

81-MM MORTAR MARK 2 MOD 0

DESCRIPTION, OPERATION, AND MAINTENANCE WITH REPLACEABLE PARTS BREAKDOWN

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FOREWORD

This manual describes the components of the 81-MM Mortar Mk 2 Mod 0 and provides operating instruction and maintenance procedures. In addition, a Replaceable Parts List is included as the last section of this publication.

The equipment is designed to fire high-explosive, illuminating, smoke, target practice, and training shells from light craft. The sight angle, sight deflection, and elevation and training scales are illuminated to facilitate night firing.

This publication supersedes the first revision of NAVWEPS OP 1743 dated 1 June 1963.

Comments and technical corrections to this publication should be made in accordance with the procedures outlined in BUWEPS Instructions 5600.15 "Ordnance Technical Manuals; Evaluation, Allowances, and Distribution of," dated 11 June 1962, paragraph 6.a, which reads: "Ships, training activities, supply points, depots, naval ship yards, and Supervisors of Shipbuilding are requested to arrange for the maximum practicable use and evaluation of the standard ordnance technical manuals and to advise the Commanding Officer, Naval Weapons Service Office, Philadelphia 19112, if all errors, omissions, discrepancies, and suggested improvements."

FOREWORD

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SAFETY SUMMARY

The following general safety precautions do not appear elsewhere in this publication. They are recommended safety precautions that personnel should observe during the phases of operation and maintenance.

AVOID DOUBLE-LOADING.

Extreme caution must be exercised to avoid double-loading the mortar particularly when operating in trigger fire mode.

CHECK FOR OVERHEAD CLEARANCE.

The mortar captain must check for overhead clearance and the safe point of the mortar before firing

The following warnings, repeated from the text, provide a summary of all safety precautions for users of this manual.

WARNINGS

Cartridges shall not be lifted or handled by the cord attached to the pull wire and the safety wire. Do not use the round if a buzzing sound is heard after removing the pull wire and the safety wire. Such a round is still safe to handle and transport provided the bore-riding pin is still in position and the safety wire is reinserted.

Exercise care when handling rounds to prevent striking the primer of the ignition cartridge against hard objects such as a belt buckle.
(Pages 4-2, 4-3, and 4-4.)

Helmets must be worn at all times when firing the mortar. The loader, however, must not use a chin strap. If he should not clear the muzzle quickly enough, blast effects could blow his helmet off.

Wipe off excess oil inside the mortar tube. A heavy coating of oil will reduce the effective range of the round.

WARNINGS (CONTINUED)

When firing in inclement weather the charges must be protected during handling from the ready ammunition box to the mortar tube. Shake off any adhering drops of water before loading.

In inclement weather keep barrel depressed except during periods of rapid fire. Failure to take these precautions will significantly reduce the range to the extent where operating personnel may be injured.

Every effort shall be made to protect the tube and the propellant when necessary to fire in the rain. Proof testing indicates that the majority of short ranges are due to the propellant of the rounds being exposed to the rain or allowed to collect moisture. (Page 4-3.)

Do not attempt to fire rounds which do not have the bore-riding safety pin in position. If rounds are fired in this armed condition, they will explode prematurely in the bore or within a few feet of the muzzle. (Page 4-5.)

When loading the mortar during DROP FIRE operation, the loader must stand forward and to the right of the barrel (see figure 4-5). He leans towards the piece only as far as is required to easily drop the round into the barrel and immediately ducks to the position shown in figure 4-6 to avoid the muzzle blast. (Page 4-5.)

No part of fingers or thumbs of either hand should be in front of the muzzle. If the mortar is hot, the loader should wear asbestos gloves. If the heat of the barrel is excessive, do not attempt to remove the misfire until the mortar has been doused with water or allowed to cool. Excessive heat in the barrel can cause the round to fire. (Page 4-8.)

To prevent possible explosion, drop misfired round overboard. (Page 4-9.)

Disassembly of fuzes aboard ship is dangerous and is prohibited except under specific direc-

WARNINGS (CONTINUED)

tions from the Bureau of Naval Weapons. Do not fire cartridges fitted with M52-Series, M82-Series, and M519-Series fuzes over the heads of friendly troops. (Page 5-2.)

M43, M56, and M57 cartridges on hand and fitted with fuzes M52-Series are issued for combat emergency use only. (Page 5-2.)

Cartridges shall not be lifted or handled by the cord which is attached to the pull wire and safety wire. If, upon removal of the pull wire and safety wire, a buzzing sound in the fuze is heard, the round shall not be used. Such a round is still safe to handle and transport provided the bore-riding pin is in position and the safety wire is reinserted. (Page 5-3.)

In the event the fuze, whether packaged separately or assembled to a cartridge, is dropped 40 feet or more, it should not be approached or disturbed for at least 30 minutes. All personnel should be evacuated from the area immediately to a point commensurate with the quantity-distance requirements established for the total quantity of explosives that could be involved in an explosion. After the 30-minute waiting period, the fuze is still dangerous but may then be approached and removed carefully and destroyed in a safe place. All operations connected with this procedure should be done either by or under direct supervision of personnel who are thoroughly familiar with the dangers of such operation and who are qualified to do this work. If the situation permits a longer waiting period, 40 hours should be allowed prior to approaching the dropped fuze for its removal. It must be remembered that the dropped fuze or fuzed cartridge is still dangerous after this 40-hour waiting period but it may be handled with comparative safety. (Page 5-5.)

Duds should not be approached or disturbed for at least 30 minutes. After the 30-minute waiting period the dud is still dangerous but may be approached carefully to destroy in place. If

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WARNINGS (CONTINUED)

it is impossible to destroy in place, the dud should be removed carefully for subsequent destruction. If the situation permits a longer waiting period, 40 hours should be allowed prior to approaching the dud for destruction in place or for removal. It must be remembered that the dud is still dangerous after this 40-hour waiting period but may be handled with comparative safety. All the operations connected with the above procedures should be performed by qualified disposal personnel. (Page 5-5.)

Do not attempt to fire rounds or fuzes that have been dropped 3 feet or more unless these have been inspected and certified by qualified personnel. (Page 5-7.)

Care must be exercised to prevent striking the primer of the ignition cartridge against hard objects such as belt buckles, etc. (Page 5-7.)

Do not fire cartridges fitted with M52 Series and M82 Series fuzes over the heads of friendly troops. (Pages 5-8 and 5-10.)

Do not fire cartridges fitted with M519 fuzes over the heads of friendly troops. (Page 5-10.)

Store white phosphorous cartridges with fuze ends up. Since WP liquifies above 100°F, protect the ammunition against an uneven rehardening of the filler. An air cavity formed on one side of the shell will unbalance it and cause instability in flight. (Pages 5-10 and 5-13.)

Short and variable ranges result if the propellant increments get wet or if there is water, excessive lubricant or solvent in the mortar bore. Do not attempt to fire the mortar if any of these conditions exist. (Page 5-13.)

Smoking is prohibited in the vicinity of the mortar when the mortar is manned for firing. (Page 5-13.)

WARNINGS (CONTINUED)

Carbon deposits forming on the firing pin bushing can cause the firing pin to stick in the DROP FIRE position. Failure to keep the bushing clean may result in injury to personnel. (Page 6-3.)

Do not exceed 4-5/12 turns from a fully seated position counterclockwise when resetting the choke valve. If more turns are required, the choke valve is defective and should be replaced. (Page 6-8.)

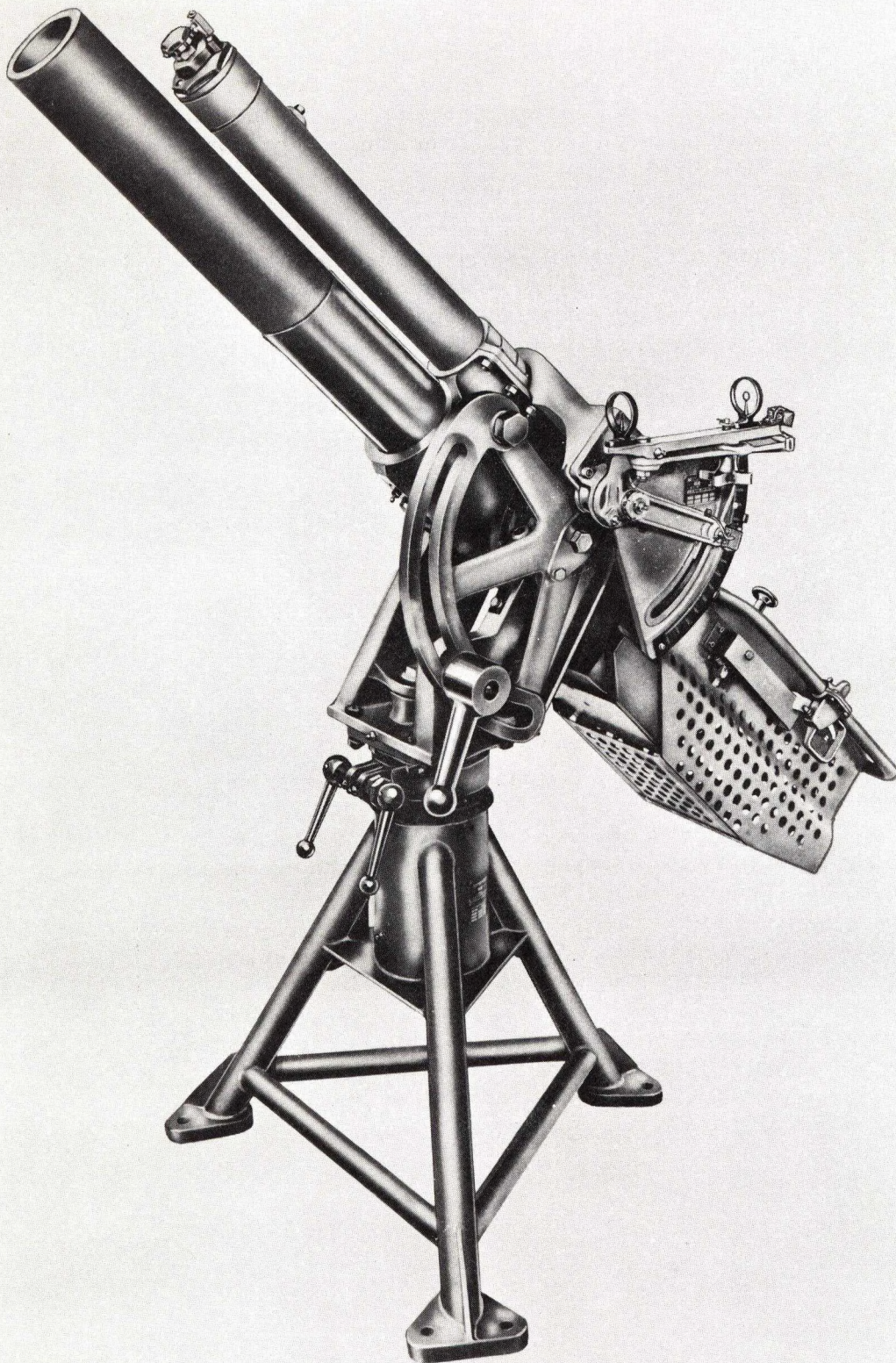
If a round fails to fire, wait one minute before removing the round. Refer to paragraph 4-46 for removal of misfire. (Page 6-9.)

Replace safety wire in round. Refer to paragraph 4-47.

At least two men are required to remove the breech mechanism and barrel which weighs approximately 190 pounds. (Page 6-12.)

The slide, breech, and barrel assembly weigh approximately 350 pounds. Several men are required to remove the assembled unit; or if possible, use an overhead type hoist and sling. Failure to observe this warning may result in injury to personnel or damage to the equipment. (Page 6-13.)

The slide, breech, barrel, and carriage assembly weigh approximately 450 pounds. Several men will be required to remove the assembled unit; or if possible, use an overhead type hoist and sling. Failure to observe this warning may result in injury to personnel or damage to the equipment. (Page 6-14.)



81-MM Mortar Mk 2 Mod 0

CHAPTER 1

INTRODUCTION

1-1. INTRODUCTION.

1-2. The 81-MM Mortar Mk 2 Mod 0 (figures 1-1 and 1-2) is tripod mounted and uses Army ammunition. It is intended for installation on small craft and is capable of firing high explosive shells, illuminating shells, or WP smoke shells. In combat this weapon is effective in bombardment, laying smoke screens, or providing nighttime target illumination.

1-3. DESIGN FEATURES.

1-4. The weapon includes several distinctive arrangements which differ from the design of landtype mortars. It has a recoil-counterrecoil mechanism for reducing brake load. It is designed for free-swinging in either train and elevation for quick changes in direction or a fixed-firing position, and both drop-fire and controlled trigger fire. The trigger fire facilitates firing when used as a free-swinging mount and affords the possibility of firing at near horizontal positions. In elevation it can be elevated to 71 degrees 30 minutes and depressed to 30 degrees.

1-5. The sight is an open yoke-type, with calibrated line-of-sight deflection and depressed movements. A basket arrangement at the rear of the breech protects the operator from recoil action.

1-6. The mortar can be operated and fired by one man, though two usually perform these duties. The oscillating unit is a balanced type, manually operated by releasing the elevation arc clamping

lever, and lowering or raising the handle bars. Similarly, a train clamping lever and the handle bars control swivel motion in train.

1-7. COMPONENT ARRANGEMENT.

1-8. The mortar consists of six major components, the barrel, breech mechanism, slide, carriage, stand, and the sight. The barrel assembly, consisting of a smooth-bore tube and the breech mechanism are supported by the slide and secured to the recoil unit. A cast steel housing on the breech end of the barrel is the main unit of the breech mechanism. It is arranged with a recoil lug at the top and a case-enclosed firing mechanism centered on its rear face. The firing mechanism is a manually cocked, trigger operated percussion firing pin.

1-9. The slide is a trunnion-pivoted mortar cradle with cylindrical liners and a longitudinal key slot for alining and supporting the barrel. Short stroke recoil of the mortar in the liners is braked and limited by a spring and hydraulic type recoil and counterrecoil mechanism located on top of the slide. The elevating arc and manually operated elevating arc clamping lever are secured to the slide and are used to control elevation movement.

1-10. The mortar carriage is a Y-shaped weldment containing horizontal trunnion bearings for the slide and a vertical pintle for the stand.

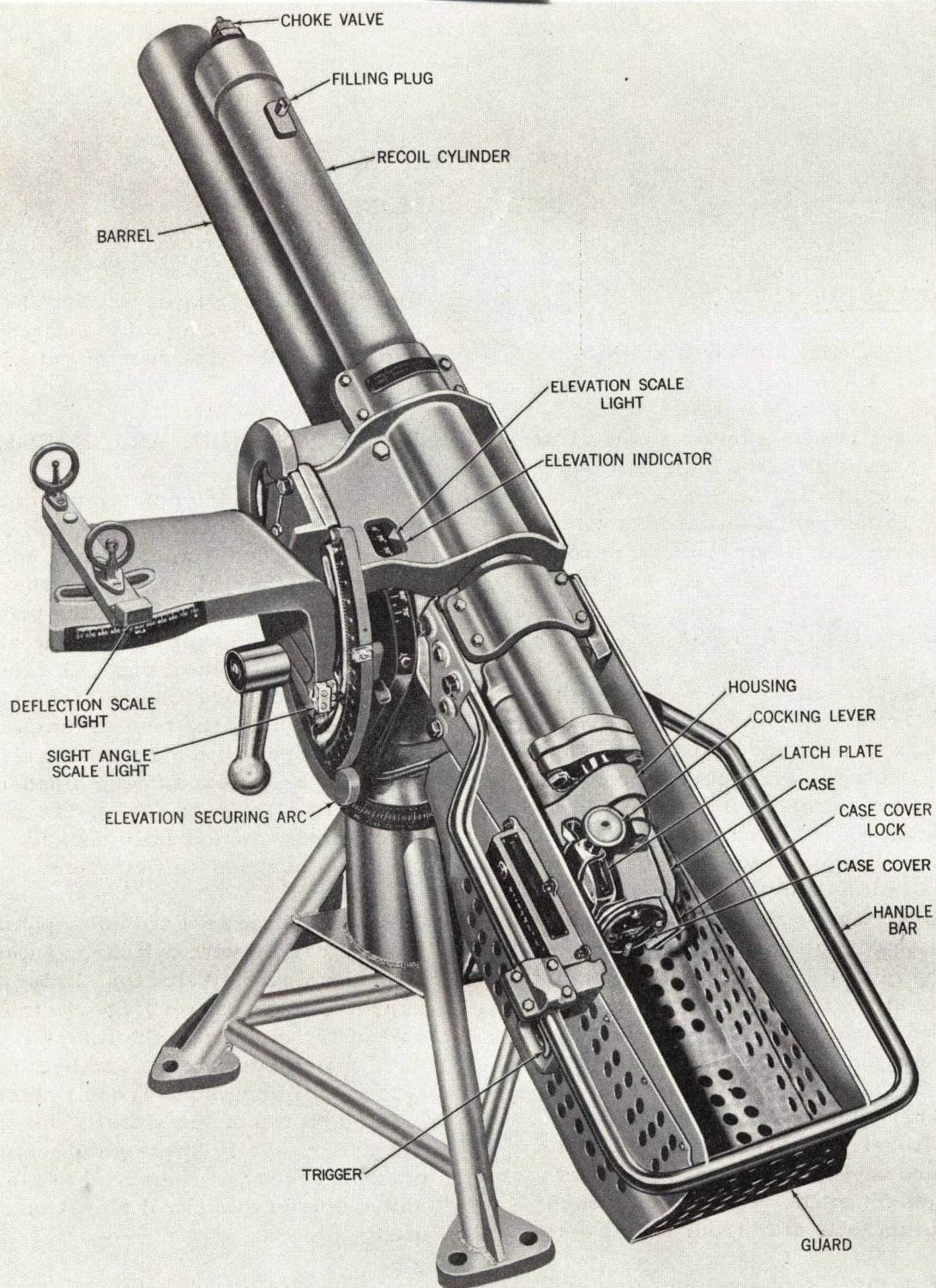


Figure 1-1. 81-MM Mortar Mk 2 Mod 0, Left Rear View

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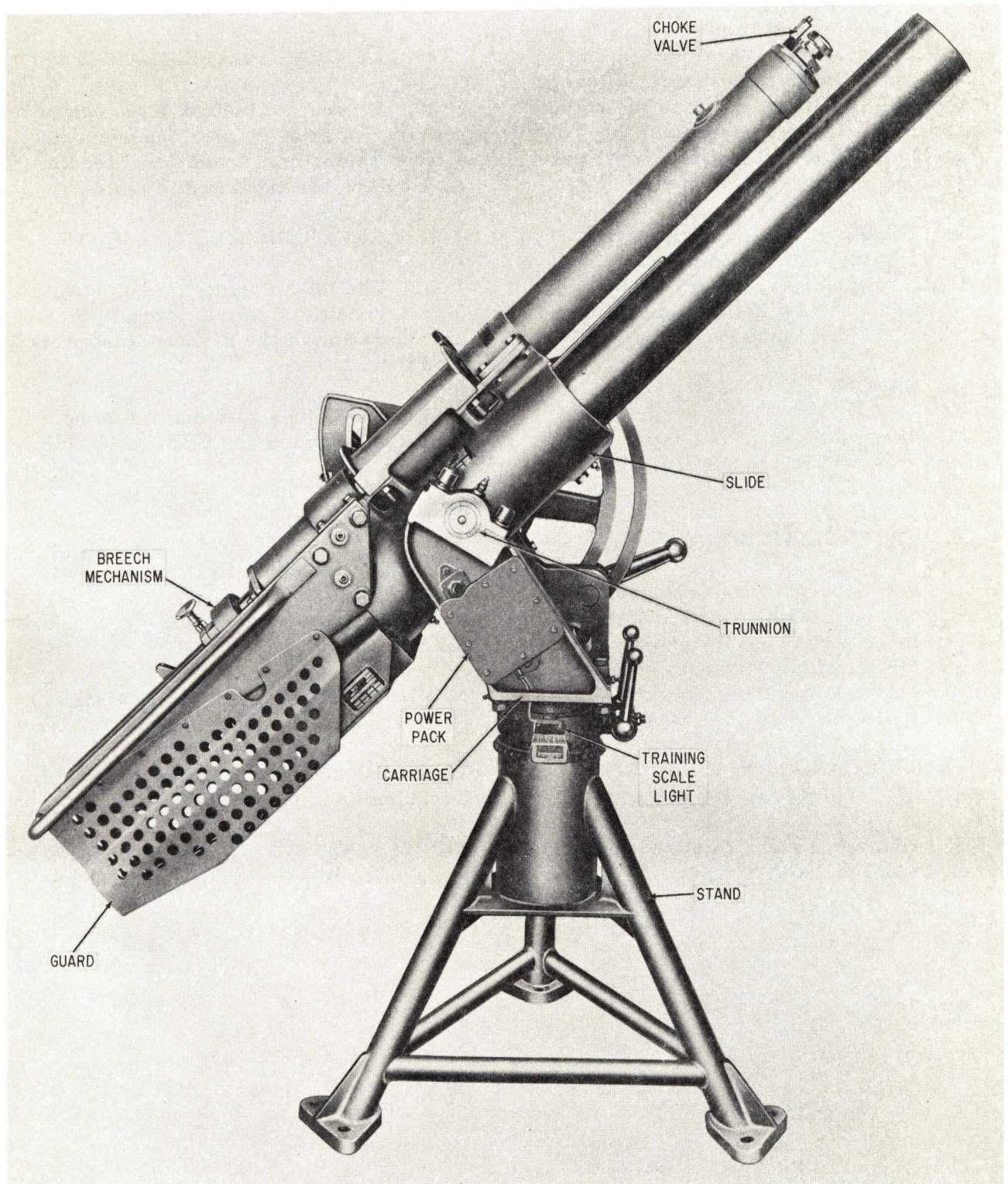


Figure 1-2. 81-MM Mortar Mk 2 Mod 0, Right Side View

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1-11

1-11. The stand is a tripod weldment of tubular stock, arranged at the bottom with deck bolt pads and at the top with a large upper bearing for the carriage and includes manually operated clamping levers that engage the slewing ring to the stand to secure the trained position of the mortar. Bearing and pintle designs permit unlimited train of the mortar.

1-12. The sight, an open yoke-type mounted at the left side of the slide, is a manually adjusted arrangement, with offset limits of 14° 20' deflection, right and left, and 75° sight angle.

1-13. RANGE.

1-14. Range tables for this mortar are tabulated in NAVWEPS OP 3183 (Refer to paragraph 1-22).

1-15. ABBREVIATIONS.

1-16. Few abbreviations are used in the text of this publication. Abbreviations and symbols are necessary, however, in tables, illustrations, and data stamped on components. Full meaning of each symbol and abbreviation is given in table 1-1.

1-17. MARK AND MOD IDENTIFICATION.

1-18. All major assemblies are identified by individual mark (Mk) and modification

(Mod) numbers. A tabulation of these components is shown in table 1-2.

1-19. LEADING PARTICULARS.

1-20. Figure 1-3 indicates the center of gravity, working circle, and over-all mount dimensions. Additional leading particulars are tabulated in table 1-3.

1-21. REFERENCED DOCUMENTS.

1-22. The following documents should be referred to in connection with the use and operation of the 81-MM Mortar Mk 2 Mod 0.

NAVWEPS OP 5 - Ammunition Ashore; Handling, Stowing and Shipping, Volume 1

NAVWEPS OP 3000 - Lubrication of Ordnance Equipment

Army TB-Ord 248 - Illuminating Shell

Army TM9-1901 - HE. and WP Smoke Ammunition

NAVWEPS OP 1014 - Ordnance Safety Precautions, Their Origin and Necessity

TM9-1300-205 - Department of the Army Technical Manual

NAVWEPS OP 3183 - Range Tables for 81-MM Projectiles Fired from Mortar Mk 2

1-4

Table 1-1. Abbreviations and Symbols

ABBREVIATION/SYMBOL	FULL MEANING
BUWEPS	Bureau of Naval Weapons (formerly Bureau of Ordnance)
C _L	Centerline
CIC	Combat Information Center
DIA	Diameter
DWG	Drawing
°	Degrees
FPS	Feet per second
FS	Sulphur trioxide chlorosulfonic acid
HE.	High explosive
Mk	Mark
MAX	Maximum
-	Minus
'	Minutes (measurement)
MV	Muzzle velocity
Mod	Modification
No.	Number
OD	Ordnance Data
OP	Ordnance Pamphlet
PD	Point detonating
+	Plus
Sec.	Seconds (time)
"	Seconds (measurement)
SQ	Superquick
TP	Target practice
VT	Variable time
WP	White phosphorous
Yd(s)	Yards

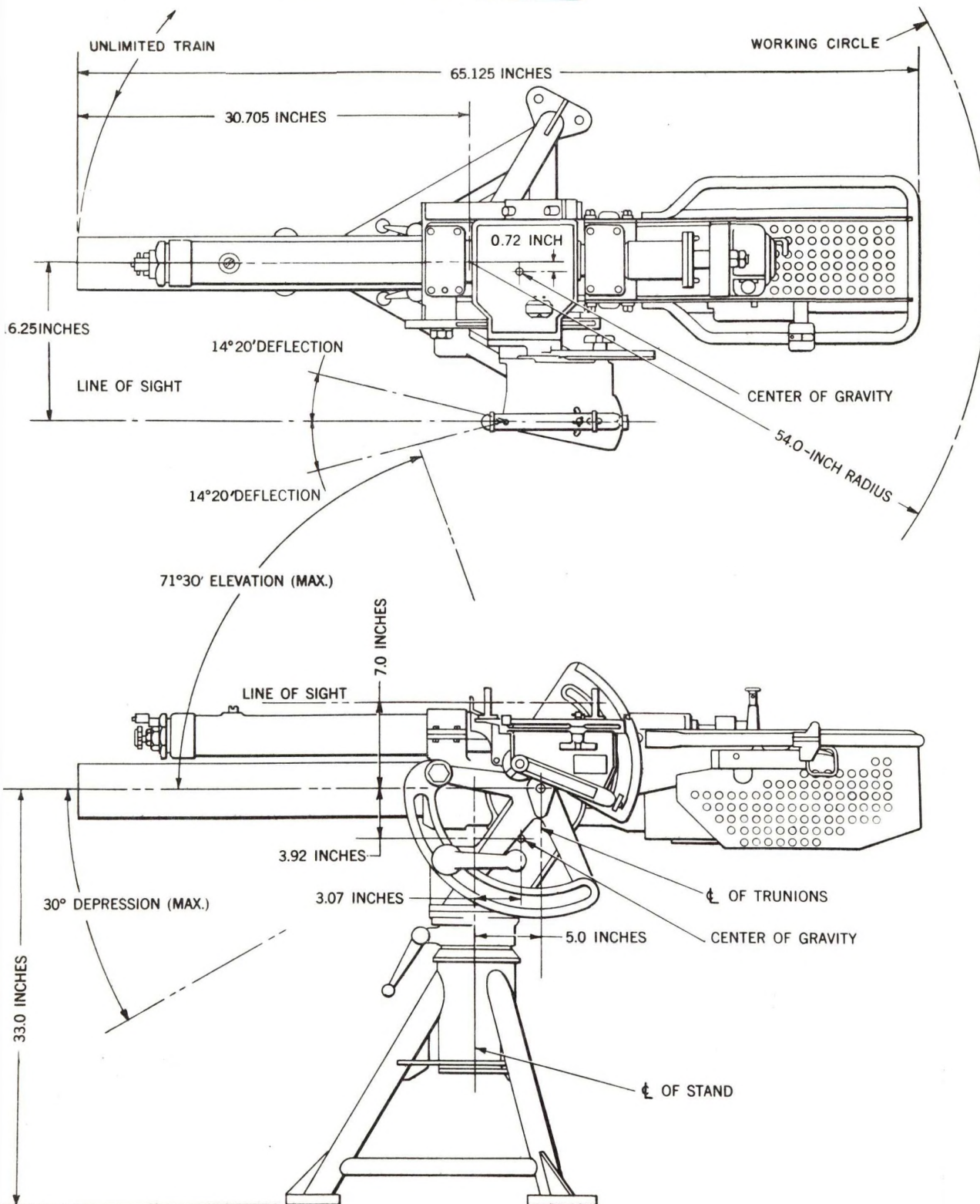


Figure 1-3. 81-MM Mortar Mk 2 Mod 0, Mount Dimensions and Working Circle

Table 1-2. Mark and Mod Chart

COMPONENT	MARK	MOD
Barrel	1	0
Breech Mechanism	1	0
Slide	1	0
Carriage	1	0
Stand	1	0
Sight	1	0
Lighting Circuit	1	0
Mortar Cover	1	0

Table 1-3. (Sheet 1) Leading Particulars, 81-MM Mortar Mk 2 Mod 0

ITEM	DATA
Mount dimensions and working circle	(See figure 1-3)
Barrel	
Length	45.50 inches
Inside DIA	3.205 inches
Outside DIA	4.375 inches
Weight	88 pounds
Slide Assembly	
Counterrecoil spring (2 required)	
Free length	26.60 inches
Outside DIA	2.25 inches
Wire DIA	0.3125 inches
Load to compress to:	
17.625 inches	423 + 45 pounds
13.625 inches	612 + 30 pounds
Weight (each spring)	9.25 pounds
Weight (slide assembly)	167 pounds
Stand	
Height	23 inches
Width, MAX.	27.13 inches
Weight	130 pounds

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Table 1-3. (Sheet 2) Leading Particulars, 81-MM Mortar Mk 2 Mod 0

ITEM	DATA
Carriage	
Height	26.0 inches
Width, MAX.	9.375 inches
Train limits	None
Elevation limits	+71° 30'
Depression limits	-30°
Weight	75 pounds
Sight mechanism (open type)	
Total deflection	500 mils, 28° 40'
Weight	29 pounds
Breech mechanism	
Weight	98 pounds
Replacement barrel and breech assembly	186 pounds
Recoil data	
Brake load, MAX.	8300 pounds
Length of recoil	8 inches
Muzzle velocity	
Muzzle velocity is dependent upon type of ammunition and number of increments used (refer to NAVWEPS OP 3183).	
Rate of fire	
Drop-fire mode at 45° elevation	18 rounds per minute
Trigger-fire mode (using procedure described in paragraph 4-39)	10 rounds per minute
Lighting circuit	
Power supply	Battery operated
Total weight of mortar	584 pounds
Ammunition	
Illuminating Shell M301W/Fuze, M84 for 81-MM Mortars	
Weight	10.71 pounds
Length	22.48 inches
Maximum number of increments to be used. Reference: Army TB-Ord 248	4

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VWEPS OP 1743

Table 1-3. (Sheet 3) Leading Particulars, 81-MM Mortar Mk 2 Mod 0

ITEM	DATA
HE. Shell M56W/Fuze Point Detonating M53	
Weight	10.85 pounds
Length	22.89 inches
Maximum number of increments to be used. Reference: Army TM9-1901	4
Smoke WP, Shell M57W/Fuze Point Detonating, M52	
Weight	11.57 pounds
Length	22.89 inches
Maximum number of increments to be used. Reference: Army TM9-1901	4
HE. Shell M362A1W/PD M524	
Weight	9.23 pounds
Length	20.798 inches
Maximum number of increments to be used. Reference: Army TM9-1300-205	8
HE. Shell M43A1 W/PD M52A2	
Weight	7.15 pounds
Length	13.32 inches
Maximum number of increments to be used. Reference: Army TM9-1300-205	6
Smoke WP, Shell M370 W/PD M524	
Weight	9.34 pounds
Length	20.767 inches
Maximum number of increments to be used. Reference: Army TM9-1300-205	8
Smoke WP, Shell M57A1 W/PD M525 or TSQ M77	
Weight	12.46 pounds
Length	24.39 inches
Maximum number of increments to be used.	4

CHAPTER 2

DESCRIPTION

2-1. CARRIAGE.

2-2. The 81-MM carriage Mk 1 Mod 0 (figure 2-1) is shown assembled in position on the stand. The carriage consists of the carriage weldment, trunnion caps, elevation arc clamping lever and elevation scale.

2-3. CARRIAGE WELDMENT (See figure 2-1).

2-4. The main unit of the carriage is a welded assembly consisting primarily of a 4-inch diameter steel center column, a base plate, a center column plate, right and left trunnion support plates, trunnion blocks and a stop plate. The center column is the carriage pintle, with upper and lower journals machined to fit the respective stand bearings. The base plate is located immediately above the upper journal and is used for mounting the right and left trunnion supports. The center column plate is a structural stiffening piece that includes an elevation stop lug and an attached depression stop.

2-5. The trunnion blocks are solid steel pieces welded in parallel to the trunnion support and machined with 2-inch diameter recesses alined to locate the slide trunnions normal to the center column journals. Each block is tapped to receive the trunnion cap bolts.

2-6. The support block, welded on the front of the left support plate, is the mounting detail for the elevation clamping lever. The right train support plate has

two tapped holes for mounting the lighting power pack (see figure 1-2).

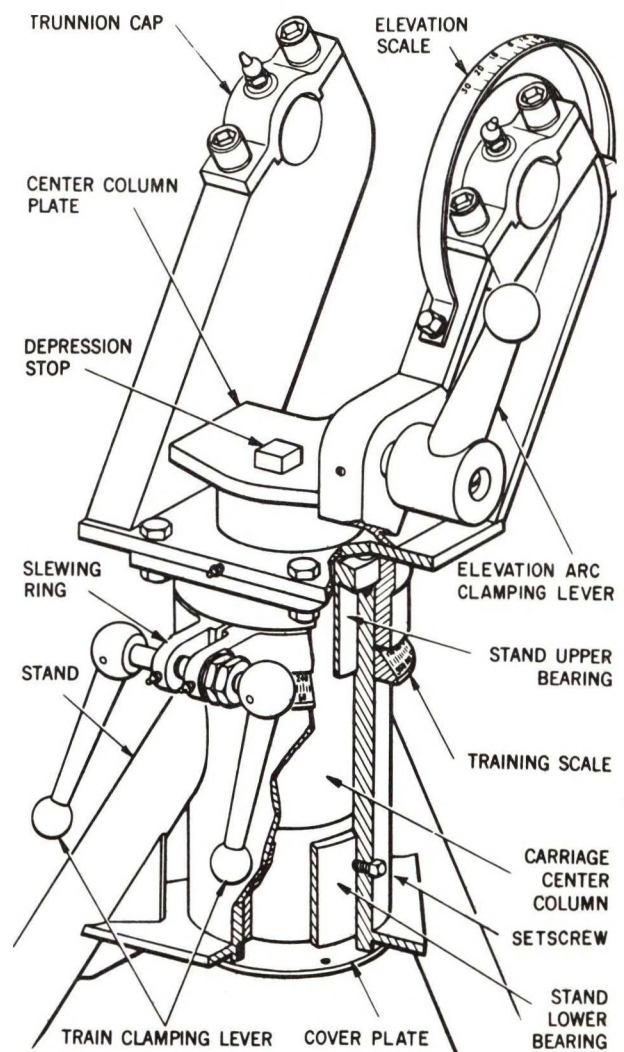


Figure 2-1. Carriage and Stand Components

2-7

2-7. Trunnion Caps (See figure 2-1.)

2-8. Right and left trunnion caps are identical cast steel pieces. Each is fitted for its assembled position, and its trunnion block. When seated over the slide trunnion bearing, each cap clamps the bearing against rotation or axial movement. Grease fittings assembled in the caps provide for lubrication of the slide trunnion bearings.

2-9. Elevating Arc Clamping Lever.

2-10. The elevating clamping lever (figure 2-1), mounted on the carriage weldment support is threaded to the clamping lever bolt and secured with a single machine screw. The elevation securing arc is also mounted on the clamping lever bolt between the trunnion support and the elevating clamping lever. The position of the mortar in elevation is secured by rotating the clamping lever to clamp. The machine screw at the end of the clamping lever bolt limits the unscrewing rotation of the clamping lever, preventing the removal of the lever when releasing the elevation securing arc.

2-11. Elevation Scale.

2-12. The elevation scale (figure 2-1) is a cast arc segment of 4-inch radius and approximately 236 degrees. A scale is engraved on the outer periphery and registers beneath the elevation indicator (figure 2-2). The scale is calibrated at intervals of 5° of arc from minus 30° to plus 75° . Alternate graduations are numbered from 30° depression to 70° elevation inclusive.

2-13. STAND (See figure 2-3.)

2-14. The 81-MM stand Mk 1 Mod 0 consists primarily of an upper and lower bearing located in the stand housing, the training scale, the slewing ring and its associated components, and the mortar

stand. At final installation, the stand is bolted to the emplacement deck and supports the carriage and all other mortar components, i.e., barrel, recoil cylinder, and breech mechanism. The upper bearing secures the carriage to the stand but permits unobstructed vertical rotation of 360 degrees.

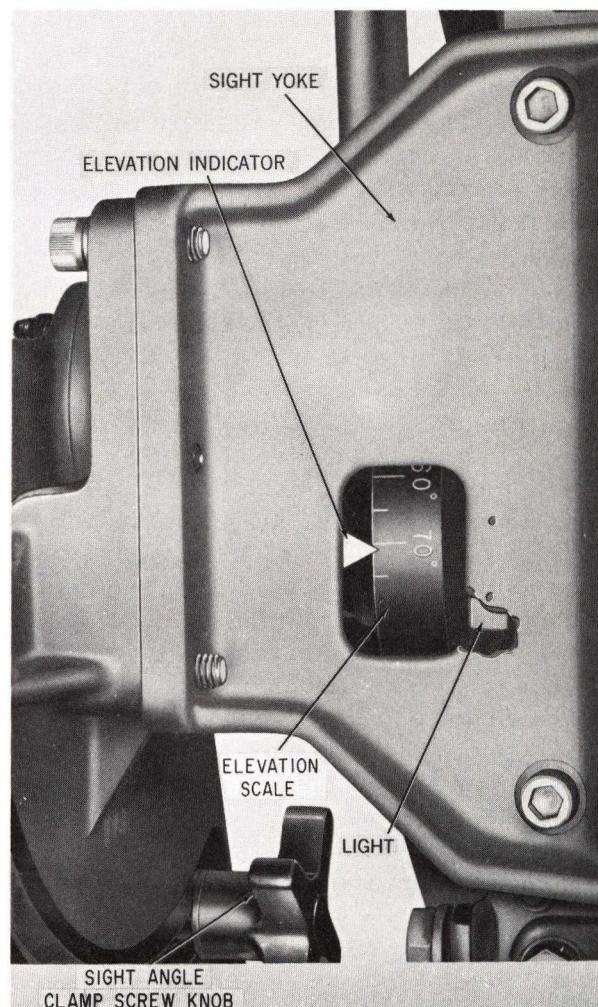


Figure 2-2. Elevation Scale and Sight Yoke

2-15. Mortar Stand.

2-16. The mortar stand (figure 2-3) is a welded structural tripod unit consisting of a center tube, three legs, cross bracing

and other stiffening details. The center tube is machined to accurately align the upper and lower bearings and secure them in place. Six equally spaced tapped holes in the top provide for attaching the upper bearing, while a single tapped hole in the lower side wall is provided for the lower bearing setscrew. A shoulder, machined on the exterior of the tube 3 inches below the top, locates the training scale described in paragraph 2-21. The cylindrical surface immediately above this shoulder is machine finished to form the clamping surface for the slewing ring and components.

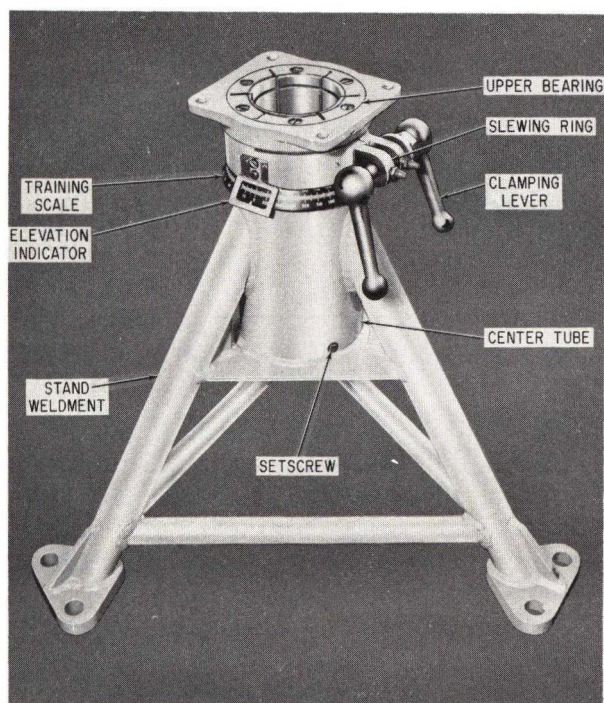


Figure 2-3. 81-MM Stand Mk 1 Mod 0

2-17. Upper Bearing. (See figure 2-1.)

2-18. The upper bearing is a flanged-bronze cylinder bushing that functions as a radial-thrust bearing and a hold-down bearing for the carriage. The top flange is a carriage thrust bearing surface

and the lower shoulder of the flange is a carriage hold-down bearing surface. Thrust and radial bearing surfaces are grooved for lubricant distribution from a grease fitting installed in the carriage slewing ring. The upper bearing hold-down shoulder mates with the annular shoulder in the slewing ring. It is this design detail that requires assemblage of the slewing ring on the stand before installing the upper bearing.

2-19. Lower Bearing.

2-20. The lower bearing functions as a radial bearing only. The inner surface of the bearing has grease-distributing grooves radiating from a grease-fitting hole that registers with a lubrication fitting in the center tube of the stand. A counterbore hole is provided in the outer surface of the bearing and is used to align the grease holes and secure the bearing in its seat. The steel cover plate (figure 2-1), closes the opening beneath the lower bearing and is secured in place with six equally spaced machine screws.

2-21. Training Scale.

2-22. The training scale (figure 2-3) is a bronze ring with a frustum surface that is graduated at 1° intervals throughout the entire circle. Two scales, one above the graduations and one below, designate each 10° graduation from the 0° mark to the 360° mark. Both scales increase in clockwise sequence, but their 0° marks are 180° apart. The training scale is oriented so that the 0° mark of the lower scale is at 3 o'clock position in the plan view of the stand, 12 o'clock being forward. This gives a train indicator reading of 0° on the lower scale when the mortar is pointing forward and parallel to ship centerline. The scale is secured in this position by a setscrew.

2-23

2-23. Slewing Ring (Train Securing Device).

2-24. The train securing device consists of the bronze-collar slewing ring, clamping levers, train indicator and associated hardware used to secure the unit (see figure 2-1).

2-25. The slewing ring is a cylindrical slotted bearing with a square bolting flange that mates with the bottom surface of the carriage weldment base plate. The bearing has an annular shoulder located immediately below the bolting flange. The shoulder engages the top flange of the mortar stand upper bearing and together they function to hold the carriage in the stand and permit unobstructed vertical rotation. The slotted bearing arrangement forms a contractible clamp that is drawn together by the clamp shaft and clamping lever. Two clamping levers are provided, enabling the securing device to be operated from either side of the mount.

2-26. The train indicator, mounted on the left side of the slewing ring, contains a small rectangular opening that frames the pointer. The position of the pointer enables it to register against the 360° graduated training scale mounted on the mortar stand.

2-27. SLIDE.

2-28. The 81-MM Slide Mk 1 Mod 0 consists primarily of the aiming handle bar, breech mechanism guard, slide assembly and recoil and counterrecoil assembly.

2-29. Handle Bar.

2-30. The aiming handle bar (figure 2-4) is a looped tubular unit secured to the slide assembly and encircles the breech mechanism and recoil area. The handle bar enables the gunner to manually train and elevate the mortar.

2-31. Breech Mechanism Guard.

2-32. The breech mechanism guard (figure 2-4) consists of a perforated steel plate suspended from the handle bar at the rear of the slide assembly. Its primary purpose is to protect the gunner during recoil movement.

2-33. Slide Assembly (Figure 2-5)

2-34. The slide assembly is a hollow steel cylindrical casting containing a forward and a rear cylinder liner, trunnion bearings and cylinder caps. The forward cylinder liner is riveted to the slide and contains a keyway which engages the key on the mortar barrel to prevent the barrel

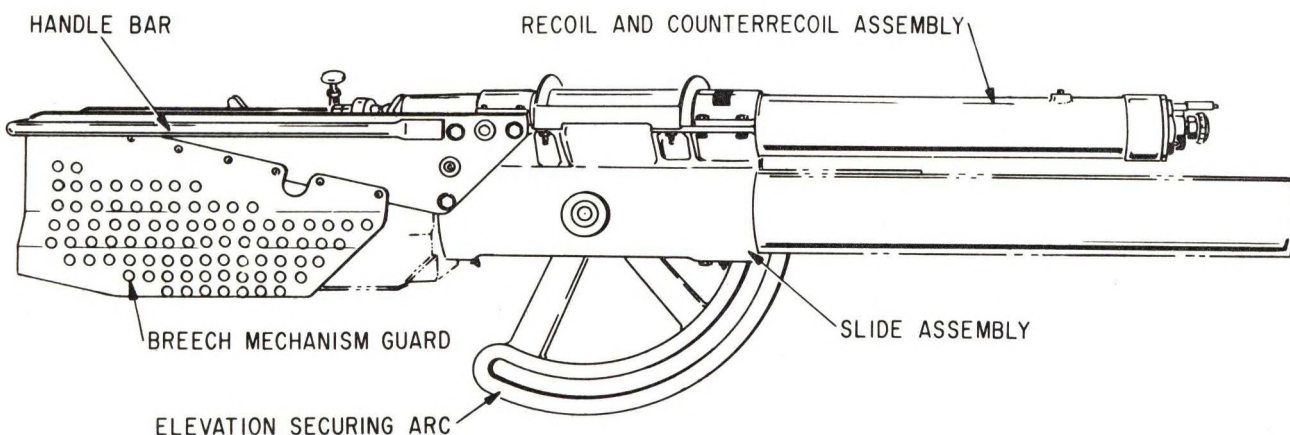


Figure 2-4. 81-MM Slide Mk 1 Mod 0

2-4

from turning during recoil and counter-recoil.

2-35. The recoil and counterrecoil assembly (figure 2-4) is mounted on top of the slide assembly and is secured and aligned in position by the forward and rear cylinder caps. The slide assembly and recoil mechanism are in turn mounted on the carriage and are secured by the carriage trunnion caps (figure 2-1). The trunnion bearings, installed over the slide trunnions (figure 2-7), are flanged-bronze bushings which permit the gunner to reposition the barrel in elevation after releasing the elevating arc clamping lever (figure 2-1).

2-36. Recoil and Counterrecoil Assembly. The recoil and counterrecoil assembly (figure 2-4), secured to the top of the slide housing, is a combination spring and hydraulic brake system that controls the motion of the mortar in recoil and counterrecoil. The primary components of the recoil mechanism are described in the following paragraphs and are illustrated in figures 2-6 and 2-7.

2-37. Recoil Rod. The recoil rod is an integral piston and piston rod. It is a steel shaft 44 inches long, approximately 1.25 inches diameter, with a 2.5-inch-diameter piston at the forward end. The rear end of the rod is stepped down to form a shoulder and is threaded to receive the lock nut that secures it to the breech housing (figure 2-6). The forward face of the piston contains a longitudinal hole 3.5 inches deep to accommodate the counter-recoil plunger (see figure 2-7). The recoil rod bushing, threaded into the piston end of the recoil rod, meters the flow of fluid during the dashpot action.

2-38. Recoil Cylinder. The recoil cylinder (figure 2-6) is a steel cylinder 40 inches long and approximately 3 inches outside diameter. Its forward end is threaded to receive the cylinder head, counterrecoil plunger and choke valve. The rear end of the cylinder is sealed by the packing vent and packings. The recoil cylinder houses the recoil and counterrecoil springs.

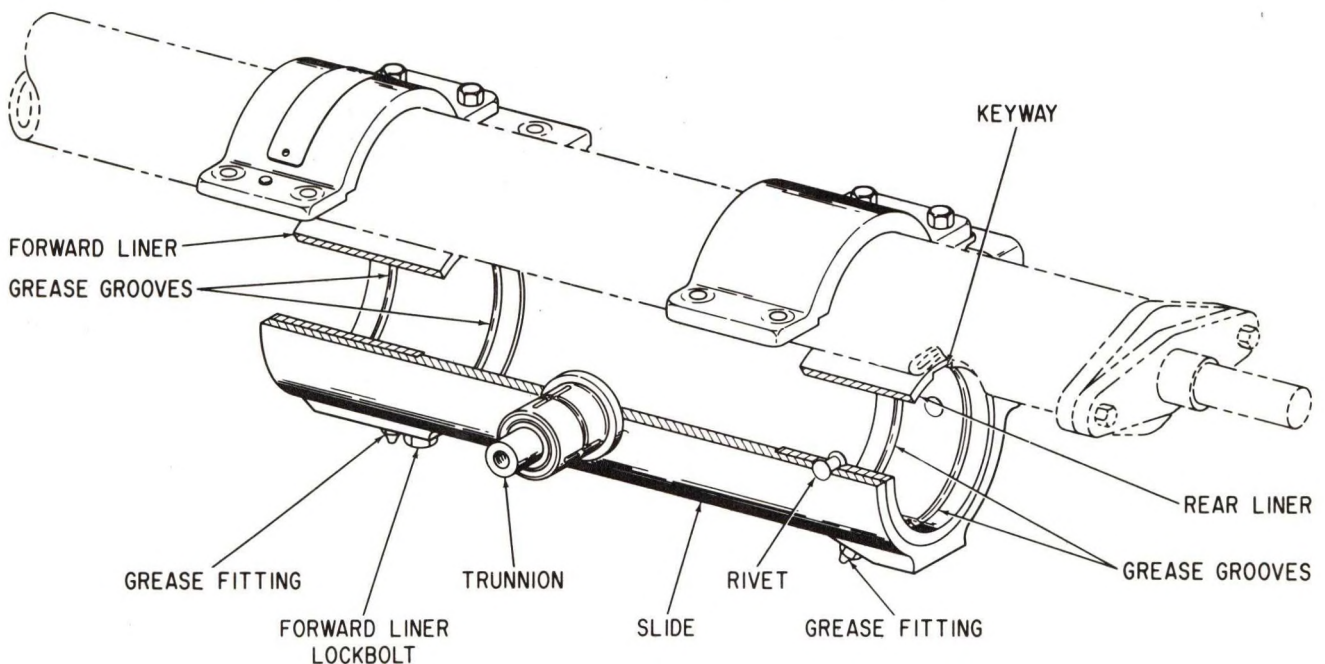


Figure 2-5. Slide Assembly

2-39

2-39. Cylinder Head (See figure 2-7.) The cylinder head, threaded into the forward end of the cylinder, is drilled and tapped through the center to align and secure the counterrecoil plunger concentric with the piston bore. The cylinder head is sealed by a copper gasket and contains the hydraulic fluid drain port.

2-40. Counterrecoil Plunger. The plunger is screw-seated into the recoil cylinder head (figure 2-7) and is a combination dashpot plunger and valve housing for the adjustable needle-type choke valve. It operates to displace fluid in the piston bore in the final 3.125 inches of counterrecoil action. The plunger mates with the recoil rod bushing with such fine clearance that most of the fluid displaced is required to flow through a center hole (0.125-inch diameter) in the plunger. Displaced fluid escapes to the cylinder

through the needle valve seat and a lateral port, the flow is controlled by adjusting the choke valve setting.

2-41. Counterrecoil Spring. The counterrecoil spring consists of two identical coil springs (figure 2-6). The springs fit around the recoil piston rod and seat against the piston head at the forward end and against packing seat at the rear end. The springs are separated in the center by the spring separator which is bronze cross-shaped washer that fits around the rod to form seats for the springs. The separator is free to slide along the rod when the springs are being compressed in recoil and when they are expanding in counterrecoil. The springs act to return the recoiling parts to battery after firing and hold the mortar assembly in the slide at all angles of elevation.

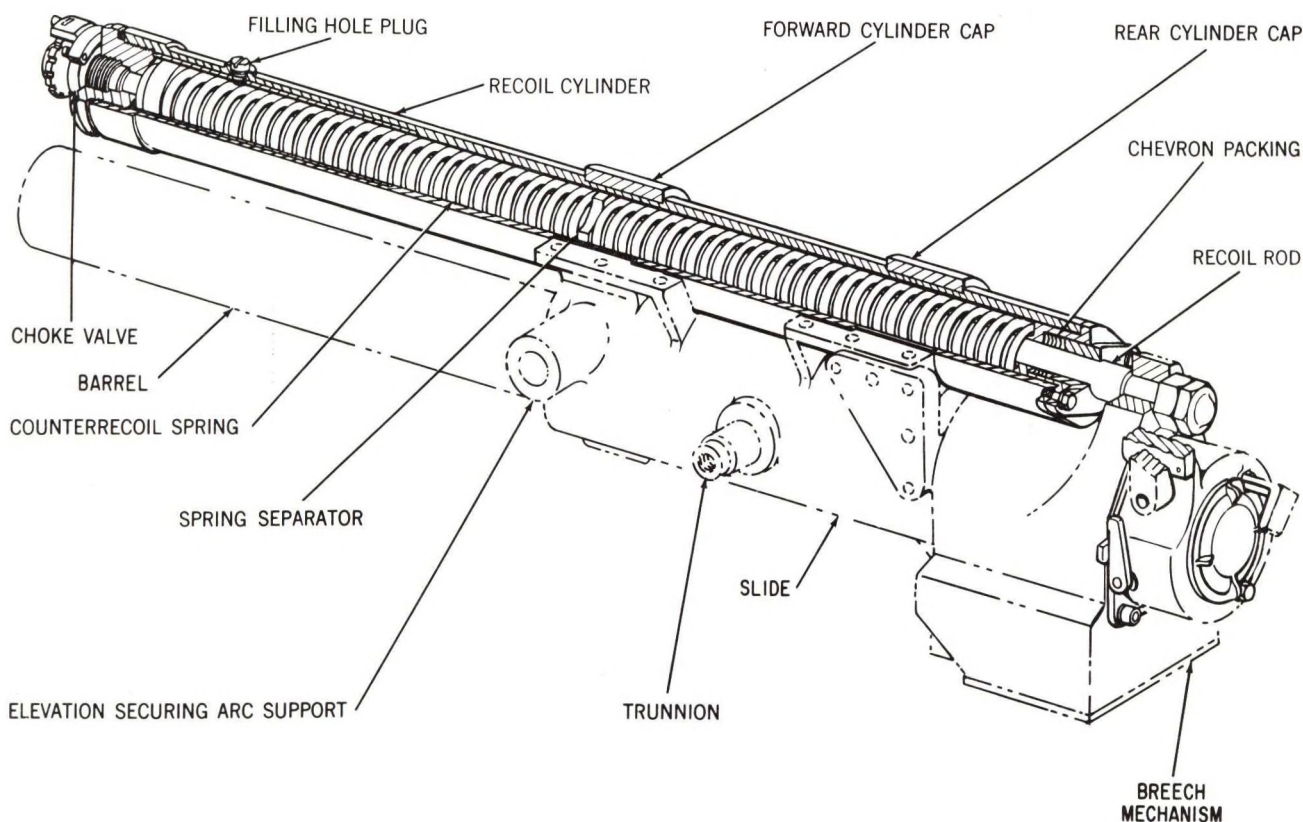


Figure 2-6. Recoil and Counterrecoil Assembly

2-42. Recoil Cylinder Liner. The recoil cylinder liner (figure 2-7) is a bronze sleeve forming a piston bearing and hydraulic fluid throttling device. It has three longitudinal tapered grooves controlling the flow of fluid from one side of the piston to the other. Variable flow through these grooves brakes the mortar recoil movement within 8 inches of piston stroke.

2-43. Choke Valve. The choke valve (figure 2-7) is an integral notched bolt head with a 3-inch long by 3/8-inch diameter needle valve. It is screw-seated in the plunger and is sealed by a packing gland and packing. The periphery of the head has 12 equally spaced, sequentially numbered notches. When adjusted and set during proof testing, a lockpin in the lockpin holder is engaged with one notch and the choke setting position used for proof testing is stamped on the face of the valve.

2-44. Elevation Securing Arc. The elevation securing arc (figure 2-4) is a cast-

steel, quadrant-shaped component bolted to the left side of the slide assembly and contains a radial slot. The radial slot engages the clamping lever bolt and the elevating arc clamping lever. Releasing the clamping lever permits the mortar to be repositioned in elevation. The mortar may be locked in any position throughout its full elevating arc of $101^{\circ} 30'$ by operating the clamping lever to tighten against the elevation securing arc.

2-45. The mortar position in elevation is indicated by the elevation indicator bolted to the securing arc. The indicator is mounted with the pointer riding over the elevation scale (figure 2-1) on the mortar carriage and is visible through an opening in the sight yoke (figure 2-2). The indicator is adjustable to ensure correct reading at zero elevation.

2-46. BREECH MECHANISM.

2-47. The breech mechanism (figure 2-8) consists primarily of the cocking handle, firing linkage assembly, firing mecha-

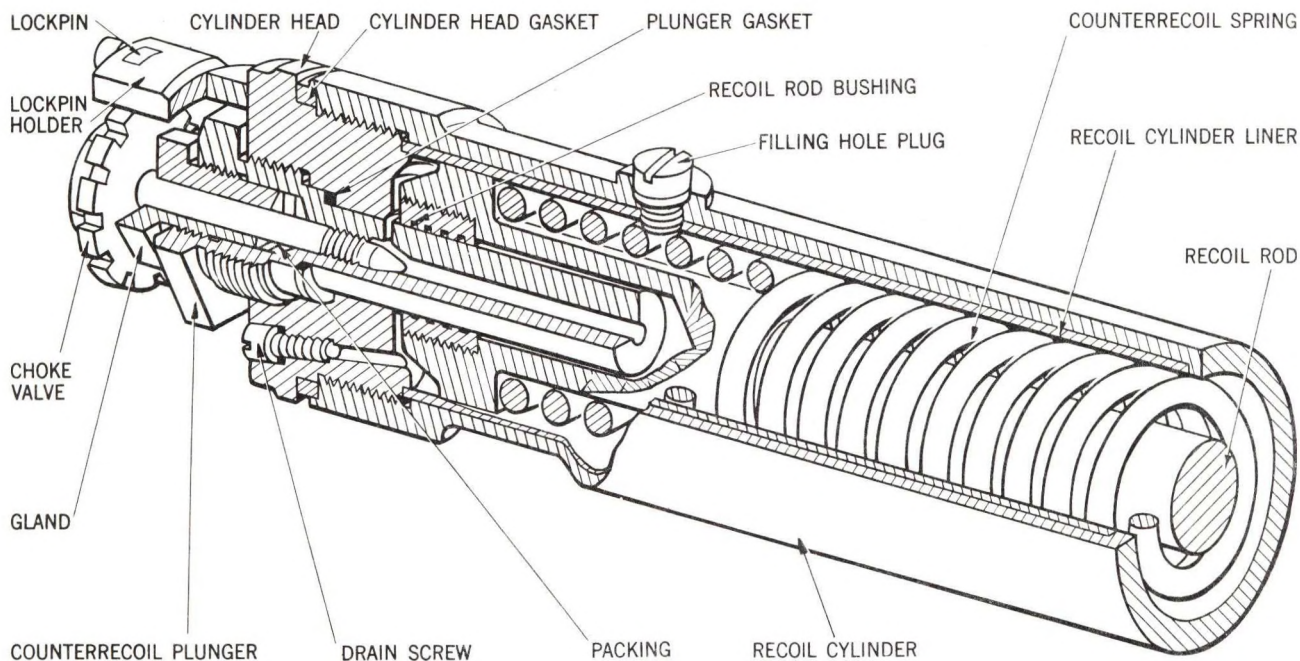


Figure 2-7. Choke Valve and Counterrecoil Buffer

2-48

nism case and the firing mechanism housing which houses the lever assembly and the firing mechanism assembly.

2-48. Firing Mechanism Housing.

2-49. The cast-steel housing contains the barrel lock screw (figure 2-9 used to secure the mortar barrel in the threaded opening at the forward face and mounts the firing mechanism case at the opposite end. The housing contains the bore which receives the firing mechanism and case cover assembly. In addition, there is a cavity in the base of the housing that is

filled with approximately 25 pounds of lead. The lead weight serves as a counterweight for the mortar.

2-50. Firing Mechanism Case.

2-51. The firing mechanism case (figure 2-8) is a circular, bronze casting bolted to the housing and supports the firing mechanism and cover assembly. In addition, the case contains reamed holes for the rear shaft, cocking lever shaft and three drilled holes for securing the latch plate and cocking lever assembly. An L-shaped spring-loaded cover lock, mounted

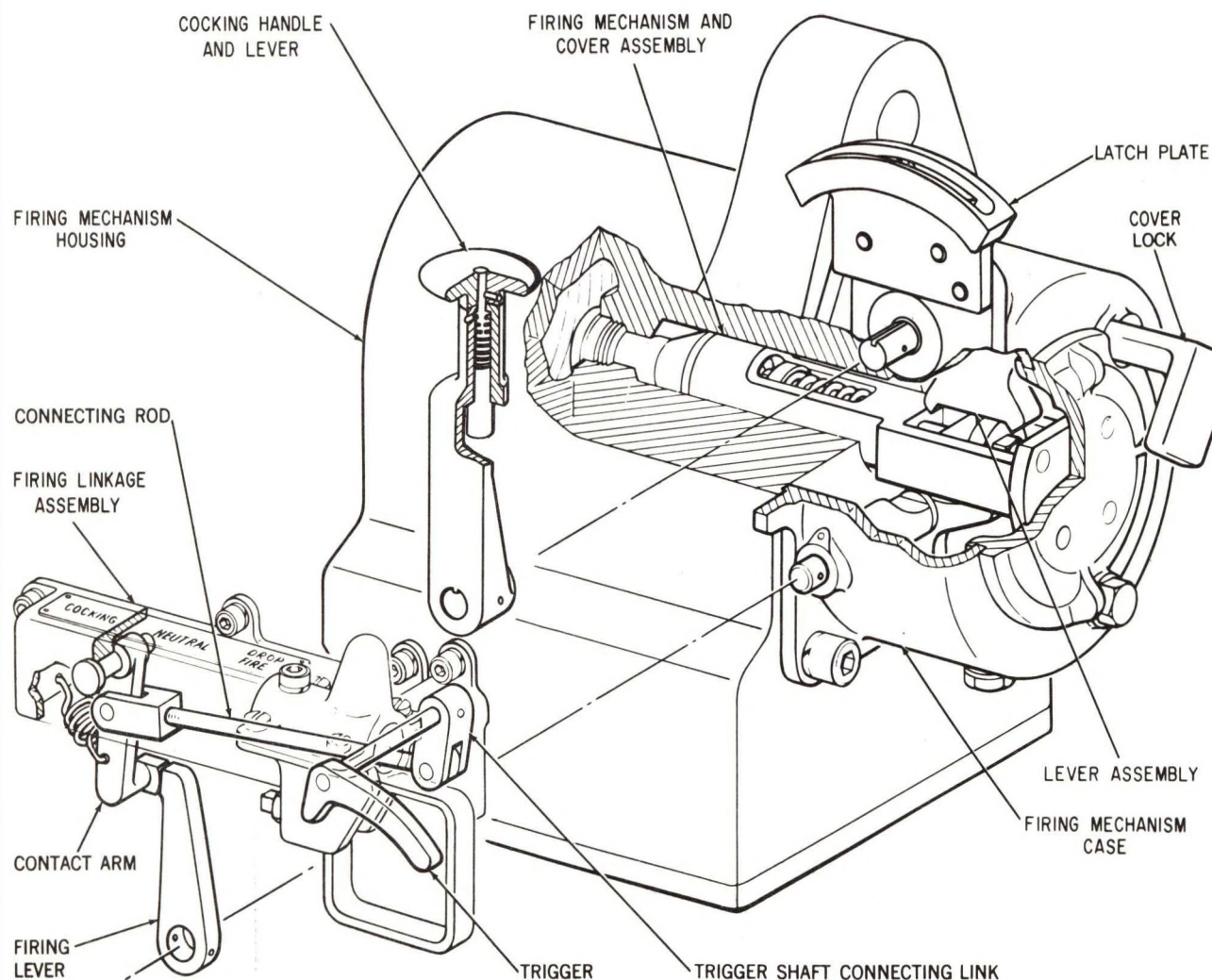


Figure 2-8. Breech Mechanism

2-8

on the case, engages the firing mechanism cover assembly in the lock position.

2-52. Firing Mechanism and Cover Assembly.

2-53. The firing mechanism and cover assembly consists of the case cover which supports the firing mechanism and protects the breech mechanism from the elements. The case cover is secured to the firing mechanism case (figure 2-9) by

rotating and engaging the four bayonet locks and by engaging the cover lock (figure 2-8).

2-54. The firing mechanism assembly is secured to the case cover and consists of a firing pin bracket, firing pin guide, firing pin, firing pin spring and bushing, an adjusting nut, spring, stop, spring seat sleeve and locknut. The base of the firing pin bracket is secured to the case cover by four bolts and can be adjusted

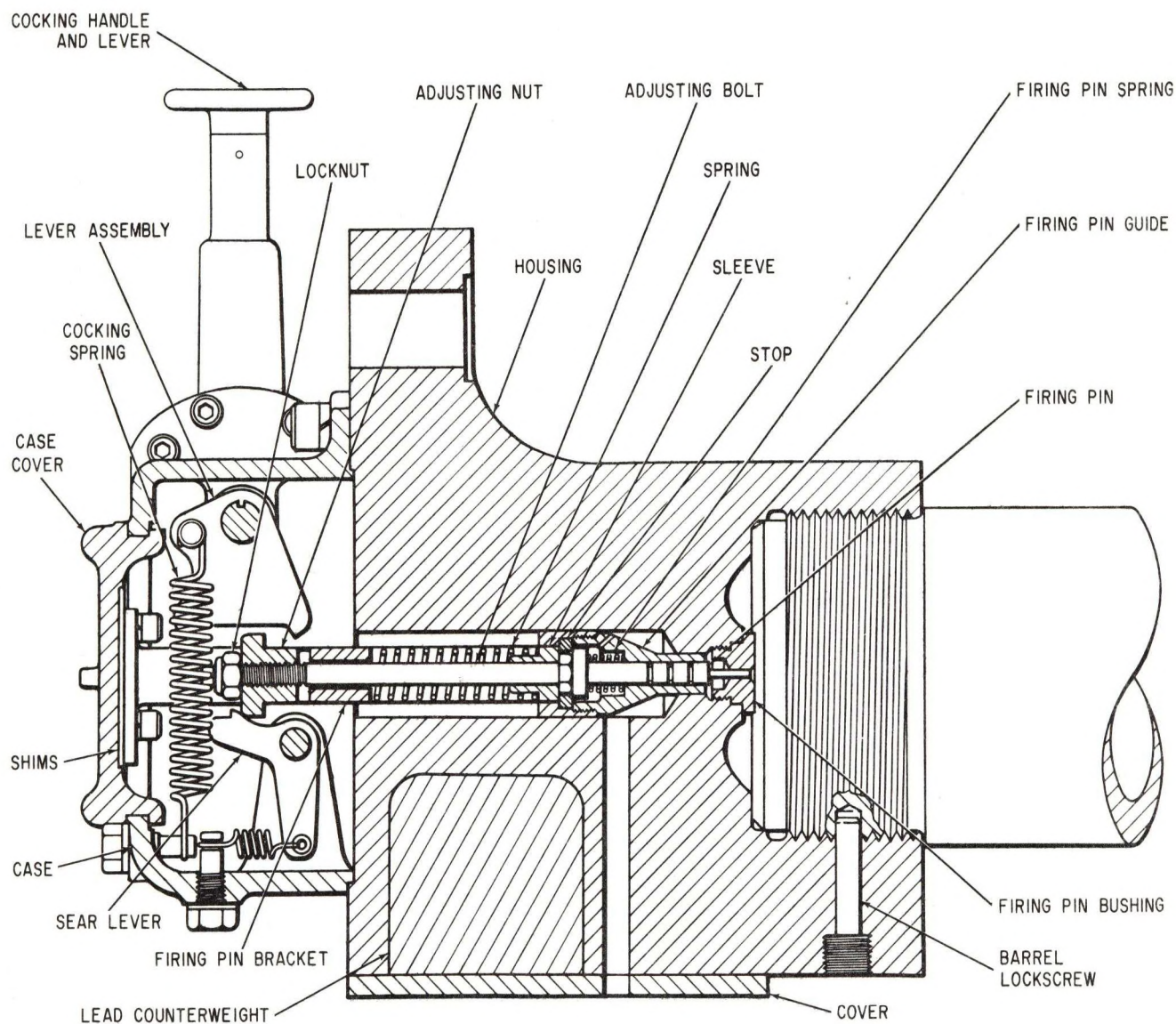


Figure 2-9. Breech Mechanism, Sectional View

to ensure proper positioning of the firing pin (see figure 5-2). The firing pin guide (figure 2-9) is attached to the bracket and holds the firing pin and spring in alignment. The adjusting bolt is held in position and pushed forward by the action of the compression spring. The adjusting nut, attached to the adjusting bolt and secured by the locknut, engages the lever assembly during cocking action.

2-55. Cocking Handle and Lever.

2-56. The cocking handle and lever (see figure 2-9), engages the cocking shaft which in turn is pinned to the lever assembly. The cocking handle is used to position and hold the firing pin in DROP FIRE position or to compress the firing pin spring until the adjusting nut engages the sear lever for TRIGGER FIRING.

2-57. Sear Lever.

2-58. The sear lever (figure 2-9) holds the adjusting bolt in its cocked position until a pull on the trigger rotates it out of engagement. The sear lever is L-shaped with a center pivot hole. There is a notched end on one leg and a drilled hole in the end of the other leg for attaching a spring. The sear lever pivots on the sear shaft, and the notched leg engages the firing plunger bolt when the firing mechanism is cocked.

2-59. Lever Assembly.

2-60. The lever assembly (figure 2-9), consisting of a drop fire lever and a spring securing pin, is attached to the cocking shaft which in turn is pinned to the cocking lever and handle. Actuating the cocking handle causes the projecting lugs at the bottom of the drop fire lever to engage the adjusting nut and move the firing pin to the desired position, i. e., DROP FIRE or COCKING for trigger firing. The mechanism is spring-loaded to return the cocking handle to NEUTRAL

position.

2-61. Firing Linkage Assembly.

2-62. The firing linkage assembly (figure 2-8) consists of the firing trigger guard, firing linkage guard, firing trigger and associated hardware required to actuate the firing mechanism for trigger firing.

2-63. Firing Trigger Guard. The firing trigger guard (figure 2-8) is a box-like bronze casting fastened to the slide assembly. It covers the firing linkage and serves as a support for the contact arm shaft and trigger shaft.

2-64. Firing Trigger. The firing trigger (figure 2-8) is manually operated to disengage the sear lever and release the adjusting bolt which is under spring tension. The adjusting bolt is then forced forward, striking the firing pin.

2-65. Firing Trigger Guard. The trigger guard (figure 2-8), secured to the handle bar, protects the trigger from accidental movement and provides a hand-stop to position the left hand for ready relocation of the trigger. The trigger-adjusting screw is located in the lower forward section of the trigger guard and bears against the trigger. It is secured by a nut that is tightened or loosened as required for trigger adjustment.

2-66. BARREL.

2-67. The muzzle loading type barrel, machined from a forged alloy steel tube, has a smooth bore and is threaded into the breech housing. The barrel is secured to the breech housing using the barrel lock screw (figure 2-9). The lock screw is installed to prevent the barrel from turning loose under firing shocks. The brass key, mounted on top of the barrel, guides the barrel in a straight recoil and counterrecoil path by means

of a keyway in the
slide assembly.

2-68. SIGHT.

2-69. The Sight Mk 1 Mod 0 is an open type sight consisting primarily of the front and rear sight assemblies, clamp screw assembly, sight angle and sight deflection mechanism, and associated hardware mounted on the slide assembly to the gunners left. The location of the sight is convenient to the gunner's vision when he is in the aiming position shown in figure 4-3. This is a line-of-sight position that moves with the slide and has relationship to the mortar as indicated in the working circle diagram, figure 1-3.

2-70. The sight yoke (figure 2-10) attaches the assembly to the slide so that centers of rotation of the line-of-sight offsetting devices are fixed with respect to the longitudinal axis of the slideway, the slide trunnions, and the mortar bore. Thus the axis of the sight angle shaft on which the sight support revolves during sight-angle movement is normal at all times to a vertical plane through the mortar axis. Similarly, the deflection (figure 2-11) on which the open sight is fixed has pivoted-deflection motion about an axis which is located in the sight support and is normal at all times to the slide-trunnion axis. By reason of these alignments the line-of-sight offset movements will not introduce errors in mortar pointing when making estimated mortar range and azimuth corrections. Such corrections, when made by means of sight angle and deflection scale indications are secured in the sight by the respective clamp knobs.

2-71. For purposes of this manual, the sight mechanism will be divided into structural and operating components, each component is fully described in the following paragraphs.

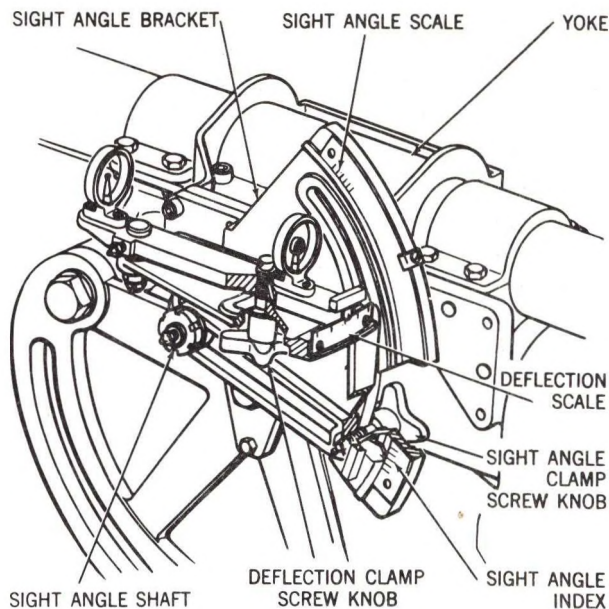


Figure 2-10. Arrangement of Sight Components

2-72. Structural Components.

2-73. Sight Yoke. The sight yoke (figure 2-10) is a bronze piece that straddles the recoil cylinder at the top of the slide above the trunnions and contains a machined pad to which the sight angle bracket is secured. Four bolts aline and secure the yoke to the slide, locating the sight angle bracket attaching surface perpendicular to the slide trunnion axis and to the left of the mortar axis. The bracket attaching pad is a rectangular area containing four tapped bolt holes and two reamed dowel holes. These details, together with the bracket dowels and bolts, provide accurate alinement and secure the sight angle bracket. Two holes near the opening for viewing the elevation scale are provided for mounting the elevation scale light.

2-74. Sight Angle Bracket. The sight angle bracket (figure 2-10) is a fan-shaped bronze casting accurately located as indicated in the description of the yoke.

The bracket precisely positions the sight angle shaft, as well as other parts of the operating mechanisms described in the following paragraphs. It is a flat bracket extending rearward from the yoke and parallel to the left side of the slide assembly. The rear portion is a 9-inch radius quadrant extending from a 7/8-inch diameter reamed hole. This hole is perpendicular to the sight yoke pad and thus its axis is parallel to the slide-trunnion axis. It is the seat for the sight angle shaft. A slot, concentric with the shaft hole at a radius of 6.75 inches, is functionally part of the sight angle scale clamp. Concentric with this slot at the rear of the bracket are machined areas and tapped holes which locate the sight angle scale.

2-75. Operating Components.

2-76. Sight Angle Mechanism. The sight angle mechanism (figures 2-10 and 2-11) consists of the sight angle shaft, open sight support, sight angle index, sight angle scale, and sight angle scale clamp. It is a manual arrangement for offsetting the line-of-sight, depressing for range position and elevating for the mortar.

2-77. Sight Angle Shaft. The sight angle shaft is a fixed shaft journal for the open sight support. It is secured in the reamed shaft hole of the sight angle bracket by an integral flange and a tapered pin. Its left end is threaded for the support/securing nut which is tapped and drilled for lubrication of the shaft journal. The journal is ground and polished to precisely align and pivot the open sight support.

2-78. Open Sight Support. The open sight support (figure 2-11) rotates on the sight angle shaft to depress the line-of-sight to any desired sight angle position between 0 degrees and 75 degrees. It is an irregularly shaped bronze casting that has free bearing on the sight angle shaft,

2-12

through a limited arc, but can be held at any adjusted position by the sight angle scale clamp. The top of the support is the mounting platform for the components of the sight deflection mechanism. The forward end of the platform contains an accurately located reamed hole for seating the deflection bar shaft. The axis of this hole is in a plane normal to the sight angle shaft, precisely locating the deflection movement. The support provides a slotted arc for the deflection clamping device and a cylindrical arc at the rear for mounting the deflection scale concentric with the deflection bar shaft. At the bottom and rear of the sight support is a slotted seat and a tapped hole for mounting the sight angle index and two holes for mounting the sight angle scale light.

2-79. Sight Angle Index. The sight angle index is a small L-shaped component installed on the sight support to register an index mark against the sight angle scale. The index is adjustable in the slotted seat of the support by means of a laminated index shim.

2-80. Sight Angle Scale. The sight angle scale (figure 2-11), attached to the sight angle bracket, is a 75° graduated arc with graduations at intervals of 1° of sight angle, numbered every 5° from 0° at the bottom of the scale to 75° at the upper limit. The scale is adjusted to indicate 0° when the line-of-sight is parallel to the bore. At the zero elevation position, the sight support is at the bottom limit of the sight angle clampway.

2-81. Sight Angle Scale Clamp. The sight angle scale clamp (figure 2-10) is a two-piece component consisting of a clamp screw and a clamp screw knob. The knob is secured to the clamp screw by a lockpin. The clamp screw mounts through the radial slot in the sight angle bracket and seats in the sight support. When tightened, it clamps a shoulder of

the knob against the sight angle bracket, holding the set position of the line-of-sight.

2-82. Sight Deflection Components.

2-83 The sight deflection components consist of the sight deflection shaft, deflection bar, deflection index, and deflection clamping device.

2-84. Deflection Bar Shaft. The deflection bar shaft is a small flanged bolt with a shaft journal for pivot movement of the deflection bar. It is accurately positioned in the forward part of the top of the sight support.

2-85. Deflection Bar. The deflection bar (figure 2-11) is a flat bronze piece, 11.125 inches long, with a reamed hole at the forward end to receive the deflection shaft. The front open sight, rear open sight, the sight deflection scale light are all mounted on the deflection bar.

2-86. Deflection Scale. The deflection scale (figure 2-11) is a calibrated brass strip adjustably secured to the open sight support by two screws. Its upper edge is graduated through an arc of $28^{\circ}40'$, with 50 equally spaced marks. Each space is an arc equivalent to 10 mils of sight deflection movement. The left mark, tenth, twentieth, thirtieth, and right end marks are identified with scale numbers 250, 300, 350, 400, 450, 500, 550, 600, 650, 700 and 750, respectively. The scale is adjusted to indicate 500 mils when the line-of-sight is parallel to the mortar bore. At this position the deflection bar is centered with respect to the limiting movement permitted by the deflection clamp which secures the deflection setting.

2-87. Front Sight Assembly. The front sight is a two-piece assemblage of a pin with a spherical bead centered in a 2-

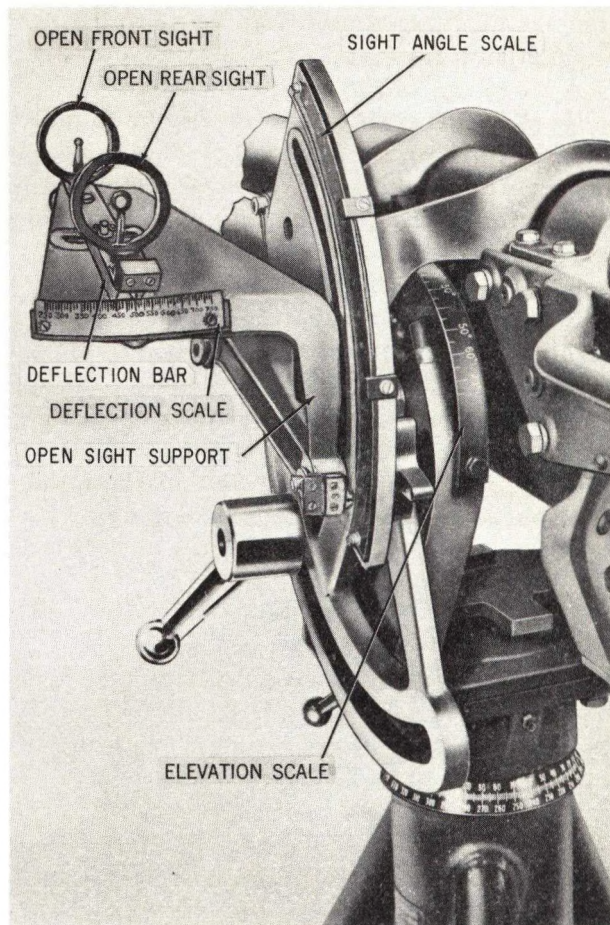


Figure 2-11. 81-MM Sight Mk 1 Mod 0
inch diameter open sight guard. The guard is secured at the front of the deflection bar with two machine screws. This position locates the bead 9 inches forward from the rear sight and 1.5 inches above the top surface deflection bar.

2-88. Open Rear Sight Assembly. The rear sight is similar to the front sight and consists of an identical guard and a rear sight post with a small ring at the top of the post and centered in the guard. The ring is brazed on the post.

2-89. SIGHT OPERATION.

2-90. Sight Setting. Sight setting is performed by the gunner according to range

2-91

table data, target position, wind and ammunition factors. The estimated range setting (sight angle) is made by loosening the sight angle clamp knob and manipulating the sight angle bracket to give the required sight scale reading. Deflection setting according to estimated azimuth offset is made similarly by loosening the deflection clamp knob. When both settings are clamped, the sight is adjusted for target aiming.

2-91. Sighting. Mortar aiming is performed by the gunner from a crouched position while grasping the handle bar and manipulating the carriage and slide, with

clamping clamps released, to hold the line-of-sight on the target (see figure 4-3).

2-92. LIGHTING CIRCUIT MK 1 MOD 0.

2-93. The lighting circuit (figure 2-12) provides adequate illumination for operation at night. All lamps are mounted adjacent to the indicator pointers and illuminate the seals and indicators. The power pack, mounted on the carriage, contains the inverter capable of changing low voltage 12.6 V dc to high voltage 110 V ac; the switch and a battery are sealed within the power pack housing.

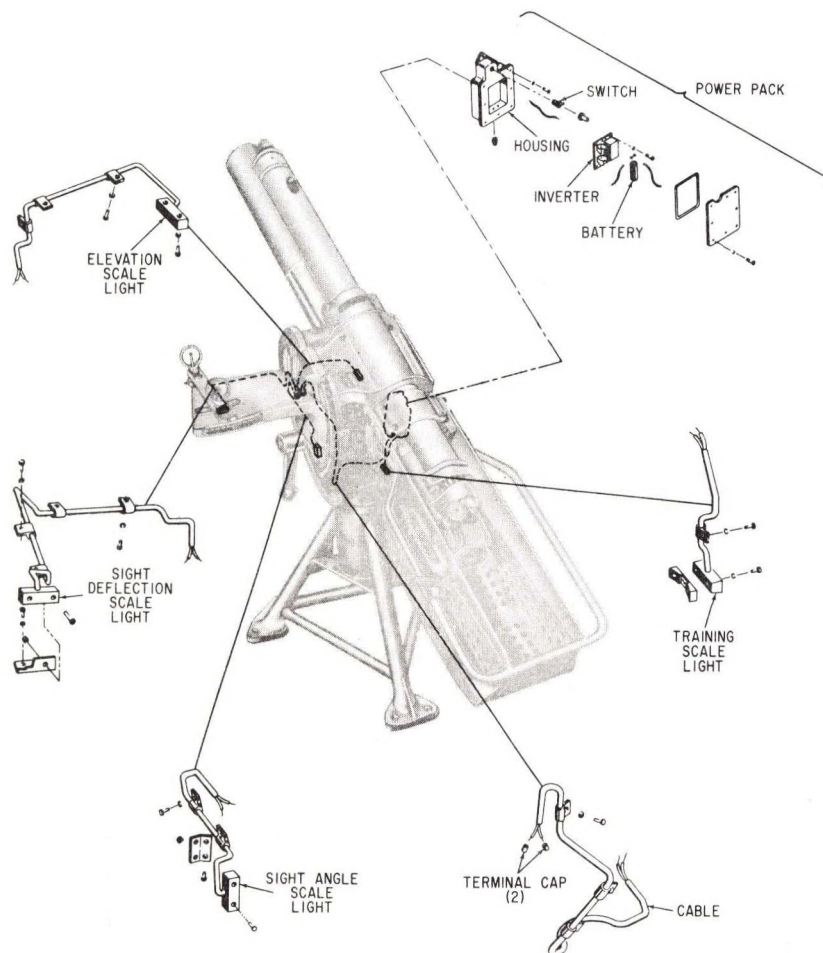


Figure 2-12. 81-MM Mortar Lighting Circuit Mk 1 Mod 0

2-14

CHAPTER 3

INSTALLATION

3-1. SHIPPING CONTAINER.

3-2. The shipping container for the 81-MM Mortar Mk 2 Mod 0 consists of a wooden skid to which the mortar is secured and a wooden cover which fits over the mortar and is secured to the skid with eight lag bolts. Metal bands are wrapped and secured around the container. The total weight of the container and its contents is 761 pounds. The container is clearly marked reusable, and is not to be destroyed.

3-3. CONTAINER CONTENTS.

3-4. The shipping container contains an assembled 81-MM Mortar with the barrel locked at 65° elevation to permit installation of the container cover. The container also contains the mortar cover assembly (refer to Appendix I, Tools and Accessories), one pair of asbestos gloves and the mortar record.

NOTE: The mortar record must be preserved since it contains a complete record of the mortar. If the mortar is to be repackaged for shipment, the mortar record must be attached to the barrel.

3-5. UNPACKING.

1. Cut and remove banding wire around shipping container.
2. Remove the eight lag bolts securing the container cover to the skid. Lift

cover clear of mortar and skid.

3. Remove mortar cover assembly and the asbestos gloves.
4. Remove the mortar record secured to the mortar barrel.

NOTE: The mortar record should be turned over to the ship's officer for safe keeping.

5. Visually inspect the mortar to insure that no damage has occurred in shipping.
6. Remove hold-down bolts securing mortar to skid.

NOTE: Do not discard or destroy the shipping container, lag bolts, or mortar hold-down bolts. This equipment is reusable.

3-6. INSTALLATION.

1. Hoist the assembled mortar clear of the shipping skid and onto the previously prepared mounting surface.
2. Aline the mortar stand to the bolt holes on the mounting surface and secure.

NOTE: The bolts, washers and nuts used to secure the mortar will be supplied by the installation crew.

3. Perform operational checkout procedures (refer to paragraph 6-6).

CHAPTER 4

OPERATION

4-1. PERSONNEL DUTIES.

4-2. Two men are normally required to operate the mortar; the pointer-trainer sight setter (mortar captain) and the loader. In low angle fire a three man crew may be desirable for effective firing. They are the sight setter (mortar captain), the pointer trainer, and the loader. One man can operate the mortar in fixed firing (drop fire) position. Personnel stations are indicated in figure 4-1, the loader stationed forward at the right hand side of the muzzle, and the mortar captain at the rear of the breech mechanism.

4-3. TRIGGER FIRING, TWO MAN CREW.

4-4. Pointer-Trainer Sight Setter. The mortar captain has the combined duty of setting the mortar sights in deflection and range and laying the mortar in train and elevation. He sets the cocking handle for the desired firing method and in trigger fire, pulls the trigger when ordered.

4-5. When available, the mortar captain will wear sound powered phones and receive firing direction from the bridge or Combat Information Center such as: range and bearings, type of fire, method of fire, type of ammunition, commence firing, cease firing, etc.

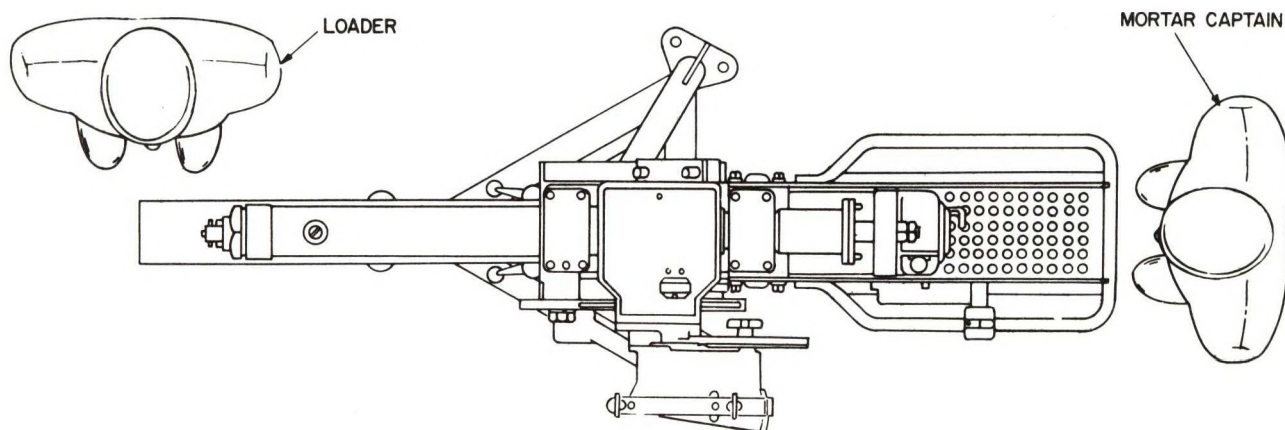


Figure 4-1. Personnel Stations, Two Man Crew

4-6

4-6. Loader.

WARNING

Cartridges shall not be lifted or handled by the cord attached to the pull wire and the safety wire. Do not use the round if a buzzing sound is heard after removing the pull wire and the safety wire. Such a round is still safe to handle and transport provided the bore-riding pin is still in position. and the safety wire is reinserted.

Exercise care when handling rounds to prevent striking the primer of the ignition cartridge against hard objects such as a belt buckle.

4-7. The loader removes the ammunition from the ready-ammunition box and loads the mortar when ordered by the mortar captain. In trigger fire, he inserts the round in the muzzle at the command LOAD.

4-8. TRIGGER FIRING, THREE MAN CREW.

4-9. For effective low angle fire, when size of vessel and increased manning permits, a three man crew may be assigned so that the pointer trainer can stay on the target using the sight mechanism while a steady input is cranked into the sight-setting mechanism by the mortar captain. The duties of the three man crew are as follows:

4-10. Sight Setter (Mortar Captain).

4-11. The mortar captain sets the mortar sights in range and deflection. He selects the method of fire, wears sound

powered phones to receive orders from the remote station, and relays commands to the pointer-trainer and loader.

4-12. Pointer-Trainer.

4-13. The pointer-trainer lays the mortar in train and elevation. He sets the cocking mechanism for the desired method of firing; and in trigger fire pulls the trigger when ordered.

4-14. Loader.

WARNING

Cartridges shall not be lifted or handled by the cord attached to the pull wire and the safety wire. Do not use the round if a buzzing sound is heard after removing the pull wire and the safety wire. Such a round is still safe to handle and transport provided the bore-riding pin is still in position and the safety wire is reinserted.

Exercise care when handling rounds to prevent striking the primer of the ignition cartridge against hard objects such as a belt buckle.

4-15. The loader removes the ammunition from the ready-ammunition box and loads the mortar when ordered. In trigger fire, he inserts the round in the muzzle at the command LOAD.

4-16. DROP FIRE.

4-17. In drop fire, the mortar captain locks the cocking lever in the position marked DROP FIRE. At the command FIRE, the loader drops the round down the barrel.

4-2

4-18. Loader.

WARNING

Cartridges shall not be lifted or handled by the cord attached to the pull wire and the safety wire. Do not use the round if a buzzing sound is heard after removing the pull wire and the safety wire. Such a round is still safe to handle and transport provided the bore-riding pin is still in position and the safety wire is reinserted.

Exercise care when handling rounds to prevent striking the primer of the ignition cartridge against hard objects such as a belt buckle.

4-19. The loader removes the ammunition from the ready-ammunition box and drops the round into the barrel at the command FIRE. As soon as he releases the round, he ducks to the position shown in figure 4-6.

4-20. PREPARATION FOR FIRING.

4-21. The mortar is prepared for firing by removing the mount cover and the muzzle cover and stowing them clear of the mortar area. The mortar captain ensures that the barrel is clear and then checks the weapon for freedom of movement by releasing the train and elevation clamps, and manipulating the slide and carriage. The mortar is then positioned as directed and the elevation and train clamping levers are secured. The cocking lever is move to COCKING position and then returned to NEUTRAL. The mortar captain pulls the trigger to ensure that the firing mechanism is functioning properly.

4-22. FIRING OPERATIONS.

4-23. For safe, efficient firing, the

following precautions must be observed.

WARNING

Helmets must be worn at all times when firing the mortar. The loader, however, must not use a chin strap. If he should not clear the muzzle quickly enough, blast effects could blow his helmet off.

Wipe off excess oil inside the mortar tube. A heavy coating of oil will reduce the effective range of the round.

When firing in enclement weather the charges must be protected during handling from the ready ammunition box to the mortar tube. Shake off any adhering drops of water before loading.

In enclement weather keep barrel depressed except during periods of rapid fire. Failure to take these precautions will significantly reduce the range to the extent where operating personnel may be injured.

Every effort shall be made to protect the tube and the propellant when necessary to fire in the rain. Proof testing indicates that the majority of short ranges are due to the propellant of the rounds being exposed to the rain or allowed to collect moisture.

4-24. Sight Setting.

4-25. The operations required in sight setting involve adjusting the azimuth and the sight angle positions of the line-of-sight. The sight setter (mortar captain) loosens the sight angle clamp screw knob as shown in figure 4-2, and the sight deflection clamp screw knob.

4-26

The mortar captain then makes the two offsets as directed and secures both knobs, clamping the line-of-sight position for fixed movement with the slide during all mortar aiming and firing operations.

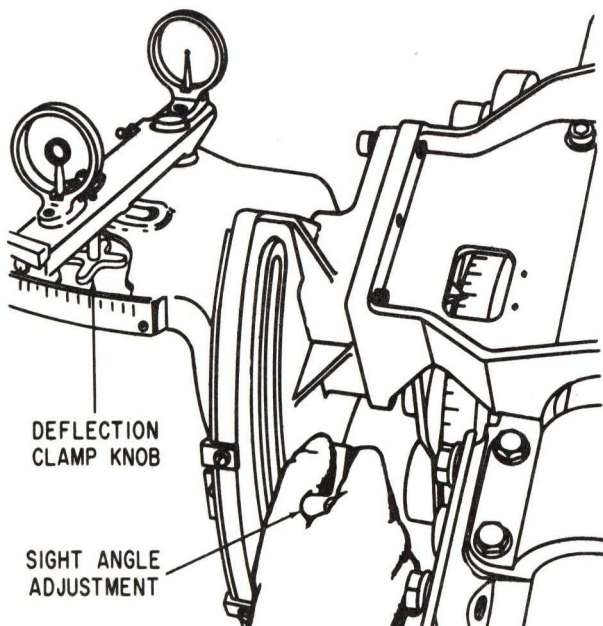


Figure 4-2. Adjusting Sight Angle Setting

4-26. Aiming.

4-27. The mortar captain, after completing sight setting, manually operates the handle bar to lay the mortar on target. This is done by releasing the elevation arc securing lever and the carriage train clamps while gripping the handle bar and manipulating the piece to observe the target through the sight. Aiming attitude is indicated in figure 4-3. If the mortar is to be fired in a fixed position, the elevation lever and train clamps are secured with the mount at the aimed position. If the mortar requires continuous movement in train and elevation, the mortar is held on the target by the mortar captain during firing.

4-4

4-28. TYPES OF FIRING.

4-29. The 81-mm mortar can be fired by two methods: drop fire or trigger fire. In the drop-fire method the round is dropped down the barrel, the primer hits the firing pin and is fired immediately, igniting the propellant charge. In trigger fire, the firing pin is retracted and the round is dropped into the barrel and remains seated until the firing trigger is pulled, causing the firing pin to strike the primer.

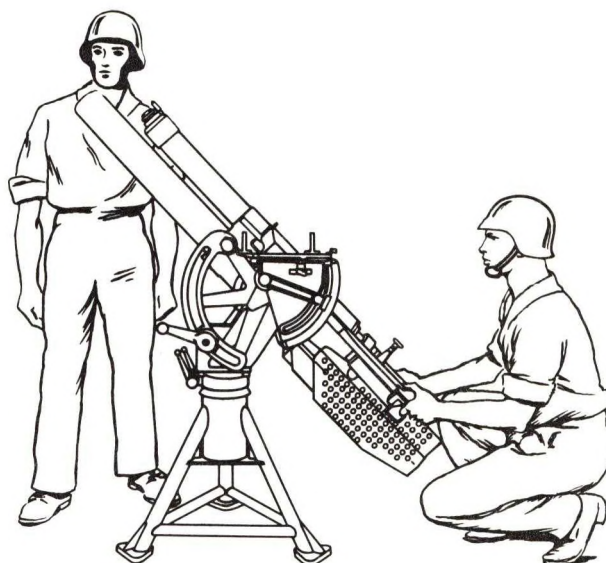


Figure 4-3. Aiming Position

4-30. Drop Fire.

4-31. In drop fire, the cocking lever is pulled rearward and locked in the position marked DROP FIRE. When the cocking lever is moved rearward (see figure 4-4), the rear lip of the drop-fire lever engages the rear face of the adjusting nut, pushing the nut and adjusting bolt forward until the head of the bolt contacts the rear face of the firing pin. The firing pin is pushed forward until it protrudes 0.075 ± 0.002 inch beyond the face of the firing pin bushing. When a round is dropped into

the barrel, the primer strikes the protruding pin and the round is immediately fired. The firing pin remains in the protruded position to receive the next round.

4-32. Loading and Firing.

4-33. The loader secures, unpacks, and inspects a round from the ready-ammunition box. A cartridge with serious dents, burrs, signs of corrosion, or other defects shall not be used, but shall be set aside for disposition. The loading and drop-firing operation will proceed as follows:

WARNING

Do not attempt to fire rounds which do not have the bore-riding safety pin in position. If a round is fired in this armed condition, it will explode prematurely in the bore or within a few feet of the muzzle.

1. The loader tests the tension of the bore-riding safety pin spring by pressing

and releasing the pin with the thumb. If the bore-riding safety pin becomes unseated, the round shall not be fired but shall be set aside for disposition. Do not permit the striker to be actuated.

2. The loader tests the striker for spring tension by pushing down on the striker with a finger. If the striker can be depressed, the round shall be set aside for disposition. Do not permit the striker to be actuated.

3. The loader removes propellant increments as required for the type of ammunition to be used and the range to be fired.

WARNING

When loading the mortar during DROP FIRE operation, the loader must stand forward and to the right of the barrel (see figure 4-5). He leans towards the piece only as far as is required to easily drop the round into the barrel and immediately ducks to the position shown in figure 4-6 to avoid the muzzle blast.

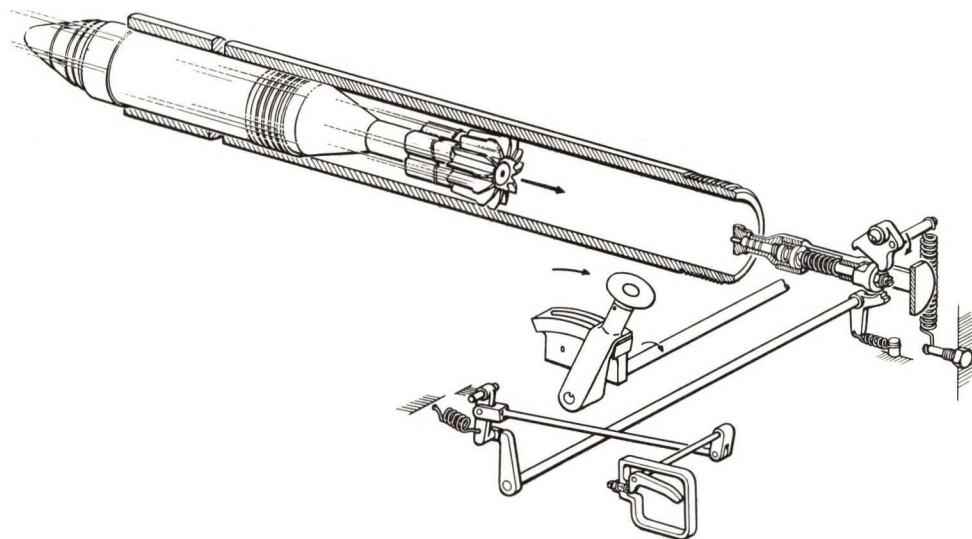


Figure 4-4. Drop Fire Operation, Firing Mechanism in Drop Fire Position

4-34

4. When directed, the loader drops the round down the barrel with the fuze end up (see figure 4-5). With fuzes having bore-riding pins, the loader must remove the safety wire(s) keeping the thumb or other digit on the bore-riding safety pin until the round is dropped down the barrel. The safety wire(s) shall be removed just before firing and at no other time.

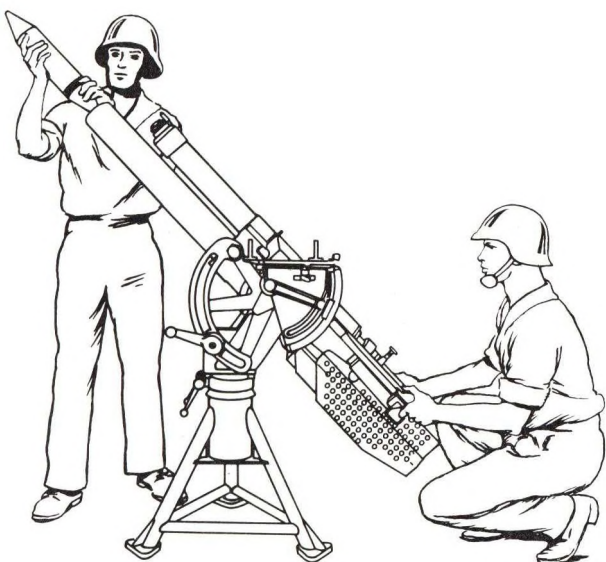


Figure 4-5. Loading Position

4-34. Trigger Fire.

4-35. In trigger fire, the cocking lever is moved forward to the position marked COCKING (see figure 2-8). As the lever is moved forward, the front lip of the drop-fire lever (figure 4-7), engages adjusting nut and pulls the nut and adjusting bolt back to the cocking position. The adjusting bolt spring is compressed by this action. The sear lever engages and locks the adjusting nut and bolt in the trigger fire position and the cocking lever is then returned to NEUTRAL. The positions of each part, when the cocking lever is in NEUTRAL, is shown in figure 4-8.

4-6

4-36. Loading and Trigger Firing.

4-37. The loader drops the round into the barrel as described in paragraph 4-32. At the command FIRE, the mortar captain pulls the trigger. A description of the trigger action is contained in the following paragraph.

4-38. When the trigger is pulled, the trigger connecting rod (figure 4-8) pulls the contact arm forward which in turn forces the firing lever and sear shaft to rotate until the sear lever disengages from the adjusting nut. The adjusting nut and bolt are then driven rapidly forward by the action of its spring, which was compressed during cocking, until the head of the adjusting bolt strikes the base of the firing pin which in turn strikes the primer of the round. The round is immediately fired and the firing pin is returned to NEUTRAL by the action of its spring.

4-39. Low-Angle Firing. In low-angle fire, the drop-fire method cannot be used

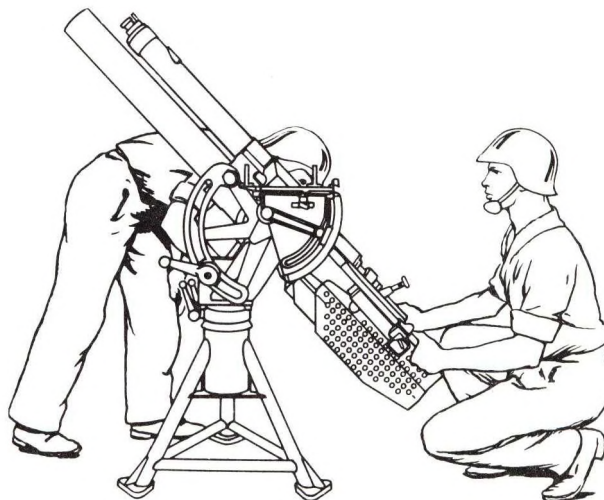


Figure 4-6. Loader Avoiding Muzzle Blast

since the projectile will not slide down the barrel. For low-angle firing, simultaneously cock the firing mechanism for trigger firing and elevate the mortar sufficiently to permit the projectile to slide down the barrel. Load as described in paragraph 4-32 and then depress the mortar to the desired firing angle.

4-42. Trigger-Fire Breech Setting Instructions.

1. Pull up on cocking lever handle.
2. Push cocking lever forward as far as it will go to COCKING position and return lever to NEUTRAL. Release cocking lever handle to lock.

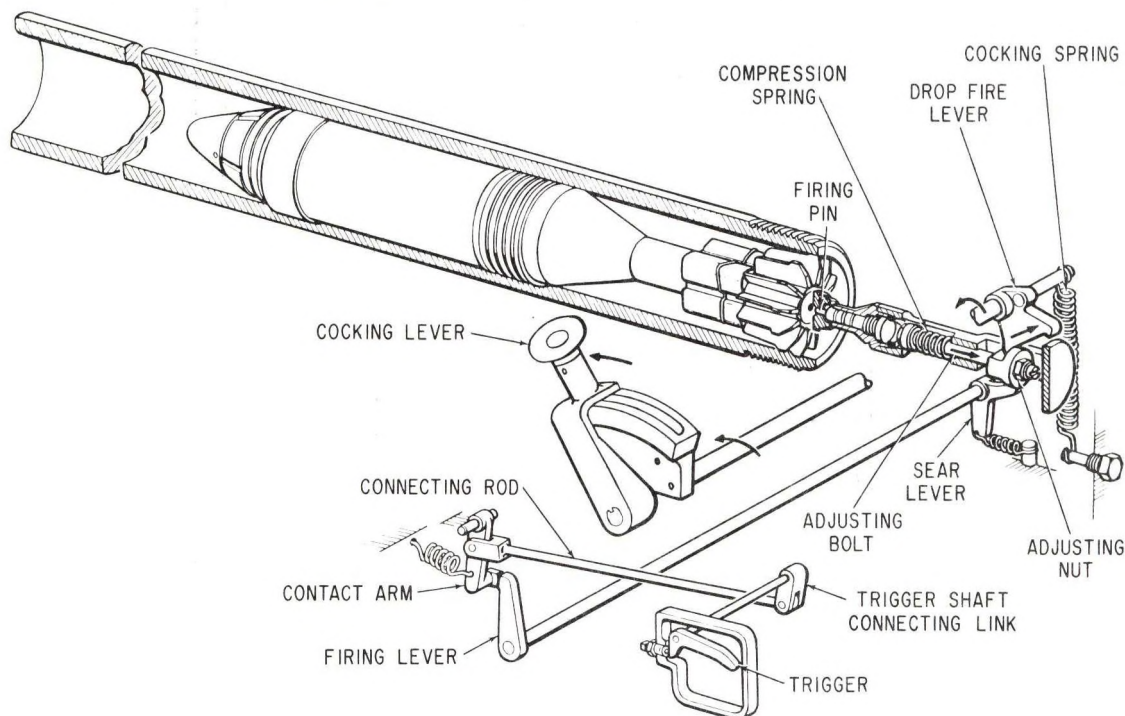


Figure 4-7. Trigger Fire Operation, Cocking Action

4-40. OPERATING INSTRUCTIONS.

4-41. The ON-OFF switch controls the lights on the sight angle, deflection, and train and elevation scales and is operated by the mortar captain for nighttime operation. The switch is located on the power pack as shown in figure 1-2.

NOTE: Ensure that the lighting circuit is switched to OFF at the end of nighttime operation to conserve battery life as lighting will not be visible during daylight hours.

4-43. Trigger-Fire Firing Instructions.

1. Cock and set breech mechanism for trigger fire.
2. Drop round into barrel.
3. Squeeze trigger when directed.
4. Be sure to keep all parts of body below muzzle of mortar when trigger is squeezed to avoid muzzle blast.

4-44. Drop-Fire Breech Setting Instructions.

1. Pull up on handle of cocking lever.
2. Pull cocking lever to rear until latched in DROP FIRE position. Release cocking lever handle to lock.

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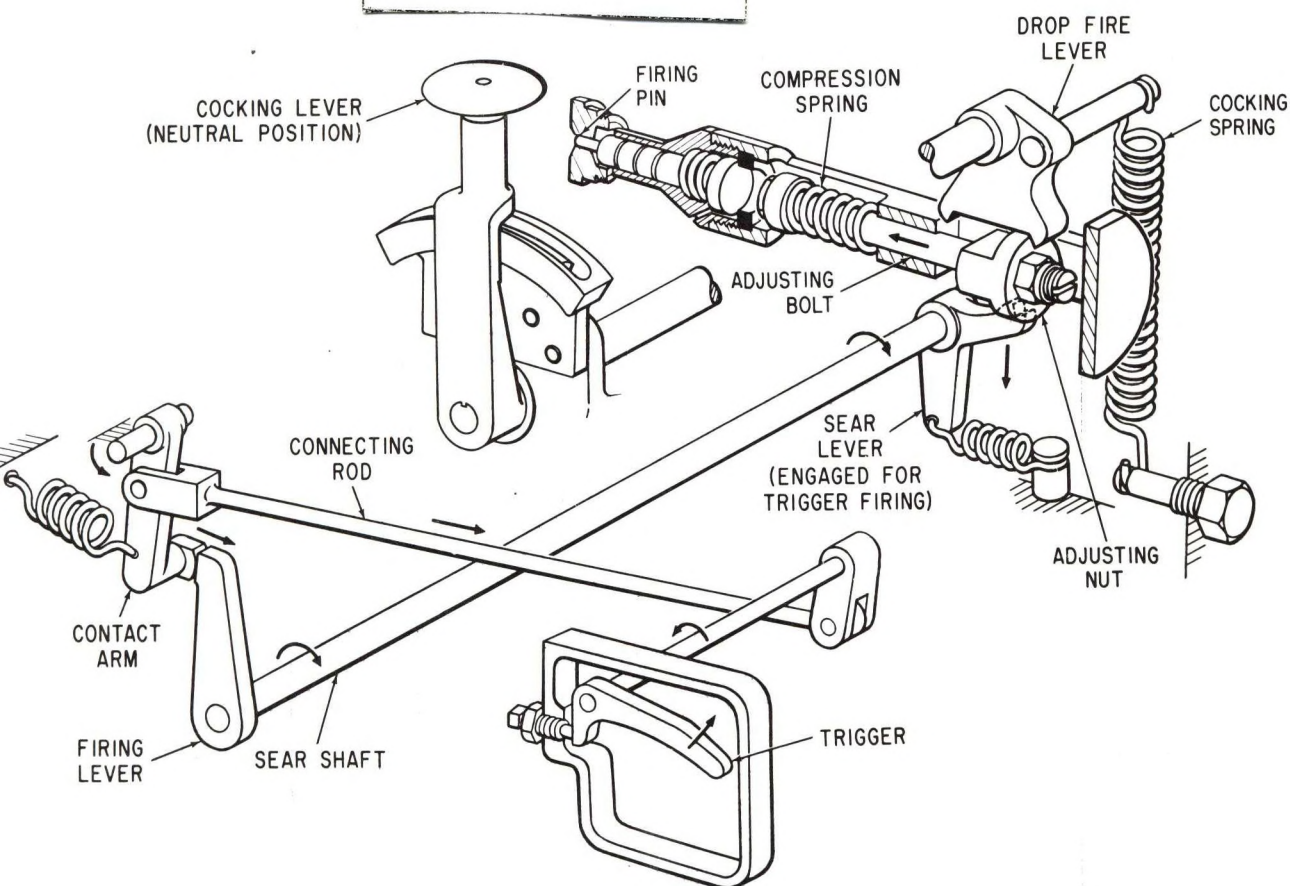
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Figure 4-8. Trigger Fire Operation, Trigger Action

4-45. Drop-Fire Firing Instructions.

1. Cock and set for DROP FIRE.
2. Drop round into barrel.
3. Remove hands quickly from front of muzzle after dropping round into the barrel (see figure 4-6).

4-46. MISFIRE OPERATIONS.

4-47. A misfire may be due to a round hanging in the barrel without striking the firing pin, or due to primer and propellant charge failure. Should a round stick in the barrel, set firing mechanism for NEUTRAL position and then kick the barrel with the heel from the rear to dislodge the round. Cock the firing pin for trigger firing and keeping clear of muzzle, pull the trigger. If the round seats but

still fails to fire, wait one minute to avoid any possible hangfire, then proceed as follows:

WARNING

No part of fingers or thumbs of either hand should be in front of the muzzle. If the mortar is hot, the loader should wear asbestos gloves. If the heat of the barrel is excessive, do not attempt to remove the misfire until the mortar has been doused with water or allowed to cool. Excessive heat in the barrel can cause the round to fire.

1. Loader places his right hand, palm up, under the barrel near the muzzle, and

his left hand, palm down, on top of barrel near muzzle.

2. The mortar captain loosens the elevation securing arc clamp and slowly depresses the muzzle of the mortar until the round drifts toward the open end. The muzzle must not be re-elevated above horizontal until the round has been removed from the barrel.

3. As the round starts out of the barrel, the loader places both thumbs over muzzle, checks the movement and gently eases the round out of the barrel, and immediately replaces the safety wire on the round.

WARNING

To prevent possible explosion, drop misfired round overboard.

4. Drop misfired round overboard.

5. If misfire repeats, check the firing pin mechanism and investigate for possible causes of propellant charge failure described in paragraph 4-48.

4-48. Propellant Charge Failure.

4-49. The propelling charge may not have functioned due to:

1. Defective primer or ignition cartridge.

2. Defective, damaged or loose firing pin.

3. Firing pin fouled or obstructed by remnants from previous rounds.

4. Fouled bore.

5. Cartridge not fully inserted in barrel.

6. Misaligned stabilizing fin.

7. Foreign matter or excess paint on bourrelet of round causing round to hang up in the barrel.

4-50. SECURING OPERATIONS.

4-51. When firing has ceased and the mortar has been cleaned, loosen the train and elevation clamping levers. Stow the mortar at 0° elevation and train, and secure both clamps. Loosen the sight angle and deflection clamp screws and set the sight for zero sight angle and zero deflection; secure clamp screws. Turn off lights and replace mortar covers.

4-52. RECOIL SYSTEM OPERATION.

4-53. The recoiling action, started by the firing of the mortar, is checked by the flow of fluid from one end of the piston head to the other through the tapered grooves. Counterrecoil action is initiated by the counterrecoil springs. When counterrecoil has progressed so that the counterrecoil plunger enters the rod bushing, the fluid trapped in the piston bore escapes around the plunger and finally through the choke valve. This controls the final buffing, checking the movement and stopping the return to battery.

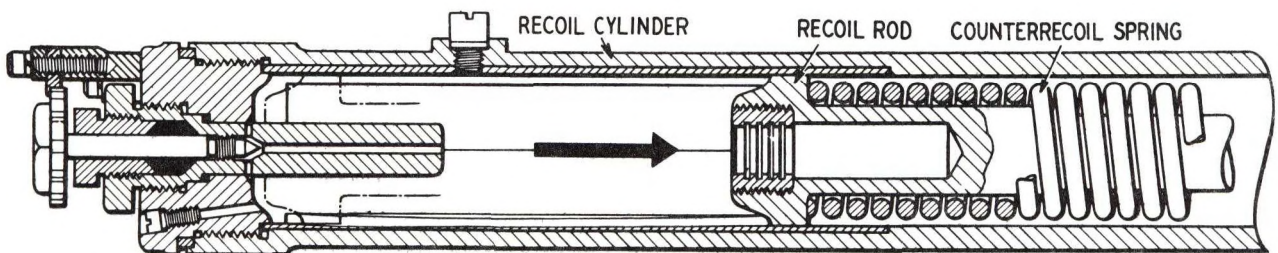


Figure 4-9. Recoil Brake Action

4-54

4-54. Recoil Action.

4-55. Recoil movement of the piston is shown in figure 4-9. When the spring is being compressed, the recoil fluid is forced from behind the recoil rod to the space forward of the recoil rod through the tapered grooves. Near the end of the recoil stroke, the grooves are gradually tapered to allow less fluid to pass, until, at the end of the stroke, they are entirely cut off to halt the recoil movement.

4-56. After recoil movement has been halted, the compressed spring starts to

move the recoil rod back to its in-battery position. The movement is rapid until near the end of the stroke when the recoil rod passes over the plunger (figure 4-10). The last three and one-eighth inches of movement is the end of the counterrecoil buffing action. In the final movement, the plunger cuts off the passage and the remaining fluid is forced through the drilled orifice in the plunger which is obstructed by the choke valve. The combined buffing and throttling actions decelerate the movement and eases the piece into battery.

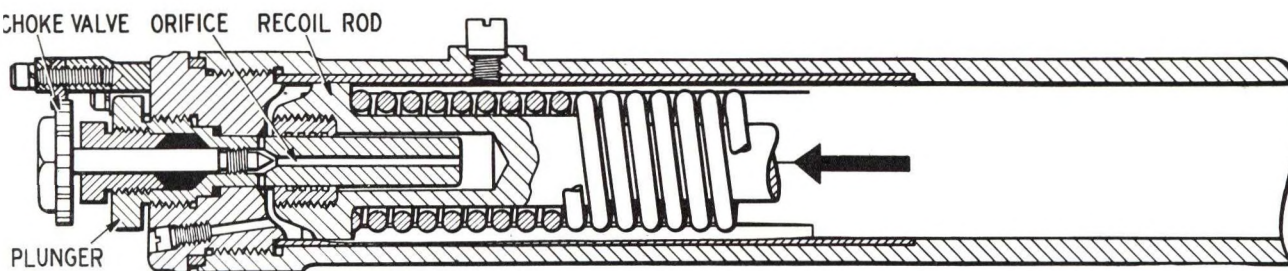


Figure 4-10. Counterrecoil Dashpot Action

4-10

CHAPTER 5

AMMUNITION

5-1. INTRODUCTION.

5-2. Ammunition for the 81-MM mortar is classified as "semifixed complete" since the increments (propelling charges) may be varied in number to vary the range, and all the elements necessary to fire a cartridge are attached to it. All rounds except the Mk 68 training cartridges are issued in the form of fuzed, complete rounds. All of the cartridges have the same general characteristics.

5-3. A complete round consists of a fuzed projectile with a fin assembly, a propelling charge consisting of a number of increments, and an ignition cartridge with a primer. The standard propelling charges are made of an explosive material called ballistite. All rounds except the training cartridge have four main components. They are the fuze, the body, the filler, and the fin assembly.

5-4. IDENTIFICATION (See Army TM9-1900 Ammunition General.)

5-5. All mortar cartridges are painted to prevent rust and to provide a means of identification as to type.

5-6. Projectiles and containers are marked according to the following color scheme.

1. High Explosive - Olive drab with yellow marking.
2. Smoke - Gray with yellow band and yellow marking.
3. Illuminating - Gray with white

markings.

4. Practice - Blue with white markings.
5. Training - Black with white markings.

5-7. Additional information pertaining to the cartridges is included on the ammunition data card packed with them. Each cartridge carries the following information stencilled on it.

1. Caliber of mortar in which fired.
2. Kind of filler.
3. Model of cartridge.
4. Ammunition lot number.

NOTE: For ammunition color coding see MIL-STD-709.

5-8. FUZES.

5-9. Three types of fuzes are used. They are point detonating, time, and proximity or variable time (VT). However, there are four types of fuze actions because point detonating (PD) fuzes can be either superquick (SQ, explode on impact) or delay (activate on impact, but explode a few hundredths of a second later).

5-10. The fuzes used with 81-MM mortar ammunition are considered boresafe. A boresafe fuze is one in which the explosive train is so interrupted that while the projectile is still in the bore of the weapon, premature action of the bursting charge is prevented should any one of the more sensitive elements (primer or detonator) function.

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WARNING

Disassembly of fuzes aboard ship is dangerous and is prohibited except under specific directions from the Bureau of Naval Weapons. Do not fire cartridges fitted with M52 Series, M82 Series, and M519 Series fuzes over the heads of friendly troops.

5-11. Point Detonating Fuze.

5-12. M52 Series. These fuzes are single-action superquick types with a direct action firing device.

WARNING

M43, M56, and M57 cartridges on hand and fitted with fuzes M52 Series are issued for combat emergency use only.

In an emergency, when the use of such rounds are required, proceed as follows:

1. Secure an unpacked round and inspect it. A cartridge with serious dents, burrs, signs of corrosion or other deformities shall not be used. It shall be set aside for disposition.

2. Test the tension of the bore-riding safety pin spring by pressing and releasing the pin with the thumb. If the bore-riding safety pin becomes unseated, the round should not be fired but shall be set aside for disposition.

3. Test the striker for spring tension by pushing down on the striker with a finger. If the striker can be depressed, the round shall be set aside for destruction.

4. Remove the necessary number of propellant increments to leave the required number in place.

WARNING

Do not attempt to fire rounds which do not have the bore-riding safety pin in position. If rounds are fired in this armed condition, they will explode prematurely in the bore or within a few feet of the muzzle.

5. Remove the safety wire, keeping the thumb or other digit on the bore-riding safety pin until the round is inserted into the muzzle of the mortar. The safety wire shall be withdrawn from the fuze just before firing and at no other time.

5-13. M53 Al Series. These fuzes operate on the same principle as the M52 Series but with the addition of a delay assembly (primer and black powder delay pellet) which is loaded to cause the fuze to function with a 0.1 second delay. This fuze is authorized for the M56 Series cartridges and for emergency combat use with M43 and M57 Series cartridges.

5-14. M82 Series. These fuzes are functionally the same as the M52 Series but with a smaller booster charge. M52 Series precautions apply (refer to paragraph 5-12). This fuze is for emergency combat use with the M43, M56, and M57 Series cartridges.

5-15. M519 Series. The M519 is an M52 Series fuze plus an adapter to accommodate the M362 and M370 Series cartridges. M52 Series precautions apply (refer to paragraph 5-12). This fuze is for emergency combat use with M362 and M370 Series cartridges.

5-16. M524 Series. The M524 is a dual purpose fuze which may be set for either superquick or delay (0.05 seconds) action by turning the striker head to the desired position. The fuze contains a delay arming feature which ensures that the fuze will remain unarmed and detonator safe for a minimum of 1.25 seconds of flight from the muzzle of the mortar but will arm within a maximum of 2.25 seconds from the mortar. This fuze is authorized for use with M362 and M370 cartridges. There is no limitation as to quadrant elevation required from a safety standpoint when using the M524 fuze.

5-17. M525 and M526 Series. The fuzes in this series (figure 5-1) are modifications of the M52 Series fuze. The modi-

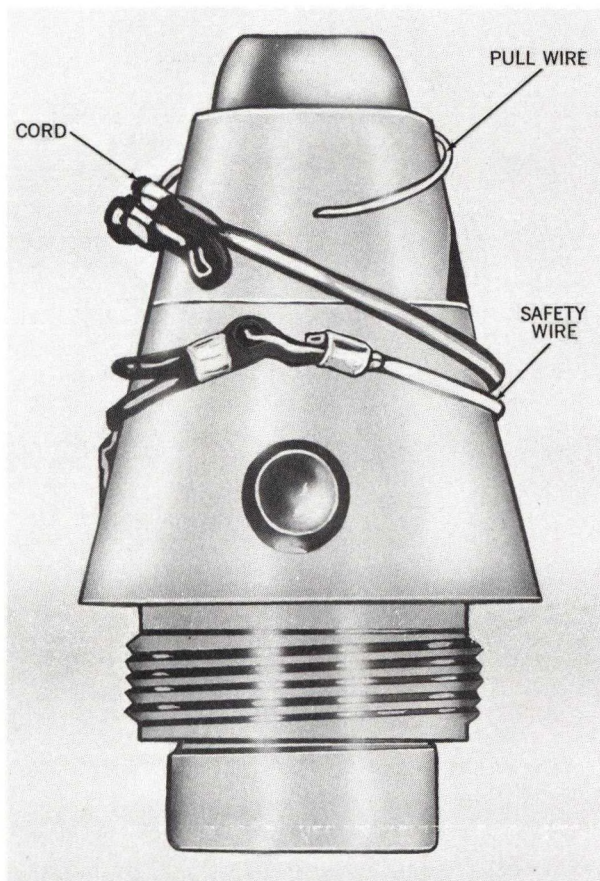


Figure 5-1. Point Detonating Fuze M525A1

fications consist of the substitution of a head assembly containing a delayed-arming mechanism in addition to the firing pin mechanism. The delay feature prevents arming until approximately 3 seconds after the cartridge has left the mortar and is at a safe distance from the firing crew.

WARNING

Cartridges shall not be lifted or handled by the cord attached to the pull wire and the safety wire. If, upon removal of the pull wire and safety wire, a buzzing sound in the fuze is heard, the round shall not be used. Such a round is still safe to handle and transport provided the bore-riding pin is in position and the safety wire is reinserted.

5-18. The M525 Series fuzes are authorized for use with M43 and M57 Series cartridges. The M526 Series fuzes are authorized for use with M362 and M370 Series cartridges.

5-19. Time Fuzes.

5-20. M84 Series. The time fuze (figure 5-2) is a single-purpose powder-train selective-time type fuze. It has a time setting up to 25 seconds in 1-second intervals. As shipped, the fuze is set SAFE, that is, the raised setting indicator on the movable adjustment ring is aligned with the S on the body. Do not use fuzes which are not set at the S position when unpacked. To obtain the desired time of functioning, it is necessary to turn the adjustment ring with the fuze setter provided for the purpose until the setting indicator on the adjustment ring is aligned with the appropriate graduation or boss on the fuze body. Counterclockwise movement of the adjusting ring (viewed from the point of the fuze) increases the fuze time. This fuze is authorized for use with the M301 Series (illuminating) cartridge.

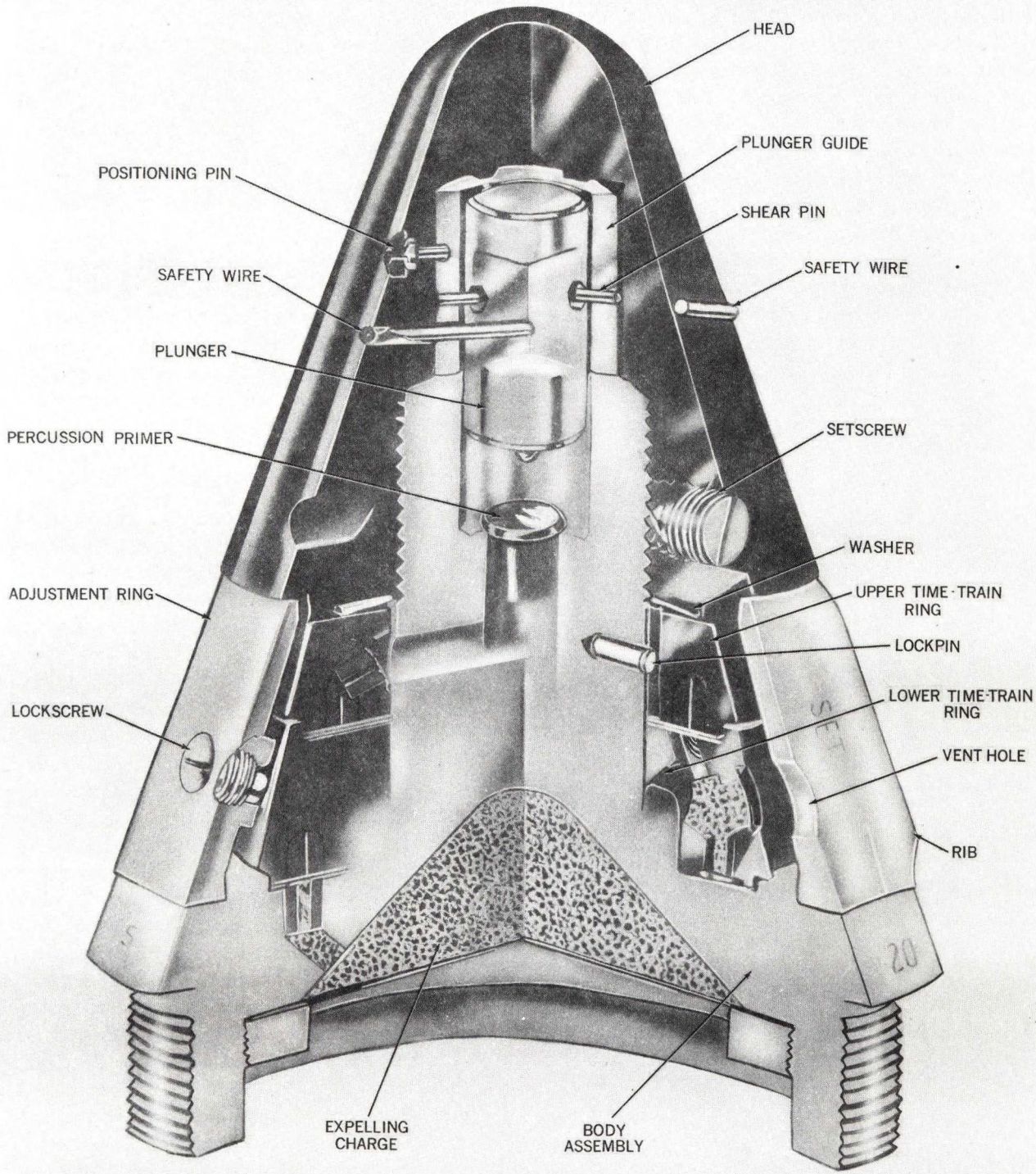


Figure 5-2. Time Fuze M84

5-21. Time And Superquick Fuze.

5-22. M77 Series. This fuze (figure 5-3) provides either superquick impact action or time function for airburst. A fuze setter is used to vary the time setting from 0 to 25 seconds (numbered every second and graduated every 0.2 seconds). When issued, the fuze is set on S (SAFE). Do not use this fuze if it is not set on S when unpacked. Impact action is obtained by leaving the fuze setting on S or setting it to any time setting greater than the expected time of flight. Superquick action is always obtained when functioned by impact. This fuze is authorized for use with M56 and M57 Series cartridges and for emergency combat use with M43 Series cartridges.

5-23. Proximity Fuzes.

5-24. M517 Series. This series (figure 5-4) is essentially a self-powered radio pulse transmitting and receiving unit. When the radio pulse front is deflected back, when at or near optimum distance from the target, it initiates detonation of the fuze explosive train. If the radio elements of the fuze should become inoperative, the impact element will cause functioning of the fuze explosive train if impact with a resistant object occurs. The minimum time after firing to arming for an impact function is in excess of 1.5 seconds. For proximity function (or early burst) 4.0 seconds (3.2 seconds under unusual combinations of circumstances) is the minimum arming time.

WARNING

In the event the fuze, whether packaged separately or assembled to a cartridge, is dropped 40 feet or more, it should not be approached or disturbed for at least 30 minutes. All personnel should be evacuated from the area immediately to a point com-

mensurate with the quantity-distance requirements established for the total quantity of explosives that could be involved in an explosion. After the 30-minute waiting period, the fuze is still dangerous but may then be approached and removed carefully and destroyed in a safe place. All operations connected with this procedure should be done either by or under direct supervision of personnel who are thoroughly familiar with the dangers of such operation and who are qualified to do this work. If the situation permits a longer waiting period, 40 hours should be allowed prior to approaching the dropped fuze from its removal. It must be remembered that the dropped fuze or fuzed cartridge is still dangerous after this 40-hour waiting period but it may be handled with comparative safety.

WARNING

Duds should not be approached or disturbed for at least 30 minutes. After the 30-minute waiting period, the dud is still dangerous but may be approached carefully to destroy in place. If it is impossible to destroy in place, the dud should be removed carefully for subsequent destruction. If the situation permits a longer waiting period, 40 hours should be allowed prior to approaching the dud for destruction in place or for removal. It must be remembered that the dud is still dangerous after this 40-hour waiting period but may be handled with comparative safety. All the operations connected with the above procedures should be performed by qualified disposal personnel.

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5-25

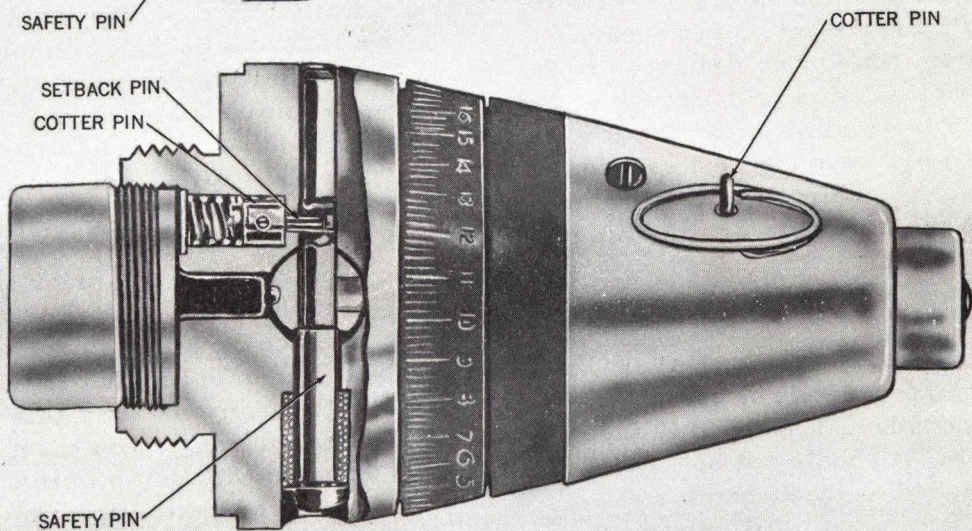
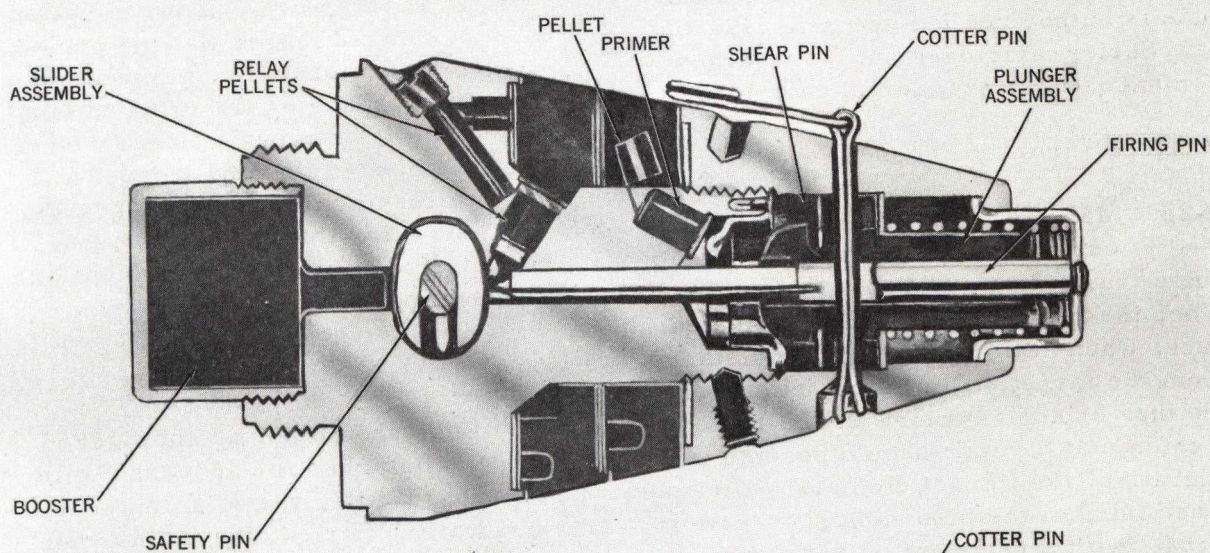
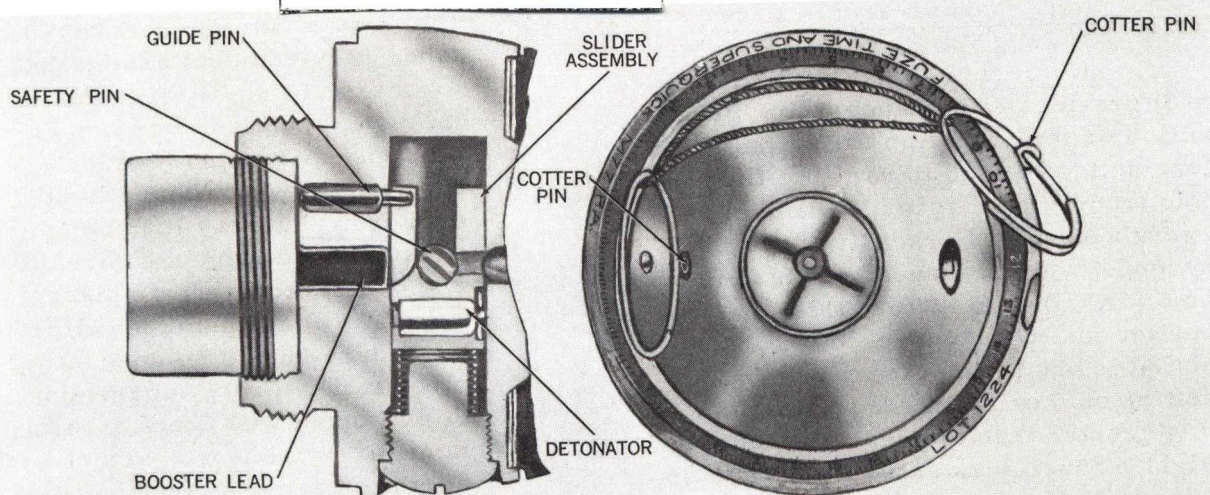


Figure 5-3. Time and Superquick Fuze M77

5-6

5-25. This fuze is authorized for use with M362 and M370 Series cartridges. There is no limitation as to quadrant elevation required from a safety standpoint when using the M517 VT fuze. See

table 5-1 for fuze interchangeability.

5-26. 81MM CARTRIDGES.

5-27. Dependent upon the type of projectile, ammunition for this mortar is classified as high-explosive (HE.), illuminating, smoke (FS) or (WP), target-practice (TP), and training.

WARNING

Do not attempt to fire rounds or fuzes that have been dropped 3 feet or more unless these have been inspected and certified by qualified personnel.

WARNING

Care must be exercised to prevent striking the primer of the ignition cartridge against hard objects such as belt buckles, etc.

NOTE: Ammunition manufactured after June 1960 will conform to the color coding shown in MIL-STD-709, Ammunition Color Coding.

NOTE: (Refer to Army SM 9-5-1315 Stock List of Current Items for Ammunition 75mm through 125mm) Cartridges are individually packed in moisture-resistant or water proof fiber or metal containers. Fiber containers are sealed with an adhesive sealing strip that is the same color as the ammunition in the container.

5-28. High Explosive Cartridges.

5-29. HE. M43 Series (Light). This series shown in figure 5-5 is a light-weight round for use against light material targets and personnel, func-

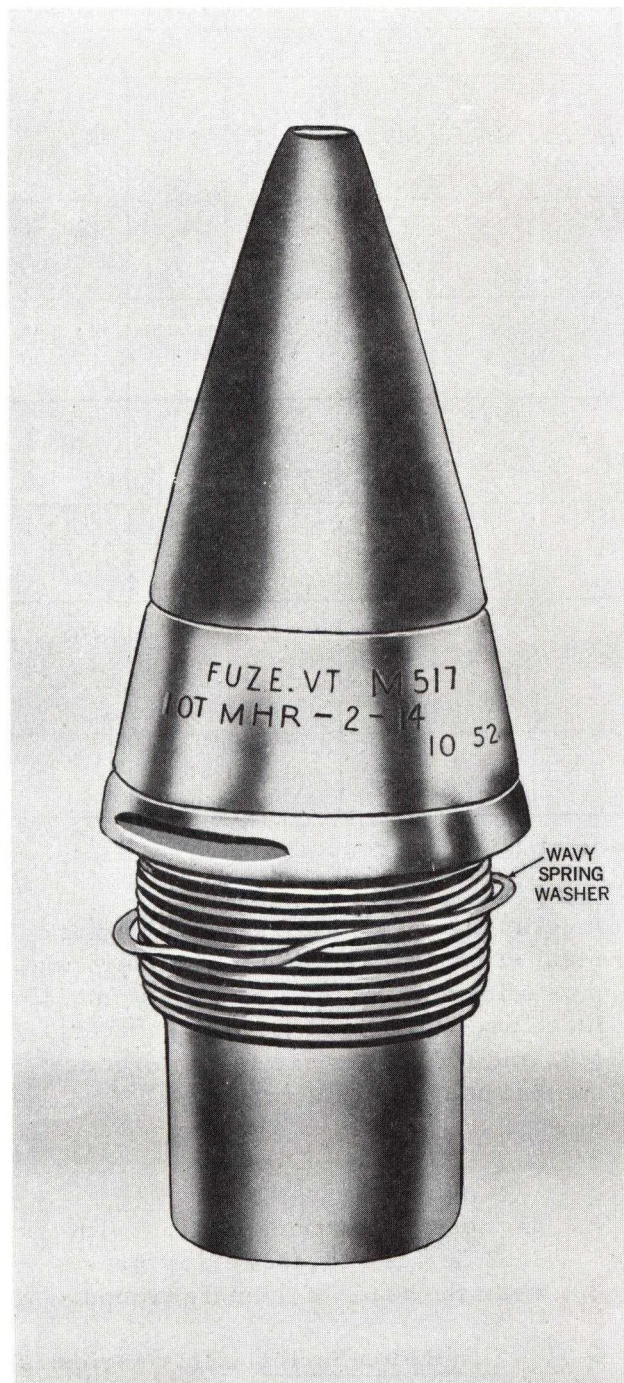


Figure 5-4. Proximity Fuze M517

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Table 5-1. Fuze Interchangeability Chart

A AUTHORIZED B FUZES FOR EMERGENCY USE ONLY	POINT DETONATING							PROX- IMITY	TIME	TIME AND SUPER QUICK
	SERIES									
	M52*	M53	M82*	M519*	M524	M525	M526	M517	M84	M77
81 MM Cartridge Types										
HE. or TP M43 Series	E	E	E			A				E
HE. M56 Series	E	A	E							A
HE. or TP M362 Series				E	A		A	A		
Illuminating M301 Series									A	
Smoke FS or WP M57 Series	E	E	E			A				A
Smoke WP M370				E	A		A	A		

*WARNING: Do not fire over heads of friendly troops.

functioning with both fragmentation and blast effect. It has an ignition cartridge plus 6 increment charges.

M525 Series fuzes are authorized for use with this cartridge. M52, M53, M82 and M77 fuzes are for emergency combat use with this cartridge.

WARNING

Do not fire cartridges fitted with M52 Series and M82 Series fuzes over the heads of friendly troops.

5-30. HE. M56 Series (Heavy). This is a high-explosive round intended for use against material targets and personnel

functioning with both fragmentation and blast effect. It has an ignition cartridge plus 4 increment charges. M53 and M77 fuzes are authorized for this cartridge. M52 and M82 fuzes are for emergency combat use with this cartridge.

WARNING

Do not fire cartridges fitted with M52 Series and M82 Series fuzes over the heads of friendly troops.

5-31. HE. M362 Series. This series is a lightweight cartridge of new design. The cartridge does not utilize gas check bourrelet grooves which characterize

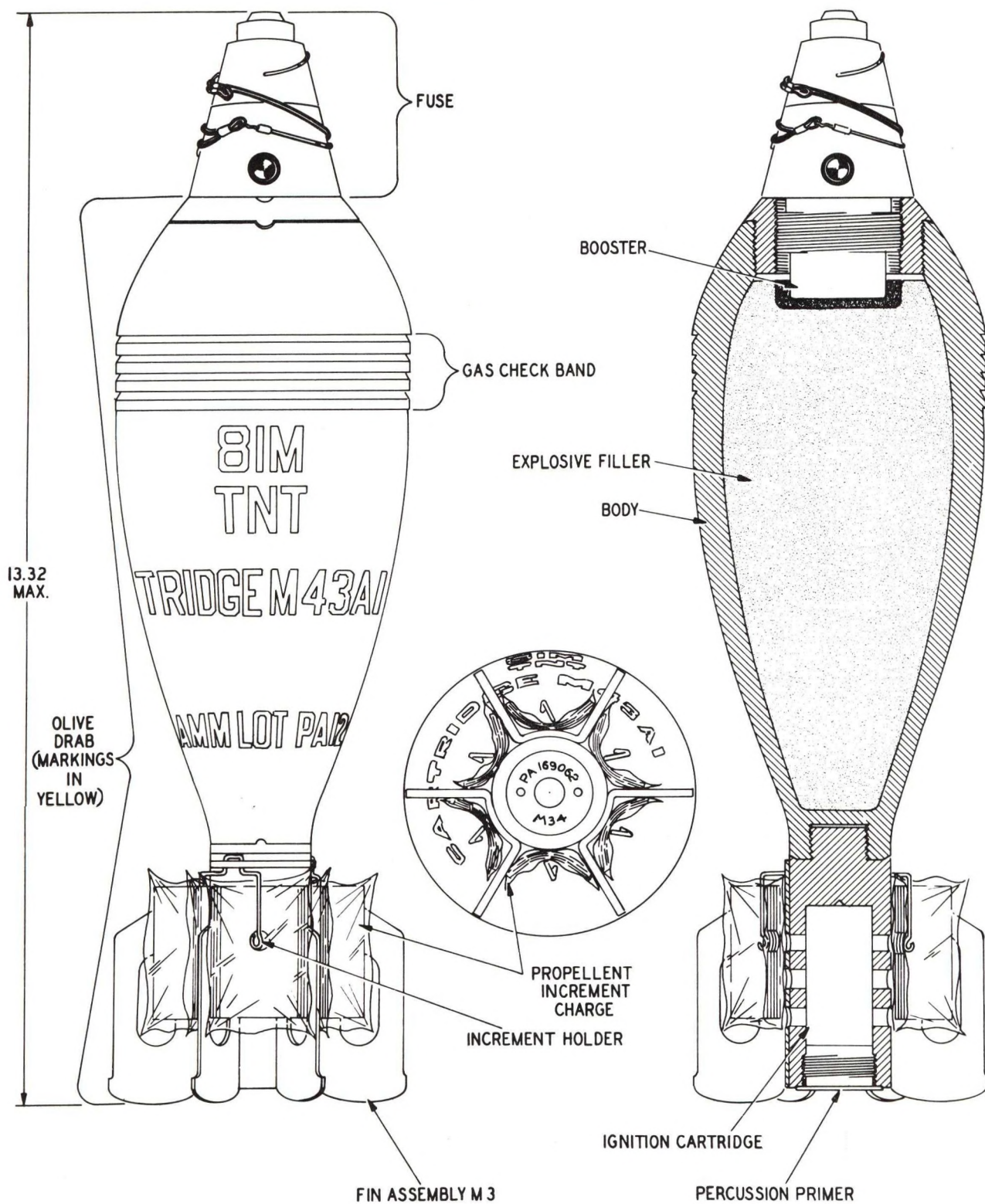


Figure 5-5. 81-MM Cartridge, HE. M43A1

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cartridges of earlier design. It has an ignition cartridge plus 8 increment charges. If a proximity fuze is to be used, remove the existing fuze with the fuze wrench (figure 6-1) and proceed as follows:

1. Remove the proximity fuze from its container.

CAUTION

Do not remove the wavy spring washer from the relief under the fuze shoulder.

2. Examine the fuze threads to insure that they are in good condition. Do not use components with faulty threads.

3. Insert the fuze (with wavy spring washer in proper position) into the fuze cavity of the projectile and screw the fuze in manually by grasping the metal portion (base) of the fuze.

4. Tighten the proximity fuze (and its washer) to the projectile by using the fuze wrench so that no clearance exists between the fuze, washer, and the projectile. If a fuze wrench is not available, tighten securely by hand so that the wavy spring washer is completely compressed and that no air gap remains between the fuze and projectile body. Loose fuzes may cause a high percentage of malfunctions. Do not stake the fuze to the projectile and do not attempt to set the fuze. M524, M526 and M517 Series fuzes are authorized for use with this cartridge. M519 fuze is for emergency combat use with this cartridge.

WARNING

Do not fire cartridges fitted with M519 fuzes over the heads of friendly troops.

5-32. Illuminating Cartridge.

- 5-33. Illuminating, M301 Series. This cartridge (figure 5-6) is intended for

illuminating a desired point or area. It is intended to be fired only with the ignition cartridge plus two, three or four increment charges. The M84 fuze is authorized for use with this cartridge.

5-34. Smoke Cartridge.

- 5-35. Smoke (FS) or WP, M57. This series (figure 5-7) is intended for producing a screening smoke. It also has incendiary and casualty producing effects. It has an ignition cartridge plus 4 increment charges. M525 Series and M77 fuzes are authorized for use with this cartridge. M52, M53 and M82 fuzes are for emergency combat use with this cartridge.

WARNING

Do not fire cartridges fitted with M52 Series and M82 Series fuzes over the heads of friendly troops.

WARNING

Store white phosphorous cartridges with fuze ends up. Since WP liquifies above 100°F, protect the ammunition against an uneven rehardening of the filler. An air cavity formed on one side of the shell will unbalance it and cause instability in flight.

- 5-36. Smoke (WP), M370. This is a lightweight cartridge intended for producing a smoke screen. It also has incendiary and casualty producing effects. It has an ignition cartridge and 8 increment charges. M524, M526 Series and M517 Series fuzes are authorized for this cartridge. M519 fuze is for emergency combat use with this cartridge.

WARNING

Do not fire cartridges fitted with M519 Series fuzes over the heads of friendly troops.

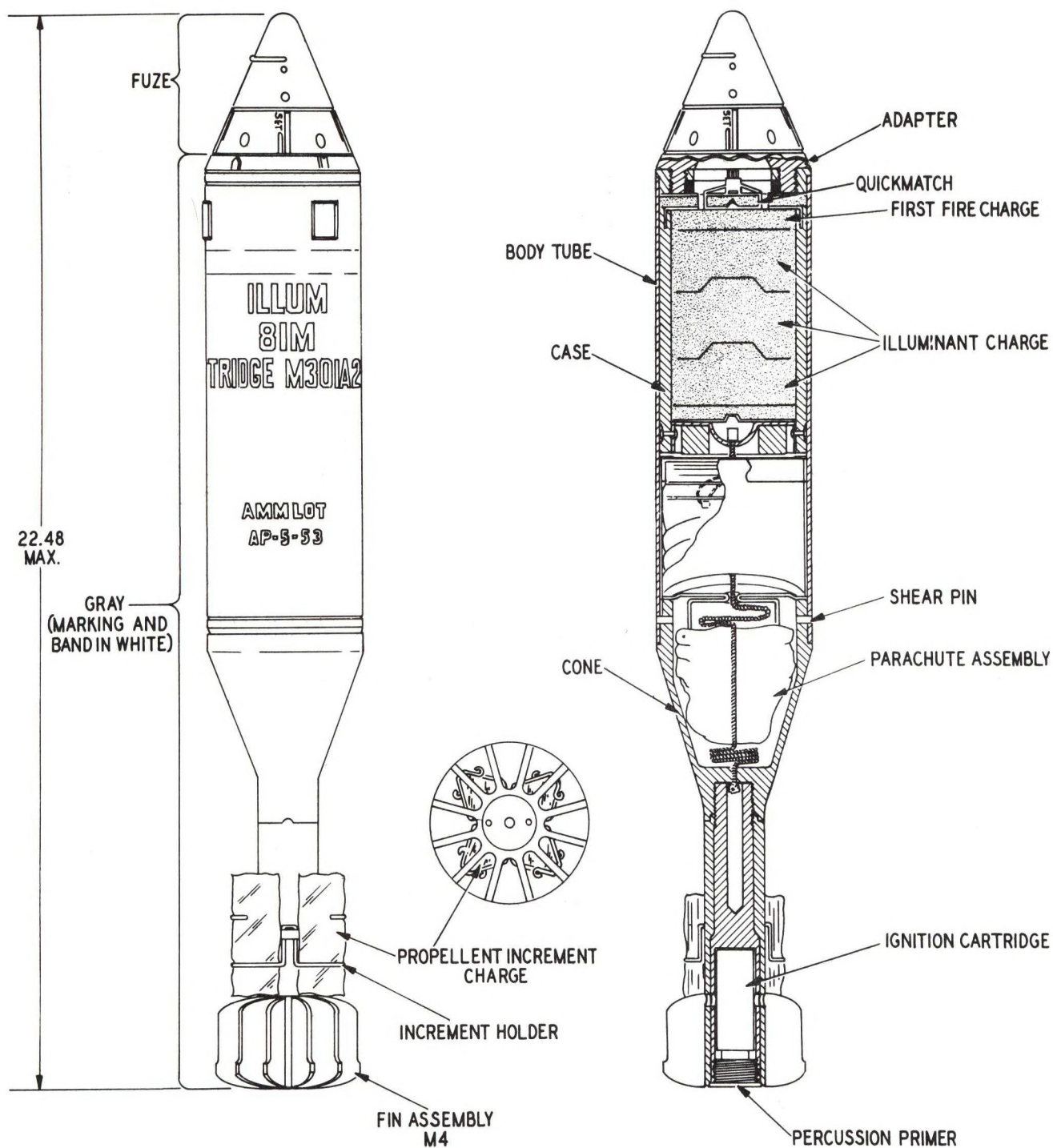


Figure 5-6. 81-MM Cartridge, Illuminating, M301A2

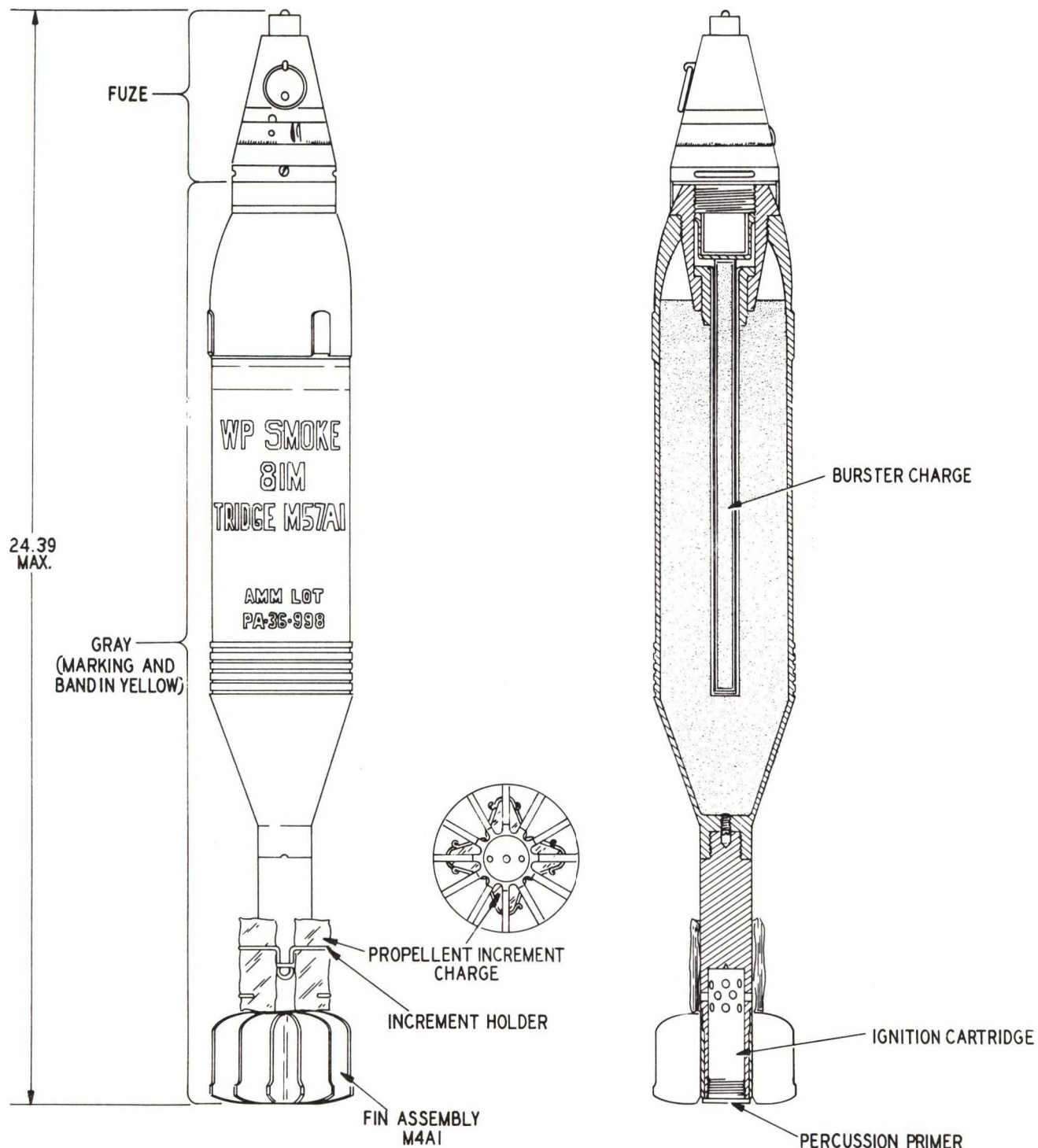


Figure 5-7. 81-MM Cartridge, Smoke, WP M57A1

WARNING

Store white phosphorous cartridges with fuze ends up. Since WP liquifies above 100°F, protect the ammunition against an uneven rehardening of the filler. An air cavity formed on one side of the shell will unbalance it and cause instability in flight.

5-37. Practice Cartridge.

5-38. TP, M34A1, W/Fuze, PD, M525A1 or M525. This projectile is intended for use in target-practice firing. This cartridge is similar to that described in paragraph 5-29 except that it is inert loaded and contains a black powder pellet. The black powder pellet and the fuze booster provide a spotting charge for observation purposes. This round can also be fitted with a modified M52 series fuze which has a black powder charge replacing the tetryl booster charge.

5-39. Training Charge.

5-40. Training, Mk 68 Projectile. This shell is provided for training in loading and firing mortars. It is completely inert and has no fuze. No propellant increment charges are issued or used, except an ignition cartridge or a combination ignition cartridge and percussion primer for firing the training projectile.

5-41. PROPELLING CHARGES.

5-42. Propelling charges consist of a primer, an ignition cartridge, and bundles of powder called increments. Increments

are sealed in cellophane envelopes or in stitched cotton cloth bags. Increments are affixed to the outside of the mortar cartridge and are therefore subject to the elements while readying to load.

WARNING

Short and variable ranges result if these increments get wet or if there is water, excessive lubricant, or solvent in the mortar bore. Do not attempt to fire the mortar if any of these conditions exist.

In order to keep the moisture problem to a minimum, do not remove the sealing tape from the fiber containers of more than three rounds at a time in the ready service lockers. Unused rounds should be retaped with new tape.

5-43. Unused Increments.

5-44. Do not throw unused increments (as removed from the cartridge) over the side nor strew on the deck during firing operations. Unused increments should be collected in a non-combustible container (such as an empty 50 caliber ammunition box) for later disposition (dumping at sea or burning ashore) in accordance with Volume 1 of OP 5, Ammunition Ashore, Handling, Stowing, and Shipping, Chapter 29 Destruction of Ammunition and Explosives.

WARNING

Smoking is prohibited in the vicinity of the mortar when the mortar is manned for firing.

CHAPTER 6

MAINTENANCE

6-1. INTRODUCTION.

6-2. This section contains the instructions necessary to maintain the 81-MM Mortar Mk 2 Mod 0 in proper operating condition. These instructions include the procedures necessary for cleaning, adjusting, lubricating, troubleshooting, and disassembly and reassembly of the equipment in preparation for repair or replacement of component parts.

NOTE: For scheduled maintenance, users of this manual must refer to the Maintenance Requirements Cards, 81-MM Mortar Mk 2 Mod 0.

6-3. When maintenance is required due to a component failure, the Bureau of Naval Weapons, Weapon System Component Failure Report NAVWEPS Form 8000/13 (9/62) must be completed. To aid in identifying component parts, reference is made by figure and index number to the Replaceable Parts Lists in Chapter 7.

6-4. SPECIAL TOOLS.

6-5. Special tools required to maintain the 81-MM Mortar are illustrated in figure 6-1 and are identified within the maintenance procedures where required.

6-6. OPERATIONAL CHECKOUT PROCEDURES.

6-7. After completing maintenance requiring replacement of any mortar com-

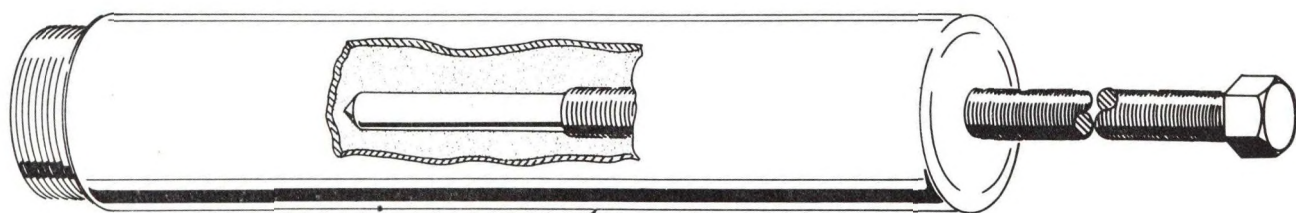
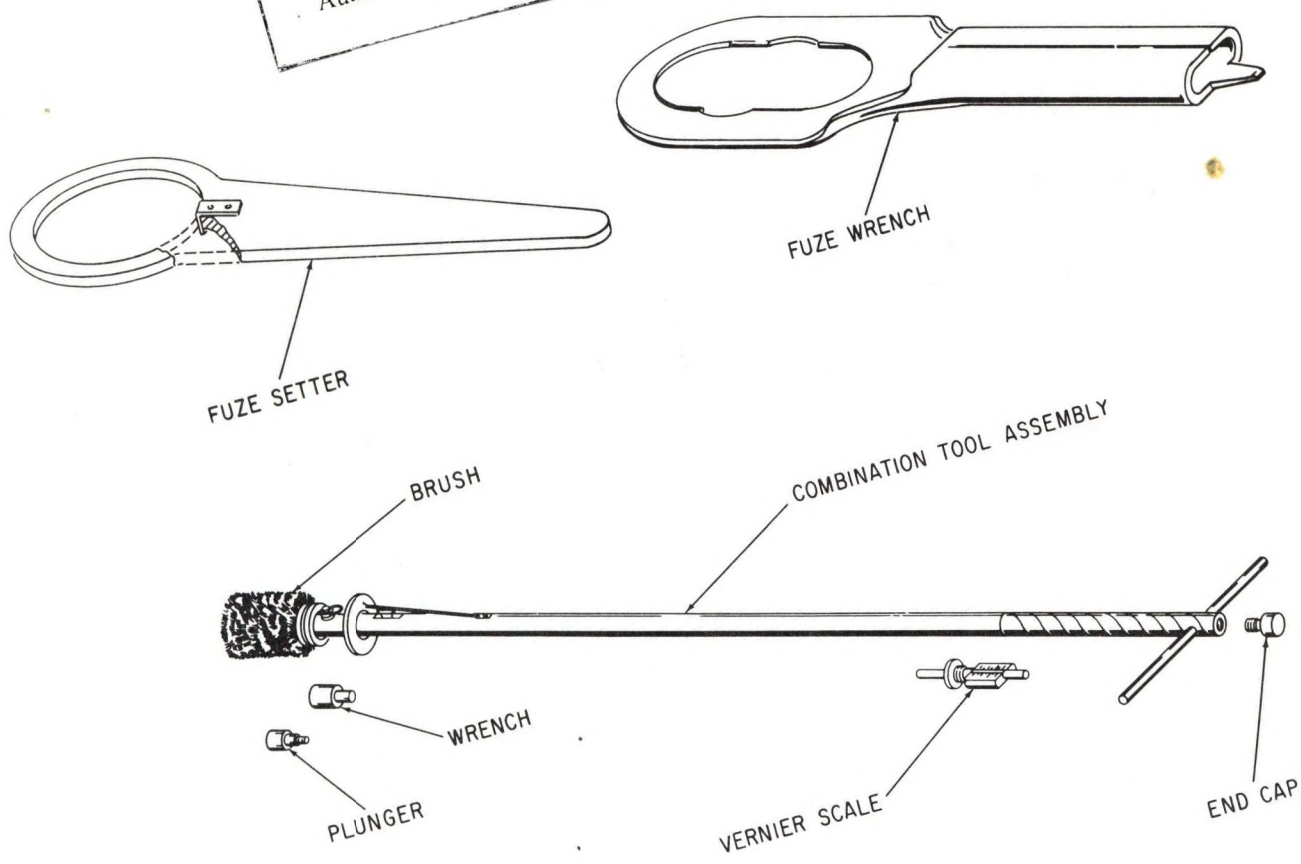
ponent, the mortar should be checked to ensure that all components have been properly reinstalled and adjustments made. The following procedures will ensure that the mortar is operational and that all maintenance has been properly completed.

1. Remove protective covers.
2. Check stand holddown bolts for security.
3. Check carriage slewing ring bolts for security.
4. Check trunnion cap bolts for security.
5. Unclamp slewing ring and check mortar in train for ease of operation. Secure clamps.
6. Unclamp elevating arc clamping lever and check oscillating action. Secure clamps.
7. Check recoil fluid level (refer to paragraph 6-18).
8. Check to ensure that all parts are properly lubricated.
9. Check mortar barrel for cleanliness.
10. Trigger fire unloaded mortar to ensure that the firing mechanism functions properly.
11. Check position of firing pin in drop fire mode using combination tool assembly (refer to paragraph 6-26).
12. Check mortar bore cleanliness. Clean the bore if required.
13. Inspect sight mechanism for security of all details and exercise the offsetting mechanisms.
14. Verify sight alignment (refer to paragraph 6-32).
15. Check counterrecoil choke valve lockpin holder for security and check for

6-8

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SPRING COMPRESSOR

Figure 6-1. Special Tools

6-2

correct setting as stencilled on the valve.

16. Check slide, carriage and stand for structural defects, corrosion, or any condition that could cause firing operation casualty.

17. Check operation of lighting circuit (refer to paragraph 6-19).

18. Check mortar and the immediate area to ensure that all tools or loose gear have been removed.

19. Replace protective covers and secure.

6-8. INSPECTION AND SERVICING.

6-9. The mortar must be inspected after maintenance to insure that all exposed surfaces are covered with a protective coating of paint, light oil, grease or other corrosion preventives (see figure 6-2). Where rust, paint flaking, or blisters appear, they must be removed to bare metal before applying a protective coating. Painted surfaces that are scratched, marred or otherwise defective must be thoroughly cleaned of grease or oil and the area repainted. Do not paint, deface or obscure the instruction plates. All bright metal work must be coated with a film of light oil.

6-10. Slide Assembly.

6-11. Inspect the recoil cylinder (32, figure 7-4) and packings at either end for evidence of leakage. Replace packings as required (refer to paragraph 6-49). Check recoil cylinder for proper oil level as described in paragraph 6-18.

6-12. CLEANING INSTRUCTIONS.

6-13. Barrel.

6-14. After firing, the mortar barrel should be cleaned using the combination tool assembly (figure 6-1) and a cleaning solution consisting of one pound of laundry soap or sodium carbonate to each gallon of boiling fresh water.

1. Remove the firing mechanism and cover assembly by releasing the cover lock (18, figure 7-5) and rotating the case cover (1, figure 7-6) to release the bayonet-type locks. Remove the case cover and firing mechanism as a unit.

2. Assemble the combination-tool cleaning group as follows:

a. Remove the plunger guide and install the brush. Secure brush with ball lockpin.

b. Back off the locknut and remove the scale and vernier and vernier rod as a unit.

c. Install the end cap and handle.

d. Tighten the setscrew to secure the spacer rod.

3. Depress the mortar barrel and using the combination tool assembly, swab the barrel with cleaning solution until the barrel is thoroughly cleaned.

4. Sponge-rinse the barrel with clean fresh water and dry with clean, dry towels.

WARNING

Carbon deposits forming on the firing pin bushing can cause the firing pin to stick in the DROP FIRE position. Failure to keep the bushing clean may result in injury to personnel.

5. Remove and clean firing pin bushing (9, figure 7-5).

6. Lubricate barrel, applying a film of light oil (see figure 6-2).

7. Sponge the outside of the barrel clean with a soap solution or solvent, PS661; rinse with clean, fresh water, and dry thoroughly. Do not permit excess water or cleaning solution to run into the breech mechanism.

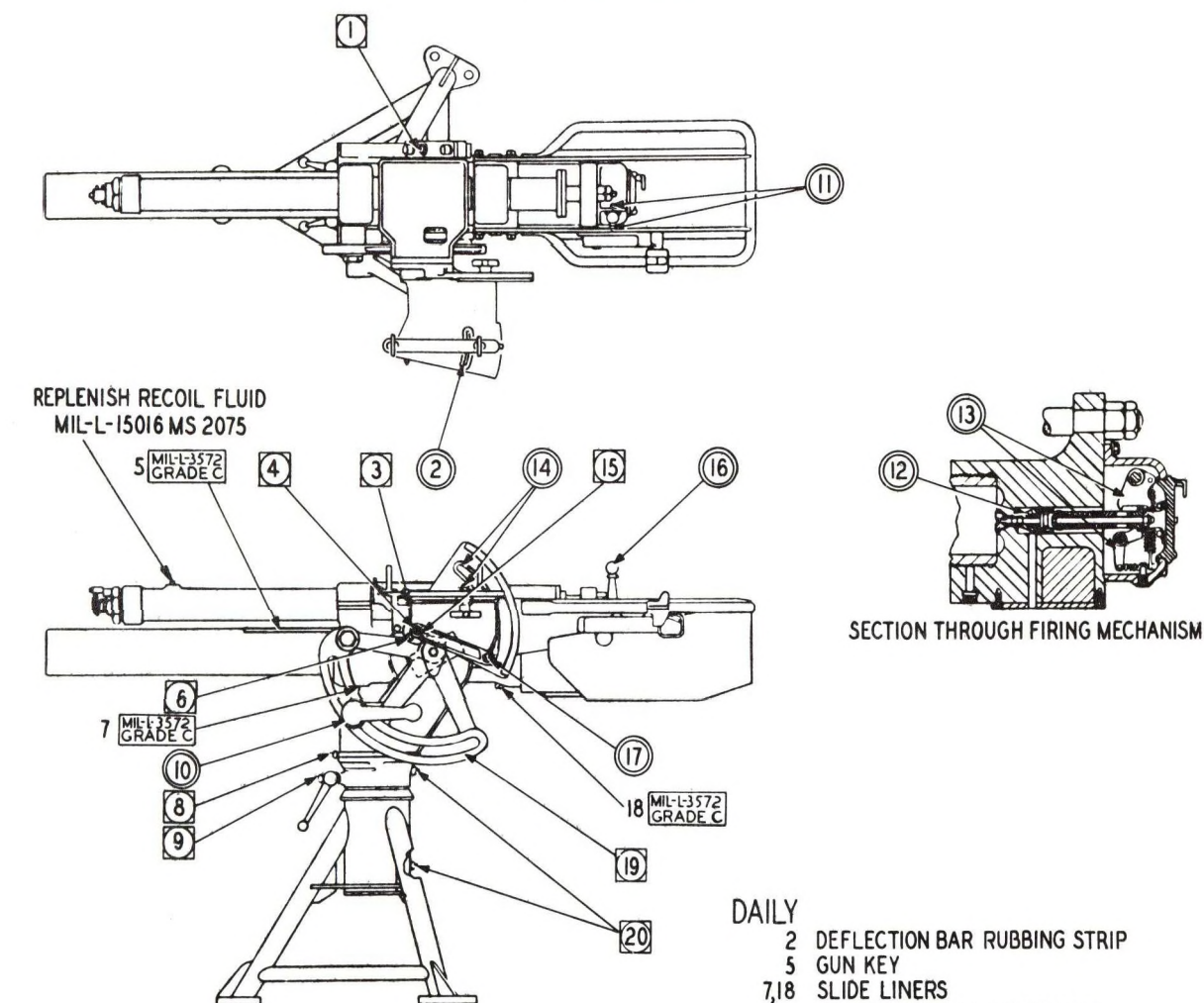
6-15. Breech Mechanism.

6-16. Thoroughly clean all moving metal parts with solvent, PS661.

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○ INDICATES OIL, LIGHT MINERAL MIL-L-15016, MS 3050 OR MS 2135. LUBRICANTS ARE SHOWN IN ORDER OF PREFERENCE.

□ INDICATES GREASE, BEARING MIL-G-16908

▭ INDICATES SPECIAL LUBRICANT, FLUID OR PRESERVATIVE COMPOUND LUBRICANTS, COLLOIDAL GRAPHITE IN OIL, MIL-L-3572

REFER TO O.D. 3000 LATEST REVISION. FOR GENERAL LUBRICATION INSTRUCTIONS, COLD WEATHER PROCEDURES, SUBSTITUTE LUBRICANTS, APPLICATION AND REMOVAL OF PRESERVATIVES, CLEANING MATERIALS, AND PRECAUTIONS TO OBSERVE DURING LUBRICATION.

APPLICATION-EXERCISE PARTS WHILE LUBRICATING.

REPORTS-SHIP EXPERIENCING ANY DIFFICULTY WITH OPERATION OF THE EQUIPMENT DUE TO LUBRICATION IN ACCORDANCE WITH THIS CHART SHOULD SUBMIT A DETAILED REPORT TO THE BUREAU OF NAVAL WEAPONS.

DAILY

- 2 DEFLECTION BAR RUBBING STRIP
- 5 GUN KEY
- 7,18 SLIDE LINERS
- 10 ELEVATION ARC LOCKING BOLT
- 11 BREECH MECHANISM
- 12 FIRING MECHANISM
- 13 BREECH MECHANISM-BRIGHT WORK
- 14 SIGHT ANGLE BRACKET RUBBING STRIP AND DEFLECTION BAR CLAMP SCREW
- 16 COCKING LEVER MECHANISM
- 17 OPEN SIGHT SUPPORT CLAMP SCREW

WEEKLY

- 1,15 TRUNNIONS
- 3 SIGHT DEFLECTION SHAFT
- 4 SIGHT ANGLE SHAFT
- 6 OPEN SIGHT SUPPORT
- 8 CARRIAGE
- 9 CARRIAGE CLAMP SHAFT
- 19 ELEVATION SECURING ARC
- 20 UPPER AND LOWER BEARINGS
- 21 BORE

BEFORE AND AFTER FIRING

CLEAN BORE AND BREECH MECHANISM.
OIL ALL SURFACES.

Figure 6-2. 81-MM Mortar Mk 2 Mod 0 Lubrication Chart

6-17. Pull out cover lock (18, figure 7-5) and remove firing mechanism and cover assembly (2). Disassemble (refer to paragraph 6-46) and clean with solvent, PS661. Dry with clean cotton waste and lubricate in accordance with lubrication chart (figure 6-2).

6-18. Recoil Cylinder. Perform the following operations when checking and replenishing recoil cylinder fluid:

NOTE: Inspection and refilling of the recoil cylinder must be done in the presence of a responsible commissioned officer.

1. Position the mortar at 45° elevation.
2. Secure the elevating arc clamping lever (2, figure 7-9).
3. Remove the fill plug (30, figure 7-4).
4. Remove the drain screw (1).
5. Run oil MIL-L-15016 MS 2075 into the recoil cylinder until it runs from the drain hole (see figure 6-2).
6. Install the drain screw and tighten.
7. Replace the fill plug.

6-19. Lighting Circuit.

6-20. The lights (see figure 7-11) are long-life type and will not need frequent replacement. After firing, inspect the lighting system. Wipe the luminescent light panel surface with a clean, soft, non-scratching material. Do not scour the illuminated surface as the plastic material will mar, thus reducing brilliancy. Check all wiring for loose connections or breaks and make certain that all lights illuminate.

2-21. Remove power pack cover (9) and remove any condensation. If battery (14) is replaced, make certain that battery polarity is not reversed. Check that all internal soldered connections are tight.

NOTE: The battery should be removed and stored in a dry storage area if the mortar is to be out of operation for any length of time.

6-22. LUBRICATION INSTRUCTIONS (See figure 6-2.)

6-23. Lubrication instructions for the 81-MM Mortar are contained in NAVWEPS OD 3000 and should be referred to for general information on lubrication and care of ordnance equipment. Detailed scheduled lubrication instructions are contained in the Maintenance Requirements cards 81-MM Mortar Mk 2 Mod 0.

6-24. ADJUSTMENTS.

6-25. Trigger Adjustment.

1. Loosen the nut (26, figure 7-7) and adjust the setscrew (27) as follows:

- a. Tighten setscrew to take up any excess slack in the trigger, or
- b. Loosen setscrew to provide more trigger pull.
- c. Tighten nut (26) after adjustment is made.

2. Cock the trigger mechanism and pull trigger to ensure proper action. If firing mechanism fails to operate, adjust the connecting rod clevis (15) as follows:

- a. Remove screws (4) securing hand stop (7) to firing trigger guard (33). Remove hand stop.
- b. Remove capscrews (1) and (28) securing firing mechanism to breech housing and remove the firing mechanism.
- c. Remove spring (16), cotter pin (17) and contact arm shaft (19).
- d. Remove cotter pin (12) and clevis pin (14) securing connecting rod clevis (15). Slide clevis clear of contact arm (20).
- e. Tighten or loosen the clevis (15) as required to obtain correct trigger action.

f. Reassemble the firing mechanism and temporarily secure to breechhousing using two capscrews (28). Reassembly is the reverse of disassembly described in steps a through d.

g. Cock the firing mechanism and pull the trigger to ensure proper firing pin action. If necessary repeat steps 1 and 2 as required to obtain proper trigger action.

h. Install remaining capscrews (1) and (28) and tighten to secure.

i. Install hand stop (7) and secure with screws (4), washers (5) and nuts (6).

6-26. Firing Pin Adjustment (Drop Fire and Neutral Position).

6-27. When firing pin assembly is in NEUTRAL position, the firing pin (12, figure 6-3) must be recessed approximately 1/16-inch from the face of the firing-pin bushing (11). This can easily be checked using a piece of soap or wax secured to the end of a rod and forced down on the firing-pin bushing (11). A check of the impression made on the soap or wax would indicate whether the pin is properly recessed. In the DROP FIRE position, the firing pin (12) must protrude 0.075 ± 0.002 inch beyond the face of the firing pin bushing. The soap or wax method may also be used to check firing pin protrusion; however, the most effective method is to use the combination tool assembly (figure 6-1) as described in the following procedures.

1. Pull cocking lever (2) to DROP FIRE position and lock.

2. Set lower surfaces of the combination tool plunger and plunger guide flush to each other and adjust vernier gage and scale gage at upper end of combination tool to read zero.

3. Insert plunger end of combination tool into the mortar barrel. Ensure that plunger guide seats at bottom of barrel.

4. Check reading on scale which should be 0.075 ± 0.002 inch. If the reading is

not within the tolerances specified, remove firing mechanism assembly (refer to paragraph 6-46) and adjust the adjusting nut (3) as required to obtain proper firing pin protrusion of 0.075 ± 0.002 inch.

NOTE: Rotate adjusting nut counterclockwise to increase firing pin protrusion and clockwise to decrease firing pin protrusion.

5. Reinstall firing mechanism assembly and repeat procedures in steps 1 through 4 to ensure proper installation.

6-28. Elevation Indicator Adjustment (See figure 6-4.)

NOTE: Elevation indicator adjustment should be accomplished when the ship is in dry-dock or the mortar removed to a level land surface.

6-29. Level the mortar using the gunners quadrant and loosen the retaining bolts and lockscrew that secures the elevation indicator to the elevation securing arc. Move the indicator to indicate 0 degrees on the elevation scale and tighten the retaining bolt and lockscrew.

6-30. Choke Valve Adjustment.

6-31. The choke valve assembly is adjusted and set during proof testing and normally should not require further adjustment. However, if it becomes necessary to disassemble, or to replace the valve, the following adjustment must be made and the new proof setting number marked on the valve (see figure 6-5).

1. Remove lockpin holder.
2. Count and record number of notches required to rotate choke valve clockwise until it is firmly seated.
3. Back out choke valve and remove.
4. Install new or repaired choke valve assembly until firmly seated.

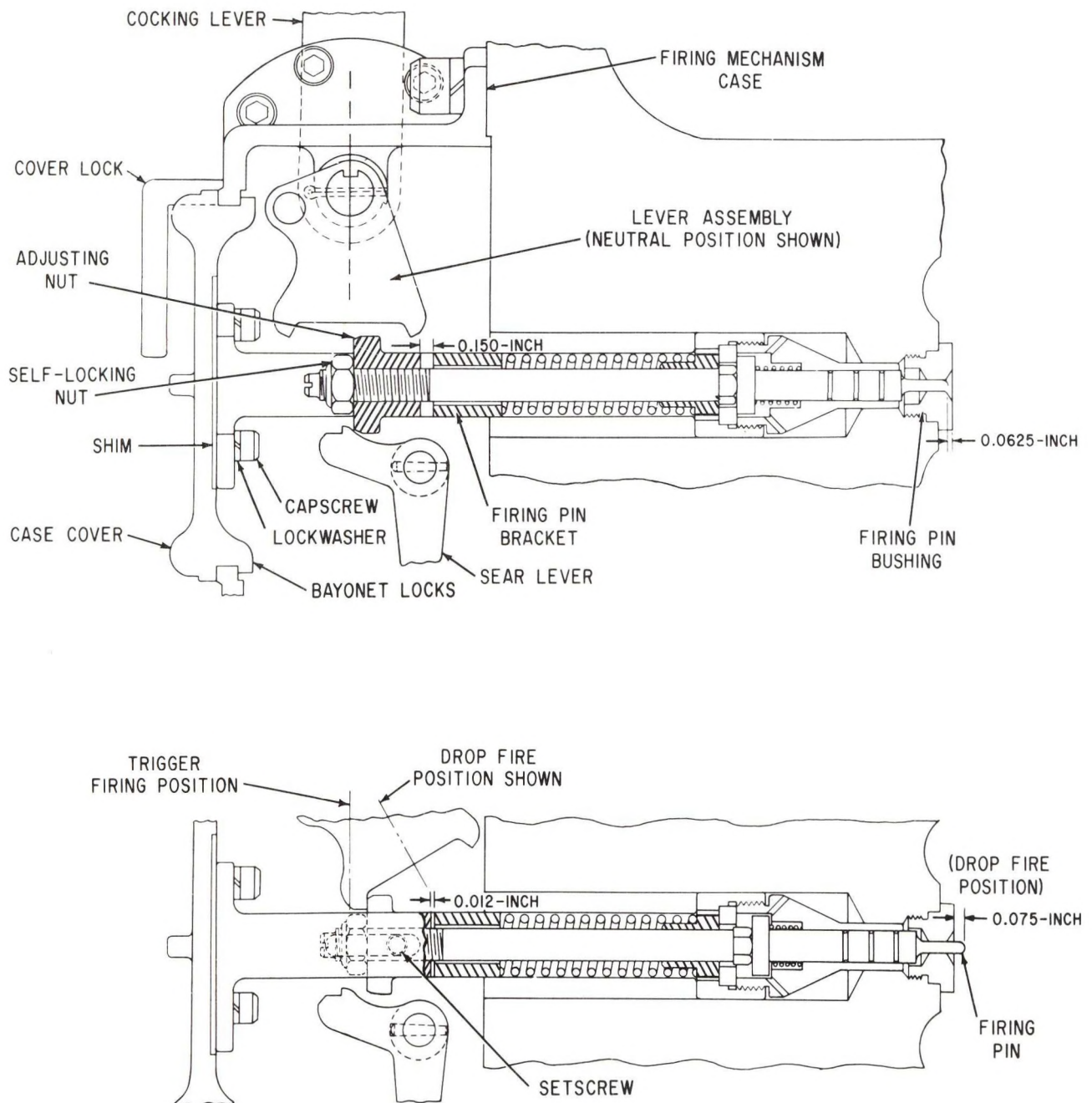


Figure 6-3. Firing Pin Adjustment

5. Back off same number of notches recorded in step 2.
6. Replace lockpin holder and secure.

CAUTION

Do not exceed 4 and 5/12 turns from a fully seated position counterclockwise when resetting the choke valve. If more turns are required, the choke valve is defective and should be replaced.

7. If buffing action is not satisfactory, adjust choke valve one notch at a time; clockwise to increase buffing action or counterclockwise to decrease action. When correct buffing action is obtained, record the new PROOF SETTING NO. on the choke valve (see figure 5-3).

6-32. Sight Alinement.

6-33. Alinement of the sight with the centerline of the barrel is obtained by two scale adjustments. One adjustment is to match zero degrees on the sight scale against an engraved bench mark on the sight angle index, and the other matches zero of the deflection scale

against an engraved mark on the deflection index. The two adjustments are made as follows:

6-34. Sight Angle Scale. Loosen the screws (49, figure 7-2) and clamps (48) that secure the scale (51) in position. Set 0° sight angle on the scale to the engraved line or bench mark on the sight angle index (54). Secure screws and clamps.

6-35. Deflection Scale. Loosen screws (56, figure 7-2) holding the deflection scale (58). Set zero (500 mils) deflection on the scale to the engraved line or bench mark on the deflection index (30). Retighten screws.

6-36. FAULT ISOLATION.

6-37. The Fault Isolation Chart, figure 6-6, lists the possible malfunctions that may occur during mortar operation. The chart shows the fault indication, or symptom, its probable cause and the suggested remedy.

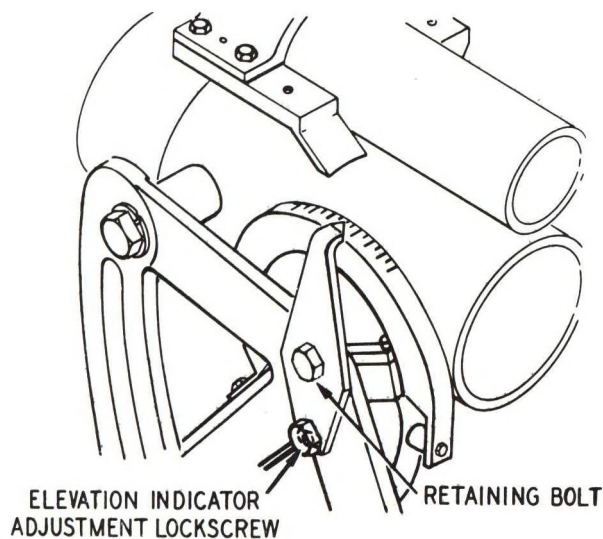


Figure 6-4. Elevation Indicator Adjustment

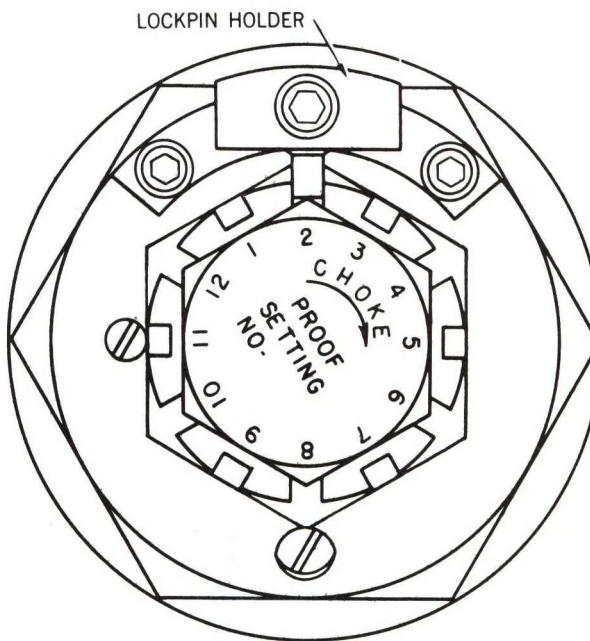


Figure 6-5. Choke Valve Adjustment

SYMPTOM	PROBABLE CAUSE	REMEDY
Bending or sluggish operation of moving parts	Rust or dirt; improper cleaning or lubrication	Clean and lubricate moving parts
Misfire	Round sticks in barrel	Keeping clear of barrel, kick barrel with heel. Cock mechanism and pull trigger to fire. WARNING If round fails to fire, wait one minute before removing the round. Refer to paragraph 4-46. WARNING Replace safety wire in round. Refer to paragraph 4-47. Remove round and check primer. If primer is dented, discard round overboard immediately. If primer is not dented, check firing mechanism for damage.
Firing mechanism fails to operate	Defective firing pin; damaged spring	Replace firing mechanism and cover assembly. Refer to paragraph 6-46, steps 1 through 3.
Firing pin fails to retract	Excessive buildup of carbon deposits on firing pin or firing pin bushing	Remove carbon deposits if time permits; or replace firing mechanism and cover assembly and firing pin bushing.
Trigger fails to operate firing linkage	Firing linkage or trigger out of adjustment	Adjust firing linkage or trigger. Refer to paragraph 6-24.
Recoil rod bushing remain out of battery		Loosen the bolts (5, figure 7-4) securing packing gland (7).
Lamps fail to light	Broken leads; defective battery or lamps	Repair broken leads, replace defective battery or lamps.

Figure 6-6. Fault Isolation Chart

-38. REMOVAL AND REPLACEMENT.

-39. The component parts of the 81-MM mortar can be removed and replaced using standard tools except for the counter-recoil spring (24, figure 7-4) and the firing pin bushing (9, figure 7-5). Where special tools are required, they are referenced in the appropriate text and illustrated in figure 6-1.

-40. If the mortar is to be completely disassembled, the preferred sequence for disassembly is as follows: Remove the sight, firing mechanism and cover assembly, and firing linkage; recoil guard assembly, handle bar, recoil and counter-recoil assembly, breech mechanism and barrel, slide assembly, carriage and stand. The following paragraphs describe the procedures required for removal, disassembly and reinstallation of a particular assembly or component.

-41. Preparation.

-42. Prior to starting any maintenance procedures involving the 81-MM Mortar, always inspect the barrel to ensure that no round is in the bore.

-43. Disassembly and Reassembly.-44. Disassembly of Sight Mechanism
(See figure 7-2.)

1. Remove screws (5 and 10) securing front and rear sight assemblies (4 and 9) to deflection bar (15). Remove sights.
2. Remove cotter pin (20) and washer (21) and unscrew clamp screw assembly (23).
3. Remove cotter pin (16), nut (17) and washer (18). Tap out deflection bar from shaft (19).
4. Lift off deflection bar (15).
5. Remove capscrews (41 and 42) that secure sight angle bracket (59) to yoke. Disconnect battery cables and clamps (see figure 7-11), and remove bracket. At

reassembly reconnect cables using terminal caps (31).

6. Remove cotter pin and washer and unscrew sight-angle clamp screw assembly (23) from sight-angle bracket (59).

7. Remove locknut (36), lockwasher (37) and washer (39) from sight angle shaft (40) and remove sight support (34).

8. Remove washers (2), nuts (37), and capscrews (1), that secure yoke sight (45) to slide and remove yoke sight.

9. Reassembly is the reverse of the disassembly.

6-45. Disassembly of Firing Linkage.

1. Remove screws (4, figure 7-7) securing hand stop (7) to trigger guard and remove hand stop.

2. Remove capscrews (1 and 28) that secure trigger guard (33) and linkage guard (32) to breech mechanism. Lift off guards and disassemble linkage.

3. Reassembly is the reverse of disassembly.

6-46. Disassembly of Firing Mechanism and Cover Assembly.

1. Ensure that cocking lever (39, figure 7-5) is in NEUTRAL position.

2. Pull out and rotate cover lock (18) to free case cover (20, figure 7-6).

3. Turn case cover to disengage bayonet locks and remove cover and firing mechanism as a unit.

NOTE: The spare replacement Firing Mechanism and Cover Assembly, American Machine & Foundry Company, Part No. 345-62006, for the 81-MM Mortar, Mk 2 Mod 0 may be installed at this time. Since the spare replacement unit has been previously assembled and aligned to match the original mechanism, the installation procedures are the reverse of steps 1 through 3. If the original equipment is damaged, the defective component

must be replaced, and the mechanism reassembled and matched to the mechanism in the mortar. This must be done to expedite replacement of a damaged firing mechanism under emergency conditions. To complete disassembly of the original equipment, proceed as follows:

4. Remove capscrews (2, figure 7-6) and washers (3) securing case cover (1). Remove case cover and shims (4). Note and record number and total thickness of shims to facilitate reassembly.

5. Back off the firing pin guide (7) and remove firing pin (9), spring (8) and firing pin stop (10).

6. Remove the nut (6) securing adjusting bolt (11) and remove bolt.

7. Remove spring (13) and spring seat sleeve (12).

8. Remove the setscrew (14) and adjusting nut (16).

6-47. Reassembly of Firing Mechanism and Cover Assembly.

1. Assemble spring (10, figure 7-6) and spring seat sleeve (12) and position in firing pin bracket (15).

2. Insert adjusting bolt (11) into bracket through sleeve and spring (10).

3. Thread adjusting nut (16) onto adjusting bolt (11) to obtain required clearance of 0.150 inch as shown in figure 6-3. Secure self-locking nut (6, figure 7-6) and setscrew (11).

4. Insert firing pin stop (10) into bracket.

5. Assemble firing pin (9) and spring (13) into firing pin guide (7). Insert unit into bracket and secure by threading firing pin guide to threaded end of bracket.

6. Install case cover (1) and correct number of shims (4) as recorded in paragraph 6-46, step 4. Secure shims and cover to bracket with capscrews (2) and lockwashers (3).

NOTE: To be certain that the firing mechanism functions properly, perform the following procedures.

7. Insert mechanism into mortar. Cock firing mechanism for trigger firing and pull the trigger. Proper firing pin action will be indicated by an audible clicking sound.

8. Perform adjustment procedures described in paragraph 6-26 to ensure proper firing pin position for DROP FIRE and NEUTRAL condition (see figure 6-3).

NOTE: Place the repaired firing mechanism and cover assembly in storage and record that the unit has been repaired and adjusted and is ready for immediate installation and operation in the particular 81-MM Mortar.

6-48. Removal of Breech Mechanism Guard.

1. Remove screws (1, figure 7-3) and lockwashers (2) that secure guard to handle bar. Remove guard.

2. Remove capscrews (4), lockwashers (5) and dowel pins (6) securing handle bar (7). Remove handle bar.

3. Installation is the reverse of removal.

6-49. Disassembly of Recoil Cylinder.

1. Remove drain screw (figure 2-7) and drain recoil cylinder oil. Remove fill plug to vent.

2. Unscrew cylinder head (20, figure 7-4). Remove head and gasket (21), counterrecoil plunger (18), and choke valve (15) as a unit.

3. Remove lockpin (10) and back out choke valve until threads disengage. Unscrew gland (16) and remove choke valve, gland, and packing (17) together. Take packing off valve and pull valve through gland.

4. Insert threaded portion of spring compressor (figure 6-7) into recoil cylinder and turn spring compressor screw (figure 6-7) to take up counter-recoil spring thrust.

5. Remove capscrews (26, figure 7-3) and dowel that retain forward cylinder cap (25) and lift off cap.

6. Remove capscrews (21) that retain rear cylinder cap (20) and lift off cap.

7. Remove recoil rod locknut (3, figure 7-4) and nut (4) that secures recoil rod (22) against firing mechanism case. Remove recoil cylinder, rod and spring compressor assembly as a unit and place on deck for disassembly.

8. Slowly unscrew compressor screw (figure 6-7) until counterrecoil springs are free and recoil rod can be removed. Remove spring compressor and pull out recoil rod, spring separator (25, figure 7-4) and spring (24).

9. Remove bolts (5) that retain packing gland (7) and remove gland. Remove packing (26, 27 and 28).

10. Reassembly is the reverse of disassembly.

components any more than necessary for removal of breech mechanism and barrel.

2. Secure elevating securing arc (16, figure 7-3) at an elevation of no more than 5 degrees.

WARNING

At least two men are required to remove the breech mechanism and barrel which weigh approximately 190 pounds.

3. Draw breech mechanism (3, figure 7-1) and barrel (4) rearward until free of slide. Position until on deck for disassembly.

4. Remove barrel lockscrew (8, figure 7-5) and unscrew barrel from breech mechanism.

5. Remove barrel key (2, figure 7-8), if required, by removing screws (1) and reinstalling two of the screws in the non-countersunk holes to force key free of barrel.

6-50. Removal of Breech Mechanism and Barrel.

1. Remove from the breech mechanism all assemblies covered in paragraphs 6-42 through 6-48. Do not disassemble the

NOTE: To disassemble the breech mechanism, refer to paragraph 6-51.

6. Reassembly procedures are the reverse of disassembly except that the

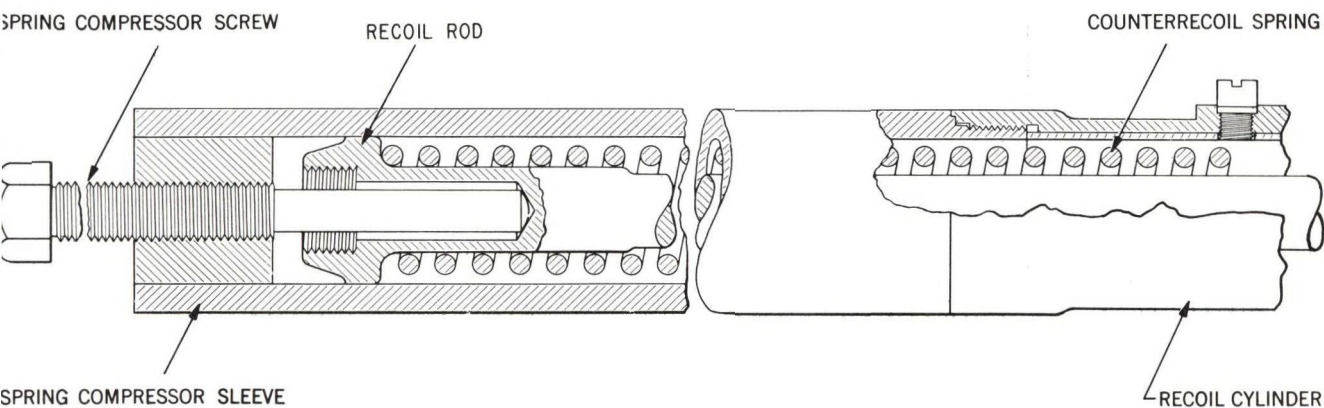


Figure 6-7. Recoil Cylinder Spring Compressor Tool Operation

spare replacement barrel and breech assembly (figure 7-12) may be used in place of original equipment.

NOTE: If the replacement barrel and breech assembly is installed in place of the original equipment, the spare firing mechanism and cover assembly (figure 7-6) must be adjusted and matched to the firing mechanism and cover assembly in the replacement barrel and breech assembly. This must be done to facilitate replacement of the firing mechanism in an emergency.

6-51. Disassembly of Breech Mechanism.

1. Remove case retaining capscrews (4, figure 7-5) and lockwashers (5) securing case (1). Remove case.
2. Remove cocking spring (24) and screw (28).
3. Remove taper pin (26) from sear shaft (32) and remove sear lever (27).
4. Remove firing lever (31) and sear shaft (32).
5. Tap out taper pin (30) and remove firing lever.
6. Pull cotter pin (33) out of cocking lever (39) and remove shaft (34).
7. Unscrew pin (35) from cocking handle (36) and remove handle and spring (38). Remove selecting latch (37).
8. Remove cotter pin (21) from other end of cocking shaft (37) and remove drop fire lever (22).
9. Remove cotter pin (14), nut (15) and washer (16) securing cover lock (18). Remove cover lock and spring (17).
10. Remove firing pin bushing (9).
11. Reassembly of breech mechanism is the reverse of disassembly. Installation is the reverse of removal (refer to paragraph 6-50).

6-52. Removal of Slide.

1. Remove breech mechanism and

barrel. Refer to paragraph 6-50, steps 1 through 3.

2. Remove screw (1, figure 7-9) securing elevating arc clamping lever (2) to clamping lever bolt (12) and unscrew the clamping lever.

3. Remove capscrews (9 and 11, figure 7-3) that retain elevation indicator (13) and remove indicator.

4. Remove bolt (14) from forward section of elevation securing arc (16) and remove arc.

5. Remove screws (3, figure 7-9) and washers (4) securing elevation scale (15) and remove scale.

6. Remove capscrews (8) and washers (9) securing trunnion caps (10) and remove caps.

7. Remove slide (37, figure 7-3).

8. Reassembly is the reverse of disassembly.

6-53. Removal of Carriage.

6-54. To remove the carriage (figure 7-9) it is necessary to first remove the breech mechanism, barrel, slide and components of the sight mechanism. Proceed as follows:

1. Remove components of sight mechanism as required to reach the trunnion caps (10, figure 7-9). Refer to paragraph 6-43, steps 5 through 8.

2. Perform procedures described in paragraph 6-52, steps 2 through 6 to remove those components that secure the slide (figure 7-3) and associated units to the carriage, i. e., breech mechanism (figure 7-5) and barrel (figure 7-8).

WARNING

The slide, breech and barrel assembly weigh approximately 350 pounds. Several men are required to remove the assembled unit; or if possible, use an overhead type hoist and sling. Failure to observe this warning may result in injury to personnel or damage to the equipment.

-54

3. Remove the slide, breech and barrel assembly clear of the carriage and stand.

4. Remove capscrews (13, figure 7-9), washers (14) and nuts (15) securing mortar carriage (19) to slewing rings (13, figure 7-10) and remove mortar carriage.

5. Reassembly is the reverse of removal.

-55. Disassembly of Stand.

1. Tighten the elevating arc securing lever (2, figure 7-9) to secure mortar at 0° elevation.

2. Remove capscrews (13), washers (14) and nuts (15) securing mortar carriage (19) to slewing ring (13, figure 7-10).

WARNING

The slide, breech, barrel, and carriage assembly weigh approximately 450 pounds. Several men will be required to remove the assembled unit; or if possible, use an overhead type hoist and sling. Failure to observe this warning may result in injury to personnel or damage to the equipment.

3. Remove assembled unit clear of stand (figure 7-10).

4. Actuate clamping levers (5) to release slewing ring (13).

5. Remove capscrews (1) and washers (2) securing upper bearing (3) and remove upper bearing.

6. Slide slewing ring (13) free of stand.

7. Remove screws (10) washers (11) securing train indicator (12) and remove indicator.

8. Remove pins (4) and clamping levers (5).

9. Remove jam nuts (6) and washer (7) securing clamping shaft (8) to slewing ring and remove shaft.

10. Back off setscrew (18) and remove training scale (19).

11. Remove screws (14) securing cover plate (16) to stand and remove cover plate.

12. Back off setscrew (20) and remove lower bearing (17).

13. Remove attaching hardware so securing the stand (14) to the deck and remove the stand.

NOTE: Attaching hardware to fit the 1-inch diameter holes in the stand are to be supplied at installation.

14. Reassembly is the reverse of disassembly.

6-56. Removal of Firing Pin Bushing (9, Figure 7-5).

1. Secure mortar at 0° elevation.

2. Using the combination tool assembly (figure 6-1) with socket and handle attached, remove the firing pin bushing (9, figure 7-5).

3. Installation is the reverse of removal.

CHAPTER 7

REPLACEABLE PARTS LIST

7-1. GENERAL INTRODUCTION.

7-2. The illustrated Replaceable Parts List describes and illustrates all assemblies of the 81-MM Mortar Mk 2 Mod 0. This listing is broken down to identify parts for maintaining the equipment, for illustrating assembly relationships, and for requisitioning, storing and issuing parts.

7-3. This publication is intended for use by all personnel concerned with the operation and maintenance of the subject equipment.

7-4. Other volumes in this series are as follows:

None.

7-5. REPLACEABLE PARTS LIST.

7-6. The Replaceable Parts List contains a breakdown of all assemblies and sub-assemblies which can be disassembled, reassembled or replaced. Each breakdown is in disassembly order and each component part is identified to show its relationship to the assembly and to the next higher assembly. Attaching parts are identified and listed directly beneath the assembly or subassembly which they attach. The information is presented in five columns; the Figure and Index Number Column, the Identifying Number Column, the Name and Description Column, the Qty Per Assy Column and the Recoverability Code Column.

7-7. Figure and Index Number Column.

7-8. Figure numbers are assigned to those assemblies that are illustrated separately. They are numbered consecutively throughout the Replaceable Parts List.

7-9. Index numbers are assigned to each item in the Replaceable Parts List and are arranged in numerical sequence in the text of each figure. An index number is assigned to each item as an aid in locating the items in the text of each figure and in the accompanying illustration for that particular figure.

7-10. Identifying Number Column.

7-11. This column contains the identifying numbers of all the assemblies and parts listed in the Replaceable Parts List.

7-12. Name and Description Column.

7-13. This column contains the noun name and description or modifier of the assemblies and parts listed by number in the Identifying Number Column.

7-14. The phrase "Figure -- NHA" indicates the figure and index number in the next higher assembly.

7-15. The phrase "see figure" signifies that the breakdown of the assembly is in that portion of the Replaceable Parts List referenced.

7-16. The phrase "Attaching Parts" is used to show those parts that attach the assembly or group to the next higher assembly.

NOTE: All dimensions shown in this section are given in inches unless otherwise noted.

7-17. Quantity Per Assembly Column.

7-18. The quantity listed in this column is the quantity used at the location indicated and is not necessarily the total quantity per equipment.

7-19. "AR" is used for "As Required" and indicates a variation in quantity or usage.

7-20. Recoverability Code Column.

7-21. All parts that must be returned (recovered) for repairs rather than discarded are identified by the code letter R (recoverable) in the Recoverability Code Column. Those parts that are damaged or worn and may be discarded are identified by the code letter C (Consumable).

7-22. PART NUMBER CROSS INDEX.

7-23. The Part Number Cross Index is a complete alpha-numerical listing of all of the identifying numbers in the Replaceable Parts List. Each item is properly referenced in its appropriate entry in the Replaceable Parts List by its figure and index number. Information in the Part Number Cross Index is presented in three columns; the Identifying No. Column, Dwg Rev Column, and Figure & Index No. Column.

7-24. Identifying Number Column.

7-25. This column lists in alpha-numerical sequence all identifying numbers shown in the Replaceable Parts List.

7-26. The sequence of numbers in the list is determined by consideration of each individual character of the number proceeding from left to right within the number. "No Number" items are listed in sequence considering the identifying noun as the part number. Sequence is obtained in accordance with the following rules:

7-27. The order of procedure in beginning the part number arrangement on the extreme left position of the number shall be as follows:

Letters A through N and P through Z
Numeral 0 through 9
Alphabetical O's are considered as numerical zeros.

7-28. The order of procedure in continuing the part number arrangement on the second and succeeding positions of the number from left to right shall be as follows:

Space (blank column)
Diagonal (slant) /
Point (period) .
Dash (hyphen) -
Letters A through N and P through Z
Numerals 0 through 9
Alphabetical O's are considered as numerical zeros

7-29. Drawing Revision Column.

7-30. This column refers to the revision of the BUWEPS drawing or list of drawings used to manufacture the part and to compile this publication.

7-31. Figure and Index Column.

7-32. This column lists the figure and index number application in the Replaceable Parts List.

7-33. REFERENCE SYMBOL CROSS INDEX.

7-34. This section contains the Reference Designation Index and the Federal Stock Number Cross Reference List.

7-35. The Reference Designation Index contains the reference designations used for the components which are listed in the Replaceable Parts List. They are cross-referenced to the identifying number and the appropriate Figure and Index number.

7-36. The Federal Stock Number Cross Reference lists, in alpha-numerical sequence, the identifying number for which a Federal Stock Number has been assigned. The identifying numbers are cross-referenced to the equivalent Federal Stock Number.

7-37. ABBREVIATIONS.

7-38. Abbreviations used in the Replaceable Parts List are listed below in alphabetical sequence, cross referenced to the appropriate word or term.

Alt	alternate
AR	As Required
dia	diameter
ext	external
Fig.	Figure(s)
fil	fillister
GA	General Arrangement
lg	long
hd	head
hex	hexagon
ID	Inside Diameter
LD	List of Drawings
max.	maximum
Mk	Mark
Mod	Modification
NHA	Next Higher Assembly
No.	number(s)
NPT	National Pipe Thread
OD	Outside Diameter
rd	round
REF	Reference

Soc	socket
sq	square
thk	thick
w	wide

7-39. IDENTIFICATION OF PARTS.

7-40. When the part number is known, locate the number in the Part Number Cross Index and find the corresponding Figure and Index Number. Use the Figure and Index Number to locate the illustration and text of the part in the Replaceable Parts List.

7-41. When the Reference Designation is known, refer to the Reference Designation Index portion of the Reference Symbol Cross Index to secure the Figure and Index Numbers.

7-42. If it is desired to find the Part Number or Reference Designation of an item, consult the Table of Contents where all illustrations are referenced by title. After locating the correct illustration check the index number of the particular part desired against the accompanying text to find the Part Number. To find the reference designation it will be necessary to research the Reference Symbol Cross Index by Figure and Index Number.

7-43. USE OF ILLUSTRATIONS.

7-44. Illustrations are furnished in sufficient detail to identify all the indexed parts in the Replaceable Parts List. The index numbers of subassemblies are circled in the illustration. When impractical to show completely in one illustration all the detail parts of each subassembly, a separate view of the subassembly is furnished. Some illustrations may include certain parts not listed to show relationship. These parts are shown in phantom to give emphasis to assemblies or parts listed.

CHAPTER 7

Replaceable Parts List

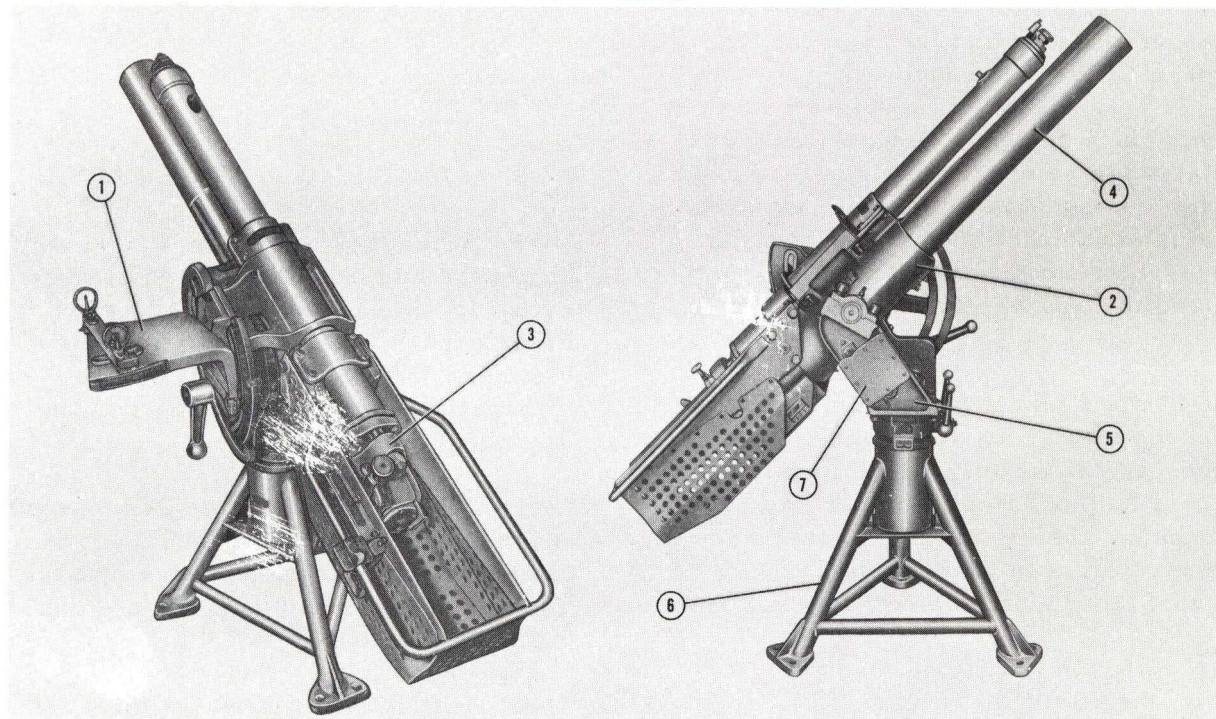


Figure 7-1. 81-MM Mortar Mk 2 Mod 0

Figure & Index No.	Identifying Number	Name and Description							Qty Per Assy	Recover- ability Code
		1	2	3	4	5	6	7		
7-1-	LD168628 (GA513527)	81-MM MORTAR Mk 2 Mod 0							1	C
-1	LD256242 (GA513431)	. SIGHT Mk 1 Mod 0 (see figure 7-2)							1	
-2	LD168646 (GA510743)	. SLIDE Mk 1 Mod 0 (see figure 7-3)							1	
-3	LD168647 (GA510764)	. MECHANISM, BREECH, Mk 1 Mod 0 (see figure 7-5)							1	
-4	LD167538 (GA507077)	. BARREL, MORTAR, Mk 1 Mod 0 (see figure 7-8)							1	
-5	LD168642 (GA510686)	. CARRIAGE Mk 1 Mod 0 (see figure 7-9)							1	
-6	LD168643 (GA510693)	. STAND Mk 1 Mod 0 (see figure 7-10)							1	
-7	LD272640 (GA2319732)	. LIGHTING CIRCUIT Mk 1 Mod 0 (see figure 7-11)							1	
	LD168628 (2618763)	.*BARREL AND BREECH ASSEMBLY, Replacement (see figure 7-12)							REF	
	LD272646	. TOOLS AND ACCESSORIES							REF	
	LD261531	. COVER ASSEMBLY							1	
* Spares only.										

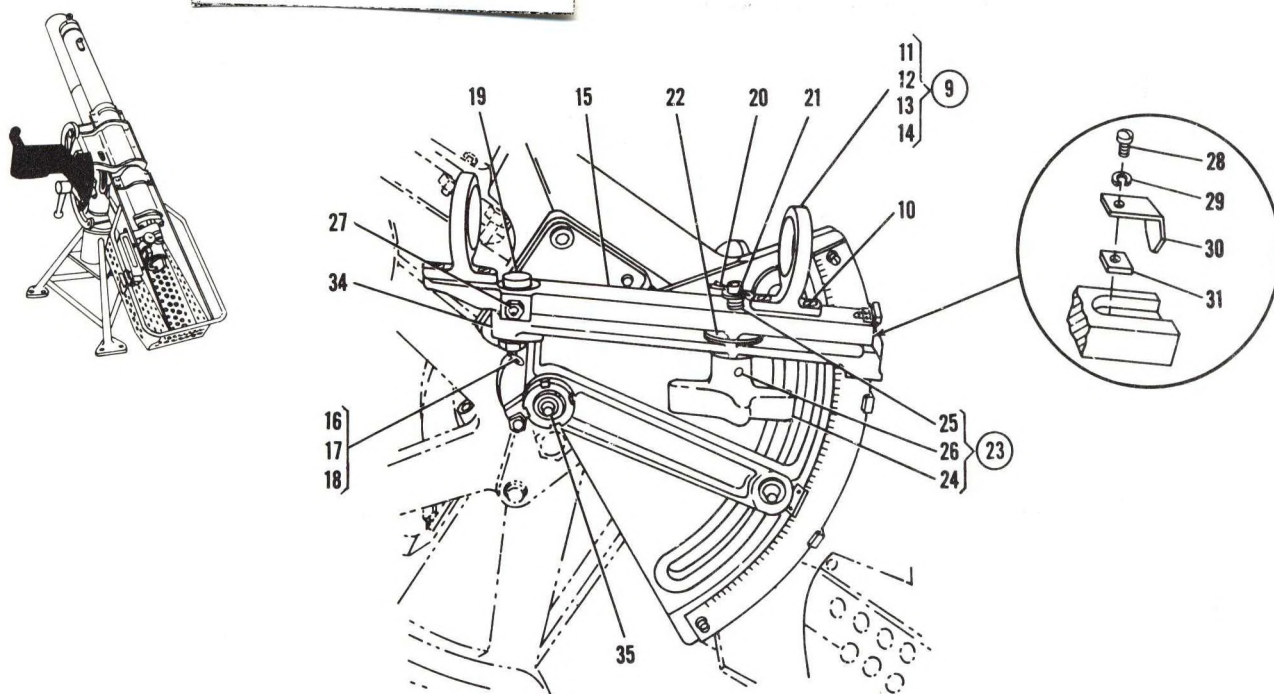


Figure 7-2. (Sheet 1) Sight Mk 1 Mod 0

Figure & Index No.	Identifying Number	Name and Description	Qty Per Assy	Recover- ability Code
		1 2 3 4 5 6 7		
7-2-	LD256242 (GA513431)	SIGHT Mk 1 Mod 0 (figure 7-1 NHA)	REF	
		(ATTACHING PARTS)		
-1	43-S-4368-60	CAPSCREW, Soc hd 3/8-16NC-2 by 1-1/2 lg	4	
-2	43-W-6359	LOCKWASHER, 3/8, 0.398 ID by 0.688 OD by 0.104 thk	4	
-3	43-N-6926-37	NUT, Hex, 3/8-16NC-2	4	
		- - - - - * - - - - -		
-4	513436-1	. SIGHT ASSEMBLY, Open front	1	C
		(ATTACHING PARTS)		
-5	43-S-8052	. SCREW, Machine, flat hd No. 10- 24NC-2A by 1/2 lg	2	
		- - - - - * - - - - -		
-6	513436-9	. . LOCKPIN, 0.064 dia by 0.475 lg	1	

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Replaceable Parts List

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Figure & Index No.	Identifying Number	Name and Description 1 2 3 4 5 6 7	Qty Per Assy	Recover- ability Code
7-2-7	513436-4	. . SIGHT, Open Front	1	
-8	513436-3	. . GUARD, Open sight	1	
-9	513436-2	. SIGHT ASSEMBLY, Open rear (ATTACHING PARTS)	1	C
-10	43-S-8052	. SCREW, Machine, flat hd No. 10- 24NC-2A by 1/2 lg -----*	2	
-11	513436-9	. . LOCKPIN, 0.064 dia by 0.475 lg	1	
-12	513436-5	. . RING, Rear sight	1	
-13	513436-6	. . POST, Rear sight	1	
-14	513436-3	. . GUARD, Open sight	1	
-15	513436-8	. BAR, Deflection	1	C
-16	42-P-4700	. PIN, Cotter, 1/8 dia by 3/4 lg	1	
-17	43-N-2875-43	. NUT, Castelated, hex, 7/16-20NF-2	1	
-18	43-W-3014-50	. WASHER, Flat, 7/16, 0.500 ID by 1.125 OD by 0.104 thk	1	
-19	513436-7	. SHAFT, Deflection	1	C
-20	42-P-4700	. PIN, Cotter, 1/8 dia by 3/4 lg	2	
-21	43-W-3012	. WASHER, Flat 3/8, 0.406 ID by 0.812 OD by 0.080 thk	2	
-22	43-W-3016	. WASHER, Flat 1/2, 0.531 ID by 1.062 OD by 0.121 thk	2	
-23	513437-1	. SCREW ASSEMBLY, Clamp	2	C
-24	513437-2	. . KNOB, Clamp screw	1	
-25	513437-3	. . SCREW, Clamp	1	
-26	513437-4	. . PIN, Clamp screw, 0.156 dia by 1.10 lg	1	
-27	45-F-449-150	. FITTING, Lubrication, 1/8 NPT	1	
-28	43-S-15542	. SCREW, Machine, fil hd No. 8-32- NC-2 by 3/8 lg	1	
-29	43-W-6353	. LOCKWASHER, No. 8, 0.178 ID by 0.296 OD by 0.046 thk	1	

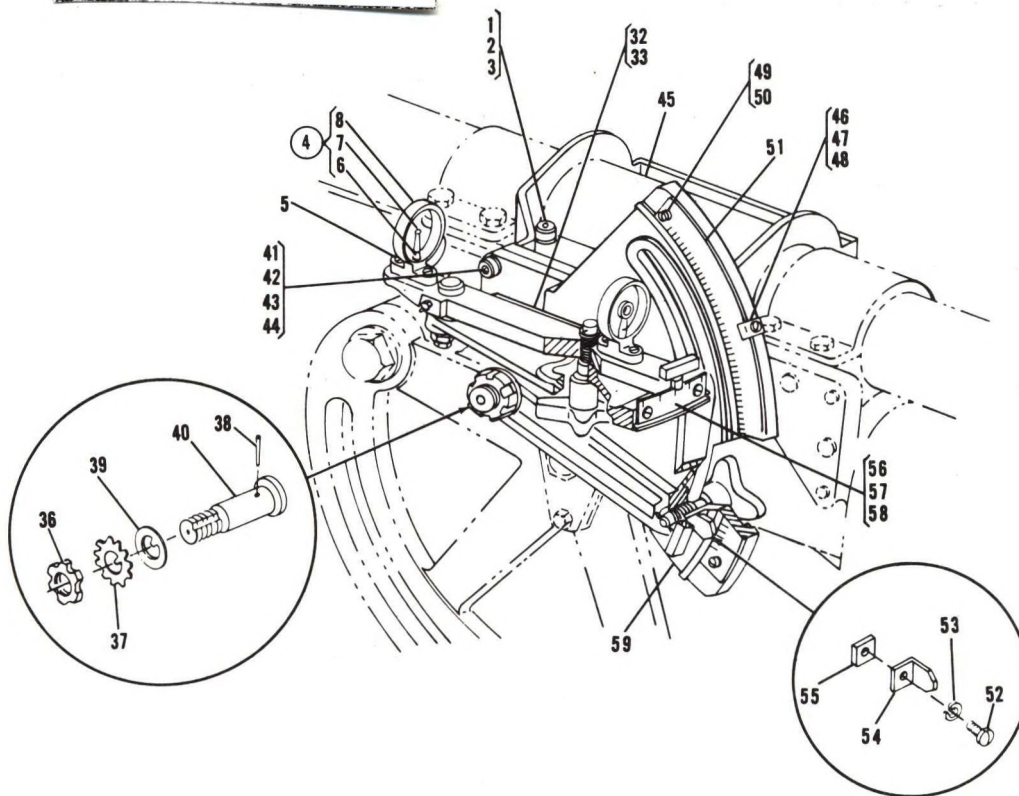


Figure 7-2. (Sheet 2) Sight Mk 1 Mod 0

Figure & Index No.	Identifying Number	Name and Description	Qty Per Assy	Recover- ability Code
		1 2 3 4 5 6 7		
7-2-30	513435-5	. INDEX, Deflection	1	C
-31	513435-6	. SHIM, Index	1	
-32	43-S-4892	. SCREW, Drive, rd hd No. 0 by 1/4 lg	4	
-33	8-Z-1131-14	. PLATE, Name & Ordalt	1	
-34	513434-1	. SUPPORT, Open sight	1	
-35	45-F-449-150	. FITTING, Lubrication, 1/8 NPT	1	
-36	77-B-999-50804	. LOCKNUT, 0.781-32NS-3	1	
-37	77-B-999-51804	. LOCKWASHER, 0.816 ID by 1.531 OD by 0.042 thk	1	
-38	513437-6	. PIN, Taper	1	
-39	513437-8	. WASHER, Keyed	1	
-40	513437-5	. SHAFT, Sight angle	1	

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Figure & Index No.	Identifying Number	Name and Description 1 2 3 4 5 6 7	Qty Per Assy	Recover- ability Code
7-2-41	43-S-4368-50	. CAPSCREW, Soc hd 3/8-16NC-3 by 1-1/4 lg	2	
-42	43-S-4368-60	. CAPSCREW, Soc hd 3/8-NC-3 by 1-1/2 lg	2	
-43	43-W-6133	. LOCKWASHER, 3/8, 0.398 ID by 0.554 OD by 0.125 thk	4	
-44	513437-7	. PIN, Dowel, 0.312 dia by 1.0 lg	2	
-45	513432-1	. YOKE, Sight	1	
-46	43-S-15542	. SCREW, Machine, fil hd No. 8-32- NC-2 by 3/8 lg	2	
-47	43-W-6353	. LOCKWASHER, No. 8, 0.178 ID by 0.296 OD by 0.046 thk	2	
-48	513435-2	. CLAMP, Sight angle scale	2	
-49	43-S-15542	. SCREW, Machine, fil hd No. 8-32- NC-2 by 3/8 lg	2	
-50	43-W-6353	. LOCKWASHER, No. 8, 0.178 ID by 0.296 OD by 0.046 thk	2	
-51	513435-1	. SCALE, Sight angle	1	
-52	43-S-15542	. SCREW, Machine, fil hd No. 8-32- NC-2 by 3/8 lg	1	
-53	43-W-6353	. LOCKWASHER, No. 8, 0.178 ID by 0.296 OD by 0.046 thk	1	
-54	513435-3	. INDEX, Sight angle	1	
-55	513435-6	. SHIM, Index	1	
-56	43-S-15677	. SCREW, Machine, pan hd No. 6-32- NC-2 by 3/8 lg	2	
-57	43-W-6961-20	. LOCKWASHER, Ext tooth, No. 6, 0.150 ID by 0.320 OD by 0.022 thk	2	
-58	513435-4	. SCALE, Deflection	1	C
-59	513433-1	. BRACKET, Sight angle	1	

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Figure & Index No.	Identifying Number	Name and Description 1 2 3 4 5 6 7	Qty Per Assy	Recover- ability Code
7-3-	LD168646 (GA510743)	SLIDE Mk 1 Mod 0 (figure 7-1 NHA)	REF	
-1	12-Z-8-70	. SCREW, Machine, pan hd No. 10-32NF-2 by 1/4 lg	14	
-2	12-Z-22-49	. LOCKWASHER, No. 10, 0.205 ID by 0.337 OD by 0.053 thk	14	
-3	510753-1	. GUARD, Breech mechanism	1	
-4	12-Z-24-81	. CAPSCREW, Hex hd 1/2-13NC-2 by 1.0 lg	6	
-5	12-Z-22-55	. LOCKWASHER, 1/2, 0.529 ID by 0.879 OD by 0.135 thk	6	
-6	513524-8	. PIN, Dowel, 0.5001 dia by 0.875 lg	4	
-7	510752-1	. BAR, Handle, aiming	1	
-8	510744	. RECOIL AND COUNTERRECOIL ASSEMBLY (see figure 7-4)	1	R
-9	12-Z-24-121	. CAPSCREW, Hex hd 5/8-11NC-2 by 1-1/4 lg	1	
-10	12-Z-22-56	. LOCKWASHER, 5/8, 0.660 ID by 1.086 OD by 0.166 thk	1	
-11	12-Z-24-242	. CAPSCREW, Hex hd 3/8-16NC-2 by 1.0 lg	1	
-12	12-Z-22-253	. LOCKWASHER, 3/8, 0.398 ID by 0.688 OD by 0.104 thk	1	
-13	510748-2	. INDICATOR, Elevation	1	
-14	510748-3	. BOLT, Elevating arc	1	
-15	12-Z-22-59	. LOCKWASHER, 1.0, 1.053 ID by 1.672 OD by 0.270 thk	1	
-16	510748-1	. SECURING ARC, Elevation	1	
-17	12-Z-35-3	. SCREW, Drive, rd hd No. 0 by 1/4 lg	4	
-18	8-Z-1131-14	. PLATE, Name & Ordalt	1	
-19	2618765	. SLIDE ASSEMBLY	1	C
-20	510747-2	. . CAP, Cylinder, rear	1	

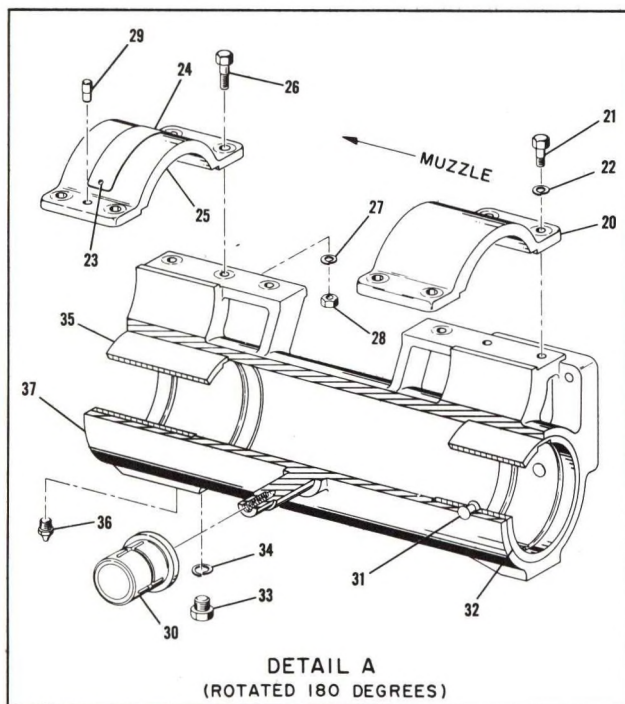
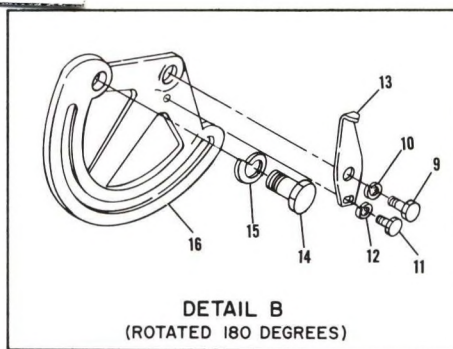
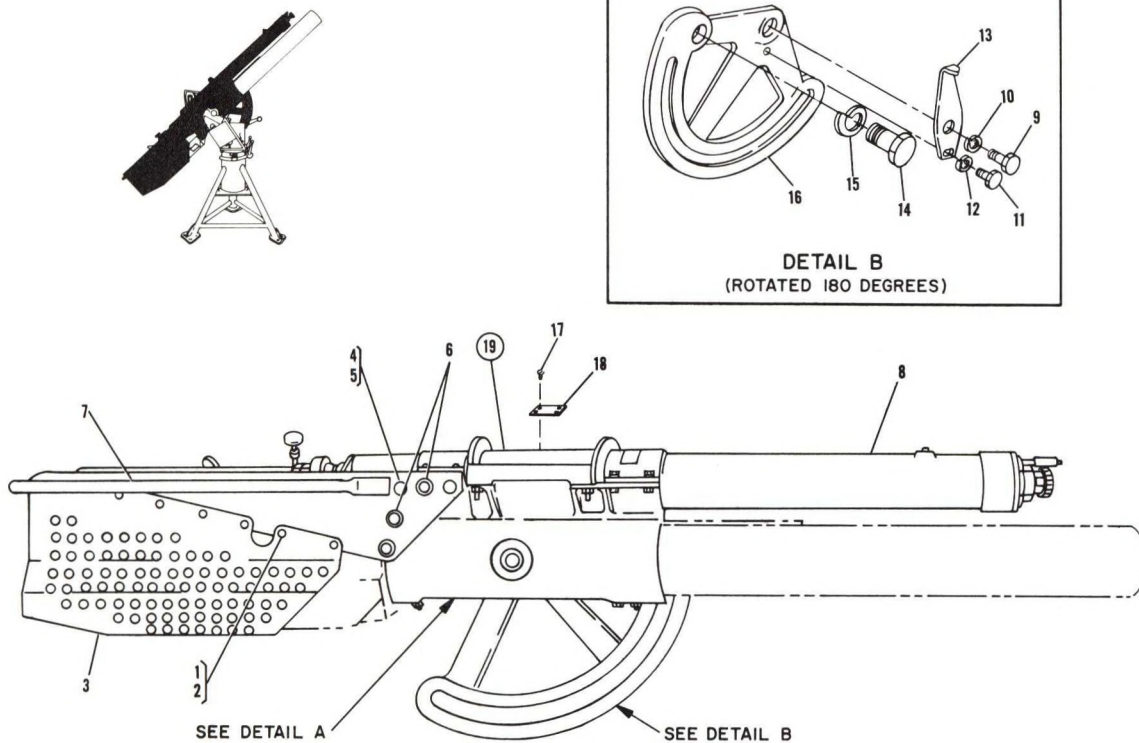


Figure 7-3. Slide Mk 1 Mod 0

Figure & Index No.	Identifying Number	Name and Description 1 2 3 4 5 6 7	Qty Per Assy	Recover- ability Code
7-3-21	12-Z-24-242	(ATTACHING PARTS) . . CAPSCREW, Hex hd 3/8-16NC-2 by 1.0 lg	4	
-22	12-Z-22-253	. . LOCKWASHER, 3/8, 0.398 ID by 0.688 OD by 0.104 thk - - - - - * - - - - -	4	
-23	12-Z-35-8	. . SCREW, Drive, rd hd No. 2 by 1/4 lg	2	
-24	510751-5	. . PLATE, Instruction	1	
-25	510747-1	. . CAP, Cylinder, forward (ATTACHING PARTS)	1	
-26	12-Z-24-43	. . CAPSCREW, Hex hd 3/8-16NC-2 by 1-1/4 lg	4	
-27	12-Z-22-253	. . LOCKWASHER, 3/8, 0.398 ID by 0.688 OD by 0.104 thk	4	
-28	12-Z-9-3	. . NUT, Hex 3/8-16NC-2	4	
-29	510748-6	. . PIN, Dowel 0.3751 dia by 0.75 lg - - - - - * - - - - -	1	
-30	510748-7	. BEARING, Trunnion	2	C
-31	510748-5	. RIVET, Liner, cylinder rear	2	
-32	510747-4	. LINER, Cylinder, rear	1	C
-33	510748-4	. BOLT, Lock, forward cylinder liner	1	
-34	12-Z-22-55	. LOCKWASHER, 1/2, 0.529 ID by 0.879 OD by 0.135 thk	1	
-35	510747-3	. LINER, Cylinder, forward	1	C
-36	12-Z-339-2	. FITTING, Lubrication, 1/8 NPT	2	
-37	510746-1	. SLIDE	1	

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Figure & Index No.	Identifying Number	Name and Description 1 2 3 4 5 6 7	Qty Per Assy	Recover- ability Code
-4-	510744	RECOIL AND COUNTERRECOIL ASSEMBLY (figure 7-3 NHA)	REF	
-1	514631-6	. SCREW, Drain, 1/4-20 by 3/4 lg (Alt MS16997-58)	1	C
-2	514631-7	. GASKET, Drain screw, 0.260 ID by 0.390 OD by 0.125 thk	1	C
-3	510751-3	. LOCKNUT, 1.0-8NC-2	1	
-4	12-Z-9-10	. NUT, Hex, 1.0-8NC-2	1	
-5	MS35308-114	. BOLT, Machine	2	
-6	MS35338-86	. LOCKWASHER	2	
-7	510750-6	. GLAND, Packing	1	
-8	12-Z-51-325	. CAPSCREW, Soc hd 1/4-20NC-3 by 1.0 lg	1	
-9	12-Z-22-286	. LOCKWASHER, 1/4, 0.267 ID by 0.361 OD by 0.078 thk	1	
-10	514631-5	. LOCKPIN, Valve	1	C
-11	12-Z-51-307	. CAPSCREW, Soc hd No. 10-24NC-3 by 1.0 lg	2	
-12	12-Z-22-285	. LOCKWASHER, No. 10, 0.205 ID by 0.299 OD by 0.047 thk	2	
-13	514631-4	. HOLDER, Lockpin	1	C
-14	12-Z-5-202	. LOCKSCREW, 1/4-20NC-2 by 3/4 lg	1	
-15	514631-1	. VALVE, Choke	1	C
-16	514631-2	. GLAND, Valve	1	
-17	514631-3	. PACKING, Gland	1	
-18	510750-2	. PLUNGER, Counterrecoil	1	C
-19	510750-4	. GASKET, Plunger	1	C
-20	510750-1	. HEAD, Cylinder	1	C
-21	510750-3	. GASKET, Head, cylinder	1	C
-22	510749-1	. ROD, Recoil	1	C
-23	510751-2	. BUSHING, Rod, recoil	1	
-24	510751-1	. SPRING, Counterrecoil	2	

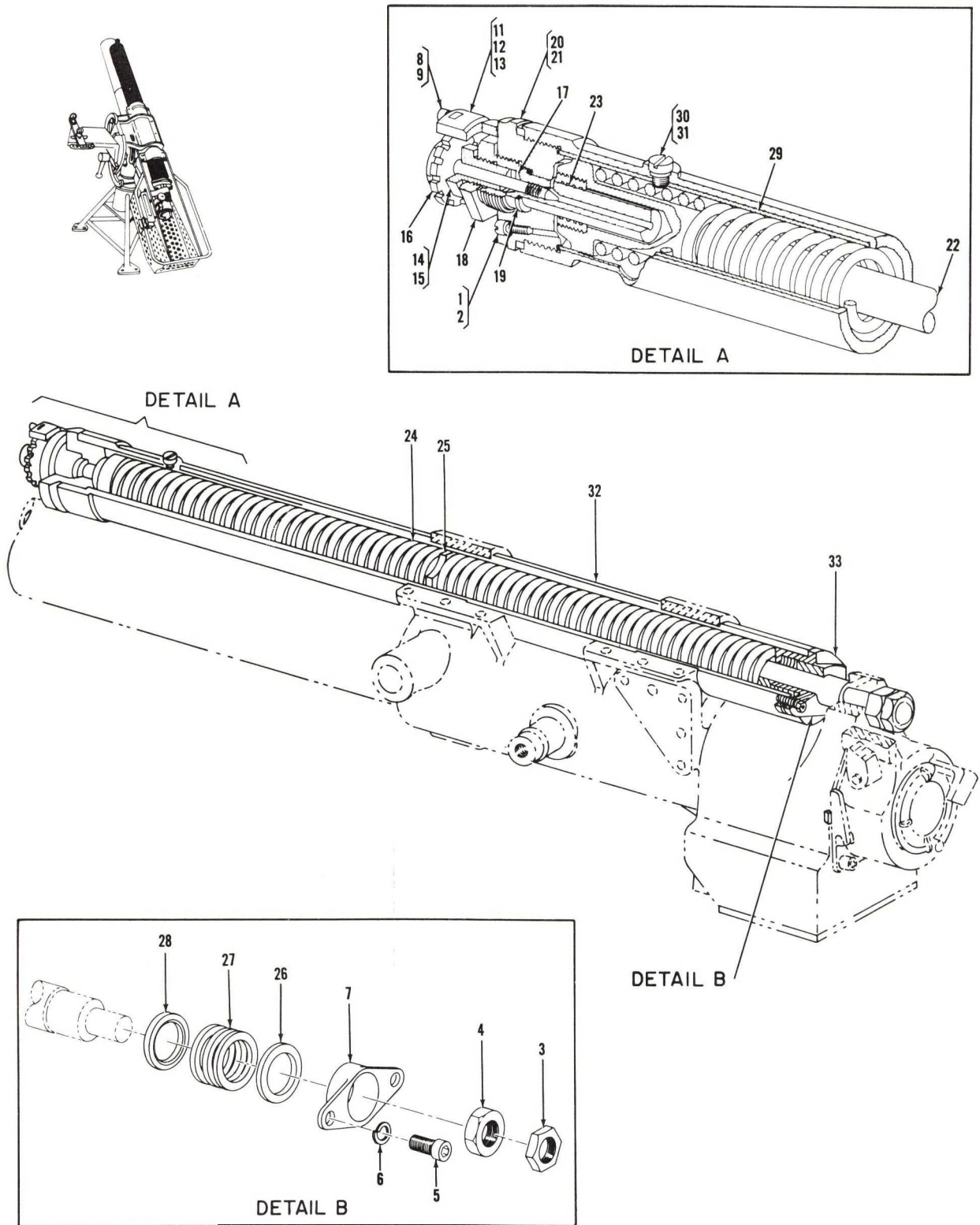


Figure 7-4. Recoil and Counterrecoil Assembly

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Figure & Index No.	Identifying Number	Name and Description 1 2 3 4 5 6 7	Qty Per Assy	Recover- ability Code
7-4-25	510751-6	. SEPARATOR, Spring, counterrecoil	1	
-26	510750-7	. SEAT, Packing	1	C
-27	510750-5	. PACKING, Cylinder	3	C
-28	510750-8	. FOLLOWER, Packing	1	C
-29	510751-4	. LINER, Cylinder, recoil	1	
-30	8-Z-1104-20	. PLUG, Fill	1	C
-31	510749-5	. WASHER, Plug, fill	2	C
-32	510749-2	. CYLINDER, Recoil	1	
-33	510749-4	. SEAT, Packing	1	

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Figure & Index No.	Identifying Number	Name and Description 1 2 3 4 5 6 7	Qty Per Assy	Recover- ability Code
7-5-	LD168647 (GA510764)	MECHANISM, BREECH, Mk 1 Mod 0 (figure 7-1 NHA)	REF	
-1	511173-1	. CASE, Mechanism, firing	1	
-2	2618764	. MECHANISM AND COVER ASSEMBLY, Firing (see figure 7-6)	1	
-3	510745	. LINKAGE ASSEMBLY, Firing (see figure 7-7)	1	
-4	12-Z-51-362	. CAPSCREW, Soc hd 3/8-16NC-3 by 3/4 lg	4	
-5	43-W-6133	. LOCKWASHER, 3/8, 0.398 ID by 0.554 OD by 0.125 thk	4	
-6	12-Z-41-404	. SCREW, Machine, flat hd 1/4-20NC- 2A by 5/8 lg	8	
-7	513447-1	. PLATE, Cover	1	
-8	513447-2	. LOCKSCREW, Barrel	1	
-9	513447-3	. BUSHING, Pin, firing	1	C
-10	511172-1	. HOUSING, Mechanism, firing	1	C
-11	511172-2	. WEIGHT, Lead, 25 lbs	1	
-12	12-Z-35-3	. SCREW, Drive, rd hd No. 0 by 1/4 lg	4	
-13	8-Z-1131-14	. PLATE, Name & Ordalt	1	
-14	12-Z-48-12	. PIN, Cotter, 1/16 dia by 3/4 lg	1	
-15	12-Z-23-41	. NUT, Castellated, 5/16-18NC-2	1	
-16	12-Z-22-32	. WASHER, Flat, 5/16, 0.375 ID by 0.875 OD by 0.064 thk	1	
-17	511175-3	. SPRING, Extension, 0.505 OD by 1.206 free length	1	C
-18	511175-2	. LOCK, Cover	1	
-19	511176-5	. SCREW, Securing, spring	1	
-20	12-Z-22-253	. LOCKWASHER, 3/8, 0.398 ID by 0.688 OD by 0.104 thk	1	
-21	12-Z-48-425	. PIN, Cotter, 3/32 dia by 1.0 lg	1	
	511176-1	. LEVER ASSEMBLY	1	C

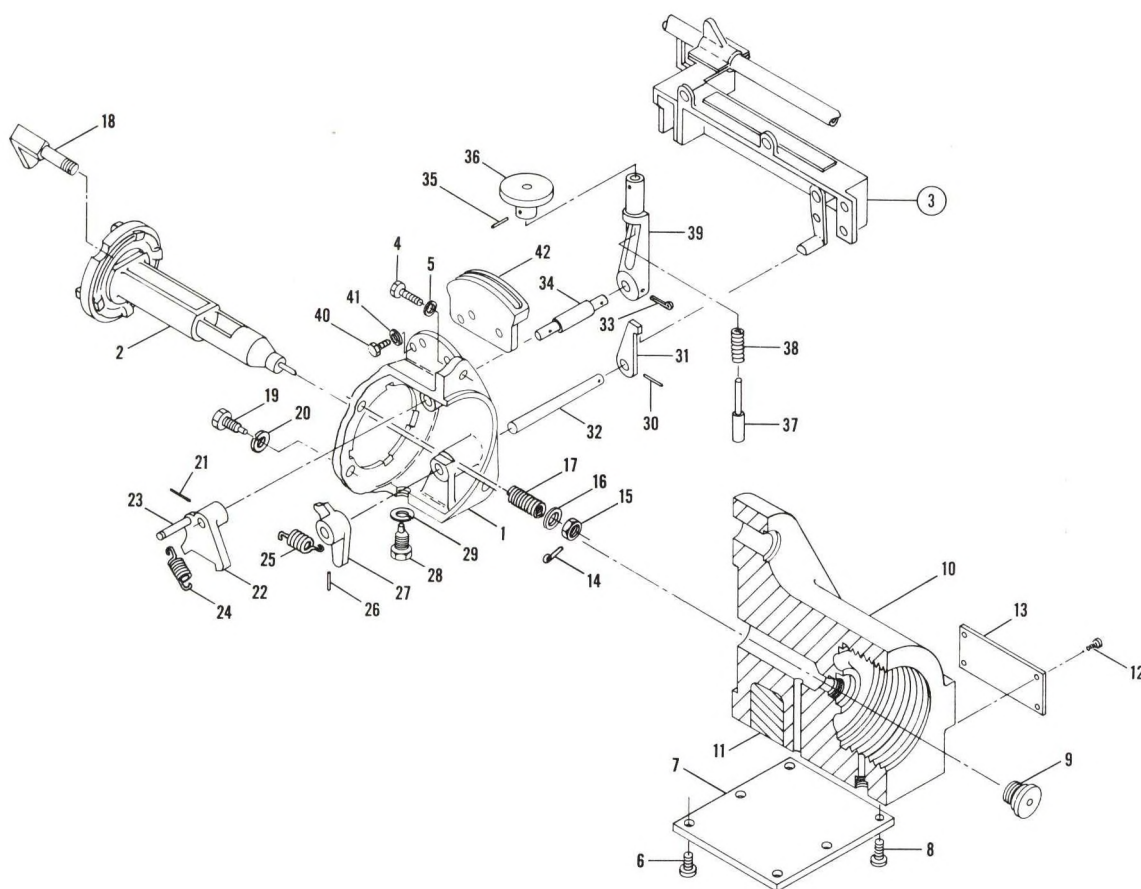
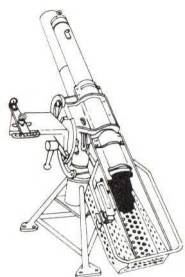
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Figure 7-5. Mechanism, Breech, Mk 1 Mod 0

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Figure & Index No.	Identifying Number	Name and Description							Qty Per Assy	Recover- ability Code
		1	2	3	4	5	6	7		
7-5-22	511176-2	.	.	LEVER,	Drop	fire			1	
-23	511176-3	.	.	PIN,	Securing,	spring			1	
-24	511176-8	.		SPRING,	Extension,	0.563 OD by			1	C
					2.66 free	length				
-25	511176-9	.		SPRING,	Extension,	0.416 OD by			1	C
					1.07 free	length				
-26	513447-4	.		PIN,	Taper,	No. 1 by 0.75 lg			1	
-27	511176-4	.		LEVER,	Sear				1	
-28	511176-5	.		SCREW,	Securing,	spring			1	
-29	12-Z-22-253	.		LOCKWASHER,	3/8,	0.398 ID by			1	
					0.688 OD	by 0.104 thk				
-30	513447-5	.		PIN,	Taper,	No. 1 by 0.90 lg			1	
-31	511175-5	.		LEVER,	Firing				1	
-32	511176-7	.		SHAFT,	Sear				1	
-33	12-Z-48-427	.		PIN,	Cotter,	3/32 dia by 1-1/2 lg			1	
-34	511176-6	.		SHAFT,	Cocking				1	C
-35	12-Z-49-14	.		PIN,	Taper,	No. 0000 by 5/8 lg			1	
-36	511177-2	.		HANDLE,	Cocking				1	C
-37	511177-5	.		LATCH,	Selecting				1	C
-38	511177-4	.		SPRING,	Compression,	0.394 OD			1	C
					by 1.291 free	length				
-39	511177-1	.		LEVER,	Cocking				1	C
-40	12-Z-51-321	.		CAPSCREW,	Soc hd 1/4-20NC-3				3	
					by 1/2 lg					
-41	12-Z-22-286	.		LOCKWASHER,	1/4,	0.267 ID by			3	
					0.361 OD	by 0.078 thk				
-42	511177-3	.		PLATE,	Latch				1	

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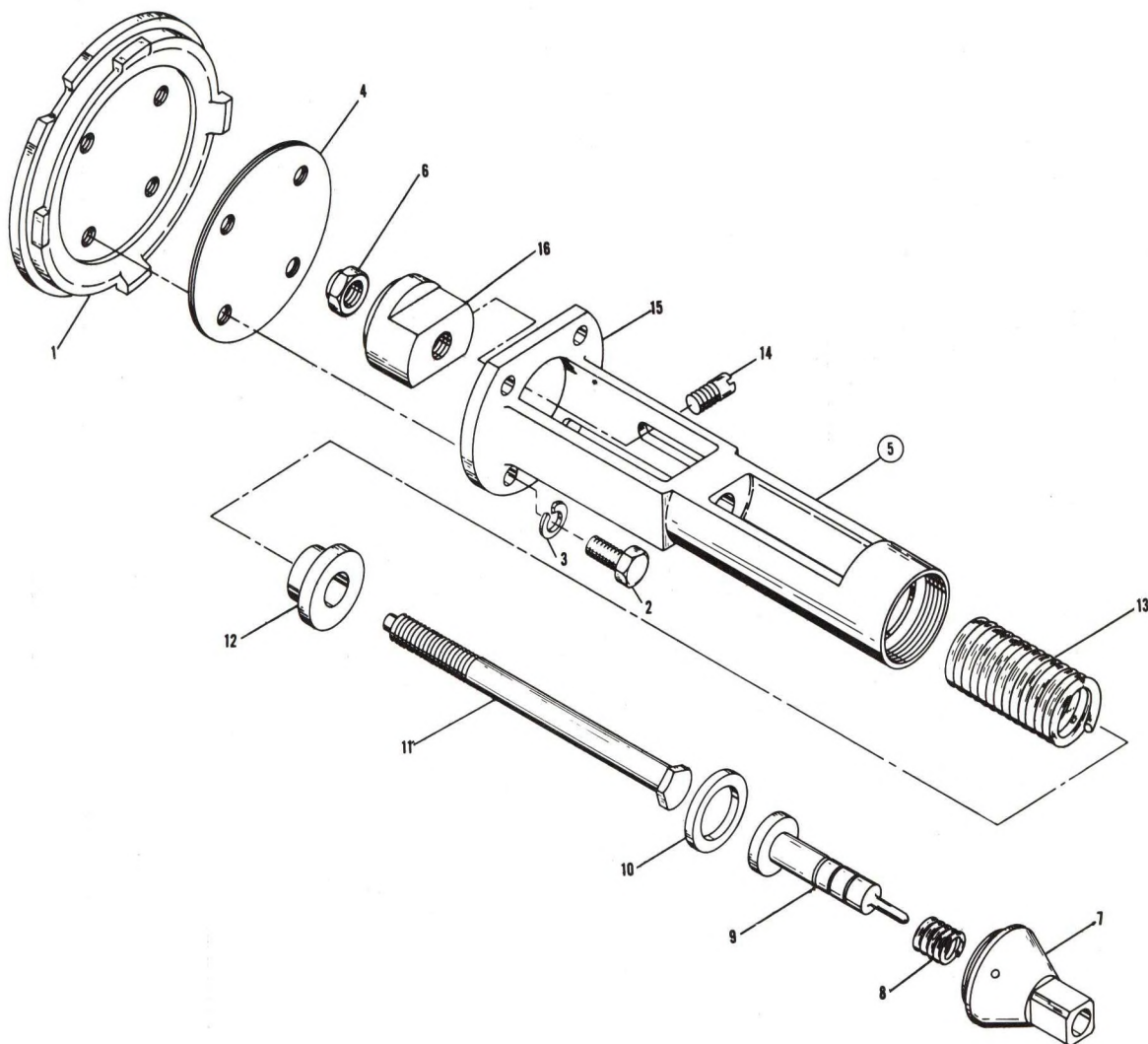
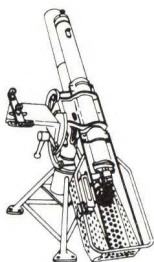


Figure 7-6. Firing Mechanism and Cover Assembly

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Figure & Index No.	Identifying Number	Name and Description 1 2 3 4 5 6 7	Qty Per Assy	Recover- ability Code
7-6-	2618764	MECHANISM AND COVER ASSEMBLY, Firing (figure 7-5 NHA)	REF	
-1	511175-1	. COVER, Case (ATTACHING PARTS)	1	C
-2	12-Z-51-321	. CAPSCREW, Soc hd 1/4-20NC-3 by 3/8 lg	4	
-3	12-Z-22-286	. LOCKWASHER, 1/4, 0.267 ID by 0.361 OD by 0.078 thk - - - - - * - - - - -	4	
-4	511175-4	. SHIM, 0.002 thk laminations	AR	
-5	513445	. MECHANISM ASSEMBLY, Firing	1	R
-6	12-Z-56-402	. . NUT, Self-locking, 5/16-18NC-3	1	
-7	511174-2	. . GUIDE, Firing pin	1	
-8	513446-4	. . SPRING, Compression, 0.376 OD by 1.106 free length	1	C
-9	511174-3	. . PIN, Firing	1	C
-10	511174-5	. . STOP, Firing pin	1	
-11	513446-1	. . BOLT, Adjusting, 5/16-18NC-2 by 4.74 lg	1	
-12	511174-4	. . SLEEVE, Spring seat	1	C
-13	513446-5	. . SPRING, Compression, 0.68 OD by 3.26 free length	1	C
-14	513446-3	. . SETSCREW, No. 12-24NC-2 by 0.625 lg	1	
-15	511174-1	. . BRACKET, Firing pin	1	
-16	513446-2	. . NUT, Adjusting, 5/16-18NC-2	1	

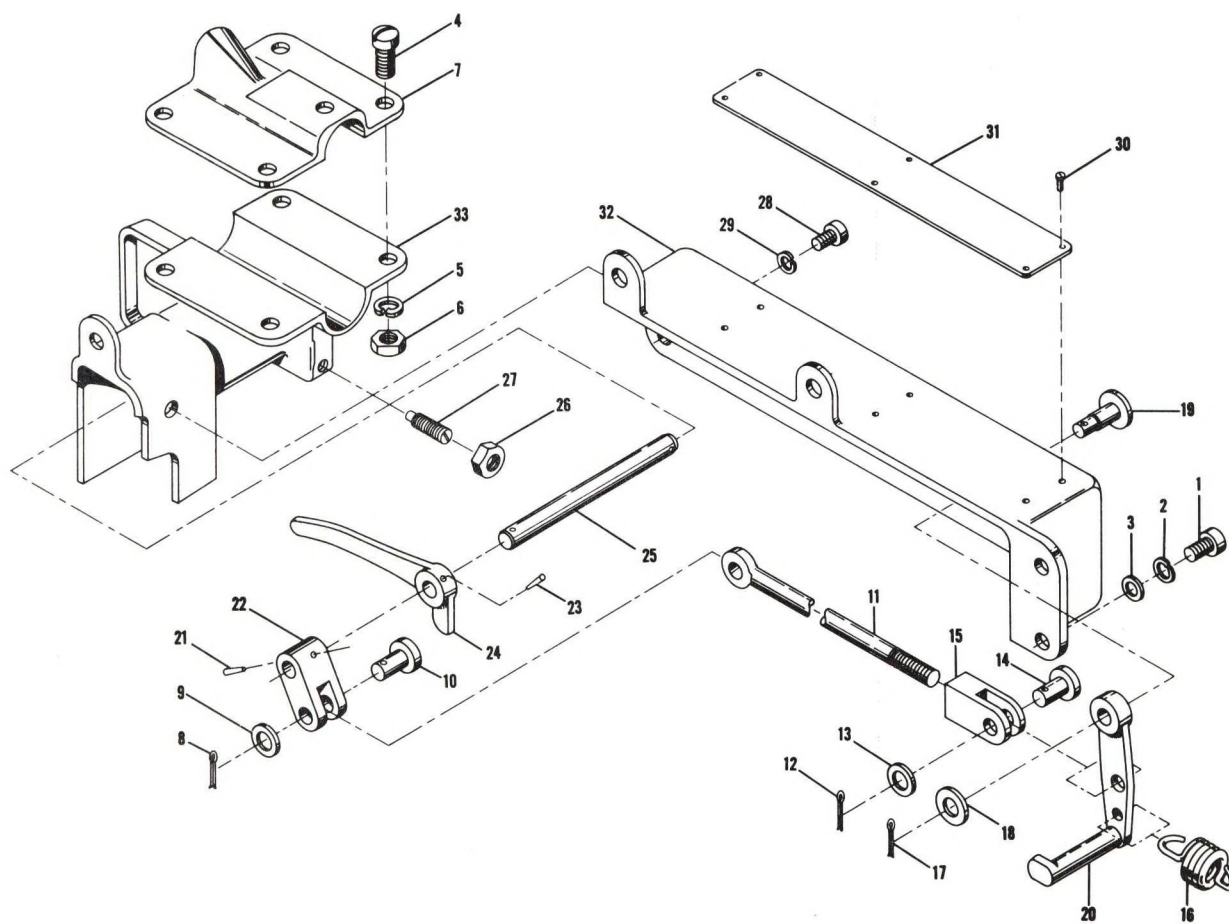
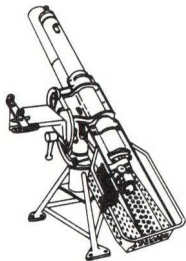


Figure 7-7. Firing Linkage Assembly

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Figure & Index No.	Identifying Number	Name and Description 1 2 3 4 5 6 7	Qty Per Assy	Recover- ability Code
7-7-	510745	LINKAGE ASSEMBLY, Firing (figure 7-5 NHA)	REF	
-1	12-Z-51-321	. CAPSCREW, Soc hd 1/4-20NC-3 by 1/2 lg	6	
-2	12-Z-22-286	. LOCKWASHER, 1/4, 0.267 ID by 0.361 OD by 0.078 thk	6	
-3	510755-8	. SHIM, Laminated brass, 9/32 ID by 0.625 OD by 0.06 thk	5	
-4	12-Z-8-482	. SCREW, Machine, fil hd No. 10-24- NC-2 by 1/2 lg	4	
-5	12-Z-22-249	. LOCKWASHER, No. 10, 0.205 ID by 0.337 OD by 0.053 thk	4	
-6	12-Z-40-419	. NUT, Hex, No. 10-24NC-2	4	
-7	510754-2	. STOP, Hand	1	
-8	12-Z-48-412	. PIN, Cotter, 1/16 dia by 3/4 lg	1	
-9	12-Z-22-471	. WASHER, Flat, 1/4, 0.265 ID by 0.500 OD by 0.062 thk	1	
-10	510754-6	. PIN, Clevis	1	
-11	510755-5	. ROD, Connecting	1	
-12	12-Z-48-412	. PIN, Cotter, 1/16 dia by 3/4 lg	1	
-13	12-Z-22-471	. WASHER, Flat, 1/4, 0.265 ID by 0.500 OD by 0.062 thk	1	
-14	510754-6	. PIN, Clevis	1	
-15	510755-4	. CLEVIS, Connecting rod	1	
-16	510755-6	. SPRING, Extension, 0.45 OD by 1.07 free length	1	C
-17	12-Z-48-412	. PIN, Cotter, 1/16 dia by 3/4 lg	1	
-18	12-Z-22-471	. WASHER, Flat, 1/4, 0.265 ID by 0.500 OD by 0.062 thk	1	
-19	510755-3	. SHAFT, Contact arm	1	
-20	510755-2	. ARM, Contact	1	
-21	12-Z-49-208	. PIN, Taper, No. 00000 by 1/2 lg	1	
-22	510754-5	. LINK, Clevis	1	

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Figure & Index No.	Identifying Number	Name and Description 1 2 3 4 5 6 7	Qty Per Assy	Recover- ability Code
7-7-23	12-Z-49-208	. PIN, Taper, No. 00000 by 1/2 lg	1	
-24	510754-3	. TRIGGER, Firing	1	
-25	510754-4	. SHAFT, Firing trigger	1	
-26	12-Z-9-401	. NUT, Hex, 1/4-20NC-2	1	
-27	12-Z-4-162	. SETSCREW, Sq hd dog point, 1/4- 20NC-2 by 3/4 lg	1	
-28	12-Z-51-320	. CAPSCREW, Soc hd 1/4-20NC-3 by 3/8 lg	1	
-29	12-Z-22-286	. LOCKWASHER, 1/4, 0.267 ID by 0.361 OD by 0.078 thk	1	
-30	12-Z-35-2	. SCREW, Drive, rd hd No. 0 by 3/16 lg	6	
-31	510755-7	. PLATE, Instruction	1	
-32	510755-1	. GUARD, Firing linkage	1	
-33	510754-1	. GUARD, Firing trigger	1	

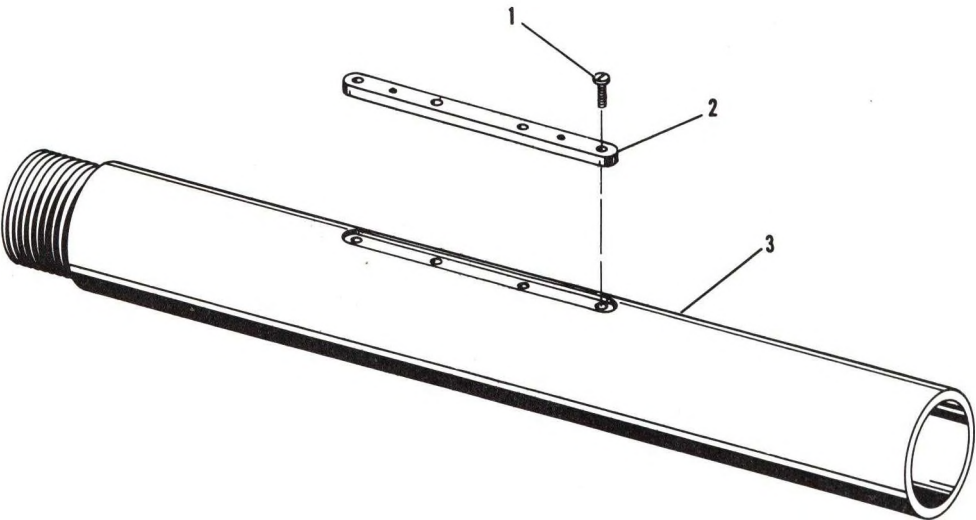


Figure 7-8. Barrel, Mortar, Mk 1 Mod 0

Figure & Index No.	Identifying Number	Name and Description	Qty Per Assy	Recover- ability Code
		1 2 3 4 5 6 7		
7-8-	LD167538 (GA507077)	BARREL, MORTAR, Mk 1 Mod 0 (figure 7-1 NHA)	REF	
-1	507075-3	. SCREW, Flat hd 1/4-20NC-3 by 0.450 lg	4	C
-2	507075-2	. KEY, Barrel	1	C
-3	507075-1	. BARREL, Gun	1	

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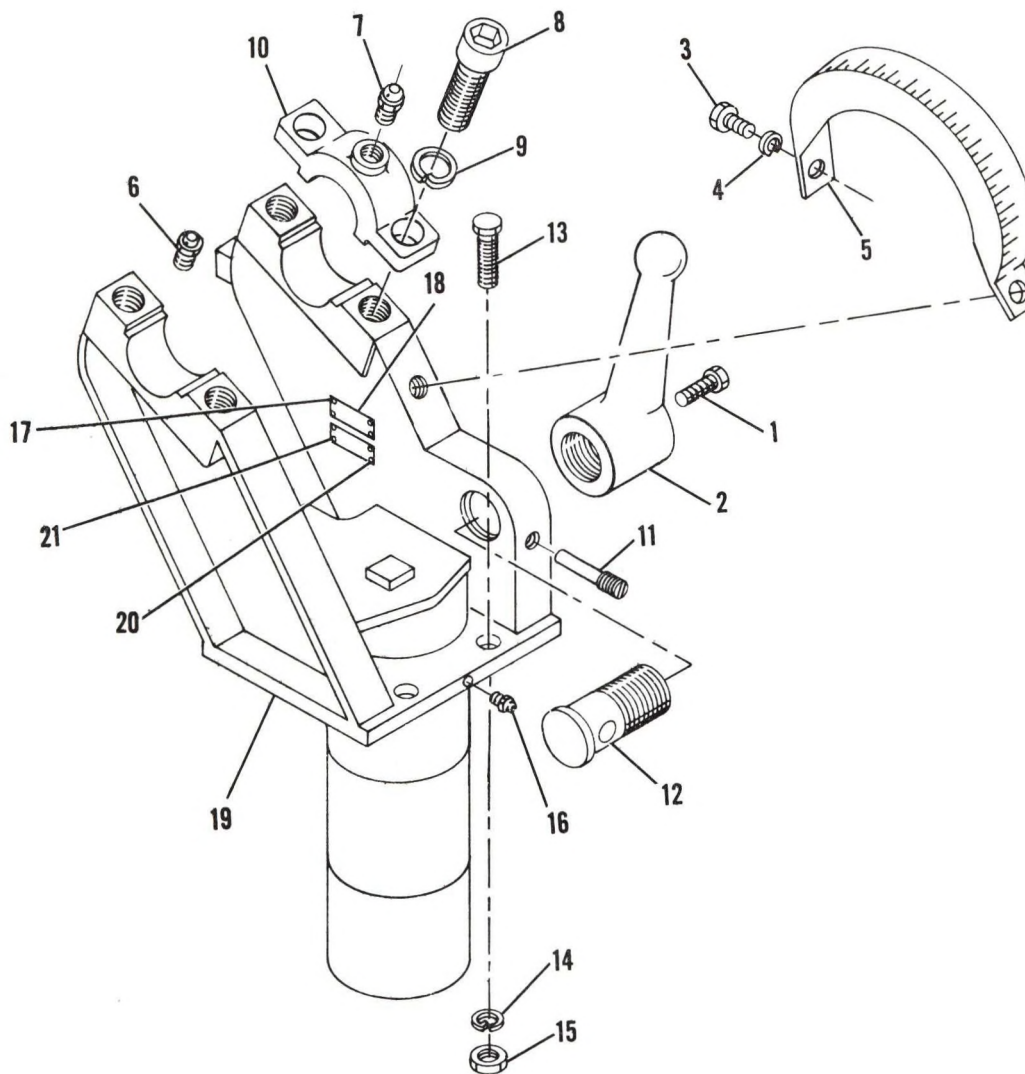
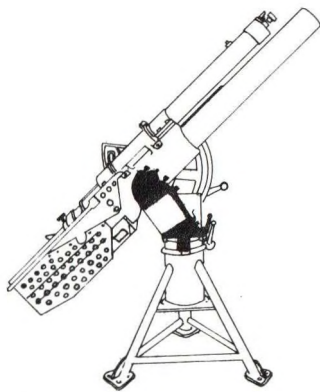


Figure 7-9. Carriage Mk 1 Mod 0

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Figure & Index No.	Identifying Number	Name and Description 1 2 3 4 5 6 7	Qty Per Assy	Recover- ability Code
7-9 -	LD168642 (GA510686)	CARRIAGE, Mk 1 Mod 0 (figure 7-1 NHA)	REF	
-1	12-Z-43-89	. SCREW, Machine, pan hd 3/8-16NC- 2 by 1.0 lg	1	
-2	510692-5	. LEVER, Clamping, elevating arc	1	
-3	12-Z-24-632	. CAPSCREW, Hex hd 5/16-18NC-2 by 5/8 lg	2	
-4	12-Z-22-852	. LOCKWASHER, 5/16, 0.333 ID by 0.591 OD by 0.088 thk	2	
-5	510691-5	. SCALE, Elevation	1	
-6	12-Z-339-2	. FITTING, Lubrication, 1/8 NPT, straight	1	
-7	12-Z-339-3	. FITTING, Lubrication, 1/8 NPT, 30° angle	1	
-8	510692-3	. CAPSCREW, Soc hd 3/4-10NC-2 by 2.31 lg	4	
-9	12-Z-22-857	. LOCKWASHER, 3/4, 0.791 ID by 1.279 OD by 0.198 thk	4	
-10	510691-3	. CAP, Trunnion	2	
-11	510691-2	. PIN, Retaining, bolt	1	
-12	510691-4	. BOLT, Lever, clamping	1	
-13	12-Z-24-684	. CAPSCREW, Hex hd 1/2-13NC-2 by 1-3/4 lg	4	
-14	12-Z-22-855	. LOCKWASHER, 1/2, 0.529 ID by 0.879 OD by 0.135 thk	4	
-15	12-Z-9-405	. NUT, Hex 1/2-13NC-2	4	
-16	12-Z-339-2	. FITTING, Lubrication 1/8 NPT, straight	1	
-17	12-Z-35-3	. SCREW, Drive, rd hd No. 0 by 1/4 lg	4	
-18	8-Z-1131-2	. PLATE, Name	1	
-19	510690-1	. CARRIAGE, Mortar	1	
-20	8-Z-1131-1	. PLATE, Name	1	
-21	12-Z-35-3	. SCREW, Drive, rd hd No. 0 by 1/4 lg	4	

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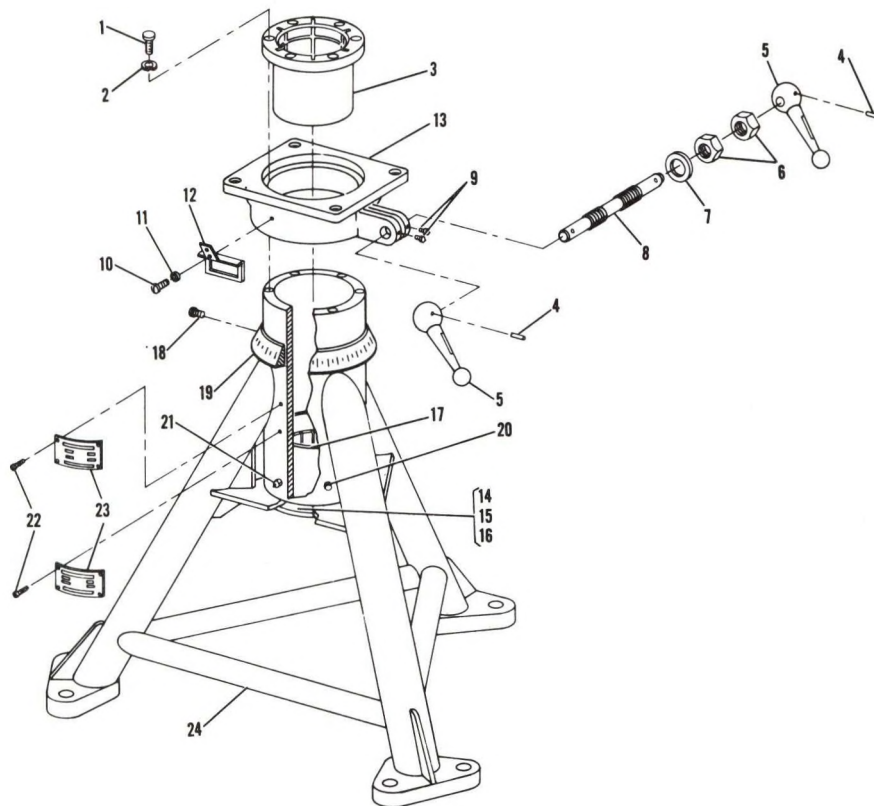


Figure 7-10. Stand Mk 1 Mod 0

Figure & Index No.	Identifying Number	Name and Description	Qty Per Assy	Recover- ability Code
		1 2 3 4 5 6 7		
7-10-	LD168643 (GA510693)	STAND Mk 1 Mod 0 (figure 7-1 NHA)	REF	
-1	510695-5	. CAPSCREW, 3/8-16NC-2 by 1.0 lg	6	C
-2	12-Z-22-288	. LOCKWASHER, 3/8, 0.398 ID by 0.554 OD by 0.125 thk	6	
-3	510695-1	. BEARING, Upper	1	
-4	12-Z-3-13	. PIN, Taper, No. 0000 by 1-1/2 lg	2	
-5	510692-1	. LEVER, Clamping	2	
-6	12-Z-58-27	. JAMNUT, 3/4-10NC-2	2	

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Figure & Index No.	Identifying Number	Name and Description 1 2 3 4 5 6 7	Qty Per Assy	Recover- ability Code
7-10-7	12-Z-22-37	. WASHER, Flat, 3/4, 0.812 ID by 1.75 OD by 0.177 thk	1	C
-8	510692-2	. SHAFT, Clamping	1	
-9	12-Z-339-2	. FITTING, Lubrication, 1/8 NPT, straight	3	
-10	12-Z-13-71	. SCREW, Machine, pan hd No. 10-24NC-2 by 3/8 lg	2	
-11	12-Z-22-849	. LOCKWASHER, No. 10, 0.205 ID by 0.337 OD by 0.053 thk	2	
-12	510692-4	. INDICATOR, Train	1	
-13	510691-1	. RING, Slewing	1	
-14	12-Z-41-415	. SCREW, Machine, pan hd 1/4-20NC-2 by 1/2 lg	6	
-15	12-Z-22-851	. LOCKWASHER, 1/4, 0.267 ID by 0.493 OD by 0.072 thk	6	
-16	510695-4	. PLATE, Cover	1	
-17	510695-2	. BEARING, Lower	1	
-18	12-Z-50-520	. SETSCREW, Soc hd, cone point, No. 10-24NC-2 by 7/16 lg	1	
-19	510695-3	. SCALE, Training	1	
-20	12-Z-4-81	. SETSCREW, Sq hd, dog point, 3/8-16NC-3 by 3/4 lg	1	
-21	12-Z-339-2	. FITTING, Lubrication, 1/8 NPT	1	
-22	12-Z-35-3	. SCREW, Drive, No. 0 by 1/4 lg	8	
-23	8-Z-1131-2	. PLATE, Name	2	
-24	510694	. STAND, Mortar	1	

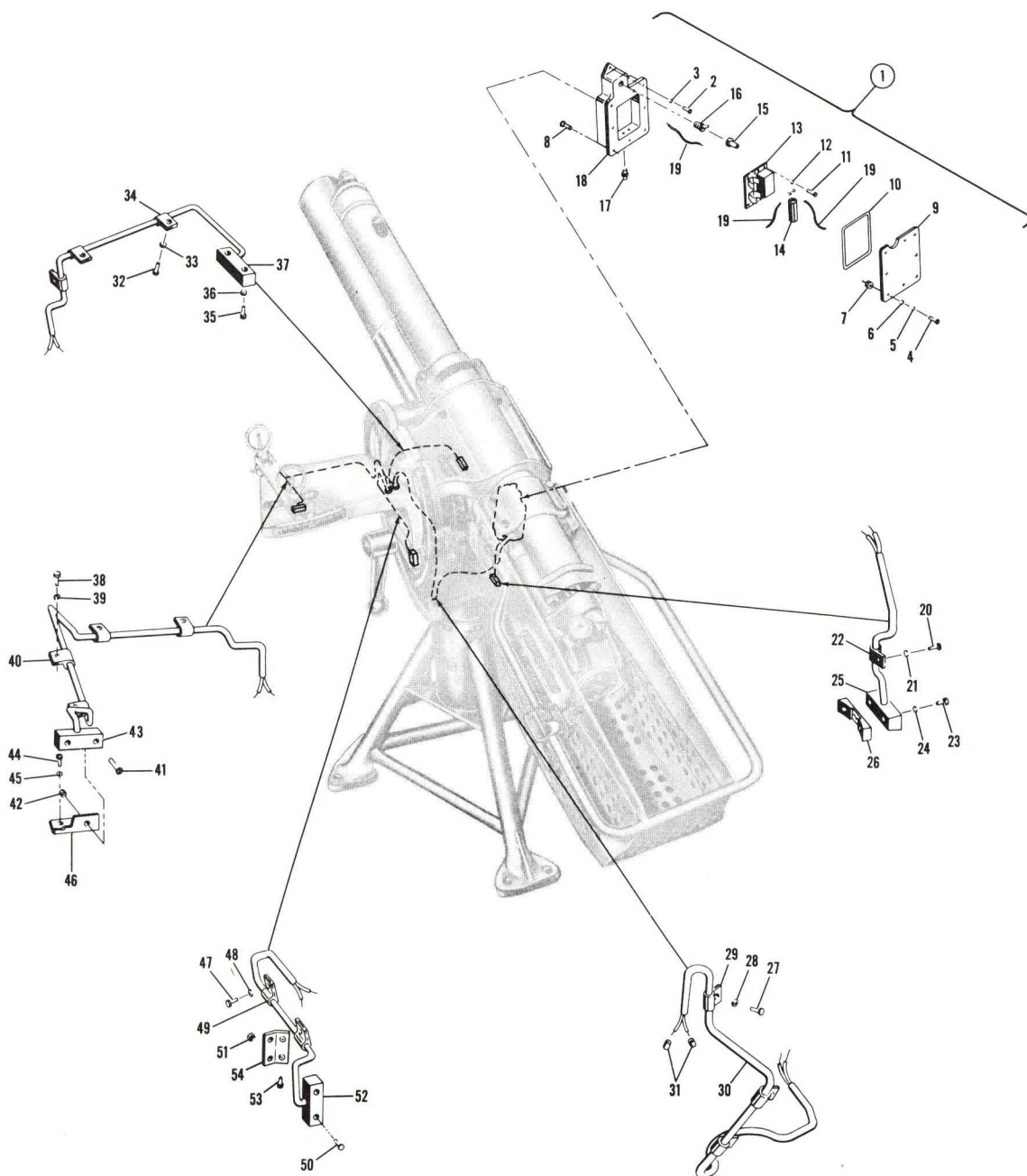


Figure 7-11. Lighting Circuit Mk 1 Mod 0

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Replaceable Parts List

Figure & Index No.	Identifying Number	Name and Description 1 2 3 4 5 6 7	Qty Per Assy	Recover- ability Code
7-11-	LD272640 (GA2319732)	LIGHTING CIRCUIT Mk 1 Mod 0 (figure 7-1 NHA)	REF	
-1	2258104	. POWER PACK ASSEMBLY (ATTACHING PARTS)	1	
-2	MS35307-7	. CAPSCREW, Hex hd 1/4-20UNC-2A by 7/8 lg	2	
-3	MS35338-82	. LOCKWASHER, 1/4, 0.267 ID by 0.493 OD by 0.072 thk - - - - - * - - - - -	2	
-4	MS35233-65	. . SCREW, Machine, pan hd No. 10- 24NC-2A by 3/4 lg	8	
-5	MS35338-81	. . LOCKWASHER, No. 10, 0.205 ID by 0.337 OD by 0.053 thk	8	
-6	12-Z-3002-5	. . WASHER, Seat, 0.213 ID by 0.354 OD by 0.062 thk	8	
-7	12-Z-1041-17	. . LOCKRING	8	
-8	12-Z-5008-14	. . INSERT, Rosan	8	
-9	1676886	. . COVER, Housing	1	
-10	MS9021-252	. . PACKING, O-ring, 0.135 dia by 5.211 ID	1	
-11	MS35233-28	. . SCREW, Machine, pan hd, No. 6- 32NC-2A by 3/8 lg	4	
-12	MS35338-79	. . LOCKWASHER, No. 6, 0.151 ID by 0.253 OD by 0.037 thk	4	
-13	1676890	. . INVERTER ASSEMBLY (PS101)	1	C
-14	2256789	. . BATTERY (BT101)	1	C
-15	MIL-B-19257, Type A, Style 1	. . BOOT, Rubber	1	C
-16	MS35058-22	. . SWITCH, Toggle (S101)	1	C
-17	1091228	. . ADAPTER, Wire terminal	2	
-18	2258069	. . HOUSING, Power pack	1	
-19	MIL-W-16878/1, Type B-22	. . WIRE, Electrical	AR	

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Replaceable Parts List

Figure & Index No.	Identifying Number	Name and Description 1 2 3 4 5 6 7	Qty Per Assy	Recover- ability Code
7-11-20	MS35233-43	. SCREW, Machine, pan hd, No. 8-32NC-2A by 3/8 lg	1	
-21	MS35338-80	. LOCKWASHER, No. 8, 0.178 ID by 0.296 OD by 0.046 thk	1	
-22	2256737	. CLAMP, Cable	1	
-23	MS35233-50	. SCREW, Machine, pan hd, No. 8-32NC-2A by 1-1/4 lg	2	
-24	MS35338-80	. LOCKWASHER, No. 8, 0.178 ID by 0.296 OD by 0.046 thk	2	
-25	2256787	. PANEL, Electroluminescent (DS101)	1	R
-26	2256739	. BRACKET, Panel	1	
-27	MS35233-43	. SCREW, Machine, pan hd, No. 8-32NC-2A by 3/8 lg	4	
-28	MS35338-80	. LOCKWASHER, No. 8, 0.178 ID by 0.296 OD by 0.046 thk	4	
-29	2256737	. CLAMP, Cable	4	
-30	2256792-1	. CABLE, Electrical	4 FT	C
-31	MS25274-3	. CAP, End, wire terminal	2	C
-32	MS35233-43	. SCREW, Machine, pan hd, No. 8-32NC-2A by 3/8 lg	3	
-33	MS35338-80	. LOCKWASHER, No. 8, 0.178 ID by 0.296 OD by 0.046 thk	3	
-34	2256737	. CLAMP, Cable	3	
-35	MS35233-48	. SCREW, Machine, pan hd, No. 8-32NC-2A by 7/8 lg	2	
-36	MS35338-80	. LOCKWASHER, No. 8, 0.178 ID by 0.296 OD by 0.046 thk	2	
-37	2256787	. PANEL, Electroluminescent (DS102)	1	
-38	MS35233-43	. SCREW, Machine, pan hd, No. 8-32NC-2A by 3/8 lg	2	
-39	MS35338-80	. LOCKWASHER, No. 8, 0.178 ID by 0.296 OD by 0.046 thk	2	
-40	2256736	. CLAMP, Cable	2	

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Replaceable Parts List

Figure & Index No.	Identifying Number	Name and Description 1 2 3 4 5 6 7	Qty Per Assy	Recover- ability Code
7-11-41	MS35233-50	. SCREW, Machine, pan hd, No. 8-32NC-2A by 1.0 lg	2	
-42	MS20365-832	. NUT, Self-locking, No. 8-32NC-2B	2	
-43	2256787	. PANEL, Electroluminescent (DS103)	1	
-44	MS35233-43	. SCREW, Machine, pan hd, No. 8-32NC-2A by 3/8 lg	2	
-45	MS35338-80	. LOCKWASHER, No. 8, 0.178 ID by 0.296 OD by 0.046 thk	2	
-46	2256735	. BRACKET, Panel	1	
-47	MS35233-43	. SCREW, Machine, pan hd, No. 8-32NC-2A by 3/8 lg	2	
-48	MS35338-80	. LOCKWASHER, No. 8, 0.178 ID by 0.296 OD by 0.046 thk	2	
-49	2256737	. CLAMP, Cable	2	
-50	MS35233	. SCREW, Machine, pan hd, No. 8-32NC-2A by 1.0 lg	2	
-51	MS20365-832	. NUT, Self-locking, No. 8-32NC-2B	2	
-52	2256787	. PANEL, Electroluminescent (DS104)	1	
-53	MS35249-49	. SCREW, Machine, flat hd, No. 8-32NC-2A by 5/16 lg	2	
-54	2256738	. BRACKET, Panel	1	

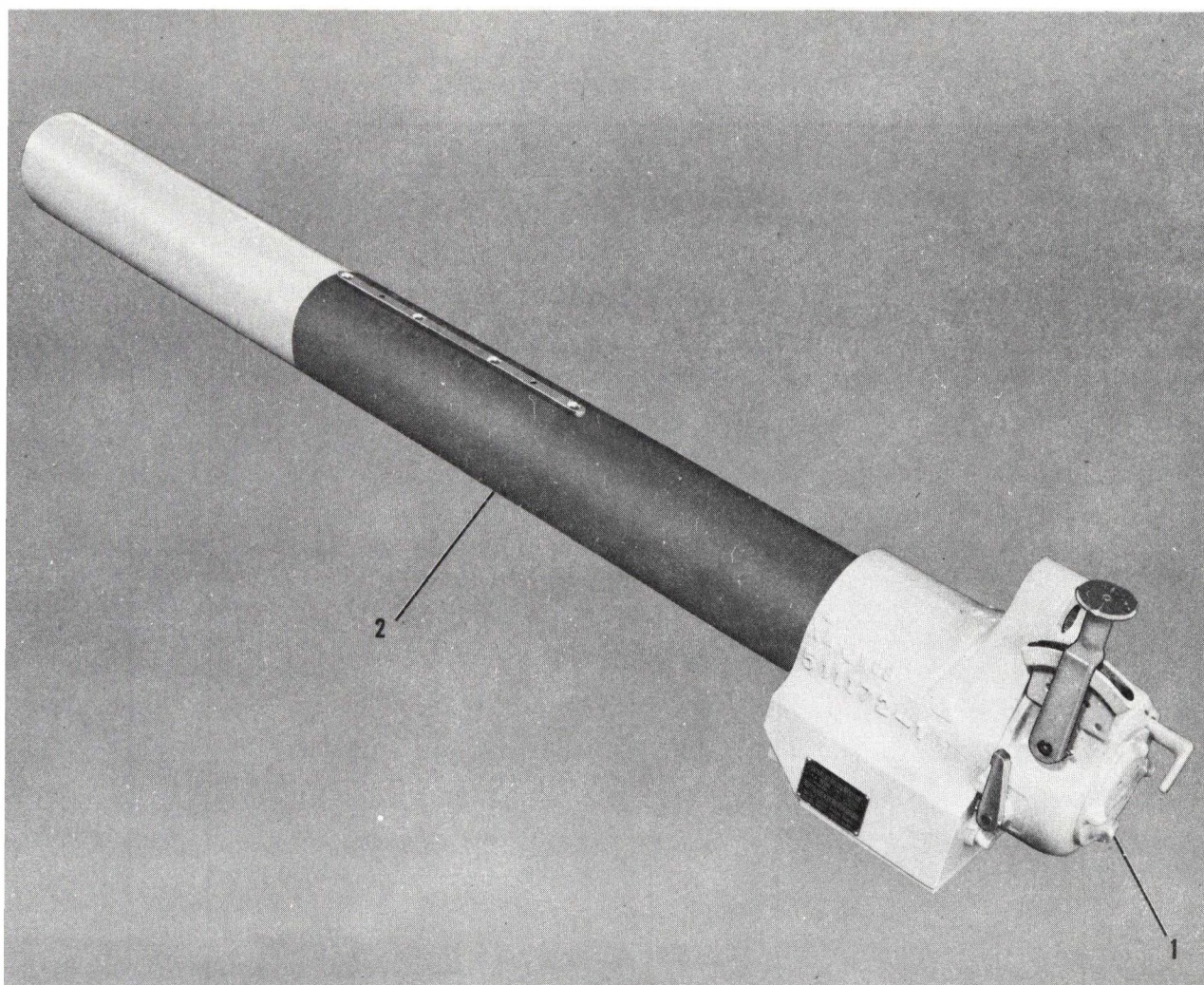


Figure 7-12. Barrel and Breech Assembly, Replacement

Figure & Index No.	Identifying Number	Name and Description	Qty Per Assy	Recover- ability Code
		1 2 3 4 5 6 7		
7-12-	LD168628 (2618763)	*BARREL AND BREECH ASSEMBLY, REPLACEMENT (figure 7-1 NHA)	REF	C
-1	GA510764	. MECHANISM, Breech, Mk 1 Mod 0 (see figure 7-5)	REF	
-2	GA507077	. BARREL, Mortar, Mk 1 Mod 0 (see figure 7-8)	REF	
		* For spares only.		

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LD167538	B	7-1-4 7-8-
LD168628	E	7-1- 7-12-
LD168642	D	7-1-5 7-9-
LD168643	E	7-1-6 7-10-
LD168646	G	7-1-2 7-3-
LD168647	D	7-1-3 7-5-
LD256242	B	7-1-1 7-2-
LD272640	A	7-1-7 7-11- 7-11-15
MIL-B-19257, Type A, Style 1		7-11-19
MIL-W-16878/1, Type B-22		7-11-42
MS20365-832		7-11-51
MS25274-3		7-11-31
MS35058-22		7-11-16
MS35233		7-11-50
MS35233-28		7-11-11
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MS35233-48		7-11-35
MS35233-50		7-11-23 7-11-41
MS35233-65		7-11-4
MS35249-49		7-11-53
MS35307-7		7-11-2
MS35308-114		7-4-5
MS35338-79		7-11-12
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MS35338-82		7-11-3
MS35338-86		7-4-6
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1091228		7-11-17
12-Z-1041-17		7-11-7
12-Z-13-71		7-10-10
12-Z-22-249		7-7-5
12-Z-22-253		7-3-12 7-3-22 7-3-27 7-5-20 7-5-29
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12-Z-22-288		7-10-2
12-Z-22-32		7-5-16
12-Z-22-37		7-10-7
12-Z-22-471		7-7-9 7-7-13 7-7-18
12-Z-22-49		7-3-2
12-Z-22-55		7-3-5 7-3-35
12-Z-22-56		7-3-10
12-Z-22-59		7-3-15
12-Z-22-849		7-10-11
12-Z-22-851		7-10-15
12-Z-22-852		7-9-4
12-Z-22-855		7-9-14
12-Z-22-857		7-9-9
12-Z-23-41		7-5-15
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12-Z-24-632		7-9-3
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12-Z-339-2		7-3-37	1676886		7-11-9
		7-9-6	1676890	B	7-11-13
		7-9-16	2256735		7-11-46
		7-10-21	2256736	A	7-11-40
		7-10-9	2256737		7-11-22
12-Z-339-3		7-9-7			7-11-29
12-Z-35-2		7-7-30			7-11-34
12-Z-35-3		7-3-17			7-11-49
		7-5-12	2256738		7-11-54
		7-9-17	2256739	A	7-11-26
		7-9-30	2256787	B	7-11-25
		7-10-22			7-11-37
12-Z-35-8		7-3-23			7-11-43
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12-Z-4-81		7-10-20	2256789	A	7-11-14
12-Z-40-419		7-7-6	2256792-1	A	7-11-30
12-Z-41-404		7-5-6	2258069	B	7-11-18
12-Z-41-415		7-10-14	2258104	A	7-11-1
12-Z-43-89		7-9-1	2319732	B	7-1-7
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12-Z-5-202		7-4-14	43-S-15542		7-2-28
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12-Z-5008-14		7-11-8			7-2-49
12-Z-51-307		7-4-11			7-2-52
12-Z-51-320		7-7-28	43-S-15677		7-2-56
12-Z-51-321		7-5-40	43-S-4368-50		7-2-41
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45-F-449-150		7-2-27 7-2-35
507075-1	C	7-8-3
507075-2	C	7-8-2
507075-3	C	7-8-1
507077	C	7-1-4 7-8- 7-12-2
510686	E	7-1-5 7-9- 7-9-19
510690-1	C	7-10-13
510691-1	F	7-9-11
510691-2	F	7-9-10
510691-3	F	7-9-12
510691-4	F	7-9-5
510691-5	F	7-10-5
510692-1	D	7-10-8
510692-2	D	7-9-8
510692-3	D	7-10-12
510692-4	D	7-9-2
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510693	C	7-10-3
510694	F	7-10-17
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510695-2	H	7-10-16
510695-3	H	7-10-1
510695-4	H	7-1-2 7-3-1
510695-5	H	7-3-8
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510746-1	D	7-3-36
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510747-4	E	
510748-1	D	

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510748-4	D	7-3-34
510748-5	D	7-3-32
510748-6	D	7-3-29
510748-7	D	7-3-31
510749-1	F	7-4-22
510749-2	F	7-4-32
510749-4	F	7-4-33
510749-5	F	7-4-31
510750-1	F	7-4-20
510750-2	F	7-4-18
510750-3	F	7-4-21
510750-4	F	7-4-19
510750-5	F	7-4-27
510750-6	F	7-4-7
510750-7	F	7-4-26
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510751-2	G	7-4-23
510751-3	G	7-4-3
510751-4	G	7-4-29
510751-5	G	7-3-24
510751-6	G	7-4-25
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510753-1	C	7-3-3
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510755-4	C	7-7-11
510755-5	C	7-7-16
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511174-3	C	7-6-9	513437-1	B	7-2-23
511174-4	C	7-6-12	513437-2	B	7-2-24
511174-5	C	7-6-10	513437-3	B	7-2-25
511175-1	B	7-6-1	513437-4	B	7-2-26
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511175-3	B	7-5-17	513437-6	B	7-2-38
511175-4	B	7-6-4	513437-7	B	7-2-44
511175-5	B	7-5-31	513437-8	B	7-2-39
511176-1	E	7-5-	513445		7-6-5
511176-2	E	7-5-22	513446-1	B	7-6-11
511176-3	E	7-5-23	513446-2	B	7-6-16
511176-4	E	7-5-27	513446-3	B	7-6-14
511176-5	E	7-5-19	513446-4	B	7-6-8
		7-5-28	513446-5	B	7-6-13
511176-6	E	7-5-34	513447-1	B	7-5-7
511176-7	E	7-5-32	513447-2	B	7-5-8
511176-8	E	7-5-24	513447-3	B	7-5-9
511176-9	E	7-5-25	513447-4	B	7-5-26
511177-1	E	7-5-39	513447-5	B	7-5-30
511177-2	E	7-5-36	513524-8	B	7-3-6
511177-3	E	7-5-42	513527	C	7-1-
511177-4	E	7-5-38	514631-1	C	7-4-15
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513431	B	7-1-1	514631-3	C	7-4-17
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513433-1	C	7-2-59	514631-6	C	7-4-1
513434-1	C	7-2-34	514631-7	C	7-4-2
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513435-3	C	7-2-54	8-Z-1104-20	AG	7-4-30
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513436-2	A	7-2-9	8-Z-1131-2	Z	7-9-18
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513436-4	A	7-2-7			
513436-5	A	7-2-12			
513436-6	A	7-2-13			
513436-7	A	7-2-19			

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BT101	2256789	11	14
DS101	2256787	11	25
DS102	2256787	11	37
DS102	2256787	11	43
DS104	2256787	11	52
PS101	1676890	11	13
S101	MS35058-22	11	16

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		Fig. No.	Index No.

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LD168628	AX1015-544-9679	12-Z-24-81	KZ5310-042-6758
MIL-W-16878/1	Z6145-702-8816	12-Z-3-13	KZ5315-198-5980
Type B-22		12-Z-339-1	9G4930-640-4081
MS15432-1	9G5120-272-1282	12-Z-339-2	9G4730-172-0043
MS15432-3	9G5120-272-1280	12-Z-339-3	9G4730-172-0045
MS15432-4	9G5120-227-7362	12-Z-35-2	KZ5305-271-2109
MS15461-4	9G5120-449-8083	12-Z-35-3	KZ5305-273-7527
MS16380-4	9G5120-227-2342	12-Z-35-8	KZ5305-273-7485
MS16380-5	9G5120-187-7123	12-Z-40-419	KZ5310-275-5095
MS16380-6	9G5120-187-7124	12-Z-41-404	KZ5305-043-1801
MS16380-11	9G5120-224-3102	12-Z-41-415	KZ5305-274-1126
MS16380-14	9G5120-187-7129	12-Z-43-89	KZ5305-543-4231
MS16380-18	9G5120-277-7025	12-Z-48-12	KZ5315-187-9370
MS16380-22	9G5120-277-2694	12-Z-48-427	KZ5315-191-0065
MS16380-27	9G5120-277-2326	12-Z-49-14	KZ5315-198-6132
MS16382-1	9G5120-277-1246	12-Z-49-208	KZ5315-187-3241
MS16382-5	9G5120-277-1243	12-Z-51-307	KZ5305-273-4979
MS20365-832	KZ5310-266-4461	12-Z-51-320	KZ5305-271-5102
MS35058-22	N5930-655-1517	12-Z-51-321	KZ5305-558-3695
MS35233-28	KZ5305-045-1628	12-Z-51-325	KZ5305-281-3175
MS35233-43	KZ5305-543-2580	12-Z-51-362	KZ5305-273-7418
MS35338-79	KZ5310-011-1041	12-Z-56-402	KZ5310-194-8692
MS35338-80	KZ5310-054-1830	12-Z-705-7	9G5120-287-2504
MS35338-81	KZ5310-054-1836	12-Z-720-1	9G5120-274-2561
MS35338-82	KZ5310-042-6758	12-Z-720-23	9G5120-242-7412
12-Z-1041-17	Z5310-595-9752	12-Z-723-1	9G5120-242-7410
12-Z-22-249	KZ5310-043-2226	12-Z-723-2	9G5120-198-5412
12-Z-22-253	KZ5310-543-2705	12-Z-723-3	9G5120-198-5413
12-Z-22-285	KZ5310-262-3517	12-Z-723-4	9G5120-198-5410
12-Z-22-286	KZ5310-262-3526	12-Z-723-7	9G5120-198-5409
12-Z-22-288	KZ5310-262-3531	42-P-4700	KZ5315-187-9382
12-Z-22-32	KZ5310-514-6737	43-N-2875-43	KZ5310-199-3068
12-Z-22-37	KZ5310-013-8572	43-N-6926-37	KZ5310-260-7895
12-Z-22-471	KZ5310-187-4124	43-S-15542	KZ5305-290-2764
12-Z-22-49	KZ5310-010-6497	43-S-15677	KZ5305-043-6663
12-Z-22-55	KZ5310-010-3323	43-S-4368-50	KZ5305-551-0142
12-Z-22-56	KZ5310-010-3325	43-S-4368-60	KZ5305-273-4980
12-Z-22-59	KZ5310-012-1326	43-S-4892	KZ5305-273-7527
12-Z-22-849	KZ5310-043-3296	43-S-8052	KZ5305-011-0596
12-Z-22-851	KZ5310-012-0380	43-W-3012	KZ5310-639-0758
12-Z-22-852	KZ5310-012-0214	43-W-3014-50	KZ5310-194-7289
12-Z-22-855	KZ5310-012-0384	43-W-3016	KZ5310-194-7290
12-Z-22-857	Z5310-011-6124	43-W-6133	KZ5310-262-3531
12-Z-23-41	KZ5310-189-2797	43-W-6353	KZ5310-209-5309
12-Z-24-242	KZ5306-271-2279	43-W-6359	KZ5310-543-2705
12-Z-24-43	KZ5310-054-1836	43-W-6961-20	KZ5310-514-6738

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Identifying No.	Federal Stock No.
45-F-449-150	9G4730-172-0043
510691-1	Z1015-152-7408
510691-5	Z1015-152-7409
510692-1	Z1015-152-7410
510692-2	Z1015-152-7411
510692-4	Z1045-692-9706
510692-5	Z1015-152-7413
510695-3	Z1015-152-7414
510749-5	Z3120-661-3231
510750-7	Z1045-380-8088
510750-8	Z1045-380-8089
510751-1	Z5340-597-0463
510755-6	Z5341-200-3363
510755-8	Z5340-384-6053
511174-3	Z1045-026-6902
511175-3	Z5340-597-0322
511175-4	Z1015-384-6054
511176-4	Z1045-380-8090
511176-6	Z1045-380-8091
511176-8	Z5340-200-3320
513435-1	Z1015-152-9222
513435-3	Z5355-152-9223
513435-4	Z1045-026-6910
513435-6	Z1045-384-6084
513436-1	Z1015-152-9226
513436-2	Z1015-152-9227
513445	Z1045-026-6911
513446-4	Z5340-209-9692
513446-5	Z5340-209-8682
514631-3	KZ5330-185-9656
514631-5	Z1045-152-9229
514631-6	Z5305-272-4178
514631-7	Z5330-265-5968
77-B-999-50804	KZ3110-185-6355
77-B-999-51804	KZ3110-186-1061
8-Z-1104-20	Z1015-384-6306
8-Z-1131-1	Z1090-253-6101
8-Z-1131-14	Z1090-253-6107
8-Z-1131-2	9G9905-253-6102
8-Z-1131-3	9G9905-396-1516
8-Z-925-7	9G5120-288-9287
8-Z-943-5	Z1020-380-8726
8-Z-943-22	KZ9510-198-7958
8-Z-975-900	

Identifying No.	Federal Stock No.

CHAPTER 7
Tools and Accessories

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Identifying No.	Federal Stock No.	SMR Code	Name and Description	Quantity Per Mortar
		1		
LD272646			TOOLS AND ACCESSORIES, 81-MM MORTAR MK 2 MOD 0	REF
LD261531		P	COVER ASSEMBLY, MK 1 Mod 0	1
MIL-G-2333, Type 1		AP	GLOVES, Asbestos	1 Pair
MS15227-4		AP	SCREWDRIVER, Double offset, 3/8 by 3/4 deep by 6.0 lg	1
MS15432-1	9G5120-278-1282	AP	SCREWDRIVER, 1/4 w by 7-5/8 lg	1
MS15432-3	9G5120-278-1280	AP	SCREWDRIVER, 3/8 w by 13.0 lg	1
MS15432-4	9G5120-227-7362	AP	SCREWDRIVER, 3/8 w by 17-1/2 lg	1
MS15461-4	9G5120-449-8083	AP	WRENCH, Adjustable, 1-1/8 by 10.0 lg	1
MS16380-4	9G5120-277-2342	AP	WRENCH, Open double-end, 3/8 and 7/16 by 4-1/8 lg	1
MS16380-5	9G5120-187-7123	AP	WRENCH, Open double-end, 7/16 and 1/2 by 5.0 lg	1
MS16380-6	9G5120-187-7124	AP	WRENCH, Open double-end, 1/2 and 9/16 by 5-1/2 lg	1
MS16380-11	9G5120-224-3102	AP	WRENCH, Open double-end, 5/8 and 3/4 by 7.0 lg	1
MS16380-14	9G5120-187-7129	AP	WRENCH, Open double-end, 3/4 and 13/16 by 8-3/8 lg	1
MS16380-18	9G5120-277-7025	AP	WRENCH, Open double-end, 15/16 and 1.0 by 10-1/2 lg	1
MS16380-22	9G5120-277-2694	AP	WRENCH, Open double-end, 1-1/8 and 1-1/4 by 12.0 lg	1
MS16380-27	9G5120-277-2326	AP	WRENCH, Open double-end, 1-7/16 and 1-5/8 by 17.0 lg	1
MS16382-1	9G5120-277-1246	AP	WRENCH, Open end 1-1/2 by 13-3/8 lg	1
MS16382-5	9G5120-277-1243	AP	WRENCH, Open end 1-7/8 by 16-3/8 lg	1
12-Z-339-1	9G4930-640-4081	AP	GUN, Grease	1
12-Z-705-7	9G5120-287-2504	AP	SCREWDRIVER, 1/8 w by 6-5/8 lg	1
12-Z-717- 0221			WRENCH, Open end 1/4 by 3-1/2 lg	1
12-Z-720-1	9G5120-224-2561	AP	WRENCH, Socket, offset handle, 3/8 by 4.0 lg	1
12-Z-720-22		AP	WRENCH, Socket, pin handle, 1/2 by 5-1/4 lg	1
12-Z-720-23	9G5120-242-7412	AP	WRENCH, Socket, pin handle, 9/16 by 5-3/4 lg	1

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CHAPTER 7

Tools and Accessories

Identifying No.	Federal Stock No.	SMR	Name and Description	Quantity Per Mortar
		Code 1		
12-Z-723-1	9G5120-242-7410	AP	WRENCH, Hex, key, 3/32 by 2-3/32 lg	1
12-Z-723-2	9G5120-198-5412	AP	WRENCH, Hex, key, 1/8 by 3-27/32 lg	1
12-Z-723-3	9G5120-198-5413	AP	WRENCH, Hex, key, 5/32 by 4-7/32 lg	1
12-Z-723-4	9G5120-198-5410	AP	WRENCH, Hex, key, 3/16 by 4-19/32 lg	1
12-Z-723-7	9G5120-198-5409	AP	WRENCH, Hex, key, 5/16 by 6-3/32 lg	1
42-M-710-20		AP	MEASURE AND FUNNEL COMBINATION	1
8-Z-925-7	9G5120-288-9287	AP	WRENCH, Open end, 3-1/32 by 27.0 lg	1
8-Z-943-5	Z1020-380-8726	AP	WRENCH, Socket, 1.385 ID by 1.60 OD by 7.0 lg	1
8-Z-943-22	KZ9510-198-7958	AP	HANDLE, Socket wrench, 5/16 dia by 7.0 lg	1
8-Z-975-900		AP	COMPRESSOR ASSEMBLY, Spring	1