Pressboard

LIBRARY

ARMY WAR COLLEGE

GPO 172868

Refe
FM 4-140
C 1

UAL

U
17
A 6

FM 4-140

COAST ARTILLERY FIELD MANUAL

ANTIAIRCRAFT ARTILLERY

SERVICE OF THE PIECE

37-MM ANTIAIRCRAFT GUN

Prepared under direction of the
Chief of Coast Artillery

UNITED STATES
GOVERNMENT PRINTING OFFICE
WASHINGTON: 1940

le by the Superintendent of Documents, Washington, D. C. - Price 15 cents

DEPARTMENT,
April 23, 1941.

.s follows:

.n traveling posi-
FOR ACTION is
mmand. He then
he designated
r supports, and
ncouple the car-
heels are parallel
tripping and lock-
riage. No. 2
ear end of car-
right front and
ge. Nos. 4 and 6
ear, respectively,
commands: TRIP.
ng levers and
Nos. 3, 4, 5,
riage at the
as the carriage
extend the adja-
nder commands:
pressure down-
, rotating the
are locked off
t the wheels
but standing or
ers to increase
since the in-
he counterpoise
2 assist the men.
No. 3 lowers
owers and adjusts
unition, and

Pressboard

JUL 15 1940

Property of U. S.

U
173
A61
FM 4-140
1940

WAR DEPARTMENT,
WASHINGTON, *May 22, 1940.*

FM 4–140, Coast Artillery Field Manual, Antiaircraft Artillery, Service of the Piece, 37-mm Antiaircraft Gun, is published for the information and guidance of all concerned.

[A. G. 062.11 (4–3–40).]

BY ORDER OF THE SECRETARY OF WAR:

G. C. MARSHALL,
Chief of Staff.

OFFICIAL:
E. S. ADAMS,
Major General,
The Adjutant General.

WAR DEPT.
RAW MISA
REGION

TABLE OF CONTENTS

	Paragraph	Page
CHAPTER 1. GENERAL.		
Scope	1	1
References	2	1
CHAPTER 2. THE PLATOON.		
SECTION I. Organization.		
Composition	3	2
Formation	4	2
II. Command duties of personnel.		
Platoon commander	5	2
Gun commander	6	4
CHAPTER 3. THE GUN SECTION.		
SECTION I. Drill.		
Posting the detail	7	5
Examine gun	8	5
Report	9	6
Target	10	7
Commence firing	11	7
Suspend firing	12	7
Cease firing	13	7
II. Notes on the drill.		
Leveling gun	14	8
Checking recoil system	15	8
Loading and unloading ammunition clips	16	10
Loading gun	17	10
Unloading gun	18	11
Examining trigger mechanism	19	11
Cooling gun barrel	20	11
III. Emplacing the gun and march order.		
Emplacing gun	21	13
March order	22	14
CHAPTER 4. ADDITIONAL INFORMATION ON THE SERVICE OF THE PIECE.		
General	23	17
Safety precautions	24	17
Service of ammunition	25	18
Action on the march	26	18
Preparation of the position	27	19
Training of gun section	28	19
CHAPTER 5. ADJUSTMENTS.		
SECTION I. Carriage.		
Equilibrator spring	29	20
Counterpoise spring	30	21
Counterpoise rod	31	21
II. Sighting system.		
Boresighting	32	22
CHAPTER 6. STRIPPING AND ASSEMBLING GUN.		
General	33	23
Removing and replacing barrel	34	23
Removing and replacing breechblock	35	24
Removing and replacing lock frame	36	24

TABLE OF CONTENTS

	Paragraph	Page
CHAPTER 6. STRIPPING AND ASSEMBLING GUN—Con.		
Removing and replacing feed mechanism	37	25
Removing and replacing carrier	38	26
Removing and replacing carrier catch	39	26
Removing and replacing barrel extension	40	26
Disassembling and assembling lock frame	41	26
Disassembling and assembling barrel extension	42	27
CHAPTER 7. CARE AND MAINTENANCE.		
SECTION I. General.		
General care	43	29
Precautions in cold weather	44	29
Precautions during and after a gas attack	45	29
II. Gun.		
General	46	30
Cleaning the bore	47	31
III. Carriage.		
General	48	31
Lubrication	49	31
Care of electric brakes	50	32
IV. Sighting system.		
Care	51	33
Lubrication	52	33
CHAPTER 8. DRILL TABLES		34
APPENDIX. LIST OF REFERENCES		41

FM 4–140

COAST ARTILLERY FIELD MANUAL

ANTIAIRCRAFT ARTILLERY

SERVICE OF THE PIECE

37-MM ANTIAIRCRAFT GUN

CHAPTER 1

GENERAL

■ 1. SCOPE.—This manual prescribes the procedure to be employed by 37-mm antiaircraft gun batteries in the performance of duties required in the service of the piece. The prescribed drill, which applies particularly to mobile units equipped with 37-mm gun M1A2 on gun carriage M3, is intended only as a guide in the assignment of individuals and duties. Changes may be made in the drill to meet variations in the assigned matériel.

■ 2. REFERENCES.—The references listed in the appendix should be consulted, especially those pertaining to ammunition and to the operation, care, and maintenance of matériel.

Pressboard

CHAPTER 2

THE PLATOON

		Paragraphs
SECTION I.	Organization	3–4
II.	Command duties of personnel	5–6

SECTION I

ORGANIZATION

■ 3. COMPOSITION.—*a.* Each platoon of the 37-mm gun battery comprises a platoon headquarters and range section and two gun sections. Each gun section mans one 37-mm gun. The platoon is the fire unit, the central control equipment being operated by the platoon headquarters and range section.

b. (1) Each mobile gun section consists of seven enlisted men: the gun commander; the vertical gun pointer, No. 1; the lateral gun pointer, No. 2; the assistant loader, No. 3; the loader, No. 4; the relayer, No. 5; and the chauffeur and ammunition detail, No. 6.

(2) Each semimobile gun section consists of six enlisted men, No. 6 being eliminated.

■ 4. FORMATION.—The platoon assembles with the platoon headquarters and range section on the right, the gun sections successively on the left at 4-pace intervals. (See fig. 1.) Each section assembles in two ranks with 4 inches between files and 40 inches between ranks. Each chief of section forms 1 pace to the right of the front rank of his section. Within each section, the men form in numerical order, odd-numbered men in the rear rank and even-numbered men in the front rank.

SECTION II

COMMAND DUTIES OF PERSONNEL

■ 5. PLATOON COMMANDER.—The platoon commander commands the platoon and is responsible—

a. For the efficiency of the personnel and condition of the matériel assigned to it.

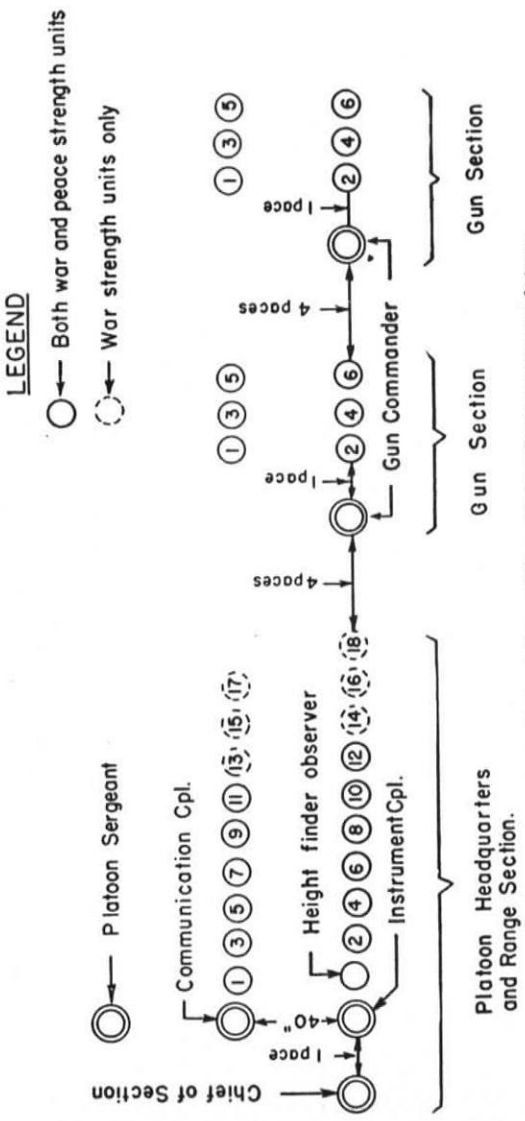


FIGURE 1.—Formation of the mobile antiaircraft 37-mm gun platoon.

b. That all safety precautions pertaining to the service of the piece are observed by the platoon.

c. For the fire direction of the platoon.

d. For the conduct of fire of the platoon.

e. For the proper emplacement of the guns, and for the adequate camouflage and local defense of the position.

■ 6. GUN COMMANDER.—The gun commander is in charge of the gun section.

a. He is responsible for the efficiency of his section and for the condition of the matériel under his charge.

b. He supervises the service of the piece, including emplacement of the gun and the service of ammunition.

c. He personally directs the work of care and preservation of matériel assigned to his section.

d. He is responsible that all mechanisms of the gun and carriage are kept in proper adjustment.

e. He is responsible that all safety precautions pertaining to service of the piece are observed by the section.

CHAPTER 3

THE GUN SECTION

	Paragraphs
SECTION I. Drill	7–13
II. Notes on the drill	14–20
III. Emplacing the gun and march order	21–22

SECTION I

DRILL

■ 7. POSTING THE DETAIL.—The gun being in position, the gun commander commands: 1. DETAILS, 2. POSTS. He obtains the tool kit and places it convenient to the gun. He also supervises procurement of equipment by other members of the section. Nos. 1 and 2 obtain their sights and place them in the sight seats. No. 3 obtains the priming rod, a wrench, recoil oil, and waste and places them convenient to the gun. No. 4 obtains lubricating oil and waste and places them convenient to the gun. Nos. 3 and 4 then remove the muzzle cover, unlock the barrel, and lower the traveling lock bracket. Nos. 5 and 6 obtain the designated number of loaded ammunition clips and place them near the ends of the two outriggers. No. 6 then uncovers the water chest. On completion of their duties, members of the section take post as follows: No. 1 on right seat of carriage; No. 2 on left seat of carriage; No. 3 on right side of gun, opposite the breech and facing to the rear; No. 4 on left side of gun, opposite the breech and facing to the rear at the feedway; No. 5 on left side of gun and convenient to the feedway; No. 6 near the ammunition and convenient to No. 5. (See fig. 2.)

■ 8. EXAMINE GUN.—The command EXAMINE GUN is given by the gun commander, who then supervises the work of the gun section. No. 1, assisted by No. 2, levels the gun. Nos. 1 and 2, under direct supervision of the gun commander, boresight the gun (par. 32), adjusting the sighting system, if necessary, then hook up the flexible cables. No. 3 fills the recuperator cylinder under immediate supervision of the gun commander.

228415°—40——2

No. 3 examines the chamber and bore, and if necessary, sponges them, assisted by No. 6. No. 4 examines the water chest and hose and, if water is needed, calls on Nos. 5 and 6 for assistance. He examines, cleans, and oils the breech mechanism, breechblock, feed mechanism, and trigger mechanism. No. 5, assisted by No. 6, examines the ammunition and loads additional ammunition clips, if necessary.

■ 9. REPORT.—When all members of the gun section have completed the duties enumerated in paragraph 8, the gun commander commands: REPORT. No. 1 reports, "Sight and elevating mechanism in order," No. 2 reports, "Sight and

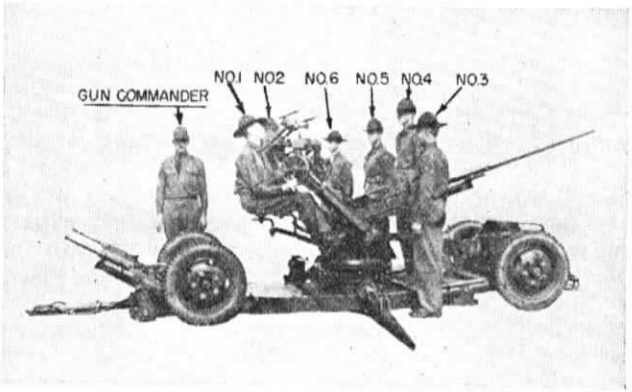


FIGURE 2.—Positions taken by the 37-mm gun section at the command, DETAILS, POSTS.

traversing mechanism in order," No. 3 reports, "Recoil mechanism and bore in order," No. 4 reports, "Gun and water chest in order," and No. 5 reports, "Ammunition in order." If any member of the gun section discovers any defect he is unable to remedy without delay, he notifies the gun commander of that defect instead of reporting his equipment in order. Reports from Nos. 1 to 5 having been received, at the command REPORT given by the platoon commander, the gun commander reports, "No. — in order," or any defects he is unable to remedy without delay.

■ 10. TARGET.—The gun commander repeats the command TARGET. He assists Nos. 1 and 2 in getting on the target. Nos. 1 and 2 train their sights on the designated target, call out "On target," and continuously track the target without further command. When both No. 1 and No. 2 have reported "On target," the gun commander reports, "No. — on target." No. 4 opens the feed box cover, calls "Prime," and holds the carrier up with his hand until No. 3 has pulled the lock frame to the rear and locked position with the priming rod. No. 4 then calls "Ammunition," receives a loaded ammunition clip from No. 5, places it, with the prongs down, on the feedway, and pushes it into the receiver against the cartridge stop. Nos. 5 and 6 prepare to feed additional ammunition.

■ 11. COMMENCE FIRING.—At the command COMMENCE FIRING, the gun commander commands: LOAD. Nos. 1 and 2 continue to track the target. No. 1 pushes down on the trigger pedal with his foot. He keeps the trigger pedal depressed until SUSPEND FIRING or CEASE FIRING is given. No. 4 pulls the cartridge stop lever halfway toward the left side of the gun and pushes the ammunition clip into the receiver until the carrier is tripped, allowing the lock frame to go forward to load the first round. He continues feeding loaded ammunition clips into the receiver in the manner described in paragraph 17. No. 5 feeds ammunition to No. 4, and No. 6 feeds ammunition to No. 5 as required. No. 3 receives the empty ammunition clips from the right side of the receiver and places them in a container clear of the gun. He keeps the base of the carriage free of empty cartridge cases. If a stoppage occurs, Nos. 3 and 4 repeat the loading operation.

■ 12. SUSPEND FIRING.—At the command SUSPEND FIRING, the gun commander slaps No. 1 smartly on the back. No. 1 lifts his foot from the trigger pedal. The gun commander then immediately commands: SUSPEND FIRING. Nos. 1 and 2 continue to track the target. No. 4 keeps one loaded ammunition clip in place on the feedway. Nos. 5 and 6 keep additional ammunition in readiness.

■ 13. CEASE FIRING.—At the command CEASE FIRING, the gun commander slaps No. 1 smartly on the back. No. 1 lifts his foot from the trigger pedal. The gun commander then im-

mediately commands: CEASE FIRING. Nos. 1 and 2 cease tracking but remain at their posts. No. 4, assisted by No. 3, unloads the gun. No. 5 receives unfired ammunition from No. 4 and passes it to No. 6 who places it in the box. The gun commander verifies that the gun is unloaded. Nos. 5 and 6 replenish the supply of loaded ammunition clips, obtaining additional ammunition from the platoon ammunition supply point when necessary. When so directed by the gun commander, No. 4, assisted by No. 3, attaches the water hose to the breech and muzzle of the gun and cools the barrel by pumping water through it.

SECTION II

NOTES ON THE DRILL

■ 14. LEVELING GUN.—The leveling mechanism (fig. 3) of the 37-mm gun does not permit adjustment of the level of the carriage to compensate for ground slopes greater than 5°. The gun should, therefore, be emplaced on an approximately level surface whenever it is practicable to do so. To level the carriage, turn the two leveling handwheels until the bubbles in the level vials attached to the leveling arms are properly centered.

■ 15. CHECKING RECOIL SYSTEM.—*a.* The length of recoil of the 37-mm gun is very critical. The normal length of recoil of the gun is 10¾ inches. Before firing, the recuperator is checked to insure that it is filled with oil. The distance of recoil is also checked after the gun is fired.

b. The recuperator cylinder (fig. 4) is located immediately under the barrel. *Before filling the recuperator cylinder,* elevate the muzzle about 5° above the horizontal. At this elevation the cylinder cannot be completely filled. Remove filler plug, which is located at the front end of recuperator cylinder, and air plug at the rear of expansion chamber. Fill recuperator with light recoil oil to level of bottom of filler plug hole. Replace filler plug and then the air plug.

c. To measure the length of recoil, put a film of grease on the barrel for 12 or more inches forward from the block bushing. Fire one or more rounds from the gun. Measure the

distance that the grease has been pushed forward by the bushing. This distance is the length of recoil. If length of

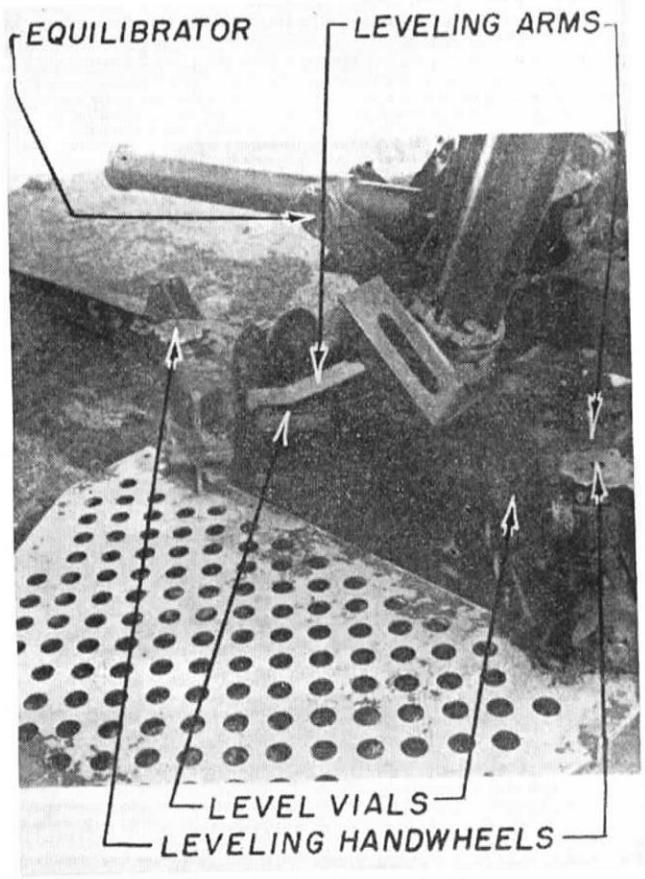


FIGURE 3.—Leveling mechanism.

recoil is too great, elevate muzzle to more than 5° and put additional oil in the recuperator. If length of recoil is too

small, depress gun to less than 5° and remove a small quantity of oil. Then recheck length of recoil.

■ 16. LOADING AND UNLOADING AMMUNITION CLIPS.—*a. To load ammunition into an ammunition clip,* place the clip, with prongs up, on a flat surface (fig. 5). Place one round at a time on the clip so that the groove in rotating band is in line with side wall projections. With one hand on the projectile and the other hand on the case, press the round straight down into place.

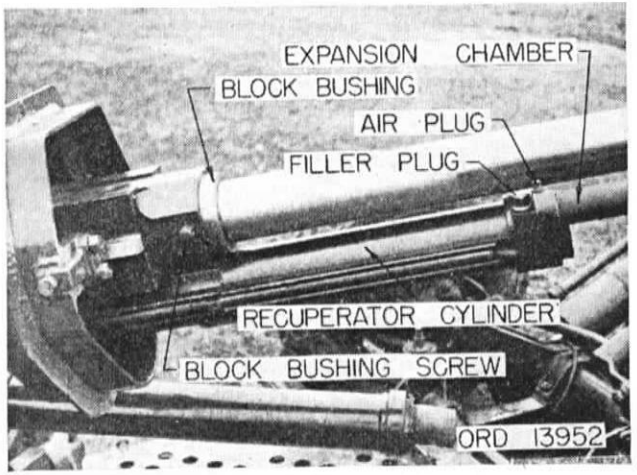


FIGURE 4.—Recuperator.

b. To unload ammunition from an ammunition clip, place the clip on a flat surface with the rounds up. Grasp a projectile with one hand and its case with the other, and with the thumbs pressing downward against the clip or adjacent cartridges, pull straight up. Removing the round from the clip by pulling on the end of the round may cause the projections of the side wall to be bent.

■ 17. LOADING GUN.—The first round is loaded into the 37-mm gun as described in paragraphs 10 and 11. Remaining rounds in the ammunition clip are fed into the gun automatically.

A second clip is pushed into contact with the first clip, firmly but without excessive force, before the last round of the first clip enters the feed box opening, pressure being maintained until the clip-holding pawl grasps the second clip. Additional clips are fed into the feed box in the same manner until the command SUSPEND FIRING or CEASE FIRING is given.

■ 18. UNLOADING GUN.—To unload the 37-mm gun, fold back the feed box cover, and with the left hand pull forward on the clip-holding pawl arm, and raise feed pawl lifter button. At the same time, draw ammunition clip back and out of feed box with right hand. Prime gun to remove round from

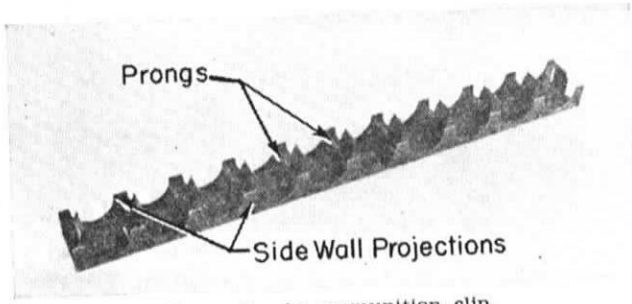


FIGURE 5.—An ammunition clip.

receiver, catching the unfired round by hand as lock frame is pulled to the rear. Inspect receiver and breech to see that they are empty. Push over carrier catch, allowing operating lever and lock frame to go forward.

■ 19. EXAMINING TRIGGER MECHANISM.—In examining trigger mechanism, No. 4 cocks the piece by pulling operating lever to the rear, directs No. 3 to push down on trigger pedal, and checks to see that the hammer is released when the pedal is operated.

■ 20. COOLING GUN BARREL.—*a.* The barrel of the 37-mm gun must be cooled after about 100 rounds of continuous fire. If practicable, it should be cooled more often, normally when about 50 rounds have been fired. If the block bushing grips the barrel so that recoil is prevented, the barrel is not being

cooled often enough, the gripping being caused by excessive expansion of the barrel from the heat of firing.

b. To cool the barrel (fig. 6), pull lock frame to the rear, insert brass tube of water delivery hose in breech end of barrel, and then ease lock frame forward to hold brass tube in place. Attach water return hose to muzzle of gun by means of brass clamping attachment. Pump water through the barrel for 2 or 3 minutes. Pumping is continued until a man

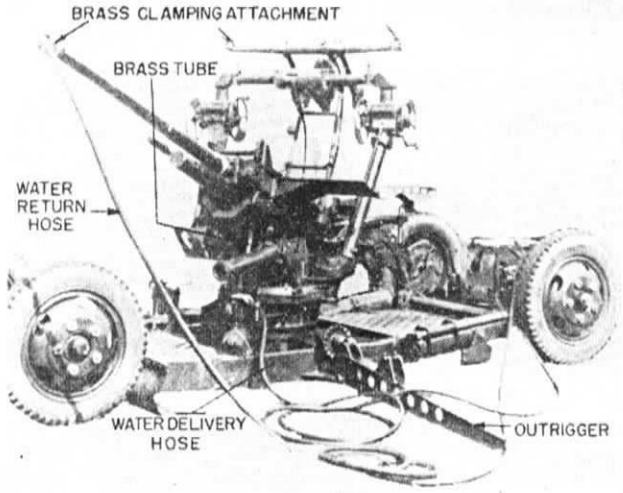


FIGURE 6.—The cooling system.

can place his bare hand lightly on the barrel without danger of being burned. When the gun has been cooled, pull lock frame to the rear, withdraw brass tube of water delivery hose, and allow water to drain from barrel. Then unfasten clamping attachment of return hose. When first handling the cooling equipment, personnel must be cautioned about danger from escaping steam.

SECTION III

EMPLACING THE GUN AND MARCH ORDER

■ **21. EMPLACING GUN.**—The gun being in traveling position (fig. 7), when the command PREPARE FOR ACTION is given, the gun commander repeats the command. He then supervises the movement of the gun to the designated position, removal of the cover and cover supports, and emplacement of the gun. Nos. 1 and 2 uncouple the carriage from the truck and see that the wheels are parallel to carriage side frames. No. 1 grasps tripping and locking levers (fig. 8) at front end of

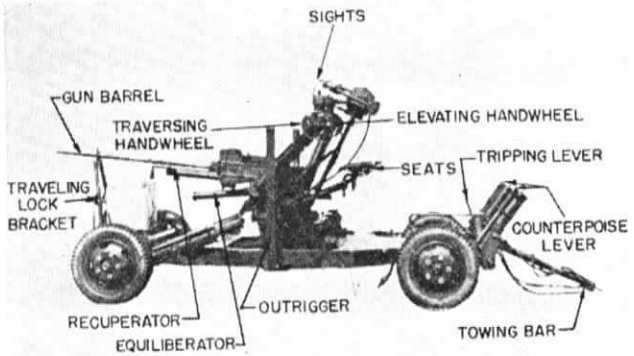


FIGURE 7.—The 37-mm gun in traveling position.

carriage. No. 2 grasps tripping and locking levers at rear end of carriage. Nos. 3 and 5 take post at right front and left front, respectively, of the carriage, each extending the adjacent counterpoise lever and grasping it with both hands. Nos. 4 and 6 take post at left rear and right rear, respectively, of the carriage, each with both feet on the adjacent extended counterpoise lever. The gun commander then commands: TRIP. Nos. 1 and 2 operate locking and tripping levers. As soon as the carriage strikes the ground, the gun commander commands: LEVERS DOWN. If necessary, the gun commander and Nos. 1 and 2 assist the men at the counterpoise

levers. No. 3 lowers and adjusts right outrigger and No. 4 lowers and adjusts left outrigger. Nos. 5 and 6 unload ammunition and other personnel unload matériel from the truck. The truck is then moved to the designated parking area by No. 6. Drill then proceeds as prescribed in section I.

■ 22. MARCH ORDER.—The gun being emplaced (fig. 9), when the command MARCH ORDER is given, the gun commander repeats the command. No. 1 elevates or depresses the gun and No. 2 traverses the gun until the barrel can be engaged by

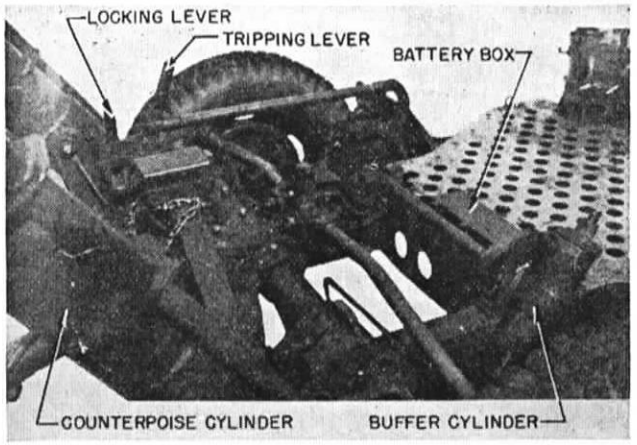


FIGURE 8.—Arrangement of front wheels of gun carriage.

the traveling lock bracket. No. 5 raises the traveling lock bracket and locks the gun. No. 3 disconnects the flexible cables and then raises and locks right outrigger. No. 4 raises and locks left outrigger. Nos. 1 and 2 remove the sights from the sight seats and replace them in the chest. No. 6 returns the ammunition to ammunition chests. All numbered personnel take post around the carriage as at PREPARE FOR ACTION. The gun commander then commands: READY. Nos. 1 and 2 grasp the tripping levers. Nos. 3, 4, 5, and 6 each grasp the adjacent counterpoise lever with both hands. The gun commander then commands: LEVERS UP. Nos. 3,

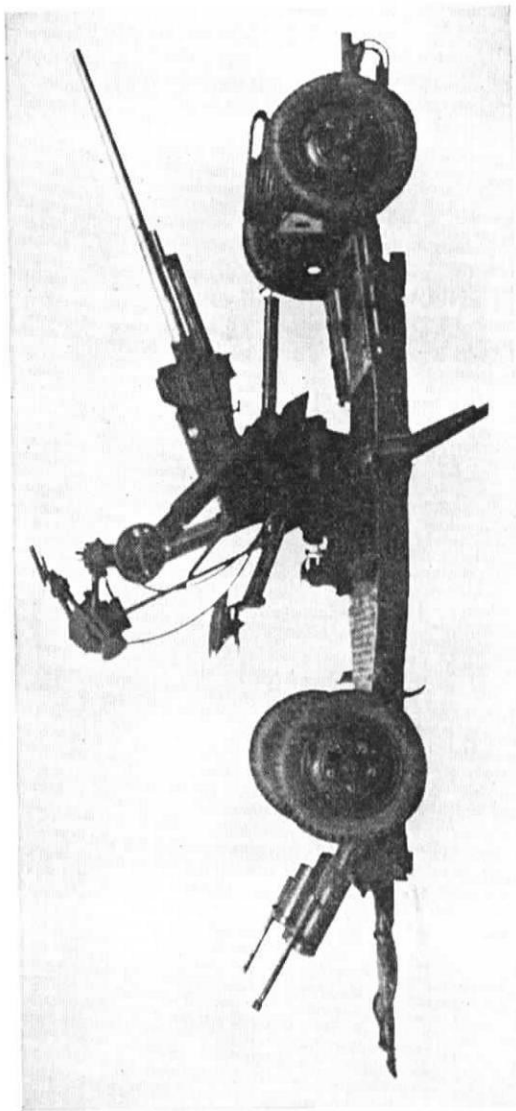


FIGURE 9.—The 37-mm gun emplaced in position.

4, 5, and 6 lift on their respective levers until the carriage is raised. The gun commander and Nos. 1 and 2 assist the men at the counterpoise levers, if necessary, while the mount is being raised. No. 1 pushes his tripping lever to the rear and No. 2 pulls his tripping lever to the rear until locking levers are engaged. The gun commander checks to see that locking levers are engaged and the outriggers and gun are secure. He then supervises the attaching of cover supports and cover, if used. The truck is brought up by No. 6. The gun commander supervises the loading of matériel, including ammunition, and the coupling of gun carriage to the truck. Nos. 5 and 6 load ammunition into the truck. Other members of the gun section assist in the loading as required. When loading is completed, Nos. 1 and 2 couple the gun carriage to the truck. Personnel are then loaded onto the truck and the truck and carriage moved to the point designated by the platoon commander.

CHAPTER 4

ADDITIONAL INFORMATION ON THE SERVICE OF THE PIECE

■ 23. GENERAL.—*a.* The service of the piece is conducted with dispatch and precision and with as few orders as possible. Except for the necessary orders, reports, and instructions, no talking is permitted.

b. Commands are given in the prescribed form and signals substituted for commands whenever practicable.

c. The commands or signals ELEVATE, DEPRESS, RIGHT, or LEFT, given in directing the pointing of the gun, refer to the direction of motion of the muzzle of the gun.

■ 24. SAFETY PRECAUTIONS.—*a.* Safety precautions to be observed in time of peace are prescribed in FM 4–120. The principles indicated should be applied under war conditions where circumstances permit.

b. The following additional precautions are prescribed in time of peace for the safety of towing airplanes or of personnel on the firing line:

(1) No live ammunition will be allowed near the emplacements except when firing is to take place.

(2) The gun will be unloaded except when firing or about to fire.

(3) When tracking a target, the vertical gun pointer will keep his foot off the trigger pedal until his sight is alined with the target.

(4) The gun will be depressed considerably below the elevation of the towing airplane until the airplane has passed the line of sight.

(5) While a stoppage is being cleared, the gun will be pointed at a safe part of the field of fire. This requirement will not prevent continued tracking of the target so long as the field of fire is safe.

(6) Members of the gun section will be trained always to pass in rear of the gun in going from one side to the other.

(7) In all cases where aerial targets are towed over or close to the gun positions at low altitudes, provision must be made for the safety of personnel from a dragging towline cable. The cable may drag if the target is accidently released or when the last target is dropped.

(8) A bell, horn, or other device capable of making a loud noise must be provided as an emergency signal for CEASE FIRING.

■ 25. SERVICE OF AMMUNITION.—Ammunition is issued to the gun section at the platoon ammunition supply point in boxes. It is the responsibility of the gun section to load the ammunition into clips and to inspect ammunition for serviceability before firing, watching particularly for inset primers (primers set too far into the base of the cartridge case). It is also the responsibility of the gun section to return empty cartridge cases to the platoon ammunition supply point and to carry additional ammunition to the gun emplacement.

■ 26. ACTION ON THE MARCH.—*a.* Except for minor variations, *drill and fire action on the march* are conducted in the same manner and by the same commands as under other conditions. However, time will not usually be available to perform the duties enumerated under EXAMINE GUN (par. 8).

b. During the march, personnel of the gun section are stationed in the truck in positions which permit a careful watch for aerial targets to be maintained in all directions.

c. Gun commanders are given instructions relative to the engagement of targets prior to the beginning of the movement. Limited only by such instructions and the necessity for avoiding casualties to adjacent troops, fire is opened on hostile aircraft as soon as possible after they are observed. Whenever the gun commander hears the command or signal TARGET anywhere in the column, he directs the chauffeur to stop his truck. The gun is prepared for action with the maximum possible speed. The speed required in going into action makes it necessary that all gun sections be trained thoroughly in emplacing the gun as rapidly as possible. Drill against time and competition between sections should be employed in this training.

d. In most cases where targets are engaged while on the march, time will not be available to set up a central control system. Guns will fire individually, fire being adjusted by Nos. 1 and 2 by the observation of tracers.

■ 27. PREPARATION OF THE POSITION.—The preparation of positions is discussed in FM 4–105 and FM 5–15. The position must have the maximum possible concealment and the personnel, weapons, and equipment the maximum possible protection consistent with efficient operation of the platoon. Under no circumstances will personnel be needlessly exposed. In most cases, the amount of protection and concealment to be provided will depend largely upon the time available. In taking measures for concealment of the position, it must be borne in mind that the position must be entirely free from trees or other obstructions because of the danger of detonating fired rounds prematurely.

■ 28. TRAINING OF GUN SECTION.—Training of the 37-mm gun section includes instruction in the following:

a. Nomenclature, operation, care, and adjustment of gun and carriage.

b. Details of emplacing the gun.

c. Drill of the gun section. Simulating the loading of ammunition is the normal procedure at drill. All members of the gun section should be familiar with all duties performed within the section. Therefore, the assigned positions of numbered personnel are changed from time to time.

d. Local defense and camouflage.

e. Details of withdrawing the gun from position.

f. Individual tracer control (FM 4–135) for use during action while accompanying a marching column.

g. Firing at aerial targets. Since the quantity of 37-mm ammunition is limited, target practice firing of the guns should be preceded by subcaliber firing using caliber .30 machine guns mounted on the 37-mm gun carriages. Special adapters and trigger mechanisms are provided for this subcaliber firing.

Pressboard

CHAPTER 5

ADJUSTMENTS

	Paragraphs
SECTION I. Carriage	29–31
II. Sighting system	32

SECTION I

CARRIAGE

■ 29. EQUILIBRATOR SPRING.—Careful adjustment of the equilibrator spring is necessary to insure smooth operation of elevating mechanism. Adjustment of the spring is made (fig. 10) by increasing or lessening the tension of the spring by turning the nuts on equilibrator rod until the elevating mechanism operates smoothly. Two wrenches are provided for this purpose. The socket of one of these wrenches will fit inside

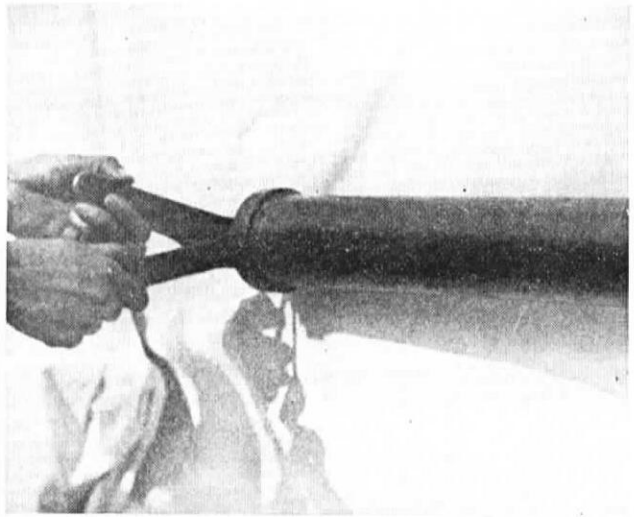


FIGURE 10.—Adjusting equilibrator spring.

the other wrench, permitting them to be applied to the nuts at the same time.

■ 30. COUNTERPOISE SPRING.—The tension of each counterpoise spring can be varied by means of the adjusting nuts on the corresponding counterpoise rod. Each spring should be adjusted (fig. 11) so that the carriage will readily descend to the ground when the tripping levers are tripped, but will not

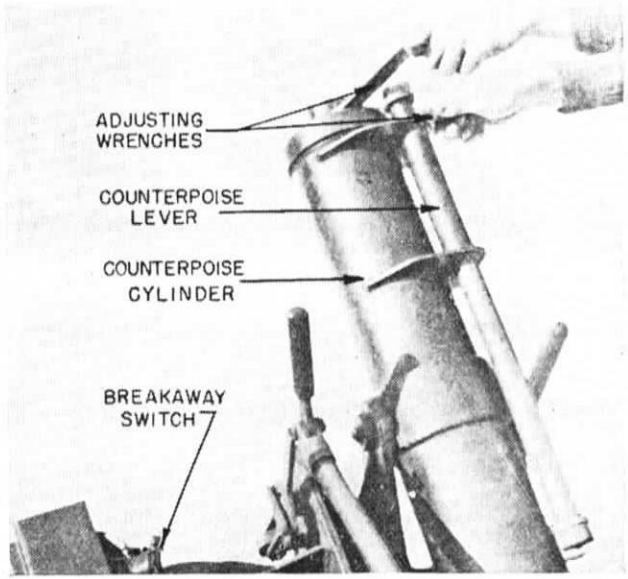


FIGURE 11.—Adjusting counterpoise spring.

require the application of excessive force to raise it to the traveling position. A compromise must be made between reducing the work of raising the wheels after the carriage is lowered in emplacing the gun and reducing the work of raising the carriage in going out of position.

■ 31. COUNTERPOISE ROD.—An adjusting screw, by controlling the effective length of the curved slot in the axle unit, de-

termines how far the corresponding counterpoise rod may be swung above the center line of the axle when the carriage is being emplaced. With the screw backed all the way out of the slot, the rod swings a maximum distance above the axle and the wheels are held off the ground with the maximum force. The screw should be set so that the wheel will be lifted from the ground and held firmly in the uppermost position, but will not require more than one man to force it down to the ground in returning the carriage to the traveling position.

SECTION II

SIGHTING SYSTEM

■ 32. BORESIGHTING.—*a.* Before boresighting the gun, see that the carriage is level and that the sights are properly in place. Remove the backplate, breechblock, and lock frame. (See ch. 6.) Sight the gun on a distant point, using improvised cross hairs on the muzzle of the barrel and a peep sight, such as an empty cartridge case with the center of the primer drilled out, in the breech end of the barrel to increase the accuracy of the sighting operation. With the cables disconnected, turn the cable couplings until the lines in the two sights coincide with the distant point on which the gun is sighted. If time permits, remove the screws from each deflection counter and lift out the counter. Turn the worm until the counter reads 300 and then replace the counter and screws. When the adjustments are completed, set the central control box and transmitters, if used, at normal and connect the flexible cables to the corresponding couplings on the carriage. Set various deflections on the control box and check them against the readings of the deflection counters.

b. Where time is limited, the counters are not removed, the readings shown on the counters when the sights are alined with the datum point being noted and recorded for use in boresighting and in checking readings with the control box.

CHAPTER 6

STRIPPING AND ASSEMBLING GUN

■ 33. GENERAL.—*a.* Stripping and assembling of the 37-mm antiaircraft gun are duties which are performed frequently in the care and maintenance of the gun.

b. In all stripping and assembling, proper tools for the performance of the work must be employed. Carelessness on this point may cause burring or other injury of the parts. Burring of parts, even though very slight, may impair the operation of the gun or render it temporarily inoperative.

c. The parts should not be removed from the gun except for essential training in matériel, for care and lubrication, or for replacement of broken or damaged parts.

d. Parts of the gun not specifically mentioned in this chapter should not be removed except by thoroughly qualified personnel.

■ 34. REMOVING AND REPLACING BARREL.—*a. To remove.*—Unscrew the two block bushing screws located on the sides of block at its front end. Pull lock frame to the rear until it is held back by carrier dog. Place barrel wrench in slots in barrel provided for it. Push in barrel latch lock on front of feed box and hold latch back until barrel is rotated about 1 inch with barrel wrench. The barrel lock can then normally be released. However, rotation of the barrel against the lock in firing may cause the lock to stick. If this occurs, tap lock lightly until it is disengaged from the barrel. Turn barrel counterclockwise until threads are disengaged from barrel extension and then pull barrel forward out of the gun. The block bushing is removed from the gun by the rear shoulder on the barrel as barrel is pulled forward.

b. To replace.—Reverse operations given in *a* above. When the barrel is in the correct position, the latch will engage the notch in the barrel. To check the positioning of the barrel when assembling it in the gun, etched lines are provided on the front end of block, on block bushing, and on the barrel. When all the lines are in alinement, the barrel latch

lock will automatically engage the lock in the barrel. When the barrel is assembled, see that depressed portion of rear face of barrel is exactly alined with depressed portion of corresponding face of barrel extension. Improper alinement of barrel and barrel extension may cause the extractor to be broken and barrel threads to be damaged.

■ 35. REMOVING AND REPLACING BREECHBLOCK.—*a. To remove.*—Pull lock frame to the rear until it is held back by carrier dog. Pull out spring plunger at bottom right side of barrel extension which releases breechblock stop. The breechblock will then drop out. If difficulty is experienced in pulling out the plunger, push breechblock up a little from the stop.

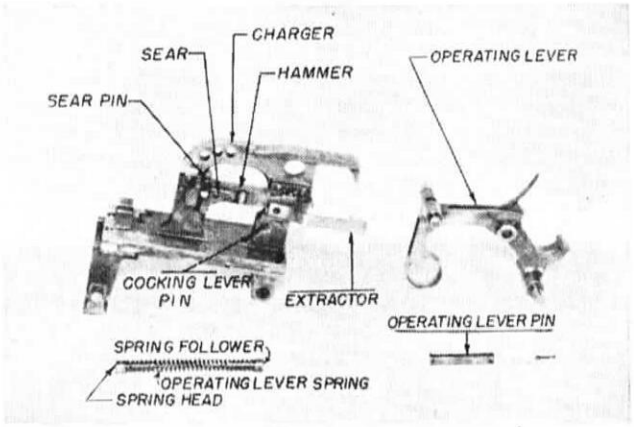


FIGURE 12.—Lock frame.

b. To replace.—Reverse operations given in *a* above. Be sure that the breechblock is resting on breechblock stop before letting the lock frame go forward.

■ 36. REMOVING AND REPLACING LOCK FRAME (fig. 12).—*a. To remove.*—See that lock frame is in its forward position. Push carrier catch to the right allowing carrier to spring downward. Pull locking clips of driving spring rod hooks out-

ward and downward and disengage hooks from lock frame Remove back plate by pushing forward on back plate latch located on bottom of right hand side plate, and then forcing back plate downward. Remove lock frame from gun, keeping a firm grip on operating lever and top of lock frame to prevent operating lever from springing forward and injuring the operator. When the lock frame has been removed from the gun, carefully swing operating lever forward.

b. To replace.—Reverse operations given in *a* above. Before reassembling lock frame, be sure that carrier is down.

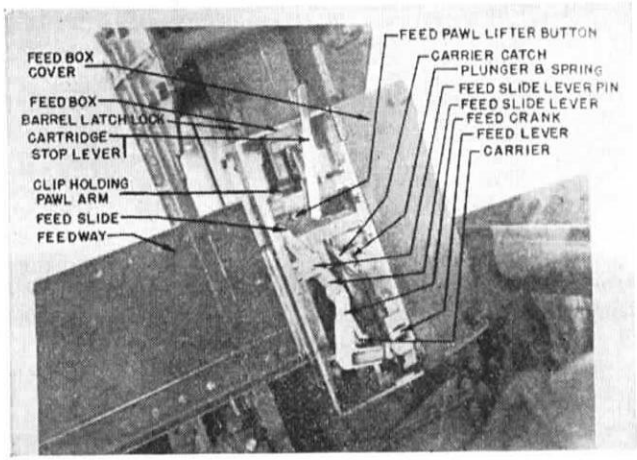


FIGURE 13.—Feed box.

■ 37. REMOVING AND REPLACING FEED MECHANISM (fig. 13).—*a. To remove.*—Fold back feed box cover. Withdraw feed slide lever pin. Force feed side to the right and lift out feed slide lever. Remove feed lever pin from right side of receiver and lift out feed lever. Remove feed crank. Push in on feed pawl pin with a match or similar object and remove pin. Remove pawl and pawl spring. Withdraw slide.

b. To replace.—Reverse operations given in *a* above.

■ 38. REMOVING AND REPLACING CARRIER.—*a. To remove.*—Rotate carrier pin slightly to the front and withdraw it from left side of receiver. Withdraw carrier.

b. To replace.—Reverse operations given in *a* above.

■ 39. REMOVING AND REPLACING CARRIER CATCH.—*a. To remove.*—Push in on carrier catch spring plunger until it is clear of catch shoulder. Remove catch and carefully release pressure on the plunger to prevent plunger and spring from flying out.

b. To replace.—Reverse operations given in *a* above.

■ 40. REMOVING AND REPLACING BARREL EXTENSION (fig. 14).—*a. To remove.*—Remove in order the back plate, lock frame, driving spring assemblies, breechblock, feed mechanism, carrier, barrel, and accelerator cam. With gun in the horizontal position, unscrew recuperator piston rod nut and pull barrel extension out to the rear. *Do not have gun elevated while piston rod nut is being unscrewed and barrel extension removed.*

b. To replace.—Reverse operations given in *a* above. The gun must be horizontal. The recuperator piston rod nut is screwed in until its outer face is just flush with the inner face of the lip of the breechblock stop when the latter is in the raised position, and the two short edges of the nut are parallel to the sides of the receiver.

■ 41. DISASSEMBLING AND ASSEMBLING LOCK FRAME.—*a. To disassemble.*—Insert a screw driver in slot in operating lever spring head at the rear of lock frame, rotate head about one-quarter turn counterclockwise, and withdraw operating lever spring, head, and follower. No further stripping of the lock-frame should be done unless necessary for replacement of parts or periodic cleaning and lubrication.

(1) To remove the operating lever, withdraw cotter pin from operating lever pin and remove operating lever pin and operating lever.

(2) To remove the extractor, withdraw cotter pin from extractor pin and remove extractor pin and extractor.

(3) To remove the sear, withdraw cotter pin from sear pin and remove sear pin and sear.

(4) To remove the hammer and cocking lever, withdraw cotter pins from hammer pin and cocking lever pin. Remove hammer pin and cocking lever pin. Withdraw hammer and cocking lever.

b. To assemble.—Reverse operations given in *a* above. After cotter pins are inserted, each one must be bent around the corresponding pin so that it does not interfere with operation of the gun.

■ 42. DISASSEMBLING AND ASSEMBLING BARREL EXTENSION.—*a. To disassemble.*—After removing barrel extension from gun, proceed as described below.

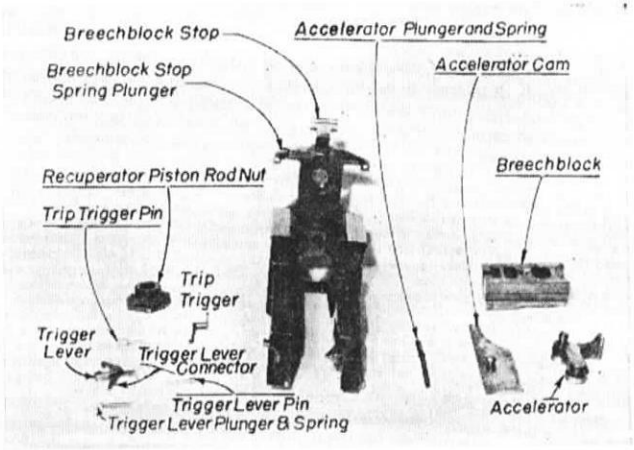


FIGURE 14.—Barrel extension and related parts.

(1) To remove the accelerator, push in on accelerator spring plunger and remove accelerator and plunger and spring.

(2) To remove the trigger assembly, pull out on trip trigger pin and remove trip trigger. Push in on trigger lever spring plunger, remove trigger lever pin, and remove trigger lever and trigger lever connector. Remove plunger and spring.

(3) To remove the ejector, withdraw cotter pin from ejector stud nut and remove nut, ejector, and ejector spring.

(4) To remove the breechblock stop, withdraw cotter pin from breechblock stop pin and remove stop pin and breechblock stop.

(5) Do not perform the operations in (3) and (4) unless necessary for the replacement of parts or periodic cleaning and lubrication.

b. To assemble.—Reverse operations given in *a* above.

CHAPTER 7

CARE AND MAINTENANCE

	Paragraphs
SECTION I. General	43–45
II. Gun	46–47
III. Carriage	48–50
IV. Sighting system	51–52

SECTION I

GENERAL

■ 43. GENERAL CARE.—It is essential that the gun and mount be maintained in the best possible condition at all times. They must always be kept clean and all unpainted parts covered with a light coating of oil. Accessories and ammunition must also be given careful attention. Particular care must be employed in damp climates, during damp or rainy weather, or when the matériel is used at night.

■ 44. PRECAUTIONS IN COLD WEATHER.—During cold weather, precautions must be taken against the cold. It will be necessary to keep the water used in cooling the gun from freezing by warming it.

■ 45. PRECAUTIONS DURING AND AFTER A GAS ATTACK.—*a.* When there is serious danger of a gas attack, particular care must be taken to keep all unpainted metal parts of the matériel coated with oil, being careful to prevent the oil from coming in contact with lenses or the interior of instruments. When practicable, additional protection can be provided by placing waterproof covers over the matériel.

b. All unpainted metal surfaces of matériel which have been exposed to gas must be cleaned, wiped dry, and reoiled as soon as possible after the attack. When mustard gas has been employed, special measures for decontamination of matériel must be used. Personnel engaged in decontamination work wear protective clothing, including protective shoes and gloves, and gas masks. They proceed as follows:

(1) Free the matériel of all dirt, lumps of earth, and liquid, with wooden spatulas or rags. Clean all moving parts, sighting apparatus, and glass surfaces by polishing them with dry rags. Immediately after this operation, bury (*do not burn*) the spatulas or rags which were used.

(2) In cleaning the remainder of the matériel, calcium hypochlorite normally is used. When calcium hypochlorite is not available, chloride of lime may be substituted. Where possible, sprinkle a continuous layer of dry calcium hypochlorite over the exposed surface. Whitewash parts which cannot be sprinkled with the dry powder with a paste consisting of three parts by volume of calcium hypochlorite and one part by volume of water. Allow the powder and paste to remain on the matériel for from 2 to 6 hours, the longer period of time being preferable. Then wash off the powder and paste and *thoroughly rinse the surfaces until all the calcium hypochlorite has been removed.*

(3) When plenty of water is available, mustard gas may be removed by washing the matériel with large quantities of warm (not boiling) water. However, this method is not satisfactory for greasy articles, which must be decontaminated with calcium hypochlorite.

(4) When none of the above means for decontaminating matériel of mustard gas is available, a period of from 6 to 8 days must elapse before the matériel can be considered safe to handle.

SECTION II

GUN

■ 46. GENERAL.—The smooth and continuous operation of the 37-mm gun is largely dependent on its proper care and lubrication. The bore, chamber, receiver, and all moving parts must be kept clean and well lubricated. At frequent intervals during the firing season, the gun must be stripped completely and all component parts thoroughly cleaned and oiled. The lock frame, barrel extension, and receiver mechanisms are lubricated with No. 3 lubricating cup grease mixed with an equal amount of light lubricating oil, class A. The feed mechanism is lubricated with light lubricating oil, class A.

■ 47. CLEANING THE BORE.—*a.* The bore is cleaned with hot water and issue soap, a solution of soda ash, hot water, or in the absence of these, cold water. Insert the bore brush in the muzzle. Elevate the gun slightly, pour some of the cleaning solution in the muzzle, and then work the brush back and forth the length of the barrel several times. Flush the bore with clear water. Examine the bore, and if it is not clean, repeat the cleaning operation. When the bore is clean, place burlap or cotton rags on the end of the rammer staff and work the staff back and forth in the barrel until the bore is dry. When the bore is thoroughly dried, apply light lubricating oil, class A, by means of a brush, cotton rags, or burlap attached to the rammer staff.

b. The soda ash solution is prepared by dissolving ½ to 1 pound, depending upon the strength desired, of soda ash (sodium carbonate cleaning compound-calcined soda) in 1 gallon of boiling water. The soda ash solution is prepared at the time it is to be used.

SECTION III

CARRIAGE

■ 48. GENERAL.—The amount of care and frequency of lubrication which the carriage requires depends upon the extent to which the matériel is used, the condition of the roads and terrain over which it is moved, and weather conditions encountered. Specific instructions on lubrication given in paragraph 49 are based on continuous use of the matériel and movements over paved roads under average conditions of weather and terrain.

■ 49. LUBRICATION.—*a.* Proper lubrication of the carriage requires the use of No. 3 lubricating cup grease and light lubricating oil, class A. In general, the grease is used for alemite fittings and the oil in the oil cups. Gear cases contain a mixture of one part grease and one part lubricating oil.

b. The leveling mechanism, top carriage, elevation stop mechanism, and grease fitting of the lower case of traversing mechanism are lubricated weekly. The axle and counterpoise cylinder bearings and buffer rod are lubricated every 2 months or 1,000 miles, more frequently if difficulty is encountered in

raising or lowering the mount. The steering and draft mechanism is lubricated every 3 months or 1,500 miles. The wheel bearings are packed every 6 months or every 5,000 miles by an experienced mechanic using short fibrous wheel-bearing grease (Spec. CD AXS–422). The counterpoise rod bearing path and the elevating rack are kept well greased. The handwheel cases and the lower cases of the elevating mechanism and the traversing mechanism are kept filled to the level of the plugs. Adjusting screws, handwheel knob spindles, joints of the firing mechanism linkage, and all other moving parts are lubricated with oil, when necessary. The equilibrator rod and front end of the piston head are greased whenever difficulty is encountered in elevating or depressing the gun.

■ 50. CARE OF ELECTRIC BRAKES.—*a*. The fabric facing of the magnet may become glazed, resulting in reduced effectiveness of the brake. To remedy this condition, the fabric facing of the magnet may be roughened with coarse emery cloth. Do not cut the pole faces down.

b. The electric current necessary to operate the brakes when the "breakaway" switch is pulled is provided by a 6-volt battery mounted in a metal case at the front end of the carriage. The battery must be checked before each movement by a trial application of the brakes. If the brakes do not operate properly, the battery must be replaced. In rainy weather, the case must be checked to see that rain water does not collect inside it.

c. To check the current delivered at the brakes, either by the normal power source or the emergency battery, disconnect one brake wire. Connect a low-reading direct-current ammeter between the wire just removed and its terminal. Leaving the other brake in the circuit, apply the full power of the controller and take a reading. The current must not be less than 2.6 amperes. If the current is not satisfactory, check for poor connections and shorted or broken wires. Check the current consumption of the brake on the opposite side. The readings of both magnets should not vary more than one-tenth of one ampere. If there is a greater variation, check all connections for good contact and look for a broken wire at the magnet.

d. The stop lights of the carriage must not be connected into the brake circuit as weak or "grabbing" brakes will result.

e. Worn bearings or loose wheels will cause erratic action of the brakes. This condition is evidenced by a wide track on the armature made by the pole faces of the magnet.

SECTION IV

SIGHTING SYSTEM

■ 51. CARE.—*a*. Care must be exercised to avoid abuse of the sights and their supporting member. The sights will be dismounted and placed in the chest provided when not in use.

b. Covers are provided at both ends of the flexible cables and at the cable couplings on the carriages. These covers are screwed in place whenever the system is uncoupled.

c. The flexible cables and transmitters will be placed in the chests provided when not in use.

■ 52. LUBRICATION.—All moving parts of the sighting system assembled on the carriage are mounted on sealed or shielded ball bearings which are lubricated at assembly by the manufacturer. No lubrication of these parts is required. Gears and wormwheels are also lubricated when originally assembled and need only be lubricated with light lubricating oil, class A, at long intervals.

CHAPTER 8

DRILL TABLES

Drill of the 37-mm gun section

Details	DETAILS, POSTS	(*a*) EXAMINE GUN (*b*) REPORT	(*a*) TARGET (*b*) COMMENCE FIRING	(*a*) SUSPEND FIRING (*b*) CEASE FIRING
No. 1	Obtains vertical sight and places it in vertical sight seat. Takes post on right seat of carriage.	(*a*) Assisted by No. 2, levels the gun; boresights the gun; adjusts sighting system, if necessary; then hooks up flexible cables. (*b*) Reports, "Sight and elevating mechanism in order."	(*a*) Trains his sight on designated target, calls out, "On target," and continuously tracks the target without further command. (*b*) Continues to track the target, and pushes down on trigger pedal with his foot. Keeps trigger pedal depressed until SUSPEND FIRING or CEASE FIRING is given.	(*a*) Lifts his foot from trigger pedal, but continues to track the target. (*b*) Lifts his foot from trigger pedal and ceases tracking, but remains at his post.
No. 2	Obtains lateral sight and places it in lateral sight seat. Then takes post on left seat of carriage.	(*a*) Assists No. 1 in leveling; boresighting; adjusting sighting system, if necessary; and hooking up flexible cables. (*b*) Reports, "Sight and traversing mechanism in order.	(*a*) Trains his sight on designated target, calls out, "On target," and continuously tracks target without further command. (*b*) Continues to track the target.	(*a*) Continues to track the target. (*b*) Ceases tracking, but remains at his post.

No. 3	Obtains the priming rod, a wrench, recoil oil, and waste and places them convenient to the gun. Then assists No. 4 in removing muzzle cover, unlocking barrel, and lowering traveling lock bracket. Takes post on right side of gun, opposite the breech and facing to the rear.	(*a*) Fills recuperator cylinder under immediate supervision of the gun commander. Examines chamber and bore and, if necessary, sponges them, assisted by No. 6. (*b*) Reports, "Recoil mechanism and bore in order."	(*a*) When No. 4 calls "Prime," pulls lock frame to the rear and locked position with priming rod. (*b*) Receives empty ammunition clips from right side of breech and places them in a container clear of the gun. Keeps base of carriage free of empty cartridge cases. If a stoppage occurs, assists No. 4 in repeating the loading operation.	(*a*) Remains at his post. (*b*) Assists No. 4 in unloading the gun. When directed, he assists No. 4 in attaching water hose and cooling gun barrel.
No. 4	Obtains lubricating oil and waste and places them convenient to the gun. Then, assisted by No. 3, removes muzzle cover, unlocks barrel, and lowers traveling lock bracket. Takes post on left side of gun, opposite the breech and facing to the rear at the feedway.	(*a*) Examines water chest hose and if water is needed calls on Nos. 5 and 6 for assistance. Examines, cleans, and oils breech mechanism, breechblock, feed mechanism, and trigger mechanism. (*b*) Reports, "Gun and water chest in order."	(*a*) Opens feed box cover, calls "Prime," and holds carrier up with his hand until lock frame is pulled to the rear and locked position. Then calls "Ammunition," receives a loaded ammunition clip from No. 5, places it, with cartridges down, on feedway, and pushes it into the receiver against cartridge stop.	(*a*) Keeps one loaded ammunition clip in place on the feedway. (*b*) Assisted by No. 4, unloads the gun, and if necessary, attaches water hose and cools gun barrel.

Pressboard
Ref
FM 4-140
C 1
UAL
DEPARTMENT,
, April 23, 1941.
as follows:
in traveling posi-
E FOR ACTION is
ommand. He then
the designated
er supports, and
uncouple the car-
wheels are paralle
tripping and lock-
rriage. No. 2
ear end of car-
right front and
ge. Nos. 4 and 6
ear, respectively,
n commands: TRIP.
ng levers and
. Nos. 3, 4, 5,
rriage at the
as the carriage
extend the adja-
ander commands:
pressure down-
s, rotating the
are locked off
t the wheels
but standing or
ers to increase
since the in-
he counterpoise
2 assist the men
. No. 3 lowers
owers and adjusts
unition, and

Drill of the 37-mm gun section—Continued

Details	DETAILS, POSTS	(*a*) EXAMINE GUN (*b*) REPORT	(*a*) TARGET (*b*) COMMENCE FIRING	(*a*) SUSPEND FIRING (*b*) CEASE FIRING
			(*b*) At the command LOAD given by the gun commander, pulls cartridge stop lever halfway toward left side of gun and pushes ammunition clip on into receiver until carrier is tripped, allowing lock frame to load the first round. Continues feeding loaded ammunition clips into receiver.	
No. 5 (see note 1)	Assisted by No. 6, obtains designated number of loaded ammunition clips and places them near the ends of the two outriggers. Takes post on left side of gun and convenient to the feedway.	(*a*) Assists Nos. 4 and 6 in obtaining water for the water chest when necessary. Assisted by No. 6, examines ammunition and loads additional ammunition clips if necessary. (*b*) Reports, "Ammunition in order."	(*a*) When No. 4 calls "Ammunition," hands him a loaded ammunition clip. Prepares to pass additional ammunition to No. 4. (*b*) Continues to pass ammunition to No. 4.	(*a*) Prepares to pass additional ammunition to No. 4. (*b*) Receives unfired ammunition from No. 4 and passes it to No. 6. Assisted by No. 6, replenishes supply of loaded ammunition clips, obtaining additional ammunition from the platoon when necessary.

No. 6 (see note 1)	Assists No. 5 in obtaining designated number of loaded ammunition clips and placing them near the ends of the two outriggers. Uncovers water chest. Takes post near the ammunition and convenient to No. 5.	(*a*) Assists Nos. 4 and 5 in obtaining water for the water chest when necessary. Assists No. 3 in sponging chamber and bore if necessary. Assists No. 5 in examining ammunition and loading additional ammunition clips if necessary. (*b*) No duties.	(*a*) Hands a loaded ammunition clip to No. 5 and prepares to pass additional clips as required. (*b*) Continues to pass ammunition to No. 5.	(*a*) Prepares to pass additional ammunition to No. 5. (*b*) Receives unfired ammunition from No. 5 and places it in the ammunition box. Assists No. 5 in replenishing supply of loaded ammunition clips and obtaining additional ammunition from the platoon when necessary.

NOTES

1. In semimobile units, duties of Nos. 5 and 6 are performed by No. 5.
2. SUSPEND FIRING is employed when a brief halt in firing is desired.
   CEASE FIRING is employed when an appreciable period of time is to elapse before firing is resumed.

Emplacing 37-mm gun and march order

Details	EMPLACING GUN	MARCH ORDER
No. 1	Assisted by No. 2, uncouples carriage from truck and sees that wheels are parallel to carriage side frames. Grasps tripping and locking levers at front end of carriage. At the command TRIP, operates locking and tripping levers. Assists the men at counterpoise levers, if necessary. Assists in unloading matériel from truck.	Elevates or depresses gun until barrel can be engaged by traveling lock bracket. Removes vertical sight from sight seat and replaces it in chest provided. At the command READY, grasps tripping lever at front end of carriage. After carriage is raised, pushes tripping lever to the rear until locking lever is engaged. Assists the men at counterpoise levers, if necessary. Assists in loading matériel on truck. When loading is completed, couples carriage to truck with assistance of No. 2.
No. 2	Assists No. 1 in uncoupling carriage from truck and in setting wheels parallel to carriage side frames. Grasps tripping and locking levers at rear end of carriage. At the command TRIP, operates locking and tripping levers. Assists the men at counterpoise levers, if necessary. Assists in unloading matériel from truck.	Traverses gun until barrel can be engaged by traveling lock bracket. Removes lateral sight from sight seat and replaces it in chest provided. At the command READY, grasps tripping lever at rear end of carriage. After carriage is raised, pulls tripping lever to the rear until locking lever is engaged. Assists the men at counterpoise levers, if necessary. Assists in loading matériel on truck. When loading is completed, assists No. 1 in coupling carriage to truck.
No. 3	Takes post at right front wheel of carriage, extends counterpoise lever, and grasps lever with both hands. At the command LEVERS DOWN, forces lever down. Lowers and adjusts right outrigger. Assists in unloading matériel from truck.	Disconnects flexible cables. Raises and locks right outrigger. Takes post at right front wheel of carriage. At the command READY, grasps counterpoise lever with both hands. At the command LEVERS UP, lifts on the lever until carriage is raised. Assists in loading matériel on truck.
No. 4	Takes post at left rear wheel of carriage, extends counterpoise lever, and places both feet on the lever, supporting himself by grasping upper carriage. At the command LEVERS DOWN, forces lever down. Lowers and adjusts left outrigger. Assists in unloading matériel from truck.	Raises and locks left outrigger. Takes post at left rear wheel of carriage. At the command READY, grasps counterpoise lever with both hands. At the command LEVERS UP, lifts on the lever until carriage is raised. Assists in loading matériel on truck.
No. 5	Takes post at left front wheel of carriage, extends counterpoise lever, and grasps lever with both hands. At the command LEVERS DOWN, forces lever down. Assisted by No. 6, unloads ammunition from truck.	Raises traveling lock bracket and locks the gun. Takes post at left front wheel of carriage. At the command READY, grasps counterpoise lever with both hands. At the command LEVERS UP, lifts on the lever until carriage is raised. Assisted by No. 6, loads ammunition on truck.

Details	EMPLACING GUN	MARCH ORDER
No. 6 (see note).....	Takes post at right rear wheel of carriage, extends counterpoise lever, and places both feet on the lever, supporting himself by grasping upper carriage. At the command LEVERS DOWN, forces lever down. Assists No. 5 in unloading ammunition from truck. When all ammunition and matériel have been removed from truck, moves truck to designated parking area and then returns to the gun position.	Returns ammunition to ammunition chests. Takes post at right rear wheel of carriage. At the command READY, grasps counterpoise lever with both hands. At the command LEVERS UP, lifts on the lever until carriage is raised. Then proceeds to the truck park and drives his truck to the gun position. Lowers tailgate and then assists No. 5 in loading ammunition

NOTE

In semimobile units, the duties of No. 6 in raising and lowering the mount are performed by the gun commander in addition to his other duties.

APPENDIX

LIST OF REFERENCES

Ammunition, coast artillery---------- TM 4–205.
Ammunition, general---------- TM 9–900
(now published as TR 1370–A).
Camouflage and protective measures---------- FM 4–105.
Care of matériel---------- FM 4–120.
Commands---------- FM 4–105.
Examination for gunners---------- FM 4–150.
Formations and inspections---------- FM 4–120.
Gunnery---------- FM 4–112.
Organization of the mobile 37-mm gun battery-- T/O 4–28.
Organization of the semimobile 37-mm gun battery ---------- T/O 4–128.
Reconnaissance, selection, and occupation of position---------- FM 4–105.
Safety precautions in firing---------- FM 4–120.
Service of matériel---------- FM 4–120.
Weapons and matériel, coast artillery---------- TM 4–210.

Pressboard

Reference

Reference

FM 4-140
C 1

U
173
A61

COAST ARTILLERY FIELD MANUAL

ANTIAIRCRAFT ARTILLERY

SERVICE OF THE PIECE

37-MM ANTIAIRCRAFT GUN

Changes)
No. 1)

WAR DEPARTMENT,
Washington, April 23, 1941.

FM 4-140, May 22, 1940, is changed as follows:

21. Emplacing gun.--The gun being in traveling position (fig. 7), when the command PREPARE FOR ACTION is given, the gun commander repeats the command. He then supervises the movement of the gun to the designated position, removal of the cover and cover supports, and emplacement of the gun. Nos. 1 and 2 uncouple the carriage from the truck and see that the wheels are parallel to carriage side frames. No. 1 grasps tripping and locking levers (fig. 8) at front end of carriage. No. 2 grasps tripping and locking levers at rear end of carriage. Nos. 3 and 5 take posts at the right front and left front, respectively, of the carriage. Nos. 4 and 6 take posts at the right rear and left rear, respectively, of the carriage. The gun commander then commands: TRIP. Nos. 1 and 2 operate locking and tripping levers and apply pressure downward on the carriage. Nos. 3, 4, 5, and 6 apply pressure downward on the carriage at the handles provided on the frame. As soon as the carriage strikes the ground, Nos. 3, 4, 5, and 6 extend the adjacent counterpoise levers. The gun commander commands: LEVERS DOWN. Nos. 3, 4, 5, and 6 apply pressure downward to the extended counterpoise levers, rotating the counterpoise cylinders until the wheels are locked off the ground. (It may be necessary to lift the wheels from the ground to the locked position, but standing or jumping on the counterpoise cylinder levers to increase the applied force is strictly prohibited since the increased force exerted thereby may bend the counterpoise rods.) The gun commander and Nos. 1 and 2 assist the men at the counterpoise levers, if necessary. No. 3 lowers and adjusts right outrigger, and No. 4 lowers and adjusts left outrigger. Nos. 5 and 6 unload ammunition, and other personnel unload matériel from the truck. The truck is then moved to the designated parking area by No. 6. Drill then proceeds as prescribed in section I.
(A.G. 062.11 (4-8-41).) (C 1, Apr. 23, 1941.)

22. March order.--The gun being emplaced (fig. 9), when the command MARCH ORDER is given, the gun commander repeats the command. No. 1 elevates or depresses the gun and No. 2 traverses the gun until the barrel can be engaged by the traveling lock bracket. No. 5 raises the traveling lock bracket and locks the gun. No. 3 disconnects the flexible cables and then raises and locks right outrigger. No. 4 raises and locks left outrigger. Nos. 1 and 2 remove the sights from the sight seats and replace them in the chest. No. 6 returns the ammunition to ammunition chests. All numbered personnel take post around the carriage as at PREPARE FOR ACTION. The gun commander then commands: READY. Nos. 3, 4, 5, and 6 each press down on the adjacent wheel until contact is made with the ground. Nos. 3, 4, 5, and 6 each grasp the adjacent counterpoise lever with both hands. The gun commander then commands: LEVERS UP. Nos. 3, 4, 5, and 6 lift on their levers, rotating the counterpoise cylinders and forcing the rods down. The gun commander and Nos. 1 and 2 assist the men at the counterpoise levers if necessary. If the mount has sunk into the ground the full length of the spade, difficulty may be encountered in pushing the wheels down far enough to allow the counterpoise cylinders to be rotated. Remove sufficient earth from under the wheels to allow them to be sufficiently depressed. On uneven ground, the counterpoise rod may not stay below the center of the axle and one man will have to hold up the counterpoise lever. The counterpoise levers being up, No. 1 takes position at the front of the carriage, grasping the tripping lever in such a manner as not to interfere with the other numbers. Nos. 3 and 6 grasp the handles on the right front of the carriage and Nos. 4 and 5 grasp the handles on the left front. The gun commander then commands: READY, UP. Nos. 3, 4, 5, and 6 lift together, raising the front end of the carriage. When the chassis comes up, No. 1 pulls the tripping lever quickly to the rear, making sure that the locking levers engage. (Do not attempt to lift the carriage by means of the counterpoise levers.) The gun commander and No. 2 assist in raising the carriage when necessary. Nos. 3, 4, 5, and 6 then take similar posts at the rear of the carriage and, with No. 2 at the tripping lever, raise the rear of the chassis. The order in which the ends of the chassis are raised should be reversed if the rear of the carriage is appreciably lower

than the front end. The gun c
locking levers are engaged and
secure. He then supervises th
ports and cover, if used. The
6. The gun commander supervis
including ammunition, and the
to the truck. Nos. 5 and 6 lo
truck. Other members of the g
loading as required. When loa
and 2 couple the gun carriage
are then loaded onto the truck
moved to the point designated

Note.--This drill is prescr
ient pending redesign of the c
(A.G. 062.11 (4-8-41).) (C

By order of the Secretary o

Official:
E. S. ADAMS,
Major General,
The Adjutant Genera

Pressboard Reference

than the front end. The gun commander checks to see that locking levers are engaged and the outriggers and gun are secure. He then supervises the attaching of cover supports and cover, if used. The truck is brought up by No. 5. The gun commander supervises the loading of matériel, including ammunition, and the coupling of gun carriage to the truck. Nos. 5 and 6 load ammunition into the truck. Other members of the gun section assist in the loading as required. When loading is completed, Nos. 1 and 2 couple the gun carriage to the truck. Personnel are then loaded onto the truck and the truck and carriage moved to the point designated by the platoon commander.

Note.--This drill is prescribed as a temporary expedient pending redesign of the counterpoise mechanism. (A.G. 062.11 (4-8-41).) (C 1, Apr. 23, 1941.)

By order of the Secretary of War:

G. C. MARSHALL,
Chief of Staff.

Official:
E. S. ADAMS,
Major General,
The Adjutant General.