TM 9-2010

(FORMERLY TM 9-223)

DEPARTMENT OF THE ARMY TECHNICAL MANUAL

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MULTIPLE CAL. .50 MACHINE GUN MOUNTS

M45, M45C, M45D, AND M45F MULTIPLE CAL. .50 MACHINE GUN TRAILER MOUNT M55 AND MOUNT TRAILER M20

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TECHNICAL MANUAL
No. 9–2010

DEPARTMENT OF THE ARMY
WASHINGTON 25, D. C., *4 December 1953*

MULTIPLE CAL. .50 MACHINE GUN MOUNTS M45, M45C, M45D, AND M45F; MULTIPLE CAL. .50 MACHINE GUN TRAILER MOUNT M55; AND MOUNT TRAILER M20

***This manual supersedes TM 9–223, 27 July 1944; those portions of TM 9–789, 16 September 1944 including C 1, 17 December 1951, pertaining to the materiel covered herein; TB 9–223–FE1, 15 March 1945; and TB 9–789–1, 4 October 1950.**

CHAPTER 1

INTRODUCTION

Section I. GENERAL

1. Scope

a. These instructions are published for the information and guidance of the personnel to whom the materiel is issued. They contain information on the operation and organizational maintenance of the multiple cal. .50 machine gun mounts M45, M45C, M45D, and M45F (figs. 1, 2, 3, and 4), mount trailer M20 (fig. 5), and the multiple cal. .50 machine gun trailer mount M55 (figs. 6 and 7).

b. The appendix contains a list of current references, including supply catalogs, technical manuals, and other available publications applicable to the materiel.

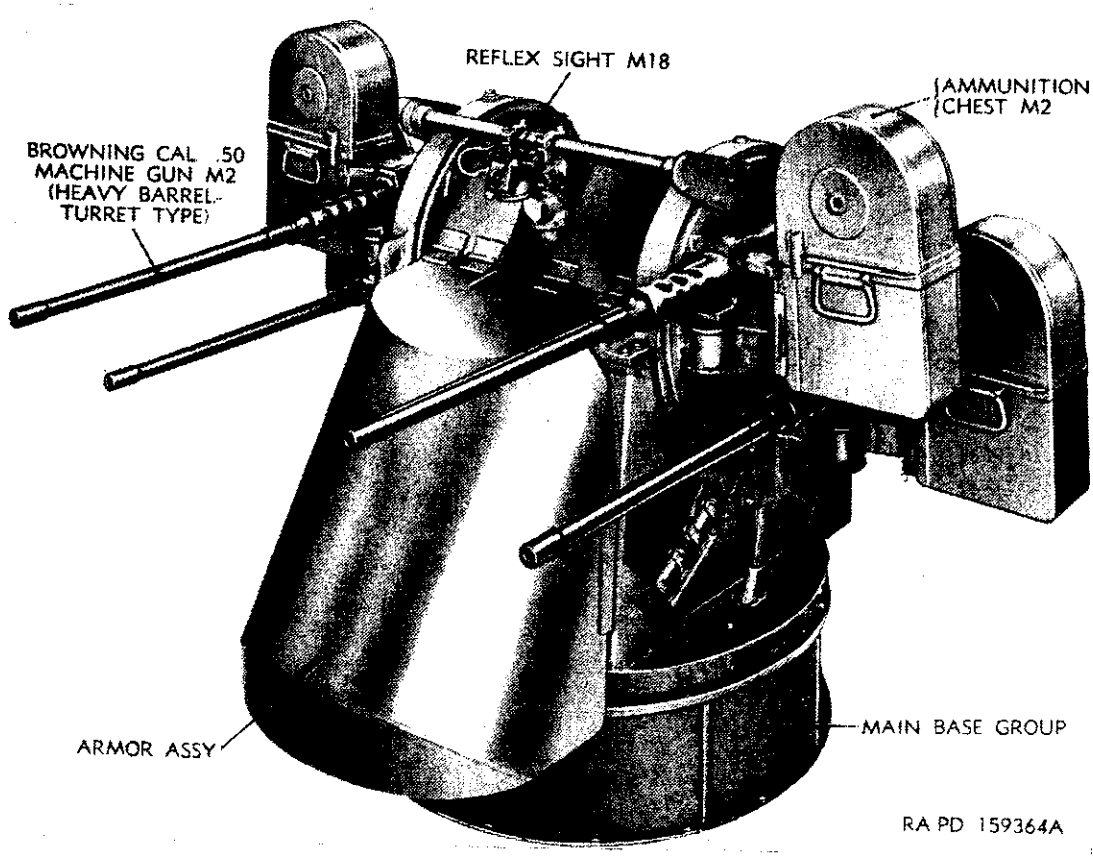


Figure 1. Multiple cal. .50 machine gun mount M45—left-front view.

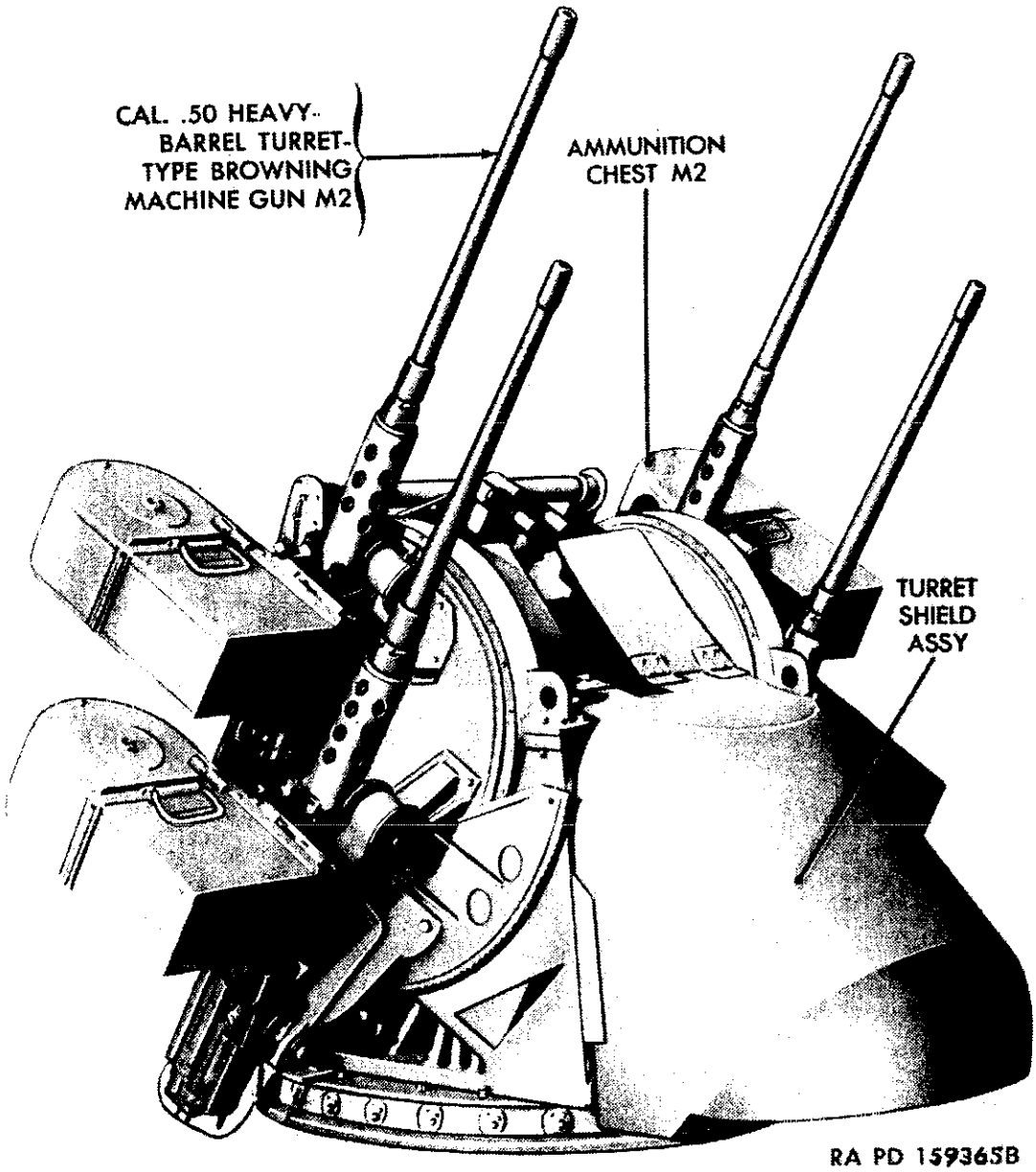


Figure 2. Multiple cal. .50 machine gun mount M45C—right-front view.

c. This manual differs from TM 9–223, 27 July 1944, as follows:

(1) Adds information on—

(*a*) Mount trailer M20 (previously contained in TM 9–789).

(*b*) Mount M45C.

(*c*) Mount M45D.

(*d*) Mount M45F.

(*e*) Reflex sight M18.

(2) Revises information on—

(*a*) Disassembly and assembly.

(*b*) Care and preservation of materiel.

(*c*) Lubrication.

(*d*) Malfunctions and their corrections.

(*e*) Operation of the mount under usual and unusual conditions.

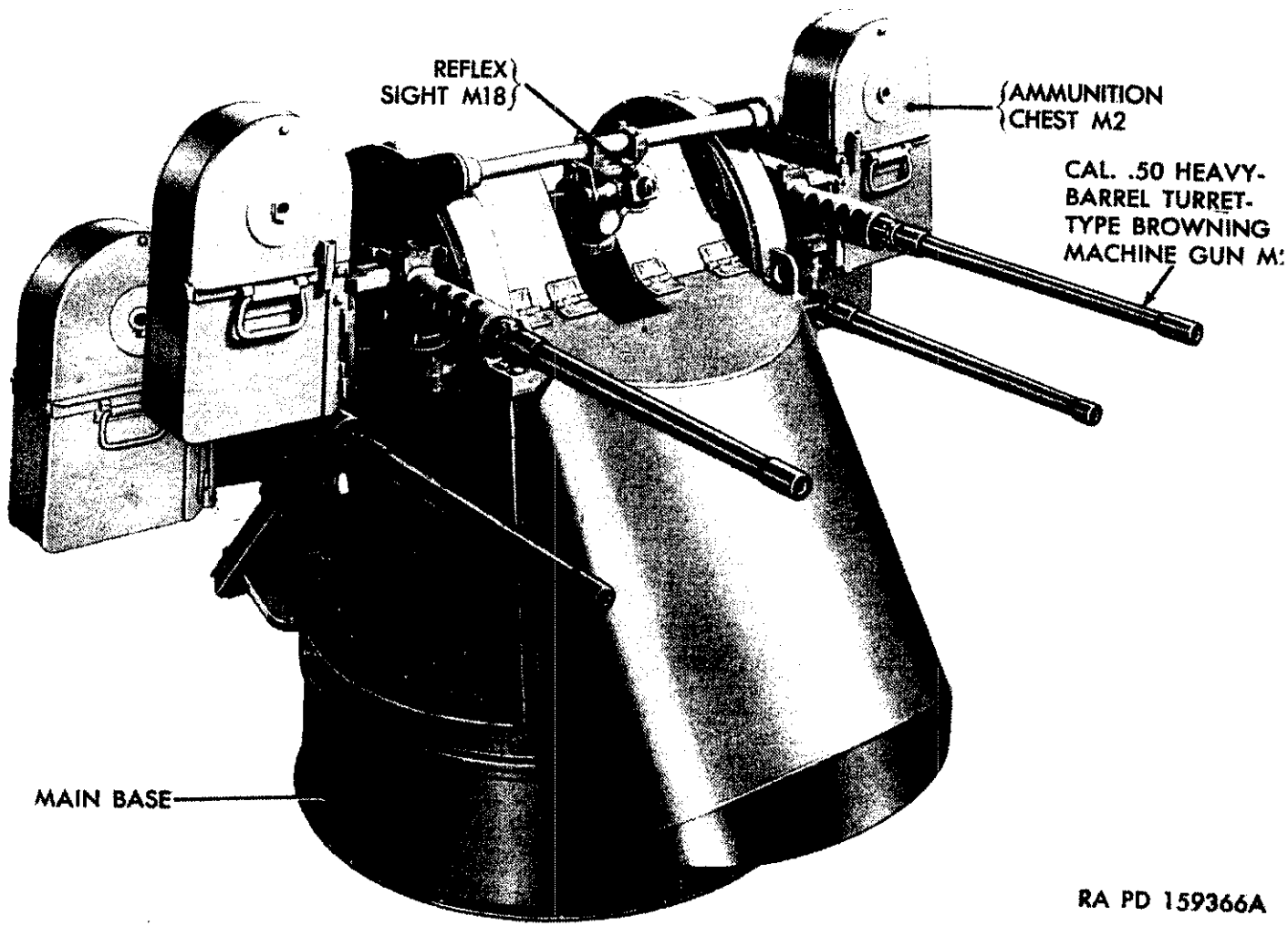


Figure 3. Multiple cal. .50 machine gun mount M45D—right-front view.

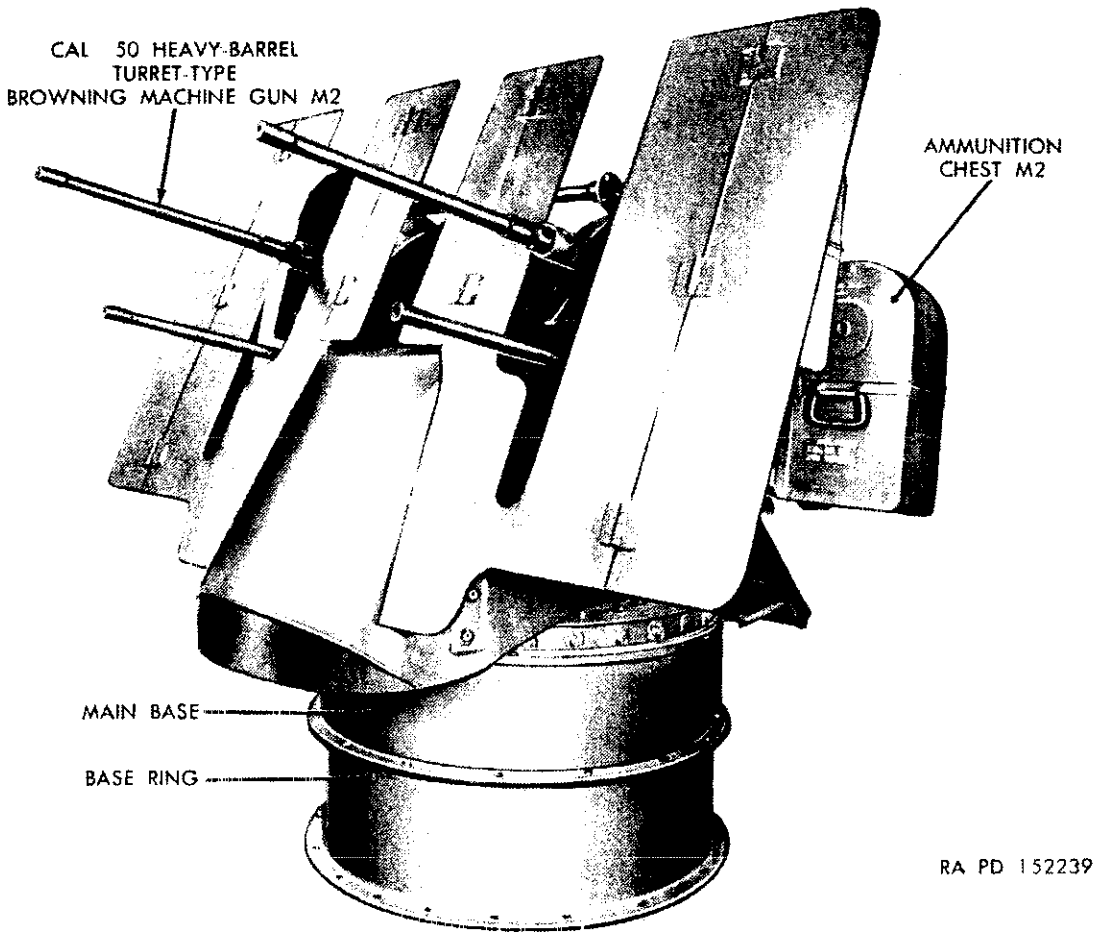


Figure 4. Multiple cal. 50 machine gun mount M45F—left-front view.

(3) Deletes information on—

(*a*) Mount M33, which is obsolete.

(*b*) Timing and head space adjustment of cal. .50 heavy barrel turret type Browning machine gun M2 (for information refer to FM 23–65).

d. This manual is correct to 24 February 1953. This first edition is being published in advance of complete technical review of all concerned. Any errors or omissions will be brought to the attention of Chief of Ordnance, Washington 25, D. C., ATTN: ORDFM–Pub.

2. Organizational Maintenance Allocation

In general, the prescribed organizational maintenance responsibilities will apply as reflected in the allocation of tools and spare parts in the appropriate columns of the current ORD 7 supply manual pertaining to this materiel and in accordance with the extent of disassembly prescribed in this manual for the purpose of cleaning, lubricating, or replacing authorized spare parts. In all cases where the nature of repair, modification, or adjustment is beyond the scope or facilities of the using organization, the supporting ordnance maintenance unit should be informed in order that trained personnel with suitable tools and equipment may be provided or other proper instructions issued.

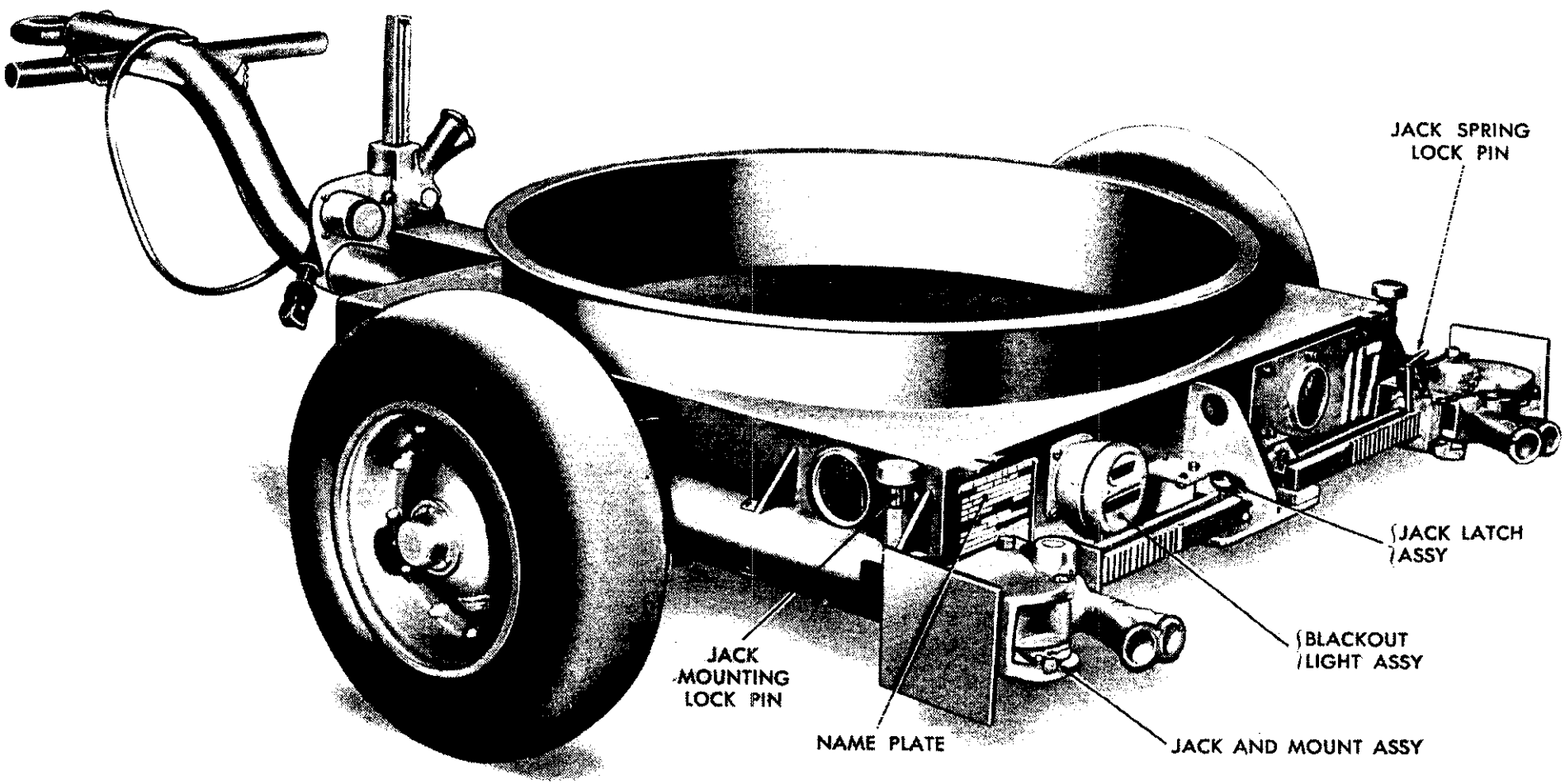


Figure 5. Mount trailer M20—left-rear view.

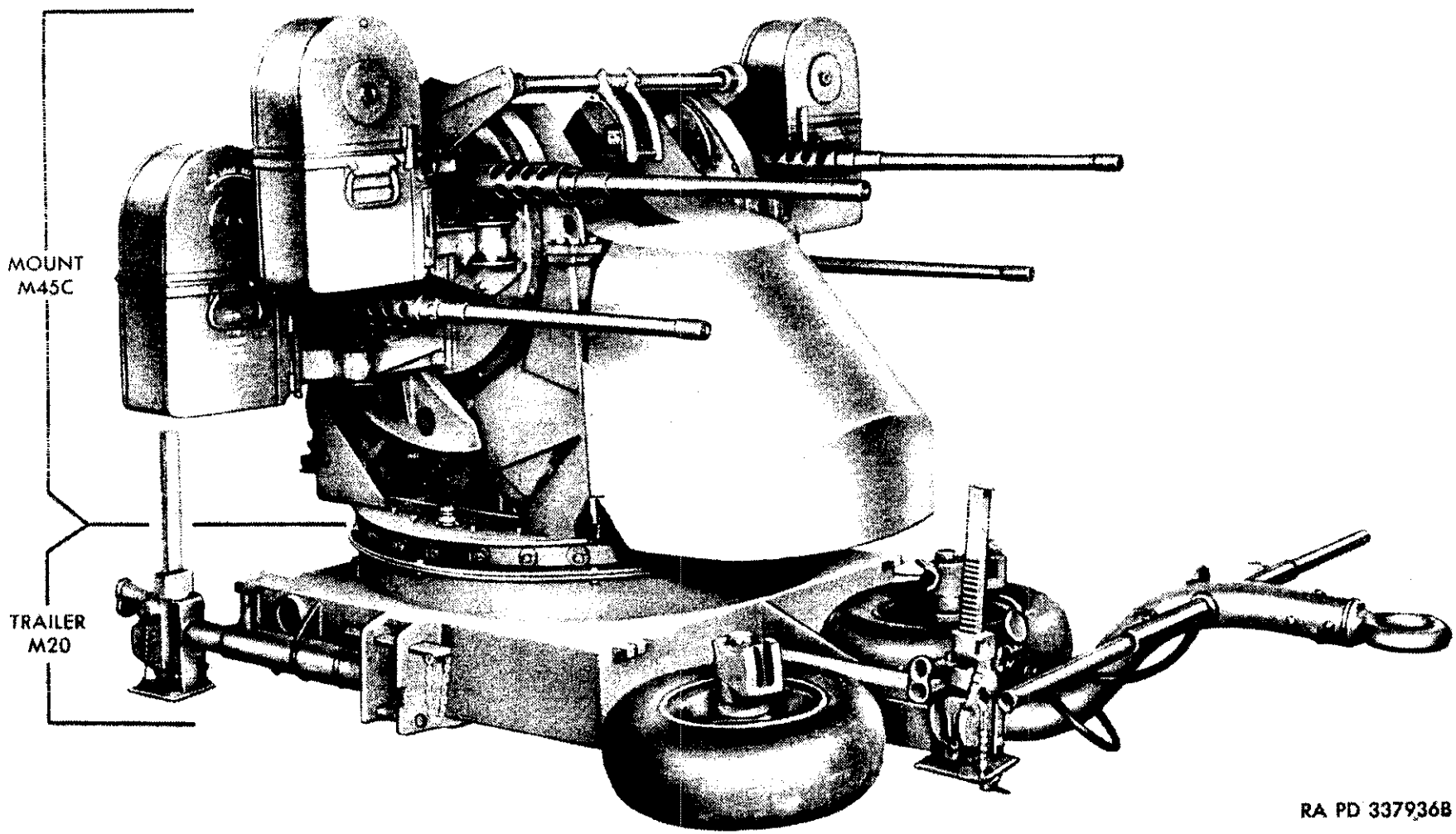


Figure 6. Multiple cal. .50 machine gun trailer mount M55—firing position.

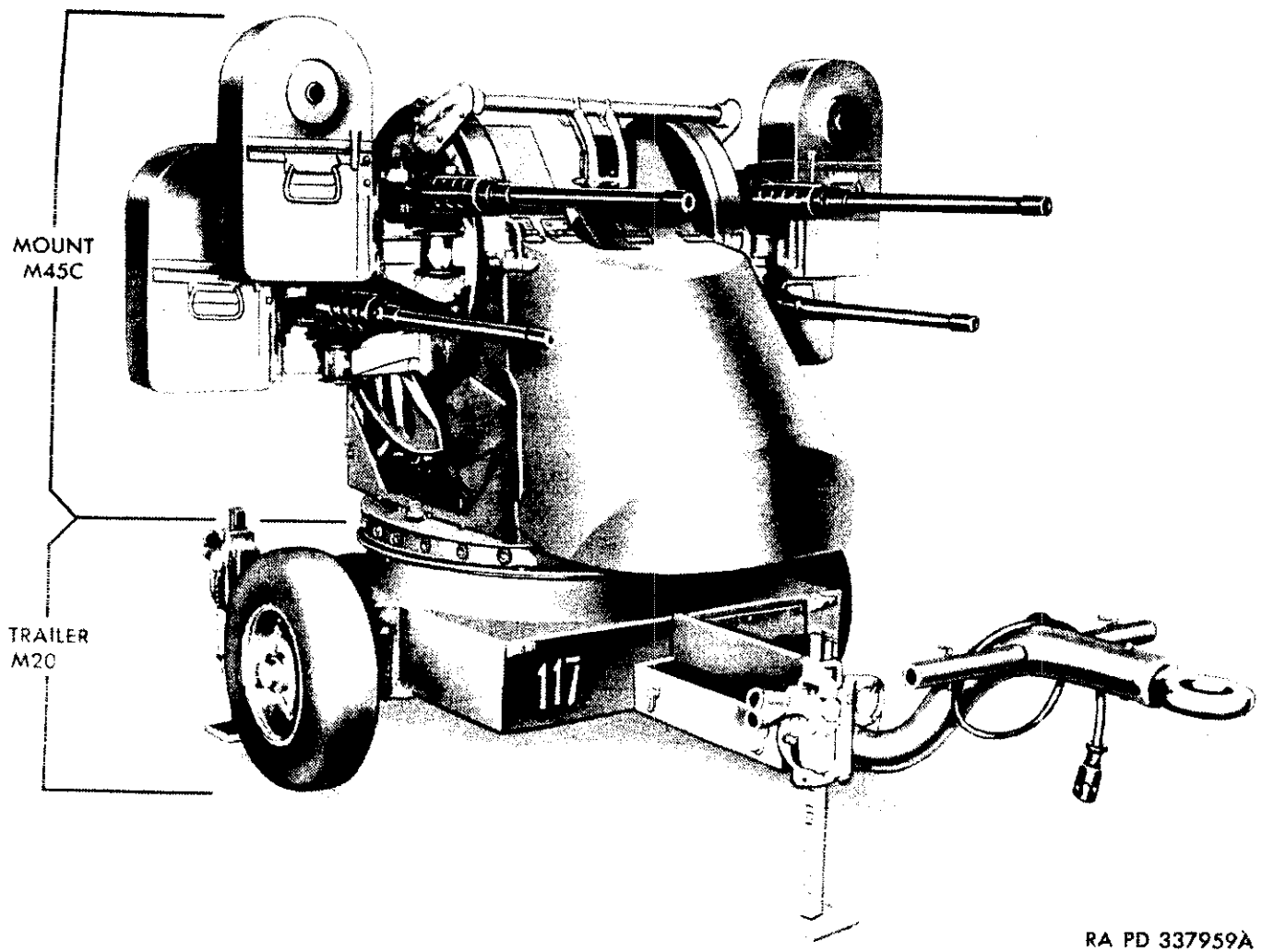


Figure 7. Multiple cal. .50 machine gun trailer mount M55—traveling position.

3. Forms, Records, and Reports

a. General. Responsibility for the proper execution of forms, r ords, and reports rests upon the officers of all units maintaining r equipment. However, the value of accurate records must be fu appreciated by all persons responsible for their compilation, mai nance, and use. Records, reports, and authorized forms are norma utilized to indicate the type, quantity, and condition of materiel to inspected, to be repaired, or to be used in repair. Properly execu forms convey authorization and serve as records for repair or repl ment of materiel in the hands of troops and for delivery of mate requiring further repair to ordnance shops in arsenals, depots, The forms, records, and reports establish the work required, the pr ress of the work within the shops, and the status of the materiel u completion of its repair.

b. Authorized Forms. The forms generally applicable to us organizations are listed in the appendix. No forms other than th approved for the Department of the Army will be used. For a c rent and complete listing of all forms, see current SR 310–20–6.

c. Field Report of Accidents.

(1) *Injury to personnel or damage to materiel.* The reports essary to comply with the requirements of the Army sa program are prescribed in detail in SR 385–10–40 serie special regulations. These reports are required when accidents involving injury to personnel or damage to mate occur.

(2) *Ammunition.* Whenever an accident or malfunction inv ing the use of ammunition occurs, firing of the lot which r functions will be immediately discontinued. In additio any applicable reports required in (1) above, details of accident or malfunction will be reported as prescribe SR 385–310–1.

d. Report of Unsatisfactory Equipment or Materials. Any gestions for improvement in design and maintenance of equipm safety and efficiency of operation, or pertaining to the applicatio prescribed petroleum fuels, lubricants, and/or preserving mater will be reported through technical channels as prescribed in 700–45–5 to the Chief of Ordnance, Washington 25, D. C., AT ORDFM, using DA Form 468, Unsatisfactory Equipment Re Such suggestions are encouraged in order that other organizat may benefit.

Note.—Do not report all failures that occur. Report only REPEATE RECURRENT failures or malfunctions which indicate unsatisfactory desi material. However, reports will always be made in the event that exceptio costly equipment is involved. See also SR 700–45–5 and the printed instruc on DA Form 468.

Section II. DESCRIPTION AND DATA

4. Description

a. General.

(1) The multiple cal. .50 machine gun mounts M45, M45C, M45D, and M45F (figs. 1, 2, 3, and 4) are power-driven, semiarmored gun mounts with self-contained power units. A power charger (gasoline engine driven generator) (fig. 8) produces electrical current to be stored in two 6-volt storage batteries. The electrical system operates from the storage batteries.

(2) Each M45 series mount (figs. 1 through 4) is constructed to accommodate two cal. .50 heavy barrel turret type Browning machine guns M2 and ammunition chests M2 on each side (trunnion). Each of the mounts is equipped with a reflex sight M18 or an illuminated sight Mk 9, model 1, through which the gunner may sight while seated in the gunner's seat inside the mount (fig. 8). The mounts are designed to be traversed through 360° and elevated through an arc of from −10° to +90° from the horizontal. Power is directed by a pair of control handles placed directly in front of the operator's seat on the mount.

(3) Mount M45C is normally mounted on the mount trailer M20, which is designated the multiple cal. .50 machine gun trailer mount M55 (figs. 6 and 7). Mount M45D and M45F are normally mounted on multiple gun motor carriages M16 (fig. 9) and M16A1 (fig. 10), respectively.

(4) Mount trailer M20 (fig. 5) is a two-wheeled vehicle designed to transport mount M45C either by manpower or by a ¼-ton 4 x 4 truck. In an emergency, it can be coupled to any vehicle equipped with a pintle tow hook. The minimum towing speed over smooth surfaced roads is 10 mph while over uneven terrain, the speed must not exceed 5 mph. When the trailer is to be transported any great distance, it is loaded onto a suitable carrier, usually a 2½-ton 6 x 6 truck, equipped with special loading and mounting equipment. Three lift jacks with special mount assemblies, two at the rear and one at the drawbar, permit quick removal of the wheels, and lowering of the body to the ground to afford the trailer a solid foundation for firing.

b. Differences Among Models. Basically, the mounts M45, M45C, M45D, and M45F are the same. The major differences are described in (1) through (3) below.

(1) Mount M45C differs from mounts M45 and M45D in that mount M45C has turret shield assembly (fig. 2) which replaces the armor assembly (fig. 1) and the main base (fig. 3) on mounts M45 and M45D.

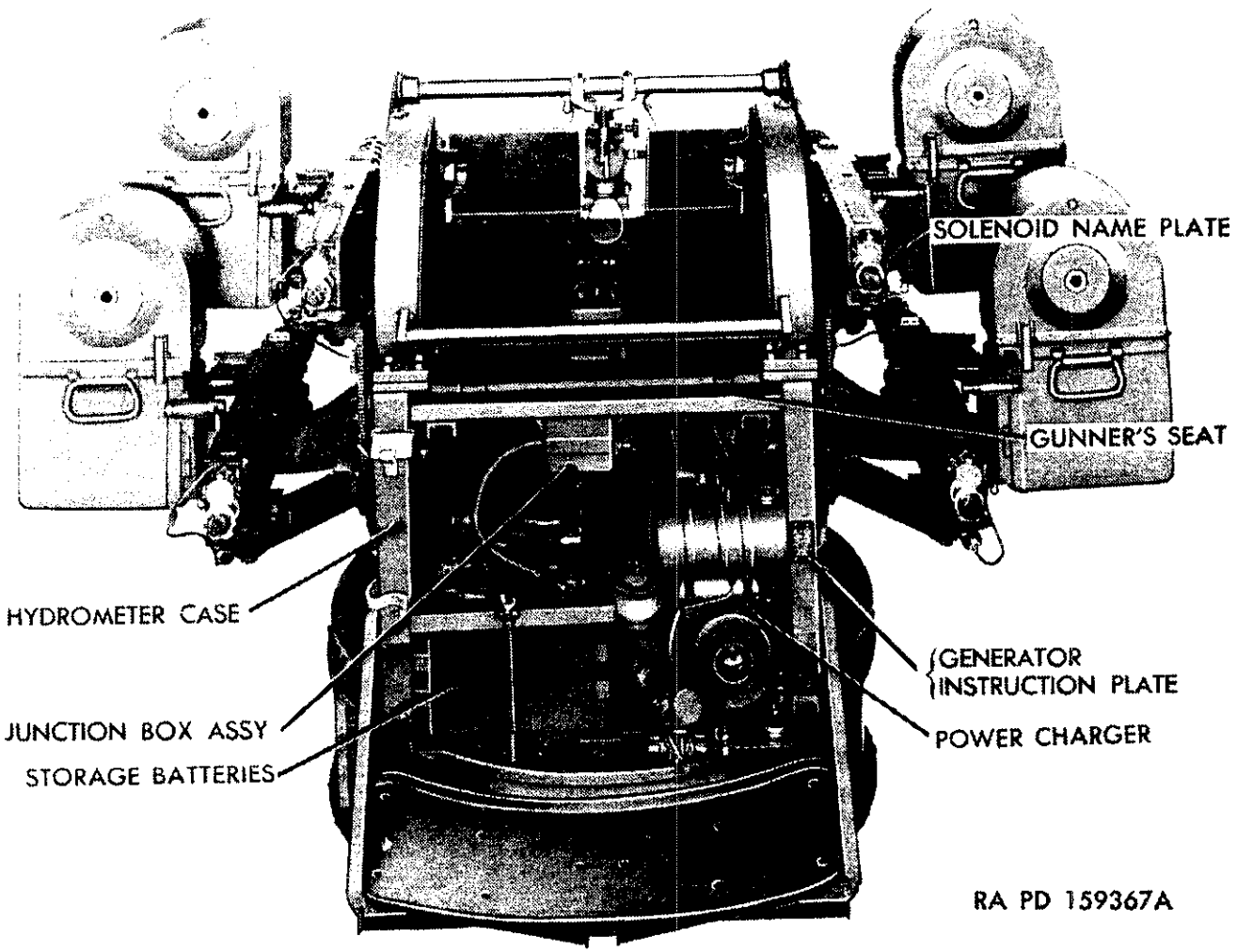


Figure 8. Multiple cal. .50 gun mount M45D rear view.

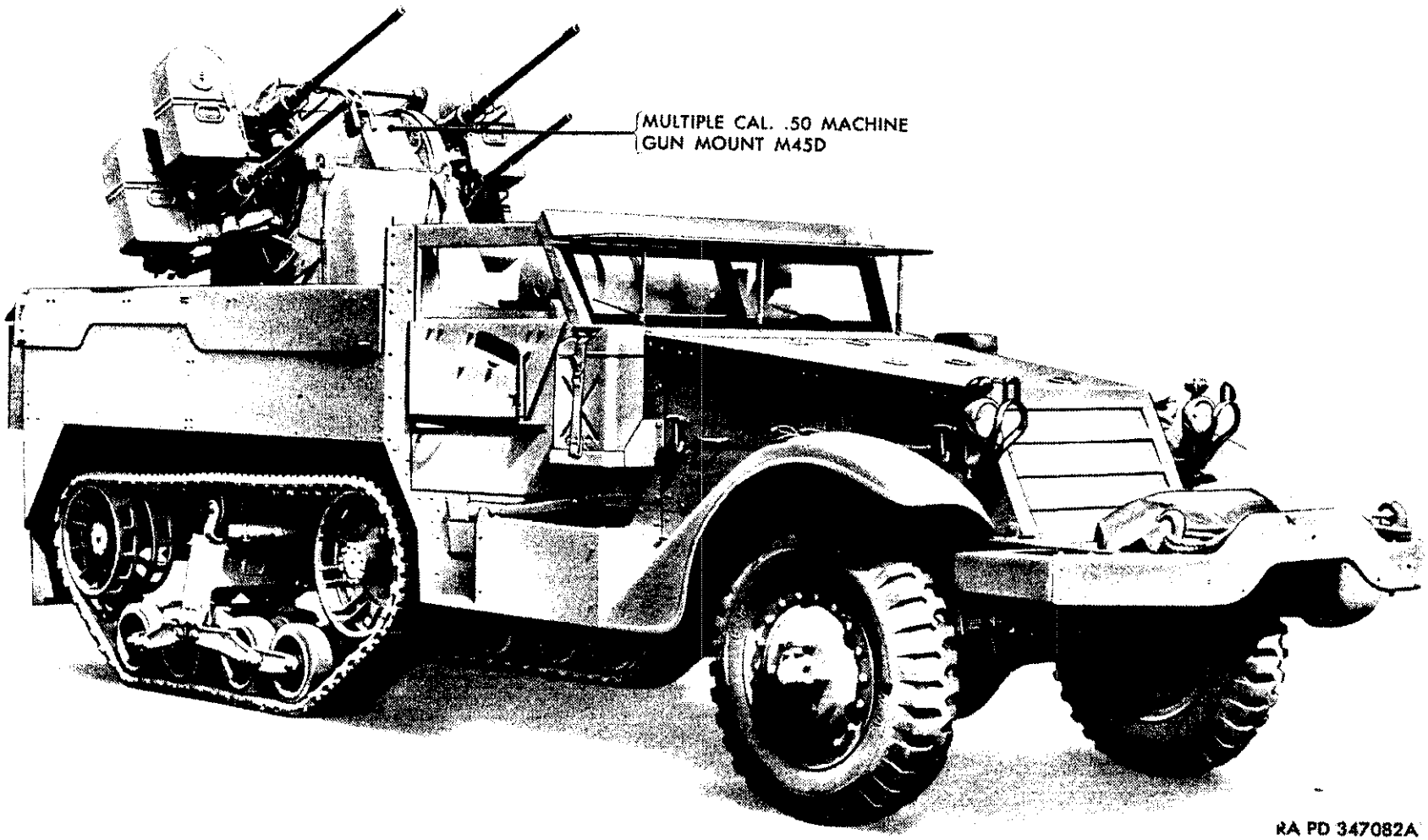


Figure 9. Multiple cal. .50 machine gun mount M45D on motor carriage M16.

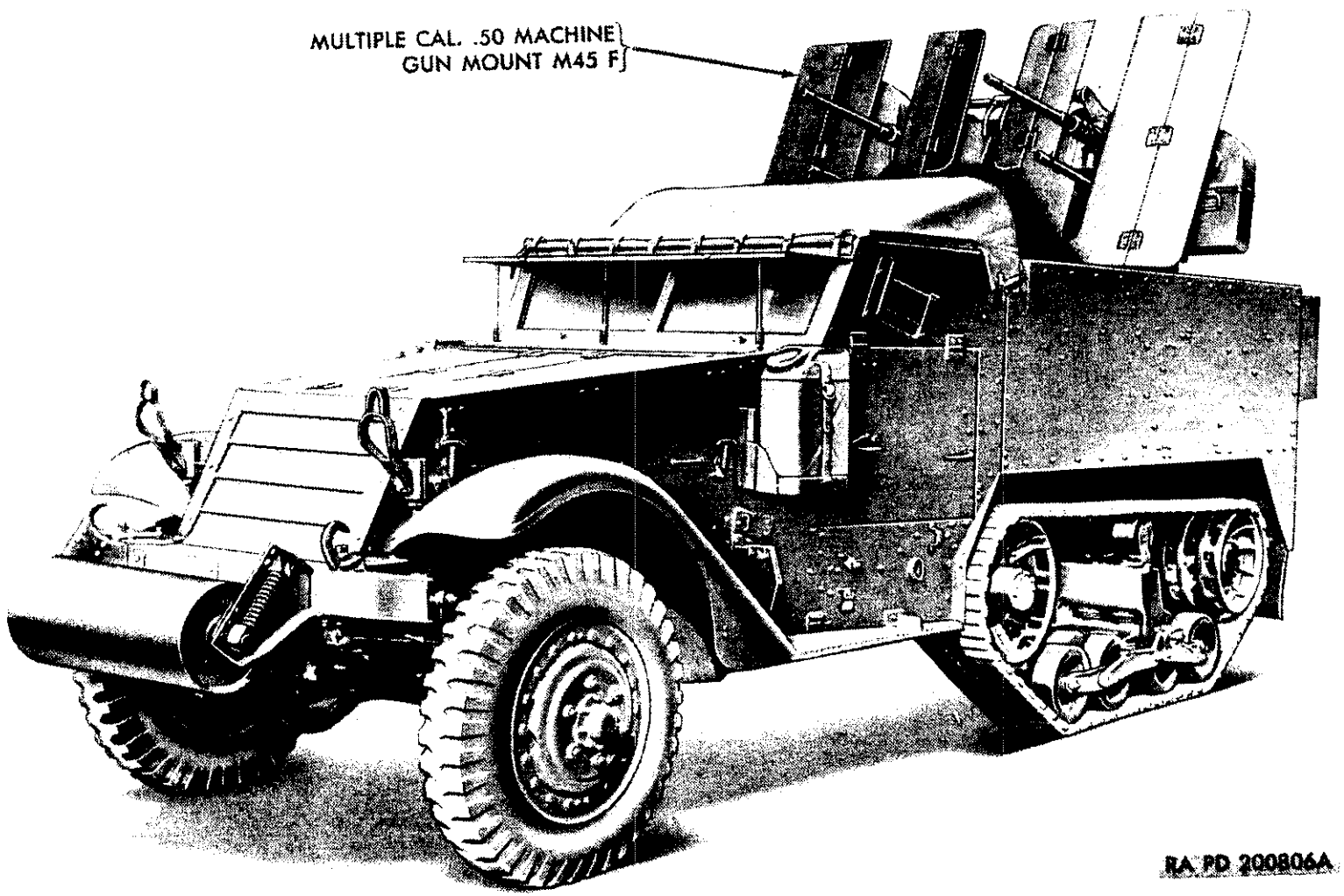


Figure 10. Multiple cal. .50 machine gun mount M45F on motor carriage M16A1.

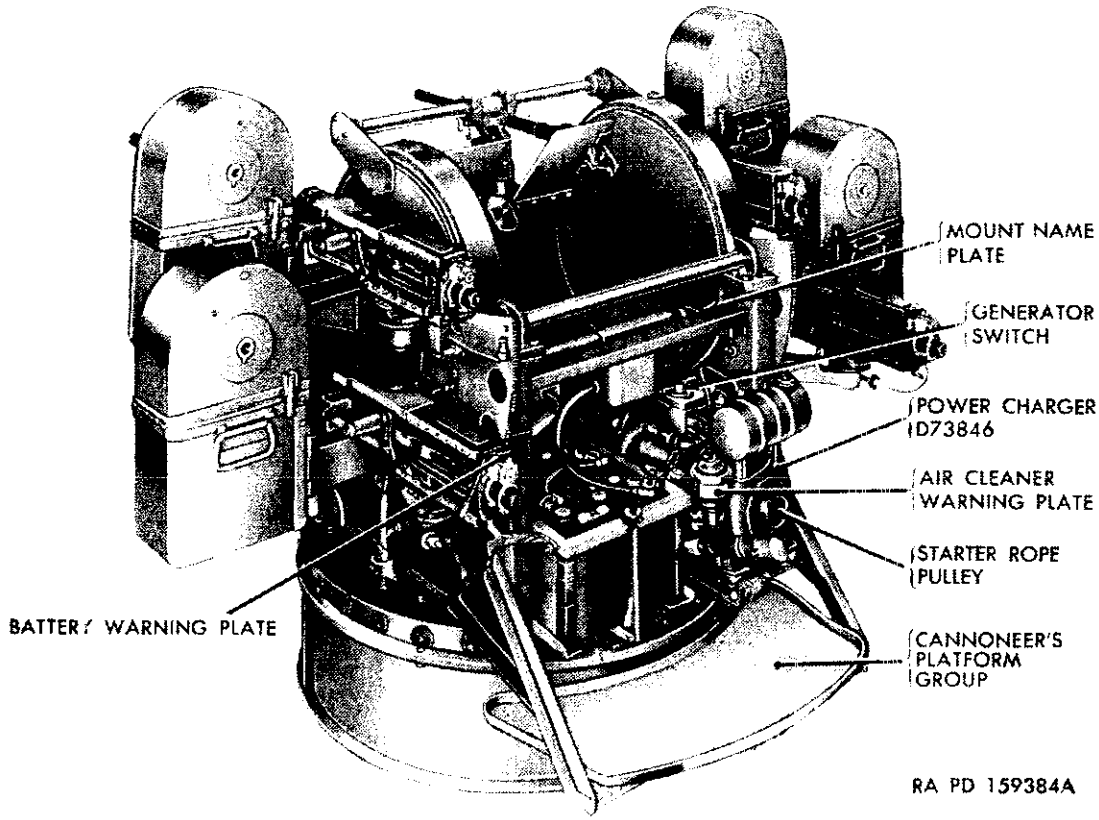


Figure 11. Multiple cal .50 machine gun mount M45D—rear view.

(2) Mount M45D differs from mounts M45 and M45C in that it has been modified by the addition of a cannoneer's platform group (MWO ORD A61–W1) (fig. 11) for use on motor carriage M16.

(3) Mount M45F (fig. 12) has additional armor shields (bat wings) for the cannoneer's protection and an on-carriage intercommunication system. Base-ring addition raises mount 12 inches for more depressed firing (fig. 4). Mount M45F is a modified M45D which is mounted on a modified half-track personnel carrier M3 or M3A1 (fig. 10) (designated motor carriage M16A1).

c. Differences Between Early and Late Designs of M45 Series Mounts.

(1) The voltmeter has been removed from the junction box assembly (fig. 8), and a hydrometer case, in which the hydrometer is carried, has been installed on the left rear main frame support.

(2) The turret drive switch (fig. 13) has been replaced with a switch box assembly that has a separate circuit breaker equipped with reset button (fig. 14). A capacitor for spark suppression has been added to the wiring circuit in the box.

(3) Storage batteries (fig. 8) of the same capacity but with larger physical dimensions have been installed.

(4) Safety belts (fig. 15) for the gunner have been added.

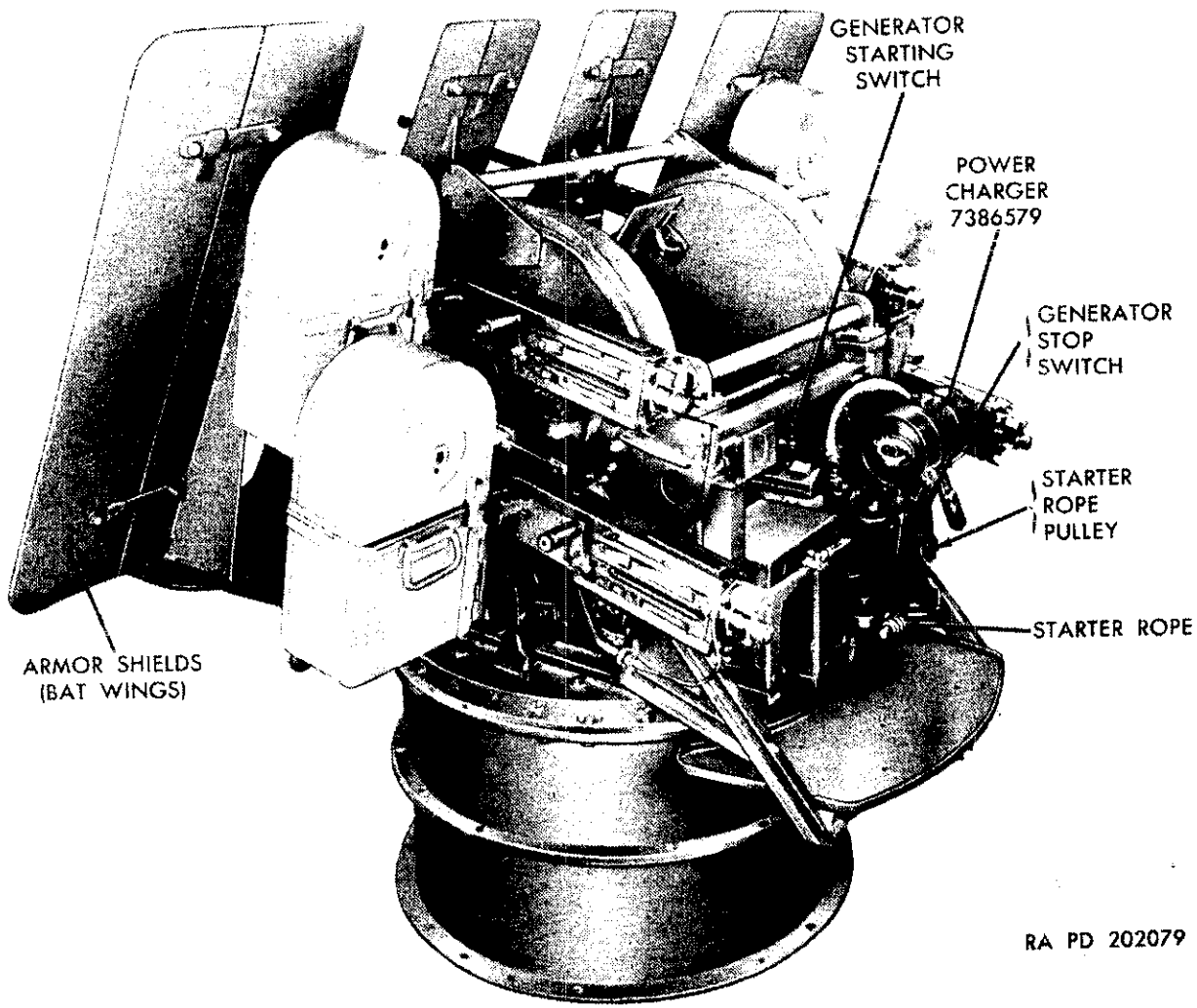


Figure 12. Multiple cal. .50 machine gun mount M45F—rear view.

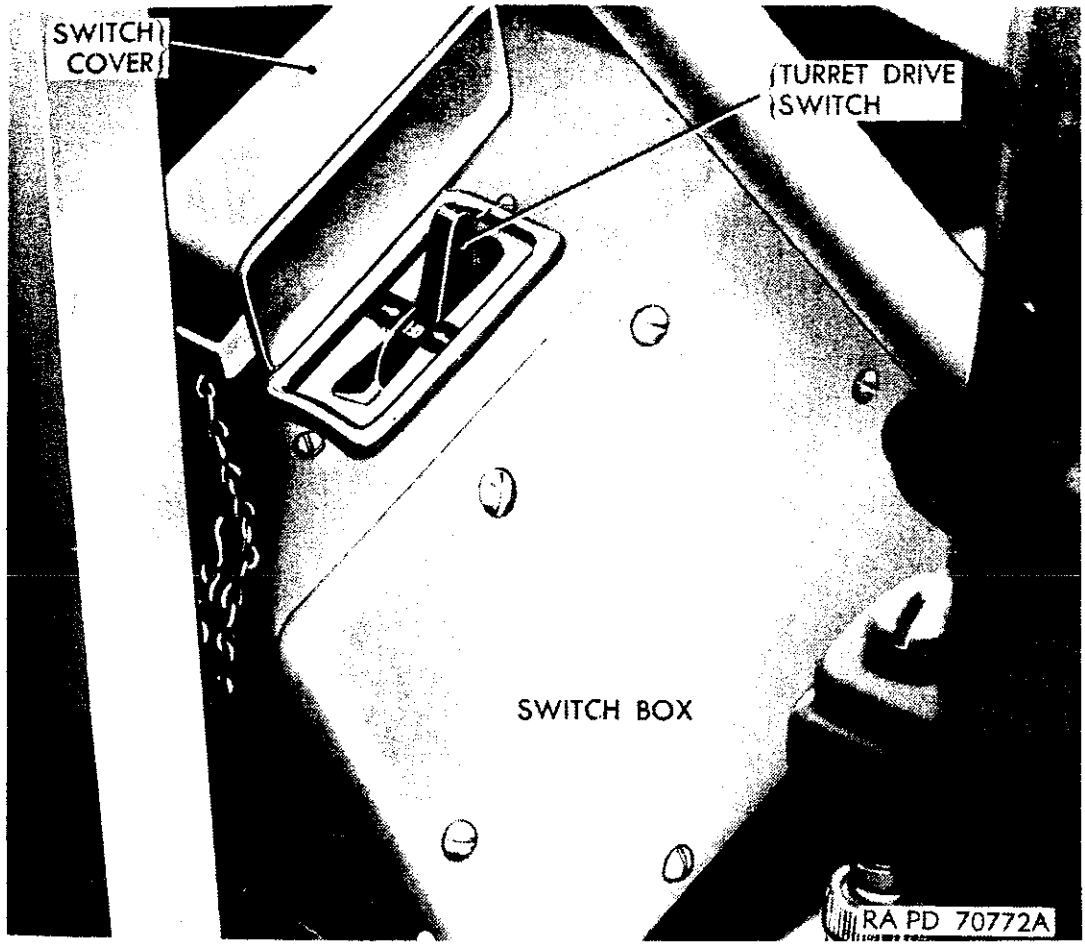


Figure 13. Switch box assembly (old type).

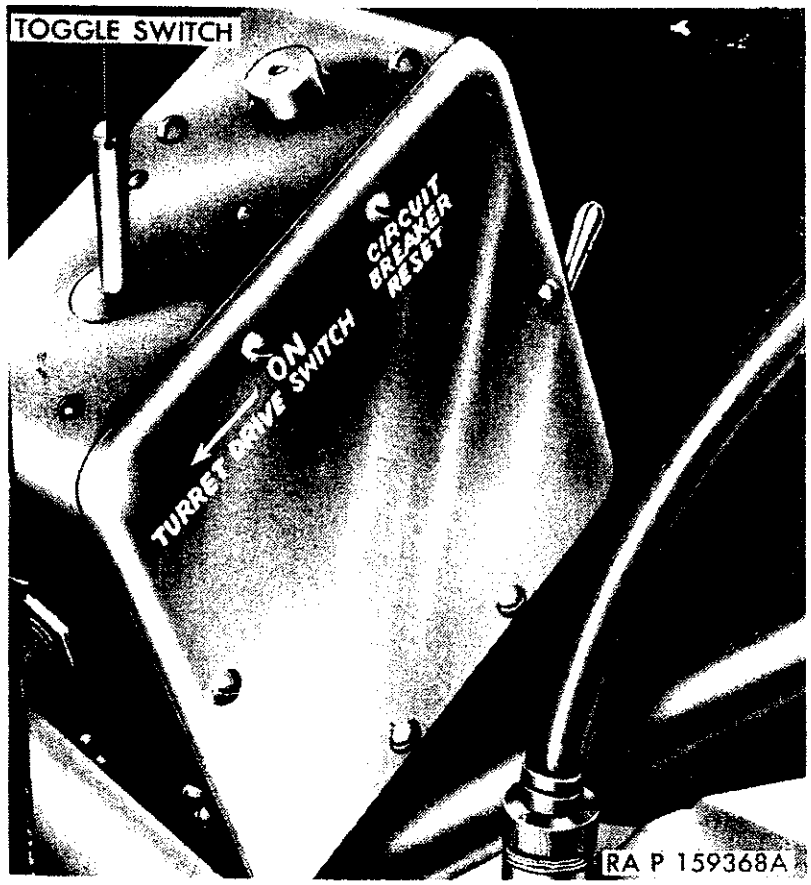


Figure 14. Switch box assembly (new type).

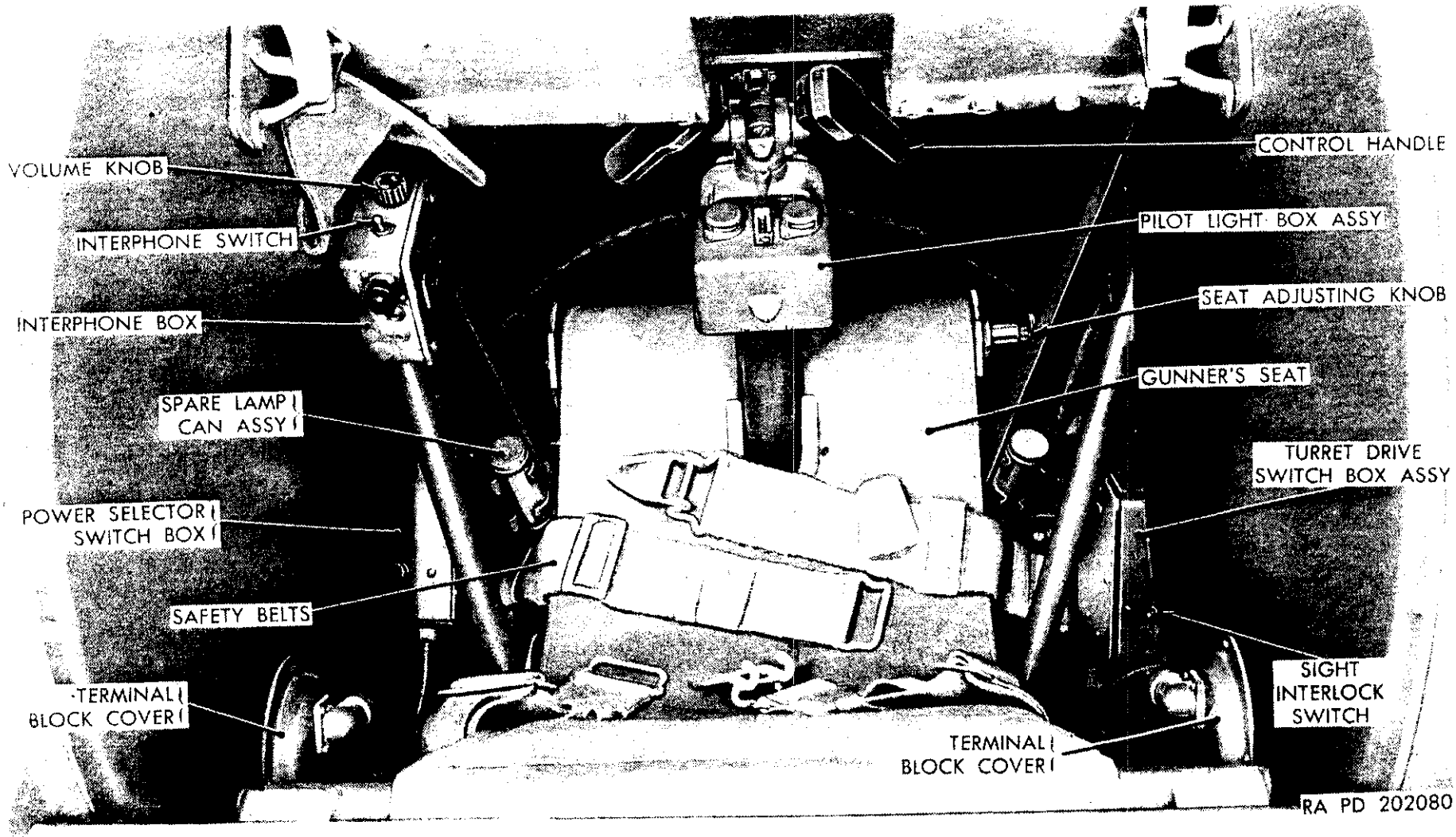


Figure 15. Controls—mount M45F.

5. Serial Number Information and Data Plates

a. Nameplates.

(1) *Mount.* A nameplate (fig. 11) located on the right-hand side of the mount frame contains name, model, serial numbers, and name of manufacturer for the mount.

(2) *Mount trailer.* A nameplate (fig. 5) located at the rear of the mount trailer contains name, model, serial number, and name of manufacturer.

b. Name and Instruction Plates.

(1) *Power charger.* Manufacturer's name and model number are located on the power charger (fig. 8). A generator instruction plate is located on the right-hand post of the mount frame.

(2) *Gun solenoid (back plate type).* A name and instruction plate (fig. 8) located on the right-hand side of the solenoid contains name, serial number, manufacturer's name, and adjustment instructions. A plate located on the left-hand side of the solenoid contains necessary information for setting the clearance for firing pin release when gun is out of battery limits.

c. Warning Plates.

(1) *Air cleaner.* A decalcomania located on the air cleaner (fig. 11) contains a warning on maintaining the oil level in the cleaner.

(2) *Battery.* A plate located on the left rear post of the mount frame (fig. 11) contains a warning on maintaining the water level in the batteries.

(3) *Pilot light box assembly.* Stamped on the front of the pilot light box (fig. 15) is a warning to keep the firing circuit switch off except during action.

(4) *Cutout plug assembly.* A plate located on the turntable near the cutout plug assembly (fig. 16) warns to check position of the cutout before firing so that the interrupter switches are engaged when mount is on a vehicle with cab area in line of fire.

6. Tabulated Data

a. General.

Weight of mount M45 (fully equipped)	Aprx 2,400 lb
Weight of mount M45C (fully equipped)	Aprx 2,150 lb
Weight of mount M45D (fully equipped)	Aprx 2,460 lb
Weight of mount M45F (fully equipped)	Aprx 2,900 lb
Weight of mount trailer M20	Aprx 800 lb
Overall width of mounts M45, M45C, M45D, and M45F.	55 in.

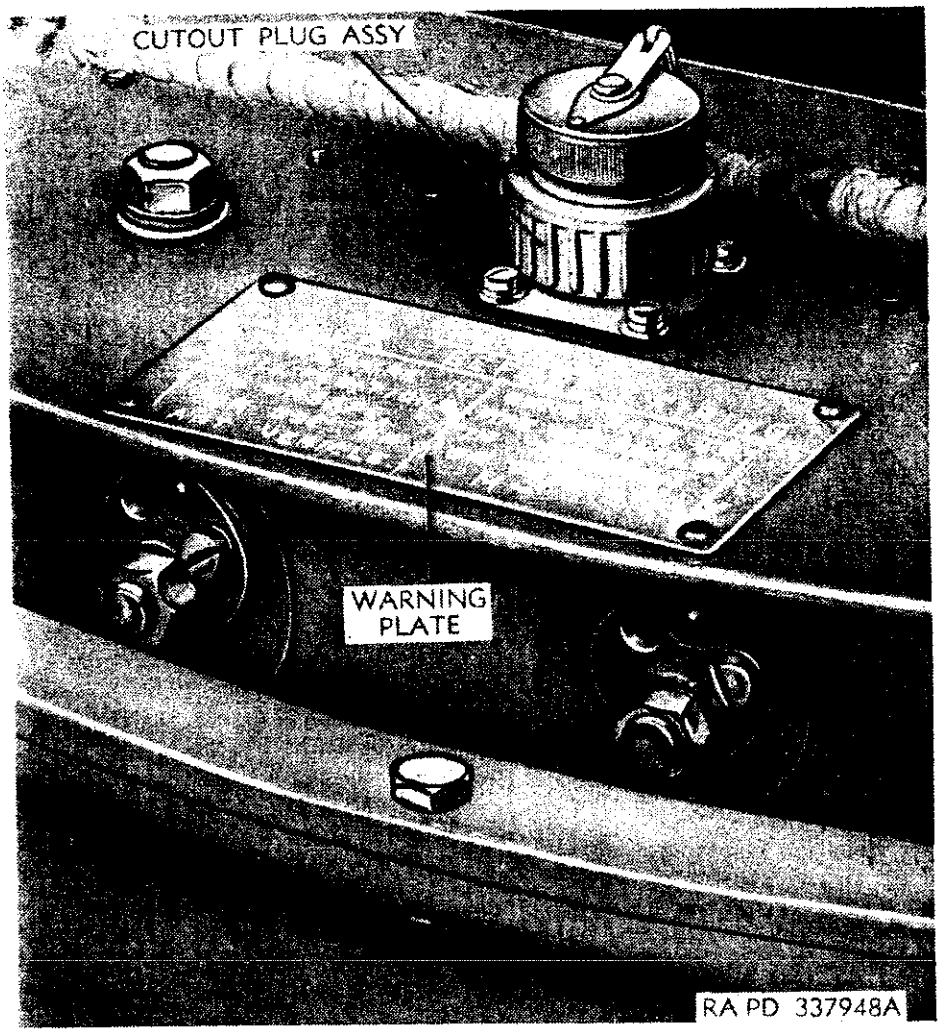


Figure 16. Cutout plug assembly warning plate.

Overall width of trailer mount M55	82⅜ in.
Overall height of mounts M45, M45C, and M45F (guns at max elevation)	75 in.
Overall height of trailer mount M55:	
Wheels attached	63¼ in.
Wheels detached	56¼ in.
Overall length of trailer mount M55	113¾ in.

b. Power Drive.

Power	Maxson variable speed drive, Model 120A w/ electric motor, style 4410417, Emerson Corp, 1 hp, compound wound, 12 v, 90 amp.
Output torque	13 in.-lb at aprx 2,800 rpm.
Dimensions	11 in. high, 18½ in. wide, 25½ in. lg.
Weight	139 lb.
Oil capacity (per differential)	22 cc (1/25 pt).

c. Power Charger.

Briggs and Stratton, Model 304, type 25592

Output	12 v, 300 w.
Gasoline engine (4-cycle)	1 cylinder.
Weight (w/fuel and oil)	75 lb.
Fuel capacity	2 qt
Oil capacity	1½ pt.
Batteries—2—storage, lead acid (4H), 3-cell, 23 plates per cell Min cap at 20-hr rate.	150 amp-hr.

d. Mount Trailer M20.

Width of tread (c to c)	60 in.
Ground clearance under body	7 in.
Height of drawbar lunette for maximum clearance	22½ in.
Tires:	
Size	22 x 7.25 x 11.50 in. (6 ply).
Type	Aircraft, smooth contour tread.
Inflation pressure	50 lb.

e. Armament.

Gun, machine, cal. .50, Browning M2, heavy barrel, turret type, w/o Edgewater adapter—4 mounted outside the right and left trunnions of mounts M45, M45C, M45D, and M45F.

Chest, ammunition, cal. .50, M2—4 mounted on supports attached to right and left trunnions.

f. Performance.

(1) *Mounts M45, M45C, M45D, and M45F.*

Duty cycle (5 min off, 5 min on)	5 hr.

Note.—Tests have indicated that when using a cycle of 5 minutes off and 5 minutes on, turret operation can reasonably be expected for 5 hours, starting with fully charged batteries and running power charger continuously.

Azimuth speed	0 deg to 60 deg per sec.
Elevation speed	0 deg to 60 deg per sec.
Power charger speed	2,600 to 2,900 rpm.

(2) *Trailer mount M55.*

Allowable speeds:	
On smooth surfaced roads	10 mph.
Cross country	5 mph.
Maximum grade	60 percent.
Maximum fording depth	18 in.
Angle of approach	10 deg.
Angle of departure	20 deg.

g. Areas of Interrupted Fire of Mount M45.

Mount M45D elevation interrupter switches:

Lower guns	From lowest limit of depression to 4-deg±1-deg elevation.
Upper guns	From lowest limit of depression to −1½-deg±1-deg depression.

Mount M45F elevation interrupter switches:

Lower guns	From lowest limit of depression t 0-deg±1-deg elevation.
Upper guns	From lowest limit of depression t —5½-deg±1-deg depression.

Mounts M45D and M45F azimuth interrupter switches:

Lower right gun	From 56½-deg±1-deg azimuth left, t 29½-deg±1-deg azimuth right.
Lower left gun	From 22½-deg±1-deg azimuth left, t 63½-deg±1-deg azimuth right.
Upper right gun	From 53-deg±1-deg azimuth left, to 33 deg±1-deg azimuth right.
Upper left gun	From 26-deg±1-deg azimuth left, to 6(deg±1-deg azimuth right.

h. Ammunition.

Cal. .50 rounds carried in each ammunition chest 20

i. On-Carriage Sighting and Fire Control Instruments. For additional information on on-carriage equipment, see paragraphs 9 through 101.

Sight, reflex, M18.
Sight, illuminated, Mk 9, Model 1.

CHAPTER 2

OPERATING INSTRUCTIONS

Section I. SERVICE UPON RECEIPT OF MATERIEL

7. General

a. When a new or reconditioned piece of materiel is first received by the using organization, it is the responsibility of the officer in charge to determine whether the materiel 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 ORD 7 SNL A–61 to be sure every item is present and determine that they are in good condition, clean, and properly mounted or stowed.

b. Make a record of any missing parts and of any malfunctions. Correct any deficiencies as quickly as possible.

c. Pay especial attention to the small parts as they are the more likely to become lost and may seriously affect the proper functioning of the materiel.

d. Whenever practicable, the operating section or crew will assist in the performance of these services.

8. New Materiel

a. Remove materiel from its crate and detach all parts that have been temporarily secured either to the materiel or to the crate.

b. Remove the preserving tape and the greaseproof barrier material.

c. Remove the preservative compound from mount and guns, using a cotton wiping cloth saturated with dry-cleaning solvent or volatile mineral spirits. Use crocus cloth to remove rust only if necessary.

d. Clean gun bores, using bore cleaning cloth and rifle-bore cleaner.

e. Check general condition and appearance of materiel.

f. Check for any missing or broken parts.

g. Assemble materiel and inspect all operating parts for connection and fit.

h. Lubricate the materiel (par. 33).

i. Check battery (par. 91).

j. Install guns (par. 92) and observe the operating parts for smoothness of performance.

k. Check spare parts, tools, and equipment, using Department of the Army Supply Manual ORD 7 SNL A–61.

l. Inspect equipment (par. 37).

9. Used Materiel

In addition to the procedures prescribed in paragraph 8, used materiel will be inspected for the following conditions:

a. Application of all modification work orders. For a current listing of all current modification work orders, refer to SR 310–20–4.

b. Wear and corrosion of parts.

Section II. CONTROLS

10. General

This section describes, locates, and illustrates all controls for operation of the materiel. This section does not include information on the controls and instruments for sighting and fire control. Sighting and fire control instruments are covered in paragraphs 93 through 101.

11. Controls

a. Mounts M45, M45C, M45D, and M45F.

(1) *Control handles.* The control handles (fig. 17) are shaped to fit the hands and are located on the pilot light box assembly directly in front of the seat (fig. 15). Their purpose is to control elevation, azimuth, slewing speeds, and firing by means of trigger switches (fig. 18).

(2) *Depression stop lever.* The depression stop lever (fig. 19) is on the front lower section of the left trunnion sector. This lever, which is manually set before firing, controls the depression arc of mount M45D when armored sides of the motor carriage M16 are raised.

(3) *Trigger switches.* There are two trigger switches (fig. 18). One switch is located in each control handle and their wires are based in the pilot light box assembly. By pressure on these switches by the gunner's index fingers, the firing circuit is energized and the guns fire.

(4) *Firing circuit switch.*

(*a*) The firing circuit switch (fig. 17) is located in the pilot light box assembly and controls the firing circuit.

(*b*) This switch must be kept on SAFE position except during action or drill. This caution must be observed due to

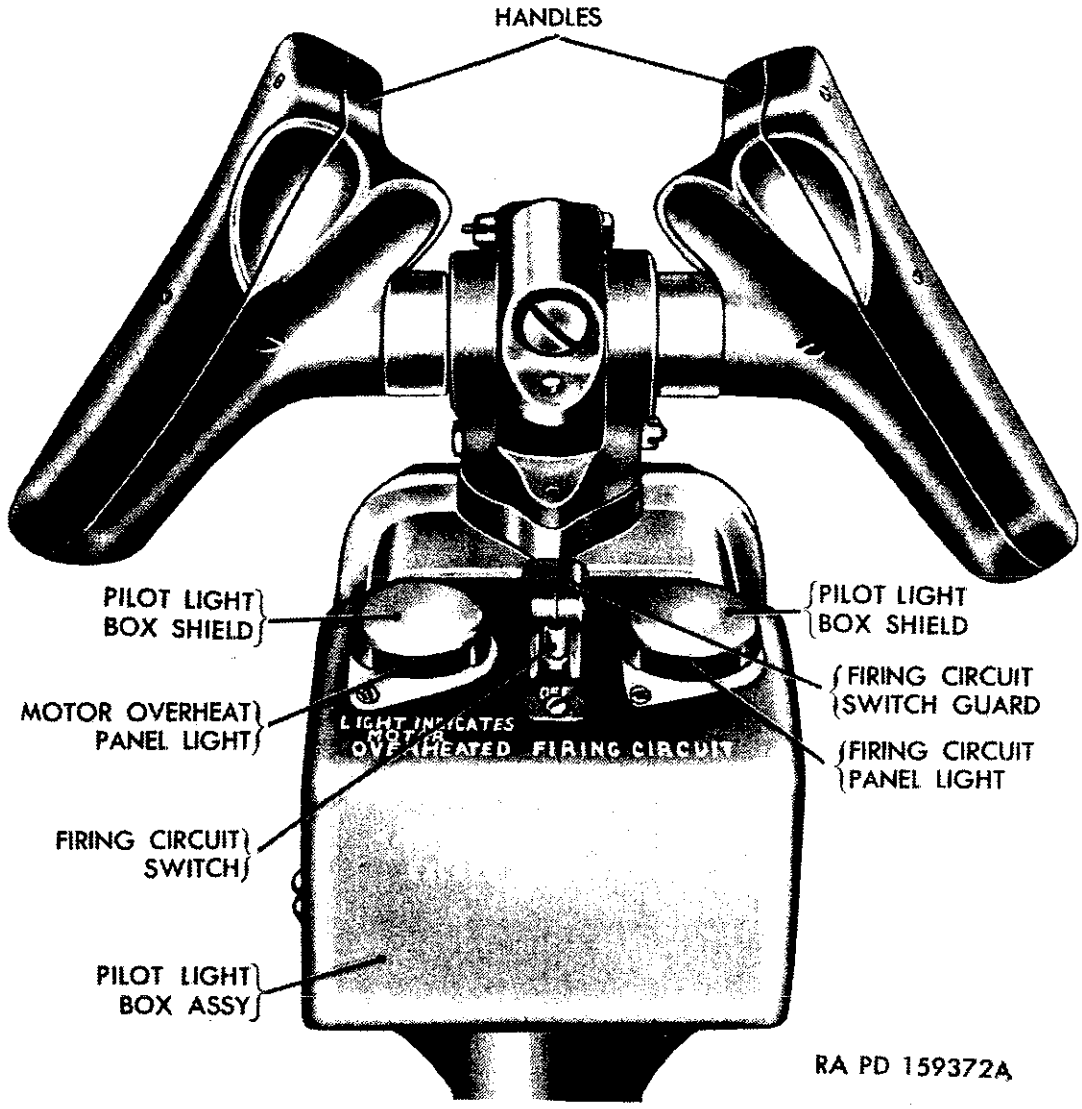


Figure 17. Pilot light box and related parts—front view.

the fact that the guns on the mounts M45 can be fired without the power drive operating.

Note.—On some early model mounts M45, the toggle switch of the switch box assembly must be set to the "ON" position before the firing circuit switch will operate.

(*c*) The red plastic firing circuit switch guard (fig. 17) covers the firing circuit switch. This guard must be closed at all times, except during action or drill, to prevent the firing circuit switch from being accidently engaged.

(5) *Turret drive switch.* This switch is located in the switch box assembly (figs. 13 and 14) and is used to stop and start the power drive motor. The switch box assembly (fig. 15) is located on the lower right-hand side of the mount.

(6) *Manual reset circuit breaker.*

(*a*) The circuit breaker is located in the switch box assembly (fig. 14) to prevent the motor, batteries, and wires against overload.

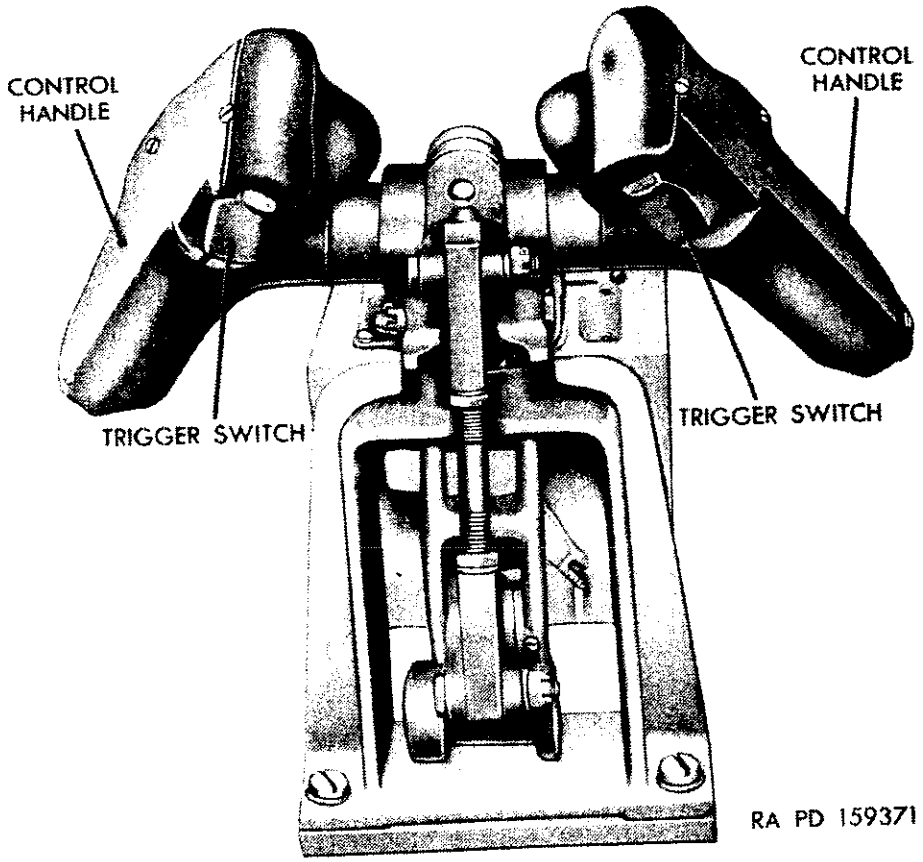


Figure 18. Pilot light box and related parts—rear view.

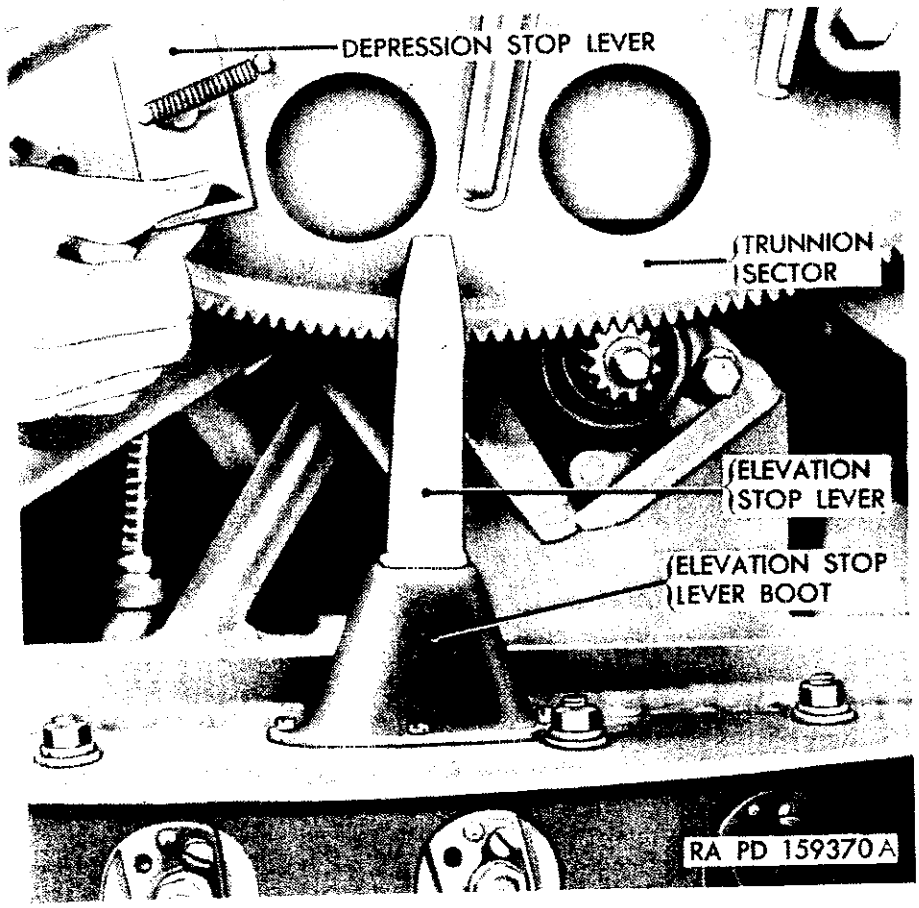


Figure 19. Depression stop lever.

(*b*) This circuit breaker will trip, opening the circuit, when the current exceeds 172 amperes.

(*c*) The circuit breaker is reset by depressing the reset button if the circuit is tripped open.

(7) *Sight interlock switch.* This switch (figs. 14 and 15) is located on the switch box assembly. Its purpose is to control the light in the sight. It is also used in bore sighting the guns. It can be operated without the power drive motor running.

(8) *Generator starting switch* (fig. 12). This switch is located on the generator control box cover and serves the purpose of starting the power charger engine.

(9) *Generator stop switch.* This switch (fig. 12) is located on the blower housing just below the gas tank. Depressing it grounds ignition impulse, causing the engine to stop.

(10) *Cutout plug assembly.* The cutout plug assembly (fig. 16) is located vertically on the right side of the turntable on mount M45C only. It is used to cut out the azimuth interrupter switches under the mount to allow firing of guns in full 360-degree traverse when the mount is not on vehicle with cab area. Proper positioning of the pointer is given on the warning plate near the base of the cutout plug assembly.

(11) *Interphone box (M45F only).*

(*a*) The interphone switch (fig. 15) enables intercommunication between personnel in the mount and vehicle and radio contact from outside sources.

(*b*) The volume knob controls the sound volume in the system.

(12) *Power selector switch box (M45F only).* This switch box (fig. 20) contains a charger switch and a power supply switch which enables power to be available from the mount battery while charging the vehicle battery or from the vehicle battery. Should the vehicle battery go dead for any reason, it is possible to charge it while running gun mount. When both toggle switches are on vehicle side of switch, power is supplied from vehicle battery which is also being charged.

(13) *Seat adjusting knob.* The seat adjusting knob (fig. 15) located at the right of the seat adjusts the depth of the seat. To raise the seat pull out and rotate the knob in a clockwise direction. Reverse motion to lower seat. Lock seat by allowing knob to engage in nearest hole in seat frame.

b. Mount Trailer M20.

(1) *Rear jack latch assemblies.* Two spring-loaded jack latch assemblies (fig. 5), located at the rear of the trailer body, secure the two rear jacks in a horizontal position when trailer is being towed.

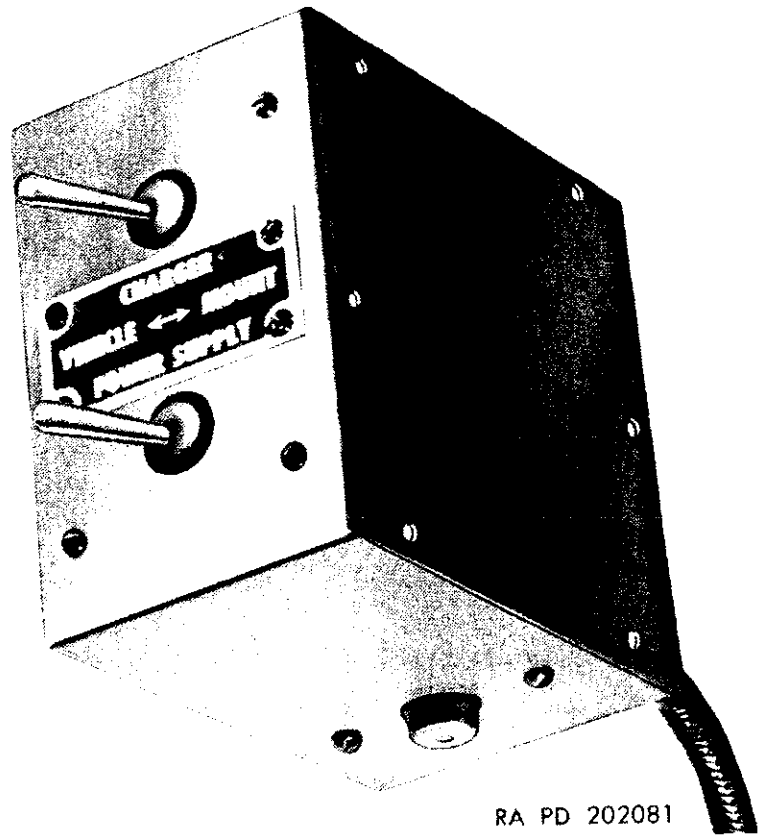


Figure 20. Power selector switch box

(2) *Jack mounting lock pins.* Two spring-loaded jack mo ing lock pins (fig. 5), located on each side of the tra secure the two rear jacks in a vertical position du operations.

Section III. OPERATION UNDER USUAL CONDITIONS

12. General

This section contains instructions for the mechanical steps n sary to operate the multiple cal. .50 machine gun mounts M45, M M45D, and M45F; and the multiple cal. .50 machine gun trailer m M55 under usual conditions. For operation under unusual c tions refer to paragraphs 23 through 28.

13. Preparing Mounts M45, M45C, M45D, and M45F Operation

a. Position the mount so it is not tilted beyond a maximum of 10° from horizontal. A sustained tilt of more than 10° will pe oil to run out of differentials, causing damage to gearing and p belts.

Note.—For preparation of trailer mount M55 for operation and tra refer to paragraph 20.

b. Remove mount cover (fig. 32). Different covers are required for M45C and M45F mounts.

c. Examine and mount guns (par. 92).

d. Install solenoids (par. 70*b*).

e. Remove the reflex sight M18 from its carrying case and install it to the sight assembly mount.

f. Using hydrometer, test batteries (par. 51*c*).

g. Examine connections of battery cables and connectors.

Warning: On mount M45C, be sure that pointer of cutout plug assembly is set to the proper position as instructed by the warning plate located near the base of the cutout plug assembly.

h. Check content of gasoline tank.

i. Set depression stop lever to engage elevation stop lever (fig. 19) for multiple gun motor carriage M16 if required. On all other installation, depression lever may be disengaged.

14. Energizing the System on Mounts M45, M45C, M45D, and M45F

Note.—Early manufactured mounts contain several types of power chargers. Where operation varies the differences are noted.

a. For electrical starting of power charger, proceed as described in (1) through (7) below.

(1) Set the generator switch (fig. 11) on the control box cover of the power charger at "N" (neutral) position (power charger D73846 only). Press generator starting switch (fig. 12) on the cyclohm power charger or other similar chargers.

(2) Pull choke rod about halfway.

(3) Open tank shut-off lever on top of gas tank by turning four complete turns counterclockwise.

(4) Turn generator switch counterclockwise to START position (power charger D73846). Hold it there until motor starts. The motor should start in a few seconds.

(5) After motor starts, release the switch. Upon release, the switch will automatically return to "N" (neutral) position.

(6) As motor warms up, gradually adjust the choke rod until the motor is running smoothly.

(7) When motor is warm and running smoothly, set generator switch in position marked HIGH (power charger D73846).

b. For manual starting when charger fails to start electrically, proceed as described in (1) through (4) below.

(1) Set power charger generator switch at "N" (neutral) position.

(2) Set knotted end of the starter rope (fig. 12) inside one of the two slots in the starter rope pulley and wind the rope around the pulley in a clockwise direction.

(3) With power charger bolted down, pull up quickly on th rope.

(4) When motor starts, allow it to warm up for a few minutes then adjust choke rod until motor runs smoothly. Now se generator switch to position marked HIGH.

c. Gunner takes position in mount (fig. 21) and proceeds wit operation.

15. Operation of Materiel

a. Energize the system (par. 14).

b. Open the red plastic firing circuit switch guard (fig. 17), an then set the firing circuit switch of the pilot light box assembly t FIRE position.

Warning: When checking operation of the firing circuit, make sur guns are not loaded when firing circuit switch is set to FIRE positio When guns are loaded, the firing circuit switch must be set on SAF position except during action.

c. The firing circuit panel light (fig. 17) is located on the right sic of the firing circuit switch. It is shielded by the pilot light box shiel When the firing circuit switch is set to ON position, the firing circu panel light lights, indicating that the circuit is alive.

d. The motor overheat panel light (fig. 17) is located on the le side of the firing circuit switch. It is shielded by the pilot light bc shield. A wire from this light runs to the thermostat, which mounted on the case of the power drive motor. When the motor overheating between 190° and 210° F, the thermostat contacts clos completing the circuit between the thermostat and the motor overhe panel light. Except in emergency, the motor should be stopped wh the motor overheat panel light lights. The high temperature of t motor will cause damage to the insulation.

e. Elevate and traverse as described in (1) through (5) below.

(1) With both hands, grasp the control handles (fig. 21) in natural grip.

(2) To move the mount to any desired position in azimuth, rota the handles in a horizontal arc. For example, to traver mount to the left, rotate handles in a counterclockwi direction.

(3) To elevate or depress the guns, move the handles in a vertic arc. For example, to elevate the guns, push the handles o ward with the heels of the hand. To depress guns, p handles.

(4) To obtain a simultaneous movement of the guns in azimu and elevation, combine the actions described in (2) and (above.

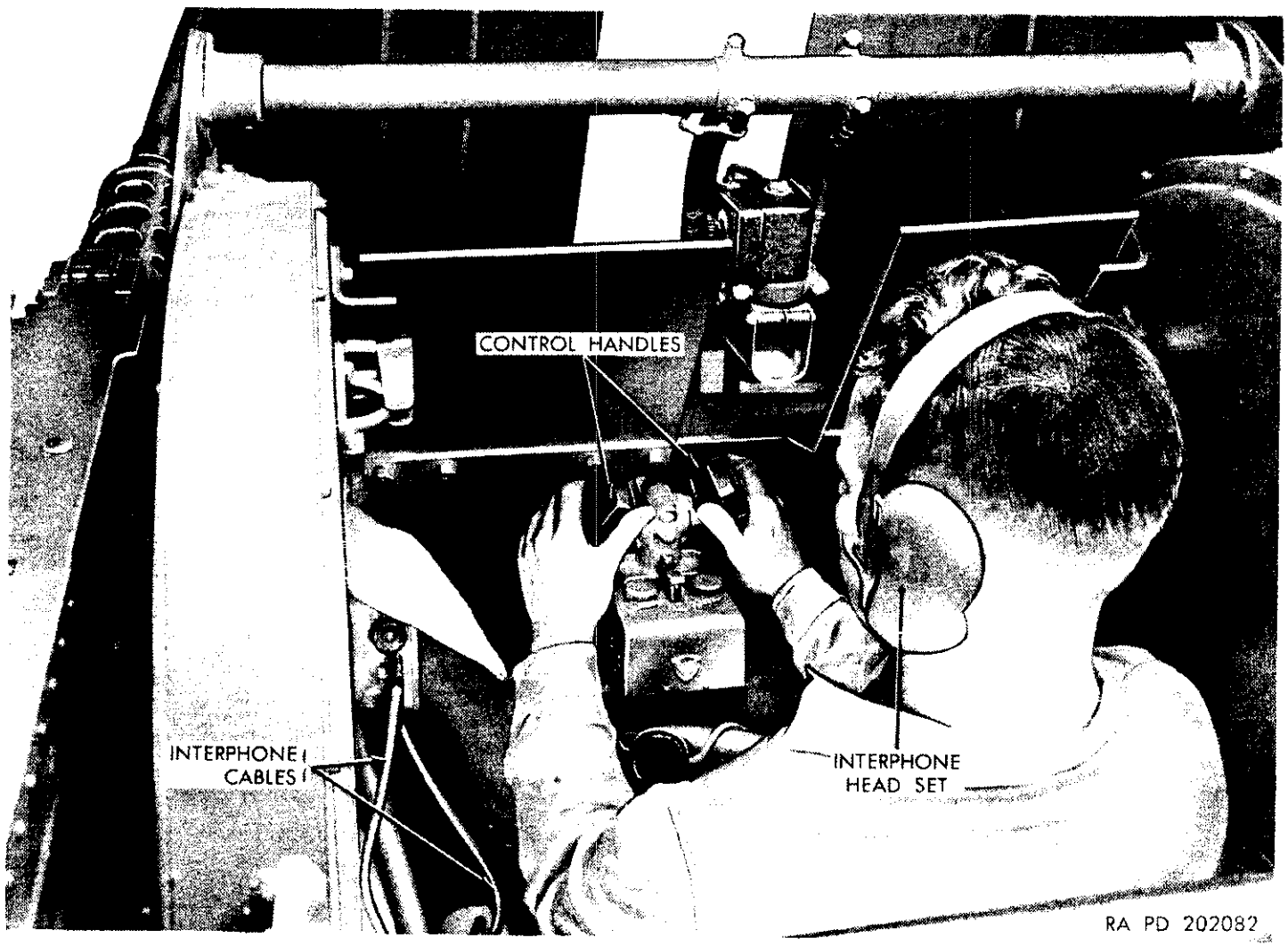


Figure 21. Gunner at controls in mount.

(5) Variations of tracking speed in elevation and traverse are determined by the distance the handles are horizontally or vertically swung from their neutral position.

f. Turn firing switch to OFF position and set red plastic firing switch guard (fig. 17) in position.

g. Before stopping the power drive motor, bring guns to the horizontal position and release the control handles when the handles are in a neutral position. If the mount is on the multiple gun motor carriage M16 or M16A1, the guns should be pointed away from the cab. Turn the toggle switch (fig. 14) to OFF position. With the toggle switch on OFF position, the controls are inoperative.

Caution: Since the late model mount firing circuit switch operates independently of the toggle switch of the switch box assembly, the guns can be fired without the power drive motor operating. Make sure that the firing circuit switch (fig. 17) is on OFF position, except during action.

h. Push in the generator stop switch (fig. 12) on the power charger. This stops the power charger.

16. Before Firing

a. Place the mount in operation (par. 15).

b. Bore sight the guns (par. 98).

c. Make solenoid adjustments (par. 71).

d. Check elevation and traverse and observe the following precautions:

(1) Fire from the guns will be interrupted on vehicles having cabs (fig. 22) when the guns reach the area of fire interruption. Interrupter switches are engaged and break the circuit between the trigger switches and the firing solenoids. This action is repeated for each gun so that it automatically ceases to fire as it enters the interruption area.

(2) When a mount that is taken from a vehicle having a cab is to be used to fire the guns at any angle, including the "dead area," the elevation and azimuth interrupter switches should be cut out. When a jumper is not available, the interrupter switches may be disengaged as described in (*a*) through (*c*) below.

(*a*) Remove the terminal block cover (fig. 15) from the right and left trunnions of the mount by removing four machine screws (fig. 23).

(*b*) Locate the trunnion terminal block (fig. 23) and make the changes indicated in figure 24 on both terminal blocks.

(*c*) Install terminal block cover with four No. 6 x 5/16 fillister-head machine screws (fig. 23). With bright yellow paint, stencil the following in large block letters on the right trunnion cover.

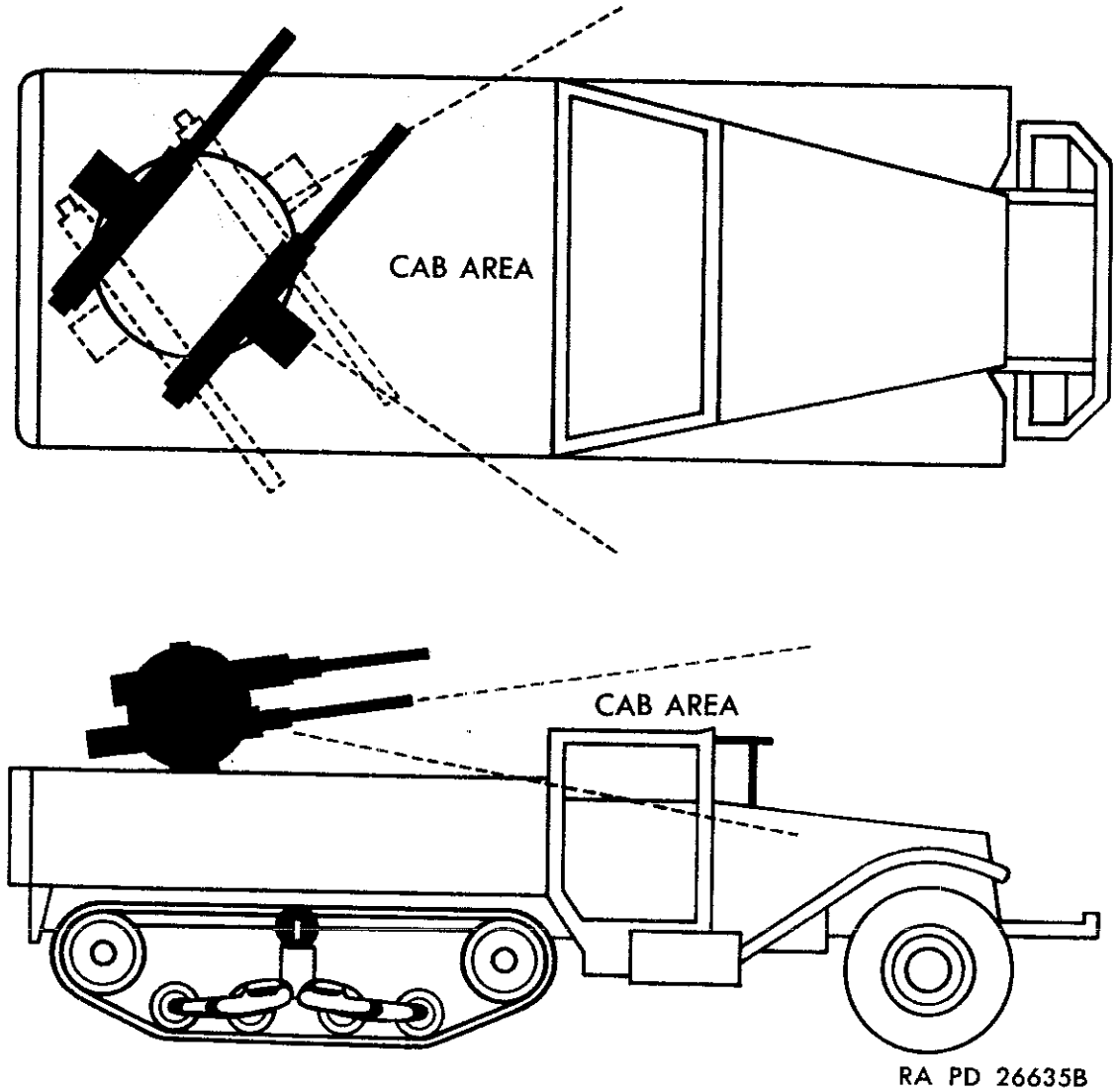


Figure 22. Extent of cab area.

Warning: Azimuth and elevation interrupter switches on this mount are adjusted for multiple cal. .50 machine gun trailer mount M55 (no dead area).

(3) When a mount that is taken from a vehicle having a cab is to be used to fire the guns at any angle, including the "dead area," and a jumper is available, the jumper will be installed to eliminate the area of interrupted fire as described in (*a*) through (*d*) below.

(*a*) Remove the terminal block covers (fig. 23) of the right and left trunnions.

(*b*) Fasten the jumper to the "+" terminal, to the "0" terminal and to the "I" terminal on both interrupter switch terminal blocks.

(*c*) Install the terminal block covers.

(*d*) Position pointer of cutout plug assembly (fig. 16) as indicated in warning plate to fire in "dead area."

(*e*) Install ammunition chests M2 (par. 92) and load guns.

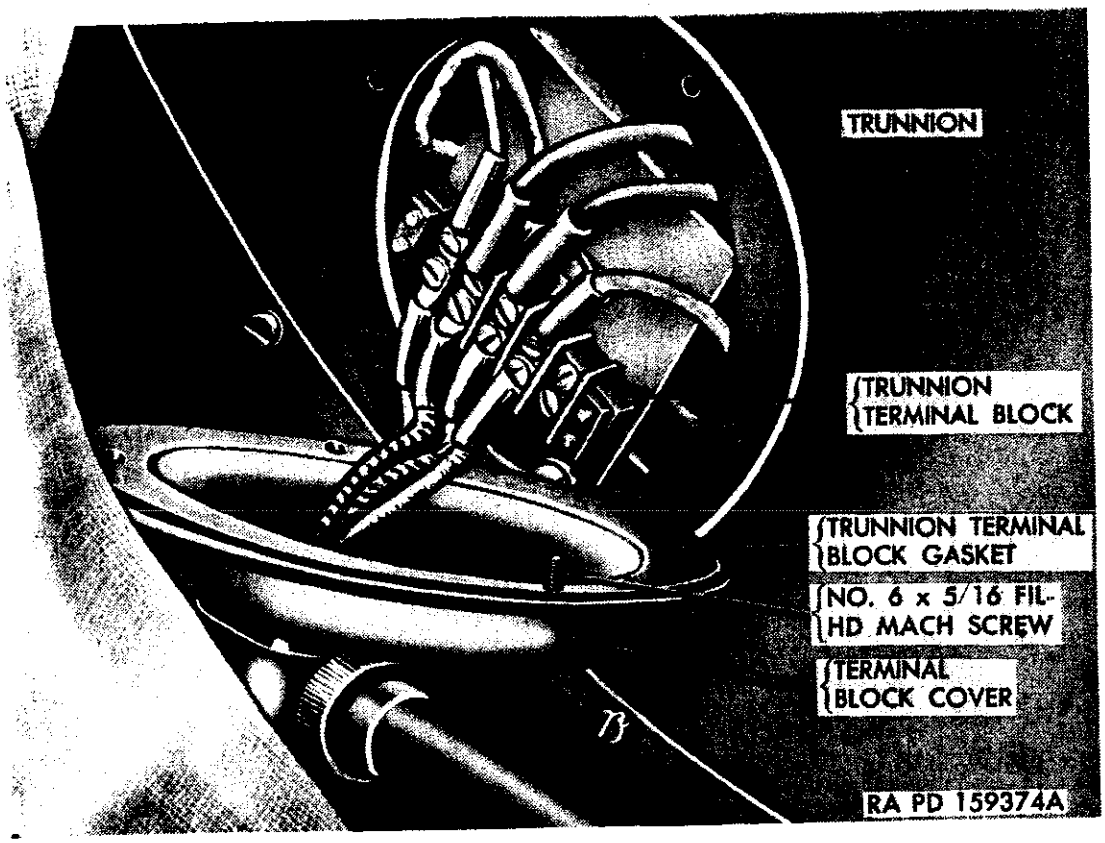


Figure 23. Terminal block—left trunnion.

17. Firing and After Firing Procedure

a. Firing.

(1) Place mount in operation (par. 15).

(2) Fully load guns.

(3) Using thumbs, depress trigger switches (fig. 18).

Note.—Depressing one or both trigger switches will fire all guns.

(4) Gunners will observe guns at all times, and if a stoppage occurs in a gun, will apply action prescribed in paragraph 43.

(5) Cannoneers unload and load ammunition chests as required.

b. After Firing.

(1) Turn firing circuit switch to OFF position (fig. 17).

(2) De-energize system (par. 15*g*).

(3) Unload guns.

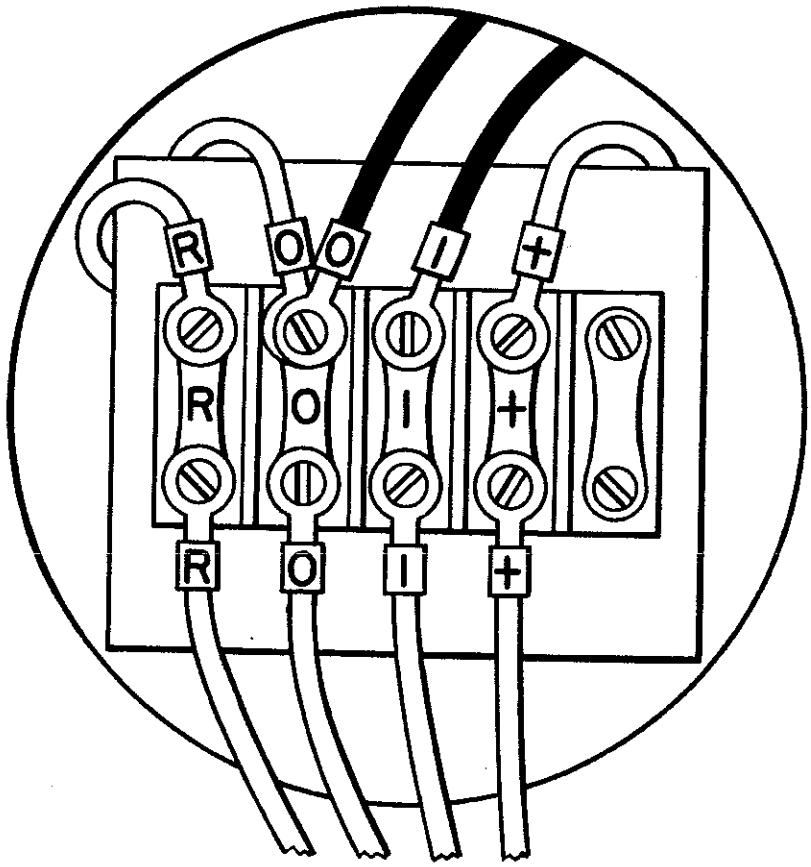
(4) Check batteries, and charge if necessary (par. 51).

(5) Make a physical inspection of the materiel (pars. 8 and 9).

18. Preparing Mounts M45, M45C, M45D, and M45F for Traveling

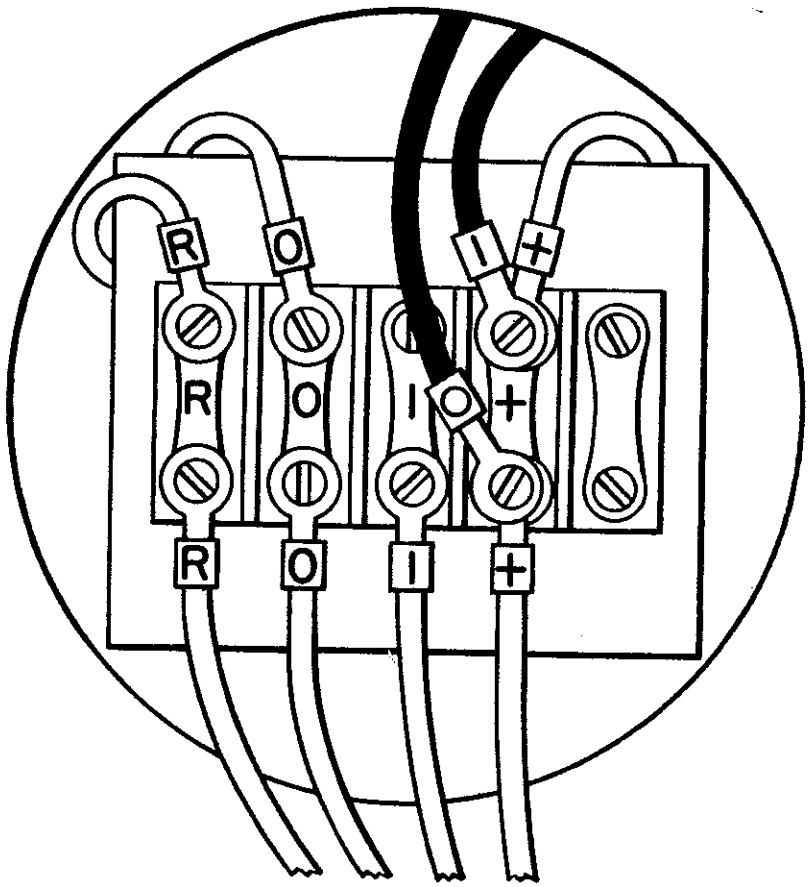
a. Disconnect the sight cable and release the locking lever. Remove the reflex sight M18 from the mount assembly and stow in carrying case (reflex sight M18 only).

Note.—Illuminating sight Mk 9, Model 1 is not removed.



LEFT TRUNNION TERMINAL BLOCK BEFORE CHANGE

WIRES INDICATED IN SOLID BLACK ARE LEADS TO BE CHANGED



LEFT TRUNNION TERMINAL BLOCK AFTER CHANGE

RA PD 70808B

Figure 24. Wiring change—Disengaging elevation interrupter switches.

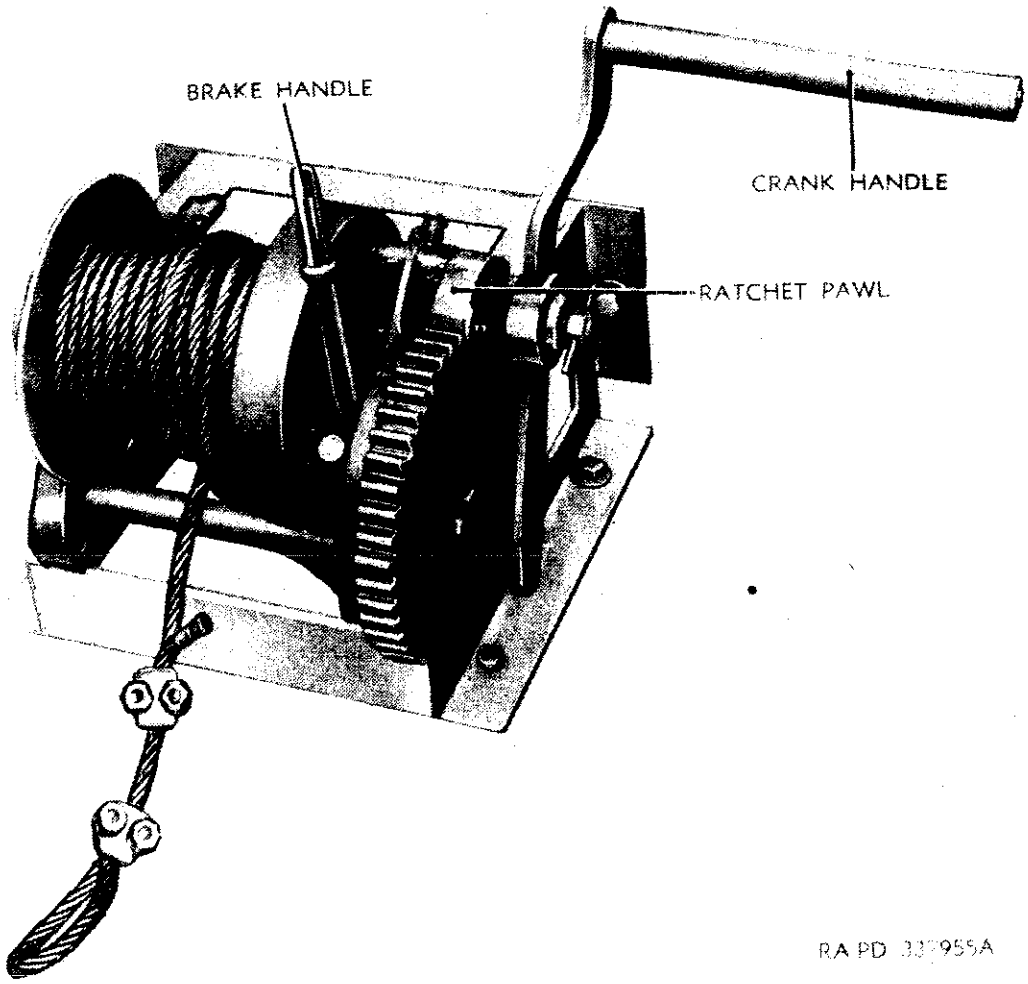


Figure 25. Hand-operated winch.

b. Make sure control handles are in neutral position.

c. Set depression stop in position. Set mount cover in place. The materiel is ready for traveling.

19. Preparing Trailer Mount M55 for Operation

a. Operation of Loading Aid Kit.

(1) To facilitate loading and unloading trailer mount M55 when transported by truck, a 2-ton capacity, hand-operated winch (fig. 25), which is a component of the loading aid kit, is furnished.

Note.—For installation of loading aid kit on vehicle refer to paragraph 84.

The winch is mounted just behind the cab in the transporting vehicle. A crank handle, a ratchet pawl, and a brake handle are integral parts of the winch and are used to help raise or lower the load.

(2) To unwind the cable from the drum, raise the ratchet pawl, pull back on the brake handle to check the cable from uncoil-

ing on the drum, and then pull the cable out the desired distance to attach to the trailer lunette.

(3) To raise the trailer, lower the ratchet pawl, release the brake, and turn the crank handle in a clockwise direction. To lower the trailer, hold the crank handle while raising the ratchet pawl and applying the brake; then turn the crank handle in a counterclockwise direction.

b. Unloading Trailer Mount M55 from Transporting Vehicle.

(1) Drop tailgate on the truck (fig. 26), remove ramp from sides of truck, and hook ends of ramps on hinge bar of tailgate. Space ramps correctly with two spacer bars attached to one of the ramps.

(2) Loosen the four tie-down bolts that hold the trailer and mount to the trailer base mounting frame.

(3) Raise trailer and mount on jacks to height that will permit the wheel with bracket assemblies to be attached to body of trailer.

(4) Place wheel with bracket assemblies (fig. 27) in place and insert wheel bracket wedges to hold brackets secure. Insert wedge lock pins in wedges.

(5) Lower trailer until weight of the trailer mount M55 rests on the wheels.

(6) Raise front jack assembly raising jack handle (fig. 28) as high as possible and lock in place with jack spring lock pin (fig. 5). Then release jack mounting lock pin, rotate rear jack assemblies, and latch into position for moving.

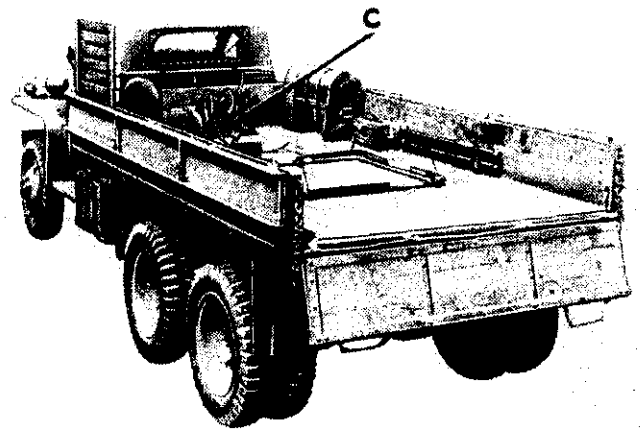
(7) Place two jack handles in drawbar tie rods (fig. 28) and lock with drawbar lock and tie rod pins to provide handle for moving. Connect cable from winch to lunette, using cable clamps provided with cable and winch assembly.

(8) Move trailer to rear of truck (fig. 26) by hand, keeping the winch cable tight.

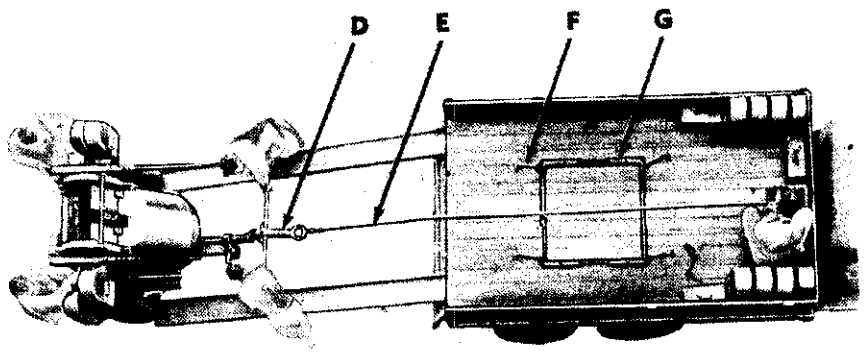
Note.—Five men are normally required to unload the trailer and mount from the truck to the ground: one to man the winch, two to handle the drawbar and guide the trailer down the ramps, and two to hold the chock blocks behind the wheels of the trailer as it rolls down the ramps.

(9) With one man unwinding winch (*a* above), two men guiding trailer by the jack handles locked in drawbar tie rod, and one man on the outside of each ramp, holding a moving chock block behind wheel, roll trailer down the ramps to the ground. Detach winch cable from lunette and wind cable up on the winch. The trailer mount is ready to be towed away.

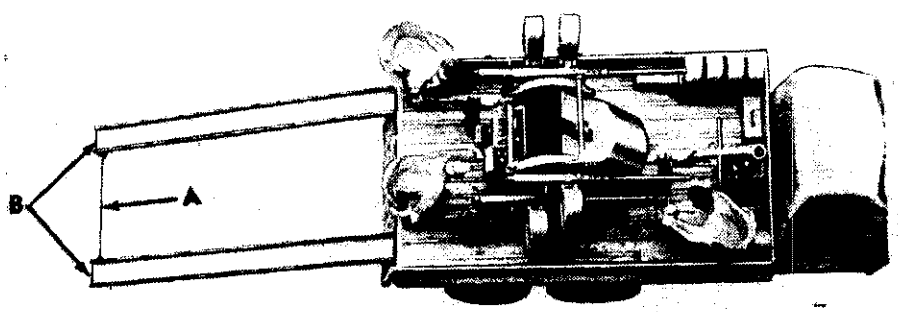
Caution: Jack spring lock pins (fig. 5) must be alined in jacks before moving the trailer at any time. Failure to lock jacks may cause accidents or broken jack assemblies.



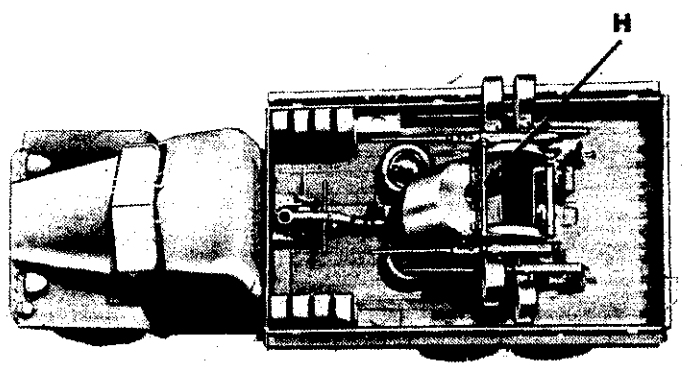
2-1/2 TON 6 x 6 TRUCK



TRAILER AT BOTTOM OF RAMPS



SPOTTING TRAILER ON MOUNTING BRACKET



TRAILER LOADED FOR TRANSPORT

RA PD 337938A

A—Spacer bar

C—Loading winch

E—Winch cable

G—Base mounting frame

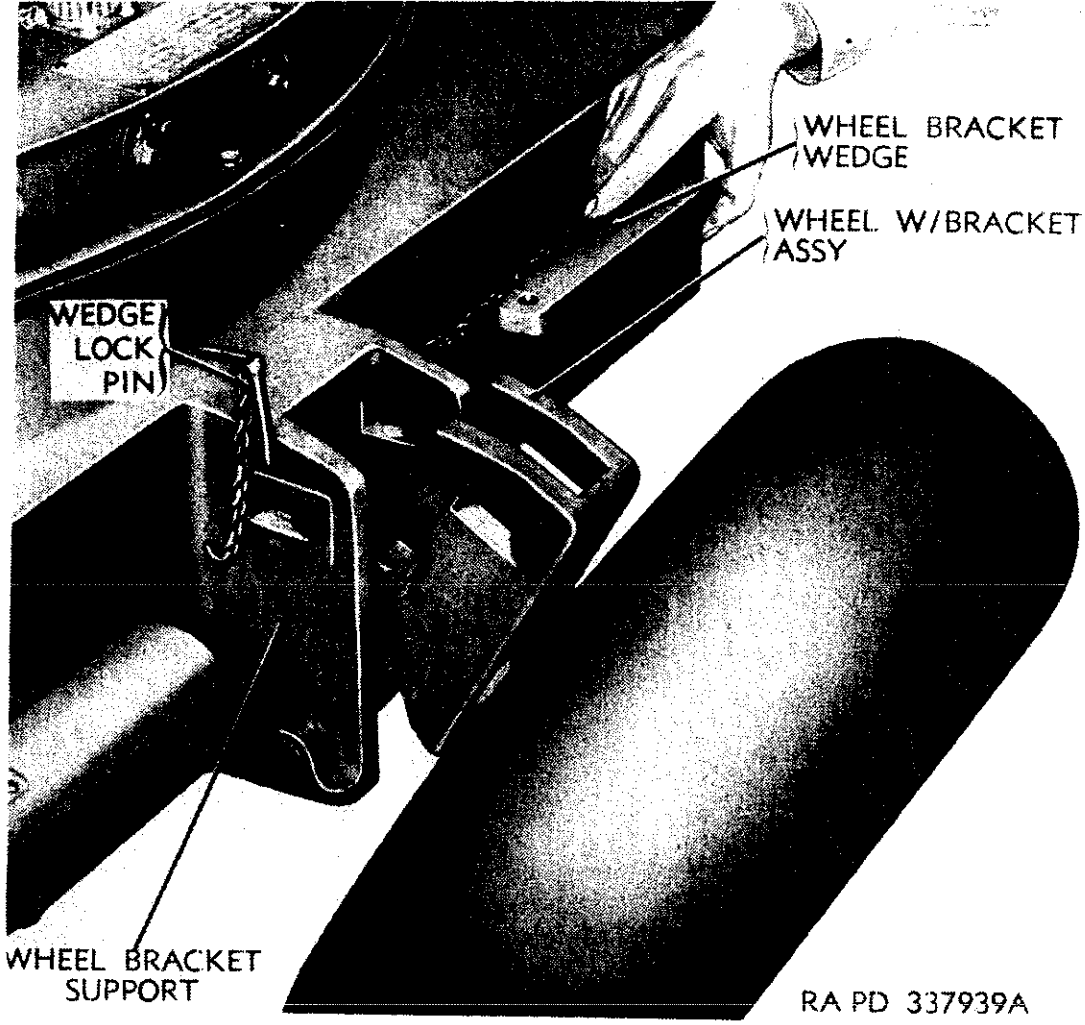


Figure 27. Removing and installing wheels of mount trailer M20.

c. Coupling Trailer Mount M55 to Towing Vehicle.

(1) Insert two jack handles in drawbar tie rod (fig. 28), lock with drawbar lock and tie rod pins, and move trailer mount to towing vehicle.

(2) Hook drawbar lunette to pintle hook of towing vehicle. The height of the pintle hook on the towing vehicle should be approximately 22½ inches. More or less than this will decrease the amount of clearance between the body of the trailer and the ground.

(3) Remove taillight jumper cable plug from dummy socket and connect it to socket at rear of towing vehicle.

(4) Remove jack handles from drawbar tie rod and place in tool box assembly. Check all three jacks to see that they are securely locked in position for traveling.

d. Driving Towing Vehicle With Trailer Mount M55. The towing vehicle with trailer mount M55 is driven in much the same manner as the towing vehicle alone. The procedures outlined in (1) through (4) below, however, should be observed.

(1) Test the operation of the blackout light assembly (fig. 5).

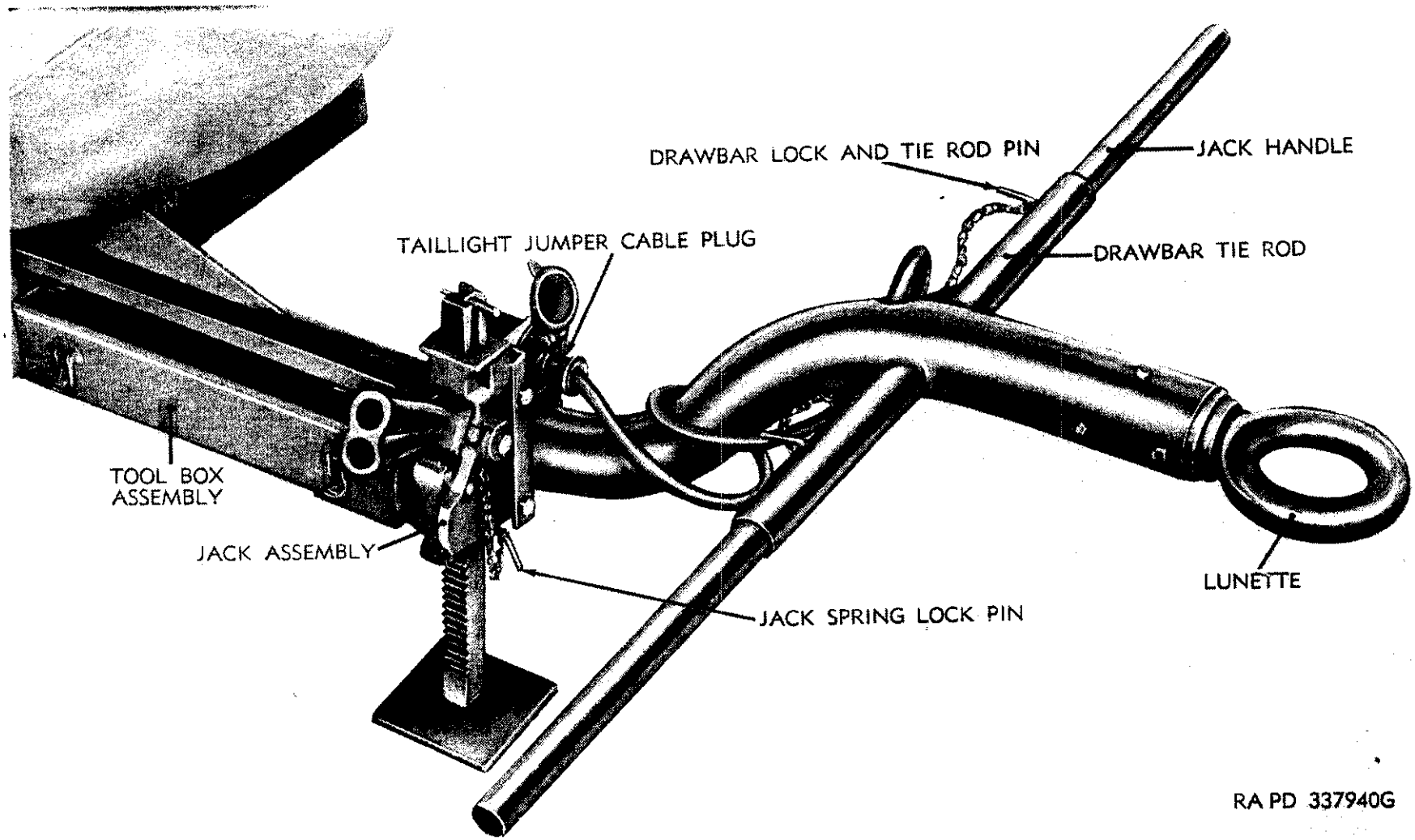


Figure 28. Drawbar group.

(2) When turning corners, allow for the fact that the trailer wheels turn inside the turning radius of the towing vehicle.

(3) When backing, steer the towing vehicle in the opposite direction to that which the trailer is to be turned.

(4) When stopping, remember that the force of another vehicle in motion must be stopped as well as the towing vehicle itself. With only the available braking power of the towing vehicle to use, plan to allow a greater distance in which to bring the two vehicles to stop.

e. Uncoupling Trailer Mount M55 from Towing Vehicle.

(1) Remove two jack handles from tool box assembly (fig. 28), insert them in drawbar tie rod, and lock with drawbar lock and tie rod pins attached by chains to drawbar.

(2) Disconnect jumper cable from truck, wind cable around drawbar to take up slack, and insert plug in dummy socket on drawbar.

(3) Uncouple drawbar lunette from pintle hook of towing vehicle.

(4) Move trailer and mount to desired location, by manpower if necessary.

f. Emplacing Trailer Mount M55.

(1) Lower front jack assembly to hold drawbar the desired height from ground. Lock jack assembly with jack spring lock pin.

(2) Remove jack handles from drawbar tie rod. Release the two rear jacks from traveling position by lifting jack mounting lock pins (fig. 5) in jack mount brackets. Pull out (toward the rear) on the entire jack and mount assemblies. Turn jack standards to vertical position with jack bases toward the ground. Line up holes of jack mounts and jack mount brackets so that jack mounting lock pins will lock jacks firmly in vertical position.

(3) Insert one jack handle in each jack, and raise trailer until both wheels are clear of the ground. Insert jack spring lock pins in jacks.

(4) To remove a wheel, pull wedge lock pin (fig. 27) from wheel bracket wedge in wheel bracket. With lead hammer, loosen and remove wedge. Lift wheel and bracket assembly from body and lay wheel, bracket side up, in front of trailer (fig. 6), next to drawbar. Remove other wheel in the same manner.

(5) Lower the trailer body. Remove jack handles and place in tool box assembly (fig. 28) together with lead hammer used in removing wedges.

(6) Install wedges in slots and key with lock pins.

(7) The trailer and mount are now in position for use.

(8) Prepare mount M45C for operation (par. 13).

20. Preparing Trailer Mount M55 for Traveling

a. Assemble wheels to trailer mount M55 (par. 19*b*(3) through (7)).

b. Couple trailer mount M55 to towing vehicle (par. 19*c*.)

c. Observe hints given in paragraph 19*d* when driving the towing vehicle.

d. When the trailer mount M55 is to be transported by loading on a truck, the trailer mount M55 is usually towed to the loading site. Uncouple trailer mount M55 from towing vehicle (par. 19*e*).

e. Load trailer mount M55 onto transporting vehicle (fig. 26).

(1) Drop tailgate on truck, remove ramps from sides of truck, and hook ends of ramps on hinge bar of tailgate. Space ramps correctly with spacer bars attached to one of the ramps.

(2) With jack handles in drawbar tie rod, move the trailer mount M55 up to the ramps.

(3) Unwind cable from winch and attach to lunette, using cable clamps provided.

(4) Wind winch until wheels of trailer are on truck floor.

Note.—Five men are normally required to load trailer mount M55 onto the truck: one man operates the winch, two men guide the trailer mount up the ramps by the drawbar handles, and two men, one on outside of each ramp, hold and move chock blocks behind wheels.

(5) Spot trailer body over trailer base mounting frame.

(6) With jacks, lift up trailer mount M55 and remove wheel with bracket assemblies (fig. 27). Place wheel with bracket assemblies on truck floor (fig. 26), bracket side up, directly in front of trailer base mounting frame and on either side of drawbar.

(7) Lower trailer into the trailer base mounting frame and on the truck floor.

(8) Remove jack handles and place in tool box assembly (fig. 28).

(9) Bring tie-down bolts in place with washer and nut on top of lugs and turn tight.

(10) Hook ramps on side of truck and tie down with web straps provided for this purpose. Close tailgate.

Note.—Winch cable remains attached to lunette, ready to unload at new location.

21. Additional Armor

a. Additional armor shields (bat wings) (fig. 29) have been added on mount M45F. For mounts with additional armor, the bat wing will be folded (fig. 30) during travel and opened during firing. Mount may be operated with wings folded.

b. The armor shields swing on hinges and are locked by locking bars (fig. 31) for maximum protection.

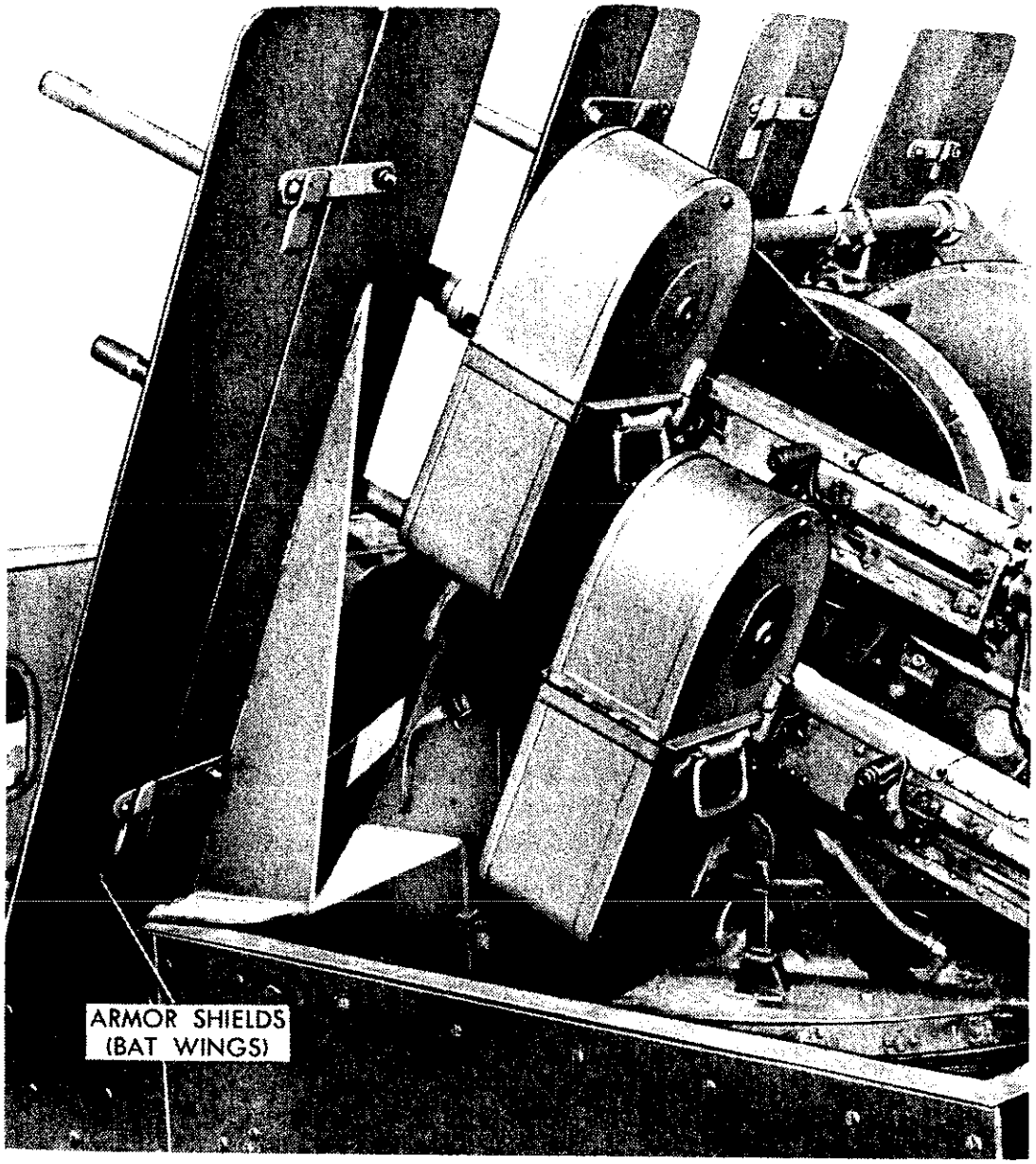


Figure 29. Armor shields (bat wings) open on mount M45F.

c. When mounts are prepared for long distance shipment, the armor shields are removed. For installation and removal of armor shields, refer to paragraph 67.

22. Intercommunication System for Mount M45F on Motor Carriage M16A1

A radio and interphone communication system (figs. 15 and 21) is provided for mount M45F on motor carriages M16A1 which enables contact between the gunner in the mount and the vehicle commander in the cab. Operation of communications equipment is covered in Signal Corps manuals.

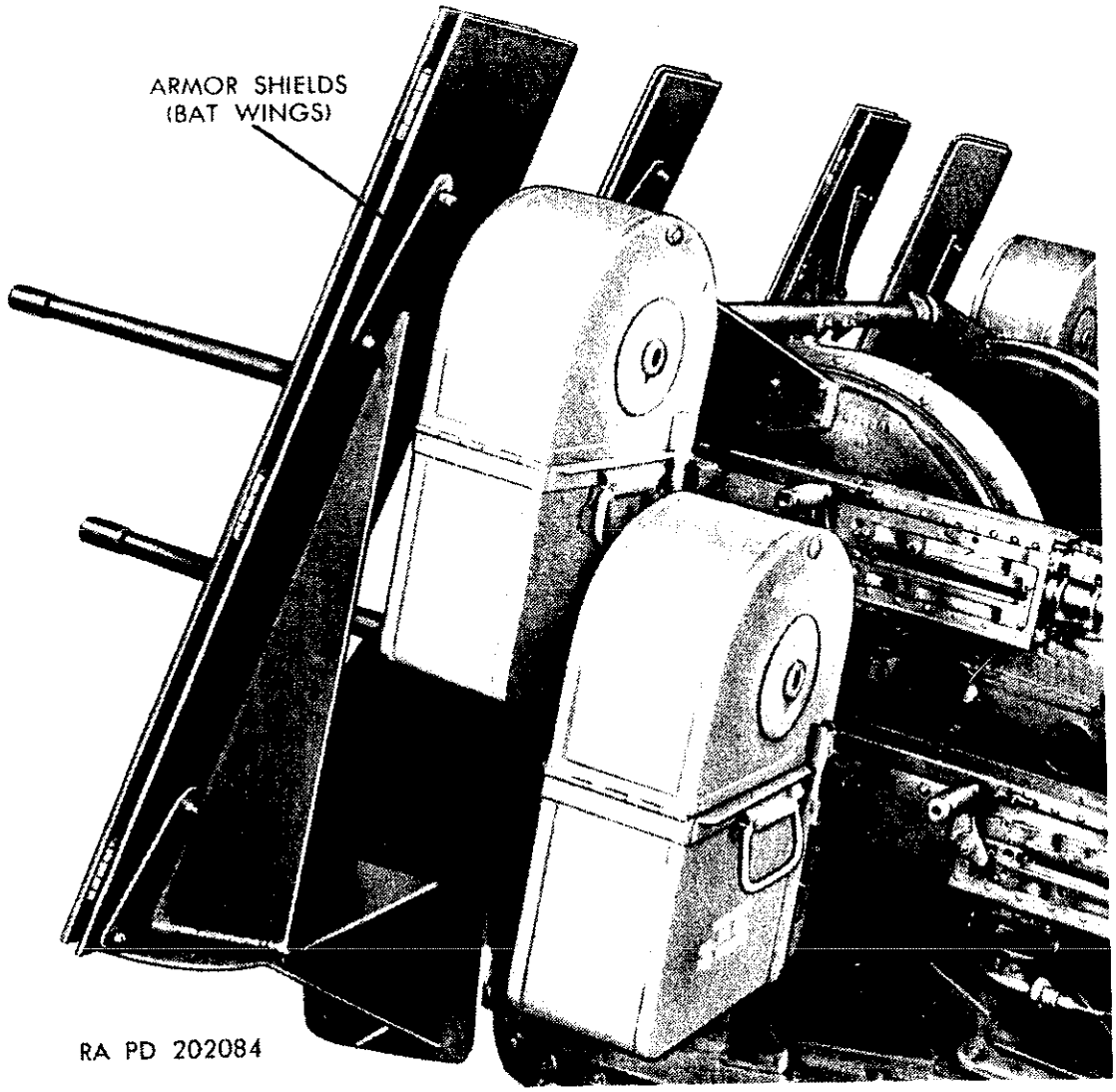


Figure 30. Armor shields (bat wings) folded on mount M45F.

Section IV. OPERATION UNDER UNUSUAL CONDITIONS

23. General

The mechanical steps of operation under unusual conditions are the same as those for operation under usual conditions which are covered in paragraphs 12 through 22. In addition to the normal preventive maintenance service specified throughout this manual, special care in cleaning and lubrication should be observed where extremes of temperature, humidity, and atmospheric conditions are present. Proper cleaning, lubrication, and storage and handling of lubricants not only insure proper operation and functioning, but also guard against excessive wear of the working parts and deterioration of the materiel.

24. Cold Weather Operation

a. Preparation for Cold Weather Operation.

(1) When it is anticipated that the materiel will be operated in cold climates, it is necessary to prepare the guns, mounts, and

equipment for cold weather operation. Refer to the lubrication order (par. 33) for the lubricants prescribed under the expected temperature of operation. When it is necessary to change grades of lubricants or change to a more fluid lubricant, it is imperative that the parts receiving the lubrication be completely disassembled and cleaned before the new lubricant is applied.

(2) Cleanliness is imperative. Rust, dirt, gumming oil, and grease in the bearing clearances interfere with proper distribution of lubricant, thus causing stiff action, if not complete stoppage, in subzero weather. In preparing materiel for subzero operation, therefore, assemblies and mechanisms

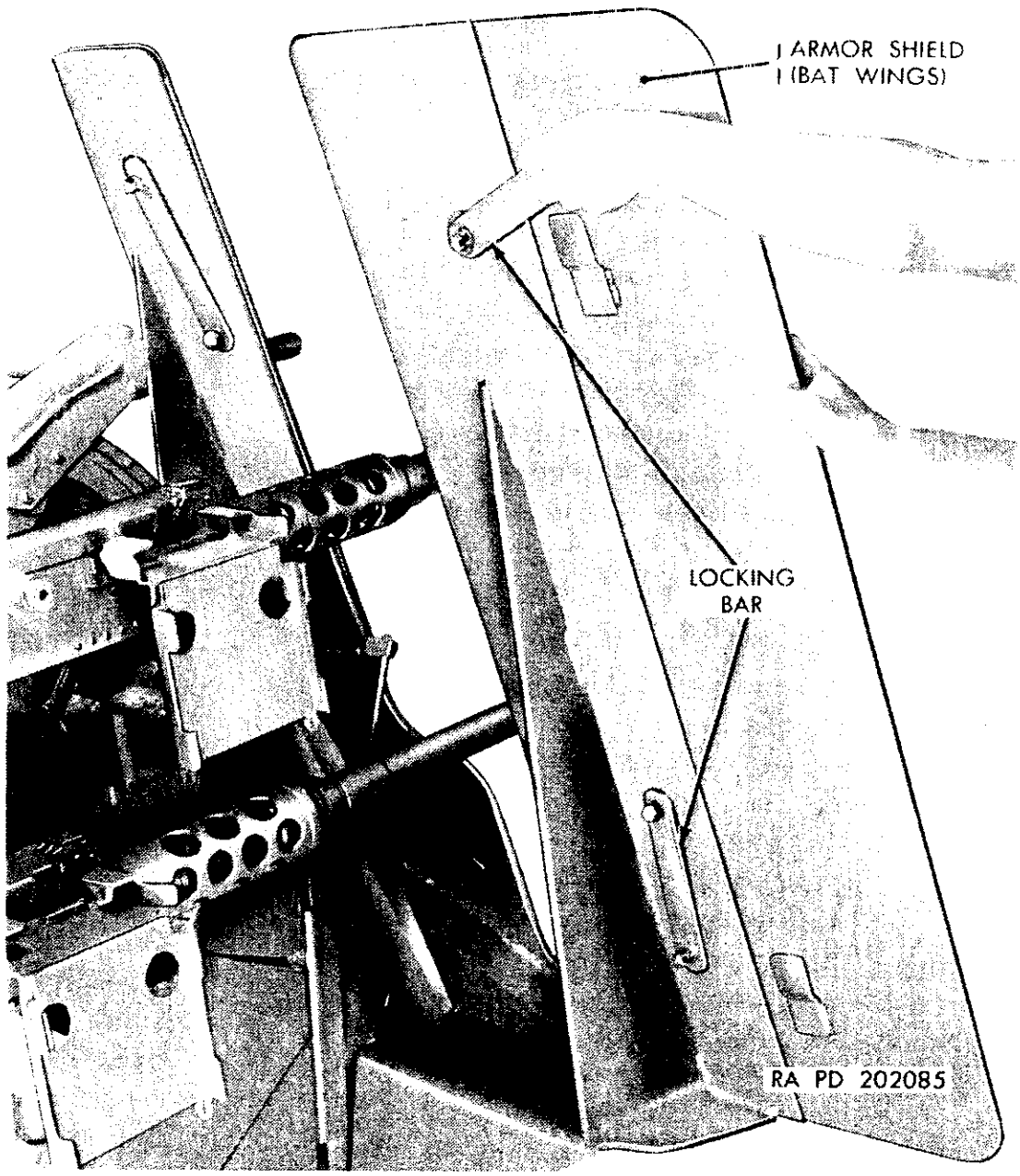


Figure 31. Locking armor shields (bat wings) on mount M45F.

must be disassembled sufficiently to permit complete removal of heavy oil, grease, and foreign matter. Cleaning is more efficiently done by washing with dry-cleaning solvent or volatile mineral spirits, using brushes and scrapers where necessary. Care must be taken not to overlook cleaning small items which may appear insignificant. Field experience has proved that careless repair, excessive lubrication, and thickening of lubricants in bearings and other similar parts may cause malfunctioning or failure of equipment in subzero weather.

b. Cold Weather Operating Instructions and Daily Care.

(1) Do not let snow and ice collect on moving parts. Remove snow by vigorously brushing with a stiff bristle or wire brush before movement of the parts is attempted.

(2) Keep all parts thoroughly clean. The procedure for cleaning the materiel is the same as for normal conditions.

(3) Leave no unpainted metal surfaces exposed without a protective film of lubricant.

(4) In addition to the procedures for traveling outlined in paragraph 20, particular attention will be given to the following:

(*a*) Make a thorough inspection and provide as much protection as possible for all parts. See that covers are properly installed and securely fastened.

(*b*) Do not fold canvas when wet or frozen.

(5) When the materiel is protected with canvas or other type of cover, moisture may form on the metal surfaces. To prevent rusting, the cover must be removed daily, and exposed surfaces inspected for the presence of moisture or ice. If moisture or ice is found, the surface must be cleaned thoroughly, dried, and coated sparingly with a light oil.

c. Prevention of Condensation.

(1) When guns, sighting and fire control equipment, parts, or assemblies are brought indoors after they have been outside at low temperature, vapor in the warm air will condense on the cold parts. If it is not dried off, this condensed moisture may cause rust and corrosion of the parts. In some cases, drying without disassembly is practically impossible. If the materiel is operated indoors while this moisture is present, the moisture will form an emulsion with the grease used for lubrication. Such a condition will necessitate removing all the grease and lubricating the instrument. If the materiel is taken outside with this moisture present, the parts will become covered with frost and may not function.

(2) Do not bring any materiel indoors unless it is absolutely necessary. It is best to leave it outdoors, but covered t

protect it from snow. Snowtight lockers which stay at outdoor temperatures are recommended as a place for keeping binoculars, telescopes, and other equipment.

(3) If it is necessary to bring instruments or other equipment from low temperatures to room temperature, "anticondensation" containers should be used. These containers can be specially made boxes, GI water cans, barracks bags, or any other fairly airtight containers with heat-conducting walls. Keep them outside so they will remain at prevailing temperatures until it is desired to bring an instrument indoors. Then put the instrument into a container, close the top, bring it indoors, and let it come to room temperature. It can be put near a stove to hasten the warming-up process.

(4) The air in the container is cold dry air from the outdoors. When it is heated, the air expands and breathing is outward; therefore, no warm humid air from the room comes in contact with the instrument and no condensation forms. When the instrument is at room temperature, the container can be opened and the instrument removed without condensation forming.

(5) It is possible for condensation to form on the inside of sealed optical instruments when they are taken outdoors to a low temperature after having been assembled at room temperature. To avoid this possibility, the instrument should be finally sealed in a room that is kept at outdoor temperature.

d. Exercising. Exercise the various controls through their entire range at required intervals to aid in keeping the controls from freezing in place and to reduce the effort required to operate them.

e. Sighting and Fire Control Instruments.

(1) Sighting and fire control instruments will operate satisfactorily at subzero temperatures if they are properly winterized and certain adjustments are made.

(2) Ordnance maintenance of fire control instruments in cold weather where shop facilities are lacking will be difficult. Therefore, all equipment should be thoroughly inspected and winterized before the onset of cold weather. Although the lubricants used on all fire control equipment are satisfactory for subzero operation, there is always danger of overlubricating. Therefore cleaning and lubricating are necessary on both old and new fire control equipment. Lubricate sparingly; a thin coat of grease is as effective as a thick coat for lubricating fire control mechanisms or for protecting them from corrosion.

25. Operation in Extremely High Temperatures

a. Changes in temperature will cause condensation of moisture in the air on metal and cause rusting. If condensation occurs on metal parts of the guns and mount, wipe them dry and coat with oil as required to prevent rusting.

b. Materiel should be inspected frequently when being operated in hot, moist areas. For care of canvas covers and other items, see paragraph 26*c*.

c. Keep tires covered with materials which may be available to protect them from the direct rays of the sun to prevent excessive air pressure and deterioration of rubber.

26. Operation in Excessively Moist or Salty Atmosphere

a. When the materiel is active, clean and lubricate the exposed metal surfaces more frequently than is prescribed for normal service.

b. Moist and salty atmospheres have a tendency to emulsify oils and greases and destroy their rust-preventive qualities. Inspect parts frequently for corrosion. Keep covers in place as much of the time as firing conditions permit.

c. Canvas covers, leather straps, or other items which are subject to deterioration from mildew or attack by insects or vermin, must be shaken out and aired for several hours as often as possible. Mildewed canvas or leather are best cleaned by scrubbing with a dry brush. If water is necessary to remove dirt, it must not be used until mildew has been removed. If mildew is present, examine material carefully by stretching and pulling for evidence of rotting or weakening. If fabric of canvas shows weakness, it is probably not worth retreatment. If not damaged, retreat canvas as outlined in TM 9–850. Do not fold wet canvas.

Note.—At no time is gasoline or volatile mineral spirits or dry-cleaning solvent to be used to remove oil or grease spots from canvas. Only water and a scrubbing brush may be used to clean canvas.

d. When the materiel is inactive, the unpainted parts should be covered with a film of heavy rust-preventive compound. All covers should be in place.

e. Check all wiring and electrical equipment frequently. Fungus growth attacks insulation and accelerates breakdown. Presence of moisture contributes to the voltage leaks and interference between circuits.

f. In the tropics, many optical instruments are protected against fungus growth by the installation of fungicidal capsules. Notify ordnance maintenance personnel if there are indications of fungus growth in any optical instrument.

27. Operation in Sandy or Dusty Conditions

Inspect and lubricate the materiel more frequently when operating in sandy or dusty areas. Exercise particular care to keep sand and dust out of the mechanisms and oil receptacles when carrying out inspecting and lubricating operations and when making adjustments and repairs. Keep all covers in place as much of the time as firing conditions permit. Shield parts from flying sand and dust with paulins or with the mount cover during disassembly and assembly operations.

28. Fording

a. Shallow-Water Fording.

(1) When trailer mount M55 is used in fording operation, cover mount M45C carefully to protect it from water being splashed against the weapon.

(2) The maximum permissible fording depth is 18 inches. Submersion to a greater depth will cause water to seep into the differential drives, gear mechanism, electric motor, and gasoline engine on mount M45C, resulting in considerable damage and rendering the materiel inoperative.

b. Deep-Water Fording. Refer to TM 9–2853 for general information, descriptions, and methods of using deep-water fording kits.

c. After-Fording Operations.

(1) Immediately after weapon is towed from the water, if the tactical situation permits, perform the following services:

(*a*) Remove wheel with bracket assemblies, disassemble, and thoroughly clean wheel bearings and other internal moving parts. Lubricate the assemblies in accordance with the lubrication order.

(*b*) Empty the materiel of any accumulated water, clean, dry, and apply the prescribed lubricant to all exposed unpainted surfaces.

(*c*) Remove access doors and inspect for water in body of trailer.

(*d*) Remove drain plugs from jack mount brackets and from bottom of trailer, allow trapped water to drain out, and install the drain plugs.

(*e*) Clean jacks carefully and lubricate.

(2) If parts of the materiel are accidentally submerged too deeply or badly splashed, apply temporary services ((1) (*a*) through (*e*) above) and notify ordnance maintenance personnel so that necessary complete disassembly, cleaning, and lubrication may be performed as soon as possible.

(3) Salt water immersion greatly increases rusting and corrosion; especially on unpainted surfaces. It is most important

to remove all traces of salt water and salt deposits from every part. Apply temporary services ((1) (*a*) through (*e*) above) and notify ordnance maintenance personnel so that necessary complete disassembly, cleaning, and lubrication may be performed as soon as possible.

CHAPTER 3

ORGANIZATIONAL MAINTENANCE INSTRUCTIONS

Section I. PARTS, SPECIAL TOOLS, AND EQUIPMENT FOR OPERATION AND ORGANIZATIONAL MAINTENANCE

29. General

Tools, equipment, and spare parts are issued to the using organization for operating and maintaining the materiel. Tools and equipment should not be used for purposes other than prescribed and, when not in use, should be properly stored in the chest and/or roll provided for them.

30. Parts

Spare parts are supplied to the using organization for replacement of those parts most likely to become worn, broken, or otherwise unserviceable, providing such operations is within the scope of organizational maintenance functions. Spare parts, tools, and equipment are listed in the following Department of the Army supply manuals which are the authority for requisitioning replacements: trailer mount M55 and multiple cal. .50 machine gun mount M45C, ORD 7 SNL A–61; multiple cal. .50 machine gun mounts M45D and M45F, ORD 7 SNL G–102, volume 14.

31. Common Tools and Equipment

Standard and commonly used tools and equipment having general application to this materiel are listed for issue by the ORD 7 manual and by T/A and T/O & E.

32. Special Tools and Equipment

All special tools and equipment designed for operation, organizational maintenance, repair, and general use with the materiel are listed in table I for information only. This list is not to be used for requisitioning replacements.

Table I. Special Tools and Equipment for Operation and Organizational Maintenance

Item	Identifying No.	References		Use
		Fig.	Par.	
COVER, battery charger	7062353	----------	----------	To protect power charger.
COVER, mount, overall (M45, M45C, and M45D)	6908248	32	12	To protect mount.
COVER, mount, overall (M45F)	----------	32	12	To protect mount.
KIT, arctic	5701161	----------	----------	Where special tactical assignment warrants its use.
KIT, loading aid	5700900	26	19 and 84	To aid in loading trailer mount M55 on truck body for transport.

Section II. LUBRICATION AND PAINTING

33. Lubrication Orders

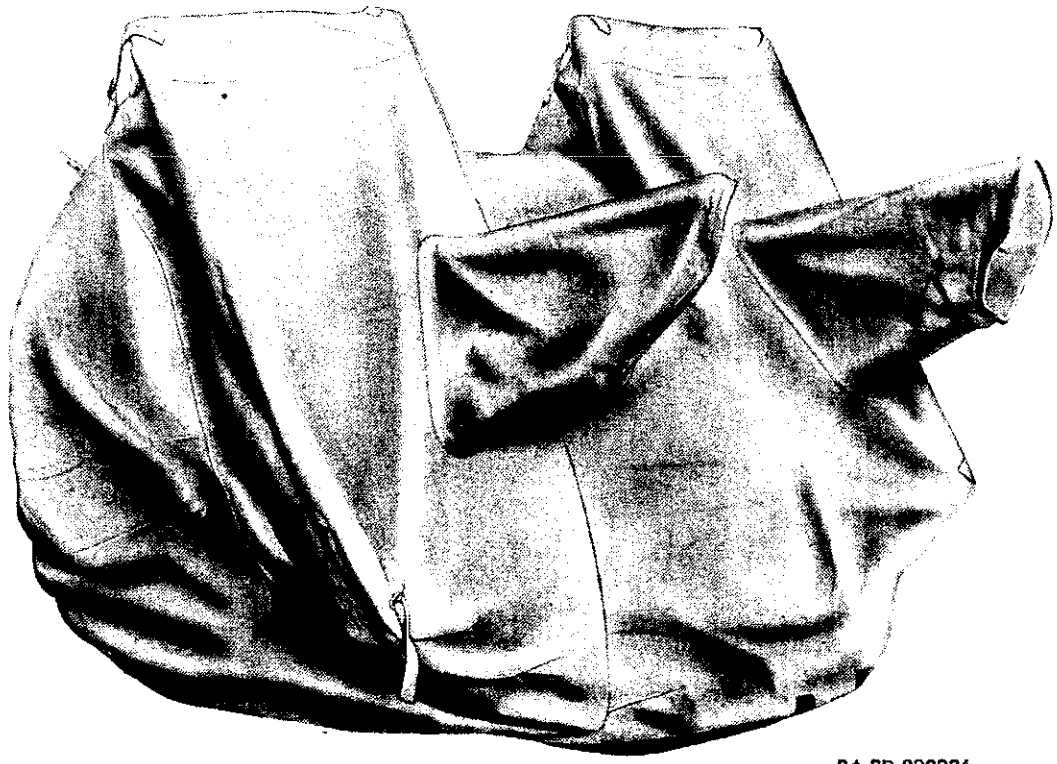
a. Lubrication Orders LO 9–710–5 (figs. 33 and 34) and LO 9–223 (figs. 35 and 36), amplified by localized lubrication illustrations (figs. 37, 38, and 39), prescribe cleaning and lubricating procedures as to locations, intervals, and the proper materials for this materiel. One each of the above lubrication orders is issued with each weapon and is to be carried with it at all times. In the event a weapon is received without copies, the using organization shall immediately requisition them. See SR 310–20–4 for lubrication orders of current date. Lubrication which is to be performed by ordnance maintenance personnel is listed on the lubrication order in the NOTES.

b. Instructions on lubrication orders are binding on all levels of maintenance and there will be no deviations.

c. Service intervals specified on lubrication orders are for normal operating conditions and during active service. These intervals will be reduced under extreme conditions, such as excessively high or low temperatures, prolonged periods of high-speed operation, continued operation in sand or dust, immersion in water, or exposure to moisture. Any one of these may quickly destroy protective qualities of the lubricant. During inactive periods, intervals may be extended commensurate with adequate preservation.

d. Lubricants are prescribed in the KEY in accordance with three temperature ranges. When to change grades of lubricant is deter

COVER FOR MOUNTS M45, M45C, AND M45D



COVER FOR MOUNT M45F

RA PD 202086

Figure 32. Overall mount covers.

mined by maintaining a close check on operation of materiel during approach to change-over periods, especially during initial action. Sluggish operation is usually an indication of lubricants thickening and is a signal to change to grades prescribed for next lower temperature range. Ordinarily, it will be necessary to change grades of

LUBRICATION ORDER

27 April 1951

LO 9-710-5

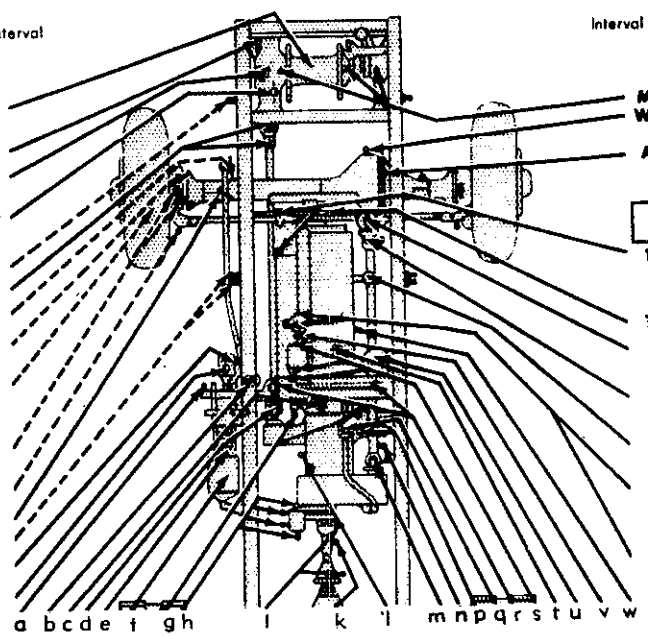
(Supersedes LO 9-710-5, 18 May 48)

CARRIAGE, MOTOR, MULTIPLE GUN, M16

References: TM 9-710; ORD 7 SNL G-102

Intervals are based on normal operation. Reduce to compensate for abnormal operation and severe conditions or contaminated lubricants. During inactive periods, intervals may be extended commensurate with adequate preservation. Relubricate after washing or fording.

Clean fittings before lubricating. Clean parts with THINNER, paint, volatile mineral spirits (TPM) or SOLVENT, dry cleaning (SD). Dry before lubricating. (For exception, see note 10). Lubricate dotted arrow points on both sides of the equipment.



Lubricant • Interval

- **Winch Cable** OE (See note 9)
- **Winch Worm Case Fill** GO
- **Winch Worm Case Drain** A (Drain and refill. Cap. 2 qt.)
- **Winch Worm Case Level** W (Check level)
- **Spring Bolt** CG 1
- **Universal and Slip Joint** CG M
- **Shock Absorber** SAH S (See note 14)
- **Front Wheel Universal Joint** CG 1 (See note 8)
- **Wheel Bearings** WB A (Remove, clean and repack annually or every 12,000 miles)
- **Steering Knuckle Bearings** CG 1 (Upper and lower)
- **Tie Rod** CG 1
- **Drag Link** CG 1
- **Spring Shackle** CG 1
- **Drag Link** CG 1
- **Steering Gear** GO 1

Interval • Lubricant

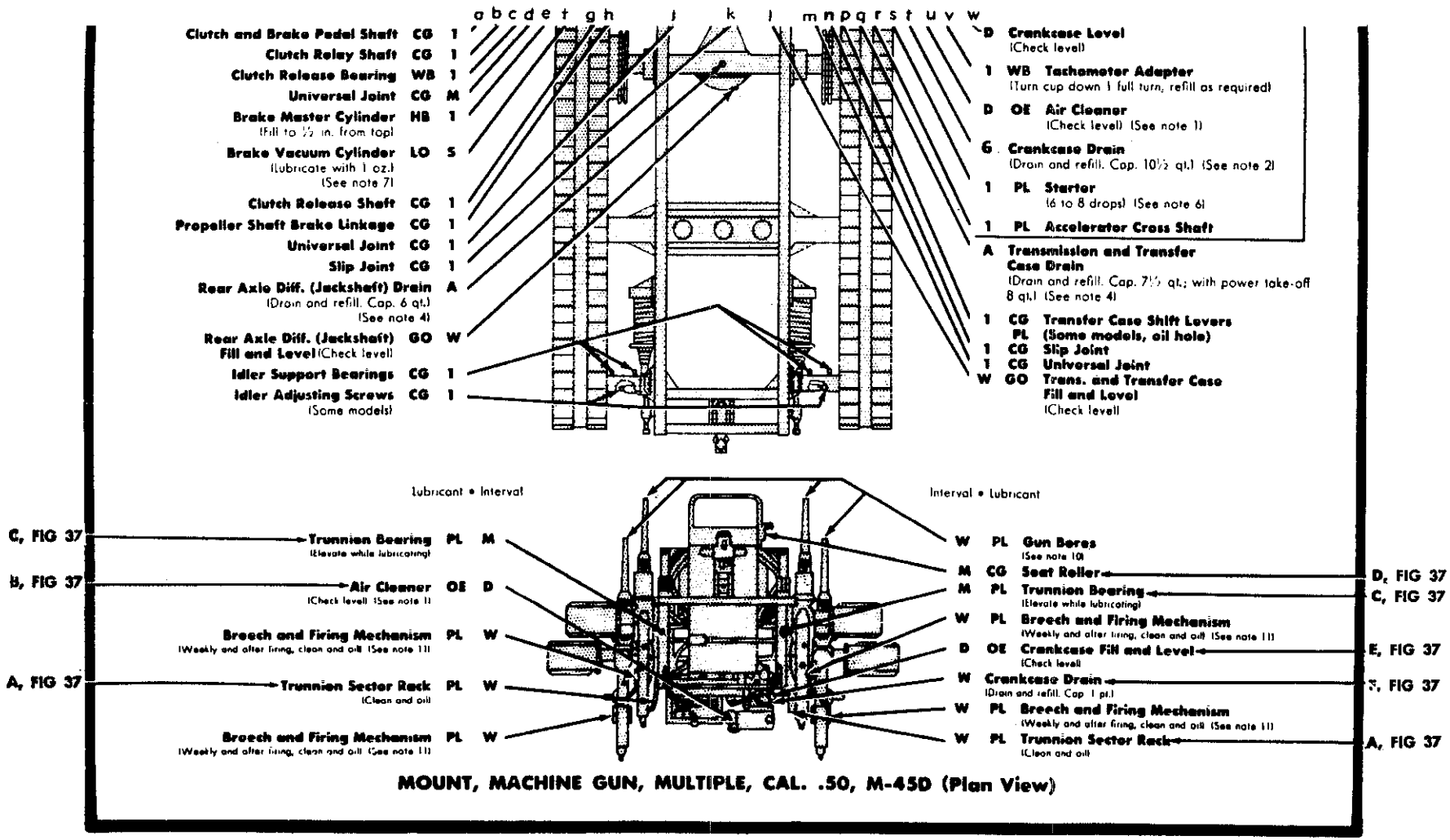
- M CG **Winch Drum and Shaft Bearings**
- W GO **Front Axle Diff. Fill and Level** (Check level)
- A **Front Axle Diff. Drain** (Drain and refill. Cap. 3½ qt.) (See note 4)

Serviced From Under Hood

- 1 WB **Generator** (Turn cups down 1 full turn, refill as required)
- 1 CG **Front Engine Support**
- 1 **Oil Filter** (See note 5)
- 1 CG **Universal Joint** (Reached from under vehicle)
- OE **Crankcase Fill and Breather** (See note 1)
- 1 WB **Distributor Shaft** (Turn cup down 1 full turn, refill as required)
- 5 **Distributor** (See note 3)

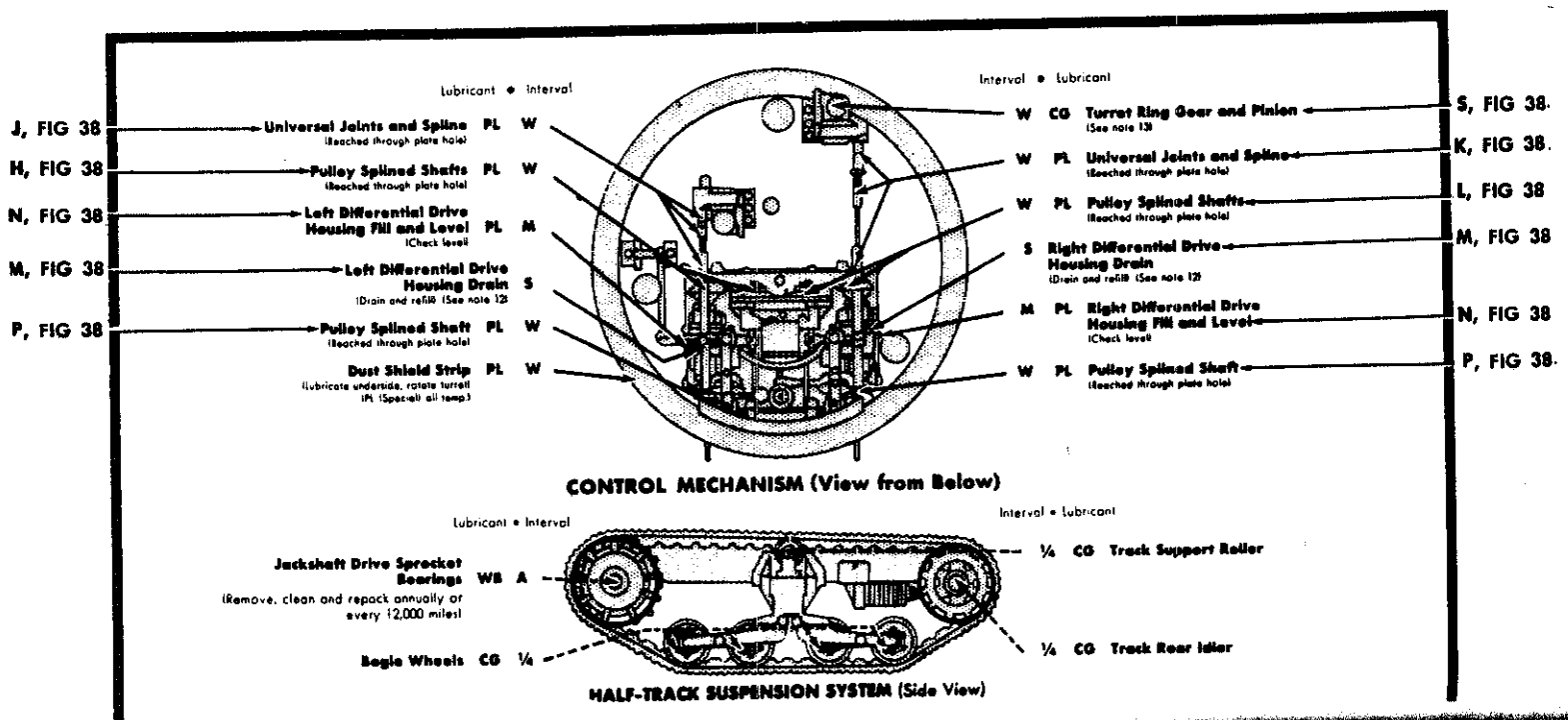
FOLD

FOLD



RA PD 148378A

Figure 33. LO 9-710-5—multiple gun motor carriage M16.


Lubricant • Interval
J, FIG 38 → Universal Joints and Spline PL W (Reached through plate hole)
H, FIG 38 → Pulley Splined Shafts PL W (Reached through plate hole)
N, FIG 38 → Left Differential Drive Housing Fill and Level PL M (Check level)
M, FIG 38 → Left Differential Drive Housing Drain S (Drain and refill (See note 12))
P, FIG 38 → Pulley Splined Shaft PL W (Reached through plate hole)
Dust Shield Strip PL W (Lubricate underside, rotate turret (PL (Special) all temp.))
Interval • Lubricant
W CG Turret Ring Gear and Pinion → S, FIG 38 (See note 13)
W PL Universal Joints and Spline → K, FIG 38 (Reached through plate hole)
W PL Pulley Splined Shafts → L, FIG 38 (Reached through plate hole)
S Right Differential Drive Housing Drain → M, FIG 38 (Drain and refill (See note 12))
M PL Right Differential Drive Housing Fill and Level → N, FIG 38 (Check level)
W PL Pulley Splined Shaft → P, FIG 38 (Reached through plate hole)
CONTROL MECHANISM (View from Below)
Lubricant • Interval
Jackshaft Drive Sprocket Bearings WB A (Remove, clean and repack annually or every 12,000 miles)
Bogie Wheels CG ¼
Interval • Lubricant
¼ CG Track Support Roller
¼ CG Track Rear Idler
HALF-TRACK SUSPENSION SYSTEM (Side View)

KEY

LUBRICANTS	EXPECTED TEMPERATURES			LUBRICANTS	INTERVALS
	above +32° F	+40° F to −10° F	0° F to −65° F		
OE—Oil, lubr, engine	**OE** 30 or **N.S.** 9250	**OE** 10 or **N.S.** 9110	**OES**	**OES**—Oil, lubr, engine, sub-zero	**D**—Daily
GO—LUBRICANT, gear, universal	**GO** 90	**GO** 75	**GOS**	**GOS**—LUBRICANT, gear, universal, sub-zero	**W**—Weekly
CG—GREASE, lubr, general purpose	**CG** 1	**CG** 0	**OG** 00	**OG**—GREASE, lubr, Ord Dept	**M**—Monthly
WB—GREASE, lubr, general purpose, No. 2	**WB**	**WB**	**OG** 00	**HBA**—FLUID, hydraulic brake, arctic	**S**—Semiannually
HB—FLUID, hydraulic brake	**HB**	**HB**	**HBA**	**OHA**—OIL, hydraulic, petroleum base	**A**—Annually
LO—OIL, lubr, t	**LO**	**LO**	**OHA**	**SAH**—FLUID, shock absorber, hy	¼—250 Miles
PL—Oil, lubr, preservative	**PL** (Med)	**PL** (Special)	**PL** (Special)	**CR**—CLEANER, rifle bore	1—1,000 Miles
				CW—LUBRICANT, chain, exposed gear and wire rope	**C**—C,000 Miles

FOLD

FOLD

NOTES

1. **AIR CLEANERS AND BREATHERS**—(Oil Bath Type). Daily, replenish to bead level with OE, crankcase grade. Every 1,000 miles clean oil reservoir and refill. Every 6,000 miles, or semiannually, disassemble, clean all parts. For desert or extremely dusty operation, reduce interval to meet conditions (Mesh Type). For normal operation, clean and re-oil at indicated intervals. For desert or extremely dusty operation, reduce intervals to meet conditions.
2. **CRANKCASE**—Drain every 6,000 miles or semiannually. Drain only when engine is hot. Refill to FULL mark. Run engine a few minutes, recheck level. For satisfactory operation on heavy duty engine oil, engine thermostat must be operating properly to maintain engine coolant temperature at +140° F min.
3. **DISTRIBUTOR**—Semiannually, wipe breaker cam lightly with CG and lubricate breaker arm pivot and wick under rotor with 1 to 2 drops of PL.
4. **GEAR CASES**—Drain every 12,000 miles or annually. Fill to plug levels before operation and after draining. Drain only after operation. Clean vents weekly and after operation in water or mud.
5. **OIL FILTER**—Every 1,000 miles, remove plug in bottom of case and drain sediment. Every 6,000 miles or semiannually, while crankcase is being drained, drain sediment, remove element, clean inside of case, install new element.
6. **STARTER**—When starter is removed, lubricate outer bearing through oiler with PL. Remove plug in top of reduction gear housing and fill with CG. Replace plug.
7. **HYDROVAC CYLINDER** (Some models)—Lubricate through plug holes in top and rear of cylinder with ½ oz. of LO in each hole. Replace plugs.
8. **FRONT WHEEL UNIVERSAL JOINTS**—Remove inspection plugs. Fill through rear plug hole until lubricant is level with opposite hole. Do not overfill. When wheels are removed for repacking, remove steering knuckles, clean and repack universal joint housing. Do not disassemble constant velocity universal joint.
9. **WINCH CABLE**—After each operation, clean and oil with used crankcase oil or OE. Weekly, if cable has not been used, coat outer coils. Monthly, unwind entire cable, clean and oil. Semiannually, if cable is not generally used, unwind entire cable and soak, by means of a brush, with PL (Special). Wipe off excess and coat cable with CW. Coat winch drum also with CW before rewinding cable on drum.
10. **GUN BORES**—After firing and on three consecutive days thereafter, clean bores with CR, making sure that all surfaces, including the rifling, are well coated. Do not wipe dry. After fourth cleaning, dry, oil with PL. When gun is not being fired, renew oil film weekly. Wipe clear before firing.
11. **MACHINE GUN OIL BUFFER** (Cal. .50 H.B.)—Weekly, inject PL (Special), rotate buffer assembly, drain excess oil. In humid and salt air areas, use PL (Med) in buffer and on external surfaces of armament.
12. **LEFT AND RIGHT DIFFERENTIAL DRIVE HOUSINGS**—(Some models) Monthly, check oil level by removing plate on side of case. Add PL to level of plate opening. Semiannually, drain and refill with PL. Drain only after operation. Fill to level of plate opening. (Some models) Fill through fill plug to level plug opening. Drain through drain plug located in bottom of case.
13. **TURRET RING GEAR AND PINION**—Apply lubricant through handhole plate opening in side of base ring to pinion and as much of the ring gear as can be reached. Monthly, clean ring gear and pinion and relubricate.
14. **SHOCK ABSORBERS**—Below 0° F, disconnect links.
15. **OIL CAN POINTS**—(Carrier) Every 1,000 miles, lubricate throttle rod ends, clevises, hinges, latches, vacuum cylinder valve and power lever linkage, propeller shaft brake control linkage, pintle, bumper roller slides and bushings (when so equipped), with PL. (Guns and mount) Weekly, lubricate azimuth and elevation control lever gears, control lever and shifter lever linkage, elevation limit linkage, gun battery and solenoid latches, armor door hinges, with PL.
16. **DO NOT LUBRICATE**—Springs, shock absorber links, water pump, fan, bogie wheel suspension linkage and slides, bumper roller bearing (when so equipped).
17. **LUBRICATED AT TIME OF DISASSEMBLY BY ORDNANCE PERSONNEL**—(Carrier) Clutch pilot bearing, speedometer and tachometer flexible shafts. (Gun mount) Torque tube gear box, motor unit cases, azimuth and elevation gear box cases.

Copy of this lubrication order will remain with the equipment at all times; instructions contained herein are mandatory and supersede all conflicting lubrication instructions dated prior to the date of this lubrication order.

BY ORDER OF THE SECRETARY OF THE ARMY:

J. LAWTON COLLINS
Chief of Staff,
United States Army

Official
EDWARD F. WITSELL
Major General, USA
The Adjutant General

DISTRIBUTION

Tech Svc (2), Arm & Svc Bd (2), AFF (2), AA Comd (2), OS Maj Comd (10), Base Comd (2), MDW (3), A (20), CHQ (2), D (2), R 9 (2), Bn 9 (2), C 9 (2); FC (2), Sch (5) except 9 (50); Gen Dep (2), Dep 9 (10), PE (Ord O) (5), OSD (2), PG 9 (10), Ars 9 (10), Dist 9 (10), One (1) copy to each of the following: T O & E's 5-412, 5 415; 5 416, 5 417, 5 800-2; 6 160N, 6 10N; 44-75N; 44 77N, SPECIAL DISTRIBUTION.

For explanation of distribution formula see SR 310 90-1.

RA PD 148379A

Figure 34. LO 9-710-5—multiple gun motor carriage M16.

LUBRICATION ORDER

1 October 1952

LO 9-223

(Supersedes LO 9-223, 1 Mar. 1945, and LO 9-789, 12 Jan. 1949)

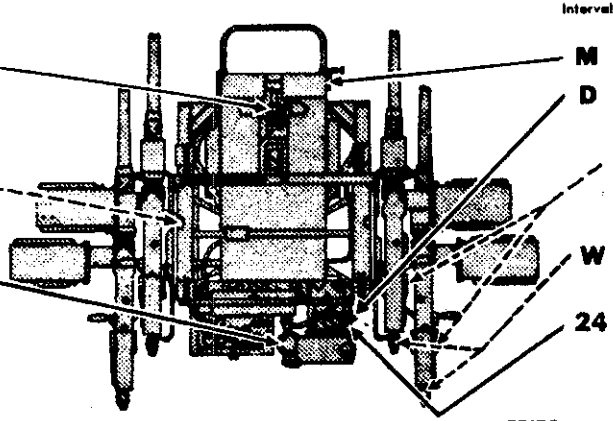
MOUNT, TRAILER, MULTIPLE CAL. .50, MACHINE GUN, M55; AND MOUNT, MACHINE GUN, MULTIPLE CAL. .50, M45 SERIES

References: ORD 7 SNL A-61, TM 9-223

Intervals as based on normal operation. Reduce to compensate for abnormal operation severe conditions or contaminated lubricants. During inactive periods intervals may be extended commensurate with adequate preservation. Relubricate after washing.

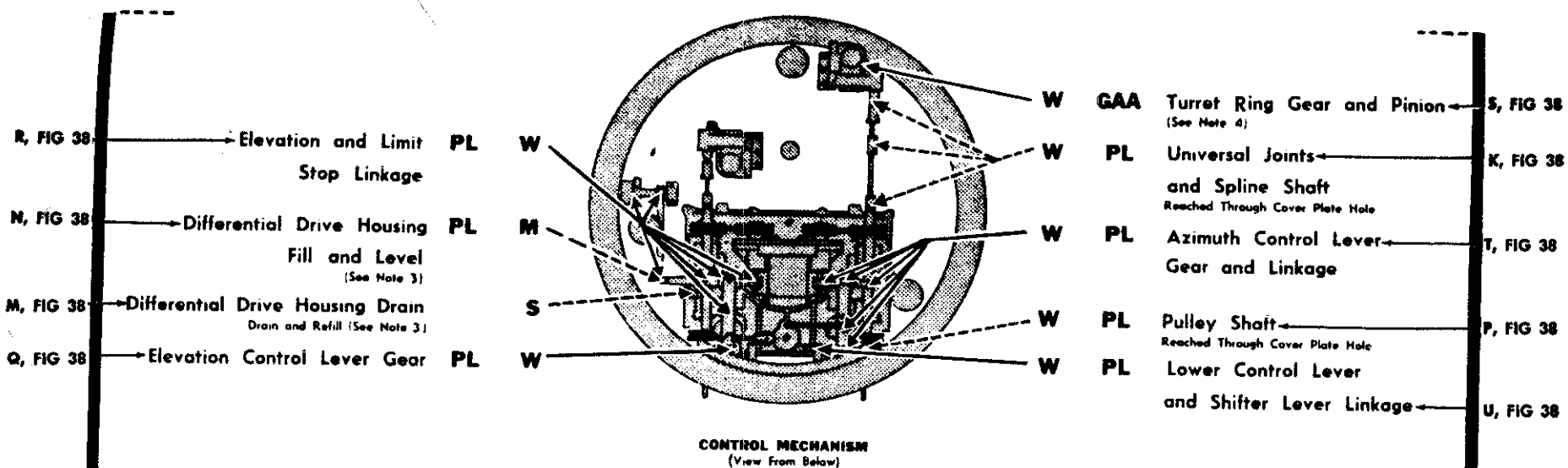
Clean fittings before lubricating. Clean parts with THINNER paint volatile mineral spirits (TPM) or SOLVENT, dry cleaning (SD). Dry before lubricating (for exception see notes 5 & 7). Lubricate dotted arrow points on both sides of equipment.

		Lubricant	Interval
G, FIG 37	Upper Control Lever and Shifter Linkage	PL	W
C, FIG 37	Trunnion Bearing (Elevate While Lubricating)	PL	M
B, FIG 37	Air Cleaner (Check Level (See Note 1))	OE	D



MOUNT, MACHINE GUN, MULTIPLE, CAL. .50, M45 SERIES
(Plan View)

Interval	Lubricant		
M	GAA	Seat Roller	D, FIG 37
D	OE	Crankcase Fill and Level (Check Level)	E, FIG 37
	PL	Gun Breech and Firing Mechanism (See Note 7)	
W	PL	Gun Buffer (See Note 6)	
24		Crankcase Drain (Drain and Refill (See Note 2))	F, FIG 37



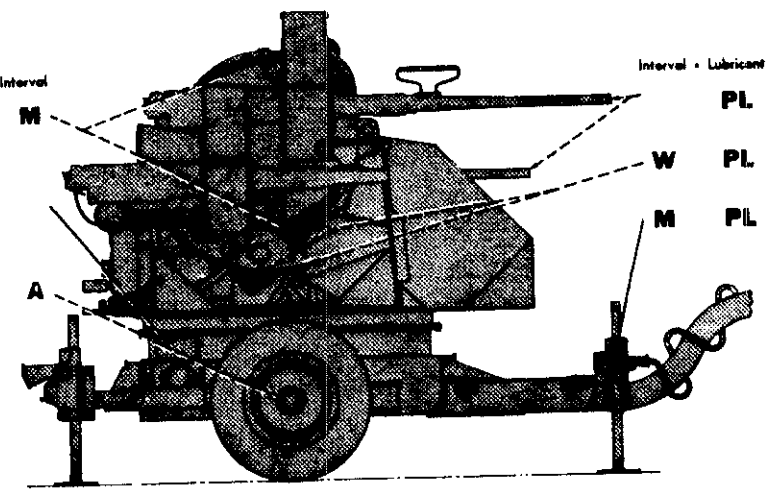
CONTROL MECHANISM
(View From Below)

—KEY—

LUBRICANTS	EXPECTED TEMPERATURES			INTERVALS
	Above +32° F.	+40° F. to −10° F.	0° F. to −65° F.	
OE—OIL, lubricating, engine	OE 30	OE 10	OES	**D**—Daily
GOS—LUBRICANT, gear, universal, sub-zero	GOS	GOS	GOS	**W**—Weekly
PL—OIL, lubricating, preservative	PL—(Medium)	PL—(Special)	PL—(Special)	**M**—Monthly
GAA—GREASE, Automotive and Artillery	GAA	GAA	GAA	**S**—Semiannually
OES—OIL, lubricating, engine, sub-zero				**A**—Annually
CR—CLEANER, rifle bore				**24**—24 Hours

RA PD 202087

Figure 35. LO 9–223—multiple cal. .50 machine gun trailer mount M55.



Lubricant	Interval	
Trunnion Felt Seals (Left and Right)	PL	M
Dust Shield Strip (See Note 8)	PL	
X, FIG 39 → Wheel Bearings	GAA	A

Interval	Lubricant	
	PL	Gun Barrel Bore (See Note 5)
W	PL	Trunnion Sectors and Pinions (Left and Right) Clean and Coat → A, FIG 37
M	PL	Jack Ratchet and Pawl → BB, CC, FIG 39

MOUNT, TRAILER, MULTIPLE CAL. .50, MACHINE GUN, M55
(right side view)

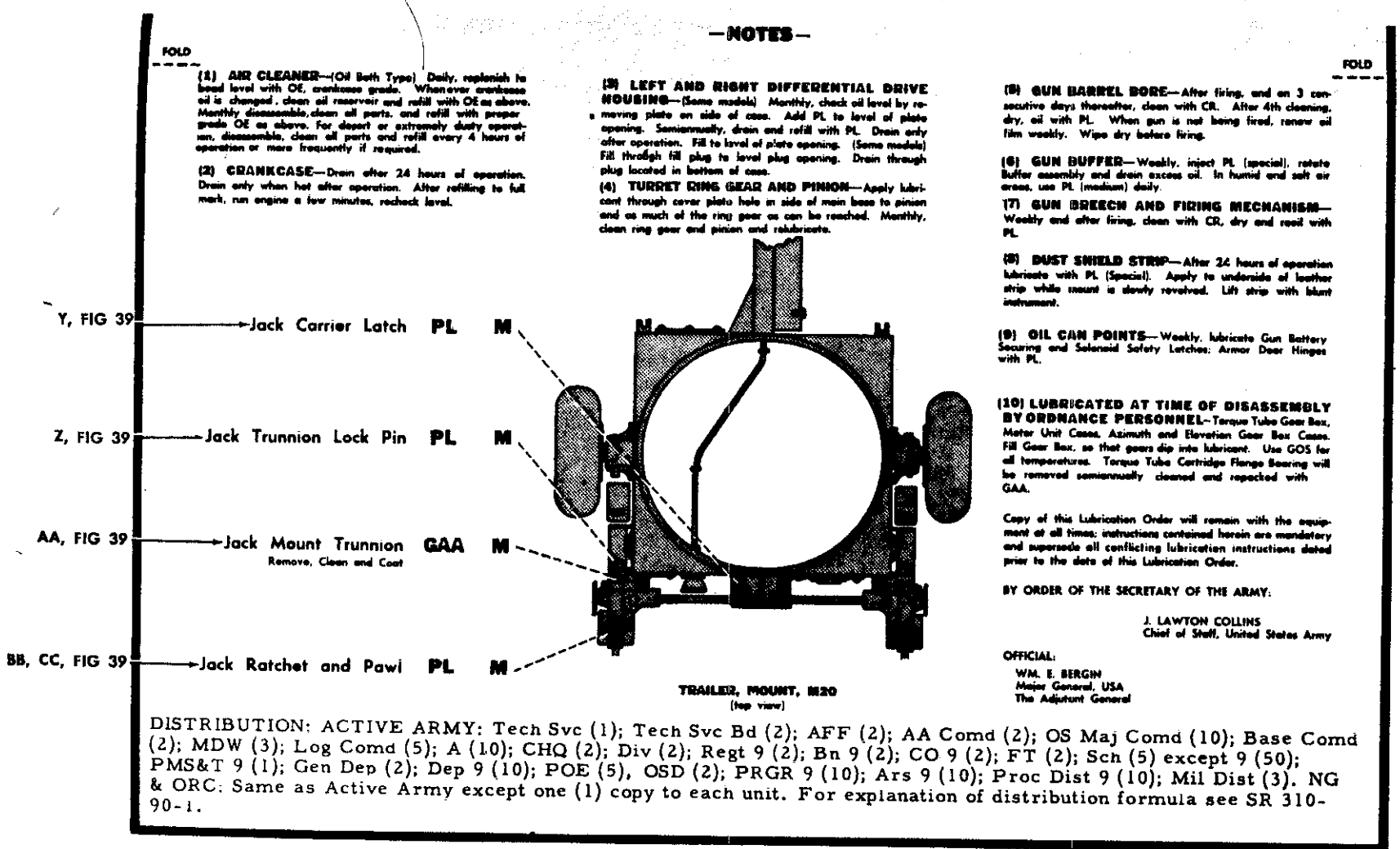


Figure 36. LO 9-223—multiple cal. .50 machine gun trailer mount M55.

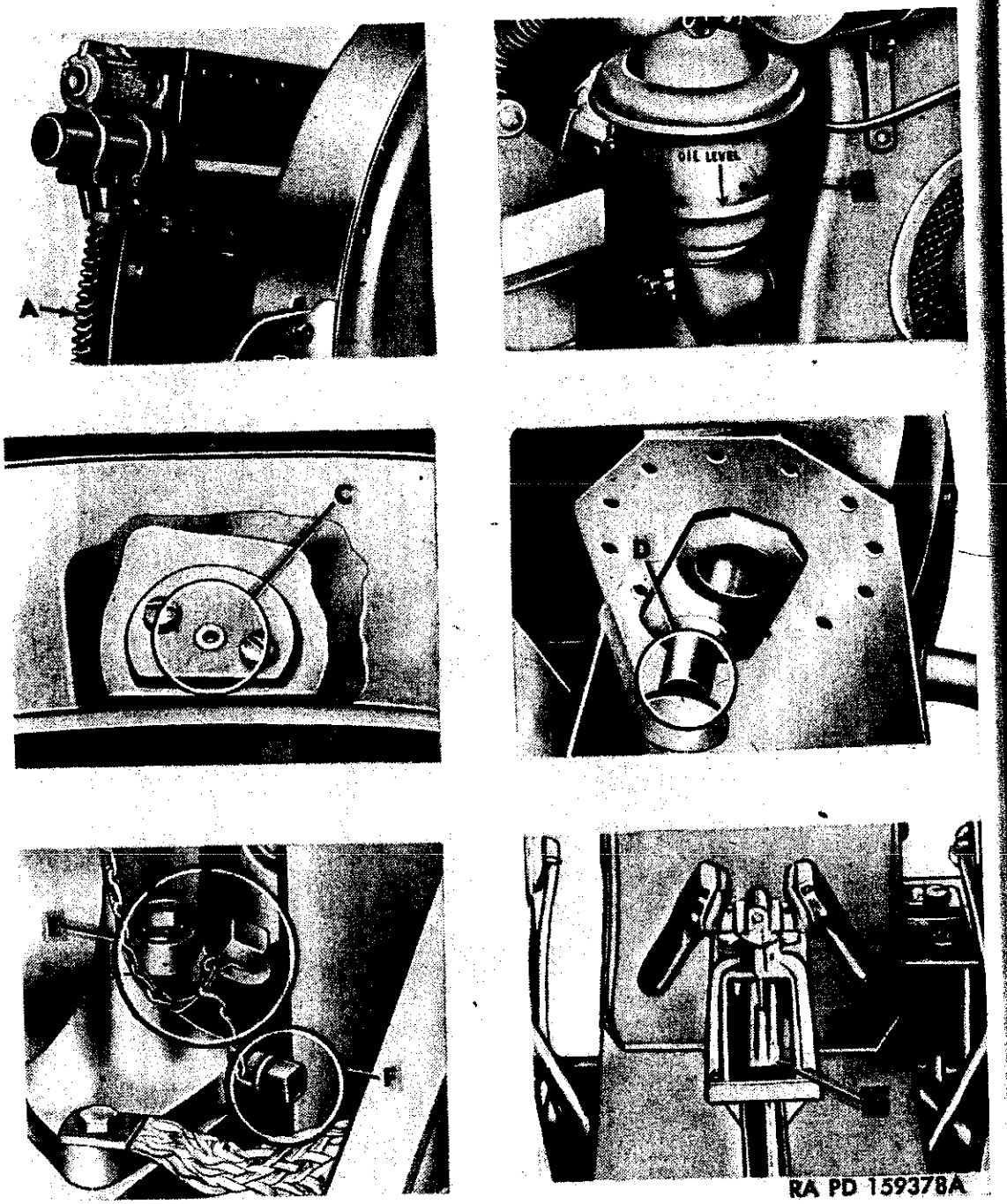


Figure 37. Localized lubrication points (points A through G).

lubricants only when air temperatures are consistently in next lower or higher range.

34. Detailed Lubrication Instructions

a. Lubrication Equipment. The materiel is supplied with lubrication equipment adequate for its maintenance. This equipment will be cleaned both before and after use. Lubrication guns will be operated carefully and in such a manner as to insure a proper distribution of lubricant.

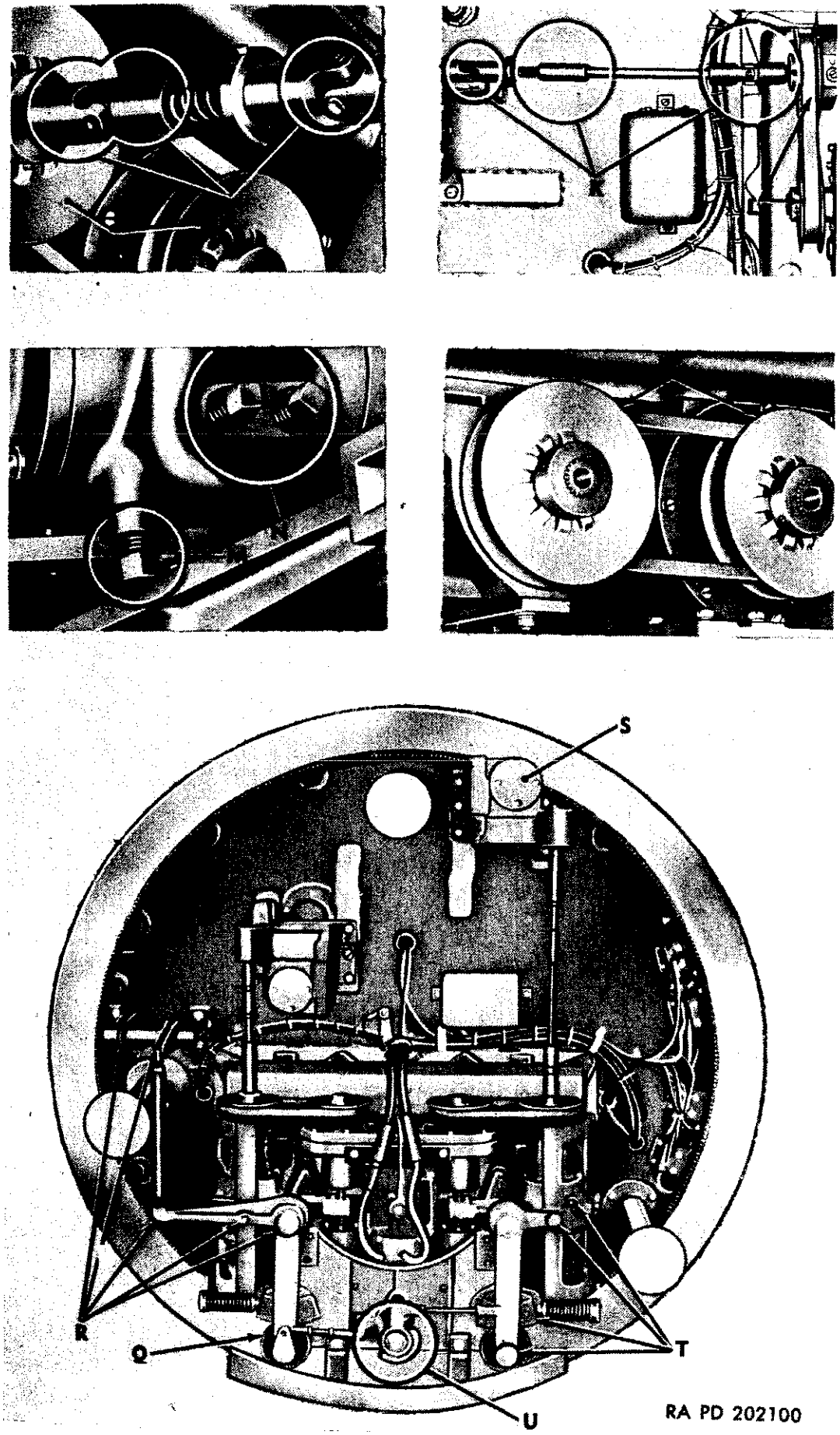


Figure 38. Localized lubrication points (points H through U).

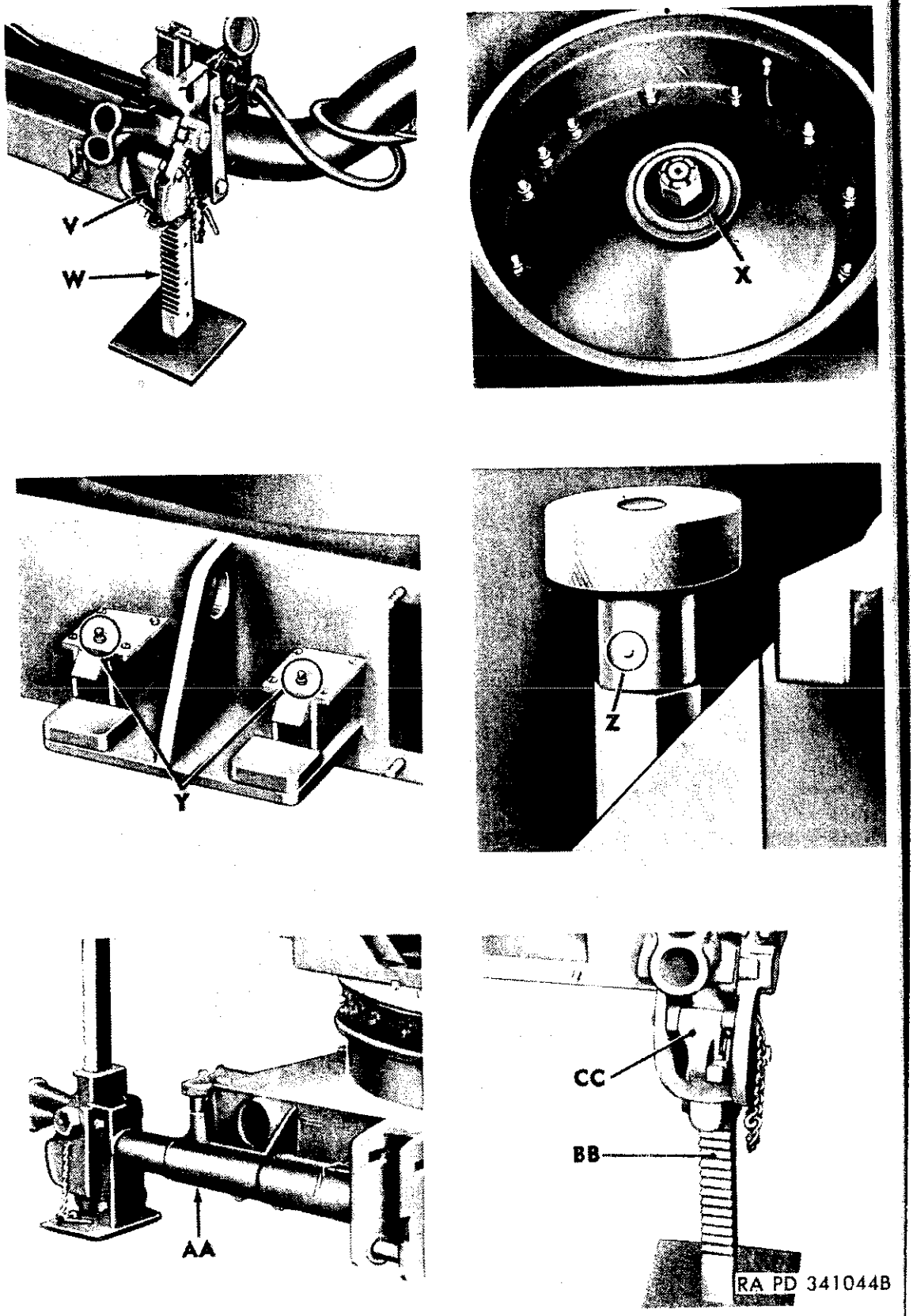


Figure 39. Localized lubrication points (points V through CC).

b. Points of Application.

(1) Lubricating fittings, grease cups, oilers, and oilholes are readily located by reference to the lubrication orders. Wipe these devices and surrounding surfaces clean before lubricant is applied. If a fitting is missing, cover the hole with tape as a temporary expedient to prevent the entrance of dirt. A new fitting must be installed as soon as possible.

(2) A ¾-inch red circle should be painted around all lubricating fittings and oilholes.

c. Reports and Records.

(1) Report unsatisfactory performance or defects in the application or effect of prescribed lubricants and preserving material in accordance with paragraph 3*d*.

(2) A record of lubrication may be maintained in DA Form 460, Preventive Maintenance Roster.

35. Painting

a. Instructions for the preparation of the materiel for painting, methods of painting, and materials to be used are contained in TM 9–2851. Camouflage painting information is contained in FM 5–20D.

b. Do not paint over nameplates or serial numbers or working surfaces which are lubricated in accordance with the lubrication order. Nameplates will be kept coated with clear lacquer; if they have become rusty or corroded, they will first be carefully cleaned.

c. Sighting and fire control instruments will not be painted by the using organizations except under supervision of ordnance personnel.

Section III. PREVENTIVE MAINTENANCE SERVICES

36. General

Preventive maintenance services are the responsibility of the using organization. These services consist of before-firing, during-firing, after-firing, weekly and before traveling services performed by operating personnel (1st echelon) and the scheduled services to be performed at semiannual intervals by mechanic or maintenance crews of the using organization (2d echelon). Note that these intervals are based on normal operations. Reduce intervals for abnormal operations or severe conditions. Intervals during inactive periods may be extended accordingly.

37. Operational Inspection

a. General. The information contained in this paragraph is intended to include overall operational inspections in order to detect any defects in operation and to prevent damage to the materiel.

b. Procedure.

(1) Energize the system (par. 14). Raise covers of all the gu pull retracting slide handle of each gun to the rear, exami chamber, and release retracting slide handle.

Caution: Do not load guns.

(2) Turn firing switch of the pilot light box assembly to t "FIRE" position and note that the firing panel lamp ligh

(3) Point guns at minimum elevation toward cab of vehicle (f turrets mounted on vehicles only), hold trigger switcl depressed, and slowly elevate guns. Listen carefully clicks of solenoids when elevation interrupter switches cl the firing circuit. Check to insure that each gun is clear the vehicle cab when its solenoid operates.

(4) Depress guns to horizontal position, point directly tow cab of vehicle (for turrets mounted on vehicles only), p retracting slide handles of all guns to the rear, and rele

Caution: Do not load guns.

Hold trigger switches depressed and traverse turret slo to the left. Listen carefully for click of solenoids w azimuth interrupter switches close the firing circuit. Ch to insure that each gun is clear of the vehicle cab when solenoid operates.

(5) Repeat the test described in (4) above, traversing right

(6) Turn off firing circuit switch and set red plastic firing cir guard in position.

(7) Traverse mount 360°, checking for sluggishness or slipp

(8) Test mount in elevation and traverse for a minimum sp of 60° per second.

(9) Orient or target sight all guns (par. 102).

(10) See that ammunition chests are fully loaded, and that securing pins are latched in place.

(11) De-energize system (par. 15*g*).

(12) Check battery, examine battery cables, power cables, pc charger leads and ground, trunnion cables, pilot light cables, solenoid plugs and connectors, and switch base loc plunger of illuminated sight Mk 9, Model 1 for tight Check gasoline supply. Check oil level. Check tight of power charger cable connections to junction box.

(13) Inspect to see that all equipment is present and in condition. Check all storage compartments to make equipment is properly stored.

38. Cleaning

a. General. Any special instructions for cleaning and care required for specific mechanisms or parts are contained in the pertinent chapter. General instructions are contained in this paragraph.

b. Cleaning Instructions.

(1) *Powder-fouled parts.* Use rifle-bore cleaner to clean all parts which have been exposed to powder fouling during firing.

Note.—Rifle-bore cleaner is not a lubricant. Parts which require lubrication will be wiped dry and oiled.

Do not use dry-cleaning solvent or volatile mineral spirits because these solvents will not readily dissolve the corrosive salts from powder and primer compositions.

(2) *General usage.* Use volatile mineral spirits or dry-cleaning solvent to clean or wash grease or oil from all parts of the gun, mount, and carriage.

(3) *Heavy accumulations.* Parts such as gear sectors or chassis, new materiel, materiel or component parts received from storage for immediate use may have heavy accumulations of grease or coatings of rust-preventive compound. This may be partly removed by scraping with sticks or other articles which will not damage parts. Remove the residue with waste, wiping cloths or a brush saturated with volatile mineral spirits, dry-cleaning solvent or with one part of grease-cleaning compound to four parts of dry-cleaning solvent or volatile mineral spirits. After cleaning, rinse off any remaining compound with cold water. Dry and lubricate as specified in lubrication order. Apply a light grade of oil to all nonpainted metal surfaces (other than optical instruments) to prevent rusting. Some new parts such as oil seals, etc., may require preparation prior to lubrication.

c. General Precautions in Cleaning.

(1) Dry-cleaning solvent or volatile mineral spirits are inflammable and should not be used near an open flame. Fire extinguishers should be provided when these materials are used.

(2) Avoid getting petroleum products, such as dry-cleaning solvent or volatile mineral spirits or lubricants on rubber parts, as they will attack the rubber and destroy its characteristics.

(3) The use of diesel fuel oil, gasoline, or benzene (benzol) for cleaning or the use of high pressure water, steam, or air for cleaning the weapon is prohibited.

(4) Under no circumstances will water be used in cleaning this weapon except in hand washing. Remove sighting and fire control instruments from their mounts before washing the weapon.

(5) Under no circumstances use polishing liquids, pastes, or abrasives, for polishing lenses and windows. Use only clean lens tissue paper for cleaning optical glass. Use of cleaning cloths is not permitted.

(6) In drying cleaned optical parts, heat from strongly concentrated sources should not be applied directly, as it may cause unequal expansion of parts, thereby resulting in damage to optical parts and inaccuracies of observation.

(7) In extreme cold, do not dilute rifle-bore cleaner. Do not add antifreeze. Store cleaners in a warm place if practical. Shake rifle-bore cleaner well before using.

39. Basic Preventive Maintenance

Inspect and service the weapon as described in paragraphs 8 and 9 at least once every 6 months and after any extended travel with the weapon, as the tactical situation permits.

a. Rust, dirt, grit, gummed oil, and water cause rapid deterioration of all parts of the weapon. Particular care should be taken to keep all bearing surfaces and exposed unpainted parts clean and properly lubricated. Wiping cloths, rifle-bore cleaner, dry-cleaning solvent or volatile mineral spirits, and lubricants are furnished for this purpose. Remove all traces of rust from finished surfaces with crocus cloth, which is the coarsest abrasive to be used by organizational personnel. A coarser abrasive may be used on unfinished parts. Take care not to change the shape or dimensions of part.

b. Repaint painted surfaces as required to cover nicks, scratches, and worn spots which expose bare metal (par. 35). Complete repainting is not necessary.

c. Tighten loose parts, as necessary.

d. Each time materiel is disassembled for cleaning or repair, carefully inspect all parts for cracks, excessive wear, rust, and like defects which might cause malfunction of the materiel. Refer to paragraphs 42 through 44 on troubleshooting for information on certain parts which when worn, damaged, or improperly adjusted cause definite malfunctions. Thoroughly clean and properly lubricate all parts before assembly.

e. Use only tools that are provided and see that they fit properly. Tools that do not fit will fail and may cause damage to parts.

f. At least every 6 months, check to see that all modification work orders have been applied. A list of current modification work orders is published in SR 310–20–4. No alteration or modification will be

made by organizational personnel, except as authorized by official publications.

g. When the materiel is not in use, install the proper covers.

h. When a canvas or other type cover is used during periods of inactivity, moisture may form on metal surfaces by condensation. To prevent rusting, remove the covers at least weekly, and dry all surfaces thoroughly. Coat unpainted surfaces with the prescribed lubricant. In cold weather, apply lubricant sparingly.

40. Preventive Maintenance by the Operators

a. To insure continued correct performance, it is necessary that the weapon be systematically inspected in order that defects may be discovered and corrected before they result in serious damage or failure. Any defects or unsatisfactory operating characteristics beyond the scope of the operator to correct (par. 2), must be reported at the earliest opportunity to the designated individual in authority.

b. The services set forth in table II are to be performed by the operator.

Table II. Operators Preventive Maintenance Services

Interval and point	Procedure	Detailed instructions
	Before Firing	
Machine guns and ammunition chests	Clean, inspect, and test	FM 23–65.
Control handles	Check tightness	Re-set control handles (par. 60)
	Test traversing and elevating	Par. 15*e*.
Battery	Test	Par. 51.
Electrical system	Test	Par. 47.
Sights	Test and inspect	Par. 96.
	During Firing	
Motor overheat panel light	Check lamp	Lamp light must not be on. If light is on, motor is overheated. Stop operation except in case of emergency.
Firing circuit lamp	Check lamp	Lamp light should be lit when firing circuit switch is set to ON position.
	After Firing	
Firing circuit switch assy	Check and inspect	If broken, replace (par. 46).
Sights	Test reflector	Using fingers, test tightness of the glass reflector. Tighten if necessary.

Table II. Operators Preventive Maintenance Services—Continued

Interval and point	Procedure	Detailed instructions
	Daily	
Air cleaner	Lubricate	See note 1, LO 9–710–5.
Batteries	Test and clean	Par. 51.
Breather holes in battery cell caps.	Inspect and clean	Remove caps and clean dirt from holes.
Crankcase	Lubricate	See note 2, LO 9–223.
Cable connections to junction box and frame.	Inspect	Clean and tighten.
Power charger	Test	Operate (par. 14).
Base of mount	Inspect	Clean and paint if necessary.
Gasoline tank cap	Inspect	Clean vent hole.
Locking wire of solenoid safety latch recess.	Inspect	Replace if frayed.
Solenoid cable connectors	Inspect	Clean.
Optical surfaces of sights	Inspect	Clean surfaces (par. 96).
Seat adjusting shaft pin	Inspect	Test engagement.
Trailer drain plugs	Inspect	If water present in jack mount bracket or trailer body, remove plugs and drain.
	Weekly	
Power charger	Inspect, clean, tighten, adjust, and lubricate.	Par. 56.
Spark plug points	Inspect	Adjust (par. 56*c*).
"V" belts	Inspect	Adjust (par. 62*c*).
Gunner's seat	Inspect and adjust	Adjust (par. 65).
Elevation stop lever boot	Inspect	Replace if necessary (par. 58*a*(4)).
Breech and firing mechanism.	Clean and oil	LO 9–710–5.
Trunnion sector rack	Clean and oil	LO 9–710–5.
Turret ring gear leather dust strip.	Clean and oil	LO 9–223.
Universal joints and spline	Lubricate	LO 9–710–5.
Pulley splined shafts	Lubricate	LO 9–710–5.
Turret ring gear and pinion	Lubricate	LO 9–710–5.
Tires	Improper condition	Apparent mechanical deficiencies causing wear should be reported to ordnance personnel. Replace worn or unserviceable tires. Rotate tires as necessary to even wear.
Blackout tail and blackout stop light and jumper cable.	Inspect	If damaged beyond serviceability, report to ordnance personnel.

Table II. Operators Preventive Maintenance Services—Continued

Interval and point	Procedure	Detailed instructions
	Weekly—Continued	
Mount trailer M20	Tighten parts	Tighten securely wheel assembly, suspension brackets, and mount to trailer body nuts and screws.
Trailer mount M55	Clean	Wash if facilities and tactical situation permit. If not practicable, wipe clean. Remove rust and paint bright spots.
	Monthly	
Trunnion bearing	Lubricate	LO 9–710–5.
Seat roller	Lubricate	LO 9–710–5.
Left differential drive housing.	Check level	LO 9–710–5.
Right differential drive housing.	Check level	LO 9–710–5.
Mount trailer M20	Lubricate	Lubricate all points except wheel bearings (LO 9–220).
	Semiannually	
Left differential drive housing.	Drain, clean, and refill	Note 12, LO 9–710–5.
Right differential drive housing.	Drain, clean, and refill	LO 9–710–5.
	Before Traveling	
Blackout tail and blackout stop light.	Clean lenses and check operation.	Turn switch on in towing vehicle and see if lamps light.
Trailer wheels	Check tightness	Wheel assembly and mounting nuts and screws should be present and secure.
Tires	Check pressure and condition.	Correct pressure is 50 pounds (max) when cool.
Wheel suspension units	Check tightness and condition.	Spindle shaft mounting supports and mounting wedges should be secure and undamaged.

Table II. Operators Preventive Maintenance Services—Continued

Interval and point	Procedure	Detailed instructions
	Before Traveling—Con.	
Towing connections	Check for proper connections and condition.	Drawbar, lunette, electrical connections, jack assemblies, and mounting devices should be in good condition and secure. All connections should be correctly made (par. 19).
Mount and mount cover	Check condition and proper installation.	
	During Traveling	
Running parts	Be alert for any unusual noise, excessive sag, sway, or drag.	Correct any condition which indicates damage, looseness, excessive wear, inadequate lubrication, tight wheel bearings, loose wheel bearings, or underinflated tires (par. 72).
Trailer mount M55	Keep speed within maximum allowable limit.	On smooth surface roads—10 mph; on cross country—5 mph.
	After Traveling	
Trailer mount M55	Clean and lubricate.	Clean excess mud, dirt, and grease from entire vehicle and lubricate.
	Check all mechanical and electrical connections for tightness and condition.	All electrical connections, mounting devices, nuts, and bolts should be secure. All parts should be in good condition
Tires	Check pressure and condition after tires cool.	Correct pressure is 50 pounds (max) when cool.

41. Preventive Maintenance by Battery Mechanic

a. The battery mechanic is issued necessary tools and either performs or supervises all authorized disassembly, maintenance, and adjustments.

b. Service by battery mechanic includes a systematic check to see that all crew preventive maintenance (par. 40) has been properly

performed at the prescribed intervals and that the materiel is in the best possible operating condition. The services set forth in table III are to be performed or supervised by the battery mechanic at the designated intervals in addition to any maintenance required as a result of the checks and services by the crew. The frequency of the preventive maintenance services prescribed is considered a minimum requirement for operation of the materiel under usual (mild) conditions. Under unusual operating conditions, such as extreme temperatures, dust or sand, extremely wet terrain, moist or salty atmosphere, or in rain or snow; it will be necessary to perform the maintenance services more frequently.

c. The crew should have the materiel in a reasonably clean condition for scheduled maintenance service by battery mechanic.

Table III. Preventive Maintenance by Battery Mechanic

Interval and point	Procedure	Detailed instructions
	Before Firing	
Machine guns	Check timing and head space.	Adjust (FM 23–65).
	Semiannually	
Wheel bearings	Remove, clean, repack, and adjust.	LO 9–223 and par. 75.
	After immersion	
Trailer mount M55	Drain, clean and lubricate	Drain entrapped water in trailer body, jack brackets, wheel bearings, and gear housings. Clean and lubricate.

Section IV. TROUBLESHOOTING

42. Scope

a. This section contains troubleshooting information and tests for locating and correcting some of the troubles which may develop in the weapon. Troubleshooting is a systematic isolation of defective components by means of an analysis of the trouble symptoms, testing to determine the defective component, and applying the remedies. Each malfunction given for an individual unit or system is followed by the probable causes of the trouble and suggested procedures to be followed.

b. This manual cannot cover all possible malfunctions that may occur. Only the more comon malfunctions are listed but similar methods of analyzing the difficulty and determining the defective component may be applied to any specific trouble which is not covered herein.

c. The tests and remedies provided in this section are governed by the scope of the organizational level of maintenance.

43. Failure to Fire

a. Misfire. A misfire is a complete failure to fire which may be due to a faulty weapon, a faulty electrical circuit, or a faulty cartridge. A misfire in itself is not dangerous, but since it cannot be immediately distinguished from a delay in the functioning of the weapon or from a hangfire, it should be considered as a possible delayed firing until such possibility has been eliminated. Such a delay in the functioning of the weapon might be caused by foreign matter or excessive lubricant which impedes the forward movement of the firing pin.

b. Hangfire. A hangfire is a delay in the functioning of the cartridge at the time of firing. The amount of delay is unpredictable but in most cases falls within the range of a split second to several minutes. A hangfire, therefore, cannot be distinguished immediately from a misfire. For this reason the time interval prescribed in *d* below should be observed before retracting the bolt after a failure to fire.

Caution: During the prescribed time interval, the weapon must be trained on the target and all personnel will stand clear of the muzzle.

c. Cook-Off. A cook-off is a functioning of any or all of the explosive components of a cartridge chambered in a hot weapon due to heat from the weapon. If this occurs the bullet may be fired from the weapon with normal velocity. To prevent cook-off, a round of ammunition in a very hot weapon should be fired or removed within 5 seconds. This prevents heating to the point where a cook-off occurs.

d. Procedures for Removing a Round.

(1) Keep weapon trained on target or in a safe field of fire.

(2) Actuate firing switch two more times.

(3) If gun still fails to fire, wait 5 seconds and retract bolt to extract cartridge.

44. Other Malfunctions and Corrections

The probable causes and the corrective measures for other malfunctions are listed in table IV.

Table IV. Troubleshooting

Malfunction	Probable causes	Corrective action
Failure of solenoid to function.	Solenoid leads loose	Seat lead tightly in receptacle. Tighten locking ring.
	Solenoid not properly adjusted.	Par 71.
	Incorrect timing of solenoid and gun.	Adjust (FM 23–65).
	Trigger switches not functioning.	Report to ordnance maintenance personnel.
	Firing circuit damaged.	Repair or replace loose or broken wires.
	Loose wiring	Tighten all wires.
Gun failures	Head space out of adjustment.	Adjust (FM 23–65)
	Feeding	FM 23–65.
	Firing	FM 23–65.
	Loading	FM 23–65.
	Loose wiring to solenoid.	Tighten wire.
Failure of one gun to fire with live round in chamber.	Firing circuit not energized.	Check wiring.
	Defective ammunition.	Replace ammunition and report (par. 3c(2)).
	Machine gun malfunction.	FM 23–65.
	Solenoid defective	Check and adjust solenoid (par. 71). If necessary, replace solenoid.
Failure of all guns to fire with live rounds in chambers.	Loose or broken wiring in firing circuit.	Check and repair wiring.
	Trigger switch defective.	Report to ordnance maintenance personnel.
	Weak batteries	Charge (par. 51).
One gun continues to fire when trigger switch is released.	Short circuit in firing circuit wiring.	Check and repair wiring.
	Defective solenoid	Check and adjust solenoid (par. 71). Replace if necessary.
	Machine gun malfunction.	FM 23–65.
All guns continue to fire when trigger switch is released.	Faulty trigger switches.	Report to ordnance maintenance personnel.
	Short circuit in firing circuit wiring.	Check and repair wiring.

Table IV. Troubleshooting—Continued

Malfunction	Probable causes	Corrective action
Failure of power drive motor to start.	Loose wire connections.	Tighten junction box to battery cable connection. See if cable wire is attached to right battery terminal. Tighten battery cable lug on battery terminal. Open main base cover and tighten motor cable to terminal block.
	Weak battery	Charge (par. 51).
	Short in motor	Report to ordnance maintenance personnel.
	Frozen pulley bearing causing circuit breaker switch to open.	Report to ordnance maintenance personnel.
	Loose ground wire	Tighten ground wire.
Failure of mount to elevate.	Linkage from control handles to power drive broken.	Report to ordnance maintenance personnel.
	Obstruction between trunnion sector rack and torque tube gear.	Remove obstruction without damaging gear teeth If not possible to remove, report to ordnance maintenance personnel.
	Pinion gear on torque tube drive shaft gear damaged or out of line.	Report to ordnance maintenance personnel.
	Loose control handles.	Set handles in neutral position and tighten all screws. If not corrected report to ordnance maintenance personnel.
	Coupling from elevation differential to elevation gear box disengaged.	Open main base cover and re-engage coupling (par. 61).
	Power drive motor belt broken.	Replace belt set (par. 61).
Failure of mount to traverse.	Obstruction in turret ring gear on azimuth pinion	If possible, work obstruction free; if not possible report to ordnance maintenance personnel.
	Azimuth pinion gear broken or out of alinement.	Report to ordnance maintenance personnel.

Table IV. Troubleshooting—Continued

Malfunction	Probable causes	Corrective action
Failure of mount to traverse—Continued	Linkage from control handles to power drive to azimuth gear box out of engagement or broken.	Re-engage. If not possible, report to ordnance maintenance personnel.
	Power drive motor belt broken.	Replace belt set (par. 61).
	Loose control handles	Set handles in position and tighten set screw.
Failure of mount to elevate and traverse properly.	Weak batteries	Recharge (par. 51).
	Loose power unit pulley belts.	Adjust (par. 61).
	Oily pulleys or belts	Clean (par. 61).
	Trunnion binding	Ring clamps too tight; loosen screws. Sight plate too tight; loosen screws. Dent in trunnion; report to ordnance maintenance personnel.
	Differential spider gear or torque gear worn or broken, causing backlash.	Report to ordnance maintenance personnel.
	Shifter block improperly set.	Report to ordnance maintenance personnel.
	Mount creeping	Clean and tighten belts (par. 61); if not satisfactory, report to ordnance maintenance personnel.
Failure of elevation and azimuth interrupter switches to operate.	Elevation interrupter switches not breaking contact.	Remove trunnion block cover and tighten all connections. If switches fail to function, report to ordnance maintenance personnel.
	Azimuth interrupter switches not breaking contact.	If switches fail to function, report to ordnance maintenance personnel.
	Elevation interrupter cam loose or missing.	Remove trunnion block cover. If loose, tighten. If missing, report to ordnance maintenance personnel.
	Loose wiring or incorrect assembly.	Assemble lead wires to correct terminals. See corresponding numbers on terminal blocks. Tighten all connections.

Table IV. Troubleshooting—Continued

Malfunction	Probable causes	Corrective action
Failure of power charger	Weak batteries	Start manually and charge batteries (par. 51).
	Loose wiring	Tighten all wires.
	Gasoline lines not feeding.	Par. 56*e*.
	No spark	Par. 56*e*.
	Ignition coil not functioning.	Test ignition system (par. 56*f*). Report to ordnance maintenance personnel.
	Carburetor not functioning properly.	Clean and adjust (par. 56*a*).
	Air cleaner clogged	Clean.
	Generator (dead)	Report to ordnance maintenance personnel.
Motor overheating	Excessive running at top speed.	Stop motor and let it cool.
Wobbly trailer wheel	Loose wheel nuts	Tighten.
	Bearings burned out	Report to ordnance maintenance personnel for replacement.
	Loose bearings	Adjust (par. 75*b*)
Hot trailer wheel hub	Lack of lubrication	Lubricate (LO 9–223).
	Damaged bearing or cup.	Report to ordnance maintenance personnel for replacement.
	Improper bearing adjustment.	Adjust properly (par. 75*b*).
Oil or grease outside of wheel.	Defective grease retainer.	Report to ordnance maintenance personnel for replacement.
	Improper or over lubrication.	Lubricate (LO 9–223).
	Defective hub cap gasket.	Report to ordnance maintenance personnel for replacement.
Excessive tire wear	Over or under inflation	Inflate tire to 50 pounds.
	Spindle shaft loose in wheel bracket.	Tighten.
	Torn or punctured tube.	Repair tube (TM 31–200) or replace (par. 73).
Jack ratchet bar will not raise or lower.	Foreign material inside housing.	Clean thoroughly with dry-cleaning solvent or volatile mineral spirits to remove foreign material from ratchet teeth and from inside housing.
	Broken or damaged pawls or springs.	Replace jack w/mount assembly (par. 82*a*)

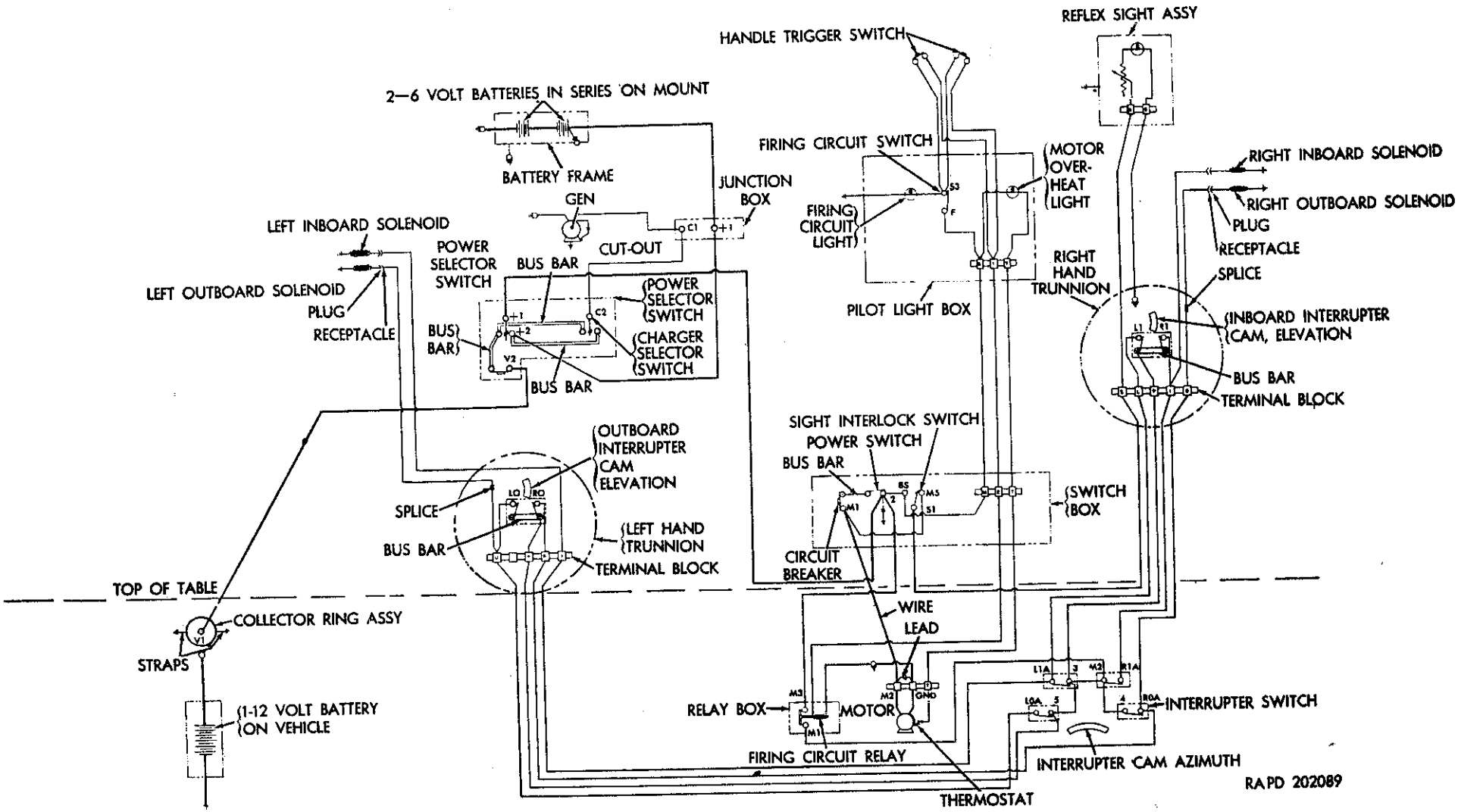


Figure 42. Wiring diagram—mount M45F.

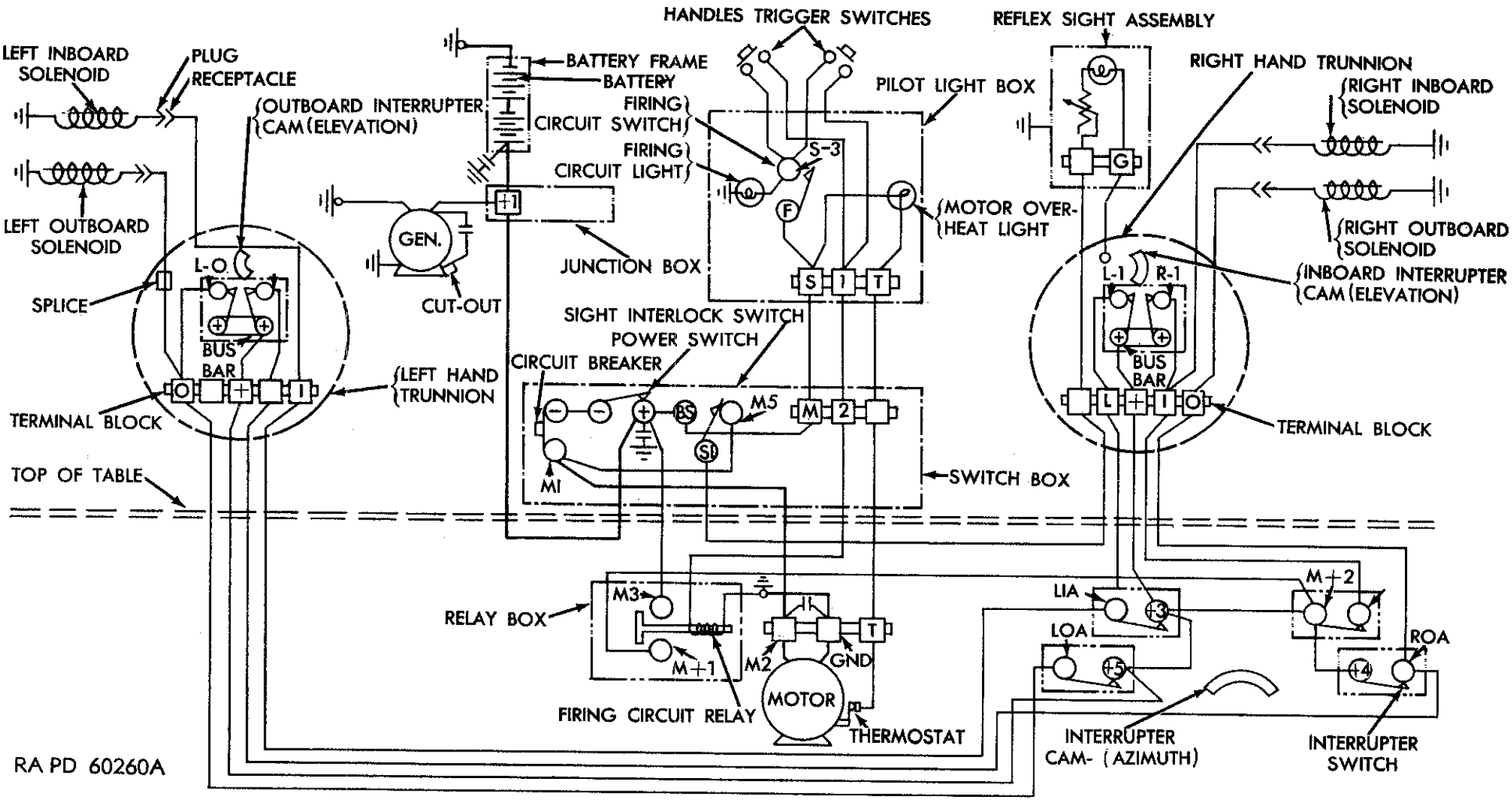


Figure 41. Wiring diagram—mounts M45C and M45D.

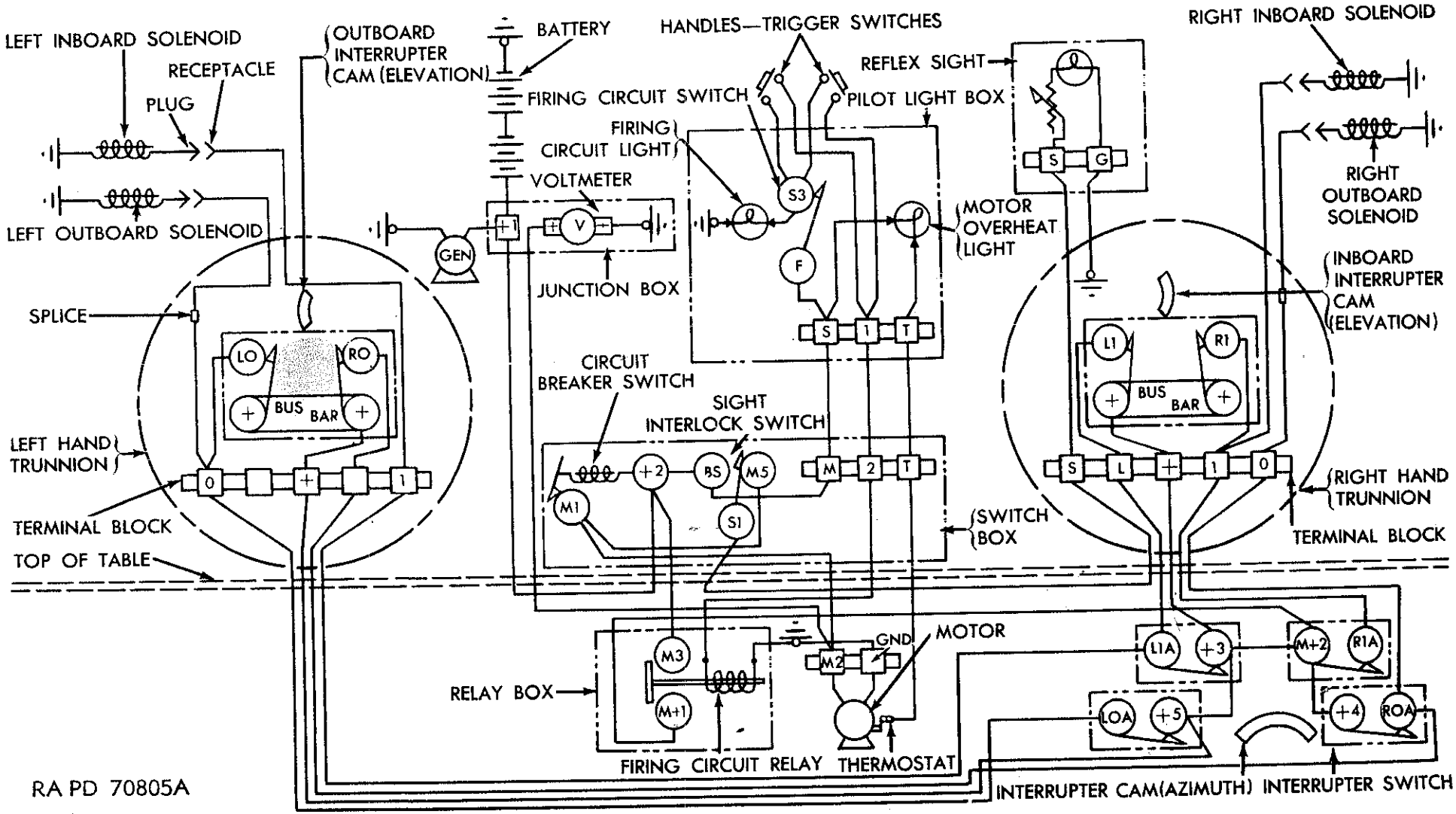


Figure 40. Wiring diagram—mount M45 (early mfr).

Table IV. Troubleshooting—Continued

Malfunction	Probable causes	Corrective action
Tail light will not light	Jumper cable not plugged into socket of towing vehicle.	Remove plug from dummy socket on drawbar and plug into socket on towing vehicle.
	Light switch on towing vehicle in "OFF" position.	Turn switch on.
	No electrical current from towing vehicle.	Check wiring on towing vehicle.
	Broken or damaged jumper cable.	Repair or report to ordnance maintenance personnel for replacement.
	Burned out lamp-unit.	Report to ordnance maintenance personnel for placement.
	Damaged or corroded jumper cable plug.	Clean or report to ordnance maintenance personnel for replacement.
Dim light	Dirty or corroded blades in coupling socket or jumper cable plug.	Clean all contact points.
	Dirty lens.	Clean.
	Dirty or corroded lamp sockets.	Remove lamp-unit and clean (par. 79).
	Weak power supply from towing vehicle.	Check power supply of towing vehicle.

Section V. ELECTRICAL SYSTEM

45. General

The components of the electrical system within the scope of organizational maintenance are the pilot light box assembly (fig. 17), switch box assembly (fig. 14), and power selector switch box (M45F) (fig. 20). The wiring diagrams (figs. 40, 41, and 42) of the electrical system are included for information on operation and organizational maintenance of the electrical components. Batteries and power chargers, although part of the electrical system, are covered in paragraphs 49 through 56.

46. Disassembly

a. Pilot Light Box Assembly.

(1) *Firing circuit light* (fig. 17).

(*a*) Unscrew and remove two screws and lock washers (fig. 43) which secure pilot light box shield to pilot light box.

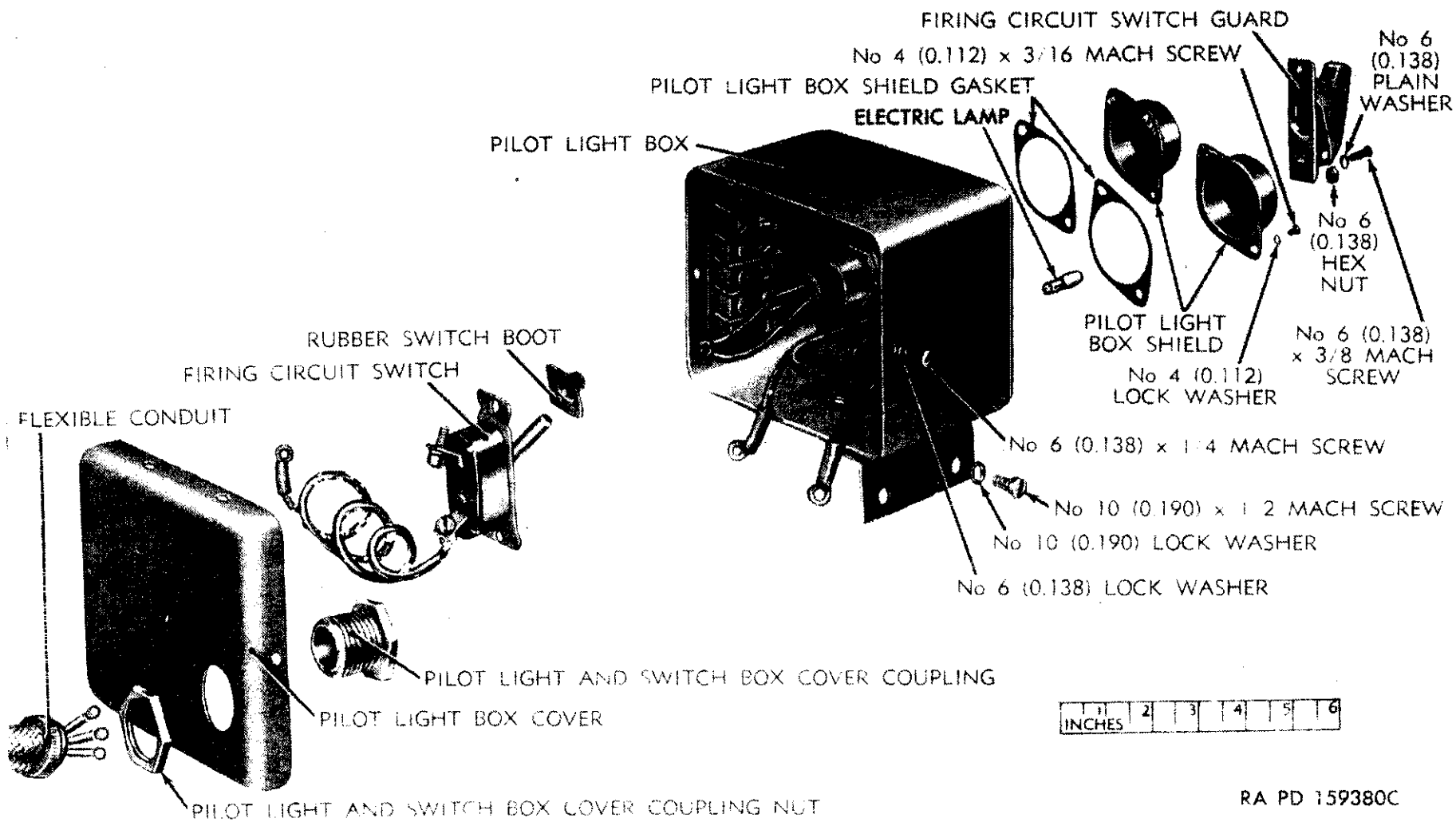


Figure 43. Pilot light box assembly—exploded view

(*b*) Remove pilot light box shield and gasket.

(*c*) Push down on lamp, turn slightly to the left, and remove lamp.

Note.—The firing circuit lamp and motor overheat lamp are removed in the same manner as in (*a*) through (*c*) above.

(2) *Firing circuit switch assembly.*

(*a*) Unscrew and remove the four screws and lock washers that hold the pilot light box assembly to the control support. Pull pilot light box assembly away from the control support.

(*b*) Release pilot light box cover by unscrewing and removing six screws and six lock washers.

(*c*) Turn off pilot light box conduit nut from pilot light and switch box cover coupling, and slide conduit down and away from cover. Turn off pilot light and switch box cover coupling nut, and slide nut and cover down wire assembly.

(*d*) Unscrew and remove screw from the firing circuit switch and remove the wire lead that runs to the firing circuit light assembly. Remove the two trigger lead wires from the same terminal.

(*e*) Unscrew and remove screw from other terminal of firing circuit switch and remove lead wire that runs to the terminal block.

(*f*) Unscrew the two screws from the nuts that secure the firing circuit switch guard to the firing switch. Remove screws, nuts, and washers.

(*g*) Remove the firing circuit switch and guard, and remove rubber switch boot from switch.

b. Switch Box Assembly.

(1) Unscrew and remove six screws and lock washers that secure the switch box cover to the switch box (fig. 44). Remove the cover.

(2) Turn off nut that secures the bus bar to the toggle switch.

(3) Unscrew and remove screw that secures the bus bar to the manual reset circuit breaker, and remove and tag the lead wire that runs from circuit breaker to sight interlock switch. Remove bus bar.

(4) Turn off nut from the left terminal of toggle switch. Remove and tag all wire leads.

(5) From top of switch box, unscrew four tapping screws from four speed nuts which secure toggle switch to switch box. Remove screws, washers, and nuts. Remove toggle switch.

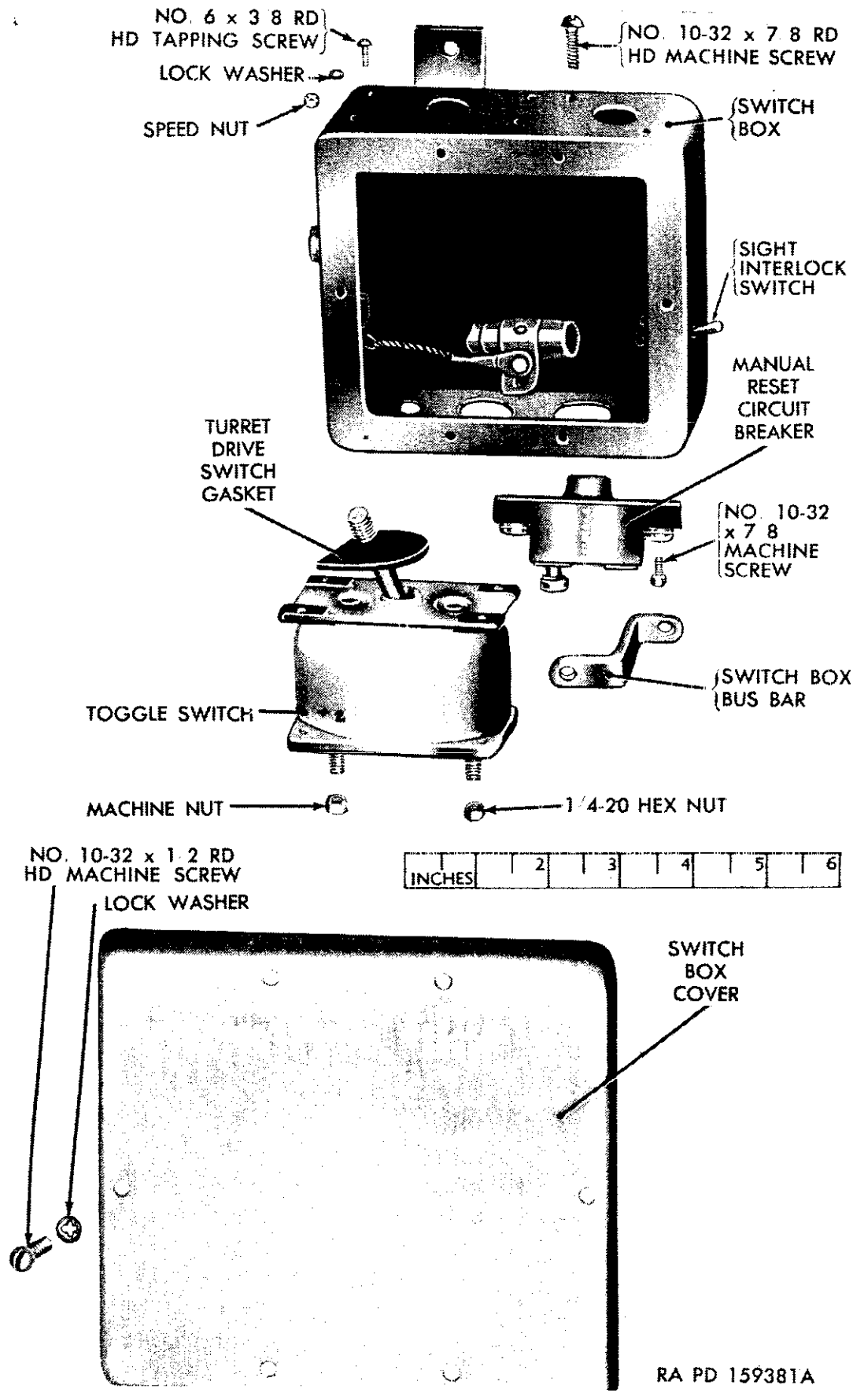


Figure 44. Switch box assembly—partial exploded view.

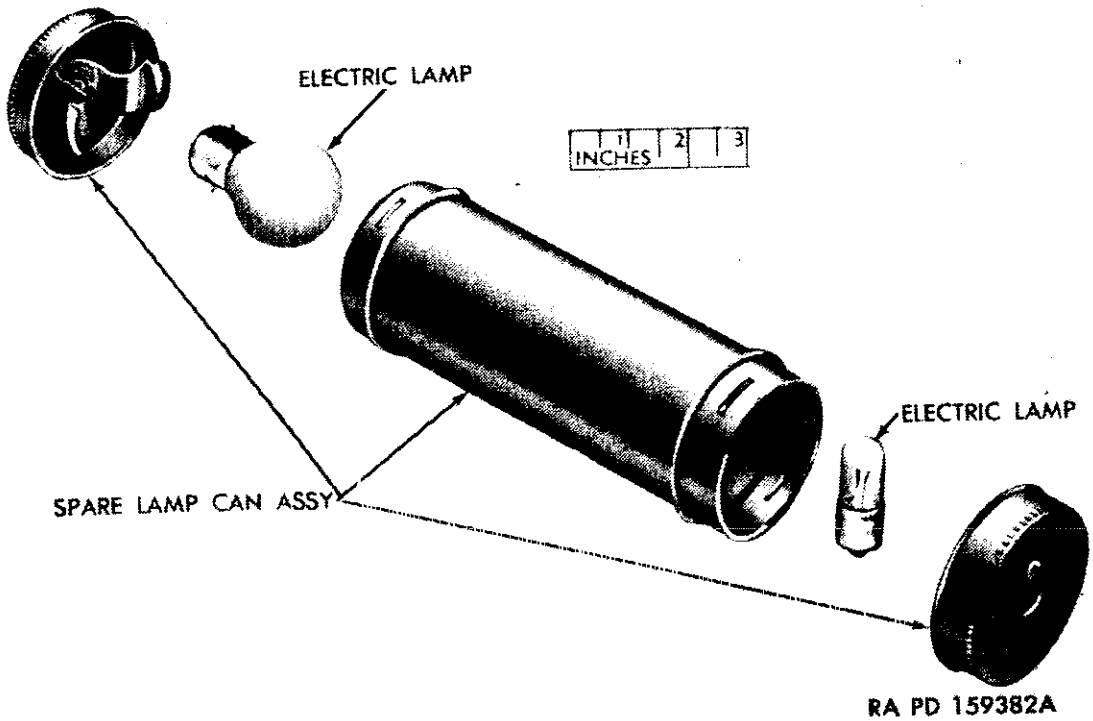


Figure 45. Spare lamp can assembly—exploded view.

(6) From top of switch box, unscrew and remove two round-head machine screws that secure manual reset circuit breaker to box. Remove circuit breaker.

c. Spare Lamp Can Assembly.

(1) Remove spare lamp can assembly from clips on either side of seat (fig. 15).

(2) Twist off end of can and remove lamp required (fig. 45).

(3) Spare lamps for the pilot light box and reflex sight are carried in these cans for ready replacement.

47. Maintenance

a. Pilot Light Box Assembly.

(1) Replace lamp in firing circuit switch light after check that lamp has burned out. Test with lamp in spare lamp can assembly in paragraph 46*c*. If lamp still fails to light, tighten all wire terminals in pilot light box. Make sure that firing circuit switch is on FIRE position; then set switch on SAFE.

Caution: Make sure guns are not loaded.

Check motor overheat light and shield for condition. This lamp will not light unless motor is overheated.

(2) Replace firing circuit switch when switch is defective. Care should be taken to tag all wires that are disconnected.

(3) Replace shield gaskets whenever shields are removed.

b. Switch Box Assembly.

(1) Replace toggle switch and gasket when check reveals that switch is defective. Be sure to tighten all connections. Power drive motor should start when switch is set to "ON" position.

(2) If circuit fails to function after circuit breaker has been reset, press reset button again after waiting a few minutes. Replace circuit breaker if found to be defective.

48. Assembly

a. Pilot Light Box Assembly.

(1) *Firing circuit light* (fig. 43).

(*a*) To replace electric lamp, push down on lamp and turn slightly to the right.

(*b*) Replace shield gasket.

(*c*) Place shield over pilot light in line with holes in flange and secure with two No. 4 lock washers and No. 4 machine screws.

(2) *Firing circuit switch assembly.*

(*a*) Connect two trigger lead wires and firing circuit light wire to one terminal of switch, and lead from terminal block to other terminal of switch.

(*b*) Place firing circuit switch with rubber boot in pilot light box. Place guard over switch and secure with two No. 6 screws, washers, and nuts.

(*c*) Slide conduit through hole in cover and connect wires to terminal block. Fasten nut and cover coupling to cover.

(*d*) Fasten pilot light box cover to pilot light box with six No. 6 x ¼ machine screws and lock washers.

(*e*) Place pilot light box assembly on control support and fasten four No. 10 x ½ machine screws and lock washers.

b. Switch Box Assembly (fig. 44).

(1) Connect bus bar to circuit breaker with the No. 10 machine screw. Connect lead wire from sight interlock switch to circuit breaker. Place reset circuit breaker in switch box and secure with two No. 10–32NF x ⅞ round-head machine screws.

(2) Connect leads to toggle switch terminal and fasten ¼-inch hex nut. Connect bus bar to toggle switch terminal.

(3) Fasten toggle switch to switch box with four No. 6 x ⅜ round-head tapping screws.

(4) Secure switch box cover to switch box using six No. 10 x ½ round-head machine screws and lock washers.

c. Spare Lamp Can Assembly (fig. 45).

(1) Replace any spare lamps used in can.

(2) Install end of can and place can in clips in mount (fig. 15).

Section VI. BATTERIES AND HYDROMETER

49. General

Two batteries are used to operate the M45 series mounts. The batteries are located in the rear of the mount alongside the power charger (figs. 46, 47, and 48) and store electrical energy generated by the power charger. A hydrometer case (fig. 46), installed on all mounts, is located on the left rear post of the main framework and houses the hydrometer which is used to determine the specific gravity of the battery fluid (electrolyte).

50. Replacement of Batteries

a. Removal.

(1) Remove battery cover by loosening the wing nut (fig. 46) on the front battery latch and swing the front latch down. Push the two remaining latches from connections, and remove the battery frame (fig. 47).

(2) Remove terminal of battery cable lead to junction box by loosening terminal nut.

(3) Loosen terminal nuts and remove cables from batteries in like manner.

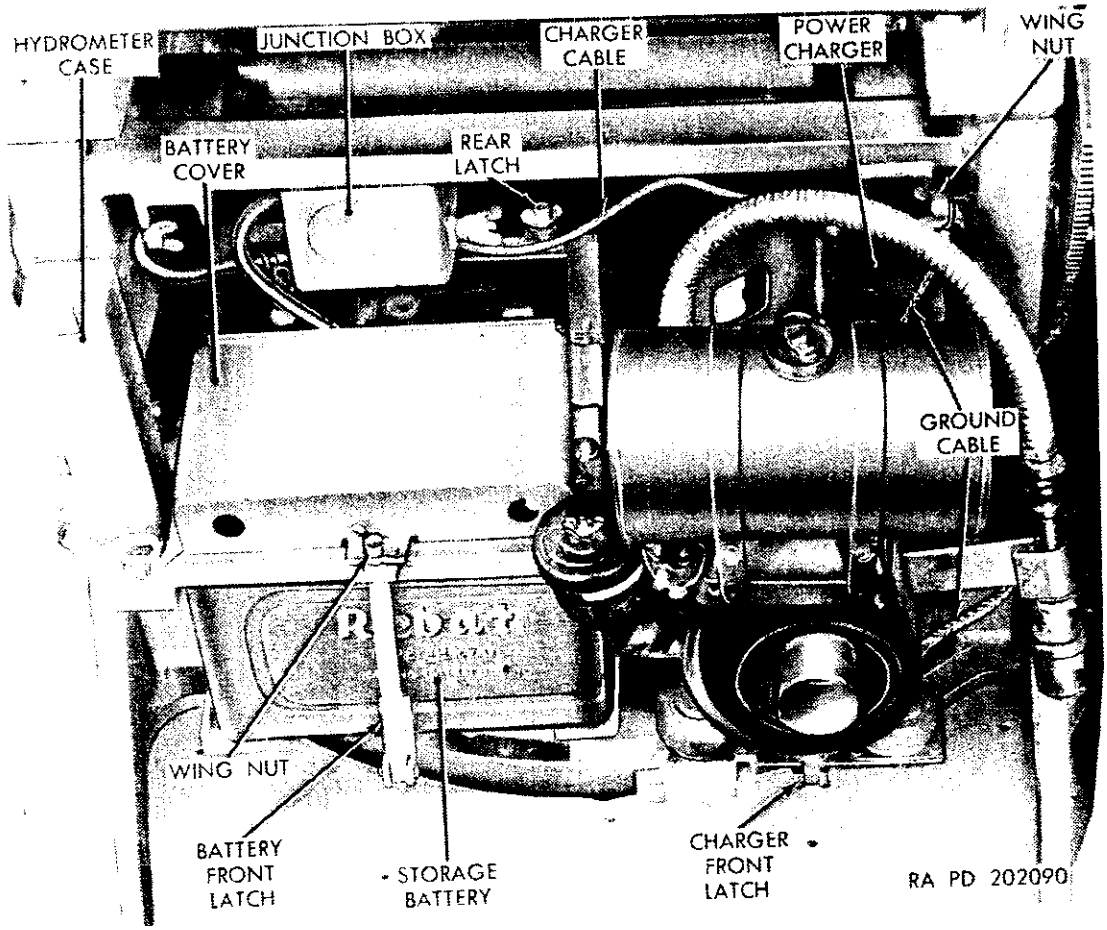


Figure 46. Battery and power charger.

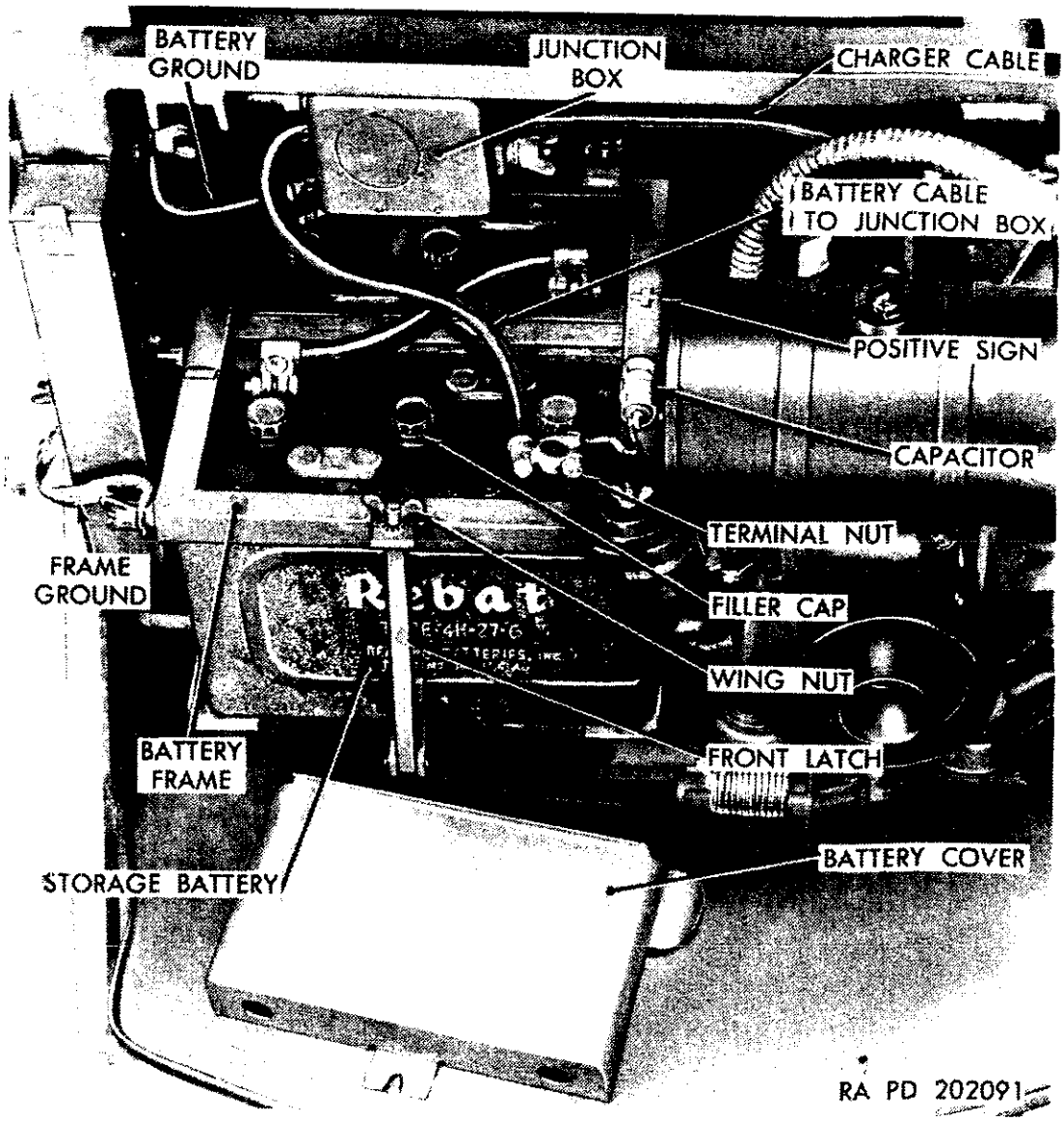


Figure 47. Battery and cables.

(4) Remove batteries by sliding from position one at a time (fig. 48).

b. Installation. To install, reverse removal procedure.

51. Maintenance and Inspection

a. Terminals. Scrape clean with a coarse wire brush; then wash with hot water and soap. Dry thoroughly; then apply No. 1 or No. 0 general purpose grease to prevent corrosion.

b. Battery Latches. Inspect condition and lubricate.

c. Battery Fluid (Electrolyte).

(1) To test battery fluid, remove hydrometer from case (fig. 46). Remove filler cap (fig. 47) and insert hydrometer to each cell. Make temperature correction as indicated in figure 49. If hydrometer reading is below 1,240, the battery should be brought up to full charge. When fully charged, the hydrometer reading should be between 1,240 and 1,280.

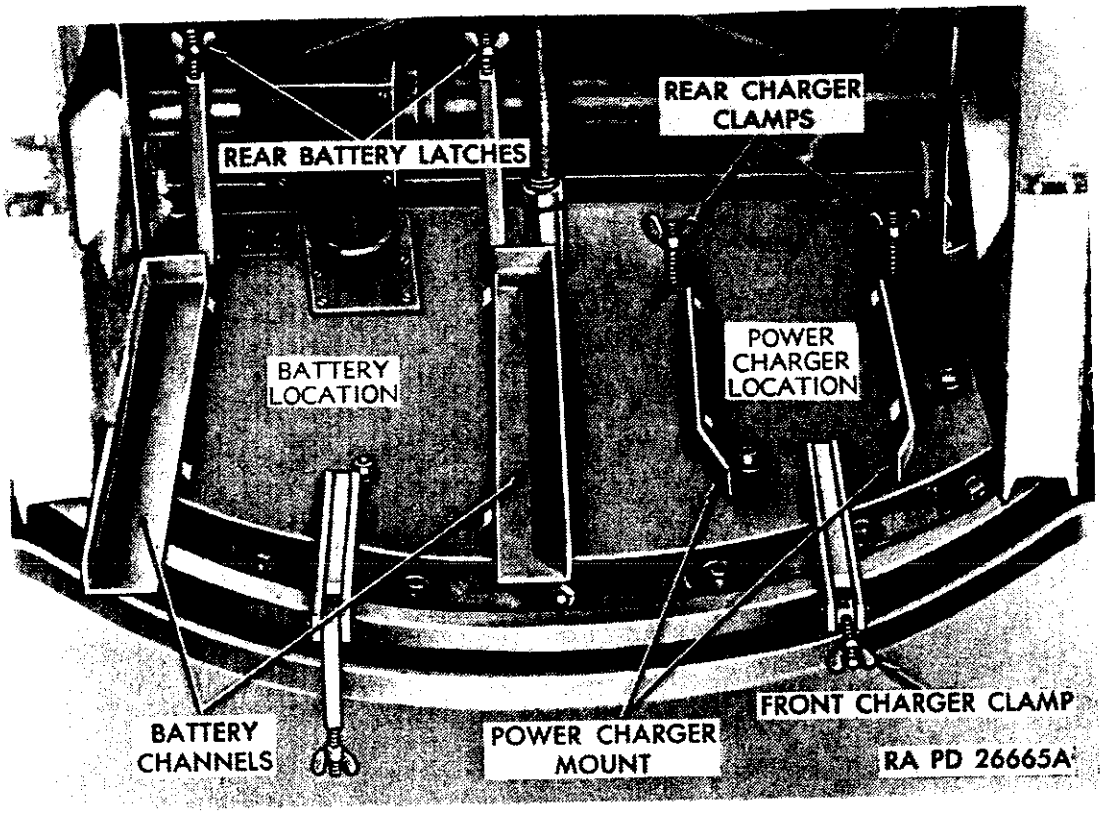


Figure 48. Battery and power charger location.

(2) If the battery fluid (acid) is spilled or any parts are damp with acid, use ordinary baking soda solution (1 lb. baking soda to 1 gal. of water) and wash parts. After washing with solution, rinse off with fresh water and dry. Avoid getting cleaning solution into cell. All clothing contaminated with acid should be discarded.

d. Battery Cell Plates. Using distilled water, maintain a fluid level of three-eighths of an inch above the cell plates. Do not overfill cells or solution may bubble over.

e. Battery Charging.

(1) *Mounts M45, M45C, and M45D.* Batteries must be fully charged at all times. Never operate the mount without the power charger in operation, since the batteries will be drained in less than 1 hour. To charge batteries, set power charger control switch on HIGH position. The charging rate should not be over 20 amperes. When batteries are almost charged, taper off the charging by setting charger switch on LOW position.

(2) *Mount M45F.* Power may be supplied from either the vehicle battery or the mount battery and either charged by means of the power selector switches. When both switches are toward the right, power is supplied by the mount battery and current from charger is supplied to the mount battery. When both toggle switches of the power selector switch box

are toward the left, power is supplied from the vehicle battery which is also being charged. These switches operate independently of each other and power may be made available from mount battery while charging vehicle or vice versa. Should the vehicle battery go dead for any reason, it is possible to charge it while still being able to run gun mount. This eliminates need for running vehicle engine to keep battery charged while maintaining radio and interphone communication.

(3) *Battery Test.* Test batteries daily, before each operation, and after each operation (*c* above).

Note.—Do not test batteries when water has just been added.

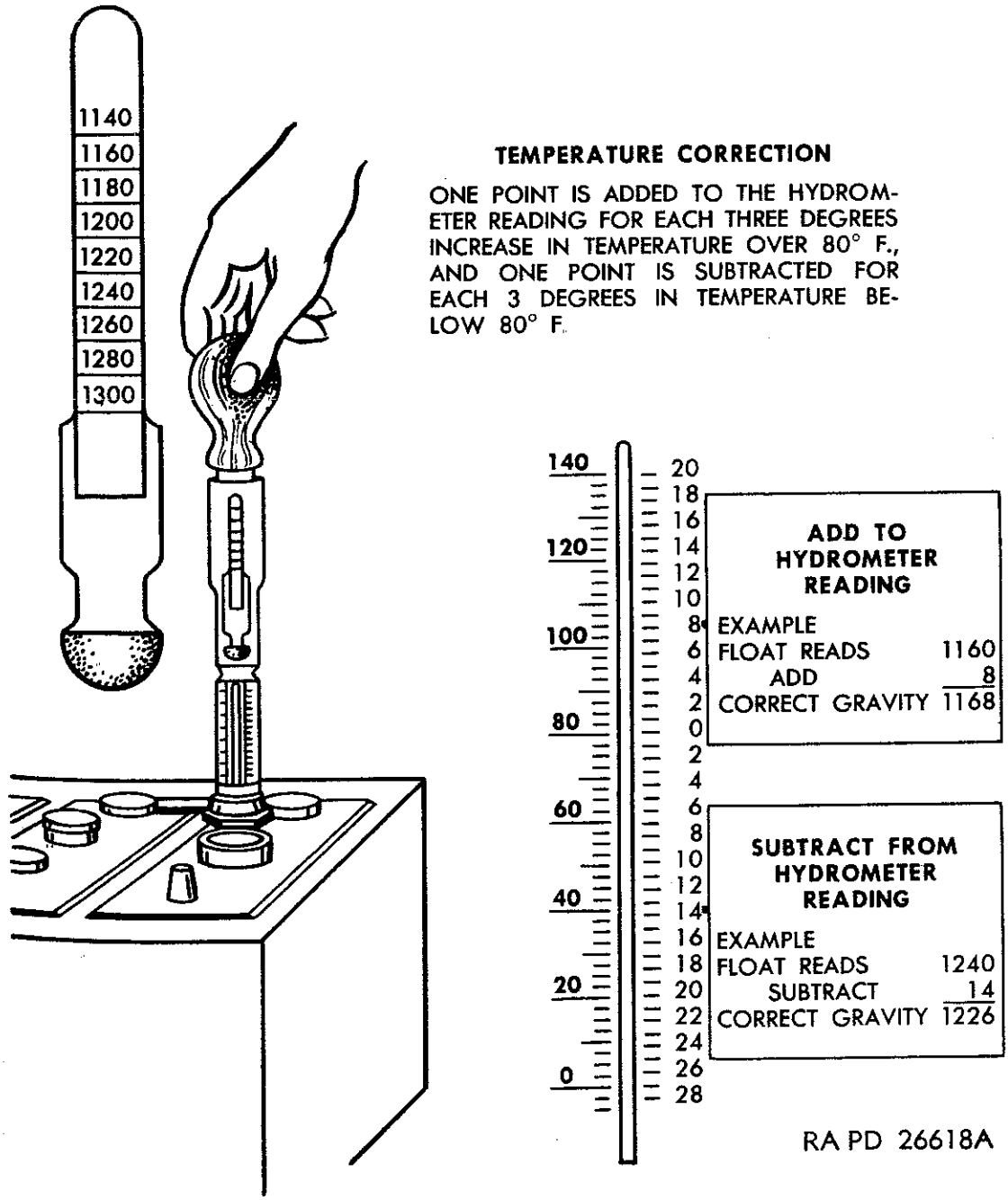


Figure 49. Using hydrometer.

Avoid battery overheating by keeping the battery fluid (electrolyte) at a temperature of 110° F. or less. A completely discharged battery may freeze and split at 0° F. The climate standards of fully charged batteries are as follows:

Tropical	1,240 to 1,260 specific gravity.
Moderate	1,240 to 1,280 specific gravity.
Frigid	1,275 to 1,300 specific gravity.

Portable chargers may be used if available. Batteries may be removed and charged separately if equipment is available.

f. Batteries as a Unit.

(1) Inspect and make sure that the batteries are properly seated on channel slides. Make certain that battery latches are holding firm. Inspect battery frame for condition.

(2) When battery is damaged or dead, inform ordnance personnel.

(3) Keep batteries clean and operative at all times.

(4) When batteries are not in use, the battery water must be checked at least once a week.

(5) Inspect cables, markers, and lugs for condition of insulation.

g. Hydrometer.

(1) Clean after using. Inspect for cracks or holes in rubber ball.

(2) Inspect hydrometer case for cracks or dents. Paint if necessary.

Section VII. POWER CHARGER GROUP

52. General

A gasoline engine driven power charger located in the rear of the mount (figs. 46 and 48) is used to charge two 6-volt storage batteries of the lead-acid type. The carburetor assembly (fig. 50) on the power charger is of the gravity type, and the gasoline supply is regulated by a needle valve. The throttle is automatically controlled by a governor. The ignition is produced by a spark from the magneto and is sent into the motor cylinder through the ignition cable and spark plug. The generator assembly, which is mounted on a tapered extension of the motor crankshaft, acts as the electric starter. However, the charger can also be started manually. The generator assembly of the power charger houses the switch, ammeter, automatic breaker, and all the wiring. The circuit breaker protects the battery against discharge back through the generator. Power chargers D73846 (fig. 50), 7062284 (fig. 51) and 7386579 (fig. 52) are authorized for replacement and may be used interchangeably. Replacement procedure is identical for these chargers.

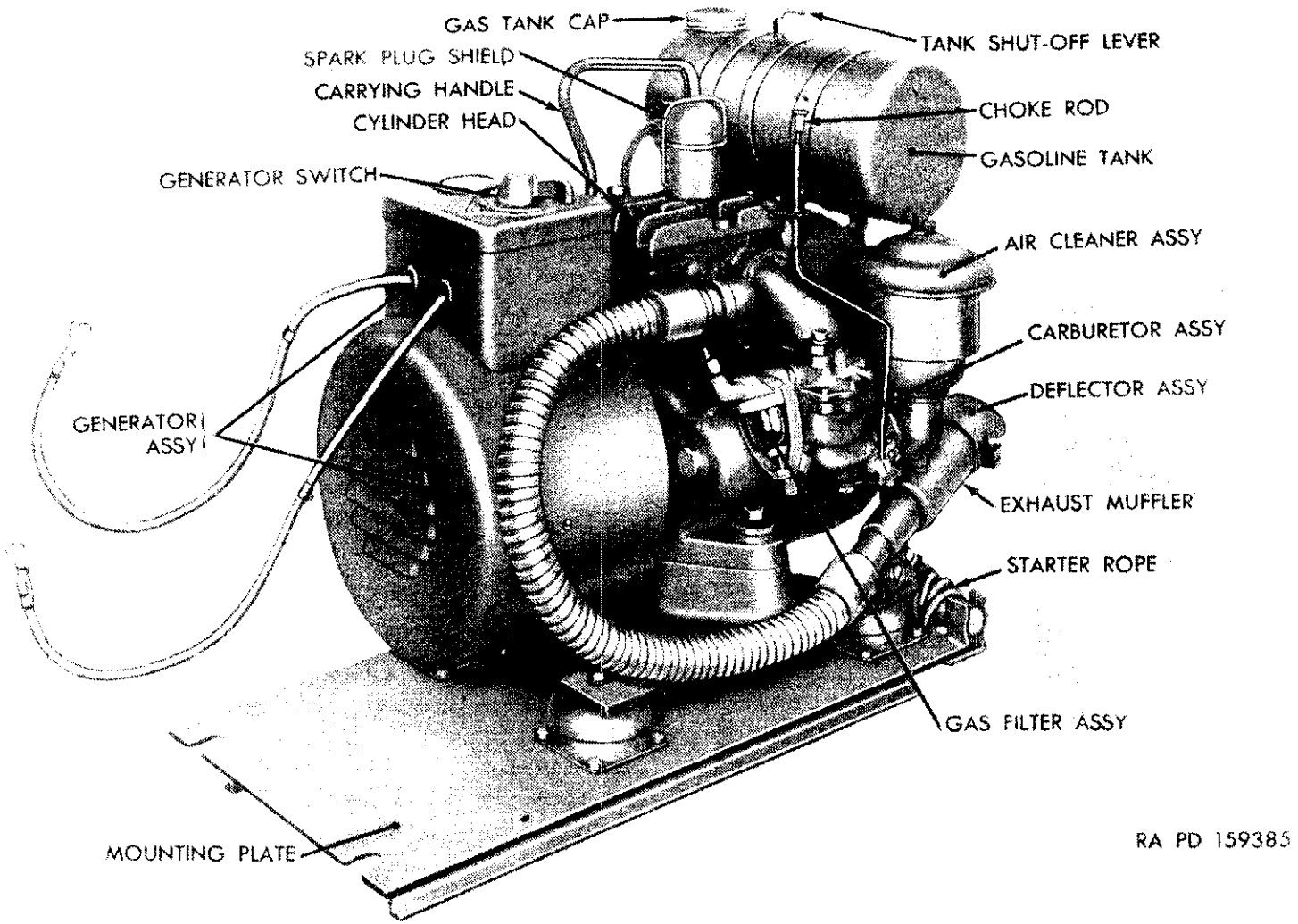


Figure 50. Power charger D73846.

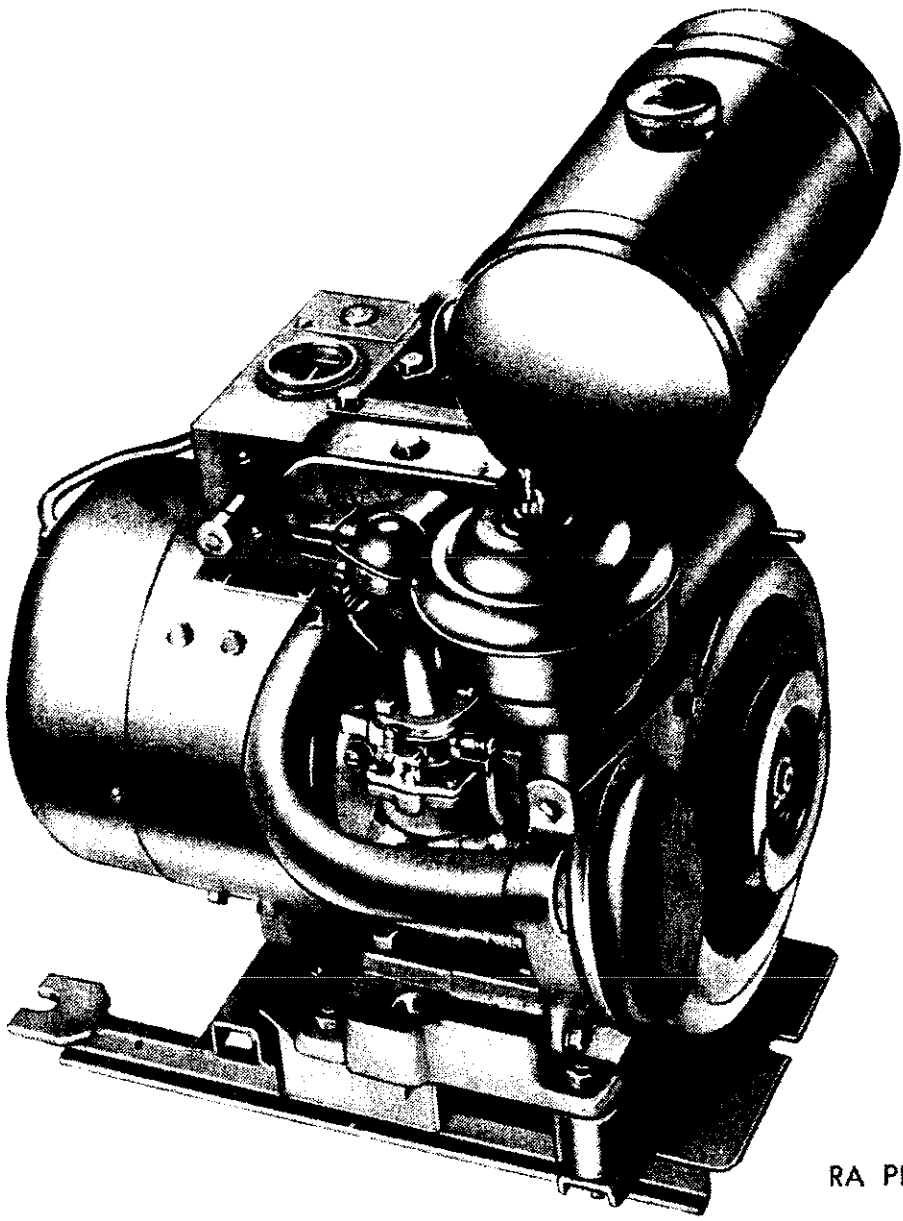


Figure 51. Power charger 7062284.

53. Replacement of Power Charger

a. Removal (fig. 46).

(1) Disconnect the charger cable from the connection on the junction box.

(2) Disconnect the two metal web ground cables from the main framework.

(3) Loosen the three wing nuts (fig. 52) two in rear and one in front of the charger.

(4) Swing front latch (fig. 46) down and out of the way and slide the power charger out of the channels. Grasp the carrying handle and remove the charger.

b. Installation. To install the power charger proceed in reverse order of removal.

54. Disassembly

a. Removal of Carburetor.

(1) Close the tank shut-off lever (fig. 53) on top of the gasoline tank.
Disconnect gasoline line at gasoline filter elbow.

(2) Disconnect choke rod at choke lever.

(3) Disconnect carburetor at carburetor intake elbow by removing two screws and lock washers.

(4) Disconnect governor spring (fig. 54) from the carburetor.

(5) Disconnect and remove the gasoline filter assembly (fig. 55) from the carburetor.

(6) Remove screw and washer that fastens carburetor brace to air cleaner.

(7) Loosen screw that connects air cleaner to carburetor. Separate the carburetor and the air cleaner.

(8) Disconnect the gasoline line from the gasoline tank.

(9) Blow out gasoline lines, clean carburetor, and clean out glass filter assembly.

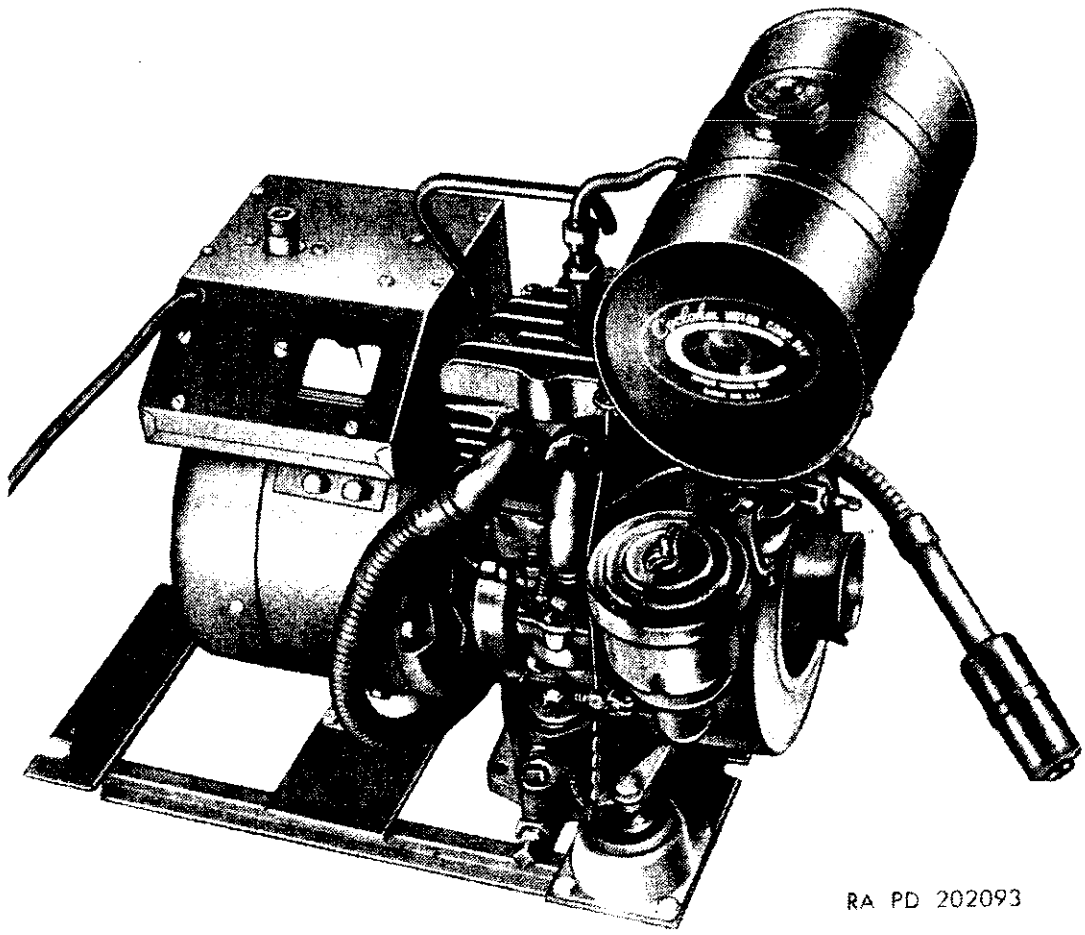


Figure 52. Power charger 7386579

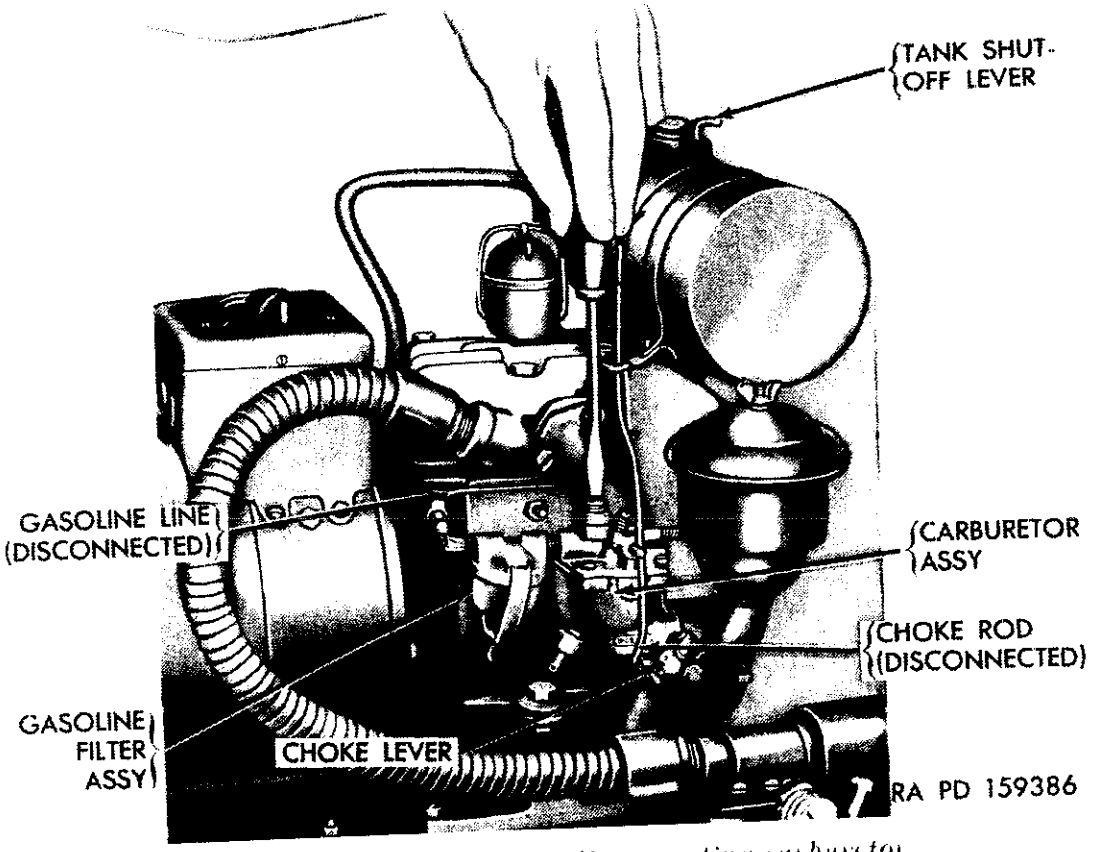


Figure 53. Power charger—disconnecting carburetor.

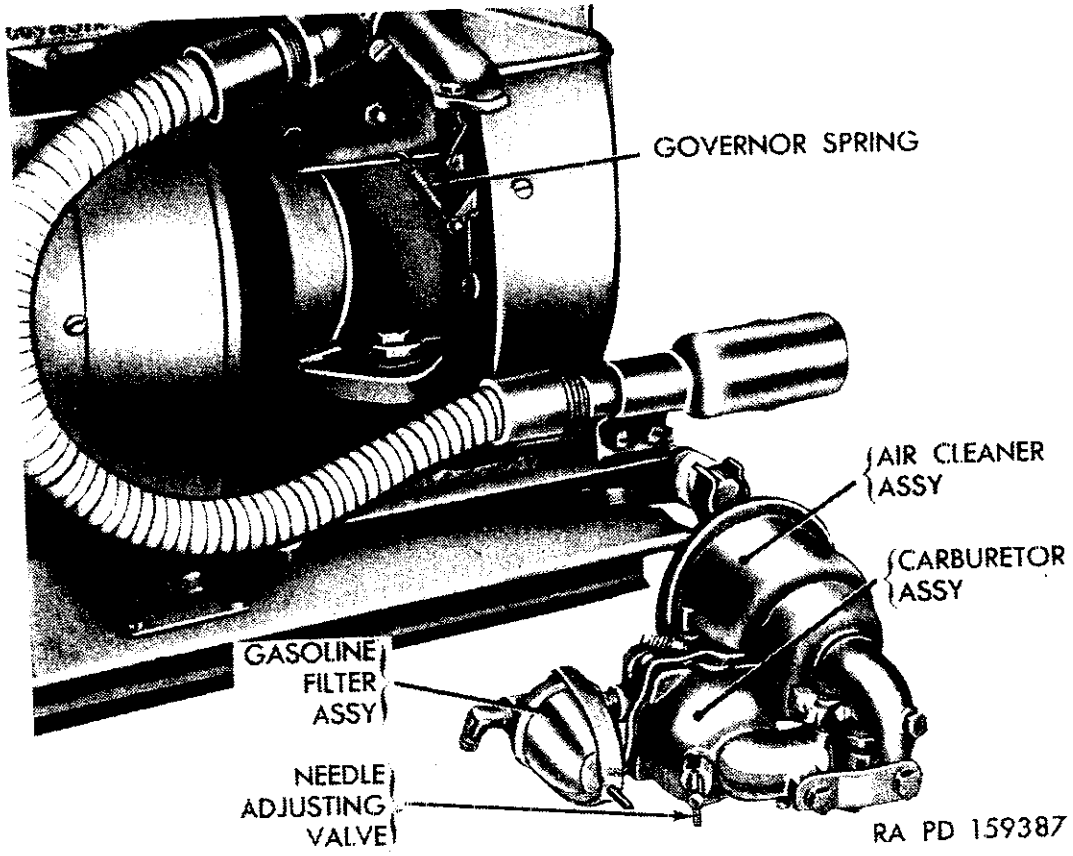


Figure 54. Power charger—governor spring, carburetor, gas filter, and air cleaner removed.

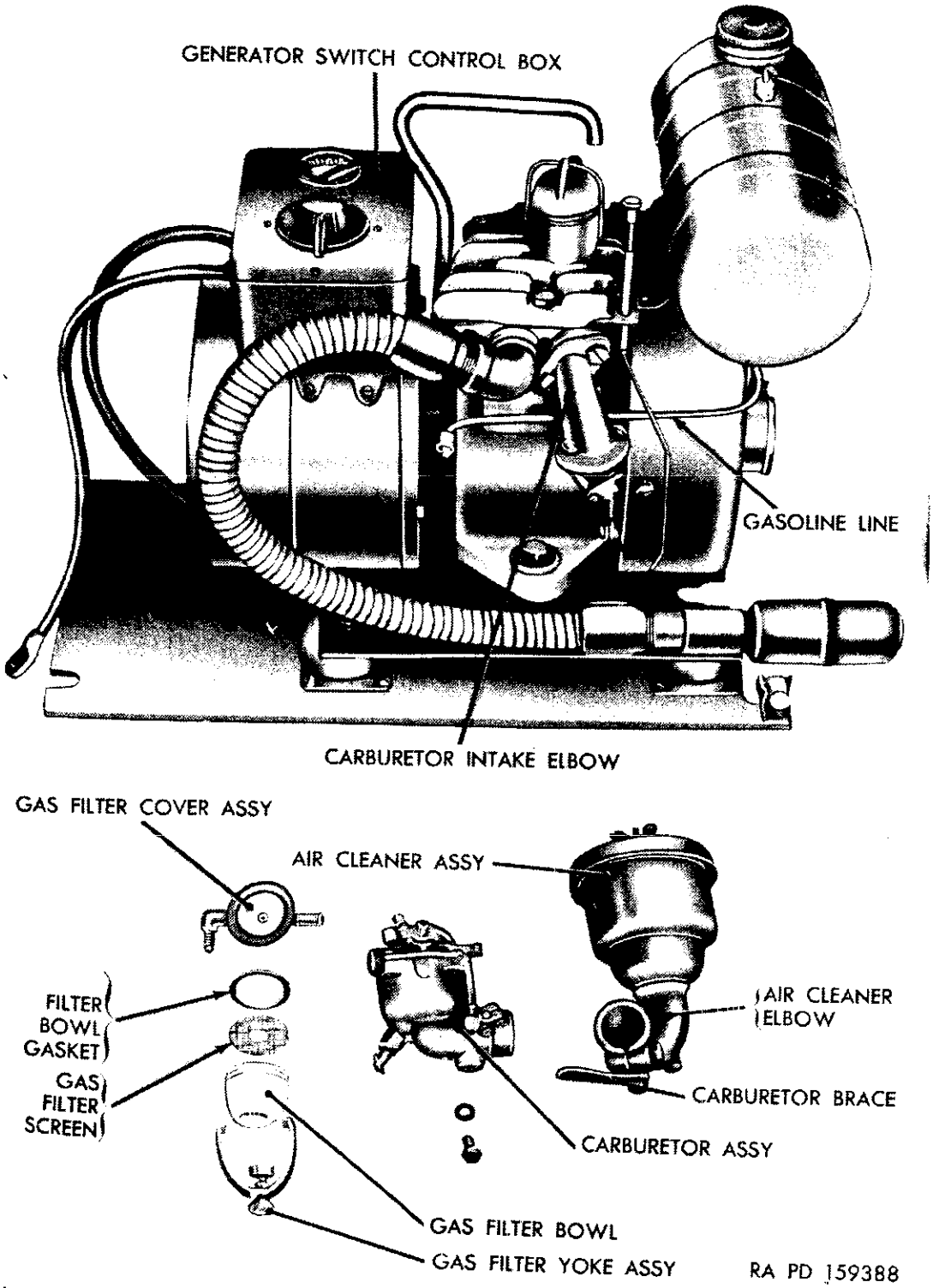


Figure 55. Power charger (carburetor, gas filter, and air cleaner removed).

b. Gasoline Filter Bowl, Yoke, Screen, and Gasket.

(1) Loosen the wing nut in the gas filter yoke assembly (fig. 55). Slide the yoke away from the two bosses that hold it to the cover.

(2) Remove the gasoline filter bowl, yoke, screen, and gasket.

c. Governor Spring. Disconnect and remove the governor spring (fig. 54) from the governor link. Adjust for tension as required or replace.

d. Needle Adjusting Valve.

(1) Unscrew needle valve packing nut (fig. 56) from carburetor; withdraw nut with needle adjusting valve attached.

(2) Unscrew needle adjusting valve from needle valve packing nut. Clean as required.

e. Spark Plug Gasket, Plug, and Shield.

(1) Lift up on the arm of the spark plug shield (fig. 57) that holds the spark plug cover to the shield cup. Remove the spark plug shield.

(2) Disconnect spark plug cable from spark plug by removing one nut.

(3) Using spark plug wrench, remove spark plug.

(4) Remove spark plug gasket.

f. Exhaust Muffler (fig. 50).

(1) Loosen the two screws of the exhaust extension clamp.

(2) Turn off the exhaust muffler from the exhaust extension.

g. Air Cleaner Gasket.

(1) Unscrew and remove the wing nut at the top of the air cleaner assembly (fig. 50). Twist gently until the cleaner is separated from the air cleaner elbow.

(2) Remove the air cleaner gasket.

h. Cylinder Head Gasket.

(1) Remove spark plug shield, plug, and gasket.

(2) Unscrew and remove four screws and lock washers holding the cylinder head to the cylinder block.

(3) Remove the cylinder head and cylinder head gasket.

55. Assembly

a. Assembly of Carburetor. To assemble all components disassembled in paragraph 54, reverse order of disassembly.

Caution: In assembling the needle valve packing nut to the carburetor, do not screw top tightly or use force when closing needle valve; damage may be done to the needle.

b. Installation of Carburetor.

(1) Attach the air cleaner to the carburetor by means of the carburetor brace, and tighten to the carburetor.

(2) Install the screw that holds the air cleaner to the carburetor.

(3) Insert the gasoline line from the gasoline filter assembly into its recess in the carburetor and turn until tight.

(4) Place carburetor assembly in position on power charger and connect carburetor to carburetor intake elbow.

(5) Connect governor spring to the carburetor and connect the choke rod to the lever.

(6) Connect the gasoline line at the gasoline filter elbow and at its connection at the gasoline tank. Open the gasoline tank shut-off lever.

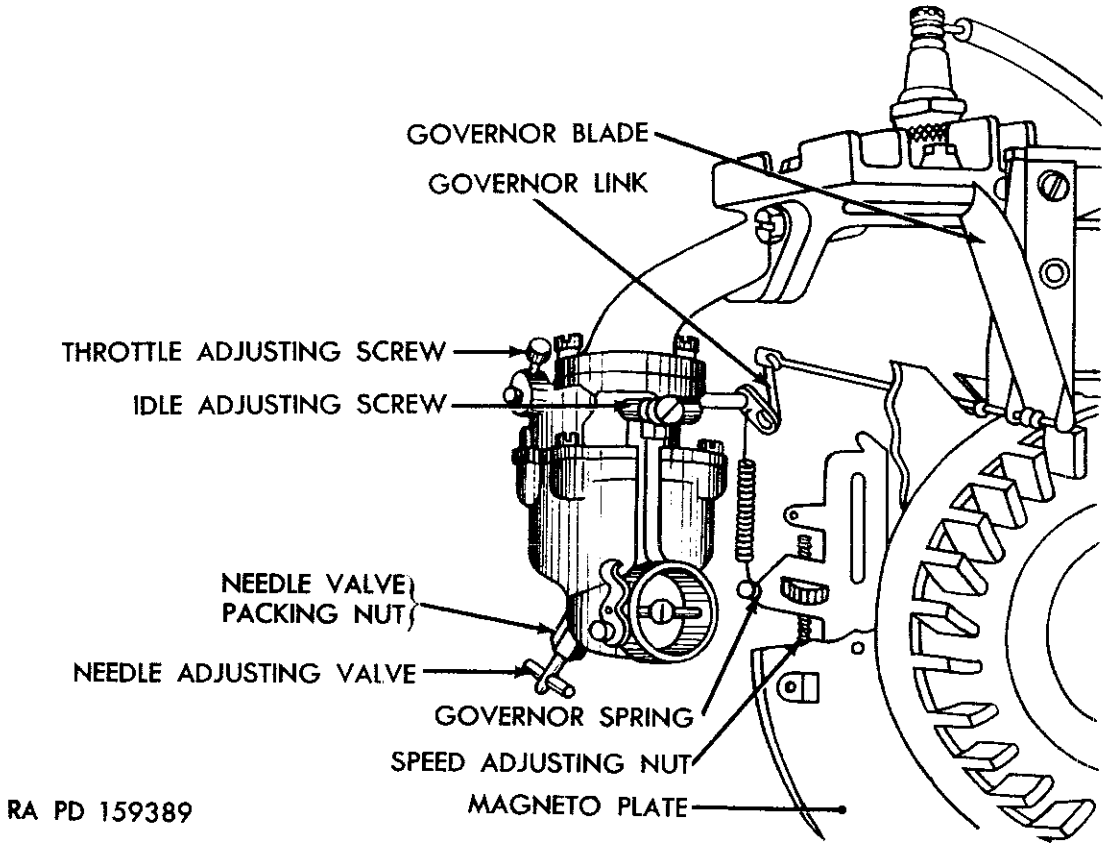


Figure 56. Adjusting points on carburetor.

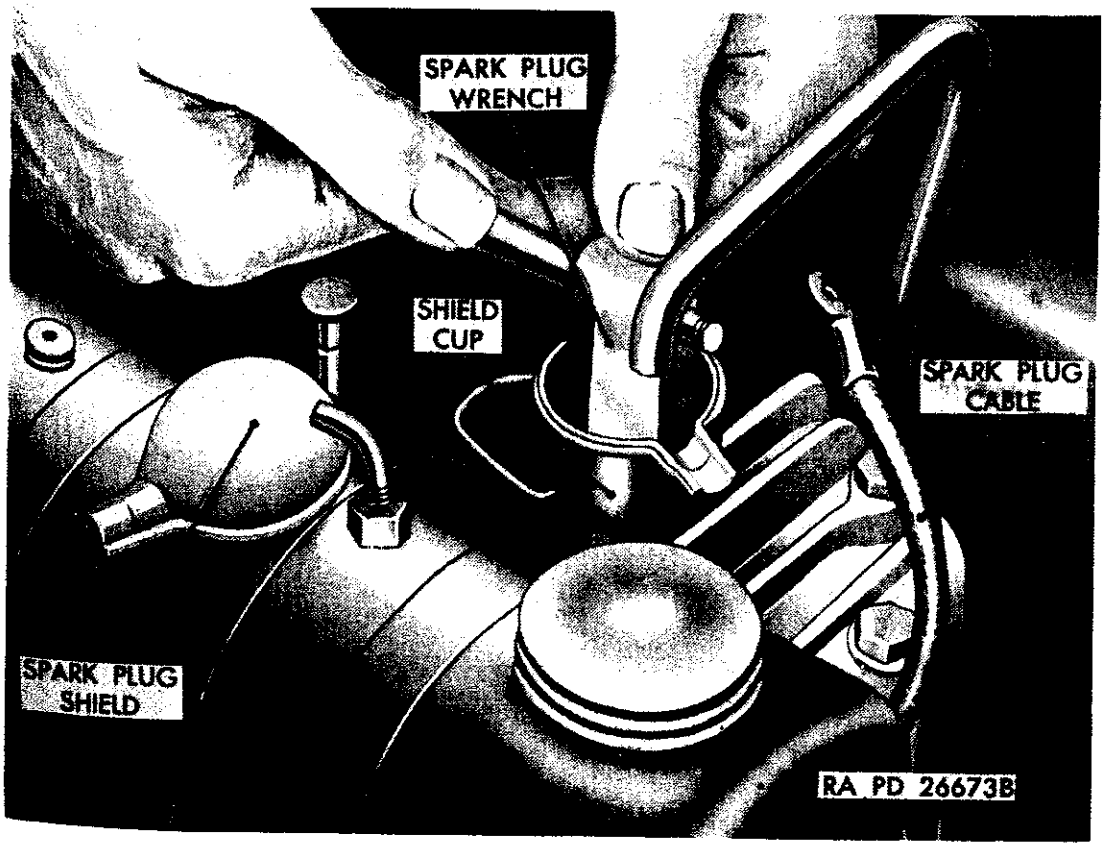


Figure 57. Power charger—removal of spark plug.

56. Maintenance and Inspection of Power Charger

a. Carburetor. To adjust the carburetor, completely close the needle adjusting valve by turning it to the right (clockwise) as far as possible. Do not use force in this action, since the needle adjusting valve may be damaged by forcing. From the closed position, open the needle valve one-half to three-quarters of a turn. With the engine running and warmed up, and the choke wide open, adjust the valve by setting it to the point at which the engine operates most smoothly with a full load.

b. Air Cleaner. Disassemble and wash all parts monthly.

c. Spark Plug. Clean and scrape plugs and reset points to 0.025-inch gap every 25 hours of motor operation. Install plug, regardless of condition, after 100 hours of operation. Examine the porcelain for cracks or breaks.

d. Governor Spring. Inspect for tension. Reset if it fails to maintain motor at charging speed (3,000 rpm).

e. Gasoline Lines. If clogged, close shut-off lever on top of gasoline tank, turning all the way to the right (clockwise). Disconnect gas line at tank and gas filter. Remove cover from carburetor bowl, loosen thumb screw below gas filter bowl, and remove and clean gas filter bowl and filter screen. Blow through gas passage in cover between carburetor and gas filter bowl. Grade B acetone can be used to dissolve gum deposits in fuel line when necessary. Inspect for leaks and breaks. Remove carburetor if necessary.

f. Ignition System and Magneto. Remove blower housing and inspect the entire length of the magneto ignition cable from spark plug to the ignition coil. If insulation of cable is broken or oil-soaked, inform ordnance personnel.

g. Generator. Inspect for worn brushes or dirty commutator. Check cable connection to junction box, and inspect all wiring for defects. Check condition of generator cutout, and make sure generator switch is in HIGH position when mount is in operation.

h. Engine. Inform ordnance personnel in case of poor compression or worn piston or piston rings. Inspect all gaskets for leaks or breaks, and tighten cylinder head. Wash out exhaust muffler regularly.

i. Power Charger as a Unit. The unit must be clean both inside and outside at all times, and in operative condition at all times. It must be lubricated and oiled as prescribed in LO 9–710–5. Care must be taken that no water enters the gas tank. Ordnance personnel should be informed for replacement of any parts not authorized for replacement by organizational personnel.

57. General

The main components of this group (figs. 58 and 59) for which parts are authorized for organizational maintenance are the ammunition tray and gun support group and the sight support group (fig. 60). These components are mounted on the right and left trunnions. The depression stop lever boot replacement is covered in this section. Each trunnion supports a trunnion sector assembly and an ammunition tray and gun support group. Motion is transmitted to the trunnions from the power drive group to the trunnion sector. The trunnions and the groups they support can be elevated through an arc of 90-degree elevation to 10-degree depression. On either end of the left trunnion sector assembly is a stud which acts against the elevation stop lever (fig. 19), thereby preventing the trunnions from overriding their normal arc.

58. Disassembly and Assembly

a. Disassembly.

(1) *Horizontal adjustment block assembly* (fig. 61).

(*a*) Remove the cotter pin locking the horizontal adjusting block nut to the shaft of the horizontal adjustment block assembly.

(*b*) Remove the nut, the horizontal adjustment block assembly, and the handwheel and washer.

(2) *Vertical adjustment yoke* (fig. 62).

(*a*) Withdraw the cotter pins from the upper vertical adjustment handwheel and the vertical adjusting yoke.

(*b*) Remove the lower vertical adjustment handwheel, the yoke, upper handwheel, the lock washer, and the vertical adjustment yoke bearing washer.

(3) *Right and left ammunition box support spring.*

(*a*) Unscrew and remove the two screws and washers that hold the spring to the support.

(*b*) Remove the ammunition box support spring.

(4) *Elevation stop lever boot disassembly* (fig. 19).

(*a*) Unscrew and remove the four screws that hold the elevation stop lever boot to the mount turntable. Remove the boot clamp.

(*b*) Slide the rubber boot over the elevation stop lever.

b. Assembly. Assemble in reverse order of disassembly.

59. Maintenance and Inspection

a. Trunnions. Check to insure that trunnions are secured tightly to side frame of main framework. Inspect trunnion for dents or other

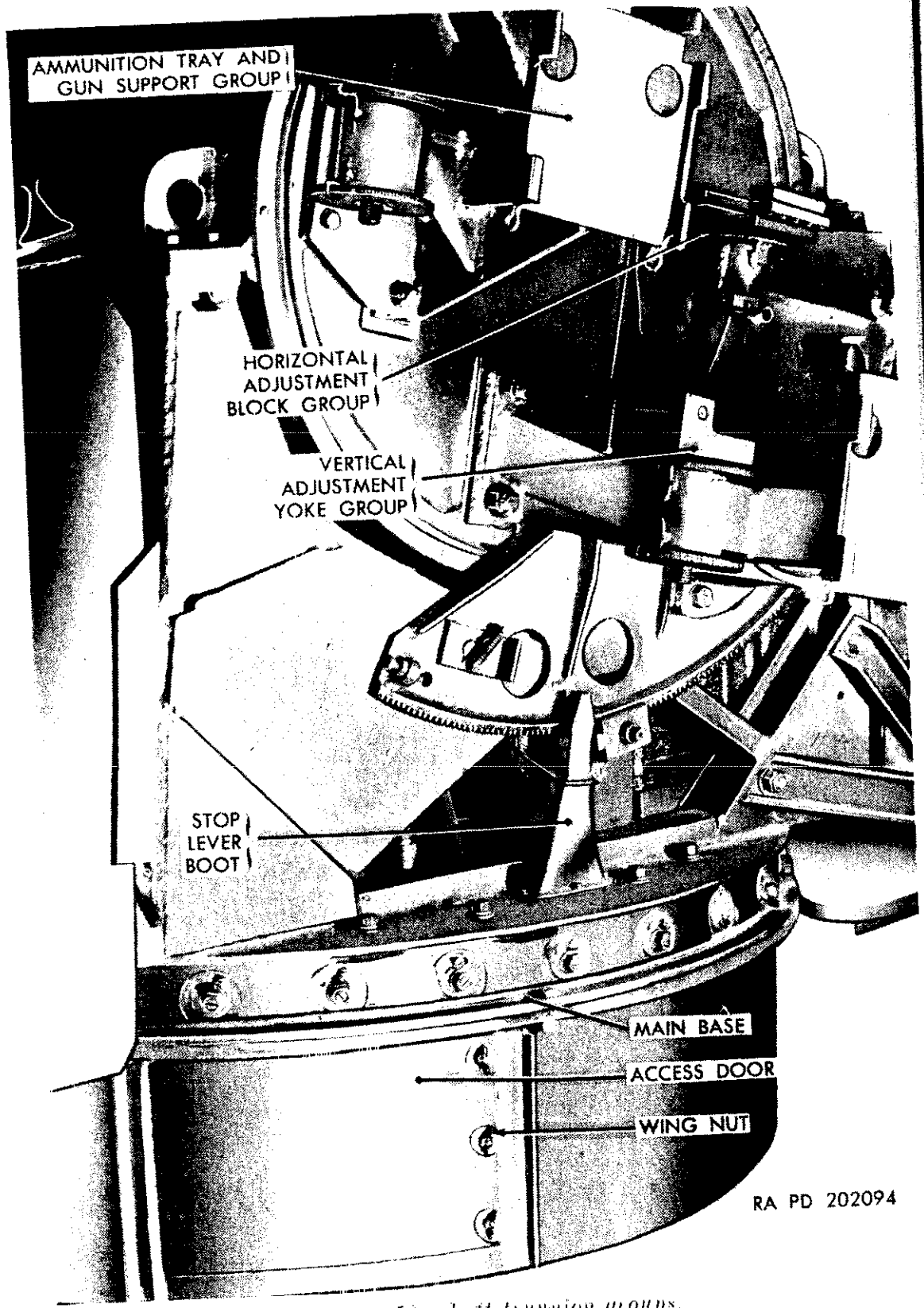
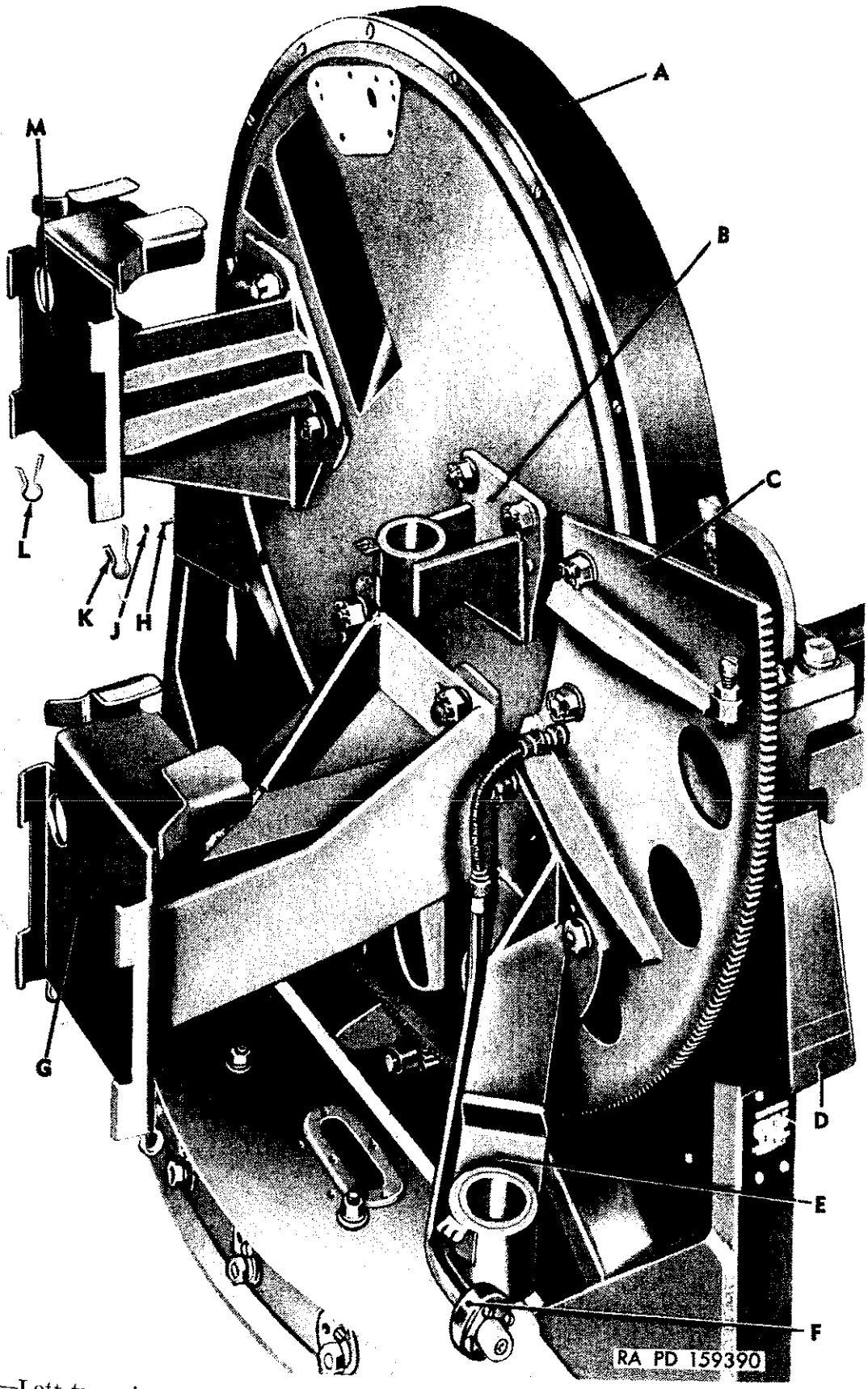


Figure 58. Left trunnion groups.

damage. Test tightness of ring clamps of trunnions to felt seal. Place mount in operation and check for trunnion binding. Lubricate trunnion according to LO 9-710-5.

b. Trunnion Sectors.

(1) Check sector rack teeth for damage. Check mesh of sector rack with gears of torque tube drive shaft.



A—Left trunnion assy.
B—Upper rear support.
C—Left trunnion sector assy.
D—Hydrometer case.
E—Lower rear support.
F—Solenoid lead receptacle.
G—Left rear ammunition box support.
H—No. 8-32×3/8 fil-hd machine screw.
J—No. 8 lock washer.
K—Ammunition box support spring.
L—Ammunition box support spring.
M—Left front ammunition box support.

Figure 59. Left trunnion assembly and related parts.

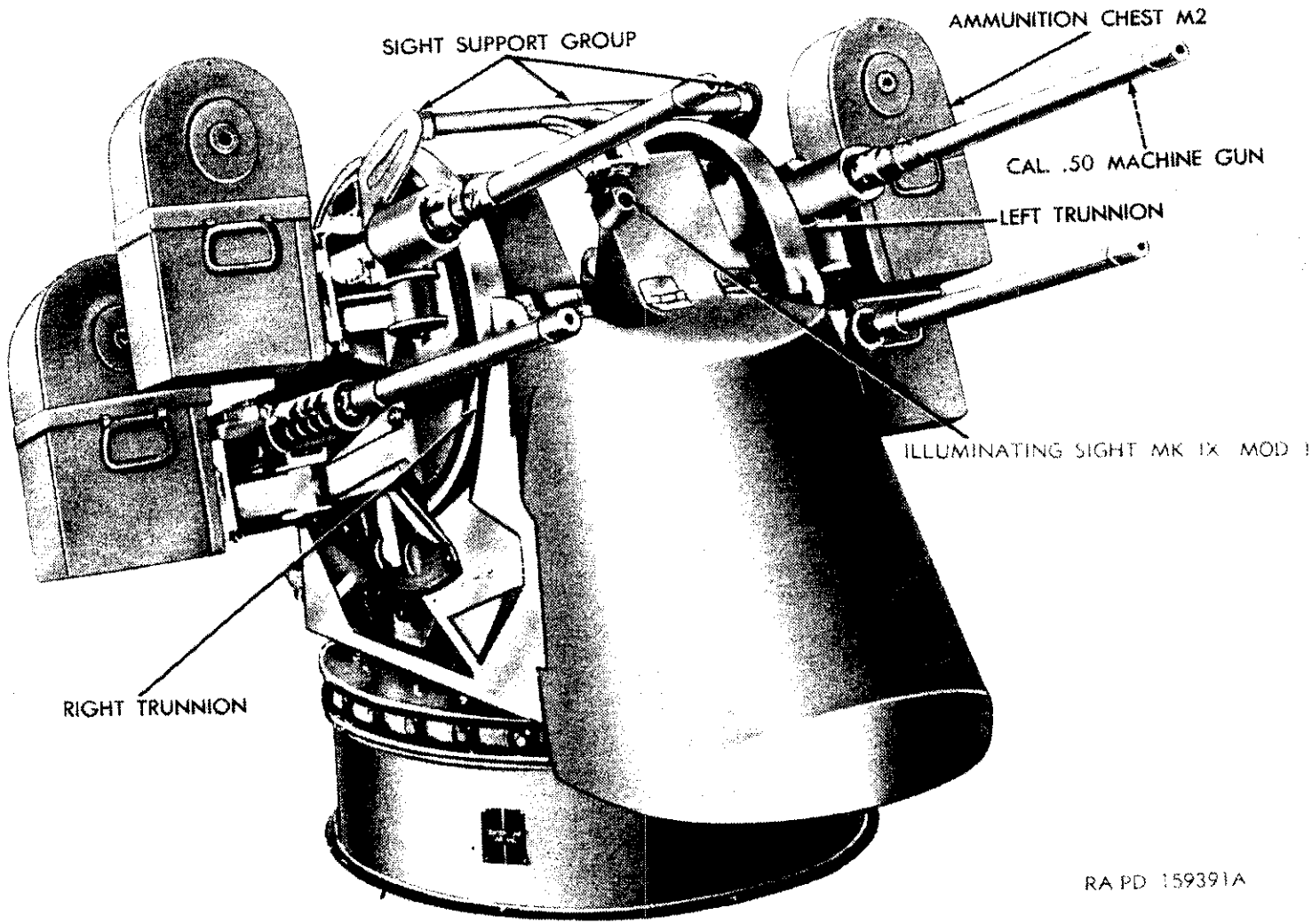


Figure 60. Sight support group.

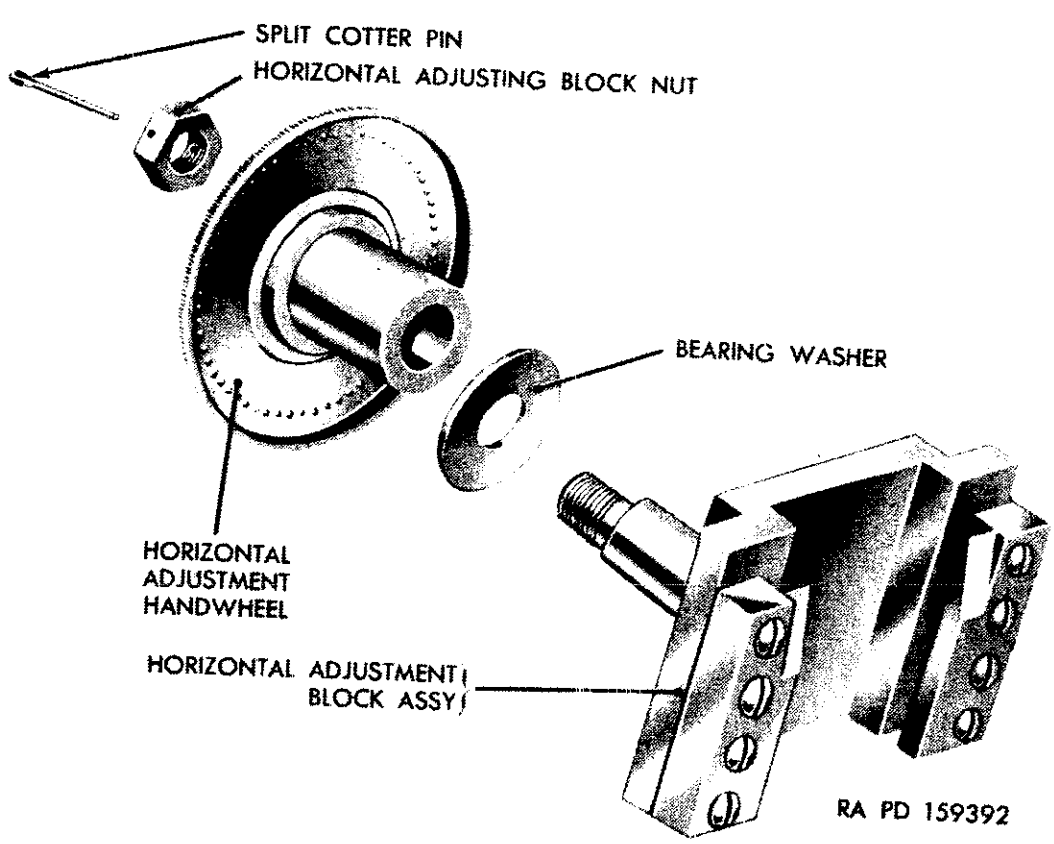


Figure 61. Horizontal adjustment block group parts.

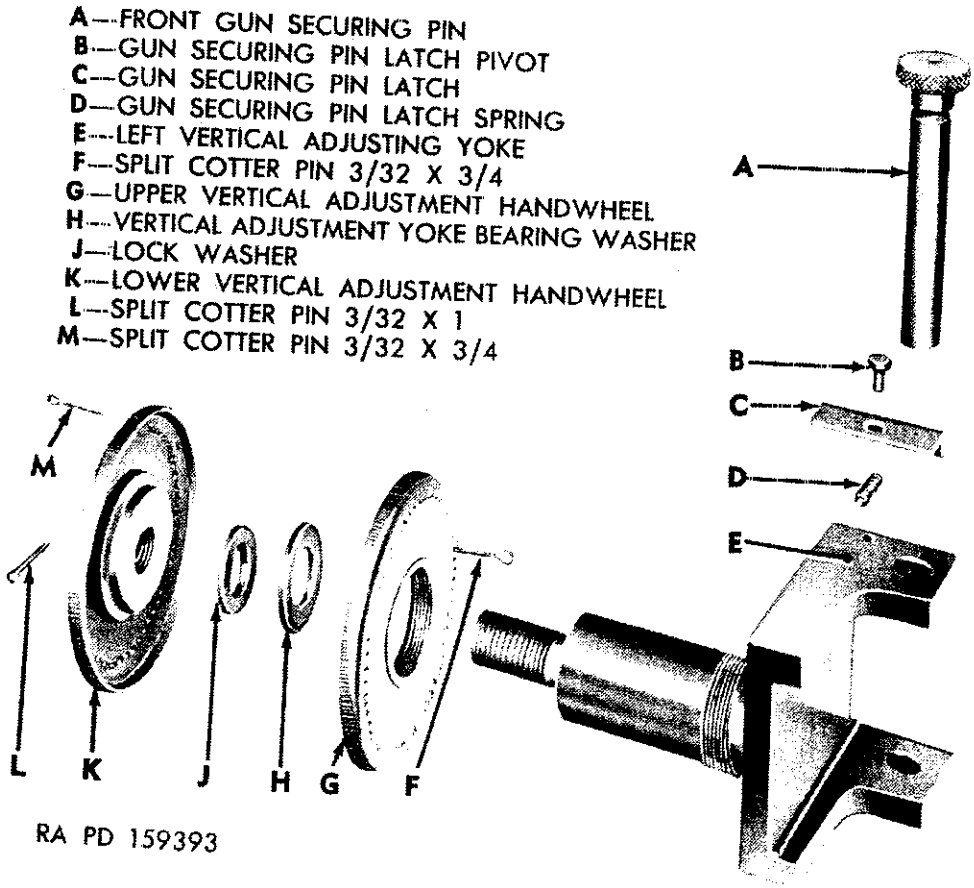


Figure 62. Vertical adjustment yoke parts.

(2) Check alinement of welded stud stops with elevation stop lever (left trunnion).
(3) Test depression stop lever for engagement with elevation stop lever.
(4) Lubricate sectors according to LO 9–710–5.

c. Ammunition Trays.
(1) Check general condition.
(2) Inspect trays for misalinement and damage.
(3) Test ammunition box support springs; replace if necessary.

d. Gun Supports and Mountings. Test tightness and general condition.

e. Sight Support Group.
(1) Test tightness of sight plates to inner trunnions.
(2) Test tightness of sight brace to sight socket.
(3) Check straightness of sight brace.
(4) Inspect sight bracket for condition and tightness to sight brace. (Bracket used only with illuminated sight Mk 9, Model 1.)
(5) Check wiring for condition.
(6) On illuminated sight Mk 9, Model 1, check sight ground.

f. Trunnion Group as a Unit. The unit must operate without binding, and all solenoid leads must be tight. Wiring must be dry and secure in receptacles. Inform ordnance personnel for repair or replacement other than authorized for organizational personnel.

Section IX. POWER DRIVE GROUP

60. General

The power drive group, consisting of the motor unit assembly and related gear drive mechanisms, is located in the main base. It is an electrically operated, variable speed drive which must deliver speeds of at least 60° per second for the proper elevation and traversing of the mount. The adjustment and/or replacement of the motor pulley belts is within the scope of organizational maintenance.

61. Disassembly and Assembly

a. Disassembly of Pulley Belts.
(1) Loosen the differential mounting screws (fig. 63) located under the seat. Open the cover plates of the main base.
(2) Remove access door (fig. 58) by turning wing nuts one-half turn. Disengage the azimuth pinion shaft from the azimuth gear box by pulling the coupling splined shaft collar (fig. 64) back against the compression spring around the coupling splined shaft. This permits the mount to be positioned by hand.

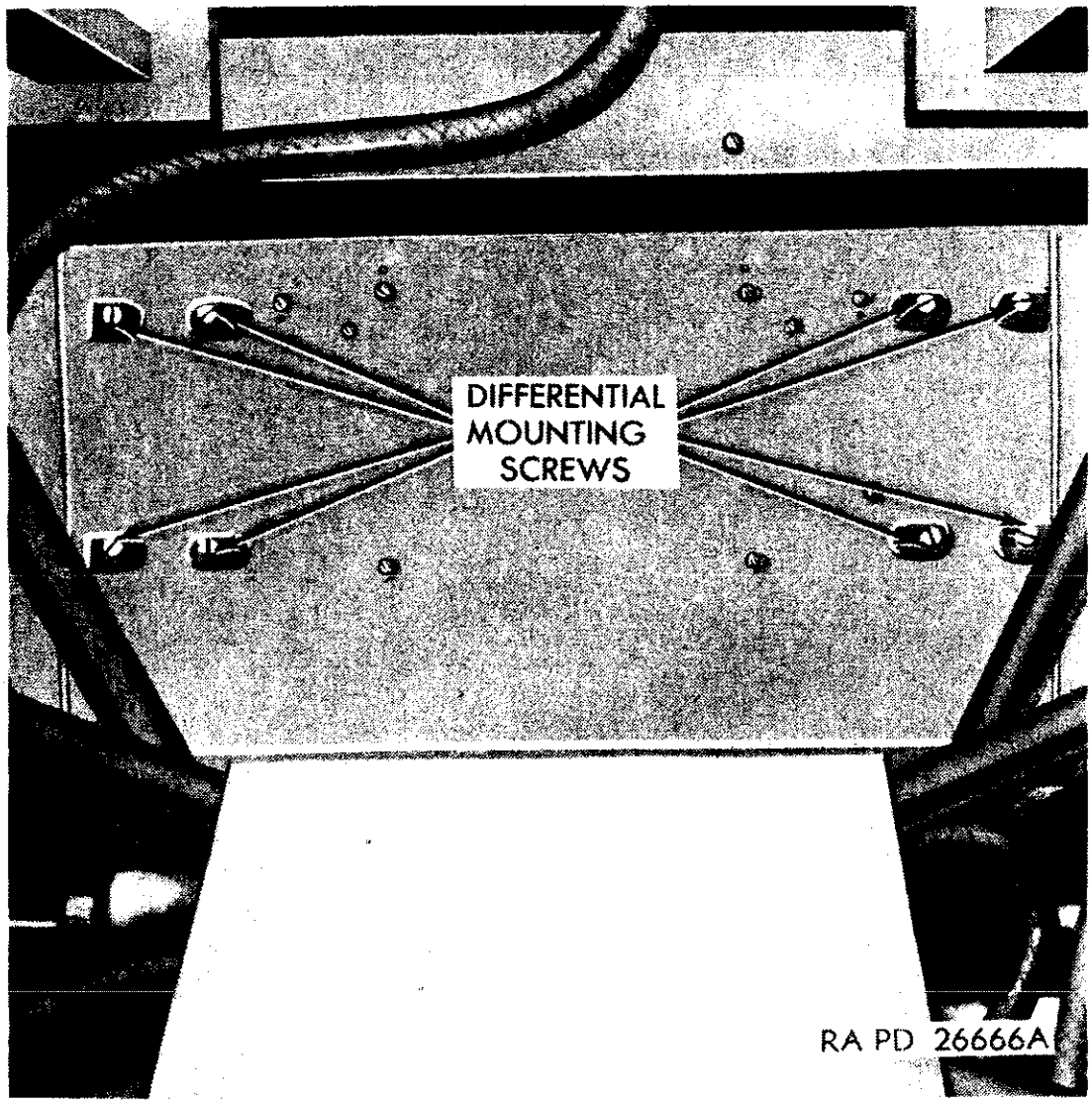


Figure 63. Differential mounting screws.

(3) Position the mount and disengage the elevation coupling assembly from the elevation gear box in like manner.

(4) Loosen lock nut on differential drive adjusting screw and turn screw to the left (counterclockwise), until it no longer moves differential inwards.

(5) Lift belt over the outer half of one pulley and work down until its falls free; lift it off the other pulley (fig. 65).

(6) If serviceable, mark belts so that they can be installed on the same pulleys from which they were taken.

Note.—Always replace belts in matched pairs as issued. Never replace only a single belt even if one belt only is unserviceable.

b. Assembly.

(1) Assemble in reverse order of disassembly.

(2) Test belt tension (fig. 66 and par. 62*c*).

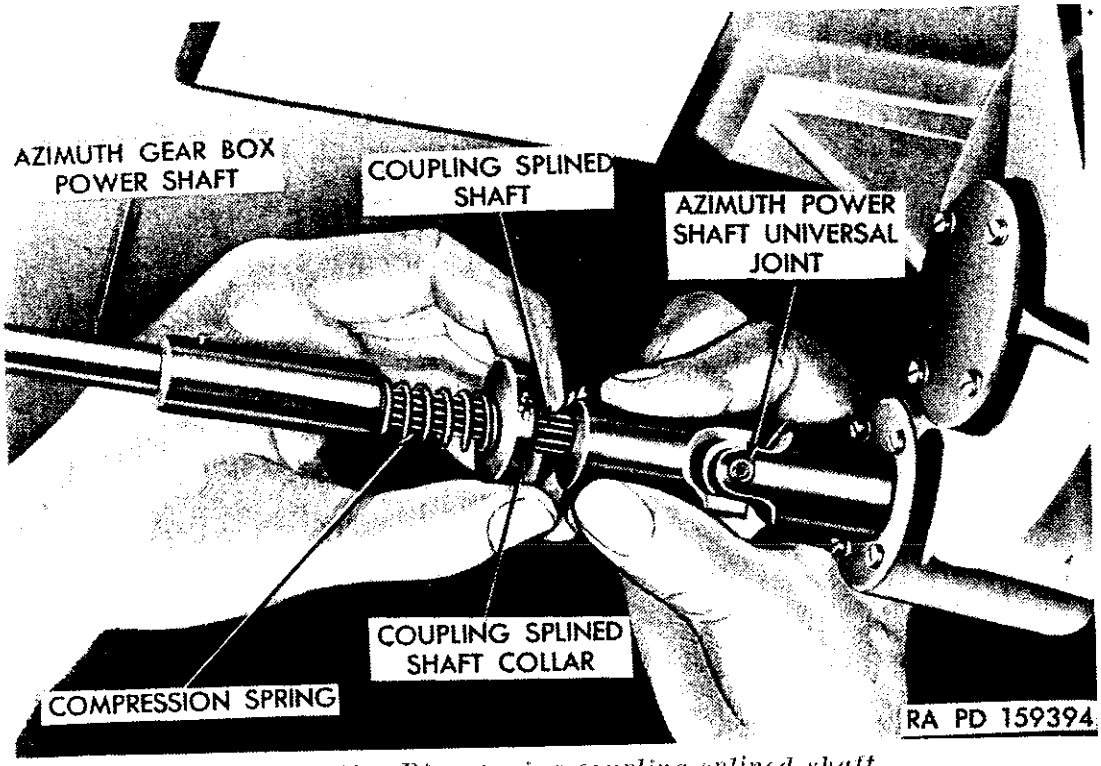


Figure 64. Disengaging coupling splined shaft.

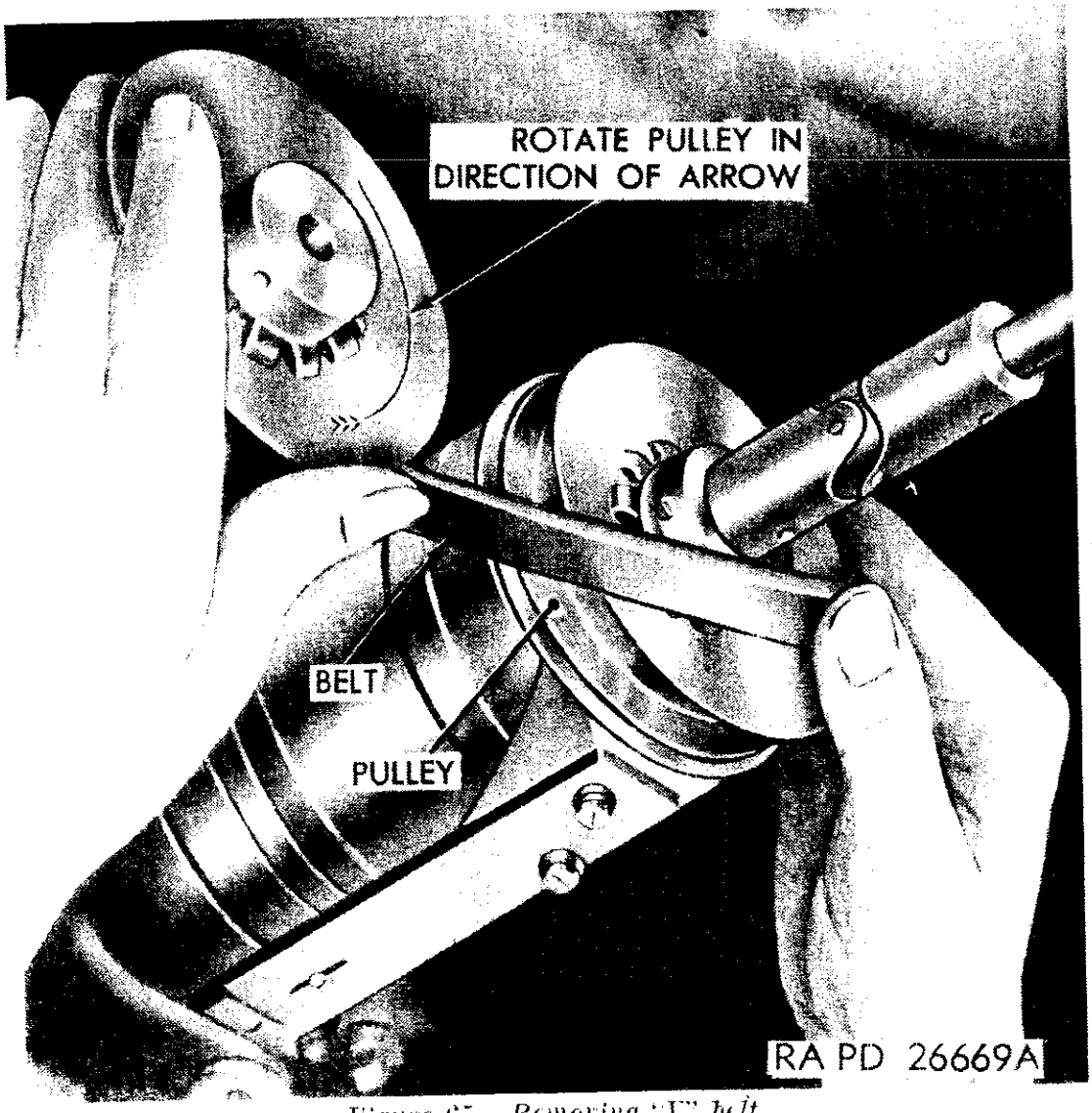


Figure 65. Removing "V" belt.

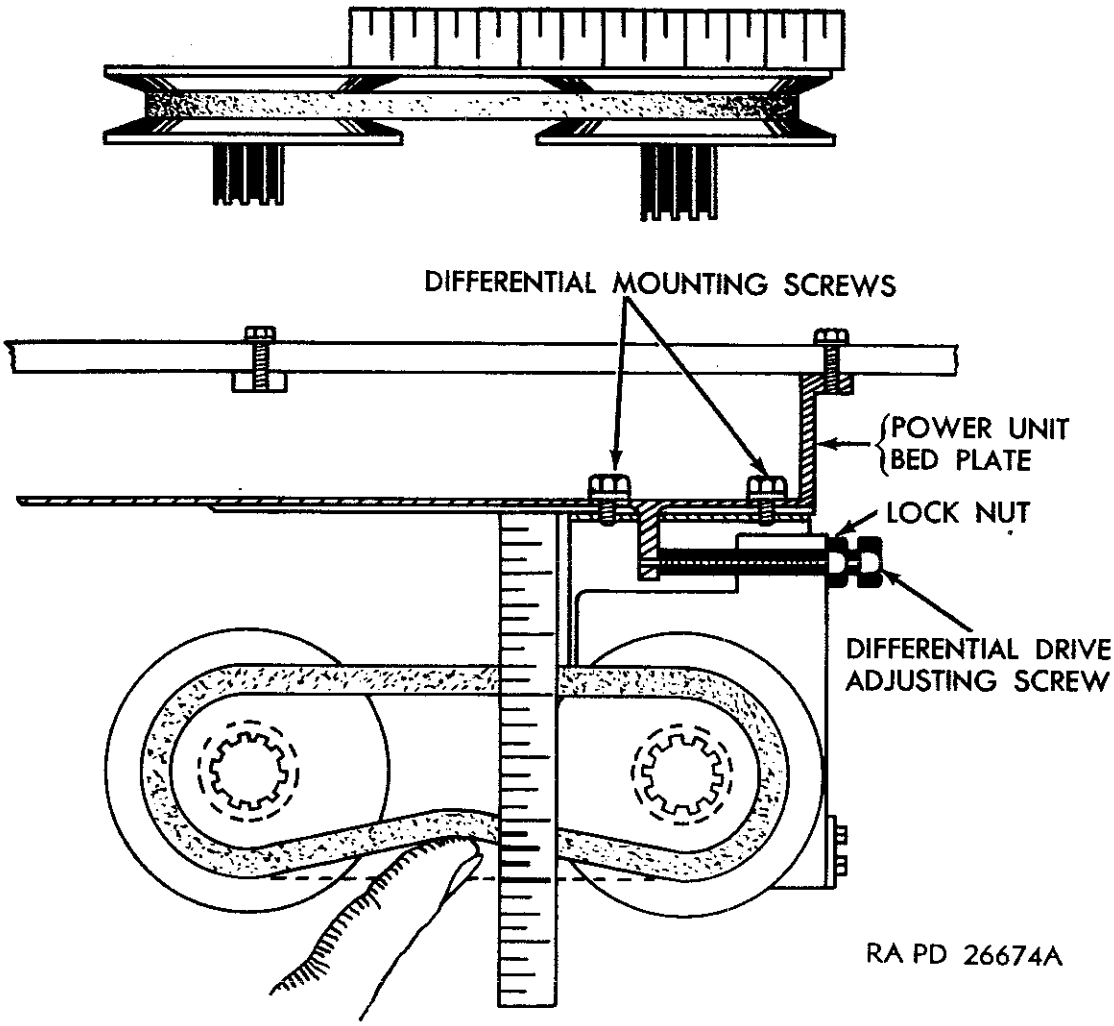


Figure 66. Testing pulley belt tension.

62. Maintenance and Inspection

a. Motor Unit Assembly. Inspect for oil leakage; check for short circuit; inspect splined shafts for scratches or burs; test tightness of set screws of motor pulleys; test tightness of motor unit to power unit bed plate; and inspect motor unit pulleys for warping or scratching.

b. Differential Drive Assemblies. Inspect for oil or grease leakage. Inspect splined shafts for scratches or burs, and test tightness of set screws of differential pulleys. Test tightness of differentals to power unit bed plate, and differential adjustment screw which must be tight to prevent slippage of unit and loss of belt tension.

c. Belts. Inspect belts for general condition. If belts are oil-soaked, remove, wash with dry-cleaning solvent or volatile mineral spirits, and dry. Before installing belts, wipe pulleys dry. If belts are in poor condition, replace.

Note.—Replace belts in matched pairs as issued.

Place mount in operation and, through the open covers of the main base, watch action of belts for looseness. Turn off the drive and test belts for proper tension by placing finger under belt. If the belt

can be displaced more than one-half inch from either pulley, it must be adjusted as described in (1) through (6) below (fig. 66).

(1) Loosen mounting screws of differential drive involved.
(2) Loosen lock nut on differential housing and turn the differential drive adjusting screw clockwise.
(3) Test tension of belt.
(4) Repeat adjustment until proper tension of belt is obtained.
(5) Tighten lock nut of differential drive adjusting screw.
(6) Tighten differential mounting screws located under seat.

d. Power Drive Group as a Unit. The unit must be kept clean at all times, and all wiring and cables must be inspected regularly for tightness, breaks, or wear. Lubricate as indicated by LO 9–710–5. Use pressure oiler when oiling differentials. Differentials must not bind, and all gears must be in good condition.

Caution: When operating the mount with the elevation and azimuth coupling assemblies uncoupled, operate very slowly, since the loosened universal joints may swing and damage other components.

Section X. SEAT AND SEAT ROLLER GROUP

63. General

This group consists of the seat assembly, seat rollers, and related parts. By means of the arm of the roller group, the operator can adjust the seat for proper position to his height when seated so as to be in line with the sight.

64. Disassembly and Assembly

a. Disassembly.
(1) Turn seat adjusting knob (fig. 67) counterclockwise until the end of seat appears.
(2) Unscrew and remove four screws on each seat securing strip and remove seat strip. Remove the cloth seat.

b. Assembly. Assemble in reverse order of disassembly.

65. Maintenance and Inspection

a. Seat and Seat Roller Group. Inspect seat assembly (fig. 68) for tears and general condition and replace if necessary. Adjust seat assembly (fig. 69) as follows:
(1) Pull out the seat adjusting shaft knob which is on the seat roller crank arm.
(2) Lock the seat roller by allowing the seat adjusting shaft knob to engage one of the 12 holes on the face of the seat roller housing.

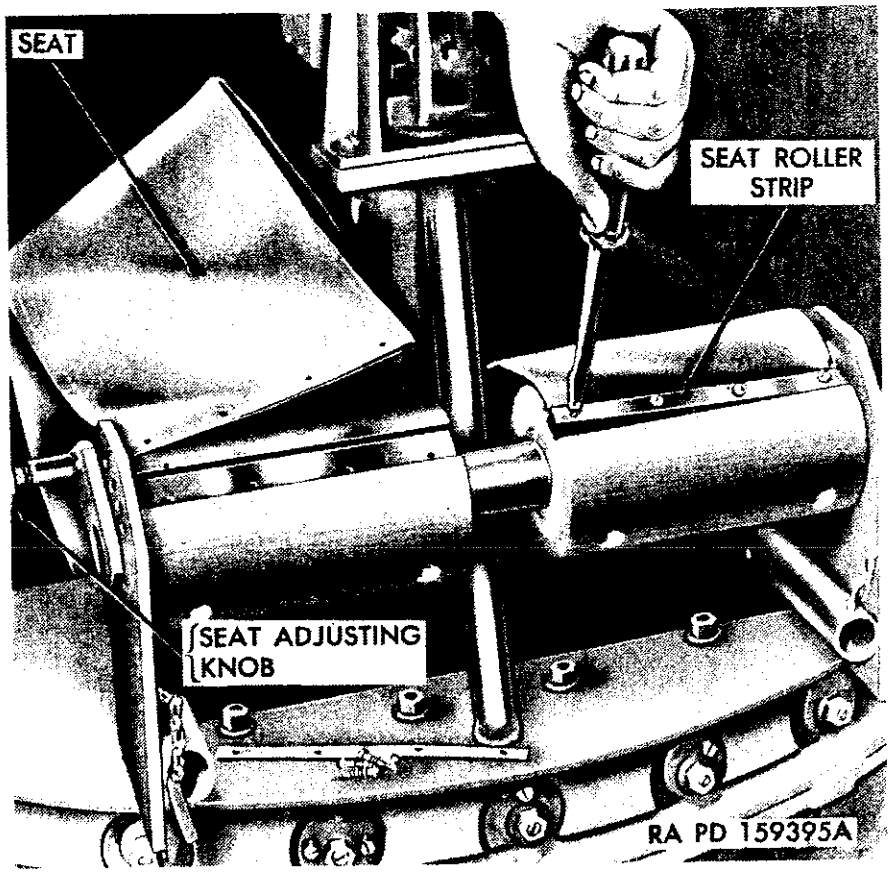


Figure 67. Seat and seat roller group.

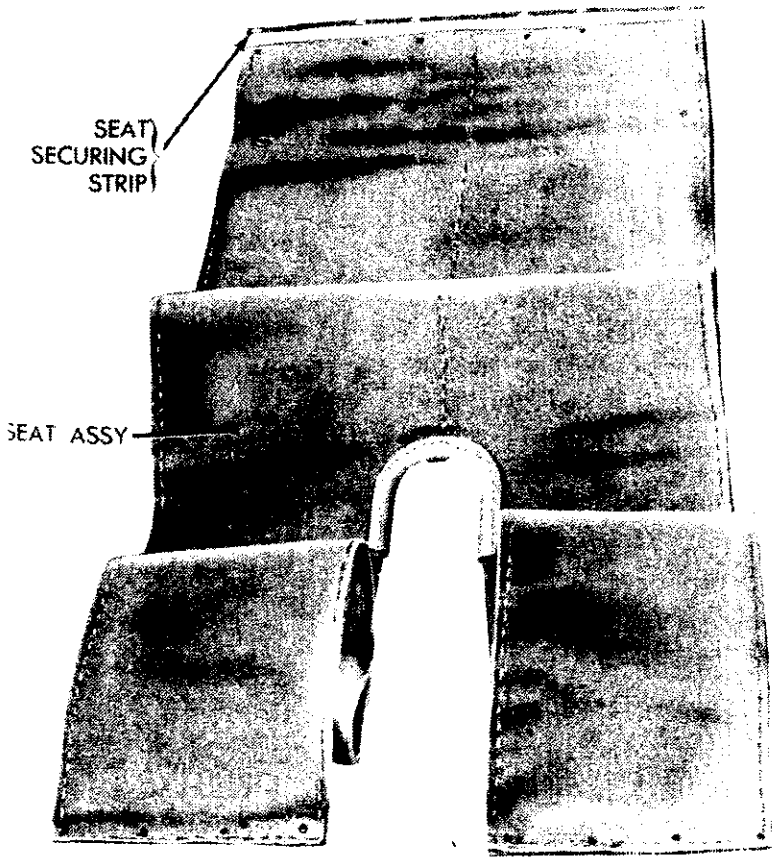


Figure 68. Seat assembly.

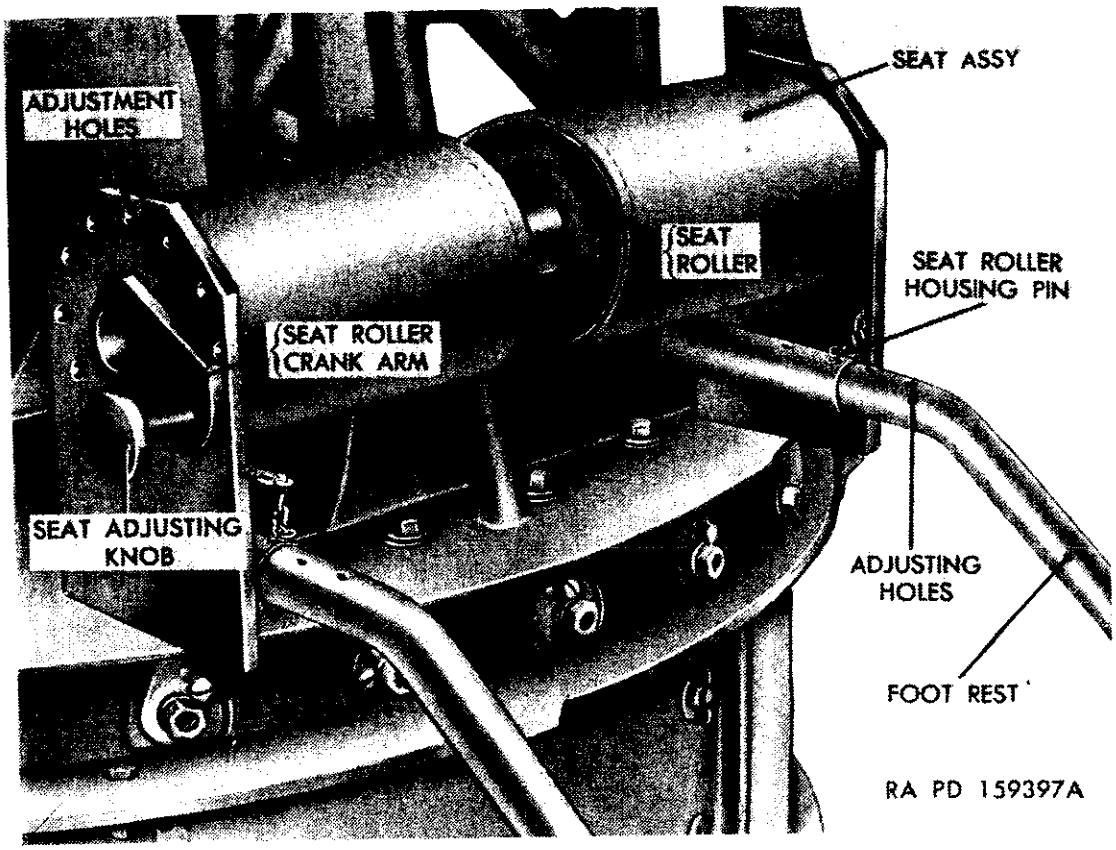


Figure 69. Seat and foot rest adjustments.

b. Foot Rest. Adjust foot rest (fig. 69) as follows:

(1) Remove the two seat roller housing pins (chained), which secure the foot rest, and move rest to the desired position.

(2) Lock foot rest in place after adjustment by resetting the seat roller housing pins in the holes provided.

Section XI. ARMOR SHIELDS (BAT WINGS)

66. General

The armor shields (figs. 70 and 71) on mounts M45F may be removed for shipment. On motor carriage M16A1 they may be stowed on each side of the mount.

67. Removal

Fold shields and remove six nuts, lock washers, and cap screws that connect shield to armor of mount. Place nuts, screws, and lock washers in shields.

68. Installation

Fold shields and place right shield (fig. 71) on armor so that holes in shield are alined with holes in armor of mount (fig. 72). Place six $\frac{1}{2}$–13NC–3 x $\frac{1}{4}$ hex-head cap screws in holes with washers. Fasten with $\frac{1}{2}$-inch washer and hex nut. Install left shield in a similar manner.

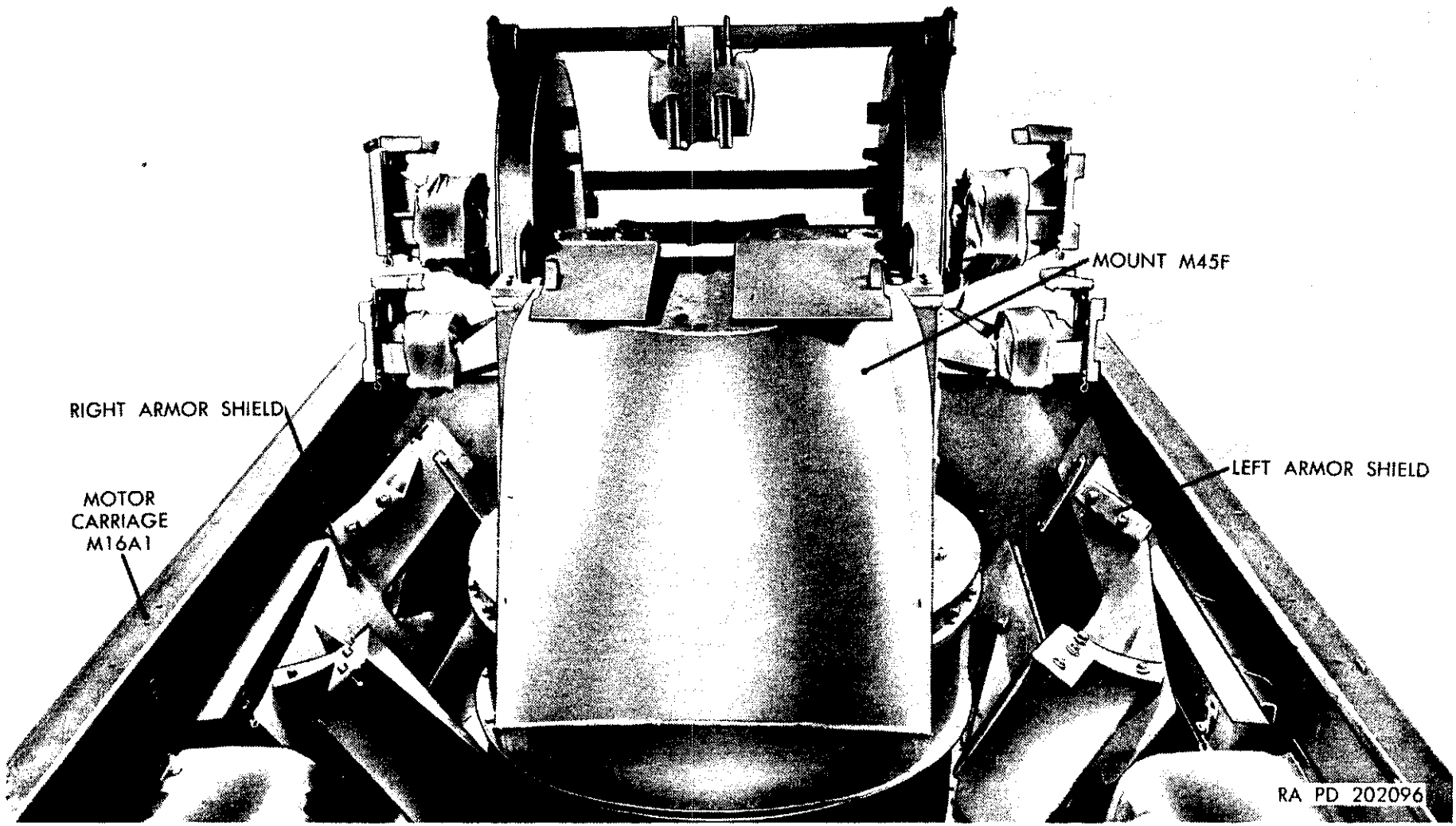


Figure 70. Mount M45F on carriage M16A1—armor shields off.

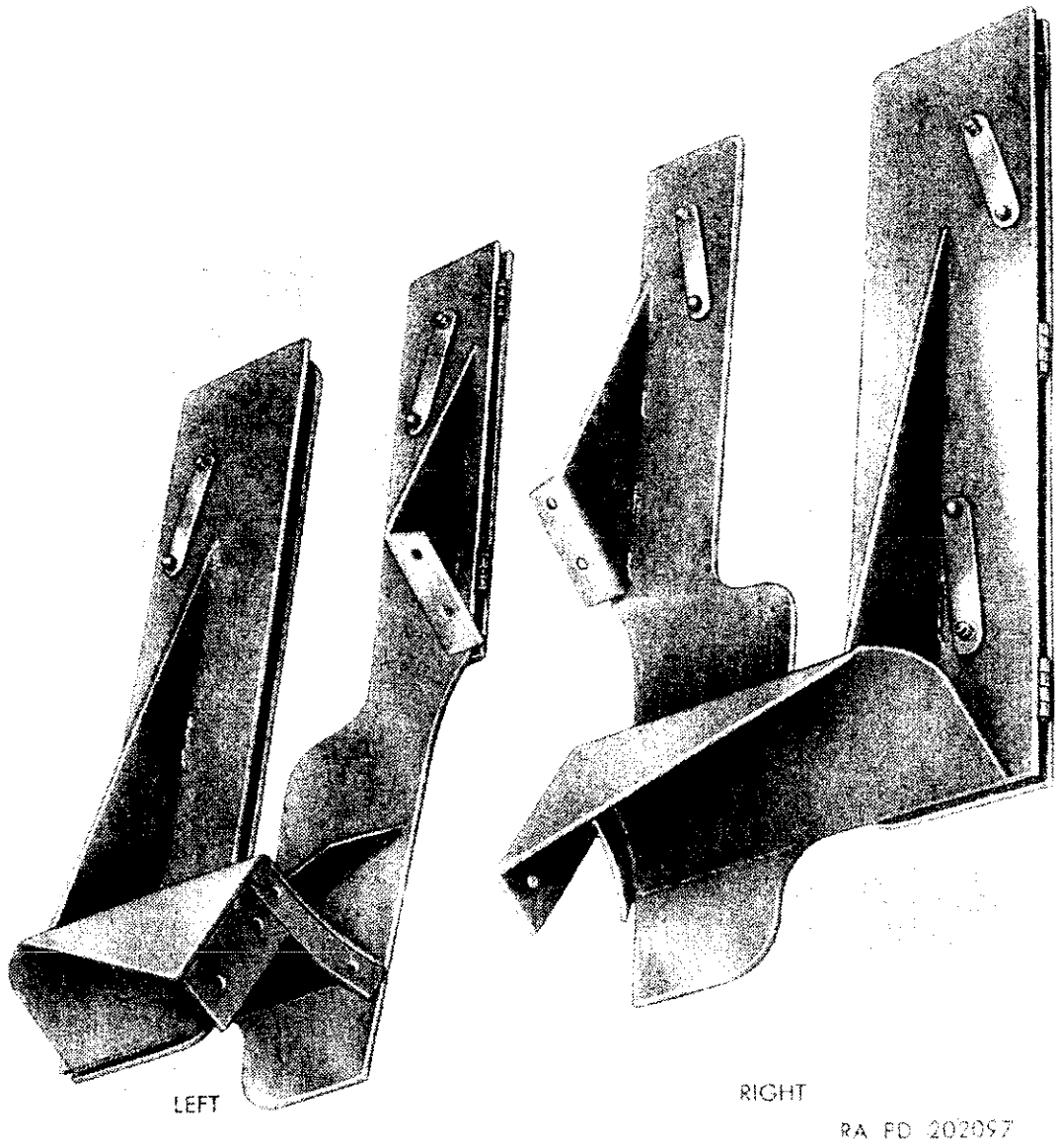


Figure 71. Armor shields (bat wings) folded.

Section XII. FIRING MECHANISM

69. General

The cal. .50 machine guns of the M45 mounts series are electrically fired by means of a back plate solenoid B269179 (fig. 73) or top plate solenoid 7162613 (fig. 74). The installation or removal of the back plate solenoid from the buffer tube of a gun may be performed by organizational personnel, however, when replacement becomes necessary, notify ordnance personnel. The original back plate solenoid will be replaced by the top plate solenoid when required. Pressure on the trigger switches in the control handles activates the solenoid and causes the gun to be fired electrically.

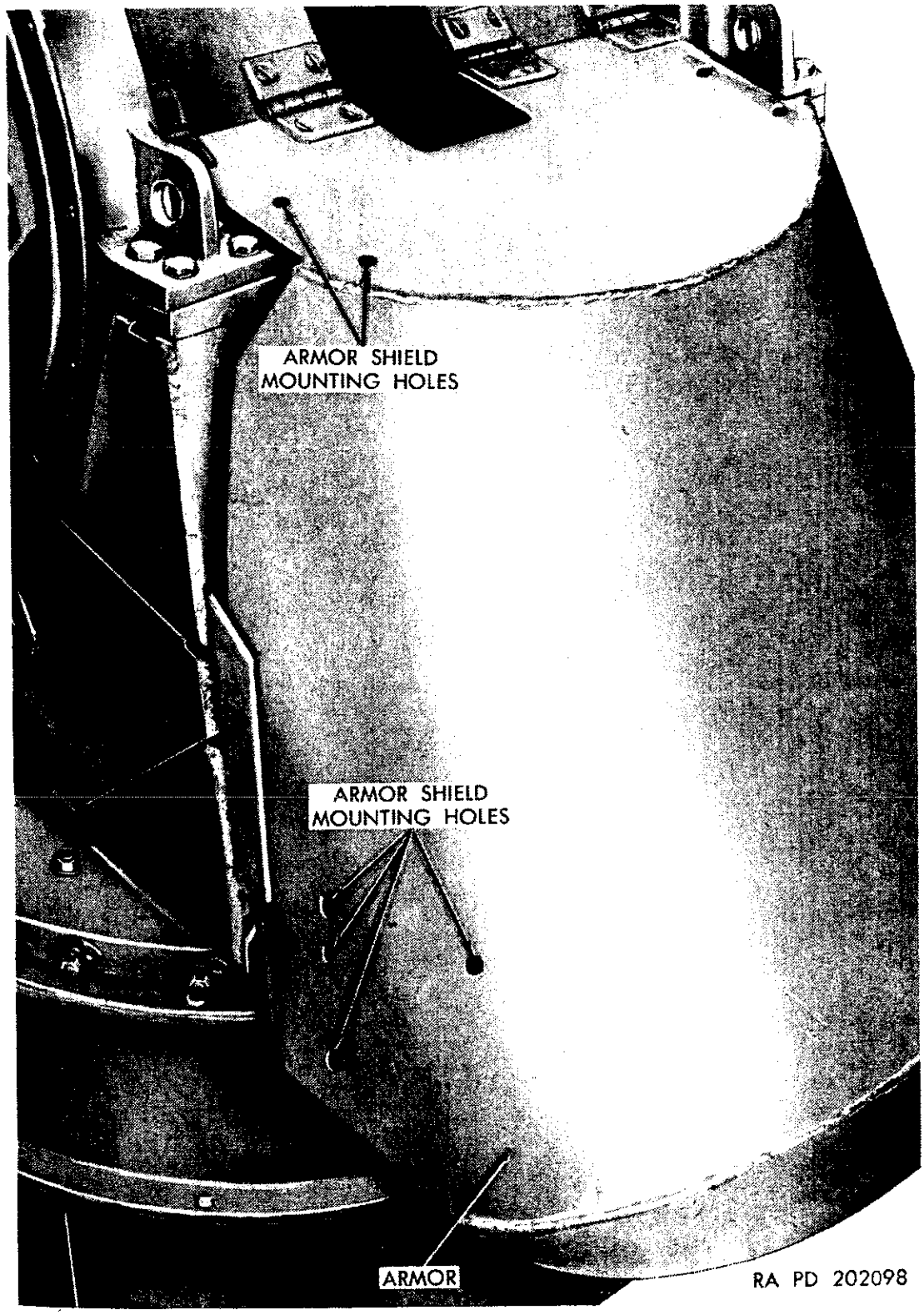


Figure 72. Location of armor shields on mount M75.

70. Replacement of Solenoid

a. Removal.

(1) Remove the plug (fig. 73) from the solenoid lead wire connector and disconnect the pad from the clip.

(2) Remove the locking wire and loosen the two bolts holding the solenoid clamping rings on the back plate buffer tube of the gun.

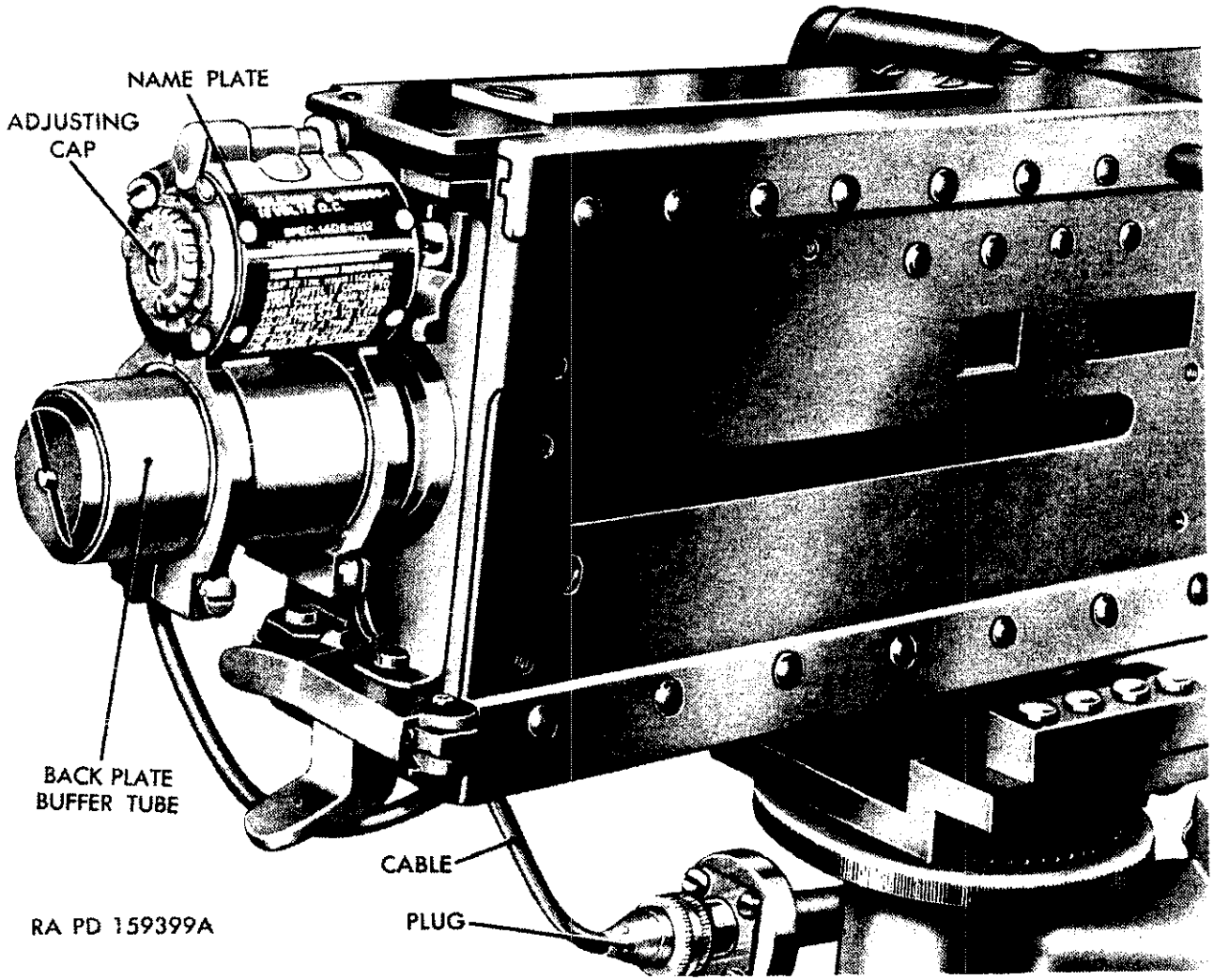


Figure 73. Back plate solenoid—solenoid mounted on gun.

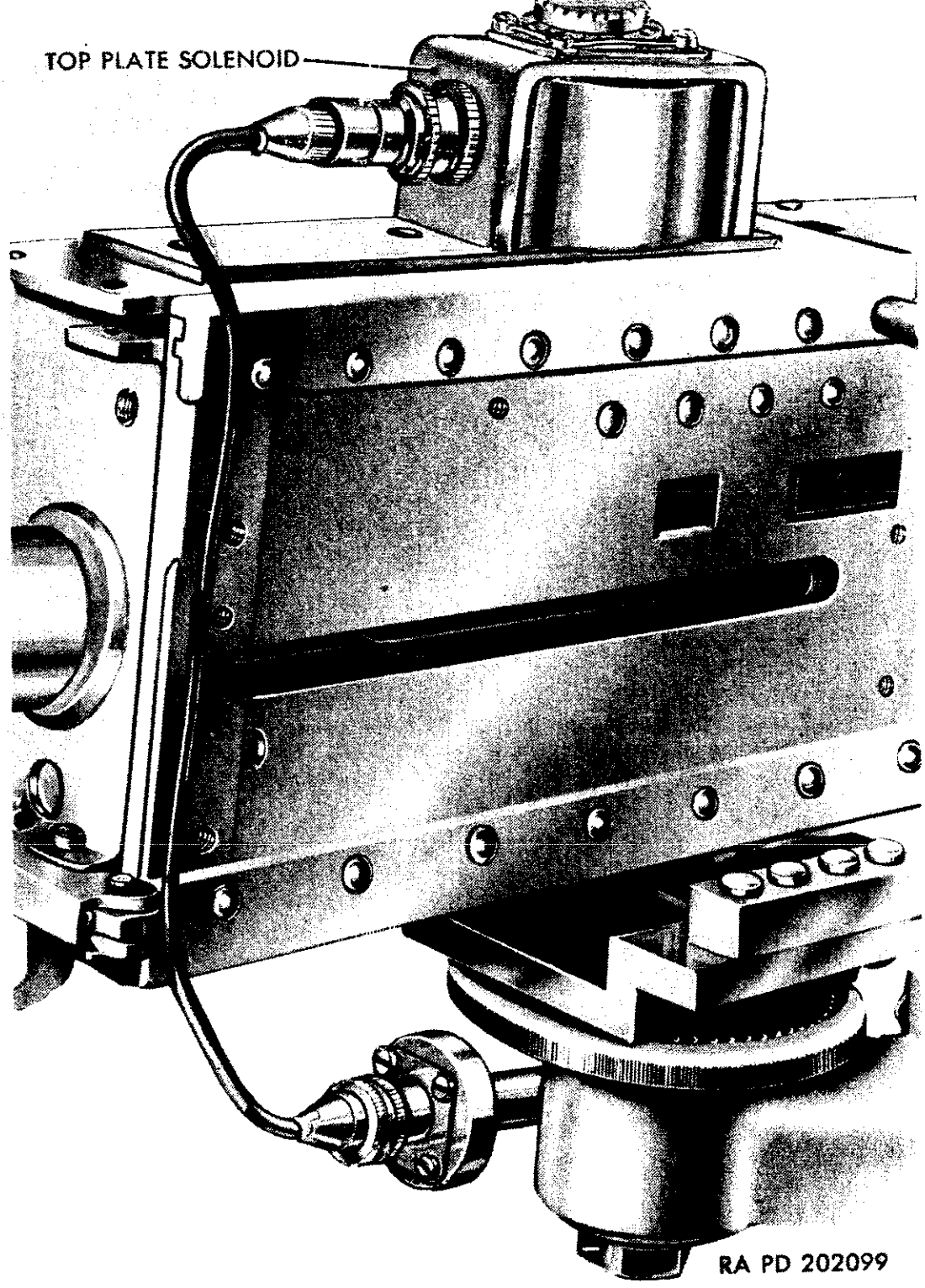


Figure 74. Top plate solenoid.

(3) Remove the locking wire from the safety latch screws. Hold down the safety latch and slide the solenoid off the buffer tube.

(4) Remove the safety latch and install the back plate filler piece on the gun.

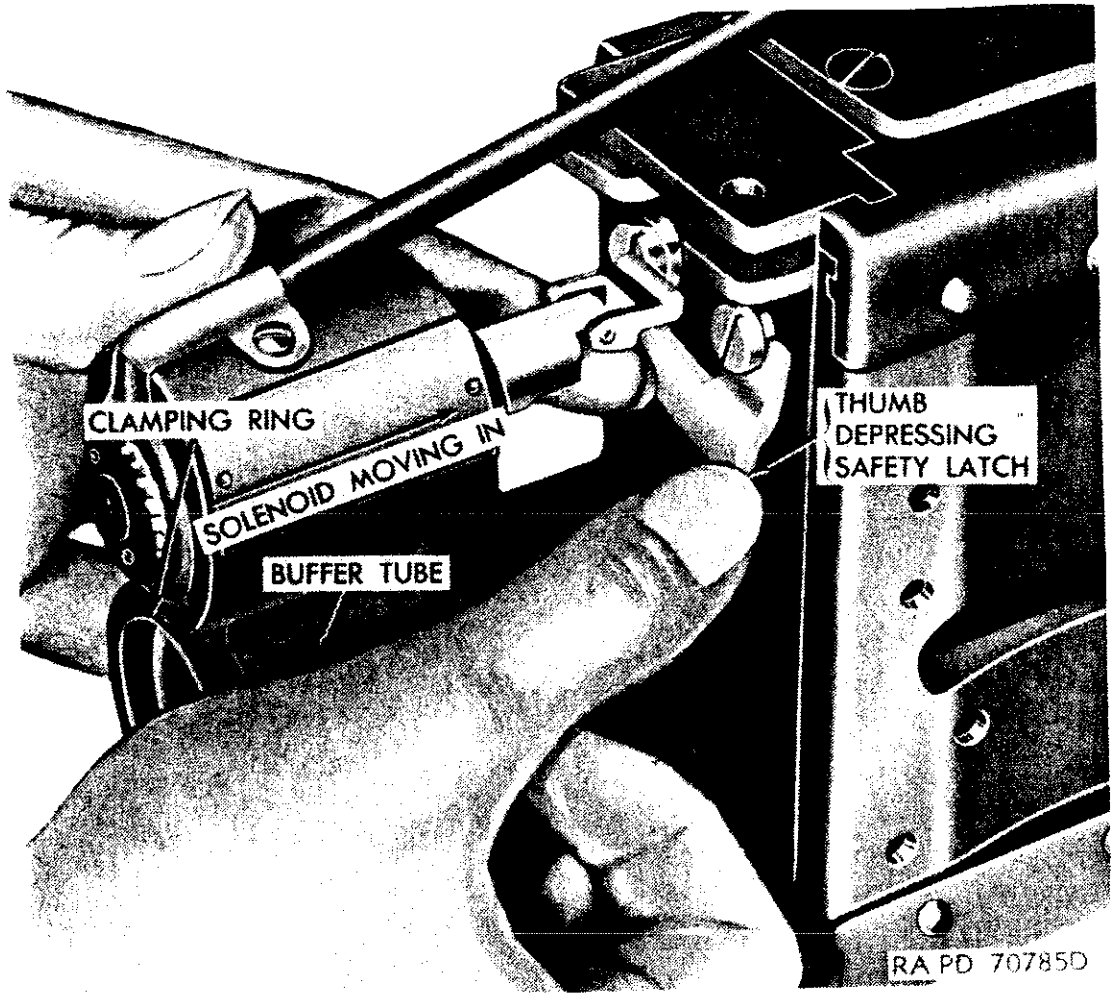


Figure 75. Installing solenoid.

b. Installation.

Caution: Make sure that guns are not loaded before mounting and adjusting solenoids.

(1) Remove the pin and the back plate filler piece from the window at the top of the back plate (FM 23–65).

(2) Position the safety latch (fig. 75) on the back plate and secure with special No. 10–32 screws in such a manner that the spring bears on the back plate buffer tube. Pass the locking wire through the holes in the head of each of the two screws.

(3) Slide the solenoid clamping rings over the back plate buffer tube. Depress the safety latch and raise the trigger bar lifter with the finger. Slide the solenoid forward until the shoulder on the case (which is immediately behind the trigger bar lifter) comes in contact with the bottom edge of the window on the back plate, and the safety latch enters the slot in the case when released.

(4) With the case approximately in the center of the window, tighten the two bolts on the clamping rings. Pass the locking wire through the hole in the head of each bolt.

(5) Insert the cable pan in the solenoid clip.

(6) Plug the solenoid lead into the solenoid lead wire connector on the trunnion sector.

Caution: Do not aline bell crank on trigger with center of solenoid until ready to fire.

71. Maintenance

a. Adjustment of Solenoids. The solenoids are adjusted without any timing gage in place. The solenoids will usually release the firing pin at any one of a series of settings. It is necessary to determine the number of notches in the series of settings which permits release of the firing pin; the central notch of this series of settings will be the correct setting. There are 12 detent notches for adjusting cap (fig. 76), and it is convenient to use these as clock hour settings for one of the two adjusting cap pins in making the adjustment. To adjust the solenoids proceed as follows:

(1) Turn the adjusting cap clockwise toward minimum as far as it will go. Then turn it one and one-half turns in the other direction toward maximum. This becomes the starting position for the test.

(2) Turn on the firing circuit switch.

(3) Cock the gun and press a trigger switch. See if the firing pin is released by looking down the "T" slot. (When familiar with the adjustment, it is possible to determine if the firing pin is released by the characteristic sound produced.)

(4) If the firing pin is not released, turn the adjusting cap one notch counterclockwise toward maximum, cock the gun, and again attempt to release the firing pin. Continue to check operation at each successive setting (toward maximum) until the first setting at which the solenoid will release the firing pin is determined. Use the head of one of the adjusting cap pins as an index and note its clock hour setting.

(5) Continue testing the setting at each notch toward maximum, and determine the series of settings at which the solenoid will release the firing pin. Usually the test indicates six or seven settings, beyond which the solenoid again fails to release the firing pin.

(6) Set the adjusting cap midway between the minimum and maximum settings of this range. This will then be the correct setting.

Note.—During adjustment it is essential to retract the retracting slide handle before each attempt to release the firing pin.

(7) Check the adjustment by cocking the gun and inserting the 0.020-inch timing gage between the trunnion block of the gun and the barrel extension. Operate the solenoid once. The firing pin must be released.

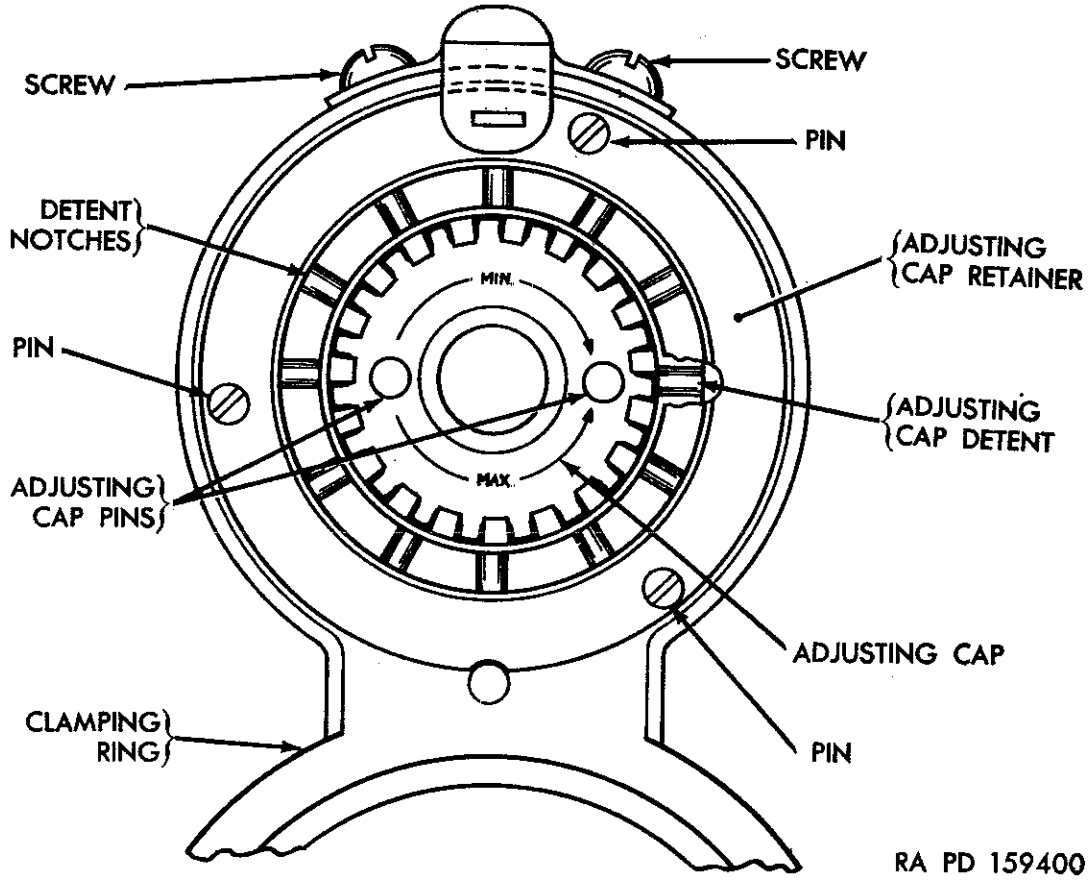


Figure 76. Firing solenoid—rear view.

(8) Again cock the gun and insert the 0.116-inch timing gage between the trunnion block of the gun and the barrel extension. Operate the solenoid once. The firing pin must not be released.

b. Cleaning and Repair of Solenoid.

(1) Clean daily with a lintless cloth.

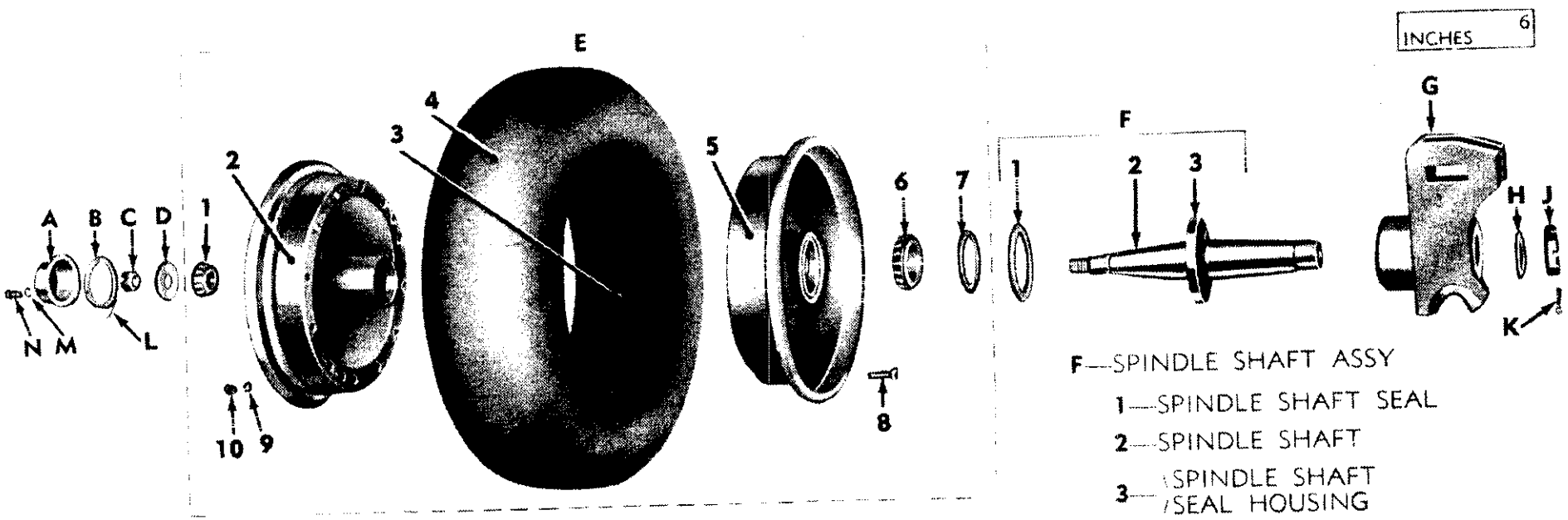
(2) Tighten all wire leads.

(3) If solenoid does not function, report to ordnance personnel.

Section XIII. TRAILER WHEEL AND WHEEL BRACKET GROUP

72. General

The wheels (fig. 77) are of the pressed-steel split type. The disks of each half of the wheel (inner half and outer half) are welded to the inner and outer sections of the hub. The outer and inner halves of the wheel are assembled into one wheel unit by 14 cap screws with lock washers and nuts. The entire wheel assembly is mounted on the spindle shaft and supported on tapered roller bearings. The spindle shaft is tapered to fit into the wheel bracket to which it is secured by a castellated nut and cotter pin. This entire wheel and wheel bracket group can be quickly attached to the body of mount trailer M20 by means of wedges which are locked in place by wedge locking pins.



A—HUB CAP
B—HUB CAP GASKET
C—3 4 CASTLE NUT
D—3 4 KEYED WASHER
E—WHEEL ASSY
1—OUTER BEARING CONE
2—OUTER HALF WHEEL W ADAPTER AND BEARING CUP
3—TUBE
RA PD 337942G

4—TIRE
5—INNER HALF WHEEL W BEARING CUP
6—INNER BEARING CONE
7—GREASE RETAINER
8—5 16 x 3 4 HEX-HD BOLT
9—5 16 PLAIN WASHER
10—5 16 SAFETY NUT

F—SPINDLE SHAFT ASSY
1—SPINDLE SHAFT SEAL
2—SPINDLE SHAFT
3—SPINDLE SHAFT SEAL HOUSING
G—WHEEL BRACKET
H—1-3 8 BEVELED WASHER
J—BRACKET TO SPINDLE SHAFT NUT
K—1 8 x 2-1 2 COTTER PIN
L—1 8 x 1-1 4 COTTER PIN
M—No 8 (0.164) LOCK WASHER
N—No 8 (0.164) x 1 4 MACH SCREW

Figure 77. Trailer wheel and wheel bracket group.

73. Replacement

a. Removal.

(1) Raise trailer with the three jacks until tires clear the ground.

(2) Remove lock pin from wedge. Tap wedge with lead hammer to loosen it, and remove wedge from slot (fig. 27).

(3) Lift wheel and bracket assembly from wheel bracket support.

b. Installation.

(1) Move wheel and bracket assembly to trailer, and place wheel bracket in wheel bracket support.

(2) Insert wedge and lock with lock pin.

(3) Lower trailer to ground and place jacks in traveling position (fig. 5).

74. Disassembly and Assembly

a. Disassembly.

(1) *Remove wheel assembly from spindle shaft.*

(*a*) Remove three machine screws (fig. 77) and lock washers from hub cap. Remove hub cap and hub cap gasket.

(*b*) Remove 1/8 x 1 1/4 cotter pin which secures castle nut to spindle shaft. Turn castle nut counterclockwise with wrench. Remove castle nut and keyed washer.

(*c*) Pull wheel assembly off spindle shaft. Outer bearing cone will slide off spindle shaft with hub. Guard against permitting bearing to fall in the dirt. Pull inner bearing cone and grease retainer off spindle shaft.

Note.—Wrap bearings in a clean cloth or wax paper to prevent them from coming in contact with sand and other foreign matter.

(*d*) Lift spindle shaft seal from spindle shaft seal housing.

(2) *Remove spindle shaft from wheel bracket.*

(*a*) Remove 1/8 x 2 1/2 cotter pin which secures nut holding bracket to spindle shaft. Turn bracket to spindle shaft nut counterclockwise with wrench. Remove nut and beveled washer.

(*b*) Tap spindle shaft from wheel bracket with hammer and wooden block, being careful not to damage threads.

(3) *Remove tires.*

(*a*) Remove wheel assembly from spindle shaft as described in (1) above.

(*b*) Remove valve cap and valve core and fully deflate tube. Install valve core and valve cap to avoid loss or damage and to prevent the entrance of dirt.

(*c*) Lay wheel assembly flat and break tire beads loose from rim flange on both sides of wheel.

(*d*) Remove 14 hex-head bolts, plain washers, and safety nuts that hold outer half wheel to inner half wheel.

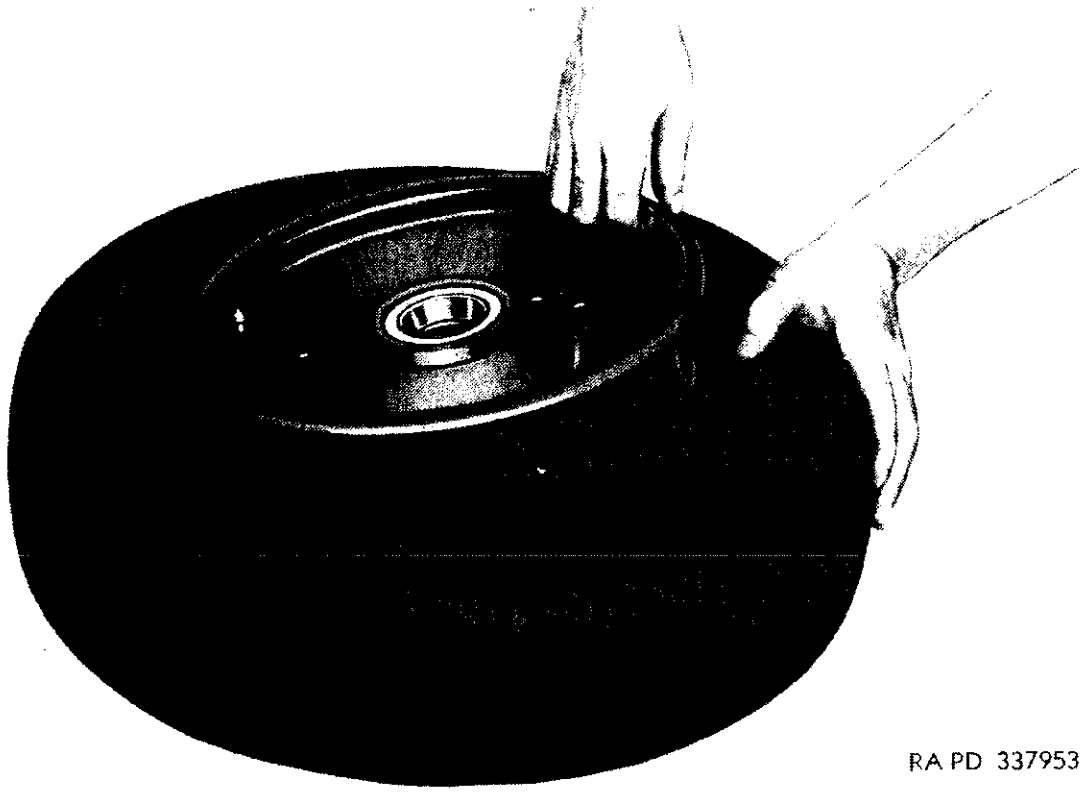


Figure 78. Removing tire.

(*e*) Remove both parts of wheel from tire (fig. 78).

(*f*) Remove inner tube from tire (fig. 77).

(4) *Remove wedges, chains, and lock pins.*

(*a*) Remove eye bolts connecting wedge to chain and to trailer (fig. 27).

(*b*) To remove lock pins, break or cut welded chain links.

b. Assembly (fig. 77).

(1) *Install wedges, chains, and lock pins.*

(*a*) Install wedge to trailer by turning eye bolts on either end of chain into holes in trailer body and in wedge.

(*b*) Wire or spot-weld chain to lock pin and to trailer body.

(2) *Install tire.*

(*a*) Fully deflate the tube and fold it for easy insertion into the small diameter tire. See that the tire and tube are mounted for correct balance by looking for marks on tube and tire to locate position of valve stem.

(*b*) Put just enough air in tube to barely round it out. Too much air will make assembly difficult or even impossible.

(*c*) Insert outer half wheel into tire. Line valve hole in outer half wheel with valve stem. Push valve stem through valve hole.

(*d*) Turn the assembly over, holding valve in place, and insert inner half wheel into tire. Be careful not to pinch tube between the two halves of wheel.

(*e*) Revolve the inner half wheel until all 14 holes of both halves of the wheel are in line.

(*f*) Insert 14 hex-head bolts into holes from inner half to outer half.

(*g*) Securely fasten wheel assembly with 14 plain washers and 14 safety nuts, tighten onto the 14 hex-head bolts.

(*h*) Inflate tire to 50 psi.

(*i*) Install wheel assembly on spindle shaft as described in (4) below.

(3) *Install spindle shaft to bracket.*

(*a*) Insert spindle shaft into wheel bracket.

(*b*) Place beveled washer on spindle shaft, install bracket to spindle shaft nut, tighten securely, and lock in place with new 1/8 x 2½ cotter pin.

(4) *Install wheel assembly on spindle shaft.*

(*a*) Place spindle shaft seal in recessed part of spindle shaft seal housing, and install grease retainer on spindle shaft.

(*b*) Lubricate bearings and hub interior (LO 9–223).

(*c*) Install inner bearing cone in hub and press in place with fingers.

(*d*) Place wheel assembly on spindle shaft.

(*e*) Install outer bearing cone and cup, keyed washer, and castle nut.

(*f*) Adjust bearings (par. 75) and install new 1/8 x 1¼ cotter pin.

(*g*) Install hub cap gasket and hub cap, using three lock washers and machine screws.

75. Maintenance

a. General. Clean each part with dry-cleaning solvent or volatile mineral spirits to remove hardened lubricant, dirt, or foreign material and lubricate (LO 9–223).

b. Adjust Bearings. With weight of trailer on jacks and wheel with bracket assembly attached to trailer, tighten spindle shaft nut until drag is felt when revolving wheel. Slack off one-sixth turn, or more if necessary. 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. Too loose adjustment will cause pounding.

c. Wheel Bracket. Inspect bracket for cracks, breaks, or other defects that might make it unsafe for further use. Inspect bore which holds spindle shaft for pits, chipping, and wear. Notify ordnance personnel if unfit for further service.

d. Wedge. Inspect wedge for chips, nicks, and mushroom end that would prevent wedge from holding wheel bracket in place on wheel

bracket support mounting. Inspect chain for broken or defective links. Inspect eye bolts for damaged threads or broken eye. Replace damaged or broken lock pin and chain assembly if damaged beyond repair.

e. Spindle Shaft. Inspect spindle shaft for damaged threads on either end. Inspect all surface areas of spindle shaft for chips, cracks, scratches, or marks that would reject it for further use. If unfit for further service, notify ordnance personnel.

f. Wheel Assembly. Inspect rollers of bearing cones for pits, chipping, and wear. While assembled inside the hub, inspect bearing cups and adapter for wear, pits, and scratches. Inspect grease retainer for wear, pits, scratches, or chipping. If cones, cups, adapter, or retainer are worn or damaged, replace entire wheel assembly (fig. 77) and refer old wheel assembly to ordnance personnel for repair.

g. Tires.

(1) When tire is removed from wheel, check for nails, glass, and other injurious particles in rubber. Inspect for wear, cuts in fabric, fabric breaks, or damaged beads. Do not mount tire on wheel unless it is satisfactory for service. Remove any dirt or foreign material from inside of tire. Be particularly careful to remove all oil, gasoline, or grease since these products cause the rubber to deteriorate.

(2) Check tube for punctures, pinches, cuts, and cracks. Inspect valve stem for proper bend and condition of inside and outside threads. Replace leaking valve core.

(3) For tire and tube repair, refer to TM 31–200. To repair synthetic tires and tubes, special materials and procedures are required. Do not attempt to repair tires or tubes until their composition has been determined and necessary materials and instructions have been made available.

(4) Unserviceable tires should be exchanged for serviceable tires through proper channels. In cases where serviceable replacements are not available, emergency repairs will bridge the gap until sound tires can be obtained.

Section XIV. TRAILER ELECTRICAL SYSTEM

76. General

a. The trailer electrical system consists of the blackout tail and blackout stop light assembly located at the left rear of the trailer body (fig. 79), the jumper cable plug socket assembly mounted on the left side of the drawbar near the front jack assembly (fig. 28), and the jumper cable.

b. The light has two sealed lamp-units; the top one is the blackout taillight, the bottom one is the blackout stop light. The lens on each

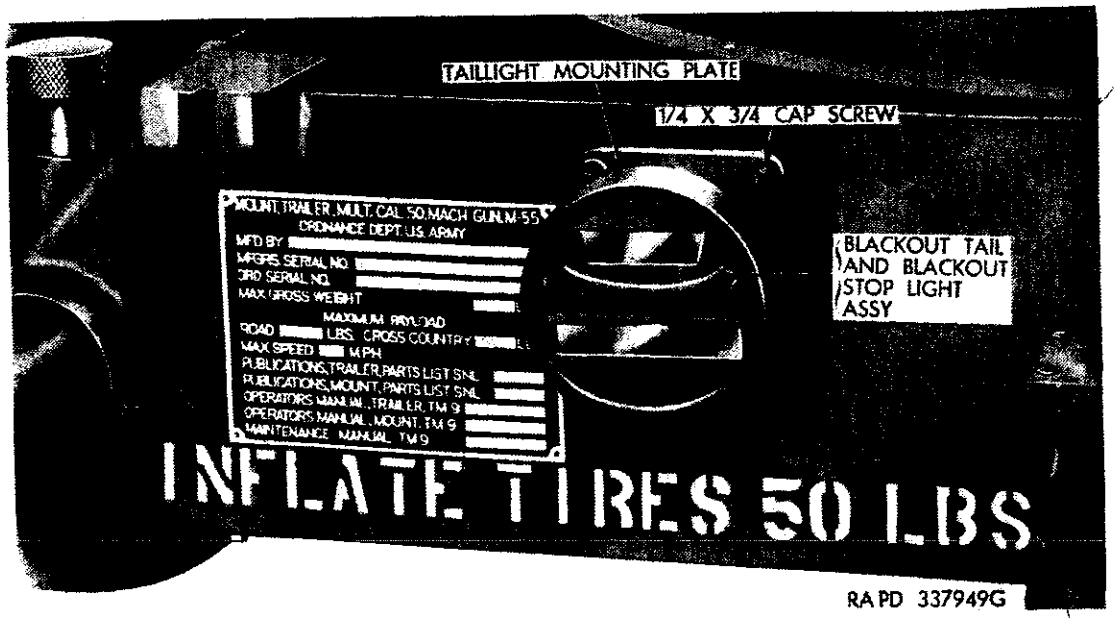


Figure 79. Blackout tail and blackout stop light assembly mounted on trailer.

unit is designed to produce two beams when viewed from a specified distance or farther. When viewed at the specified distance or closer, the two beams merge into a single highly visible beam. This arrangement allows the driver of a vehicle, which may be following the trailer, to judge the distance between the two vehicles, thus reducing the danger of collision. To insure the accuracy of construction necessary to produce this effect, the lamp is soldered to the lens retainer, and the lens and filter are crimped to make a complete unit. When the lamp is burned out, it is necessary to replace the complete sealed lamp-unit. Removal and installation for both units are identical.

c. The jumper cable plug socket assembly (fig. 80) holds the jumper cable plug when the trailer is not being towed by another vehicle. It is not connected to any electric wiring circuit. Its sole purpose is to hold the jumper cable and plug in a position where neither will become damaged or covered with dirt.

d. The jumper cable connects the blackout tail and blackout stop light with the jumper cable plug.

77. Removal and Installation

a. Removal of Blackout Tail and Blackout Stop Light Assembly.

(1) Remove four cap screws from taillight mounting plate (fig. 79). Remove light assembly with mounting plate from trailer body.

(2) Disconnect two plug and cable assemblies from taillight assembly. Remove two nuts and two lock washers. Remove taillight assembly and gasket from mounting plate.

b. Removal of Jumper Cable Plug Socket Assembly. Remove four cap screws, hex nuts, and lock washers holding socket assembly to front jack mount bracket (fig. 80). Remove socket assembly.

c. Installation of Jumper Cable Plug Socket Assembly. Install jumper cable plug socket assembly to front jack mount bracket, and secure with cap screws, hex nuts, and lock washers.

d. Installation of Blackout Tail and Blackout Stop Light Assembly.

(1) Place taillight and outer gasket onto mounting plate. Secure assembly with two lock washers and nuts. Connect cable and plug assemblies (fig. 81) into their sockets in taillight body.

Note.—Red cable is ground lead, and black cable has been doubled back and taped with rubber insulation material. Green cable is for blackout tail lamp-unit, and white cable is for blackout stop lamp-unit.

(2) Install taillight assembly with mounting plate and gasket to trailer body (fig. 79). Secure with four cap screws.

78. Disassembly and Assembly

a. Disassembly of Blackout Tail and Blackout Stop Light Assembly (fig. 81).

(1) Remove two machine screws from door and remove door.

(2) Pull the blackout stop lamp-unit and the blackout tail lamp-unit out of the taillight body.

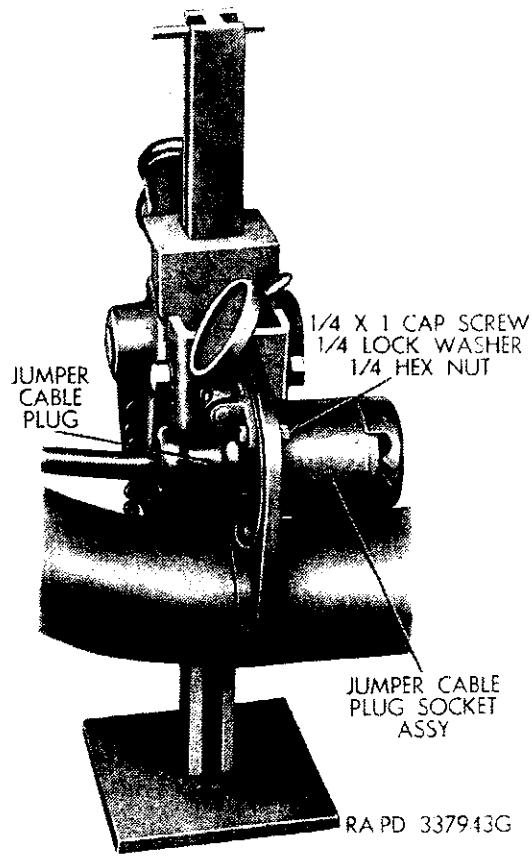


Figure 80. Jumper cable plug socket assembly mounted on trailer.

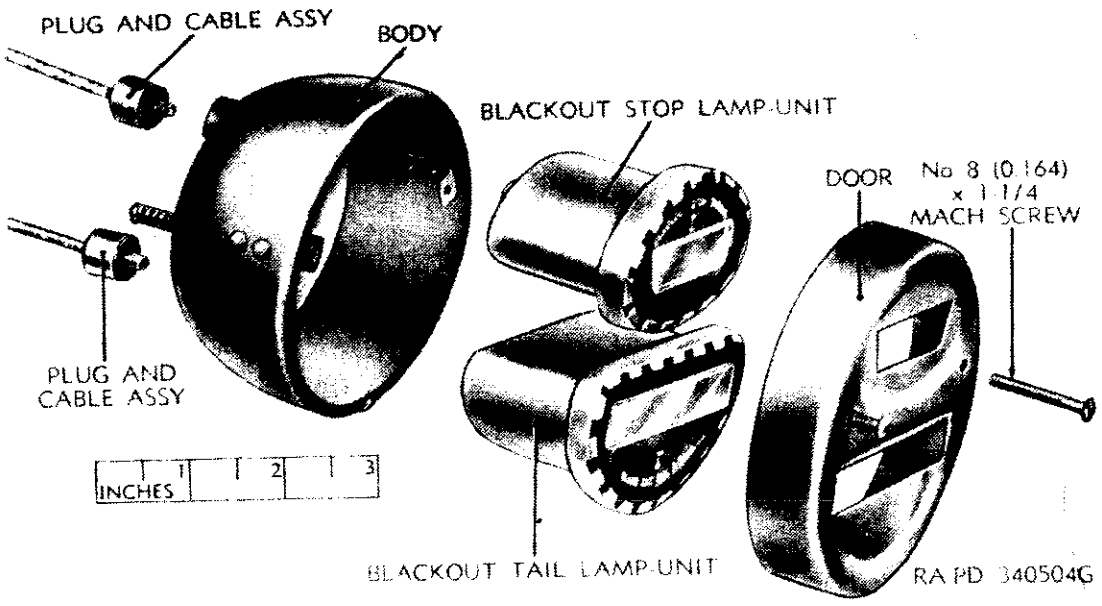


Figure 81. Blackout tail and blackout stop light assembly.

b. Assembly of Blackout Tail and Blackout Stop Light Assembly (fig. 81).

(1) Install sealed lamp-units in their proper position.

(2) Secure door to taillight body, using two machine screws.

79. Maintenance

a. Blackout Tail and Blackout Stop Light Assembly. Clean contacts of lamp-units. Clean lamp-unit windows and cable and plug assemblies. If lamp-units are burned out, notify ordnance maintenance personnel. If wiring is damaged beyond repair, notify ordnance maintenance personnel. Replace lamp connector plug and tail ground wire solderless terminal if necessary.

b. Jumper Cable Plug Socket Assembly. Clean inside of socket assembly to remove dirt, moisture, or foreign matter.

c. Jumper Cable. Inspect for breaks and condition of insulation. If damaged beyond repair, notify ordnance maintenance personnel.

Section XV. TRAILER BODY AND FRAME GROUP

80. General

a. Body. The body of the trailer is made of sheet steel, welded construction, in the shape of a square box having a ring and flange assembly welded into the top. This flange on the ring forms a mounting base to which the mount M45C is attached. The jack mount brackets, the wheel mounting support brackets, and the drawbar assembly are welded to the body. Four access doors, two on body and two on turret ring, permit entry into inside of trailer for changing belts on the machine gun mount when it is mounted on the trailer.

b. Chains. Chain assemblies to protect against loss of lock pins and wedges are located as follows:

(1) One on each jack, attached to lock pin for jack.

(2) Two on drawbar tie rod, attached to drawbar lock and tie rod pin for jack handles (fig. 28).

(3) One on each side of trailer body to the rear of wheel bracket support, attached to wedge lock pin (fig. 27).

(4) One on each side of trailer body in front of wheel bracket support, attached to wedge.

c. Jacks. Two lifting and lowering jacks, of the pawl and ratchet type, are mounted to the rear of the body on brackets provided for this purpose. One jack of the same type is mounted on the drawbar tie rod (fig. 28). The three jacks provide the means of raising the trailer in order to take off or mount the wheels. They also are used to lower the body of the trailer to the ground, after wheels have been removed, to permit body to provide a firm base for operation of mount M45C. When trailer is being moved from one location to another on its wheels, the rear jacks are turned to a horizontal position and held secure by two latch assemblies on the rear of the body of the trailer; the front jack assembly is drawn up as far as it will go and held in place by a lock pin.

d. Reflex Reflectors. Three reflex reflectors are mounted on the body of the trailer mount; one on each side and to the rear and one on rear access door.

e. Drawbar and Lunette. The drawbar on early models is made in one piece. On late models it is made in two sections to facilitate crating. The lunette eye has an inside diameter of 3 inches and an outside diameter of 6¼ inches. The drawbar and lunette are held in one assembly by three ½-inch rivets extending through both sides of each assembly. A tool box assembly is welded to the right side of the drawbar, between the front lifting jack assembly and the trailer body.

81. Removal and Installation

a. Removal of Rear Jack With Mount Assembly (fig. 82).

(1) Place jack in vertical position and permit its base to rest on ground free of any weight of trailer.

(2) Remove four machine screws from upper and lower mounting bracket cover plates. Remove cover plates.

(3) Using a punch, drive out mount bracket retaining pin through holes uncovered by cover plates.

(4) Pull jack with mount assembly from mounting bracket support.

(5) Remove four machine screws and two mounting bracket cover plates from bottom of mounting bracket support.

(6) Unscrew and remove drain plugs.

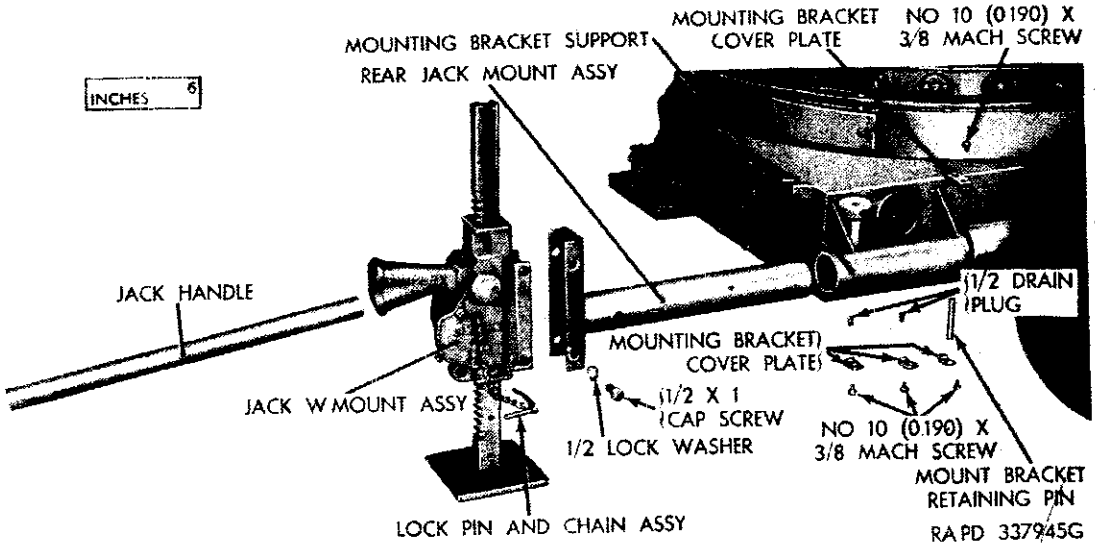


Figure 82. Rear jack with mount assembly removed from trailer.

b. Removal of Front Jack With Mount Assembly.

(1) Place jack in position so that its base rests on ground free of any weight of trailer.

(2) Remove four cap screws and lock washers holding jack with mount assembly to its mounting bracket.

(3) Remove jack with mount assembly.

c. Removal of Trailer Body Access Doors (fig. 83).

(1) Remove hex nuts and lock washers holding trailer body access door to trailer body.

(2) Remove trailer body access door with reflex reflector and gasket.

Note.—Trailer body access door gasket is sealed to the door and will come off as a unit with the door and reflector.

d. Removal of Turret Base Access Door (fig. 83).

(1) Remove hex nuts and lock washers holding turret base access door to trailer body.

(2) Remove turret base access door with gasket.

e. Installation of Turret Base Access Doors (fig. 83).

(1) Place turret base access door gasket and door in position on studs protruding from trailer body.

(2) Secure with lock washers and hex nuts.

f. Installation of Trailer Body Access Door (fig. 83).

(1) Place trailer body access door gasket and trailer body access door with reflex reflector in position on studs protruding from trailer body.

(2) Secure with lock washers and hex nuts.

g. Installation of Jack With Mount Assemblies (fig. 82). Install jack with mount assemblies in reverse order of removal (*a* and *b* above).

82. Disassembly and Assembly

a. Remove four cap screws and lock washers holding jack with mount assembly to rear jack mount assembly (fig. 82). Remove jack with mount assembly.

b. Remove two machine screws holding reflex reflector to trailer body access door. Remove reflex reflector.

c. Assemble in reverse order of disassembly.

83. Maintenance

a. Reflex Reflectors. Clean reflectors by wiping while dry or by washing. Replace broken reflectors.

b. Chains and Pins. Repair broken chains by wiring together or by welding. Replace lock pin and chain assembly when damaged beyond repair.

c. Jacks.

(1) Clean and lubricate rear jack mount trunnions (LO 9-223).

(2) Clean jack assemblies. Lubricate jack ratchet and pawl in accordance with LO 9-223.

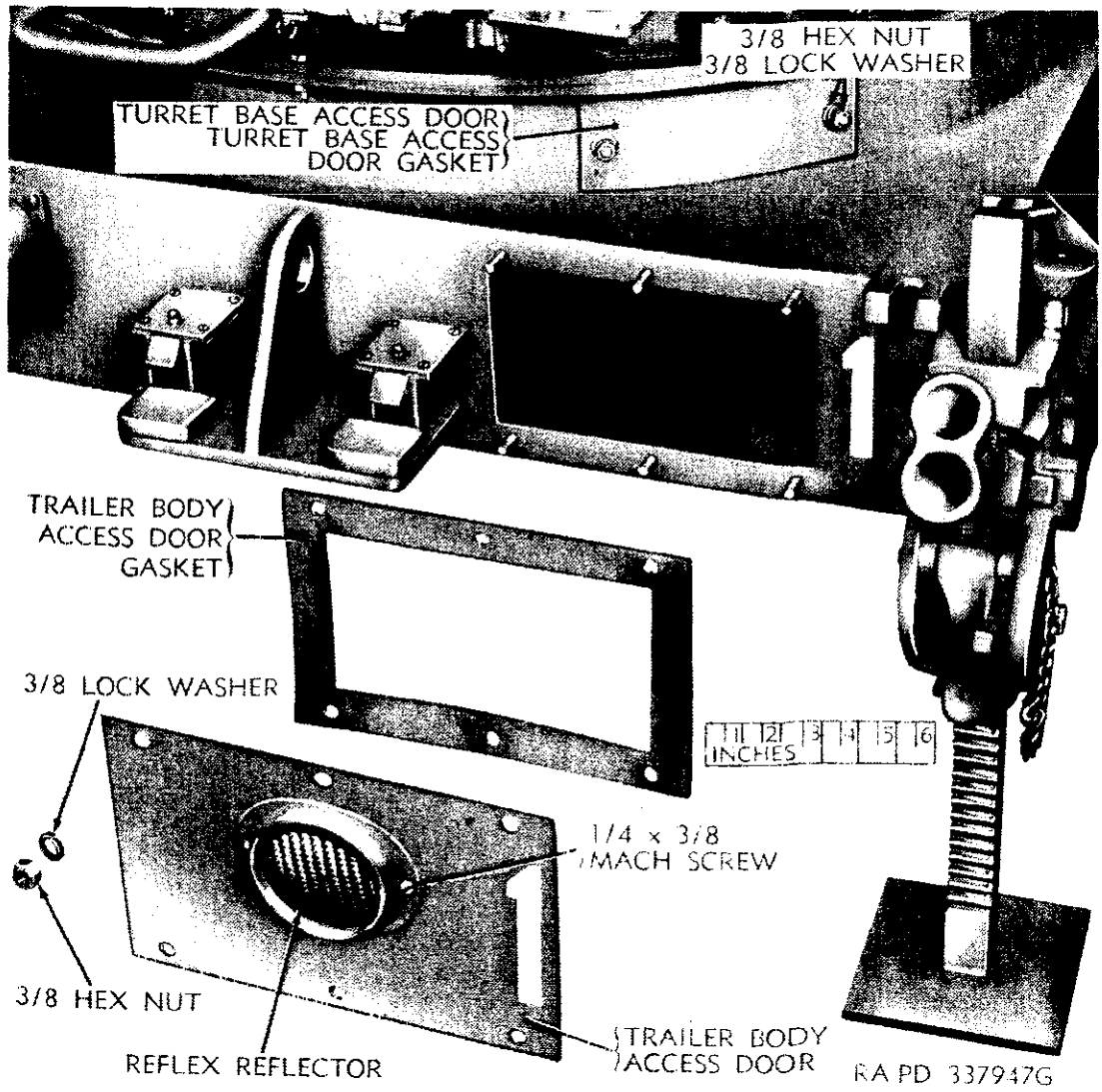


Figure 83. Access doors.

(3) Drain water which may have accumulated inside jack mounting bracket.
(4) Replace defective jack with mount assemblies.
(5) Replace damaged or missing jack handles.

d. Jack Latch Assembly. Clean dirt and foreign material which may have accumulated in jack latch assembly. Lubricate (LO 9–223).

e. Body.

(1) Inspect bottom of trailer body through trailer body access doors. Drain accumulations of water from bottom of trailer by removing drain plugs.

(2) Inspect underside of turntable of mount M45C through access doors. If inspection indicates that gear boxes, electric motor, or wiring have been immersed, refer to ordnance maintenance for correction. Any other organizational maintenance necessary on mount M45C may be performed through access doors.

Section XVI. TRAILER EQUIPMENT

84. General

a. Loading aid kit 5700900 (formerly 7069664) is equipment issued with the trailer mount M55, when destined for truck transportable antiaircraft battalion. It is intended for installation on the 2½-ton 6 x 6 truck (GMC Model CCKW 353 LWB). It is designed to aid in loading trailer mount M55 on the truck body for transport.

b. Procedure for installation of new installations (fig. 84) of loading aid kit 5700900 is given in paragraph 86. Procedure for altering old installations of loading aid kit 7069664 to new installations is given in paragraph 87.

85. Removal (New Installations)

a. Remove left and right chock blocks which were stowed inside truck body.

b. Remove truck racks, top bows, and paulin.

c. Remove two ramp hanger strap assemblies from each of the two side panels and remove ramps (fig. 84).

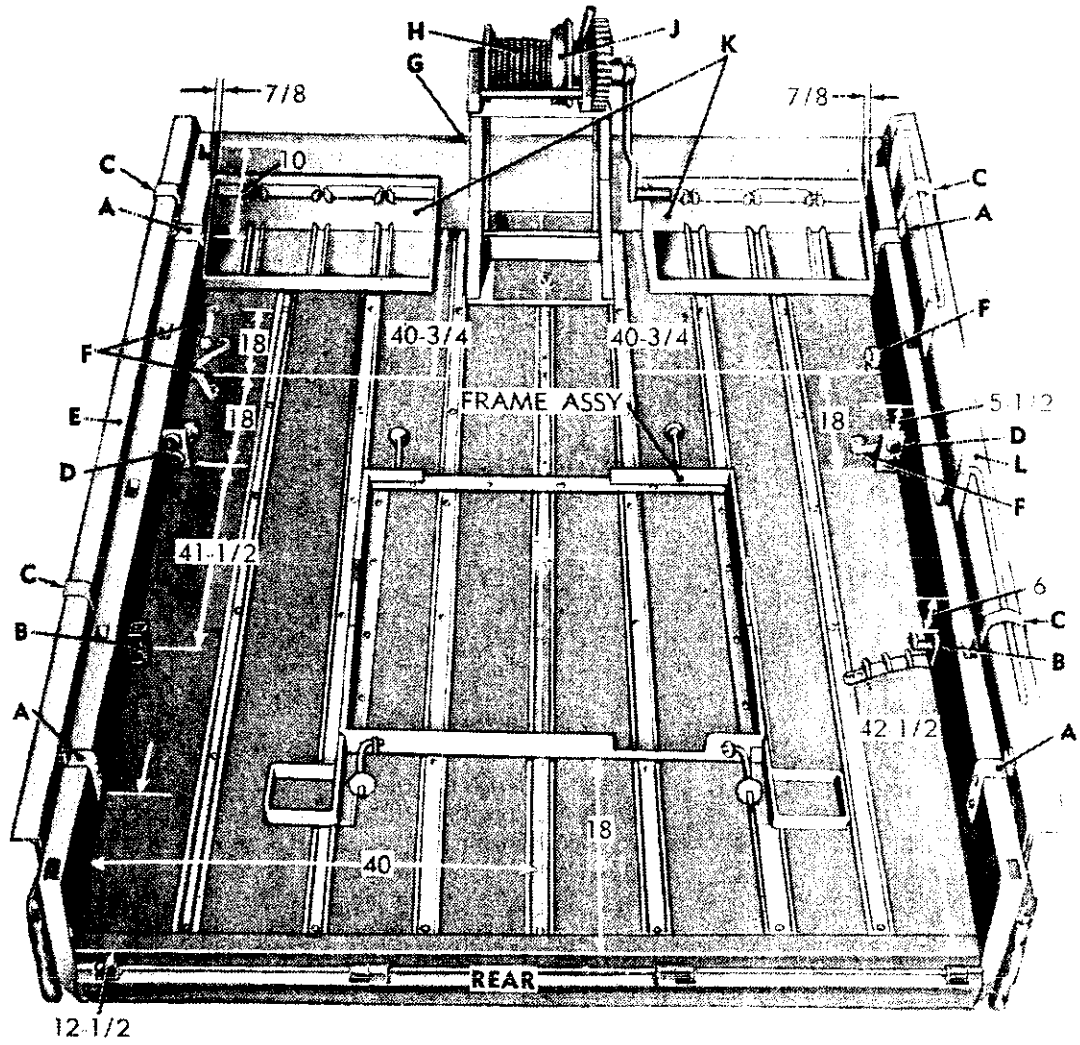
d. Remove screws, nuts, and washers holding the two ramp hangers to each side panel of truck. Remove four ramp hangers.

e. Remove bolts, nuts, screws, and washers holding the frame to truck body floor. Remove frame.

f. Remove screws, nuts, and washers holding trailer loading winch to winch mounting base. Remove winch with winch cable.

g. Remove bolts, nuts, screws, and washers holding winch mounting base to truck floor and to front panel. Remove winch mounting base.

h. Remove bolts, nuts, screws, and washers holding two front and two rear spare barrel brackets to truck body. Remove four spare barrel brackets.



A–RAMP HANGER ASSY
B–REAR SPARE BARREL BRACKET ASSY
C–RAMP HANGER STRAP ASSY
D–FRONT SPARE BARREL BRACKET ASSY
E–LEFT RAMP
F–SPARE PARTS BOX STRAP ASSY BILLET ASSY
G–WINCH MOUNTING BASE ASSY
H–WINCH CABLE
J–TRAILER LOADING WINCH
K–AMMUNITION RACK ASSY
L–RIGHT RAMP

NOTE: ALL DIMENSIONS SHOWN ARE IN INCHES RA PD 117804B

Figure 84. New installation of loading aid kit 5700900.

i. Remove bolts, nuts, and washers holding three billets and three spare parts box straps to truck floor. Remove three billets and three straps from truck body.

j. Remove screws, nuts, and washers holding two ammunition racks to floor of truck body. Remove two ammunition racks.

k. Install paulin, top bows, and racks to body of truck.

86. Installation (New Installations)

a. Table V contains a listing of major parts and attaching parts in loading aid kit 5700900 for information only and is provided to assist in the installation of the loading aid kit. Use ORD 7 SNL A–61 for requisitioning replacements.

Table V. Loading Aid Kit 5700900

Part		Quantity	Part No.
Major part	Attaching parts		
BASE, winch mounting, high, assy	To attach winch to winch mounting base:	1	7070905
	NUT, hex, ½–20NF–3	4	117051
	SCREW, cap, hex-hd, S, ½–20NF–3 x 1⅜	4	106297
	WASHER, lock, med, S, ½ in.	4	103323
	To attach rear of winch mounting base to truck:		
	BOLT, carriage, ½–20NF–3 x 2¼	4	7069466
	NUT, hex, ½–20NF–3	4	117051
	WASHER, lock, med, S, ½ in.	4	103323
	To attach bottom of winch mounting base to truck:		
	NUT, hex, ½–20NF–3	8	117051
	SCREW, cap, hex-hd, S, ½–20NF–3 x 2¼	4	106298
	SCREW	4	181713
	WASHER	8	106265
	WASHER, lock, med, S, ½ in.	8	103323
BILLET, w/strap, assy	To attach billet to truck floor:	3	7069659
	BOLT, carriage, ¼–28NF–3 x 2	2	7069754
	NUT, hex, ¼–28NF–3	2	117047
	WASHER, plain, S, 5/16 ID	2	106261
	WASHER, lock	2	103319
BLOCK, chock, left, assy	To hold wheel of trailer	1	7070981
BLOCK, chock, right, assy	To hold wheel of trailer	1	7070982
BRACKET, front spare gun barrel, assy	To attach spare barrel brackets:	2	7069509
	BOLT, carriage, ⅜–24NF–3 x 2	4	7069669
	NUT, hex, ⅜–24NF–3	4	117049
	WASHER, plain, S, 7/16 ID	4	106263
	WASHER, lock, med, S, ⅜	4	103321
BRACKET, rear spare gun barrel, assy	To attach spare barrel brackets:	2	7069570
	BOLT, carriage, ⅜–24NF–3 x 2	4	7069669
	NUT, hex, ⅜–24NF–3	4	117049
	WASHER, plain, S, 7/16 ID	4	106263
	WASHER, lock, med, S, ⅜ in.	4	103321
CABLE, winch		1	7069695

Table V. Loading Aid Kit 5700900—Continued

Part		Quantity	Part No.
Major part	Attaching parts		
FRAME, trailer mounting, assy.	To attach frame to truck floor:	1	7069480
	BOLT, carriage, ⅜–24NF–3 x 2.	18	7069669
	NUT, hex, ⅜–24NF–3	18	117049
	SCREW (used on composite bodies only).	4	216326
	WASHER, plain, S, 7/16 ID	18	106263
	WASHER, lock, med, S, ⅜ in.	18	103321
HANGER, ramp, assy	To attach ramp mounting hanger bar:	4	7069696
	NUT, hex, ⅜–24NF–3	2	117049
	SCREW (for metal bodies)	2	100026
	SCREW (for wood bodies)	2	100032
	WASHER, plain, S, 7/16 ID	2	106263
	WASHER, lock, med, S, ⅜ in.	2	103321
RACK, ammunition, assy.	To attach ammunition racks:	2	7069508
	NUT, hex, ⅜–24NF–3	4	117049
	SCREW	4	100028
	WASHER, plain, S, 7/16 ID	4	106263
	WASHER, lock, med, S, ⅜ in.	4	103321
RAMP, LH		1	7069434
RAMP, RH		1	7069435
STRAP, assy		4	7069441
STRAP, assy	To attach strap to truck floor:	3	7069660
	BOLT, carriage, ¼–28NF–3 x 2.	2	7069754
	NUT, hex, ¼–28NF–3	2	117047
	WASHER, plain, S, 5/16 ID	2	106261
	WASHER, lock	2	103319
WINCH		1	7069581

b. Remove paulin, top bows, and racks from the body of truck.

c. Position the two ammunition racks (fig. 84) against right and left front panels of truck body, seven-eighths of an inch in from side panels. Using each ammunition rack as a template, drill holes in floor of truck body for attaching screws. Install ammunition rack assemblies, using pertinent screws, nuts, and washers (table V).

d. Position the three billets and three spare parts box straps. Using billet assembly and strap assembly as templates, drill holes for attaching bolts. Install billet assemblies and straps, using pertinent attaching parts (table V).

e. Position the two front and the two rear spare barrel brackets. Using front and rear spare barrel brackets as templates, drill holes for

attaching bolts. Install bracket assemblies, using pertinent attaching parts (table V).

f. Position winch mounting base in center of truck body. Using winch mounting base as a template, drill holes in front panel and floor for attaching bolts and screws. Install base assembly, using pertinent attaching parts (table V).

g. Install trailer loading winch with winch cable on winch mounting base, using pertinent attaching parts (table V).

h. Position frame on floor of truck body 18 inches ±¼ inch from rear edge and equidistant from each side. Using frame as a template, drill holes for attaching bolts and/or screws. Install frame assembly, using pertinent attaching parts (table V).

i. Position two ramp hangers on right side panel and two on the left side panel of truck body. Using each hanger as a template, drill holes for attaching screws. Install hanger assemblies, using pertinent attaching parts (table V).

j. Install right ramp on the two ramp hanger assemblies on the right side panel and secure with two ramp hanger strap assemblies.

k. Install left ramp on the two ramp hanger assemblies on the left side panel and secure with two ramp hanger strap assemblies.

l. Install truck racks, top bows, and paulin.

m. Stow right chock block and left chock block in a convenient place inside of truck body.

87. Alteration of Old Installations

a. The following part is required for altering old installations (fig. 86) to new installations (fig. 85).

BASE, winch mounting, high, assembly 7070905.

b. The following parts of old installations (fig. 85) are to be discarded:

BASE, winch mounting, low, assembly 7069473.

PLATE, adapter 7070519.

c. Remove paulin, top bows, and racks from the body of truck.

d. Remove both ammunition rack assemblies (fig. 86) from their positions in front right and front left of truck body.

e. Remove spare parts box strap assemblies, billet assembly, adapter plate, and winch mounting base assembly (fig. 87) from front bed of truck.

f. Remove frame assembly from bed of truck (fig. 88).

g. Install the two ammunition rack assemblies, previously removed (par. 86*c*).

h. Install spare parts box strap assemblies and billet assemblies previously removed (par. 86*d*).

i. Install winch mounting base assembly (par. 86*f*).

j. Install trailer loading winch with winch cable (par. 86*g*).

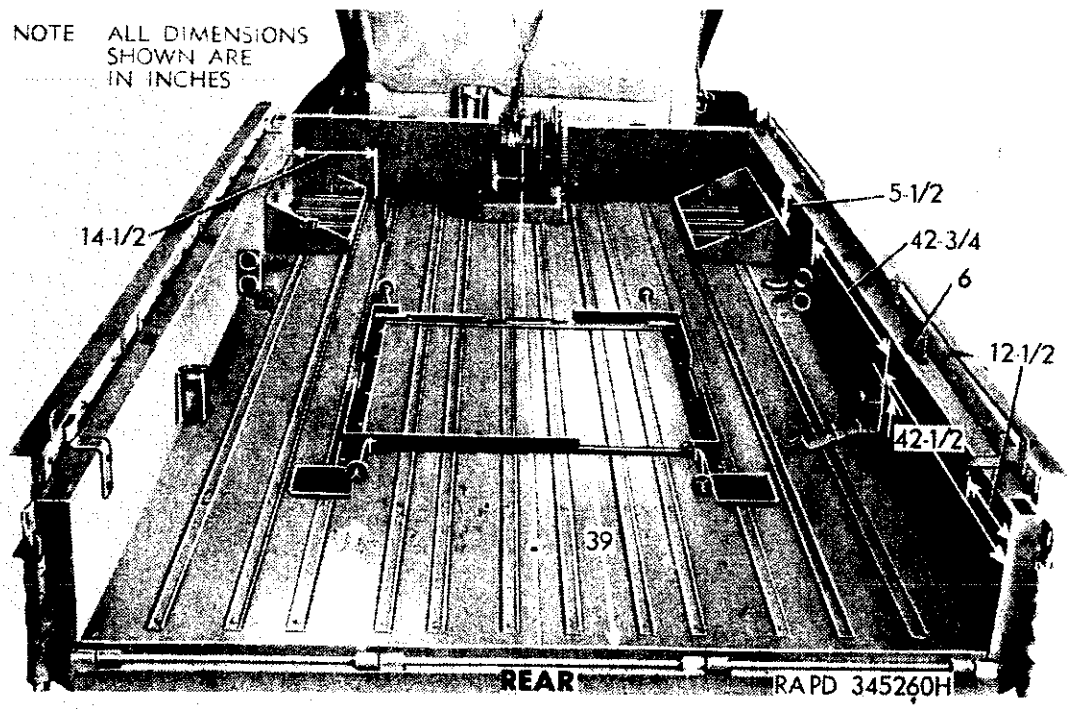


Figure 85. Superseded installation of loading aid kit 7069664.

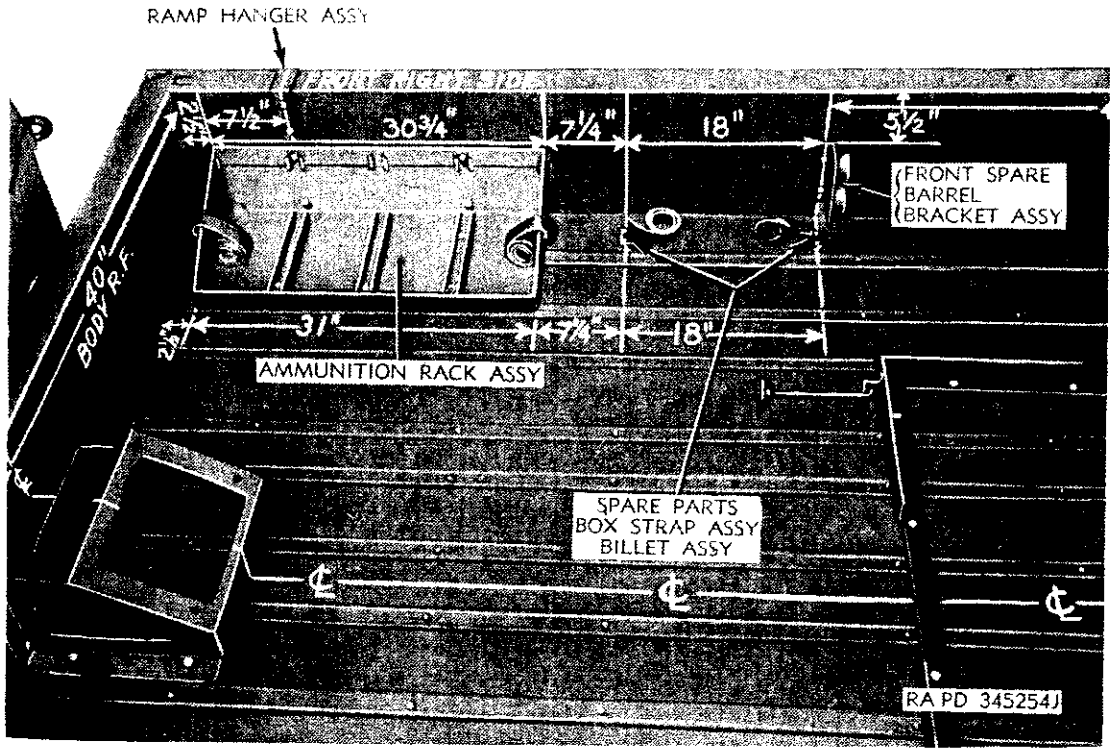


Figure 86. Superseded installation of ammunition rack assembly.

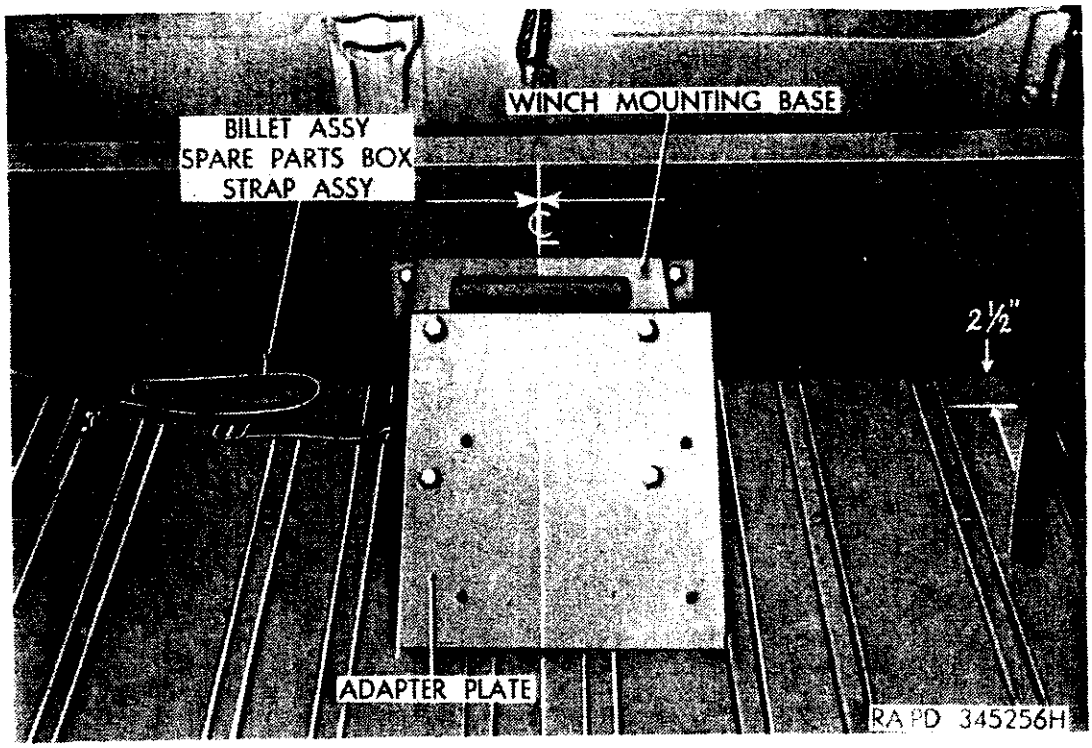


Figure 87. Superseded installation of winch mounting base assembly, adapter plate, and spare parts box strap assemblies.

k. Install frame assembly, previously removed (par. 86*h*).

l. Install racks, top bows, and paulin.

m. Stow right chock block and left chock block in convenient place inside of truck body.

88. Disassembly and Assembly

No disassembly of the equipment is required for organizational maintenance.

89. Maintenance

a. Inspect straps for wear and deterioration. Inspect metal parts for wear and damage.

b. Inspect winch cable for kinks. Straighten out all kinks.

c. Clean and lubricate trailer loading winch.

d. Inspect gear teeth on winch. Check for proper operation of brake.

e. Any component part or assembly of loading aid kit which is damaged or broken should be referred to ordnance personnel for repair or replacement.

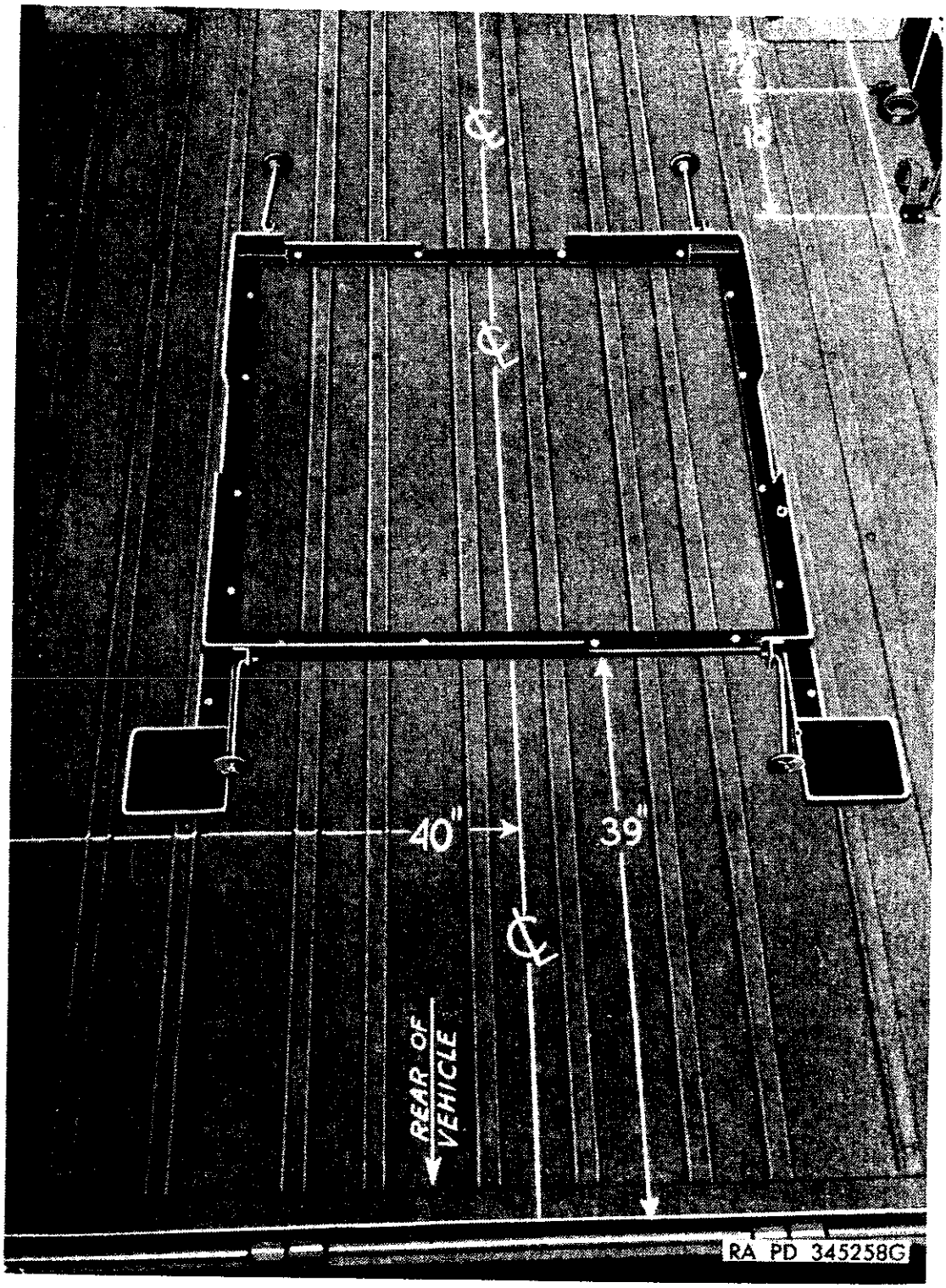


Figure 88. Superseded installation of frame assembly

CHAPTER 4

MATERIEL USED IN CONNECTION WITH MOUNTS M45, M45C, M45D, AND M45F

Section I. CAL. .50 MACHINE GUNS AND AMMUNITION CHESTS

90. General

The multiple cal. .50 machine gun mounts M45, M45C, M45D, and M45F support four cal. .50 heavy barrel turret type Browning machine guns M2. Two guns are located on each trunnion. These guns are fed from the standard cal. .50 ammunition chests M2. See FM 23–65 for complete information on guns and ammunition chests. See Department of the Army Supply Manual ORD 7 SNL A–59 for spare parts, tools, and equipment.

91. Description

a. Guns. The cal. .50 heavy barrel turret type Browning machine guns M2 used on these mounts are air-cooled, recoil-operated guns and are fed by metallic link belts. The gun is cocked by means of a retracting slide. The gun is fundamentally an automatic weapon fired by means of a solenoid. When put in motion, it will automatically fire and load as long as pressure is applied to the triggers and ammunition is fed. All guns are fired simultaneously when pressure is applied to one or both triggers located in the control handles. The gun must be manually loaded and cocked for firing the first round.

b. Ammunition Chests. Each gun is fed from a cal. .50 ammunition chest M2. The chest has a capacity of 200 rounds. The metallic disintegrating link belt is loaded into the chest either from right-hand feed or left-hand feed, depending on the gun it is to serve. To prevent dislodgment of the chest when the guns are fired at high angles, the ammunition support springs (fig. 59) (at the base of each support) engage the chest and hold it in place.

92. Removal and Installation

a. General. The following instructions for removal and installation of the cal. .50 Browning machine guns and cal. .50 ammunition chest M2 must be carried out under the supervision of an officer or mechanic.

b. Removing Guns.

(1) Disengage the gun securing pin latch from the front gun securing pin in the vertical adjustment yoke (fig. 89).

(2) Remove the front gun securing pin.

(3) Lift the front end of the gun by the barrel support (do not lift by barrel) until the receiver just clears the yoke, and slide gun to rear until the rear securing pin clears the horizontal adjustment block. Now lift the gun clear of the mount.

c. Installing guns.

(1) Lift the gun and place it over the horizontal adjustment block and vertical adjustment yoke, with the retracting slide outward and the rear gun securing pin on the under side of the gun receiver in front of the horizontal adjustment block.

(2) With one man holding the barrel support of the gun (do not hold by the barrel) above and clear of the vertical adjustment yoke assembly, ease the gun backward until the rear gun securing pin drops to the level of the horizontal slot in the horizontal adjustment block assembly (fig. 90).

(3) With the rear securing pin engaged in the slot, move the gun forward and down until the hole in the forward end of the receiver lines up with the holes in the yoke.

(4) Using a twisting motion, insert the front gun securing pin through the holes in the yoke and gun receiver until it is engaged in the hole in the opposite side of the yoke. Allow gun securing pin latch to enter the slot just behind the knurled head of the front gun securing pin.

(5) Adjust head space and timing (par. 11, C2, 1 Nov. 1950, FM 23–65).

d. Removing Ammunition Chest.

(1) Pull chest out to release from springs at bottom.

(2) Lift the chest straight up and out of the ammunition chest support.

e. Installing Ammunition Chest.

(1) Grasp the ammunition chest by the two carrying handles and lift to slightly above the level of the ammunition chest support.

(2) Position the tapered slides of the ammunition chest in the flanges of the ammunition chest support.

(3) Slide chest downward in support until the slide of the chest engages the ammunition chest support springs.

(4) Depress spring and seat chest firmly in the support, making certain the end of the chest slide is hooked on the base of the support.

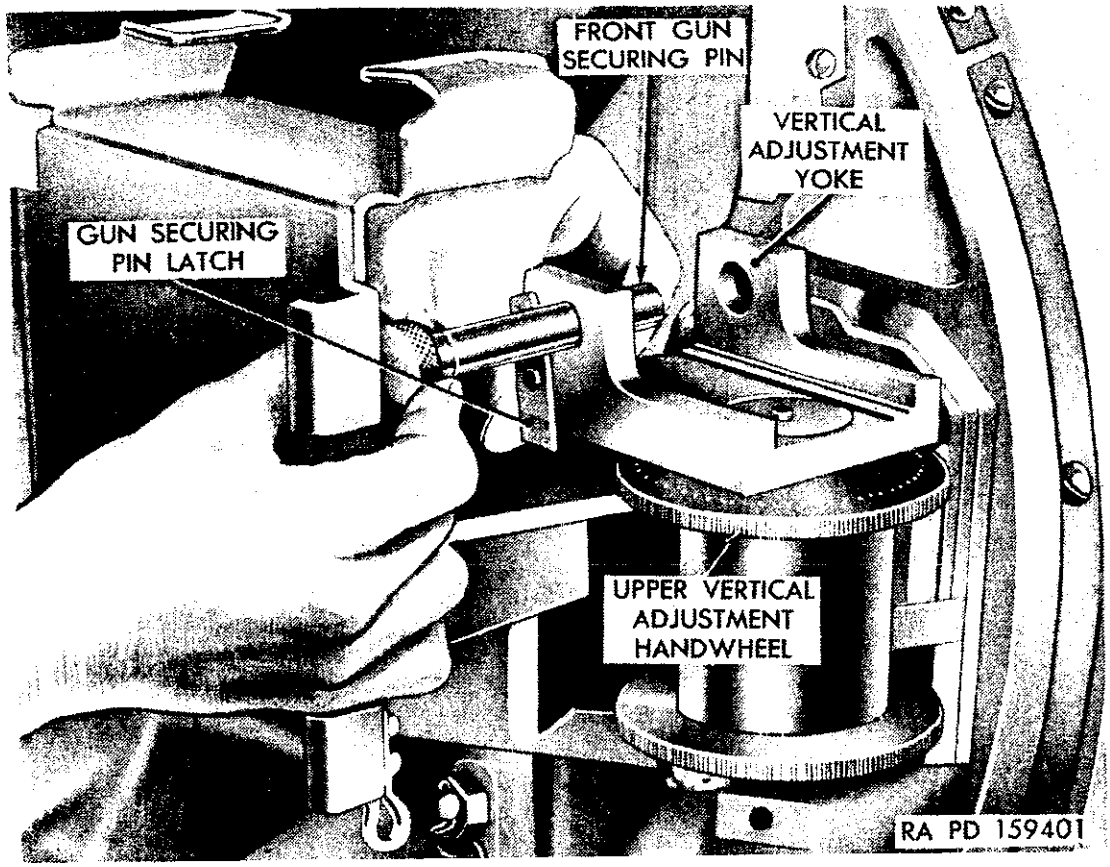


Figure 89. Setting front gun securing pin on mount M45.

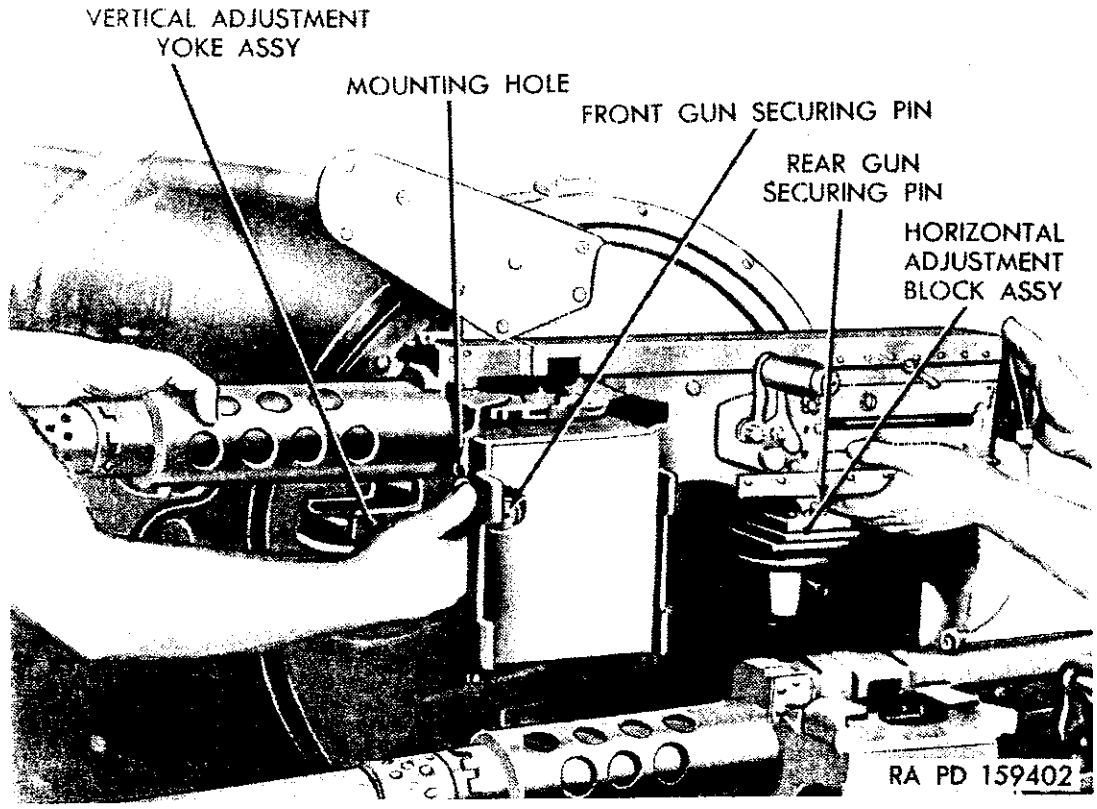


Figure 90. Cal. 50 Browning machine gun M2 mounted on mount M45.

Section II. SIGHTING AND FIRE CONTROL INSTRUMENTS

93. General

This section contains complete detailed operating instructions for on-carriage sighting and fire control instruments, as well as necessary instructions covering maintenance authorized to organizational personnel. Instructions covering off-carriage instruments are contained in separate manuals which are listed in the appendix.

94. Description

a. Reflex sight M18 with sight mount 7675757 (fig. 91) completes a projection-type collimator sight, which replaces the Mk 9, Model 1 illuminated sight (12 volts) (fig. 92). The reflex sight M18 is used for direct sighting of the multiple cal. .50 machine gun mounts M45, M45C, M45D, and M45F.

b. The sight mount 7675757 (fig. 91) is a clamping device used to attach the reflex sight M18 to the machine gun mount. The sight mount clamps on the horizontal sight brace of the machine gun mount. A dovetail slot formed by a slot cut into the holder and a gib with a locking lever (fig. 91) secure the reflex sight M18 in place.

c. The reflex sight M18 consists of a sight assembly and a housing assembly. The sight assembly contains the optical system of the reflex sight, while the housing assembly (fig. 93) provides artificial illumination when desired for sighting. The housing assembly can be raised, allowing daylight to enter the optical system of the sight assembly through the sight assembly window. When artificial illumination of the reticle is desired, the housing assembly is lowered and the intensity of the illumination controlled by the rheostat knob.

d. With the housing assembly lowered, the artificial light from the housing assembly is diffused by both the housing assembly window and the sight assembly window. With the housing assembly raised (fig. 94), the daylight passes through only the sight assembly window. The diffused light falls upon a metal reticle, located behind the sight assembly window, and passes through the etched pattern, and is deviated through 90° by a mirror after which it is focused at infinity by the objective assembly. The image of the reticle from the objective strikes the reflector (fig. 93) which is held at an angle of 45°. Since the reflected light rays are parallel, the reticle pattern (fig. 95) appears at infinity, which makes it possible for the observer to superimpose the image on the target and focus on both at once.

e. The reticle pattern is composed of four lead circles with three sighting dots. The line of sight is determined by the uppermost of the three dots and the two dots appearing below are for setting in super-elevation; one at 5 mils elevation, the other at 10 mils. The

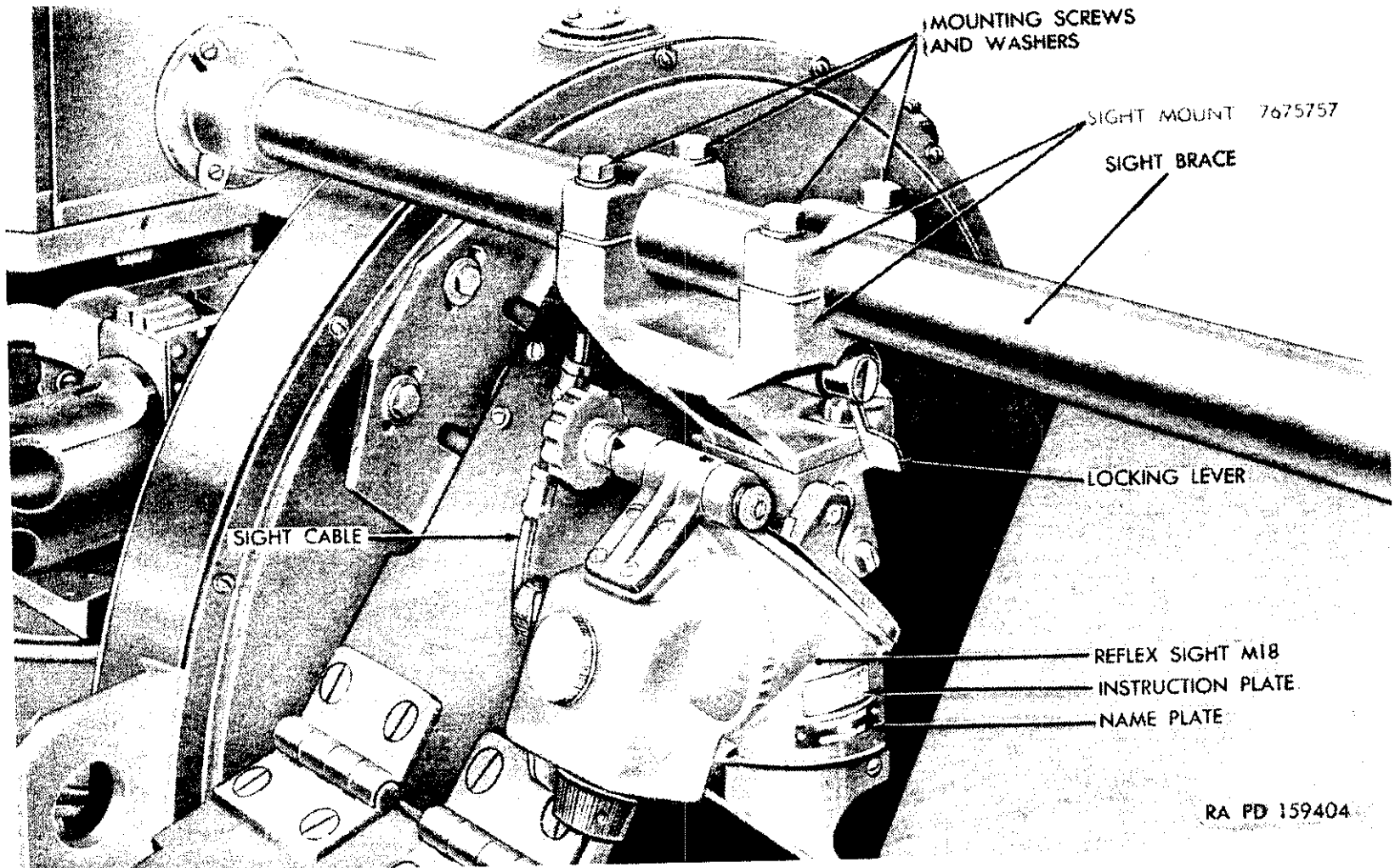


Figure 91. Reflex sight M18 and sight mount 7675757 installed on machine gun mount.

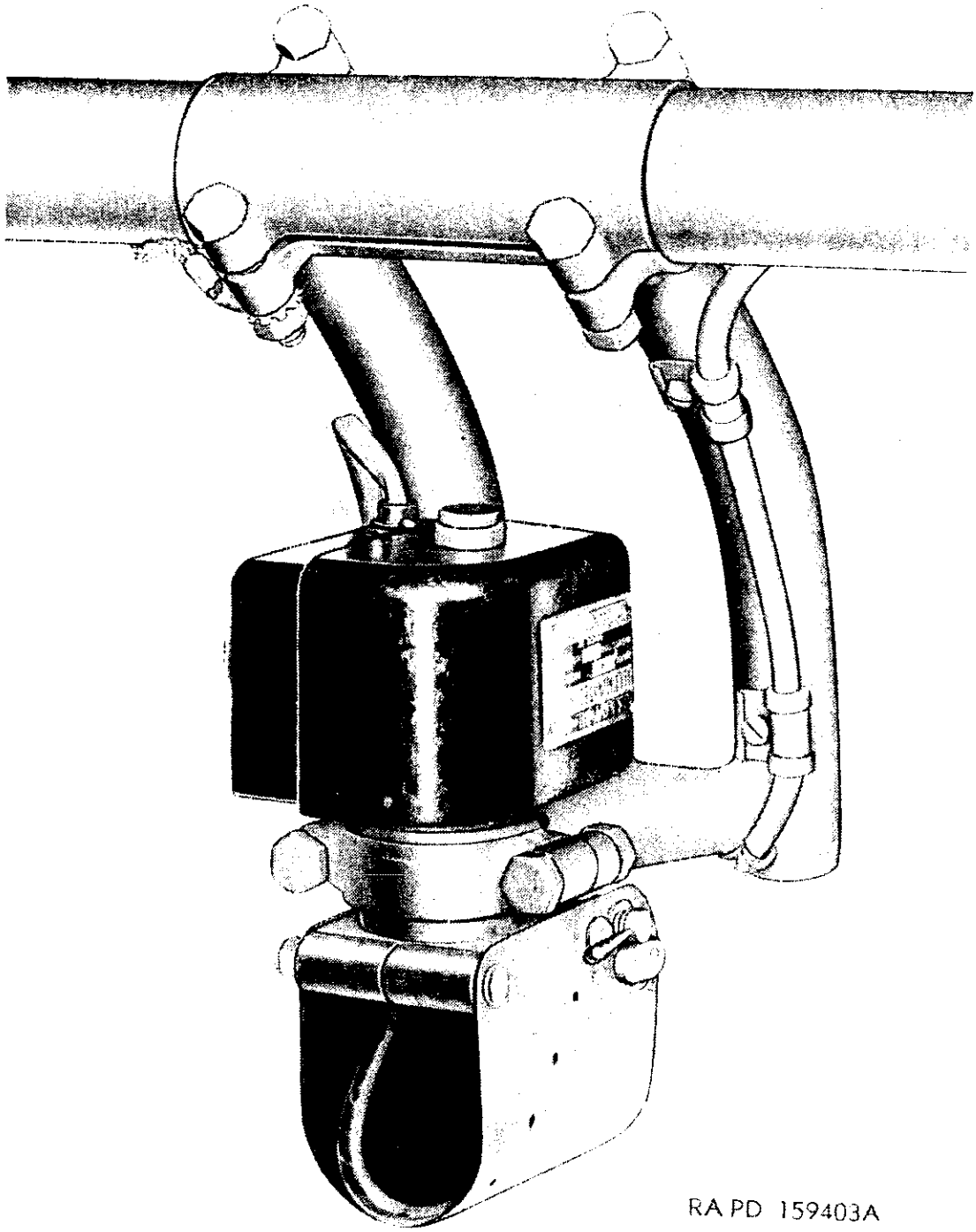


Figure 92. Mk 9 model 1 illuminated sight (13 volts).

lead circles are spaced at intervals corresponding to 100 mph (65 mils), 200 mph (130 mils), 300 mph (195 mils), and 400 mph (260 mils).

95. General Precautions in Handling Sighting and Fire Control Instruments

a. Handle sighting and fire control instruments gently. They are delicate and inaccuracy or malfunction will result from mistreatment.

b. Do not turn any screws or other parts that are not incident to the use of the instruments.

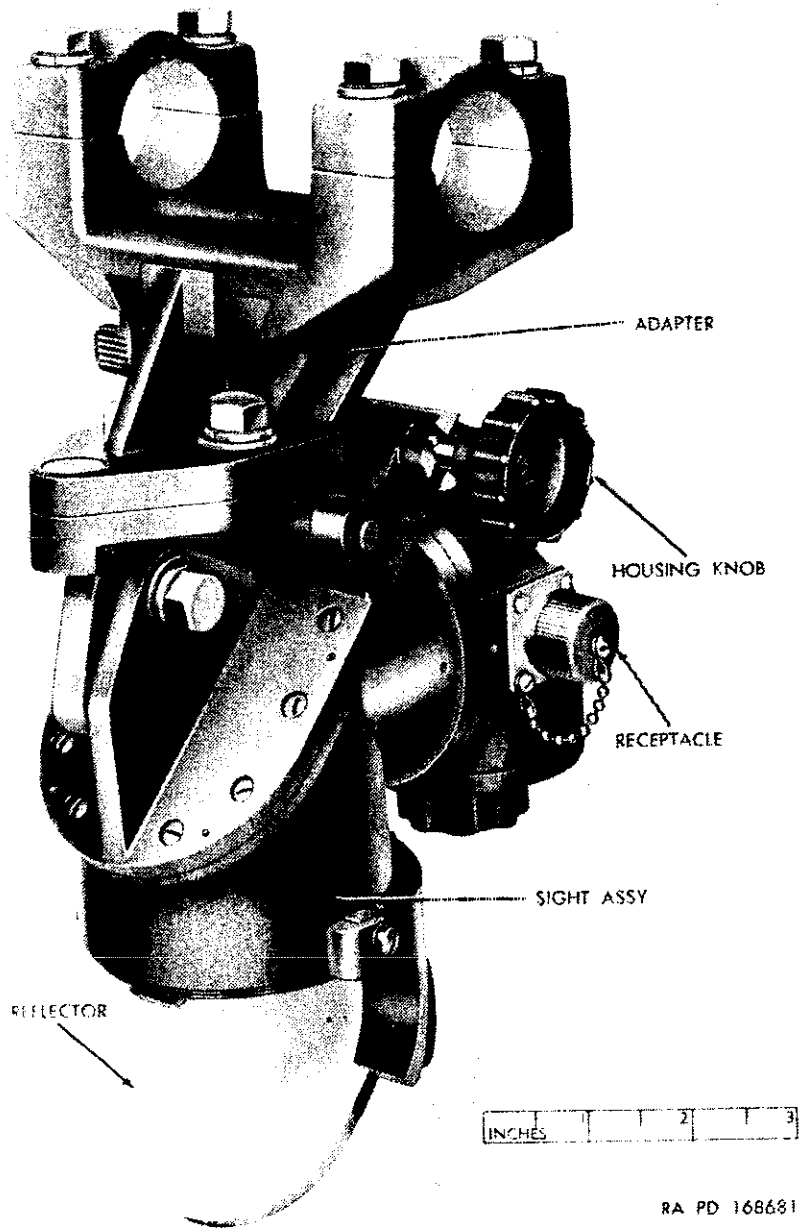


Figure 93. Redeye sight MX with sight mount 7675757—right rear view.

e. Do not attempt to force the rotation of any knob beyond the stop limit.

d. Keep the instruments as dry as possible. If an instrument is wet, dry it carefully.

e. Keep the instrument in the carrying case provided, or covered and protected from dust and moisture when not in use.

f. Do not tighten clamping and adjusting screws beyond a snug contact. Excessive wear of threads and other damage to the instruments are thereby eliminated.

g. Do not attempt to turn or move any part that has been clamped in place without first loosening the clamping device.

h. Do not attempt any repair, disassembly, or adjustment that is not specifically covered in this section. Those instruments requiring

repair, disassembly, or adjustment other than what is authorized to the using arm are to be referred to ordnance maintenance personnel.

96. Maintenance

a. General. Intervals for servicing sighting and fire control instruments will be found in the preventive maintenance services (table II). However, test and inspection of the sighting and fire control instruments should be made by organizational personnel at any time that inaccurate performance is suspected. Do not attempt any adjustment, service, or replacement of spare parts not specifically covered in this paragraph. Refer all maintenance which is beyond the scope of organizational personnel to ordnance maintenance personnel.

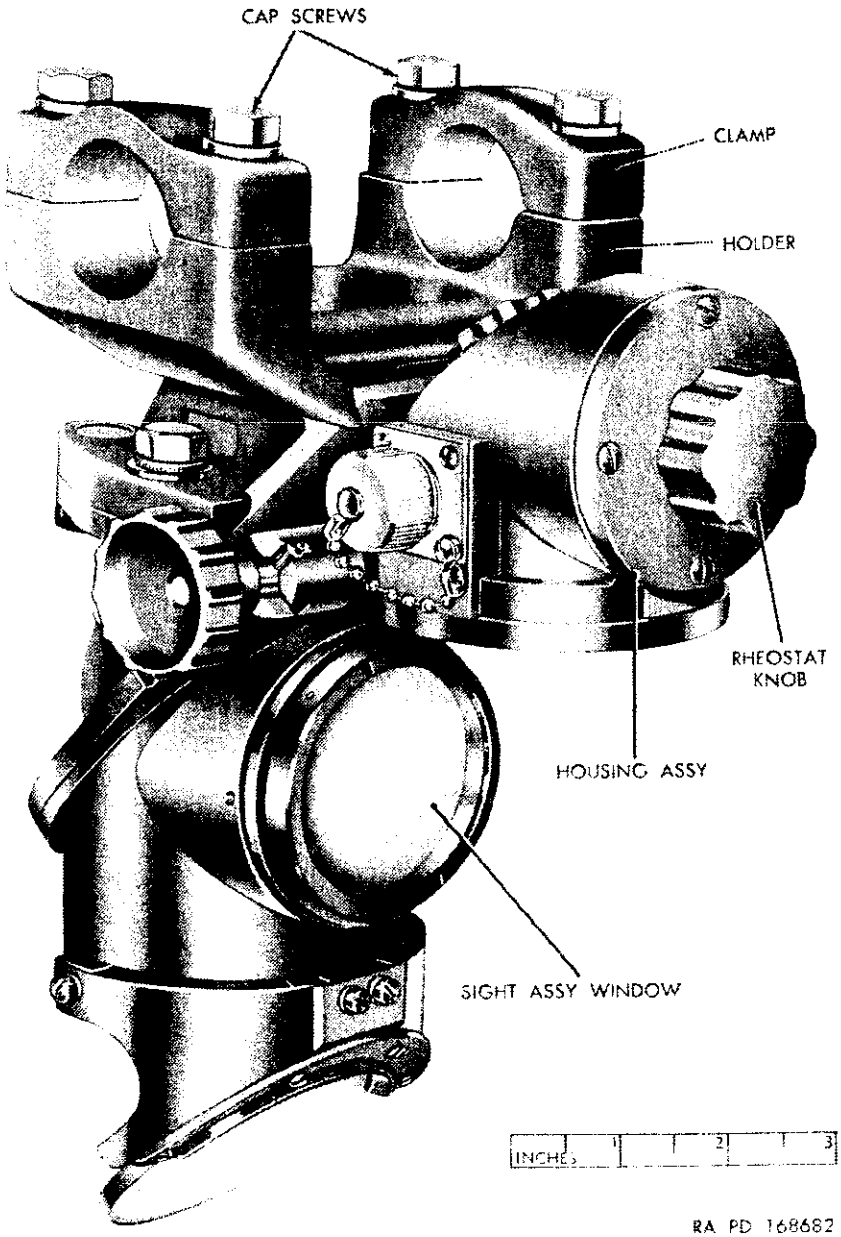


Figure 94. Reflex sight M18 with sight mount 767577 housing assembly raised—right front view.

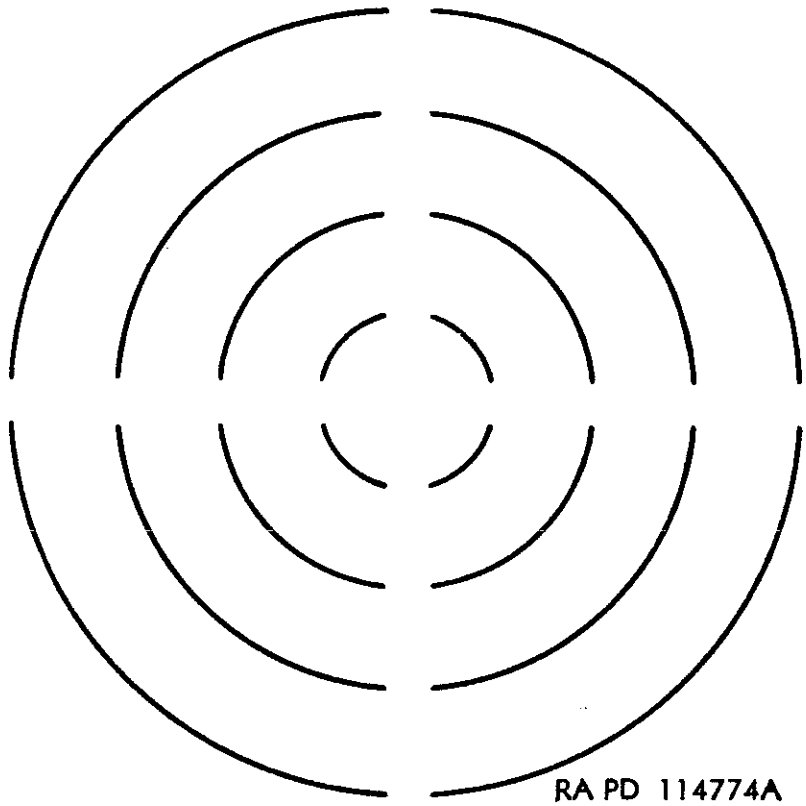


Figure 95. Reticle pattern—reflex sight M18.

b. Optical Parts.

(1) To obtain satisfactory vision, it is necessary that the exposed surfaces of the lenses and other parts be kept clean and dry. Etching of the surfaces of the glass, which interferes with vision, can be prevented or greatly retarded by keeping the glass clean and dry.

(2) Under no circumstances should polishing liquids, pastes, or abrasives be used for polishing lenses and windows.

(3) For wiping optical parts, use only lens tissue paper, especially intended for cleaning optical glass. Use of cleaning cloths in the field is not permitted. To remove dust, brush the glass lightly with a clean artist's camel-hair brush, and rap the brush against a hard body in order to knock out the small particles of dust that cling to the hairs. Repeat this operation until all dust is removed.

(4) Exercise particular care to keep optical parts free from oil and grease. Do not wipe lenses or windows with the fingers. To remove oil or grease from optical surfaces, apply liquid lens cleaning soap with a tuft of lens tissue paper, and wipe gently with clean lens tissue paper. If liquid soap is not available, and if the surrounding temperature is above 32° F., breathe heavily on the glass and wipe off with clean lens tissue paper. Repeat this operation until clean.

(5) Below freezing temperature, clean optics by rubbing gently with dry lens tissue paper. To remove oil film, take the instrument into a warm inclosure and allow it to reach room temperature before applying liquid lens cleaning soap.

(6) Moisture may condense on the optical parts of the instrument when the temperature of the parts is lower than that of the surrounding air. This moisture, if not excessive, can be removed by placing the instrument in a warm place. Heat from strongly concentrated sources should not be applied directly, since it may cause unequal expansion of parts, thereby resulting in damage to optical parts and inaccuracies of function.

c. Lubrication. Lubrication of fire control materiel will be performed only by ordnance personnel, with the following exceptions which may be lubricated by the using organizations.

(1) External parts not readily lubricated with grease, such as knobs, hinges, and brackets. Lubricate these as required with aircraft and instrument lubricating oil.

(2) Exposed bearing surfaces such as clamps, dovetail slots, and segments. Lubricate with a thin film of aircraft and instruments lubricating grease. This grease provides for both lubrication and protection against corrosion.

d. Replacement of Organizational Spare Parts.

(1) *Replacement of electric lamp.*

(*a*) Unscrew the lamp receptacle assembly (fig. 96) from the housing assembly.

(*b*) Gently press the lamp into the socket and twist; remove the defective lamp from socket.

(*c*) Insert new lamp into the socket.

(*d*) Press gently on the lamp so that it is turned in the socket and securely fastened in the socket by the bayonet lock.

(*e*) Screw lamp receptacle assembly in housing assembly.

(2) *Replacement of reflector.*

(*a*) Loosen the four screws that secure the reflector plate (fig. 97) to the reflector bracket.

(*b*) Gently remove the damaged reflector.

(*c*) Insert the squared end of the new reflector between the reflector plate and reflector bracket so that the gasket protects it from the bracket.

Note.—The coated side of the reflector must be facing away from the operator for correct optical operation. The reflector is very finely coated so that it reflects while still being transparent. To determine which side of the reflector is the coated side, test reflection with a pencil point near the edge. If the point seems to touch its own image, that is the coated side. If there is a gap between point and image, that is the back side.

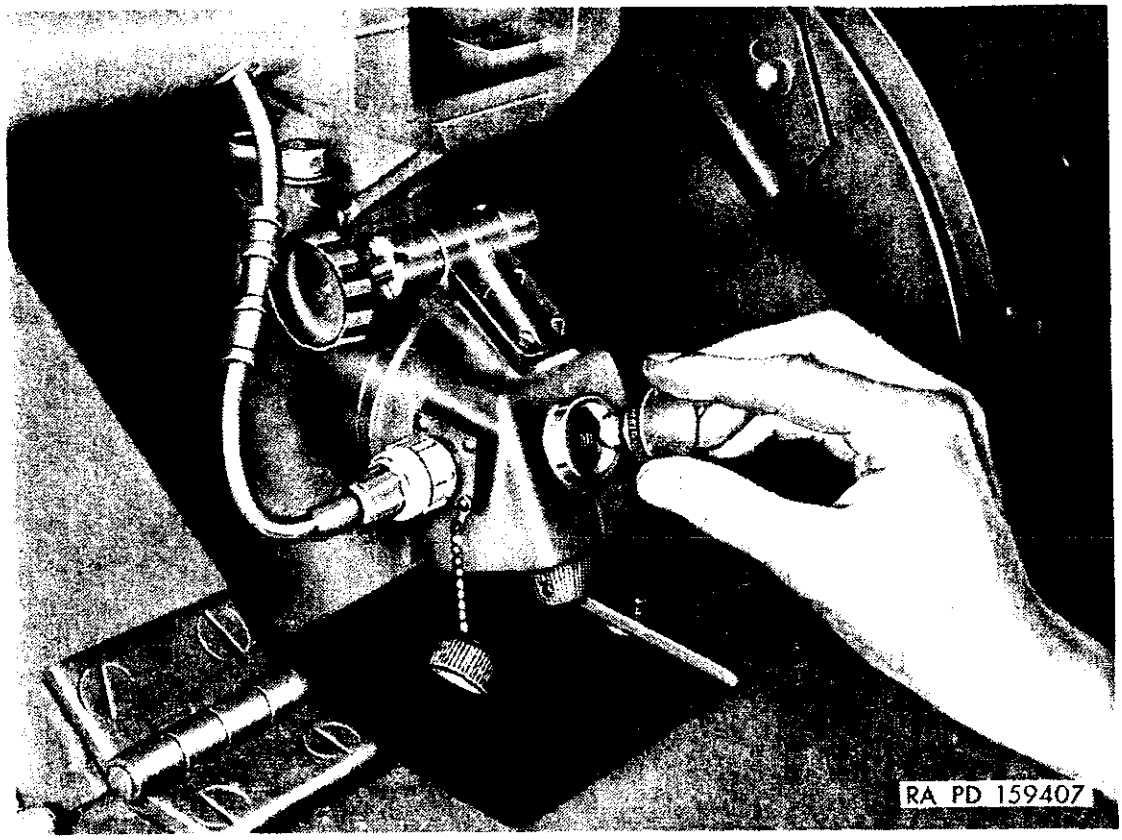


Figure 96. Removing lamp receptacle assembly from housing assembly

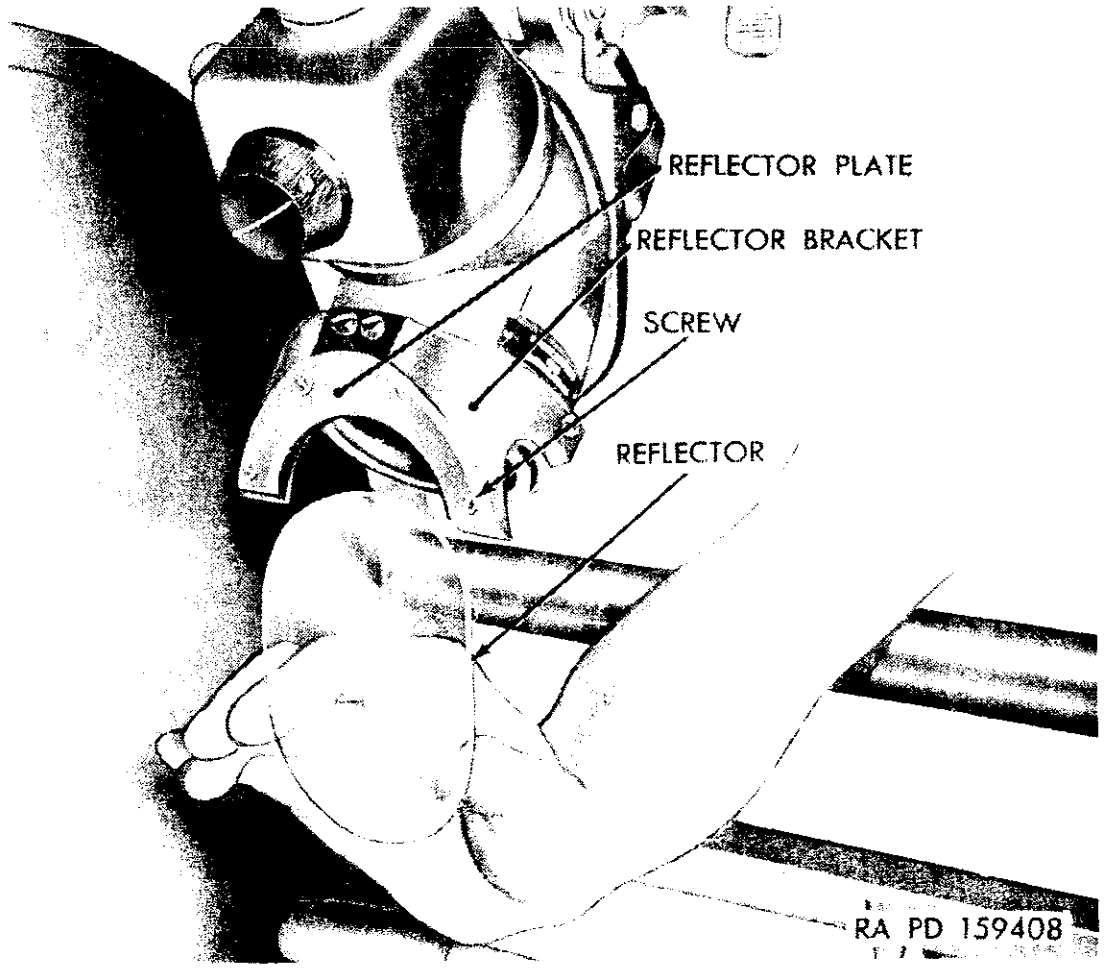


Figure 97. Removing reflector from between reflector plate and reflector bracket

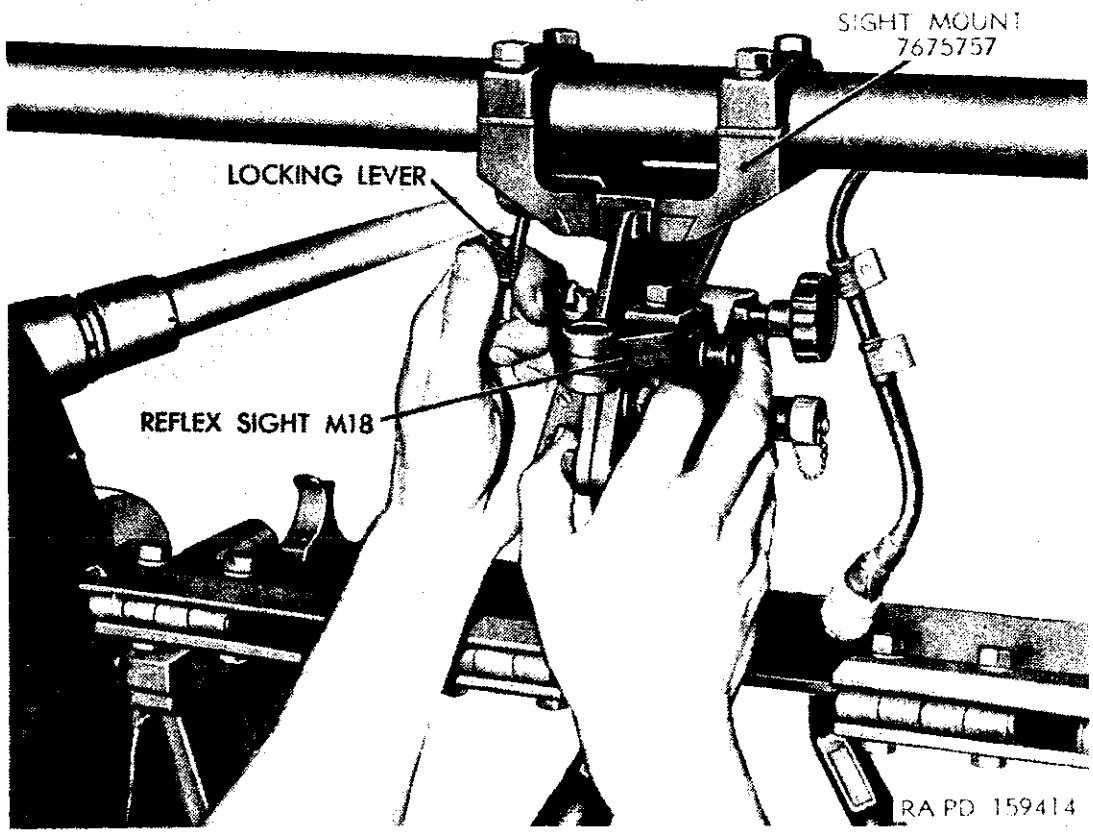


Figure 98. Installing reflex sight M18 in sight mount 7675757.

(*d*) Take up evenly on the four retaining screws so that the plate presses evenly on the reflector, holding it firmly against the gasket.

97. Installation

a. Remove the sight mount 7675757 (fig. 91) from its carrying-case. The sight mount is present in position on the sight brace. To install the reflex sight M18 (fig. 98) to the sight mount, pull the locking lever to its unlocked position and slide the reflex sight in the dovetail slot of the sight mount. Push the locking lever forward to its locked position, securing the reflex sight in place.

b. Unscrew the cap with chain from the power receptacle and attach the sight cable (fig. 99) to the power receptacle.

98. Bore Sighting

a. General. The purpose of these instructions is to furnish sufficient information to check whether the sighting equipment is properly adjusted in relation to the axis of the bore of the guns to obtain accuracy of fire. In addition, instructions to provide for a limited amount of adjustment are included. In the event that further adjustments are necessary, notify ordnance maintenance personnel. Organizational personnel are not permitted to make any adjustments other than those contained herein.

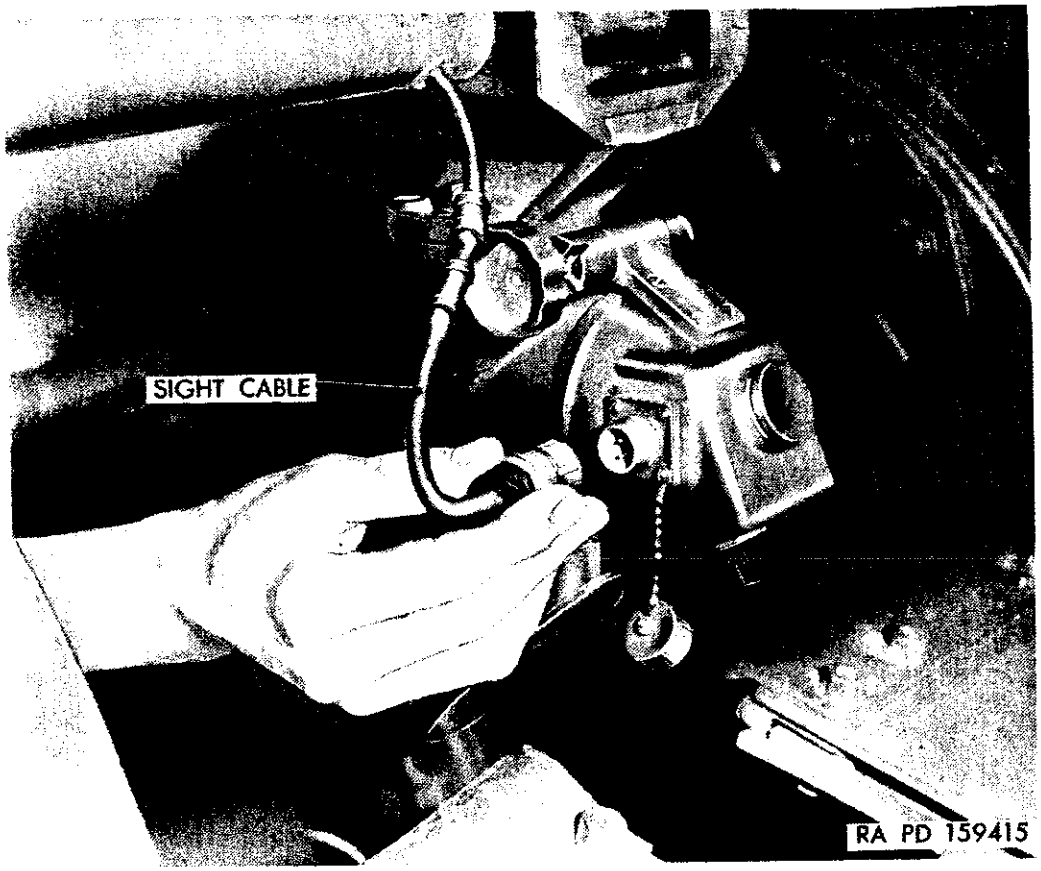


Figure 99. Installing sight cable.

b. Preparation for Bore Sighting.

(1) Select ground as level as possible and position materiel for bore sighting.

(2) Disconnect solenoid lead cables to all guns (only if using back plate solenoids).

(3) Remove back plate, driving rod and springs, and bolt assemblies from each gun (FM 23-65). Mark these items so that they can be installed on the gun from which they were removed.

(4) Remove the cotter pins from the horizontal adjusting block handwheel and from the upper and lower vertical adjusting yoke handwheels.

(5) Loosen lower vertical adjusting yoke handwheels.

(6) Adjust right inboard gun to the approximate center of its lateral and vertical movement.

c. Distant Aiming Point Method. Select a distant aiming point which is a sharp and distinct object, preferably in excess of the greatest range of employment and never less than the average range of employment, or at 1,000 yards if neither of these ranges is known.

(1) Place the turret in operation (par. 15).

(2) By positioning the turret in power control, bore sight the right inboard gun roughly on the orienting point (by sighting through right inboard gun).

(3) Cut off turret switch making the mount inoperative (par. 18).
(4) Sight through the bore of each gun and turn the horizontal adjusting block handwheel (fig. 100) until the gun is bore sighted on the orienting point in azimuth. Turn the upper vertical adjusting yoke handwheel (fig. 101) and bore sight each gun on the orienting point in elevation.
(5) After all the guns are alined on the orienting point, view the orienting point through the reflector of the reflex sight M18.

Note.—When viewing the orienting point through the reflector, keep both eyes open and note position of head. An eye distance of 5.5 inches from center of the reflector is recommended.

If the reticle pattern needs illumination, lower the housing assembly and turn the rheostat knob (fig. 94) until the required intensity of illumination is obtained. If the *lower* dot of the reticle pattern is not on the orienting point, adjust the reflex sight M18 as described in (*a*) through (*g*) below.
(*a*) Loosen the lateral adjusting clamping screw (fig. 102).
(*b*) Sighting through the reflector, turn the azimuth eccentric (fig. 102) to bring the *lower* dot of the reticle pattern in line vertically with the orienting point.
(*c*) Tighten the lateral adjusting clamping screw.
(*d*) Loosen the vertical adjusting clamping screw (fig. 103).
(*e*) Sighting through the reflector, turn the elevation eccentric (fig. 103) and aline the *lower* dot of the reticle pattern with the orienting point.
(*f*) Tighten the vertical adjusting clamping screw.
(*g*) Check the line of sight to be certain it has not moved off the orienting point.

Note.—Since the azimuth eccentric causes the line of sight to swing in an arc, the azimuth adjustment should be made before the elevation adjustment.

(6) Tighten lower vertical adjusting yoke handwheel.
(7) Verify alinement of sight and guns to make certain they remain bore sighted.
(8) Place the superelevation on the reflex sight M18 as described in (*a*) through (*c*) below.
(*a*) Loosen the vertical adjusting clamping screw (fig. 103).
(*b*) Sighting through the reflector, turn the elevation eccentric (fig. 103) and aline the *upper* dot (10-mil superelevation dot) with the orienting point.
(*c*) Tighten the vertical adjusting clamping screw.
(9) Assemble machine guns (FM 23–65).

d. Testing Target Method.
(1) Where conditions of terrain or visibility are such that the distant aiming point method of bore sighting cannot be used,

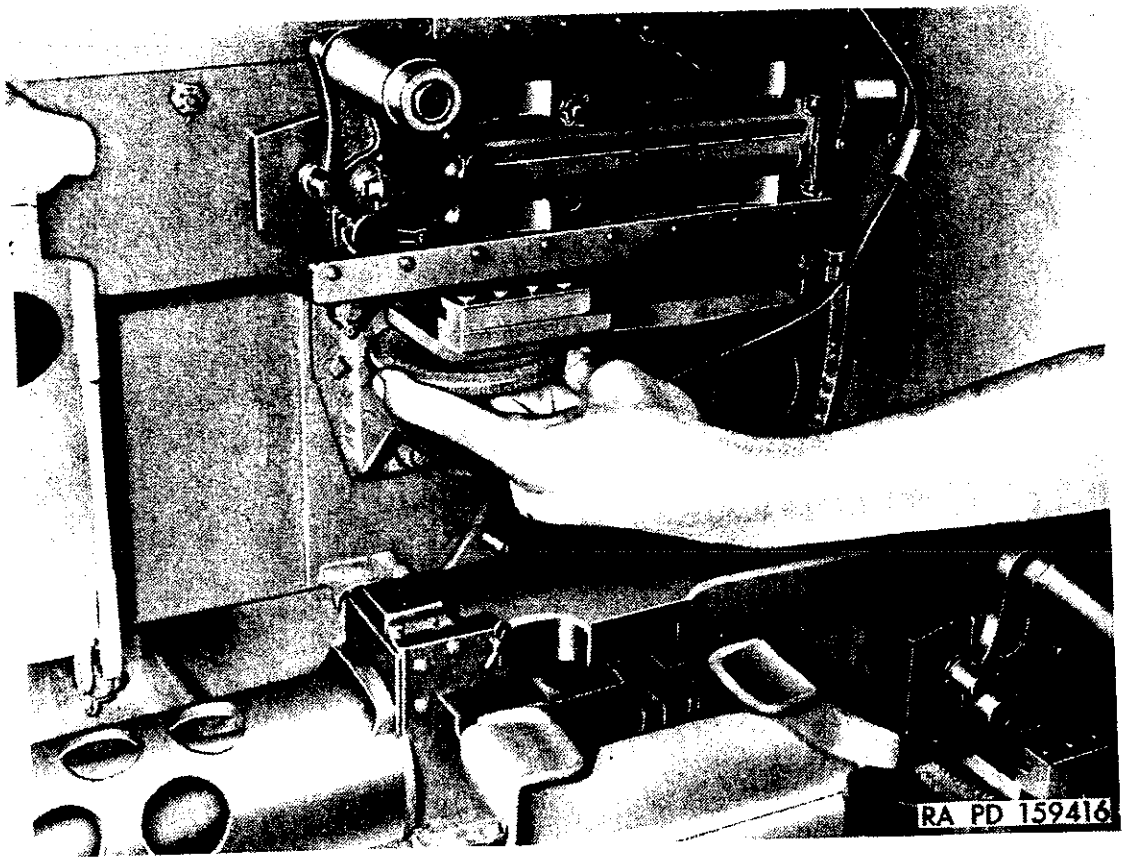


Figure 100. Turning horizontal adjusting block handwheel.

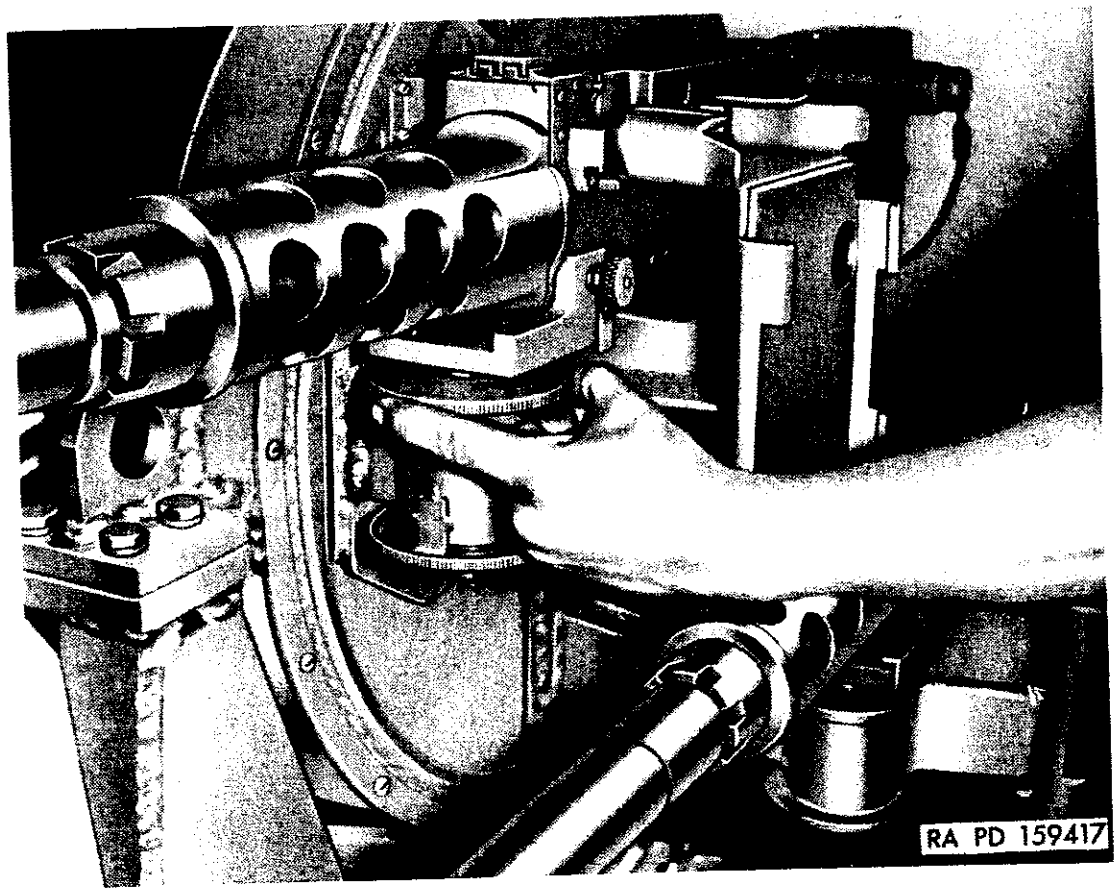


Figure 101. Turning vertical adjusting yoke handwheel.

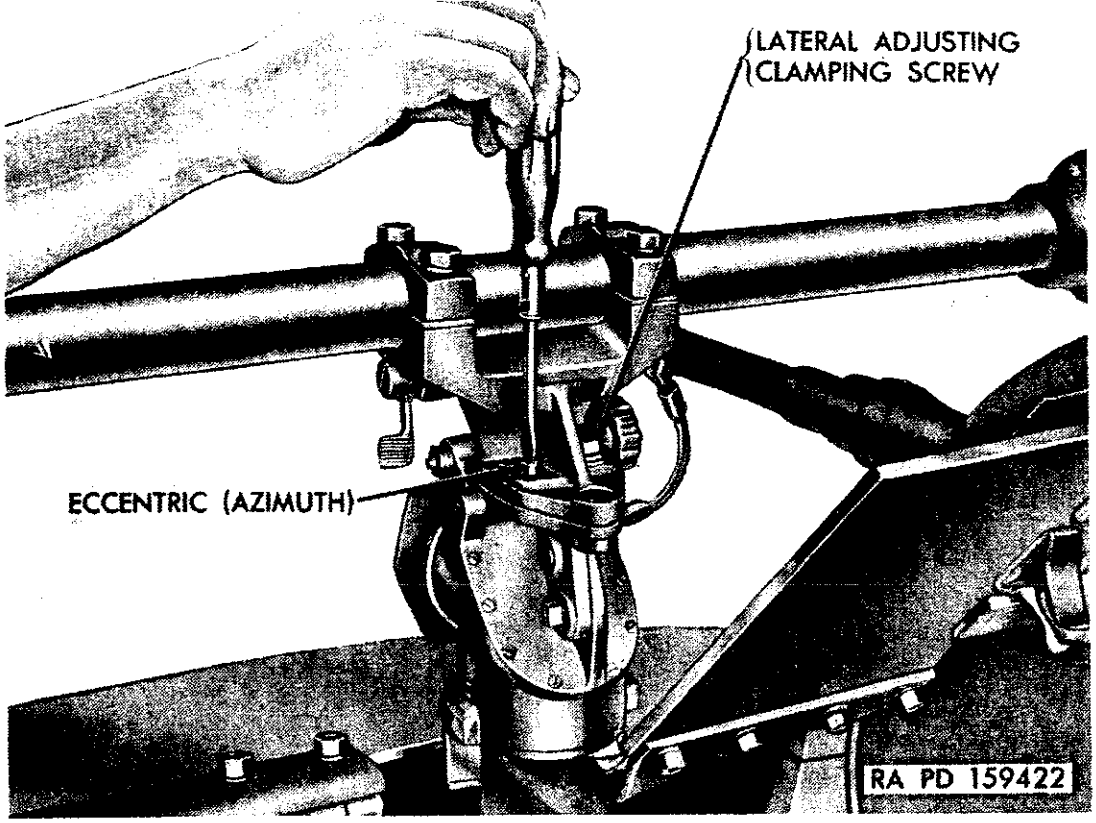


Figure 102. Adjusting azimuth eccentric

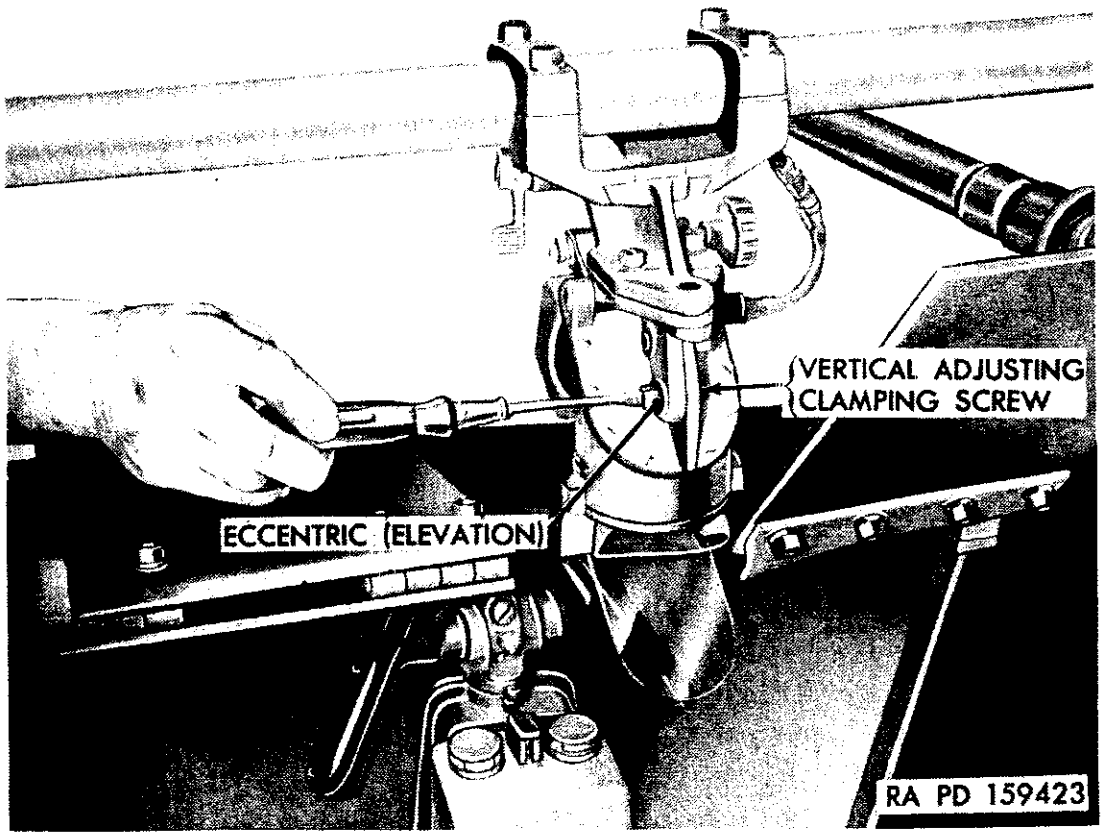


Figure 103. Adjusting elevation eccentric.

the weapon may be accurately bore sighted by using a testing target.

(2) A piece of cardboard or some other suitable material can be used to fabricate a testing target, using the dimensions shown in figure 104.

(*a*) Make an overall 1-foot allowance for a border and mark the top of the testing target "TOP" to avoid accidentally positioning the target in an inverted position.

(*b*) The testing target should be protected at all times against dampness to prevent shrinkage. If shrinkage is suspected, check the dimensions with a scale or ruler before using the target.

(3) Select ground as level as possible, and position and cross level materiel.

(4) Place the testing target at a minimum distance of 50 yards from the muzzle of the guns.

(5) The horizontal edge of the target should be level and the face vertical so that it is at right angles to the line of sight.

Note.—If the gun trunnions are slightly out of level, the horizontal edge of the target should be out of level by the same amount and in the same direction. Check the verticality of the testing target with a plumb line.

(6) All the steps prescribed for the distant aiming point method (*c* above) apply for the testing target method except, of course, that the bore sighting dot (uppermost dot) of the reflex sight and the line of sight through the tubes of the machine guns are alined with their respective aiming diagrams on the testing target instead of on a common distant aiming point.

99. Preparation for Operation

a. Daylight Operation. For daylight operation, the housing assembly (fig. 94) is raised by pulling the housing knob out against the pressure of the spring and turning the housing knob 90° away from the observer. Release the knob, allowing the spring to pull the shaft inward holding the housing assembly in the raised position. This will allow daylight to enter the optical system of the sight assembly through the sight assembly window.

b. Night Operation. For night operation or on days of poor visibility, the housing assembly is lowered and intensity of illumination of the reticle pattern is controlled by the rheostat knob (fig. 94).

100. Operation

With mount in operation (par. 15), the operator superimposes the reticle pattern (fig. 95) of the reflex sight on the target and, by use of

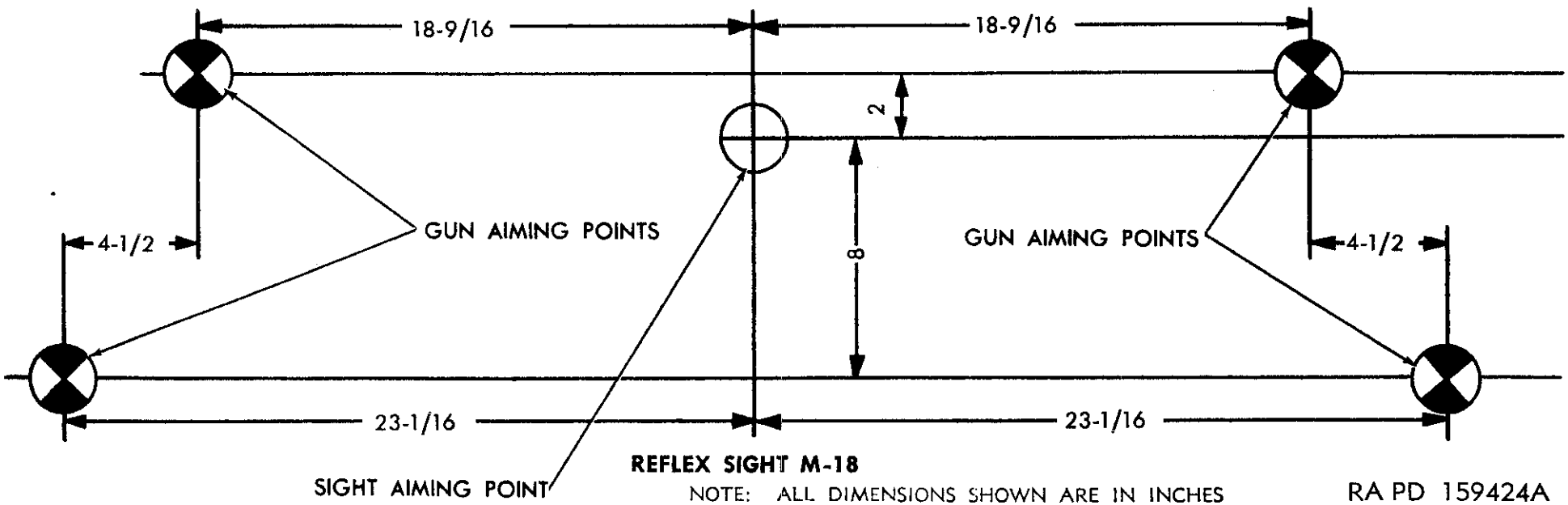


Figure 104. Testing target.

the superelevation dots and the concentric lead circles (par 94*e*), applies the estimated superelevation and lead to the target. The operator may view the target with both eyes open, but should be close enough to see all four lead circles. An eye distance of 5.5 inches from center of the reflector plate is recommended.

101. Preparation for Travel

a. Position the housing assembly in its closed position (par. 99).

b. Remove the sight cable (fig. 99) from the power receptacle and screw the cap with chain over the power receptacle.

c. Remove the reflex sight M18 from the sight mount 7675757 by pulling the locking lever (fig. 98) forward to its unlocked position and sliding the reflex sight from the dovetail slot of the sight mount.

d. Place the reflex sight M18 in its carrying case.

CHAPTER 5

SHIPMENT AND LIMITED STORAGE AND DESTRUCTION OF MATERIEL TO PREVENT ENEMY USE

Section I. SHIPMENT AND LIMITED STORAGE

102. Domestic Shipping Instructions

a. Preparation for Shipment in Continental United States. When shipping the mounts M45, M45C, M45D, and M45F interstate, except directly to ports of embarkation, the officer in charge of preparing the shipment *will be responsible* for furnishing mounts to the carriers for transport in a *serviceable* condition properly cleaned, preserved, painted, lubricated, etc., as prescribed in SB 9–4.

Note.—For loading and blocking instructions for these weapons on freight cars, refer to paragraphs 104 and 105.

b. Preparation for Shipment to Ports.

(1) *Inspection.* All used mounts destined for oversea use will be inspected prior to shipment in accordance with TB ORD 385.

(2) *Processing for shipment to ports.* All mounts destined to ports of embarkation for oversea shipment will be further processed in accordance with SB 9–4.

Note.—Ports of embarkation will supplement any necessary or previously omitted processing upon receipt of mount.

(3) *Marking of arctic lubricated materiel.* It will be the responsibility of the officer in charge of the organization or activity performing arctic lubrication to insure that the equipment is durably marked as prescribed in SR 746–30–5. When the equipment is deprocessed of this special lubrication, such marking will be immediately and thoroughly obliterated. It will be the responsibility of the officer in charge of the installation or activity shipping equipment which has been arctic lubricated to insure that each item is so marked. Unit commanders of using organizations will insure that such markings are not obliterated while the equipment is arctic lubricated.

c. Removal of Preservatives for Shipment. Personnel withdrawing mounts from a limited storage status for domestic shipment must not remove preservatives other than to insure that they are complete and serviceable. If it has been determined that preservatives have been

removed, they must be restored prior to domestic shipment. The removal of preservatives is the responsibility of depots, ports, or field installations (posts, camps, and stations) receiving the shipments.

d. Army Shipping Documents. Prepare all shipping documents accompanying freight in accordance with TM 38–705.

103. Limited Storage Instructions

a. General.

(1) Mounts received for storage already processed for domestic shipment need not be processed unless the inspection performed on receipt of mounts reveals corrosion, deterioration, etc.

(2) Completely process mounts upon receipt for storage if they have been rendered ineffective by operation, freight shipping damage, or upon receipt of mounts directly from manufacturing facilities.

(3) Mounts to be prepared for limited storage must be given a limited technical inspection and processed as prescribed in TB ORD 408.

b. Receiving Inspections.

(1) Report of mounts received for storage in a damaged condition or improperly prepared for shipment will be reported on DD Form 6 in accordance with SR 745–45–5. Report of mounts received in an unsatisfactory condition (chronic failure a malfunction of the mount or equipment) will be reported on the Unsatisfactory Equipment Report DA Form 468 in accordance with SR 700–45–5 (see par. 3*d*).

(2) When mounts are inactivated, they are to be placed in a limited storage status for periods not to exceed 90 days. Standby storage for periods in excess of 90 days will normally be handled by ordnance maintenance personnel only.

(3) Immediately upon receipt of mounts they must be inspected and serviced as prescribed in paragraphs 7 through 9. Perform a systematic inspection and replace or repair all missing or broken parts. If repairs are beyond the scope of the unit, and mount will be inactivated for an appreciable length of time, store them in a limited storage status and attach a tag to them specifying the repairs needed. The report of these conditions will be submitted by the unit commander for action by an ordnance maintenance unit.

c. Inspection During Storage. Perform a visual inspection periodically to determine general condition. If corrosion is found on any part, remove the rust spots, clean, paint, and treat with the prescribed preservatives (see TB ORD 408).

Note.—Touch-up painting will be in accordance with TM 9–2851.

d. Removal from Limited Storage.

(1) If the mounts are not shipped or issued upon expiration of the limited storage period, they may either be processed for another limited storage period or be further treated for stand-by storage (mounts inactivated for periods in excess of 90 days up to 3 yrs.) by ordnance maintenance personnel.

(2) If mounts to be shipped will reach their destination within the scope of the limited storage period, they need not be processed upon removal from storage unless inspection reveals it to be necessary according to anticipated in-transit weather conditions.

Note.—All mounts being reissued through the depot supply system to troops within the continental limits of the United States must meet the requirements of TB ORD 385. This is NOT required for so-called reissue, exchanges, or redistribution among troop units, where the depot supply system is not involved.

(3) Deprocess mounts when it has been ascertained that they are to be placed into immediate service. Remove all rust preventive compounds and thoroughly lubricate as prescribed in paragraph 10 and 11.

(4) Repair and/or replace all items tagged in accordance with *b*(3) above.

e. Storage Site. The preferred type of storage for the mount is under cover in open sheds or warehouses whenever possible. Where it is found necessary to store mounts outdoors, they must be protected against the elements as prescribed in TB ORD 379.

104. Loading the Mount Transporting Vehicles for Rail Shipment

a. Preparation.

(1) When the trailer mount M55 (used for transporting mount M45C) and the gun motor carriage M16 or M16A1 (used for transporting the mounts M45D and M45F respectively) are shipped by rail, every precaution must be taken to see that they are properly loaded and securely fastened and blocked to the floor of car. All "on vehicle materiel" (OVM) must be thoroughly cleaned, preserved, packed (boxed or crated), labeled, and securely stowed in vehicle or blocked and strapped to floor of car during transit.

Note.—If materiel is equipped with steel tool boxes, all padlocks and keys will be removed from the materiel in order to prevent pilferage while materiel is in transit. Lids of steel tool boxes will be secured by wiring the hasp to prevent damage during shipment. Padlocks and keys will be preserved with preservative engine oil (grade 1) and wrapped in greaseproof-barrier materiel for domestic

shipment. For oversea shipment the items will be sealed in a waterproof-greaseproof wrapping or bag. Locate all wrapped padlocks and keys in the shipping container with the accessories.

(2) Prepare all materiel for rail shipment in accordance with paragraph 102*a*. In addition take the following precautions:

(*a*) For rail shipment, place mount in normal traveling position.

(*b*) Apply the vehicle hand brakes after it has been finally spotted on the freight car. The vehicle must be loaded on the car in such a manner as to prevent the car from carrying an unbalanced load.

(*c*) Increase tire pressure slightly higher than normal except in cases where shipment is to be exposed to extremely hot weather conditions.

b. Types of Cars. Instructions contained herein pertain to the loading of vehicles on gondola cars (an open top car having fixed sides, fixed or drop ends and solid bottom), and flatcars (cars with wooden floors laid over sills and without sides or ends but equipped with stake pockets), and in boxcars (cars equipped with side or side and end doors).

c. Method of Loading Vehicle on Flatcars.

(1) *Flatcar loading.*

(*a*) When suitable hoisting equipment is not available for loading vehicles on or subsequent unloading from a flatcar, an end ramp must be used in cases where the vehicle is not on a level with the flatcar deck. Vehicles on a warehouse platform or loading dock can be pivoted over spanning platforms aboard a flatcar spotted adjacent to the platform, then again pivoted into lateral position on the flatcar.

(*b*) When the vehicles must be loaded from ground level, a ramp may be improvised ((4) below) by borrowing railroad ties normally found stacked in railroad yards and by procuring necessary planking. An ideal end ramp is shown in place in figure 105. The bill of materials for constructing this ramp is shown in figure 106.

Note.—Railroad ties alone, stacked without deck planking and not securely anchored, provide a very unstable ramp and should not be used except under conditions of extreme emergency.

(*c*) To load vehicle, tow it onto the improvised apron at the base of the ramp and unhitch. Using a cable laid along the center line of the freight car attached to vehicle, it is pivoted to point towards the ramp and towed up the ramp to its position on the flatcar.

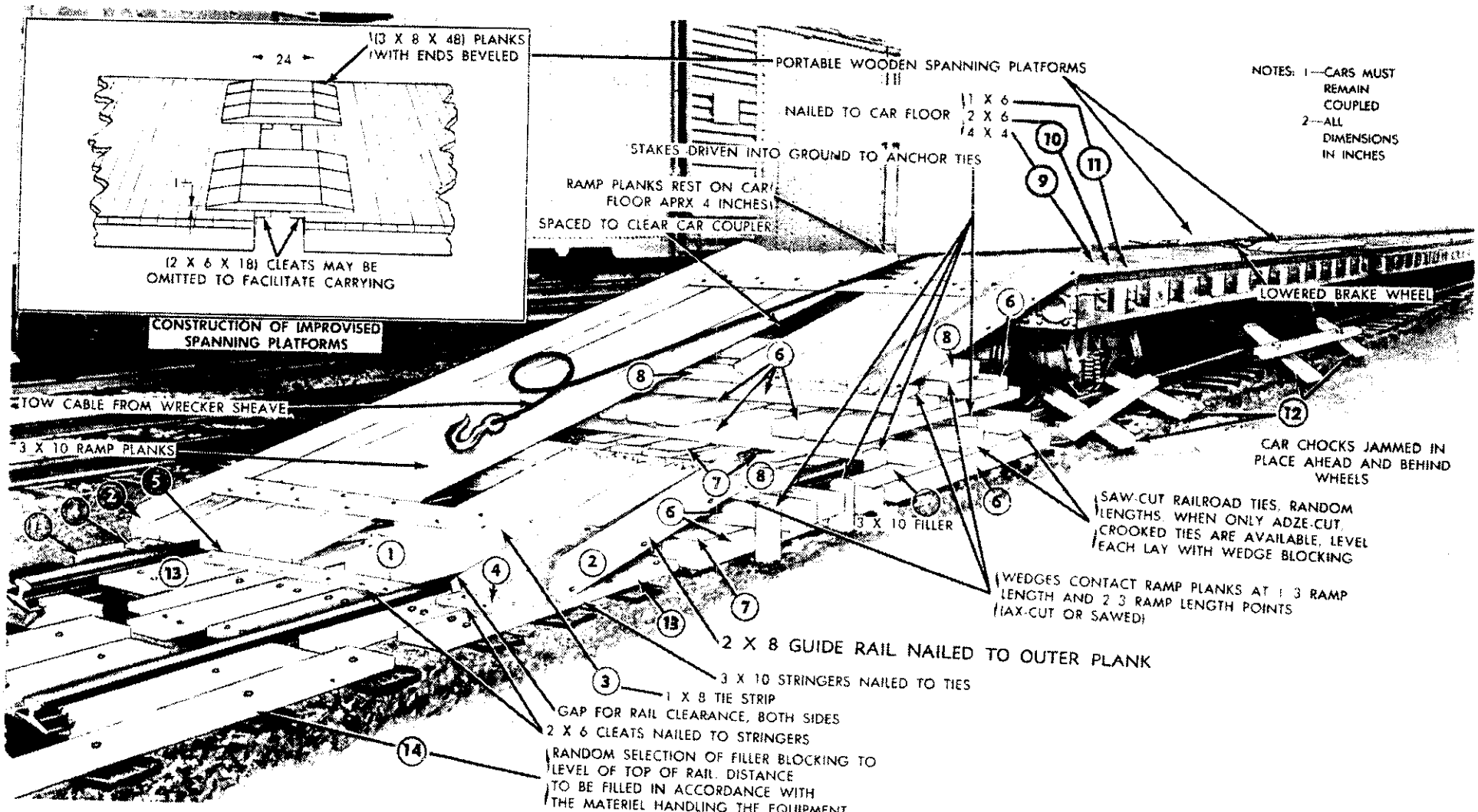


Figure 105. Construction of improvised loading ramp and spanning platforms.

BILL OF MATERIALS FOR RAMP AS ILLUSTRATED					
PART NO	QUANT REQ'D	PART NAME	LENGTH	WIDTH	THICKNESS
1	8	RAMP PLANKS	20 ft	10 in	3 in
2	2	GUIDE RAILS	20 ft	8 in	2 in
3	2	TIE STRIPS	8 ft	8 in	1 in
4	2	CLEATS	18 in	6 in	2 in
5	1	CLEAT	56 in	6 in	2 in
6	31	RAILROAD TIES	8 ft	8 in	8 in
7	AS REQD	FILLERS	AS REQD	10 in	3 in
8	AS REQD	WEDGES (CUT TO FIT)	8 ft	—	—
9	1	STEPDOWN PIECE	8 ft	4 in	4 in
10	1	STEPDOWN PIECE	8 ft	6 in	2 in
11	1	STEPDOWN PIECE	8 ft	6 in	1 in
12	4	CHOCK BLOCKS	AS REQD	4 in	4 in
13	AS REQD	STRINGERS	AS REQD	10 in	3 in
14	AS REQD	GROUND DUNNAGE	AS REQD		

NOTES:

1. RAMP SHOWN IS OF CAPACITY OF LARGEST END-LOADING FREIGHT CAR. FOR LESSER LOADS, REDUCE NUMBER OF RAMP PLANKS.
2. WIDTH DETERMINED BY TREAD OF MATERIEL BEING LOADED.
3. FOR LOADING TWO WHEELED ARTILLERY TRAILERS, OR SHORT WHEELBASE MATERIEL, RAMP PLANKS MAY BE SHORTER.

CAUTION: WHEN RAMP IS TOO SHORT, UNDERPINNING OP MATERIEL WILL STRIKE END OF RAMP (EX· 90 MM AA GUN).

4. OPENING AT CENTER MAY BE FILLED UP TO THE CAR COUPLER TO AVOID INJURY TO MANEUVERING PERSONNEL.
5. FOR LOADS OVER 40-TONS, APPROACH END OF FLATCAR MUST BE BLOCKED UP TO AVOID TIPPING OF FLATCAR.
6. THIS TYPE RAMP IS ADAPTABLE TO DROP-END GONDOLA AND AUTO END-DOOR BOX CAR LOADING.
7. WHEN LOADING AN AUTO END-DOOR BOX CAR, IT MAY BE NECESSARY TO LOAD A FLATCAR COUPLED TO THE BOX CAR, TO GAIN OVERHEAD LOADING CLEARANCE.
8. WHEN LOADING BY WRECKER CABLE, WITH PULL AT 90-DEGREES TO TRAIN, USING A SHEAVE, FLATCAR AT POINT OF PULL MUST BE LASHED TO ADJACENT RAILS, CARS, OR OTHER FIXED OBJECT.

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Figure 106. Bill of materials for improvised loading ramp.

Caution: Follow forward movement of vehicle up ramp by chocking behind one or more wheels on the ramp.

(*d*) Steel or wooden spanning platforms or bridges are used to cover the gaps between cars. Flatcar brake wheels must first be lowered to floor level to permit passage. A pair of improvised spanning platforms is shown in the insert in figure 105. These spanning platforms are moved along the train by hand as the vehicle advances.

(*e*) The above method of train loading requires careful advance planning as to the order of loading, so that vehicles are arranged on each flatcar under prescribed methods and combinations.

(*f*) For powering the towing cable (fig. 107), a vehicle with winch is spotted at *right angles* to the train, located at about the third or fourth flatcar to facilitate signaling and because of cable length limits. A single-sheave snatch block located between cars on the train center line will provide the necessary *lateral* pull. Vehicles passing this point can be towed by a vehicle on the ground with personnel guiding its passage. A long tow cable from the towing vehicle will lessen the tendency of the vehicle to stray from the center line of the train.

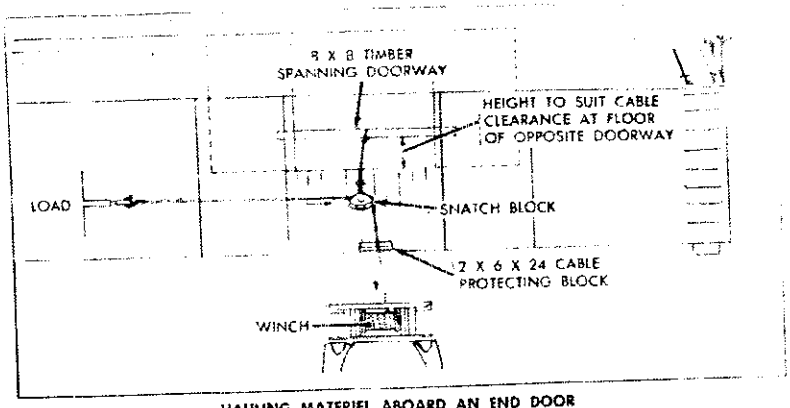
Note.—The snatch block fastening chain must be lashed to an adjacent solidly fixed object to offset the cross pull of the powered winch (see fig. 107). Snatch block movement is allowed for low front winches and high rear (wrecker) winches.

(2) *Gondola car loading.*

(*a*) Fixed-end type gondola cars may only be loaded when hoisting facilities are available for initial loading at destination. Hopper- or drop-bottom gondola cars are not to be used for shipments of unboxed vehicles without false flooring and hoisting facilities.

(*b*) Drop-end gondola cars may be loaded exactly as described for flatcars ((1) above). Height of fixed sides is immaterial. Vehicles may progress through a gondola car by passing over the two inwardly-dropped ends and over spanning platforms. Vehicles selected to remain in a gondola car are first moved to the closed end of the car, then spread out for blocking after the remaining end is closed and latched.

Note.—Do not block vehicle flush against ends of gondola cars. When ordering gondola cars, specify inside width required as some may be received with gussets along the inner sides which affect clearance.



HAULING MATERIEL ABOARD AN END DOOR BOXCAR BY CABLE THROUGH SIDE DOORWAY

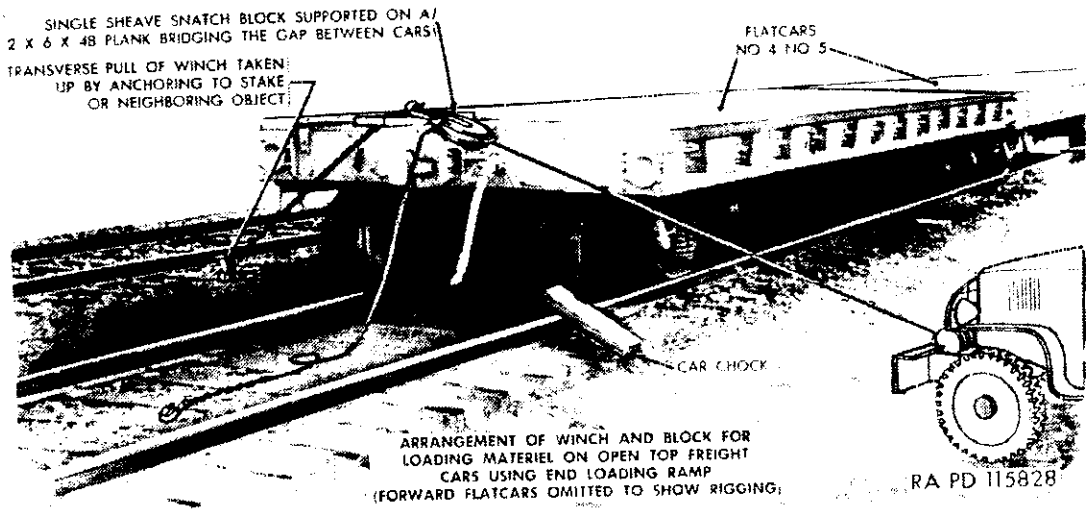


Figure 107. Method of powering the towing cable.

(3) *Boxcar loading.*

(*a*) End-door type boxcars are spotted with the door ends towards the ramp and loaded as described for flatcars ((1) above) except that loading must be accomplished by pushing the vehicle or towing by cable and block through the side door (fig. 107).

Note.—When ordering end-door boxcars, it must be remembered that some automobile boxcars may be received with an overhead built-in rack which affects inside height calculations. Specify inside height required. Keep open end-doors clear of traffic on adjacent tracks.

(*b*) Side-door boxcars are provided with either single or double rolling doors at each side and must be loaded from a platform of about the same level as the boxcar floor or from an adjacent flatcar. Automobile cars of this type have large side door openings and present less difficulty in loading, however, ordinary boxcars may require the use of roller automobile jacks to maneuver the vehicle into

place. Steel plates or spanning platforms must be used to bridge the gap between platform and car (fig. 105).

Note.—In emergency when no roller-jacks are available, the vehicle may be moved sideways by means of an ordinary jack canted against the axle from the floor. Wetting both the floor of the car and the bridging will reduce the friction of the tires.

(4) *Loading ramp.*

(*a*) A ramp for end-loading of vehicles on open-top freight cars may be improvised when no permanent ramps or hoisting facilities are available. An ideal ramp suitable for the loading of most ordnance items is shown in figure 105. Length of planking must be determined with consideration to under-chassis clearance, in order to clear the hump at upper end of ramp.

Caution: Personnel guiding the vehicle up the ramp must exercise care when working close to the ramp planking.

(*b*) The flatcar bearing the ramp must be securely blocked against rolling, particularly when the car brakes are not applied as in train loading. Successive cars must remain coupled and be additionally chocked at several points along the train when ground towing of vehicles aboard the train is being effected.

(*c*) Whenever the freight cars are not on an isolated track or blocked siding, each end approach to the train must be placarded (blue flag or light) to advise that men are at work and that the siding may not be entered beyond those points.

(*d*) Upon completion of the loading operation, the ramp planks and bridging devices should be loaded on the train for use in unloading operations. Random sizes of timbers used in building the approach apron up to rail level should be included. All materials should be securely fastened to the car floors after vehicles are blocked in place and entered upon the bill of lading (B/L). Railroad ties borrowed for the operation need not be forwarded to the unloading point unless specifically required and only with the consent of the owner.

d. Loading Rules. For general loading rules pertaining to rail shipment of ordnance material, refer to TB 9–OSSC–G.

Warning: The height and width of vehicle when prepared for rail transportation must not exceed the limitations indicated by the loading table as prescribed in section II, AR 700–105. Whenever possible local transportation officers must be consulted about the limitations of the particular railroad lines to be used for the movement to avoid delays, danger, or damage to equipment.

105. Blocking the Trailer Mount M55 for Rail Shipment

a. General. All blocking instructions specified herein are minimum and are in accordance with Association of American Railroads "Rules Governing the Loading of Commodities on Open Top Cars." Additional blocking may be added as required at the discretion of the officer in charge. Double-headed nails may be used if available, except in the lower piece of two-piece cleats. All item reference letters given below refer to the details and locations as shown in figure 108.

Note.—For methods of blocking the gun motor carriage M16 or M16A1, used for transporting the mounts M45D and M45F respectively, refer to TM 9–710. Any loading methods or instructions developed by any source which appear in conflict with this publication or existing loading rules of the carriers, must be submitted to the Chief of Ordnance, Washington 25, D. C., for approval.

b. Brake Wheel Clearance "A." Load trailer mount M55 on cars with a minimum clearance of at least 4 inches below and 6 inches above, behind, and to each side of the flatcar brake wheel (fig. 108). Increase clearance as much as is consistent with proper location of load.

c. Chock Blocks "B" (6 x 8 x 24, Four Reqd Per Mount). Locate the 45-degree surface of the chock blocks against the front and rear of each wheel. Blocks are to be positioned in such a manner as to permit flush application of wheel side cleats "E" (*f* below) when nailed to chock blocks. Nail the heel of the chock blocks to the floor of the car with three fortypenny nails. Toenail the side of the chock blocks to car floor with two fortypenny nails.

Note.—Filler cleats may be used between chock blocks and side cleats to centrally locate the chock block against tires. These cleats are not shown in figure 108. Chock blocks may be cut from timbers (or railroad ties when available) as shown in figure 109.

d. Support Blocks "C" (4 x 4, Lgh to Suit, Six Reqd Per Mount). Lower the three jacks just enough to relieve the pressure from the tires. Place two blocks just in back of the front jacks and two blocks at each corner under the rear end of mount. Toenail each lower block to the car floor with four sixtypenny nails at each side. Toenail upper blocks to the lower blocks with four sixtypenny nails at each side. After positioning and nailing support blocks, raise the three jacks to their normal traveling position.

e. Cushioning Material "D." Locate suitable cushioning material such as waterprof paper, burlap, etc., between tires and cleats. The cushioning material must protrude beyond cleats on car floor and above cleats against tire.

f. Wheel Side Cleats "E" (1 x 8, Lgh to Suit, Two Reqd Per Mount). Locate cushioning material "D" against tires and locate and nail cleats to chock blocks "B" using four tenpenny nails at each end (see *Note* in *c* above).

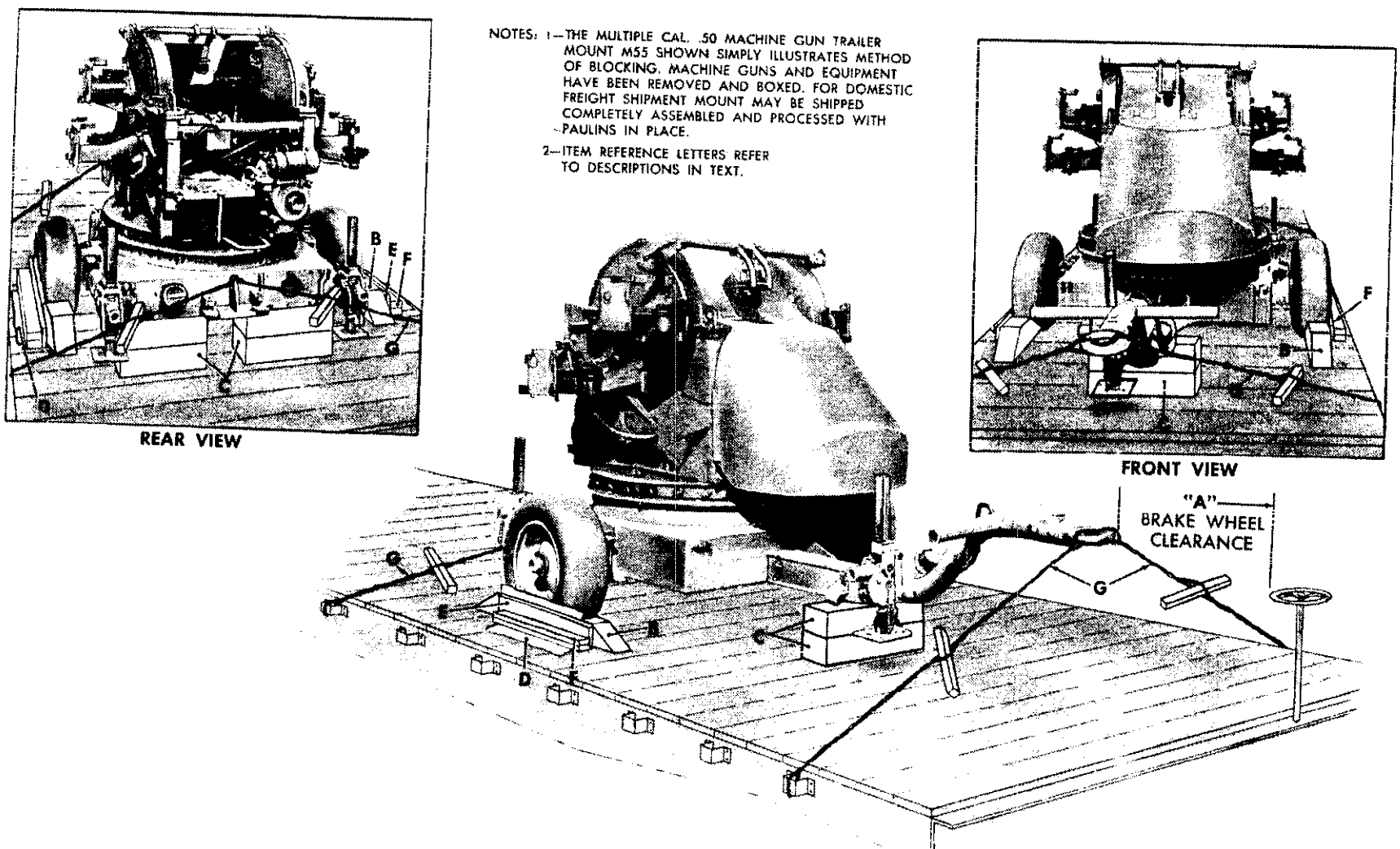
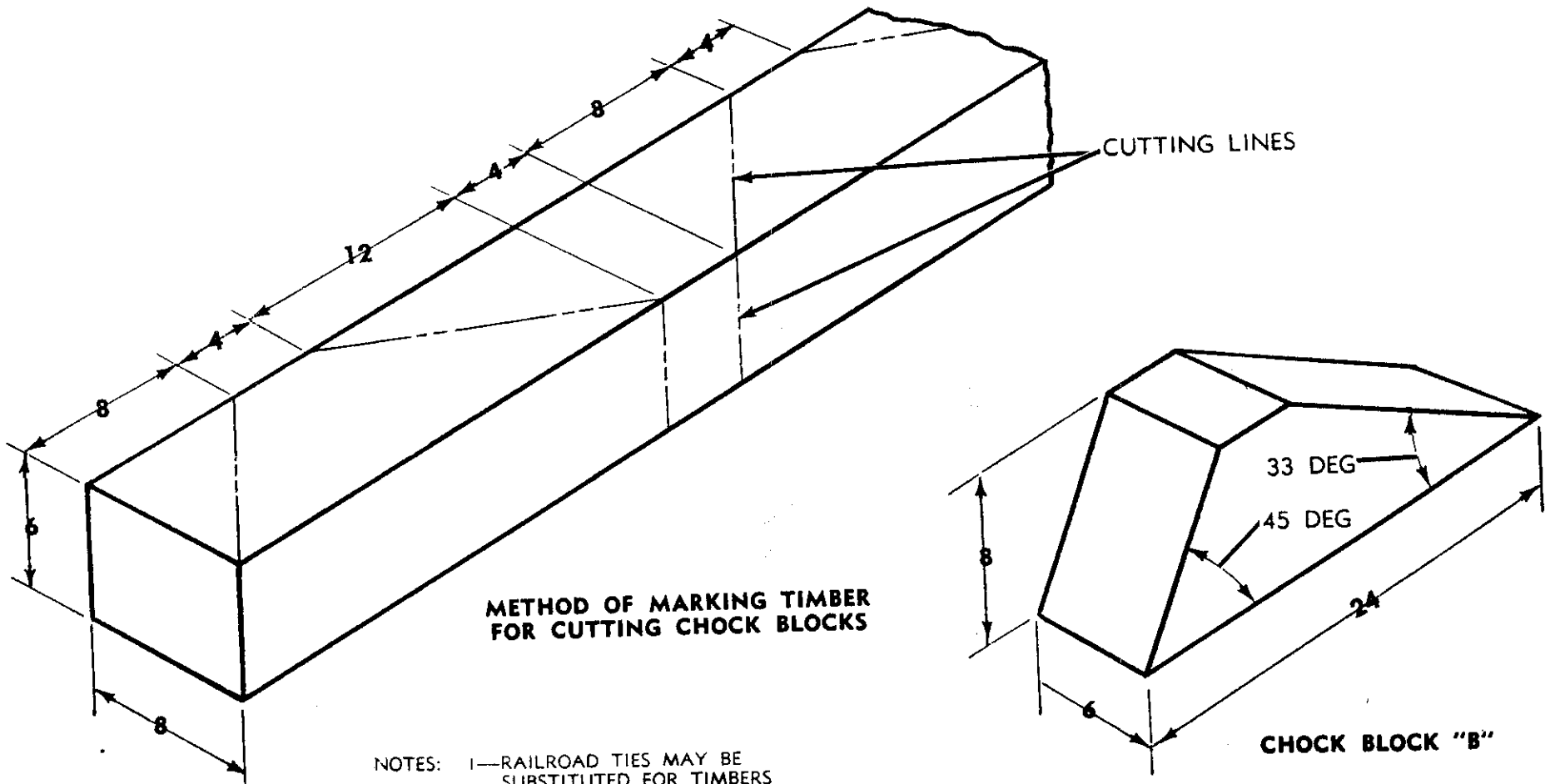


Figure 108. Blocking the trailer mount M55 for rail shipment.



NOTES: 1—RAILROAD TIES MAY BE SUBSTITUTED FOR TIMBERS WHEN AVAILABLE
2—ALL DIMENSIONS SHOWN ARE IN INCHES

Figure 109. Cutting chock blocks from timbers.

g. Floor Side Cleats "F" (2 x 4, Lgh to Suit, Four Reqd Per Mount). Locate two side cleats against wheel side cleats "E" with cushioning material protruding underneath. Nail lower cleats to car floor with thirtypenny nails, staggered. Nail upper cleats to lower cleats and car floor with fortypenny nails, staggered.

h. Strapping "G" (Four Strands No. 8 Gage Black Annealed Wire).

Note.—If gondola or boxcars are used, apply strapping in similar fashion as in (1) and (2) below and attach to car floor by use of anchor plates or blocking.

(1) *Lunette.* Twist together four strands of wire to length desired to form a cable. Insert one end of the cable through eye of lunette extending end beyond half the distance to a stake pocket. Form a 6-inch loop in end of cable, winding ends *tightly* around cable. Insert the free end of the cable through stake pocket bringing end through the 6-inch loop. Pull cable hand tight and form another loop, winding ends tightly around cable. Insert a tightening tool in one of the loops and place a random length 2 x 2 block between the cables. Twist tightening tool, winding cables together, tightening just enough to take up slack. Keep random length 2 x 2 block in place to retain an aperture for future tightening of strapping if necessary. Repeat above operation for lunette attaching cable to opposite stake pocket (fig. 108).

Note.—Cables are passed through stake pockets so that the cable loop lies against the car frame. A short stake driven into each stake pocket will protect the cable loop from chafing and loosening. (These stakes are omitted in fig. 108.) If flatcars are received where flooring is flush against the top of the well-type stake pockets, a loop of cable is passed through the stake pocket, and a short cleat about 2 x 4 x 18 is inserted in the loop below the stake pocket. Subsequent tightening of the cable will cause it to draw the wooden cleat securely against the bottom of stake pocket.

(2) *Jack carrier bracket.* Pass cable through hole in jack carrier bracket at rear of mount and attach to stake pocket on each side of car. Form cable and twist-tie as in (1) above.

Section II. DESTRUCTION OF MATERIEL TO PREVENT ENEMY USE

106. General

a. Destruction of the trailer mount M55 and mount M45 or M45D, when subject to capture or abandonment in the combat zone, will be undertaken by the using arm only when, in the judgment of the unit commander concerned, such action is necessary in accordance with orders of, or policy established by, the army commander.

b. The information which follows is for guidance only. Certain

of the procedures outlined require the use of explosives and incendiary grenades which normally may not be authorized items for the trailer mount or machine gun mount. The issue of these and related materials, and the conditions under which destruction will be effected, are command decisions in each case, according to the tactical situation. Of the several means of destruction, those most generally applicable are:

Mechanical-- Requires axe, pick mattock, sledge, crowbar, or similar implement.
Burning---- Requires gasoline, oil, incendiary grenades, or other inflammables.
Demolition-- Requires suitable explosives or ammunition.
Gunfire----- Includes artillery, machine guns, rifles using rifle grenades, and launchers using antitank rockets. Under some circumstances hand grenades may be used.

In general, destruction of essential parts, followed by burning will usually be sufficient to render the materiel useless. However, selection of the particular method of destruction requires imagination and resourcefulness in the utilization of the facilities at hand under the existing conditions. Time is usually critical.

c. If destruction to prevent enemy use is resorted to, the materiel must be so badly damaged that it cannot be restored to a usable condition in the combat zone either by repair or cannibalization. Adequate destruction requires that all parts essential to the operation of the materiel, including essential spart parts, be destroyed or damaged beyond repair. However, when lack of time and personnel prevents destruction of all parts, priority is given to the destruction of those parts most difficult to replace. Equally important, the same essential parts must be destroyed on all like materiel so that the enemy cannot construct one complete unit from several damaged ones.

d. If destruction is directed, due consideration should be given to:

(1) Selection of a point of destruction that will cause greatest obstruction to enemy movement and also prevent hazard to friendly troops from fragments or richocheting projectiles which may occur incidental to the destruction.
(2) Observance of appropriate safety precautions.

107. Destruction of the Trailer Mount M55 and Mount M45 or M45D

a. General. The methods of destruction outlined below apply to the trailer mount and machine gun mounts only. However, if machine guns are mounted thereon and destruction is directed, the mount, weapons, and vehicle upon which they are mounted, should be de-

stroyed as a unit. Pneumatic tires should be destroyed in conjunction with the trailer mount as in paragraph 108.

b. Method No. 1—by Burning.

(1) Puncture the fuel tank of the power charger and collect the gasoline for use as in (3) below.

(2) Smash all vital elements, such as the magneto, carburetor, air cleaner, generator, batteries, junction box, control handles, and left and right elevating sectors. On the trailer mount M55, also smash the trailer lights, reflectors, and plug and cable assembly.

(3) Pour gasoline and oil in and over the mount; ignite and take cover.

Caution: When igniting the gasoline, due consideration should be given to the highly inflammable nature of gasoline and its vapor. Carelessness in its use may result in painful burns.

Elapsed time: about 5 minutes.

c. Method No. 2—by Demolition.

(1) Planning for simultaneous detonation, prepare two 1-pound charges (three for the trailer mount M55) of EXPLOSIVE, TNT (using one 1-lb block per charge or equivalent together with the necessary detonating cord).

(*a*) Place the *first* charge on the left sector adjacent to the torque tube drive shaft gear.

(*b*) Place the *second* charge on the generator adjacent to the switch control box.

(*c*) On the trailer mount, also place a charge on the trailer drawbar.

(*d*) Connect the charges for simultaneous detonation with detonating cord.

(2) Provide for dual priming to minimize the possibility of a misfire. For priming, either a nonelectric blasting cap crimped to at least 5 feet of safety fuse (safety fuse burns at the rate of 1 foot in 30 to 45 seconds; test before using) or an electric blasting cap and firing wire may be used. Safety fuse, which contains black powder, and nonelectric blasting caps must be protected from moisture at all times. The safety fuse may be ignited by a fuse lighter or a match; the electric blasting cap requires a blasting machine or equivalent source of electricity.

Caution: Keep the blasting caps, detonating cord, and safety fuse separated from the charges until required for use.

Note.—For the successful execution of methods of destruction involving the use of demolition materials, all personnel concerned will be thoroughly familiar with the pertinent provisions of FM 5–25. Training and careful planning are essential.

(3) Detonate the charges. If primed with nonelectric blasting cap and safety fuse, ignite and take cover. If primed with electric blasting cap, take cover before firing the charges. The danger area is approximately 200 yards. Elapsed time: about 4 minutes.

d. Method No. 3—by Gunfire. Destroy the mount by gunfire, using adjacent artillery, machine guns, rifles using rifle grenades, or launchers using antitank rockets. Fire on the mount aiming at the power charger and trunnion assembly. When destroying the trailer mount, also fire on the trailer body. Although one well-placed direct hit may destroy the materiel, several hits are usually required for complete destruction. Unless evacuated, destroy the last remaining mount by the best means available.

Caution: Firing at ranges of 500 yards or less should be from cover. Elapsed time: about 5 minutes.

108. Destruction of Pneumatic Tires

a. General. An attempt must always be made to destroy pneumatic tires even if time will not permit destruction of the remainder of the trailer mount.

b. Method No. 1—with Incendiary Grenades.

(1) Ignite an incendiary grenade under each tire.

(2) When this method is combined with the destruction of materiel by means of demolition materials, the detonation of explosive charges should be delayed until the incendiary fires are well started to offset the possibility of the flames being extinguished by the blast of the explosion. Elapsed time: about 2 minutes.

c. Method No. 2—by Slashing. Slash tires. If tires are inflated, exercise care to prevent injury should the tire blow out while being slashed. Whenever practicable, it is usually preferable to deflate tires before slashing. Elapsed time: about 3 minutes.

APPENDIX

REFERENCES

1. Publication Indexes

Special regulations in the 310–20 series, SR 110–1–1, ORD 1 and FM 21–8 should be consulted frequently for latest changes or revisions of references given in this appendix for new publications relating to materiel covered in this manual.

2. Supply Manuals

The following Department of the Army Supply Manuals pertain to this materiel:

a. Destruction to Prevent Enemy Use.

Land Mines and Components; Demolition Explosives and Related Items; and Ammunition for Simulated Artillery, Booby Trap, Hand Grenade, and Land Mine Fire.	ORD–3 SNL R–7

b. Maintenance and Repair.

Cleaners, Preservatives, Lubricants, Recoil Fluids, Special Oil, and Related Maintenance Materials.	ORD 3 SNL K–1
Items of Soldering, Metallizing, Brazing, and Welding Materials; Gases and Related Items.	ORD 3 SNL K–2
Lubricating Equipment, Accessories, and Related Dispensers.	ORD (*) SNL K–3
Lubricating Fittings, Oil Filters, and Oil Filter Elements.	ORD 5 SNL H–16

c. Mounts, Carriages, and Weapon.

Carriage, Motor, Multiple Gun, M16	ORD 7 SNL G–102, Volume 14
Gun, Machine, Cal. .50, Browning, M2, Heavy Barrel, Turret Type.	ORD (*) SNL A–59
Mount, Trailer, Multiple Cal. .50 Machine Gun, M55 (Composed of Mount, Machine Gun, Multiple Cal. .50, M45C; and Trailer, 1-Ton, 2-Wheel, Machine Gun Mount, M20); Mount, Machine Gun, Multiple Cal. .50, M45C and M45D.	ORD (*) SNL A–61

d. Sighting and Fire Control Equipment.

Sight, Illuminated, Mk 9, Mod 1 (12 Volts); Sight, Reflex, M18.	ORD (*) SNL F–242

3. Forms

The following forms are applicable to this materiel:

DA Form 9–3, Processing Record for Shipment and Storage of Vehicles and Boxed Engines (Tag).

(*) See ORD 1 for published manual of the ordnance section of the Department of the Army Supply Manual.

DA Form 460, Preventive Maintenance Roster.
DA Form 468, Unsatisfactory Equipment Report.
DA Form 478, MWO and Major Unit Assembly Replacement Records and Organization Equipment File.
DA Form 811, Work Request and Job Order.
DA Form 811–1, Work Request and Hand Receipt.
DA Form 867, Status of Modification Work Order.
DD Form 6, Report of Damaged or Improper Shipment.
DD Form 317, Preventive Maintenance Service Due (Sticker).

4. Other Publications

The following publications contain information pertinent to this materiel and associated equipment.

a. Ammunition.

Allocation and Distribution of Training Ammunition and Explosives Within the Zone of Interior	SR 710–60–50
Ammunition, General	TM 9–1900
Ammunition Inspection Guide	TM 9–1904
Ballistic Data, Performance of Ammunition	TM 9–1907
Qualification in Arms and Ammunition Training Allowances	AR 370–5
Regulations for Firing Ammunition for Training, Target Practice, and Combat.	SR 385–310–1

b. Camouflage.

Camouflage, Basic Principles	FM 5–20
Camouflage of Field Artillery	FM 5–20D
Camouflage of Vehicles	FM 5–20B

c. Decontamination.

Decontamination	TM 3–220
Defense Against Chemical Attack	FM 21–40

d. Destruction to Prevent Enemy Use.

Explosives and Demolitions	FM 5–25

e. General.

Basic Arctic Manual	FM 31–70
Instruction Guide: Operation and Maintenance of Ordnance Materiel in Extreme Cold (0° to −65° F.)	TM 9–2855
Mountain Operations	FM 70–10
Operations in the Arctic	FM 31–71
Preparation of Ordnance Materiel for Deep-Water Fording	TM 9–2853
Reports of Accident Experience	SR 385–10–40
Supplies and Equipment: Motor Vehicles	AR 700–105
Unsatisfactory Equipment Report	SR 700–45–5
Target Material and Training Course Layouts	TM 9–855

f. Maintenance and Repair.

Abrasive, Cleaning, Preserving, Sealing, Adhesive, and Related Materials Issued for Ordnance Materiel.	TM 9–850
Fire Control Materiel: Lubrication	TB 9–2835–1
Instruction Guide: Care and Maintenance of Ball and Roller Bearings.	TM–37–265
Lubrication	TM 9–2835
Lubrication Order	LO 9–223
Lubrication Order	LO 9–710–5
Maintenance and Care of Pneumatic Tire and Rubber Treads	TM 31–200
Maintenance Supplies and Equipment: Maintenance Responsibilities and Shop Operation.	AR 750–5
Painting Instructions for Field Use	TM 9–2851
Wheeled and Half-Track Vehicles, Trailers, and Towed Artillery: Lubrication of Wheel Bearings.	TB 9–2835–12

g. Mounts, Carriage, and Weapon.

Browning Machine Gun, Cal. .50, Heavy Barrel, M2	FM 23–65
Half-Track Vehicles; Car, Half-Track, M2; Carrier, Personnel, Half-Track, M3; Carrier, 81-mm Mortar, Half-Track, M4; Carriage, Motor, 75-mm Gun, M3.	TM 9–710
Ordnance Maintenance: Twin Cal. .50 Machine Gun Mount M33 and Multiple Cal. .50 Machine Gun Mount M45	TM 9–1223

h. Shipment and Limited Storage.

Army Shipping Document	TM 38–705
Instruction Guide: Ordnance Packaging and Shipping (Posts, Camps, and Stations).	TM 9–2854
Marking of Oversea Supply	SR 746–30–5
Military Standard—Marking of Shipments	MIL–STD–129 [1]
Ordnance Storage and Shipment Chart—Group G	TB 9–OSSC–G
Preparation for and Maintenance in Storage of Combat Vehicular Armament.	TB ORD 408
Preparation for and Maintenance in Storage of Mobile Field Artillery Materiel.	TB ORD 414
Preparation of Supplies and Equipment for Shipment: Processing of Unboxed and Uncrated Equipment for Oversea Shipment.	AR 747–30
Preservation, Packaging, and Packing of Military Supplies and Equipment.	TM 38–230
Processing of Motor Vehicles and Related Unboxed Materiel for Shipment and Storage.	SB 9–4
Protection of Ordnance General Supplies in Open Storage	TB ORD 379
Shipment of Supplies and Equipment: Report of Damaged or Improper Shipment.	SR 745–45–5
Standards for Oversea Shipment and Domestic Issue of Ordnance Materiel Other Than Ammunition and Army Aircraft.	TB ORD 385

i. Sighting and Fire Control Equipment.

Auxiliary Sighting and Fire Control Equipment	TM 9–575

[1] Copies may be obtained from Aberdeen Proving Ground, Aberdeen, Md

INDEX

[AG 473.5 (29 Sep 53)]

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