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WAR DEPARTMENT

COAST ARTILLERY FIELD MANUAL

SERVICE OF THE PIECE

8-INCH GUN, MARK VI,
MODIFICATION 3A2,
ON BARBETTE CARRIAGE M1

26 JULY 1943

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COAST ARTILLERY FIELD MANUAL

SERVICE OF THE PIECE

8-INCH GUN, MARK VI,
MODIFICATION 3A2,
ON BARBETTE CARRIAGE M1

Prepared by The Coast Artillery School
under the direction of
THE COMMANDING GENERAL,
ARMY GROUND FORCES

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BY ORDER OF THE SECRETARY OF WAR:

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The Adjutant General.

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

This manual distributed to interested headquarters and batteries only.

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8-INCH GUN, MARK VI, MODIFICATION 3A2, ON BARBETTE CARRIAGE M1

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SECTION I

GENERAL

	Paragraph
Scope	1
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■ 1. SCOPE.—*a*. This manual prescribes the service of the piece for the 8-inch gun, Mark VI, Modification 3A2, on barbette carriage M1 (see figs. 1 and 2). The duties of the members of the gun section in the service of the piece are contained in section III and in the drill table, section IX.

b. The service of the piece as described herein is intended as a guide for the battery commander. Changes in the details of the service of the piece may be made to meet local conditions.

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

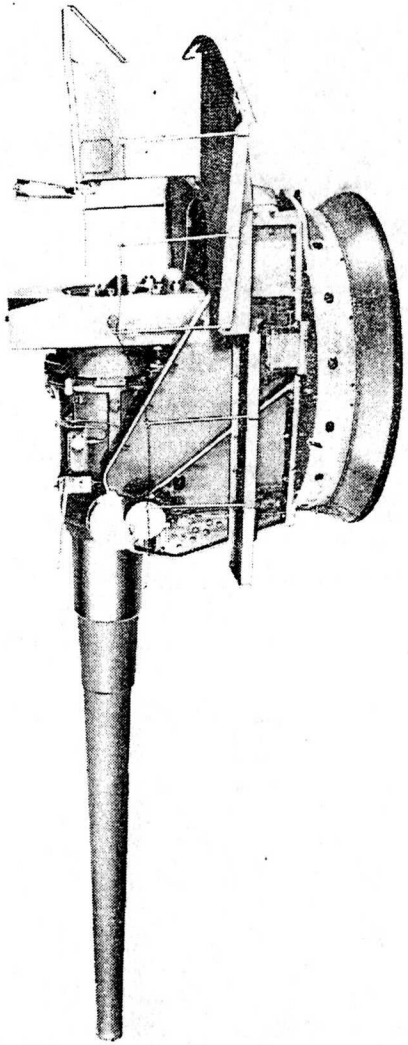


FIGURE 1.—8-inch gun and barbette carriage—left side.

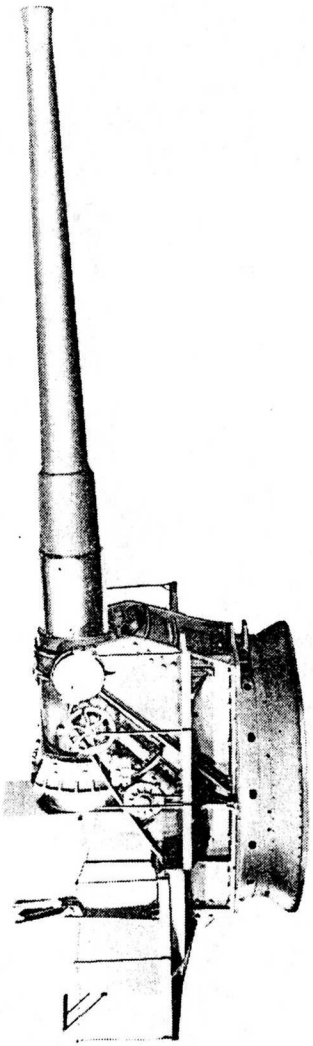


FIGURE 2.—8-inch gun and barbette carriage—right side.

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ORGANIZATION

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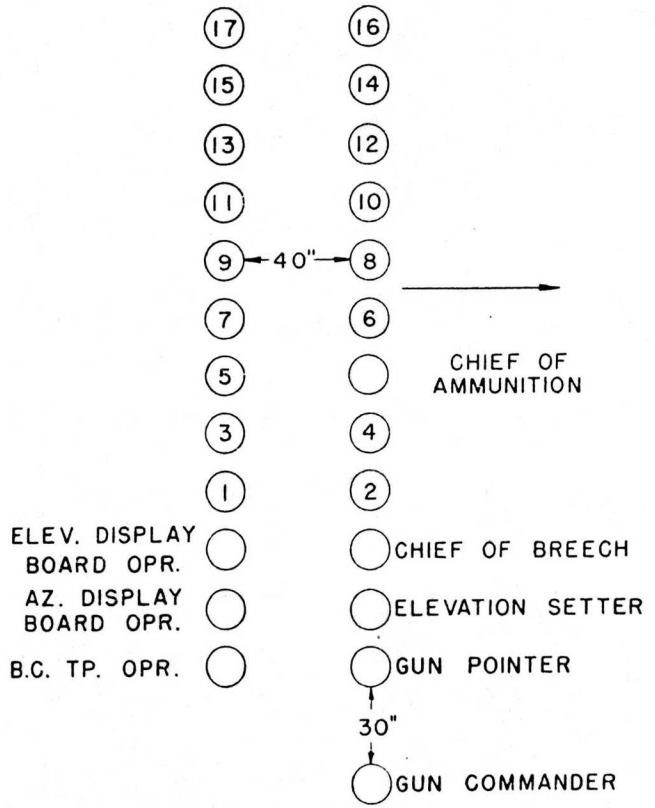


FIGURE 3.—Formation of gun section.

■ 3. GUN SECTION.—Each emplacement of 1 gun is manned by a gun section consisting of a gun squad and an ammunition squad. The strength is 25 enlisted men.

■ 4. GUN SQUAD.—The gun squad (12 enlisted men) consists of the gun commander, gun pointer, elevation setter, battery commander's telephone operator, 2 display board operators, chief of breech, and 5 cannoneers, numbered from 1 to 5 inclusive. Men are assigned to permanent positions according to their aptitude, but will be interchanged frequently in drill positions in order to develop flexibility and facilitate replacement.

■ 5. AMMUNITION SQUAD.—The ammunition squad (13 enlisted men) consists of the chief of ammunition and 12 ammunition handlers numbered from 6 to 17 inclusive. This squad is divided by its chief into details for the service of powder and projectiles and for miscellaneous duties required by local conditions.

■ 6. FORMATION.—Each gun section assembles in two ranks as shown in figure 3. Unnumbered cannoneers form on the right of their respective squads. The chief of breech and the chief of ammunition form at the right of the numbered cannoneers in the gun squad and ammunition squad respectively. After forming the gun section, the gun commander takes post in the front rank 30 inches to the right of the gun pointer.

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■ 7. BATTERY EXECUTIVE.—*a.* The battery executive commands the firing section of the battery and is in charge of the gun emplacements and accessories. He is responsible for the—

(1) Training and efficiency of the personnel of the firing section.

(2) Condition of the materiel under his charge.

(3) Observance of all safety precautions pertaining to the service of the piece.

(4) Police of all emplacements.

(5) Camouflage of all emplacements.

b. Twice daily, morning and evening, he inspects the materiel under his charge and personally verifies the adjustment of all pointing devices. He tests the operation of all traversing, elevating, and breech mechanisms. He checks the safety features of all firing mechanisms. He verifies the filling of the recoil cylinders and the intensifier, and the air pressure in the recuperator.

c. He receives the reports of the assistant battery executives or gun commanders and reports to the battery commander, "Sir, firing section in order," or reports defects which he is unable to remedy without delay.

d. He exercises general supervision over the loading and pointing. If, for any reason, he desires to hold fire for one firing interval, he commands: RE-LAY, and reports his action to the battery commander.

e. At the conclusion of drill or firing, the battery executive commands: REPLACE EQUIPMENT, inspects the emplacements, and reports to the battery commander.

f. He selects the positions for and supervises the emplacement and employment of the machine guns of the firing section.

■ 8. ASSISTANT BATTERY EXECUTIVE.—Each assistant battery executive will perform the duties of the battery executive that pertain to the emplacement or emplacements to which he is assigned.

■ 9. GUN COMMANDER.—*a.* The gun commander is in command of the gun section and is also chief of the gun squad. He is responsible to the officer in charge of the emplacement for the—

(1) Training and efficiency of the personnel of his section.

(2) Condition of the materiel under his charge.

(3) Preparation of the piece for firing, including camouflage discipline and gas discipline when necessary.

(4) Firing of the piece.

(5) Observance of all safety precautions pertaining to the service of the piece.

(6) Police of the emplacement.

b. He supervises the service of the piece and the service of ammunition and gives the necessary commands and instructions for carrying out these operations. He personally directs the care and preservation of the materiel.

c. Twice daily at the direction of the assistant battery executive or battery executive, he forms his gun section at the emplacement and commands: 1. DETAILS, 2. POSTS. Servicing equipment is kept convenient to the individual posts, and it is only necessary for members of the gun section to check the items for presence and place them for use. After all details have reached their posts (fig. 4), he commands: EXAMINE GUN. He then makes an inspection of the gun, carriage, and other materiel, giving particular attention to the recoil and recuperator systems, firing mechanism, recoil parts lock and other safety devices, and oiling of the various bearings. He receives the reports of the chief of ammunition and of the various details of the gun squad, and reports to the officer in charge of the emplacement, "Sir, No. —— in order," or any defects which he is unable to remedy without delay.

d. When the details are posted for drill or action and it is necessary to verify the details, he commands: CALL OFF. At this command the cannoneers in each squad call off their titles or numbers in succession, beginning with the unnumbered members of the section, followed by the numbered members in order.

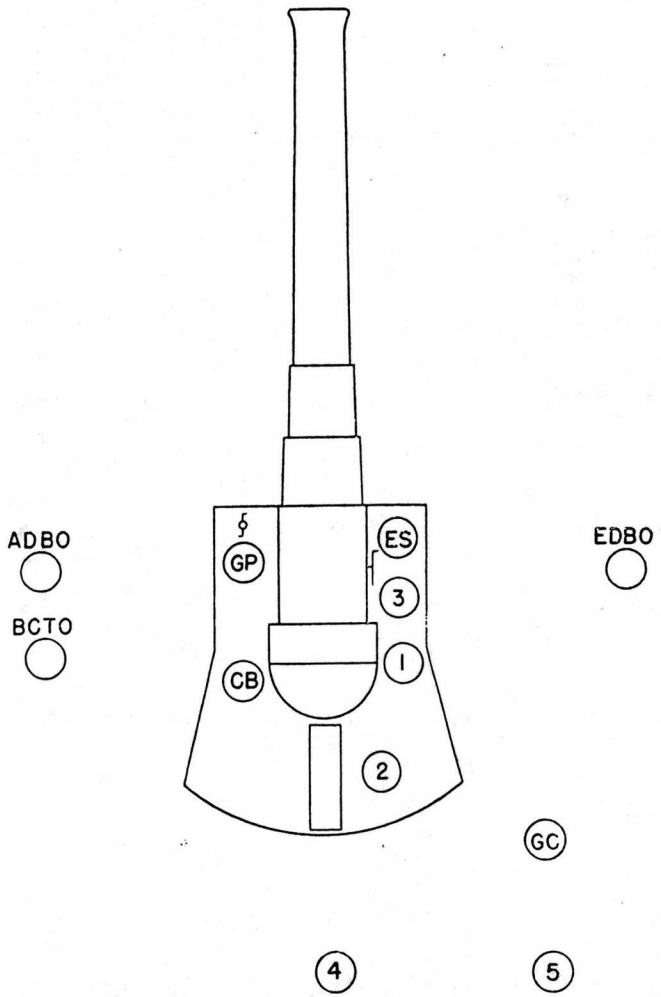


FIGURE 4.—Positions of gun squad at DETAILS, POSTS.

e. During preparations for drill or action he informs the chief of ammunition as to the projectile, fuze, and powder charge to be used.

f. At the command TARGET, he repeats the command and the target designation. In Case II firing he signals to the chief of breech to supervise the loading and then turns to assist the gun pointer in getting on the correct target. In Case III firing he supervises the loading. As soon as the gun pointer is on the target, the gun commander reports or signals to the officer in charge of the emplacement, "Sir, No. —— on target."

g. At the command COMMENCE FIRING, he calls, "Ready," and the gun pointer fires when on the target if firing Case II. If firing Case III, the gun commander fires on the next time interval signal, or if the battery is equipped with a gun data computer, he fires as soon as the gun is ready. *Note*: It is not necessary for fire to be held for the time interval signal when firing with a gun data computer.

h. He commands: CEASE FIRING, when the number of shots specified have been fired. He repeats the command CEASE FIRING, when it is received. At the conclusion of a series of shots, he reports to the officer in charge of the emplacement, "Sir, No. —— (so many) rounds fired." Should the gun be loaded at the command CEASE FIRING, he causes all hands to keep away from the gun commander's push button and the trigger of the firing pistol. If firing by lanyard, he causes the lanyard to be detached. When dummy ammunition is used, he commands: UNLOAD, and supervises the unloading.

i. At the command SUSPEND FIRING, the gun commander repeats the command, and if the piece is unloaded, he has it loaded and holds fire until he receives the command RESUME FIRING.

j. During the firing he stations himself in such a position as best to observe the functioning of the gun section and the gun. He pays particular attention to the action of the gun in recoil and counterrecoil in order that a loss of recoil oil by leakage may be observed in time to be corrected.

k. In case of a misfire, he calls, "No. —— misfire." He sees that the precautions described in paragraph 41 are observed.

l. When firing on a time interval signal, he commands: RE-LAY, in case the time interval signal fails to sound at the gun, or in case his gun is not ready to fire when the time interval signal sounds. He repeats the command RE-LAY, when it is received.

m. He can verify his gun section by commanding CALL OFF, at which command unnumbered and numbered members of the gun section call off their designations beginning with the gun pointer, and proceeding in the same manner as when in formation (see fig. 3).

n. At the command REPLACE EQUIPMENT, he supervises the replacing of all equipment, sees that all materiel is properly secured and the emplacement policed, and then, unless otherwise directed, he forms his section.

■ 10. GUN POINTER.—The gun pointer is charged with the duty of pointing the piece in direction. He is responsible to the gun commander for the proper operation, care, and adjustment of the telescope and telescope mount, azimuth indicator, and traversing mechanism (fig. 5). For detailed duties of the gun pointer, see the drill table, section IX.

■ 11. ELEVATION SETTER.—The elevation setter is charged with the duty of laying the piece in elevation. He is responsible to the gun commander for the proper operation, care, and adjustment of the elevation indicator and the elevating mechanism (fig. 6). For the detailed duties of the elevation setter, see the drill table, section IX.

■ 12. CHIEF OF BREECH.—The chief of breach is responsible to the gun commander for the efficiency of the personnel of the breech detail; for the condition and serviceability of the breech mechanism, chamber, and bore; for the observance of safety precautions that pertain to his detail; and for the proper loading of the piece. He pays particular attention to the seating of the projectile and sees that the

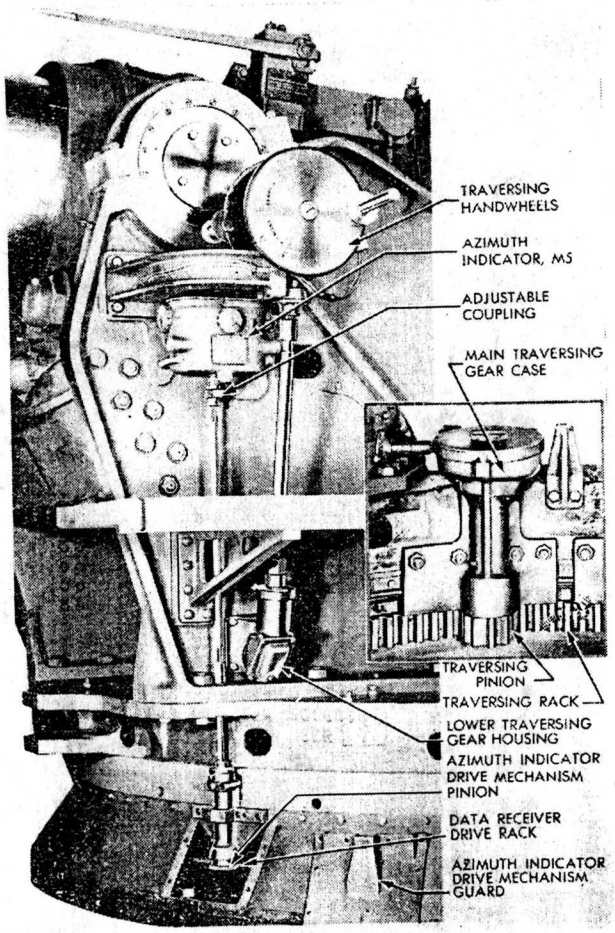


FIGURE 5.—Traversing and azimuth indicator mechanisms.

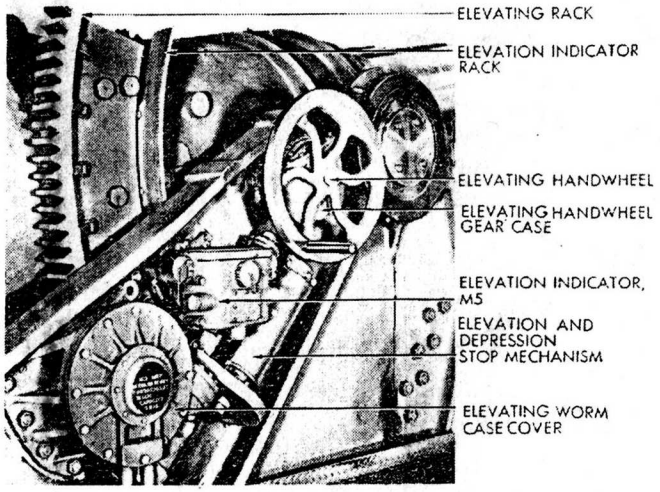


FIGURE 6.—Elevation and elevation indicator mechanisms.

igniter is on the rear end of the powder charge. He attaches the firing cable if firing electrically or the lanyard when firing by percussion. For the detailed duties of the chief of breech, see the drill table, section IX.

■ 13. BATTERY COMMANDER'S TELEPHONE OPERATOR.—The battery commander's telephone operator is charged with the duty of receiving and transmitting all messages passing between the battery commander and the officer in charge of the emplacement, and the keeping of such records as may be directed. For detailed duties of the battery commander's telephone operator, see the drill table, section IX.

■ 14. DISPLAY BOARD OPERATORS.—The azimuth and elevation display board operators are responsible to the gun commander for the operation of the display boards and for the recording of all data received from the plotting room. For detailed duties of the display board operators, see the drill table, section IX.

■ 15. CHIEF OF AMMUNITION.—*a.* The chief of ammunition is responsible to the gun commander for the—

(1) Efficiency of the personnel under his charge.

(2) Care and preservation of the ammunition and the ammunition magazine, including the equipment contained therein.

(3) Camouflage discipline and gas discipline at the magazines and shelters pertaining to his squad.

(4) Observance of all safety precautions in the care and service of the ammunition.

(5) Security and careful handling of the ammunition and its protection against water, dampness, fire, and the direct rays of the sun.

(6) Uninterrupted service of ammunition during action.

b. He keeps a record of all ammunition received and ammunition used by his gun, exercising particular care that projectiles and fuzes are listed under proper name and type.

c. He keeps the gun commander informed regarding ammunition on hand, checks the weights of projectiles, and reports defects found in the ammunition.

d. He keeps a thermometer in a selected powder container and reports the temperature of the powder when required. Where powder has been stored for at least 2 weeks in a service magazine, the temperature of the magazine may be taken as the powder temperature. This temperature should be taken immediately upon opening the magazine.

e. At the command DETAILS, POSTS, he opens the magazine and posts the members of the ammunition squad. He inspects the materiel under his charge and gives the necessary instructions for preparing ammunition and equipment for firing or drill.

f. At the command REPORT, he reports to the gun commander, "Ammunition service in order," or reports any defects he cannot remedy without delay.

g. At the command TARGET, he directs and supervises the service of ammunition.

h. At the command REPLACE EQUIPMENT, he supervises the replacing or securing of all projectiles, fuzes, and propelling charges; directs the policing of the magazine, forms his squad, and reports to the gun commander.

■ 16. AMMUNITION SQUAD.—*a.* At the command DETAILS, POSTS, members of the ammunition squad (Nos. 6 to 17) take posts in the magazine or gallery and prepare the equipment for firing or drill.

b. At the command TARGET—

(1) Nos. 6 and 7 load projectiles in shot tongs or on shot trucks.

(2) Nos. 8, 9, 10, and 11, working in pairs, deliver the loaded shot tongs or shot trucks to the gun and return to the magazine or gallery with the empty tongs or trucks.

(3) Nos. 12 and 13 remove the powder charge from the container (one at a time as needed) and stand ready to deliver the charge to No. 14, 15, 16, or 17 stationed outside the magazine or load the charge on a powder cart located outside the magazine doors.

(4) Nos. 14, 15, 16, and 17 stationed outside the magazine receive in turn the powder charges and deliver them to No. 4 at the gun.

c. At the command REPLACE EQUIPMENT, the ammunition squad secures all materiel.

■ 17. ARTILLERY MECHANICS.—*a.* The artillery mechanics are members of the executive officer's detail. They make minor repairs and adjustments, assisted by members of the gun section. The chief artillery mechanic is the custodian of supplies pertaining to the gun emplacements to which his battery is assigned. He is responsible for the condition of the storeroom of the battery and for the supplies contained therein. The chief artillery mechanic or his assistant issues such equipment, tools, oils, paints, and cleaning materials to the members of the gun sections as may be necessary for the service and care of the guns and accessories.

b. Under the supervision of the gun commander, the artillery mechanics will perform daily the following duties—

(1) Check the level of the oil in the recoil cylinders at zero degrees elevation and add more oil if necessary. (See par. 43*b*.)

(2) Check the position of the intensifier rod. The index should point to a graduation between 0 and 7. If not, more oil must be pumped into the intensifier by operating the oil pump on the cradle. (See par. 43*e*.)

(3) Open the needle valve at the air end of the intensifier and note the reading on the air pressure gage. If the pressure is lower than the pressure indicated by the red mark on the gage (1,600 pounds per square inch), a cylinder of compressed air must be attached to the maneuvering valve filling hole and the air pressure in the recuperator system increased to 1,600 pounds per square inch. If the air pressure is allowed to increase over 1,600 pounds per square inch, the pressure can be reduced by letting air escape through the maneuvering valve. After testing, both valves must be closed. (See par. 43*d*.)

(4) Check the fluid level in the storage battery that supplies power to the electrical firing circuit. (See par. 48.)

■ 18. POWER PLANT OPERATORS.—*a.* The power plant operators are members of the executive officer's detail. They are responsible for the operation, care, and maintenance of the power plant, power plant equipment, sludge and spray pumps, and dehumidifying and decontaminating units.

b. The power plant operators will exercise the power plant daily and will keep a record of hours of operation, loads, and fuel consumption.

SECTION IV

NOTES ON THE SERVICE OF THE PIECE

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The command STAND FAST	30

■ 19. GENERAL.—*a.* The service of the piece will be conducted with dispatch and precision and with as few orders as possible. In going into action it is not necessary to go through the commands of DETAILS, POSTS or EXAMINE GUN. The sounding of the alert signal is sufficient to post the details. The gun commander can verify his details, especially at night, by the command CALL OFF and can check their readiness for action by the command REPORT. Except for the necessary orders, reports, and instructions, no talking will be permitted. Cannoneers will change positions at a run, except those men posted on the carriage who will change positions as rapidly as practicable.

b. Commands will be given in the prescribed forms (see FM 4-5). Signals may be substituted for commands whenever practicable (see FM 4-20).

c. Loading with dummy ammunition and pointing the piece as for firing is the normal practice at drills.

d. When there is a lull in the firing or drill, each member of the gun section will inspect, clean, and place in the best condition possible, the materiel under his charge.

■ 20. OPENING BREECH.—*a.* No. 1 turns the breech operating crank handle counterclockwise until the breechblock clears the breech opening. The breechblock must be held in full open position (fig. 7); otherwise, the loading trough will strike the mushroom head.

b. After each round, No. 1 opens the breech, extracts the used primer, cleans the vent, and wipes off the mushroom head with oily waste.

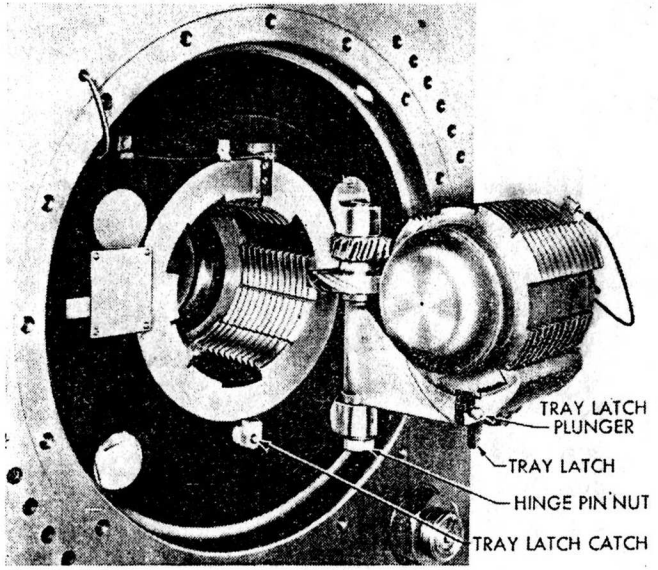


FIGURE 7.—Breechblock in full open position.

■ 21. CLOSING BREECH.—No. 1 turns the breech operating crank handle clockwise until the breechblock is locked tight in the breech recess (fig. 8).

■ 22. LOADING.—*a.* Shot tongs or shot trucks carrying projectiles should be at the gun prior to the command TARGET.

b. At the command TARGET, Nos. 8 and 9, or 10 and 11, lower or shove a projectile onto the loading stand and then roll the shot tongs along the trolley or the shot truck along the track until it is clear of the loading stand.

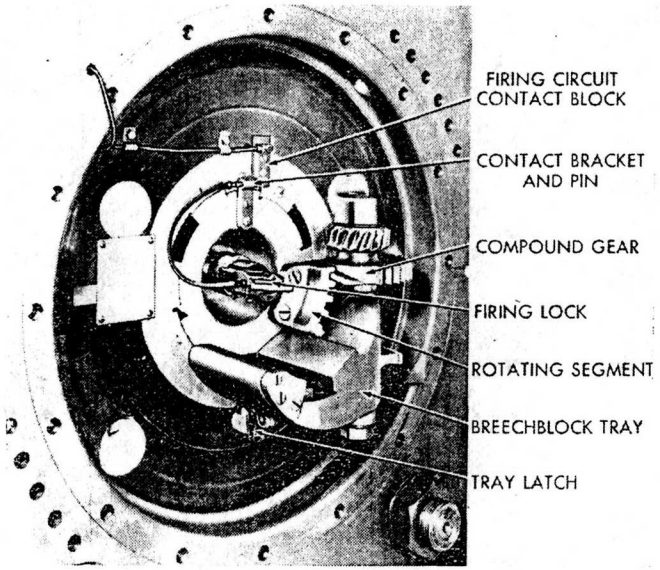


FIGURE 8.—Breechblock in closed position.

c. No. 1 opens the breech as the gun is being depressed to loading position. The breechblock should be in full open position by the time the gun is depressed to the loading elevation (— 5 degrees).

d. The chief of breech lowers the loading trough until the forward end of the trough rests firmly in the breech recess.

e. The projectile is pushed home by the chief of breech with his right hand and by No. 2 with his left hand. The projectile should be pushed home with all possible force. The loading trough should be lubricated slightly to facilitate ramming.

f. No. 14, 15, 16, or 17 of the powder detail brings up the propelling charge to No. 4 who places it on the loading stand.

g. The chief of breech shoves the propelling charge into the powder chamber until it just clears the end of the loading trough and then raises the loading trough from the breech.

h. After the breechblock has been rotated and locked, the chief of breech inserts the primer and commands or signals: ELEVATE. If the lanyard is to be used, the chief of breech attaches the lanyard hook in the trigger eye, inserts the primer, and commands or signals: ELEVATE.

■ 23. CHANGING POWDER CHARGE.—In the event that it becomes necessary to change the powder charge either by removing or inserting the increment after the command RE-LAY has been given, the gun commander will give the necessary instructions. At his command the designated cannoneers will perform such portions of the duties prescribed for the commands SUSPEND FIRING or TARGET as are applicable.

■ 24. POINTING, CASE III.—*a.* When the azimuth indicator is used with the data transmitter in the plotting room, the gun pointer traverses the piece until the electrical and mechanical pointers are matched; calls, "Azimuth set"; and keeps the pointers matched at all times.

b. When the azimuth indicator is used without the data transmitter, the gun pointer traverses the piece until the mechanical pointer indicates the azimuth received over his head and chest set or posted on the azimuth display board and calls, "Azimuth set."

■ 25. ELEVATION, CASE III.—*a.* When using the elevation indicator with continuous data, the elevation setter elevates the piece at the command or signal ELEVATE until the mechanical and electrical pointers are matched, and calls, "Elevation set." He keeps the mechanical and electrical pointers matched until the piece is fired, after which he depresses to the loading position.

b. When the elevation indicator is used without the data transmitter, the elevation setter elevates the piece until the

mechanical pointer indicates the elevation received over his head and chest set or posted on the elevation display board, and calls, "Elevation set."

c. The elevation setter should set the elevation in the same manner each time by depressing to the proper setting rather than setting sometimes by elevating and sometimes by depressing, except when matching the pointers.

■ 26. FIRING, CASE III.—*a.* Since normal operation during Case III firing will include the continuous reception of azimuth data, the gun pointer requires both hands to traverse the gun accurately and smoothly. Therefore, the electric firing circuit should include a switch and suitable wiring in order that the firing pistol may be by-passed during Case III firing.

b. When using a gun data computer the gun pointer keeps the mechanical and electrical pointers matched at all times. After the elevation setter calls, "Elevation set," the gun commander commands or signals: FIRE, and presses the gun commander's push button.

c. When firing on a time interval signal, the gun pointer and elevation setter set the data received over their head and chest sets or posted on the display boards and call, "Azimuth set," and "Elevation set," respectively. The gun commander commands or signals: FIRE, at the sounding of the proper time interval signal and presses the gun commander's push button.

d. The chief of breech may be detailed to press the gun commander's push button at the gun commander's command or signal.

■ 27. FIRING, CASE II.—The gun pointer sets on his sight the deflection received over his head and chest set or posted on the display board and traverses the piece, keeping the vertical cross wire of his sight on the target. The elevation setter sets the elevation as in paragraph 25 and calls or signals, "Elevation set." The gun pointer traverses the piece to keep the vertical cross wire of his sight on the target. At the time the gun commander calls, "Ready," he

presses and holds down the gun commander's push button. On hearing, "Ready," the gun pointer pulls the trigger of the firing pistol when on the target.

■ 28. DRILL DURING SIMULATED FIRING.—For simulated firing using dummy ammunition, the following procedure is recommended:

a. For the first and succeeding odd-numbered rounds, the operations of loading, pointing, and firing are as given above for service ammunition.

b. For the second and succeeding even-numbered rounds, the operation of unloading is substituted therefor. As soon as the projectile is removed, No. 1 closes the breech, and the operations of pointing and firing proceed as for service ammunition. The dummy projectile must be removed *slowly and carefully* to prevent burring the threads in the breech recess and bouncing the projectile onto the spanning tray.

■ 29. THE COMMAND RE-LAY.—At the command RE-LAY, the gun pointer and the elevation setter continue to point the piece in direction and elevation as at the command TARGET, and the display board operators post the new data on their display boards as they receive it.

■ 30. THE COMMAND STAND FAST.—If it is desired to halt all movements of materiel and personnel, the officer in charge of the emplacement or the gun commander commands: STAND FAST.

SECTION V

SAFETY PRECAUTIONS

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hammer begins to move directly to the rear, apply a slight pressure tending to revolve it to the right. When the hammer has reached its rear position, it will revolve 45 degrees to the right, bringing the hammer contact piece in line with the firing pin, and the sear will engage the hammer stem.

e. Uncocking firing lock.—To uncock the firing lock, grasp the hammer and pull it about 1/16 inch to the rear and revolve it about 45 degrees to the left. Ease the hammer forward until it reaches the forward limit of its travel. Then revolve the hammer 45 degrees to the right of its closed position.

■ 46. SPONGING SOLUTION.—*a.* The sponging solution is a solution of water and castile soap. Its purpose is to provide a sponging liquid that will extinguish burning residue in the chamber of the gun and also serve to lubricate the breech recess. If the soap solution is not available, plain water may be used.

b. The solution consists of 1 pound of castile soap in 4 gallons of water. Yellow soaps should not be used as they are liable to leave a gummy residue in the breech recess. The soap is shaved from the bar and the water is heated to facilitate dissolving. The water should be stirred with as little agitation as possible to prevent foaming.

c. To avoid the necessity of handling large receptacles, as much soap as will be required may be dissolved in one bucket of water. This concentrated soap solution will be added to water in other receptacles in the prescribed proportions.

■ 47. CARE OF BORE.—*a.* As soon as possible after firing and every day thereafter until all "sweating" has stopped, the bore of the gun will be cleaned, dried, and oiled. The cleaning solution is made by dissolving ½ pound of soda ash or 1 pound of sal soda in each gallon of boiling water. The bore is washed with this solution, using a bore sponge wrapped with burlap. Then the bore is wiped thoroughly dry with new burlap. Finally, a light coating of oil is applied to the

presses and holds down the gun commander's push button. On hearing, "Ready," the gun pointer pulls the trigger of the firing pistol when on the target.

■ 28. DRILL DURING SIMULATED FIRING.—For simulated firing using dummy ammunition, the following procedure is recommended:

a. For the first and succeeding odd-numbered rounds, the operations of loading, pointing, and firing are as given above for service ammunition.

b. For the second and succeeding even-numbered rounds, the operation of unloading is substituted therefor. As soon as the projectile is removed, No. 1 closes the breech, and the operations of pointing and firing proceed as for service ammunition. The dummy projectile must be removed *slowly and carefully* to prevent burring the threads in the breech recess and bouncing the projectile onto the spanning tray.

■ 29. THE COMMAND RE-LAY.—At the command RE-LAY, the gun pointer and the elevation setter continue to point the piece in direction and elevation as at the command TARGET, and the display board operators post the new data on their display boards as they receive it.

■ 30. THE COMMAND STAND FAST.—If it is desired to halt all movements of materiel and personnel, the officer in charge of the emplacement or the gun commander commands: STAND FAST.

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■ 31. GENERAL.—The following safety precautions are prescribed for *peacetime conditions*. They indicate as well the *principles* to be followed under *war service conditions* but these precautions should be interpreted by the battery executive according to the *circumstances existing at the time of any particular emergency*. Further instructions concerning safety precautions are prescribed in AR 750-10 and FM 4-20.

■ 32. THE COMMAND CEASE FIRING.—*a*. Any individual in the military service will command or signal: CEASE FIRING, if he observes any condition which makes it unsafe to fire.

b. At the command CEASE FIRING, given when the piece is loaded, the lanyard will be detached if the gun is being fired by use of the lanyard.

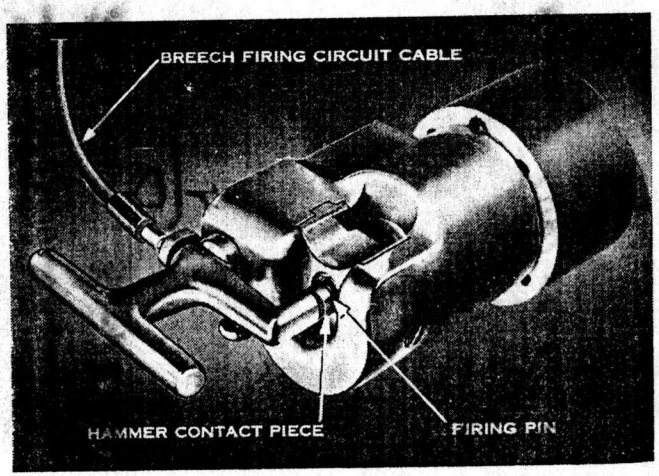


FIGURE 9.—Firing lock closed, ready for electrical firing.

■ 33. FIRING MECHANISM.—*a*. The firing mechanism is a Navy firing lock, Mark VIII, Modification II (fig. 9).

b. The firing mechanism will be inspected and tested at

frequent intervals. It is essential that the firing mechanism be checked immediately before firing to insure proper operation and functioning of the safety features.

c. To test the safety features of the firing mechanism, a combination electric and percussion primer will be inserted before the breech is rotated. With the gun commander's push button pressed, the trigger of the firing switch will be pulled, while the block is being rotated, to ascertain if it is possible to fire the primer before the breechblock is locked.

■ 34. LANYARD.—The lanyard will be pulled with a quick, strong pull (not a jerk) from a position as near the rear of the piece as is convenient. There is no safety device on this gun that operates when it is fired by the lanyard; therefore, the greatest care must be exercised in hooking the lanyard to the firing mechanism, and in handling the lanyard thereafter, to avoid firing before the gun is elevated. The firing lock must not be cocked until after the lanyard is attached.

■ 35. PRIMERS.—Precautions in the care and handling of primers will be observed as follows:

a. Prior to firing, the primer pouch will be examined to make certain that it contains live primers only. Each primer of a new lot will be tested electrically prior to firing and also to check the fit of the primer in the primer seat. If the primers do not fit, the primer seat will be examined to see that it does not contain any foreign particles which would interfere with the seating of the primer.

b. Care must be taken not to drop the primers.

c. Primers will not be inserted until after the breechblock has been closed and locked excepting when primers are used to test the safety devices.

d. No. 1 places fired primers in his pocket after extracting them and discards them at the first opportunity.

e. Necessary precautions will be taken to prevent any attempt to use a primer that has failed.

f. Any primer removed after an attempt to fire will be handled with great care.

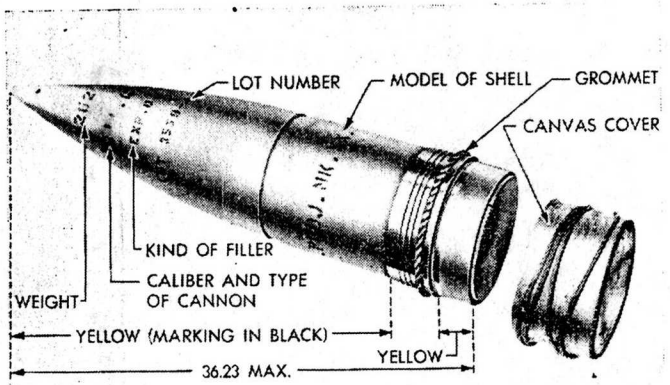


FIGURE 10.—A.P. projectile, Mk. XX, with B.D. fuze, Mk. X.

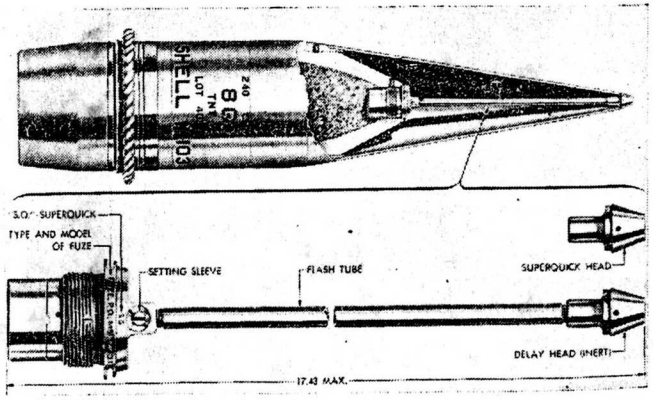


FIGURE 11.—H.E. projectile, M103, with P.D. fuze, M51-Mod. 1.

■ 36. FUZES.—*a.* Normally, the armor-piercing projectile, Mk. XX, equipped with base-detonating fuze, Mk. X, will be received properly fuzed for firing (fig. 10).

b. The high-explosive shell is fitted with Fuze, P.D., M51A1-Mod. 1 or Fuze, P.D., M51-Mod. 1 (fig. 11). The fuze, as received, is arranged for delay action. Delay action requires that the delay head (inert) be used. Superquick action is obtained when the superquick head is used in place of the delay head. The superquick head, which contains a firing pin and primer, is shipped in a separate container but in the same packing box as the shell. The delay head is made of solid brass, whereas the superquick head is closed with a disk of aluminum, crimped in place. The delay action is always operative; hence, if the fuze is arranged for superquick action and this action should fail, the fuze will still function with delay action.

c. A retaining screw, packed in the box with the high-explosive projectile, is intended for use only with the delay head when the Fuze, P.D., M51A1-Mod. 1 or Fuze, P.D., M51-Mod. 1 is replaced by a time fuze. The time fuze does not have an extended flash tube. Therefore, it requires the retaining screw to secure the delay head to the end of the windshield.

d. To arrange the fuze for superquick action:

(1) Unscrew the delay head from the point of the projectile with the fuze wrench provided for that purpose.

(2) Assemble the superquick head in place of the delay head and tighten with the fuze wrench.

e. For further instructions on the care and handling of fuzes, see FM 4-20 and appropriate Technical Manuals.

■ 37. SERVICE OF POWDER CHARGES.—In the powder magazine or in the gallery all powder charges will be kept in their containers except the charge which is to be served to the piece for the next succeeding round. The powder charge for any given round will not be brought near the breech until the preceding round has been fired, the powder chamber sponged, and the face of the mushroom head wiped.

■ 38. SPONGING POWDER CHAMBER.—After each shot the powder chamber will be sponged with the liquid provided for that purpose (see par. 46), and the mushroom head will be wiped with oily waste.

■ 39. COVER FOR GUN SECTION.—If cover is prescribed when firing high-explosive ammunition, each member of the gun section will be required to take adequate shelter each time the piece is fired (see AR 750-10).

■ 40. FIRING CONDITIONS.—During target practice, firing will be stopped at once if firing conditions become so poor as to endanger the tug or shipping in the field of fire.

■ 41. MISFIRES.—*a. General.*—A misfire occurs if the piece fails to fire when desired. In case of a misfire all personnel must remain clear of the path of recoil, and the piece is kept pointed at the target or at a safe place in the field of fire.

b. Primer heard to fire.—If the primer is heard to fire, it will *not* be removed or the breechblock opened until 10 minutes have elapsed since the primer fired.

c. Primer not heard to fire.—If the primer is not heard to fire, at least three attempts will be made to fire it. If a special device, by which the primer can be removed by an individual standing clear of the path of recoil, is available, the primer may be removed 2 minutes after the last attempt to fire. If the primer *has not fired,* a new one may be inserted and firing continued. If the primer *has fired,* a new primer will not be inserted or the breechblock opened until at least 10 minutes have elapsed since the last attempt to fire. If a special device for removing the primer is not available, the primer will not be removed nor the breechblock opened until 10 minutes have elapsed since the last attempt to fire (see FM 4-20).

SECTION VI

CARE AND ADJUSTMENT OF MATERIEL

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Firing mechanism 45
Sponging solution 46
Care of bore 47
Electric storage battery 48

■ 42. GENERAL.—*a.* Officers will be held strictly responsible for the proper care and preservation of all artillery materiel in their charge.

b. The methods prescribed for the operation, care, and preservation of materiel are those described herein and in other publications issued by the War Department (see appendix), a thorough understanding of which is required on the part of all officers and others having materiel in their charge.

c. Major repairs will be made by the services concerned. Adjustments and minor repairs will be made by battery personnel.

■ 43. RECOIL MECHANISM.—*a. General.*—The recoil mechanism is contained in two recoil cylinders, one long and one short, fitted into the lower section of the cradle, and one recuperator cylinder located between the two recoil cylinders (fig. 12). The recoil cylinders must be completely filled with recoil oil at all times. The air pressure in the recuperator must be kept constantly at 1,600 pounds per square inch as the air under this pressure holds the gun in battery when elevated; and when further compressed during recoil, it returns the gun to battery in counterrecoil. The proper amount of oil must be kept in the intensifier as this device controls the liquid seal which maintains a tight joint between the two halves of the recuperator. The amount of oil in the intensifier is indicated by the distance the piston rod protrudes from the front of the intensifier. The end of the piston rod must be kept between the prescribed limits of 0 and 7 on the indicator scale. The recoil cylinder, intensifier, oil tubes, and fittings should be examined regularly for leakage of oil.

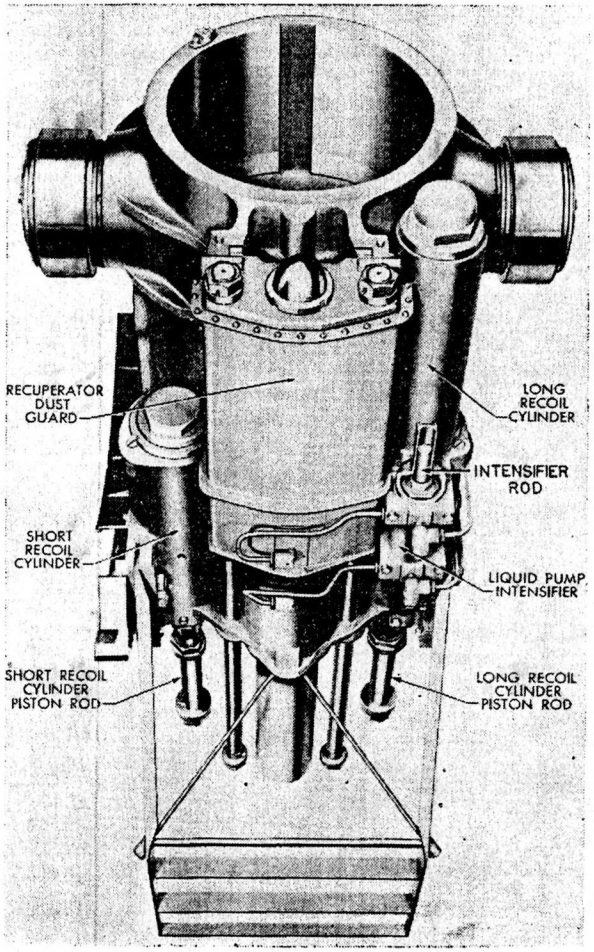


FIGURE 12.—Bottom view of cradle and recoil mechanism.

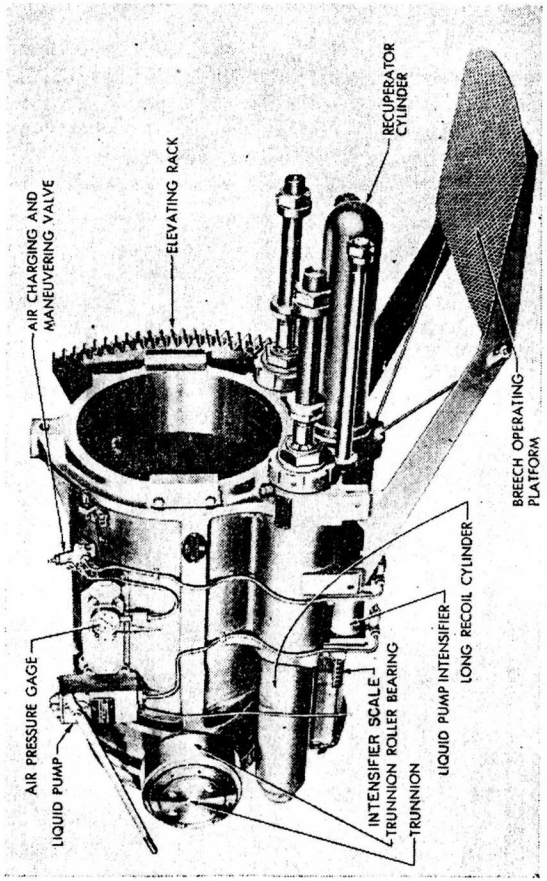


FIGURE 13.—Left side of cradle.

b. Filling recoil cylinder.—(1) Set the gun at zero degrees elevation.

(2) Remove the plugs located at the top rear of both the long and short recoil cylinders.

(3) Pour heavy recoil oil (specification 2-96A) into the filling hole in each recoil cylinder by means of a funnel until the level of the oil reaches the top of the filling hole. Allow any air present to escape and then pour in more oil until it is level with the top of the filling hole. About 48 quarts of recoil oil are required to fill both cylinders.

(4) Insert plugs and screw up tight.

c. Draining recoil cylinder.—(1) Set the gun at zero degrees elevation.

(2) Carefully wipe off any dirt or grit around the filling hole and then remove the filling plug.

(3) Remove drain plug and allow oil to run into a container. Oil should be changed once in each 6-month period.

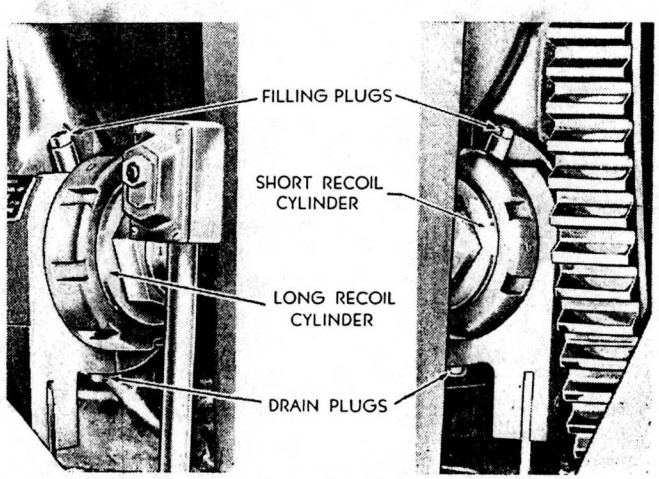


FIGURE 14.—Recoil cylinder filling and drain plugs.

d. Recharging recuperator.—(1) Frequent readings of the air pressure gage (fig. 15) must be taken to insure that 1,600 pounds per square inch is maintained in the recuperator at all times. To take a reading to determine the air pressure in the recuperator, very gradually open the needle valve on the air end of the intensifier. Opening quickly may damage the pressure gage. After the reading has been made, close the needle valve.

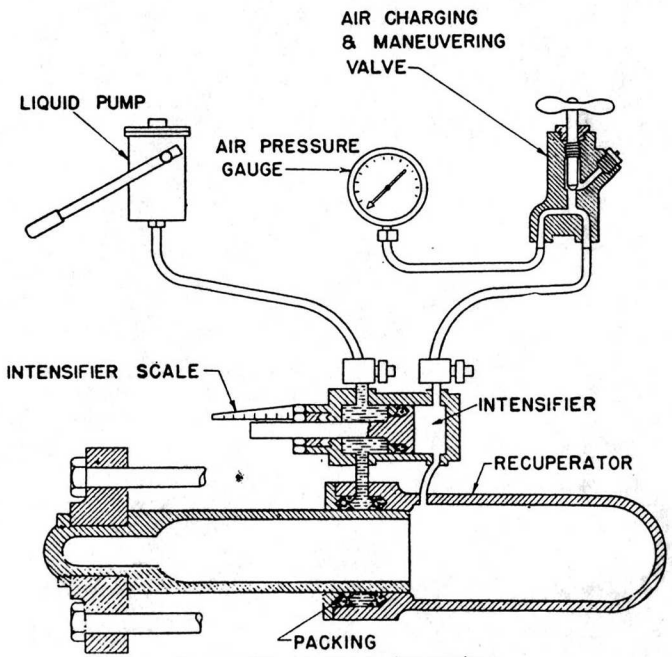


FIGURE 15.—Recuperator system.

(2) If the air pressure in the recuperator is less than 1,600 pounds per square inch, the system is recharged as follows:

(a) Make sure the maneuvering valve and the needle valve on the air end of the intensifier are closed.

(b) Remove the filling hole plug from the maneuvering valve.

(c) Connect a cylinder filled with compressed air to the filling hole of the maneuvering valve by means of the connection tubing designed for that purpose.

(d) Open the valve on the attached compressed air cylinder. By then opening the maneuvering valve *very slowly* the air cylinder pressure will be registered on the air pressure gage.

(e) If the air pressure in the air cylinder is greater than the air pressure in the recuperator, very gradually open the needle valve on the air end of the intensifier to full open position.

(f) Open the valve on the attached compressed air cylinder.

(g) Slowly open the maneuvering valve to permit air to flow gradually from the compressed air cylinder to the recuperator. When the air pressure gage shows that the air pressure in the recuperator system is slightly over 1,600 pounds per square inch, close all valves, disconnect the tubing, and replace the filling hole plug in the maneuvering valve.

e. Refilling intensifier.—When the position of the intensifier indicator shows an insufficient supply of reserve oil for the recuperator liquid seal, additional oil is supplied to the intensifier by means of the liquid pump mounted on the upper left side of the cradle in the following manner:

(1) Examine the oil in the pump reservoir for dirt and water. Drain, flush, and refill the reservoir if the oil is dirty or contains water.

(2) Make sure the pump reservoir is filled with a sufficient quantity of heavy recoil oil. It should be filled to within ¾ inch of the top of the reservoir.

(3) Open the needle valve in the liquid end of the intensifier. This valve is on the bottom of the front end of the intensifier.

(4) Operate the pump handle until the indicator end of the intensifier piston rod is near the figure 7 on the indicator scale.

(5) Close the needle valve in the liquid end of the intensifier.

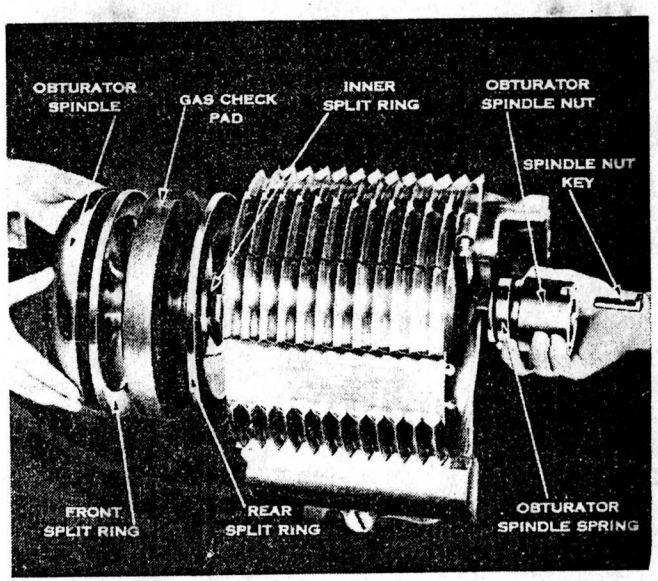


FIGURE 16.—Breechblock and obturator disassembled.

■ 44. BREECH MECHANISM.—*a. General.*—(1) Keep the breech mechanism (fig. 16) clean and well lubricated. When the gun is not in use, the breech cover should be in place to prevent dust and dirt from getting into the recesses of the mechanism.

(2) After firing and at intervals specified by the officer in charge, the breechblock and the firing lock should be disassembled, cleaned, and oiled. Residue should be removed from the primer seat and the vent through the spindle.

(3) If the breechblock does not rotate smoothly, or if the mechanism requires a greater effort than usual to operate, this defect should be sufficient warning to disassemble the breech operating mechanism to determine the cause.

(4) Any cutting or abrasion of the threads of the breechblock or in the breech recess should be reported to the Ordnance maintenance personnel for correction.

(5) Extreme care must be taken to prevent injury to the gas check seat as this affects the seating of the split rings and is likely to cause leakage of gas and burning of the gas check pad. A leak may result in serious erosion. Because the gas check seat is susceptible to moisture, rusting is likely to occur. The seat and rings, therefore, should be well-protected by oil when the piece is active, and by rust-preventive compound when the gun is not in use.

(6) The gas check pad must be kept in a condition that will permit its being compressed without being injured. It should be oiled frequently with engine oil, SAE 10, and the oil should be rubbed in well. A pad of the proper resiliency will yield slightly under heavy pressure from the thumbs.

(7) Except when the gun is being manned continuously, or when there is an order to the contrary, the firing lock should be removed from the gun, placed in its box, and stored in the armament chest. The thread-protecting cap should be screwed on the obturator spindle threads to protect them from damage.

b. Assembling breechblock.—(1) Assemble the front split ring, gas check pad, rear split ring, and inner split ring on the obturator spindle. Insert the spindle in the breechblock with the keyway for the spindle nut key alined under the firing contact bracket (fig. 8).

(2) Place the obturator spindle spring on the spindle and assemble the obturator spindle nut. Before setting the nut up tight, the gas check pad and the split rings must be centered. If they are not centered properly, the front edge of the front split ring will strike or scrape the inside of the

gun when the breech is closed and may injure the split ring and gas check pad or burr the gas check seat.

(3) Screw on the obturator spindle nut until the rear end of the nut is flush with the shoulder in the rear of the spindle thread. Aline the keyway in the nut with the keyway in the spindle and then give the nut one more complete turn. The proper amount of compression of the obturator spindle spring is obtained with the nut in this position. Insert the spindle nut key.

(4) If the obturator gives indication of being loose after long use, the obturator nut should be tightened one additional turn.

■ 45. FIRING MECHANISM.—*a. General.*—The firing mechanism (fig. 9) is designed for use with combination electric and percussion primers. The firing lock is intended to be fired electrically but may be fired by percussion if the electric circuit fails. The hammer contact piece is insulated and serves both to conduct current to the primer when the gun is to be fired electrically, and to strike the firing pin when the gun is to be fired by percussion. The primer is supported in its seat in the spindle by the firing lock wedge which closes behind it.

b. Installing firing lock.—Press the housing latch and hold it as far to the rear as it will go. Screw the firing lock on the end of the obturator spindle by turning the lock housing clockwise. Secure the firing lock in place by engaging the latch in its slot in the spindle. Connect the breech firing circuit cable with the firing lock and the contact bracket.

c. Firing electrically.—To reprime the firing lock, grasp the hammer and pull it about 1/16 inch to the rear. Then rotate the hammer to the left until the wedge is in its lowest position, insert the primer, and revolve the hammer to the right until the hammer contact piece is in line with the firing pin.

d. Firing by percussion.—To cock the firing lock for percussion firing, grasp the hammer and pull it gently to the rear about 1/16 inch. Then turn the hammer to the left about 45 degrees, keeping up a pull to the rear. When the

hammer begins to move directly to the rear, apply a slight pressure tending to revolve it to the right. When the hammer has reached its rear position, it will revolve 45 degrees to the right, bringing the hammer contact piece in line with the firing pin, and the sear will engage the hammer stem.

e. Uncocking firing lock.—To uncock the firing lock, grasp the hammer and pull it about 1/16 inch to the rear and revolve it about 45 degrees to the left. Ease the hammer forward until it reaches the forward limit of its travel. Then revolve the hammer 45 degrees to the right of its closed position.

■ 46. SPONGING SOLUTION.—*a.* The sponging solution is a solution of water and castile soap. Its purpose is to provide a sponging liquid that will extinguish burning residue in the chamber of the gun and also serve to lubricate the breech recess. If the soap solution is not available, plain water may be used.

b. The solution consists of 1 pound of castile soap in 4 gallons of water. Yellow soaps should not be used as they are liable to leave a gummy residue in the breech recess. The soap is shaved from the bar and the water is heated to facilitate dissolving. The water should be stirred with as little agitation as possible to prevent foaming.

c. To avoid the necessity of handling large receptacles, as much soap as will be required may be dissolved in one bucket of water. This concentrated soap solution will be added to water in other receptacles in the prescribed proportions.

■ 47. CARE OF BORE.—*a.* As soon as possible after firing and every day thereafter until all "sweating" has stopped, the bore of the gun will be cleaned, dried, and oiled. The cleaning solution is made by dissolving ½ pound of soda ash or 1 pound of sal soda in each gallon of boiling water. The bore is washed with this solution, using a bore sponge wrapped with burlap. Then the bore is wiped thoroughly dry with new burlap. Finally, a light coating of oil is applied to the

bore, using SAE 10 engine oil for temperatures below 32 degrees F. and SAE 30 engine oil for temperatures above 32 degrees F.

b. Care must be exercised to prevent the staves of the sponges and the slush and cleaning brushes from rubbing against the lower portion of the bore, as excessive wear of the lands will result from such practice.

■ 48. ELECTRIC STORAGE BATTERY.—*a.* The level and specific gravity of the battery fluid will be checked daily. Never use matches or other open flame as a light when checking the battery.

b. The specific gravity reading will be made with a hydrometer. The reading should be taken before distilled water is added to bring the battery fluid up to the required level (¼ inch above the plates). The normal reading will vary with the temperature of the air. The normal and recharging readings for various temperatures are as follows:

Temperature Degrees F.	*Normal reading*	*Recharging reading*
100	1.272	1.207
90	1.276	1.211
80	1.280	1.215
70	1.284	1.219
60	1.288	1.223
50	1.292	1.227
40	1.296	1.231
30	1.300	1.235
20	1.304	1.239
10	1.308	1.243
0	1.312	1.247
−10	1.316	1.255
−20	1.320	1.265
−30	1.324	1.275

c. Warm water poured slowly over the terminals will loosen any battery terminal corrosion (copper sulphate) that has been deposited, so that it can be brushed off and flushed away. The battery should be removed from the

gun while this work is being done. Battery posts and terminals should be wiped clean with a cloth saturated in an alkaline solution such as soda ash (sodium carbonate) and water. Corrosion can be retarded by coating the posts and terminals with grease.

d. The efficiency of storage batteries decreases with decreasing temperatures and becomes practically zero at —40 degrees F. A fully charged battery will not freeze at temperatures likely to be encountered even in Arctic climates, but a completely discharged battery will freeze at 5 degrees F.

SECTION VII

DEMOLITION OF MATERIEL

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Sights and observation instruments	55
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Ammunition	57
Fire control and observation stations; ammunition magazines	58

■ 49. GENERAL PRINCIPLES.—*a.* Tactical situations may arise when, due to limitations of time or transportation, it will become impossible to evacuate all equipment. In such situations it is imperative that all materiel that cannot be evacuated be destroyed to prevent:

(1) Its capture intact by the enemy.

(2) Its use by the enemy, if captured, against our own or allied troops.

b. The working principles to be followed are:

(1) Methods for the destruction of materiel subject to capture or abandonment in the combat zone must be adequate, uniform, and easily followed in the field.

(2) Destruction must be as complete as the available time, equipment, and personnel will permit. If thorough destruction of all parts cannot be completed, the parts essential to the operation or use of the materiel, particularly

those which cannot be easily duplicated, should be destroyed or removed. *The same essential parts must be destroyed on all like units to prevent the enemy's constructing one complete unit from several damaged ones by "cannibalization."*

(3) The destruction of materiel subject to capture or abandonment *will be undertaken only when ordered by the harbor defense or higher commander.*

c. To accomplish adequate and uniform destruction of materiel, it is essential that:

(1) All echelons prepare plans for the destruction of materiel in the event of imminent capture. Such plans must be flexible enough to make allowance for variations in available time, equipment, and personnel.

(2) All echelons be trained to effect the desired destruction of materiel issued to them. *Training will not involve the actual destruction of materiel.*

d. Certain of the methods outlined require special tools and materials, such as TNT and incendiary grenades, which normally may not be items of issue. The issue of such special tools and materials, the materiel for which issued, and the conditions under which destruction will be effected *are command decisions in each case,* according to the tactical situation.

■ 50. PRIORITY OF DESTRUCTION.—*a.* Destruction should be accomplished in the following priority:

(1) Tube, breech, and recoil mechanism.
(2) Power equipment.
(3) Carriage.
(4) Sights and observation instruments.
(5) Plotting room equipment.
(6) Ammunition.
(7) Fire control and observation stations; ammunition magazines.

b. In the event of imminent capture, everything that could be of possible use to the enemy should be destroyed. If evacuation is probable, all sights, optical instruments, and other valuable small items should be evacuated.

■ 51. TUBE.—*a. General.*—The selection of a method of demolition will depend on the tactical situation and the materials available. The methods for the destruction of the tube are presented in the order of their effectiveness.

b. Demolition by unfuzed HE shell and either M9A1 AT grenade or M6 AT rocket.—(1) Remove the recoil cylinder drain plug. It is not necessary to wait for the recoil fluid to drain completely before firing the piece as in (4) below.

(2) Lay an *armed (safety pin removed)* M9A1 AT grenade, HE, or M6 AT rocket in the tube about 6 inches in front of the projectile [in (3) below] with the ogive nose end toward the shell. The grenade or rocket must be centered in the tube, using either a wooden adapter or a wad of waste.

(3) Place an *unfuzed,* point-detonating, HE shell M103 and propelling charge in the gun and close the breech.

(4) Fire the gun electrically if possible; if not use a lanyard at least 100 feet long. The person firing the piece should be under cover in the rear of the piece and about 20 degrees off the line of fire.

(5) When using this method, the danger zone is about 500 yards in radius.

c. Demolition by TNT blocks.—(1) Remove the recoil cylinder drain plug. Insert 30 to 50 one-half pound TNT blocks in the chamber and close the breechblock. Plug the muzzle end of the tube tightly with earth to a distance of approximately 2 feet from the muzzle. Detonate the TNT charge by means of detonating cord routed through the primer vent.

(2) The firer should be under cover. The danger zone is about 500 yards.

(3) For instructions on the wiring and firing of TNT, see FM 5-25.

d. Demolition by TNT blocks and HE shell.—Remove the recoil cylinder drain plug. Ram an HE shell M103 into the forcing cone, place 30 to 50 one-half pound TNT blocks in the chamber, and close the breechblock. Detonate the

TNT with a detonating cord routed through the primer vent. A sufficient length of safety fuse should be used to permit personnel to reach cover.

e. Demolition by incendiary grenades.—If evacuation is imminent and it is desired to accomplish demolition without telltale explosions, the following method should be used: Place 10 to 12 unfuzed M14 incendiary grenades in the chamber. They should be placed on their sides and stacked one on top of another. Close the breech. Equip another incendiary grenade with a 15-second Bickford fuze, ignite it, and throw it in the muzzle. Elevate the gun quickly to its maximum elevation. The metal from the grenades will fuse with the interior of the breechblock, making it impossible to open the breech.

f. Demolition by firing guns at each other.—(1) Fire adjacent guns at each other at point-blank range, using HE or AP shells. Two or more hits on a vital spot such as the breech mechanism, recoil mechanism, or tube should adequately destroy a gun. Fire from cover. The danger space is from 200 to 500 yards.

(2) Destroy the last gun and carriage by the best means available.

(3) *Danger from "cannibalization" is inherent in this method.*

■ 52. BREECH.—Any of the above methods for destroying the tube should also destroy the breech; but if the method selected does not, a heavy sledge may be used to render the breech useless.

■ 53. RECOIL MECHANISM.—*a.* If the methods explained in paragraphs 51*b*, 51*c*, or 51*d* are used to destroy the tube and breech, the carriage and recoil mechanism should be adequately destroyed.

b. No other hasty method of destroying the recoil mechanism has been proposed.

■ 54. POWER EQUIPMENT.—All auxiliary power equipment should be rendered useless. Electric motors and generators

can most effectively and easily be put out of operation by injuring the field or armature windings. If time is available, the motor shell may be broken with a sledge and the coils ruined with a crowbar. If time is short, a small arms bullet may easily be directed into the coils through the air vents in either end bell, but care should be taken to see that nobody is in the path of a possible ricochet. Switch panels, plugs, and fuse or circuit-breaker panels should be smashed with a sledge or ax.

■ 55. SIGHTS AND OBSERVATION INSTRUMENTS.—Sights and observation instruments should be evacuated if possible. If they cannot be carried away, they should be smashed thoroughly.

■ 56. PLOTTING ROOM EQUIPMENT.—All boards and instruments should be smashed and burned if possible. Data transmitters and all communication equipment should be smashed.

■ 57. AMMUNITION.—*a. Projectiles.*—Projectiles are stacked horizontally with ogive ends pointing in the same direction. Remove the fuze from the center shell in the top row of each pile. Pack a detonating cap, with detonating cord attached, next to the booster in each center shell and detonate. The danger zone is at least 200 yards. Shells standing on their bases cannot be destroyed satisfactorily by sympathetic detonation.

b. Powder.—Separate loading propelling charges can be destroyed best by burning. This is accomplished most effectively when the charges are out of their containers or the containers are split.

■ 58. FIRE CONTROL AND OBSERVATION STATIONS; AMMUNITION MAGAZINES.—*a.* These installations can best be destroyed by demolition with TNT.

b. See FM 5-25 for details of demolition planning and execution.

SECTION VIII

STATISTICAL DATA

	Paragraph
Gun	59
Ammunition	60
Carriage, 8-inch, barbette, M1	61

■ 59. GUN.—

Diameter of bore between lands	inches	8.00
Diameter of bore between grooves	inches	8.14
Length of bore	calibers	45
Length from muzzle to rear face of breech	inches	369.
Length of rifling	inches	288.79
Type of rifling	Uniform, right-hand twist, one turn in 25 calibers.	

■ 60. AMMUNITION.—*a. Projectiles.*—

Shell, High-Explosive, 240 pounds, M103
Shell, Armor-Piercing, 260 pounds, Mk. XX
Shell, Target-Practice, 260 pounds, Mk. XVIII

b. Fuzes.—

Fuze, Point-Detonating, M51, Mod. 1
Fuze, Point-Detonating, M51A1, Mod. 1
Fuze, Base-Detonating, Mk. X

c. Primer.—

Primer, combination electric and percussion, Mk. XV, Mod. 1

d. Muzzle velocity.—

Shell, H.E., 240 pounds, M103		
Normal charge	feet per second	2,150
Supercharge	feet per second	2,840
Shell, A.P., 260 pounds, Mk. XX		
Normal charge	feet per second	2,100
Supercharge	feet per second	2,750
Shell, T.P., 260 pounds, Mk. XVIII		
Normal charge	feet per second	2,100
Supercharge	feet per second	2,750

e. Seating of projectile.—

Shell, A.P., and T.P.	inches	74.75
Shell, H.E.	inches	70.5

■ 61. CARRIAGE, 8-INCH, BARBETTE, M1.—*a. Elevation.—*

Maximum firing	degrees	45
Minimum firing (depending on emplacement)	degrees	(—)5
Loading	degrees	(—)5

b. Traverse.—

Continuous	degrees	360
Emplaced in casemate	degrees	145

c. Recoil mechanism.—

Recoil distance, normal	inches	27
Recoil distance, maximum	inches	28.5
Initial air pressure in recuperator	lbs. per sq. in.	1,600
Final air pressure in recuperator	lbs. per sq. in.	2,683
Initial liquid pressure in intensifier	lbs. per sq. in.	1,828
Final liquid pressure in intensifier	lbs. per sq. in	3,065

DRILL TABLE

Service of the piece, 8-inch gun, Mark VI, Modification 3A2, on barbette carriage M1

Details	DETAILS, POSTS	(*a*) EXAMINE GUN *** (*b*) REPORT
Gun pointer.....	Procures telescope, field telephone and head and chest set. Places telescope in telescope mount and uncovers azimuth indicator. Connects head and chest set to telephone and telephone to line. Tests communications. Takes post in rear of traversing handwheel, facing it.	(*a*) Checks adjustment, orientation, and serviceability of telescope, telescope mount, and azimuth indicator; tests traversing mechanism and communications to plotting room. (*b*) Reports to gun commander, "Traversing in order," or any defects he is unable to remedy without delay.
Elevation setter....	Procures field telephone and head and chest set. Connects head and chest set to telephone and telephone to line. Tests communications. Removes recoil parts lock. Uncovers elevation indicator. Takes post at elevating handwheel, facing to rear.	(*a*) Checks adjustment and serviceability of elevation indicator; tests elevating mechanism and communications to plotting room. (*b*) Reports to gun commander, "Elevation in order," or any defects he is unable to remedy without delay.

***The details listed under EXAMINE GUN are performed twice daily, morning and evening, and this command is not included when preparing for drill or combat.

DRILL TABLE

Service of the piece, 8-inch gun, Mark VI, Modification 3A2, on barbette carriage M1

TARGET	COMMENCE FIRING	(*a*) CEASE FIRING (*b*) SUSPEND FIRING
If using Case II pointing, pays particular attention to target designation and makes sure target described is selected; sets deflection as ordered and tracks target; calls or signals, "On target." If using Case III pointing without continuous data transmission, starts setting azimuths as ordered; calls or signals, "Azimuth set." If using Case III pointing with continuous data transmission, starts matching the mechanical and electrical pointers; calls or signals, "Azimuth set."	If using Case II pointing, waits for gun commander to call, "Ready," and then pulls trigger of firing pistol when on target; continues to set deflection and track target. If using Case III pointing, continues to set azimuths or match pointers.	(*a*) and (*b*) Continues receiving and setting data until CEASE TRACKING is received.
Depresses to loading position. As soon as chief of breech calls or signals, "Elevate," sets elevation by elevation indicator or by matching pointers. Calls or signals, "Elevation set."	After piece has been fired, depresses gun to loading position as rapidly as possible. As soon as chief of breech calls or signals, "Elevate," sets elevation by elevation indicator or by matching pointers. Calls or signals, "Elevation set."	(*a*) and (*b*) Continues receiving and setting data until CEASE TRACKING is received.

DRILL TABLE

Service of the piece, 8-inch gun, Mark VI, Modification 3A2, on barbette carriage M1

Details	DETAILS, POSTS	(*a*) EXAMINE GUN *** (*b*) REPORT
Chief of breech.....	Procures firing mechanism and cable, primer pouch containing primers, and pair of pliers. Assists No. 1 to remove breech cover. Places firing mechanism on obturator spindle and attaches firing cable. Tests firing circuit. Takes post at left of loading trough, facing to rear.	(*a*) Examines firing mechanism, places it on obturator spindle, and attaches firing cable; tests firing circuit; supervises work of breech detail. (*b*) Reports to gun commander, "Breech in order," or any defects he is unable to remedy without delay.
Battery Commander's telephone operator.	Procures field telephone and head and chest set. Connects head and chest set to telephone and telephone to line. Tests communications. Takes post at battery commander's telephone station.	(*a*) Checks equipment and cleans it. Tests communications. (*b*) Reports to gun commander, "Battery commander's telephone in order," or any defects he is unable to remedy without delay.
Azimuth display board operator.	Procures field telephone, head and chest set, chalk, and blackboard eraser or waste. Connects head and chest set to telephone and telephone to line. Tests communications. Takes post at azimuth display board.	(*a*) Checks equipment and cleans it. Tests communications. (*b*) Reports to gun commander, "Azimuth display board in order," or any defects he is unable to remedy without delay.
Elevation display board operator.	Procures field telephone, head and chest set, chalk, and blackboard eraser or waste. Connects head and chest set to telephone and telephone to line. Tests communications. Takes post at elevation display board.	(*a*) Checks equipment and cleans it. Tests communications. (*b*) Reports to gun commander, "Elevation display board in order," or any defects he is unable to remedy without delay.

***The details listed under EXAMINE GUN are performed twice daily, morning and evening, and this command is not included when preparing for drill or combat.

DRILL TABLE

Service of the piece, 8-inch gun, Mark VI, Modification 3A2, on barbette carriage M1

TARGET	COMMENCE FIRING	(*a*) CEASE FIRING (*b*) SUSPEND FIRING
Lowers loading trough, places right hand on base of projectile, and assisted by No. 2, pushes projectile into chamber and then shoves powder charge into powder chamber so that it will be pushed into place by mushroom head when breechblock is closed, and raises loading trough. When breechblock is closed and locked, inserts primer, signals or commands, "ELEVATE." If lanyard is used, hooks it, cocks firing lock, signals or commands, "ELEVATE."	When delegated, presses gun commander's push button. Listens for the explosion of primer which may be audible if powder charge fails to ignite. Repeats duties listed under command: TARGET.	(*a*) Notifies gun commander if gun is loaded (the executive will supervise the unloading by firing the gun when the field of fire is safe). If gun is unloaded, directs opening of breech and cleaning of breechblock, obturator head, gas check seat, breech recess, primer vent, and firing mechanism. (*b*) If piece is unloaded, directs loading and performs normal operations listed under command: TARGET.
Transmits the command.....	Transmits the command....	(*a*) and (*b*) Transmits the command. Continues to transmit all commands until relieved.
Relays data to gun pointer, then writes data on display board.	Continues posting data on display board.	(*a*) and (*b*) Continues as under TARGET until CEASE TRACKING is received.
Relays data to elevation setter, then writes data on display board.	Continues posting data on display board.	(*a*) and (*b*) Continues as under TARGET until CEASE TRACKING is received.

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DRILL TABLE

Service of the piece, 8-inch gun, Mark VI, Modification 3A2, on barbette carriage M1

Details	DETAILS, POSTS	(*a*) EXAMINE GUN *** (*b*) REPORT
No. 1 (breech detail).	Procures cotton waste, lubricating oil, and vent cleaning bit, placing them convenient to breech; removes breech cover, assisted by chief of breech; takes post to right of breech at breech crank, facing breech.	(*a*) Examines, cleans, and oils breechblock and breech mechanism. (*b*) Reports to chief of breech any defects in breech.
No. 2 (sponging and ramming detail).	Assisted by No. 5, procures sponge and sponge tub containing sponging liquid; removes loading trough cover; takes post at right of loading stand, facing to the rear.	(*a*) Examines sponge, loading stand, and loading trough. (*b*) Reports to gun commander, "Sponging in order," or any defects he is unable to remedy without delay.
No. 3 (Elevating detail).	Removes muzzle cover; takes post by elevating handwheel, facing to the rear.	(*a*) Assists elevation setter. (*b*) No duties.

***The details listed under EXAMINE GUN are performed twice daily, morning and evening, and this command is not included when preparing for drill or combat.

DRILL TABLE

Service of the piece, 8-inch gun, Mark VI, Modification 3A2, on barbette carriage M1

TARGET	COMMENCE FIRING	(*a*) CEASE FIRING (*b*) SUSPEND FIRING
Opens breech and holds breechblock in full open position; stands by until piece is loaded, then closes breech and faces to rear.	As soon as piece is fired, opens breech, ejects primer, cleans primer vent, and wipes off mushroom head. When piece is loaded, closes breech.	(*a*) No duties if piece is loaded. If piece is unloaded, opens breech and wipes off breechblock, obturator head, gas check seat, breech recess, primer vent, and firing mechanism. (*b*) If piece is unloaded, opens breech and holds breechblock in full open position; stands by until piece is loaded, then closes breech.
Places left hand on base of projectile and assists chief of breech to push projectile into chamber.	As soon as piece is fired and breech is open, sponges powder chamber with drained sponge fully saturated with sponging liquid. Places left hand on base of projectile and assists chief of breech to push projectile into chamber.	(*a*) and (*b*) No duties if piece is loaded. If piece is unloaded, sponges powder chamber as soon as breech is open.
Assists elevation setter.....	Assists elevation setter.....	(*a*) and (*b*) Assists elevation setter.

DRILL TABLE

Service of the piece, 8-inch gun, Mark VI, Modification 3A2, on barbette carriage M1

Details	DETAILS, POSTS	(*a*) EXAMINE GUN *** (*b*) REPORT
No. 4 (Powder detail).	Takes post at rear of gun directly in rear of loading stand, facing to the rear.	(*a*) Assists other details as directed by gun commander. (*b*) No duties.
No. 5 (sponging detail).	Assists No. 2 in procuring sponge and sponge tub containing sponging liquid; takes post near the sponge, facing to the rear.	(*a*) Assists No. 2. (*b*) No duties.

***The details listed under EXAMINE GUN are performed twice daily, morning and evening, and this command is not included when preparing for drill or combat.

DRILL TABLE

Service of the piece, 8-inch gun, Mark VI, Modification 3A2, on barbette carriage M1

TARGET	COMMENCE FIRING	(*a*) CEASE FIRING (*b*) SUSPEND FIRING
Receives powder charge from either No. 14, 15, 16, or 17 of ammunition squad and places it on loading stand as soon as projectile has been pushed into chamber, pushing the powder charge toward the breech. If powder cart is used, shoves powder from the cart onto the loading stand.	Receives powder charge from either No. 14, 15, 16, or 17 of ammunition squad and places it on loading stand as soon as projectile has been pushed into chamber, pushing the powder charge toward the breech. If powder cart is used, shoves powder from the cart onto the loading stand.	(*a*) No duties. (*b*) If piece is unloaded, same duties as under TARGET.
Stands by.....	As soon as breechblock is opened after each shot, assists No. 2 in sponging.	(*a*) and (*b*) Same duties as under TARGET.

APPENDIX

LIST OF REFERENCES

Ammunition, Coast Artillery	TM 4-205
Ammunition, general	TM 9-1900
Camouflage, cover, protection against air and chemical attacks, local security, machine gun defense	FM 4-5 TM 5-265
Care and maintenance of materiel	FM 4-20 TM 9-442 TM 9-850 TM 4-245
Commands	FM 4-5
Demolition	FM 5-25
Examination for gunners	FM 4-19 (now published as FM 4-150)
Fire control and position finding	FM 4-15
Gunnery	FM 4-10
Organization of the battery	FM 4-5 T/O 4-67
Safety precautions in firing	AR 750-10 FM 4-20

SECTION

DRILL TABLE

DETAILS	DETAILS, POST	(a) EXAMINE GUN (EQUIPMENT) (b) REPORT
No. 1 (breech detail).	Procures cotton waste, lubricating oil, and vent cleaning bit, placing them convenient to breech; removes breech cover, assisted by chief of breech; takes post to right of breech at breech crank, facing breech.	(a) Examines, cleans, and oils breechblock and breech mechanism. (b) Reports to chief of breech any defects in breech.
No. 2 (sponging and ramming detail).	Assisted by No. 5, procures sponge and sponge tub containing sponging liquid; removes loading trough cover; takes post at right of loading stand, facing to the rear.	(a) Examines sponge, loading stand, and loading trough. (b) Reports to gun commander, "Sponging in order," or any defects he is unable to remedy without delay.
No. 3 (elevating detail).	Removes muzzle cover; takes post by elevating handwheel, facing to the rear.	(a) Assists elevation setter. (b) No duties.
No. 4 (powder detail).	Takes post at rear of gun directly in rear of loading stand, facing to the rear.	(a) Assists other details as directed by gun commander. (b) No duties.

IX

(Superseded.)

(a) TARGET (DESIGNATION) (b) (AMMUNITION) LOAD	COMMENCE FIRING (RESUME FIRING)	(a) CEASE FIRING (b) SUSPEND FIRING
(a) Opens breech and holds breechblock in full open position. (b) Stands by until piece is loaded, then closes breech and faces to rear.	As soon as piece is fired, opens breech, ejects primer, cleans primer vent, and wipes off mushroom head. When piece is loaded, closes breech.	(a) No duties if piece is loaded. If piece is unloaded, opens breech and wipes off breechblock, obturator head, gas check seat, breech recess, primer vent, and firing mechanism. (b) If piece is unloaded, opens breech and holds breechblock in full open position; stands by until piece is loaded, then closes breech.
(a) No duties. (b) Places left hand on base of projectile and assists chief of breech to push the projectile into the chamber.	As soon as piece is fired and breech is open, sponges powder chamber with drained sponge fully saturated with sponging liquid. Places left hand on base of projectile and assists chief of breech to push projectile into chamber.	(a) and (b) No duties if piece is loaded. If piece is unloaded, sponges powder chamber as soon as breech is open.
(a) and (b) Assists elevation setter.	Assists elevation setter.	(a) and (b) Assists elevation setter.
(a) No duties. (b) Receives powder charge from either No. 14, 15, 16, 17, or 18 and places it on loading stand as soon as projectile has been pushed into the chamber, pushing the charge toward the breech.	Continues to place powder charges on the loading stand as needed.	(a) Returns unused powder charge (if any) to powder detail. (b) Places powder charge, if needed, on the loading stand.

SECTION

DRILL TABLE

DETAILS	DETAILS, POST [1]	(a) EXAMINE GUN (EQUIPMENT) (b) REPORT
Elevation setter..	Procures field telephone and head and chest set. Connects head and chest set to telephone and telephone to line. Tests communications. Removes recoil parts lock. Uncovers elevation indicator. Takes post at elevating handwheel, facing to rear.	(a) Checks adjustment and serviceability of elevation indicator; tests elevating mechanism and communications to plotting room. (b) Reports to gun commander, "Elevation in order," or any defects he is unable to remedy without delay.
Chief of breech...	Procures firing mechanism and cable, primer pouch containing primers, and pair of pliers. Assists No. 1 to remove breech cover. Places firing mechanism on obturator spindle and attaches firing cable. Tests firing circuit. Takes post at left of loading trough, facing to rear.	(a) Examines firing mechanism, places it on obturator spindle, and attaches firing cable; tests firing circuit; supervises work of breech detail. (b) Reports to gun commander, "Breech in order," or any defects he is unable to remedy without delay.
Battery commander's telephone operator.	Procures field telephone and head and chest set. Connects head and chest set to telephone and telephone to line. Tests communications. Takes posts at battery commander's telephone station.	(a) Checks equipment and cleans it. Tests communications. (b) Reports to gun commander, "Battery commander's telephone in order," or any defects he is unable to remedy without delay.

1X

(Superseded.)

(a) TARGET (DESIGNATION) (b) (AMMUNITION) LOAD	COMMENCE FIRING (RESUME FIRING)	(a) CEASE FIRING (b) SUSPEND FIRING
(a) Depresses gun to the loading position. (b) As soon as the chief of breech calls or signals, "Elevate," sets elevation by elevation data indicator or by matching pointers. Calls or signals, "Elevation set."	After piece has been fired, depresses gun to loading position as rapidly as possible. As soon as chief of breech calls or signals, "Elevate," sets elevation by elevation indicator or by matching pointers. Calls or signals, "Elevation set."	(a) If gun is not loaded, brings it to the load position and remains at post. If gun is loaded, continues to match pointers or set elevations until CEASE TRACKING is given. (b) Brings the gun to the load position if the chamber is empty. When gun is loaded, continues to match pointers or to set elevations until CEASE TRACKING is given.
(a) Lowers loading trough into the loading position. (b) Assisted by No. 2, pushes projectile into chamber and then shoves powder charge into powder chamber so that it will be pushed into place by the mushroom head when the breechblock is closed. Raises loading trough. When breechblock is closed and locked, inserts primer and signals or commands: ELEVATE. If lanyard is used, hooks it, cocks firing lock, and signals or commands: ELEVATE.	When delegated, presses gun commander's push button. Pulls lanyard when it is used. Listens for the explosion of the primer which may be audible if the powder charge fails to ignite. Repeats duties listed under the command LOAD.	(a) Notifies gun commander if gun is loaded (the executive will supervise the unloading by firing the gun when the field of fire is safe). If gun is unloaded, directs opening of breech and cleaning of breechblock, obturator head, gas check seat, breech recess, primer vent, and firing mechanism. (b) If piece is unloaded, directs loading and performs normal operations listed under command LOAD.
(a) and (b) Transmits the command.	Transmits the command.	(a) and (b) Transmits all commands.

SECTION

DRILL TABLE

DETAILS	DETAILS, POST [1]	(*a*) EXAMINE GUN (EQUIPMENT) [2] (*b*) REPORT
Gun commander.	Gives command. Supervises procurement of equipment. Takes post near gun commander's push button, alert to the supervision of his detail.	(*a*) Gives command. Inspects the gun, carriage, and other matériel, giving particular attention to the recoil mechanism, recuperator intensifier, firing mechanism, recoil parts lock and other safety devices, and oiling of the various bearing surfaces. (*b*) Commands: REPORT, and receives all reports from the chief of ammunition and the various details of the gun squad. Reports through the battery commander's telephone operator, "No. —— in order" or any defects he is unable to remedy without delay.
Gun pointer.....	Procures telescope, field telephone, and head and chest set. Places telescope in telescope mount and uncovers azimuth indicator. Connects head and chest set to telephone and telephone to line. Tests communications. Takes post in rear of traversing handwheel, facing it.	(*a*) Checks adjustment, orientation, and serviceability of telescope, telescope mount, and azimuth indicator; tests traversing mechanism and communications to plotting room. (*b*) Reports to gun commander, "Traversing in order," or any defects he is unable to remedy without delay.

[1] All men should take posts on the alert signal. A verbal order is not necessary.

[2] The command EXAMINE GUN (EQUIPMENT) is not necessary when preparing for readiness.

[3] See paragraphs 9, 26, and 27.

IX

(Superseded.)

(*a*) TARGET (DESIGNATION) (*b*) (AMMUNITION) LOAD	COMMENCE FIRING (RESUME FIRING)	(*a*) CEASE FIRING (*b*) SUSPEND FIRING
(*a*) Repeats command and target designation. In Case II firing, assists the gun pointer in getting on the correct target. Reports through the battery commander's telephone operator, "Sir, No. —— on target." [3] (*b*) As soon as the ammunition to be used is indicated, relays this information to the chief of ammunition. Repeats the command LOAD and supervises the work of the squad.	In Case III firing with continuous data transmission, fires the gun after the elevation setter calls, "Set." Without continuous data transmission, fires the gun on the proper time interval after the gun pointer and elevation setter call, "On target" and "Elevation set," respectively. In Case II firing, presses the gun commander's push button and calls, "Ready." [3]	(*a*) Gives or repeats command and supervises the duties of the gun squad. Holds the gun squad ready to continue firing until the command REPLACE EQUIPMENT is given. (*b*) Repeats command. If the gun is unloaded, causes it to be loaded and holds fire until he receives the command RESUME FIRING. (*a*) and (*b*) If the gun is loaded, causes all personnel to keep away from the gun commander's push button. If firing by lanyard, causes lanyard to be detached.
(*a*) In Case III pointing with continuous data transmission, traverses the piece until the pointers are matched; calls or signals, "On target." Without continuous data transmission, starts setting azimuths as ordered; calls or signals, "On target." In Case II firing gets on target with telescope; sets deflection as soon as available; calls or signals, "On target," and tracks target. (*b*) In Case III firing, continues to match pointers or to set azimuths. In Case II firing, continues to track target.	If using Case II pointing, waits for gun commander to call, "Ready," and then pulls trigger of firing pistol when on target; continues to set deflection and track target. If using Case III pointing, continues to set azimuths or match pointers.	(*a*) and (*b*) Continues receiving and setting data until CEASE TRACKING is received.

combat, as the gun and servicing equipment are maintained constantly in a state of

structions contained in TM 9–442, War Department Lubricating Order No. 67, and other appropriate War Department publications. The cleaning solution is made by dissolving ½ pound of soda ash in each gallon of boiling water. The bore is * * * with new burlap. Finally, a light coating of oil is applied to the bore, using SAE 30 engine oil for temperatures above + 32° F., SAE 10 engine oil for temperatures between + 32° F. and 0° F., or special preservative lubricating oil for temperatures below 0°F. If the gun is not on a defense status, which requires that it be ready to fire within 24 hours, medium preservative lubricating oil will be applied in accordance with instructions contained in TM 9–2835.

Note (Added).—TM 9–2835 will supersede the TB 2835 series and "Lubrication of Ordnance Matériel."

* * * * *

■ 48. ELECTRIC STORAGE BATTERY.—*a.* The level and specific gravity of the battery fluid will be checked weekly. Never use matches * * * checking the battery.

b. The specific gravity * * * with a hydrometer. The reading should be taken before distilled water is added to bring the battery fluid up to the required level (⅜ inch above the separators). The normal reading * * * are as follows:

* * * * *

■ 60. AMMUNITION.—*a. Projectiles.*—

* * * * *

Shell, Armor-Piercing, 260 pounds, Mk. XX
Shell, C. I., 260 pounds, Mk. XVIII
Shell, C. I., 260 pounds, M109.

b. Fuzes.—

Fuze, Point-Detonating, M51 (all types), Mod. 3
Fuze, Base-Detonating, Mk. X

* * * * *

d. Muzzle velocity.—

* * * * *

Shell C. I., 260 pounds, Mk. XVIII

* * * * *

■ 40. SAFETY POINTING.—*a. Poor visibility.* During target practice * * * field of fire.

b. (Added.) *Safety pointing observer.* The employment of a safety pointing observer will be in accordance with one of the methods given in FM 4–20.

■ 41. MISF[illegible]S.

* * * * *

b. (Superseded.) Two attempts will be made to fire the primer before it may be removed. If upon examination it is found that the primer has not fired, a new primer will be inserted and fire continued. If the primer has fired, a minimum of 60 seconds will be allowed before the breech may be opened and the faulty charge removed. The faulty charge must be stored separately from other charges. (See FM 4–20.)

c. Rescinded.

■ 42. GENERAL.

* * * * *

b. The methods prescribed for the operation, care, and preservation of matériel are those described in this manual, War Department Lubrication Order No. 67, TM 9–442, TM 9–850, TM 9–2835, and other publications issued by the War Department (see appendix), a thorough understanding of which is required on the part of all officers and others having matériel in their charge.

■ 43. RECOIL MECHANISM.—*a. General.*—The recoil mechanism * * * leakage of oil. The gun must not be allowed to recoil more than 27½ inches. For information concerning the measuring of the length of recoil and other details of the recoil and counterrecoil mechanisms, see TM 9–442. For instructions concerning recoil fluid, refer to War Department Recoil Fluid Guide No. 59.

b. Filling recoil cylinder.

* * * * *

(3) Pour the prescribed recoil fluid into the filling hole in each recoil cylinder by means of a funnel until the level of the oil reaches the top of the filling hole. Allow any air * * * fill both cylinders.

* * * * *

e. Refilling intensifier.

* * * * *

(2) Make sure the pump reservoir is filled with a sufficient quantity of the prescribed recoil fluid. It should be * * * of the reservoir.

* * * * *

■ 44. BREECH MECHANISM.—*a. General.*

* * * * *

(2) Daily and after firing the breechblock and the firing lock should be disassembled, cleaned, and oiled in accordance with instructions contained in TM 9–442 and other appropriate War Department publications. Residue should be * * * through the spindle.

* * * * *

(6) The gas check pad must be kept in a condition that will permit its being compressed without being injured. When the breechblock is disassembled for cleaning and oiling, the gas check pad should be removed from the obturator spindle, wiped clean with a dry cloth, and oiled lightly with a clean cloth wet with engine oil (SAE 30 above +32° F., or SAE 10 below +32° F.). The gas check pad should not be soaked in oil; neither should it be cleaned with dry-cleaning solvent or any other type of cleaning solution. A pad of * * * from the thumbs.

* * * * *

■ 46. SPONGING SOLUTION.—*a.* Rescinded.

b. Rescinded.

c. (Superseded.) Clean water will be used to sponge the powder chamber and obturator mushroom head between rounds. When subfreezing temperatures prevail, during firing, denatured alcohol will be used with water to prevent freezing of the sponging solution in the breech recess or breechblock. To 10 parts by volume of water, add the following number of parts of denatured alcohol:

Temperatures degrees F.	*Alcohol denatured*	*Temperatures degrees F.*	*Alcohol denatured*
20	2	−15	9
10	4	−30	16
0	6½	−40	27

■ 47. CARE OF BORE.—*a.* As soon as possible after firing and every day thereafter until all "sweating" has stopped, the bore of the gun will be cleaned, dried, and oiled in accordance with in-

b. Nos. 8 and 9, or 10 and 11, lower or shove a projectile onto the loading stand and then roll the shot tongs along the trolley or the shot truck along the track until it is clear of the loading stand.

* * * * *

e. At the command **LOAD,** the projectile is pushed home by the chief of breech with his right hand and by No. 2 with his left hand. The projectile should * * * to facilitate ramming.

f. At the command **LOAD,** No. 14, 15, 16, 17, or 18 of the powder detail brings up the propelling charge to No. 4.

g. After the command **LOAD** has been given and the projectile has been rammed, No. 4 places the powder charge on the loading stand. The chief of * * * from the breech.

* * * * *

■ 23. CHANGING POWDER CHARGE.—In the event * * * the necessary instructions. At his command the designated cannoneers will perform such portions of the duties prescribed for the commands SUSPEND FIRING OR **LOAD** as are applicable.

■ 24. POINTING, CASE III.—*a.* When the azimuth indicator is used with the data transmitter in the plotting room, the gun pointer at the command **TARGET,** and as soon as data are available, traverses the piece until the electrical and mechanical pointers are matched and calls, "On target." Thereafter he keeps the pointers matched at all times.

b. When the azimuth indicator is used without the data transmitter, the gun pointer traverses the piece until the mechanical pointer indicates the azimuth received over his head and chest set and calls, "On target."

■ 25. ELEVATION, CASE III.

* * * * *

b. When the elevation indicator is used without the data transmitter, the elevation setter elevates the piece until the mechanical pointer indicates the elevation received over his head and chest set and calls, "Elevation set."

* * * * *

■ 26. FIRING, CASE III.

* * * * *

b. When using a * * * at all times. After the elevation setter calls, "Elevation set," the gun commander fires the piece by pressing the gun commander's push button.

c. When firing on a time interval signal, the gun pointer and elevation setter set the data received over their head and chest sets and call, "On target" and "Elevation set," respectively. The gun commander, at the sounding of the proper time interval signal, fires the gun by pressing the gun commander's push button.

d. The chief of breech may be detailed to press the gun commander's push button at the gun commander's command or signal of **FIRE.** If firing by lanyard, the chief of breech fires the piece when the gun commander commands or signals: **FIRE.**

■ 27. FIRING, CASE II.—***a.*** The gun pointer sets on his sight the deflection received over his head and chest set and traverses the piece, keeping the vertical cross wire of his sight on the target. At the time * * * on the target.

b. (Added.) For a description of the telescope and telescope mount and methods of adjustment and operation see TM 9–442.

■ 29. THE COMMAND RE-LAY.—At the command * * * the command TARGET.

■ 31. GENERAL.—The following safety precautions are prescribed for ***training conditions.*** They indicate as well the *principles* to be followed under ***combat conditions*** but these precautions should be interpreted by the battery executive according to the *circumstances existing at the time of any particular emergency.* Further instructions concerning * * * AR 750–10 and FM 4–20.

■ 36. FUZES.

* * * * *

b. The high-explosive shell is fitted with Fuze, P. D., **M51A( )-Mod. 3** or Fuze, P. D., M51-Mod. 1 (fig. 11). The fuze, as * * * with delay action.

c. A retaining screw, packed in the box with the high-explosive projectile, is intended for use only with the delay head when the Fuze, P. D., **M51A( )-Mod. 3** or Fuze, P. D., M51-Mod. 1 is replaced by time fuze **M67A3.** This time fuze does not have an extended flash tub. Therefore, it requires * * * of the windshield.

* * * * *

■ 38. SPONGING POWDER CHAMBER.—After each shot the powder chamber and obturator mushroom head will be sponged with the liquid provided for that purpose (see par. 46).

command and the target designation. In Case II firing, he assists the gun pointer in getting on the correct target. As soon as the gun pointer is on target (Case II) or has his pointers matched (Case III), the gun commander reports through the battery commander's telephone operator, "Sir, No. —— on target."

g. At the command **LOAD**, he repeats the command, supervises the loading of the piece, and stands ready to fire the gun or give the command to fire.

h. At the command * * * gun data computer.

i. He commands: CEASE * * * it is received. At the conclusion of a series of shots, he reports through the battery commander's telephone operator, "Sir, No. —— (so many) rounds fired." Should the gun * * * to be detached. If **CEASE TRACKING** is given, the gun commander sees that the piece is pointed in a safe field of fire. When dummy ammunition is used, he commands: UNLOAD, and supervises the unloading. If using live ammunition, the gun may be unloaded by firing under the supervision of the battery executive when the field of fire is clear.

* * * * *

Subparagraphs *g* to *n*, inclusive, are relettered *h* to *o*, inclusive.

■ 14. DISPLAY BOARD OPERATORS.—Rescinded.

■ 15. CHIEF OF AMMUNITION.

* * * * *

b. He keeps a record of all ammunition received and ammunition used by his gun, exercising particular care that projectiles and fuzes are listed under proper name, type, and lot number.

* * * * *

g. At the command **LOAD**, he directs and supervises the service of ammunition.

* * * * *

■ 16. AMMUNITION SQUAD.—*a.* At the command DETAILS, POSTS, members of the ammunition squad (Nos. 6 to 18) take posts in the magazine or galley and prepare the equipment for firing or drill.

b. At the command **LOAD**—

* * * * *

(3) Nos. 12 and 13 remove the powder charge from the container (one at a time as needed) and stand ready to deliver the

charge to No. 14, 15, 16, 17 or 18 stationed outside the magazine or load the charge on a powder cart located outside the magazine doors.

(4) Nos. 14, 15, 16, 17, and 18 stationed outside the magazine receive in turn the powder charges and deliver them to No. 4 at the gun.

* * * * *

■ 17. ARTILLERY MECHANICS.—*a.* The artillery mechanic is a member of the maintenance section of the battery. He makes minor repairs and adjustments, assisted by members of the gun section. The artillery mechanic is the custodian of supplies pertaining to the gun emplacements to which his battery is assigned. He is responsible * * * supplies contained therein. The artillery mechanic or his assistant issues such equipment, tools, oils, paints, and cleaning materials to the members of the gun sectitons as may be necessary for the service and care of the guns and accessories.

b. Under the supervision * * * the following duties—

(1) Check the level * * * oil if necessary. (See par. 43*b* and TM 9–442.)

(2) Check the position * * * on the cradle. (See par. 43*c* and TM 9–442.)

(3) Open the needle * * * must be closed. (See par. 43*d* and TM 9–442.)

(4) Check the fluid * * * electrical firing circuit. (See par. 48 and TM 9–442.)

■ 18. POWER PLANT OPERATORS.—*a.* The power plant operators are members of the power plant detail of the battery. They are responsible * * * and decontaminating units.

* * * * *

■ 19. GENERAL.

* * * * *

c. (Superseded.). Normally, practice drill will be carried out simulating the full firing cycle, using dummy ammunition, dummy or fired service primers, and tracking a moving target or following a simulated target course.

* * * * *

■ 22. LOADING.—*a.* Shot tongs or shot trucks carrying projectiles should be delivered to the gun immediately after the chief of ammunition has been informed as to the type of projectile, fuze, and powder charge to be used.

■ 3. GUN SECTION (Superseded).—T/O & E 4–67 provides for a gun section consisting of 24 enlisted men for a battery in category of defense C or higher and equipped with a data transmission system or with data phones for gun pointer and elevation setter. When the wartime status of a battery equipped with a data transmission system or with data phones for gun pointer and elevation setter is lower than category of defense C, the table allots 3 less cannoneers and the gun section's complement is 21 men.

Note.—T/O & E 4–67 also allots one basic for each of the above gun sections. These basics are provided as loal replacements to take care of normal "garrison" losses and are over and above the complement of personnel required to perform the functions for which the unit is designed.

■ 4. GUN SQUAD.—The gun squad (10 enlisted men) consists of the gun commander, gun pointer, elevation setter, battery commander's telephone operator, chief of breech, and 5 cannoneers, numbered from 1 to 5 inclusive. Men are assigned * * * and facilitate replacement.

■ 5. AMMUNITION SQUAD.—The ammunition squad (14 enlisted men) consists of the chief of ammunition and 13 ammunition handlers numbered from 6 to 18 inclusive. This squad is * * * by local conditions.

■ 6. FORMATION.—Each gun section * * * the gun pointer. When the artillery mechanic is present, he falls in at the extreme left of the front rank.

■ 7. BATTERY EXECUTIVE.

* * * * *

b. Twice daily, or as prescribed by the harbor defense commander, he inspects the matériel under his charge and personally verifies the adjustment of all pointing devices. He tests the * * * in the recuperator.

* * * * *

■ 9. GUN COMMANDER.

* * * * *

c. At the direction of the assistant battery executive or battery executive, he forms his gun section at the emplacement and commands: 1. DETAILS, 2. POSTS. Servicing equipment is * * * remedy without delay.

* * * * *

f. (Superseded.) At the command TARGET, he repeats the

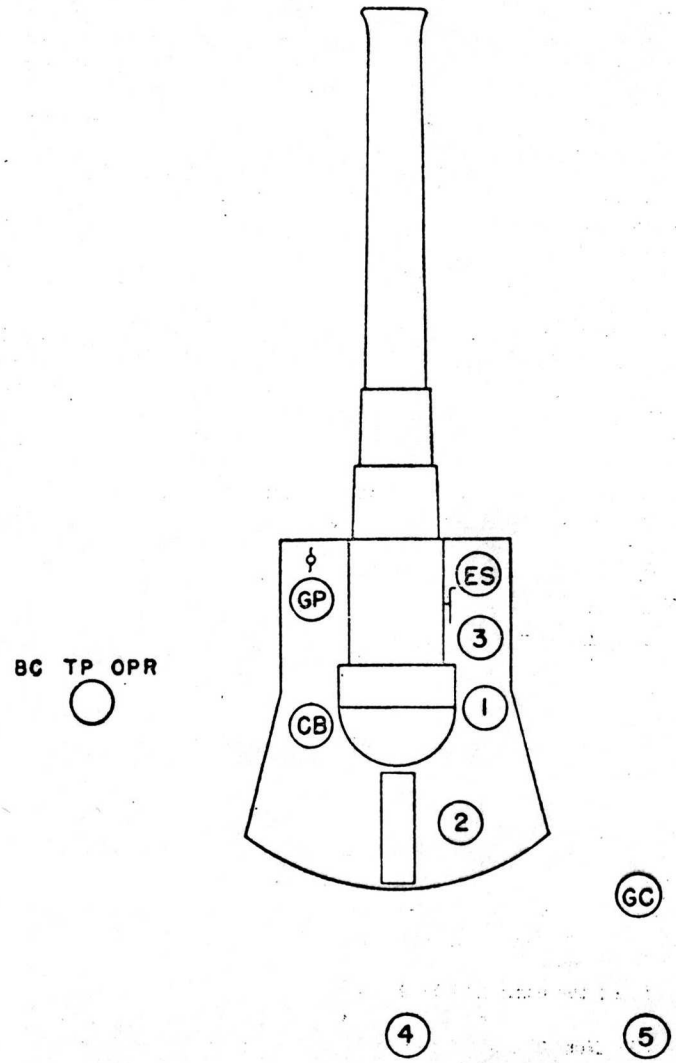


FIGURE 4.—Positions of gun squad at DETAILS, POST.

Reference

RESTRICTED

FM 4–48
C 1

COAST ARTILLERY FIELD MANUAL

SERVICE OF THE PIECE

8-INCH GUN, MARK VI, MODIFICATION 3A2, ON BARBETTE CARRIAGE M1

CHANGES No. 1

WAR DEPARTMENT,
WASHINGTON 25, D. C., 13 December 1944.

FM4–48, 26 July 1943, is changed as follows:

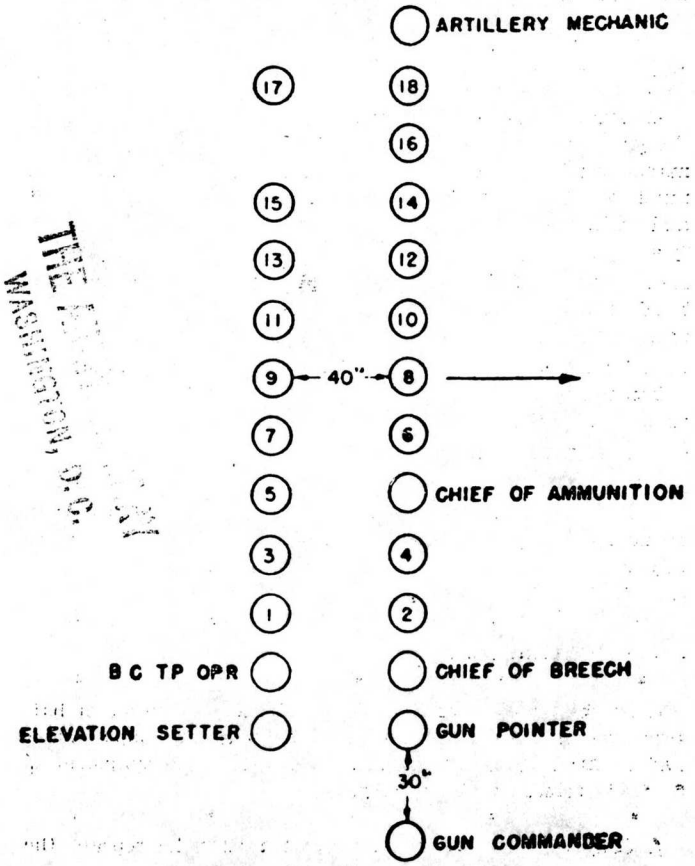


FIGURE 3.—Formation of gun section.

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APPENDIX

LIST OF REFERENCES

* * * * *

Camouflage, cover, protection against air and chemical attacks, local security, machine gun defense	FM 4–5 FM 5–20 FM 5–20F FM 5–20G FM 21–40 TM 3–220 TM 5–265 TM 5–267

* * * * *

Examinations for gunners	FM 4–19

* * * * *

Safety precautions in firing	AR 750–10 FM 4–20

Note (Added).—For additional references see FM 21–6.

[AG 300.7 (29 Sep 44)]

BY ORDER OF THE SECRETARY OF WAR:

G. C. MARSHALL
Chief of Staff

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

DISTRIBUTION:
AGF (10); ASF (2); Arm & Sv Bd 4, 5, 9, 11 (2); Def C (10); Sectors (2), Sub-sectors (2); Tech Sv (2); Sv C (10); HD (5); Sp Sv Sch 4 (100), 9 (2); USMA (2); ROTC 4 (1).
T/O & E: 4–62 (5); 4–66 (5); 4–67 (25); Special Distribution oversea.
For explanation of symbols, see FM 21–6.

Reference

SECTION

DRILL TABLE

DETAILS	DETAILS, POST	(a) EXAMINE GUN (EQUIPMENT) (b) REPORT
No. 5 (sponging detail).	Assists No. 2 in procuring sponge and sponge tub containing sponging liquid; takes post near the sponge, facing to the rear.	(a) Assists No. 2. (b) No duties.
Chief of ammunition.	Takes post where he can most conveniently direct the ammunition squad.	(a) Supervises and assists in the examination of the ammunition-handling equipment; sees that projectiles are clean and so arranged by weight groups that projectiles of one weight group will be fired consecutively; and inspects powder to be used. (b) Reports to the gun commander, "Ammunition service in order," or any defects he is unable to remedy without delay.
Nos. 6 to 18 (ammunition detail).	Open the projectile rooms and the powder magazines; stand by positions as posted by the chief of ammunition.	(a) Examine and prepare the ammunition and the ammunition-handling equipment for service. (b) No duties.

IX

(Superseded.)

(a) TARGET (DESIGNATION) (b) (AMMUNITION) LOAD	COMMENCE FIRING (RESUME FIRING)	(a) CEASE FIRING (b) SUSPEND FIRING
(a) and (b) Stands by.	As soon as breechblock is opened after each shot, assists No. 2 in sponging.	(a) and (b) No duties if piece is loaded. If piece is unloaded, assists No. 2 to sponge powder chamber when breech is opened.
(a) No duties. (b) Repeats name and type of projectile, fuze, and powder charge called for by gun commander, and supervises service of ammunition to the gun.	Supervises the service of ammunition to the gun position.	(a) Halts the service of ammunition and sees that all powder charges are returned to their containers and the containers closed. (b) If piece is unloaded, sees that projectile and powder charge are served to load the gun.
(a) No duties. (b) Serve ammunition to the loading stand at the gun position. Place one projectile in the depression on the top of the loading stand. Deliver powder charge to No. 4.	Continue to serve ammunition as needed.	(a) No duties. (b) Continue to serve ammunition, if needed, to the gun position.