FM 4-74

WAR DEPARTMENT FIELD MANUAL

SERVICE OF THE PIECE

6-INCH GUN M1903A2 OR M1905A2 ON BC M1 AND M2 6-INCH GUN M1 ON BC M3 AND M4

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WAR DEPARTMENT · 15 AUGUST 1944

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FM 4–74

COAST ARTILLERY FIELD MANUAL

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FM 4-74, Coast Artillery Field Manual, Service of the Piece, 6-inch Gun M1903A2 or M1905A2 on BC M1 and M2, 6-inch Gun M1 on BC M3 and M4 is published for the information and guidance of all concerned.

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BY ORDER OF THE SECRETARY OF WAR:

G. C. MARSHALL,
Chief of Staff.

OFFICIAL:

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

DISTRIBUTION:

As prescribed in paragraph 9*a*, FM 21–6: Island Comds (5); Base Comds (5); Sv C (10); Depts (5); Sectors (5); Sub-Sectors (5); HD (5); IR 4 (5); IBn 4 (5); IC 4 (25); Arm & Sv Boards (2); Posts, Camps & Sta having Seacoast Arty units (1); Coast Arty ROTC units (1); Gen & Sp Sv Sch (50) except Coast Arty Sch (100); C of Tech Sv (2).

IR 4: T/O & E 4–62, Hq & Hq Btry, CA Gp (HD).

IBn 4: T/O & E 4–66, Hq & Hq Det, CA Bn (HD).

IC 4: T/O & E 4–67, CA Btry (Gun) (HD), Types BC, BD, and BE.

For explanation of symbols, see FM 21–6.

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COAST ARTILLERY FIELD MANUAL

SERVICE OF THE PIECE

6-INCH GUN M1903A2 OR M1905A2 ON BC M1 AND M2 6-INCH GUN M1 ON BC M3 AND M4

SECTION I

GENERAL

1. SCOPE. a. This manual prescribes the service of the piece for the 6-inch gun M1903A2 or M1905A2 on barbette carriages M1 and M2, and for the 6-inch gun M1 on barbette carriages M3 and M4. The duties of the members of the gun section in the service of the piece are contained in section IV and in the drill table, appendix III.

b. Statements in this manual apply to all of the above-listed pieces except where otherwise specifically stated in the text. Duties of certain members of the gun section in service of the piece will be different on the various carriages because major differences in breechblocks and elevating mechanisms exist (par. 18). Inasmuch as these variations in duties due to differences in materiel are few, it has been considered practical to include the service of all four pieces in one manual.

c. 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.

NOTE. For definitions of military terms not defined in this manual, see TM 20-205.

SECTION II

ORGANIZATION

3. GUN SECTION. a. Each gun emplacement is manned by a gun section consisting of a gun commander and 25 enlisted men.

b. The gun section is divided into the gun squad and the ammunition squad.

4. GUN SQUAD. The gun squad consists of a gun commander, a gun pointer, an elevation setter, a telephone operator, and 10 cannoneers numbered from 1 to 10 inclusive.

5. AMMUNITION SQUAD. a. The ammunition squad consists of the chief of ammunition and 11 cannoneers numbered from 11 to 21 inclusive.

b. The chief of ammunition divides the ammunition squad into two details, one for the service of powder and one for the service of projectiles.

6. FORMATION. Each gun section assembles in two ranks at close interval as shown in figure 1. Unnumbered cannoneers form on the right of their respective squads. After forming the gun section, the gun commander takes post in the front rank 30 inches to the right of the gun pointer.

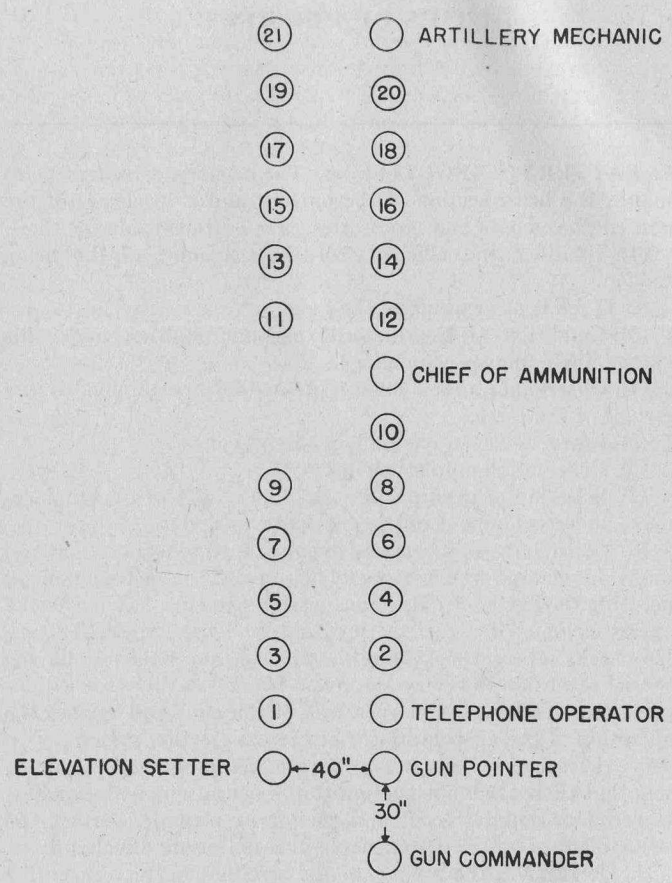


Figure 1. Formation of gun section.

SECTION III

DUTIES OF PERSONNEL

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) Technical handling of the guns.

(3) Condition of the materiel and ammunition under his charge, including its camouflage.

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

(5) Enforcement of camouflage discipline.

(6) Police of all emplacements.

(7) Selection of positions for and supervision of the emplacement and employment of the automatic weapons.

b. Twice daily, morning and evening, he inspects the materiel under his charge and personally verifies the adjustment of all pointing devices and data transmission systems. He tests the operation of all traversing, elevating, and breech mechanisms. He checks all electrical circuits and firing mechanisms, paying special attention to safety features. He checks all power equipment associated with the operation of the guns and verifies the operation of the air compressor of the gas ejection system.

c. At least once daily he verifies the filling of recoil cylinders, sees that there is no obstruction to the operation of the carriage in recoil or counterrecoil, and, so far as possible, verifies the adjustment of all parts that move in recoil or are affected by it.

d. He receives the reports of the assistant battery executive or the gun commanders and reports to the battery commander, "Sir, firing section in order," or reports defects which cannot be remedied without delay.

e. When firing on time interval signals, it is his responsibility to see that the guns are fired immediately upon receipt of the proper firing signal, safety precautions permitting. If it becomes necessary to suspend firing for a time interval, he commands: RE-LAY, and reports his action to the battery commander.

f. Should circumstances arise after the firing battery has been reported ready, which in his opinion would make it unsafe to fire, he commands: CEASE FIRING, and causes the firing circuit to be broken, the lanyard to be dropped, or other effective steps taken to prevent the firing of any piece affected by the unsafe condition. He then reports his action to the battery commander.

g. If, at the command CEASE FIRING, the piece is loaded and no further firing is anticipated, the executive will supervise the unloading as directed in FM 4–20.

h. The battery executive will make sure that, except for the necessary orders, reports, and instructions, no talking is permitted. Commands are given in the prescribed form (FM 4–5). Signals may be substituted for commands whenever desirable.

i. At the conclusion of drill or firing, the battery executive commands: REPLACE EQUIPMENT, inspects the emplacement, and reports to the battery commander stating any deficiencies affecting the readiness of the battery for subsequent action. He supervises the cleaning and preparation of the guns for the next firing.

8. ASSISTANT BATTERY EXECUTIVE. The assistant battery executive performs the duties of the battery executive insofar as they 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 supervises the service of the piece and the service of ammunition, and personally directs the work of care and preservation of the materiel in the emplacement to which his section is assigned. He is responsible to the officer in charge of the emplacement for the—

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

(2) Condition of the materiel under his charge.

(3) Preparation of the piece for firing, and for camouflage and gas discipline of his section.

(4) Firing of the piece.

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

(6) Police of the emplacement.

b. Twice daily, at the direction of the battery executive or the assistant battery executive, he forms his gun section at the emplacement and commands: DETAILS, POSTS. Servicing equipment is kept convenient to the individual posts, and it is necessary only for the members of the gun section to verify the presence of items and place them for use. After all details have reached their posts (fig. 2 or 3), he commands: EXAMINE GUN. He then makes an inspection of the gun, carriage, and other materiel, paying particular attention to the traversing and elevating mechanisms, recoil cylinder, breech and firing mechanisms, safety devices, and the oiling of the various bearings. He receives the reports of the chief of ammunition and the various details of the gun squad. He reports to the officer in charge of the emplacement, "Sir, No..... in order," or reports defects which he is unable to remedy without delay.

c. It is not necessary when going into action 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 detail, especially at night, by the command CALL OFF, at which the cannoneers call off their titles and numbers in succession. The command EXAMINE GUN is unnecessary since the guns and servicing equipment are maintained constantly in a state of readiness for use, insured by two inspections daily.

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

e. At the command TARGET, he repeats the command and the target designation, and in case II firing he turns to assist the gun pointer in getting on the correct target. As soon as the gun pointer is on the target (case II) or has his pointers matched (case III), the gun commander reports or signals to the officer in charge of the emplacement, "Sir, No..... on target."

f. At the command LOAD, given by the battery commander, the gun commander repeats the command and supervises loading. The piece is not fired until the battery commander has given the command COMMENCE FIRING.

g. At the command COMMENCE FIRING, if the piece is unloaded he commands: LOAD and supervises the loading. He commands: LOAD before each shot of a series, and acts in accordance with the method of pointing being used, as follows:

(1) In case II pointing, after the report, "Breech," has been given by No. 1 and the elevation setter has reported, "Set," the gun commander presses his push button and calls, "Ready," to indicate to the gun pointer that the piece is ready to fire.

(2) In case III pointing using continuous firing data, after the report, "Breech," has been given by No. 1 and the elevation setter has reported, "Set," he fires the piece himself by pressing his push button.

(3) In case III pointing not using continuous firing data, after the report, "Breech," has been given by No. 1 and the elevation setter has reported, "Set," he fires the piece on the next time interval signal.

h. When firing on the time interval signal, he is responsible to the officer in charge of the emplacement for the immediate firing of the piece upon the proper signal, safety precautions permitting. 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 given by the officer in charge of the emplacement. During firing the gun commander will observe the action of recoil and counterrecoil, and will determine, as far as possible, that the action is satisfactory.

i. In case of misfire, he calls, "No..... misfire." He sees that the requirements of paragraph 39 are observed.

j. The gun commander commands: CEASE FIRING, when the number of rounds specified has been fired. He repeats the command CEASE FIRING when it is given by anyone qualified to give it. 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 be kept away from the gun commander's push button and the gun pointer's firing key. If firing by lanyard, he has the lanyard detached. When dummy ammunition is used, he commands: UNLOAD, and sees that the piece is unloaded.

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

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

m. He keeps a record of the number of rounds fired by his gun, showing the date and approximate time, in order that the emplacement book may be kept posted accurately and up to date.

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. When firing by case II, the gun pointer is charged with the duty of firing the piece. When continuous firing data are being used, he waits for the order, "Ready," from the gun commander and fires the piece by pressing his firing key as soon thereafter as he is exactly on target. When firing by case II on a time interval signal, he will be exactly on target and fire the piece on the signal immediately following the gun commander's order, "Ready."

11. ELEVATION SETTER. The elevation setter is charged with the duty of setting the piece in elevation. He is responsible to the gun commander for the proper operation, care, and adjustment of the elevating mechanism. He is charged with the duty of starting the elevating motor and, in the case of the M2 and M4 carriages, of checking the operation of the remote-control system. For detailed duties see drill table, appendix III, and paragraphs 22, 23, and 24.

12. CHIEF OF BREECH. The chief of breech (No. 2) 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; and for the observance of safety precautions that pertain to his detail. He listens for the report of the primer, which may be audible, if the powder charge fails to ignite. For detailed duties see drill table, appendix III, and paragraph 24.

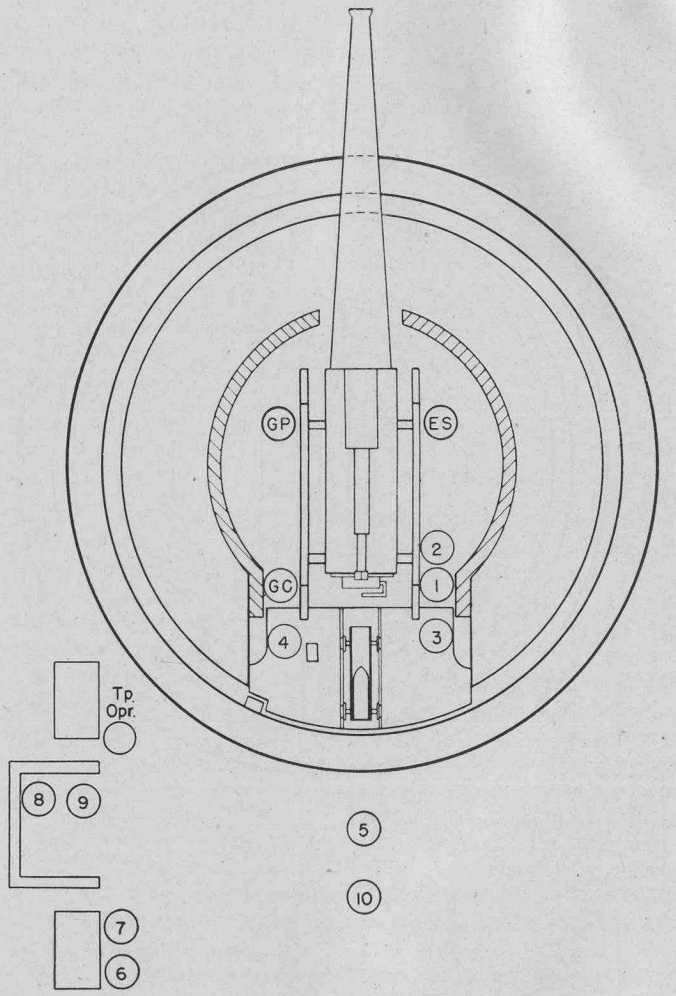


Figure 2. Position of gun squad at the command DETAILS, POSTS *(M1 and M2 carriages).*

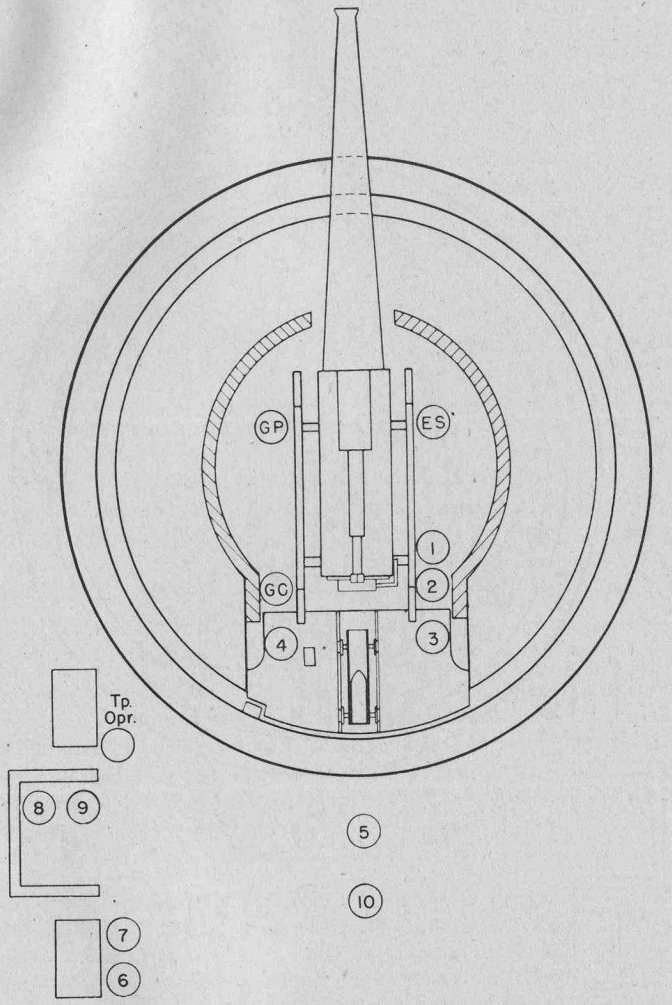


Figure 3. Position of gun squad at the command DETAILS, POSTS *(M3 and M4 carriages).*

13. TELEPHONE OPERATOR. It is the duty of the telephone operator to receive and relay to the gun commander all commands and instructions sent from the battery commander's station. He will also relay all reports from the emplacement to the battery commander's station.

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

(1) Efficiency of the personnel of his squad.

(2) Care of the ammunition and ammunition-handling apparatus.

(3) Uninterrupted service of ammunition.

(4) Proper fuzing of projectiles.

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

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

(7) Policing of the magazines and galleries under his charge.

b. He keeps a record of all ammunition received into or delivered from the magazines and galleries under his charge, exercising particular care that the projectiles, fuzes, and powder charges are listed under proper names and types. He keeps the gun commander informed regarding the ammunition on hand and reports any defects found.

c. He keeps a thermometer in a selected powder container and reports the temperature of the powder when required.

d. At the command DETAILS, POSTS, he opens the magazines 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.

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

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

g. At the command CEASE FIRING, he halts the service of ammunition and orders powder charges returned to their containers and the containers closed.

h. At the command REPLACE EQUIPMENT, he supervises the replacement of equipment, sees that the ammunition and

materiel are properly secured, forms his squad, and reports to the gun commander.

15. AMMUNITION SQUAD. a. The chief of ammunition divides the cannoneers of the ammunition squad into two details, the projectile detail and the powder detail.

b. Projectile detail. The chief of ammunition designates one of the cannoneers as chief of detail to supervise the work of the detail. Previous to and during firing, the detail moves projectiles from the magazines to the serving table, carrying the projectiles by hand. In addition, the detail maintains the ammunition and ammunition-handling apparatus and polices the magazines and corridors. For detailed duties see drill table, appendix III, and paragraph 28.

c. Powder detail. The chief of ammunition designates one of the cannoneers as chief of detail. His duty is to supervise the work of the detail. The detail keeps a record of all pertinent data, including weights of charges, lot numbers of powder, and temperatures of magazines. For detailed duties see drill table, appendix III, and paragraph 28.

16. ARTILLERY MECHANIC. a. The artillery mechanic, assisted by members of the gun section, makes such minor repairs and adjustments as can be made with the means available. The artillery mechanic is the custodian of supplies pertaining to the gun emplacements to which the battery is assigned. He is responsible for the condition of the storerooms pertaining to the gun emplacements and the supplies contained therein. He issues such equipment, tools, oils, paints, and cleaning materials to the members of the gun sections as are necessary for the service and care of the guns and accessories.

b. The artillery mechanic is responsible for the proper operation and maintenance of the air compressor. See FM 9–428 for complete operating instructions.

17. POWER PLANT OPERATORS. a. The power plant operators are members of the maintenance section of the battery. They are responsible for the operation and maintenance of the power plant and all associated equipment.

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

SECTION IV

NOTES ON THE SERVICE OF THE PIECE

18. MATERIEL. a. General. The major differences between the four pieces covered by this manual are contained in the following general descriptions:

(1) *The M1 carriage.* This carriage is designed to mount either the M1903A2 or M1905A2 gun and is equipped with a manually controlled electric-hydraulic elevating mechanism.

(2) *The M2 carriage.* This carriage, also designed to mount either the M1903A2 or the M1905A2 gun, is equipped with an all-electric elevating mechanism and the remote-control system M14.

(3) *The M3 carriage.* This carriage mounts the M1 gun and is equipped with the same elevating mechanism that is on the M1 carriage.

(4) *The M4 carriage.* This carriage also mounts the M1 gun but is equipped with the electric elevating mechanism and the remote-control system M14.

b. Guns. The M1903A2, M1905A2, and M1 guns are ballistically identical even though they differ slightly in physical detail (app. II).

c. Breechblocks and firing mechanisms. (1) The breechblocks on both the M1903A2 gun and the M1905A2 gun are lever-operated, carrier-type blocks. The entire swing of the operating lever is in the horizontal plane. The M1903A2 block is ogival in shape and carries a single-step thread. The M1905A2 block is tapered and is also provided with the single-step thread. Both breechblocks are equipped with combination friction-electric firing mechanisms which are not removable from the breechblock intact. Both firing mechanisms use either the electric primer M30 or the friction primer M1914.

(2) The breechblock on the M1 gun is also a lever-operated, carrier-type block. However, the motion of the operating lever in rotating the block open is downward in the vertical plane,

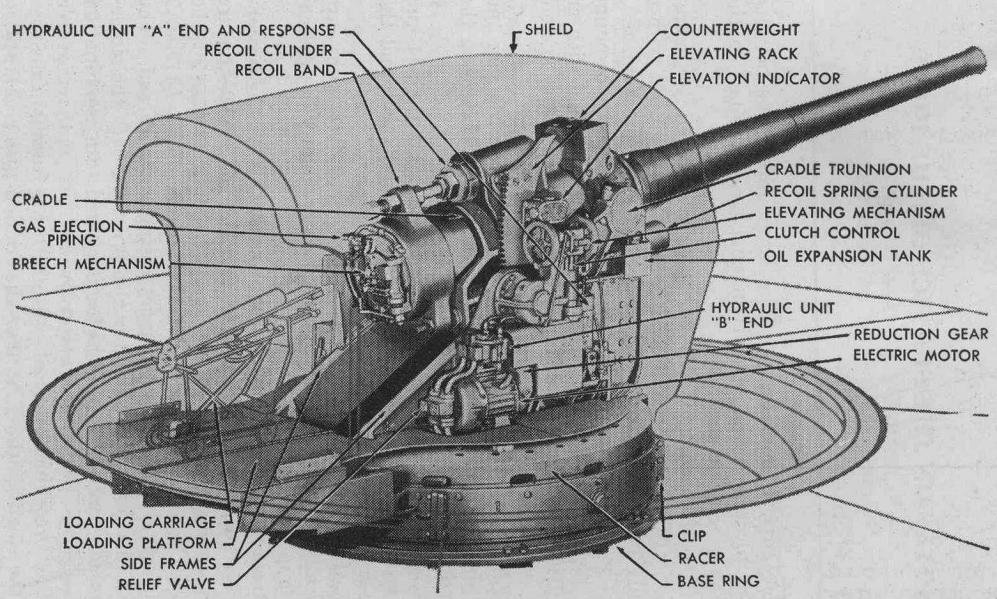


Figure 4. 6-inch gun M1903A2 on barbette carriage M1, right rear view. (The M3 carriage is the same except that it mounts the M1 gun.)

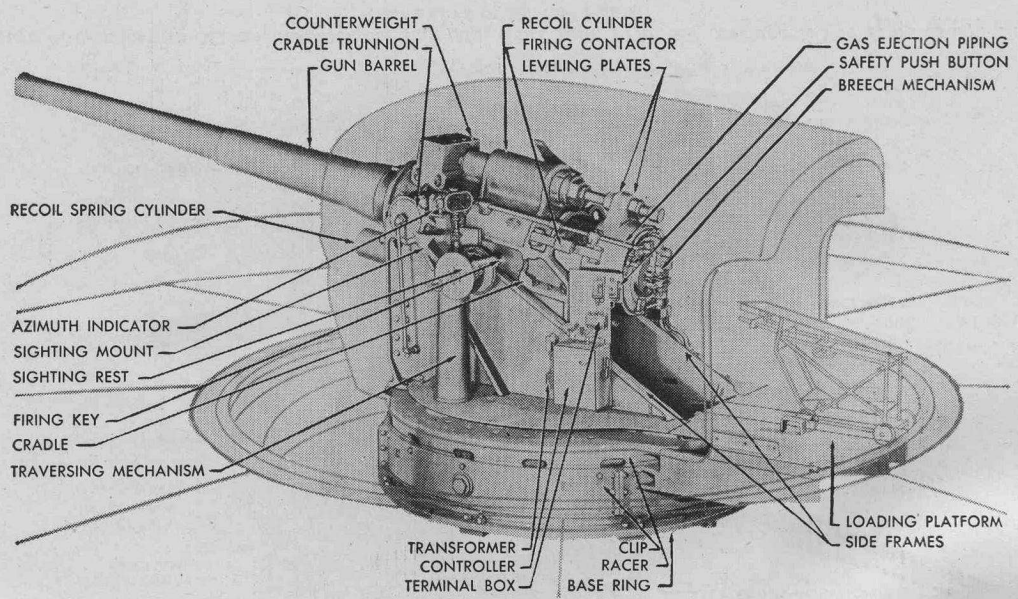


Figure 5. 6-inch gun M1903A2 on barbette carriage M1, left rear view. (Similar view of 6-inch gun M1903A2 on barbette carriage M2 is substantially the same.)

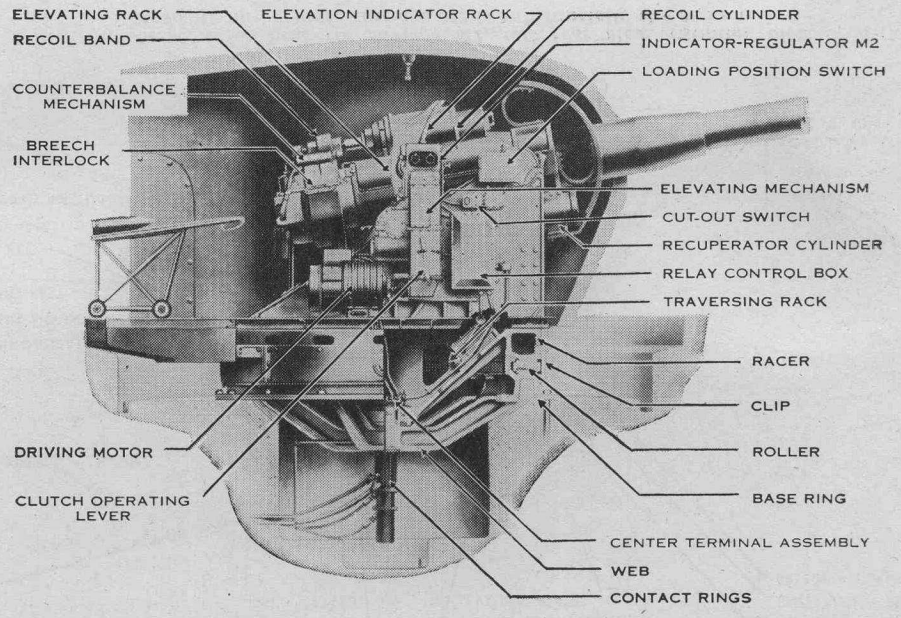


Figure 6. 6-inch gun M1 on barbette carriage M4, right side. (The M2 carriage is the same except that it mounts the M1903A2 gun.)

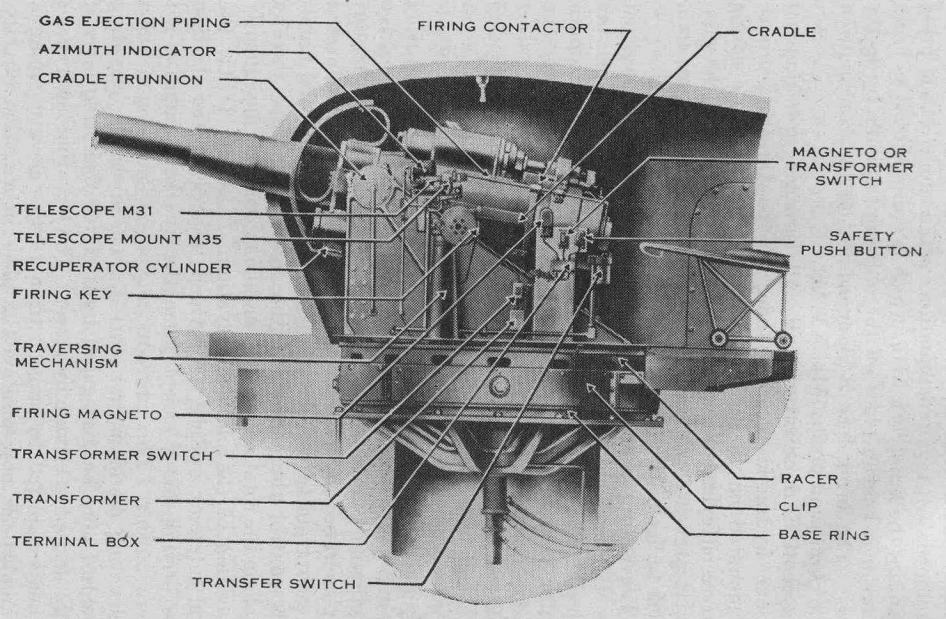


Figure 7. 6-inch gun M1 on barbette carriage M4, left side. (Similar view of 6-inch gun M1 on barbette carriage M3 is substantially the same.)

and the motion of the operating lever in swinging the block to the open position is in the horizontal plane. The M1 block is straight and carries a two-step thread. This breechblock is equipped with a combination percussion-electric firing mechanism, the firing lock M16, which is removable. The firing mechanism is held in place on the obturator spindle by sector threads. The firing lock is designed to use the combination electric-percussion primer Mk. XV M1.

d. Recoil and counterrecoil. All carriages are equipped with one hydraulic recoil cylinder of the throttling-groove type mounted on the cradle above the gun and two spring counterrecoil cylinders mounted on the cradle below the gun. Shock is prevented at the end of counterrecoil by a tapered, oil-filled buffer in the forward end of the recoil cylinder.

e. Traversing mechanism. All the carriages are designed to be traversed by hand. All traversing mechanisms are identical. The carriages are all equipped with the azimuth indicator M9 and are provided with the telescope M31 and the telescope mount M35.

f. Elevating mechanisms. (1) The hydraulic elevating mechanism used on the M1 and M3 carriages consists of an electric motor, a variable-delivery hydraulic pump, a fixed-stroke hydraulic motor, and the hydraulic piping connecting the pump and the motor. The electric motor is used to drive the hydraulic pump, which in turn drives the hydraulic motor. When operating by power, the hydraulic motor is connected by a gear train to the elevating pinion. The elevating handwheels control the output of the hydraulic pump, thereby controlling the rotation of the hydraulic motor and consequently the position of the piece in elevation. A safety device, the neutral interlock switch, is provided to prevent the starting of the driving motor except when the hydraulic pump is set for zero output. This prevents movement of the gun when the elevating motor is first started. The hydraulic elevating mechanism may be disengaged by a clutch operating lever if it is not desired to elevate by power. The elevating handwheels are then connected by a gear train to the elevating pinion. The handwheels now position the piece in elevation directly. The M1 and M3 carriages are equipped with the elevation indicator M8 which displays firing elevation on the inner or electrical dials and quadrant elevation on the outer or mechanical dials and provides a match-the-pointer system for setting elevations.

(2) The principal elements of the electric elevating mechanism used on the M2 and M4 carriages are the motor-generator set M1, the driving motor, and the indicator-regulator M2. The motor-generator set is located off carriage in the motor-generator room and supplies the current for the operation of the driving motor. The driving motor is located at the gun and when in use is geared directly to the elevating pinion. The indicator-regulator controls the output of the motor-generator set, and thereby controls the rotation of the driving motor and consequently the position of the piece in elevation. The indicator-regulator contains the elements of an elevation indicator and, in addition, the equipment necessary to control the output of the motor-generator set. The indicator-regulator may be set so that the data receiver positions the control equipment, thereby giving full automatic operation; or it may be set so that the handwheels position the control equipment, thereby giving semiautomatic operation. The elevating mechanism is also equipped with the transfer switch, which when operated takes control away from the indicator-regulator and automatically returns the piece to the loading elevation. When the transfer switch is returned to its original position, it permits either the automatic or semiautomatic control to function, and the piece is returned to the firing elevation by the method in use. A safety device, the breech interlock switch, is provided to prevent operation of the driving motor if the breechblock is open. The electric elevating mechanism may be disengaged by a clutch lever when its use is not desired. The elevating handwheels are then connected by a gear train to the elevating pinion and position the piece in elevation directly.

g. Gas ejection system. All carriages are equipped with a compressed-air gas ejection system to eliminate sponging the powder chamber. The air is compressed and pumped into storage tanks in the motor-generator room. From the storage tanks, the air is piped to the equalizer tank on the carriage and from there to three ports in the unthreaded sectors of the breech recess. The air valve is opened by a trip when the breech is opened, thus permitting the air to blow the tube clean. The valve must be closed by hand.

h. Firing circuits. All carriages are equipped with a primary and an auxiliary firing circuit. The primary circuit is energized with 110-volt alternating current, which is brought onto the carriage through the collector rings. The auxiliary circuit is of the magneto type. For case II firing, the primary circuit contains the gun commander's push button and the gun pointer's firing key, both of which must be closed to fire the piece. For case III firing, the gun pointer's firing key is unplugged, allowing the piece to be fired by the gun commander's push button alone. The magneto is located at the gun commander's push button station. He will fire the piece with it if the primary circuit fails.

19. OPERATION OF M1903A2 BREECH AND FIRING MECHANISMS. a. To open this breech, grasp the operating lever and swing it to the rear and right. The first pull on the lever will disengage it from the lever latch. During approximately the first 45° of its swing, the operating lever rotates the block and also moves the slide and firing leaf to the right,

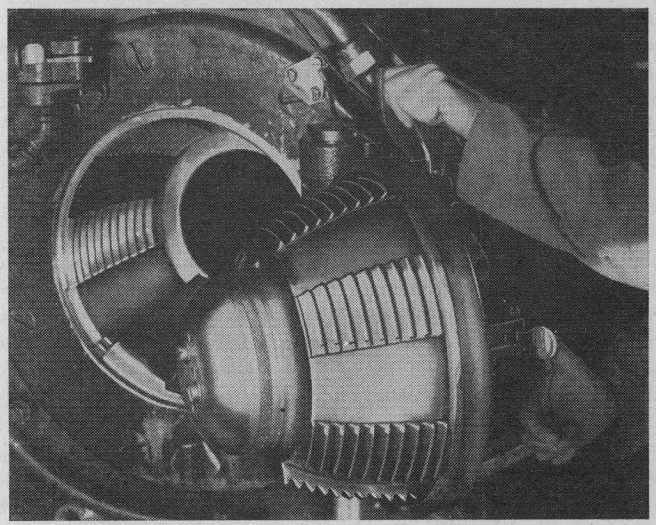


Figure 8. Breechblock and obturator, 6-inch gun M1903A2.

thereby disengaging them from the firing lever and exposing the primer seat. The second 45° of the operating lever's swing translates the block. The remainder of its motion swings the block to the open position. When the block is in the open position, the action of the rack lock holds the slide and firing leaf in position and prevents their being moved back into place over the primer seat. However, when the block is closed, the slide may be disengaged from the rack lock, which has then moved the slide back into position over the primer seat. This allows the slide to be moved to its open position and gives access to the primer seat. The action during the closing of the breech is the reverse of that during its opening. The last motion of the operating lever rotates the block to its locked position and moves the slide and firing leaf into firing position.

b. The operation of the M1905A2 breech is substantially the same as that of the M1903A2 breech.

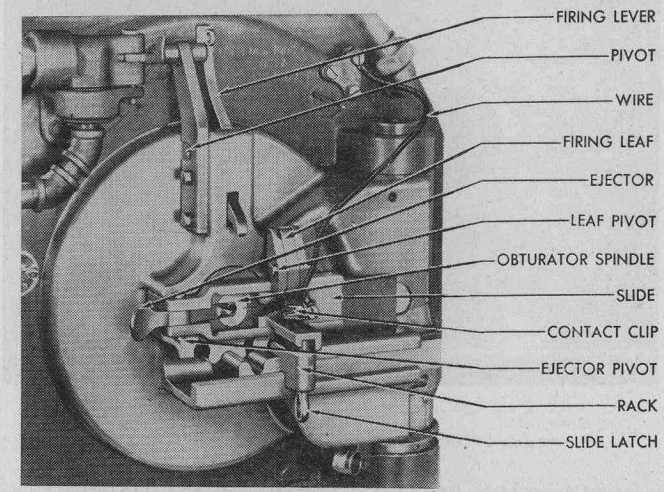


Figure 9. Firing mechanism, 6-inch gun M1903A2.

20. OPERATION OF THE M1 BREECH. To open this breech, push down on the operating lever catch until it is released from the catch plate and move the operating lever down to a horizontal position. This rotates and translates the block.

Swing the breechblock to the open position by moving the operating lever to the right toward the muzzle of the gun. To close the breechblock, grasp the operating lever firmly and swing it left toward the breech and up. The counterbalance mechanism assists the movement of the carrier in closing. To prevent the operating lever from slamming against the breechblock carrier and becoming bent or disengaged from the operating lever catch, it is advisable to continue to grasp it and follow it through to the closed position. The operation of the breech is entirely independent of the operation of the firing lock.

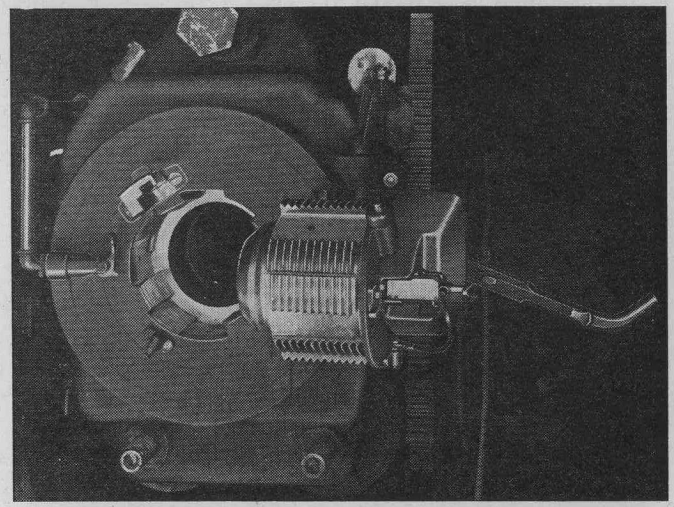


Figure 10. Breechblock and obturator, 6-inch gun M1.

21. OPERATION OF THE FIRING LOCK M16. a. The firing lock is held in place on the obturator spindle by sector threads. To attach the firing lock, place it in line with the obturator spindle in such a position that the firing lock hammer is horizontal when the wedge is closed. Rotate the firing lock about 30° to the left so that the threaded sectors of the firing lock line up with the unthreaded sectors on the spindle. Slip

the firing lock onto the spindle as far as it will go, and rotate it back 30° to the right to engage the sector threads. When the firing lock has been turned back to the right, the firing-lock retaining screw may be screwed into place to hold the firing lock in position.

b. To prime the firing lock, grasp the hammer and pull it about 1/16 inch to the rear. Rotate the hammer left until the wedge is in its lowest position, insert the primer, and rotate the hammer to the right until the wedge is closed and the hammer contact piece is in line with the firing pin. If the piece is being fired electrically, the firing lock is now ready to fire; if it is being fired by lanyard, it must be cocked.

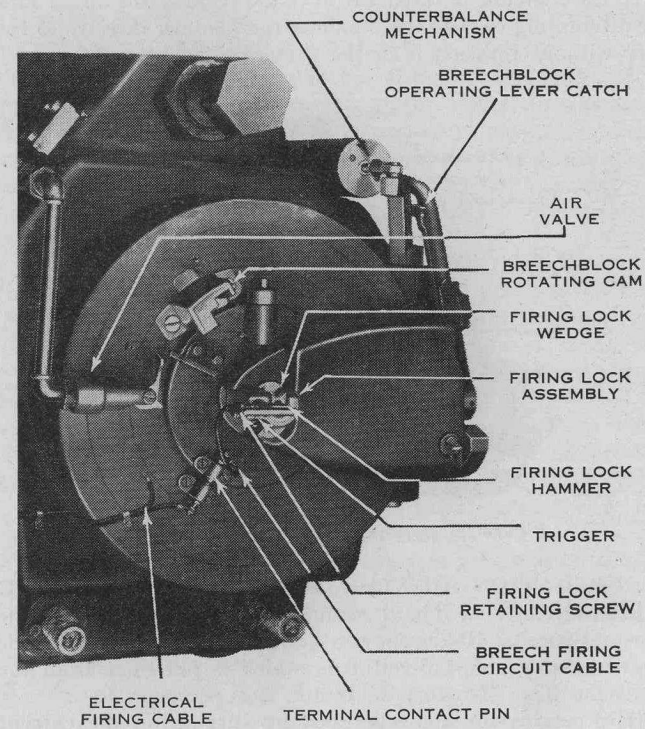


Figure 11. Firing mechanism, 6-inch gun M1.

c. To cock the firing lock, grasp the hammer and pull it gently to the rear about 1/16 inch. Then turn the hammer to the left about 45°, continuing the pull to the rear. When the hammer begins to move directly to the rear, exert a slight pressure tending to revolve it to the right. When the hammer has reached its rear position, it will revolve 45° to the right, thereby bringing the hammer contact piece in line with the firing pin, and the sear will engage the hammer stem.

d. To uncock the firing lock, grasp the hammer and pull it about 1/16 inch to the rear and revolve it about 45° to the left. Ease the hammer all the way forward and then revolve it 45° to the right to its closed position.

e. Care should be used to prevent breaking the firing lock by attempting to cock it by pulling the hammer directly to the rear without rotating it in the prescribed manner.

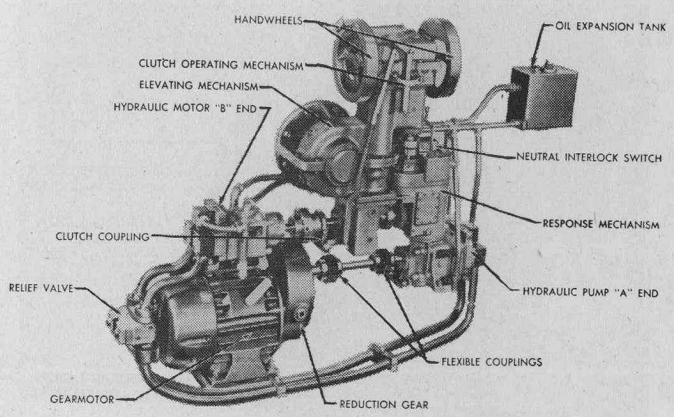


Figure 12. Hydraulic elevating mechanism.

22. OPERATION OF THE HYDRAULIC ELEVATING MECHANISM. a. The hydraulic pump is driven by the constant-speed, 10-horsepower, direct-current motor. The motor operates on 440-volt d.c., which is fed to it from the controller box. To start the motor, it is necessary to—

(1) Energize the controller box by turning on the current at the main switch panel. To do this, press the SET button

on the main switch panel, rotate the operating handle 180° counterclockwise, and then rotate it clockwise to its original position.

(2) Shift the lever of the clutch operating mechanism from HAND to POWER.

(3) Rotate the handwheels slowly until the neutral interlock switch is closed. The switch is closed when the switch lever is in the position of maximum outward movement. (See fig. 12.)

(4) Press the START button and the motor will operate.

(5) Press the STOP button to turn off the motor.

Caution. Do not attempt to shift the clutch lever when the motor is running.

23. OPERATION OF THE ELECTRIC ELEVATING MECHANISM. The d.c. motor, which operates the gun, and the motor-generator set are capable of producing a considerable amount of power. Misuse of this power, either through ignorance or carelessness, may lead to serious injury to personnel and damage to materiel. It is extremely important, therefore, that all battery personnel exercise great care in starting and using the power equipment. The following instructions should be followed in detail:

a. To start the motor-generator set. (1) Make certain that everything at the gun is in order and ready to operate. The clutch operating lever should be in the HAND position. The cut-out switch should be OFF. Personnel should be notified that the power is to be turned on. The breech should be closed, and wrenches and other foreign material should be well away from all gears.

(2) Close the main power switch at the main circuit breaker panel.

(3) Push the START button above the starter panel at the motor-generator set. This will start the set.

(4) If at any time the motor-generator set trips off due to overload, press the RESET button on the starter panel and start the set as before. If it trips out again, a careful check should be made to determine the cause of overload.

b. To start the driving motor. (1) After the motor-generator set has been started, but while the clutch operating lever is still in the HAND position, bring the pointers to an approximate match manually.

(2) Move the clutch operating lever to the POWER position. (**Note.** The gears should never be shifted with the motor running.)

(3) Set the control lever at the AUTO position.

(4) Press the ON button of the cut-out switch and make certain that the remote-control system brings the pointers to an exact match.

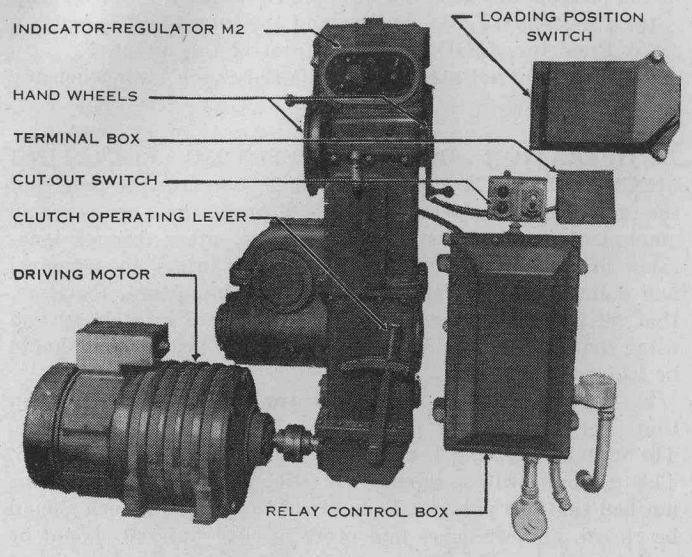


Figure 13. Electric elevating mechanism.

24. NOTES ON LOADING. a. General. (1) This paragraph and the drill table, appendix III, cover the service of the piece for the normal methods of case II and case III pointing. The use of continuous data transmission, armor-piercing projectiles, and electric firing circuits is assumed. Although the drill table takes for granted the use of the power elevating equipment, no change in the drill will result from manual operation.

(2) Since the use of continuous data transmission permits the firing of the piece as soon as it is serviced and set, the rate of fire will depend only on the gun section, and if the maximum

rate of fire is to be realized, the members of the gun section must be so well drilled that they work as a team. The physical limits of the turret also demand absolute coordination in the gun squad.

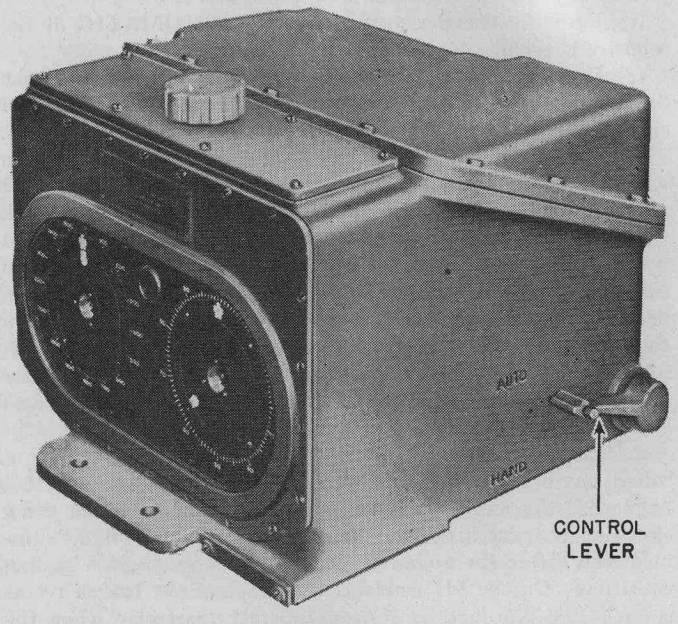


Figure 14. Indicator-regulator M2.

b. Gun commander. (1) In addition to his supervisory duties, the gun commander must perform certain cyclic duties during drill and firing.

(2) On M1 and M3 carriages these duties are to—

(*a*) Turn off the compressed air of the gas ejection system just as the projectile enters the breech recess.

(*b*) Permit the gun pointer to fire the piece by pressing the firing button and commanding READY after the report, "Breech," and after the elevation setter calls, "Set," or to fire the piece himself when the elevation is set.

(3) On M2 and M4 carriages, the gun commander's duties are to—

(*a*) Turn the transfer switch to LOAD.

(*b*) Turn off the compressed air of the gas ejection system just as the projectile enters the breech recess.

(*c*) Turn the transfer switch back to AUTOMATIC at the report, "Breech."

(*d*) Permit the gun pointer to fire the piece by pressing the firing button and commanding READY when the elevation setter calls, "Set," or to fire the piece himself when the elevation is set.

c. Gun pointer. The duties of the gun pointer depend on whether case II or case III pointing is being used. In case III pointing his sole duty is to keep the pointers matched at all times. This is essential because the gun commander will not wait for the gun pointer to call, "Set," but will fire as soon as the elevation is set. In case II, the gun pointer receives deflections from the plotting room by telephone. He must keep the deflection scale properly set and the cross hairs on the target. After the gun commander has ordered READY, the gun pointer makes sure the cross hairs are directly on the target and fires the piece.

d. Elevation setter. (1) *On M1 and M3 carriages.* After a round has been loaded and the breech operator has reported, "Breech," the elevation setter returns the piece to the firing elevation by matching the pointers and reports, "Set." Immediately after the round is fired, he returns to the loading elevation. On the M1 carriage, the shape of the breech recess is such that the loading carriage operates correctly when the piece is at any elevation between 155 and 195 mils. The elevation setter should return the piece to any convenient elevation within this range. On the M3 carriage, however, the breech recess is straight, and the elevation setter must return the piece to within 10 mils of the elevation at which the loading carriage is set to operate (about 175 mils).

(2) *On M2 and M4 carriages.* Since normal operation includes the use of the remote-control system, the elevation setter normally only has to report, "Set," when the remote-control system has properly set the elevation. In the event that the remote-control system fails, the instructions for the elevation setter on the M1 and M3 carriages apply.

e. Breech operator. (1) *On M1 and M2 carriages.* The breech operator (No. 1) should be trained to hold oily waste in his left hand for wiping the mushroom head and breechblock and to operate the breech with his right hand. He should be trained to reach for the operating lever as soon as it comes up out of the well, so that he can have the breech at least partly open when the gun reaches the loading elevation. When the gun is loaded, he closes the breechblock and reports, "Breech."

(2) *On the M3 and M4 carriages.* The breech operator (No. 1) should hold oily waste in his right hand and operate the breech with his left. He should grasp the operating lever and open the breech as soon as the breech has cleared the loading platform. This places him on the muzzle side of the operating lever. Throughout loading he should hold the breech in the full open position with his left hand. His next operation, the wiping of the mushroom head, must be coordinated with the ramming of the projectile. As soon as the breech is open, the breech operator should reach over the top of the breechblock with his right hand and rest the oily waste on top of the mushroom head. As the head of the rammer passes his hand on the ram stroke, he wipes down the mushroom head around the bottom and finishes with an upward stroke before the rammer is withdrawn. He must do this quickly as the rammer (No. 5) will not wait for him. When the powder has been inserted, he closes the breech. He should follow through on the upward swing of the operating lever to make sure that the lever latches in place but does not slam too hard against its stop.

f. Chief of breech. (1) *On the M1 and M2 carriages.* As soon as No. 1 has swung the breech open, the chief of breech (No. 2) should grasp the gas ejector trip with his left hand so that he can hold the breechblock out of the way of the loading carriage. He should eject the used primer, brush the primer seat, and insert the new primer with his right hand. He should ream the primer seat and clean the primer vent during lulls in firing. The used primers should be picked up off the floor and discarded at the first opportunity.

(2) *On M3 and M4 carriages.* The chief of breech (No. 2) holds the primer seat brush in his right hand and operates the firing lock with the same hand. He primes with his left hand. As soon as the breech is open, he opens the firing lock, thereby

ejecting the used primer, and cleans the primer seat with the primer seat cleaning brush. When the breech is closed, he inserts the primer, closes the firing lock, and reports, "Breech." He reams the primer seat and cleans the primer vent during lulls in firing, and picks up and discards the used primers at the first opportunity.

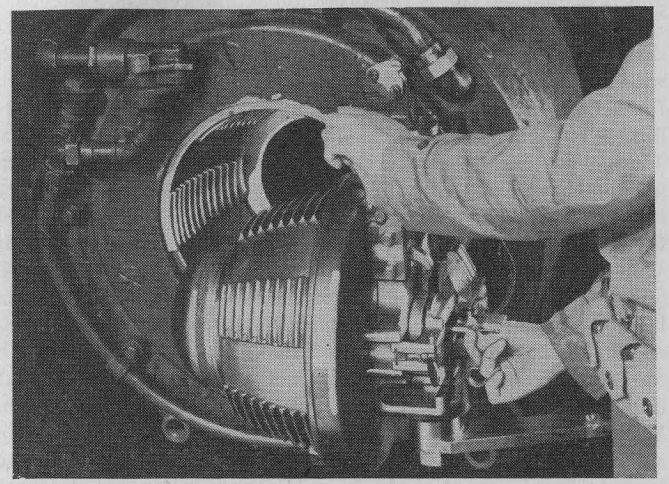


Figure 15. Inserting the electric primer, 6-inch gun M1903A2.

g. Nos. 3, 4, and 5. The two loading carriage operators (Nos. 3 and 4) and the rammer (No. 5) must have a great deal of practice together in order to do their jobs quickly. No. 4 should release the loading carriage catch just before No. 1 has the breech entirely open, so that he and No. 3 can roll the loading carriage up to its seat in the breech recess as soon as possible. No. 5, holding the rammer against the base of the projectile, should move forward slightly faster than the loading carriage so that the projectile will have been moved about three-quarters of the way up the loading carriage by the time the loading carriage seats itself in the breech recess. Nos. 3 and 4 inspect for clearness of the powder chamber as they move up the loading carriage. If it is clear, No. 5 keeps moving forward and rams

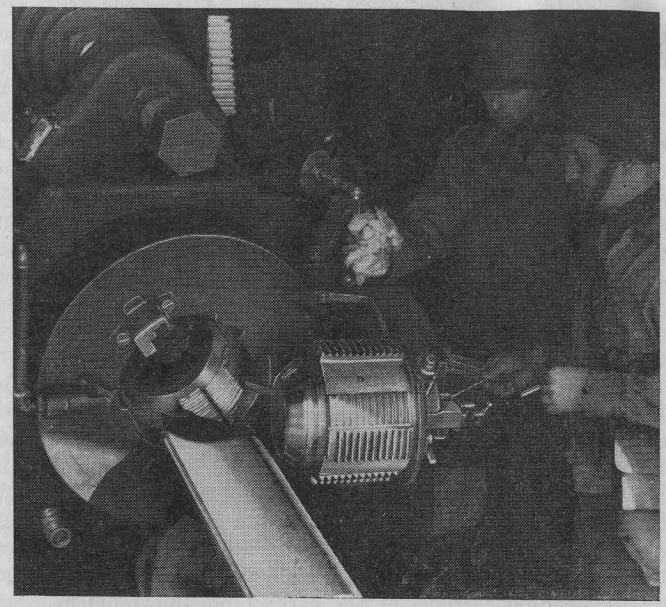


Figure 16. Cleaning the primer seat, 6-inch gun M1.

the projectile. If it is not clear, No. 3 or No. 4 must signal No. 5 not to ram. After the carriage is seated, No. 3 must forcibly hold it in its seat while the powder is brought up and placed on the loading carriage and while No. 4 is pushing the powder into the chamber. No. 3 should start the loading carriage to the rear just before No. 4 has finished ramming the powder. This is done so that the carriage will be out of the closing path of the breechblock by the time No. 4 has withdrawn his hand from the breech recess. Shortly after the carriage reaches its rearmost position, the next round is brought up and placed on it. No. 3 must move the round a few inches forward so that No. 5 can get the head of the staff against the base of the projectile. Prior to firing, No. 4 must adjust the elevation at which the loading carriage is set. On M1 and M2 carriages he will see that it is set at its minimum elevation so that it

will operate over its greatest range. On M3 and M4 carriages he will, with the cooperation of the gun commander, set the carriage to operate properly at the loading elevation.

h. Service of projectiles. Nos. 6 and 7 alternate in bringing up the projectiles. When firing armor-piercing projectiles, the man serving a projectile gets it from the ammunition shelf and carries it to the nearest side of the loading carriage. He should arrive at the loading carriage just before the previous round is fired. When firing high-explosive projectiles, he gets the fuzed projectile from the ammunition shelf, carries it to the nearest side of the loading carriage, holds it there out of the path of recoil until the previous round has been fired, and then places it on the carriage. He must step back quickly out of the way in order not to interfere with the powder server.

i. Service of powder. Nos. 8 and 9 alternate in bringing up the powder. Each man in turn receives a charge from a member of the ammunition squad just inside the corridor entrance and holds it there until he hears the report of the previous round. He then runs to the nearest side of the loading carriage (that side which does not require him to run behind the rammer). He should arrive before No. 5 has removed the rammer from the powder chamber so that he can place the powder charge on the loading carriage at the earliest possible moment. As soon as he has delivered the powder, he should step back quickly out of the way of the carriage operators and go back for his next charge. On his way back he should be careful to avoid the man bringing up the next projectile. For those propelling charges with an igniter on either end, no error can be made in loading the charge and the powder servers need not be concerned with the way the charge is laid in their arms. However, with many of the propelling charges of older manufacture, only one igniter is provided and the usual care must be taken when inserting the charge to have the igniter to the rear.

j. Sponger. In the event of failure of the gas ejector, the sponger (No. 10) will sponge out the powder chamber just prior to the ramming of the projectile.

25. FIRING ON TIME INTERVALS. If it becomes necessary to use standard plotting room equipment in place of the gun data computer, fire must be conducted on the time interval system. The service of the piece remains the same, but data

transmission must be switched from the gun data computer transmitter to the M5 standard auxiliary transmitter. The elevation setter receives a firing elevation for each time interval bell and the gun pointer receives an azimuth. They call, "Set," when the data are correctly set, and the gun commander fires the piece on the bell.

26. FIRING WITH FRICTION PRIMERS (M1 AND M2 CARRIAGES ONLY). Friction primers are to be used only as an emergency method because their use requires that the piece be primed after the breech is closed. If it becomes necessary to fire the piece using friction primers, the chief of breech (No. 2) changes places with No. 3. No. 3 holds the breech open and cleans the primer vent during loading while No. 2 handles the loading carriage. When the breech is closed, No. 2 primes the piece, hooks the lanyard, calls, "Breech," and fires the piece at the gun commander's order.

27. FIRING BY LANYARD (M3 AND M4 CARRIAGES ONLY). Firing by lanyard should be resorted to only when both the primary and the auxiliary firing circuits have failed, because the time required to attach the lanyard and cock the firing lock will reduce the rate of fire. When it is necessary to fire by lanyard, the chief of breech (No. 2), after the breech has been closed, inserts the new primer, closes the firing lock, attaches the lanyard, cocks the firing lock, and reports, "Breech." He fires the piece at the gun commander's order.

28. SERVICE OF AMMUNITION. a. General. The chief of ammunition has in his ammunition squad 11 men. It is intended that 6 men be used as a powder detail and 5 as a projectile detail. However, if local conditions dictate otherwise, the necessary changes should be made.

b. Powder detail. Two men of the powder detail are stationed at the magazine to open the powder cans, remove the lids, and partially remove the charge. The other four men relay the powder to the powder servers at the corridor entrance. They remove a charge from an open can at the magazine, carry it to the corridor entrance, pass it to the server, and return to the magazine for a new charge. At the command LOAD (or COMMENCE FIRING), the chief of ammunition has one powder

bag taken immediately to the gun, one to the corridor entrance, one about halfway down the corridor from the magazine, and one opened at the magazine and ready to be carried toward the entrance when the report of the first round is heard. Thereafter a charge leaves the magazine at each report.

c. Projectile detail. (1) All 5 men of the projectile detail carry projectiles from the magazine to the projectile shelf at the gun when firing armor-piercing shell. If the battery is alerted or firing is expected, 10 or 15 rounds are placed on the ammunition shelf prior to the assignment of the target. This supply is maintained by the projectile detail.

(2) When firing high-explosive ammunition, 2 men are detailed to fuze the projectiles as they are placed on the ammunition shelf. If the battery is alerted or firing is expected, 10 or 15 fuzed rounds are placed on the ammunition shelf prior to the assignment of the target. This supply is maintained by the detail.

d. Coordination of details. Service of the projectiles and powder is attained with the least confusion if the projectiles are served to the piece from the rear projectile shelf. Using this procedure, all traffic to the gun moves down the center of the corridor. The men in the powder detail relay the powder to the servers near the front wall of the corridor and then return to the magazine along this wall. The projectile carriers place the projectiles on the rear shelf and return to the magazine along the rear wall of the corridor.

29. DUMMY DRILL. The normal method of training the gun squad is by means of dummy drill. The odd-numbered rounds are loading rounds and the even-numbered ones unloading rounds. During drills and training, the gun squad and ammunition squad should be interchanged so that all men in the gun section will be familiar with all duties. During drills, caution should be exercised to see that the gun commanders do not form the habit of turning off the gas ejector air too quickly. The pressure in the gas ejection system should be only about 50 p.s.i. during drills.

SECTION V

SAFETY PRECAUTIONS

30. GENERAL. The following safety precautions are prescribed for peacetime conditions. They indicate, as well, the principles to be followed under war service conditions, but they should be interpreted by the battery executive according to the circumstances existing at the time of a particular emergency. Further instructions concerning safety precautions will be found in AR 750–10 and FM 4–20.

31. THE COMMAND CEASE FIRING. **a.** Any individual in the military service will command or signal CEASE FIRING if he observes any conditions which make 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 lanyard. If the gun is being fired electrically, both the gun pointer and the gun commander will take their hands off the firing key and push-button switch respectively.

32. FIRING MECHANISM. a. All firing mechanisms will be inspected and tested frequently to insure proper operation and functioning of the safety devices. Prior to firing, the mechanisms will be tested with live primers to insure that primers cannot be fired before the breechblock is locked. The test should be conducted as follows:

(1) In the case of the M1903A2 or M1905A2 firing mechanism, insert an electric primer M30 into the open breechblock and, as the breech is closed, make several attempts to fire the primer using both the gun commander's push button and the gun pointer's firing key. Similarly, insert a friction primer M1914 and attempt to fire by lanyard as the breech is closed. It should be impossible to fire either the friction or the electric primer before the breech is locked.

(2) In the case of the firing lock M16, insert a Mk. XV M1 primer into the open breechblock and, as the breechblock is closed, make several attempts to fire the primer electrically, using both the gun commander's push button and the gun pointer's firing key. Similarly, insert a Mk. XV M1 primer and, while closing the breechblock, attempt several times to fire by lanyard. It should be impossible to fire either electrically or by lanyard before the breechblock is locked.

b. (1) There is no safety device on the M1903A2 or the M1905A2 firing mechanism that operates after the lanyard has been attached and the breech has been closed. Therefore, after the breech has been closed and the piece has been primed, great care must be exercised to avoid firing the gun before it is elevated.

(2) There is no safety device on the M16 firing mechanism that operates after it has been cocked. Therefore, after the piece has been primed and the firing mechanism cocked, great care must be exercised to avoid unintentional firing.

33. 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.

b. Prior to firing, all electric primers will be tested in an electric testing set which may be secured from local ordnance. Full instructions for the operation of the set are printed on it. For proper operation, the resistance of any primer should not be more than 3 ohms.

c. Care will be taken not to drop primers.

d. All primers will be checked to see that they fit properly in the primer seat.

e. M30 and M1914 primers will never be inserted or removed by means of the button or wire.

f. No. 2 will pick up the used primers from the turret floor and discard them at the earliest opportunity.

g. Precautions will be taken to prevent any attempt to use primers that have failed. Primers will be handled with great care.

h. Friction primers will be used only if it is necessary to fire the piece when electric primers are not available or when

there is a simultaneous power failure and magneto failure. When friction primers are used, the piece must be primed after the breech is closed.

34. FUZES. a. Projectiles equipped with base-detonating fuzes will be received properly fuzed for firing.

b. Projectiles equipped with point-detonating fuzes will normally be received unfuzed and will be fuzed as required in the following manner:

(1) Unscrew the eyebolt lifting plug from the projectile nose.

(2) Insert the fuze, being careful to see that it is fitted with its felt or rubber washer. Screw the fuze home handtight. (No fuze wrench is provided.)

(3) If any difficulty is encountered in screwing home the fuze remove it and insert another. If the same trouble is experienced with the second fuze, reject the shell.

c. For further instructions on care and handling of fuzes, see FM 4–20 and appropriate technical manuals.

35. POWDER CHARGES. In magazines all powder charges will be kept unopened except those required to start the flow of powder to the piece and those that are opened at each report to maintain the flow.

36. POWDER CHAMBER. After each round, Nos. 3 and 4 will inspect the powder chamber to see if it has been blown clean by the gas ejector.

37. COVER FOR THE GUN SECTION. When high-explosive ammunition is being fired and cover is prescribed, each member of the gun section will be required to take adequate shelter each time the piece is fired.

38. SAFETY POINTING. a. Since it is impractical to employ line of metal observers for safety pointing purposes during target practice, the other method of safety pointing indicated in FM 4–20 must be used. In using this method, the safety pointing observer will be stationed at the azimuth index on the left rear corner of the loading platform. He will be connected directly by telephone with an assistant who is provided with an oriented azimuth instrument so located that the towing

vessel may be tracked. The assistant will observe and telephone the azimuth of the tug continuously to the safety pointing observer. The safety pointing observer will obtain, before, the practice, such data as to the effect of wind, drift, and travel for the probable course of the target as will enable him to determine the safety of the pointing of the gun. When the azimuth of the gun is such as to endanger the tug, he will not permit the gun to be fired.

b. During target practice, firing will be stopped at once if visibility becomes so poor as to endanger the tug or any shipping in the field of fire.

39. MISFIRES. a. If a misfire occurs and the primer was not heard to fire, proceed as follows:

(1) Make two attempts to fire the primer using the primary electric circuit.

(2) If the primer still fails to fire, remove it.

(3) If examination shows that the primer did not fire, insert another electric primer and attempt to fire one time with the primary electric circuit and one time with the magneto.

(4) If either of these attempts results in success, continue firing using electric primers and the operative firing circuit. If both fail, remove the electric primer and continue firing using friction or percussion primers.

b. If a misfire occurs and the report of the primer is heard, or if the examination of any primer removed after a misfire shows that the primer did fire, wait a minimum of 30 seconds and then remove the faulty charge. The faulty charge must be stored separately from other charges.

SECTION VI

CARE AND ADJUSTMENT OF MATERIEL

40. GENERAL. a. Officers will be held strictly responsible for the proper care and preservation of all 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, a thorough knowledge of which is required of officers and all others having charge of materiel.

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

d. Cleaning and preserving materials will be used as prescribed in TM 9–850.

e. War Department Lubrication Orders Nos. 99 and 205 prescribe detailed lubrication procedures for these guns and carriages.

f. The following cleaning materials are issued by the Ordnance Department for use in the field:

(1) *Burlap.* Used over the sponge for cleaning the bore.

(2) *Crocus cloth.* Used for removing rust or stains, and for polishing of the breech mechanism, the firing mechanism, and other finished surfaces of metal.

(3) *Abrasive aluminum-oxide cloth.* Used for cleaning unfinished or nonbearing steel surfaces only. Do not use this material on the surfaces of the breech and firing mechanism.

(4) *Cotton wiping cloth.* Used for cleaning all parts of the materiel except the gun bore.

(5) *Lens tissue paper.* Used for cleaning lenses of optical instruments. Take special care to keep the paper free from grit, dirt, or dust which might scratch the glass surface. Before using this paper, free optical surfaces from dust using a soft

brush. Then moisten surfaces with breath and clean with the paper. Avoid hard rubbing.

(6) *Castile soap.* Used in preparing a solution for sponging the bore. Prepare the sponging solution by dissolving 1 pound of soap in 4 gallons of water. If castile soap is not available, use issue soap as a substitute.

(7) *Soda ash.* Used in solution for cleaning the bore. To prepare the solution, dissolve ½ pound soda ash in 1 gallon of hot water.

(8) *Dry-cleaning solvent.* Unless otherwise specified, use dry-cleaning solvent, or Diesel fuel oil, to clean or wash all metal parts whenever partial or total disassembly is undertaken, or when renewing the protective lubricant film on exposed metal surfaces. Dry all parts thoroughly before lubricating.

(9) *Natural or cellulose sponge.* Used with water and very mild cleaning solutions for washing and rinsing.

(10) *Cotton waste.* Used for general cleaning purposes where lint will not interfere with the operating mechanisms of the weapon. Colored cotton waste may be used on exterior parts of equipment. Use white waste for cleaning all finished surfaces.

41. CARRIAGE. a. When the guns are active, they should be elevated, depressed, and traversed throughout their entire allowed movement every day, and the azimuth at which they stand should be changed about 30° each day to prevent uneven settling of the base ring.

b. The guns should be retracted without firing about once every 6 months. While the gun is retracted, the sliding portion and the inside of the cradle should be thoroughly cleaned and lubricated.

c. All parts of carriages must be kept free from rust at all times. If rust is found it should be removed immediately with nothing more abrasive than crocus cloth. Its removal from all bearing parts and piston rods requires particular attention in order that clearances will not be increased.

d. Oilholes must be cleaned out frequently to keep them free from dirt and grit and should be kept closed with the screw plugs or screws provided, except while being filled with oil. Before oiling at any oilhole, carefully wipe off any dirt or grit that might be carried down into the bearing by the oil.

e. All exposed gears should be kept well lubricated, and just prior to use should be thoroughly cleaned and relubricated.

f. All parts should be lubricated at frequent intervals whether the carriage is maneuvered or not. When the carriages are in use for daily drills, a thorough lubrication twice each week should be sufficient for all but the most severely used parts.

42. RECOIL CYLINDER. a. For information concerning the fluid to be used in recoil cylinders, tests to be applied to it, and instructions governing its storage, see TM 9–428.

b. No water should be allowed to enter the recoil cylinder at any time.

c. Bolts passing into the hydraulic cylinder should be kept tight.

d. Recoil cylinders should be drained and refilled at least once every 3 months. "Recoil Oil, Heavy" is prescribed for temperatures above 0° F. For temperatures below 0° F., the recoil cylinders may be filled with hydraulic oil or a mixture containing approximately 75 percent heavy recoil oil and 25 percent light recoil oil.

43. FIRING MECHANISM. a. General. From time to time and always before firing, the firing mechanism will be carefully inspected to ascertain that all parts are in good condition. Any rust or dirt that is found will be removed, and damaged or improperly fitting parts repaired or replaced.

b. Firing mechanism M1903A2. (1) This firing mechanism is an assembled part of the breechblock and cannot be removed intact from the breech. Extreme care must be exercised, therefore, to keep the firing mechanism clean, free from rust, and well lubricated.

(2) Previous to firing, each of the primers to be used will be inserted in the primer seat and the slide of the firing mechanism slid into place over each to insure proper operation of the mechanism with all primers.

c. Firing lock M16. (1) This firing mechanism is removable. It is held in place on the obturator spindle by sector threads which are similar to an interrupted screw but have no pitch. The mechanism should be removed from the breechblock whenever it is not being used for drill or firing. It should be

thoroughly cleaned and lubricated and, when not in use, stored in the armament chest. It will be carefully inspected from time to time and always before firing to make certain that all parts are in good condition.

(2) Previous to firing, the firing mechanism will be inserted in the breechblock and each of the primers to be used will be inserted in the primer seat and the wedge of the firing mechanism slid into place over each to insure proper operation of the mechanism with all primers.

44. OBTURATOR SPINDLE ASSEMBLY. a. General. (1) Mushroom heads, spindles, and split rings require continual care to prevent rusting and pitting. When gas check pads are removed from guns, they should be placed in suitable containers which will preserve them from deformation and contact with moisture.

(2) Gas check pads should be cleaned and lubricated with engine oil, SAE 30, for temperatures above 32° F. and with engine oil, SAE 10, for temperatures from 32° F. to 0° F. The oil should be applied sparingly with a cloth. Gas check pads must never be immersed in oil or cleaned with dry-cleaning solvent.

b. Obturator spindle assembly M1903A2. (1) With the breechblock carrier in the open position, the obturator spindle, with split rings, gas check pad, and filling-in disk assembled upon it, is inserted in the breechblock. Then the obturator spindle spring and the housing are inserted in the stem of the breechblock, and the obturator spindle is screwed into the housing until its face is flush with that of the housing, and the scribed marker line on the spindle is in line with that on the housing face.

(2) When the spindle has been screwed into the housing properly, the spindle key can be inserted. The spindle key keeps the obturating parts from getting out of adjustment and the breech is then ready to close for firing.

c. Obturator spindle assembly M1. (1) With the breechblock carrier in the open position, the obturator spindle, with split rings, gas check pad, and filling-in disk assembled upon it, is inserted in the breechblock. Then the obturator spindle spring is slipped over the spindle from the rear and the obturator spindle nut screwed on. Care should be taken to see that the

spline on the obturator spindle is lined up with the keyway of the hub of the block carrier before it is inserted, and that the spindle nut should be screwed down tight.

(2) The firing mechanism may then be engaged on the obturator spindle and the breechblock is ready to close for firing.

45. SPONGING SOLUTION. If the gas ejector system fails during firing, the powder chamber is sponged out with clear water only.

46. BORE. a. The bore is coated with rust-preventive compound when the gun is to be inactive for a considerable length of time. The compound is applied by means of the bore-greasing device. Normally the bore will be oiled with engine oil SAE 30 (for temperatures above 32° F.) or engine oil SAE 10 (for temperatures from 32° F. to 0° F.). As soon as possible after any period of firing and every day thereafter until all "sweating" has stopped, the bore of the gun should be cleaned, dried, and oiled. The cleaning solution is made by dissolving one-half pound of soda ash in each gallon of water. Ordinarily a bore sponge wrapped with burlap is used with this solution to clean the bore, but if difficulty is experienced in cleaning, the wire brush provided may be used. After the bore is clean, it should be thoroughly washed with plain hot water to remove moisture-collecting salts and then dried. When the bore is thoroughly dried, it should be oiled or coated with rust-preventive compound as noted above.

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

47. AZIMUTH INDICATOR M9. a. No attempt should be made by coast artillery personnel to dismantle or lubricate the azimuth indicator. However, orientation and synchronization adjustments may be made.

b. Orientation. An adjustable coupling is located in the indicator drive shaft for the purpose of making this adjustment. With the piece laid at a known azimuth, loosen the clamping screw on the adjustable coupling and turn the adjusting worm until the indicator scale reading is the same as the known azimuth. Tighten the clamping screw to retain the adjustment.

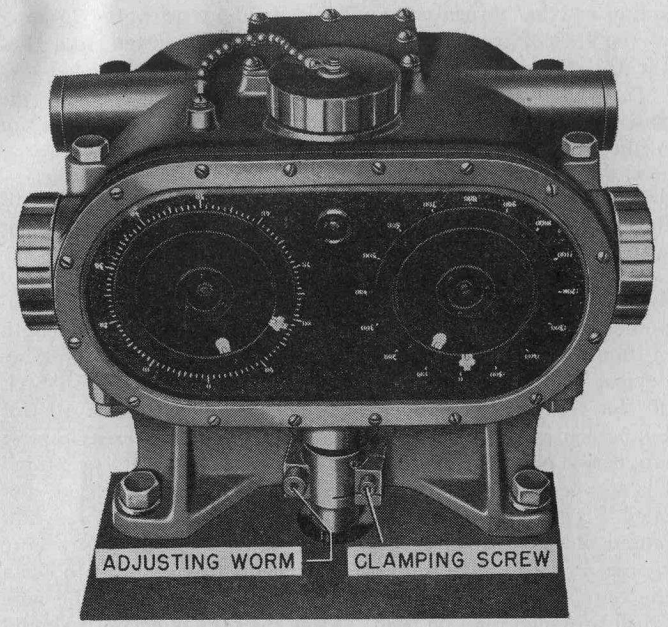


Figure 17. Indicator showing adjustable coupling in drive shaft.

c. Synchronization. Two slotted adjusting shafts, for the purpose of making this adjustment, are located under the indicator signal lamp cover. With the system energized and by means of the respective adjusting shafts, set the inner coarse and fine indexes to read the same as the transmitted azimuth.

48. ELEVATION INDICATOR M8. a. No attempt will be made by coast artillery personnel to dismantle or lubricate the elevation indicator.

b. The orientation and synchronization adjustments are made exactly as on the azimuth indicator M9.

49. REMOTE-CONTROL SYSTEM M14. a. Indicator-regulator M2. The indicator-regulator is an integral part of the remote-control system M14 and should not be dismantled

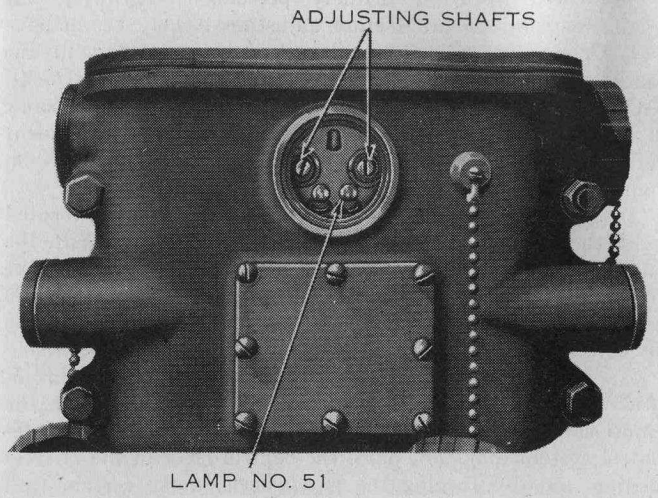


Figure 18. Indicator showing synchronizing adjusting shafts.

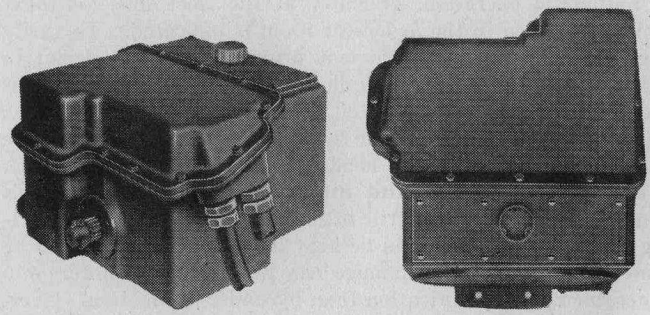


Figure 19. Indicator-regulator M2, showing adjustable coupling in drive shaft (left) and synchronizing adjusting shafts (right).

or lubricated by coast artillery personnel. However, the orientation and synchronization adjustments may be made.

(1) *Orientation.* An adjustable coupling is located in the indicator drive shaft for the purpose of making this adjustment. With the piece laid at a known elevation, loosen the setscrew on the adjustable coupling and by turning the adjustment worm make the mechanical dial read the known elevation. Tighten the setscrew.

(2) *Synchronization.* Two slotted adjusting shafts are located under the screw cover on the top of the indicator. With the data transmission system energized, adjust the coarse and fine electrical dials with their corresponding adjusting shafts to make them read exactly the transmitted elevation. *During this adjustment, the control lever must be in the HAND position.*

(3) *Check of operation.* After the orientation and synchronization adjustments have been made, the operation of the remote-control system must be checked. Turn on the remote-control system (par. 23), place the control lever in the HAND position and, by turning the handwheels, make certain that the piece can be set where desired. After checking the semiautomatic operation, place the control lever in the AUTO position and check the automatic operation. Slow rates of increasing or decreasing data should be transmitted from the plotting room for making this check. If the system works properly in semiautomatic operation but will not follow smoothly in automatic operation, difficulty at the electronic controller which is located in the generator room is indicated. To verify this, plug the resistance element provided into the circuit in place of the electronic controller. If automatic operation is then satisfactory, the indicated difficulty exists. In this case and in all other cases when the remote-control system cannot be made to function properly, local ordnance should be consulted.

b. Elevating motor and motor-generator set M1. This equipment requires very little attention. The bearings supporting the motor shafts should be kept lubricated but it should be remembered that more damage can be done to a motor or a generator by over-lubrication than by under-lubrication. Over-lubrication will cause oil to seep into the motor and stator windings, and serious damage may result.

50. ELEVATING MECHANISMS. a. Carriages M1 and M3. The care of the hydraulic elevating mechanisms on these carriages is restricted to the cleaning and lubrication of the gear train and the maintenance of the proper oil level in the oil expansion tank (TM 9–428).

b. Carriages M2 and M4. The maintenance of this equipment requires only the lubrication of the elevating gear train and the care of the remote-control system M14 as stated in paragraph 49.

51. AIR COMPRESSOR. Care of the air compressor is restricted to lubrication of the compressor and maintenance of the air lines. The compressor itself should be kept well lubricated, but the electric driving motor must not be over-lubricated. All line connections should be kept tight. After using the compressor, drain the intercooler by removing the intercooler drain plug. The finned tubes of the intercooler and the suction muffler should be kept clean.

NOTE. Local ordnance personnel should be consulted when questions regarding care and maintenance arise.

SECTION VII

DESTRUCTION OF MATERIEL

52. 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 which 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 most important features of the materiel should be destroyed and parts essential to the operation or use of the materiel which cannot be easily duplicated should be ruined 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 in the combat zone, *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 materiel, such as TNT and incendiary grenades, which normally may not be items of issue. The issue of such special tools and materiel, 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.

53. PRIORITY OF DESTRUCTION. a. Destruction should be accomplished in the following priority:

(1) Tube, breech, and recoil mechanism.

(2) Power equipment.

(3) Carriage.

(4) Fire control equipment.

(5) Ammunition.

(6) 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, fire control equipment, and other valuable small items should be carried away.

54. GUN. a. The selection of a method of demolition will depend on the tactical situation and the materials available, but regardless of the method selected, all guns must be rendered useless. The four methods for the destruction of the gun are presented in order of their effectiveness.

b. Demolition by unfuzed HE shell and either M9A1 AT grenade or M6 AT rocket.

(1) Remove the recoil cylinder 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 gun 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 gun, using either a wooden adapter or a wad of waste.

(3) Place an unfuzed, boostered HE shell and propelling charge in the gun and close the breech. An unfuzed 6-inch shell Mk. II or Mk. II A2 should be used.

(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 rear of the piece and about 20° 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) Insert thirty to fifty ½-pound TNT blocks in the chamber. Close the breechblock and plug the muzzle tightly with about 18 inches of dirt. Detonate the TNT charge.

(2) The person firing the charge should be under cover. The danger space 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. Ram an HE shell into the forcing cone, place thirty to fifty ½-pound TNT blocks in the chamber, and close the breechblock. Detonate the TNT with a safety fuze routed through the primer vent. A sufficient length of fuze 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, this method should be used. Place six to eight *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 cannon quickly to its maximum elevation.

55. BREECH. Any of the above methods for destroying the gun should simultaneously destroy the breech; but if the method selected does not, a heavy sledge may be used to render the breech useless.

56. RECOIL MECHANISM. a. If the methods in paragraphs 54*b*, *c*, and *d* are used for destroying the gun, the recoil mechanism and carriage may be effectively destroyed by draining the oil prior to firing.

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

57. POWER EQUIPMENT. a. The power equipment which will require destruction in the event of capture or evacuation includes—

(1) Elevating motors at each gun.

(2) Motor-generator set for elevating control (M2 and M4 carriages only).

(3) Electric motor driving air compressor.

(4) The auxiliary power plant.

b. Electric motors and generators can be most effectively and easily 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 fired into each coil will effectively destroy it. A 45- or 30-caliber bullet may be fired into the coils through the air vents of either end bell but care should be taken to see that no one is in the path of possible ricochet. The main switch panels in the power plant should be destroyed with an ax or sledge, and all sockets, plugs, and fuse or circuit breaker panels should be smashed completely.

58. FIRE CONTROL EQUIPMENT. a. This equipment is difficult to replace and should be destroyed only in the event of imminent capture. All firing tables, charts, and maps should be burned. All plotting boards and associated instruments, data transmitters and receivers, communications equipment, and gun data computers should be smashed, covered with gasoline, and ignited.

59. AMMUNITION. a. Projectiles. Separate-loading projectiles should be 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 fuze, next to the booster in each such center shell and detonate. The danger zone is at least 200 yards. Shells standing on their bases cannot be satisfactorily destroyed by sympathetic detonation.

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

60. 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.

APPENDIX I

LIST OF REFERENCES

Ammunition, General	TM 9–1900
Coast Artillery Ammunition	TM 4–205
Examinations for Gunners	FM 4–19
Explosives and Demolitions	FM 5–25
Fire Control and Position Finding	FM 4–15
Firing Preparations, Safety Precautions, Care and Service of Materiel	FM 4–20
Gunnery	FM 4–10
Organization	T/O & E 4–67
Preservation and Care of Seacoast Defense Materiel	TM 4–245
Safety Precautions in Firing	AR 750–10
Service of the Base-end Data and Gun Data Transmission Systems	FM 4–32
6-inch Seacoast Materiel: Guns M1903A2 and M1905A2; Barbette Carriage M1	TM 9–428
6-inch Seacoast Materiel: Gun T2 and Barbette Carriages M3 and M4	TM 9–429
Standard Nomenclature List	SNL E-54
Tactics	FM 4–5
War Department Lubrication Orders	No. 99 No. 205

FILMS AND FILM STRIPS

Explosives and Demolitions.

Part I.	Explosives, TNT	TF 5–270
Part II.	Nonelectric	TF 5–271
Part III.	Electric	TF 5–272
Part IV.	Primacord	TF 5–273

The 6-inch Guns M1903A2 and M1905A2 on Barbette Carriage M1 or M2.

Part I.	The Barrel, Breech and Firing Mechanisms	FS 4–237
Part II.	The Carriage and Traversing Mechanism	FS 4–238
Part III.	The Recoil and Counterrecoil Systems	FS 4–239
Part IV.	The Elevating Mechanism.	
	Section I. The Elevating Mechanism for the 6-inch Gun on Barbette Carriage M1	FS 4–240
	Section II. The Elevating Mechanism for the 6-inch Gun on Barbette Carriage M2	FS 4–241
Part V.	The Sighting Equipment	FS 4–242

APPENDIX II

STATISTICAL DATA

1. GUN. a. Model 1903A2.

Weight	pounds	19,990.
Total length	inches	310.4
Length of bore	calibers	50.
Maximum diameter, breech	inches	24.
Diameter of muzzle	do	9.8
Rifling (data in parentheses relate to the last guns of this model manufactured):		
Number of grooves		36. (54.)
Width of grooves	inches	0.3736 (0.2091)
Depth of grooves	do	0.04 (0.05)
Width of lands	do	0.15 (0.14)
Twist		1 turn in 50 to 1 in 25 calibers (0 to 1 turn in 25 calibers)
Powder chamber (cylindro-conical):		
Diameter	do	8.
Length	do	43.405
Capacity	cu. inches	2,114.
Total capacity of bore	do	9,504.

Breechblock (interrupted single-step screw, ogive, carrier type).

Type of firing mechanism (combination friction-electric).

b. Model 1905A2.

Weight	pounds	21,148.
Total length	inches	309.8
Length of bore	calibers	50.
Maximum diameter, breech	inches	24.
Diameter of muzzle	do	10.4
Rifling:		
Number of grooves		54.
Width of grooves	inches	0.2091
Depth of grooves	do	0.05
Width of lands	do	0.14
Twist		(0 to 1 turn in 25 calibers)
Powder chamber (cylindrical):		
Diameter	do	8.0
Length	do	43.715
Capacity	cu. inches	2,122.
Total capacity of bore	do	9,457.

Breechblock (interrupted single-step screw, tapered, carrier type).

Type of firing mechanism (combination friction-electric).

c. Model M1.

Weight	pounds	20,510.
Total length	inches	309.90
Length of bore	calibers	50.
Maximum diameter, breech	inches	22.
Diameter of muzzle	do	12.
Rifling:		
Number of grooves		48.
Length	inches	252.01
Twist		(uniform, 1 turn in 25 calibers)
Volume of powder chamber	cu. inches	2,122.
Density of loading		.482
Maximum powder pressure	pounds per sq. in.	38,000.

Breechblock (interrupted screw, step thread, straight, carrier type).

Type of firing mechanism (combination percussion-electric).

Ammunition	Shell type and model	Weight of shell	Weight of charge	Fuze
Service.....	Shell HE, Mk. II..	90 lb.	32 lb.	PD, Mk. IV—Star or PD, M47.
	Shell HE, Mk. II A2.	90 lb.	32 lb.	PD, M51A1.
	Shell AP, M1911..	108 lb.	32 lb.	BD, Mk. V.
	Shot AP, M1911..	108 lb.	32 lb.	BD, Mk. V.
	Shot AP, Mk. XXXIII.	105 lb.	37 lb.	BD, M60.
Practice....	Shell C.I., M1911..	108 lb.	32 lb.	
	Projectile, Mk. XXIX.	105 lb.	37 lb.	
	Shell Mk. II.....	90 lb.	32 lb.	
Drill.....	Projectile, dummy, Mk. I.	90 lb.	32 lb.	
	Projectile, dummy, Mk. II.	108 lb.	32 lb.	
	Projectile, dummy, Mk. II A1.	108 lb.	32 lb.	

APPENDIX III

DRILL TABLE

Service of the piece, 6-inch Guns M1903A2 and M1905A2 on BC M1 and M2 and 6-inch Gun M1 on BC M3 and M4

Details	DETAILS, POSTS	(*a*) EXAMINE GUN[1] (*b*) REPORT
Gun commander (M1 and M3 carriages only).	(1) Commands: DETAILS, POSTS. (2) Takes post at gun commander's push-button station. (3) Tests gas ejection system. (4) Before giving this command the gun commander will have the power turned on and see that the air compressor is operating and maintaining a pressure of about 150 p.s.i.	(*a*) (1) Commands: EXAMINE GUN. (2) Supervises inspection of gun, carriage, servicing equipment, and other materiel, paying particular attention to the traversing and elevating mechanisms, recoil cylinder, breech and firing mechanisms, firing circuits, and safety devices. (*b*) (1) Commands: REPORT. (2) Receives report of gun and ammunition squads. (3) Reports to the officer in charge of the emplacement, "Sir, No..... in order," or any defects he is unable to remedy.

[1] 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.

(*a*) TARGET (Designation) (*b*) (Ammunition) LOAD	COMMENCE FIRING (also: RESUME FIRING)	(*a*) CEASE FIRING (*b*) SUSPEND FIRING
(*a*) Repeats the command and the target designation. Receives and verifies the gun pointer's report, "On target," and reports to the officer in charge of the emplacement, "Sir, No..... on target." (*b*) As soon as the ammunition to be used is indicated, relays this information to the chief of ammunition. At the command LOAD, repeats the command and supervises the loading of the piece. Holds fire until command COMMENCE FIRING is given.	(1) Repeats command COMMENCE FIRING (or: RESUME FIRING) and supervises the service and firing of the piece. (2) Commands: LOAD before each round of a series. (3) In firing case II, the gun commander will press his push button and call, "Ready," after No. 1 calls, "Breech," and the elevation setter has called, "Set." This permits the gun pointer to fire when the cross hairs are on target. In firing case III with continuous data transmission, the gun pointer's firing key is unplugged, and the gun commander fires the piece with his push button when the elevation setter calls, "Set." When not using continuous data transmission, the gun commander fires on the time interval signal. (4) The gun commander also shuts off the air of the gas ejection system as each projectile enters the powder chamber.	(*a*) (1) Gives command: CEASE FIRING, after firing a specified number of rounds and reports to the assistant executive, "Sir, No. ....., ... rounds fired." (2) Gives or repeats command: CEASE FIRING, when so directed, or when observing anything which makes gun unsafe to fire. Should piece be loaded when command is given, gun commander causes all hands to clear firing circuit switches and reports to assistant executive, "Sir, No..... loaded." (*b*) (1) Gives or repeats command: SUSPEND FIRING for temporary interruption, such as change in target or change of ammunition. (2) If piece is unloaded, directs that it be loaded and instructs gun and ammunition squads to stand by for RESUME FIRING.

Details	DETAILS, POSTS	(*a*) EXAMINE GUN [1] (*b*) REPORT
Gun commander (M2 and M4 carriages).	(1) Commands: DETAILS, POSTS. (2) Takes post at gun commander's push-button station. (3) Tests gas ejection system and transfer switch. (4) Before giving this command the gun commander will have the motor-generator set turned on and see that the air compressor is operating and maintaining a pressure of about 150 p.s.i.	(*a*) (1) Commands: DETAILS, POSTS. (2) Checks operation of transfer switch and firing circuits, directs No. 4 in setting and checking the operation of the loading carriage, and supervises the inspection of the gun, carriage, servicing equipment, and other materiel. (*b*) (1) Commands: REPORT. (2) Receives report of gun and ammunition squad. (3) Reports to the officer in charge of the emplacement, "Sir, No..... in order," or any defects he is unable to remedy.

(*a*) TARGET (Designation) (*b*) (Ammunition) LOAD	COMMENCE FIRING (also: RESUME FIRING)	(*a*) CEASE FIRING (*b*) SUSPEND FIRING
(*a*) Repeats the command and the target designation. Receives and verifies the gun pointer's report, "On target," and reports to the officer in charge of the emplacement, "Sir, No. ..... on target." (*b*) As soon as the ammunition to be used is indicated, relays this information to the chief of ammunition. At the command LOAD, repeats the command and supervises the loading of the piece. Holds fire until command COMMENCE FIRING is given.	(1) Repeats the command COMMENCE FIRING (or: RESUME FIRING) and supervises the service and firing of the piece. (2) Turns the transfer switch to LOAD and commands: LOAD before each round of a series. (3) In firing case II, the gun commander will press his push button and call, "Ready," after No. 1 calls, "Breech," and the elevation setter has called, "Set." This permits the gun pointer to fire when the cross hairs are on target. In firing case III with continuous data transmission, the gun pointer's firing key is unplugged, and the gun commander fires the piece with his push button when the elevation setter calls, "Set." When not using continuous data transmission, the gun commander fires on the time interval signal. (4) The gun commander also turns off the compressed air of the gas ejection system as each projectile enters the powder chamber and turns the transfer switch back to AUTOMATIC at the report, "Breech."	(*a*) (1) Gives command: CEASE FIRING, after firing a specified number of rounds, and reports to the assistant executive, "Sir, No. ....., ... rounds fired." (2) Gives or repeats command: CEASE FIRING when so directed, or when observing anything which makes gun unsafe to fire. Should piece be loaded when command is given, gun commander causes all hands to clear firing circuit switches and reports to assistant executive, "Sir, No. ..... loaded." (*b*) (1) Gives or repeats command: SUSPEND FIRING for temporary interruption, such as change in target or change of ammunition. (2) If piece is unloaded, directs that it be loaded and instructs gun and ammunition squads to stand by for RESUME FIRING.

DRILL TABLE.—Service of the piece, 6-inch Guns M1903A2 and M1905A2 on BC M1 and M2 and 6-inch Gun M1 on BC M3 and M4—(Continued)

Details	DETAILS, POSTS	(*a*) EXAMINE GUN [1] (*b*) REPORT	(*a*) TARGET (Designation) (*b*) (Ammunition) LOAD	COMMENCE FIRING (also: RESUME FIRING)	(*a*) CEASE FIRING (*b*) SUSPEND FIRING
Gun pointer....	(1) If not already done, procures telescope and head and chest set. Mounts telescope, plugs in head and chest set, and checks communication. Presses transformer push-button switch. (2) Takes post on gun pointer's platform.	(*a*) (1) Verifies telescope and mount adjustments. (2) Checks traversing mechanism and orientation of azimuth pointing indexes. (3) Assists in checking firing circuits. (*b*) Reports to gun commander, "Traversing in order," or any defects he is unable to remedy without delay.	(*a*) (1) In firing case II, sets deflection received from plotting room on telescope mount, traverses piece until cross hairs are on target, and reports, "On target." (2) In firing case III with continuous data transmission, matches pointers quickly and reports, "On target." When not using continuous data transmission, sets azimuth as received from plotting room and reports, "On target." (*b*) Continues to track target.	(1) In firing case II, he tracks target, keeps latest deflection from plotting room set on telescope mount, and presses his firing key as soon after gun commander calls, "Ready," as he can get cross hairs on target. (2) In firing case III with continuous data transmission, gun pointer keeps pointers matched so gun commander can fire when ready. When not using continuous data transmission, gun pointer keeps latest azimuth data set.	(*a* & *b*) In firing case II, continues tracking target and setting deflections received from plotting room until command CEASE TRACKING is given. In firing case III, continues matching pointers or setting azimuths until CEASE TRACKING is given. After command CEASE TRACKING, turns off power to firing circuit.
Elevation setter (M1 and M3 carriages only).	(1) Sets elevation hydraulic power unit in operation. (2) Plugs in head and chest set and checks communication. (3) Takes post facing the elevation indicator.	(*a*) (1) Checks operation of elevating mechanism. (2) Verifies operation and orientation of elevation pointing indexes. (3) Sets loading elevation so that o. 4 can adjust loading carriage. (*b*) Reports to gun commander, "Elevation in order," or any defects he is unable to remedy without delay.	(*a*) Brings piece to loading elevation. (*b*) Sets firing elevation at report, "Breech," and calls, "Set."	(1) After each round, quickly sets and holds piece at loading elevation. At report, "Breech," returns piece to firing elevation and reports "Set." (2) When firing a specified number of rounds, elevation setters will keep count of number fired (as, "Four rounds fired").	(*a*) Returns piece to loading elevation. Turns off power equipment at command CEASE TRACKING. (*b*) If piece is loaded, sets firing elevation by matching pointer indexes continuously. If piece is unloaded, performs normal duties in loading and matches pointers continuously.
Elevation setter (M2 and M4 carriages).	(1) Turns on elevating motor. (See par. 23.) (2) Plugs in head and chest set and checks communication. (3) Takes post facing the indicator-regulator.	(*a*) (1) Places control lever in HAND position and checks semiautomatic operation of elevating mechanism. (2) Places control lever in AUTO position and checks automatic operation. (3) Verifies orientation of elevation pointing indexes. (4) Cleans and oils gears if necessary. (*b*) Reports to gun commander, "Elevation in order," or any defects he is unable to remedy without delay.	(*a*) No duties. (*b*) No duties.	(1) Reports, "Set," when the remote-control system has properly set the elevation for each round. (2) When firing a specified number of rounds, he will keep count of number fired (as, "Four rounds fired").	(*a*) No duties. Turns off elevating motor at command CEASE TRACKING. (*b*) No duties.

DRILL TABLE.—Service of the piece, 6-inch Guns M1903A2 and M1905A2 on BC M1 and M2 and 6-inch Gun M1 on BC M3 and M4—(Continued)

Details	DETAILS, POSTS	(*a*) EXAMINE GUN [1] (*b*) REPORT	(*a*) TARGET (Designation) (*b*) (Ammunition) LOAD	COMMENCE FIRING (also: RESUME FIRING)	(*a*) CEASE FIRING (*b*) SUSPEND FIRING
No. 1 (breech detail) (M1 and M2 carriages).	(1) If not already done, places cotton waste and lubricating oil convenient to breech. (2) Removes breech cover and places it in designated spot. (3) Takes post at right of breech, slightly in rear of and facing it.	(*a*) (1) Examines, cleans, and oils breechblock, breech mechanism, breech recess, and gas check seat. Checks functioning of gas ejection system. (*b*) No duties (except to notify No. 2 of any defects).	(*a*) No duties. (*b*) (1) As soon as breech clears loading platform, opens breech. (2) Closes breech when projectile and powder have been rammed and primer has been inserted. (3) Calls, "Breech," as soon as breech has been closed. Stands clear of recoil.	(1) Opens breech as soon as possible after each round is fired, wipes off obturator head, cleans and oils breechblock if necessary. (2) Calls, "Breech," when breech has been closed and stands clear.	(*a*) Stands by for instructions from chief of breech. (*b*) If piece is unloaded, proceeds as at command LOAD.
No. 1 (breech detail) (M3 and M4 carriages).	(1) If not already done, places cotton waste and lubricating oil convenient to breech. (2) Removes breech cover and places it in designated spot. (3) Takes post at right of breech, slightly forward of and facing it.	(*a*) (1) Examines, cleans, and oils breechblock, breech mechanism, breech recess, and gas check seat. (2) Checks recoil cylinder with assistance of No. 3. (*b*) No duties (except to notify No. 2 of any defects).	(*a*) No duties. (*b*) (1) As soon as breech clears loading platform, opens breech. (2) Closes breech when projectile and powder have been rammed. Stands clear of recoil.	(1) Opens breech as soon as possible after each round is fired. Wipes off obturator head during ramming of projectile. (See par. 24*e*.) (2) Stands clear of recoil.	(*a*) Stands by for instructions from chief of breech. (*b*) If piece is unloaded, proceeds as at command LOAD.
No. 2 (chief of breech) (M1 and M2 carriages).	(1) If not already done, procures primers, primer pouch, gunner's punch, primer vent drill, and primer seat reamer. Places them convenient to breech. (2) Takes post at right of breech, slightly forward of and facing it.	(*a*) (1) Examines breech mechanism, breechblock, breech recess, chamber and bore, and gives necessary orders for placing them in firing order. (2) Examines primer vent and primer seat. Cleans them if necessary. (3) Assists gun commander and gun pointer in checking operation of firing mechanism and firing circuit. (4) Checks recoil cylinder with assistance of No. 3. (*b*) Reports to gun commander, "Breech in order," or any defects that cannot be remedied promptly.	(*a*) No duties. (*b*) Inserts primer and stands clear of recoil.	(1) When piece has been fired and No. 1 opens breech, No. 2 grasps breech by the gas ejector trip and holds it open throughout loading. At the same time he ejects the fired primer. (2) Cleans primer seat and inserts a new primer. (3) Cleans primer vent and reams primer seat during lulls in firing if required.	(*a*) If gun is loaded, notifies gun commander. If gun is unloaded, directs opening of breech and cleaning of breechblock, breech recess, primer vent, and firing mechanism. (*b*) If piece is unloaded, proceeds as at command LOAD.

DRILL TABLE.—Service of the piece, 6-inch Guns M1903A2 and M1905A2 on BC M1 and M2 and 6-inch Gun M1 on BC M3 and M4—(Continued)

Details	DETAILS, POSTS	(*a*) EXAMINE GUN [1] (*b*) REPORT
No. 2 (chief of breech) (M3 and M4 carriages).	(1) If not already done, procures primers, primer pouch, gunner's punch, primer vent drill, and primer seat reamer. Procures and inserts firing lock. (2) Takes post at right of breech, slightly in rear of and facing it.	(*a*) (1) Examines breech mechanism, breechblock, breech recess, chamber and bore, and gives necessary orders for placing them in firing order. (2) Examines firing mechanism, primer vent, and primer seat; cleans them if necessary. Checks functioning of gas ejection system. (3) Assists gun commander and gun pointer in checking operation of firing circuit. (*b*) Reports to gun commander, "Breech in order," or any defects that cannot be remedied promptly.
No. 3.....	(1) If not already done, procures measure of recoil oil, filling plug wrench, and filling funnel. Places them convenient for use. (2) Takes post at right of loading carriage, facing it.	(*a*) Assists in checking and filling recoil cylinder, passing wrench, funnel, and recoil oil when required. (*b*) No duties.

(*a*) TARGET (Designation) (*b*) (Ammunition) LOAD	COMMENCE FIRING (also: RESUME FIRING)	(*a*) CEASE FIRING (*b*) SUSPEND FIRING
(*a*) No duties. (*b*) Inserts primer after breech has been closed and reports, "Breech." Stands clear of recoil.	(1) When piece has been fired and No. 1 opens breech, No. 2 opens the firing mechanism and cleans the primer seat. (2) After breech is closed, he inserts new primer, closes firing lock, and reports, "Breech." (3) Cleans primer vent and reams primer seat during lulls in firing if required.	(*a*) If gun is loaded, notifies gun commander. If gun is unloaded, directs opening of breech and cleaning of breechblock, breech recess, primer vent, and firing mechanism. (*b*) If piece is unloaded, proceeds as at command LOAD.
(*a*) No duties. (*b*) (1) When the projectile has been placed on the loading carriage, No. 3 moves the projectile a few inches forward so No. 5 can place rammer against base of projectile. (2) Assists No. 4 in rolling loading carriage forward to its seat in breech recess, noting at same time that powder chamber is clear. No. 3 holds carriage in loading position while projectile and powder are being rammed. As powder leaves loading carriage, No. 3 quickly moves carriage to rear to clear breech.	Same duties as at command LOAD.	(*a*) When using dummy ammunition, brings up the loading carriage to receive powder and projectile. (*b*) If piece is unloaded, proceeds as at command LOAD.

DRILL TABLE.—Service of the piece, 6-inch Guns M1903A2 and M1905A2 on BC M1 and M2 and 6-inch Gun M1 on BC M3 and M4—(Continued)

Details	DETAILS, POSTS	(*a*) EXAMINE GUN [1] (*b*) REPORT	(*a*) TARGET (Designation) (*b*) (Ammunition) LOAD	COMMENCE FIRING (also: RESUME FIRING)	(*a*) CEASE FIRING (*b*) SUSPEND FIRING
No. 4.....	(1) If not already done, procures loading carriage and places it on its tracks. (2) Takes post at left of loading carriage facing it.	(*a*) Inspects loading carriage and, with the assistance of the elevation setter, checks its adjustment. (*b*) No duties.	(*a*) No duties. (*b*) (1) As soon as the breech is open, No. 4 releases the loading carriage catch. Both Nos. 3 and 4 roll the loading carriage forward to its seat in the breech recess, checking at the same time to see that the powder chamber has been blown clear by the gas ejection system. (2) When the powder charge is placed on the loading carriage, he pushes it into the chamber.	Same duties as at command LOAD.	(*a*) If using dummy ammunition, No. 4 extracts powder bag and helps No. 3 return loading carriage after No. 5 has extracted projectile. (*b*) If piece is unloaded, proceeds as at command LOAD.
No. 5.....	(1) If not already done, places rammer and extractor in convenient position. (2) Takes post 10 feet in rear of breech facing it.	(*a*) Assists breech detail in cleaning. (*b*) No duties.	(*a*) No duties. (*b*) (1) Places rammer against base of projectile as soon as it has been placed on loading carriage. (2) Moves forward with carriage and rams projectile as carriage seats in breech recess. (3) Removes rammer and clears as fast as possible.	Same duties as at command LOAD.	(*a*) When using dummy ammunition, No. 5 extracts the projectile. (*b*) If piece is unloaded, proceeds as at command LOAD.
Nos. 6 and 7 (projectile servers).	(1) If not already done, No. 7 removes and places muzzle cover in designated spot. (2) Take posts at rear projectile shelf, facing gun.	(*a*) Both assist projectile detail of ammunition squad to arrange projectiles on shelf. (*b*) No duties.	(*a*) No duties. (*b*) (1) No. 6 places a projectile from ammunition shelf on loading carriage. (2) No. 7 should be ready to place next shell on loading carriage by time first round is fired.	Nos. 6 and 7 alternate in placing projectiles from ammunition shelf on loading carriage. Nos. 6 and 7 should work fast enough to have a round on the loading carriage at the time the previous round is fired.	(*a*) When using dummy ammunition, No. 6 stands by to receive projectile. (*b*) If piece is unloaded, proceed as at command LOAD.

Details	DETAILS, POSTS	(*a*) EXAMINE GUN [1] (*b*) REPORT	(*a*) TARGET (Designation) (*b*) (Ammunition) LOAD	COMMENCE FIRING (also: RESUME FIRING)	(*a*) CEASE FIRING (*b*) SUSPEND FIRING
Nos. 8 and 9 (powder servers).	Take posts on loading platform at corridor entrance.	(*a*) Duties as directed by gun commander. (*b*) No duties.	(*a*) No duties. (*b*) (1) No. 8 brings up the powder charge and places it on loading carriage as soon as projectile has been rammed. (2) No. 9 should be ready to run out with the next charge as soon as the first round is fired.	Nos. 8 and 9 alternate in bringing up the powder charge and placing it on the loading carriage after the projectile has been rammed. Nos. 8 and 9 should work fast enough so that each can arrive at the loading carriage while the projectile is being rammed.	(*a*) When using dummy ammunition No. 8 stands by to receive powder bag. (*b*) If piece is unloaded, proceed as at command LOAD.
No. 10 (sponger).	(1) If not already done, places bore sponge and sponging solution in convenient position (as standby if gas ejection system fails). (2) Takes post on edge of loading platform, directly behind gun and facing it.	(*a*) Duties as directed by gun commander. (*b*) No duties.	(*a*) No duties. (*b*) Duties as directed by gun commander.	Duties as directed by gun commander. If gas ejection system fails, No. 10 sponges out powder chamber after each round is fired.	(*a* & *b*) Duties as directed by gun commander.
Telephone operator.	(1) Takes post at command telephone. (2) Tests communications.	(*a*) No duties. (*b*) Reports to gun commander, "Telephone in order," or any defects he is unable to remedy.	(*a* & *b*) Repeats commands given by battery commander. Transmits report, "Sir, No. ..... on target," when ordered to do so by battery executive.	Repeats command given by battery commander.	(*a* & *b*) Repeats command (if given by battery commander); transmits such reports as may be directed by battery executive.
Chief of ammunition.	(1) Takes post where he can most conveniently direct the ammunition squad. (2) Posts the men of the ammunition squad.	(*a*) Inspects projectiles and sees that they are so arranged by weight groups that projectiles of one weight group will be fired consecutively. Inspects fuzes and powder to be used. (*b*) Reports to gun commander, "Ammunition in order," or any defects that cannot be remedied without delay.	(*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. (See par. 28).	Assures himself that designated projectile, fuze, and powder charge are being served. Enforces proper methods of handling ammunition.	(*a*) Halts service of ammunition and orders powder charges returned to their containers and containers closed. (*b*) If piece is unloaded, sees that projectile and powder charge are served to load the piece.
Ammunition squad (Nos. 11 to 21 incl.).	Take posts as directed by chief of ammunition.	(*a*) Assist chief of ammunition in his inspection of ammunition. (*b*) No duties (except to report any defects to chief of ammunition).	(*a*) No duties. (*b*) Serve designated projectiles and powder charges as directed by chief of ammunition.	Maintain the flow of ammunition to the gun.	(*a*) Replace unused ammunition as directed by chief of ammunition. (*b*) Prepare for further action.

32.3 Fort Monroe—7-24-44—18,000