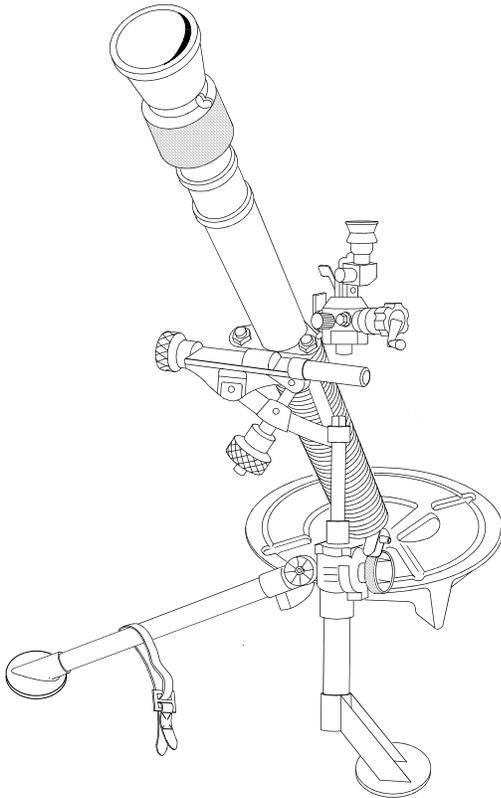


ARMY TM 9-1015-249-23&P  
MARINE CORPS TM 09922A-23&P/2A

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**TECHNICAL MANUAL  
UNIT AND DIRECT SUPPORT MAINTENANCE MANUAL  
WITH REPAIR PARTS AND SPECIAL TOOLS LIST  
FOR  
81-MM MORTAR M252  
(1015-01-164-6651) (EIC: 4SK)**



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PCN 18409922000

SEPTEMBER 1998



## WARNING SUMMARY

This warning summary contains general safety warnings and hazardous materials warnings that must be understood and applied during operation and maintenance of this equipment. Failure to observe these precautions could result in serious injury or death to personnel. Also included are explanations of safety and hazardous materials icons used within the technical manual.

### FIRST AID

For first aid information, refer to FM 4-25.11, First Aid.

### EXPLANATION OF SAFETY WARNING ICONS



**FLYING PARTICLES** - arrows bouncing off face shows that particles flying through the air will harm face.



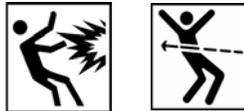
**EXPLOSION** - rapidly expanding symbol shows that the material may explode if subjected to high temperatures, sources of ignition, or high pressure.



**WEAPON FIRE** - Weapon may accidentally discharge causing severe injury or death.

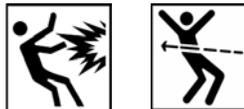
### GENERAL SAFETY WARNING DESCRIPTIONS

#### WARNING



Before starting an inspection or performing maintenance procedures, be sure to clear the weapon. Do not actuate the trigger until the weapon has been cleared. Inspect the bore to ensure it is empty and free of obstructions. Keep live ammunition out of the area during maintenance operations.

#### WARNING

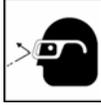


Dented barrels must be replaced as they are unsafe for firing.

## WARNING SUMMARY - Continued

### GENERAL SAFETY WARNING DESCRIPTIONS - Continued

#### WARNING



When latch bearing ball is pried out of lower half clamp body, compression helical spring may fly out.

### EXPLANATION OF HAZARDOUS MATERIALS ICONS



**CHEMICAL** - drops of liquid on hand shows that the material will cause burns or irritation to human skin or tissue.



**EYE PROTECTION** - person with goggles shows that the material will injure the eyes.



**FIRE** - flame shows that a material will ignite and cause burns.



**RADIATION** - three circular wedges shows that the material emits radioactive energy and can injure human tissue.



**VAPOR** - human figure in a cloud shows that material vapors present danger to life or health.

### HAZARDOUS MATERIALS DESCRIPTION

#### WARNING



#### SOLVENTS AND THINNERS

Dry cleaning solvents (SD) and paint thinners are flammable. Do not clean parts near an open flame or in a smoking area. Make sure adequate ventilation is available. Wear safety glasses, splash goggles, and protective gloves. Always know location of nearest eye wash station. Dry cleaning solvents and paint thinners evaporate quickly and have a drying effect on the skin. When used without protective gloves, these chemicals may cause irritation to, or cracking of, the skin.

## WARNING SUMMARY - Continued

### HAZARDOUS MATERIALS DESCRIPTION - Continued

#### WARNING



#### RADIOACTIVE TRITIUM ( $^3\text{H}$ )

The M64/M64A1/M67 Sight Units and M58/M59 Aiming Post Lights contain radioactive tritium gas in sealed source form. Exposure to tritium gas is a potential ionizing radiation hazard.

- Eating, drinking, or smoking is NOT allowed in tritium device maintenance areas.
- Arms rooms are not authorized work areas for any radioactive mortar component.
- All personnel who operate and/or maintain fire control equipment must be aware of the special precautions to control exposure to tritium. See the "Tritium ( $^3\text{H}$ ) Safety, Care and Handling" section, paragraph 1-8.
- Immediately report any suspected lost or damaged items to your Local Radiation Safety Officer (LRSO). If your LRSO cannot be reached, contact the TACOM-RI Safety Office during regular duty hours at DSN 793-2965/4594, 309-782-2965/4594.

LRSO: \_\_\_\_\_ Phone: \_\_\_\_\_



CHANGE

NO. 3

HEADQUARTERS  
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AND MARINE CORPS  
Washington, D.C., 25 May 2010

**UNIT AND DIRECT SUPPORT  
MAINTENANCE MANUAL  
WITH REPAIR PARTS AND SPECIAL TOOLS LIST  
FOR  
81-MM MORTAR, M252  
(1015-01-164-6651) (EIC: 4SK)**

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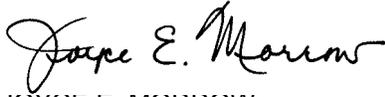
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Washington, D.C., 20 February 2006

**UNIT AND DIRECT SUPPORT  
MAINTENANCE MANUAL  
WITH  
REPAIR PARTS AND SPECIAL TOOLS LIST  
FOR  
81-MM MORTAR, M252  
(1015-01-164-6651) (EIC: 4SK)**

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**UNIT AND DIRECT SUPPORT  
MAINTENANCE MANUAL  
WITH  
REPAIR PARTS AND SPECIAL TOOLS LIST  
FOR  
81-MM MORTAR, M252  
(1015-01-164-6651) (EIC: 4SK)**

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**UNIT AND DIRECT SUPPORT MAINTENANCE MANUAL  
WITH REPAIR PARTS AND SPECIAL TOOLS LIST  
FOR  
81-MM MORTAR, M252  
(1015-01-164-6651) (EIC: 4SK)**

Current as of 1 September 2005 for Appendix C

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### **HOW TO USE THIS MANUAL**

The safest, easiest, and best way to do maintenance on the M252 81-MM Mortar is to use this manual. Learning to use this TM is as easy as reading through the next few pages. Knowing what is in this manual, and how to use it, will save you time and work and will help you to avoid exposing yourself to unnecessary hazards while you do your job.

#### **SO WHERE DO YOU START?**

Start right here, if this is the first time you are using this TM, by completely reading this section first. There is a lot of information you will need to know.

#### **HOW IS THE MANUAL ORGANIZED?**

Basically, the manual is divided into two types of maintenance activities. These are: (1) Troubleshooting or location of faults by symptoms you can detect and (2) Maintenance Procedures that are used to correct faults or repair failed parts. You will be using the procedures in this manual to do one of these types of maintenance. Within this manual, you will find the material organized in functional group code order as it appears in the Maintenance Allocation Chart or MAC, found in Appendix B of this manual. This allows the TM to be aligned with its applicable Repair Parts and Special Tools List (RPSTL). For information on how to use the RPSTL, refer to the introduction in Appendix C.

#### **HOW DO I FIND PROCEDURES OR SYMPTOMS?**

If you're using the manual to perform troubleshooting, go to the general paragraph or symptom table for either unit or direct support maintenance, as applicable. Read the instructions or table information and proceed according to the instructions or information found there. If you are using the manual to repair or replace a part you already know is defective, start by locating the part to be replaced or repaired from the Alphabetical Index located in the back of the manual.

## **HOW TO USE THIS MANUAL - Continued**

### **HOW DO I FIND THE CORRECT MAINTENANCE PROCEDURE?**

Once you are in the Alphabetical Index, look for a key noun from the mortar weapon system or part nomenclature. Once you have located the correct procedure, read it to determine if you have everything you need to perform the task. Make sure all Equipment Conditions have been met before beginning. Familiarize yourself with the potential hazards, if any, described by any WARNINGS or CAUTIONS. You should familiarize yourself with the entire maintenance procedure before beginning the maintenance task.

### **HOW DO I USE A MAINTENANCE PROCEDURE?**

The first page of a maintenance procedure lists everything you will need to perform the task. The following paragraphs describe all the blocks of information you will encounter.

a. **TOOLS and SPECIAL TOOLS.** Individual tools from your mechanic's tool kit will not be listed under this heading. If any tools from a kit are required, the tool kit itself will be listed as the first item. Special tools, fabricated tools, and tools from any other source will be listed with a reference to a specific item and appendix number. The referenced appendix will provide you with the necessary information to find the tool.

b. **MATERIALS/PARTS.** If any expendable or consumable supplies are needed to perform the task, they will be listed under this heading along with the quantity in parentheses and with a reference to the appropriate item and appendix in the back of the TM. The referenced appendix will give you detailed information to requisition the item. Replacement parts are not normally listed under this heading. The inspection steps in the removal or disassembly procedures will tell you which parts to replace. Mandatory repair parts (parts that are destroyed during disassembly or not normally re-used, such as gaskets and lockwashers) are listed under this heading by their nomenclature only.

c. **PERSONNEL REQUIRED.** The number of personnel necessary to perform the task will be listed here. You will find this heading only in procedures that require more than one person.

d. **EQUIPMENT CONDITION.** This heading will list the special conditions which must be met prior to performing your task. In many cases, the condition has already been identified in another procedure. In these cases, the equipment condition will refer to that maintenance procedure for details in performing the preliminary task.

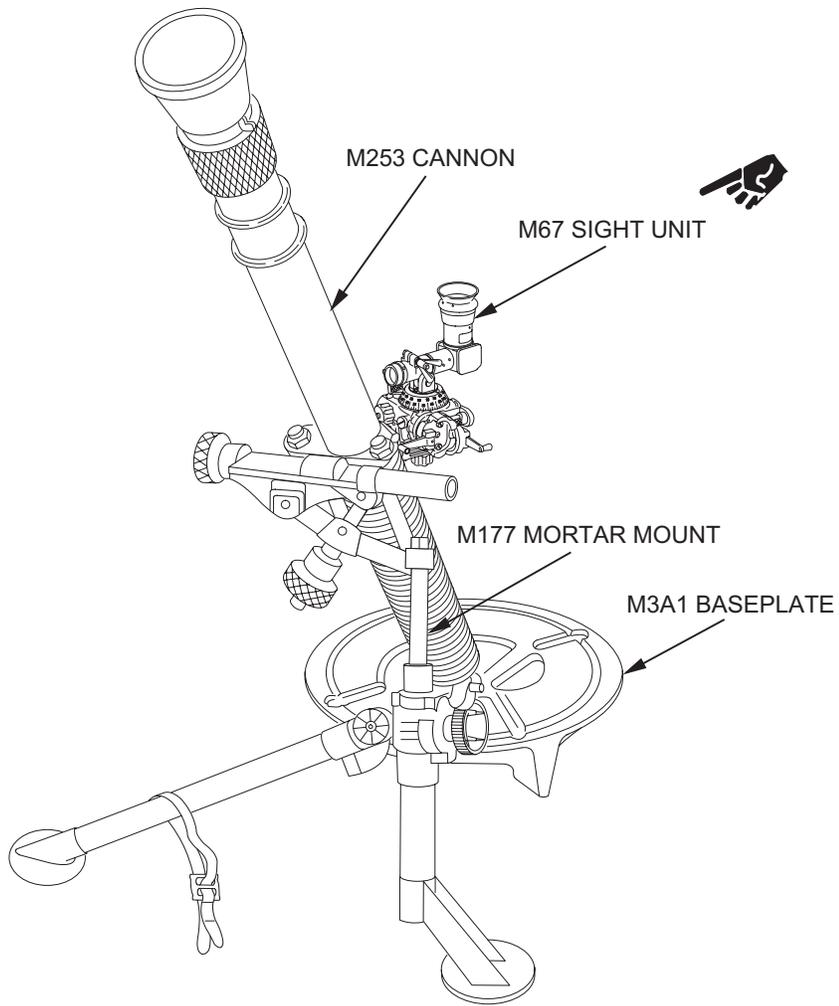
e. **REFERENCES.** These are other technical publications you will need in order to do the task. Full titles of these publications are found in Appendix A. This heading will only appear when other references are required.

### **HOW IS THE MAINTENANCE TASK ORGANIZED?**

The maintenance procedure is arranged so it will be performed in the most logical and recommended manner. Besides the information already discussed, categories such as inspection, service, disassembly, lubrication, repair, and reassembly will be listed. Specific instructions will be given to perform that part of the maintenance procedure. Be sure to follow all the steps given and do not skip any categories unless you are absolutely sure that they are not required for the completion of your maintenance task.

## **AM I READY TO USE THIS TM?**

If you have taken the time necessary to read this section, and are sure of the location and arrangement of the different sections of the TM, then you are ready to begin. Remember, this TM has been arranged with you, the user, in mind. Your safety and ability to perform the necessary tasks in the most efficient manner possible are most important. Finally, always check with your supervisor for approval that you are fully prepared to use this manual. If you follow all of the above guidelines and suggestions given in this section, you will have no trouble when using this manual and it will provide the maintenance information necessary to keep this weapon system operating in the manner for which it was designed.



**M252 81-MM MORTAR**

# CHAPTER 1

## INTRODUCTION

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### Section I. GENERAL INFORMATION

1-1. SCOPE.

- a. Type of Manual: Organizational and direct support maintenance.
- b. Model Number and Equipment Name: M252 81-MM Mortar.
- c. Purpose of Equipment: Provides a high-angle fire support system for use against a variety of ground targets.

1-2. MAINTENANCE FORMS, RECORDS, AND REPORTS. Department of the Army forms and procedures used for equipment maintenance will be those prescribed by DA PAM 750-8, The Army Maintenance Management System (TAMMS) Users Manual. Marine Corps personnel refer to the on-line MCPDS or Marine Corps Stocklist SL-1-2 Index of Technical Publications.

Marine Corps users/maintainers will use the forms, records, and procedures used for equipment maintenance as prescribed by TM 4700-15/1, Equipment Record Procedures.

1-3. DESTRUCTION OF ARMY/USMC MATERIEL TO PREVENT ENEMY USE. Procedures and materials used for the destruction of the mortar to prevent enemy use will be found in TM 750-244-7.

1-4. PREPARATION FOR STORAGE OR SHIPMENT. Refer to Chapter 2, Section VI.

1-5. OFFICIAL NOMENCLATURE, NAMES, AND DESIGNATIONS. The following list includes nomenclature cross-references used in this manual.

#### NOMENCLATURE CROSS-REFERENCE LIST

<u>Common Name</u>	<u>Official Nomenclature</u>
Barrel	M253 81-mm cannon
Barrel clamp assembly	Gun component retainer
Bearing cap	Protective plug cap
Bipod	M177 mortar mount
Blast attenuator device	Flash suppressor device
Buffer cylinder	Mechanical housing
Buffer spring housing	Mechanical housing
Cross leveling mechanism	Mechanical actuator assembly
Elevating shaft	Shouldered shaft assembly
Housing cap	Protective plug cap
Outer traversing sleeve	Shouldered shaft
Spring seating collar	Retaining collar

1-6. REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATIONS (EIRs).

**Army:** If your M252 81-mm mortar needs improvement, let us know. Send us an EIR. You, the user, are the only one who can tell us what you don't like about your equipment. Let us know why you don't like the design or performance. Put it on an SF 368 (Product Quality Deficiency Report). Mail it to us at Commander, U.S. Army Armament Research, Development and Engineering Center, ATTN: AMSTA-AR-QAW-A (R)/Customer Feedback Center, Rock Island, IL 61299-7300 (FAX: DSN 793-6653, Commercial (309) 782-6653) (E-mail: qawqdrs@ria.army.mil). A reply will be furnished to you.

**Marine Corps Users/Maintainers:**

If the M252 81-mm Mortar has been damaged during shipment, if shipment is incomplete, if incorrect item is received, or if incorrect quantity of Marine Corps Supply System Responsibility (SSR), Marine Corps Collateral Material (CM), or Marine Corps Using Unit Responsibility (UUR) items are received, submit a Supply Discrepancy Report SF 364 in accordance with SECNAVINST 4355.18.

If your M252 Mortar has deficiencies in materiel or design or nonconforming conditions which limit or prohibit the item from fulfilling its intended purpose, submit a Product Quality Deficiency Report (PDQR) SF 368 in accordance with MCO 4855.10, Product Quality Deficiency Report, and TM 4700-15/1, Equipment Record Procedures. Mail it to: Commander (Code 808-1), Marine Corps Logistics Bases, 814 Radford Blvd, Albany, GA 31704-1128 (Telephone: DSN 567-5292/5482, Commercial (912) 439-5292/5482; FAX: DSN 567-5631, Commercial (912) 439-5631; E-mail: mbp@ala.usmc.mil) or via Naval Message. A reply will be furnished to you.

1-7. WARRANTY INFORMATION. Some mortars are under warranty. Contact the ARDEC Warranty Control Office (WARCO) for warranty information. Point of contact is SMCAR-QAH-P, DSN 880-5817, Commercial (201) 724-5817.

1-8. TRITIUM (<sup>3</sup>H) SAFETY, CARE, AND HANDLING.

1. Purpose: These precautions implement mandatory license requirements for use and maintenance of tritium radio luminous fire control devices used on mortars.

2. Hazard Description: Radioactive tritium gas is contained in the following mortar components: M64/M64A1/M67 Sight Units and M58/M59 Aiming Post Lights. Provided are some facts about tritium exposure:

- Tritium is a potential ionizing radiation hazard.
- The tritium gas is hermetically sealed into glass tubes or vials like miniature fluorescent lamps.
- No external radiation is emitted by the vial itself since the glass effectively stops the beta particles.
- The beta radiation emitted by tritium is only a hazard if the tritium vial is broken and contaminates personnel or work areas.
- The tritium gas will quickly disperse into the surrounding air if a vial is broken. It becomes more hazardous when released into a confined space such as an arms room or unventilated room, where the tritium gas converts to tritiated water vapor.
- Tritiated water is readily absorbed by the body through inhalation, ingestion, or absorption through the skin when contact is made with contaminated surfaces or devices.

3. Identification: Mortar devices containing radioactive self-luminous vials are identified by means of radioactive warning labels. These labels should not be defaced or removed during maintenance and should be replaced immediately when necessary.
4. Control: Control of this radioactive materiel is mandated by Federal Regulation. Immediately report any suspected lost or damaged items to your Radiation Safety Officer (RSO). If your local Radiation Safety Officer cannot be reached, contact the TACOM-RI Safety Office during regular duty hours at DSN 793-2965/4594, or (309) 782-2965/4594.

LOCAL RSO: \_\_\_\_\_ PHONE: \_\_\_\_\_

5. Procedures for Handling Damaged Tritium Lamps: The following procedures shall be followed when a tritium lamp contained in a mortar component is broken or does not show illumination.

- a. If the tritium lamp is broken, cracked, or there is no illumination, immediately wrap the device in two clear plastic bags, seal with tape, and mark the bag "Broken Tritium Device – Do Not Open". Personnel handling the tritium device should wear impermeable gloves. If gloves are not available, use the inverted bag method in picking up the device. Place the potentially contaminated gloves between the first and second plastic bag prior to sealing.

- b. If skin contact is made with any device or area potentially contaminated with tritium, wash immediately (within 3 minutes) with nonabrasive soap and cold water for at least 1 minute.

- c. Notify your local RSO immediately to report the incident. Contact the base safety office or your NBC officer for the name and telephone number of the local RSO.

- d. Broken tritium sources indoors may result in tritium contamination of the areas, such as work bench table tops, ceilings, floors, etc. Personnel need to inform other persons to vacate the immediate area and secure the immediate area from entry until the RSO has determined the extent of contamination. This can only be determined by the RSO performing a wipe test survey of the potentially contaminated work surfaces/areas.

- e. Your local RSO will perform a leak test on the damaged device and related work area by performing wipe tests to determine the extent of tritium contamination. If wipe test results are in excess of 1,000 disintegrations per minute (DPM), decontaminate the area per guidance provided by the TACOM-RI licensed RSO. The local RSO will perform another wipe test after decon to be certain decontamination was successful.

6. Maintenance Precautions: This procedure is applicable to all personnel working with tritium devices, including depot and field maintenance levels.

- a. Do not attempt to repair a known broken device until it has been determined by the RSO that the device is free of tritium contamination. It may or may not be economically feasible to repair mortar components. Due to expired shelf-life, not all non-illuminated devices will have evidence of tritium contamination, but will still be handled as if they were contaminated.

- b. Check for illumination prior to maintenance in a low light or darkroom. Check the luminosity of each lamp in each device to determine the condition. If any lamp is not illuminated, do not repair. Wrap the entire device in plastic bag as outlined above and notify your RSO immediately.

- c. Wear protective gloves and perform work in a well-ventilated designated area.
- d. Wash hands immediately (within 3 minutes) with nonabrasive soap and cold water after handling a broken mortar fire control device that contains tritium modules.
- e. When mortar tritium module components are replaced during maintenance, they must be placed into a clear plastic bag, labeled radioactive tritium component, the NSN, and activity present in millicuries. The maintainer must turn in the fire control component immediately to the unit RSO for proper radioactive waste disposal and security.
- f. Spare parts to include modules containing tritium lamps must be stored in the shipping container, as received, until installation into the mortar component. Storage of radioactive items is required to be in a secured, well-ventilated area that is designated by the RSO.
- g. Additional guidance for safe handling and maintenance is located in TM 9-254, General Maintenance Procedures for Fire Control Materiel.

#### 7. Maintenance Levels:

- a. Modules containing tritium lamps can be replaced at the field maintenance level. The module encloses the tritium lamp, e.g., level vials are considered to be modules. Maintenance of mortar components containing tritium fire control involving module replacement ONLY will be performed in a controlled area designated by the installation or mission/unit RSO.
- b. Any repair requiring the removal of the tritium lamp itself from the module is prohibited by TACOM-RI NRC license. Depot level maintenance repair facilities have been established to perform more difficult repairs on fire control devices. All mortar tritium fire control devices requiring replacement of the tritium lamp(s) contained INSIDE the module will be evacuated to the appropriate Tritium Instrument Repair Facility designated by the TACOM LCMC senior health physicist as indicated below. Severely damaged devices (not economically feasible to repair) must be turned in to your installation or local RSO immediately for disposal. The following is an approved list of depot level repair Tritium Instrument Repair Facilities:

- (1) Anniston Army Depot
- (2) Fort Drum, NY
- (3) Fort Stewart, GA
- (4) Fort Bragg, NC
- (5) Fort Lewis, WA
- (6) Schofield Barracks, HI
- (7) MCLB Albany, GA
- (8) MCLB Barstow, CA
- (9) Rock Island Arsenal, Rock Island, IL

8. Posting Requirements: In accordance with Title 10 CFR Section 19.11, the following rules and regulations shall be posted in work area where mortar tritium fire control devices are repaired. Copies may be requested or further information obtained by contacting the TACOM-RI LCMC RSO/licensee, ATTN: AMSTA-CSC-ZR, Rock Island, IL 61299-7630.

**NOTE**

**Postings e and f (below) may be filed in the installation safety office for review, rather than posting them in the work area.**

- a. NRC License (TACOM license BML 12-00722-06).
- b. Standard Operating Procedures specifying maintenance procedures.
- c. NRC Form 3 (May 1999) and Reorganization Act of 1974, Section 206.
- d. Emergency contact information (local RSO and licensed RSO).
- e. 10 CFR Part 19 - Notices, Instructions, and Reports to Workers.
- f. 10 CFR Part 20 - Standards for Protection against Radiation.

1-9. CORROSION PREVENTION AND CONTROL.

a. Corrosion Prevention and Control (CPC) of Army materiel is a continuing concern. It is important that any corrosion problems with this item be reported so that the problem can be corrected and improvements can be made to prevent the problem in the future items.

b. While corrosion is typically associated with rusting of metals, it can also include deterioration of other materials such as rubber and plastic. Unusual cracking, softening, swelling, or breaking of these materials may be a corrosion problem.

1-9. CORROSION PREVENTION AND CONTROL (Cont).

c. If a corrosion problem is identified, it can be reported using Standard Form 368, Product Quality Deficiency Report. Use of key words such as "corrosion", "rust", "deterioration", or "cracking" will assure that the information is identified as a CPC problem.

d. SF Form 368, Product Quality Deficiency Report, should be submitted to the address specified in DA PAM 750-8, The Army Maintenance Management System (TAMMS) Users Manual.

## Section II. EQUIPMENT DESCRIPTION AND DATA

1-10. EQUIPMENT CHARACTERISTICS, CAPABILITIES, AND FEATURES.

a. Capabilities and Features.

- (1) Smooth bore barrel is muzzle loaded and has a removable firing pin.
- (2) Portable.
- (3) Provides high-angle fire.
- (4) Provides close range support for ground troops.
- (5) Capable of delivering various types of cartridges with a variety of fuzes at a rapid rate of fire.
- (6) M67 Sight Unit allows indirect fire capability.

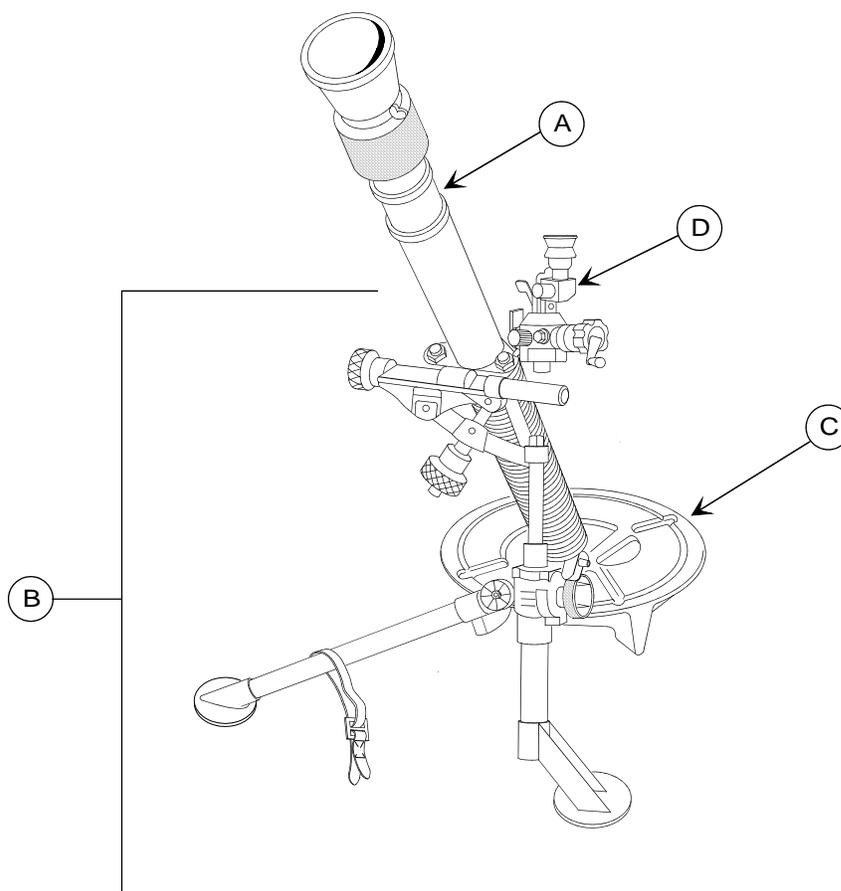
b. Major Components.

- (1) M253 Cannon.
- (2) M177 Mortar Mount (Bipod).
- (3) M3A1 Baseplate.
- (4) M67 Sight Unit.

### NOTE

**M67 sight unit is the primary sight unit. The M64/M64A1 sight unit may still be in use but is becoming obsolete. While the M67 sight unit is preferred and is illustrated in many parts of this manual, some illustrations still show the M64/M64A1 sight unit.**

1-11. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS.



- A CANNON Used to fire projectiles. Muzzle end has a blast attenuator device and breech end is finned for better cooling. Mortar serial number is engraved on the lower barrel stop end of the cannon above the cooling fins.
- B BIPOD Provides firm support for elevation, traversing, and cross leveling of the cannon. Shock is absorbed by mortar mounting buffers.
- C BASEPLATE Supports breech plug of cannon and absorbs recoil shock.
- D SIGHT UNIT Consists of an elbow telescope and a telescope mount. The sight unit is used to lay the mortar.

1-12. DIFFERENCES BETWEEN MODELS. Although some mortars may be initially fielded with the M3 Baseplate, the M3A1 Baseplate is the only authorized replacement.

1-13. EQUIPMENT DATA. Refer to TM 9-1015-249-10/TM 09922A-10/1.

#### 1-14. PREEMBARKATION INSPECTION PROCEDURES.

Preembarkation standards also apply to return of equipment to user, operational readiness floats, and return of items to supply system.

Fire control instruments must be inspected for outward appearance, mechanical condition, proper operation, and illumination of radioactive light sources.

Instruments must approach new equipment standards of operation and appearance. The workmanship and quality must reflect the highest standards obtainable. The tritium light source must exhibit proper illumination and be free of any apparent damage.

See TB 9-1000-247-34 for further instructions and equipment requirements.

#### **Specific Instructions**

Fire control instruments must conform to the following specifications for overseas shipment:

a. Condition of optical element. Lenses, prisms, reticles, and windows must be free from dirt, scratches, pits, and chips that will affect optical performance of the instrument and must exhibit proper illumination of radioactive light sources.

b. Functioning of mechanical parts. Mechanical parts must operate smoothly without binding or rough motion. Parts must be free from grit and must be properly lubricated.

c. Illumination of radioactive parts. The level vials, reticles, and counter dials must illuminate properly. Refer to illumination test on page 1-3.

d. General appearance and condition of the instrument:

(1) All parts of the instrument must be present and free from defects.

(2) Paint must cover all specified surfaces. Repaint if painted surfaces show signs of damage.

(3) All optics must be free from any internal dirt and moisture. Excessive dirt or moisture indicates a breakdown in sealing and is cause for rejection of the instrument.

(4) All scales must be easily read. All numbers and divisions must be clearly defined.

(5) Any fire control instrument failing to meet the requirements of the final inspection is unsatisfactory for overseas shipment.

### **Section III. PRINCIPLES OF OPERATION**

1-15. M252 81-MM MORTAR. Refer to TM 9-1015-249-10/TM 09922A-10/1 and FM 23-90.

## CHAPTER 2

### UNIT MAINTENANCE INSTRUCTIONS

#### Section I. REPAIR PARTS, SPECIAL TOOLS, TEST, MEASUREMENT, AND DIAGNOSTIC EQUIPMENT (TMDE), AND SUPPORT EQUIPMENT

- 2-1. COMMON TOOLS AND EQUIPMENT. For authorized common tools and equipment, refer to the Modified Table of Organization and Equipment (MTOE), CTA 50-970, or CTA 8-100, as applicable to your unit.
- 2-2. SPECIAL TOOLS, TMDE, AND SUPPORT EQUIPMENT. Tools and test equipment are listed in appendix B. Special tools authorized at unit level are listed in appendix C. Instructions and illustrations for fabricated tools are found in appendix E.
- 2-3. REPAIR PARTS. Repair parts are listed and illustrated in appendix C.

#### Section II. SERVICE UPON RECEIPT

- 2-4. SERVICE UPON RECEIPT OF MATERIEL.
- a. Inspect the equipment for damage incurred during shipment. If the equipment has been damaged, report the damage on SF 364, Report of Discrepancy (ROD). USMC users refer to MCO 4610.19.
  - b. Check the equipment against the packing slip to see if the shipment is complete. Report all discrepancies in accordance with the instructions of DA PAM 750-8. USMC users refer to MCO 4430.3.
  - c. Check to see whether the equipment has been modified. Refer to the authorized equipment configuration changes listed in DA PAM 750-10 and DA PAM 25-30.

**Table 2-1. SERVICE UPON RECEIPT FOR 81-MM MORTAR, M252**

LOCATION	ITEM	ACTION	REMARKS
1. Mortar	a. Cannon	Make sure cannon is properly assembled, cleaned, and lubricated. Copy serial number from cannon onto DA Form 2408-4. (USMC users shall use NAVMC 10558A.)  Attach blast attenuator device.	See TM 9-1015-249-10/ TM 09922A-10/1 for proper assembly and lubrication.  See para 2-13.

**Table 2-1. SERVICE UPON RECEIPT FOR 81-MM MORTAR, M252 - Continued**

LOCATION	ITEM	ACTION	REMARKS
1. Mortar (Cont)	b. Bipod	Make sure bipod is properly assembled and lubricated. Check for any missing parts or damage.	See TM 9-1015-249-10/ TM 09922A-10/1 for proper assembly and lubrication.
		Mark and match bipod with specific cannon tube to facilitate and confirm scheduled service on assembly.	See Unit Preventive Checks and Services, item 2e.
	c. Baseplate	Make sure baseplate is not damaged.	See TM 9-1015-249-10/ TM 09922A-10/1.
2. Container	a. Basic Issue Items	Check for missing items.	See TM 9-1015-249-10/ TM 09922A-10/1.
	b. M67 Sight Unit	Check for missing or damaged parts.	See TM 9-1015-249-10/ TM 09922A-10/1.

**Section III. UNIT PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)**

2-5. GENERAL. The required Unit PMCS procedures are listed in table 2-2. These services should be performed by the unit armorer with the crew's assistance. Perform PMCS every 90 days if the weapon has not been used during that time.

**Table 2-2. UNIT PREVENTIVE MAINTENANCE CHECKS AND SERVICES FOR 81-MM MORTAR, M252**

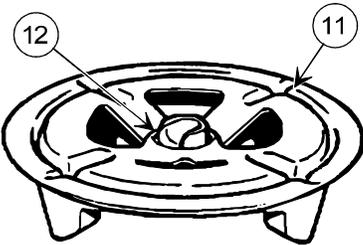
Item No.	Interval	Location	Procedure	Not Fully Mission Capable if:
		Item to be Checked/ Serviced		
1	Quarterly	Cannon	a. Check cannon (1) for unusual wear and damage in bore or corrosion and damage to external surface. Check for loose, missing, or damaged parts on cannon or blast attenuator device (2). Check for damaged cooling fins. Marine Corps only: Perform bore straightness test (para 2-11).	Cannon has cracks, dents, bulges, unusual wear, loose, missing, or damaged parts. Marine Corps only: Cannon tube fails bore straightness test.

**Table 2-2. UNIT PREVENTIVE MAINTENANCE CHECKS AND SERVICES FOR 81-MM MORTAR, M252 - Continued**

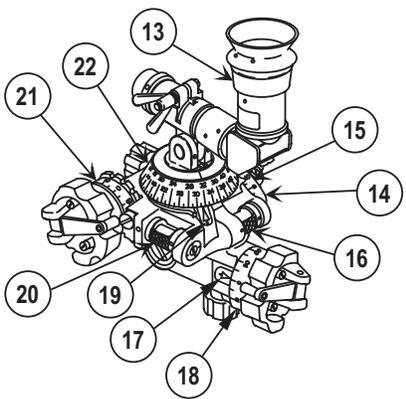
Item No.	Interval	Location	Procedure	Not Fully Mission Capable if:
		Item to be Checked/ Serviced		
1 (Cont)		Cannon (Cont)	<p>b. Remove breech plug (3). Check firing pin (4) for damage and correct protrusion. Check breech plug for erosion and for tightness when reassembled.</p> <p>c. Check that cannon tube has been borescoped and pullover gaged prior to firing. Refer to TM 9-1000-202-14. Notify support maintenance if necessary.</p>	<p>Firing pin is damaged or fails protrusion test. Breech plug has condemning erosion or will not stay tight.</p> <p>Borescope and pullover gage requirements have not been met.</p>
2	Quarterly	Bipod	<p>a. Check bipod (5) (including mortar mount leg) for cracks, broken welds, rust, and loose, missing, or damaged parts.</p> <p>b. Elevating mechanism assembly (6), traversing mechanism assembly (7), and cross leveling mechanism (8) must operate smoothly and without binding through entire range of travel, with less than 1/8 turn of backlash.</p> <p>c. Test function of mortar mounting buffers (9) by pulling down on both of them at the same time; they should return to the original position when released. Check that buffers recoil and counter recoil, without any free play, or slackness.</p>	<p>Bipod has cracks, broken welds, loose, missing, or damaged parts.</p> <p>Elevating mechanism assembly, traversing mechanism assembly, or cross leveling mechanism is inoperative or binding. Backlash exceeds 1/8 turn.</p> <p>Mortar mounting buffers inoperative or binding, or do not recoil properly.</p>

**Table 2-2. UNIT PREVENTIVE MAINTENANCE CHECKS AND SERVICES  
 FOR 81-MM MORTAR, M252 - Continued**

Item No.	Interval	Location	Procedure	Not Fully Mission Capable if:
		Item to be Checked/ Serviced		
2 (Cont)		Bipod (Cont)	d. Barrel clamp assembly (10) must operate properly and hold cannon securely.	Barrel clamp assembly is inoperative or doesn't hold cannon securely.
			e. Check mortar mount to ensure support maintenance has performed semi-annual service.	Mortar mount has not had semi-annual service.
3	Quarterly	Baseplate	a. Check baseplate (11) for cracks, broken welds, loose, missing, or damaged parts.	Baseplate has cracks, broken welds, loose, missing, or damaged parts.
			b. Ensure that baseplate socket (12) rotates smoothly 360°.	Baseplate socket does not rotate smoothly 360°.
			c. Disassemble and clean baseplate and all components.	
4	Quarterly	M67 Sight Unit	<p style="text-align: center;"><b>WARNING</b></p>  <p style="text-align: center;"><b>RADIATION HAZARD - TRITIUM (<sup>3</sup>H)</b>                      Radioactive contamination may occur if vials containing tritium gas are broken. If vials are broken or if illumination is not present, notify the local RSO or TACOM-RI RSO. See instructions in warning summary on page c.</p>	



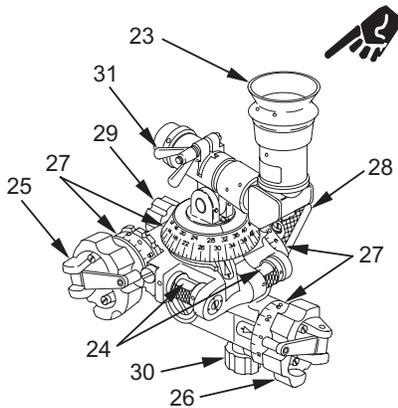
**Table 2-2. UNIT PREVENTIVE MAINTENANCE CHECKS AND SERVICES  
FOR 81-MM MORTAR, M252 - Continued**

Item No.	Interval	Location	Procedure	Not Fully Mission Capable if:
		Item to be Checked/ Serviced		
4 (Cont)		M67 Sight Unit (Cont)	 <p>a. There are ten items on the sight unit that are radioactively illuminated. Check the ten items listed below in a darkened area. If they are damaged or not illuminated, notify the RSO. See instructions in warning summary on page c.</p> <ul style="list-style-type: none"> <li>13. Telescope</li> <li>14. Coarse elevation scale</li> <li>15. Coarse elevation index arrow</li> <li>16. Cross level vial</li> <li>17. Fine elevation index arrow</li> <li>18. Fine elevation scale</li> <li>19. Coarse deflection index arrow</li> <li>20. Elevation vial</li> <li>21. Fine deflection scale</li> <li>22. Coarse deflection scale</li> </ul>	Items are damaged or not illuminated.



**Table 2-2. UNIT PREVENTIVE MAINTENANCE CHECKS AND SERVICES  
 FOR 81-MM MORTAR, M252 - Continued**

Item No.	Interval	Location	Procedure	Not Fully Mission Capable if:
		Item to be Checked/ Serviced		
4 (Cont)		M67 Sight Unit (Cont)	<p>b. Check eyeshield (23) for damage. Check lenses and windows for moisture, fungus, chips, dirt, lint, cement separation, and missing coating.</p> <p>c. Check that level vials (24) are not cracked, broken, or loose.</p> <p>d. Check the azimuth and elevation control knobs (25 and 26) for free and easy operation throughout entire range.</p> <p>e. Check index scales and lines (27). They must be clear and distinct.</p> <p>f. Check that dovetail locking lever (28) is not broken, and secures sight unit to dovetail adapter.</p> <p>g. Check that azimuth and elevation control knobs (25 and 26) stay in position when locking knobs (29 and 30) are tightened. Backlash of control knobs must not exceed 0.5 mil.</p> <p>h. Check that clamping mechanism (31) secures elbow telescope to telescope mount.</p>	<p>Lenses or windows exhibit moisture, fungus, chips, dirt, lint, cement separation, or missing coating.</p> <p>Level vials are cracked, broken, or loose.</p> <p>Knobs do not turn or have excessive backlash.</p> <p>Scales and lines cannot be read.</p> <p>Locking lever broken or does not secure sight unit.</p> <p>Azimuth or elevation control knob slips when locking knob is tightened. Backlash exceeds 0.5 mils.</p> <p>Clamping mechanism does not secure elbow telescope.</p>



## Section IV. UNIT TROUBLESHOOTING

### 2-6. GENERAL.

a. This section contains troubleshooting information for locating and correcting most of the operating troubles which may develop in the mortar. Each malfunction for an individual component, unit, or system is followed by a list of tests/inspections which will help you to determine corrective actions to take. Perform the tests/inspections and corrective actions in the order listed.

b. This section cannot list all possible malfunctions that may occur nor all tests/inspections and corrective actions. If a malfunction is not listed (except when malfunction and cause are obvious) or is not correctable by the listed corrective actions, notify your supervisor.

### 2-7. TROUBLESHOOTING PROCEDURES.

a. Refer to the troubleshooting symptom index on this page.

b. Use the symptom index for a quick reference to symptoms covered in table 2-3.

### SYMPTOM INDEX

	<b>Troubleshooting Procedure</b>
Baseplate socket is frozen or difficult to rotate .....	7
Binding in cross leveling mechanism.....	5
Excessive backlash in traversing, elevating, or cross leveling handwheels .....	6
Mortar does not recoil properly .....	4
Mortar fails to fire .....	1
Mortar is difficult to elevate or depress .....	3
Mortar is difficult to traverse.....	2
Poor visibility in sight unit lens .....	9
Sight unit controls do not operate .....	10
Sight unit will not seat in dovetail adapter.....	8

Table 2-3. UNIT TROUBLESHOOTING PROCEDURES

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
-------------	--------------------	-------------------

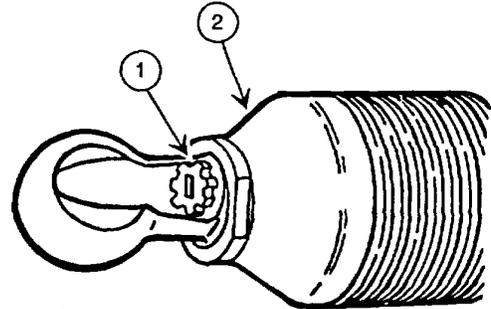
**1. MORTAR FAILS TO FIRE.**

Step 1. Check for worn, damaged, or improperly seated firing pin (1).

Replace firing pin if worn or damaged (para 2-11). Reseat if improperly seated.

Step 2. Check for damaged barrel (2).

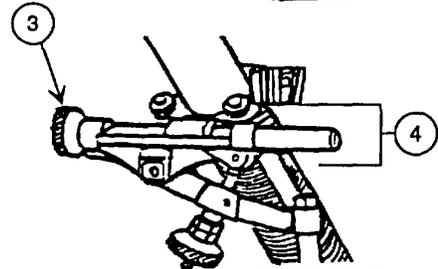
If damaged, evacuate to direct support maintenance. Clean if dirty.



**2. MORTAR IS DIFFICULT TO TRAVERSE.**

Turn traversing handwheel (3) and check traversing mechanism assembly (4) for binding or inoperative parts.

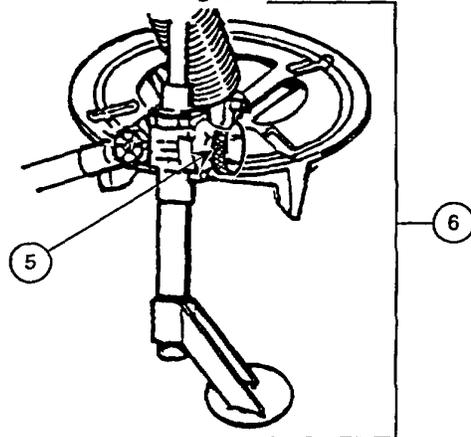
Evacuate to direct support maintenance.



**3. MORTAR IS DIFFICULT TO ELEVATE OR DEPRESS.**

Check elevating handwheel (5) and check for binding or inoperative parts.

Replace entire elevating mechanism assembly (6) (para 2-13).



**4. MORTAR DOES NOT RECOIL PROPERLY.**

Check for bent or damaged mortar mounting buffers (7).

Replace mortar mounting buffers (para 2-13).

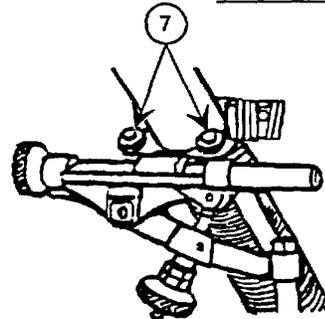


Table 2-3. UNIT TROUBLESHOOTING PROCEDURES - Continued

**MALFUNCTION**

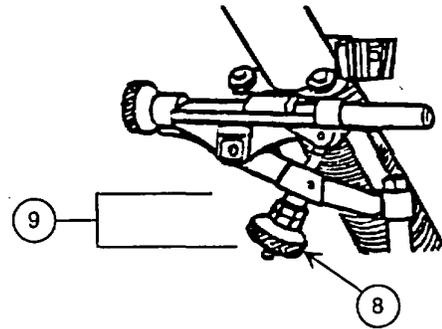
**TEST OR INSPECTION**

**CORRECTIVE ACTION**

**5. BINDING IN CROSS LEVELING MECHANISM.**

Turn cross leveling handwheel (8) and check cross leveling mechanism (9) for binding or inoperative parts.

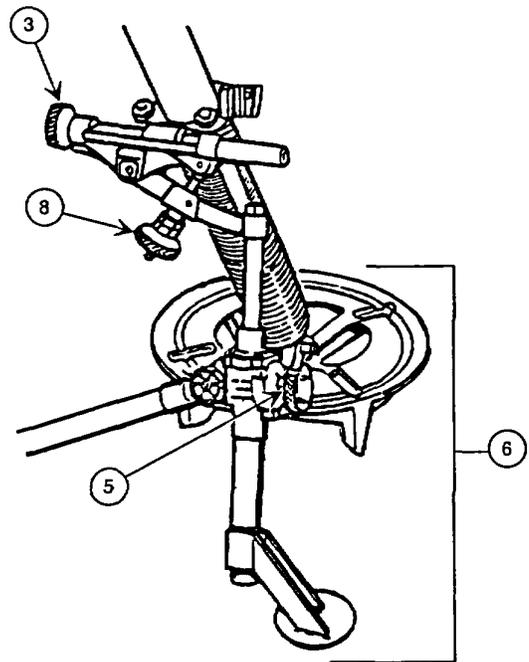
Evacuate to direct support maintenance.



**6. EXCESSIVE BACKLASH IN TRAVERSING, ELEVATING, OR CROSS LEVELING HANDWHEELS.**

Check if backlash in the traversing handwheel (3), the elevating handwheel (5), and the cross leveling handwheel (8) is greater than one-eighth of a turn (450).

If backlash in the elevating handwheel (5) exceeds limits, replace elevating mechanism assembly (6). If backlash in the traversing handwheel (3) or the cross leveling handwheel (8) exceeds limits, evacuate to direct support maintenance.



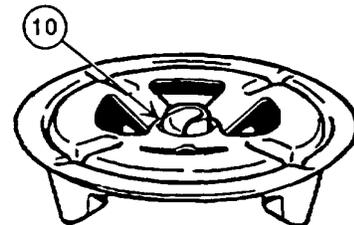
**7. BASEPLATE SOCKET IS FROZEN OR DIFFICULT TO ROTATE.**

Step 1. Check for dirt or foreign matter in baseplate socket (10).

Disassemble and clean thoroughly (para 2-14).

Step 2. Check for worn or broken parts.

Replace worn or broken parts (para 2-14).



**Table 2-3. UNIT TROUBLESHOOTING PROCEDURES - Continued**

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
-------------	--------------------	-------------------

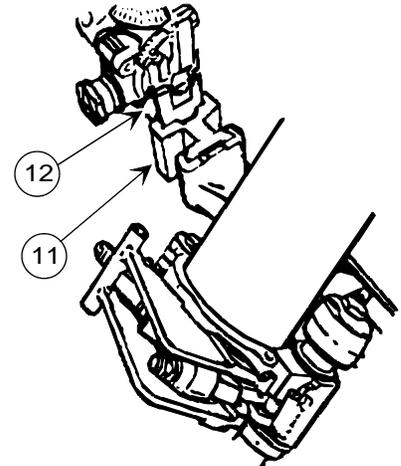
**8. SIGHT UNIT WILL NOT SEAT IN DOVETAIL ADAPTER.**

Step 1. Check for broken or bent dovetail adapter (11).

Replace dovetail adapter (para 2-13).

Step 2. Check for broken or bent dovetail (12) on sight unit.

Replace telescope mount if dovetail is broken or bent (para 2-15).



**9. POOR VISIBILITY IN SIGHT UNIT LENS (USMC ONLY).**

Step 1. Check lens for cracks or breaks.

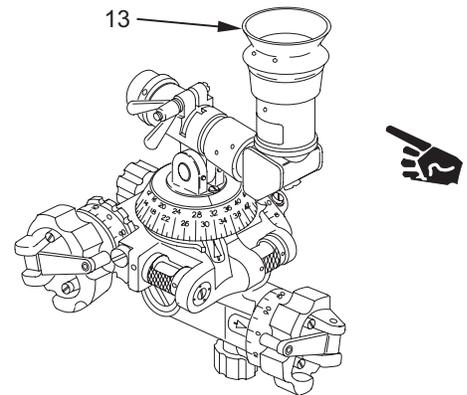
Replace elbow telescope (13) (para 2-15).

**CAUTION**

**Do not apply heat directly to sight unit lens.**

Step 2. Check lens for moisture.

Place sight unit in a warm area to see if moisture clears. If it doesn't, replace elbow telescope (13) (para 2-15).



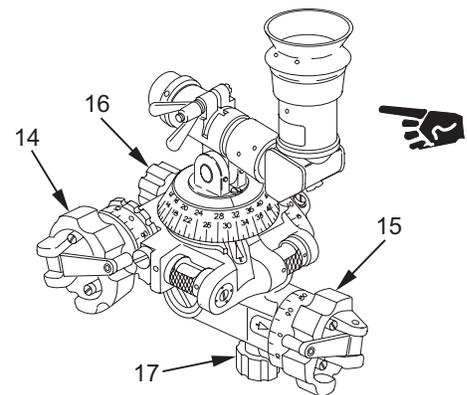
**10. SIGHT UNIT CONTROLS DO NOT OPERATE (USMC ONLY).**

Step 1. Check azimuth and elevation control knobs (14 and 15) for operation.

Replace telescope mount if knobs are inoperative (para 2-15).

Step 2. Check azimuth and elevation locking knobs (16 and 17) for operation.

Replace telescope mount if knobs are inoperative (para 2-15).



## Section V. UNIT MAINTENANCE PROCEDURES

### WARNING

Before performing maintenance procedures, be sure to clear the weapon. Do not actuate the trigger until the weapon has been cleared. Inspect the bore to make sure it is empty and free of obstructions. Keep live ammunition out of the area during maintenance operations.

Dented barrels must be replaced as they are unsafe for firing (Army only). Marine Corps: Refer to paragraph 2-11, Test.

Dry cleaning solvents (SD) and paint thinners (TPM) are flammable. Do not clean parts near an open flame or in a smoking area. Make sure adequate ventilation is available. Wear safety glasses, splash goggles, and protective gloves. Always know location of nearest eye wash station. Dry cleaning solvents and paint thinners evaporate quickly and have a drying effect on the skin. When used without protective gloves, these chemicals may cause irritation to, or cracking of, the skin.

2-8. GENERAL. This section provides repair instructions for all items which are the responsibility of unit maintenance. Maintenance of the mortar at unit level consists mainly of the replacement of modules. Defective modules are then sent to the supporting field maintenance element for repair.

2-9. LUBRICATION INSTRUCTIONS. Refer to TM 9-1015-249-10/TM 09922A-10/1. Under arctic conditions, use weapons lubricating oil (LAW) (item 17, app D) instead of general purpose lubricating oil (item 16, app D).

2-10. INITIAL SETUP.

- a. Tools and Special Tools lists tools needed for the procedures.
- b. Materials/Parts refers to expendable materials and 100% replaceable parts.
- c. Personnel Required is listed only if the task requires more than one person. If Personnel Required is not listed, it means one person can do the job.
- d. References lists other publications containing necessary information.
- e. Equipment Condition lists conditions to be met before starting the procedure.

### UNIT MAINTENANCE INDEX

Item	Para
Blast Attenuator Device .....	2-12
Elbow Telescope .....	2-16
M3A1 Mortar Baseplate .....	2-14
M177 Mortar Mount and Dovetail Adapter .....	2-13
M253 81-mm Cannon .....	2-11
M67 Sight Unit .....	2-15

---

## 2-11. M253 81-MM CANNON MAINTENANCE INSTRUCTIONS.

---

This Task Covers:

- a. Test (USMC ONLY)                      b. Disassembly                      c. Cleaning/Repair                      d. Reassembly
- 

### INITIAL SETUP:

#### Tools and Special Tools:

Bore Straightness Gauge (item 4, app B)  
(USMC USE ONLY)  
Breech Mechanism Wrench (Barrel) (item 12, app B)  
Breech Mechanism Wrench (Plug) (item 14, app B)  
Firing Pin Wrench (item 13, app B)  
Small Arms Repairman Tool Kit (item 10, app B)  
Striker Protrusion Gauge (item 5, app B)

#### Personnel Required:

2 Persons

#### References:

NAVMC 10558A  
TI-4733-15/1D

#### Materials/Parts:

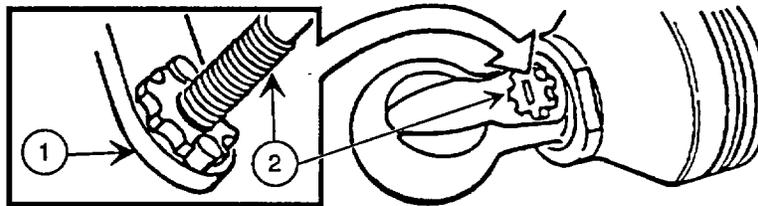
Black lacquer (item 14, app D)  
Dry cleaning solvent (item 10, app D)  
General purpose lubricating oil (item 16, app D)  
Gloves, chemical and solvent resistant (item 11, app D)  
Paint brush (item 5, app D)  
Synthetic thinner (item 26, app D)  
Wiping rag (item 22, app D)

---

### TEST (USMC ONLY)

---

1



- a. Lay the cannon tube on a suitable support.
  - b. Position firing pin wrench (1) as shown.
  - c. Unscrew and remove firing pin (2).
  - d. Clean inside of cannon tube. Check for foreign matter in barrel and wipe interior of barrel dry.
  - e. Check for cracks; broken welds; rust; and loose, missing, dented, or damaged parts on cannon tube and blast attenuator device.
-

---

**2-11. M253 81-MM CANNON MAINTENANCE INSTRUCTIONS (CONT).**

---

**TEST (USMC ONLY) (CONT)**

---

**2**

**NOTE**

**The bore straightness gauge requires annual calibration. Refer to TI-4733-15/1D.**

- a. Inspect bore straightness gauge for burrs. Burrs should be removed by hand using a fine carborundum sharpening stone.
  - b. Using a wooden rod, slowly push the bore straightness gauge through the entire length of the cannon tube. If the gauge moves freely through the cannon, the bore is free from bends or obstructions. If, however, it encounters resistance in the process, the cannon tube will have to be sent to maintenance for further evaluation.
  - c. After gauging, lightly lubricate the interior of the barrel with general purpose lubricating oil (GPL).
- 

**NOTE**

**Check to see if your weapon has been borescoped and pullover gauged within 180 days prior to firing and within 180 day intervals during firing periods.**

**Update NAVMC 10558A to reflect day's firing. After 5000 rounds fired, have weapon borescoped every 500 additional rounds.**

---

**DISASSEMBLY**

---

**1**

- a. Position firing pin wrench (1) as shown.
- b. Unscrew and remove firing pin (2).



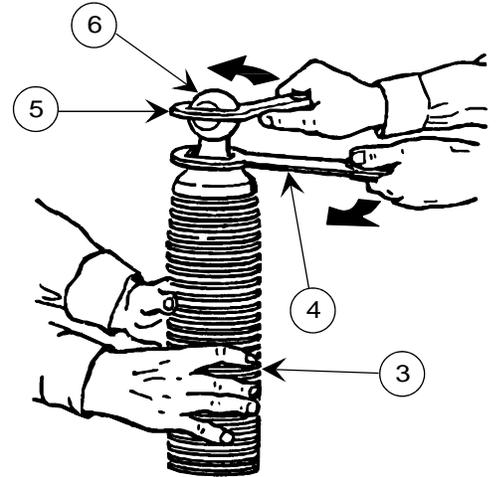
## 2

- a. Place open end of cannon (3) on flat surface, and have one mechanic hold it securely for steps b. through d.

### NOTE

**Breech mechanism wrench (barrel) is the wrench with the larger opening.**

- b. Position breech mechanism wrench (barrel) (4) on cannon (3) and position breech mechanism wrench (plug) (5) on breech plug (6) as shown.
- c. Turn breech mechanism wrench (barrel) (4) clockwise while turning breech mechanism wrench (plug) (5) counterclockwise.
- d. Unscrew breech plug (6) and remove from cannon (3).

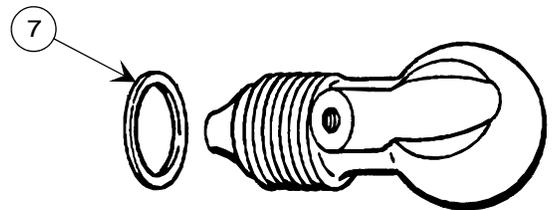


## 3

### CAUTION

**Be careful not to damage cannon when cutting thrust washer bearing.**

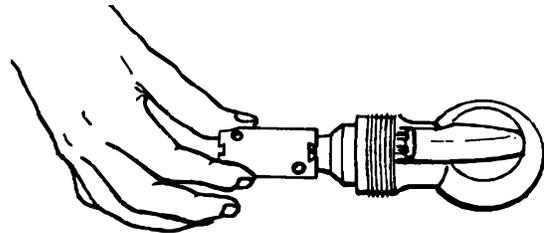
If there is evidence of gas leakage (visible discoloration), remove and replace thrust washer bearing (7). It may be necessary to carefully cut it with a chisel and hammer in order to remove it.



**2-11. M253 81-MM CANNON MAINTENANCE INSTRUCTIONS (CONT).**

**CLEANING/INSPECTION/REPAIR**

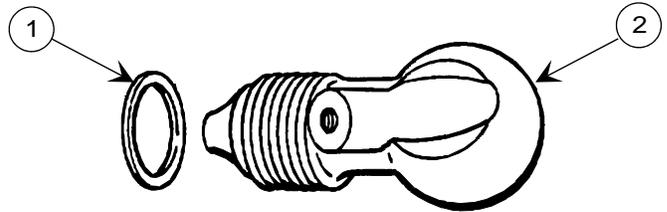
- a. Clean parts with dry cleaning solvent and wipe dry with wiping rag.
- b. Replace thrust washer bearing if evidence of gas leakage was found during disassembly. See appendix C.
- c. Replace firing pin if it is chipped, cracked, or deformed.
- d. Install firing pin in breech plug and check protrusion using striker protrusion gauge.
- e. Hold striker protrusion gauge over the firing pin with the gauge held perpendicular to, and in contact with, the front face of the breech plug.
- f. The minimum recess 0.080 in. (2.032 mm) should not clear the firing pin and the maximum recess 0.130 in. (3.302 mm) should clear the firing pin.
- g. Replace firing pin if it clears low notch on gauge or does not clear high notch. Repeat protrusion test on new firing pin.
- h. Replace breech plug if defective or damaged.
- i. Lubricate parts with general purpose lubricating oil before reassembly.
- j. Apply solid film lubricant to worn or untreated exterior surfaces as required.



**REASSEMBLY**

**1**

If removed, install a new thrust washer bearing (1) on breech plug (2).



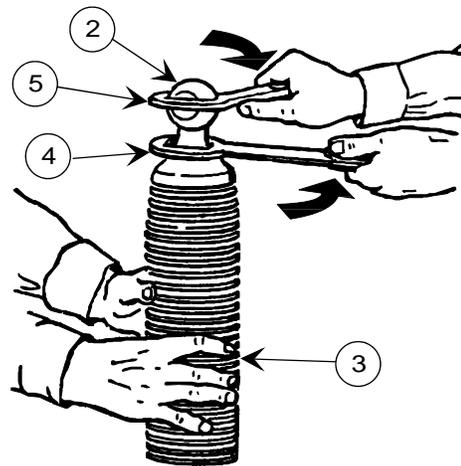
**2**

- a. Place open end of cannon (3) on flat surface and have one mechanic hold it securely for step b.

**NOTE**

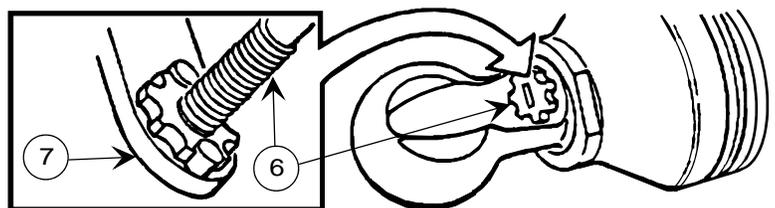
**Breech mechanism wrench (barrel) is the wrench with the larger opening.**

- b. Screw breech plug (2) onto cannon (3), using breech mechanism wrench (barrel) (4) and breech mechanism wrench (plug) (5) as shown. Tighten as much as possible without using extensions or hammering on wrenches.



**3**

- a. Install firing pin (6), using firing pin wrench (7).
- b. If necessary, touch up painted surfaces.



**2-12. BLAST ATTENUATOR DEVICE MAINTENANCE INSTRUCTIONS.**

This task covers:

- a. Disassembly                      b. Cleaning/Repair                      c. Reassembly

**INITIAL SETUP**

**Tools and Special Tools:**

Small Arms Repairman Tool Kit (item 10, app B)  
Strap Pipe Wrench (2) (item 7, Figure C-15)

**Personnel Required:**

2 Persons

**Materials/Parts:**

Black lacquer (item 14, app D)  
Dry cleaning solvent (item 10, app D)  
General purpose lubricating oil (item 16, app D)  
Gloves, chemical and solvent resistant (item 11, app D)  
Paint brush (item 5, app D)  
Solid film lubricant (item 15, app D)  
Synthetic thinner (item 26, app D)  
Wiping rag (item 22, app D)

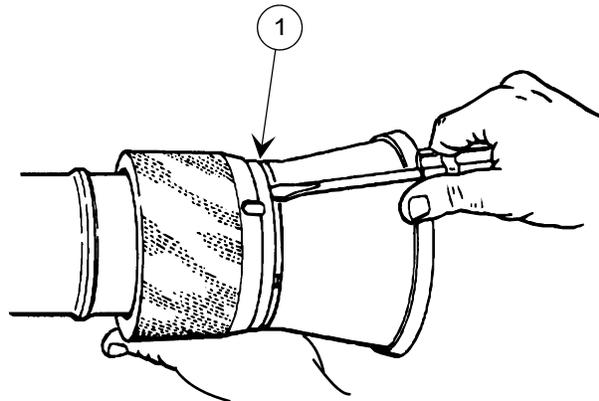
**DISASSEMBLY**

**NOTE**

**This procedure applies only to previous configuration of cannon tube.**

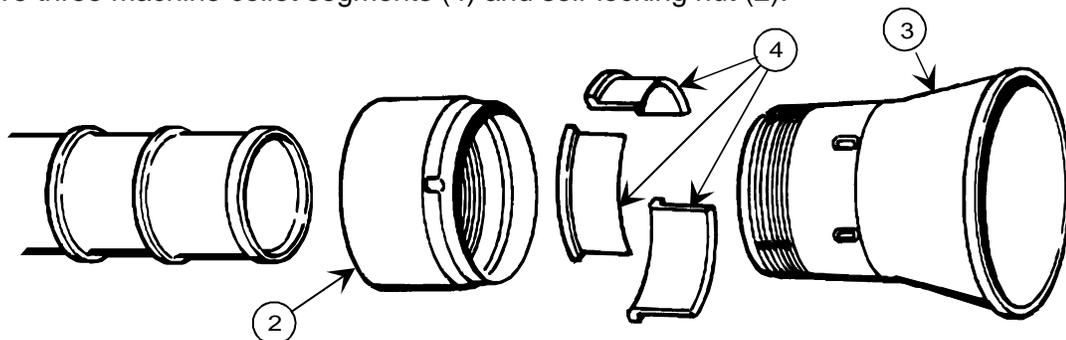
**1**

Pry up bent edge of retaining ring (1) in recess.



## 2

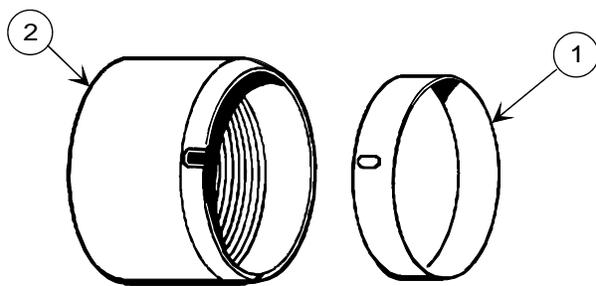
- a. With one mechanic holding the cannon tube with a strap wrench, the other mechanic, using a second strap wrench, should unscrew self-locking nut (2) and slide blast device (3) off.
- b. Remove three machine collet segments (4) and self-locking nut (2).



## CLEANING/REPAIR

## 3

Remove retaining ring (1) from self-locking nut (2).



- a. Clean parts with dry cleaning solvent and wipe dry with wiping rag.

### CAUTION

**The machine collet segments are a matched set and therefore must be replaced as a set.**

### NOTE

**The retaining ring may be used three times before it must be replaced.**

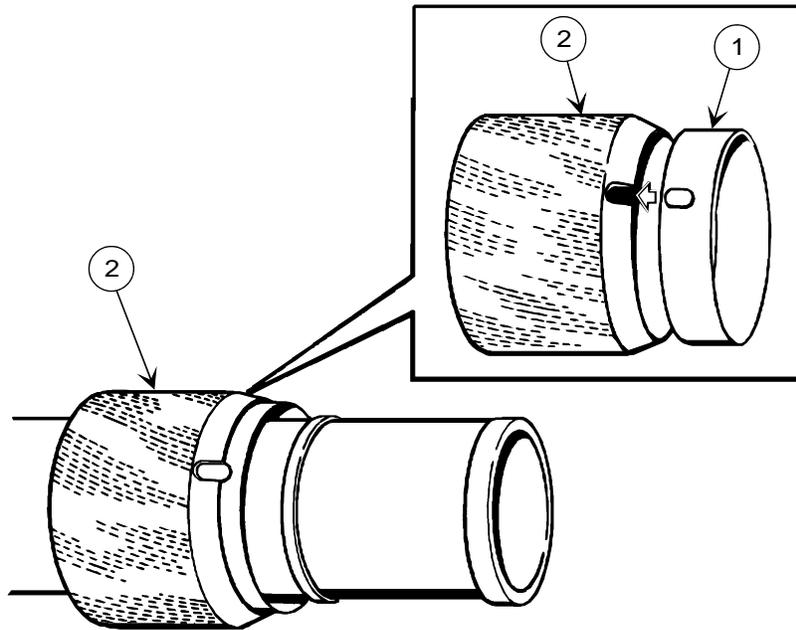
- b. Replace any damaged or defective parts. See appendix C.
- c. If blast device is damaged, replace entire blast attenuator device.
- d. Inspect exterior of cannon tube, near muzzle end, for flaking or peeling of nickel plate. Flaking or peeling of nickel plate is not criteria for condemnation.
- e. Apply solid film lubricant to worn or untreated exterior surfaces at every disassembly.
- f. Lubricate parts with general purpose lubricating oil before reassembly.

**2-12. BLAST ATTENUATOR DEVICE MAINTENANCE INSTRUCTIONS (CONT).**

**REASSEMBLY**

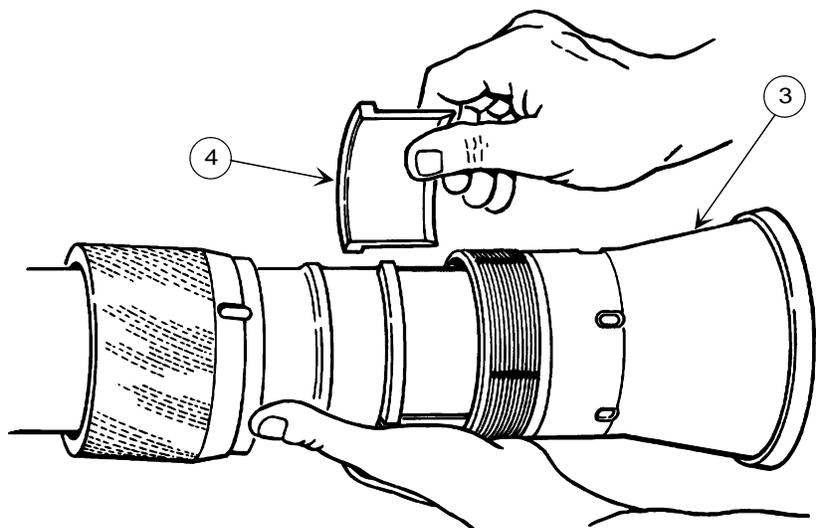
**1**

- a. Slide retaining ring (1) into self-locking nut (2), aligning tabs with slots as shown. Retaining ring (1) must be installed so that the tabs contact the bottom of the self-locking nut (2).
- b. Slide self-locking nut (2) over muzzle of cannon.



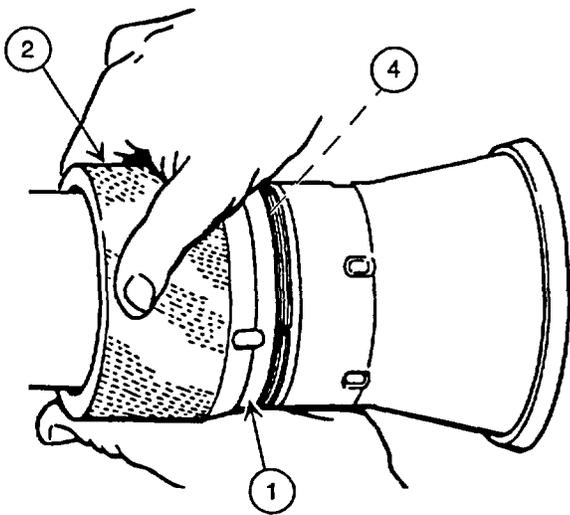
**2**

- a. Position blast device (3) on cannon.
- b. Position three machine collet segments (4) between cannon and base of blast device.



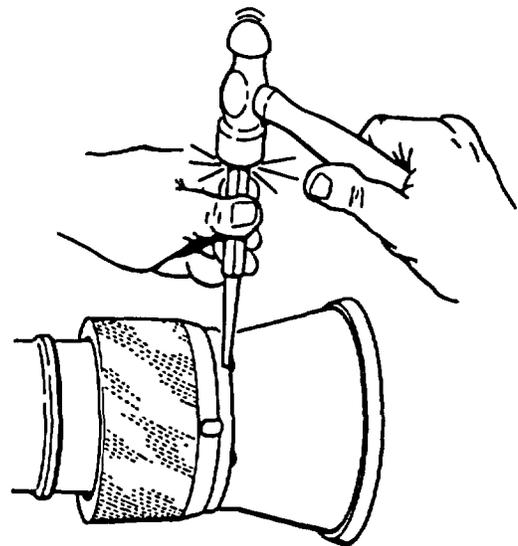
3

- a. Hold machine collet segments (4) in position and slide self-locking nut (2) up cannon barrel until self-locking nut holds machine collet segments.
- b. Install self-locking nut (2) and screw until handtight. With one mechanic holding the cannon tube with a strap wrench, the other mechanic, using a second strap wrench, will tighten self-locking nut (2) ensuring retaining ring (1) fully covers recesses.



4

- a. Drive retaining ring into two recesses on blast device 180° apart, using a punch and hammer.
- b. If necessary, touch up painted surfaces.



---

## 2-13. M177 MORTAR MOUNT AND DOVETAIL ADAPTER MAINTENANCE INSTRUCTIONS.

---

This task covers:

a. Disassembly

b. Cleaning/Repair

c. Reassembly

---

### INITIAL SETUP

Tools and Special Tools:

Fabricated Spanner Wrench (app E)  
Mechanical Puller (item 8, app B)  
Small Arms Repairman Tool Kit (item 10, app B)

### Materials/Parts:

Black lacquer (item 14, app D)  
Dry cleaning solvent (item 10, app D)  
Polyurethane coating (item 21, app D)  
General purpose lubricating oil (item 16, app D)  
Gloves, chemical and solvent resistant (item 11, app D)  
Paint brush (item 5, app D)  
Synthetic thinner (item 26, app D)  
Wiping rag (item 22, app D)

### NOTE

**M177 Mortar Mount is required to be serviced semiannually by Direct Support maintenance.**

Cotter pin MS24665-153  
Cotter pin (2) MS24665-302  
Key washer (2) 11579912  
Key washer (2) 11579916  
Self-locking nut MS51943-43

---

### DISASSEMBLY

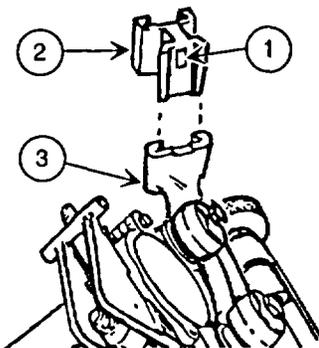
---

1

#### NOTE

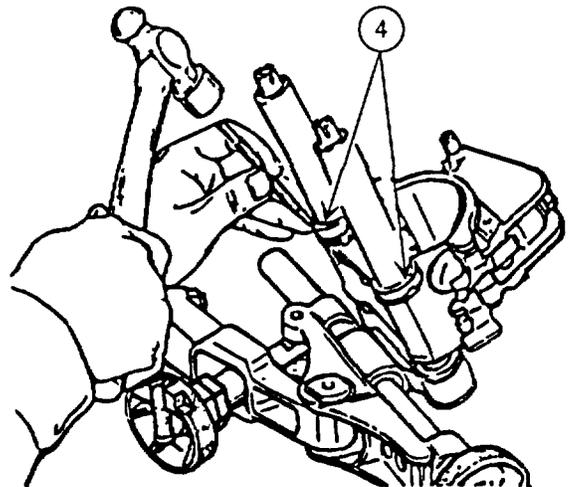
**Dovetail adapter is not to be removed unless damaged.**

Loosen setscrew (1) in dovetail adapter (2) and remove dovetail adapter (2) from traversing mechanism assembly (3). Remove setscrew (1) only if necessary for replacement.



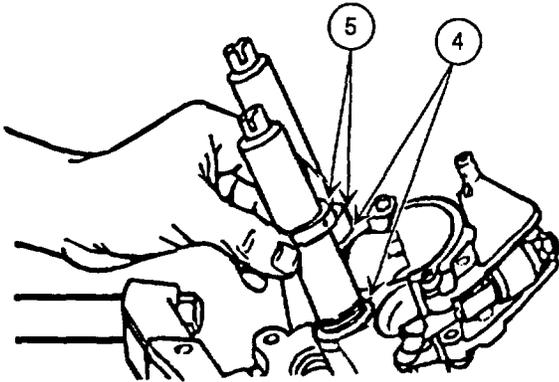
2

Flatten the areas on the two key washers (4) where they were staked, using a punch and hammer.



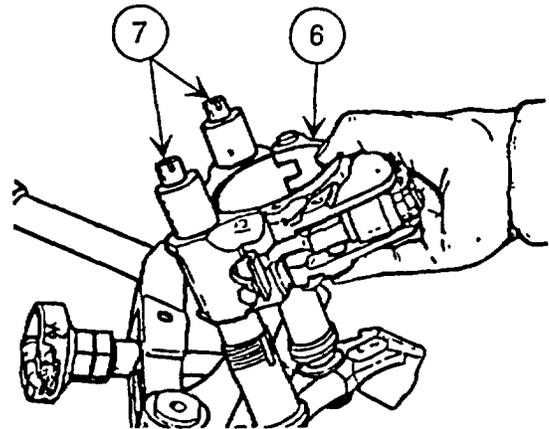
3

Loosen two round plain nuts (5) with fabricated spanner wrench and remove along with two key washers (4). Discard key washers (4).



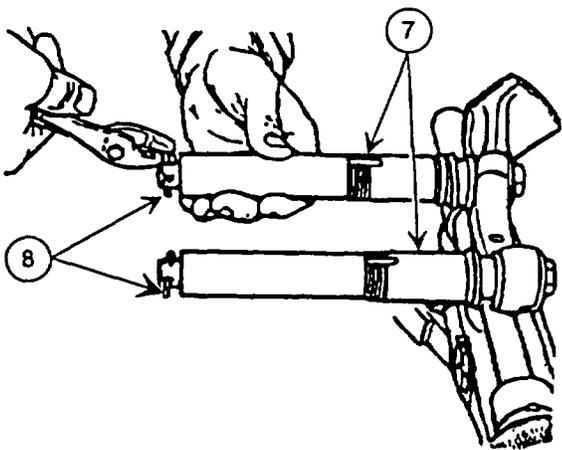
4

Remove barrel clamp assembly (6) from mortar mounting buffers (7).



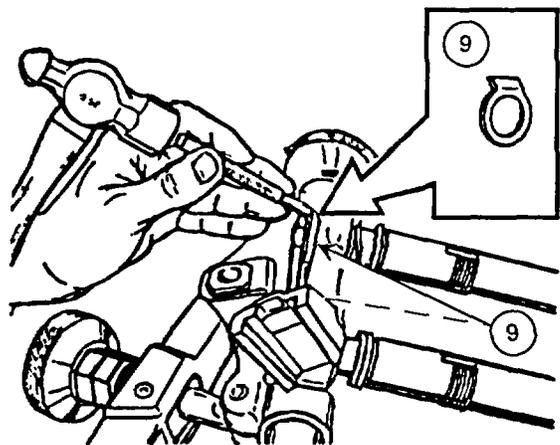
5

Remove two cotter pins (8) from mortar mounting buffers (7). Discard cotter pins (8).



6

Flatten the locking tabs on two key washers (9), using a punch and hammer.

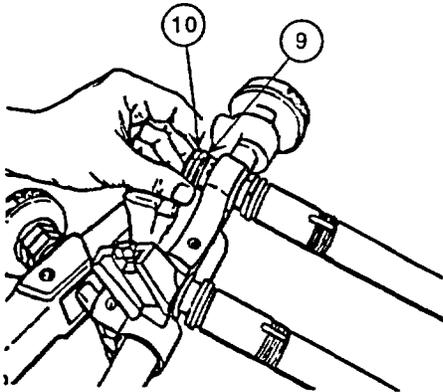


**2-13. M177 MORTAR MOUNT AND DOVETAIL ADAPTER MAINTENANCE INSTRUCTIONS (CONT).**

**DISASSEMBLY (CONT)**

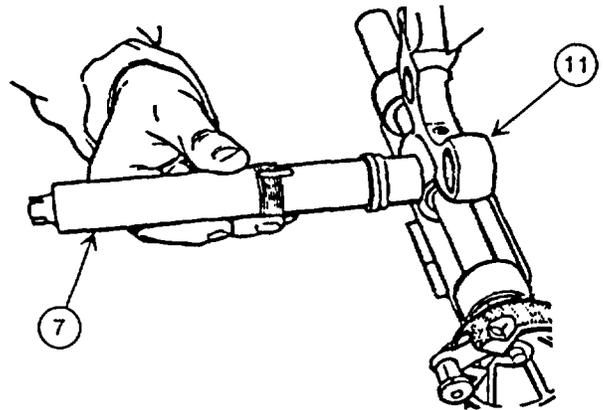
**7**

- a. Loosen two machine threaded plugs (10), using a 3/4 inch wrench.
- b. Remove machine threaded plugs (10) and two key washers (9). Discard key washers (9).



**8**

- Remove two mortar mounting buffers (7) from buffer carrier (11).

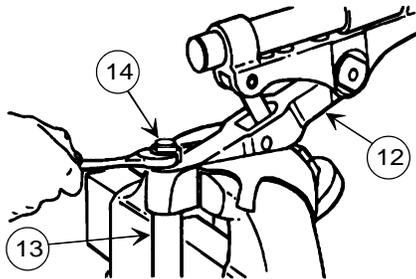


9

**CAUTION**

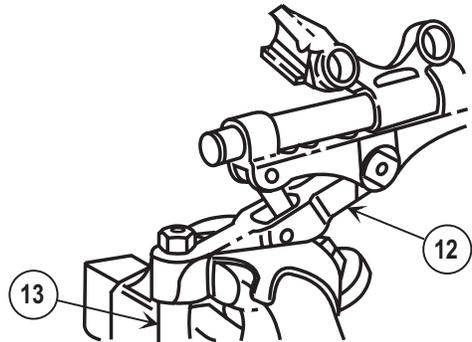
**Use a soft-jawed vise to prevent equipment damage.**

- a. Support but do not clamp cross leveling mechanism (12) on a vise or similar device. Fully extend elevating mechanism assembly (13).
- b. Loosen self-locking nut (14) with 1-1/16 inch box or open end wrench until it is flush with the top of the elevating mechanism assembly (13).



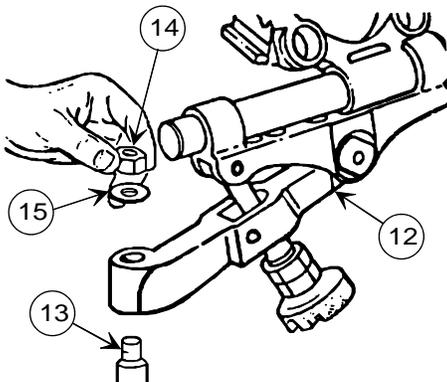
10

Using mechanical puller, loosen cross leveling mechanism (12) from elevating mechanism (13).



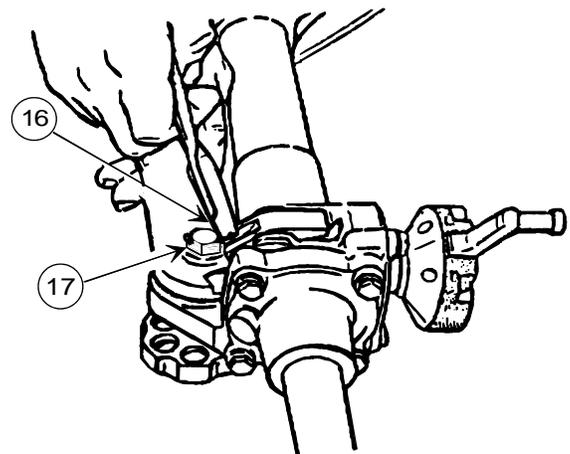
11

- a. Remove equipment from vise.
- b. Remove self-locking nut (14) and flat washer (15). Discard self-locking nut (14).
- c. Remove cross leveling mechanism (12) from elevating mechanism assembly (13).



12

Remove cotter pin (16) and hexagon slotted plain nut (17). Discard cotter pin (16).

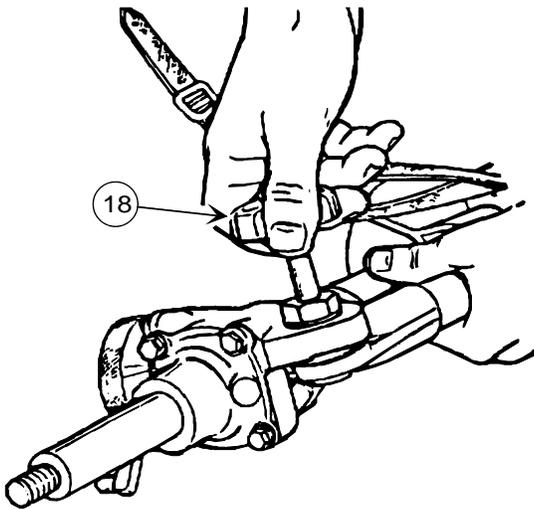


**2-13. M177 MORTAR MOUNT AND DOVETAIL ADAPTER MAINTENANCE INSTRUCTIONS (CONT).**

**DISASSEMBLY (CONT)**

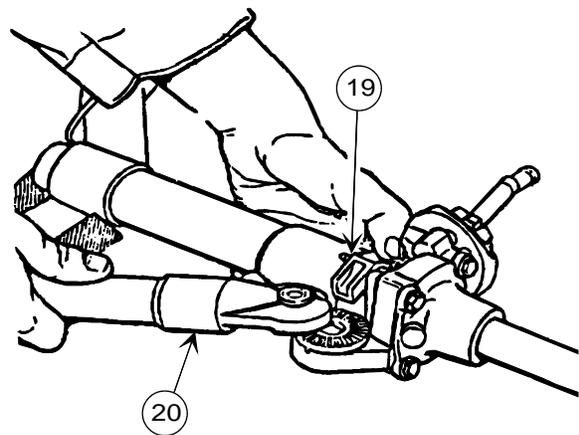
**13**

Unscrew and remove leg locking knob (18).



**14**

Depress leg locking lever (19) and remove mortar mount leg assembly (20).



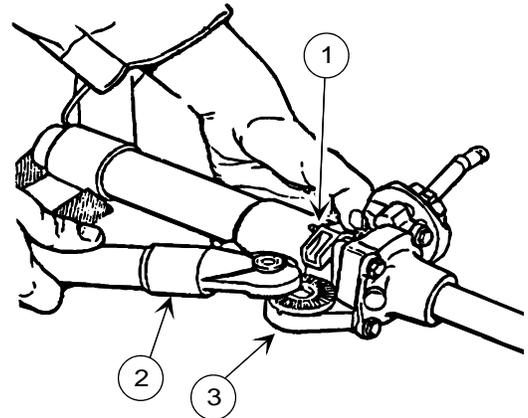
## CLEANING/REPAIR

- a. Clean parts with dry cleaning solvent and wipe dry with wiping rag.
- b. Replace damaged or defective parts. See appendix C.
- c. Lubricate parts with general purpose lubricating oil before reassembly.

## REASSEMBLY

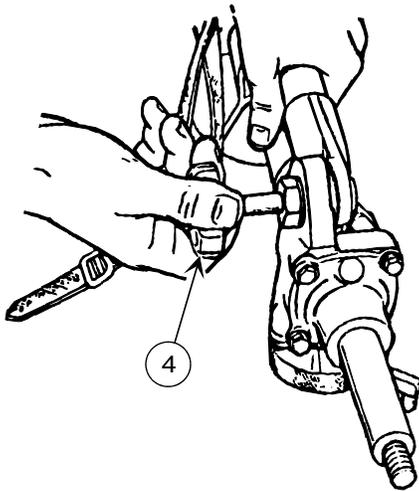
**1**

- a. Depress leg locking lever (1).
- b. Position mortar mount leg assembly (2) on elevating mechanism assembly (3) and release leg locking lever (1).



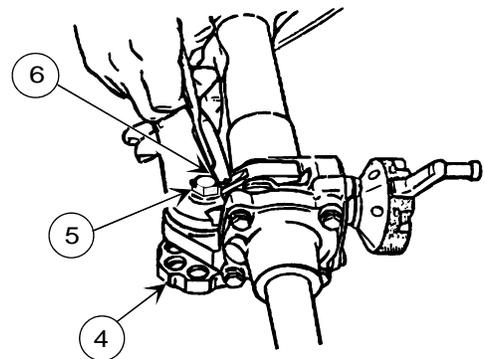
**2**

Install leg locking knob (4).



**3**

- a. Thread hexagon slotted plain nut (5) onto leg locking knob (4) and align pin holes.
- b. Install new cotter pin (6) in hexagon slotted plain nut (5).

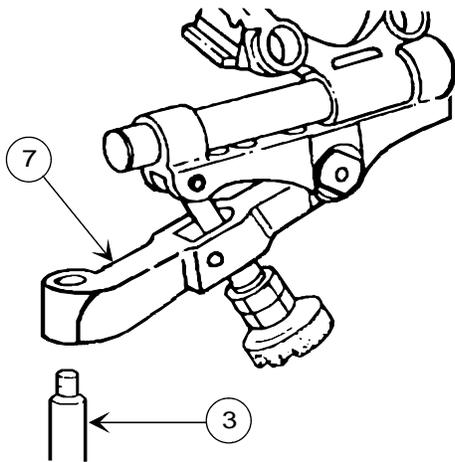


**2-13. M177 MORTAR MOUNT AND DOVETAIL ADAPTER MAINTENANCE INSTRUCTIONS (CONT).**

**REASSEMBLY (CONT)**

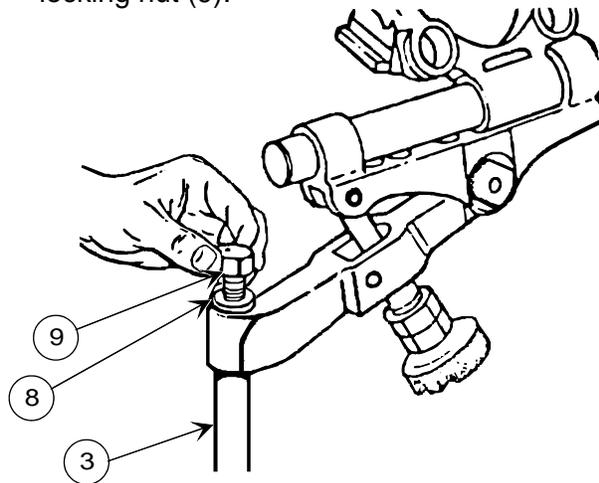
**4**

- a. Fully retract elevating mechanism assembly (3).
- b. Install cross leveling mechanism (7) on elevating mechanism assembly (3).



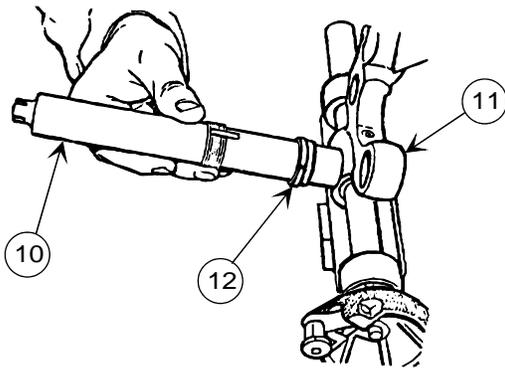
**5**

- a. Install flat washer (8) and new self-locking nut (9) on elevating mechanism assembly (3).
- b. Using a 1-1/16 inch wrench, tighten self-locking nut (9).



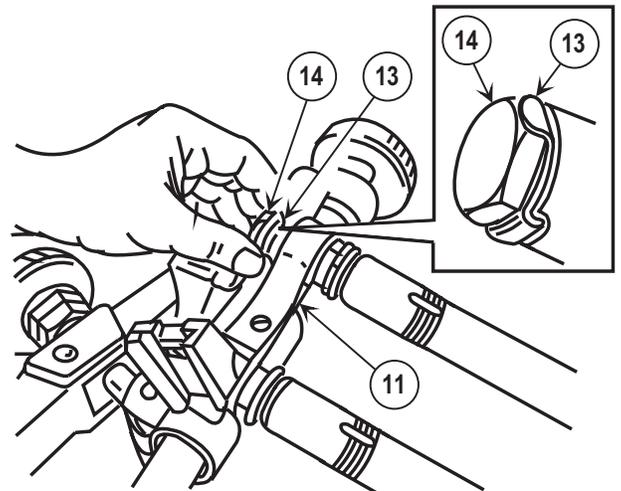
6

- a. Install two mortar mounting buffers (10) in buffer carrier (11).
- b. Make sure that locating flats (12) are correctly positioned on flat area of buffer carrier (11).



7

- a. Install two new key washers (13) so tab is in recess of buffer carrier (11). Install two machine threaded plugs (14).
- b. Bend edge of two key washers (13) to lock against the machine threaded plugs (14).

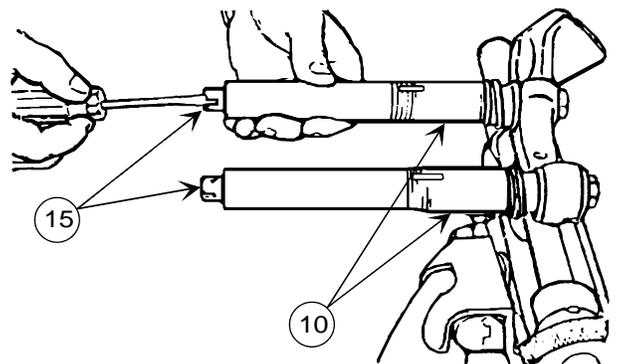


8

#### NOTE

**If correct spring tension cannot be achieved, have maintenance support (Army only) ensure bolt collars were installed correctly (para 3-11).**

- a. Unscrew two spring retaining bolts (15) until no end play is felt in the mortar mounting buffers (10).
- b. If tension has already been released in the mortar mounting buffers (10) it may be necessary to tighten, by turning clockwise, the spring retaining bolts (15) instead of releasing them.
- c. When no end play is felt, align the holes for the cotter pins with the slots in the mortar mounting buffers (10).

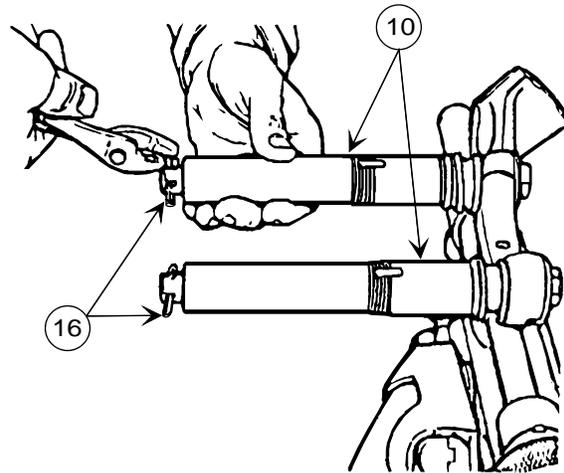


**2-13. M177 MORTAR MOUNT AND DOVETAIL ADAPTER MAINTENANCE INSTRUCTIONS (CONT).**

**REASSEMBLY (CONT)**

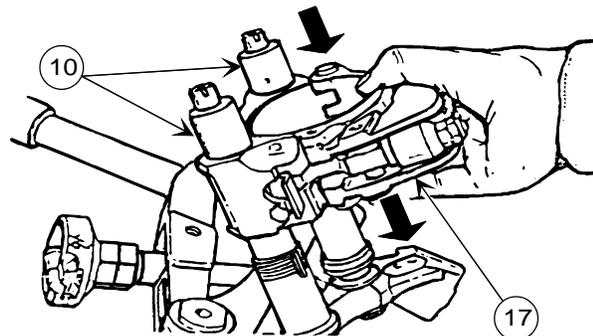
**9**

Install two new cotter pins (16) in mortar mounting buffers (10).



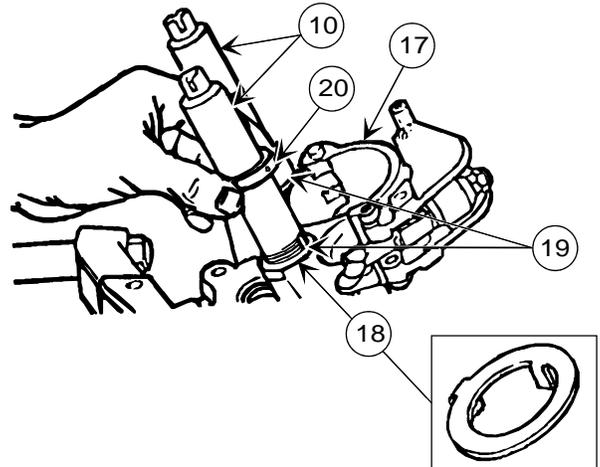
**10**

- a. Install barrel clamp assembly (17) on two mortar mounting buffers (10). Make sure that barrel clamp assembly (17) is installed facing the correct way and is seated against the mortar mounting buffers (10) as shown in the illustration.
- b. Make sure that the flanges of the mortar mounting buffers (10) seat in the recesses on the barrel clamp assembly (17).



## 11

- a. Install two new key washers (18) on mortar mounting buffers (10).
- b. Make sure that the two internal tabs are bent and seated in the grooves (19) on the mortar mounting buffers (10) and that the external locking tabs are bent and seated in the holes of the barrel clamp assembly (17). (It may be necessary to turn mortar mounting buffers to align internal and external tabs.)
- c. Using the fabricated spanner wrench, install two round plain nuts (20) on mortar mounting buffers (10) with the machined slots on the nuts facing the barrel clamp assembly (17).
- d. Lock two round plain nuts (20) in position by punching each key washer (18) up into one slot on each round plain nut (20).

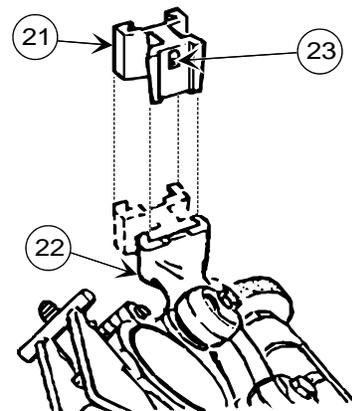


## 12

### NOTE

**Dovetail adapter is to be used on older model of traversing mechanism assembly. An extension has been integrated into newer model of traversing mechanism assembly.**

- a. Install dovetail adapter (21) on traversing mechanism assembly (22). If removed, install setscrew (23).
- b. Tighten setscrew (23) in dovetail adapter (21).
- c. If necessary, touch up painted surfaces.



## 2-14. M3A1 MORTAR BASEPLATE MAINTENANCE INSTRUCTIONS.

This task covers: Disassembly/Cleaning/Repair/Reassembly

### INITIAL SETUP

#### Tools and Special Tools:

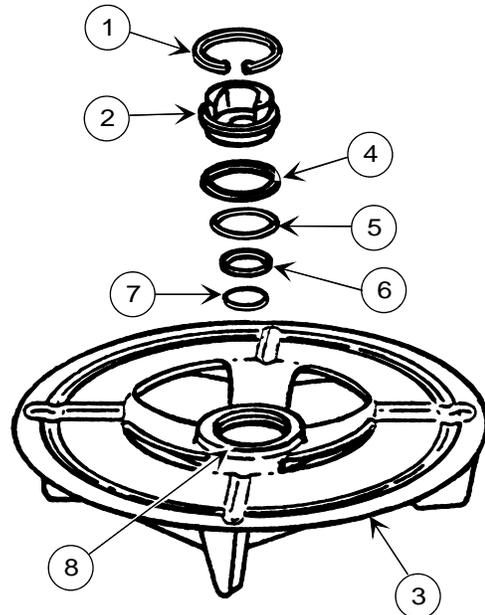
Small Arms Repairman Tool Kit (item 10, app B)

#### Materials/Parts:

Dry cleaning solvent (item 10, app D)  
Gloves, chemical and solvent resistant (item 11, app D)  
Grease, aircraft (GA) (item 12, app D)  
Polyurethane coating (item 21, app D)  
Paint brush (item 5, app D)  
Synthetic thinner (item 26, app D)  
Wiping rag (item 22, app D)

### DISASSEMBLY/CLEANING/REPAIR/REASSEMBLY

- a. Remove retaining ring (1) and baseplate socket (2) from baseplate body (3).
- b. Remove three rings (4, 5, and 6) and pad (7).
- c. Clean parts with dry cleaning solvent and wipe dry with wiping rag.
- d. Wipe all dirt, dust and other foreign material from rings, pad, and socket seat (8) of baseplate.
- e. Replace any item found to be damaged during disassembly. See appendix C.
- f. Apply light coat of aircraft grease (GA) to socket seat, pad, rings, and baseplate socket before reassembly.
- g. Install pad (7) and three rings (6, 5, and 4) in baseplate body (3).
- h. Install baseplate socket (2) and retaining ring (1).
- i. If necessary, touch up painted surfaces.



**2-15. M67 SIGHT UNIT MAINTENANCE INSTRUCTIONS (USMC ONLY).**

This task covers: Disassembly/Cleaning/Repair/Reassembly

**INITIAL SETUP**

**Tools and Special Tools:**

Snap Ring Pliers (item 7, app B)

**Materials/Parts:**

Alcohol (item 1, app D)  
Cleaning brush (item 4, app D)  
Cleaning compound (item 6, app D)  
Lens paper (item 18, app D)  
Plastic bag (item 3, app D)

**References:**

TM 9-1015-249-10/TM 09922A-10/1  
TB 43-0197

**Equipment Condition:**

Sight unit removed from mortar  
(TM 9-1015-249-10/TM 09922A-10/1)

**WARNING**



**RADIATION HAZARD - TRITIUM ( $^3\text{H}$ )**

**Radioactive contamination may occur if vials containing tritium gas are broken. If vials are broken or if illumination is not present, notify the local RSO or TACOM-RI RSO. See instructions in warning summary on page c.**

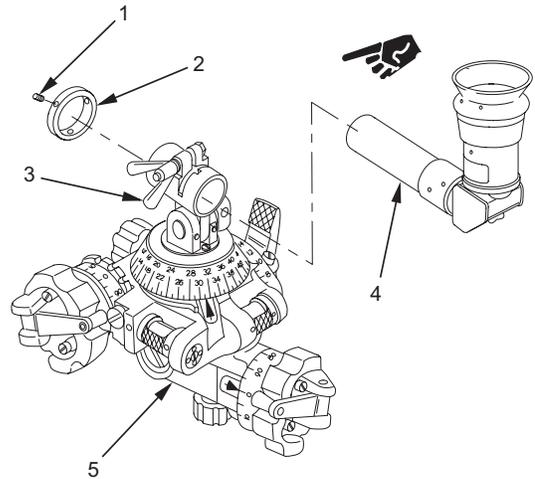
**2-15. M67 SIGHT UNIT MAINTENANCE INSTRUCTIONS (USMC ONLY) (CONT).**

**DISASSEMBLY/CLEANING/REPAIR/REASSEMBLY**

**NOTE**

**M67 sight unit is the primary sight unit. The M64/M64A1 sight unit may still be in use but is becoming obsolete. Maintenance procedures for the M64/M64A1 sight unit are similar to the instructions below.**

- a. Loosen three setscrews (1).
- b. Remove shaft collar (2). Loosen wing nut (3).
- c. Slide elbow telescope (4) out of telescope mount (5).
- d. Clean lenses as necessary, using cleaning compound and cleaning brush or alcohol and lens paper.
- e. Replace elbow telescope or telescope mount if defective. See appendix C. Refer to TB 43-0197 for disposal or evacuation procedures. All defective tritium items must be placed in a plastic bag.



**NOTE**

**Be sure that wing nut is loosened.**

- f. Slide elbow telescope (4) into telescope mount (5).
- g. Install shaft collar (2).
- h. Tighten wing nut (3) and three setscrews (1).

## 2-16. ELBOW TELESCOPE MAINTENANCE INSTRUCTIONS (USMC ONLY).

This task covers: Disassembly/Cleaning/Repair/Reassembly

### INITIAL SETUP

#### Tools and Special Tools:

Small Arms Repairman Tool Kit (item 10, app B)

#### Materials/Parts:

Alcohol (item 1, app D)  
Cleaning brush (item 4, app D)  
Cleaning compound (item 6, app D)  
Instruction decal (item 13, app D) (as required)  
Lens paper (item 18, app D)  
Plastic bag (item 3, app D)

#### References:

TB 43-0197

#### Equipment Condition:

Elbow telescope removed from telescope mount (para 2-15)

#### WARNING

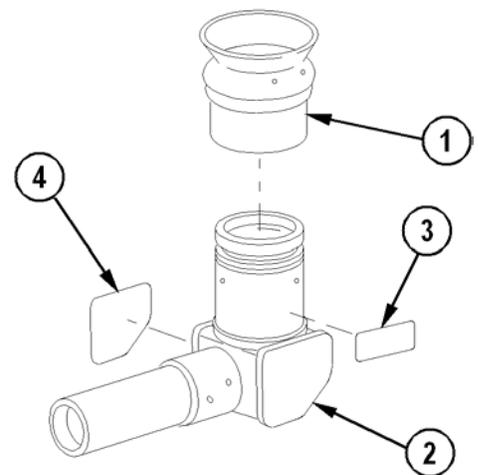


#### RADIATION HAZARD - TRITIUM ( $^3\text{H}$ )

Radioactive contamination may occur if vials containing tritium gas are broken. If vials are broken or if illumination is not present, notify the local RSO or TACOM-RI RSO. See instructions in warning summary on page c.

### DISASSEMBLY/CLEANING/REPAIR/REASSEMBLY

- Pull optical eyeshield (1) from body (2).
- If torn or illegible, remove instruction decal (3) and identification plate (4) from body (2).
- Clean lenses as necessary, using cleaning compound and cleaning brush or alcohol and lens paper.
- Replace any defective parts. See appendix C. Refer to TB 43-0197 for disposal or evacuation procedures. All defective tritium items must be placed in a plastic bag.
- If instruction decal (3) or identification plate (4) was removed, clean body (2) with cleaning compound (item 6, app D). Install instruction decal or identification plate.
- Install optical eyeshield (1) onto body (2).



## Section VI. PREPARATION FOR STORAGE OR SHIPMENT

### 2-17. PREPARATION FOR STORAGE.

#### a. General.

(1) Both the mortar (a pilferable item) and the fire control system, which contains radioactive components, must be stored in a secure area that conforms with the requirements of AR 190-11.

(2) Bulk storage of the radioactive fire control instruments must be in accordance with TB 43-0197.

(3) Storage of radioactive fire control instruments is limited to 1000 curies in each storage area. Not more than twenty (20) M252 fire control systems can be stored together unless special measuring devices (TRITIUM air monitor) and a good ventilation system are in use. This limit is required by Federal Law 10CFR and is established by US Army TACOM-RI Nuclear Regulatory Commission license 12-00722-06.

(4) You must dispose of radioactive waste in accordance with TB 43-0197.

(5) Any questions relative to the handling or storage of your fire control instruments should be referred to your local Radiation Safety Officer (RSO). If he cannot resolve your problem, have him contact the TACOM-RI Radiation Safety Officer (RSO), DSN 793-2962/2965, Commercial (309) 782-2962/2965.

(6) Specific questions relative to specific packaging, shipping or handling criteria should be referred to the local transportation authorities through your chain of command.

(7) USMC users refer to MCO P4450.7.

#### b. Preparation of Mortar.

(1) Disassemble, inspect, and clean the mortar.

(2) Repaint all scratched or marred painted surfaces with polyurethane coating (item 21, app D) or black lacquer (item 14, app D).

(3) Apply a light coat of general purpose lubricating oil (item 16, app D) to all external surfaces with the exception of those areas where lubrication is prohibited.

(4) Store the mortar in clean/dry racks, cabinets or containers that meet the security requirements of AR 190-11.

#### c. Preparation of M67 Sight Unit.

(1) Inspect and clean.

(2) After cleaning, cover exposed lens with two thicknesses of lens paper (item 18, app D) and secure with masking tape (item 25, app D).

(3) Store in a location that meets the security requirements of AR 190-11. Marine Corps: Refer to OPNAVINST 5530.13.

## 2-18. PREPARATION FOR SHIPMENT - OCONUS.

### a. Mortar.

(1) Perform the operations in paragraph 2-17.b. (1), (2), and (3).

(2) Cover the interior bore of the cannon with VCI-treated paper (item 19, app D) rolled into a tube with the treated surfaces outward.

(3) Wrap the muzzle end of the cannon with VCI-treated paper (item 19, app D). Secure with water resistant tape (item 24, app D).

### **CAUTION**

**Do not wrap tape over the muzzle cover. It can remove the waterproofing material from the surface of the muzzle cover.**

(4) Place the muzzle cover over the wrapped muzzle end of the cannon and secure in place.

(5) Enclose "Weapon Record Data" (DA Form 2408-4/NAVMC 10558A for Marine Corps) and, when applicable, "Equipment Control Record" (DA Form 2408-9) in a waterproof bag and secure to the cannon tube. Secure with a strip of water resistant tape (item 24, app D) on each end of the bag for 1-1/2 turns. Be sure that the markings on the bag are clearly visible after securing to the tube.

(6) Wrap cannon and mount in separate sheets of corrugated wrapping paper (item 20, app D) and secure the wraps with masking tape (item 25, app D) or any other available pressure sensitive tape.

(7) Place the wrapped items in corrugated fiberboard boxes conforming to PPP-B-636 or PPP-B-640 and add fiberboard as required to be sure of rigid pack. Close boxes and seal all joints and seams with water resistant tape (item 24, app D).

(8) Cover the bearing surfaces of the M3A1 mortar baseplate with barrier material conforming to MIL-B-121. Secure with water resistant tape (item 24, app D). Place baseplate into fiberboard carton conforming to PPP-B-636 or PPP-B-640 and seal with water resistant tape.

(9) Package each BII item and consolidate into the fiberboard carton along with the M3A1 mortar baseplate. Immobilize in the carton with corrugated wrapping paper (item 20, app D) and seal carton with water resistant tape (item 24, app D).

(10) Construct a wood box of 3/4 inch (19.05 mm) plywood to a size of approximately 60 x 24 x 24 inches (152.4 x 60.96 x 60.96 cm). Place all fiberboard cartons into exterior shipping container. Cartons containing cannon and mount should be secured with wooden blocks. The baseplate carton should be on top of these and secured with two wooden blocks on top of carton and nailed to side of box.

(11) Nail top to wooden box and apply girth strapping just prior to shipment.

2-18 (Cont)

b. M67 Sight Unit.

**NOTE**

**M67 sight unit is the primary sight unit. The M64/M64A1 sight unit may still be in use but is becoming obsolete. Shipping instructions for the M64/M64A1 sight unit are the same as the instructions below.**

(1) Perform the operations in paragraph 2-17.c. (1) and (2).

(2) Cover level vials with two thicknesses of lens paper (item 18, app D) and secure with masking tape (item 25, app D).

(3) Remove the eyeshield, dust with commercial talcum, and place in a paperboard container conforming to PPP-B-676. Place the eyeshield against the caution-labeled side of the elbow telescope. Wrap the entire unit with cushioning material (item 9, app D) and secure with water resistant tape (item 24, app D).

(4) Place the wrapped M67 sight unit in a fiberboard box conforming to PPP-B-636. Surround the sight unit with no less than 2 inches (5.08 cm) of cushioning material (item 9, app D). Immobilize the sight unit within the box, and seal with water resistant tape (item 24, app D).

2-19. PREPARATION FOR SHIPMENT - CONUS.

a. Unit Packaging.

(1) Unit packaging is the same as for OCONUS with the following exceptions:

(a) Wrap all exterior surfaces of the cannon and mount with VCI-treated paper (item 19, app D).

(b) Enclose the VCI-wrapped cannon and mount in host-sealed plastic bags conforming to MIL-B-117.

(2) The unit package as specified in paragraph 2-18.b. for mortar and in paragraph 2-18.c. for the M67 sight unit serve as the respective shipping containers.

b. Palletization.

(1) Palletize two (2) mortar shipping containers in accordance with the requirements of MIL-STD-147 in order to comply with sensitive item cargo requirements of 200 pounds per shipment.

(2) Do not ship more than thirty (30) M67 sight units together so that radioactivity levels are below 200 curies. Under no circumstances will parcel post shipments of this item be made.

c. Container Markings.

- (1) Mark interior packages, including BII, and exterior shipping container in accordance with the requirements of Federal Law 49CFR and as specified herein. Packing lists are required. Include the mortar serial number with all identification markings.
- (2) Mark the bag containing the weapon record "WEAPON RECORD" in 1/2 inch (12.7 mm) letters.
- (3) Apply additional markings such as project codes, corner colors, etc., if specified.

d. Transportation and Handling.

- (1) Transportation Criteria.

**NOTE**

**A sensitive item is defined as an item which, because of its vulnerability to theft and potential use in civil disturbance, requires a high degree of protection and control during the materiel life cycle.**

(a) The M252 mortar and M67 sight unit are sensitive items and will be transported in accordance with provisions of sensitive cargo cited in AR 740-26.

(b) The shipper is responsible for assuring that a Report of Shipment (RESHIP) is transmitted by electrical means to the consignee setting forth name of carrier, conveyance identification number, bill of lading number, and estimated time of arrival (ETA). The receiving transportation officer is required to initiate tracer action if the shipment has not arrived within 48 hours of the ETA.

(2) Handling Criteria. The receiving activity is responsible for ensuring that protective measures are taken to protect the sensitivity of the item in accordance with applicable regulations.

(3) Transportation and Handling of Associated Support Parts, Tools, and Equipment. Associated support parts, tools, and equipment may be shipped utilizing standard transportation and handling procedures.

(4) Packaging. Packaging of end item and associated support parts, tools, and equipment must, as a minimum, conform to applicable rail or motor rules, regulations, and specifications as appropriate.



## CHAPTER 3

### DIRECT SUPPORT MAINTENANCE INSTRUCTIONS

#### Section I. DIRECT SUPPORT PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)

3-1. GENERAL. The required direct support PMCS procedures are listed in Table 3-1.

**Table 3-1. DIRECT SUPPORT PREVENTIVE MAINTENANCE CHECKS AND SERVICES FOR 81-MM MORTAR, M252**

Item No.	Interval	Location	Procedure	Not Fully Mission Capable if:
		Item to be Checked/ Serviced		
1	Semi-annual	M177 Mount (Bipod)	Mortar mount will be disassembled to a level allowing each part's complete cleaning, inspection for repair, and lubrication (Direct Support Semi-annual Parts Kit, NSN 1015-01-451-5789).	Mount's operational effectiveness is reduced by any repairable deficiency.

#### Section II. DIRECT SUPPORT TROUBLESHOOTING

3-2. GENERAL.

a. This section contains troubleshooting information for locating and correcting most of the operating troubles which may develop in the mortar. Each malfunction for an individual component, unit, or system is followed by a list of tests/inspections which will help you to determine corrective actions to take. Perform the tests/inspections and corrective actions in the order listed.

b. This section cannot list all possible malfunctions that may occur nor all tests/inspections and corrective actions. If a malfunction is not listed (except when malfunction and cause are obvious) or is not correctable by the listed corrective actions, notify your supervisor.

3-3. TROUBLESHOOTING PROCEDURES.

- a. Refer to the troubleshooting symptom index on this page.
- b. Use the symptom index to quickly refer to malfunctions covered in Table 3-2.

**SYMPTOM INDEX**

	<b>Troubleshooting Procedure</b>
Binding in cross leveling mechanism .....	5
Excessive backlash in traversing, elevating, or cross leveling handwheels .....	6
Mortar does not recoil properly .....	4
Mortar fails to fire .....	1
Mortar is difficult to elevate or depress .....	3
Mortar is difficult to traverse .....	2

**Table 3-2. DIRECT SUPPORT TROUBLESHOOTING PROCEDURES**

---

**MALFUNCTION**  
**TEST OR INSPECTION**  
**CORRECTIVE ACTION**

---

**1. MORTAR FAILS TO FIRE.**

Step 1. Check for worn, damaged, or improperly seated firing pin (1).

Reseat or replace firing pin per cannon maintenance instructions in para 2-11.

Step 2. Check for damaged barrel (2).

Replace barrel if necessary per para 3-7.

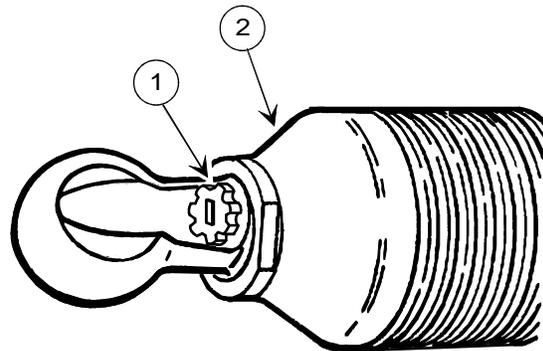
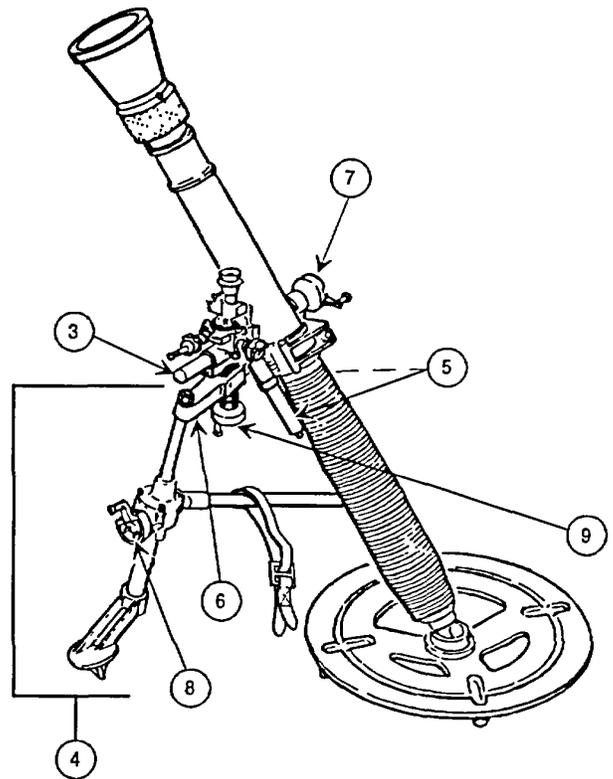


Table 3-2. DIRECT SUPPORT TROUBLESHOOTING PROCEDURES - Continued

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<b>2. MORTAR IS DIFFICULT TO TRAVERSE.</b>	Check traversing mechanism assembly (3) for worn, damaged, or missing parts.	Replace parts as necessary per para 3-10.
<b>3. MORTAR IS DIFFICULT TO ELEVATE OR DEPRESS.</b>	Check elevating mechanism assembly (4) for worn, damaged, or missing parts.	Replace parts as necessary per para 3-14.
<b>4. MORTAR DOES NOT RECOIL PROPERLY.</b>	Check mortar mounting buffers (5) for worn, damaged, or missing parts. Perform buffer test per Table 2-2.	Replace parts as necessary per para 3-11.
<b>5. BINDING IN CROSS LEVELING MECHANISM.</b>	Check cross leveling mechanism (6) for worn, damaged, or missing parts.	Replace parts as necessary per para 3-12.
<b>6. EXCESSIVE BACKLASH IN TRAVERSIN ELEVATING, OR CROSS LEVELING HANDWHEELS.</b>	Check if backlash in the traversing handwheel (7), the cross leveling handwheel (8), and the elevating handwheel (9) is greater than one-eighth of a turn (45°).	If backlash exceeds limits, replace parts as necessary per (paras 3-10, 3-12, and 3-14).



### Section III. DIRECT SUPPORT MAINTENANCE PROCEDURES

#### WARNING

**Before performing maintenance procedures, be sure to clear the weapon. Do not actuate the trigger until the weapon has been cleared. Inspect the bore to ensure it is empty and free of obstructions. Keep live ammunition out of the area during maintenance operations.**

**Dented barrels must be replaced as they are unsafe for firing (Army only). Marine Corps: Refer to paragraph 2-11, Test.**

**Dry cleaning solvents (SD) and paint thinners (TPM) are flammable. Do not clean parts near an open flame or in a smoking area. Make sure adequate ventilation is available. Wear safety glasses, splash goggles, and protective gloves. Always know location of nearest eye wash station. Dry cleaning solvents and paint thinners evaporate quickly and have a drying effect on the skin. When used without protective gloves, these chemicals may cause irritation to, or cracking of, the skin.**

#### 3-4. GENERAL.

a. Before beginning maintenance operations, check to see that TM 9-1015-249-10/TM 09922A-10/1, Operator's Manual for Mortar 81-MM, M252, is available in the maintenance shop.

b. Complete disassembly of a unit is not always necessary in order to make a required repair or replacement. Good judgment should be exercised to keep disassembly and assembly to a minimum.

c. Damaged threads should be repaired by using a thread restorer or by lathe-chasing and by replacing helical inserts.

d. Damaged surfaces should be restored using materials and tools consistent with tolerances of item being restored.

(1) Various methods and materials are used for removing corrosion. These should be carefully selected in order that surfaces being processed will not be damaged beyond serviceability.

(2) Crocus cloth (item 8, app D) and fine stones should be used to remove corrosion, burrs, and scores from polished surfaces. Aluminum oxide abrasive cloth, files, or scrapers are permissible where critical dimensions will not be altered by their use.

e. Torque requirements are listed in appendix F.

f. Helical inserts must be removed when they are bent, broken, or improperly installed. If necessary to remove an insert:

(1) Position the blade (1) of the extracting tool (2) into the center of the insert (3).

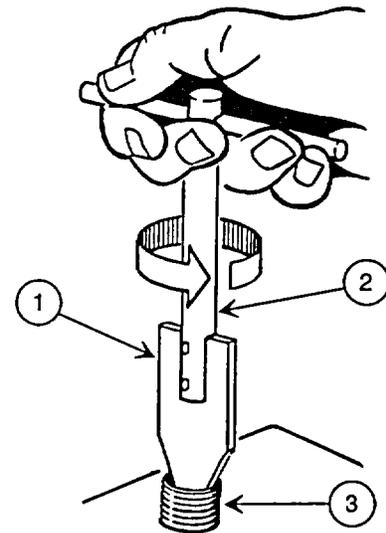
(2) Tap the top of the extracting tool (2) with a hammer to seat the tool into the insert (3).

(3) Push down on the extracting tool (2) and turn counterclockwise to back the insert (3) out of the hole.

(4) Discard the insert (3).

**NOTE**

**Never reuse an insert.**



g. To install an insert:

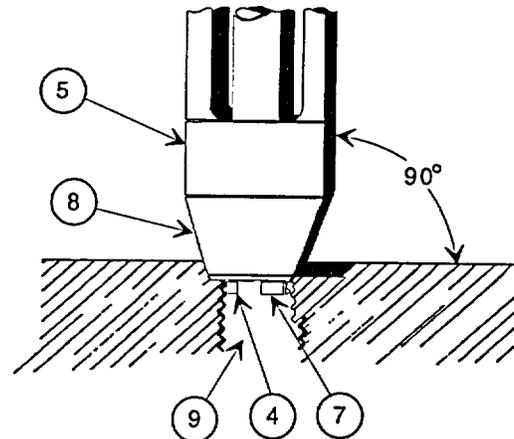
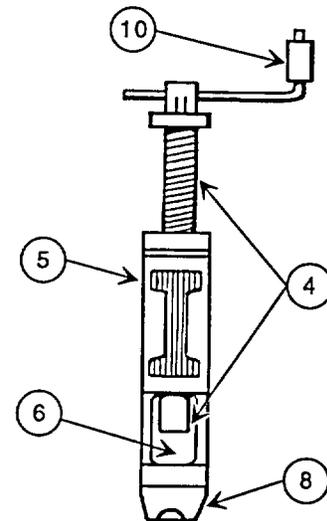
(1) Retract the mandrel (4) of the helical inserting tool (5) and place a helical insert (3) into the chamber (6) with the insert tang (7) toward the chuck (8).

(2) Advance the mandrel (4) until it fully engages the insert tang (7). Continue turning the mandrel, advancing the insert (3) into the chuck (8) until the mandrel and insert are flush with the tip of the chuck.

(3) Hold the helical inserting tool (5) firmly and squarely against the work with the insert (3) aligned with the tapped hole (9).

(4) Rotate the handle (10) clockwise at a slow uniform rate until the top coil of the insert (3) is 1/4 to 1/2 turn below the top work surface of the tapped hole (9).

(5) Rotate the handle (10) counterclockwise to remove mandrel (4) from the tapped hole (9).

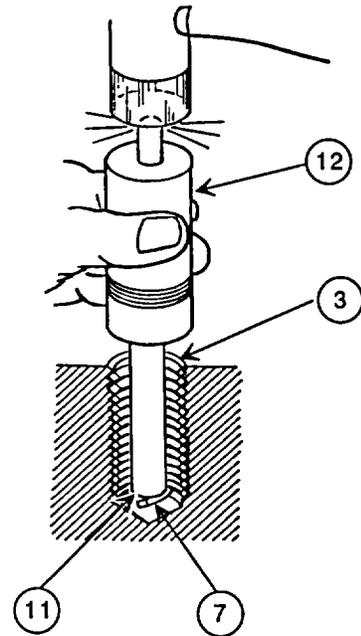


3-4 (Cont)

(6) Place the punch end (11) of the tang break-off tool (12) into the center of the insert (3), resting the tool squarely on the insert tang (7).

(7) Strike the top of the tang break-off tool (12) with a sharp blow (using a soft-faced hammer) to break insert tang (7) from installed insert (3).

(8) If needed, use long narrow tweezers to remove the insert tang (7) from insert hole.



3-5. LUBRICATION INSTRUCTIONS. Refer to TM 9-1015-249-10/TM 09922A-10/1. Under arctic conditions, use weapons lubricating oil (LAW) (item 17, app D) instead of general purpose lubricating oil (item 16, app D).

3-6. INITIAL SETUP.

- a. Tools and Special Tools lists tools needed for the procedures.
- b. Materials/Parts refers to expendable materials and 100% replaceable parts.
- c. Personnel Required is listed only if the task requires more than one person. If Personnel Required is not listed, it means one person can do the job.
- d. References lists other publications containing necessary information.
- e. Equipment Condition lists conditions to be met before starting the procedure.

**DIRECT SUPPORT MAINTENANCE INDEX**

<b>Item</b>	<b>Para</b>
Cross Leveling Mechanism .....	3-12
Elevating Mechanism Assembly and Elevating Screw Assembly .....	3-14
Final Inspection .....	3-15
Barrel Clamp Assembly .....	3-9
Mortar Mount Leg Assembly .....	3-13
Mortar Mounting Buffer .....	3-11
M177 Mortar Mount .....	3-8
M253 81-mm Cannon .....	3-7
Traversing Mechanism Assembly .....	3-10

### 3-7. M253 81-MM CANNON MAINTENANCE INSTRUCTIONS.

This task covers: Cleaning/Inspection

#### INITIAL SETUP

##### Tools and Special Tools:

Basic Pullover Gage Accessories Outfit (item 1, app B)  
M3 Borescope (item 2, app B)  
Small Arms Shop Set: Field Maintenance, Basic, Less Power (item 11, app B)  
81MM Pullover Gage (item 3, app B)

##### Materials/Parts:

Cleaning compound, rifle bore (RBC) (item 7, app D)  
General purpose lubricating oil (item 16, app D)  
Wiping rag (item 22, app D)

##### References:

TM 9-1000-202-14  
TM 9-4933-258-13&P/TM 00640A-13&P/1  
TM 9-6650-235-13&P/TM 08552A-13&P

##### Equipment Condition:

Blast attenuator device removed from cannon (para 2-12)

#### CLEANING/INSPECTION

- a. Clean cannon with RBC and wipe dry with wiping rag.

#### WARNING

**Dented barrels must be replaced as they are unsafe for firing (Army only).  
Marine Corps: Refer to paragraph 2-11, Test.**

- b. Use borescope and pullover gage to inspect barrel according to instructions in TM 9-1000-202-14.
- c. See TM 9-6650-235-13&P/TM 08552A-13&P for operation of the M3 Borescope.
- d. See TM 9-4933-258-13&P/TM 00640A-13&P/1 for operation of pullover gage.
- e. Replace cannon if dented, cracked, or deformed. See para 2-12.
- f. Lubricate cannon with general purpose lubricating oil when inspection is complete, and replace blast attenuator device.
- g. See paras 2-11 and 2-12 for maintenance procedures for cannon and blast attenuator device.

**3-8. M177 MORTAR MOUNT MAINTENANCE INSTRUCTIONS.**

The bipod is repaired by replacing its major assemblies and attaching hardware. See para 2-13 for these maintenance procedures. The major assemblies are repaired as follows.

**3-9. BARREL CLAMP ASSEMBLY MAINTENANCE INSTRUCTIONS.**

This task covers:

- a. Disassembly      b. Cleaning/Repair      c. Reassembly      d. Adjustment

**INITIAL SETUP**

**Tools and Special Tools:**

Basic Field Maintenance Small Arms Shop Set, Less Power (item 11, app B)  
Small Arms Shop Set: Field Maintenance, Basic, Less Power (item 11, app B)  
Snap Ring Pliers (item 7, app B)  
Surveyor's Steel Measuring Tape Tension Handle (item 9, app B)

**Materials/Parts:**

Dry cleaning solvent (item 10, app D)  
General purpose lubricating oil (item 16, app D)  
Gloves, chemical and solvent resistant (item 11, app D)  
Grease, aircraft (GA) (item 12, app D)  
Sealing compound (item 23, app D)  
Wiping rag (item 22, app D)

**Equipment Condition:**

Barrel clamp assembly removed from mortar mount (para 2-13)

Key washer (3) (MS9276-10)  
Helical self-locking nut (MS51943-31)  
Retaining ring (2) (MS31217-1050)  
Self-locking nut (MS51943-5)  
Spring pin (2) (MS16562-16)

## DISASSEMBLY

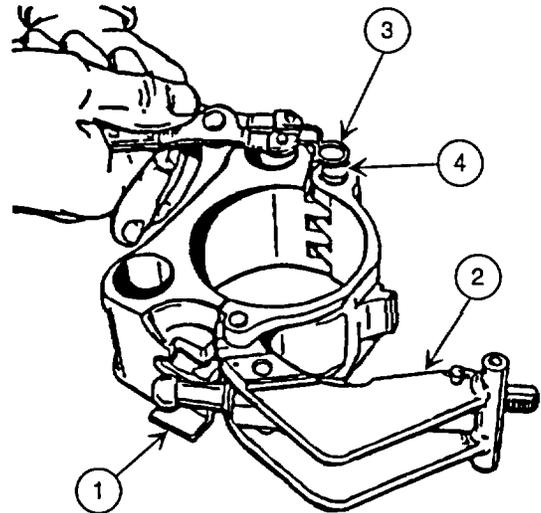
1

- a. Make sure that barrel clamp latch (1) is released and manual control handle (2) is open.

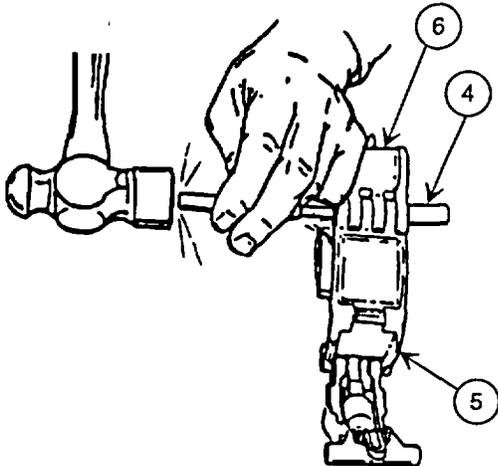
### NOTE

Grooved pin is held in place by two retaining rings. For removal of the pin, it is only necessary to remove one retaining ring.

- b. Remove retaining ring (3) from grooved pin (4) using snap ring pliers. Discard retaining ring (3).

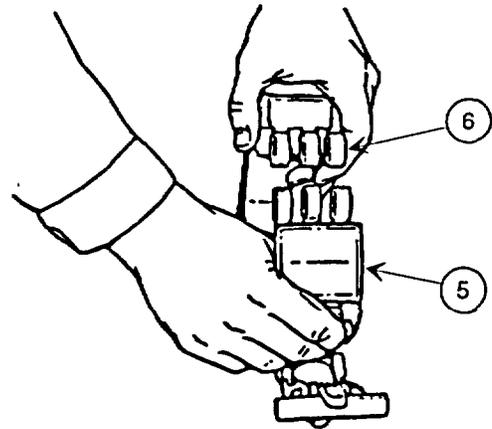


2



Remove grooved pin (4) from upper half clamp body (5) and lower half clamp body (6), using punch and hammer.

3

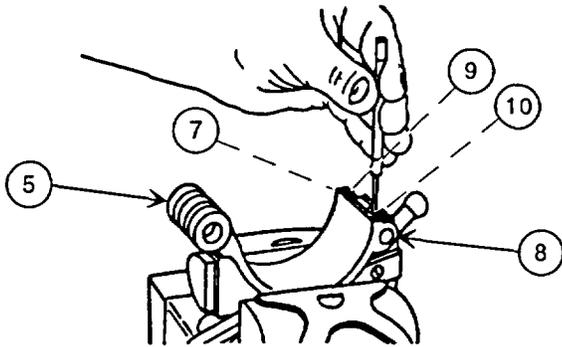


Separate upper half clamp body (5) and lower half clamp body (6).

3-9. BARREL CLAMP ASSEMBLY MAINTENANCE INSTRUCTIONS (CONT).

DISASSEMBLY (CONT)

4



**CAUTION**

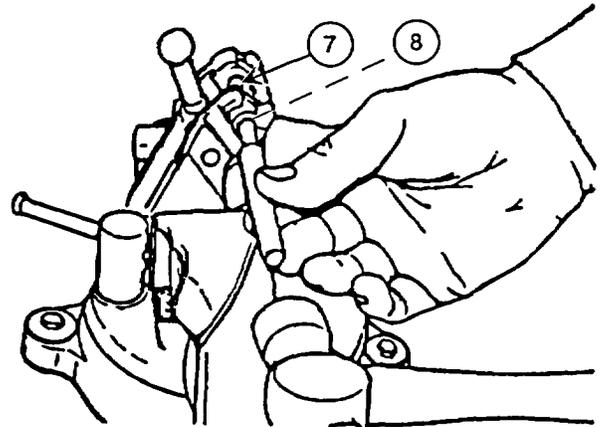
It may be necessary to use a vise for steps 4 thru 15. Use a soft-jawed vise to prevent equipment damage.

**NOTE**

Headless straight pins (7 and 8) must be replaced in the same position from which they are removed.

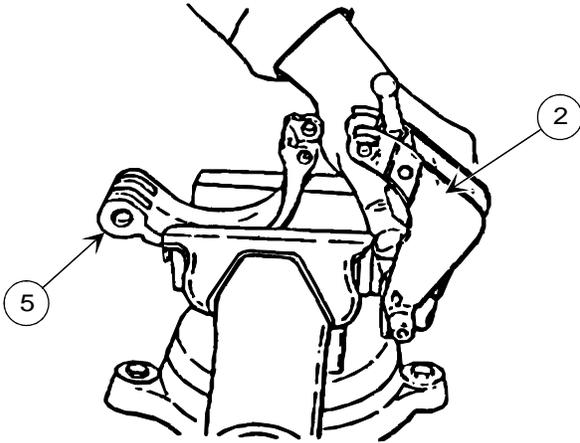
- a. Scribe marks on upper half clamp body (5) and headless straight pins (7 and 8).
- b. Remove spring pins (9 and 10) from upper half clamp body (5) using a punch and hammer. Discard spring pins (9 and 10).

5



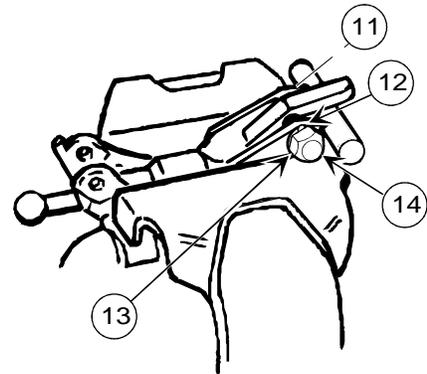
Remove headless straight pins (7 and 8), using a punch and hammer.

6



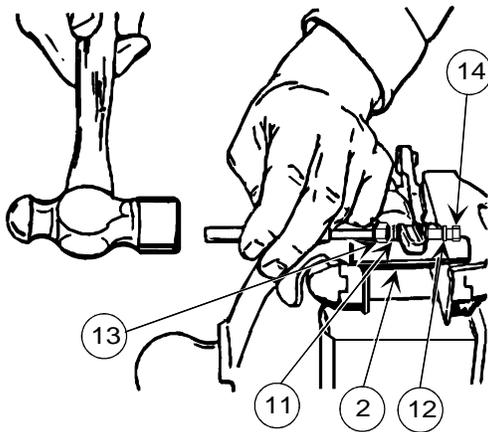
Remove manual control handle (2) from upper half clamp body (5).

7



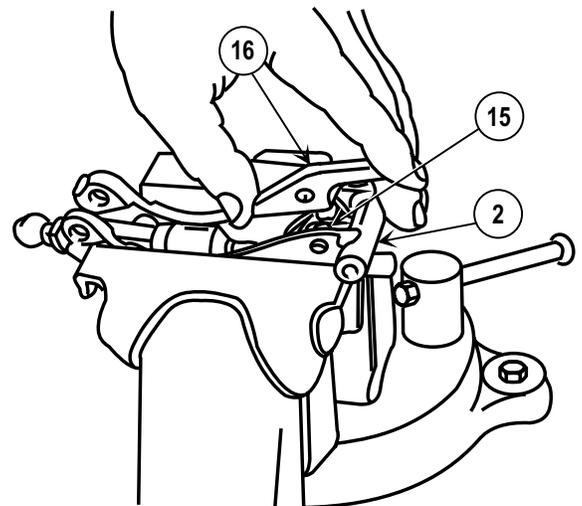
- a. Flatten tabs on key washers (11 and 12).
- b. Using two 7/16 inch wrenches, loosen helical self-locking nut (13) until flush with end of machine bolt (14).

8



- a. Tap on machine bolt (14) with a brass drift and hammer.
- b. Remove helical self-locking nut (13), key washer (11), machine bolt (14), and key washer (12) from manual control handle (2). Discard helical self-locking nut (13) and key washers (11 and 12).

9

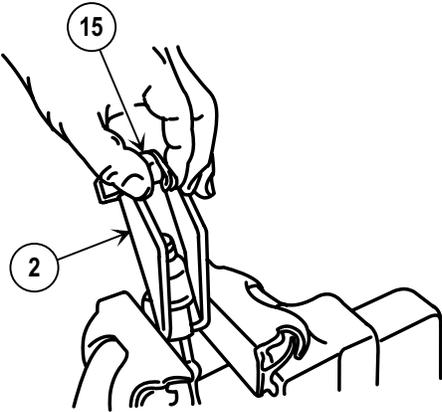


- a. Note position of torsion helical spring (15).
- b. Remove barrel clamp locking lever (16) from manual control handle (2).

**3-9. BARREL CLAMP ASSEMBLY MAINTENANCE INSTRUCTIONS (CONT).**

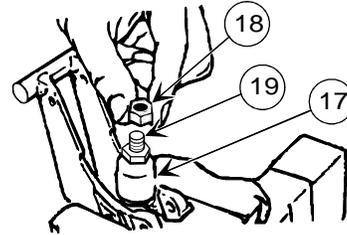
**DISASSEMBLY (CONT)**

**10**



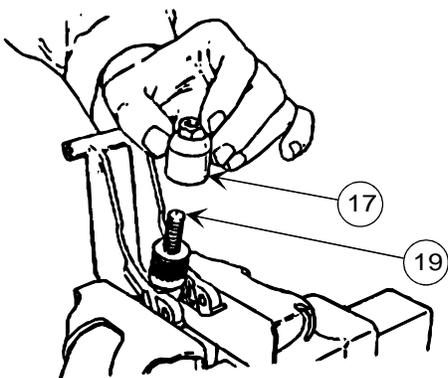
Remove torsion helical spring (15) from manual control handle (2).

**11**



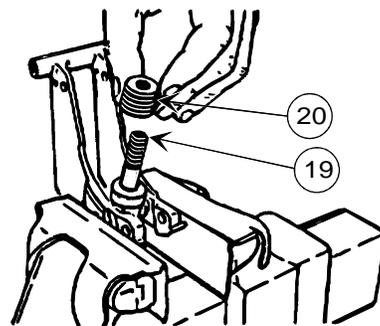
- a. Hold barrel nut (17) with a 9/16 inch wrench, if necessary.
- b. Using a 9/16 inch wrench or socket, remove self-locking nut (18) from locking rod (19). Discard self-locking nut (18).

**12**



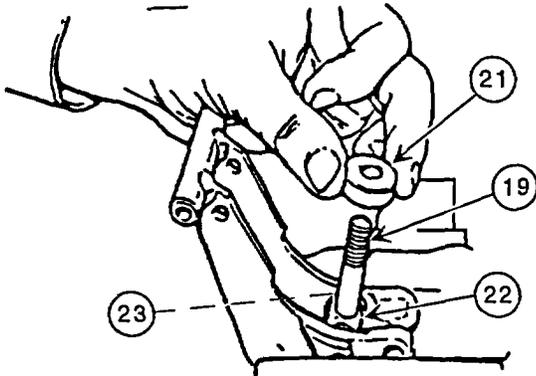
Hold locking rod (19) and unscrew barrel nut (17).

**13**



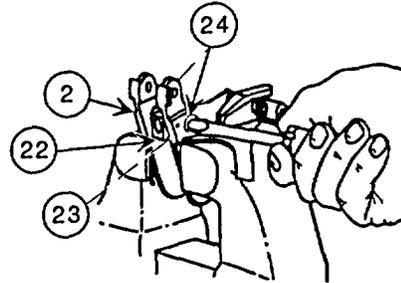
Remove 12 spring tension washers (20) from locking rod (19). Be sure to keep washers in order.

14



- a. Remove sleeve bushing (21) and locking rod (19) from rod end connector (22).
- b. Inspect and note location and configuration of rod end connector (22) and torsion spring (23).

15

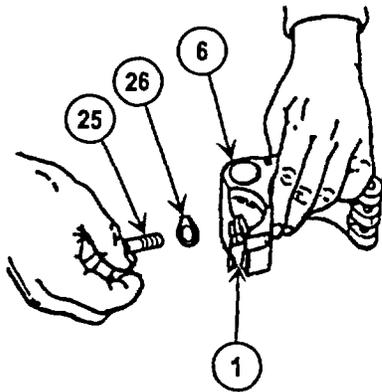


**CAUTION**

**Apply just enough heat to soften the sealing compound.**

- a. Carefully apply heat to the outside of the manual control handle (2) and the two shoulder screws (24).
- b. Unscrew and remove two shoulder screws (24). Remove rod end connector (22) and torsion spring (23).

16

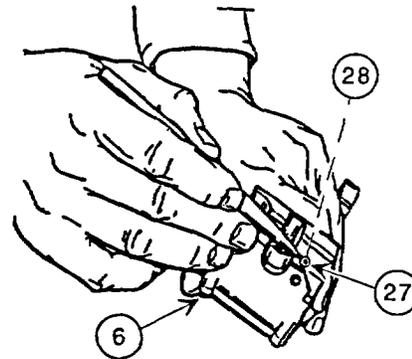


**CAUTION**

**Latch bearing ball may fall out when barrel clamp latch is removed.**

Using a 7/16 inch wrench or socket, remove hexagon cap screw (25), key washer (26), and barrel clamp latch (1) from lower half clamp body (6). Discard key washer (26).

17



**WARNING**

**When latch bearing ball is pried out, compression helical spring may fly out.**

If damaged, remove latch bearing ball (27) and compression helical spring (28) from lower half clamp body (6).

**3-9. BARREL CLAMP ASSEMBLY MAINTENANCE INSTRUCTIONS (CONT).**

**CLEANING/REPAIR**

- a. Clean parts with dry cleaning solvent and wipe dry with wiping rag.
- b. Replace damaged or defective parts.

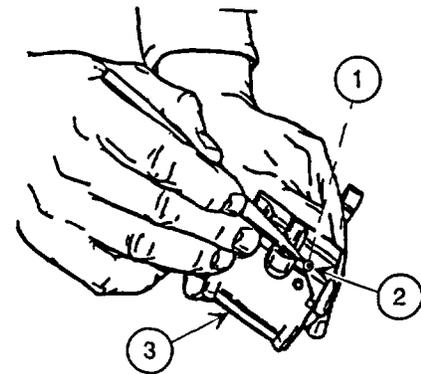
**CAUTION**

**The upper and lower half clamp bodies are a matched set. Replace both at the same time with a new barrel clamp assembly.**

- c. If upper or lower half clamp body is damaged, replace entire barrel clamp assembly.
- d. Lubricate parts (except the spring tension washers) with general purpose lubricating oil before reassembly.
- e. Apply a light coat of GA to the ten spring tension washers before reassembly.

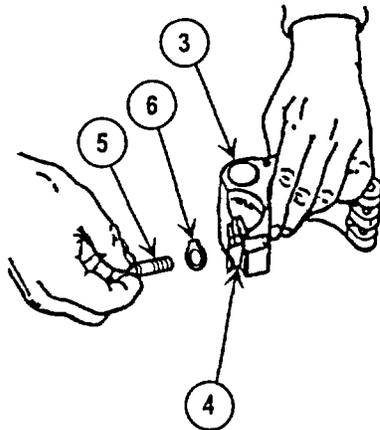
**REASSEMBLY**

**1**



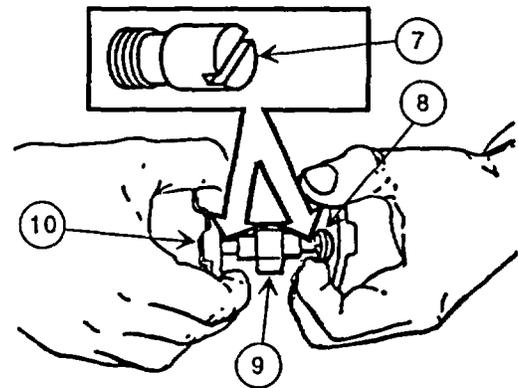
If removed, install new compression helical spring (1) and latch bearing ball (2) in lower half clamp body (3).

**2**



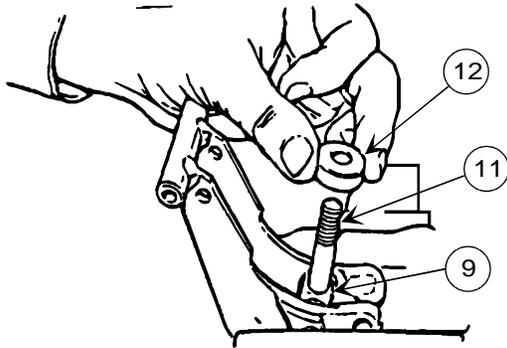
Install barrel clamp latch (4), hexagon capscrew (5), and new key washer (6) in lower half clamp body (3).

**3**



- a. Apply sealing compound to the threads of two shoulder screws (7).
- b. Install torsion spring (8), two shoulder screws (7), and rod end connector (9) in manual control handle (10).

4

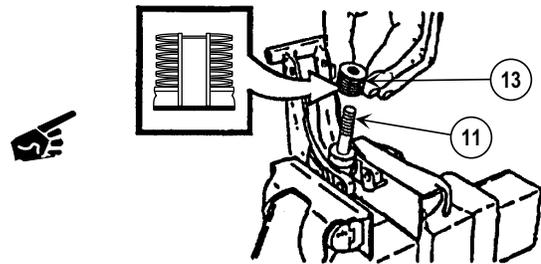


**CAUTION**

It may be necessary to use a vise for steps 4 thru 12. Use a soft-jawed vise to prevent equipment damage.

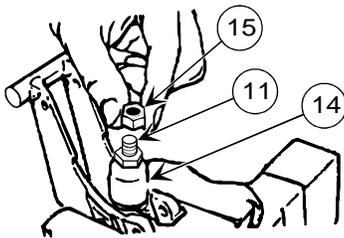
Install locking rod (11) and sleeve bushing (12) on rod end connector (9).

5



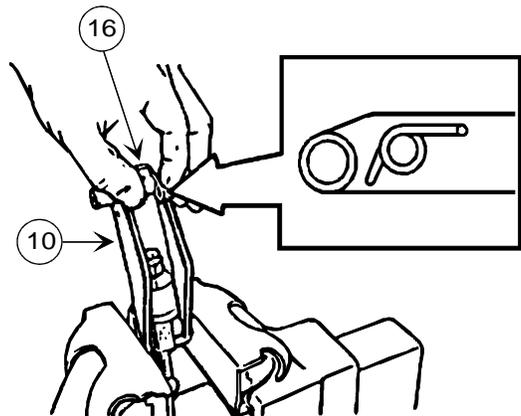
Install 12 spring tension washers (13) on locking rod (11). (See inset for correct order.)

6



Install barrel nut (14) and new self-locking nut (15) on locking rod (11). Do not tighten either nut at this time.

7

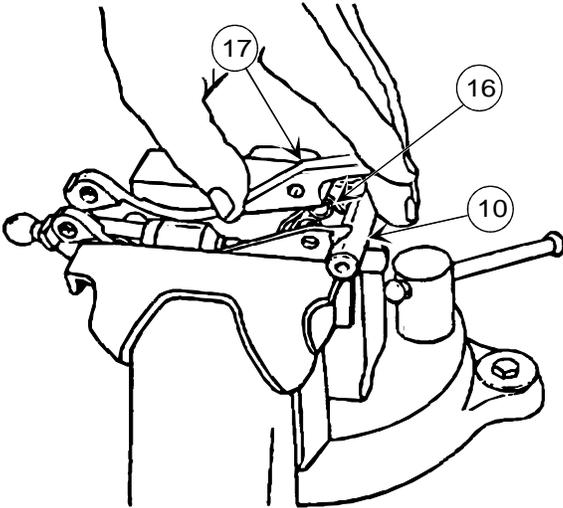


Install torsion helical spring (16) in manual control handle (10). Align coils of torsion helical spring (16) with holes in manual control handle (10).

**3-9. BARREL CLAMP ASSEMBLY MAINTENANCE INSTRUCTIONS (CONT).**

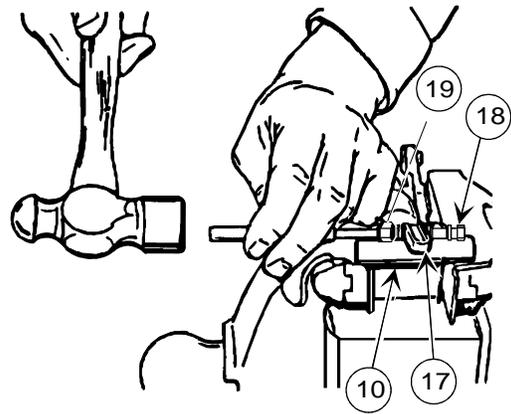
**REASSEMBLY (CONT)**

**8**



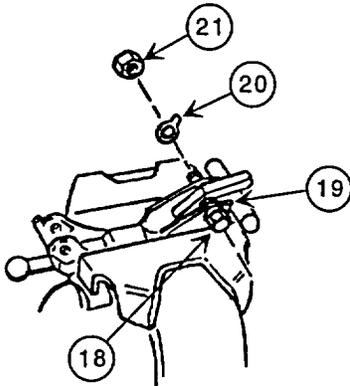
Position barrel clamp locking lever (17) in manual control handle (10). Torsion helical spring (16) must apply spring tension to barrel clamp locking lever (17).

**9**



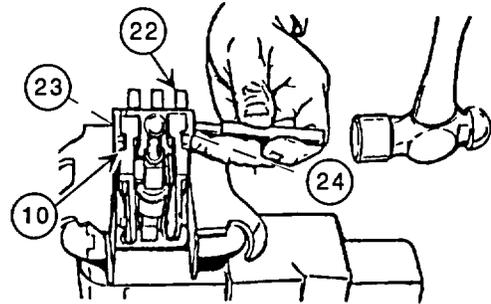
Install machine bolt (18) and new key washer (19) in manual control handle (10) and barrel clamp locking lever (17), using a punch and hammer.

10



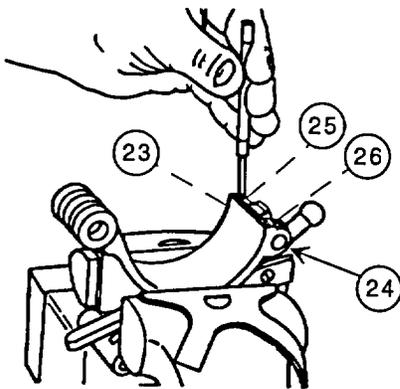
- a. Install new key washer (20) and new helical self-locking nut (21) on machine bolt (18).
- b. Bend tabs on two key washers (19 and 20) to lock in place.

11



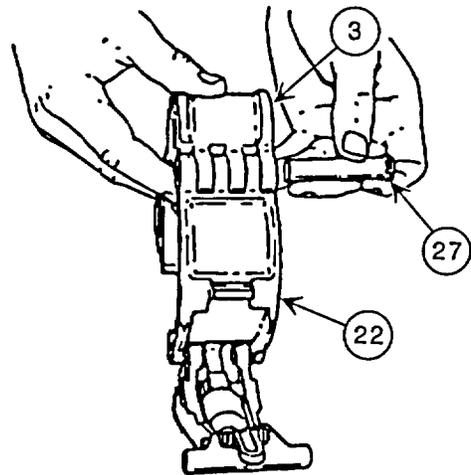
- a. Install manual control handle (10) in upper half clamp body (22).
- b. Make sure that scribe marks on upper half clamp body (22) and headless straight pins (23 and 24) align.
- c. Install headless straight pins (23 and 24) in upper half clamp body (22) and manual control handle (10), using a punch and hammer.

12



- a. If headless straight pins (23 and/or 24) are replaced, it will be necessary to drill a hole 0.05 + 0.01 inch through them for the spring pins.
- b. Install two new spring pins (25 and 26) in headless straight pins (23 and 24) using a punch and hammer.

13



- a. Align upper half clamp body (22) with lower half clamp body (3).
- b. Install grooved pin (27).

---

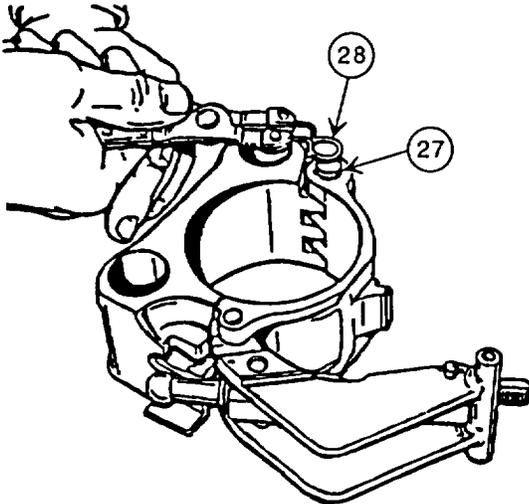
3-9. BARREL CLAMP ASSEMBLY MAINTENANCE INSTRUCTIONS (CONT).

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REASSEMBLY (CONT)

---

14



Install new retaining ring (28) on grooved pin (27), using snap ring pliers. If other retaining ring was removed, replace it.

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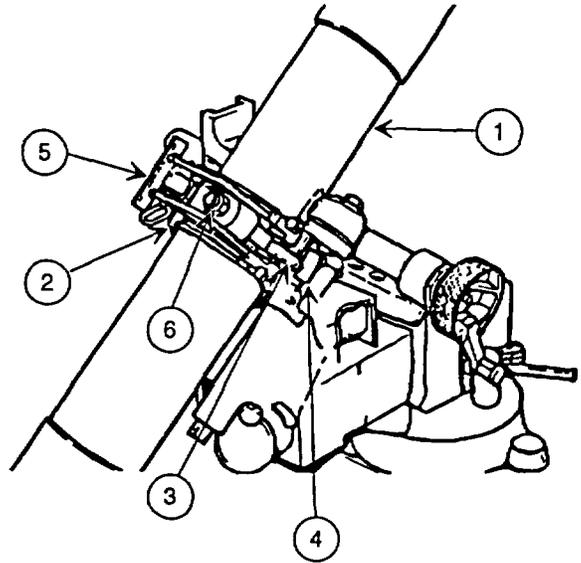
## ADJUSTMENT

1

### NOTE

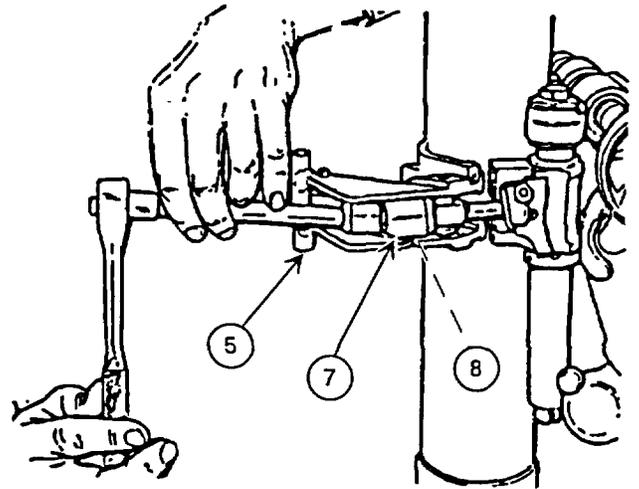
**The following adjustment procedure must be performed whenever the barrel clamp assembly is disassembled and reassembled.**

- a. Assemble mortar mount (para 2-13).
- b. Position mortar cannon (1) in barrel clamp assembly (2).
- c. Retain locking rod (3) with barrel clamp latch (4).
- d. Place manual control handle (5) in closed position.
- e. Remove self-locking nut (6) from locking rod (3) with a 9/16 inch socket wrench.



2

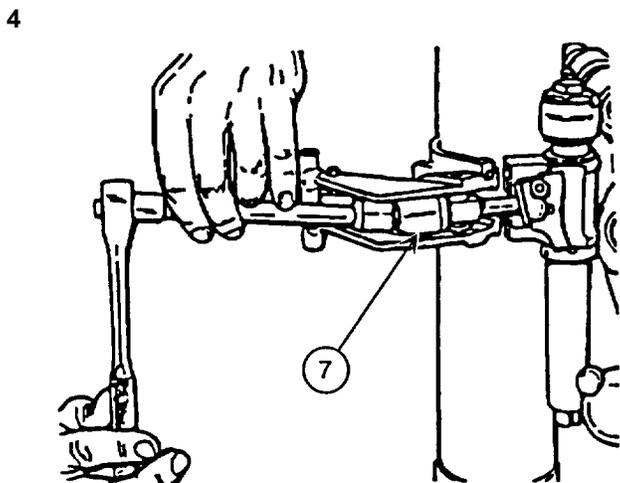
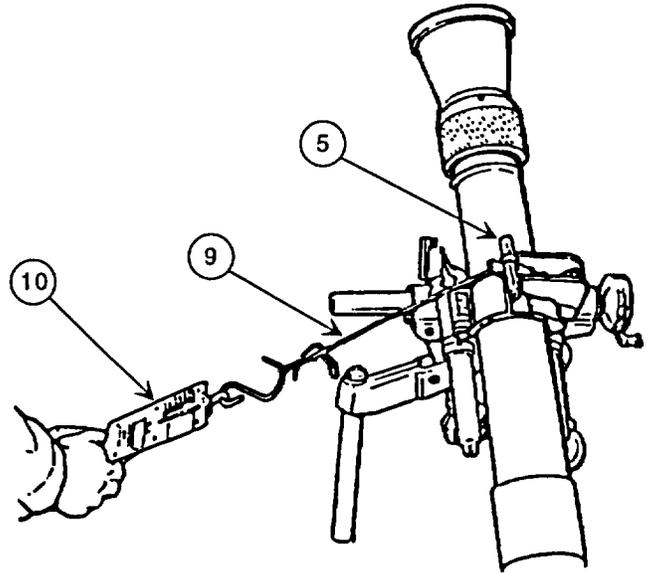
- a. Open manual control handle (5).
- b. Using a 9/16 inch socket wrench, unscrew barrel nut (7) until it is free of spring tension washer pack (8).
- c. Screw barrel nut (7) down until contact is just made with spring tension washer pack (8).
- d. Continue to screw barrel nut (7) down for two revolutions relative to the spring tension washer pack seating.



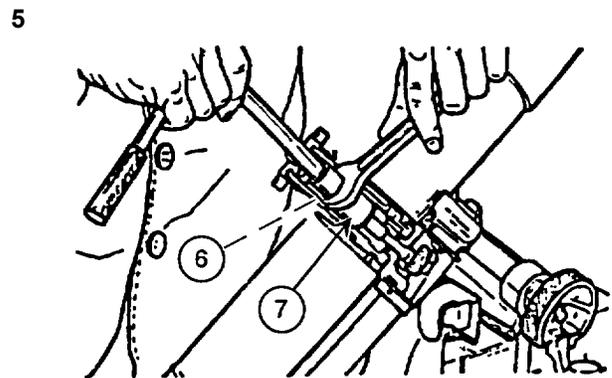
**3-9. BARREL CLAMP ASSEMBLY MAINTENANCE INSTRUCTIONS (CONT).**

**ADJUSTMENT (CONT)**

- 3**
- a. Tie cord (9) near center of manual control handle (5).
  - b. Attach surveyor's steel measuring tape tension handle (10) to other end of cord (9).
  - c. Pull cord (9) with surveyor's steel measuring tape tension handle (10). (See illustration for correct position.)
  - d. Note reading as manual control handle (5) moves to closed position. Maximum reading should be 25-30 lb.
  - e. If reading is correct, go to step 5. If reading is incorrect, perform step 4 first.



- a. Screw barrel nut (7) up or down 1/2 turn, using a 9/16 inch socket wrench.
- b. Repeat adjustment until correct pullover of manual control handle is obtained.



Install self-locking nut (6) and lock against barrel nut (7) using a 9/16 inch socket wrench and a 9/16 inch open end wrench.

**3-10. TRAVERSING MECHANISM ASSEMBLY MAINTENANCE INSTRUCTIONS.**

This task covers:  
a. Disassembly      b. Cleaning/Repair      c. Reassembly

**INITIAL SETUP**

**Tools and Special Tools:**

Helical Insert and Tool Kit (item 6, app B)  
Small Arms Shop Set: Field Maintenance, Basic, Less Power (item 11, app B)

**Materials/Parts:**

Dry cleaning solvent (item 10, app D)  
General purpose lubricating oil (item 16, app D)  
Gloves, chemical and solvent resistant (item 11, app D)  
Grease, aircraft (GA) (item 12, app D)  
Wiping rag (item 22, app D)

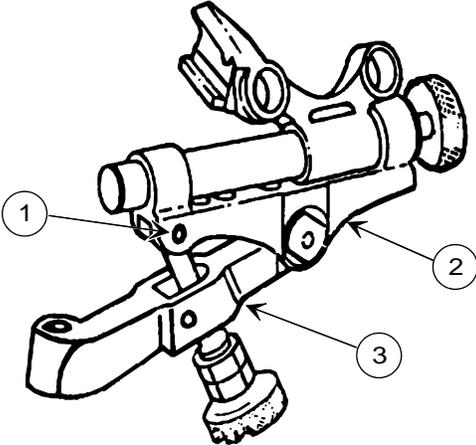
**Equipment Condition:**

Traversing mechanism assembly and cross leveling mechanism removed from mortar mount; dovetail adapter removed from traversing mechanism assembly (para 2-13)

Cotter pin (MS9245-27)  
Headless straight pin (MS16562-114)  
Key washer (11579911)  
Key washer (11579967)  
Spring pin (MS16562-29)  
Spring pin (MS16562-227)  
Wiper ring (11580064)

**DISASSEMBLY**

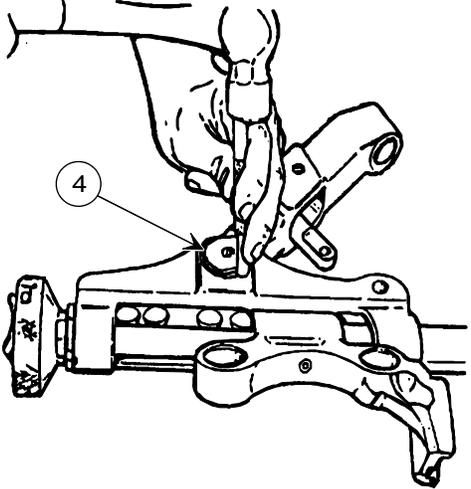
**1**



**CAUTION**  
It may be necessary to use a vise for this step. Use a soft-jawed vise to prevent equipment damage.

Press out roll pin (1) from traversing mechanism assembly (2) and cross leveling mechanism (3).

**2**

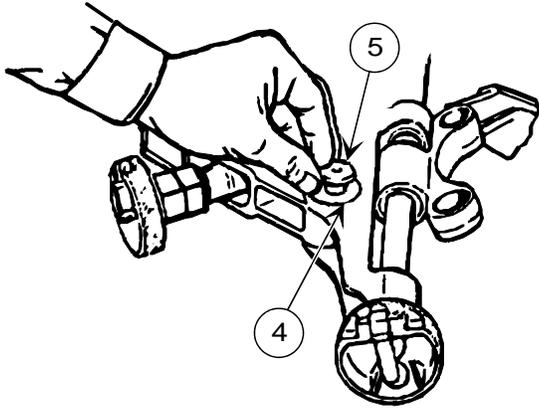


Flatten locking tabs of key washer (4), using a punch and hammer.

**3-10. TRAVERSING MECHANISM ASSEMBLY MAINTENANCE INSTRUCTIONS.**

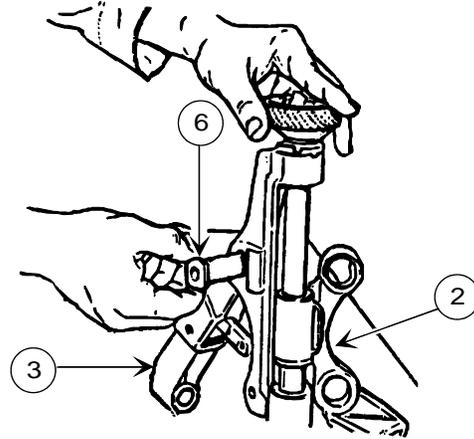
**DISASSEMBLY (CONT)**

**3**



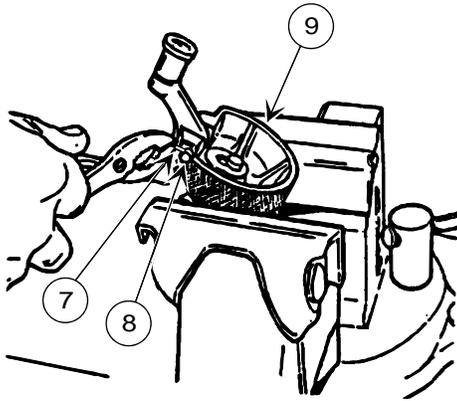
Remove internally relieved bolt (5) and key washer (4), using a 1-1/8 inch open end wrench. Discard key washer (4).

**4**



- a. Remove yoke axis pin (6).
- b. Remove traversing mechanism assembly (2) from cross leveling mechanism (3).

5

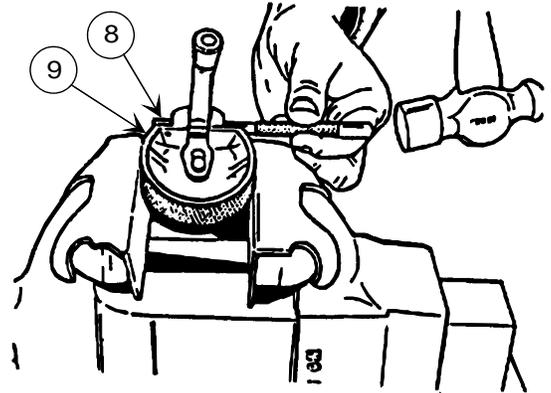


**CAUTION**

It may be necessary to use a vise during some of the following steps. Use a soft-jawed vise to prevent equipment damage.

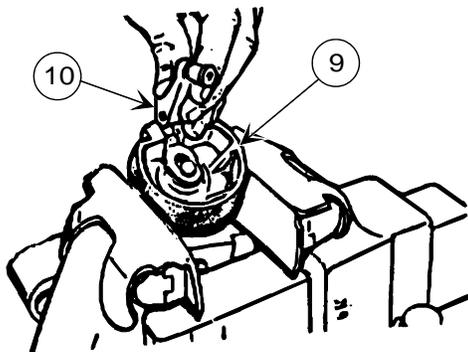
Remove cotter pin (7) from headless straight pin (8) and handwheel (9) using slip-joint pliers. Discard cotter pin (7).

6



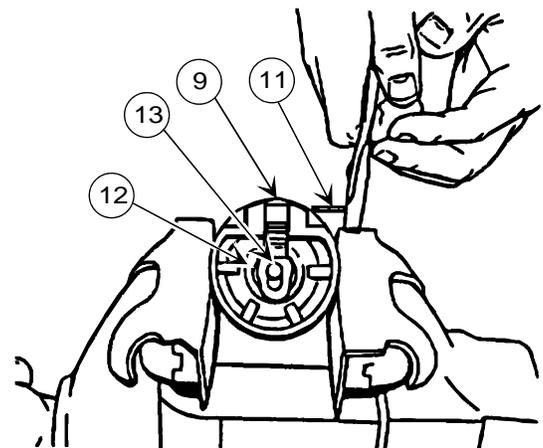
Support handwheel (9) and remove headless straight pin (8) with a hammer and punch.

7



Remove crank handle (10) from handwheel (9).

8

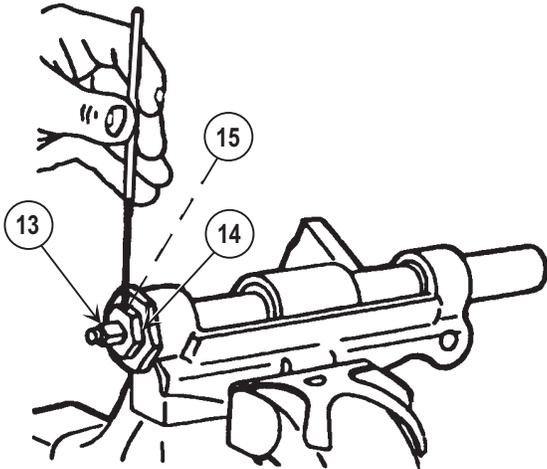


- a. Loosen headless straight pin (11) using a punch and hammer. Remove and discard headless straight pin (11) using slip-joint pliers.
- b. Remove flat spring (12). Remove handwheel (9) from traversing screw nut (13), using rubber mallet if necessary.

**3-10. TRAVERSING MECHANISM ASSEMBLY MAINTENANCE INSTRUCTIONS.**

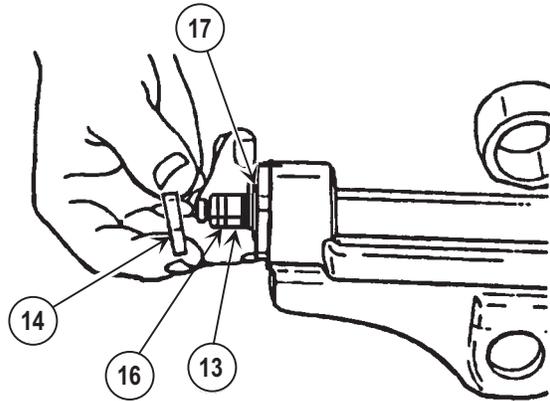
**DISASSEMBLY (CONT)**

**9**



- a. Scribe line on hexagon plain nut (14) and traversing screw nut (13).
- b. Remove spring pin (15) using a punch and hammer. Discard spring pin (15).

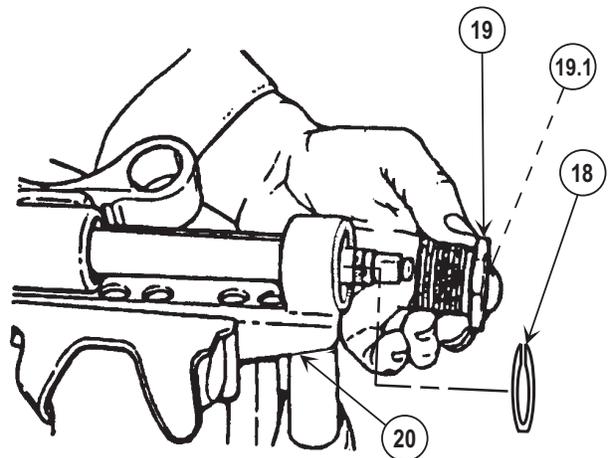
**10**



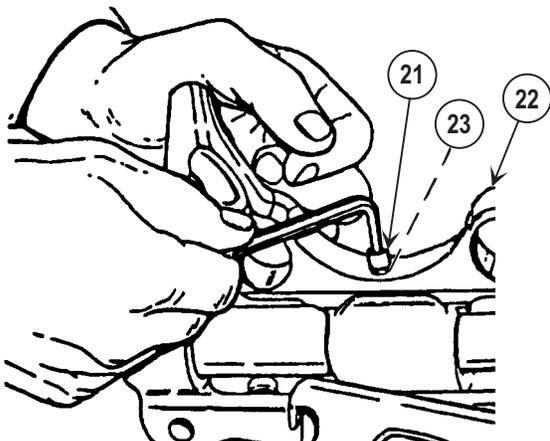
Using a 15/16 inch wrench, remove hexagon plain nut (14), laminated shim (16), and flat washer (17) from traversing screw nut (13).

**11**

- a. Flatten locking tabs of key washer (18) using a punch and hammer.
- b. Using a 1-1/2 inch open-end wrench, unscrew machine threaded bushing (19) and remove machine threaded bushing (19) and key washer (18) from traversing gear yoke (20). Discard key washer (18).
- c. If damaged, discard machine threaded bushing (19) and bearing sleeve (19.1).



12



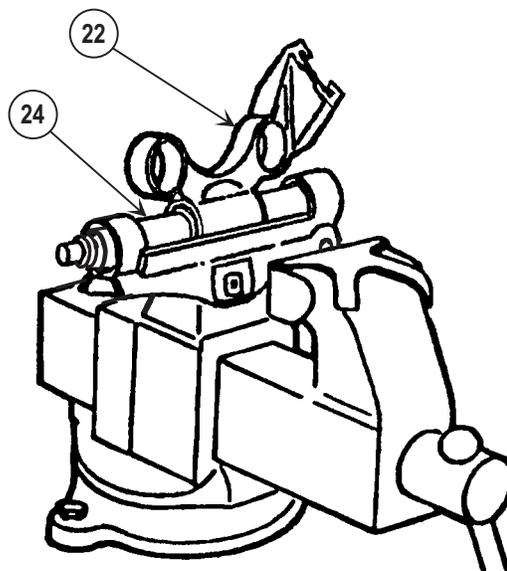
- a. Remove socket head capscrew (21) from buffer carrier (22) using a 3/16 inch hex key wrench.
- b. If damaged, remove and discard screw thread insert (23) using helical insert and tool kit (refer to para 3-4).

13

**CAUTION**

**It may be necessary to use a vise during some of the following steps. Use a soft-jawed vise to prevent equipment damage.**

Secure outer traversing sleeve (24) in vise. Using dead blow hammer to tap buffer carrier (22) if necessary, loosen buffer carrier (22).



**3-10. TRAVERSING MECHANISM ASSEMBLY MAINTENANCE INSTRUCTIONS.**

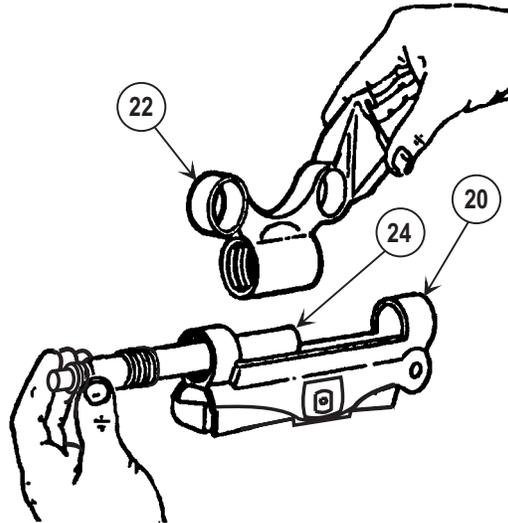
**DISASSEMBLY (CONT)**

**14**

**NOTE**

**Take note of the position of the buffer carrier in the traversing gear yoke.**

Unscrew outer traversing sleeve (24) from buffer carrier (22) and through traversing gear yoke (20) to separate components.



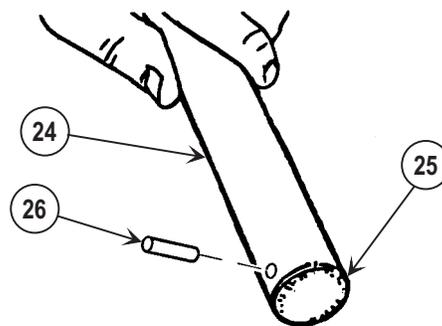
**15**

- a. Scribe marks on outer traversing sleeve (24) and traversing screw (25) to aid in reassembly.

**NOTE**

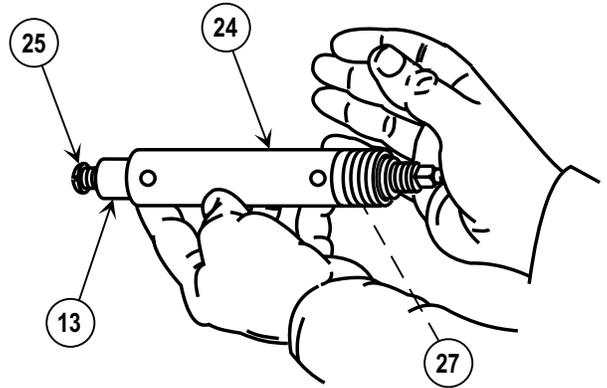
**Some older models may have a countersunk screw in lieu of spring pin (26).**

- b. Remove spring pin (26) from outer traversing sleeve (24). Discard spring pin (26).
- c. Remove and discard screw. Outer traversing sleeve (24) and traversing screw (25) can be reused. Drill 1/8 inch through hole. (See reassembly for procedure.)

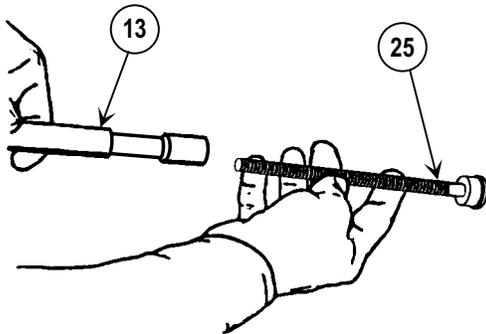


## 16

- a. Push on traversing screw nut (13) to remove assembled traversing screw nut (13) and traversing screw (25) from outer traversing sleeve (24).
- b. Remove and discard wiper ring (27) from outer traversing sleeve (24).

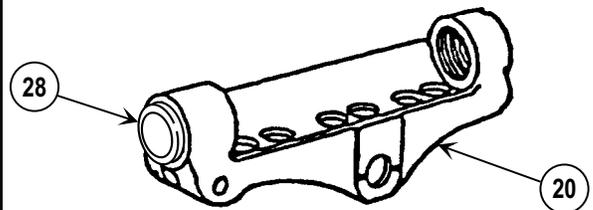


## 17



Separate traversing screw (25) from traversing screw nut (13).

## 18



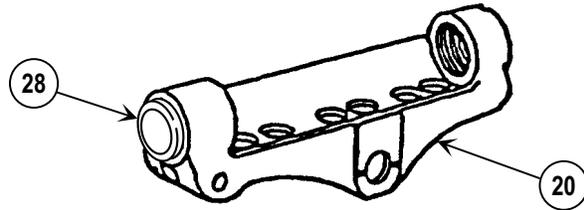
If damaged, remove sleeve bearing (28) from traversing yoke (20).

**CLEANING/REPAIR**

- a. Clean parts with dry cleaning solvent and wipe dry with wiping rag.
- b. Replace damaged or defective parts.
- c. The traversing screw nut and the hexagon plain nut that goes on it must both be replaced if one is damaged.
- d. Lubricate parts with general purpose lubricating oil before reassembly.
- e. Apply a light coat of GA to traversing screw.

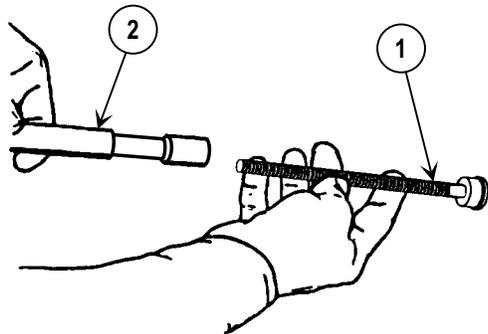
**REASSEMBLY**

**0.1**



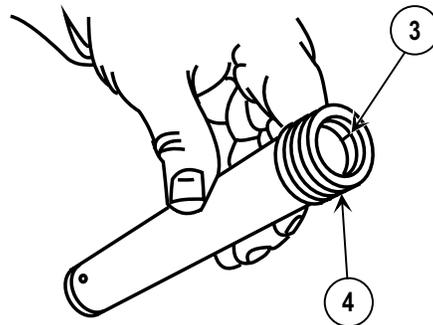
If removed, install new sleeve bearing (28) in traversing yoke (20).

**1**



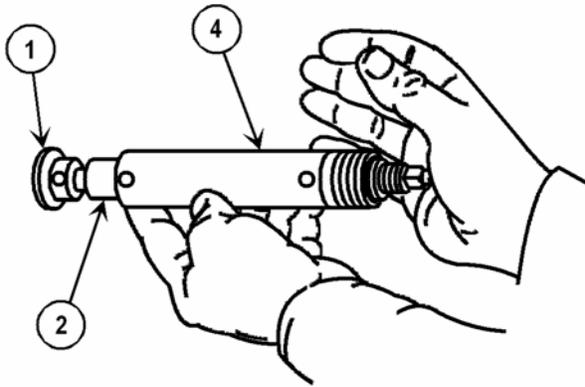
Install traversing screw (1) into traversing screw nut (2).

**2**



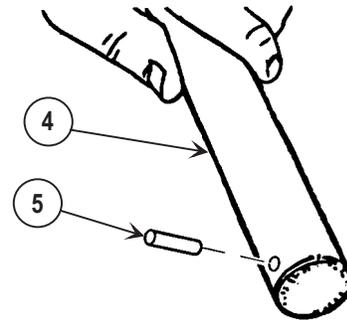
Install new wiper ring (3) in outer traversing sleeve (4).

3



- a. Align scribe marks and install assembled traversing screw nut (2) and traversing screw (1) into outer traversing sleeve (4).
- b. If installing a new outer traversing sleeve (4), or using an older countersunk sleeve, assemble traversing screw (1) and traversing nut (2) into outer traversing sleeve (4). Mark outer traversing sleeve  $0.280 \pm 0.010$  in. from end of traversing screw and drill  $1/8$  in. through hole.

4



Install new spring pin (5) in outer traversing sleeve (4).

**3-10. TRAVERSING MECHANISM ASSEMBLY MAINTENANCE INSTRUCTIONS.**

**REASSEMBLY (CONT)**

**5**

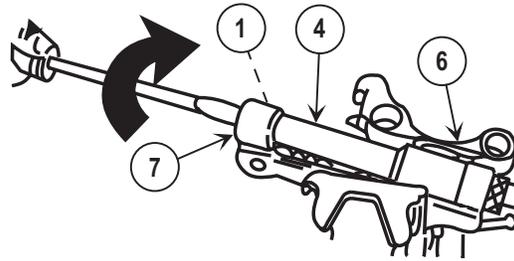
**CAUTION**

It may be necessary to use a vise during some of the following steps. Use a soft-jawed vise to prevent equipment damage.

**NOTE**

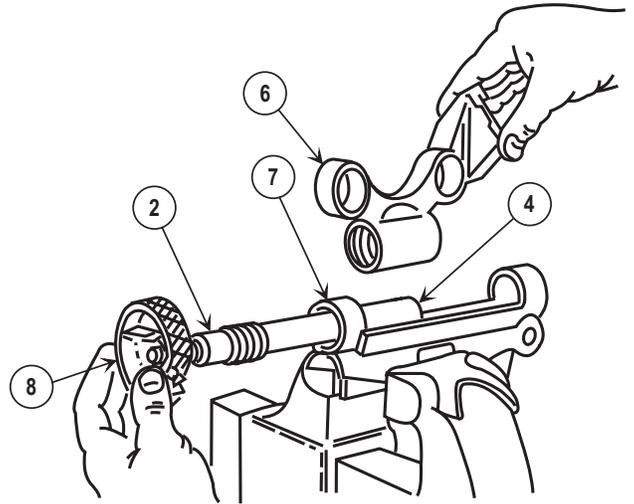
The following procedure can be performed only if the traversing screw has a screwdriver slot. If the slot is not there, go to step 6.

- a. Align buffer carrier (6) and traversing gear yoke (7) and install outer traversing sleeve (4).
- b. Using a screwdriver, turn counterclockwise on traversing screw (1) until holes in outer traversing sleeve (4) and buffer carrier (6) align.



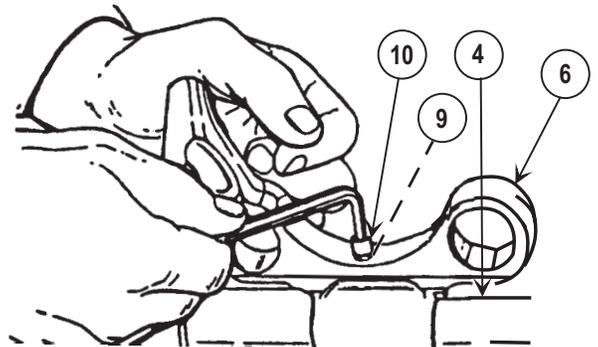
## 6

- a. If installing a new outer traversing sleeve (4), it may be necessary to drill a new capscrew hole as follows:  
Thread outer traversing sleeve (4) into buffer carrier (6) to flush or within 0.020 inch tolerance. Mark hole through buffer carrier onto outer traversing sleeve (4) with a standard 3/16 inch punch. Remove outer traversing sleeve (4) and drill through one side of it at mark using a letter F (0.257) drill.
- b. Place handwheel (8) on end of traversing screw nut (2) and screw outer traversing sleeve (4) and buffer carrier (6) into traversing gear yoke (7).
- c. Screw outer traversing sleeve (4) back through buffer carrier (6) and align screw holes.



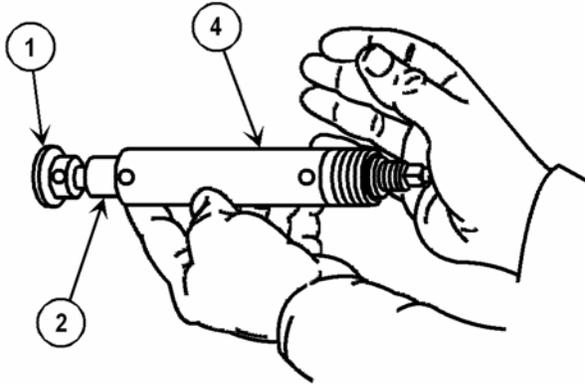
## 7

- a. If removed, install new screw thread insert (9) using helical insert and tool kit (refer to para 3-4).
- b. Using a 3/16 inch hex key wrench, install socket head capscrew (10) in buffer carrier (6). Ensure that socket head capscrew (10) engages the recess in outer traversing sleeve (4).



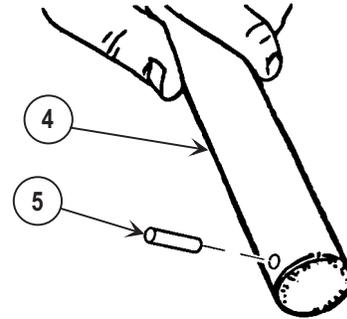


3



- a. Align scribe marks and install assembled traversing screw nut (2) and traversing screw (1) into outer traversing sleeve (4).
- b. If installing a new outer traversing sleeve (4), or using an older countersunk sleeve, assemble traversing screw (1) and traversing nut (2) into outer traversing sleeve (4). Mark outer traversing sleeve  $0.280 \pm 0.010$  in. from end of traversing screw and drill  $1/8$  in. through hole.

4



Install new spring pin (5) in outer traversing sleeve (4).

**3-10. TRAVERSING MECHANISM ASSEMBLY MAINTENANCE INSTRUCTIONS.**

**REASSEMBLY (CONT)**

**5**

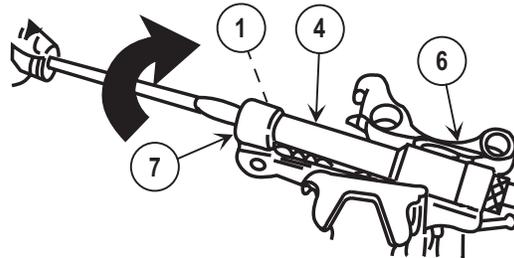
**CAUTION**

It may be necessary to use a vise during some of the following steps. Use a soft-jawed vise to prevent equipment damage.

**NOTE**

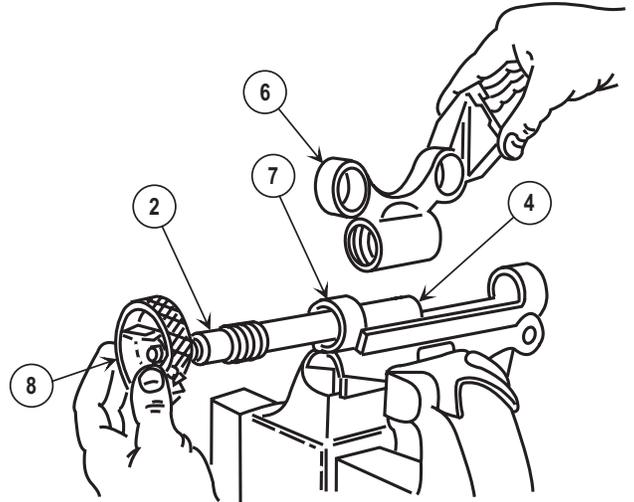
The following procedure can be performed only if the traversing screw has a screwdriver slot. If the slot is not there, go to step 6.

- a. Align buffer carrier (6) and traversing gear yoke (7) and install outer traversing sleeve (4).
- b. Using a screwdriver, turn counterclockwise on traversing screw (1) until holes in outer traversing sleeve (4) and buffer carrier (6) align.



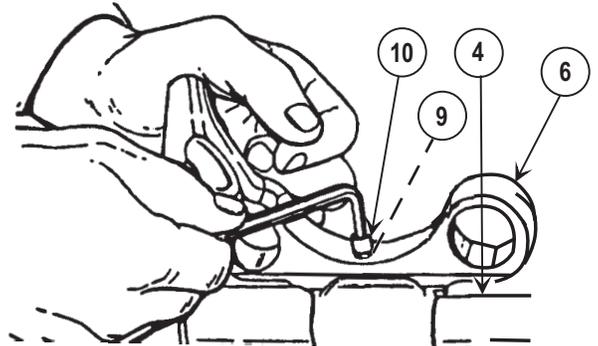
## 6

- a. If installing a new outer traversing sleeve (4), it may be necessary to drill a new capscrew hole as follows:  
Thread outer traversing sleeve (4) into buffer carrier (6) to flush or within 0.020 inch tolerance. Mark hole through buffer carrier onto outer traversing sleeve (4) with a standard 3/16 inch punch. Remove outer traversing sleeve (4) and drill through one side of it at mark using a letter F (0.257) drill.
- b. Place handwheel (8) on end of traversing screw nut (2) and screw outer traversing sleeve (4) and buffer carrier (6) into traversing gear yoke (7).
- c. Screw outer traversing sleeve (4) back through buffer carrier (6) and align screw holes.

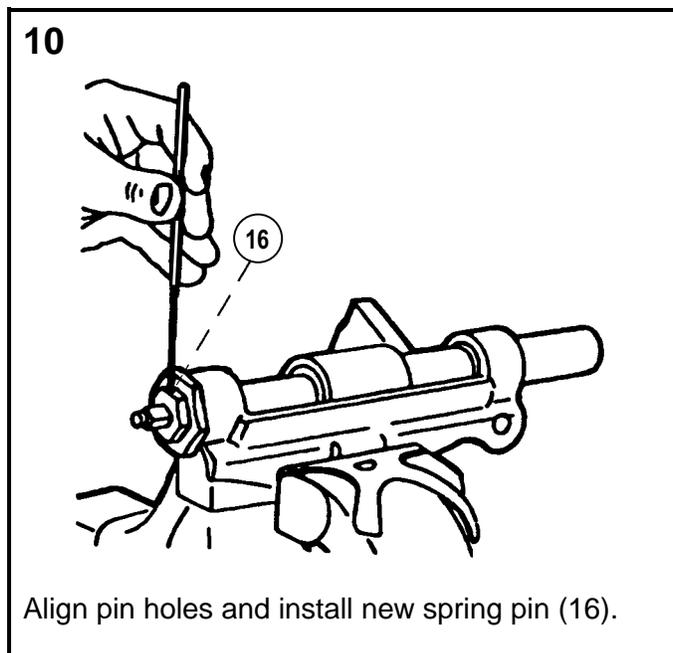
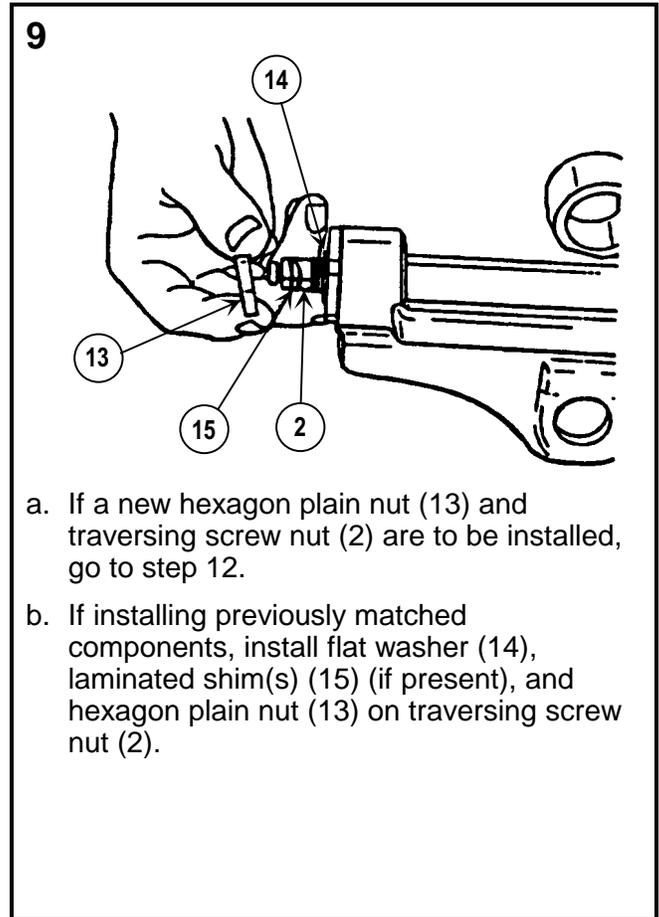
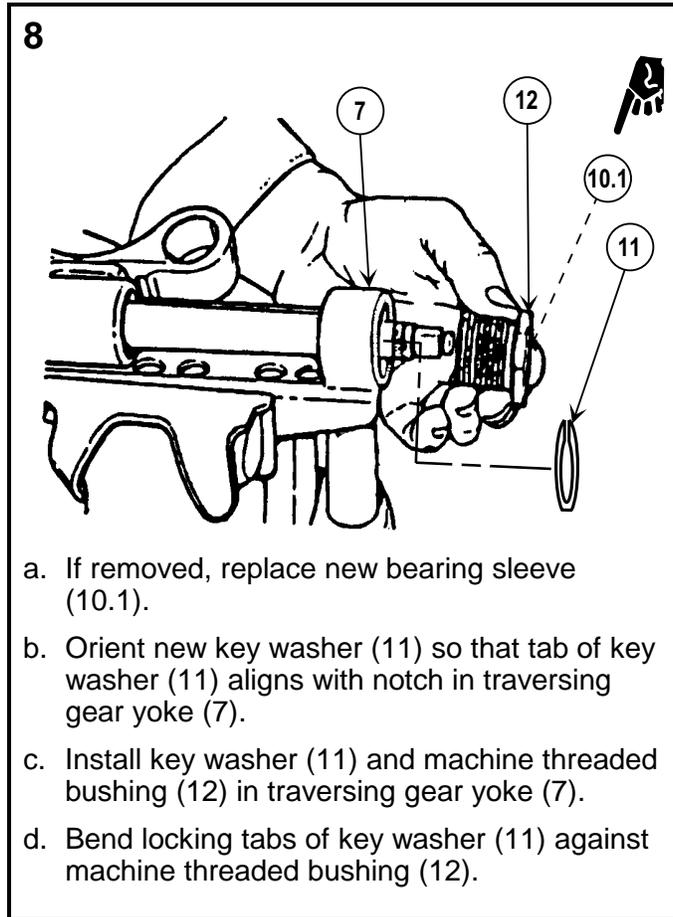


## 7

- a. If removed, install new screw thread insert (9) using helical insert and tool kit (refer to para 3-4).
- b. Using a 3/16 inch hex key wrench, install socket head capscrew (10) in buffer carrier (6). Ensure that socket head capscrew (10) engages the recess in outer traversing sleeve (4).





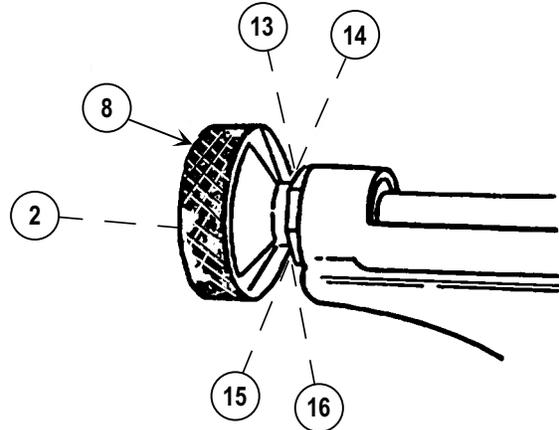


**3-10. TRAVERSING MECHANISM ASSEMBLY MAINTENANCE INSTRUCTIONS (CONT).**

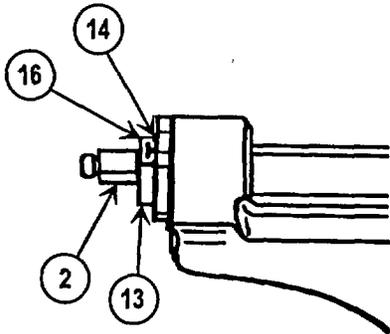
**REASSEMBLY (CONT)**

**11**

- a. Install handwheel (8) on traversing screw nut (2).
- b. Rotate handwheel (8) and observe operation of traversing mechanism assembly.
- c. If backlash exceeds 1/8 turn, remove handwheel (8), spring pin (16), and hexagon plain nut (13).
- d. Install laminated shim(s) (15) on traversing screw nut (2). Install hexagon plain nut (13). Using a feeler gauge, remove/add laminated shim(s) (15) until the 0.002 inch distance is obtained between flat washer (14) and hexagon plain nut (13) at its pinned position. Install spring pin (16) and handwheel (8).
- e. Repeat steps 11a, 11b, 11c, and 11d until backlash is removed. Go to step 14.

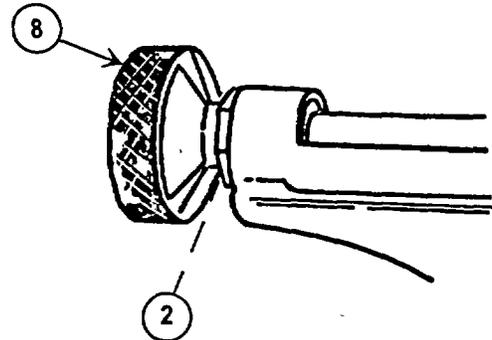


12



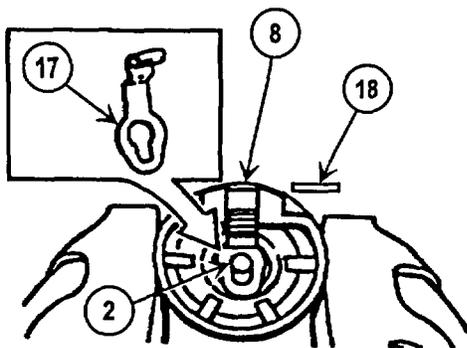
- a. Install flat washer (14) and hexagon plain nut (13) on traversing screw nut (2).
- b. Using feeler gauge, measure distance between flat washer (14) and hexagon plain nut (13). Adjust until distance is 0.002 inch.
- c. Drill a hole 0.094 + 0.010 inch through hexagon plain nut (13) and traversing screw nut (2). Install new spring pin (16).

13



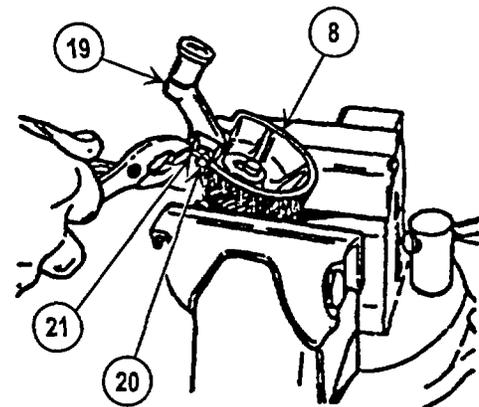
- a. Install handwheel (8) on traversing screw nut (2).
- b. Check for backlash. See step 11c.

14



- a. Install flat spring (17) on traversing screw nut (2) with end of curl up.
- b. Install new headless straight pin (18) on handwheel (8), using a hammer and punch.
- c. Lightly peen over ends of headless straight pin (18).

15

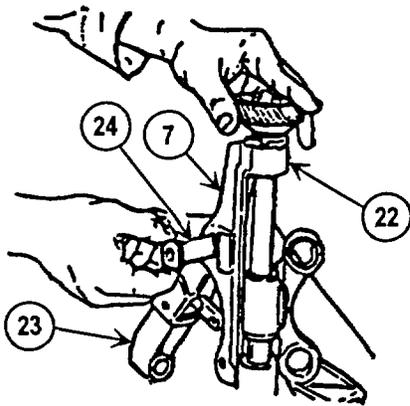


- a. Install crank handle (19) and headless straight pin (20) on handwheel (8).
- b. Install new cotter pin (21) in headless straight pin (20) and handwheel (8).

3-10. TRAVERSING MECHANISM ASSEMBLY MAINTENANCE INSTRUCTIONS (CONT).

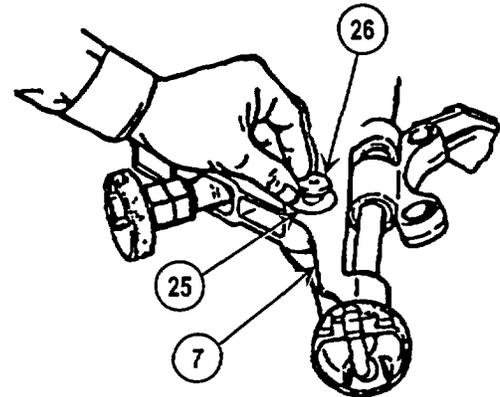
REASSEMBLY (CONT)

16



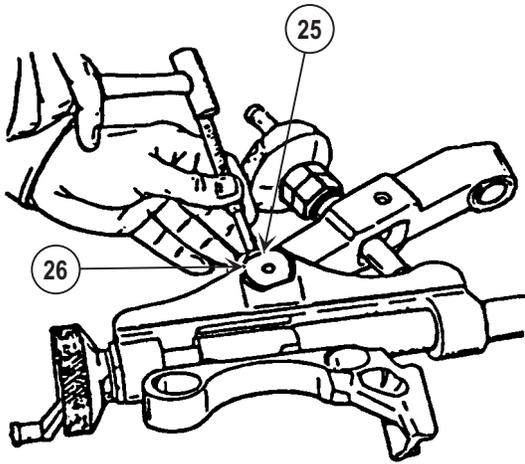
- a. Install traversing mechanism assembly (22) on cross leveling mechanism (23) and align holes.
- b. Install yoke axis pin (24) with flat edge of yoke axis pin (24) against machined shoulder of traversing gear yoke (7).

17



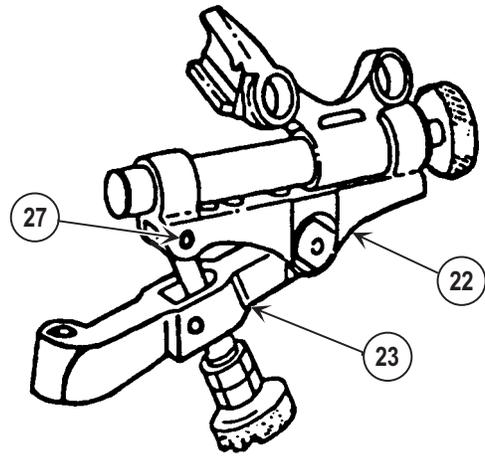
- a. Install new key washer (25) and bend tabs into holes in traversing gear yoke (7).
- b. Install internally relieved bolt (26).
- c. Tighten, using a 1-1/8 inch open end wrench.

18



Lock tabs of key washer (25) up against internally relieved bolt (26), using a punch and hammer.

19



Press roll pin (27) in cross leveling mechanism (23) and traversing mechanism assembly (22).

**3-11. MORTAR MOUNTING BUFFER MAINTENANCE INSTRUCTIONS.**

This task covers:

- a. Disassembly      b. Cleaning/Repair      c. Reassembly      d. Adjustment

**INITIAL SETUP**

**Tools and Special Tools:**

Small Arms Shop Set: Field Maintenance, Basic, Less Power (item 11, app B)

**Materials/Parts:**

Antiseize compound (item 2, app D)  
Dry cleaning solvent (item 10, app D)  
General purpose lubricating oil (item 16, app D)

**Materials/Parts - Cont:**

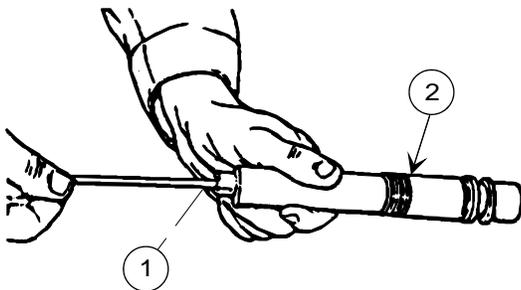
Gloves, chemical and solvent resistant (item 11, app D)  
Wiping rag (item 22, app D)

**Equipment Condition:**

Mortar mounting buffers removed from mortar mount (para 2-13)

**DISASSEMBLY**

1

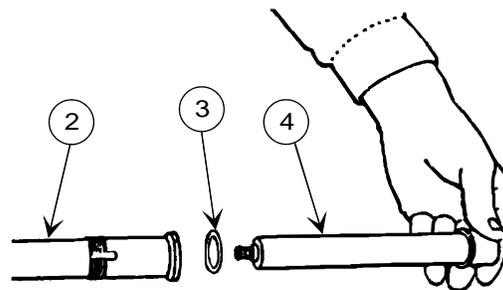


**NOTE**

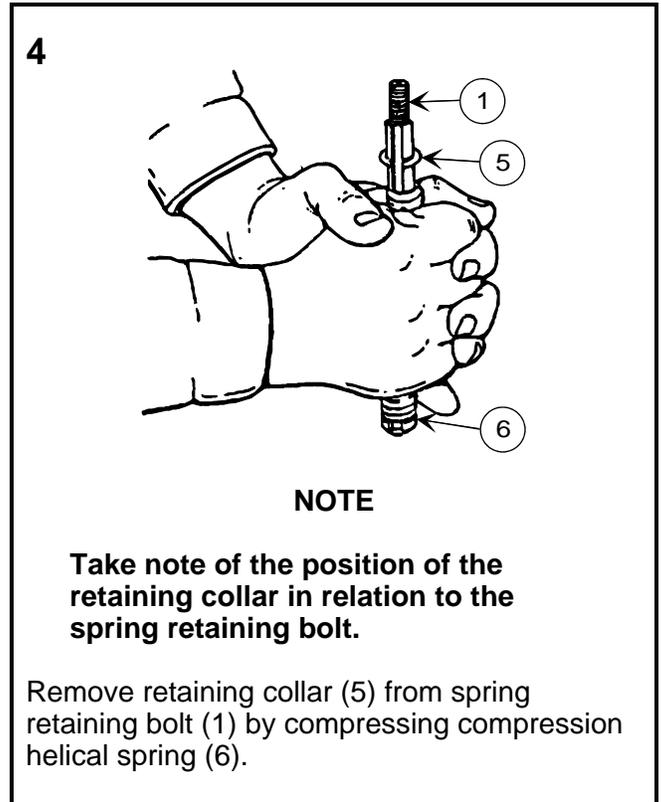
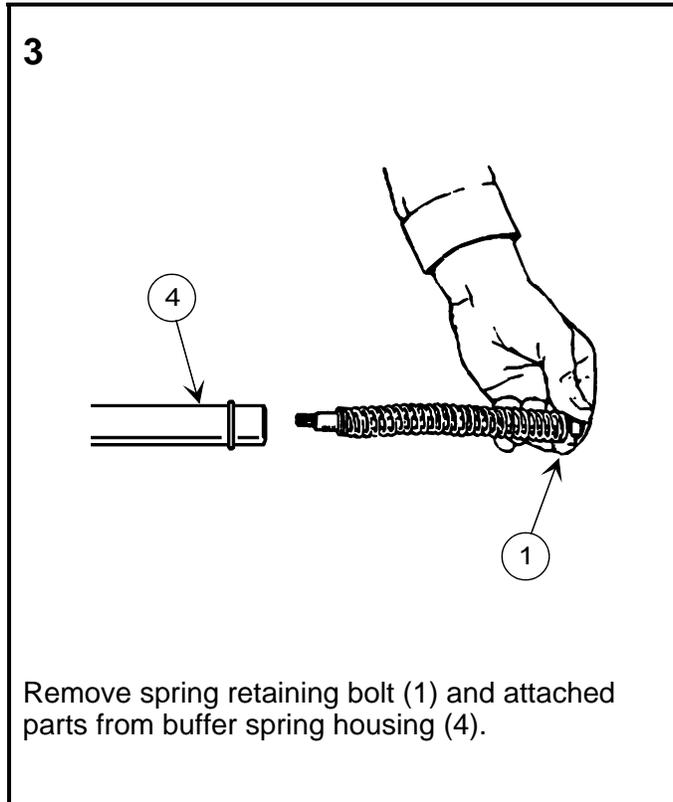
The cotter pin on the end of the buffer cylinder was removed when the mortar mounting buffer was removed from the bipod.

Screw spring retaining bolt (1) clockwise into buffer cylinder (2) until it releases.

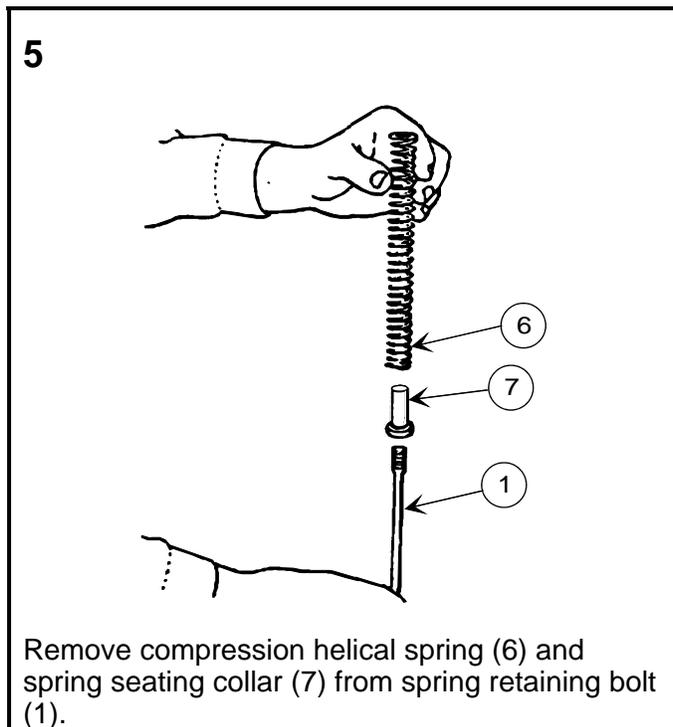
2



Slide buffer cylinder (2) and flat washer (3) from buffer spring housing (4).



#### CLEANING/REPAIR

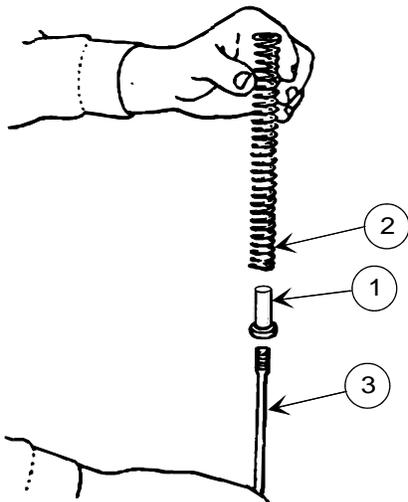


- Clean parts with dry cleaning solvent and wipe dry with wiping rag.
- Replace damaged or defective parts.
- If buffer cylinder or buffer spring housing are damaged, replace entire mortar mounting buffer.
- Lubricate parts with general purpose lubricating oil before reassembly.

**3-11. MORTAR MOUNTING BUFFER MAINTENANCE INSTRUCTIONS (CONT).**

**REASSEMBLY**

**1**

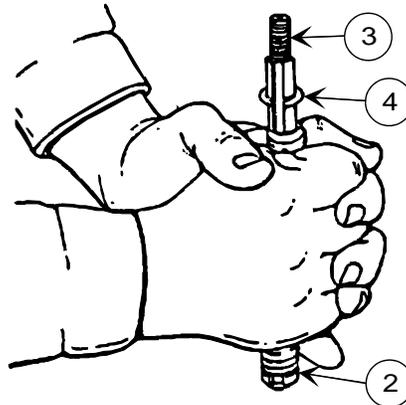


Install spring seating collar (1) and compression helical spring (2) on spring retaining bolt (3).

**2**

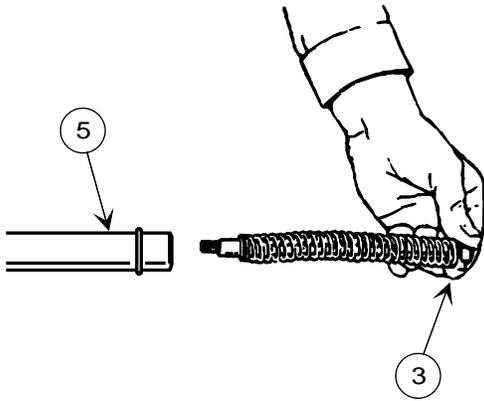
**WARNING**

Take note of the position of the retaining collar (4) in relation to the spring retaining bolt (3). Incorrect assembly could cause damage to equipment or serious injury to personnel.



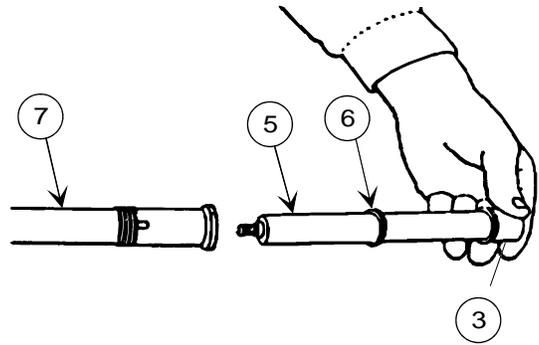
With long side up, install retaining collar (4) on spring retaining bolt (3) by compressing compression helical spring (2).

3



- a. Apply antiseize compound to threaded end of spring retaining bolt (3).
- b. Install spring retaining bolt (3) and attached parts in buffer spring housing (5).

4



Install flat washer (6) and then buffer cylinder (7) on buffer spring housing (5). Make sure that buffer cylinder (7) threads onto spring retaining bolt (3) until cotter pin hole appears in slot.



## ADJUSTMENT

The mortar mounting buffers require adjustment after disassembly and reassembly. This adjustment is done when the mortar mounting buffers are installed in the bipod (para 2-13).

If correct recoil adjustment cannot be obtained by the procedures described in Task Block 8, page 2-27, the retaining collar(s) has been installed backwards on the spring tension bolt(s). Disassemble/reassemble IAW TM instructions; page 3-37 Task Block 4, and page 3-38 Task Block 2.

### 3-12. CROSS LEVELING MECHANISM MAINTENANCE INSTRUCTIONS.

This task covers:

- a. Disassembly      b. Cleaning/Repair      c. Reassembly

#### INITIAL SETUP

##### Tools and Special Tools:

Small Arms Shop Set: Field Maintenance, Basic, Less Power (item 11, app B)

##### Equipment Condition:

Cross leveling mechanism removed from traversing mechanism assembly (para 3-10)

##### Materials/Parts:

Dry cleaning solvent (item 10, app D)  
General purpose lubricating oil (item 16, app D)  
Gloves, chemical and solvent resistant (item 11, app D)  
Grease, aircraft (GA) (item 12, app D)  
Wiping rag (item 22, app D)  
Cotter pin (MS9245-27)  
Headless straight pin (MS16562-114)  
O-ring (MS28775-115)

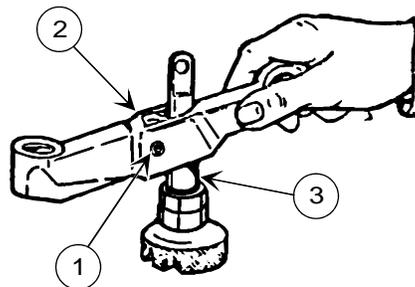
#### DISASSEMBLY

1

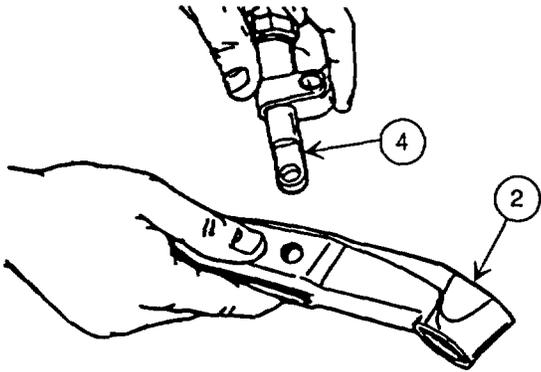
#### CAUTION

**It may be necessary to use a vise for this step. Use a soft-jawed vise to prevent equipment damage.**

Press out roll pin (1) from cross-leveling arm (2) and mechanical housing (3).

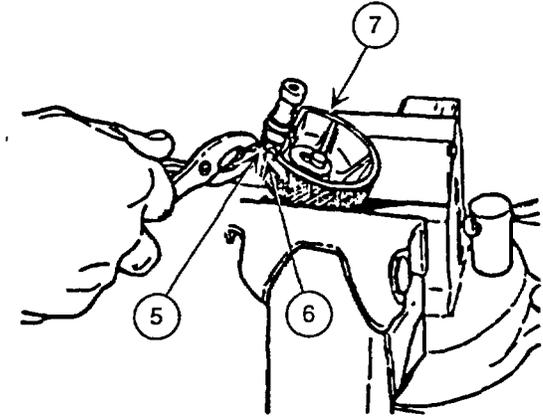


2



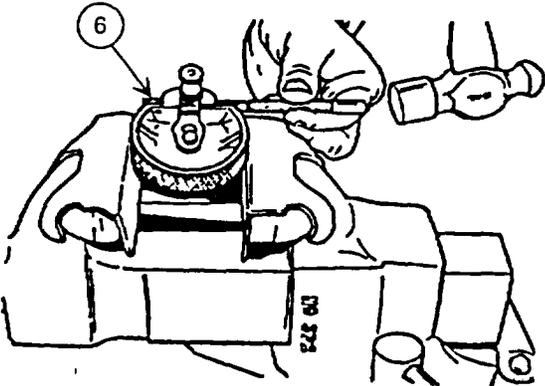
Remove rod end connector (4) and attached parts from cross-leveling arm (2).

3



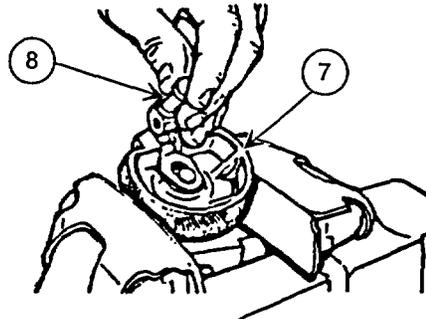
Remove cotter pin (5) from headless straight pin (6) and handwheel (7), using slip-joint pliers. Discard cotter pin (5).

4



Remove headless straight pin (6) using a punch and hammer.

5

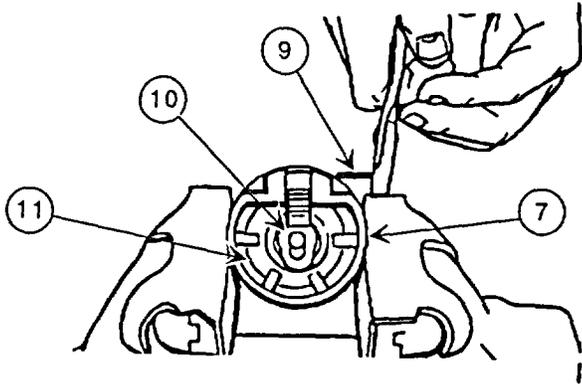


Remove crank handle (8) from handwheel (7).

3-12. CROSS LEVELING MECHANISM MAINTENANCE INSTRUCTIONS (CONT).

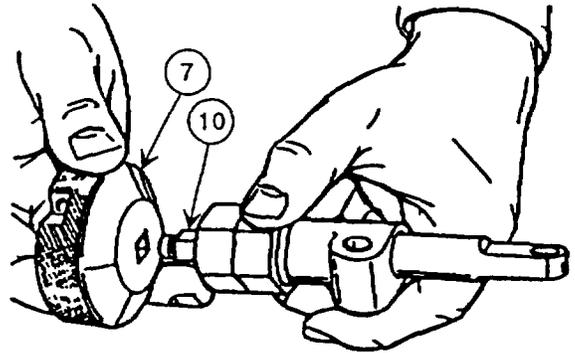
DISASSEMBLY (CONT)

6



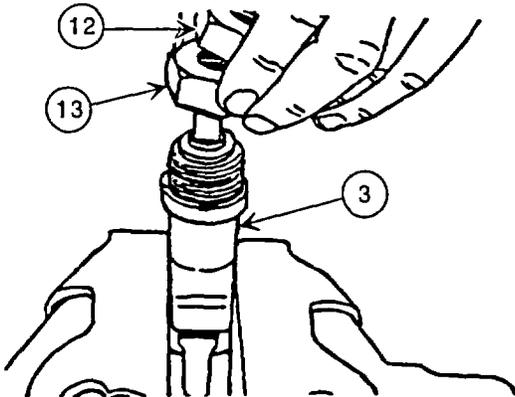
- a. Loosen headless straight pin (9) with a hammer and punch and then remove it from handwheel (7) and ribbed shoulder bolt (10) with slip-joint pliers. Discard headless straight pin (9).
- b. Remove flat spring (11).

7



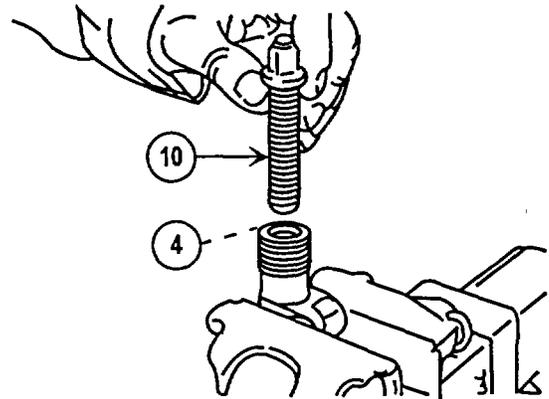
Remove handwheel (7) from ribbed shoulder bolt (10), using rubber mallet if necessary.

8



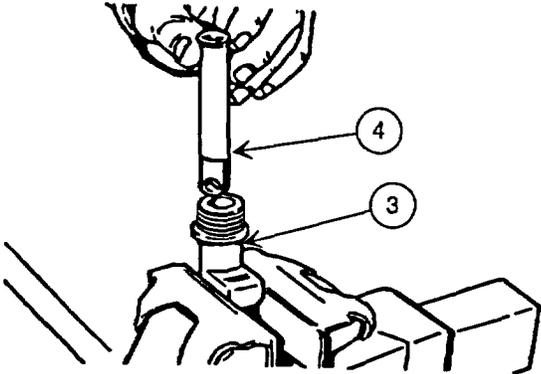
- a. Loosen plug protective cap (12) and hexagon plain nut (13) with a 1-1/8 inch box end wrench.
- b. Remove plug protective cap (12) and hexagon plain nut (13) from mechanical housing (3).

9



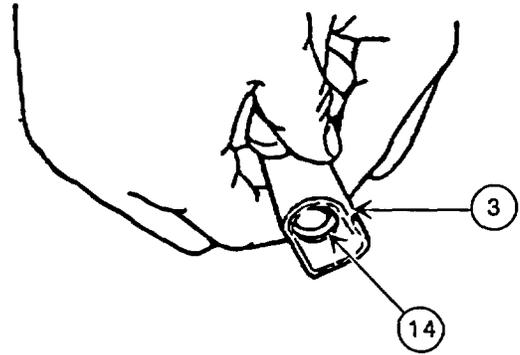
Unscrew ribbed shoulder bolt (10) and remove from rod end connector (4).

10



Remove rod end connector (4) by pushing from mechanical housing (3).

11



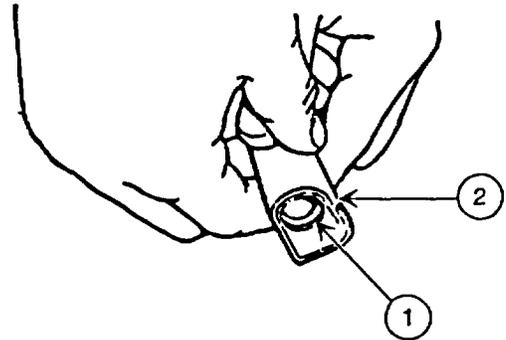
Remove and discard O-ring (14) from mechanical housing (3).

#### CLEANING/REPAIR

- Clean parts with dry cleaning solvent and wipe dry with wiping rag.
- Replace damaged or defective parts.
- If cross-leveling arm is damaged, replace entire cross leveling mechanism.
- Lubricate parts (except ribbed shoulder bolt) with general purpose lubricating oil before reassembly.
- Lubricate ribbed shoulder bolt with GA before reassembly.

#### REASSEMBLY

1

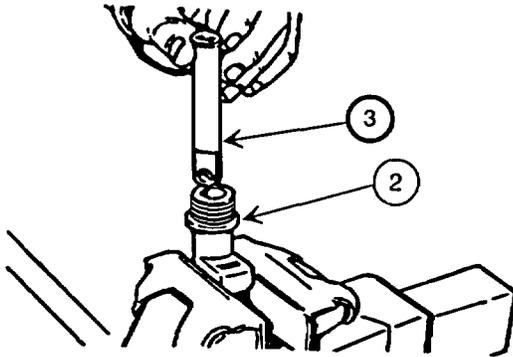


Install new O-ring (1) in mechanical housing (2).

3-12. CROSS LEVELING MECHANISM MAINTENANCE INSTRUCTIONS (CONT).

REASSEMBLY (CONT)

2

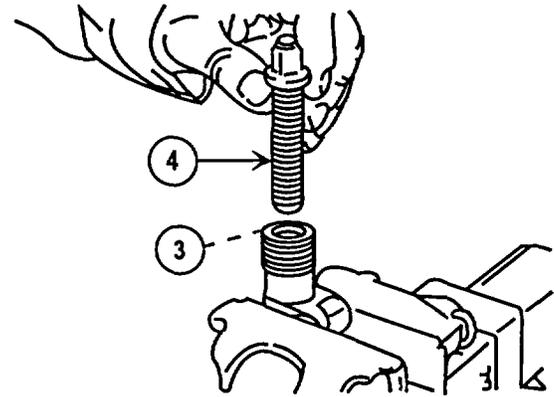


**CAUTION**

It may be necessary to use a vise during some of the following steps. Use a soft-jawed vise to prevent equipment damage.

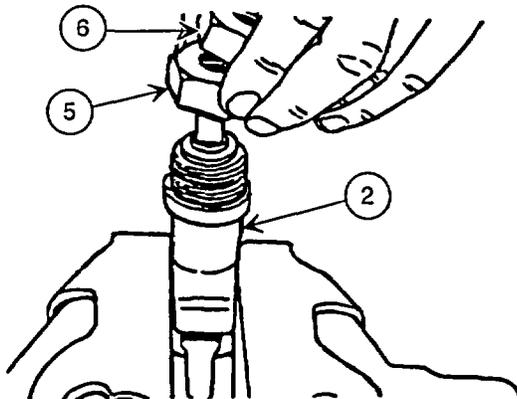
Install rod end connector (3) flush with top of mechanical housing (2).

3



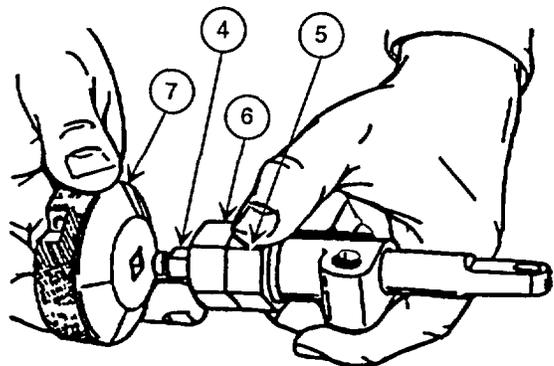
Screw ribbed shoulder bolt (4) into rod end connector (3).

4



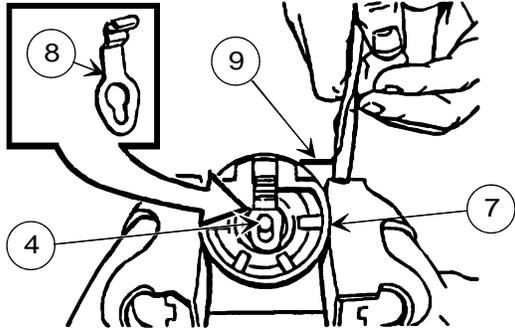
Install hexagon plain nut (5) and plug protective cap (6) on mechanical housing (2).

5



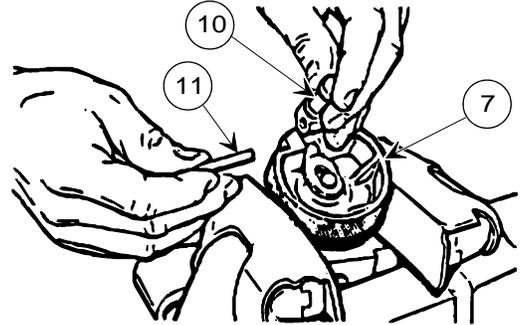
- Install handwheel (7) on ribbed shoulder bolt (4).
- Adjust for smooth movement until a slight drag is observed on handwheel (7).
- Tighten plug protective cap (6) and hexagon plain nut (5) securely. Do not overtighten.

6



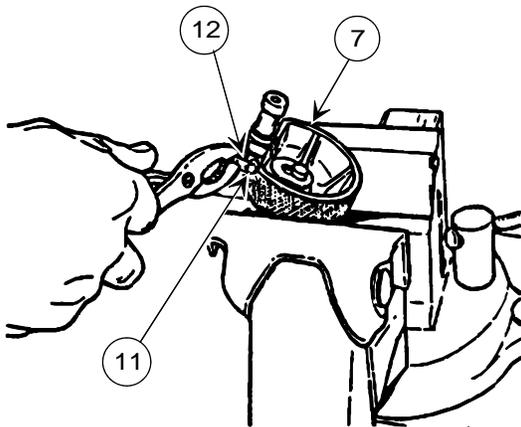
- a. Install flat spring (8) on ribbed shoulder bolt (4) with end of curl up.
- b. Install new headless straight pin (9) on handwheel (7) using slip-joint pliers, and then a hammer and punch.
- c. Lightly peen over ends of headless straight pin (9).

7



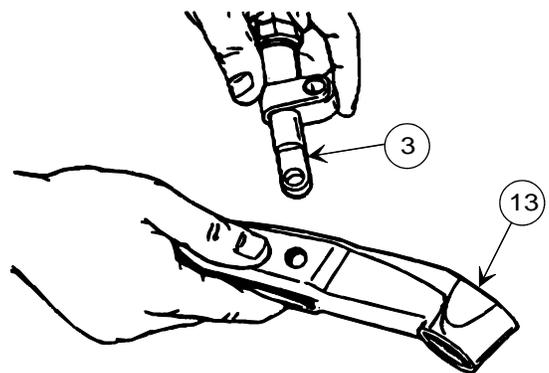
Install crank handle (10) and headless straight pin (11) on handwheel (7).

8



Install new cotter pin (12) in headless straight pin (11) and handwheel (7).

9



Install rod end connector (3) with attached parts in cross-leveling arm (13).

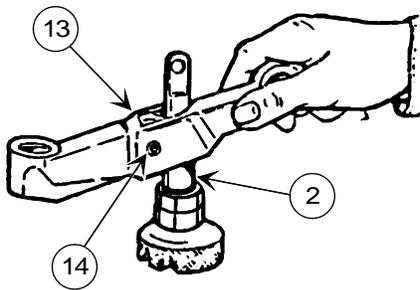
**3-12. CROSS LEVELING MECHANISM MAINTENANCE INSTRUCTIONS (CONT).**

**REASSEMBLY (CONT)**

**10**

**NOTE**

**Ensure mechanical housing (2) is approximately centered in cross-leveling arm (13).**



Press roll pin (14) into cross-leveling arm (13) and mechanical housing (2).

### 3-13. MORTAR MOUNT LEG ASSEMBLY MAINTENANCE INSTRUCTIONS.

This task covers: Disassembly/Cleaning/Repair/Reassembly

#### INITIAL SETUP

##### Tools and Special Tools:

Small Arms Shop Set: Field Maintenance, Basic, Less Power (item 11, app B)

##### Equipment Condition:

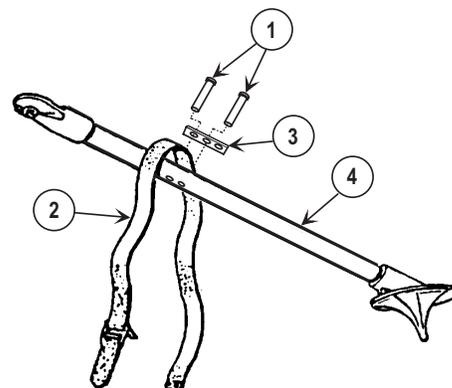
Mortar mount leg assembly removed from mortar mount (para 2-13)

##### Materials/Parts:

Dry cleaning solvent (item 10, app D)  
General purpose lubricating oil (item 16, app D)  
Gloves, chemical and solvent resistant (item 11, app D)  
Wiping rag (item 22, app D)

#### DISASSEMBLY/CLEANING/REPAIR/REASSEMBLY

- a. If solid rivet (1) or webbing strap (2) is damaged, file off solid rivet (1), and remove mounting plate (3) and webbing strap (2) from fixed leg (4).
- b. Clean metal parts with dry cleaning solvent and wipe dry with wiping rag.
- c. Replace damaged or defective parts.
- d. If fixed leg is damaged, replace entire mortar mount leg assembly.
- e. Lubricate metal parts with general purpose lubricating oil before reassembly.
- f. Position new webbing strap (2) over the hole in fixed leg (4).
- g. Install mounting plate (3) and new solid rivet (1) through webbing strap (2) and fixed leg (4).
- h. Brad or flare solid rivet (1) on fixed leg (4).



**3-14. ELEVATING MECHANISM ASSEMBLY AND ELEVATING SCREW ASSEMBLY  
MAINTENANCE INSTRUCTIONS.**

This task covers:

- a. Disassembly      b. Cleaning/Repair      c. Reassembly

**INITIAL SETUP**

**Tools and Special Tools:**

Helicoil Insert and Tool Kit (item 6, app B)  
Small Arms Shop Set: Field Maintenance, Basic, Less  
Power (item 11, app B)  
Snap Ring Pliers (item 7, app B)

**Materials/Parts:**

Dry cleaning solvent (item 10, app D)  
General purpose lubricating oil (item 16, app D)  
Gloves, chemical and solvent resistant (item 11, app D)  
Grease, aircraft (GA) (item 12, app D)  
Wiping rag (item 22, app D)

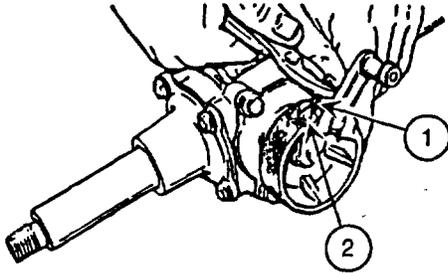
**Equipment Condition:**

Elevating mechanism assembly removed from  
mortar mount (para 2-13)

Cotter pin (2) (MS9245-27)  
Gasket (as required) (11580010)  
Gasket (as required) (11580013)  
Headless straight pin (MS16562-114)  
Hexagon self-locking nut (MS16228-6C)  
Key washer (MS9582-17)  
O-ring (MS28775-215)  
O-ring (MS28775-222)

## DISASSEMBLY

1

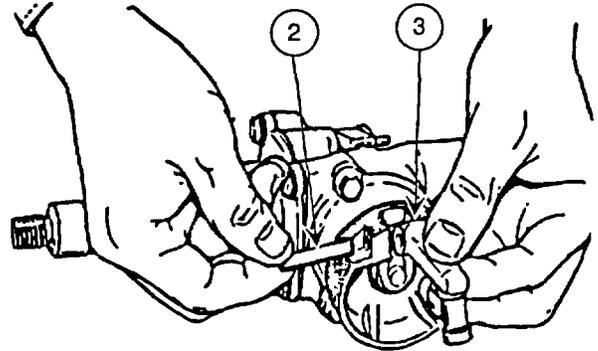


### NOTE

The self-locking nut and flat washer on the end of the elevating screw assembly were removed when the elevating mechanism assembly was removed from the bipod.

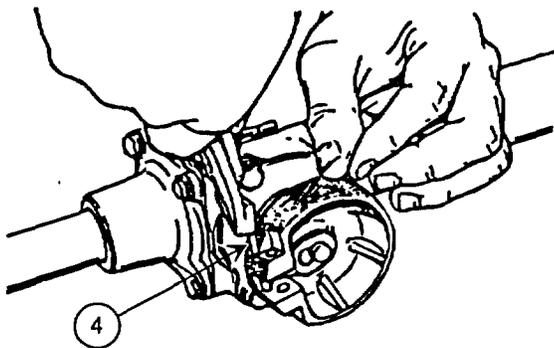
Remove cotter pin (1) from headless straight pin (2). Discard cotter pin (1).

2



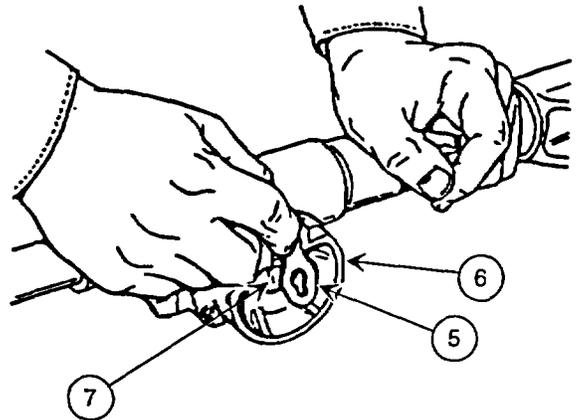
- a. Remove headless straight pin (2), using a hammer and punch.
- b. Remove crank handle (3).

3



Remove headless straight pin (4) with a hammer and punch. Discard headless straight pin (4).

4

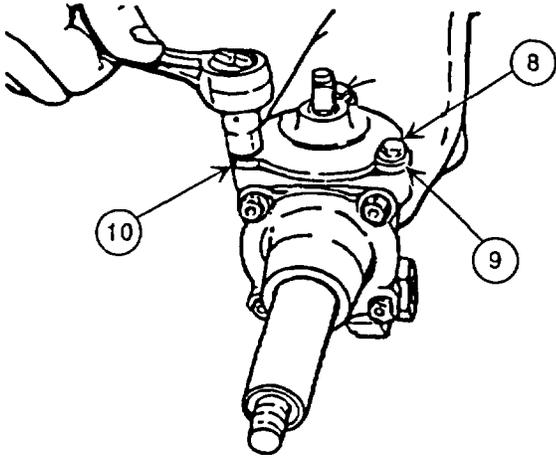


Remove flat spring (5). Remove handwheel (6) from shaft of bevel gear (7), using rubber mallet if necessary.

3-14. ELEVATING MECHANISM ASSEMBLY AND ELEVATING SCREW ASSEMBLY MAINTENANCE  
INSTRUCTIONS (CONT).

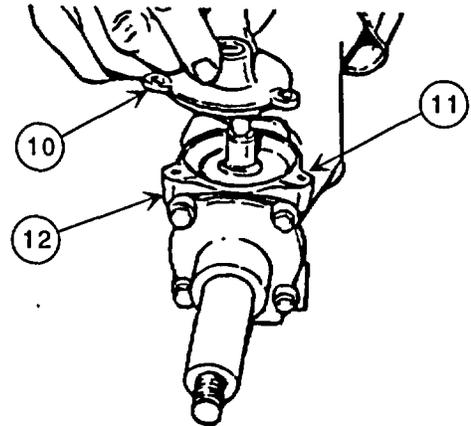
DISASSEMBLY (CONT)

5



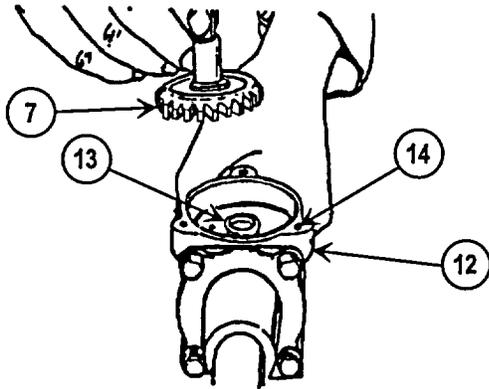
Using a 7/16 inch socket wrench, remove three hexagon cap screws (8) and three flat washers (9) from housing cap (10).

6



Remove housing cap (10) and gasket (11) from elevating leg (12). Discard gasket (11).

7

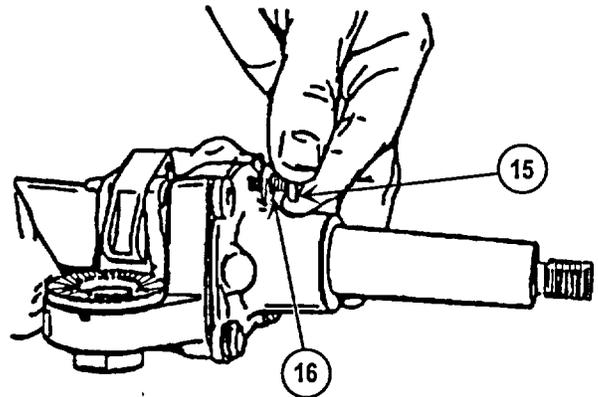


**NOTE**

**Ring spacer may adhere to bevel gear.**

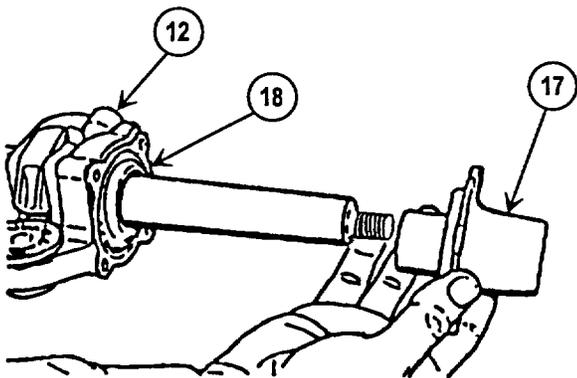
- a. Remove bevel gear (7) and ring spacer (13) from elevating leg (12).
- b. If damaged, remove and discard three screw thread inserts (14) using helical insert and tool kit (see para 3-4).

8



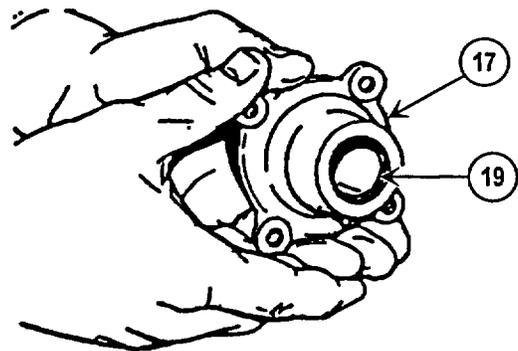
Using a 7/16 inch socket wrench, remove four hexagon capscrews (15) and four flat washers (16).

9



Remove bearing cap (17) and gasket (18) from elevating leg (12). Discard gasket (18).

10

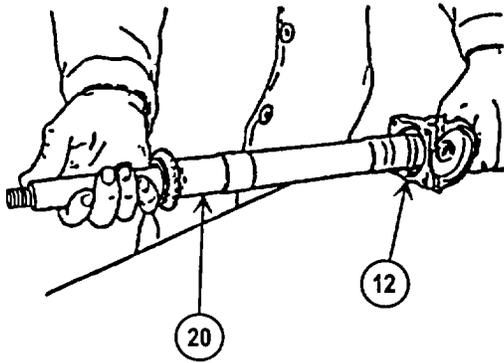


Remove and discard O-ring (19) from bearing cap (17).

3-14. ELEVATING MECHANISM ASSEMBLY AND ELEVATING SCREW ASSEMBLY MAINTENANCE  
INSTRUCTIONS (CONT).

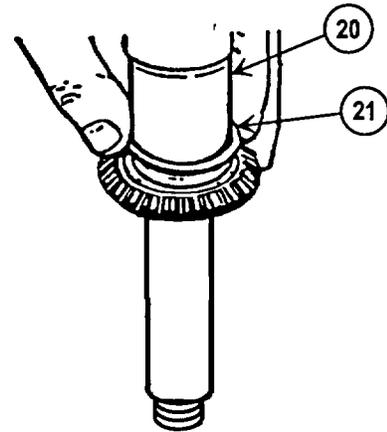
DISASSEMBLY (CONT)

11



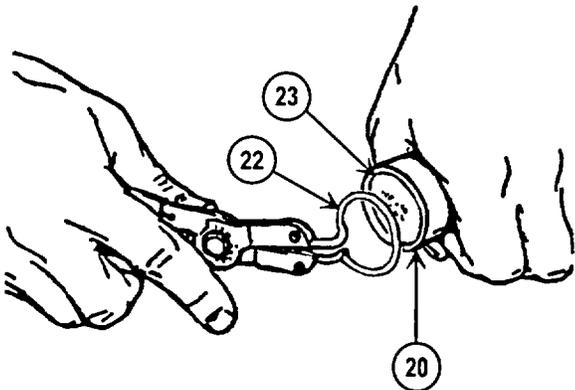
Remove elevating shaft (20) with attached parts from elevating leg (12).

12



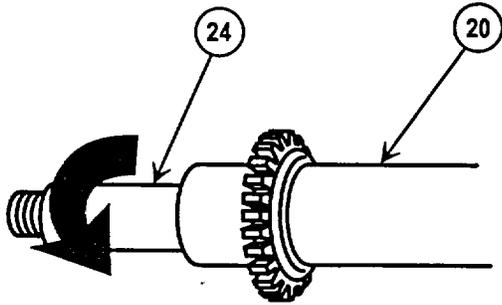
Remove ring spacer (21) from elevating shaft (20).

13



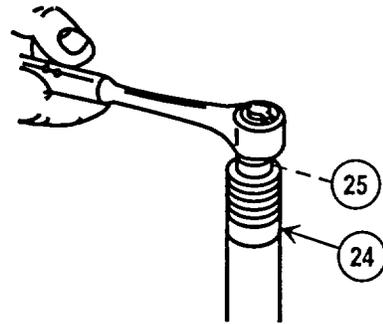
- a. Using snap ring pliers, remove retaining ring (22) from elevating shaft (20).
- b. Remove plain solid disk (23).

14



While holding elevating shaft (20), unscrew elevating screw assembly (24) clockwise to remove from elevating shaft (20).

15



**CAUTION**

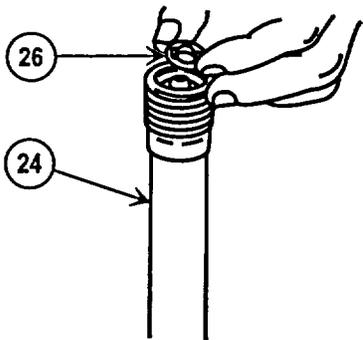
Do not place elevating tube in a vise.

**NOTE**

For steps 15 through 18, it may be helpful to use a strap wrench to hold the elevating screw assembly.

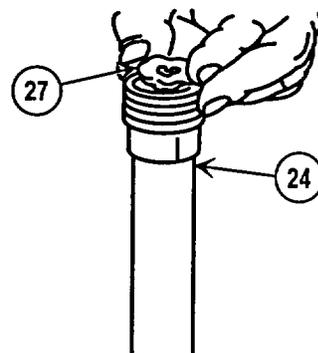
Using a 9/16 inch socket wrench, remove hexagon self-locking nut (25) from elevating screw assembly (24). Discard hexagon self-locking nut (25).

16



Remove flat washer (26) from elevating screw assembly (24).

17

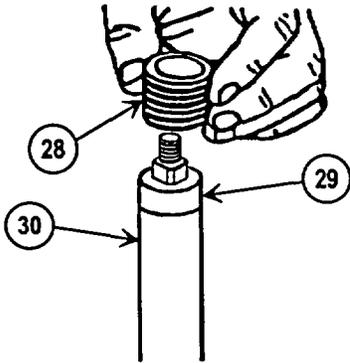


Remove lock washer (27) from elevating screw assembly (24).

3-14. ELEVATING MECHANISM ASSEMBLY AND ELEVATING SCREW ASSEMBLY MAINTENANCE  
INSTRUCTIONS (CONT).

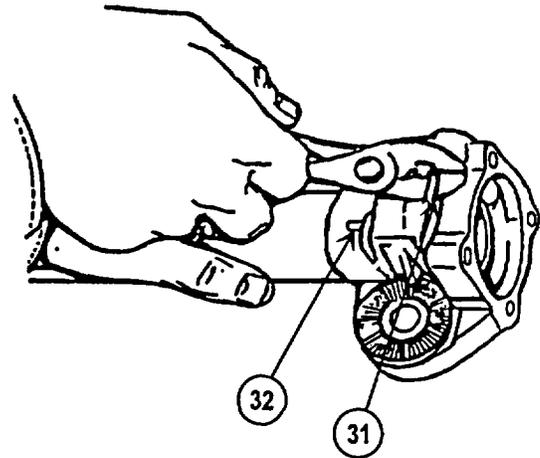
DISASSEMBLY (CONT)

18



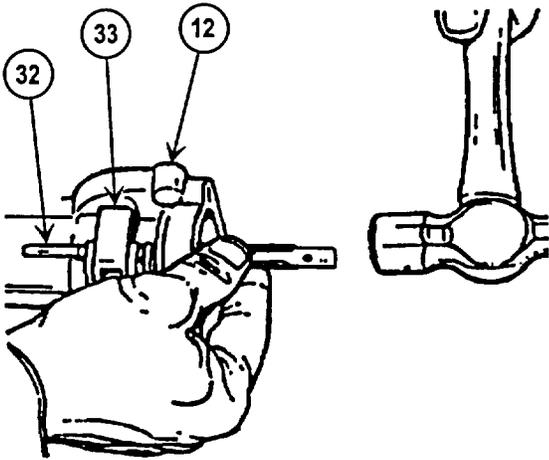
Remove spur gear (28) and linear-rotor roller (29) from elevating tube (30).

19



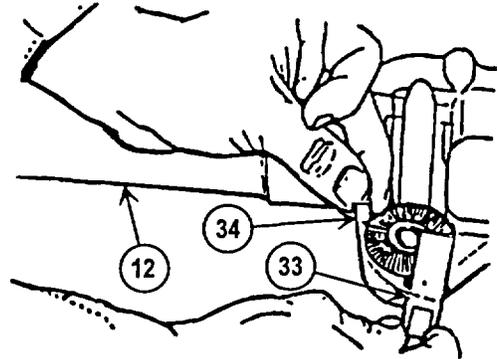
Remove cotter pin (31) from headless straight pin (32), using slip-joint pliers. Discard cotter pin (31).

20



Hold down lock release lever (33) and use a hammer and punch to remove headless straight pin (32) from elevating leg (12).

21

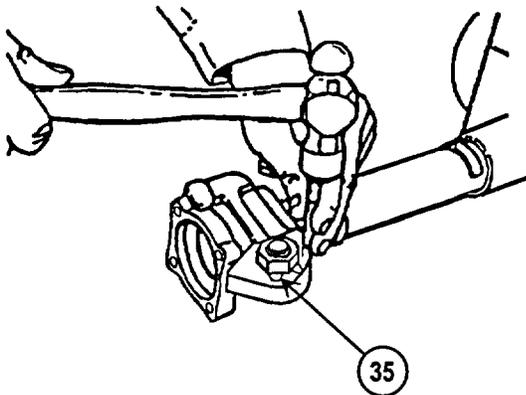


**NOTE**

**Take note of the position of the torsion helical spring in relation to the lock release lever.**

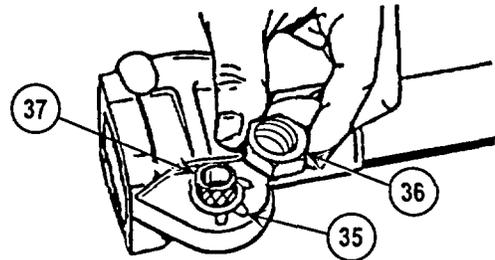
Remove lock release lever (33) and torsion helical spring (34) from elevating leg (12).

22



Using a punch and hammer, flatten the locking tabs on key washer (35).

23

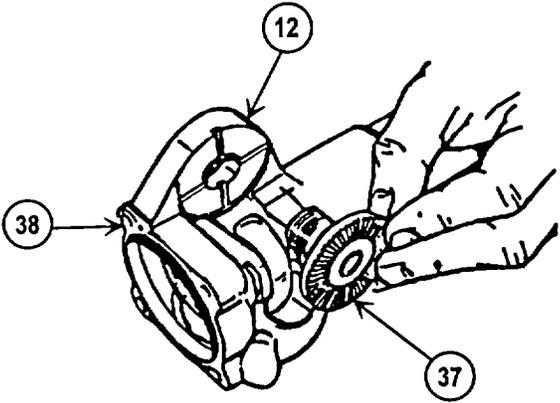


- a. Using a 1-1/8 inch wrench, remove hexagon plain nut (36) from serrated flange (37).
- b. Remove and discard key washer (35).

3-14. ELEVATING MECHANISM ASSEMBLY AND ELEVATING SCREW ASSEMBLY MAINTENANCE  
INSTRUCTIONS (CONT).

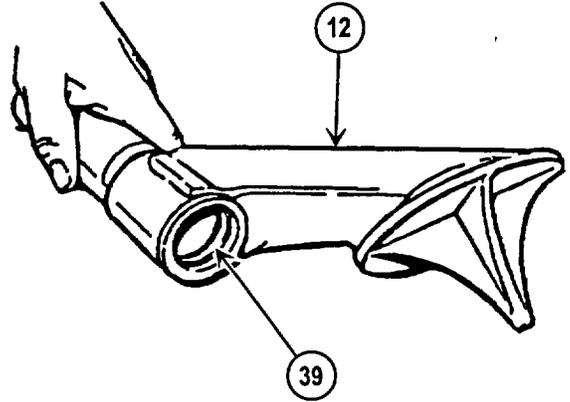
DISASSEMBLY (CONT)

24



- a. Remove serrated flange (37) from elevating leg (12).
- b. If damaged, remove and discard four screw thread inserts (38) using helical insert and tool kit (see para 3-4).

25



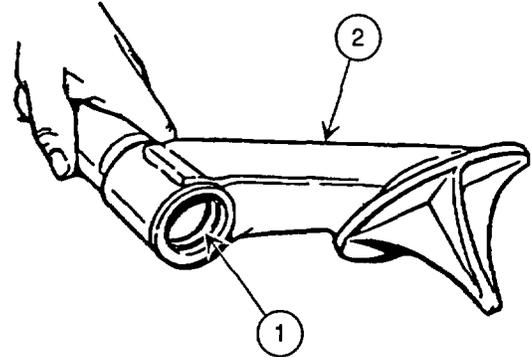
Remove and discard O-ring (39) from elevating leg (12).

**CLEANING/REPAIR**

- a. Clean parts with dry cleaning solvent and wipe dry with wiping rag.
- b. Replace damaged or defective parts.
- c. If the elevating leg is damaged, replace the entire elevating mechanism assembly. If the elevating tube is damaged, replace the entire elevating screw assembly.
- d. Lubricate parts (except those in step e below) with general purpose lubricating oil before reassembly.
- e. Apply a light coat of GA to bevel gear, elevating shaft, elevating screw assembly, and spur gear before reassembly.

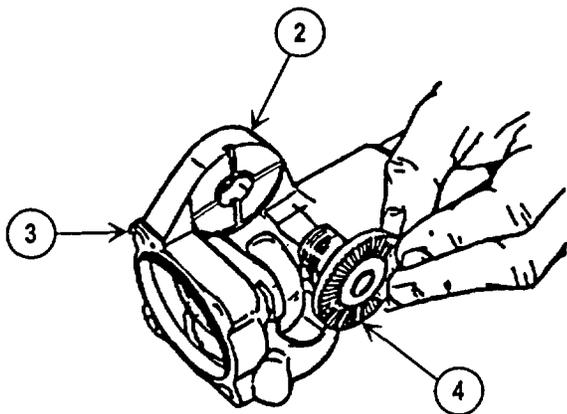
**REASSEMBLY**

1



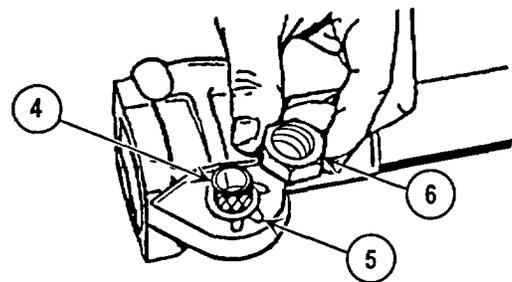
Install new O-ring (1) in elevating leg (2).

2



- a. If removed, install four new screw thread inserts (3) using helical insert and tool kit (see para 3-4).
- b. Install serrated flange (4) in elevating leg (2). Make sure short keyways align with short slots.

3

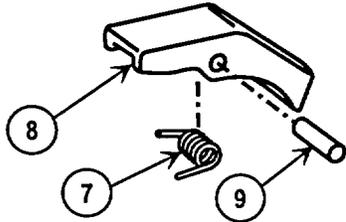


- a. Install new key washer (5) on serrated flange (4).
- b. Install hexagon plain nut (6) using a 1-1/8 inch wrench.
- c. Flatten locking tabs of key washer (5) against hexagon plain nut (6) using a punch and hammer.

**3-14. ELEVATING MECHANISM ASSEMBLY AND ELEVATING SCREW ASSEMBLY MAINTENANCE INSTRUCTIONS (CONT).**

**REASSEMBLY (CONT)**

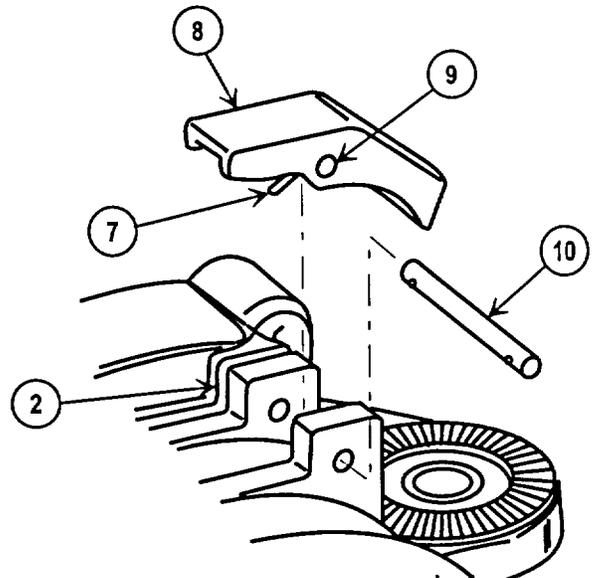
**4**



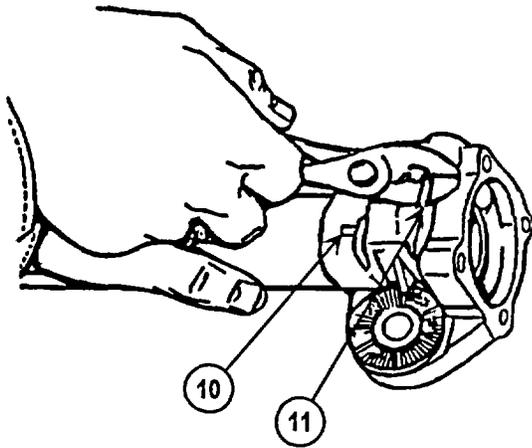
- a. Fabricate an extra headless straight pin approximately 3/16 inch in diameter and 5/8 inch in length. Break all sharp edges.
- b. Place torsion helical spring (7) inside lock release lever (8). Pin in place with fabricated headless straight pin (9).

**5**

- a. Insert lock release lever (8) onto elevating leg (2), catching left leg of torsion helical spring (7) on leg body.
- b. Bend torsion helical spring (7) under and to the right, causing a pre-load.
- c. Align pin hole in elevating leg (2) and lock release lever (8).
- d. Insert headless straight pin (10) from either side, driving out fabricated headless straight pin (9).
- e. If fabricated headless straight pin (9) went inside elevating leg (2), be sure to remove it.

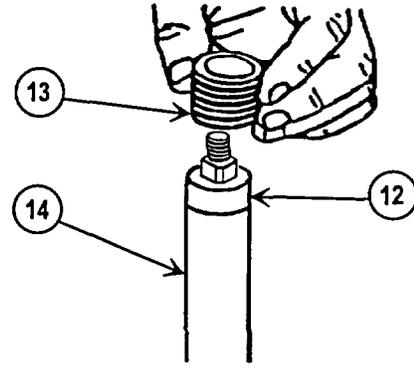


6



Install new cotter pin (11) in headless straight pin (10).

7



**CAUTION**

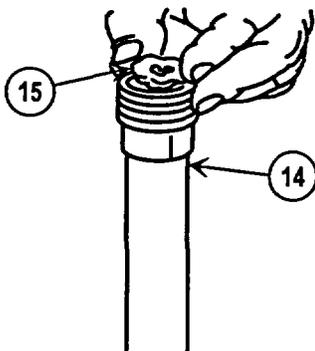
**Do not place elevating tube in a vise.**

**NOTE**

**For steps 7 through 10, it may be helpful to use a strap wrench to hold the elevating tube.**

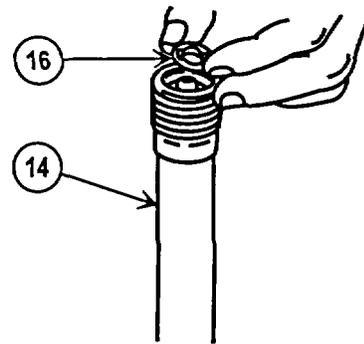
Install linear-rotor roller (12) and spur gear (13) on elevating tube (14).

8



Install lock washer (15) on elevating tube (14).

9

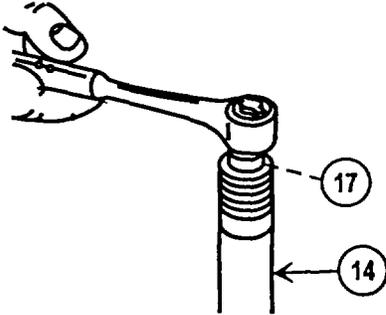


Install flat washer (16) on elevating tube (14).

3-14. ELEVATING MECHANISM ASSEMBLY AND ELEVATING SCREW ASSEMBLY MAINTENANCE  
INSTRUCTIONS (CONT).

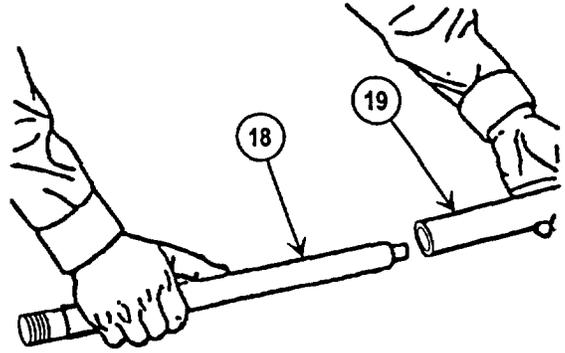
REASSEMBLY (CONT)

10



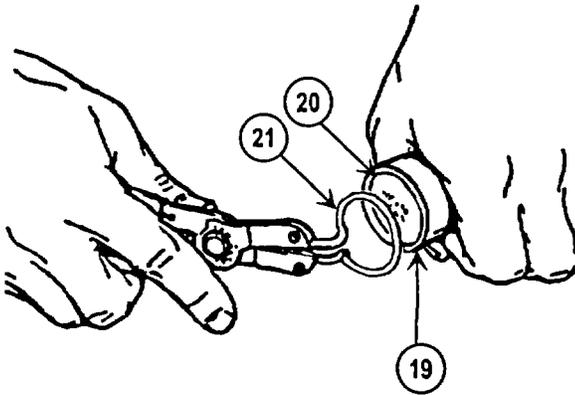
Install new hexagon self-locking nut (17) on elevating tube (14), using a 9/16 inch socket wrench.

11



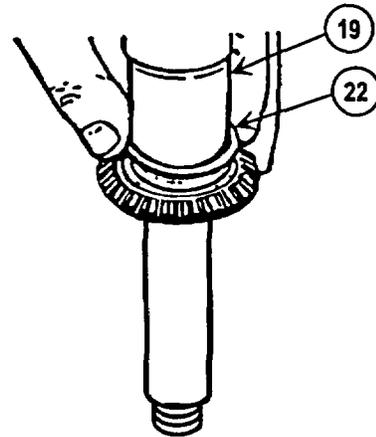
Install assembled elevating screw assembly (18) in elevating shaft (19).

12



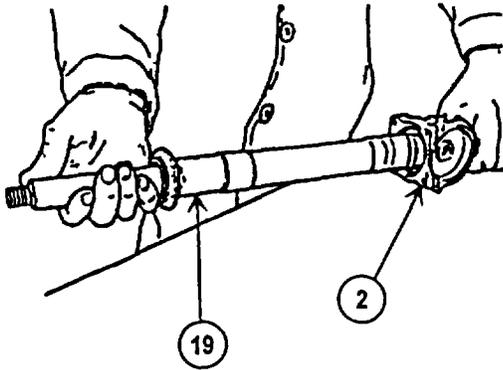
Install plain solid disk (20) in elevating shaft (19) and secure with retaining ring (21) using snap ring pliers.

13



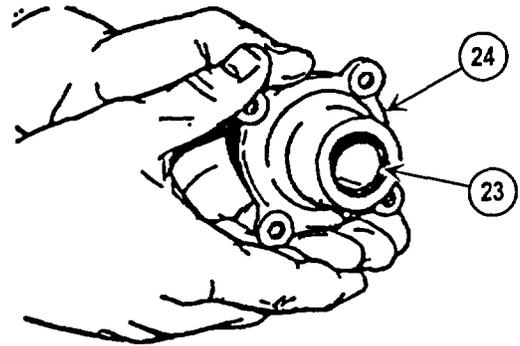
Install ring spacer (22) on elevating shaft (19).

14



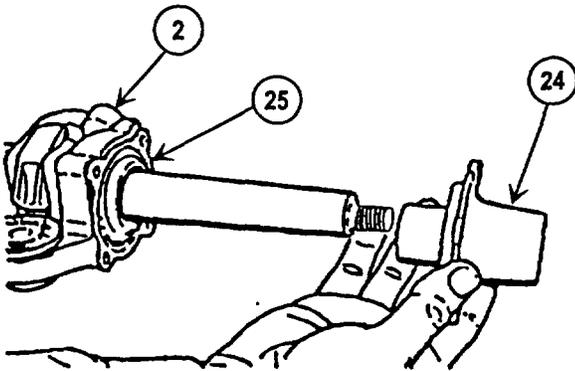
Install elevating shaft (19) with attached parts in elevating leg (2).

15



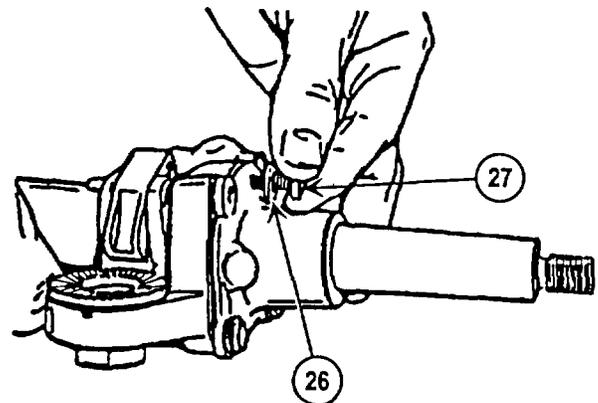
Install new O-ring (23) in bearing cap (24).

16



Install new gasket (25) and bearing cap (24) on elevating leg (2). Use gaskets as required to obtain the proper fit.

17

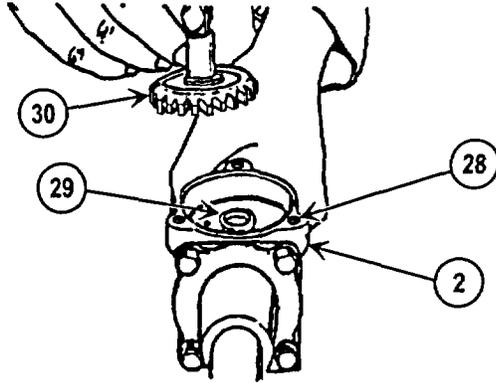


Install four flat washers (26) and four hexagon capscrews (27) using a 7/16 inch socket wrench.

3-14. ELEVATING MECHANISM ASSEMBLY AND ELEVATING SCREW ASSEMBLY MAINTENANCE INSTRUCTIONS (CONT).

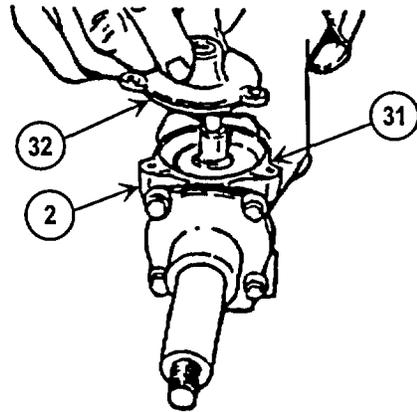
REASSEMBLY (CONT)

18



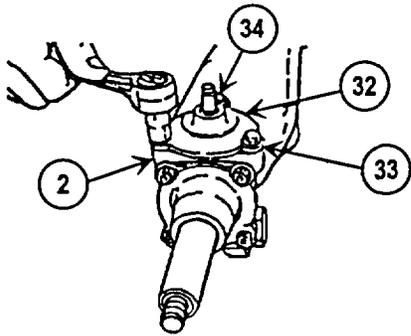
- a. If removed, install three new screw thread inserts (28) using helical insert and tool kit (see para 3-4).
- b. Install ring spacer (29) and bevel gear (30) on elevating leg (2).

19



Install new gasket (31) and housing cap (32) on elevating leg (2). Use gaskets as required to remove backlash in excess of 1/8 turn and ease binding of elevating mechanism assembly.

20

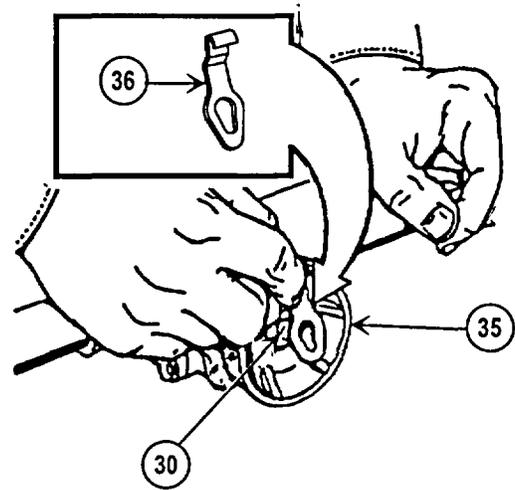


**CAUTION**

**Improper torque may cause binding in the mechanism.**

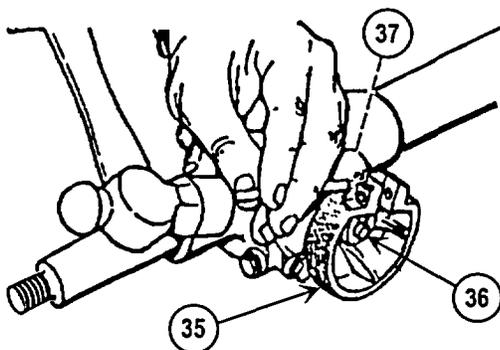
Install three flat washers (33) and three hexagon cap screws (34) in housing cap (32) and elevating leg (2) using a 7/16 inch socket wrench. Torque hexagon cap screws (34) to 6 ft.-lb (8.10 N-m).

21



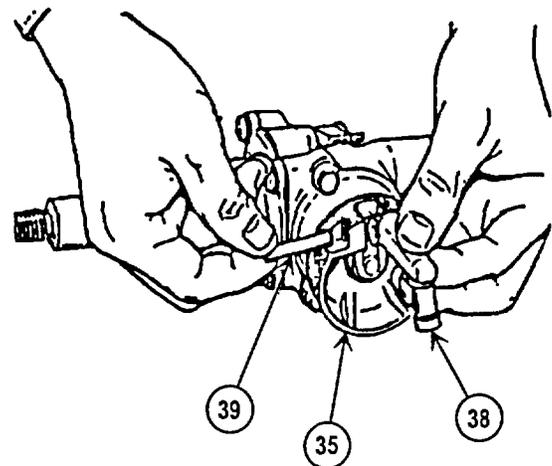
- a. Install handwheel (35) on shaft of bevel gear (30).
- b. Install flat spring (36) on bevel gear (30) with end of curl up.

22



- a. Install new headless straight pin (37) in handwheel (35) and flat spring (36) using slipjoint pliers and then a hammer and punch.
- b. Lightly peen over ends of headless straight pin (37).

23



Install crank handle (38) and headless straight pin (39) in handwheel (35).

---

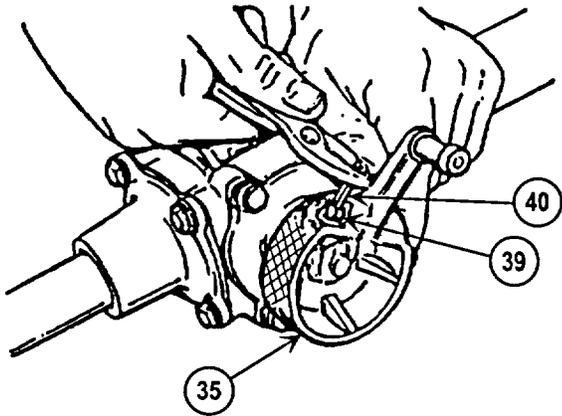
3-14. ELEVATING MECHANISM ASSEMBLY AND ELEVATING SCREW ASSEMBLY MAINTENANCE  
INSTRUCTIONS (CONT).

---

REASSEMBLY (CONT)

---

24



- a. Install new cotter pin (40) in headless straight pin (39) and handwheel (35).
  - b. Check for backlash. See step 19.
-

**3-15. FINAL INSPECTION MAINTENANCE INSTRUCTIONS**

This task covers: Final Inspection

**INITIAL SETUP**

**Materials/Parts:**

- Black lacquer (item 14, app D)
- Gloves, chemical and solvent resistant (item 11, app D)
- Polyurethane coating (item 21, app D)
- Paint brush (item 5, app D)
- Synthetic thinner (item 26, app D)

**References:**

- TM 43-0139
- TM 9-1000-202-14

**Equipment Condition:**

Major assemblies reassembled

**FINAL INSPECTION**

Perform the final inspections below (as applicable) after maintenance procedures have been completed.

**Point to be inspected**

**Final Inspection**

Mortar cannon .....	Cannon is free of dirt, grit, and rust. Meets requirements of TM 9-1000-202-14. All components present and in good condition.
Barrel clamp assembly .....	Functions smoothly. Correct pullover reading is obtained in adjustment procedure. All components present and in good condition.
Traversing mechanism assembly .....	Functions smoothly. Backlash not in excess of 1/8 turn. All components present and in good condition.
Mortar mounting buffers .....	Test in accordance with PMCS (Table 2-2). All components present and in good condition.
Cross leveling mechanism.....	Functions smoothly. Backlash not in excess of 1/8 turn. All components present and in good condition.
Mortar mount leg assembly.....	All components present and in good condition.
Elevating mechanism assembly .....	Functions smoothly. Backlash not in excess of 1/8 turn. All components present and in good condition.
Baseplate.....	Baseplate not deformed or cracked. Socket rotates freely. All components present and in good condition.
Painted surfaces .....	In good condition. Touch up bare spots and scratches. See TM 43-0139.

**Section IV. PREEMBARKATION INSPECTION OF MATERIEL IN UNITS  
ALERTED FOR OVERSEAS MOVEMENTS**

3-16. PREEMBARKATION INSPECTION OF MATERIEL IN UNITS ALERTED FOR OVERSEAS MOVEMENT.

a. General. This inspection is conducted on materiel in alerted units scheduled for overseas duty to be sure that such materiel will not become unserviceable in a relatively short time. It prescribes a higher percentage of remaining usable life in serviceable materiel to meet a specific need beyond minimum serviceability.

b. Preinspection Points.

**WARNING**

**Before performing inspection procedures, inspect the cannon barrel to make sure it is empty.**

(1) Equipment must be considered "ready" under the criteria established in PMCS procedures (Table 2-2) in this publication and in the Preventive Maintenance Checks and Services (PMCS) section of TM 9-1015-249-10/TM 09922A-10/1.

(2) Operator publications applicable to the equipment log book must accompany the equipment. All log book entries must be complete and up-to-date including those covering any repairs, replacements, or adjustment.

(3) Weapons must be complete with all items required by applicable Department of the Army publications, including those in the basic issue items list of TM 9-1015-249-1 0/TM 09922A-10/1.

(4) Weapons and/or fire control equipment which do not qualify for shipment or issue will either be redistributed, repaired, or overhauled, or will become candidates for cannibalization or other disposition as required by existing regulations.

a. Inspection Points.

(1) Damaged threads should be repaired by using a thread restorer or by lathe-chasing and by replacing helical inserts.

(2) Damaged surfaces should be restored using materials and tools consistent with tolerances of item being restored.

(a) Methods and materials used for removing corrosion should be carefully selected in order that surfaces being processed will not be damaged beyond serviceability.

(b) Crocus cloth (item 8, app D) and fine stones should be used to remove corrosion, burrs, and scores from polished surfaces. Aluminum oxide abrasive cloth, files, or scrapers are permissible where critical dimensions will not be altered by their use.

(3) All markings must be legible.

(4) Complete disassembly of a unit is not always necessary in order to make a required repair or replacement. Good judgment should be exercised to keep disassembly and assembly to a minimum.

(5) Exercise caution when removing and installing spring and headless grooved pins to prevent damage to the mechanism or component.

(6) When assembling a unit, replace all spring and headless grooved pins with new pins. Self-locking screws and nuts must be replaced if they were removed.

(7) Springs that are kinked and/or fail to function properly must be replaced.

(8) During repair the materiel should be kept clean and lubricated before functioning or testing. Do not over-lubricate. Use as little lubricant as necessary for proper functioning.

d. Specific Criteria.

(1) Surfaces. A worn or shiny surface is objectionable from the standpoint of visibility when it is capable of reflecting light, as a mirror does. A weapon with a distinct shine on exterior parts will be rejected for overseas shipment.

(2) M252 Mortar. The mortar must meet the requirements of the final inspection in paragraph 3-15.

(3) M253 Cannon. The cannon tube must have a bore diameter of 3.205 to 3.222 in. to be acceptable for overseas shipment.



## APPENDIX A

### REFERENCES

---

A-1. SCOPE. This appendix lists all forms, technical manuals, miscellaneous publications, and USMC publications and forms referenced in this manual.

A-2. ARMY REGULATIONS.

AR 190-11 .....	Physical Security of Arms, Ammunition and Explosives
AR 740-26 .....	Physical Inventory Control
AR 750-1 .....	Army Materiel Maintenance Policy and Retail Maintenance Operations

A-3. DA PAMPHLETS.

DA PAM 25-30 .....	Consolidated Index of Army Publications and Blank Forms
DA PAM 750-8 .....	The Army Maintenance Management System (TAMMS) Users Manual
DA PAM 750-10 .....	US Army Equipment Index of Modification Work Orders

A-4. FIELD MANUALS.

FM 4-25.11 .....	First Aid
FM 23-90 .....	Mortars

A-5. FORMS.

DA Form 2028 .....	Recommended Changes to Publications and Blank Forms
DA Form 2408-4 .....	Weapon Record Data
DA Form 2408-9 .....	Equipment Control Record
NRC Form 3 .....	Notice to Employees
SF 364 .....	Report of Discrepancy (ROD)
SF 368 .....	Product Quality Deficiency Report

A-6. MISCELLANEOUS PUBLICATIONS.

CTA 8-100 .....	Army Medical Department Expendable/Durable Items
CTA 50-970 .....	Expendable/Durable Items (Except: Medical, Class V, Repair Parts and Heraldic Items)
10CFR Part 19.....	Notices, Instructions and Reports to Workers; Inspections
10CFR Part 20.....	Standards for Protection Against Radiation
10CFR Part 21.....	Reporting of Defects and Noncompliance
49CFR .....	Transportation

A-7. SPECIFICATIONS AND STANDARDS.

MIL-B-117 .....	Bags, Sleeves and Tubing
MIL-B-121 .....	Barrier Material, Greaseproofed, Waterproofed, Flexible
MIL-STD-147 .....	Palletized Unit Loads
PPP-B-636.....	Box, Shipping, Fiberboard
PPP-B-640.....	Box, Fiberboard, Corrugated, Triple Wall
PPP-B-676.....	Boxes Setup

A-8. SUPPLY CATALOGS.

SC 4933-95-CL-A11 .....	Shop Set, Small Arms: Field Maintenance, Basic, Less Power
SC 5180-95-CL-A07 .....	Tool Kit, Small Arms Repairman

A-9. TECHNICAL BULLETINS.

TB 43-0197 .....	Instructions for Safe Handling, Maintenance, Storage, and Disposal of Radioactive Items Managed by US Army Armament Materiel Readiness Command
TB 9-1000-247-34.....	Standards for Overseas Shipment of Small Arms, Aircraft Armament, Towed Howitzers, Mortars, Recoilless Rifles, Rocket Launchers, and Associated Fire Control Equipment

A-10. TECHNICAL MANUALS.

TM 9-254 .....	General Maintenance Procedures for Fire Control Materiel
TM 9-1000-202-14 .....	Evaluation of Cannon Tubes
TM 9-1015-249-10/TM 09922A-10/1 .....	Operator's Manual for Mortar, 81-MM, M252 (1015-01- 164-6651)
TM 9-4933-258-13&P/TM 00640A-13&P/1.....	Operator's, Unit, and Direct Support Maintenance Manual (Including Repair Parts and Special Tools List) for Pullover Gage Kit PN 7242997

A-10. TECHNICAL MANUALS - Continued.

TM 9-6650-235-13&P/TM-08552A-13&P .....	Operator's, Organizational, and Direct Support Maintenance Manual (Including Repair Parts and Special Tools List) (Including Depot Maintenance Repair Parts) for Borescope, M3 (6650-01-063-0035)
TM 43-0139.....	Painting Instructions for Army Materiel
TM 750-244-7 .....	Procedures for Destruction of Equipment in Federal Supply Classifications 1000, 1005, 1010, 1020, 1025, 1030, 1055, 1090, and 1095, to Prevent Enemy Use

A-11. USMC PUBLICATIONS AND FORMS.

Marine Corps Stocklist SL-1-2 .....	Index of Technical Publications
MCO 4400.150.....	Consumer-Level Supply Policy Manual
MCO 4430.3.....	Reporting of Item and Packaging Discrepancies
MCO 4610.19.....	Transportation and Travel Report of Transportation Discrepancies
MCO 4855.10.....	Product Quality Deficiency Report
NAVMC Form 10558A .....	Weapon Record Book
NAVMC Form 10772.....	Recommended Changes to Publications
OPNAVINST 5530.13 .....	Department of the Navy Physical Security Instruction for Conventional Arms, Ammunition, and Explosives (AA&E)
OPNAVINST 5530.14 .....	Department of the Navy Physical Security and Loss Prevention
SECNAVINST 4355.18 .....	Reporting of Item and Packaging Discrepancies
TI-4733-15/1D.....	TMDE Calibration and Maintenance Procedures
TI-5104-15/2A.....	Special Handling Tritium Fire Control
TM 4700-15/1.....	Equipment Record Procedures



## APPENDIX B

### MAINTENANCE ALLOCATION CHART

---

#### Section I. INTRODUCTION

##### B-1. GENERAL.

a. This introduction provides a general explanation of all maintenance and repair functions authorized at the two maintenance levels under the Two-Level Maintenance System concept.

b. The Maintenance Allocation Chart (MAC) in section II designates overall authority and responsibility for the performance of maintenance functions on the identified end item or component. The application of the maintenance functions to the end item or component will be consistent with the capacities and capabilities of the designated maintenance levels, which are shown on the MAC in column (4) as:

Field — includes two columns, Unit maintenance and Direct Support maintenance. The Unit maintenance column is divided again into two more subcolumns, C for Operator or Crew and O for Unit maintenance.

Sustainment — includes two subcolumns, General Support (H) and Depot (D).

c. Section III lists the tools and test equipment (both special tools and common tool sets) required for each maintenance function as referenced from section II.

d. Section IV contains supplemental instructions and explanatory notes for a particular maintenance function.

##### B-2. MAINTENANCE FUNCTIONS. Maintenance functions are limited to and defined as follows:

a. Inspect. To determine the serviceability of an item by comparing its physical, mechanical, and/or electrical characteristics with established standards through examination (e.g., by sight, sound, or feel). This includes scheduled inspection and gagings and evaluation of cannon tubes.

b. Test. To verify serviceability by measuring the mechanical, pneumatic, hydraulic, or electrical characteristics of an item and comparing those characteristics with prescribed standards on a scheduled basis, i.e., load testing of lift devices and hydrostatic testing of pressure hoses.

c. Service. Operations required periodically to keep an item in proper operating condition, i.e., to clean (includes decontaminate, when required), to preserve, to drain, to paint, or to replenish fuel, lubricants, chemical fluids, or gases. This includes scheduled exercising and purging of recoil mechanisms. The following are examples of service functions:

Unpack. To remove from packing box for service or when required for the performance of maintenance operations.

Repack. To return item to packing box after service and other maintenance operations.

B-2. MAINTENANCE FUNCTIONS (Cont)

Clean. To rid the item of contamination.

Touch up. To spot paint scratched or blistered surfaces.

Mark. To restore obliterated identification.

d. Adjust. To maintain or regulate, within prescribed limits, by bringing into proper position, or by setting the operating characteristics to specified parameters.

e. Align. To adjust specified variable elements of an item to bring about optimum or desired performance.

f. Calibrate. To determine and cause corrections to be made or to be adjusted on instruments of test, measuring and diagnostic equipment used in precision measurement. Consists of comparisons of two instruments, one of which is a certified standard of known accuracy, to detect and adjust any discrepancy in the accuracy of the instrument being compared.

g. Remove/Install. To remove and install the same item when required to perform service or other maintenance functions. Install may be the act of emplacing, seating, or fixing into position a spare, repair part, or module (component or assembly) in a manner to allow the proper functioning of equipment or system.

h. Paint. To prepare and spray color coats of paint so that the ammunition can be identified or protected. The color indicating primary use is applied, preferably, to the entire exterior surface as the background color of the item. Other markings are to be repainted as original so as to retain proper ammunition identification.

i. Replace. To remove an unserviceable item and install a serviceable counterpart in its place. "Replace" is authorized by the MAC and assigned maintenance level is shown as the third position code of the Source, Maintenance and Recoverability (SMR) code.

j. Repair. The application of maintenance services, including fault location/troubleshooting, removal/installation, and disassembly/assembly procedures and maintenance actions to identify troubles and restore serviceability to an item by correcting specific damage, fault, malfunction, or failure in a part, subassembly, module (component or assembly), end item, or system.

**NOTE**

The following definitions are applicable to the "repair" maintenance function:

Services. Inspect, test, service, adjust, align, calibrate, and/or replace.

Fault location/troubleshooting. The process of investigating and detecting the cause of equipment malfunctioning; the act of isolating a fault within a system or unit under test (UUT).

Disassembly/assembly - The step-by-step breakdown (taking apart) of a spare/functional group coded item to the level of its least component, that is assigned an SMR code for the level of maintenance under consideration (i.e., identified as maintenance significant).

Actions - Welding, grinding, riveting, straightening, facing, machining, and/or resurfacing.

k. Overhaul. That maintenance effort (service/action) prescribed to restore an item to a completely serviceable/operational condition as required by maintenance standards in appropriate technical publications. Overhaul is normally the highest degree of maintenance performed by the Army. Overhaul does not normally return an item to like new condition.

l. Rebuild. Consists of those services/actions necessary for the restoration of unserviceable equipment to a like new condition in accordance with original manufacturing standards. Rebuild is the highest degree of materiel maintenance applied to Army equipment. The rebuild operation includes the act of returning to zero those age measurements (e.g., hours/miles) considered in classifying Army equipment/components.

B-3. EXPLANATION OF COLUMNS IN THE MAC, SECTION II.

a. Column 1, Group Number. Column 1 lists functional group code (FGC) numbers, the purpose of which is to identify maintenance significant components, assemblies, subassemblies, and modules with the next higher assembly (NHA).

b. Column 2, Component/Assembly. Column 2 contains the names of components, assemblies, subassemblies, and modules for which maintenance is authorized.

c. Column 3, Maintenance Function. Column 3 lists the functions to be performed on the item listed in column 2. (For detailed explanation of these functions, see para B-2.)

d. Column 4, Maintenance Level. Column 4 specifies each level of maintenance authorized to perform each function listed in column 3, by indicating work time required (expressed as manhours in whole hours or decimals) in the appropriate subcolumn. This work time figure represents the active time required to perform that maintenance function at the indicated level of maintenance. If the number or complexity of the tasks within the listed maintenance function varies at different maintenance levels, appropriate work time figures will be shown for each level. The work time figure represents the average time required to restore an item (assembly, subassembly, component, module, end item, or system) to a serviceable condition under typical field operating conditions. This time includes preparation time (including any necessary disassembly/assembly time), troubleshooting/fault location time, and quality assurance time in addition to the time required to perform the specific tasks identified for the maintenance functions authorized in the MAC. The symbol designations for the various maintenance levels are as follows:

Field:

C.....	Operator or Crew maintenance
O.....	Unit maintenance
F.....	Direct Support maintenance

Sustainment:

L.....	Specialized Repair Activity (SRA)
H.....	General Support maintenance
D.....	Depot maintenance

**NOTE**

The "L" maintenance level is not included in column (4) of the MAC. Functions to this level of maintenance are identified by work time figure in the "H" column of column (4), and an associated reference code is used in the REMARKS column (6). This code is keyed to the remarks and the SRA complete repair application is explained there.

B-3. EXPLANATION OF COLUMNS IN THE MAC, SECTION II (Cont)

e. Column 5, Tools and Equipment Reference Code. Column 5 specifies, by code, those common tool sets (not individual tools), common Test, Measurement and Diagnostic Equipment (TMDE), and special tools, special TMDE, and special support equipment required to perform the designated function. Codes are keyed to the entries in the tools and test equipment table.

f. Column 6, Remarks Code. When applicable, this column contains a letter code, in alphabetical order, which is keyed to the remarks table entries.

B-4. EXPLANATION OF COLUMNS IN TOOL AND TEST EQUIPMENT REQUIREMENTS, SECTION III.

a. Column 1, Tool or Test Equipment Reference Code. The tool or test equipment reference code correlates with a code used in column (5) of the MAC.

b. Column 2, Maintenance Level. The lowest level of maintenance authorized to use the tool or test equipment.

c. Column 3, Nomenclature. Name or identification of the tool or test equipment.

d. Column 4, National Stock Number (NSN). The NSN of the tool or test equipment.

e. Column 5, Tool Number. The manufacturer's part number.

B-5. EXPLANATION OF COLUMNS IN REMARKS, SECTION IV.

a. Column 1, Remarks Code. The code recorded in column (6) of the MAC.

b. Column 2, Remarks. This column lists information pertinent to the maintenance function being performed as indicated in the MAC.

**Section II. MAINTENANCE ALLOCATION CHART**

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE LEVEL					(5) TOOLS AND EQUIP REF CODE	(6) REMARKS CODE
			Field			Sustain- ment			
			Unit						
			C	O	F	H	D		
00	M252 81-MM MORTAR								
01	81-MM MORTAR AND MOUNT	Service Replace Repair	0.2	0 1 0.2			10 10		

**Section II. MAINTENANCE ALLOCATION CHART - Continued**

(1)  GROUP NUMBER	(2)  COMPONENT/ ASSEMBLY	(3)  MAINTENANCE FUNCTION	(4)  MAINTENANCE LEVEL					(5)  TOOLS AND EQUIP REF CODE	(6)  REMARKS CODE
			Field			Sustain- ment			
			Unit		DS	GS	De- pot		
			C	O	F	H	D		
0101	M253 81-mm Cannon	Inspect	0.1	0.1	1.0			1, 2, 3, 5, 10 4  10, 12, 13, 14 5, 10, 12, 13, 14	A, B, E
		Test (USMC ONLY)		0.2					
		Service	0.2						
		Replace		0.1					
		Repair		0.2					
	Overhaul				1.0				
010101	Blast Attenuator Device	Inspect	0.1	0.1				10 10	
		Replace		0.1					
		Repair		0.2					
0102	M177 Mortar Mount	Inspect	0.1	0.1	0.2			8, 10	C, D
		Service	0.2	0.2	0.2				
		Repair		1.5					
		Overhaul				10.0			
010201	Barrel Clamp Assembly	Inspect	0.1	0.1	0.4			9, 10 7, 10 7, 10, 11	
		Adjust			0.2				
		Replace		0.5					
		Repair			1.0				
010202	Traversing Mechanism Assembly	Inspect	0.1	0.1	0.5		1.0	6, 10, 11 6, 10, 11	
		Replace			2.0				
		Repair			2.5				
010203	Mortar Mounting Buffer	Inspect	0.1	0.1	0.1			10 10, 11	
		Replace		0.5					
		Repair			0.7				
010204	Cross Leveling Mechanism	Inspect	0.1	0.1	0.3			10, 11 10, 11	
		Replace			0.5				
		Repair			0.8				

**Section II. MAINTENANCE ALLOCATION CHART - Continued**

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE LEVEL					(5) TOOLS AND EQUIP REF CODE	(6) REMARKS CODE
			Field			Sustain- ment			
			Unit		DS	GS	De- pot		
			C	O	F	H	D		
010205	Mortar Mount Leg Assembly	Inspect Replace Repair	01	0.1 0.1	0.1 0.5			10 10, 11	
010206	Elevating Mechanism Assembly	Inspect Replace Repair	0.1	0.1 0.2	0.5 1.7			10 6, 7, 10, 11	
01020601	Elevating Screw Assembly	Inspect Replace Repair			0.1 0.1 0.2			10, 11 10, 11	
0103	Dovetail Adapter	Replace Repair		0.1 0.1				10 10	
02	M3A1 MORTAR BASEPLATE	Inspect Replace Repair	0.1	0.1 0.1 0.5				10 10	
03	M67 SIGHT UNIT (Marine Corps only)	Inspect Adjust Install Replace Repair	0.2 0.5 0.2 0.2	0.2		0.5		7	
0301	Elbow Telescope (Marine Corps only)	Inspect Replace Repair	0.1	0.2 0.2 0.2				10 10	
9500	Special Tools								

### Section III. TOOL AND TEST EQUIPMENT REQUIREMENTS

(1) TOOL OR TEST EQUIP REF CODE	(2) MAINTENANCE LEVEL	(3) NOMENCLATURE	(4) NATIONAL/NATO STOCK NUMBER	(5) TOOL NUMBER
1	F	Accessories Outfit, Pullover Gages, Basic	4933-00-348-8652	7242998
2	F	Borescope, M3	6650-01-063-0035	11584701
3	F	Gage, Pullover, Assembly, 81MM	5210-01-343-0996	12520694
4	O	Gauge, Bore Straightness (USMC USE ONLY)	5220-01-343-2225	11580040
5	O	Gauge, Striker Protrusion	5220-01-441-4158	11580237
6	F	Helicoil Insert and Tool Kit	5180-00-054-7506	4131-04-1
7	O	Pliers, Snap Ring	5120-00-789-0492	GGG-P-480
8	O	Puller, Mechanical	5120-00-293-2925	GGG-P-781, Type 1, Class 1, Style 1
9	F	Tension Handle, Steel Measuring Tape, Surveyor's	6675-00-641-3540	MIL-T-11752
10	O	Tool Kit, Small Arms Repairman	5180-01-506-8287	GOV92608
11	F	Shop Set, Small Arms: Field Maintenance, Basic, Less Power	4933-00-754-0664	SC 4933-95-A11
12	O	Wrench (Barrel), Breech Mechanism: No. 384	5120-01-442-2309	11580259
13	C	Wrench, Firing Pin	5120-01-442-2311	11580236
14	O	Wrench (Plug), Breech Mechanism: No. 383	5120-01-442-2312	11580256

### Section IV. REMARKS

REMARKS CODE	REMARKS
A	Refer to TM 9-1000-202-14.
B	Refer to TM 9-6650-235-13&P/TM-08552A-13&P.
C	It may be helpful to use the fabricated spanner wrench (see app E) to remove the round plain nuts.
D	It may be necessary to use the mechanical puller to remove the elevating leg assembly.
E	Refer to TM 9-4933-258-13&P/TM 00640A-13&P/1.

**APPENDIX C**  
**UNIT AND DIRECT SUPPORT MAINTENANCE**  
**REPAIR PARTS AND SPECIAL TOOLS LIST**

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**Section I. INTRODUCTION**

C-1. SCOPE. This RPSTL lists and authorizes spares and repair parts; special tools; special test, measurement, and diagnostic equipment (TMDE); and other special support equipment required for performance of unit and direct support maintenance of the M252 81-mm Mortar. It authorizes the requisitioning, issue, and disposition of spares, repair parts, and special tools as indicated by the Source, Maintenance and Recoverability (SMR) codes.

C-2. GENERAL. In addition to this section, Introduction, this Repair Parts and Special Tools List is divided into the following sections:

a. Section II, Repair Parts List. A list of spares and repair parts authorized by this RPSTL for use in the performance of maintenance. This list also includes parts which must be removed for replacement of the authorized parts. Parts lists are composed of functional groups in ascending alphanumeric sequence, with the parts in each group listed in ascending figure and item number sequence. Bulk materials are listed in item name sequence. Repair parts kits are listed separately in their own functional group within section II. Repair parts for repairable special tools are also listed in section II. Items listed are shown on the associated illustration(s)/figure(s).

b. Section III, Special Tools List. A list of special tools, special TMDE, and other special support equipment authorized by this RPSTL (as indicated by Basis of Issue (BOI) information in DESCRIPTION AND USABLE ON CODE column) for the performance of maintenance.

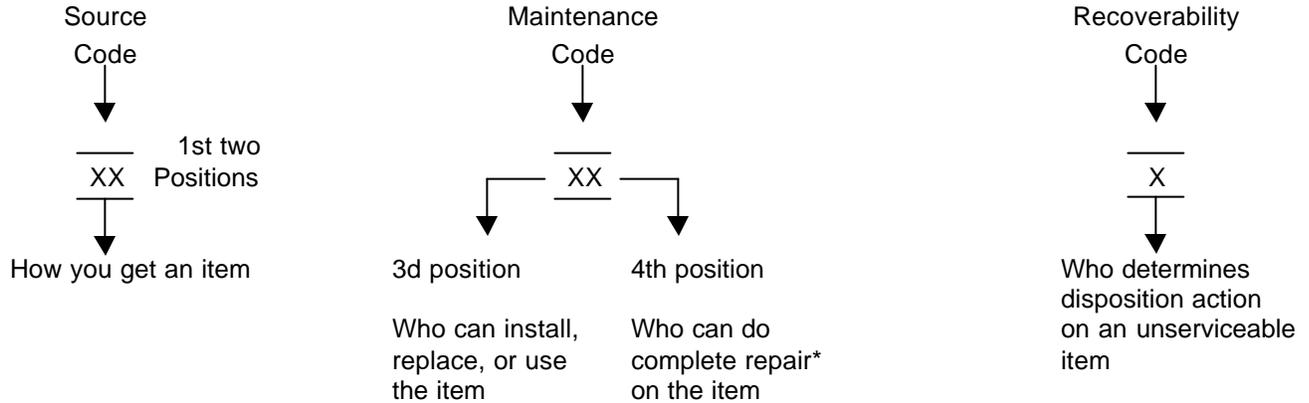
c. Section IV, Cross-Reference Indexes. There are two cross-reference indexes in this RPSTL: the National Stock Number Index and the Part Number Index. The National Stock Number Index refers you to the figure and item number. The Part Number Index refers you to the figure and item number.

C-3. EXPLANATION OF COLUMNS (SECTIONS II AND III).

a. ITEM NO. (Column (1)). Indicates the number used to identify items called out on the illustration.

C-3 (Cont)

b. SMR CODE (Column (2)). The Source, Maintenance, and Recoverability (SMR) Code is a 5 position code containing supply/requisitioning information, maintenance level authorization criteria, and disposition instruction, as shown in the following breakout:



\*Complete Repair: Maintenance capacity, capability, and authority to perform all corrective maintenance tasks of the "Repair" function in a use/user environment in order to restore serviceability to a failed item.

(1) Source Code. The source code tells you how to get an item needed for maintenance, repair, or overhaul of an end item/equipment. Explanations of source codes follow:

Source Code	Explanation
<div style="border: 1px solid black; padding: 5px; display: inline-block;">           PA            PB            PC**            PD            PE            PF            PG         </div>	<p>Stock items; use the applicable NSN to request/requisition items with these source codes. They are authorized to the level indicated by the code entered in the 3d position of the SMR codes.</p> <p>**NOTE: Items coded PC are subject to deterioration.</p>
<div style="border: 1px solid black; padding: 5px; display: inline-block;">           KD            KF            KB         </div>	<p>Items with these codes are not to be requested/requisitioned individually. They are part of a kit which is authorized to the maintenance level indicated in the 3d position of the SMR code. The complete kit must be requisitioned and applied.</p>

**Source Code**

**Explanation**

MO - (Made at Unit/AVUM level) MF - (Made at DS/AVIM level) MH - (Made at GS level) ML - (Made at Specialized Repair Act (SRA)) MD - (Made at Depot)		Items with these codes are not to be requested/requisitioned individually. They must be made from bulk material which is identified by the part number in the DESCRIPTION AND USABLE ON CODE (UOC) column and listed in the Bulk Material group of the repair parts list of the RPSTL. If the item is authorized to you by the 3d position code of the SMR Code, but the source code indicates it is made at a higher level, order the item from the higher level of maintenance.
AO - (Assembled by Unit/AVUM level) AF - (Assembled by DS/AVIM level) AH - (Assembled by GS level) AL - (Assembled by SRA) AD - (Assembled by Depot)		Items with these codes are not to be requested/requisitioned individually. The parts that make up the assembled item must be requisitioned or fabricated and assembled at the level of maintenance indicated by the source code. If the 3d position code of the SMR code authorizes you to replace the item, but the source code indicates the item is assembled at a higher level, order the item from the higher level of maintenance.
XA- XB - XC - XD-		Do not requisition an "XA" - coded item. Order its next higher assembly. (Also, refer to the NOTE below.) If an "XB" - coded item is not available from salvage, order it using the CAGEC and part number. Installation drawing, diagram, instruction sheet, field service drawing, that is identified by manufacturer's part number. Item is not stocked. Order an "XD" - coded item through normal supply channels using the CAGEC and part number, if no NSN is available.

**NOTE**

**Cannibalization or controlled exchange, when authorized, may be used as a source of supply for items with the above source codes, except for those source coded "XA" or those aircraft support items restricted by requirements of AR 750-1.**

C-3 (Cont)

(2) Maintenance Code. Maintenance codes tell you the level(s) of maintenance authorized to use and repair support items. The maintenance codes are entered in the third and fourth positions of the SMR Code as follows:

(a) The maintenance code entered in the third position tells you the lowest maintenance level authorized to remove, replace, and use an item. The maintenance code entered in the third position will indicate authorization to one of the following levels of maintenance.

<b>Maintenance Code</b>	<b>Application/Explanation</b>
C	Crew or operator maintenance done within unit/AVUM maintenance.
O	Unit/AVUM maintenance can remove, replace, and use the item.
F	Direct support/AVIM maintenance can remove, replace, and use the item.
H	General support maintenance can remove, replace, and use the item.
L	Specialized repair activity can remove, replace, and use the item.
D	Depot can remove, replace, and use the item.

(b) The maintenance code entered in the fourth position tells whether or not the item is to be repaired and identifies the lowest maintenance level with the capability to do complete repair (i.e., perform all authorized repair functions). (NOTE: Some limited repair may be done on the item at a lower level of maintenance, if authorized by the Maintenance Allocation Chart (MAC) and SMR codes.) This position will contain one of the following maintenance codes.

<b>Maintenance Code</b>	<b>Application/Explanation</b>
O	Unit/AVUM is the lowest level that can do complete repair of the item.
F	Direct support/AVIM is the lowest level that can do complete repair of the item.
H	General support is the lowest level that can do complete repair of the item.
L	Specialized repair activity is the lowest level that can do complete repair of the item.
D	Depot is the lowest level that can do complete repair of the item.
Z	Nonreparable. No repair is authorized.
B	No repair is authorized. (No parts or special tools are authorized for maintenance of a "B" coded item.) However, the item may be reconditioned by adjusting, lubricating, etc., at the user level.

(3) Recoverability Code. Recoverability codes are assigned to items to indicate the disposition action on unserviceable items. The recoverability code is entered in the fifth position of the SMR Code as follows:

Recoverability Code	Application/Explanation
Z	Nonreparable item. When unserviceable, condemn and dispose of the item at the level of maintenance shown in 3d position of SMR Code.
O	Reparable item. When uneconomically repairable, condemn and dispose of the item at unit or aviation unit level.
F	Reparable item. When uneconomically repairable, condemn and dispose of the item at direct support or aviation intermediate level.
H	Reparable item. When uneconomically repairable, condemn and dispose of the item at the general support level.
D	Reparable item. When beyond lower level repair capability, return to depot. Condemnation and disposal of item not authorized below depot level.
L	Reparable item. Condemnation and disposal not authorized below Specialized Repair Activity (SRA).
A	Item requires special handling or condemnation procedures because of specific reasons (e.g., precious metal content, high dollar value, critical materiel, or hazardous materiel). Refer to appropriate manuals/directives for specific instructions.

c. NSN (Column (3)). The national stock number for the item is listed in this column.

d. CAGEC (Column (4)). The Contractor and Government Entity Code (CAGEC) is a 5-digit alphanumeric code which is used to identify the manufacturer, distributor, or Government agency/ activity that supplies the item.

e. PART NUMBER (Column (5)). Indicates the primary number used by the manufacturer (individual company, firm, corporation, or Government activity), which controls the design and characteristics of the item by means of its engineering drawings, specifications standards, and inspection requirements to identify an item or range of items.

**NOTE**

**When you use an NSN to requisition an item, the item you receive may have a different part number from the number listed.**

f. DESCRIPTION AND USABLE ON CODE (UOC) (Column (6)). This column includes the following information:

- (1) The Federal item name, and, when required, a minimum description to identify the item.
- (2) Items that are included in kits and sets are listed below the name of the kit or set.

C-3 (Cont)

(3) Spare/repair parts that make up an assembled item are listed immediately following the assembled item line entry or reference is made to the applicable figure.

(4) Part numbers of bulk materials are referenced in this column in the line item entry for the item to be manufactured/fabricated.

(5) The statement "END OF FIGURE" appears just below the last item description in column (6) for a given figure in both section II and section III.

g. QTY (Column (7)). The QTY (quantity per figure column) indicates the quantity of the item used in the breakout shown on the illustration/figure, which is prepared for a functional group, subfunctional group, or an assembly. A "V" appearing in this column instead of a quantity indicates that the quantity is variable and the quantity may vary from application to application.

C-4. EXPLANATION OF INDEX FORMAT AND COLUMNS (SECTION IV).

a. NATIONAL STOCK NUMBER (NSN) INDEX.

(1) STOCK NUMBER column. This column lists the NSN by National Item Identification Number (NIIN) sequence. The NIIN consists of the last nine digits of the NSN

NSN  
(i.e., 5305-01-674-1467). When using this column to locate an item, ignore the first four digits of the  
NIIN  
NSN. However, the complete NSN (13 digits) should be used when ordering items by stock number.

(2) FIG. column. This column lists the number of the figure where the item is identified/located. The figures are in numerical order in section II and section III.

(3) ITEM column. The item number identifies the item associated with the figure listed in the adjacent FIG. column. This item is also identified by the NSN listed on the same line.

b. PART NUMBER INDEX Part numbers in this index are listed by part number in ascending alphanumeric sequence (i.e., vertical arrangement of letter and number combination which places the first letter or digit of each group in order A through Z, followed by the numbers 0 through 9 and each following letter or digit in like order).

(1) PART NUMBER column. Indicates the part number assigned to the item.

(2) FIG. column. This column lists the number of the figure where the item is identified/located in section II or III.

(3) ITEM column. The item number is the number assigned to the item as it appears in the figure referenced in the adjacent figure number column.

C-5. SPECIAL INFORMATION.

a. Assembly Instruction. Detailed assembly instructions for items source coded to be assembled from component spare/repair parts are found in the maintenance portion of this manual. Items that make up the assembly are listed immediately following the assembly item entry or reference is made to an applicable figure.

b. Kits. Line item entries for repair parts kits appear in the group in section II (see table of contents).

c. Associated Publications. The publications listed below pertain to the M252 81-mm Mortar and its components:

Publication	Short Title
TM 9-1015-249-10/TM 09922A-10/1	Operator's Manual for Mortar 81-MM, M252 (1015-01-164-6651)

C-6. HOW TO LOCATE REPAIR PARTS.

a. When National Stock Number or Part Number is Not Known.

(1) First. Using the table of contents, determine the assembly group or subassembly group to which the item belongs. This is necessary since figures are prepared for assembly groups and subassembly groups, and listings are divided into the same groups.

(2) Second. Find the figure covering the assembly group or subassembly group to which the item belongs.

(3) Third. Identify the item on the figure and note the item number.

(4) Fourth. Refer to the Repair Parts List for the figure and item numbers. The NSNs and part numbers are on the same line as the associated item numbers.

b. When National Stock Number or Part Number is Known.

(1) First. If you have the National Stock Number, look in the STOCK NUMBER column of the National Stock Number Index. The NSN index is in National Item Identification Number (NIIN) sequence (see C-4.a(1)). Note the figure and item number next to the NSN.

(2) Second. Turn to the figure and locate the item number. Verify that the item is the one you are looking for.

**NOTE**

**If you have the part number, look in the PART NUMBER column of the part number index. Identify the figure and item number. Look up the item on the figure in Section II.**

C-7. ABBREVIATIONS. Not applicable.

**SECTION II. REPAIR PARTS LIST**

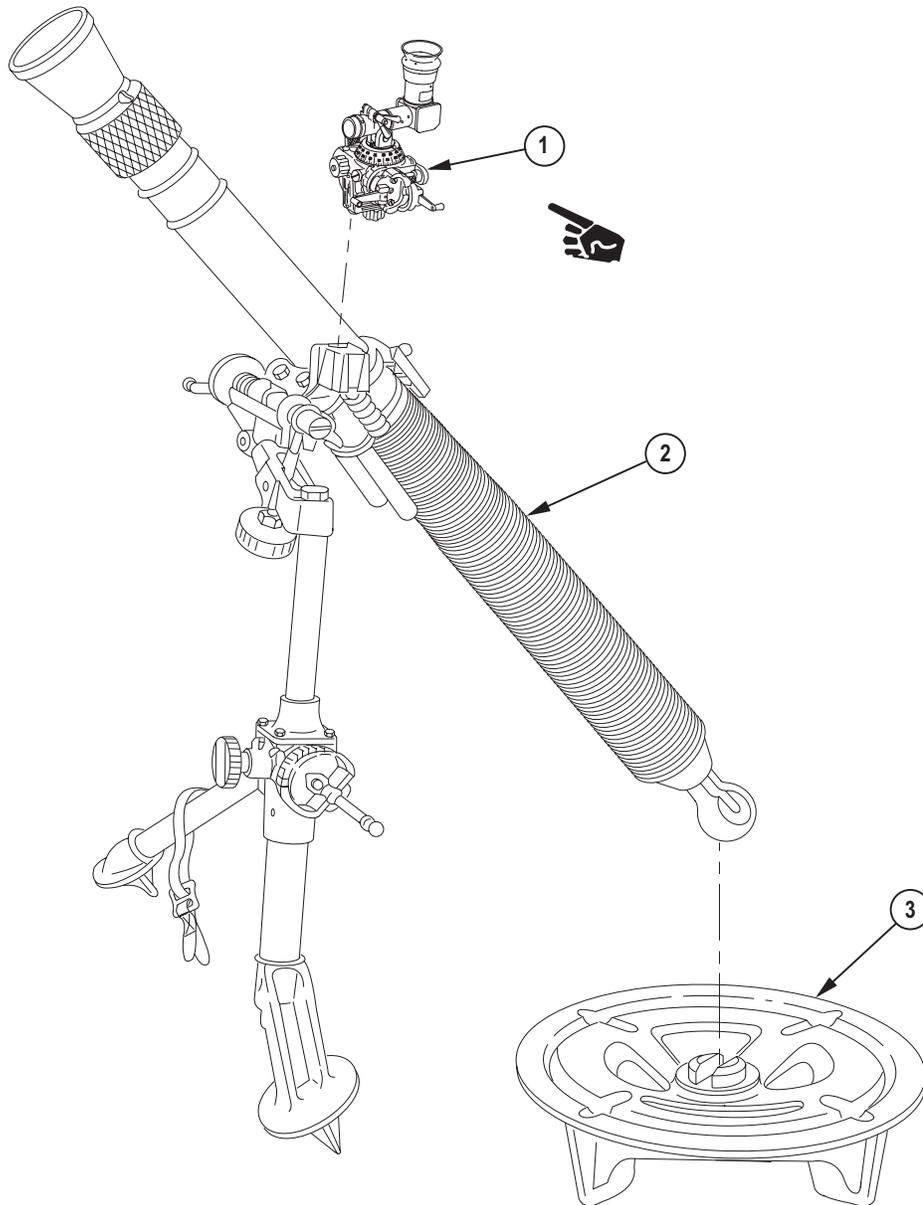


Figure C-1. M252 81-MM Mortar.

SECTION II.

ARMY TM 9-1015-249-23&P C02  
 AIR FORCE TO 11W2-5-21-2  
 MARINE CORPS TM 09922A-23&P/2A

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
					FIGURE C-1 GROUP 00 M252 81-MM MORTAR 11579801	
*1	AOOHA		19200	9356182	SIGHT UNIT,M67 (SEE FIG. C-13 FOR ASSEMBLY BREAKDOWN) .....	1
					UOC:M96	
2	AOCFF		19206	11580050	81-MM MORTAR AND MOUNT (SEE FIG. C-2 FOR ASSEMBLY BREAKDOWN) .....	1
					UOC:M96	
3	PACOO	1015-01-236-0389	19206	11579870	BASEPLATE,MORTAR:M3A1 (SEE FIG. C-12 FOR ASSEMBLY BREAKDOWN) .....	1
					UOC:M96	

END OF FIGURE

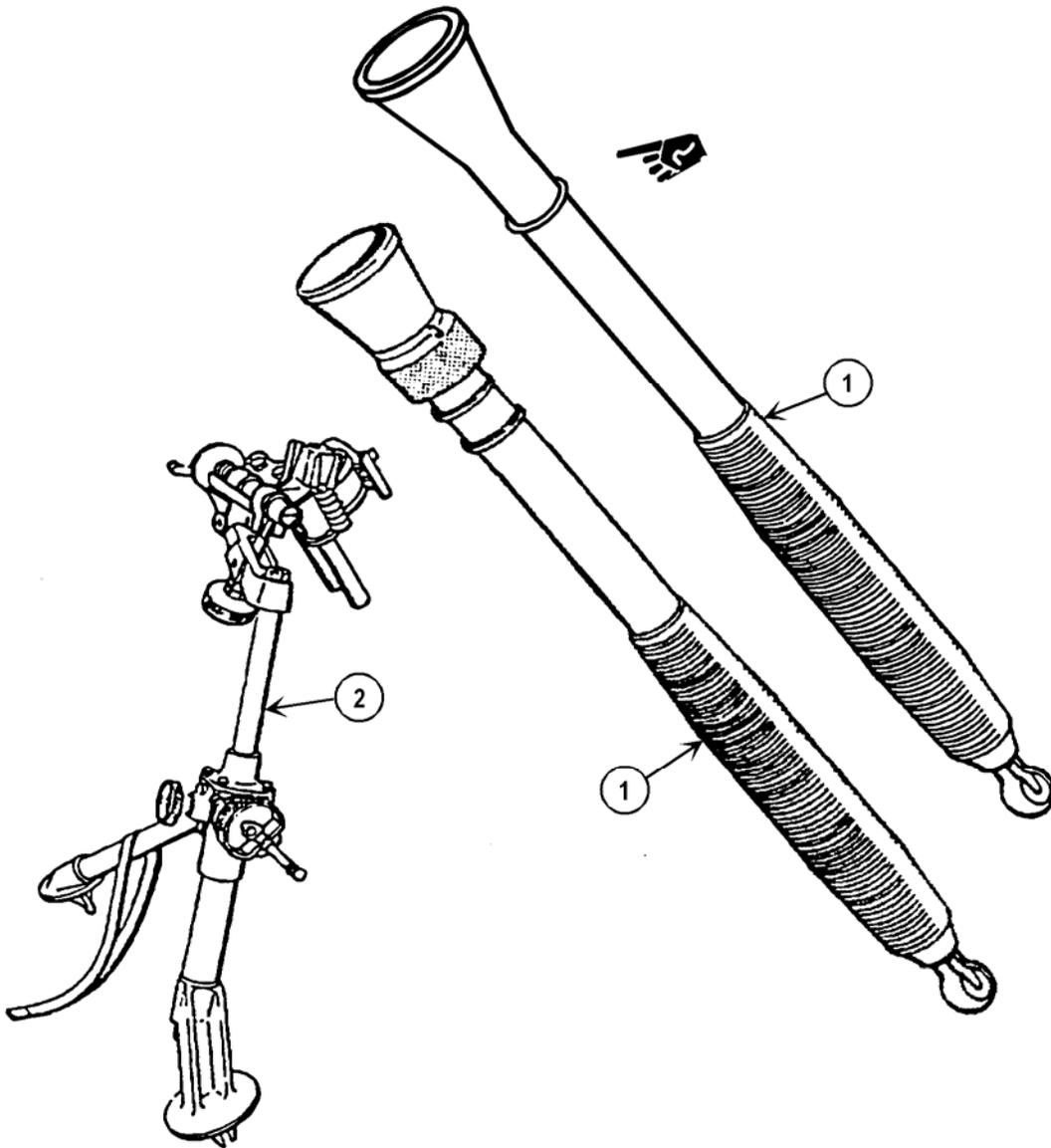


Figure C-2. 81-MM Mortar and Mount.

SECTION II.

ARMY TM 9-1015-249-23&P C03  
MARINE CORPS TM 09922A-23&P/2A

TEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
					FIGURE C-2 GROUP 01 AND GROUP 0103 81-MM MORTAR AND MOUNT 11580050	
1	PAOOD	1015-01-528-2773	1NUW7	12901300	CANNON,81-MM:M253 (SEE FIG. C-3 FOR ASSEMBLY BREAKDOWN)..... UOC:M96	1
*1	PROOD	1015-01-440-5935	19206	11580048	CANNON,81-MM:M253 (SEE FIG. C-3.1 FOR ASSEMBLY BREAKDOWN)..... UOC:M96	1
2	PAOFF	1015-01-521-1612	19206	11580035	MOUNT,MORTAR:M177 (SEE FIG. C-4 FOR ASSEMBLY BREAKDOWN)..... UOC:M96	1

**NOTE**

Dovetail adapter not required with newly manufactured bipod.

**\*NOTE**

This item has been superseded by NSN 1015-01-528-2773  
and will only be supported until stock is exhausted.

END OF FIGURE

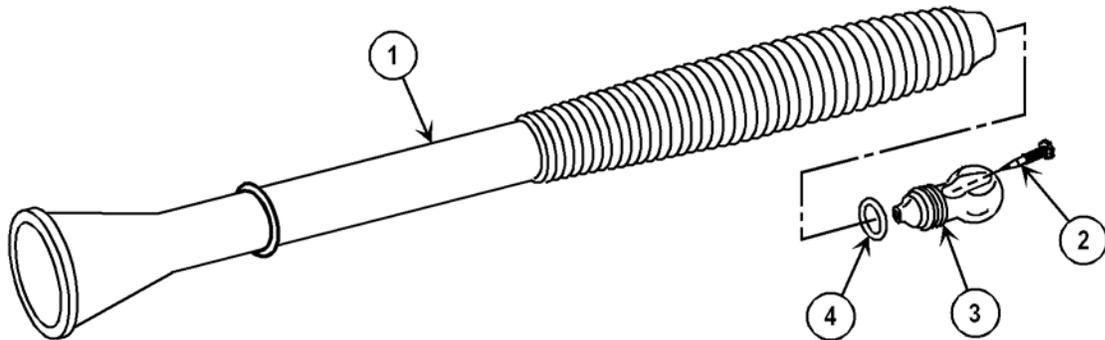


Figure C-3. M253 81-MM Cannon.

SECTION II.

ARMY TM 9-1015-249-23&P C03  
MARINE CORPS TM 09922A-23&P/2A

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
					FIGURE C-3 GROUP 0101 AND GROUP 010101 M253 81-MM CANNON 12901300	
1	XAOZD		1NUW7	12901301	CANNON,81-MM,M253..... UOC:M96	1
2	PACZZ	1015-01-441-4160	19206	11580037	PIN,FIRING ..... UOC:M96	1
3	PAOZZ	1015-01-441-5502	19206	11580045	PLUG,BREECH ..... UOC:M96	1
4	PAOZZ	3120-01-442-2307	19206	11580044	BEARING,WASHER,THRUST ..... UOC:M96	1

END OF FIGURE

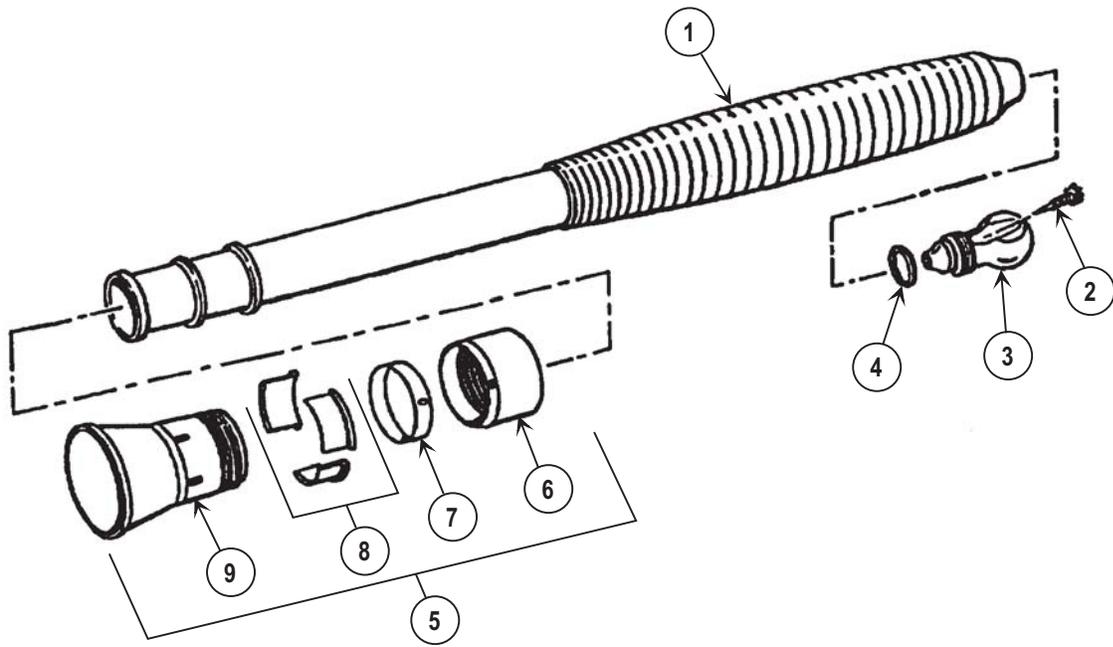


Figure C-3.1. M253 81-MM Cannon and Blast Attenuator Device.

## SECTION II.

ARMY TM 9-1015-249-23&P C03  
MARINE CORPS TM 09922A-23&P/2A

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
					FIGURE C-3.1 GROUP 0101 AND GROUP 010101 M253 81-MM CANNON 11580048 AND BLAST ATTENUATOR DEVICE 11580051	
1	XAOZD		19206	11580047	CANNON,81-MM,M253..... UOC:M96	1
2	PACZZ	1015-01-441-4160	19206	11580037	PIN,FIRING ..... UOC:M96	1
3	PAOZZ	1015-01-441-5502	19206	11580045	PLUG,BREECH ..... UOC:M96	1
4	PAOZZ	3120-01-442-2307	19206	11580044	BEARING,WASHER,THRUST ..... UOC:M96	1
5	PAOOO	1015-01-444-4222	19206	11580051	DEVICE,BLAST ATTENUATOR ..... UOC:M96	1
6	PAOZZ	5310-01-441-4149	19206	11580039	.NUT,SELF-LOCKING,HEXAGON..... UOC:M96	1
7	PAOZZ	5325-01-441-4162	19206	11580038	.RING,RETAINING..... UOC:M96	1
8	PAOZZ	3460-01-442-0159	19206	11580041	.COLLET,MACHINE..... UOC:M96	1
9	XAOZZ		19206	11580043	.DEVICE,BLAST ..... UOC:M96	1

END OF FIGURE



## SECTION II.

ARMY TM 9-1015-249-23&P  
AIR FORCE TO 11W2-5-21-2  
MARINE CORPS TM 09922A-23&P/2A

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
					FIGURE C-4 GROUP 0102 M177 MORTAR MOUNT 11580035 AND DOVETAIL ADAPTER 9362653	
1	PAOZZ	5365-01-441-4152	19206	11579913	PLUG,MACHINE,THREAD .....	2
					UOC:M96	
2	PAOZZ	5310-01-441-4151	19206	11579912	WASHER,KEY .....	2
					UOC:M96	
3	PAFFF	1015-01-414-7493	19206	11579980	TRAVERSING MECHANISM ASSEMBLY (SEE FIG. C-6 FOR ASSEMBLY BREAKDOWN) .....	1
					UOC:M96	
4	PAOFF	1015-01-443-9351	19206	11579929	BUFFER,MORTAR MOUNTING (SEE FIG. C-7 FOR ASSEMBLY BREAKDOWN) .....	2
					UOC:M96	
5	PAOFF	1015-01-443-8387	19206	11579963	RETAINER,GUN COMPONENT (SEE FIG. C-5 FOR ASSEMBLY BREAKDOWN) .....	1
					UOC:M96	
6	PAOZZ	1015-01-444-4230	19206	11579916	WASHER,KEY .....	2
					UOC:M96	
7	PAOZZ	5310-01-441-7385	19206	11579917	NUT,PLAIN,ROUND .....	2
					UOC:M96	
8	PAOZZ	5315-00-234-1864	96906	MS24665-302	PIN,COTTER .....	2
					UOC:M96	
9	PAOFF	1015-01-440-5937	19206	11579940	LEG,MORTAR MOUNT (SEE FIG. C-9 FOR ASSEMBLY BREAKDOWN) .....	1
					UOC:M96	
10	PAOZZ	5315-00-234-1854	96906	MS24665-153	PIN,COTTER .....	1
					UOC:M96	
11	PAOZZ	5310-00-842-1488	96906	MS35692-21	NUT,PLAIN,SLOTTED,HEXAGON .....	1
					UOC:M96	
12	PAOZZ	5355-01-441-4153	19206	11579920	KNOB .....	1
					UOC:M96	
13	PAOFF	1015-01-414-6269	19206	11580034	ELEVATING MECHANISM ASSEMBLY (SEE FIG. C-10 FOR ASSEMBLY BREAKDOWN) .....	1
					UOC:M96	
14	PAFFF	3010-01-437-1083	19206	11579990	ACTUATOR, MECHANICAL ASSEMBLY (SEE FIG. C-8 FOR ASSEMBLY BREAKDOWN) .....	1
					UOC:M96	
15	PAFZZ	5306-01-441-1622	19206	11579914	BOLT,INTERNALLY RELIEVED .....	1
					UOC:M96	
16	PAFZZ	5310-01-439-9537	19206	11579911	WASHER,KEY .....	1
					UOC:M96	
17	PAFZZ	5315-01-436-7624	19206	11580062	PIN,ROLL .....	1
					UOC:M96	

SECTION II.

ARMY TM 9-1015-249-23&P C03  
MARINE CORPS TM 09922A-23&P/2A

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
18	PAFZZ	5325-01-442-2310	19206	11579915	PIN,YOKE AXIS..... UOC:M96	1
*19	PAOOO	1015-01-211-4045	19200	9362653	ADAPTER,DOVETAIL..... UOC:M96	1
*20	PAOZZ	5305-01-052-3714	80205	MS51031-111	.SETSCREW ..... UOC:M96	1

**\*NOTE**

Dovetail adapter is to be used on older model of traversing mechanism assembly. An extension has been integrated into newer model of traversing mechanism assembly.

END OF FIGURE



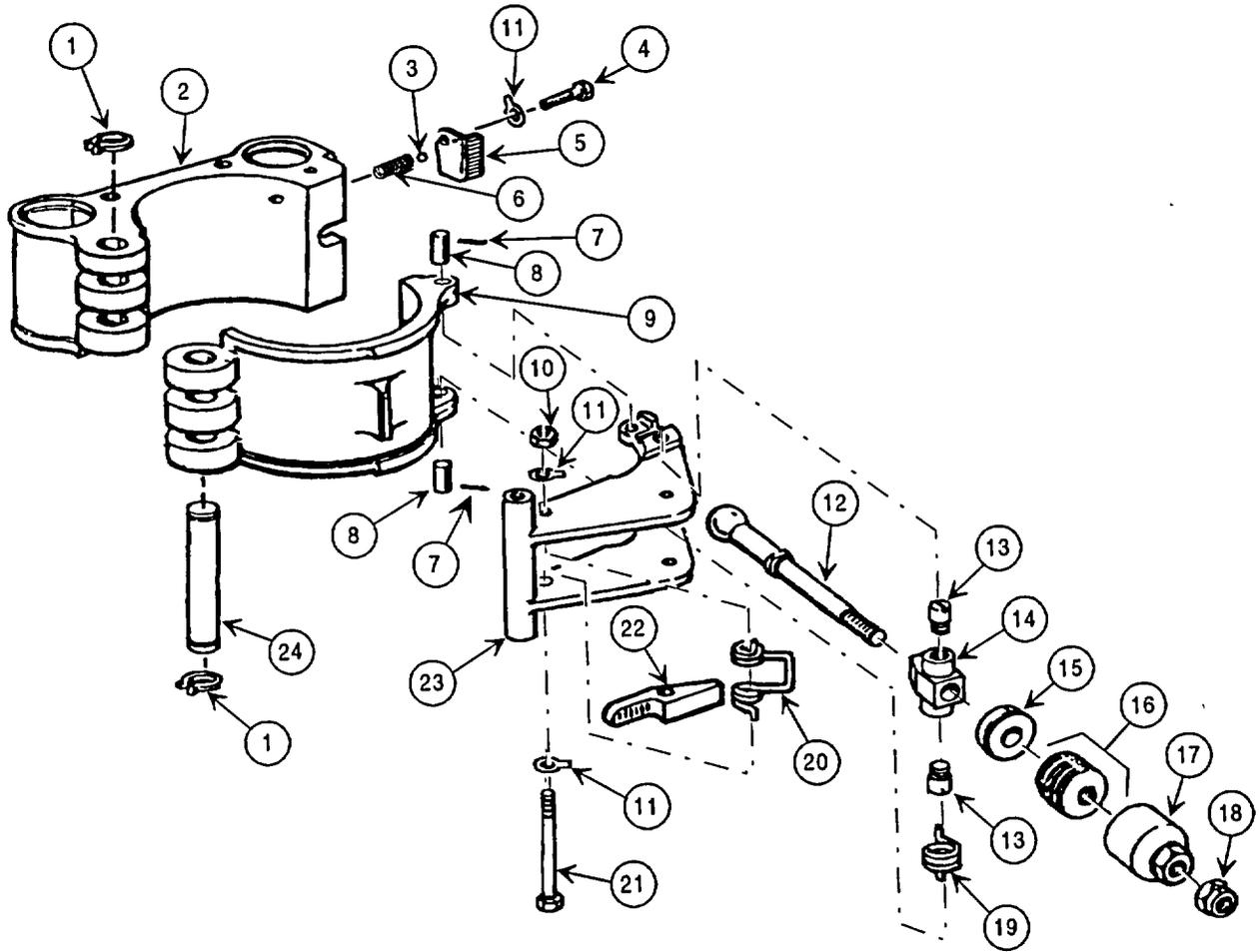


Figure C-5. Barrel Clamp Assembly.

## SECTION II.

ARMY TM 9-1015-249-23&P C03  
MARINE CORPS TM 09922A-23&P/2A

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
					FIGURE C-5 GROUP 010201 BARREL CLAMP ASSEMBLY 11579963	
1	PAFZZ	5325-01-046-3670	96906	MS31217-1050	RING,RETAINING..... UOC:M96	2
2	XAFZZ		19206	11579962	CLAMP BODY,LOWER HALF ..... UOC:M96	1
3	PAFZZ	3110-01-442-8170	96906	MS19059-508	BALL,BEARING LATCH..... UOC:M96	1
4	PAFZZ	5305-00-225-3842	80204	B1821BH025- C113N	SCREW,CAP,HEXAGON..... UOC:M96	1
5	PAFZZ	1015-01-442-3231	19206	11579953	LATCH,BARREL CLAMP..... UOC:M96	1
6	PAFZZ	5360-01-440-2130	19206	11579946	SPRING,HELICAL,COMPRESSION..... UOC:M96	1
7	PAFZZ	5315-00-067-7499	96906	MS16562-16	PIN,SPRING ..... UOC:M96	2
8	PAFZZ	5315-01-441-5500	19206	11579947	PIN,STRAIGHT,HEADLESS ..... UOC:M96	2
9	PAFZZ	1015-01-470-4101	19206	11579961	CLAMP BODY,UPPER HALF ..... UOC:M96	1
10	PAFZZ	5310-00-061-4650	96906	M45913/3- 4CG8C	NUT,SELF-LOCKING,HELICAL..... UOC:M96	1
11	PAFZZ	5310-00-969-4466	96906	MS9276-10	WASHER,KEY ..... UOC:M96	3
12	PAFZZ	5306-01-441-4147	19206	11579955	ROD,LOCKING ..... UOC:M96	1
13	PAFZZ	5305-01-441-4148	19206	11579943	SCREW,SHOULDER ..... UOC:M96	2
14	PAFZZ	1015-01-444-4231	19206	11579956	CONNECTOR,ROD END..... UOC:M96	1
15	PAFZZ	3120-01-442-6041	19206	11579952	BUSHING,SLEEVE ..... UOC:M96	1
16	PAFZZ	5310-01-325-8982	19206	11579944	WASHER,SPRING TENSION..... UOC:M96	12
17	PAFZZ	1015-01-444-4221	19206	11579954	NUT,BARREL ..... UOC:M96	1
18	PAFZZ	5310-01-500-3209	81349	M45913/3- 6CG8Z	NUT,SELF-LOCKING,HEXAGON..... UOC:M96	1
19	PAFZZ	1015-01-443-9352	19206	11579945	SPRING,TORSION ..... UOC:M96	1
20	PAFZZ	5360-01-440-2131	19206	11579950	SPRING,HELICAL,TORSION ..... UOC:M96	1
21	PAFZZ	5360-01-439-9872	19206	11579910	BOLT,MACHINE ..... UOC:M96	1
22	PAFZZ	1015-01-442-3232	19206	11579951	LEVER,LOCKING,BARREL ..... UOC:M96	1

SECTION II.

ARMY TM 9-1015-249-23&P  
 AIR FORCE TO 11W2-5-21-2  
 MARINE CORPS TM 09922A-23&P/2A

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
23	PAFZZ	5340-01-441-4157	19206	11579960	HANDLE,MANUAL CONTROL..... UOC:M96	1
24	PAFZZ	5315-01-441-5501	19206	11579949	PIN,GROOVED ..... UOC:M96	1

END OF FIGURE



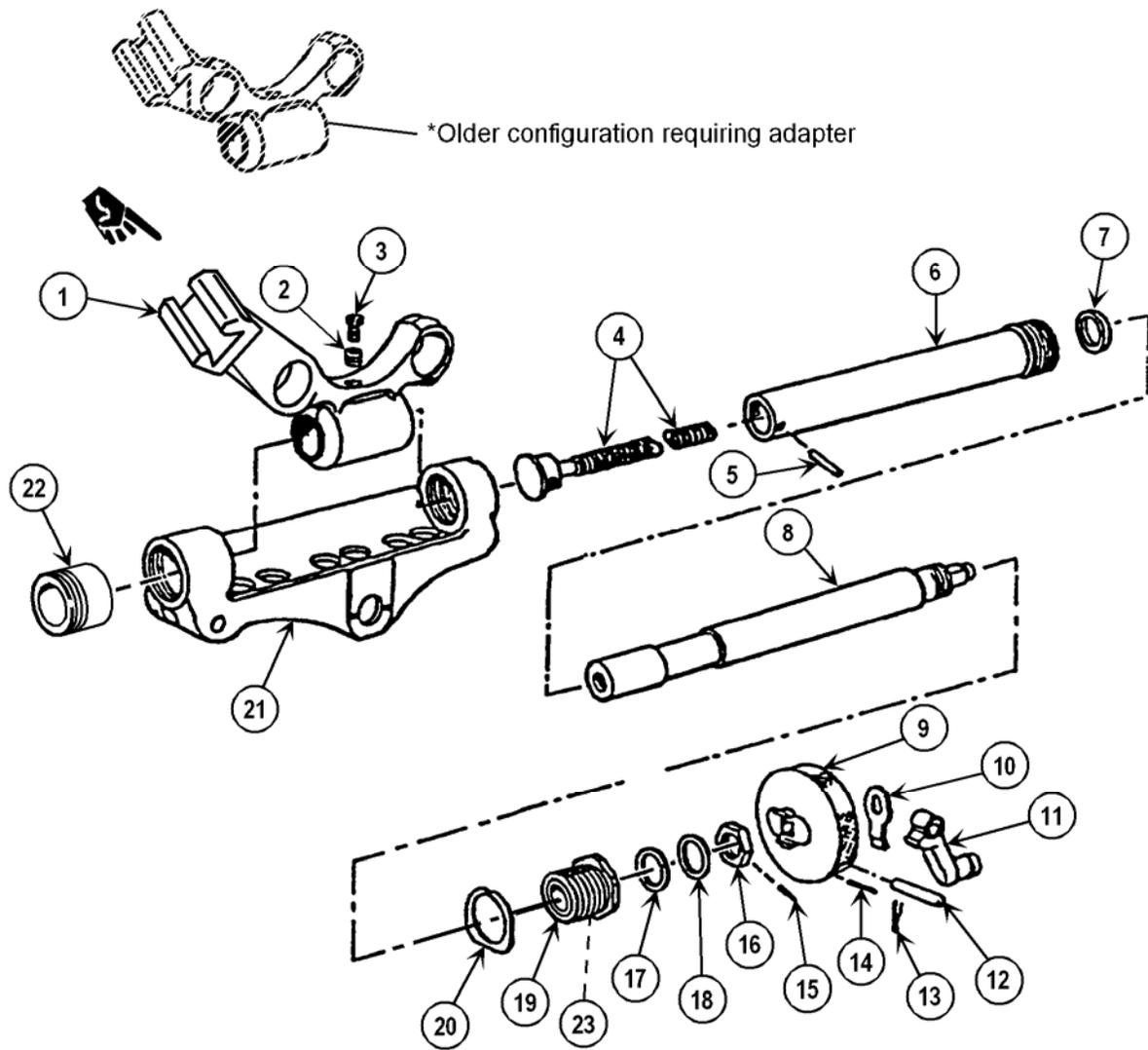


Figure C-6. Traversing Mechanism Assembly.

## SECTION II.

ARMY TM 9-1015-249-23&P C03  
MARINE CORPS TM 09922A-23&P/2A

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
					FIGURE C-6 GROUP 010202 TRAVERSING MECHANISM ASSEMBLY 11579980	
<b>NOTE</b>						
Dovetail adapter is to be used on older model of traversing mechanism assembly. An extension has been integrated into newer model of traversing mechanism assembly.						
1	PAFZZ	1015-01-441-1620	19206	11579978	CARRIER,BUFFER..... UOC:M96	1
2	PAFZZ	5325-00-754-0847	96906	MS21209C4-15	INSERT,SCREW THREAD..... UOC:M96	1
3	PAFZZ	5305-00-273-5004	80205	MS24677-33	SCREW,CAP,SOCKET HEAD..... UOC:M96	1
4	PAFZZ	5305-01-441-4155	19206	11579973	SCREW,TRAVERSING..... UOC:M96	1
5	PAFZZ	5315-00-058-9756	96906	MS16562-227	PIN,SPRING..... UOC:M96	1
6	PAFZZ	3040-01-441-4154	19206	11579977	SHAFT,SHOULDERED..... UOC:M96	1
7	PAFZZ	5330-01-443-0247	19206	11580064	RING,WIPER..... UOC:M96	1
8	PAFZZ	1015-01-441-5495	19206	11579976	NUT,TRAVERSING SCREW..... UOC:M96	1
9	PAFZZ	5340-01-437-4190	19206	11580026	HANDWHEEL..... UOC:M96	1
10	PAFZZ	5360-01-436-7623	19206	11580024	SPRING,FLAT..... UOC:M96	1
11	PAFZZ	5340-01-436-3673	19206	11580023	HANDLE,CRANK..... UOC:M96	1
12	PAFZZ	5315-01-436-7626	19206	11580025	PIN,STRAIGHT,HEADLESS..... UOC:M96	1
13	PAFZZ	5315-00-881-2705	96906	MS9245-27	PIN,COTTER..... UOC:M96	1
14	PAFZZ	5315-01-449-8094	96906	MS16562-114	PIN,STRAIGHT,HEADLESS..... UOC:M96	1
15	PAFZZ	5315-00-837-4545	96906	MS16562-29	PIN,SPRING..... UOC:M96	1
16	PAFZZ	5310-01-441-3117	19206	11579968	NUT,PLAIN,HEXAGON..... UOC:M96	1
17	PAFZZ	5310-01-439-9538	19206	11579969	WASHER,FLAT..... UOC:M96	1
18	PAFZZ	5365-01-472-9154	81349	M70344/1-34C1	SHIM,LAMINATED..... UOC:M96	1
19	PAFZZ	5365-01-441-2487	19206	11579970	BUSHING,MACHINE THREADED..... UOC:M96	1
20	PAFZZ	5310-01-441-3116	19206	11579967	WASHER,KEY..... UOC:M96	1

SECTION II.

ARMY TM 9-1015-249-23&P  
 AIR FORCE TO 11W2-5-21-2  
 MARINE CORPS TM 09922A-23&P/2A

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
21	XAFZZ		19206	11579979	YOKE, TRAVERSE GEAR ..... UOC:M96	1
22	PAFZZ	3120-01-442-2308	19206	11579972	BEARING, SLEEVE ..... UOC:M96	1
23	PAFZZ	3120-01-441-4156	19206	11579971	SLEEVE, BEARING ..... UOC:M96	1

END OF FIGURE



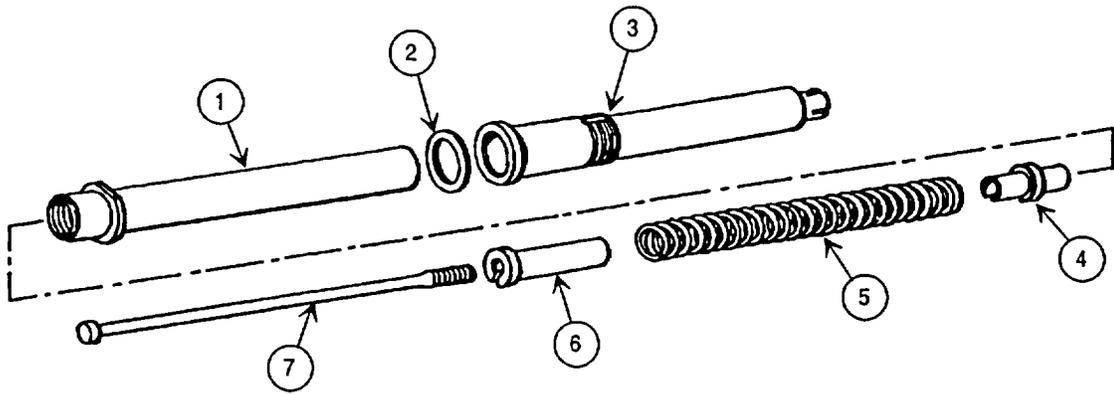


Figure C-7. Mortar Mounting Buffer.

SECTION II

ARMY TM 9-1015-249-23&P  
 AIR FORCE TO 11W2-5-21-2  
 MARINE CORPS TM 09922A-23&P/2A

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODES (UOC)	(7) QTY
					FIGURE C-7 GROUP 010203 MORTAR MOUNTING BUFFER 11579929	
1	PAFZZ	1015-01-443-9348	19206	11579925	HOUSING, MECHANICAL ..... UOC:M96	2
2	PAFZZ	5310-01-439-9540	19206	11579927	WASHER, FLAT ..... UOC:M96	2
3	PAFZZ	1015-01-443-9349	19206	11579926	HOUSING, MECHANICAL ..... UOC:M96	2
4	PAFZZ	1015-01-444-5527	19206	11579923	COLLAR, RETAINING ..... UOC:M96	2
5	PAFZZ	5360-01-440-2129	19206	11579928	SPRING, HELICAL, COMPRESSION ..... UOC:M96	2
6	PAFZZ	1015-01-444-5525	19206	11579924	COLLAR, RETAINING ..... UOC:M96	2
7	PAFZZ	1015-01-443-9346	19206	11579922	BOLT, SPRING RETAINING ..... UOC:M96	2
END OF FIGURE						

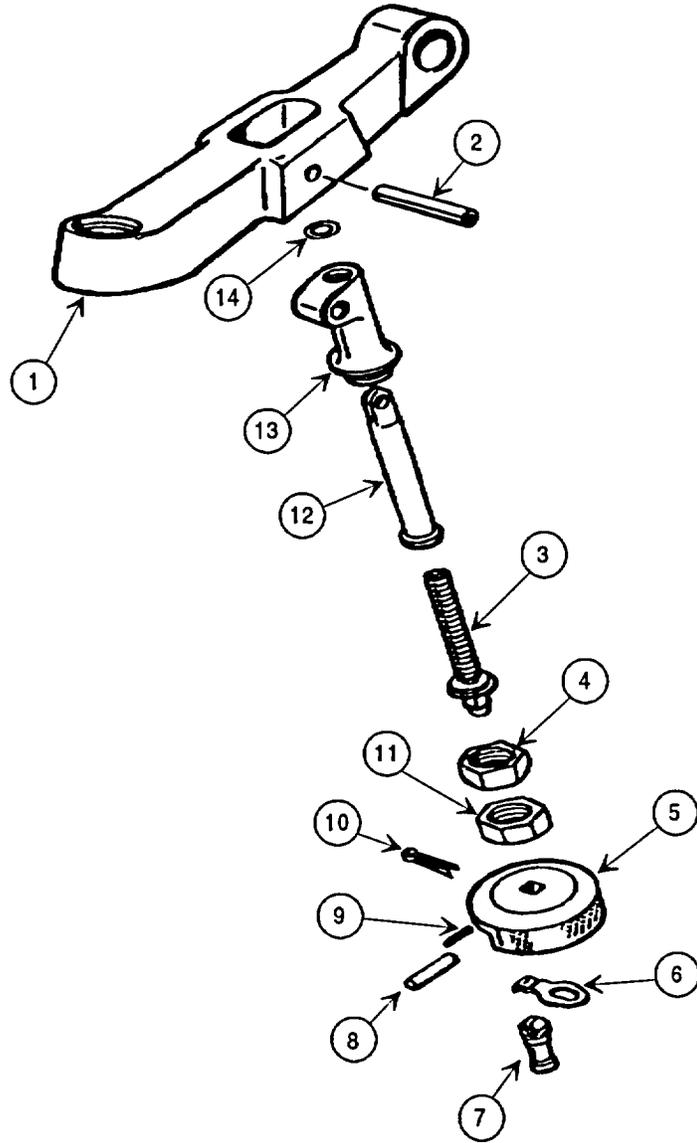


Figure C-8. Cross Leveling Mechanism.

## SECTION II.

ARMY TM 9-1015-249-23&P  
AIR FORCE TO 11W2-5-21-2  
MARINE CORPS TM 09922A-23&P/2A

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
					FIGURE C-8 GROUP 010204 CROSS LEVELING MECHANISM 11579990	
1	XAFZZ		19206	11579989	ARM,CROSS-LEVELING .....	1
					UOC:M96	
2	PAFZZ	5315-01-436-7624	19206	11580062	PIN,ROLL .....	1
					UOC:M96	
3	PAFZZ	5306-01-436-7629	19206	11579986	BOLT,RIBBED SHOULDER .....	1
					UOC:M96	
4	PAFZZ	5310-01-436-7625	19206	11580036	NUT,PLAIN,HEXAGON .....	1
					UOC:M96	
5	PAFZZ	5340-01-437-4190	19206	11580026	HANDWHEEL .....	1
					UOC:M96	
6	PAFZZ	5360-01-436-7623	19206	11580024	SPRING,FLAT .....	1
					UOC:M96	
7	PAFZZ	5340-01-436-7630	19206	11579984	HANDLE,CRANK.....	1
					UOC:M96	
8	PAFZZ	5315-01-436-7626	19206	11580025	PIN,STRAIGHT,HEADLESS.....	1
					UOC:M96	
9	PAFZZ	5315-01-449-8094	96906	MS16562-114	PIN,STRAIGHT,HEADLESS.....	1
					UOC:M96	
10	PAFZZ	5315-00-881-2705	96906	MS9245-27	PIN,COTTER .....	1
					UOC:M96	
11	PAFZZ	5340-01-436-3677	19206	11579985	CAP,PLUG PROTECTIVE.....	1
					UOC:M96	
12	PAFZZ	5340-01-436-3675	19206	11579988	CONNECTOR,ROD END .....	1
					UOC:M96	
13	PAFZZ	3040-01-437-1082	19206	11579987	HOUSING,MECHANICAL.....	1
					UOC:M96	
14	PAFZZ	5330-00-579-7916	96906	MS28775-115	O-RING.....	1
					UOC:M96	

END OF FIGURE

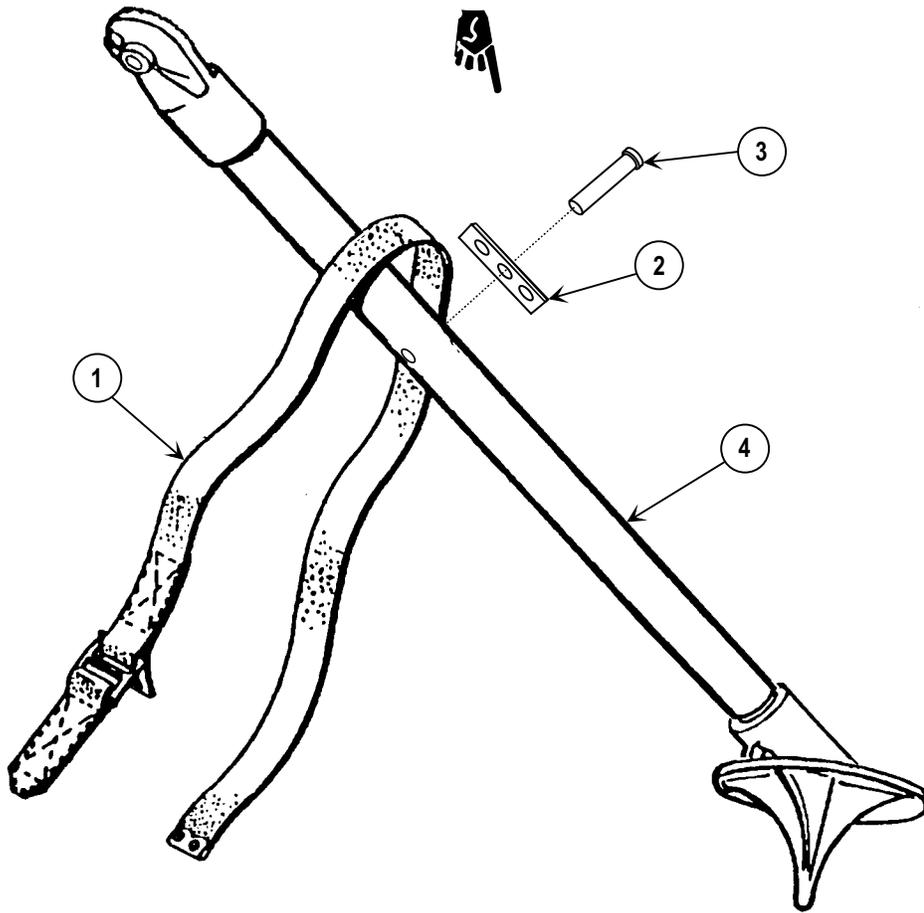


Figure C-9. Mortar Mount Leg Assembly.

SECTION II.

ARMY TM 9-1015-249-23&P  
 AIR FORCE TO 11W2-5-21-2  
 MARINE CORPS TM 09922A-23&P/2A

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
					FIGURE C-9 GROUP 010205 MORTAR MOUNT LEG ASSEMBLY 11579940	
1	PAFZZ	5340-01-437-1085	19206	11579939	STRAP,WEBBING..... UOC:M96	1
2	PAFZZ	5340-01-432-8541	19206	11580661	PLATE,MOUNTING..... UOC:M96	1
3	PAFZZ	5320-01-429-8509	96906	MS9403-172	RIVET,SOLID..... UOC:M96	1
4	XAFZZ		19206	11579935	LEG,FIXED..... UOC:M96	1

END OF FIGURE

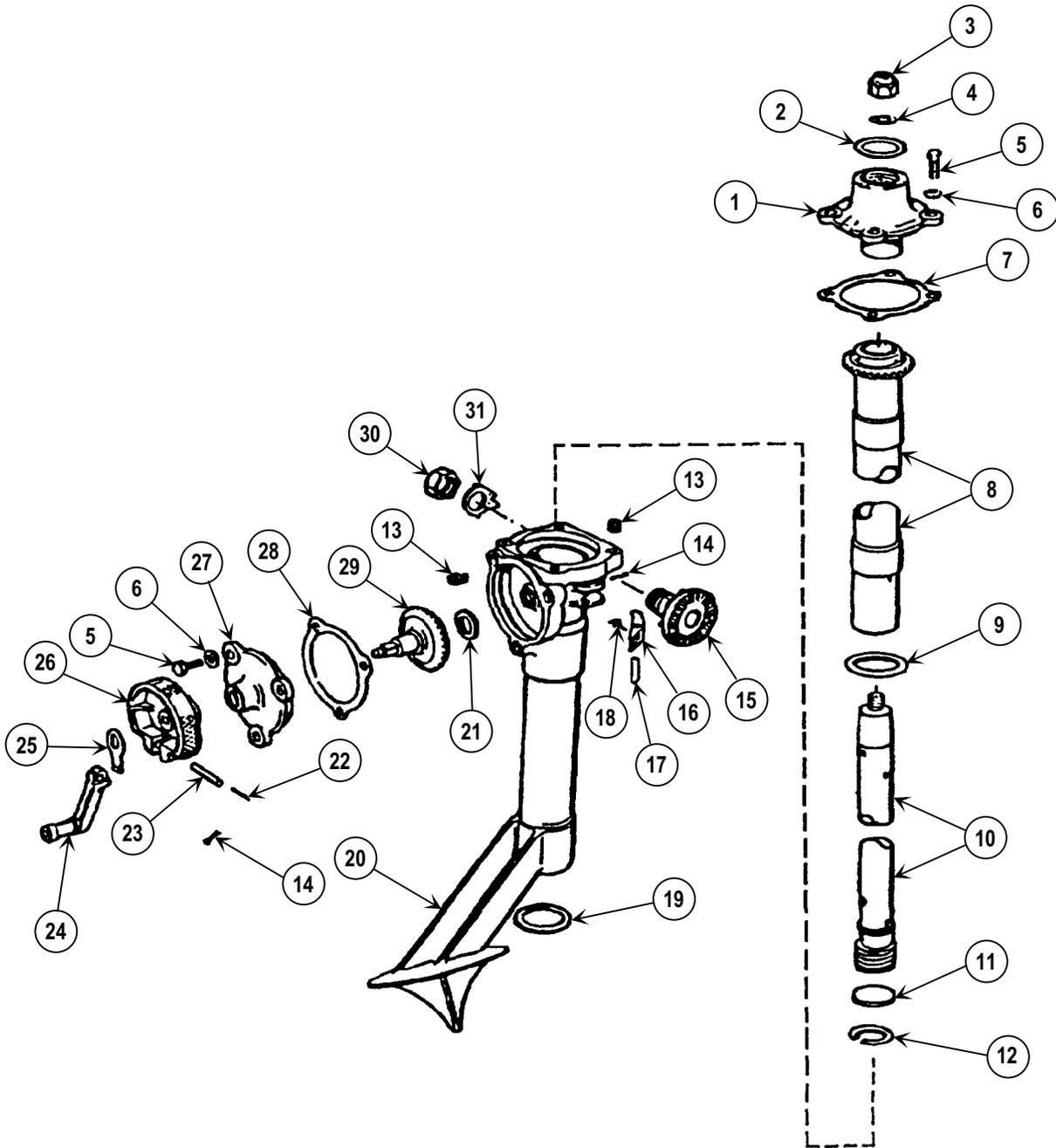


Figure C-10. Elevating Mechanism Assembly.

## SECTION II.

ARMY TM 9-1015-249-23&P C03  
MARINE CORPS TM 09922A-23&P/2A

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
					FIGURE C-10 GROUP 010206 ELEVATING MECHANISM ASSEMBLY 11580034	
1	PAFZZ	5340-01-436-6426	19206	11580019	CAP,PLUG,PROTECTIVE .....	1
					UOC:M96	
2	PAFZZ	5330-00-579-7911	96906	MS28775-215	O-RING .....	1
					UOC:M96	
3	PAOZZ	5310-00-245-8826	96906	MS16228-10C	NUT,SELF-LOCKING,HEXAGON.....	1
					UOC:M96	
4	PAOZZ	5310-00-585-3243	96906	MS9320-16	WASHER,FLAT .....	1
					UOC:M96	
5	PAFZZ	5305-00-068-0501	96906	MS90725-5	SCREW,CAP,HEXAGON.....	7
					UOC:M96	
6	PAFZZ	5310-00-809-4058	96906	MS27183-10	WASHER,FLAT .....	7
					UOC:M96	
7	PAFZZ	5330-01-436-7631	19206	11580013	GASKET.....	AR
					UOC:M96	
8	PAFZZ	3040-01-436-7627	19206	11580007	SHAFT ASSEMBLY,SHOULDERED .....	1
					UOC:M96	
9	PAFZZ	5365-01-436-7632	19206	11580012	SPACER,RING.....	AR
					UOC:M96	
10	PAFFF	1015-01-436-6425	19206	11580002	ELEVATING SCREW ASSEMBLY (SEE FIG. C-11 FOR ASSEMBLY BREAKDOWN).....	1
					UOC:M96	
11	PAFZZ	5340-01-436-6423	19206	11580008	DISK,SOLID,PLAIN.....	1
					UOC:M96	
12	PAFZZ	5365-00-804-3892	96906	MS16625-1331	RING,RETAINING.....	1
					UOC:M96	
13	PAFZZ	5340-00-754-0847	96906	MS21209-C4-15	INSERT,SCREW THREADED .....	7
					UOC:M96	
14	PAFZZ	5315-00-881-2705	96906	MS9245-27	PIN,COTTER,SPLIT.....	2
					UOC:M96	
15	PAFZZ	1015-01-443-9345	19206	11580028	FLANGE,SERRATED .....	1
					UOC:M96	
16	PAFZZ	5340-01-436-3676	19206	11580027	LEVER,LOCK RELEASE .....	1
					UOC:M96	
17	PAFZZ	5315-01-437-9123	19206	11580014	PIN,STRAIGHT,HEADLESS .....	1
					UOC:M96	
18	PAFZZ	5360-01-436-6424	19206	11580009	SPRING,HELICAL,TORSION .....	1
					UOC:M96	
19	PAFZZ	5331-00-297-9990	06845	A28642	O-RING .....	1
					UOC:M96	
20	XAFZZ		19206	11580032	LEG,ELEVATING .....	1
					UOC:M96	

## SECTION II.

ARMY TM 9-1015-249-23&P C03  
MARINE CORPS TM 09922A-23&P/2A

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
21	PAFZZ	5365-01-436-3679	19206	11580011	SPACER,RING ..... UOC:M96	1
22	PAFZZ	5315-01-449-8094	96906	MS16562-114	PIN, SPRING ..... UOC:M96	1
23	PAFZZ	5315-01-436-7626	19206	11580025	PIN,STRAIGHT,HEADLESS ..... UOC:M96	1
24	PAFZZ	5340-01-436-3673	19206	11580023	HANDLE,CRANK..... UOC:M96	1
25	PAFZZ	5360-01-436-7623	19206	11580024	SPRING,FLAT ..... UOC:M96	1
26	PAFZZ	5340-01-437-4190	19206	11580026	HANDWHEEL..... UOC:M96	1
27	PAFZZ	5340-01-436-3674	19206	11580065	CAP-PLUG,PROTECTIVE ..... UOC:M96	1
28	PAFZZ	5330-01-437-6230	19206	11580010	GASKET ..... UOC:M96	V
29	PAFZZ	3020-01-436-3678	19206	11580015	GEAR,BEVEL..... UOC:M96	1
30	PAFZZ	5310-00-226-3929	96906	MS35691-1226	NUT,PLAIN HEXAGON ..... UOC:M96	1
31	PAFZZ	5310-01-449-1058	96906	MS9582-17	WASHER,KEY..... UOC:M96	1

END OF FIGURE



SECTION II.

ARMY TM 9-1015-249-23&P  
AIR FORCE TO 11W2-5-21-2  
MARINE CORPS TM 09922A-23&P/2A

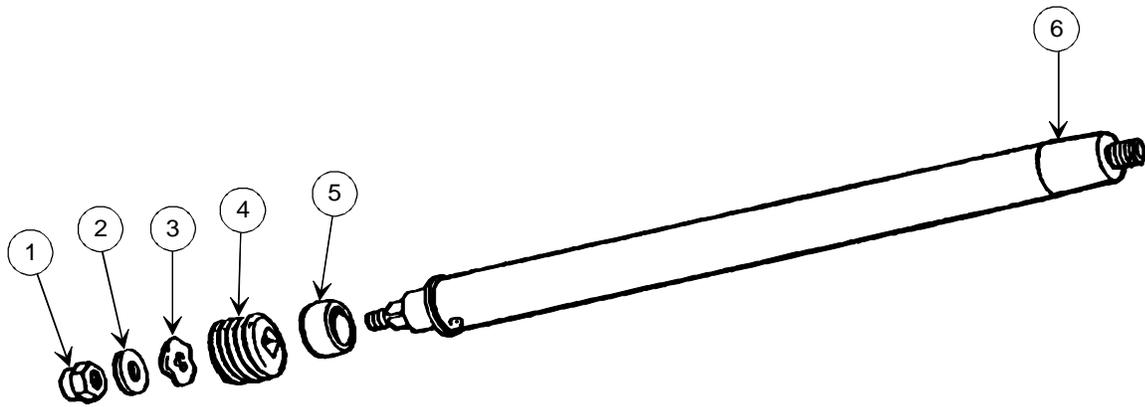


Figure C-11. Elevating Screw Assembly.

SECTION II.

ARMY TM 9-1015-249-23&P  
 AIR FORCE TO 11W2-5-21-2  
 MARINE CORPS TM 09922A-23&P/2A

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
					FIGURE C-11 GROUP 01020601 ELEVATING SCREW ASSEMBLY 11580002	
1	PAFZZ	5310-00-241-6640	96906	MS16228-6C	NUT, SELF-LOCKING, HEXAGON .....	1
					UOC:M96	
2	PAFZZ	5310-00-080-6004	96906	MS27183-14	WASHER, FLAT .....	1
					UOC:M96	
3	PAFZZ	5310-00-616-6354	96906	MS35335-38	WASHER, LOCK .....	1
					UOC:M96	
4	PAFZZ	3020-01-436-6427	19206	11580000	GEAR, SPUR .....	1
					UOC:M96	
5	PAFZZ	3120-01-436-6428	19206	11580001	ROLLER, LINEAR-ROTOR .....	1
					UOC:M96	
6	XAFZZ		19206	11579999	TUBE, ELEVATING .....	1
					UOC:M96	

END OF FIGURE

SECTION II.

ARMY TM 9-1015-249-23&P  
AIR FORCE TO 11W2-5-21-2  
MARINE CORPS TM 09922A-23&P/2A

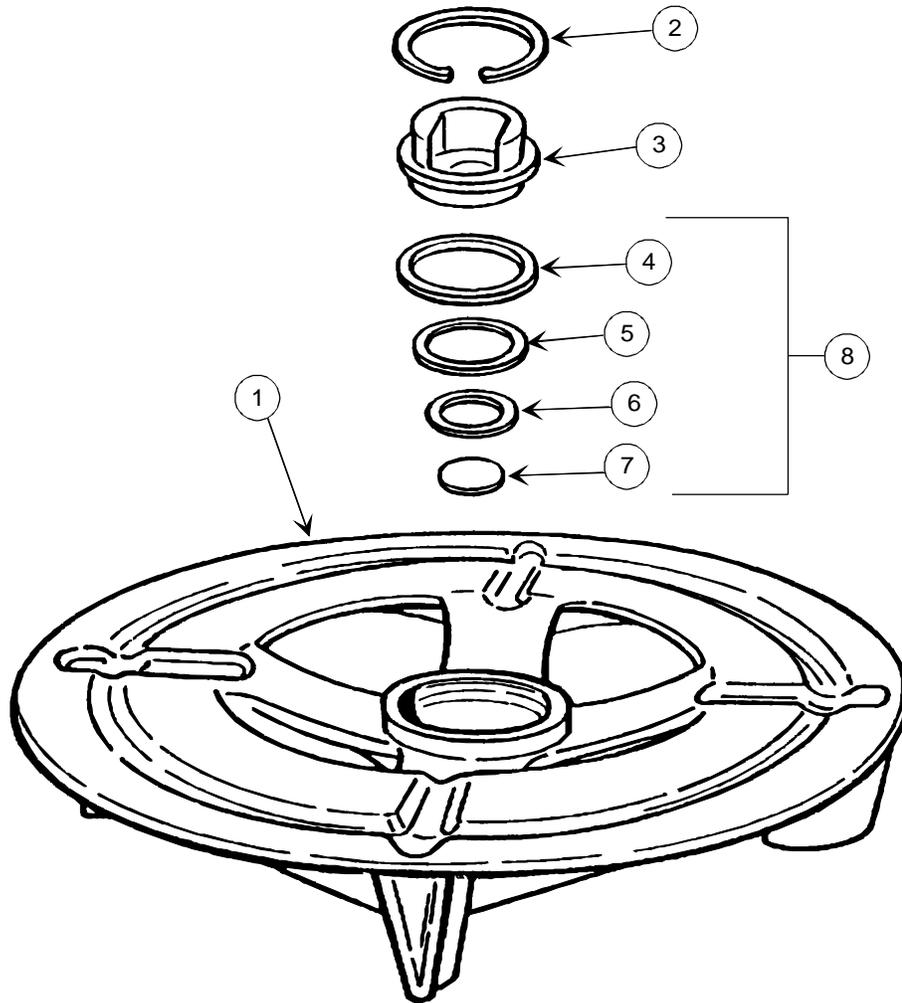


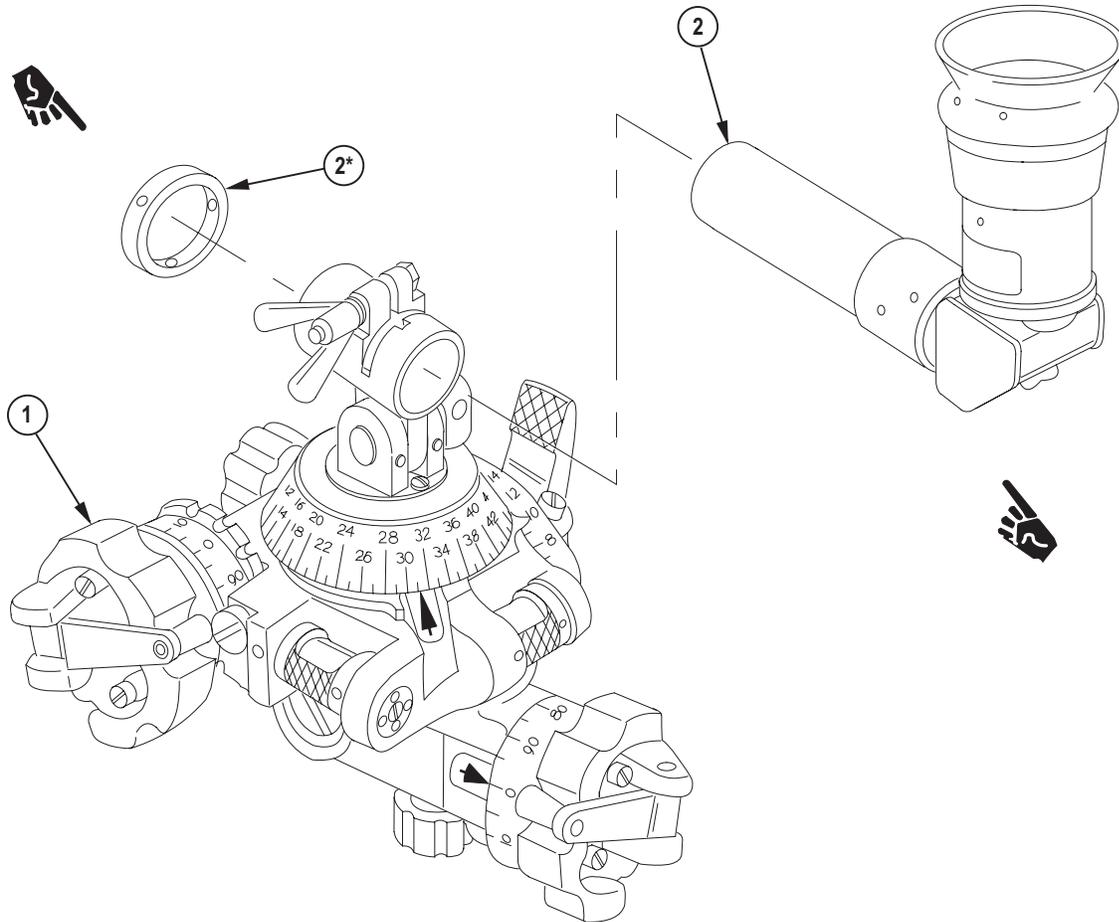
Figure C-12. M3A1 Mortar Baseplate.

## SECTION II.

ARMY TM 9-1015-249-23&P  
AIR FORCE TO 11W2-5-21-2  
MARINE CORPS TM 09922A-23&P/2A

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
					FIGURE C-12 GROUP 02 M3A1 MORTAR BASEPLATE 11579870	
1	XAOZZ		19206	11579871	BODY,BASEPLATE .....	1
					UOC:M96	
2	PAOZZ	5365-00-576-2499	19207	7309124	RING,RETAINING.....	1
					UOC:M96	
3	PAOZZ	1015-00-923-4257	19206	7309125	SOCKET,BASEPLATE.....	1
					UOC:M96	
4	KFOZZ		19204	11578758	RING: PART OF KIT PART OF KIT P/N 11578762 .....	1
					UOC:M96	
5	KFOZZ		19204	11578759	RING: PART OF KIT PART OF KIT P/N 11578762 .....	1
					UOC:M96	
6	KFOZZ		19204	11578760	RING: PART OF KIT PART OF KIT P/N 11578762 .....	1
					UOC:M96	
7	KFOZZ		19204	11578761	PAD: PART OF KIT PART OF KIT P/N 11578762 .....	1
					UOC:M96	
8	PAOZZ	1015-00-340-1179	19206	11578762	PARTS KIT,MORTAR BASEPLATE .....	V
					PAD: PART OF KIT (1) 12-7	
					RING: PART OF KIT (1) 12-6	
					RING: PART OF KIT (1) 12-5	
					RING: PART OF KIT (1) 12-4	

END OF FIGURE



\*Supplied with identically numbered item.

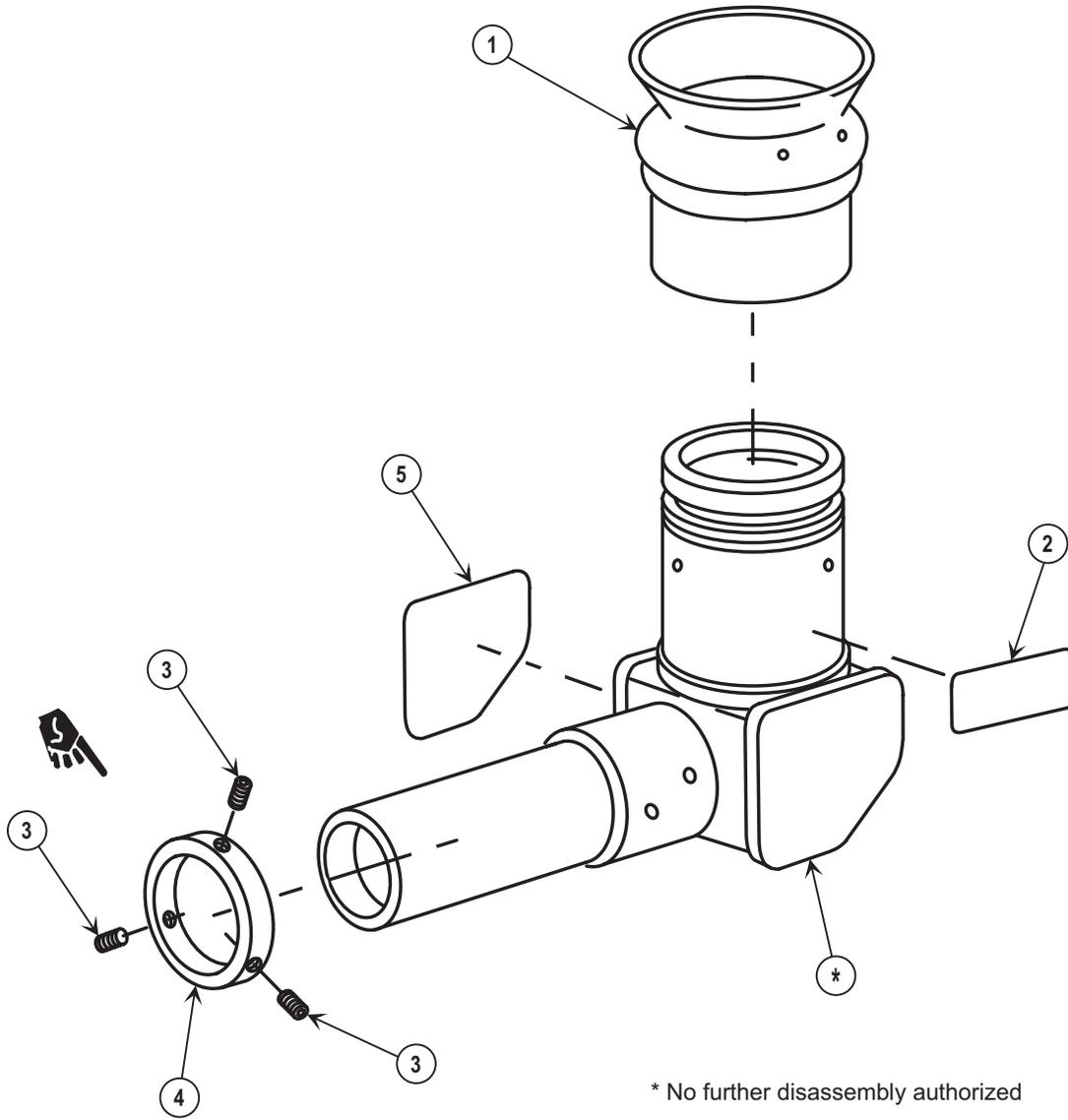
Figure C-13. M67 Sight Unit.

SECTION II.

ARMY TM 9-1015-249-23&P C03  
MARINE CORPS TM 09922A-23&P/2A

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
					FIGURE C-13 GROUP 03 M67 SIGHT UNIT 9356182	
1	PCODA	6650-01-340-6082	19200	9356166	MOUNT,TELESCOPE..... UOC:M96	1
2	PCODA	6650-01-341-5195	19200	9356181	TELESCOPE,ELBOW (SEE FIG. C-14 FOR ASSEMBLY BREAKDOWN) ..... UOC:M96	1

END OF FIGURE



\* No further disassembly authorized

Figure C-14. Elbow Telescope.

## SECTION II.

ARMY TM 9-1015-249-23&P C02  
 AIR FORCE TO 11W2-5-21-2  
 MARINE CORPS TM 09922A-23&P/2A

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
					FIGURE C-14 GROUP 0301 ELBOW TELESCOPE 9356181	
*1	PAOZZ	1240-00-892-5517	19200	8588791	EYESHIELD,OPTICAL..... UOC:M96	1
*2	PAOZZ	9905-00-257-2746	19200	11731011	DECAL,INSTRUCTION..... UOC:M96	1
*3	PAOZZ	5305-00-716-8035	96906	MS51974-1	SETSCREW..... UOC:M96	3
*4	PAOZZ	3040-00-520-6438	19200	5206438	COLLAR,SHAFT..... UOC:M96	1
*5	PAOZZ	9905-01-341-4963	19206	9356145	PLATE,IDENTIFICATION..... UOC:M96	1

END OF FIGURE

**SECTION III. SPECIAL TOOLS LIST**

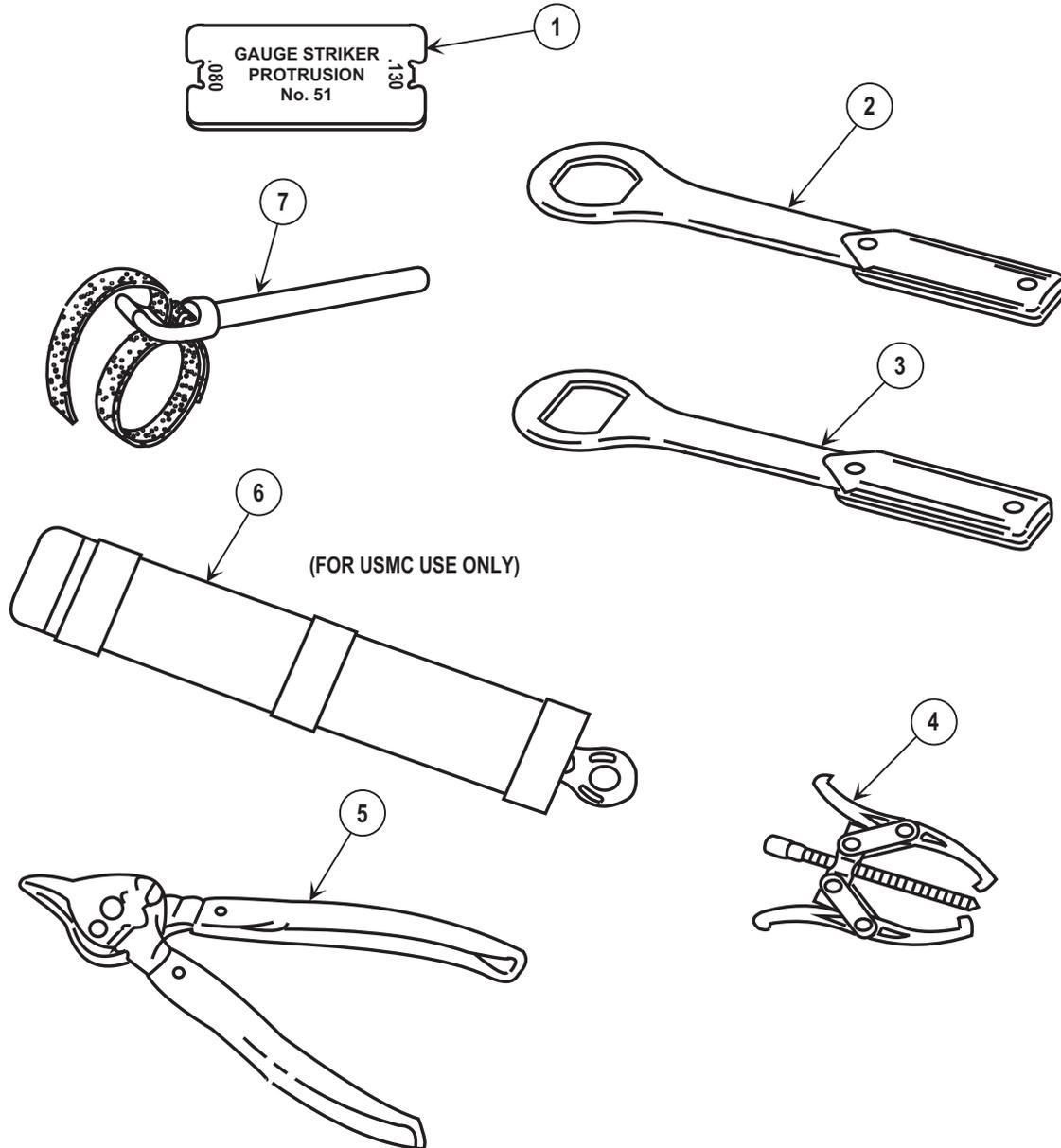


Figure C-15. Special Tools.

## SECTION III.

ARMY TM 9-1015-249-23&P C03  
MARINE CORPS TM 09922A-23&P/2A

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
					FIGURE C-15 GROUP 9500 SPECIAL TOOLS	
1	PAOZZ	5220-01-441-4158	19206	11580237	GAUGE,PROFILE .....	
					UOC:M96	
2	PAOZZ	5120-01-442-2312	19206	11580256	WRENCH,BOX (PLUG).....	
					UOC:M96	
3	PAOZZ	5120-01-442-2309	19206	11580259	WRENCH,BOX (BARREL) .....	
					UOC:M96	
4	PAOZZ	5120-00-293-2925	80244	PD5120-00-293- 2925	PULLER,MECHANICAL .....	
					UOC:M96	
5	PAOZZ	5120-00-789-0492	05047	B107.19	PLIERS SET,RETAINING,G-RING .....	
					UOC:M96	
6	PAOZZ	5220-01-343-2225	19206	11580040	GAUGE, BORE STRAIGHTNESS (USMC ONLY).....	
					UOC:M96	
7	PAOZZ	5120-00-262-8491	19207	5576345	WRENCH,PIPE,STRAP .....	2
					UOC:M96	

END OF FIGURE



## CROSS-REFERENCE INDEXES

## NATIONAL STOCK NUMBER INDEX

STOCK NUMBER	FIG.	ITEM	STOCK NUMBER	FIG.	ITEM
5315-00-058-9756	6	5	1015-01-211-4045	4	19
5310-00-061-4650	5	10	1015-01-236-0389	1	3
5315-00-067-7499	5	7	5310-01-325-8982	5	16
5305-00-068-0501	10	5	6650-01-340-6082	13	1
5310-00-080-6004	11	2	9905-01-341-4963	14	5
5305-00-225-3842	5	4	6650-01-341-5195	13	2
5310-00-226-3929	10	30	5220-01-343-2225	15	6
5315-00-234-1854	4	10	1015-01-414-6269	4	13
5315-00-234-1864	4	8	1015-01-414-7493	4	3
5310-00-241-6640	11	1	5320-01-429-8509	9	3
5310-00-245-8826	10	3	5340-01-432-8541	9	2
9905-00-257-2746	14	2	5340-01-436-3673	6	11
5120-00-262-8491	15	7		10	24
5305-00-273-5004	6	3	5340-01-436-3674	10	27
5120-00-293-2925	15	4	5340-01-436-3675	8	12
5331-00-297-9990	10	19	5340-01-436-3676	10	16
1015-00-340-1179	12	8	5340-01-436-3677	8	11
3040-00-520-6438	14	4	3020-01-436-3678	10	29
5365-00-576-2499	12	2	5365-01-436-3679	10	21
5330-00-579-7911	10	2	5340-01-436-6423	10	11
5330-00-579-7916	8	14	5360-01-436-6424	10	18
5310-00-585-3243	10	4	1015-01-436-6425	10	10
5310-00-616-6354	11	3	5340-01-436-6426	10	1
5305-00-716-8035	14	3	3020-01-436-6427	11	4
5325-00-754-0847	6	2	3120-01-436-6428	11	5
	10	13	5360-01-436-7623	6	10
5120-00-789-0492	15	5		8	6
5365-00-804-3892	10	12		10	25
5310-00-809-4058	10	6	5315-01-436-7624	4	17
5315-00-837-4545	6	15		8	2
5310-00-842-1488	4	11	5310-01-436-7625	8	4
5315-00-881-2705	6	13	5315-01-436-7626	6	12
	8	10		8	8
	10	14		10	23
1240-00-892-5517	14	1	3040-01-436-7627	10	8
1015-00-923-4257	12	3	5306-01-436-7629	8	3
5310-00-969-4466	5	11	5340-01-436-7630	8	7
5325-01-046-3670	5	1	5330-01-436-7631	10	7
5305-01-052-3714	4	20	5365-01-436-7632	10	9
1240-01-201-8299	13	1	3040-01-437-1082	8	13
1240-01-211-3608	13	2	3010-01-437-1083	4	14

**CROSS-REFERENCE INDEXES****NATIONAL STOCK NUMBER INDEX**

<b>STOCK NUMBER</b>	<b>FIG.</b>	<b>ITEM</b>	<b>STOCK NUMBER</b>	<b>FIG.</b>	<b>ITEM</b>
5340-01-437-1085	9	1	5310-01-441-7385	4	7
5340-01-437-4190	6	9	3460-01-442-0159	3.1	8
	8	5	3120-01-442-2307	3	4
	10	26		3.1	4
5330-01-437-6230	10	28	3120-01-442-2308	6	22
5315-01-437-9123	10	17	5120-01-442-2309	15	3
5310-01-439-9537	4	16	5325-01-442-2310	4	18
5310-01-439-9538	6	17	5120-01-442-2312	15	2
5310-01-439-9540	7	2	1015-01-442-3231	5	5
5360-01-439-9872	5	21	1015-01-442-3232	5	22
5360-01-440-2129	7	5	3120-01-442-6041	5	15
5360-01-440-2130	5	6	3110-01-442-8170	5	3
5360-01-440-2131	5	20	5330-01-443-0247	6	7
1015-01-440-5935	2	1	1015-01-443-8387	4	5
1015-01-440-5937	4	9	1015-01-443-9345	10	15
1015-01-441-1620	6	1	1015-01-443-9346	7	7
5306-01-441-1622	4	15	1015-01-443-9348	7	1
5365-01-441-2487	6	19	1015-01-443-9349	7	3
5310-01-441-3116	6	20	1015-01-443-9351	4	4
5310-01-441-3117	6	16	1015-01-443-9352	5	19
5306-01-441-4147	5	12	1015-01-444-4221	5	17
5305-01-441-4148	5	13	1015-01-444-4222	3.1	5
5310-01-441-4149	3.1	6	1015-01-444-4230	4	6
5310-01-441-4151	4	2	1015-01-444-4231	5	14
5365-01-441-4152	4	1	1015-01-444-5525	7	6
5355-01-441-4153	4	12	1015-01-444-5527	7	4
3040-01-441-4154	6	6	5310-01-449-1058	10	31
5305-01-441-4155	6	4	5315-01-449-8094	6	14
3120-01-441-4156	6	23		8	9
5340-01-441-4157	5	23		10	22
5220-01-441-4158	15	1	1015-01-444-4222	3	5
1015-01-441-4160	3	2	1015-01-470-4101	5	9
	3.1	2	5365-01-472-9154	6	18
5325-01-441-4162	3.1	7	5310-01-500-3209	5	18
1015-01-441-5495	6	8	1015-01-521-1612	2	2
5315-01-441-5500	5	8	1015-01-528-2773	2	1
5315-01-441-5501	5	24			
1015-01-441-5502	3	3			
	3.1	3			

## CROSS-REFERENCE INDEXES

## PART NUMBER INDEX

PART NUMBER	FIG.	ITEM	PART NUMBER	FIG.	ITEM
A28642	10	19	PD5120-00-293-2925	15	4
B107.19	15	5	11578758	12	4
B1821BH025-C113N	5	4	11578759	12	5
M45913/3-4CG8C	5	10	11578760	12	6
M45913/3-6CG8Z	5	18	11578761	12	7
M70344/1-34C1	6	18	11578762	12	8
MS16228-6C	11	1	11579870	1	3
MS16228-10C	10	3	11579871	12	1
MS16562-16	5	7	11579910	5	21
MS16562-29	6	15	11579911	4	16
MS16562-114	6	14	11579912	4	2
	8	9	11579913	4	1
	10	22	11579914	4	15
MS16562-227	6	5	11579915	4	18
MS16625-1331	10	12	11579916	4	6
MS16228-10C	10	3	11579917	4	7
MS19059-508	5	3	11579920	4	12
MS21209-C4-15	10	13	11579922	7	7
MS21209C4-15	6	2	11579923	7	4
MS24665-153	4	10	11579924	7	6
MS24665-302	4	8	11579925	7	1
MS24677-33	6	3	11579926	7	3
MS27183-10	10	6	11579927	7	2
MS27183-14	11	2	11579928	7	5
MS28775-115	8	14	11579929	4	4
MS28775-215	10	2	11579935	9	4
MS31217-1050	5	1	11579939	9	1
MS35335-38	11	3	11579940	4	9
MS35691-1226	10	30	11579943	5	13
MS35692-21	4	11	11579944	5	16
MS51031-111	4	20	11579945	5	19
MS51974-1	14	3	11579946	5	6
MS90725-5	10	5	11579947	5	8
MS9245-27	6	13	11579949	5	24
	8	10	11579950	5	20
	10	14	11579951	5	22
MS9276-10	5	11	11579952	5	15
MS9320-16	10	4	11579953	5	5
MS9403-172	9	3	11579954	5	17
MS9582-17	10	31	11579955	5	12

**CROSS-REFERENCE INDEXES****PART NUMBER INDEX**

<b>PART NUMBER</b>	<b>FIG.</b>	<b>ITEM</b>	<b>PART NUMBER</b>	<b>FIG.</b>	<b>ITEM</b>
11579956	5	14	11580024	6	10
11579960	5	23		8	6
11579961	5	9		10	25
11579962	5	2	11580025	6	12
11579963	4	5		8	8
11579967	6	20		10	23
11579968	6	16	11580026	6	9
11579969	6	17		8	5
11579970	6	19		10	26
11579971	6	23	11580027	10	16
11579972	6	22	11580028	10	15
11579973	6	4	11580032	10	20
11579976	6	8	11580034	4	13
11579977	6	6	11580035	2	2
11579978	6	1	11580036	8	4
11579979	6	21	11580037	3	2
11579980	4	3		3.1	2
11579984	8	7	11580038	3.1	7
11579985	8	11	11580039	3.1	6
11579986	8	3	11580040	15	6
11579987	8	13	11580041	3.1	8
11579988	8	12	11580043	3.1	9
11579989	8	1	11580044	3	4
11579990	4	14		3.1	4
11579999	11	6	11580045	3	3
11580000	11	4		3.1	3
11580001	11	5	11580047	3.1	1
11580002	10	10	11580048	2	1
11580007	10	8	11580050	1	2
11580008	10	11	11580051	3.1	5
11580009	10	18	11580062	4	17
11580010	10	28	11580064	6	7
11580011	10	21	11580065	10	27
11580012	10	9	11580237	15	1
11580013	10	7	11580256	15	2
11580014	10	17	11580259	15	3
11580015	10	29	11580661	9	2
11580019	10	1	11731011	14	2
11580023	6	11	12901300	2	1
	10	24	12901301	3	1

**CROSS-REFERENCE INDEXES****PART NUMBER INDEX**

<b>PART NUMBER</b>	<b>FIG.</b>	<b>ITEM</b>
5206438	14	4
5576345	15	7
7309124	12	2
7309125	12	3
8588791	14	1
9356145	14	5
9356166	13	1
9356181	13	2
9356182	1	1
9362653	4	19



## APPENDIX D

### EXPENDABLE AND DURABLE ITEMS LIST

#### Section I. INTRODUCTION

D-1. SCOPE. This appendix lists expendable and durable items you will need to operate and maintain the mortar. This listing is for informational purposes only and is not authority to requisition the listed items. These items are authorized to you by CTA 50-970, Expandable/Durable Items (Except Medical, Class V, Repair Parts, and Heraldic Items), or CTA 8-100, Army Medical Department Expendable/Durable Items.

D-2. EXPLANATION OF COLUMNS.

a. Column (1) - Item Number. This number is assigned to the entry in the listing and is referenced in the narrative instructions to identify the material (e.g., "Use cleaning compound (item 12, app D)").

b. Column (2) - Level. This column identifies the lowest level of maintenance that requires the listed item.

C - Operator/Crew  
O - Unit Maintenance

c. Column (3) - National Stock Number. This is the National stock number assigned to the item; use it to request or requisition the item.

d. Column (4) - Description. Indicates the Federal item name and, if required, a description to identify the item. The last line for each item indicates the Contractor and Government Entity Code (CAGEC) in parentheses followed by the part number.

e. Column (5) - Unit of Measure (U/M). This measure is expressed by a two-character alphabetical abbreviation (e.g., ea, in., pr). If the unit of measure differs from the unit of issue, requisition the lowest unit of issue that will satisfy your requirements.

#### Section II. EXPENDABLE AND DURABLE ITEMS LIST

(1) ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION	(5) U/M
1	C	6810-00-201-0906	ALCOHOL, DENATURED (19203) 837015	PT
2	F	8030-00-251-3980	ANTISEIZE COMPOUND (81349) MIL-A-907	CN

**Section II. EXPENDABLE AND DURABLE ITEMS LIST (CONT)**

(1) ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION	(5) U/M
3	C	8105-00-269-4662	BAG, PLASTIC (81349) MIL-B-1117 pkg of 100	EA
4	C	7920-00-205-2401	BRUSH, CLEANING TOOL (80244) 7920-00-205-2401	EA
5	C	8020-00-242-7266	BRUSH, PAINT (58536) A-A-3192	EA
6	C		CLEANING COMPOUND, OPTICAL LENS: liquid (58536) AA59199-1 1 qt bottle 2 oz bottle	QT OZ
7	C	6850-00-227-1887 6850-00-392-9751	CLEANER COMPOUND, RIFLE BORE (RBC): solution type (81349) MIL-PRF-372 8 oz can 1 gal can	OZ GL
7.1	C	9150-01-193-6376	CLEANER, LUBRICANT, PRESERVATIVE (27412) CLP-9	CN
8	C	5350-00-221-0872	CLOTH, ABRASIVE: crocus (80204) ANSI B74.18 50 sheet package	SH
9	O	8315-00-300-4905	CUSHIONING MATERIAL (81348) PPP-C-1797	FT
10	C	6850-00-281-1985	DRY CLEANING SOLVENT (SD) (58536) A-A-59601 1 gal can	GL
11	C	8415-00-266-8675	GLOVES, CHEMICAL AND SOLVENT RESISTANT (TYPE 3) (81349) MIL-DTL-32066	PR
12	O	9150-01-228-3389	GREASE, AIRCRAFT (GA) (1NUW7) 11581022	TU

**Section II. EXPENDABLE AND DURABLE ITEMS LIST (CONT)**

(1) ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION	(5) U/M
13	C	9905-00-257-2746	INSTRUCTION DECAL (19200) 11731011	EA
14	C	8010-01-331-6108	LACQUER, BLACK (58536) AA2787-1-16OZ-37038	PT
15	O	9150-01-360-1906	LUBRICANT, SOLID FILM (81349) MIL-L-46147 Type II, 16 oz black	EA
16	C	9150-00-231 -2361	LUBRICATING OIL, GENERAL PURPOSE (81349) M3150-02-PL-M 1 gal can	GL
17	C	9150-00-292-9689	LUBRICATING OIL, WEAPONS (LAW) (81349) MIL-PRF-14107 1 qt can	QT
18	C	6640-00-240-5851	PAPER, LENS: tissue, sheet form (25518) NSN6640-00-240-5	EA
19	O	8135-00-985-7242	PAPER, VOLATILE, PACKAGING (81349) MIL-P-3420 36 in. wide, 100 ft roll	FT
20	O	8135-00-281-3920	PAPERBOARD, WRAPPING (81349) PPP-P-291 24 in. wide, 250 ft long	FT
21	O	8010-01-229-7546	POLYURETHANE COATING, GREEN (81349) M53039-1-001Q-34 1 qt can	QT
22	C	7920-00-205-1711	RAG, WIPING (64067) 7920-00-205-1711 50 lb bale	LB
23	F	8030-00-081-2333	SEALING COMPOUND (81346) ASTM D5363	CO

**Section II. EXPENDABLE AND DURABLE ITEMS LIST (CONT)**

(1) ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION	(5) U/M
24	O	7510-00-297-6655	TAPE, PRESSURE SENSITIVE ADHESIVE: paperback, water resistant (81346) ASTM D5486/D5486M 2 in. wide x 120 yd roll	YD
25	O	7510-00-266-6712	TAPE, PRESSURE SENSITIVE ADHESIVE (19203) 8783476 1 in. wide x 60 yd roll	YD
26	C	8010-00-160-5791	THINNER, SYNTHETIC RESIN ENAMEL (81349) M81772-1-001G 1 pt can	PT

APPENDIX E

ILLUSTRATED LIST OF MANUFACTURED ITEMS

This appendix includes complete instructions for making items authorized to be fabricated at unit and direct support maintenance. All bulk materials needed for manufacture of an item are listed by NSN or specification number.

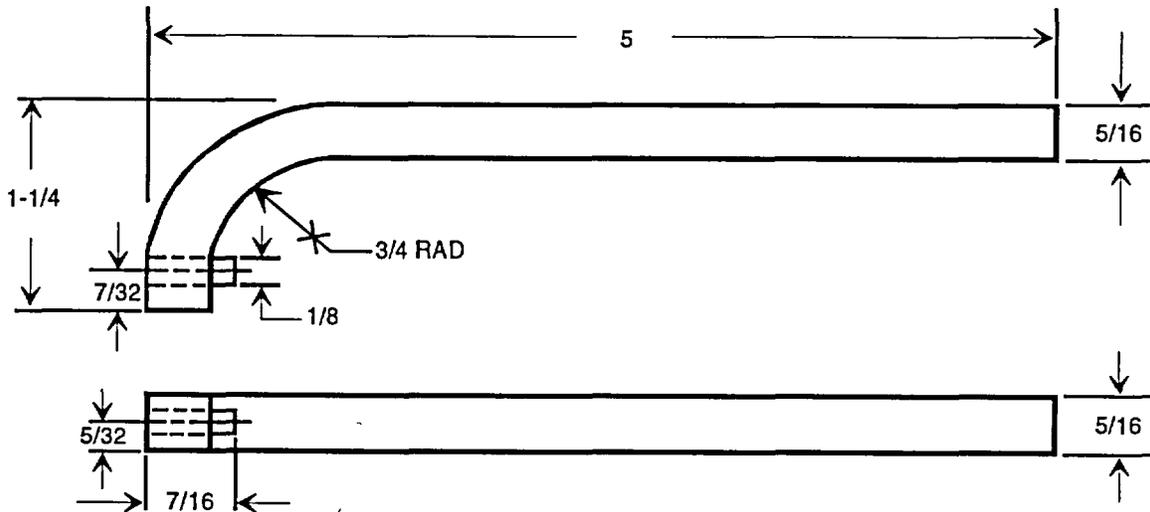


Figure E-1. Fabricated Spanner Wrench

NOTES:

1. Cut a 6 inch length of 5/16 inch bar stock (NSN 9505-00-528-45 86, MIL-S-6758).
2. Bend one end of bar stock to obtain a 3/4-inch radius.
3. Cut a pin 7/16 inch long from 1/8 inch round stock (NSN 9505-00-227-4815, ASTMA 108).
4. Drill a hole through the 5/16 inch bar stock and press in the pin.
5. All dimensions are in inches.
6. Break all sharp edges and deburr the hole.



**APPENDIX F**  
**TORQUE LIMITS**

This appendix includes a list of torque values that may be used with the M252 81-mm Mortar.

THREAD SIZE	WIDTH ACROSS FLATS	TORQUE	
		FT-LB (FOOT-POUNDS)	N-M (NEWTON-METERS)
1/4-20 UNC	7/16	6	8.10
1/4-28 UNF	7/16	7	9.45
5/16-18 UNC	1/2	13	17.55
5/16-24 UNF	1/2	14	18.90
3/8-16 UNC	9/16	23	31.05
3/8-24 UNF	9/16	26	35.10
7/16-14 UNC	5/8	37	49.95
7/16-20 UNF	5/8	41	55.35
1/2-13 UNC	3/4	57	76.95
1/2-20 UNF	3/4	64	86.40
9/16-12 UNC	13/16	82	110.70
9/16-18 UNF	13/16	91	122.85
5/8-11 UNC	15/16	111	149.85
5/8-18 UNF	15/16	128	172.80
3/4-10 UNC	1-1/8	200	270.00
3/4-16 UNF	1-1/8	223	301.05
7/8-9 UNC	1-5/16	315	425.25
7/8-14 UNF	1-5/16	340	459.00
1-8 UNC	1-1/2	400	540.00
1-12 UNF	1-1/2	460	621.00



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By Order of the Secretary of the Army:

DENNIS J. REIMER  
*General, United States Army*  
*Chief of Staff*

Official:

JOEL B. HUDSON  
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*Secretary of the Army*  
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ITEM NO.	PAGE NO.	PARA-GRAPH	LINE NO. *	FIGURE NO.	TABLE NO.	RECOMMENDED CHANGES AND REASON <i>(Provide exact wording of recommended changes, if possible).</i>
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20	3-12			13		<p>Change sentence to read "Remove 12 spring tension washers (20)...".</p> <div style="text-align: center; font-size: 4em; font-weight: bold; transform: rotate(-15deg); opacity: 0.5;">       SAMPLE     </div>
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PAGE NO.	COLM NO.	LINE NO.	NATIONAL STOCK NUMBER	REFERENCE NO.	FIGURE NO.	ITEM NO.	TOTAL NO. OF MAJOR ITEMS SUPPORTED	RECOMMENDED ACTION

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## THE METRIC SYSTEM AND EQUIVALENTS

### LINEAR MEASURE

1 Centimeter = 10 Millimeters = 0.01 Meter = 0.3937 Inch  
 1 Decimeter = 10 Centimeters = 3.94 Inches  
 1 Meter = 10 Decimeters = 100 Centimeters  
           = 1000 Millimeters = 39.37 Inches  
 1 Dekameter = 10 Meters = 32.8 Feet  
 1 Hectometer = 10 Dekameters = 328.08 Feet  
 1 Kilometer = 10 Hectometers = 1000 Meters  
               = 0.621 Mile = 3,280.8 Feet  
 Millimeters = Inches times 25.4  
 Inches = Millimeters divided by 25.4

### WEIGHTS

1 Centigram = 10 Milligrams = 0.154 Grain  
 1 Decigram = 10 Centigrams = 1.543 Grains  
 1 Gram = 0.001 Kilogram = 10 Decigrams  
           = 1000 Milligrams = 0.035 Ounce  
 1 Dekagram = 10 Grams = 0.353 Ounce  
 1 Hectogram = 10 Dekagrams = 3.527 Ounces  
 1 Kilogram = 10 Hectograms = 1000 Grams = 2.205 Pounds  
 1 Quintal = 100 Kilograms = 220.46 Pounds  
 1 Metric Ton = 10 Quintals = 1000 Kilograms = 1.102 Short Tons

### LIQUID MEASURE

1 Milliliter = 0.001 Liter = 0.034 Fluid Ounce  
 1 Centiliter = 10 Milliliters = 0.34 Fluid Ounce  
 1 Deciliter = 10 Centiliters = 3.38 Fluid Ounces  
 1 Liter = 10 Deciliters = 1000 Milliliters = 33.82 Fluid Ounces  
 1 Dekaliter = 10 Liters = 2.64 Gallons  
 1 Hectoliter = 10 Dekaliters = 26.42 Gallons  
 1 Kiloliter = 10 Hectoliters = 264.18 Gallons

### SQUARE MEASURE

1 Sq Centimeter = 100 Sq Millimeters = 0.155 Sq Inch  
 1 Sq Decimeter = 100 Sq Centimeters = 15.5 Sq Inches  
 1 Sq Meter (Centare) = 100 Sq Decimeters  
                           = 10,000 Sq Centimeters = 10.764 Sq Feet  
 1 Sq Dekameter (Are) = 100 Sq Meters = 1,076.4 Sq Feet  
 1 Sq Hectometer (Hectare) = 100 Sq Dekameters = 2.471 Acres  
 1 Sq Kilometer = 100 Sq Hectometers = 1,000,000 Sq Meters  
                           = 0.386 Sq Mile

### CUBIC MEASURE

1 Cu Centimeter = 1000 Cu Millimeters = 0.061 Cu Inch  
 1 Cu Decimeter = 1000 Cu Centimeters = 61.02 Cu Inches  
 1 Cu Meter = 1000 Cu Decimeters = 1,000,000 Cu Centimeters  
                           = 35.31 Cu Feet

### TEMPERATURE

$5/9 (°F - 32°) = °C$   
 $(9/5 \times °C) 32° = °F$   
 -35° Fahrenheit is equivalent to -37° Celsius  
 0° Fahrenheit is equivalent to -18° Celsius  
 32° Fahrenheit is equivalent to 0° Celsius  
 90° Fahrenheit is equivalent to 32.2° Celsius  
 100° Fahrenheit is equivalent to 38° Celsius  
 212° Fahrenheit is equivalent to 100° Celsius

## APPROXIMATE CONVERSION FACTORS

<u>TO CHANGE</u>	<u>TO</u>	<u>MULTIPLY BY</u>
Inches .....	Centimeters .....	2.540
Feet .....	Meters .....	0.305
Yards .....	Meters .....	0.914
Miles .....	Kilometers .....	1.609
Square Inches .....	Square Centimeters .....	6.452
Square Feet .....	Square Meters .....	0.093
Square Yards .....	Square Meters .....	0.836
Square Miles .....	Square Kilometers .....	2.590
Acres .....	Square Hectometers .....	0.405
Cubic Feet .....	Cubic Meters .....	0.028
Cubic Yards .....	Cubic Meters .....	0.765
Fluid Ounces .....	Milliliters .....	29.574
Pints .....	Liters .....	0.473
Quarts .....	Liters .....	0.946
Gallons .....	Liters .....	3.785
Ounces .....	Grams .....	28.350
Pounds .....	Kilograms .....	0.454
Short Tons .....	Metric Tons .....	0.907
Pound-Feet .....	Newton-Meters .....	1.356
Pounds-Inches .....	Newton-Meters .....	0.11298
Pounds per Square Inch .....	Kilopascals .....	6.895
Ounce-Inches .....	Newton-Meters .....	0.007062
Miles per Gallon .....	Kilometers per Liter .....	0.425
Miles per Hour .....	Kilometers per Hour .....	1.609
Centimeters .....	Inches .....	0.394

<u>TO CHANGE</u>	<u>TO</u>	<u>MULTIPLY BY</u>
Meters .....	Feet .....	3.281
Meters .....	Yards .....	1.094
Kilometers .....	Miles .....	0.621
Square Centimeters .....	Square Inches .....	0.155
Square Meters .....	Square Feet .....	10.764
Square Meters .....	Square Yards .....	1.196
Square Kilometers .....	Square Miles .....	0.386
Square Hectometers .....	Acres .....	2.471
Cubic Meters .....	Cubic Feet .....	35.315
Cubic Meters .....	Cubic Yards .....	1.308
Milliliters .....	Fluid Ounces .....	0.034
Liters .....	Pints .....	2.113
Liters .....	Quarts .....	1.057
Liters .....	Gallons .....	0.264
Grams .....	Ounces .....	0.035
Kilograms .....	Pounds .....	2.205
Metric Tons .....	Short Tons .....	1.102
Newton-Meters .....	Pound-Feet .....	0.738
Kilopascals .....	Pounds per Square Inch .....	0.145
Kilometers per Liter .....	Miles per Gallon .....	2.352
Kilometers per Hour .....	Miles per Hour .....	0.621
°Fahrenheit .....	°Celsius .....	$(°F-32) \times 5/9$
°Celsius .....	°Fahrenheit .....	$°F = (9/5 \times °C) + 32$

