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Training Command
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MM1301
10 May 04

STUDENT OUTLINE

INTRODUCTION TO THE M224 60MM MORTAR

LEARNING OBJECTIVES

a. TERMINAL LEARNING OBJECTIVE. None.

b. ENABLING LEARNING OBJECTIVES

(a) Given a list of choices, identify the characteristics of a M224 60mm mortar in accordance with FM 23-90. (41TR.01.01a)

(b) Given a list of choices and a diagram of a SL-3 complete, M224 60mm mortar, identify the nomenclature of a M224 60mm mortar in accordance with FM 23-90. (41TR.01.01b)

(c) Given a list of choices, identify the theory of operation for a M224 60mm mortar in accordance with TM 08206A-10/1A. (41TR.01.01c)

1. CHARACTERISTICS

a. The M224 60mm mortar is a SMOOTH BORE, MUZZLE LOADED, And HIGH ANGLE OF FIRE WEAPON. It can be fired either by drop firing in the conventional mode with bipod, or by trigger fire, in the handheld mode.

2. CAPABILITIES

a. Rates of Fire

(1) M720 and M888 Cartridges

(a) Maximum 30 RPM (For 4 Minutes)

(b) Sustained 20 RPM

(2) M49A4 Cartridge

(a) Maximum 30 RPM (For 1 minute) then 18 RPM
(For the next 4 minutes)

(b) Sustained 8 RPM

b. Range

(1) Conventional Mode

- (a) Minimum 70m
- (b) Maximum 3490m
- (2) Handheld
 - (a) Minimum 75m
 - (b) Maximum 1340m
- (3) M49A4, M302A1, M83A3, and M69 Cartridges
 - (a) Minimum 70m (231 ft)
 - (b) Maximum 1930m (M494 series ammo), 1630m (M302A1 series ammo) 931m (M83A3 series ammo)

b. Weights and dimensions

- (1) M224 Complete
 - (a) Weight, conventional mode 46.5 lbs (21.1kg)
 - (b) Weight, hand-held mode 18 lbs (8.2kg)
- (2) Cannon M225
 - (a) Overall Length 40 in. (1m)
 - (b) Weight 14.4 lbs (6.5kg)
- (3) Bipod Assembly M170
 - (a) Weight 15.2 lbs (6.9kg)
 - (b) Overall length (collapsed) 28 in. (0.7m)
 - (c) Azimuth adjustment 250 mils
 - (d) Elevation adjustment 800 to 1511 mils
- (4) Base plate M7
 - (a) Weight 14.4 lbs (6.5kg)
- (5) Base plate M8
 - (a) Weight 3.6 lbs (1.6kg)
- (6) Sight Unit M64A1
 - (a) Weight 2.5 lbs (1.1kg)
 - (b) Magnification 1.5x unity power
 - (c) Field of view 17 degrees (302 mils)

(4) Self contained radioactive tritium (H3). The half-life of tritium is over 12 years

3. NOMENCLATURE

a. Cannon M225. The cannon assembly has one end closed by a base cap. The base cap end of the cannon has cooling fins on the outside, which reduce heat generated during firing. Attached to the base cap end are a combination, carrying handle and firing mechanism. The carrying handle has a trigger, firing selector, range indicator, and auxiliary carrying handle. On the outside of the barrel, there is an upper and a lower firing saddle.

(1) Firing Selector

(a) The firing selector has three positions: S-SAFE, D-DROP, and T-TRIGGER FIRE.

b. Bipod Assembly, M170. The bipod assembly consists of 7 SUB ASSEMBLIES.

(2) Collar Assembly. The collar assembly, with an upper and lower half, is hinged on its left and secured by a locking knob on its right. The collar fastens in one of two firing saddles (depending on the elevation being fired), securing the bipod to the barrel.

(3) Shock Absorbers. Two shock absorbers protect the bipod and sight from the shock of recoil during firing, and are located on the underside of the collar assembly.

(4) Traversing Mechanism. The traversing mechanism moves the collar assembly left or right when the traversing hand crank is pulled out and turned. The hand crank is turned CLOCKWISE to move the barrel to the RIGHT, and counterclockwise move the barrel to the left. A dovetail slot to attach the sight to the bipod is on the left side of the traversing assembly.

(5) Elevating Mechanism. The elevating mechanism is used to elevate or depress the barrel by turning the hand crank at the base of the elevation guide tube. This assembly consists of an elevating spindle, screw, hand crank, and housing (elevation guide tube). A latch to secure the collar and shock absorbers to the housing for carrying is on the housing. The hand crank is turned CLOCKWISE to depress, and counterclockwise to elevate.

(6) Right Leg Assembly. The right leg assembly has no moving parts. It consists of a spiked foot, tubular steel leg, and hinge attached to the elevating housing. It is commonly referred to as DEAD LEG.

(7) Left Leg Assembly. The left leg assembly consists of a spiked foot, tubular steel leg, hinge attached to the elevating housing, locking sleeve, and fine cross leveling nut (adjusting nut). The left leg assembly is commonly referred to as the "MECHANICAL LEG".

(a) The locking sleeve is near the spiked foot. It is used to lock the elevation housing in place.

(b) The fine cross-leveling nut above the locking sleeve is used for fine leveling.

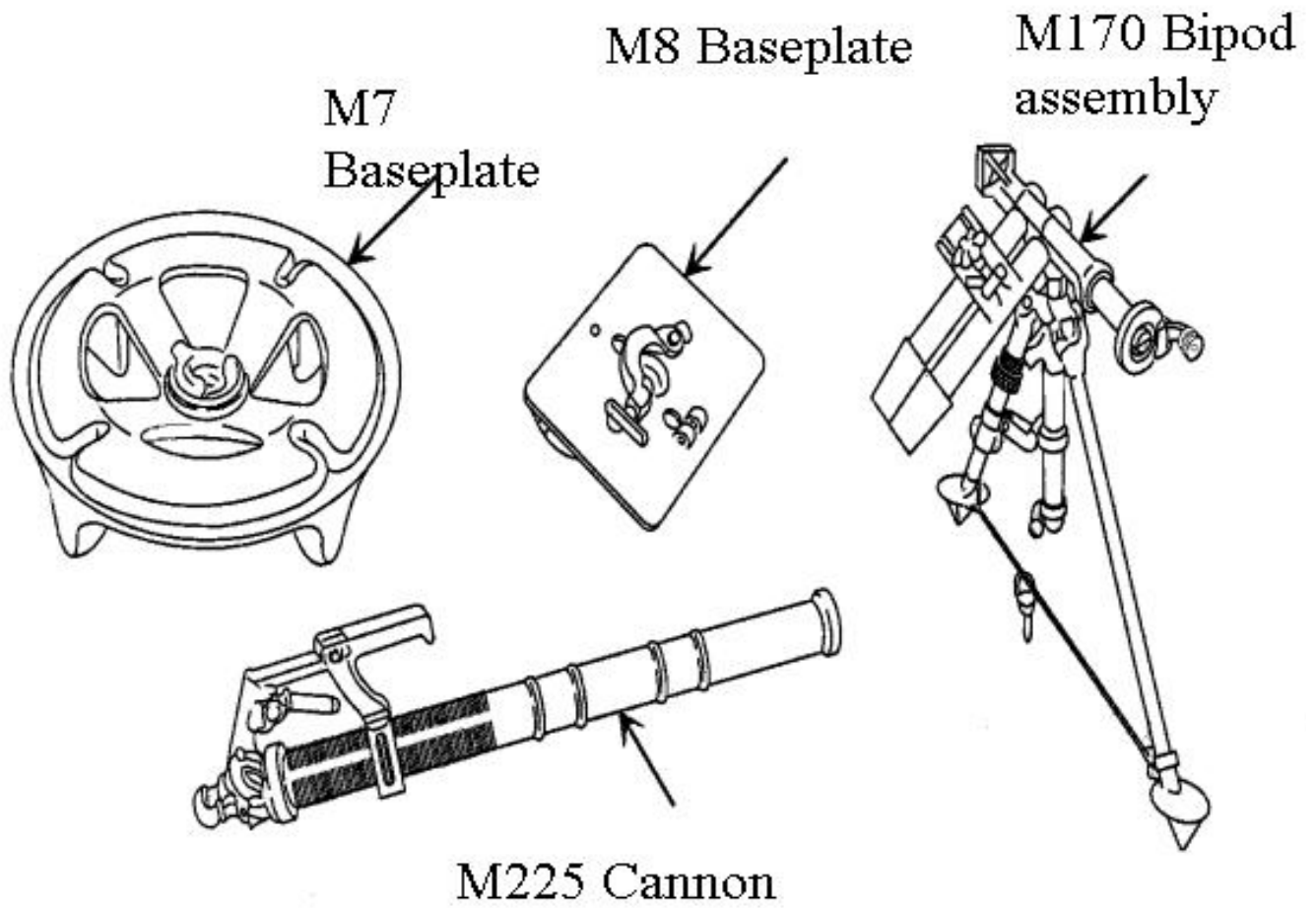
(8) Spread Cable. The spread cable is a plastic-coated steel cable attached to the bipod legs, which controls the spread of the two tubular steel legs. A snap hook is fixed to the cable to secure the bipod legs when they are collapsed for carrying.

c. Baseplate M7

(1) The baseplate, M7, is one piece, circular aluminum forged base. It has a ball socket with a rotating locking cap and a stationary retaining ring held in place by four screws and lock washers. The locking cap rotates 6400 mils (360 degrees). The underside of the baseplate has four spades to stabilize the mortar during firing.

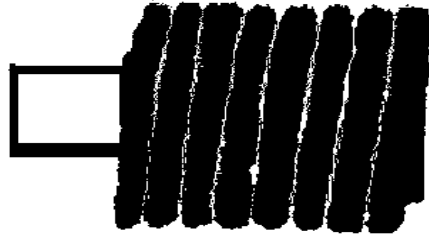
d. Baseplate M8

(1) The baseplate, M8 is a one-piece, rectangular, aluminum forged base. It should be used when the mortar is fired in the handheld mode. It has a socket in which the barrel can be locked to the baseplate by securing the locking arm. The underside of the baseplate has four spades to strengthen and stabilize the mortar during firing. Two spring-loaded plungers lock the baseplate to the barrel in its carry position.

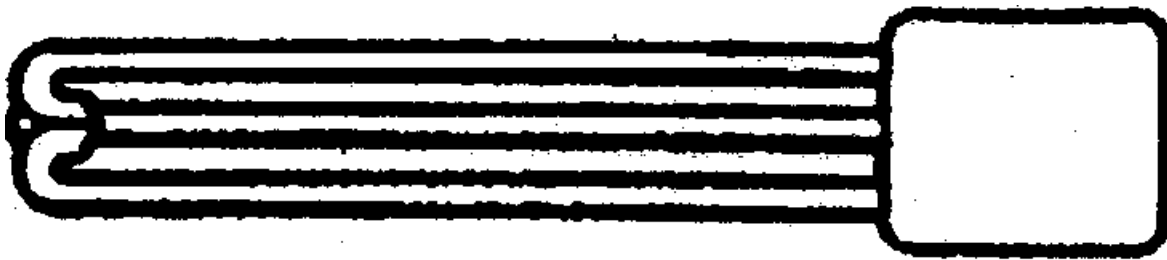


4. BASIC ISSUE ITEMS

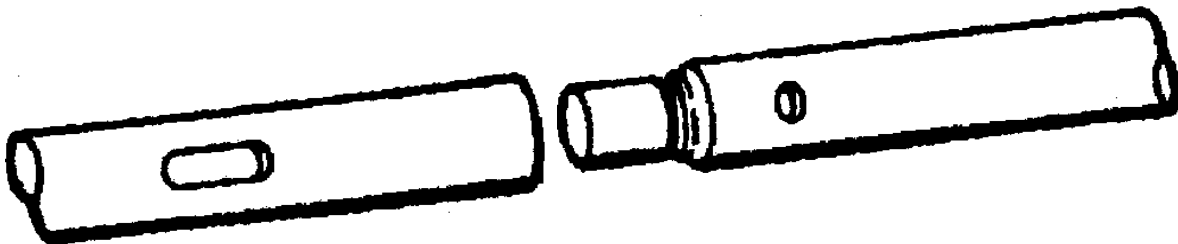
a. Cleaning Artillery Brush. For scouring/cleaning the inside of the cannon.



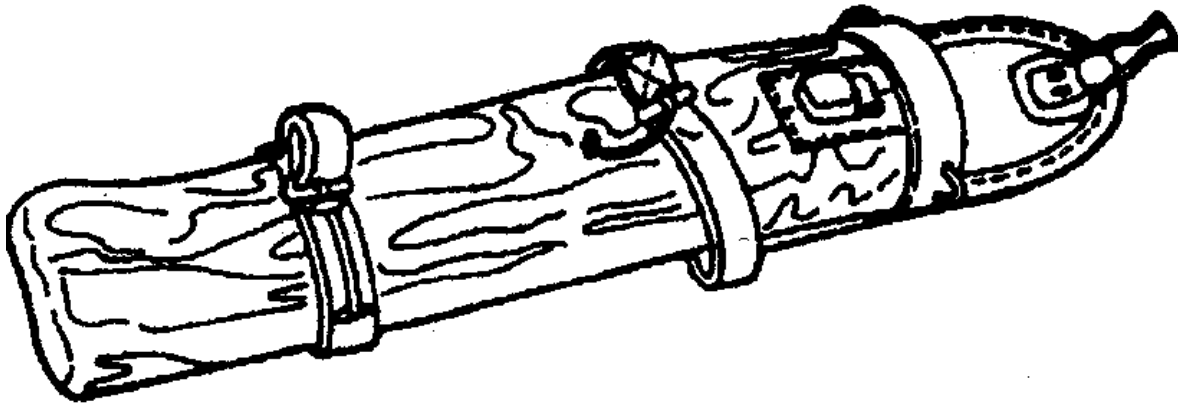
b. Artillery Clearing Hook. For cleaning the inside of the cannon.



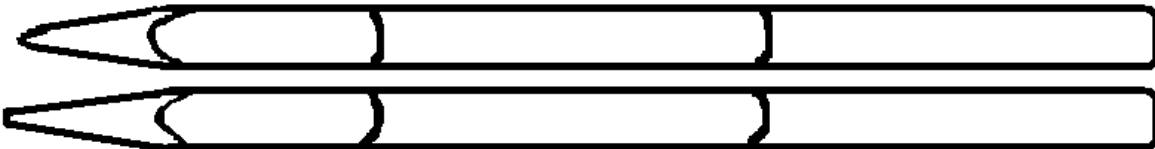
c. Section Cleaning Staff. (1) The Staff, when assembled, provides a handle to fix the brush and hook to.



d. Aiming Post Case. (1) Canvas bag for transporting aiming posts.



e. M14 Aiming Post. (1) Provide an aiming point for laying the mortar.

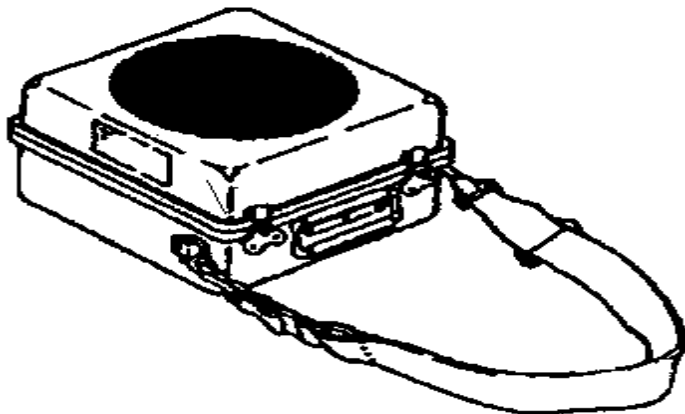


f. Driving Stake. (1) The driving stake is used to force the aiming post into hard or frozen ground.

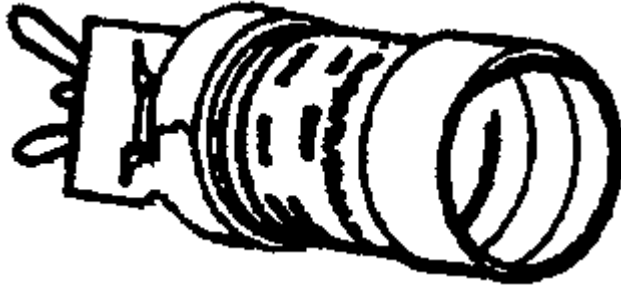


g. Sight Unit Case. Provides a housing for the sight unit, NADs, M115 boresight and screwdriver.

(1) The outside of the case provides an aiming point for boresighting.



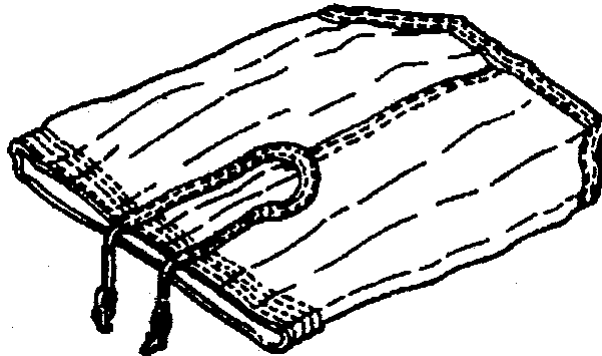
h. M58 Aiming Post Light (Night Aiming Device) X2. (1) Green in color, illuminated by tritium. They afford a means to see your aiming points at night. There are two M58s in the sight box.



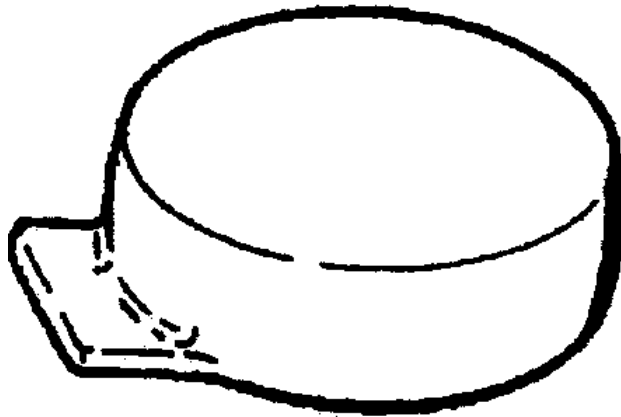
i. M59 Aiming Post Light (Night Aiming Device)

(1) Orange in color, illuminated by tritium. They are a different color so the gunner can tell which posts he is looking at. (Identical to picture above).

j. Fire Control Cover. Protects the sight from dust and debris.



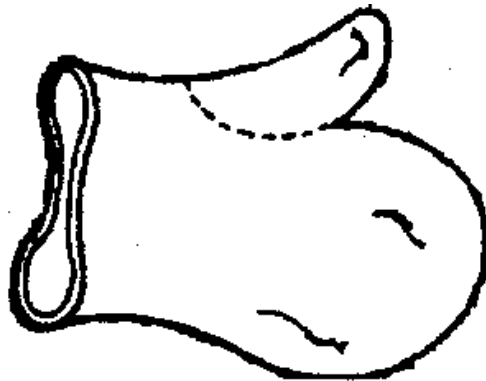
k. Gun Muzzle Cover. Prevents water or debris from entering the muzzle.



l. Small Arms Sling. (1) The sling may be used when transporting the weapon system. Most commonly used for the sight box.



m. Heat Protective Mitten. (1) The asbestos mitten protects the gunner's hand from heat radiating from the cannon.



n. Flat-Tip Screwdriver. (1) The screwdriver is used to adjust the minor deflection and minor elevation scales.



o. TM 08206A-10/1A. The Manual contains instructions for proper use and maintenance of the M224 60mm Mortar.

5. Theory of Operation. The M224 60mm mortar is operated using the drop fire or trigger fire methods. Traditionally the drop fire method is utilized in conventional mode and the trigger fire method is used in hand-held mode.

a. Drop Fire Method

(1) Mortar is fired by dropping the round down the cannon tube, fin first. The selector switch must be at D.

(2) Percussion primer and ignition cartridge function after the primer on round strikes firing pin in base of cannon.

(3) The propelling charge is ignited by the flash of the ignition cartridge. Expanding gases force the round from the mortar.

(4) The fins on the rear of the round stabilize it in flight.

b. Trigger Fire Method

(1) With the selector switch at T, the round is dropped down the cannon tube, fin first. Mortar will fire only after trigger is squeezed.

(2) Trigger fire method can be used when the mortar is in either the conventional or hand-held mode.

(3) Trigger firing without a round in the barrel will cause rapid failure of the sear. Trigger firing without a round should be limited to inspection for operation only.

REFERENCES. TM 08206A-10/1A, Operator's Manual for Lightweight Company Mortar, 60mm, M224 pages 0003 00-1 through 0003 00-3 and FM 23-90, Mortars pages 3-1 through 3-6.