motor vehicles | AR 850-10 |
| Motor vehicle inspections and preventive maintenance service | TM 9-2810 |
| Precautions in handling gasoline | AR 850-20 |
| Qualifications in arms and ammunition training allowances | AR 775-10 |
| Small arms ammunition | TM 9-1990 |
| Standard military motor vehicles | TM 9-2800 |
| Targets, target materials, and rifle range constructions | TM 9-855 |

### *b. Operation of Materiel.*

| | |
|---|---|
| Directors M9, M9A1, M9A2, and M10 | TM 9-671 |
| Generating unit, M7 | TM 9-618 |
| Generating unit, M18 | TM 9-617 |
| Twin cal. .50 machine gun mount M33 and multiple cal. .50 machine gun mount M45 | TM 9-223 |

### *c. 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: Browning machine gun, cal. .50, all types | TM 9-1225 |
| Ordnance maintenance: Directors M9 and M10, general maintenance and computors M3 and M4 | TM 9-1671A |

| | |
|---|---|
| Ordnance maintenance: Directors M9 and M10, power unit M8, tracker M2 and altitude converter M2 | TM 9-1671B |
| Ordnance maintenance: Directors M9 and M10, wiring diagrams | TM 9-1671C |
| Ordnance maintenance: Director M9A2, wiring diagrams | TM 9-1671D |
| Ordnance maintenance: Generating unit, M7 | TM 9-1618 |
| Ordnance maintenance: Twin cal. .50 machine gun mount M33 and multiple cal. .50 machine gun mount M45 | TM 9-1223 |

*d. 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 |

*e. Storage and Shipment.*

| | |
|---|---|
| Ordnance company, depot | FM 9-25 |
| Ordnance storage and shipment chart, group G—Major items | OSSC-G |
| Preparation of unboxed ordnance materiel for shipment | SB 9-4 |
| Registration of motor vehicles | AR 850-10 |
| Rules governing the loading of mechanized and motorized army equipment, also major caliber guns, for the United States Army and Navy, on open top equipment, published by Operations and Maintenance Department of Association of American Railroads. | |
| Storage of motor vehicle equipment | AR 850-18 |

# INDEX

C



D

## G



## H



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