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# TM 9-1311

## WAR DEPARTMENT TECHNICAL MANUAL

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### ORDNANCE MAINTENANCE

# 75-MM GUN M4 AND AIRPLANE MOUNT M6

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WAR DEPARTMENT

17 NOVEMBER 1943

### FOR ORDNANCE PERSONNEL ONLY

### UNCLASSIFIED

ORDNANCE MAINTENANCE

75-MM GUN M4 AND  
AIRPLANE MOUNT M6



WAR DEPARTMENT

17 NOVEMBER 1943

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**WAR DEPARTMENT**  
Washington 25, D. C., 17 November 1943

TM 9-1311, Ordnance Maintenance: 75-mm Gun M4 and Airplane Mount M6, is published for the information and guidance of all concerned.

[ A.G. 300.7 (6 October 1943)  
O.O. 461/47959 O.O. (17 November 1943) ]

**BY ORDER OF THE SECRETARY OF WAR:**

**G. C. MARSHALL,**  
*Chief of Staff.*

**OFFICIAL:**

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

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

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\*This Technical Manual supersedes that part of TB 1240-3, dated 15 October 1943, Elimination of Date of Manufacture on Aircraft Cannon, which applies to the 75-mm Gun M4.

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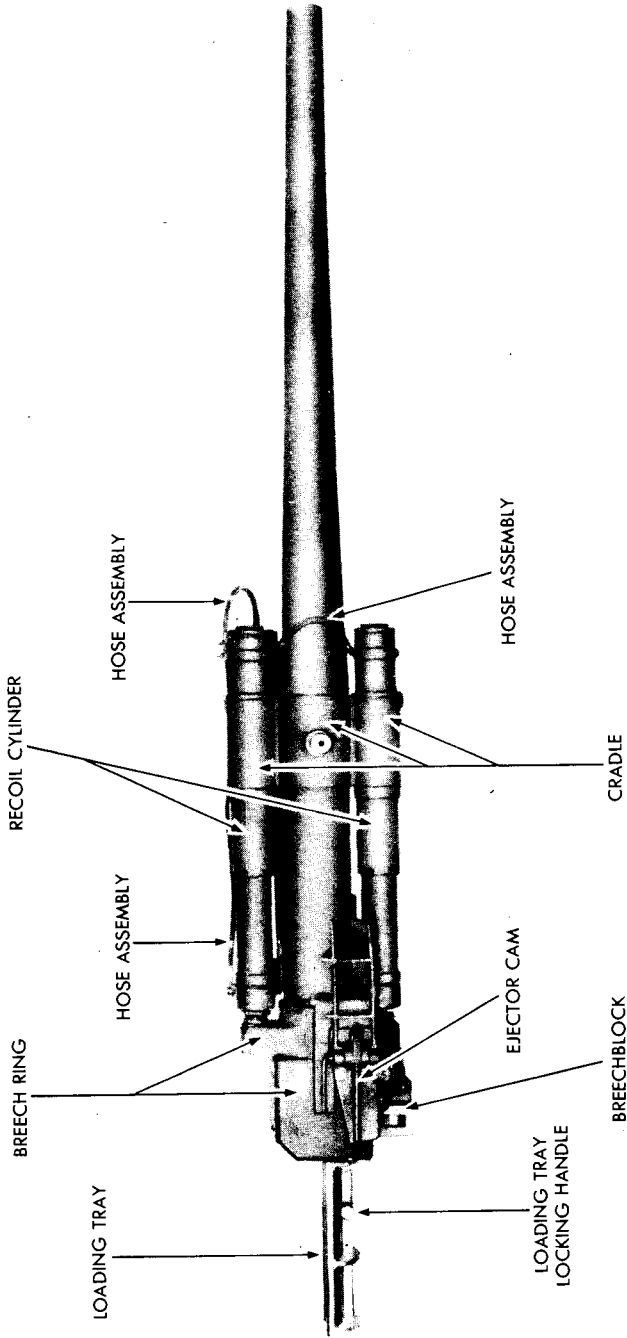
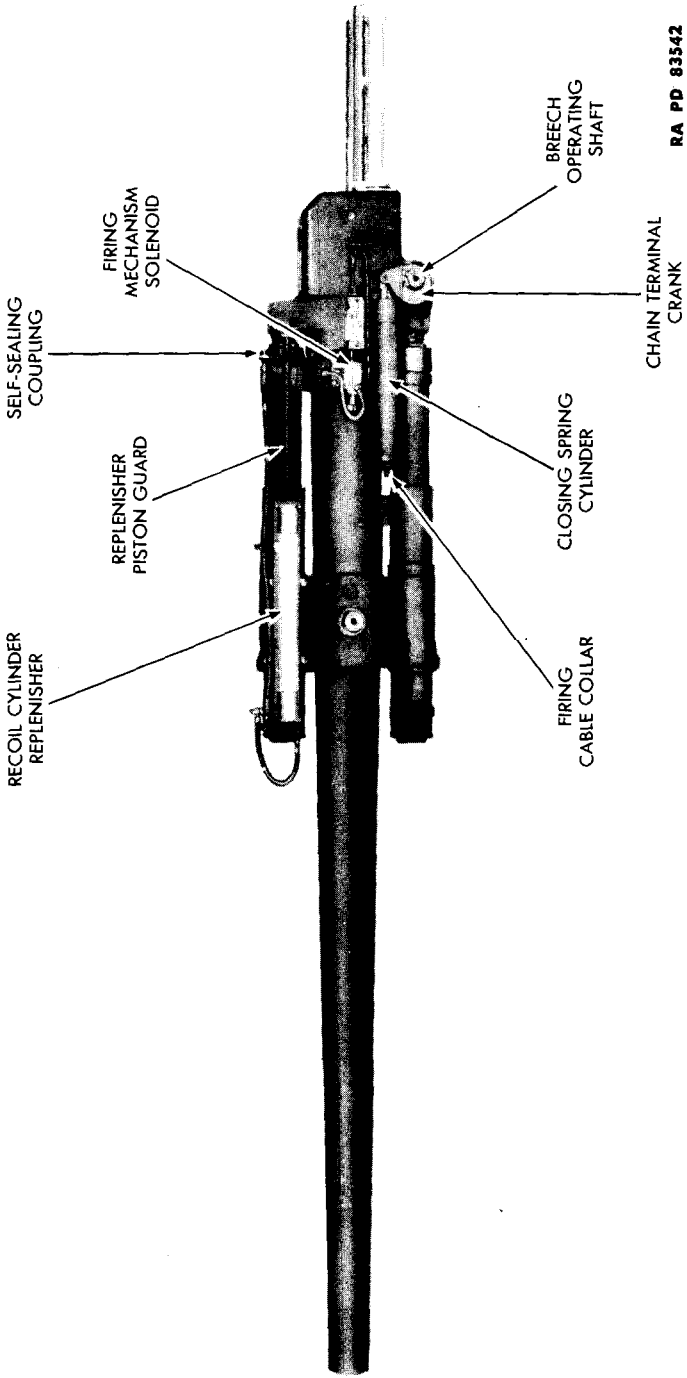


Figure 1 — 75-mm Gun M4 and Airplane Mount M6 — Right Side

**ORDNANCE MAINTENANCE — 75-MM GUN M4 AND  
AIRPLANE MOUNT M6**



RA PD 83542

**Figure 2 — 75-mm Gun M4 and Airplane Mount M6 — Left Side**

**ORDNANCE MAINTENANCE – 75-MM GUN M4 AND  
AIRPLANE MOUNT M6**

**CHAPTER 1  
GENERAL**

**Section I**

**INTRODUCTION**

	Paragraph
Scope .....	1
Characteristics .....	2
Differences among models .....	3

**1. SCOPE.**

a. The instructions contained in this Technical Manual are for the information and guidance of the ordnance maintenance personnel charged with the maintenance and repair of the 75-mm aircraft gun materiel. This Technical Manual contains detailed instructions for inspection; disassembly and assembly; maintenance and repair; and packing, shipment, and storage of the 75-mm Gun M4 and Airplane Mount M6. Instructions are supplementary to those in Field Manuals and Technical Manuals prepared for the using arms. Additional descriptive material and illustrations are included herein to aid in providing a complete working knowledge of the materiel.

**b. Elimination of Date of Manufacture on Aircraft Cannon.**

(1) The year of manufacture is stamped on the breech ring of the 75-mm Gun M4. It should be removed by grinding and polishing. Obliterating the date by peening is not satisfactory.

(2) The bright spot left after grinding should be painted with one coat of PRIMER, synthetic, rust-inhibiting, and two coats of ENAMEL, synthetic, olive-drab, lusterless.

(3) Although the date of the manufacture should appear only in the location described above, each gun tube should be inspected to make sure that no date appears on it.

**2. CHARACTERISTICS.**

a. The 75-mm Gun M4 is adapted for use in aircraft. It consists of a tube which is screwed into a breech ring. A vertical sliding (drop-block) type breechblock is used.

b. The Mount M6 consists of a cradle to support the tube assembly and to carry two recoil cylinders which are mounted one above, and the other below, the tube.

**3. DIFFERENCES AMONG MODELS.**

a. The 75-mm Gun M4 is a modification of the 75-mm Gun M3 and is adapted for use in aircraft. A seat has been machined in the gun tube so that the muzzle cover spline ring may be attached. This does not now apply as the muzzle cover has been removed from the 75-mm Gun M4.

**GENERAL**

**Section II**

**DATA**

Data .....	Paragraph 4
------------	-------------

**4. DATA.**

**a. Weights, Dimensions, and Ballistics of 75-mm Gun M4 and Airplane Gun Mount M6:**

Weight of 75-mm gun assembly .....	893 lb
Weight of tube .....	628 lb
Weight of gun and recoil mechanism .....	
Length of bore .....	37.5 cal
Length of tube (over-all) .....	110.625 minus 0.050 in.
Center of gravity from breech of gun .....	39.81 in.
Caliber .....	75 mm
Type of breechblock .....	Vertical sliding
Weight of breechblock .....	41 lb
Weight of breech ring .....	176 lb
Chamber capacity (case 71-2-71) .....	80.59 cu in.
Muzzle velocity (standard weight projectile) .....	1,970 ft per sec
Maximum powder pressure .....	38,000 lb per sq in.

**Rifling:**

Length .....	96.2 in.
Number of lands and grooves .....	24
Width of grooves .....	0.248 in.
Width of lands .....	0.139 in.
Depth of grooves .....	0.02 in.
Twist .....	Uniform right-hand
Weight of fixed round .....	19 lb 12.14 oz
Weight of projectile (standard weight) .....	14.7 lb
Weight of powder charge .....	32.55 oz
Recoil cylinder piston pull (average) 650 each piston .....	1,300 lb
Recoil, normal .....	21 in.
Recoil oil .....	Oil, recoil, special



**ORDNANCE MAINTENANCE – 75-MM GUN M4 AND  
AIRPLANE MOUNT M6**

**CHAPTER 2**

**INSPECTION INSTRUCTIONS**

	Paragraph
Purpose .....	5
General inspection procedure .....	6
<u>Average life of gun tube</u> .....	7
Star-gaging .....	8
Inspection of gun tube .....	9

**5. PURPOSE.**

a. Inspection of the weapon is vital. Thorough, systematic inspection is the best insurance against an unexpected breakdown at a critical moment when maximum performance is absolutely necessary. Never let materiel run down. Keep it in first class fighting condition by vigilant inspection.

b. Inspection is for the purpose of determining by critical examination the condition of the materiel, whether repairs or adjustments are required, that all modifications authorized by Field Service Modification Work Orders have been made, and to insure serviceability and proper functioning of the materiel. Its immediate aim is trouble prevention, which includes:

- (1) Detecting faulty or careless preventive maintenance.
- (2) Determining when repair or replacement of parts is required because of ordinary wear or breakage.
- (3) Determining that all modifications authorized by Field Service Modification Work Orders have been completed.

**6. GENERAL INSPECTION PROCEDURE.**

a. Inspection should always be accompanied by corrective measures to remedy any deficiencies or defects found. When properly carried out, inspection and necessary corrective maintenance will insure the maximum rehabilitation and performance of the materiel.

b. The results of inspection should be noted in the Artillery Gun Book (O.O. Form 5825) by the inspector. Any unusual condition which might result in improper operation, damage to materiel, or injury to personnel will be remedied immediately.

c. Suggested improvements in design, maintenance, and safety and efficiency of operation prompted by chronic failure or malfunction of the weapon, spare parts, or equipment should be forwarded to the Office of the Chief of Ordnance, Field Service Division, Maintenance

**INSPECTION INSTRUCTIONS**

Branch, with all pertinent information necessary to initiate corrective action. Such suggestions are encouraged in order that other organizations may benefit.

**d. Inspection on Receipt of Materiel.** Upon receipt of materiel, it is the responsibility of the officer in charge to ascertain whether the materiel is complete with spare parts and equipment and in serviceable operating condition, and that all modifications authorized by Field Service Modification Work Orders have been completed. A record should be made of any missing parts and any malfunction, and the condition should be corrected as quickly as possible.

<b>Parts To Be Inspected</b>	<b>Points To Be Observed</b>
e. Bore.	Open breech and inspect for wear and deformation of lands and grooves, powder residue, and rust. Erosion of tube. Bearing surface, for scoring or mutilation.
f. Breech mechanism.	Breechblock for burs, roughness, or scoring. Breechblock bushing, for worn firing pin hole and tightness in breechblock. Breechblock crank assembly, for wear or damage. Extractors for cracks, scores, and roughness. Crank for burs, nicks, scratches, scoring, or other mutilations. Threads on piston rod, for burs. Inspect for jammed or cross-threaded threads. Breech operating shaft, for burs or scratches.
g. Breech ring.	Breech recess for burs, scoring, or other damage. Bearing strips for tightness, scores, bruises, or damage. Tightness of breech ring on tube. Removal of date of manufacture.
h. Firing mechanism.	Protrusion of firing pin ahead of breech block bushing. Tightness of lever and yoke. Straightness of rod.

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<b>Parts To Be Inspected</b>	<b>Points To Be Observed</b>
	Spring, for distortion or breaks.
	Shaft, for freedom from scores and nicks.
	Solenoid, for proper operation (par. 29 b).
	Condition of connection, wire, and conduit.
i. Recoil mechanism.	Note whether <del>lubrication fittings</del> are identified with a 3/4-inch circle, in order that they may be readily identified.
	See that the proper amount of oil is in the recoil cylinders and sufficient reserve in the replenisher (TM 9-311)
	Check oil drain, and refill plug and hole threads for condition.
	Purge plugs for tightness.
	Hose connections, for leakage of recoil oil.
j. Loading tray.	Tray for dents.
	Torsion spring, for distortion or breaks.
k. Lubrication.	Correct lubricants, used in accordance with the proper lubrication guide (chapter 3, section VII).
l. Inspection and repair tools.	Check inspection and special repair tools against list given in SNL C-47.
	Inspection and special repair tools are of such design that, with proper handling and storage in respective retainers, they will require little care. Inspect each tool before and after use, and remove all burs with smooth file or oilstone. When placed in container, give light coat of OIL, engine, SAE 30.

**7. AVERAGE LIFE OF GUN TUBE.**

- a. The average life of this gun tube is approximately 6,000 rounds. The guns in service should be star-gaged after approximately 90

## INSPECTION INSTRUCTIONS

percent of their estimated accuracy life, and thereafter at each 10 percent during the remainder of their service.

b. Tubes are star-gaged any time an inspector may find it advisable, due to unusual wear or other irregularities in the bore. Decop-  
pering of bore of this gun is prohibited.

### 8. STAR-GAGING.

a. Star-gaging equipment is not issued to all ordnance maintenance companies but may be obtained from a heavy ordnance maintenance company or the army inspector of artillery.

b. Instructions for star-gaging will be found in TM 9-1860.

### 9. INSPECTION OF GUN TUBE.

a. The effect of scratches, nicks, pitting, scoring, etc., in the bore caused by accidents, local defects of the bore, and improper care is either to allow leakage of gas from the projectile rotating band and thereby promote further erosion of the forcing cone, or to wear away the rotating band so that the projectile does not attain its proper rotational velocity. Such defects should, therefore, be smoothed and rounded, and on the basis of their location, character, and extent. Determination should be made as to whether they are likely to be injurious from the point of view of gas leakage or wear on the rotating bands. No definite rule can be used in making this determination.

b. **Pastilles.** The effect of pastilles upon the safety and accuracy of the gun is thought to be negligible. However, as a precautionary measure, guns having more than three pastilles the size of a 5-cent piece are withdrawn from service.

c. **Deformation of Rifling.** Deformation of the rifling at the origin, in general, consists of sheared lands and a flow of the metal in the grooves, so that the pitch of the rifling for the first inch or two is considerably reduced. This is a serious defect and gun tubes showing it to a marked degree are not to be reissued.

**ORDNANCE MAINTENANCE – 75-MM GUN M4 AND  
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**CHAPTER 3**

**MAINTENANCE AND REPAIR INSTRUCTIONS**

**Section I**

**GENERAL INSTRUCTIONS**

	<b>Paragraph</b>
General .....	10
Use of tools .....	11

**10. GENERAL.**

a. In this manual major units of the gun and mount are removed, disassembled, inspected, and repaired, and then reassembled and installed.

b. When assembling units, assemble all subassemblies before attempting to mount them.

c. The barrels of the 75-mm Guns M4 are interchangeable.

d. Except in emergencies, work requiring welding, riveting, and the making of new parts for major replacements will not be undertaken in the field.

**11. USE OF TOOLS.**

a. Use only wrenches that fit snugly on parts. Tools that do not fit will fail or cause damage to corners of nuts, bolt heads, etc.

b. Special tools are issued to ordnance maintenance units for inspection and repair purposes.

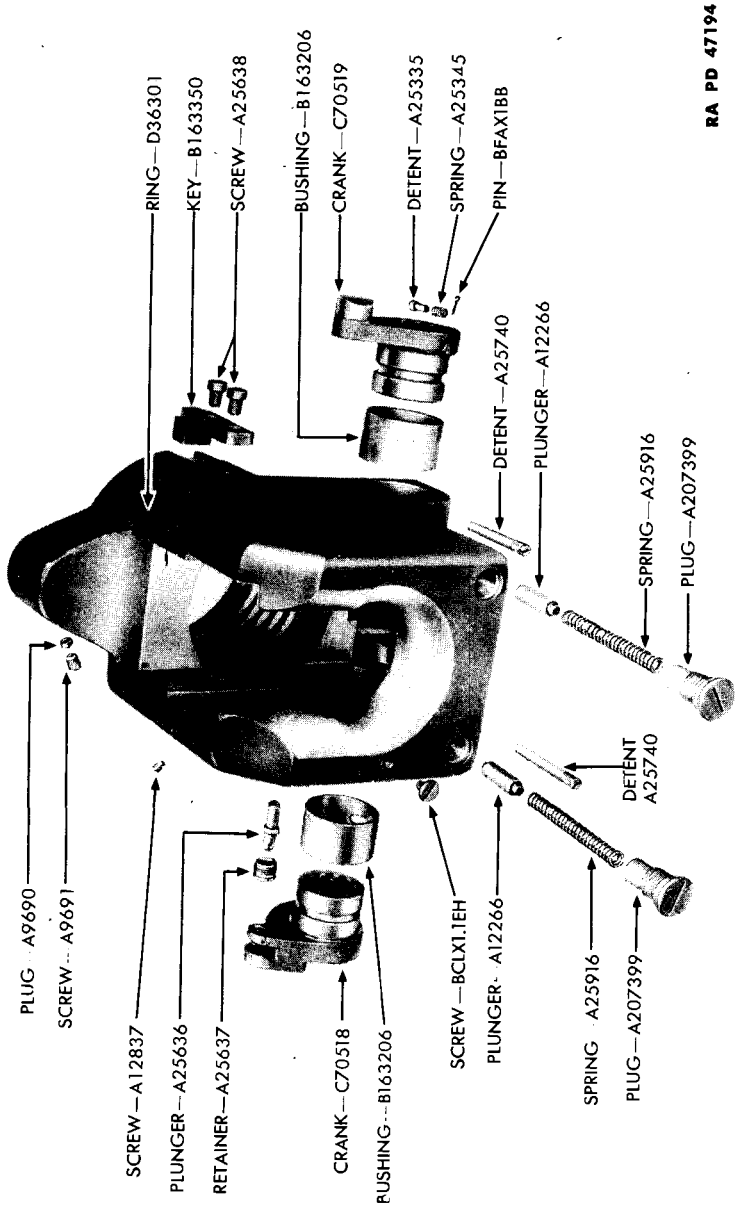
c. Information and instructions contained herein are supplementary to adjustment and repair instructions contained in TM 9-311, prepared for the personnel of the using arms. Operations covered in TM 9-311 are sometimes performed by the ordnance maintenance personnel, who should refer to TM 9-311 for proper instructions covering these operations.

**Section II**

**BREECH MECHANISM**

	<b>Paragraph</b>
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Malfunctions .....	13
Removal of breech mechanism .....	14
Disassembly of breech mechanism .....	15
Inspection and repair of breech mechanism .....	16
Assembly of breech mechanism .....	17
Installation of breech mechanism .....	18

MAINTENANCE AND REPAIR INSTRUCTIONS



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Figure 3 - Breech Ring - Exploded View

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**12. GENERAL.**

a. The breech mechanism includes breech ring, the extractor, extractor plunger assemblies, breechblock crank assembly, operating shaft assembly, operating crank, chain terminal crank, closing spring assembly, and breechblock assembly (which consists of the breechblock, sear assembly, percussion mechanism assembly, and cocking mechanism assembly) (figs. 3, 12, and 22).

b. A complete description of these parts, and of their functions and operations, is given in TM 9-311, paragraphs 7 and 8.

**13. MALFUNCTIONS.**

**a. Fails to Extract Cartridge Case.**

<b>Cause</b>	<b>Correction</b>
Broken extractor.	Ram case out. Disassemble breechblock and replace broken extractor. Examine firing chamber for high spots that appear to affect extraction.

**b. Breechblock Fails to Rise When Extractors Are Forced Forward.**

Broken closing spring or broken chain.	Replace closing spring or chain.
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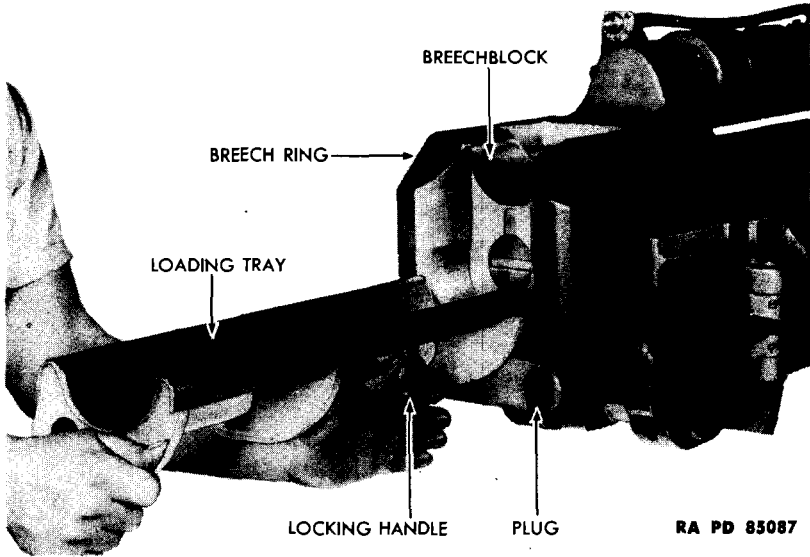
**c. Breechblock Fails to Rise to Fully Closed Position When Extractors Are Forced Forward.**

Lack of proper compression of closing spring.	Adjust compression of closing spring.
Lack of lubrication on the operating shaft or in the breech ring bushings.	Disassemble breechblock, and lubricate.
Improper chambering of cartridge case.	Manually open breech and insert another round.

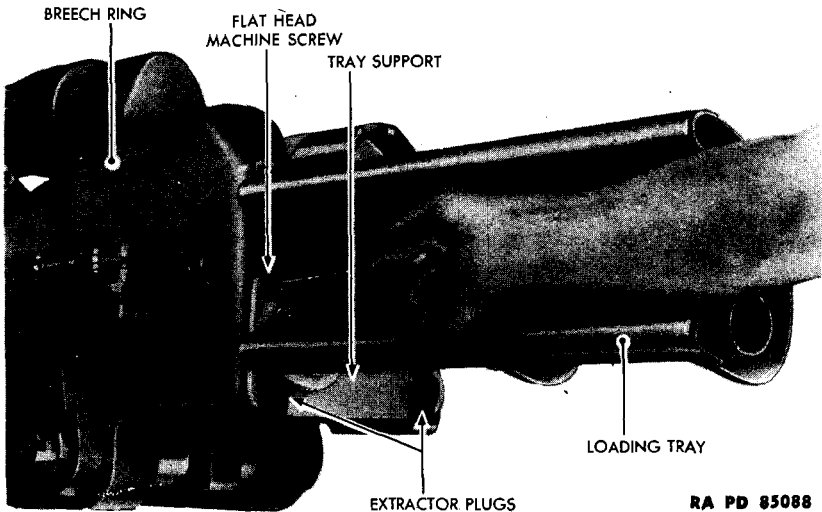
**14. REMOVAL OF BREECH MECHANISM.**

a. **Remove Loading Tray.** Pull loading tray locking handle outward to disengage loading tray locking shaft (fig. 4) and tilt tray to left so that loading tray flat head machine screw is readily accessible for removal (fig. 5). Remove flat head machine screw and washer that secure upper end of tray support to breech ring (fig. 5). Then loosen extractor plugs that secure lower end of tray support to breech ring. Lift loading tray and tray support straight upward and off extractor plugs.

**MAINTENANCE AND REPAIR INSTRUCTIONS**



**Figure 4 – Releasing Lock on Loading Tray**

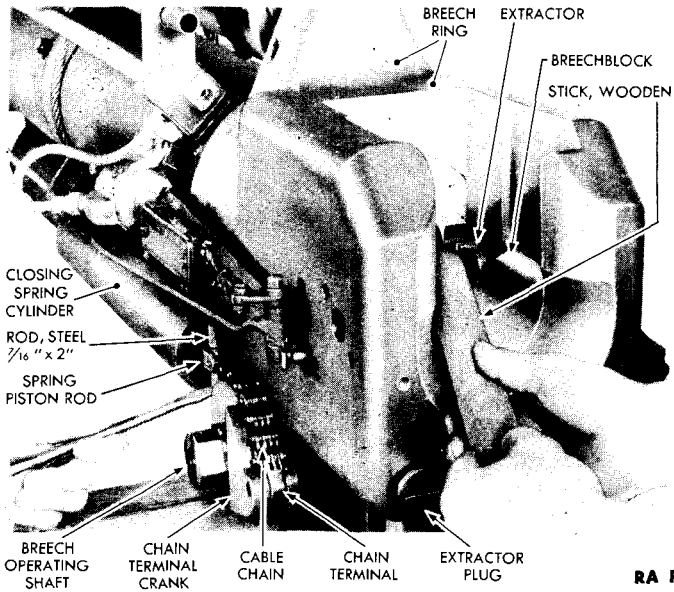


**Figure 5 – Removing Loading Tray**

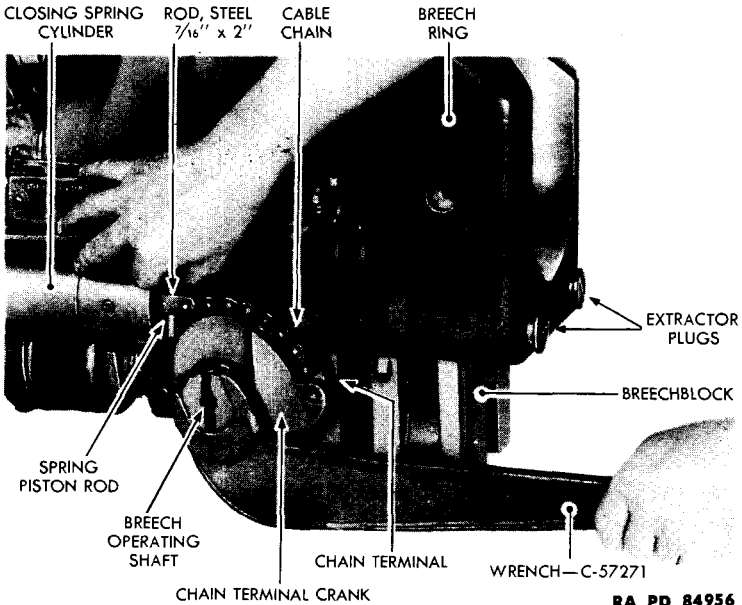
**b. Release Closing Spring Tension from Breechblock.** Manually open the breech by placing operating shaft wrench C57271 on left end of breech operating shaft and pulling downward. This operation causes the breech operating shaft to rotate chain terminal crank, thereby pulling chain and spring piston rod rearward and compressing



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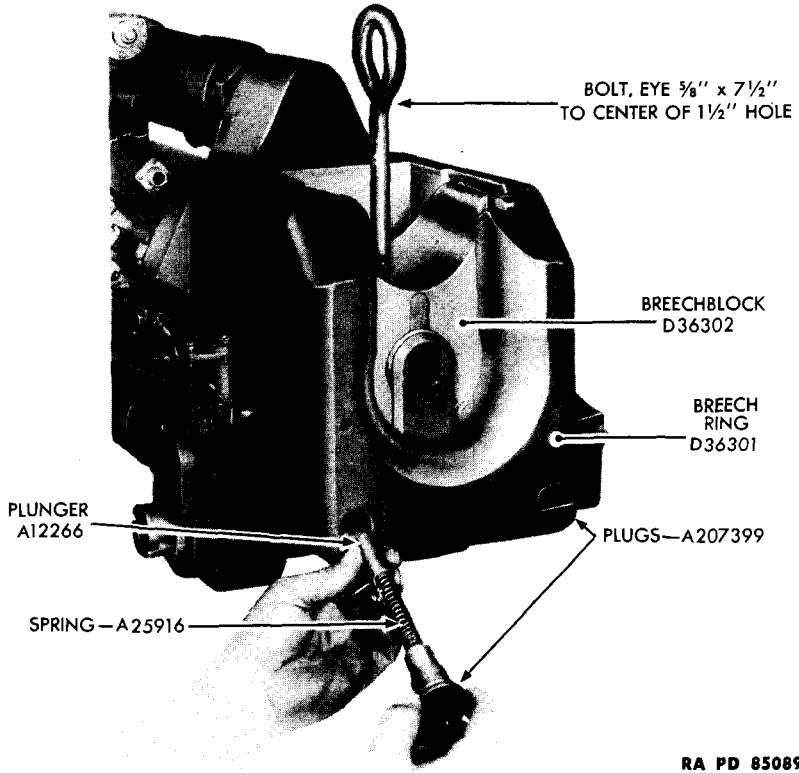


**Figure 6 – Blocking Closing Spring Compression**

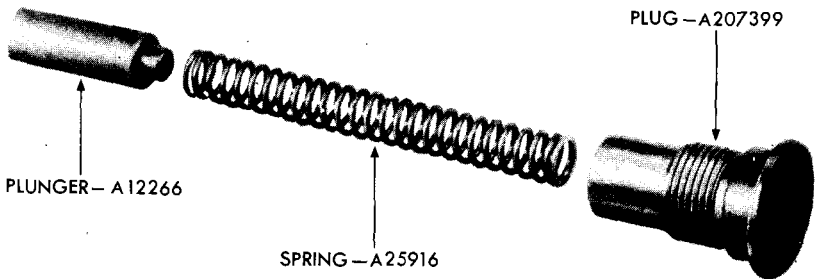


**Figure 7 – Releasing Closing Spring Compression from Breechblock**

**MAINTENANCE AND REPAIR INSTRUCTIONS**



**Figure 8 – Removal of Extractor Plunger, Spring, and Plug**



**Figure 9 – Extractor Plunger Assembly – Exploded View**

spring (fig. 17). Insert round steel rod (7/16 by 2 inches) in hole provided in spring piston rod (fig. 6). One man holds steel rod in position across the opening of closing spring cylinder (fig. 7), while a second man trips the extractors, thereby putting closing spring com-

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pression on the steel rod and eliminating compression from breechblock. **NOTE:** While tripping extractors, hold closing spring compression with wrench.

**c. Block Breechblock.**

(1) Install eye bolt in tapped hole provided in top of breechblock (fig. 8). Insert wooden stick through eye bolt. Lift breechblock to its approximate closed position and remove firing mechanism (par. 15 a). Replace with breechblock support tool B163768. **NOTE:** This is a two-man operation.

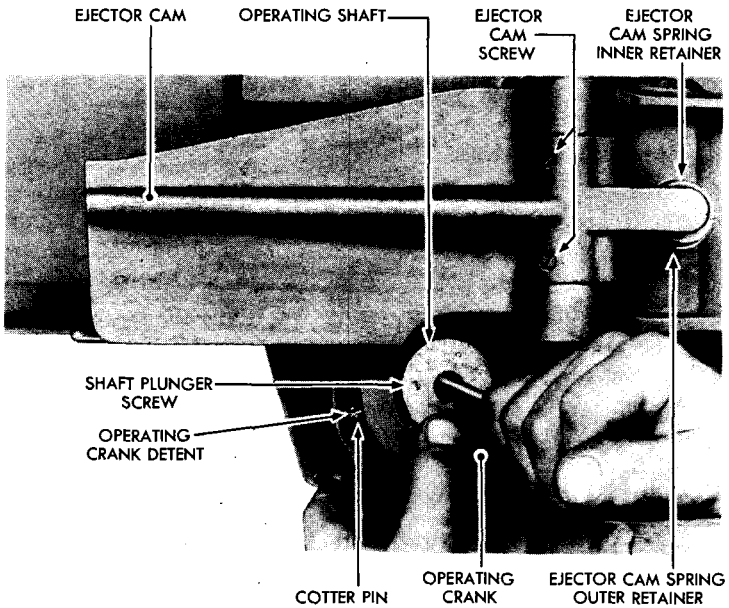
(2) If breechblock support tool is not available, the use of two wood blocks placed between the top surface of the breech ring and the wooden stick, when the breechblock is raised to its approximate closed position, will have to be resorted to. This procedure, however, is not recommended, as the top surface of the breech ring is not entirely flat. If this operation is necessary, it is recommended that the removal of the firing mechanism be performed after the breechblock has been removed from the recess in the breech ring.

**d. Remove Extractor Plunger Assembly.** Unscrew extractor plunger plugs from breech ring, and pull plugs, springs, and plungers from breech ring (figs. 8 and 9).

**e. Remove Breechblock Operating Crank and Breech Operating Shaft.** Press operating shaft plunger (figs. 10 and 12) downward to disengage detent from shaft. Then push the shaft to the left and out of operating crank (figs. 10 and 11). Place one hand under breechblock operating crank to prevent it from dropping and being damaged while shaft is being removed (fig. 11). Pull shaft out of chain terminal crank at the same time catching breechblock operating crank. Be careful not to drop breechblock cross heads from pivots (fig. 12). Lay breechblock operating crank carefully to one side, but replace shaft in chain terminal and operating cranks since it will be needed to assist in the removal of the closing spring.

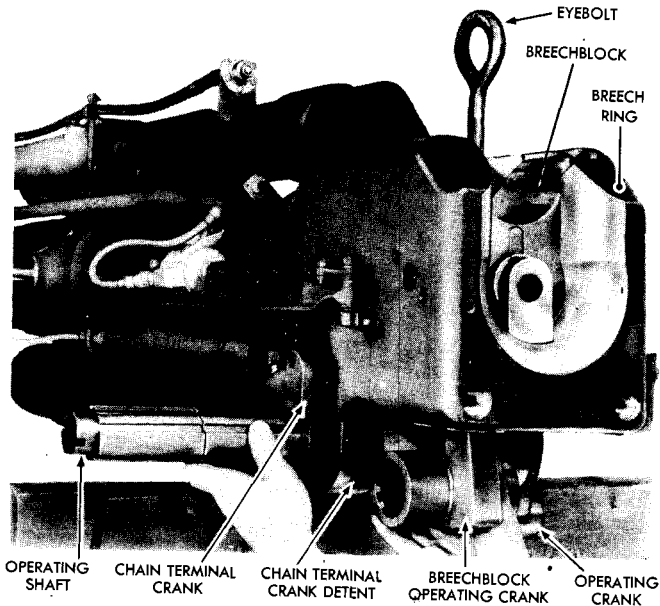
**NOTE:** The breech operating shaft is modified by Field Service Modification Work Order C47-W1 which provides for cutting the shaft in half and joining the two halves by means of a stud. This was necessary in order to remove the shaft when the gun was mounted in the plane as there was interference in removal of the full length shaft. To remove the breech operating shaft proceed as follows: Press operating shaft plunger downward to disengage detent from shaft, and push shaft to the left until the left half of the shaft clears the chain terminal crank. Then unscrew the left half of the shaft from the stud. Place the hand under the breechblock operating crank to prevent it from dropping. Remove the breechblock operating crank. Push the right half of the breech operating shaft from the chain terminal crank.

**MAINTENANCE AND REPAIR INSTRUCTIONS**



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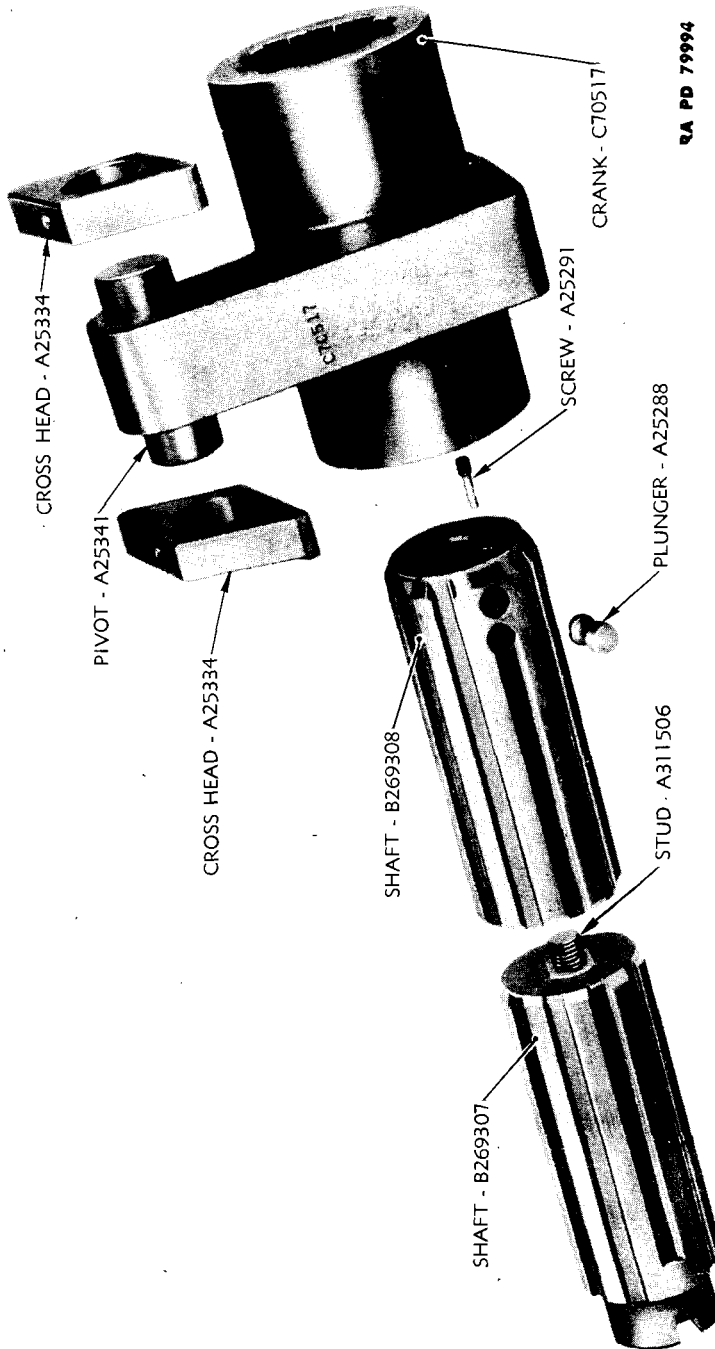
**Figure 10 – Disengaging Breech Operating Shaft Detent**



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**Figure 11 – Removing Breech Operating Shaft**

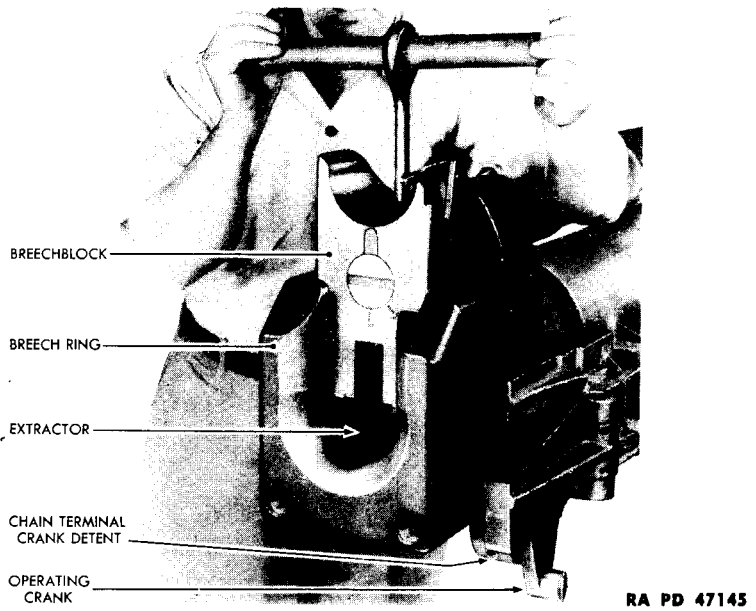
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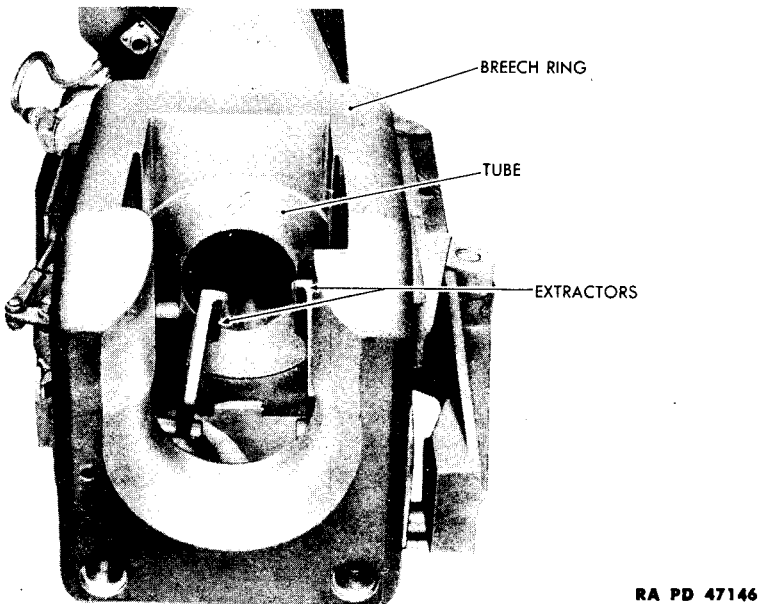
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Figure 12 - Breech Operating Shaft and Breechblock Operating Crank - Exploded View

**MAINTENANCE AND REPAIR INSTRUCTIONS**



**Figure 13 – Lifting Breechblock from Breech Ring**



**Figure 14 – Removing Extractors from Breech Ring**

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f. **Remove Breechblock from Breech Ring** (fig. 13). Grasp eyebolt and lift breechblock upward and out of breech ring. Lay breechblock carefully to one side.

g. **Remove Extractors** (fig. 14). Lift the extractors from the extractor trunnion grooves provided in breech ring.

h. **Removal of Chain Terminal Crank Assembly.** NOTE: The welded bracket which was made to support the rear end of the front tube operating cable interferes with removal of nut from closing spring piston rod. To remove the chain terminal crank assembly, it is necessary to first disconnect the upper and lower recoil cylinders from the breech ring, and then pull ring and tube rearward out of cradle. NOTE: Guns made without muzzle cover assembly do not have this bracket.

(1) Disconnect upper and lower recoil piston rod nuts from breech ring (par. 33 d), then pull breech ring and tube slightly to rear and partly out of cradle far enough to allow wrench to be placed on the closing spring piston rod nut. Make sure gun and mount are approximately level or gun will slide all the way out of cradle. NOTE: If closing spring compression has not previously been released, do so now as follows: Install breech operating shaft wrench C57271 on breech operating shaft, then pull crank downward to remove compression from the retaining rod (fig. 6). Remove retaining rod from the spring piston rod, then gradually move wrench upward to allow closing spring to resume its normal position in cylinder (fig. 17).

(2) Remove cotter pin from spring piston rod (fig. 45) then remove piston rod nut from spring piston rod. Piston is machined so that its concave surface fits the convex surface of piston rod nut, and piston will be removed with the nut (fig. 15).

(3) Pull closing spring from rod and out of cylinder (fig. 17).

(4) Remove cotter pin from chain terminal pin (fig. 16), then remove chain terminal pin from chain terminal. Pull chain and rod from cylinder.

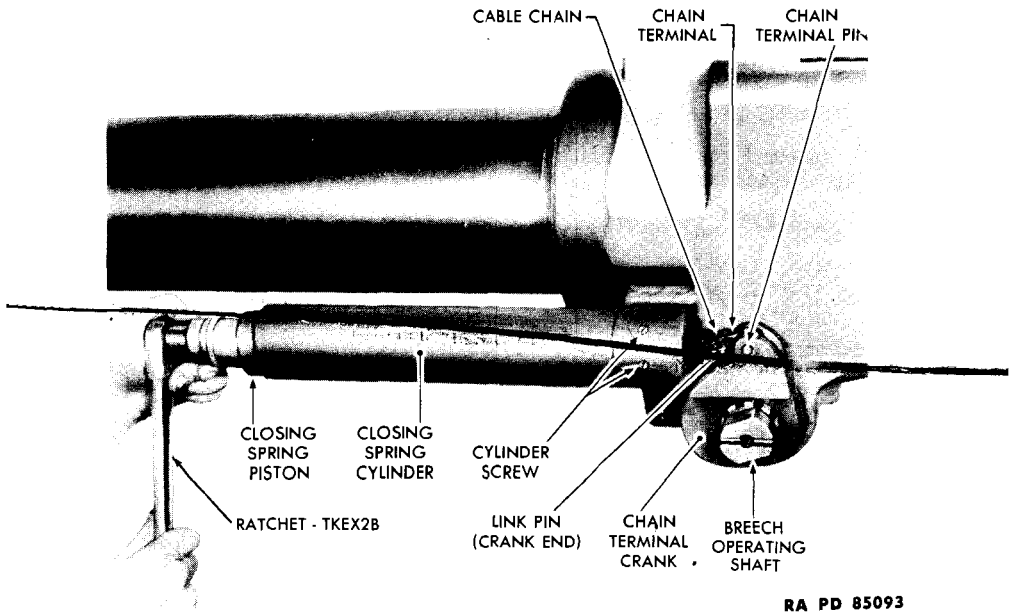
(5) Remove breech operating shaft from chain terminal crank (subpar. e, above).

(6) Remove detent from breech ring and pull chain terminal crank from breech ring (figs. 3 and 20).

(7) Remove two cylinder screws that secure closing spring cylinder to breech ring (fig. 15). Then pull cylinder out of ring. If cylinder sticks in ring, it may be necessary to tap it loose with a rawhide mallet.

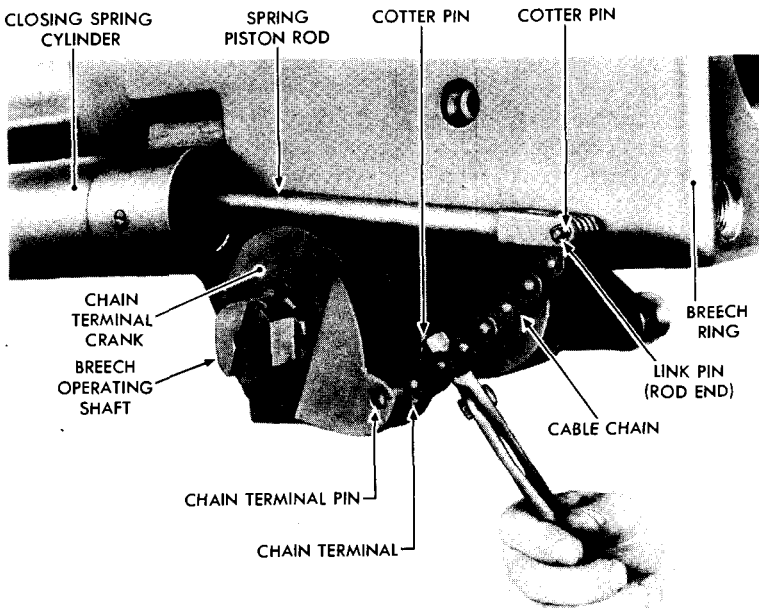
i. **Remove Operating Crank and Ejector Mechanism.** NOTE: Operating crank cannot be removed from breech ring when gun is in battery due to interference of ejector cam support bracket. However, when breech ring is disconnected from recoil piston rod end nuts and

**MAINTENANCE AND REPAIR INSTRUCTIONS**



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**Figure 15 – Removal of Closing Spring Assembly from Cylinder**

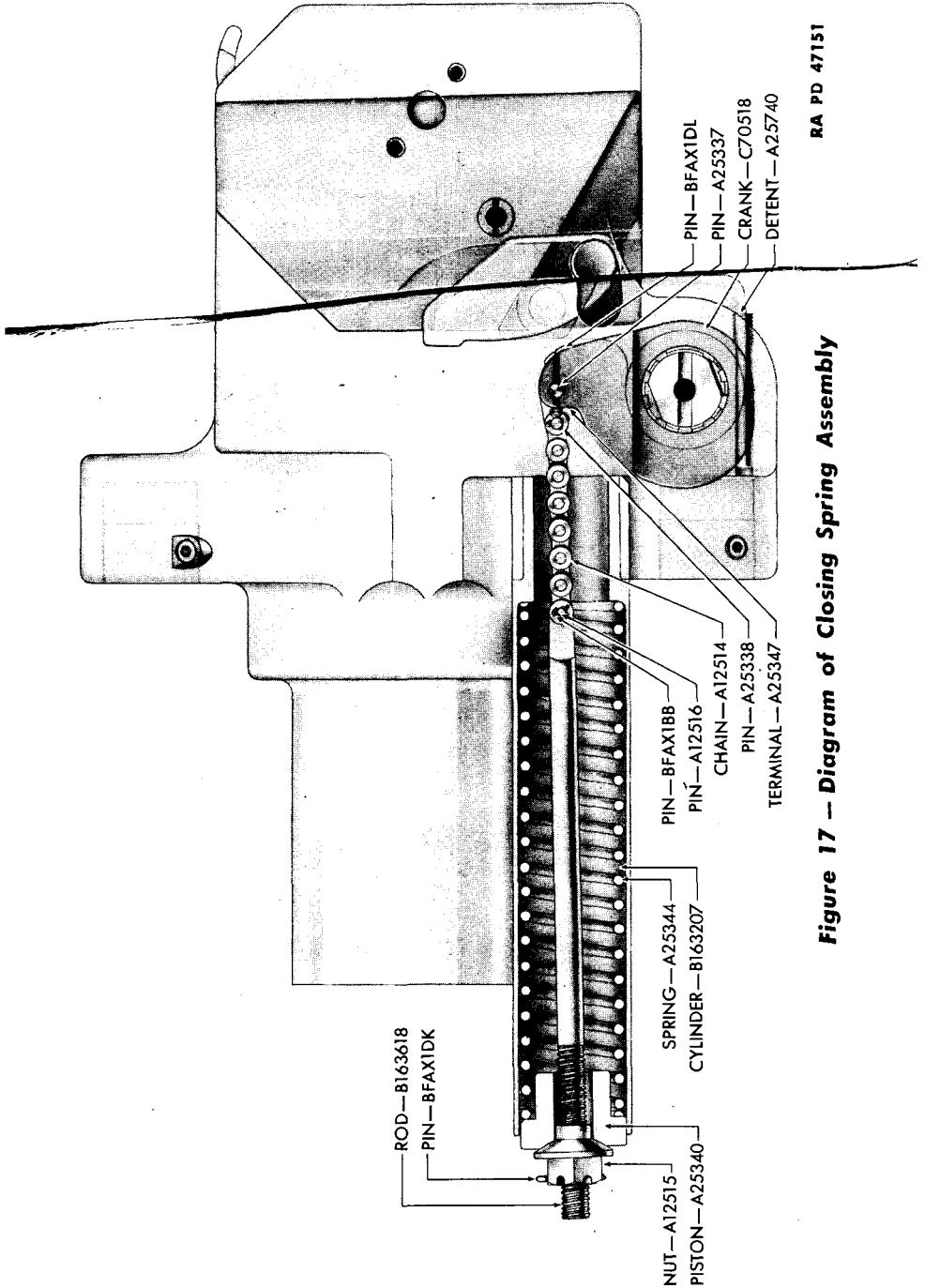


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**Figure 16 – Disconnecting Chain from Chain Terminal Crank**



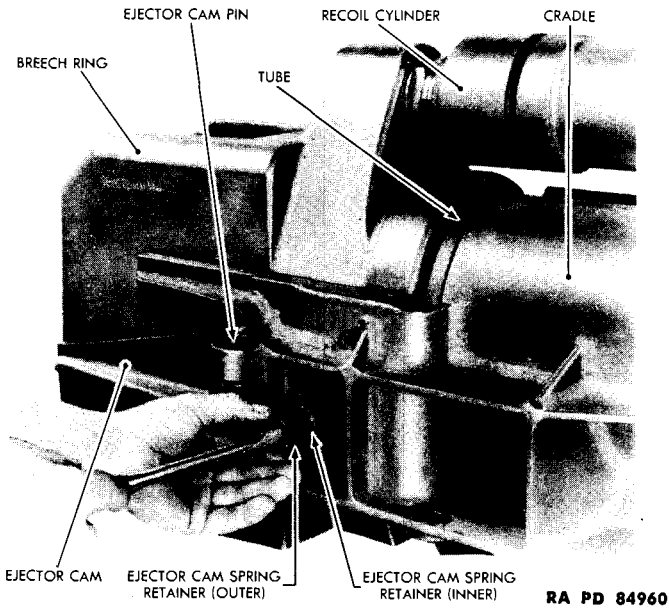
ORDNANCE MAINTENANCE — 75-MM GUN M4 AND  
AIRPLANE MOUNT M6



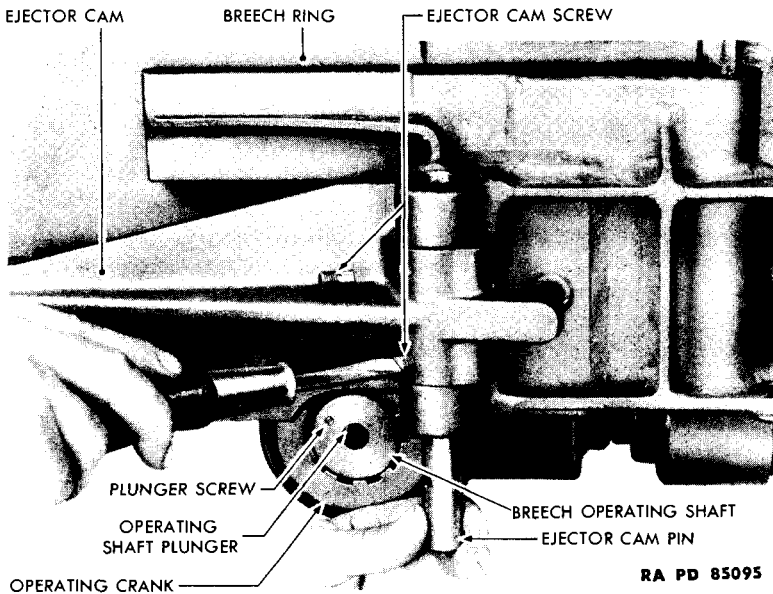
RA PD 47151

Figure 17 — Diagram of Closing Spring Assembly

### MAINTENANCE AND REPAIR INSTRUCTIONS



**Figure 18 – Removing Ejector Cam Spring and Retainers**



**Figure 19 – Removing Ejector Cam**

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pulled backward (subpar. h, above), or with the removal of the ejector cam (to be discussed in the following steps), the operating crank is readily accessible and can be removed. Press outer ejector cam spring retainer over inner retainer. Then remove both retainers and spring from ejector mechanism (fig. 18). **CAUTION:** Hold retainers and spring securely to prevent loss of parts due to sudden release of spring compression. Remove two set screws that secure operating crank ejector cam pin in position, then remove pin from ejector cam (fig. 19). Lift ejector cam from bracket on cradle. Remove operating crank detent from breech ring and pull operating crank from breech ring (figs. 3 and 20).

**j. Remove Bushings from Breech Ring.** Breech ring bushings may become worn to the extent that their bearing efficiency is no longer effective, or, due to previous scraping and polishing, they may become thin and unreliable. If examination indicates replacement of bushings, do so as follows:

(1) Breech ring bushings are press-fitted. If available, an all purpose puller or a ram can be used for removing them. If neither of these is available, a special improvised tool is necessary for their removal and installation (fig. 21). This tool consists of a  $\frac{5}{8}$ - by 14-inch bolt with 6-inch thread of  $\frac{5}{8}$ -inch-11 NC dimension. A steel bar,  $\frac{5}{8}$  by  $1\frac{1}{4}$  by 5 inches, is centrally drilled with a  $\frac{5}{8}$ -inch hole to provide a snug fit for the bar against bolt head. A cylindrical driver  $2\frac{1}{8}$  inches in length is machined to 3.000 (-0.010) diameter, and one end of this cylinder driver is turned down to 2.750 (-0.005) diameter for a distance of  $\frac{5}{16}$ -inch from face of driver. The cylindrical driver is drilled axially with a  $\frac{4}{16}$ -inch hole (break all sharp corners) to provide for insertion of the bolt. A  $\frac{5}{8}$ -inch nut is provided to fit the bolt loosely and to facilitate removal and installing operations by being able to spin the nut during its free travel on bolt.

(2) Place the  $\frac{5}{8}$ - by  $1\frac{1}{4}$ - by 5-inch bar on the  $\frac{5}{8}$ - by 14-inch bolt, so that bar is snug against bolt head (fig. 21). Then insert bolt from outside breech ring through both bushings with steel bar (at head of bolt) against outside of breech ring on opposite side of bushing to be removed. Install cylindrical driver on bolt with smaller diameter of driver alined inside bushing on opposite side of breech ring. Screw the  $\frac{5}{8}$ -inch nut on bolt and up against cylindrical driver. When nut is snug against driver, continue to turn nut until driver forces bushing out of breech ring.

(3) Remove the  $\frac{5}{8}$ -inch nut from the  $\frac{5}{8}$ - by 14-inch bolt, then slide cylindrical driver from bolt and remove bushing from bolt. Lay bushing aside. Remove the  $\frac{5}{8}$ - by 14-inch bolt from breech ring and install from opposite side of breech ring in order to remove the other bushing, which is removed in exactly the same manner.

MAINTENANCE AND REPAIR INSTRUCTIONS

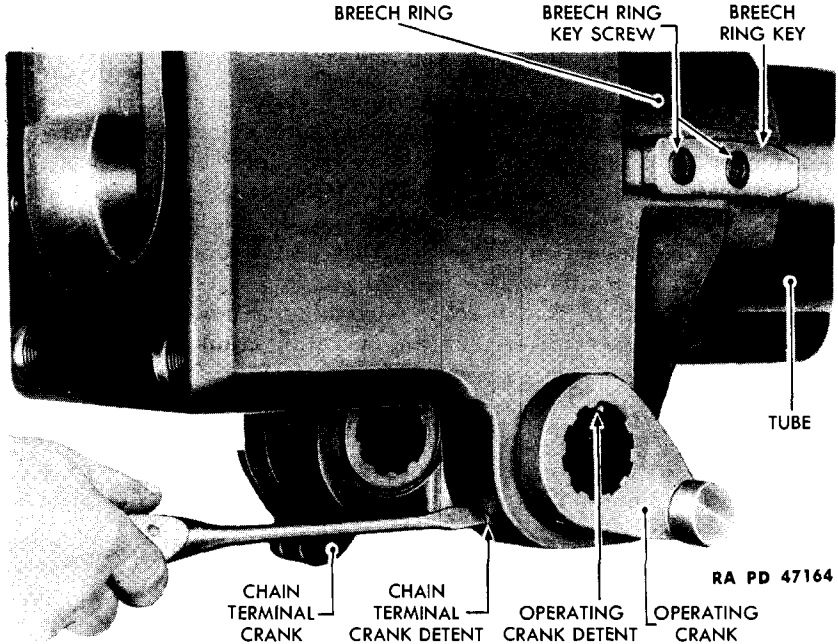


Figure 20 — Removal of Breech Operating Crank

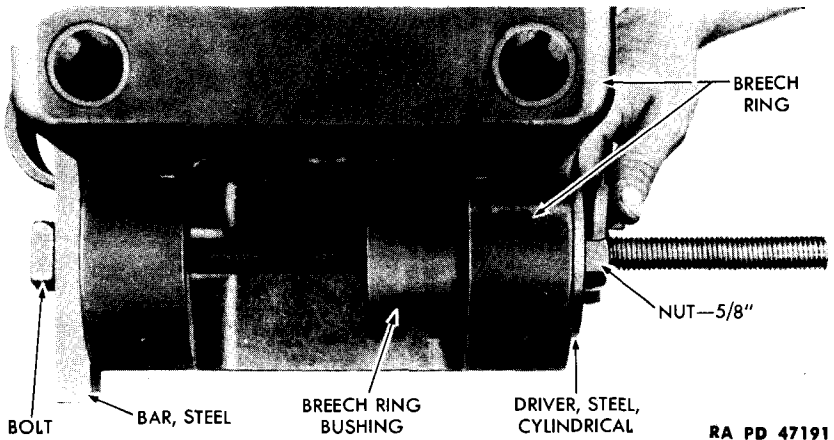
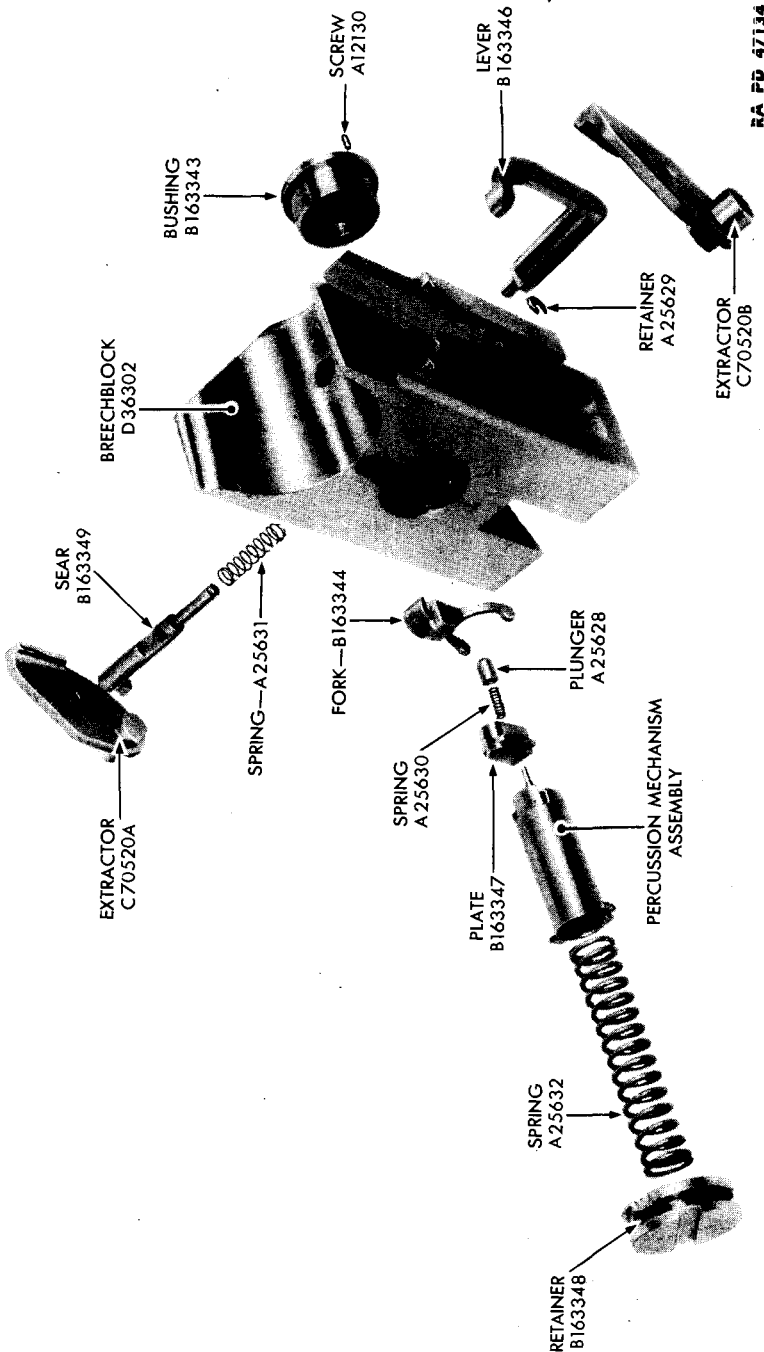


Figure 21 — Removing Bushings from Breech Ring

15. DISASSEMBLY OF BREECH MECHANISM.

a. Remove Firing Spring. NOTE: This operation will be performed at this time only if breechblock support tool is *not* used. Place thumbs against firing spring retainer, press inward against spring pressure, and at the same time turn retainer so that arrow mark scribed on retainer will be turned from the position marked "LOCK,"

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Figure 22 — Breechblock — Exploded View

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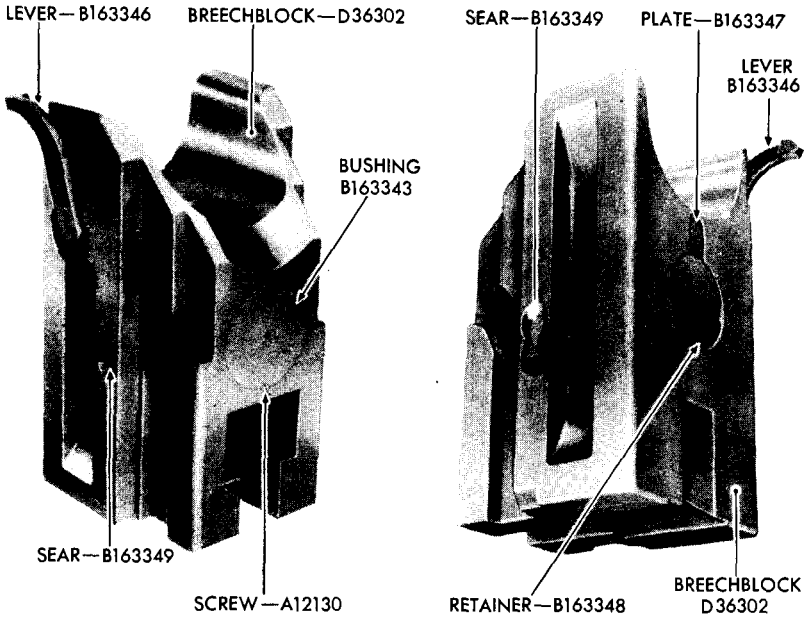


Figure 23 — Breechblock — Front and Rear View RA PD 47171

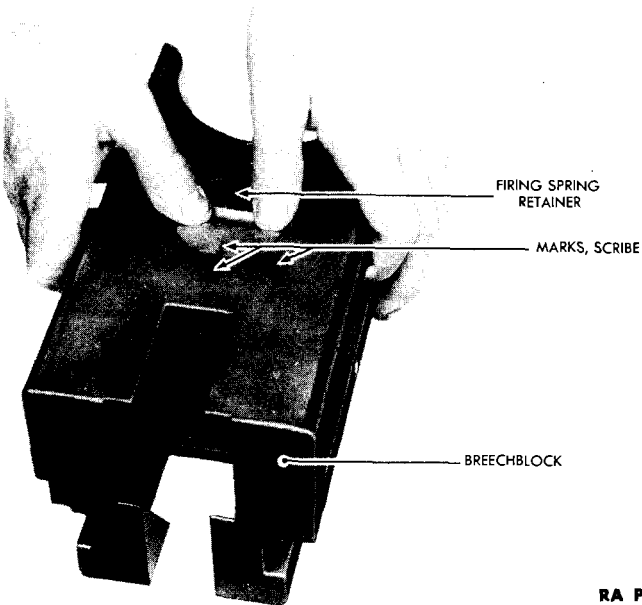
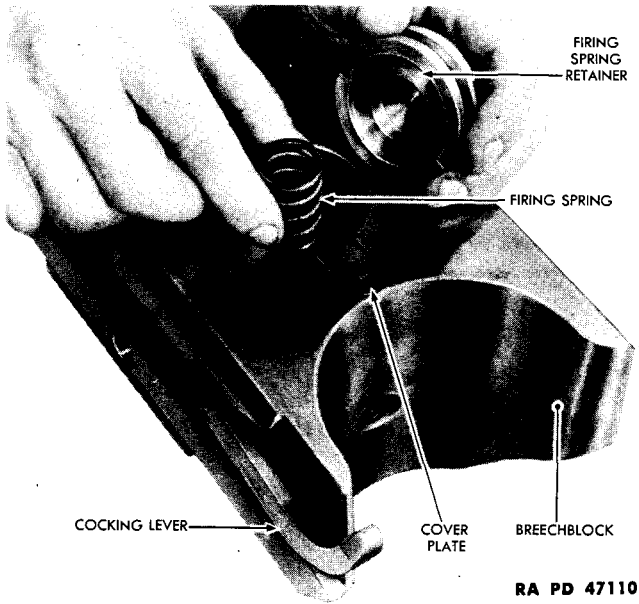


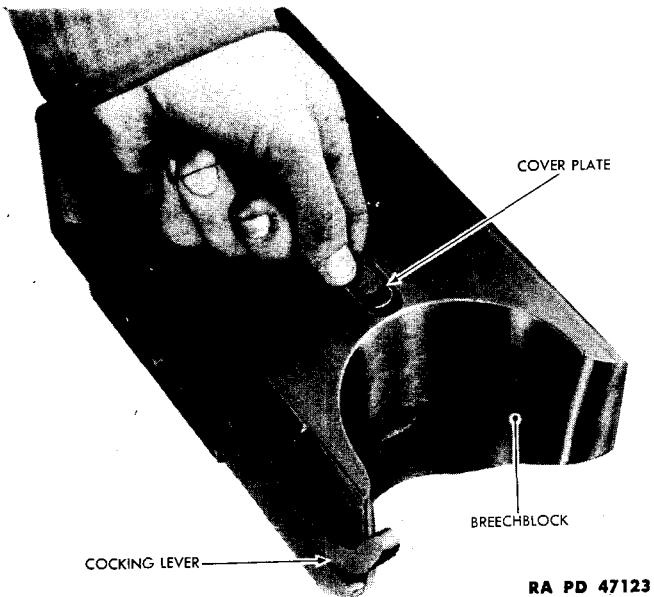
Figure 24 — Removal of Firing Spring Retainer

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**ORDNANCE MAINTENANCE – 75-MM GUN M4 AND  
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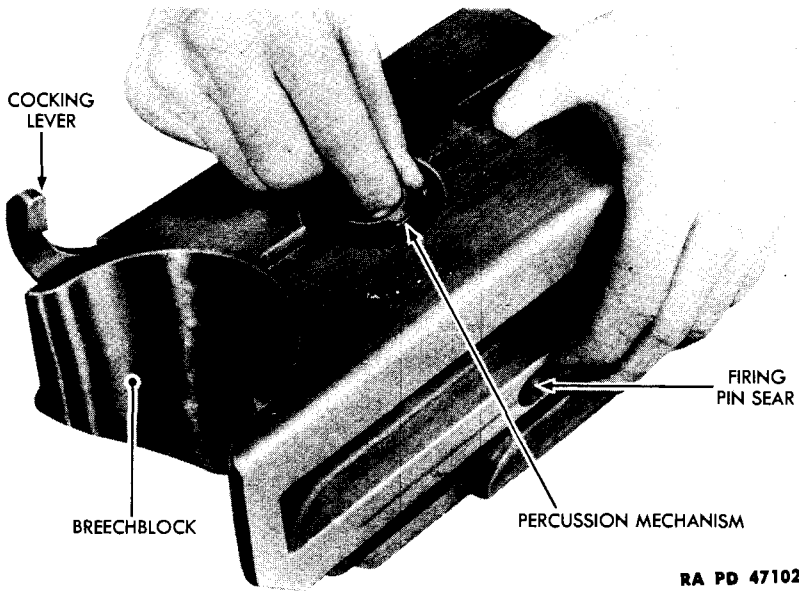


**Figure 25 – Removal of Firing Spring**

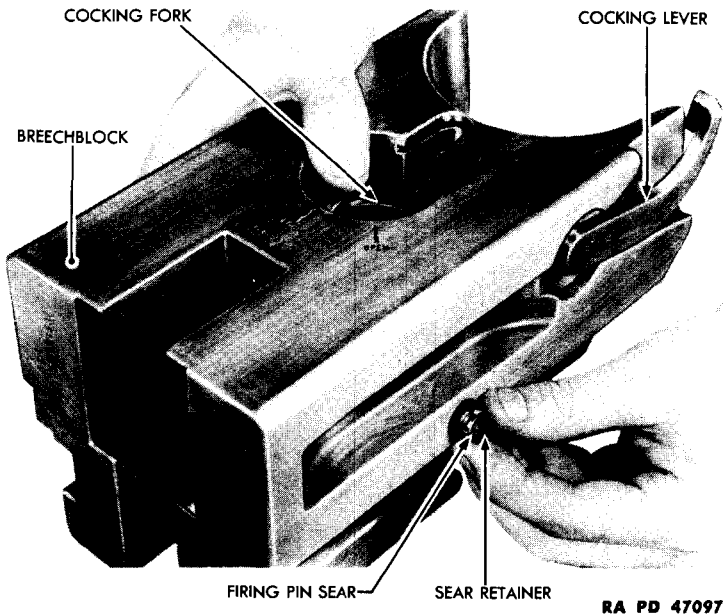


**Figure 26 – Removal of Plunger Assembly**

**MAINTENANCE AND REPAIR INSTRUCTIONS**



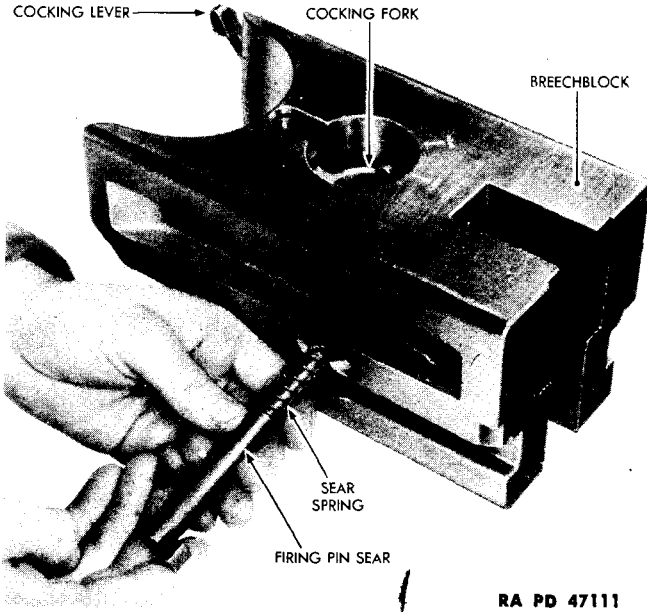
**Figure 27 – Removal of Percussion Mechanism**



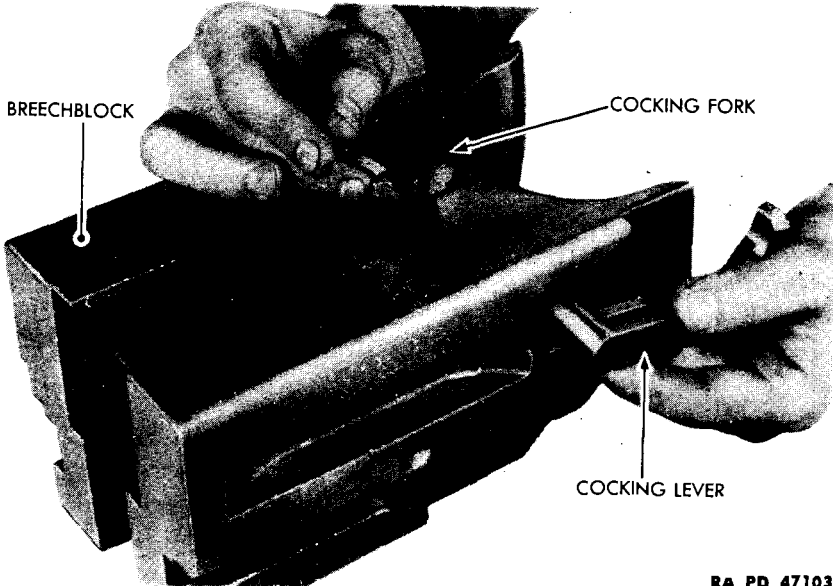
**Figure 28 – Removal of Sear Retainer**



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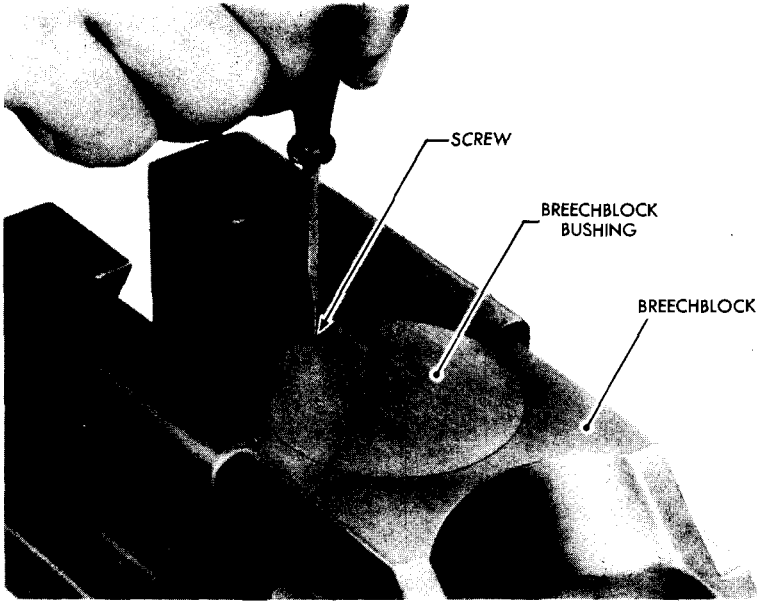


**Figure 29 – Removal of Sear and Sear Spring**



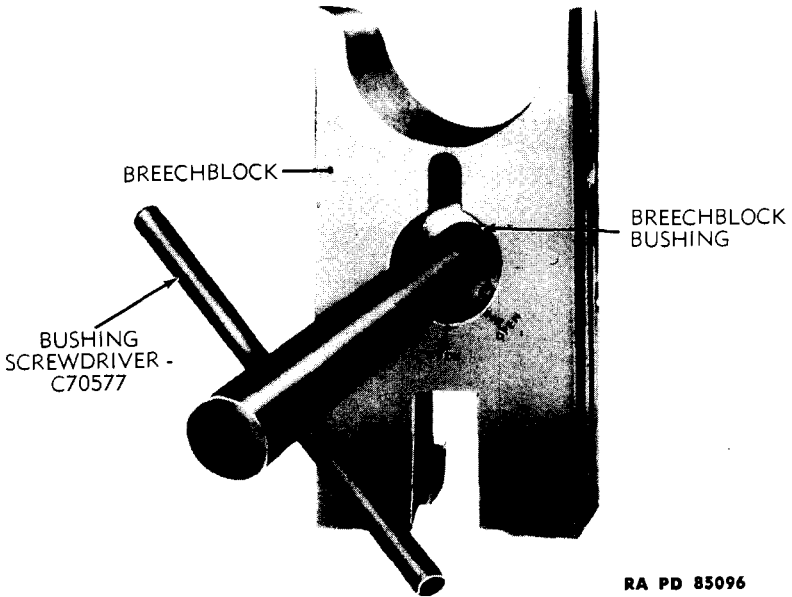
**Figure 30 – Removal of Cocking Lever and Cocking Fork**

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RA PD 47112

Figure 31 - Removal of Breechblock Bushing Screw



RA PD 85096

Figure 32 - Removal of Breechblock Bushing

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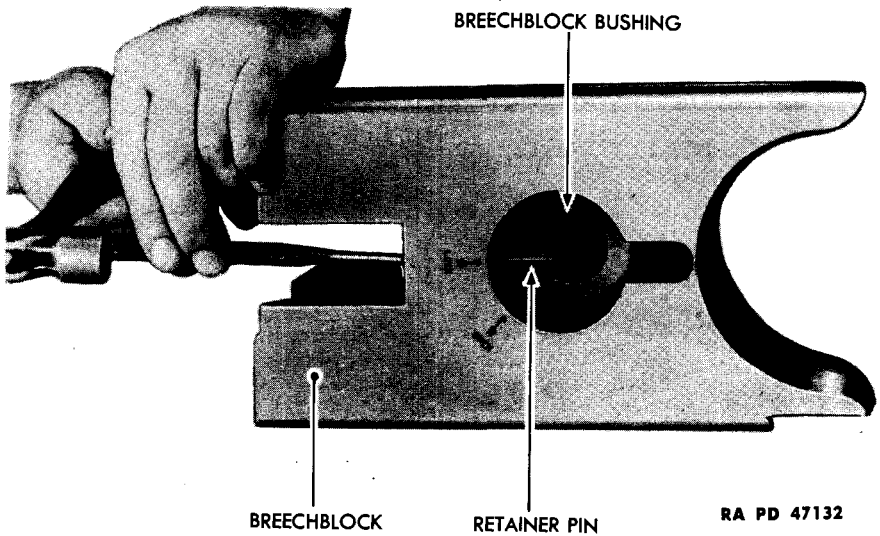


Figure 33 – Removal of Firing Spring Retainer Pin

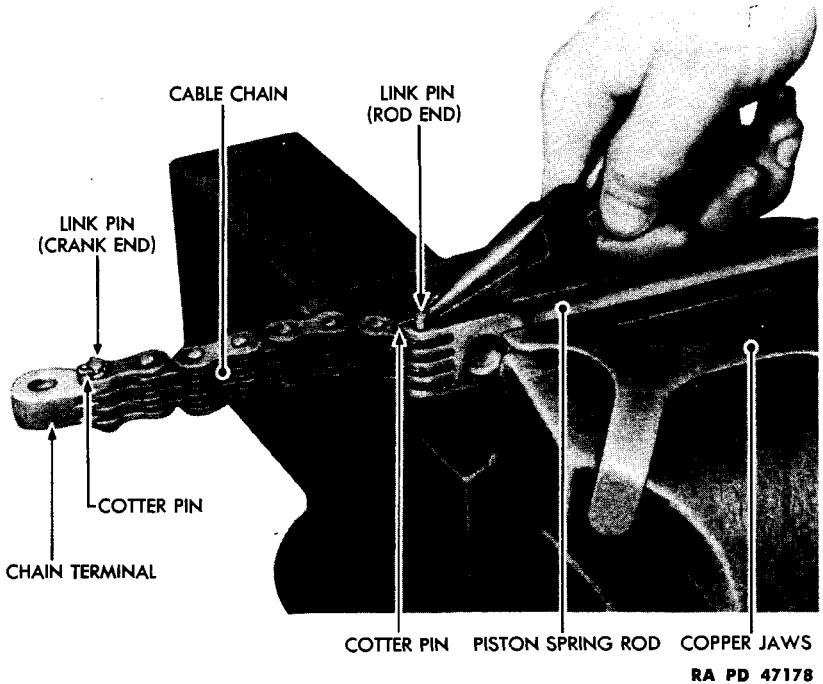


Figure 34 – Removal of Chain from Closing Spring Piston Rod

MAINTENANCE AND REPAIR INSTRUCTIONS

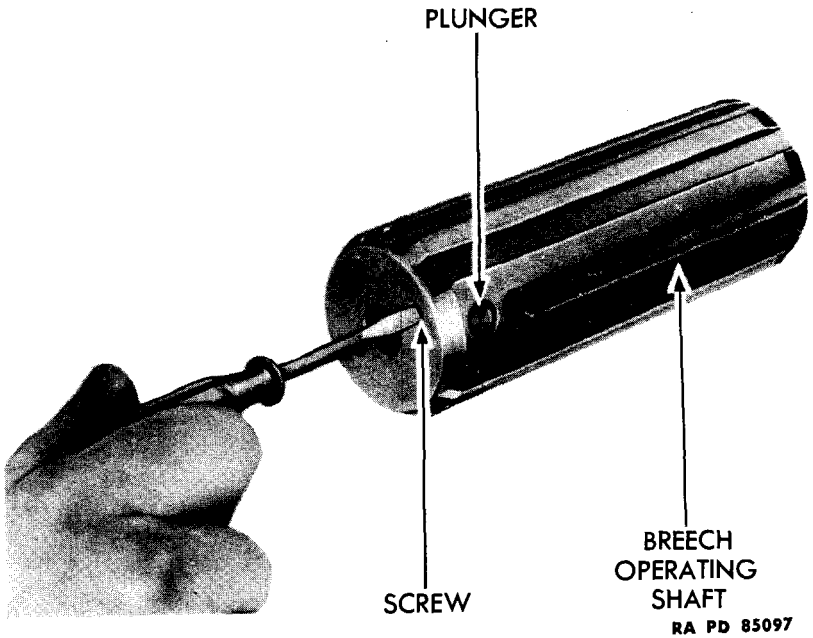


Figure 35 – Removal of Breech Operating Shaft Plunger Screw

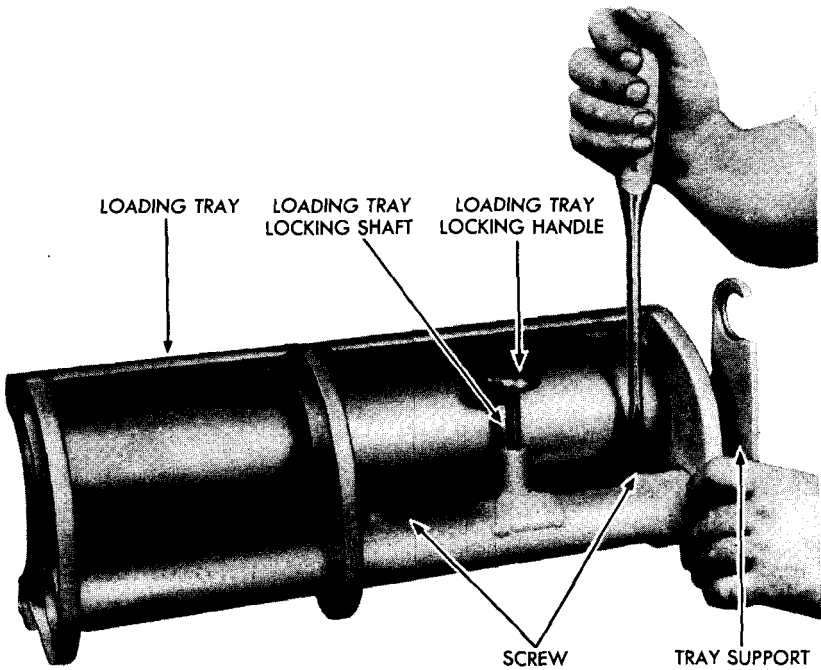
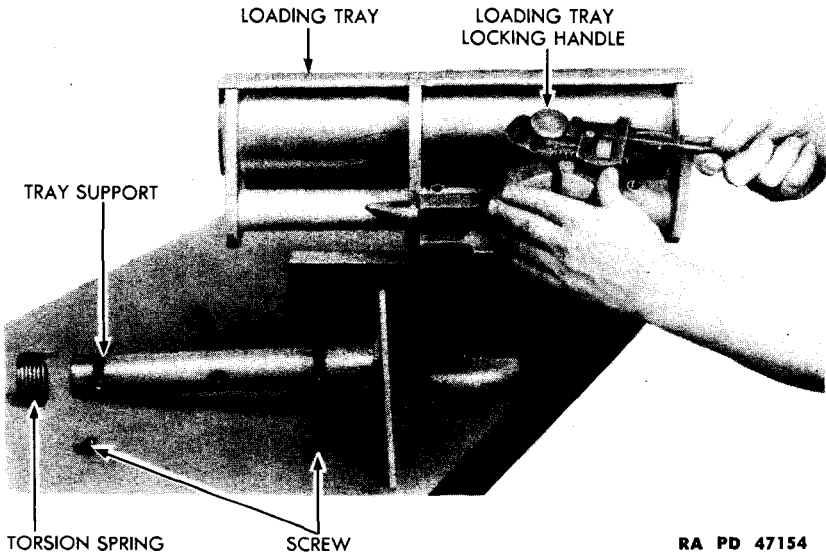
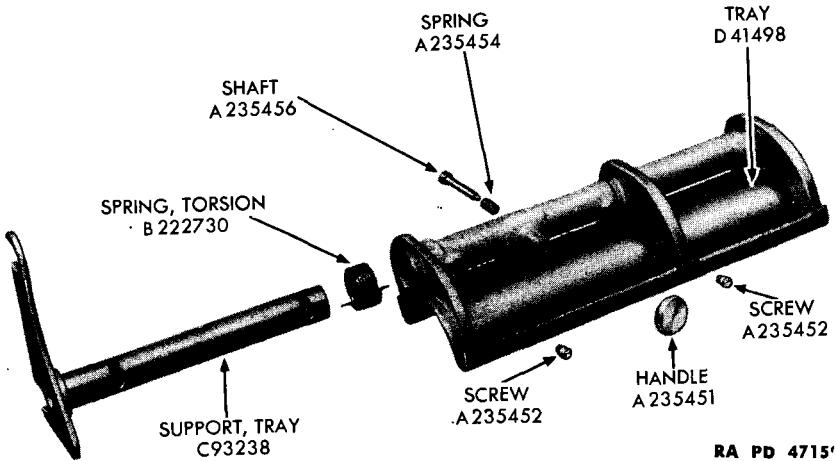


Figure 36 – Removal of Loading Tray Support

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**Figure 37 – Removal of Loading Tray Locking Handle**



**Figure 38 – Loading Tray Assembly – Exploded View**

scribed on breechblock, to the position marked "OPEN" (fig. 24). Lift firing spring retainer from breechblock, then remove firing spring (fig. 25).

**b. Remove Percussion Mechanism.** Remove plunger, spring, and plate from slot in breechblock (figs. 22 and 26). Press sear in-

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ward to release percussion mechanism assembly, then lift percussion mechanism assembly from breechblock (fig. 27).

**c. Remove Sear.** Press sear inward and remove retainer from sear (fig. 28). Then pull sear and spring from breechblock (figs. 23 and 29).

**d. Removing Cocking Lever and Cocking Fork (fig. 30).** Pull cocking lever partially out of breechblock to disengage lever from cocking fork. Remove fork and lever from breechblock.

**e. Remove Breechblock Bushing.** Remove screw from bushing (figs. 23 and 31). Install special breechblock bushing screwdriver in slot provided inside breechblock bushing, and unscrew bushing clockwise (fig. 32). If bushing cannot be removed in this manner, use procedure described in paragraph 16 e.

**f. Remove Firing Spring Retainer Pin (fig. 33).** Place pin punch in hole provided in breechblock on the lower side of pin and drive the firing spring retainer pin, which is drive-fitted, toward opening in breechblock provided to house percussion mechanism.

**g. Remove Chain from Closing Spring Piston Rod (fig. 34).** Place closing spring piston rod in vise equipped with copper jaws. Remove cotter pin from link pin (rod end), then remove link pin from rod, thus disconnecting chain and terminal from rod. Remove cotter pin from link pin (crank end), then remove link pin from chain terminal and lift terminal from chain.

**h. Remove Plunger and Screw from Breech Operating Shaft (fig. 35).** Remove screw that secures operating shaft plunger in operating shaft and push plunger from shaft.

**i. Disassembly of Loading Tray Assembly.** Remove two screws that prevent horizontal movement of loading tray on tray support (fig. 36). Pull loading tray locking handle and loading tray locking shaft outward to disengage shaft from hole in tray support, then slide tray support and torsion spring from tray (fig. 38). Slide torsion spring from its position on tray support. Secure shaft in vise equipped with copper jaws and unscrew handle from shaft (handle (fig. 37) is staked to shaft). Remove tray and shaft from vise, then slide shaft and spring out of tray.

## 16. INSPECTION AND REPAIR OF BREECH MECHANISM.

**a.** Clean all parts of the breech mechanism thoroughly in SOLVENT, dry-cleaning, and dry with compressed air or CLOTH, wiping.

**b.** Examine all parts carefully for cracks, wear, or breakage.

**c.** Examine closely for cuttings or abrasions on breechblock and recess in breech ring. Scoring or bruises on breechblock or in breech ring recess are removed with fine-cut file, oilstone, or scraper and polished with CLOTH, crocus. CAUTION: Remove only enough metal to eliminate the score or bruise.

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d. Replace worn or damaged parts.

**e. Replace Worn Breechblock Bushing.**

(1) A worn firing pin hole in the breechblock may cause fouling of the firing pin. Replace bushing when in worn condition.

(2) Remove screw from breechblock bushing when in worn condition (fig. 31).

(3) Remove bushing (par. 15 e). If bushing is too tight to unscrew from breechblock, drill a hole in face of bushing large enough to insert a  $\frac{3}{8}$ -inch drift punch. Unscrew bushing by tapping drift with a hammer (fig. 39).

(4) Install new bushing. Screw bushing into breechblock until properly seated. Grind or file half hole in bushing to match half hole in breechblock. Smooth with oilstone or crocus cloth.

(5) File and polish the bushing face flush with the breechblock face (fig. 40).

(6) Install the set screw. Then remove screwdriver bur from screw.

f. Examine cranks for burs, nicks, scratches, scoring, or other mutilations and remove defects, then polish.

g. Examine threads on spring piston rod; if burred, remove bur. If threads are jammed or cross-threaded, replace rod. Examine chain; if worn, replace. Visually inspect terminal; if roughened or burred, smooth out. If connecting pin hole is worn, replace terminal.

h. Examine screw holes in ejector cam. If staking has burred or mutilated the threads, clean up threads (fig. 41). Examine screws. If staking has burred the threads, recut threads (fig. 42). If staking has badly mutilated the threads, replace the screw.

i. Examine breech operating shaft (fig. 12). Remove burs or scratches and polish. Visually inspect plunger and screw. If plunger is worn, replace. Remove screwdriver bur from screw.

j. **Lubrication.** Proper instructions for lubrication of the breech mechanism are given in chapter 3, section VII.

**k. Inspection and Repair of Loading Tray (fig. 38).**

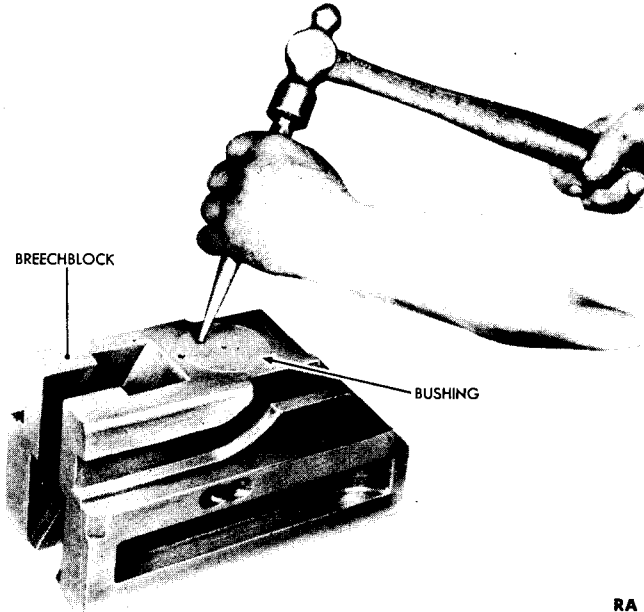
(1) Visually inspect tray support. Remove scratches or burs. If tray support is distorted, replace.

(2) Visually inspect torsion spring and, if distorted or ends of spring are bent or broken, replace spring.

(3) Visually inspect tray and, if slightly dented, straighten. If heavily dented, replace tray.

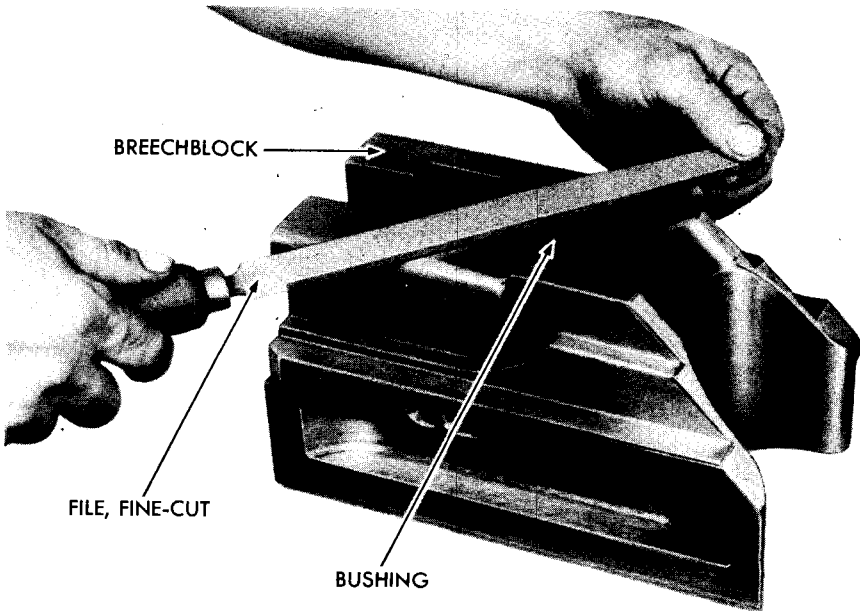
(4) Visually inspect shaft. If burred, remove burs and polish. Remove staking burs.

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**Figure 39 – Removing Breechblock Bushing**



RA PD 47187

**Figure 40 – Filing Breechblock Bushing**



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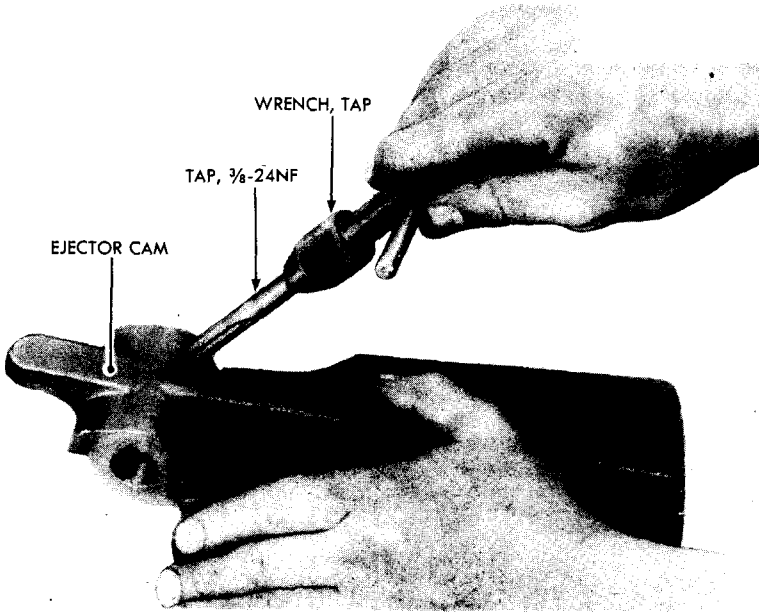


Figure 41 – Removing Staking Burs from Ejector Cam RA PD 47121

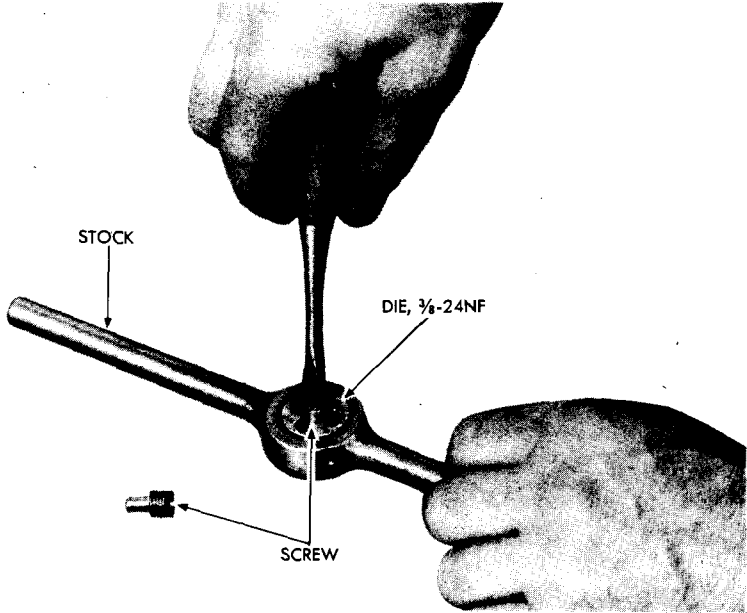


Figure 42 – Recutting Thread on Ejector Cam Screws RA PD 47095

**MAINTENANCE AND REPAIR INSTRUCTIONS****17. ASSEMBLY OF BREECH MECHANISM.**

**a. Assemble Closing Spring Piston Rod, Chain, and Terminal (fig. 34).**

(1) Place closing spring piston rod in a vise equipped with copper jaws.

(2) Aline holes in end links of chain with holes in end of rod, then insert link pin (rod end) through holes provided in rod and holes in end links of chain. Secure link pin (rod end) in position by installing cotter pin through transverse hole provided in end of link pin.

(3) Aline holes in terminal with holes in end links of chain, then install link pin (crank end) through holes provided in terminal and end links of chain. Secure pin in position by installing cotter pin through transverse hole provided in link pin.

(4) Remove closing spring piston rod from vise and lay assembled rod carefully aside.

**b. Install Firing Spring Retainer Pin (fig. 33).** NOTE: If breechblock support tool B163786 is used when installing breechblock, breechblock must be installed before installing firing mechanism (par. 18). Aline firing spring retainer pin with lower end of hole provided in breechblock. Be careful to have pin properly alined in hole as installation is a drive fit. Tap pin gently to start pin in hole. Then drive pin into hole. Drive pin into hole provided in breechblock until pin extends  $\frac{1}{8}$  inch into percussion mechanism housing in breechblock (fig. 33).

**c. Install Breechblock Bushing.** Screw breechblock bushing into breechblock by hand (clockwise) as far as possible. Then turn breechblock around and place breechblock bushing screwdriver in slot provided in rear end of bushing (fig. 32). Turn bushing until tight in breechblock with screw hole (half in bushing and half in breechblock) properly alined (fig. 31). Install screw to secure bushing in breechblock. After installing screw in bushing, remove burs left by screwdriver and polish with CLOTH, crocus (fig. 40).

**d. Install Cocking Lever and Cocking Fork (fig. 30).** Hold cocking fork in opening provided in breechblock. Then insert cocking lever in opening provided in breechblock and engage lug on end of lever with slot in fork.

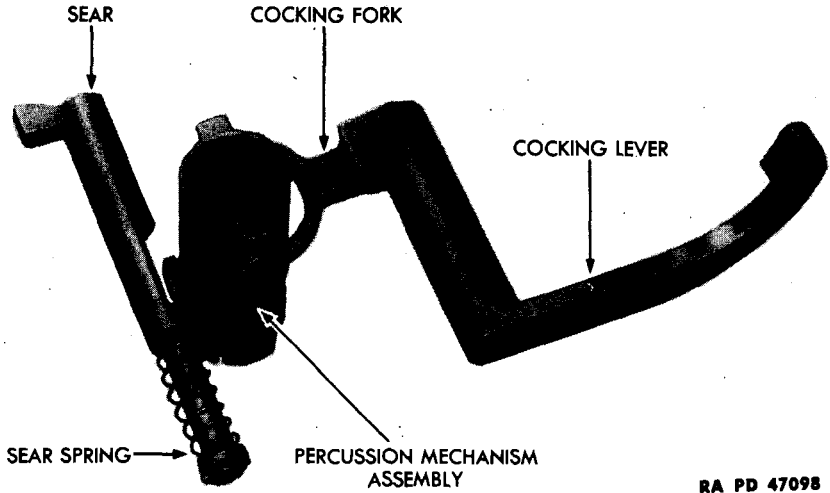
**e. Install Sear.** Place spring on sear (fig. 29). Insert spring and sear into breechblock. Push sear into breechblock until retainer end of sear extends out opposite side of breechblock. Then install retainer on sear (fig. 28).

**f. Install Percussion Mechanism.**

(1) Press sear inward to allow lugs on percussion mechanism to clear lug on sear.

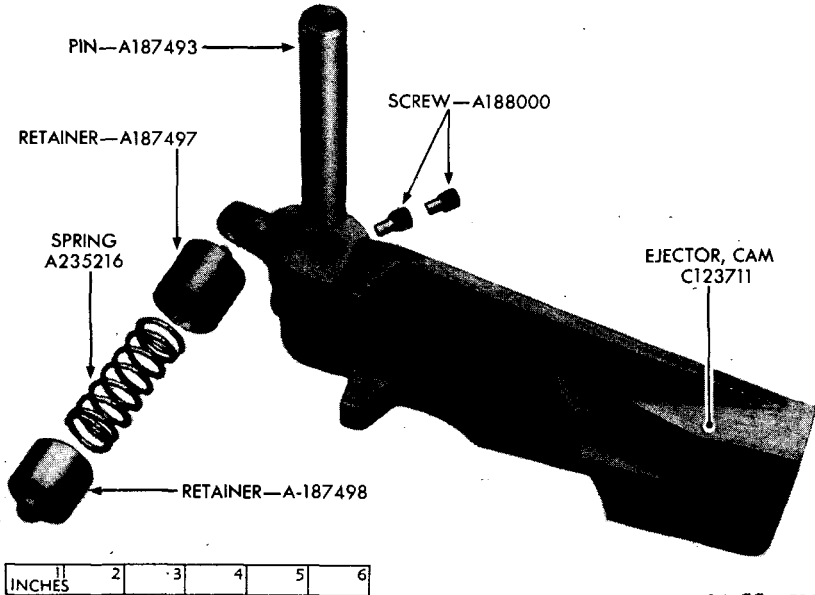
(2) Place percussion mechanism in opening provided in breech-

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Figure 43 — Percussion and Cocking Mechanism



RA PD 47168

Figure 44 — Ejector Cam — Exploded View

block (fig. 27). Then release sear in order to have lug on sear engage lugs on percussion mechanism (fig. 43).

(3) Assemble cocking fork plunger, compression spring, and cover plate (figs. 22 and 26). Move cocking lever toward rear which ro-

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tates cocking fork toward front of breechblock and facilitates installation of plunger assembly (fig. 43). Then place plunger assembly in position in breechblock (fig. 26) and hold in position while moving cocking lever toward rear to hold plunger in place.

**g. Install Firing Spring and Firing Spring Retainer.** NOTE: This operation will be performed at this time only when breechblock support tool B163786 is not used. Place firing spring in the opening provided in percussion mechanism (fig. 25). Then place firing spring retainer on spring and compress spring into percussion mechanism (figs. 22 and 25). Hold thumbs on retainer (fig. 24). Aline scribe mark (arrow) on retainer with scribe mark (arrow) marked "OPEN" on breechblock. When retainer is properly seated, turn retainer until scribe mark on retainer is alined with scribe mark on breechblock marked "LOCK." Slot provided in retainer (fig. 25) is now engaged by pin (fig. 33).

**h. Install Plunger in Breech Operating Shaft.** Place operating shaft plunger in hole provided in shaft and secure in place by installing screw (figs. 12 and 35).

### 18. INSTALLATION OF BREECH MECHANISM.

#### a. Install Bushings in Breech Ring.

(1) Before installing the various parts of the breech mechanism, all parts are to be thoroughly cleaned with SOLVENT, dry-cleaning, then thoroughly dried with compressed air (if available) or CLOTH, wiping. Lubricate all parts as outlined in chapter 3, section VII.

(2) Aline breech ring bushing outside breech ring with hole provided in breech ring (fig. 3). Have detent slot in bushing carefully alined with detent hole provided in breech ring, then start bushing into ring by carefully tapping bushing with hammer and wood block. Scale bushing on all sides to be sure of its correct alinement (if bushing is not correctly alined, it will be damaged beyond use if forced into ring).

(3) Install improvised tool for bushings as outlined in paragraph 14 j.

(4) Screw  $\frac{5}{8}$ -inch nut of improvised tool to force cylindrical driver against bushing. Continue turning nut until bushing is properly installed in breech ring. The other bushing is installed in same manner (fig. 21).

#### b. Install Breech Operating Crank and Ejector Mechanism.

(1) Install breech operating crank in breech ring bushing located on right side of breech ring (fig. 3). Install operating crank detent (fig. 20) which secures crank from any lateral movement in breech ring.

(2) Place ejector cam in position in support bracket located on

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right side of cradle (fig. 19). Aline hinge pin hole in ejector cam with hinge pin hole in bracket. Then install pin, being sure to aline set screw holes in pin with screw holes in ejector cam. Install two screws that secure ejector cam to bracket on cradle. Then stake screws in position.

(3) Assemble outer ejector cam spring retainer, spring, and inner retainer (inner retainer telescopes into outer retainer) (fig. 44). Hold this ejector spring assembly together, and insert the boss provided on end of inner retainer (fig. 44) into socket provided in cradle (fig. 19). Press outer retainer over inner retainer (fig. 18), and guide this ejector spring assembly to left until boss provided on outer retainer is alined with socket provided in ejector cam (fig. 44). Then gradually release outer retainer until spring compression will hold both retainers in position.

**c. Install Chain Terminal Crank and Closing Spring Mechanism.**

(1) Install closing spring cylinder in bracket provided on breech ring, being sure to aline screw holes in cylinder with screw holes in bracket on breech ring. Then install two screws that secure cylinder to breech ring (figs. 15 and 17).

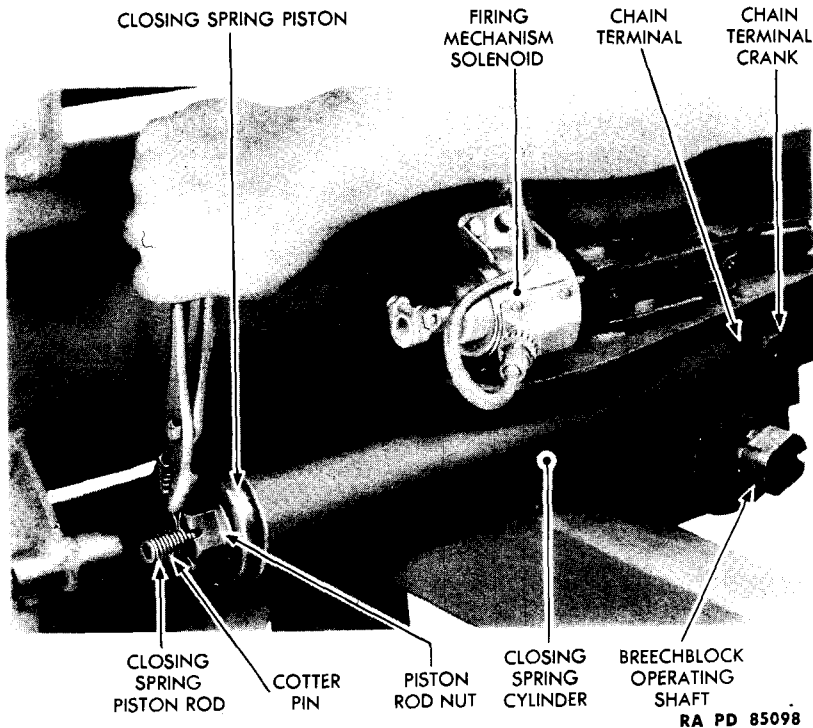
(2) Install chain terminal crank in bushing located on left side of breech ring (fig. 3). Install chain terminal crank detent that secures crank from any lateral movement in breech ring. This detent is installed in same manner as shown in figure 20.

(3) Place spring piston rod in cylinder with chain turned in such a manner that the head of link pin (rod end) is toward breech ring. This is to eliminate the possibility of pin falling out of rod in case cotter pin should work itself loose, or break out of link pin (fig. 16). Then aline hole in terminal with hole provided in crank, and insert chain terminal pin. Secure chain terminal pin in crank by installing cotter pin in transverse hole provided in chain terminal pin.

(4) Aline splines on shaft with slots provided in chain terminal and operating cranks and install shaft in cranks (fig. 11). **NOTE:** With shaft modified as authorized by Field Service Modification Work Order C47-W1, assemble breech mechanism as follows: Insert right-hand half of breech operating shaft into chain terminal crank and breechblock operating crank in usual manner, until  $\frac{1}{4}$  inch of stud extends from chain terminal crank. Screw left half of breech operating shaft onto stud as far as it will go, and back it off until splines match. Push to right until detent engages shaft in normal manner.

(5) Rotate chain terminal crank forward and push spring piston rod and chain forward until end of rod protrudes from front end of cylinder (fig. 17).

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**Figure 45 – Adjusting Closing Spring Compression**

(6) Slide closing spring on rod and into cylinder (fig. 17). Place piston with its machined concave surface against the convex surface of piston rod nut and install piston and nut on rod (figs. 15 and 17). Temporarily install cotter pin in spring piston rod until final adjustment (fig. 45).

(7) Place wrench C57271 on left-hand breech operating shaft, then rotate chain terminal crank downward until steel retaining rod,  $\frac{7}{16}$  by 2 inches, can be installed in hole provided in piston rod to block closing spring compression from chain terminal crank and operating shaft (fig. 6) preparatory to installation of breechblock.

(8) Remove left-hand breech operating shaft from chain terminal crank (par. 14 e) (fig. 11).

**d. Install Breechblock.**

(1) Place the extractors in the extractor trunnion grooves provided in breech ring (fig. 14).

(2) Install eye bolt (par. 14 c) in hole provided in top of breechblock. Insert wooden stick through eye bolt. Lift breechblock into position over recess in breech ring. Lower breechblock (fig. 13) to

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its approximate closed position and insert breechblock support tool B163786 (par. 14 e) into opening in which firing mechanism ordinarily fits. NOTE: This is a two-man operation.

(3) If breechblock support tool B163768 is not available, the use of two wood blocks placed between the top surface of the breech ring and the wooden stick, when the breechblock is raised to its approximate closed position, will have to be resorted to. This operation is not recommended as the top surface of the breech ring is not entirely flat. If this operation is performed, it is recommended that firing mechanism be replaced before breechblock is placed in the recess in the breech ring.

**e. Install Breechblock Operating Crank and Breech Operating Shaft.** Place right-hand breech operating shaft in chain terminal crank. Place cross heads on pivots (fig. 12), then guide breechblock operating crank, with cross heads properly aligned according to scribe marks on cross heads, in the T-slot provided in bottom of breechblock (fig. 11). Then raise breechblock operating crank to its approximate normal position in breechblock to prevent cross heads from falling off pivots, and hold breechblock operating crank in this position until shaft is installed. Aligned splines on shaft with slots on cranks and slide shaft through these cranks until shaft is held in position by detent in operating crank (fig. 10).

**f. Install Extractor Plunger Assembly.** Assemble extractor plug, spring, and plunger (fig. 9) and install in hole provided in breech ring (fig. 8). Install other identical extractor plunger assembly in the same manner.

**g. Remove Eye Bolt from Breechblock.** Remove breechblock support tool B163786 and insert firing mechanism into its proper location (par. 17 g). Lower breechblock to its open position and unscrew eye bolt (fig. 8). NOTE: This is a two-man operation.

**h. Release Closing Spring Compression** (fig. 6). Place wrench C57271 on left end of operating shaft, then pull downward on wrench until spring compression is removed from retaining rod. Lift steel retaining rod ( $\frac{7}{16}$  by 2 inches) from piston rod and gradually raise handle to let breechblock assembly absorb closing spring compression.

**i. Adjust Closing Spring Compression.** If compression on spring is too great, the breechblock will return to its closed position with too much shock, or, conversely, if spring compression is too light, the breechblock will not close completely. To make adjustment of spring, remove cotter pin from piston rod (fig. 45), then tighten or loosen piston rod nut as desired (fig. 14). When desired compression is obtained, align slot in castellated piston rod nut with nearest of holes provided in piston rod, and secure in this position by installing

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cotter pin through slot in nut and hole in rod (fig. 45). The closing spring piston rod nut should be screwed on the piston rod until a cotter pin can be inserted in the fifth hole in the piston rod. This nut may be tighter if the spring fails to close the breechblock properly.

**Section III**

**PERCUSSION MECHANISM**

	Paragraph
General .....	19
Malfunctions .....	20
Removal of percussion mechanism .....	21
Disassembly of percussion mechanism .....	22
Inspection and repair of percussion mechanism .....	23
Assembly of percussion mechanism .....	24
Installation of percussion mechanism .....	25

**19. GENERAL.**

a. The percussion mechanism (fig. 46) consists of firing pin guide pin, firing pin guide, firing spring stop, firing pin spring, and firing pin.

b. A complete description of these parts, and of their functions and operations, is given in TM 9-311, paragraph 8.

**20. MALFUNCTIONS.**

**a. Gun Fails to Fire.**

Cause	Correction
Lack of, or insufficient blow on primer.	Remove and disassemble percussion mechanism. Wash in SOLVENT, dry-cleaning. Remove any burrs with oilstone. Replace broken or mutilated parts. Lubricate, assemble, and install. Try for free action with no binding.
Broken or deformed point on firing pin.	Replace firing pin.

**21. REMOVAL OF PERCUSSION MECHANISM.**

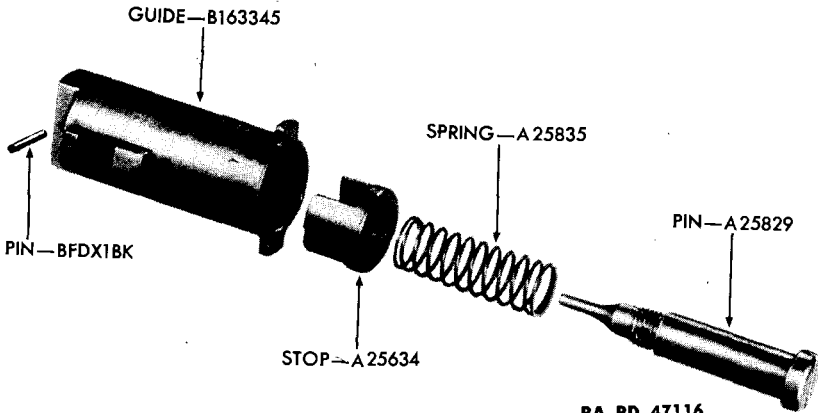
a. **Remove Percussion Mechanism.** NOTE: Percussion mechanism may be removed from breechblock while breechblock is installed in breech ring or while breechblock is removed from breech ring. For removal of percussion mechanism, see paragraph 15 b.

**22. DISASSEMBLY OF PERCUSSION MECHANISM.**

a. **Disassemble Percussion Mechanism.** Push firing spring stop (fig. 46) against spring compression and into firing pin guide, then turn

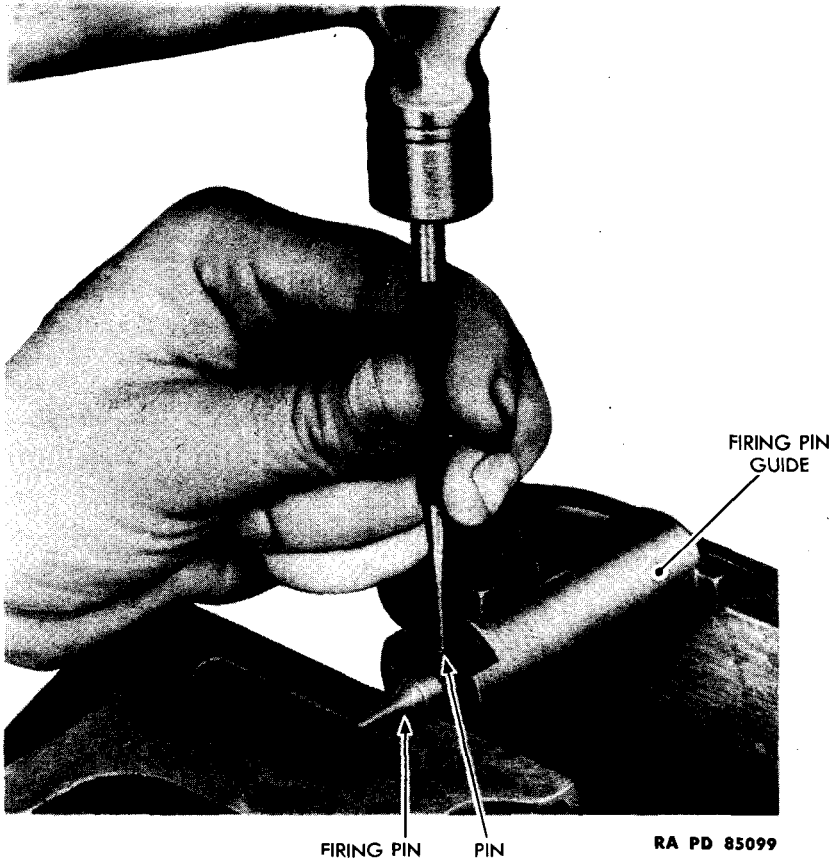


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AIRPLANE MOUNT M6**



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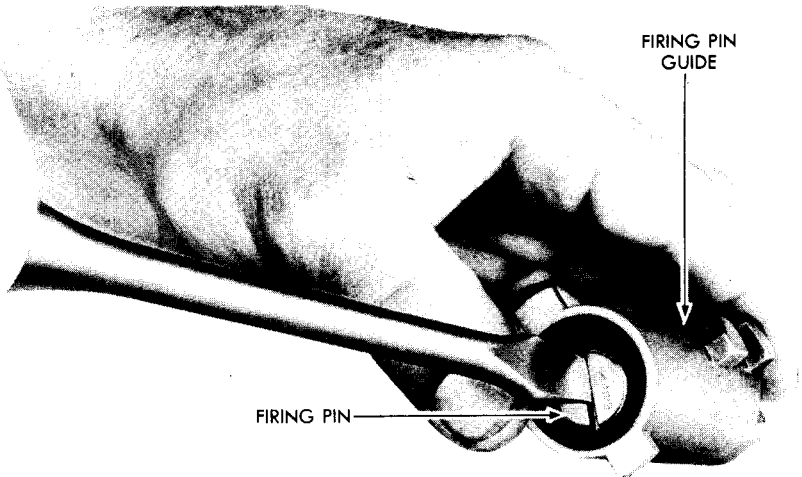
**Figure 46 – Percussion Mechanism Assembly – Exploded View**



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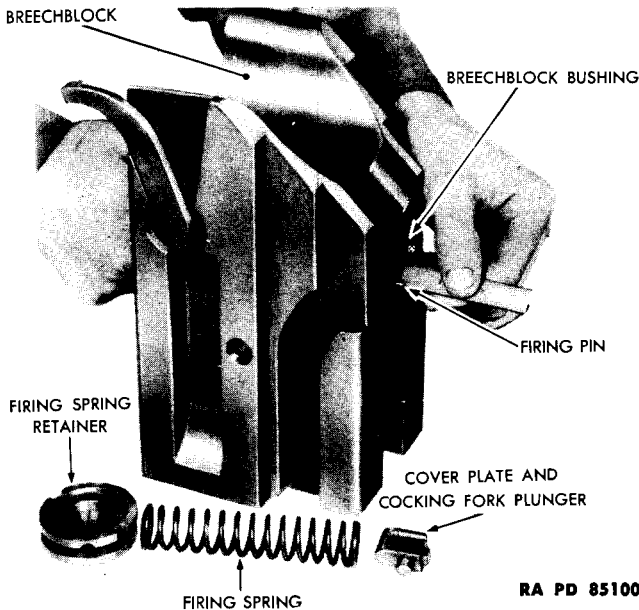
**Figure 47 – Removal of Firing Pin Guide Pin**

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RA PD 47140

**Figure 48 – Removing Firing Pin from Firing Pin Guide**



**Figure 49 – Measuring Firing Pin Protrusion**

stop approximately one-quarter turn to keep it inside guide, or stop may be held in guide with small pin punch or small nail. Remove pin from firing pin guide. This guide pin is loosely installed and can be pushed out of guide with end of pin punch. However, if guide pin

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should be stuck in firing pin guide, place percussion mechanism in soft-jawed vise and drive pin out of guide (fig. 47). Remove firing pin from guide (fig. 48). Then remove spring and stop (fig. 46).

**23. INSPECTION AND REPAIR OF PERCUSSION MECHANISM.**

**a. Inspect Percussion Mechanism (fig. 46).**

(1) All parts of percussion mechanism are to be thoroughly cleaned with SOLVENT, dry-cleaning, and thoroughly dried with compressed air or CLOTH, wiping.

(2) Wear in this mechanism is negligible. Although frequent disassembly for the purpose of cleaning, inspecting, and replacing worn or damaged parts is required of the using arms, the percussion mechanism is also disassembled, cleaned, inspected, repaired, and assembled by ordnance maintenance personnel.

(3) Remove burrs and smooth roughened surfaces with CLOTH, crocus, or an oilstone.

(4) Replace worn, damaged, or deformed parts.

(5) Lubricate in accordance with instructions contained in chapter 3, section VII.

**24. ASSEMBLY OF PERCUSSION MECHANISM.**

**a. Assembly of Percussion Mechanism.** Place firing spring stop into firing pin guide, then place spring into guide and against stop (fig. 46). Install firing pin (fig. 48). Push stop against spring compression and into guide. Then turn stop approximately one-quarter turn to keep stop inside guide. Place pin in hole provided in guide. Keep pin in place in guide by releasing stop (turning one-quarter turn to release stop) from guide.

**25. INSTALLATION OF PERCUSSION MECHANISM.**

**a.** Before complete installation of percussion mechanism, check firing pin protrusion. With firing spring and firing spring retainer removed from breechblock, press firing pin as far forward as it will go (fig. 49). The firing pin protrusion can then be measured with a scale at the front of the breechblock. Protrusion should be  $\frac{5}{32}$  to  $\frac{7}{32}$  inch. If there is less or greater protrusion, replace firing pin.

**b.** For installation of percussion mechanism refer to paragraph 17 f.

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**Section IV**

**FIRING MECHANISM**

	<b>Paragraph</b>
General .....	26
Malfunction .....	27
Removal of firing mechanism .....	28
Inspection and repair of firing mechanism .....	29
Assembly and installation of firing mechanism .....	30

**26. GENERAL.**

a. The firing mechanism (fig. 50) consists of the firing solenoid, firing mechanism compression spring, firing mechanism shaft, ring mechanism rod, firing mechanism rod adjusting yoke, firing plunger lever assembly, firing plunger and retainer.

b. A complete description of these parts, their functions and operations is given in TM 9-311, paragraphs 13 and 21.

**27. MALFUNCTION.**

**a. Fails to Fire.**

<b>Cause</b>	<b>Correction</b>
Solenoid fails to operate when energized by electric switch.	Test solenoid (par. 29 b). Replace solenoid if inoperative.
Firing mechanism operates; but gun fails to fire.	Adjust firing mechanism (par. 30 b).
Mechanical firing mechanism fails to operate.	Replace broken or damaged parts of firing mechanism.

**28. REMOVAL OF FIRING MECHANISM.**

a. **Remove Solenoid** (fig. 51). Remove two cap screws and lock washers that secure solenoid to cradle. Then lift solenoid from cradle.

**b. Remove Mechanical Firing Mechanism.**

(1) Remove two machine screws and lock washers that secure name plate to cradle (figs. 50 and 51). Lift name plate from cradle.

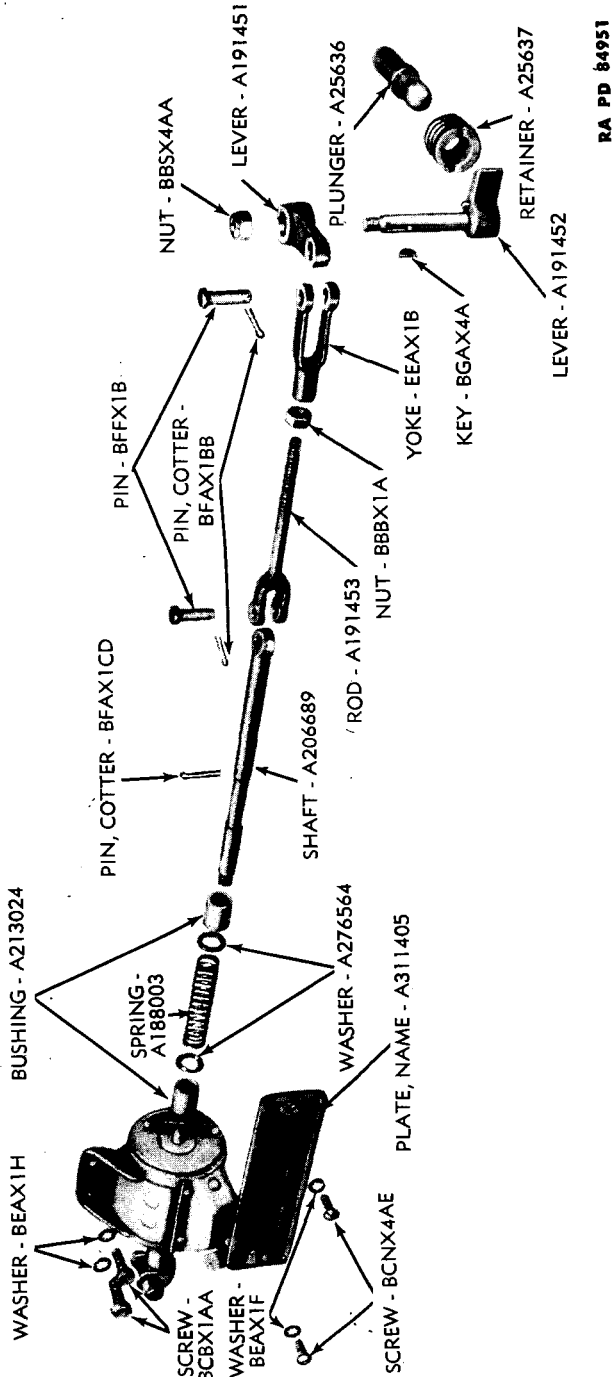
(2) Remove cotter pin from yoke pin, then remove the yoke pin which secures rod end yoke to lever and lift yoke from lever (figs. 50 and 52).

(3) Remove cotter pin from firing mechanism shaft. This relieves the compression on shaft spring (fig. 52).

(4) Remove safety nut from firing lever (fig. 52). Then pry yoke lever (fig. 53) upward to disengage lever from key. (Do not attempt to remove firing lever by driving it downward with hammer, as it is securely held by a Woodruff key.)

(5) Remove Woodruff key from firing lever (fig. 54). Then pull firing lever downward and out of its bracket on cradle (figs. 50 and 53).

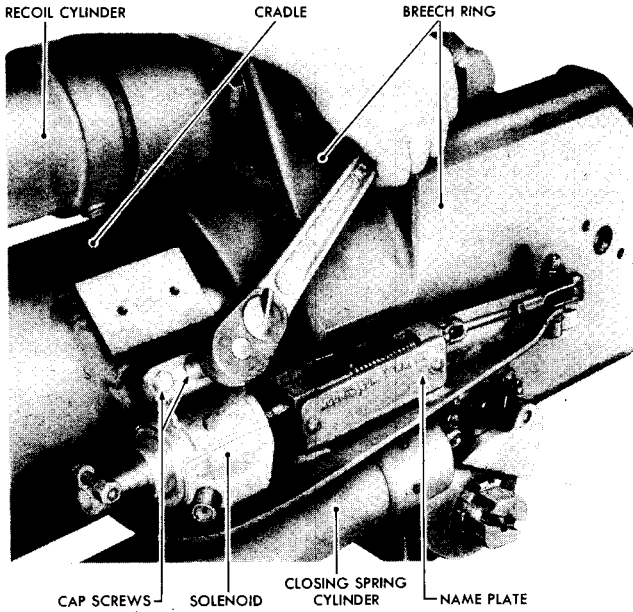
ORDNANCE MAINTENANCE – 75-MM GUN M4 AND  
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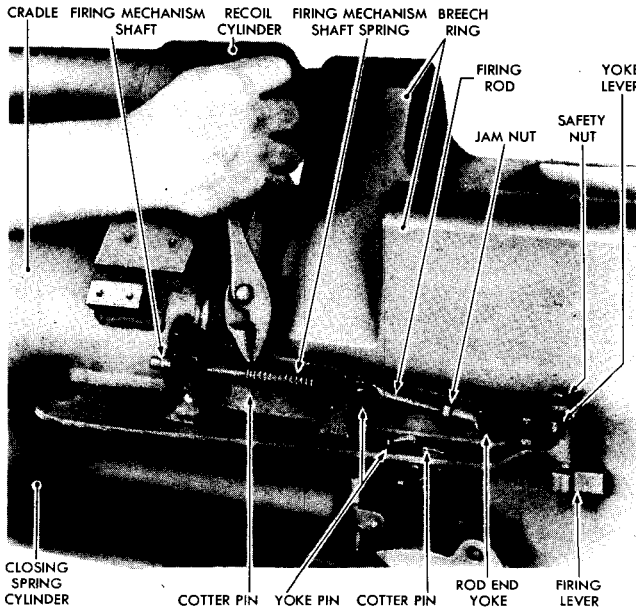
Figure 50 — Firing Mechanism — Exploded View

**MAINTENANCE AND REPAIR INSTRUCTIONS**



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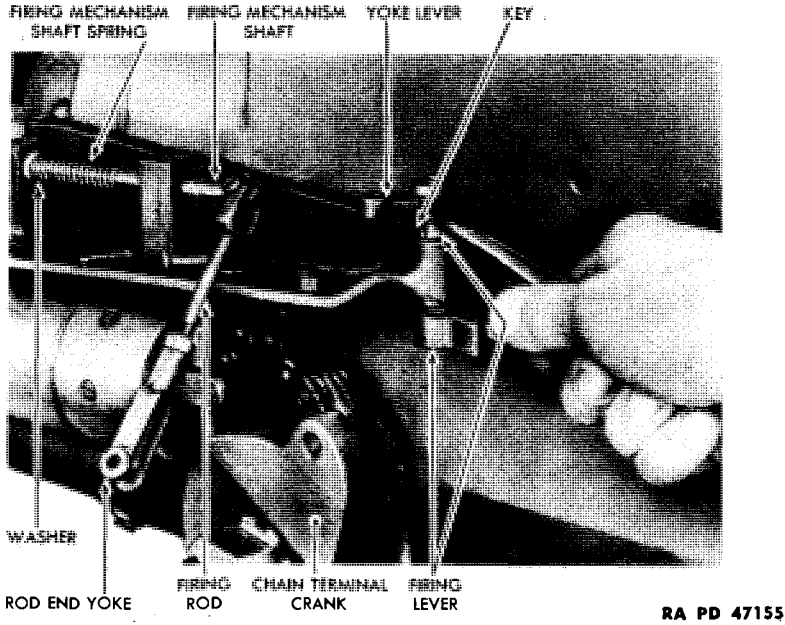
**Figure 51 – Removing Solenoid**



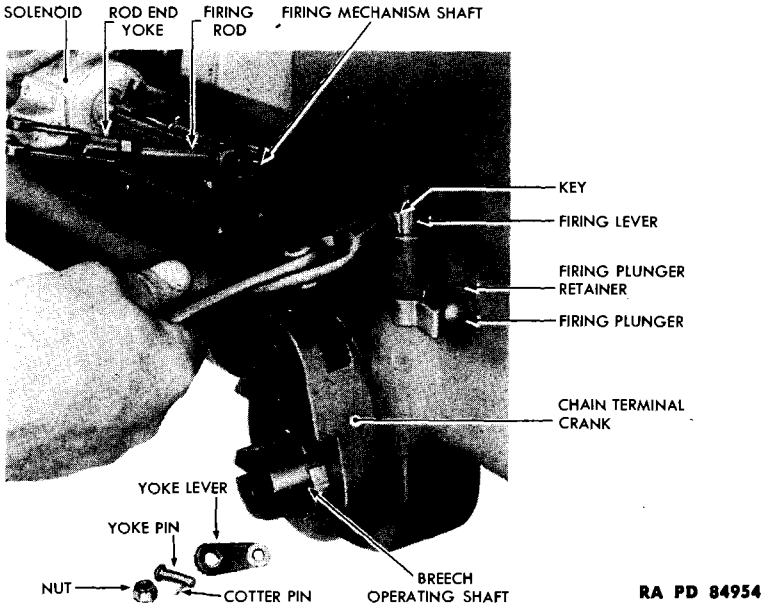
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**Figure 52 – Releasing Compression from Firing Mechanism Shaft Spring**

**ORDNANCE MAINTENANCE – 75-MM GUN M4 AND  
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**Figure 53 – Removing Firing Mechanism Lever Assembly**



**Figure 54 – Removing Woodruff Key from  
Firing Mechanism Lever**

## MAINTENANCE AND REPAIR INSTRUCTIONS

(6) Slide firing rod and firing mechanism shaft out of blocks on cradle, being careful to catch washers and spring as shaft is pulled through blocks on cradle (figs. 50 and 52).

(7) Drive out bushings (figs. 50 and 95). (Use improvised steel driving rod,  $\frac{9}{16}$  by 7 inches turned down to  $\frac{3}{8}$  inch on one end for  $\frac{1}{4}$  inch from end of rod (fig. 95).)

**NOTE:** Do not remove plunger from breech ring unless it has been broken. In that case make an improvised wrench from gas pipe or electrical conduit ( $\frac{3}{8}$ -inch I.D. by  $\frac{7}{8}$ -inch O.D. by  $\frac{1}{8}$ -inch square lugs on end) and use it to unscrew retainer and remove retainer and plunger from breech ring (fig. 55).

### 29. INSPECTION AND REPAIR OF FIRING MECHANISM.

#### a. Inspect Mechanical Firing Mechanism (fig. 50).

(1) Thoroughly clean all parts of the firing mechanism with SOLVENT, dry-cleaning, and thoroughly dry all parts with compressed air (if available) or CLOTH, wiping. Personnel will be very careful not to saturate electrical parts with dry-cleaning solvent. Lubricate moving parts as per instructions in chapter 3, section VII.

(2) Visually inspect end of firing plunger for roughness or nicks and remove same with fine-cut file. Also inspect striking face of firing lever. If nicked or grooved, smooth out with fine-cut file.

(3) Visually inspect Woodruff key and remove burs or scratches. If key is distorted, replace key.

(4) Visually inspect yoke lever. Remove nicks or scratches. If lever connecting hole is worn so that a sloppy fit between yoke lever and yoke is effected, replace yoke lever.

(5) Visually inspect both yoke pins. If pins are lightly grooved from contact with yoke lever and firing mechanism shaft, remove groove with fine-cut file. If pins are heavily grooved, replace pins.

(6) Examine yoke. If holes in connecting end of yoke are worn, replace yoke. Examine threads of yoke. If burred, recut threads.

(7) Examine firing rod; if distorted, replace rod. Visually inspect threads. If burred, remove burs with a knife-edge file. If threads are crossed, replace rod.

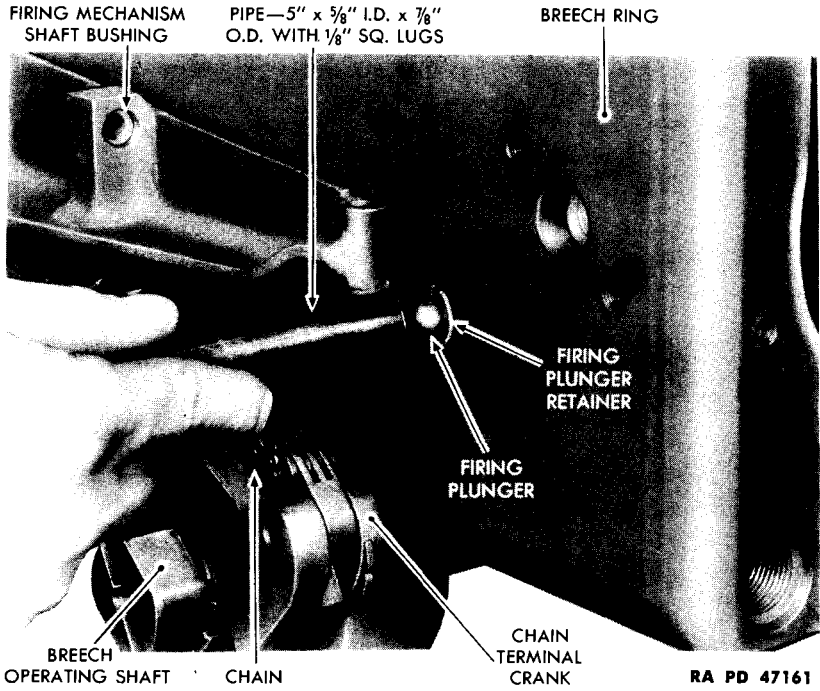
(8) Examine firing mechanism shaft. Shaft must have a smooth finish to function in bushing. If shaft is nicked or scored, remove nicks and scores and polish with crocus cloth. Visually inspect rod end of shaft. If hole is worn to extent of getting too much play in connections, replace shaft.

(9) Inspect firing mechanism shaft spring. Free height should be 2.375 inches. If longer, spring has weakened; replace spring.

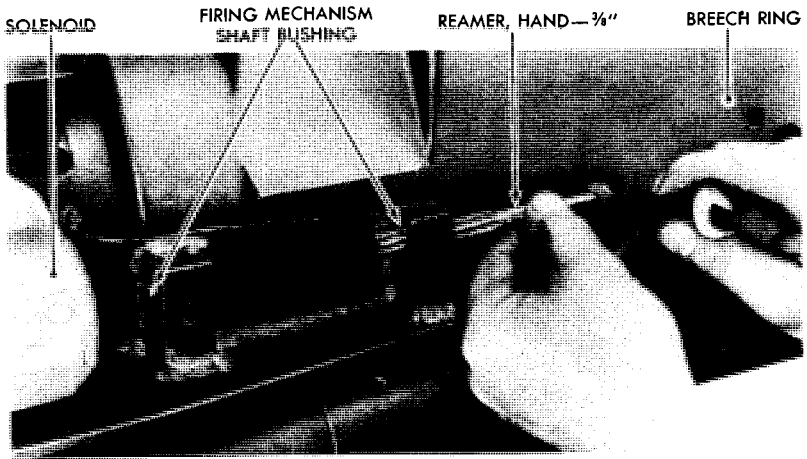
(10) Examine washers. If grooved or worn from contact with spring, reverse contact sides of washers. If washers have previously been turned and are worn on both sides, replace washers.



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**Figure 55 — Removing Firing Plunger**



**Figure 56 — Removing Bur from Bushings**

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b. **Inspect Solenoid.** Connect a piece of wire to positive terminal of a 24-volt battery and another piece of wire to the negative terminal. Then insert positive wire into solenoid to make contact within outlet that connects with connector. Intermittently ground negative wire and watch action of solenoid plunger. If plunger fails to operate, first determine whether battery and battery connections are correct; and if they are all right, and solenoid fails to function, replace solenoid.

### 30. ASSEMBLY AND INSTALLATION OF FIRING MECHANISM.

#### a. Install Mechanical Firing Mechanism.

(1) Aline bushing with hole provided in cradle, then start bushing into hole in cradle. Using improvised driving rod (par. 28 b (7)), drive bushings into position in cradle.

(2) Remove burs from bushings caused by driving tool during installation. Smooth ends of bushings with fine-cut file and polish with CLOTH, crocus. The other bushing is installed in the same manner.

(3) Place firing plunger in hole provided in breech ring with long section of plunger entering ring first (figs. 50 and 55). Then screw on retainer which secures plunger in ring (fig. 55). Tighten with improvised tool and small Stillson wrench.

(4) Install firing lever in opening provided in rear end of firing mechanism mounting plate on cradle. Secure lever in position by installing key in slot provided in lever (fig. 54).

(5) Aline key slot in yoke lever with key, then hold firing lever with one hand and press yoke lever over key and down into position on firing lever (fig. 53). Install nut on firing lever to secure yoke lever in place (fig. 52).

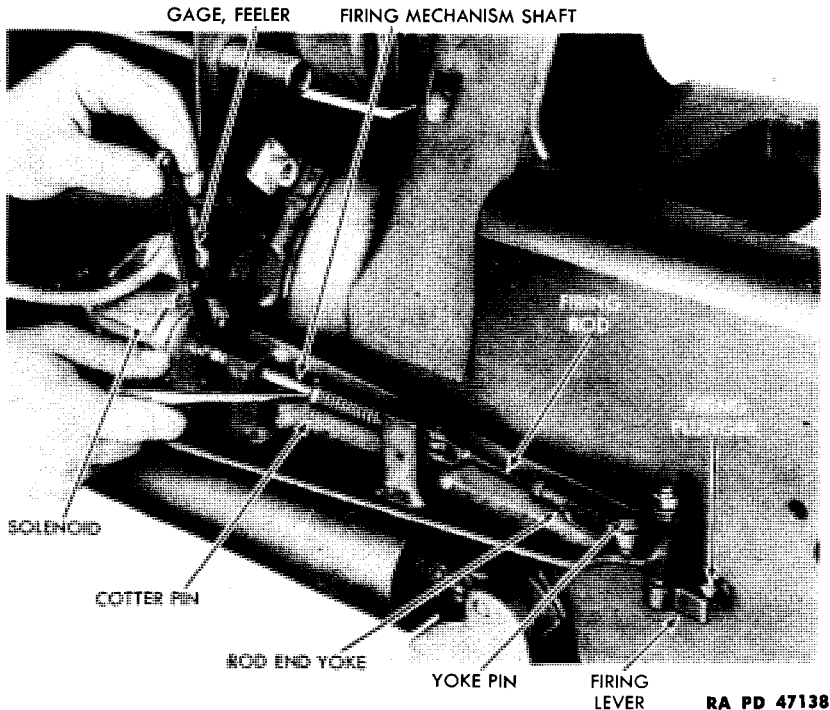
(6) Place solenoid in position on cradle with screw holes in solenoid alined with tapped holes provided in cradle. Secure solenoid to cradle by installing two shakeproof washers and two cap screws (fig. 51).

(7) Slide firing mechanism shaft through rear bushing with "eye" of shaft toward rear of gun, then slide washer, spring, and another washer on shaft (figs. 50 and 52). Push shaft through front bushing. Hold rear end of shaft with thumb and compress spring and washers toward rear of shaft with fingers. Secure spring in this compressed position by installing cotter pin in front of forward washer and through shaft.

(8) Aline holes in small yoke end of firing rod with hole in rear end of shaft, then insert yoke pin, and secure with cotter pin (figs. 50 and 53).

(9) Install jam nut loosely on firing rod, then screw adjustable yoke on rod (figs. 50 and 52). Aline holes in yoke with hole in yoke lever and insert yoke pin. (Do not install cotter pin in yoke pin until firing mechanism is adjusted.)

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**Figure 57 – Adjusting Firing Mechanism**

**b. Adjust Firing Mechanism (fig. 57).**

- (1) Cock gun manually by pushing cocking lever forward.
- (2) Push firing rod and firing mechanism shaft rearward until firing lever is up against firing plunger. This removes all slack from yoke connections of firing mechanism. Then use a feeler gage to measure the distance between plunger end of solenoid and forward end of firing mechanism shaft. The correct distance should be 0.0625 or  $\frac{1}{16}$  inch. This clearance enables firing mechanism to obtain this amount of free travel and sharply “slap” firing plunger when solenoid is energized.
- (3) Make desired adjustment by removing yoke pin from adjustable rod end yoke and screwing the yoke on firing rod until desired clearance is obtained. Then install yoke pin through yoke lever and yoke and secure by installing cotter pin.

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**Section V**

**RECOIL MECHANISM**

	<b>Paragraph</b>
General .....	31
Malfunctions .....	32
Removal of recoil cylinders .....	33
Removal of replenisher .....	34
Disassembly of recoil cylinders .....	35
Inspection and repair of recoil cylinders .....	36
Assembly of recoil cylinders .....	37
Installation of recoil cylinders .....	38
Disassembly of replenisher .....	39
Inspection and repair of replenisher .....	40
Assembly of replenisher .....	41
Installation of replenisher .....	42

**31. GENERAL.**

a. The recoil mechanism (fig. 58) consists of the upper recoil cylinder assembly, the lower recoil cylinder assembly, the replenisher assembly, the connecting hose assemblies, the filling hose assembly, and the filling hose coupling.

b. A complete description of these parts, and of their functions and operations, is given in TM 9-311, paragraphs 11 and 12.

**32. MALFUNCTIONS.**

**a. Gun Returns to Battery with Too Great a Shock.**

<b>Cause</b>	<b>Correction</b>
Recoil oil too light.	Check type of recoil oil used.
Insufficient amount of recoil oil in recoil system.	Check recoil system with replenisher gage and add oil. Purge air from system. Check and tighten all connections in recoil system.

**b. Gun Fails to Return to Battery.**

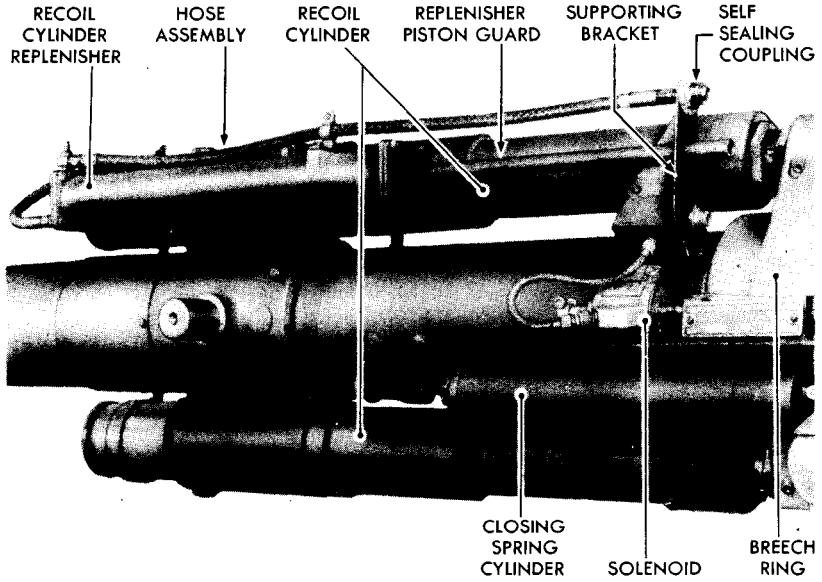
Broken spring or springs. Replace with new spring or springs.

**c. Air in Recoil Cylinders.**

Lines not properly purged when adding recoil oil to system. Connect oil filler line to oil filler valve; then purge lines, upper cylinder, and replenisher as oil is pumped into system.

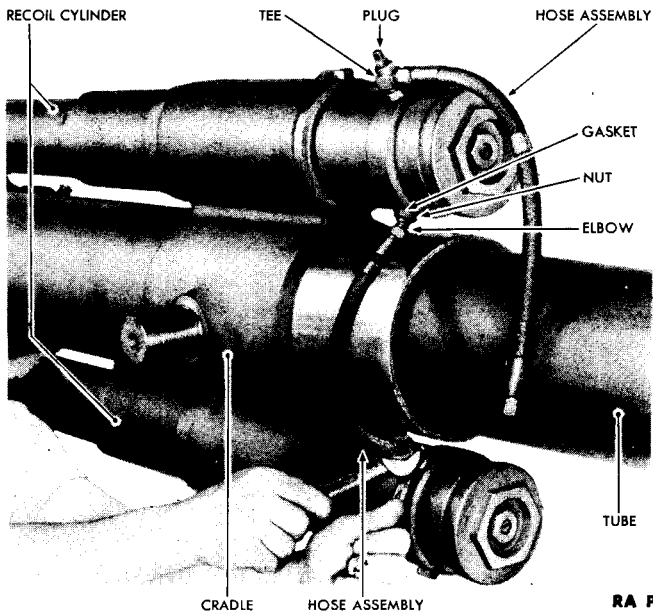
Replenisher empty. Fill replenisher and purge system.

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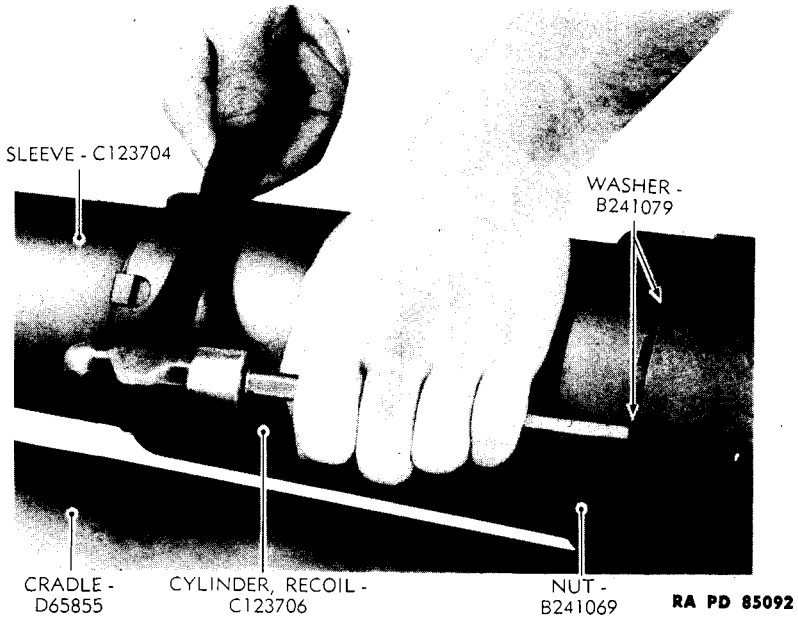
Figure 58 — Recoil Cylinders — Left Rear View



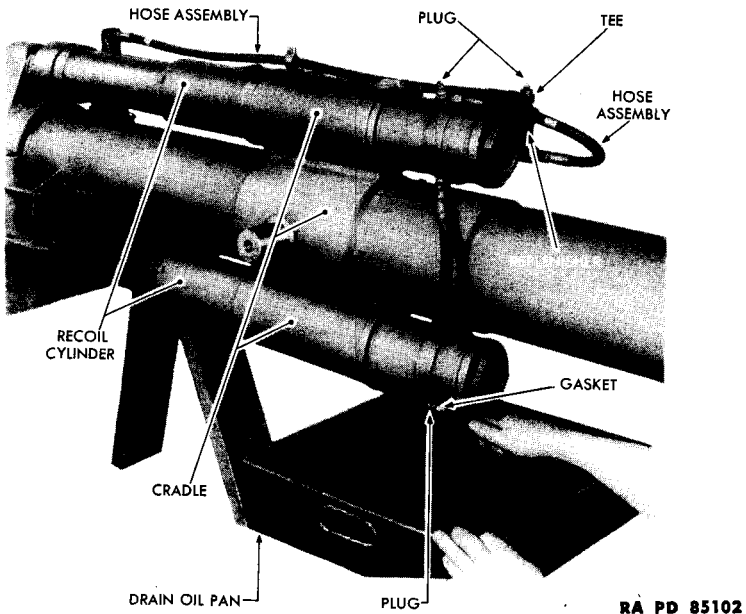
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Figure 59 — Removing Recoil Cylinder Hose Assemblies

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**Figure 60 – Driving Fingers of Lock Washer from Recoil Cylinder Securing Nut Slots**



**Figure 61 – Draining Recoil Cylinders**

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Imperfect connections in system. Check all connections. Keep them tight and free from dirt. Replace cracked or imperfect connections or hoses. Purge air from system.

Leakage at oil filler valve. Replace oil filler valve. Purge air from system.

**d. Replenisher Gage Reading Too Low.**

Leakage in recoil. Check and tighten all connections. Replace cracked or worn parts.

**33. REMOVAL OF RECOIL CYLINDERS.**

**a. Drain Recoil Cylinders.** Hang a tag in a conspicuous place on gun or cradle to indicate type of recoil oil used, then release oil pressure from recoil system by securing coupling A236062 (part of oil filling hose assembly B269301) onto filler hose coupling and allow oil under pressure to escape from system (fig. 67). Place a drain oil pan beneath plug located in lower forward end of lower recoil cylinder (fig. 61). Remove plug and gasket from lower recoil cylinder to allow recoil oil to drain from cylinders. Remove purge plug (fig. 59) to facilitate draining of recoil system.

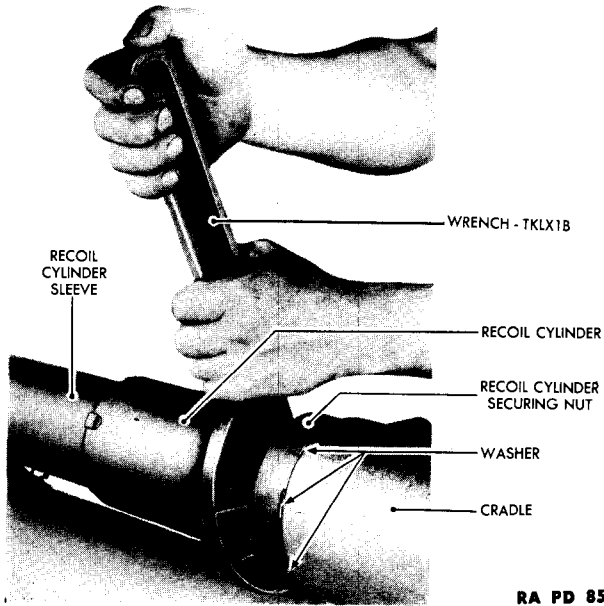
**b. Remove Recoil Mechanism Hose Assemblies** (fig. 59). Remove hose assembly from tee. Disconnect hose assembly from elbows.

**c. Loosen Securing Nut.** Drive fingers of washer out of slots provided in recoil cylinder securing nut (fig. 60). Unscrew securing nut from threads on recoil cylinder (wrench TKLX1B) (fig. 62).

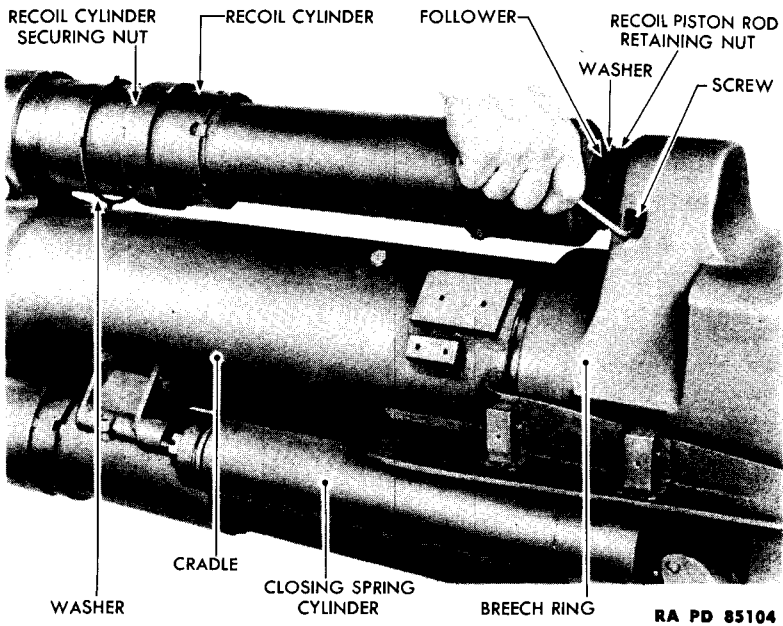
**d. Disconnect Recoil Cylinder from Breech Ring.** Loosen set screw that secures retaining nut in breech ring (fig. 63). Unscrew retaining nut from breech ring (wrench B224249) (fig. 64). As this recoil cylinder retaining nut is unscrewed from breech ring, the recoil cylinder to which nut is installed moves out of ring as a unit. This causes keyway on forward shoulder of recoil cylinder to become disengaged from key welded on cradle after recoil cylinder securing nut is unscrewed from threads on recoil cylinder (subpar. c above) (fig. 65). Hold recoil cylinder with one hand to prevent it from turning as retaining nut is completely unscrewed from breech ring. Slide securing nut and washer from recoil cylinder.

**e. Remove Recoil Cylinder from Cradle** (fig. 65). Pull recoil cylinder from cradle. It may be necessary to use a rawhide hammer to jar recoil cylinder to facilitate its removal. Both recoil cylinders can be removed in exactly the same manner.

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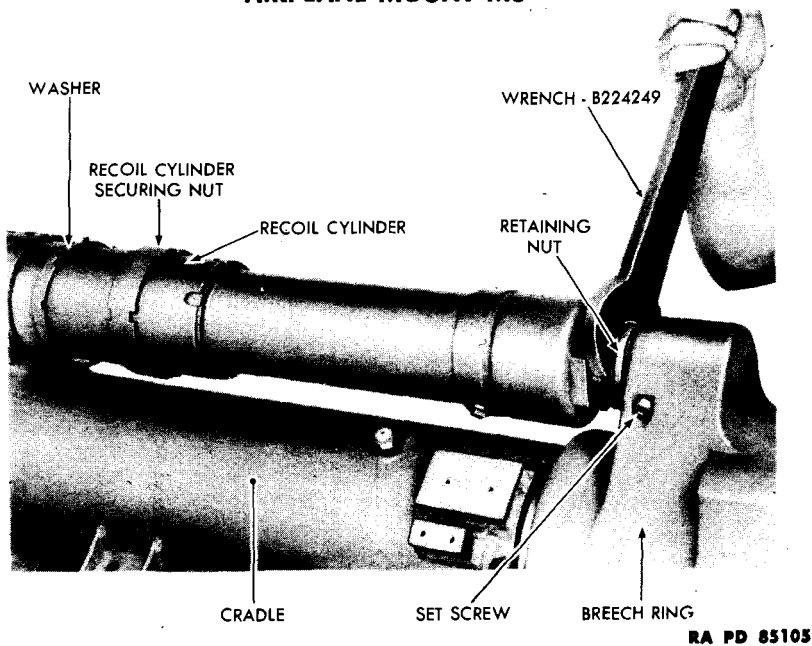
**Figure 62 – Unscrewing Securing Nut from Recoil Cylinder**



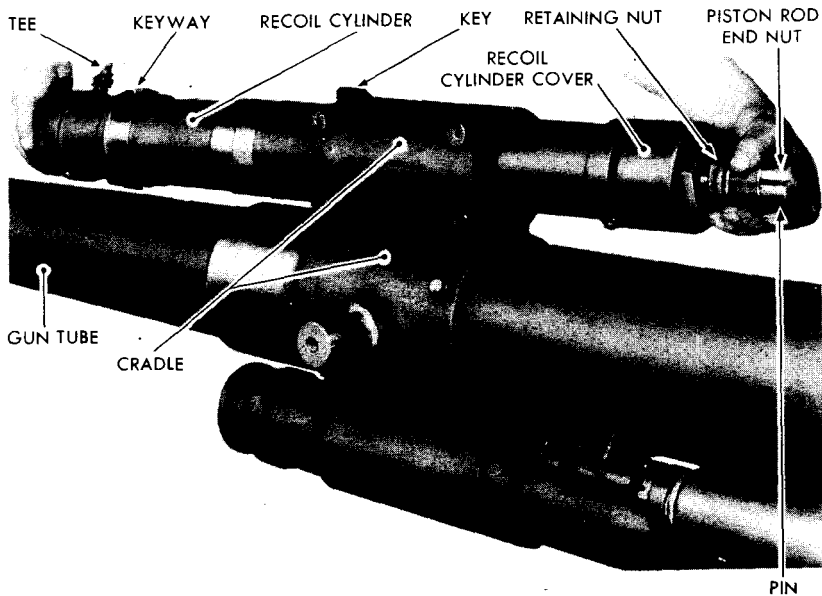
**Figure 63 – Loosening Recoil Cylinder Coupler Nut Set Screw**



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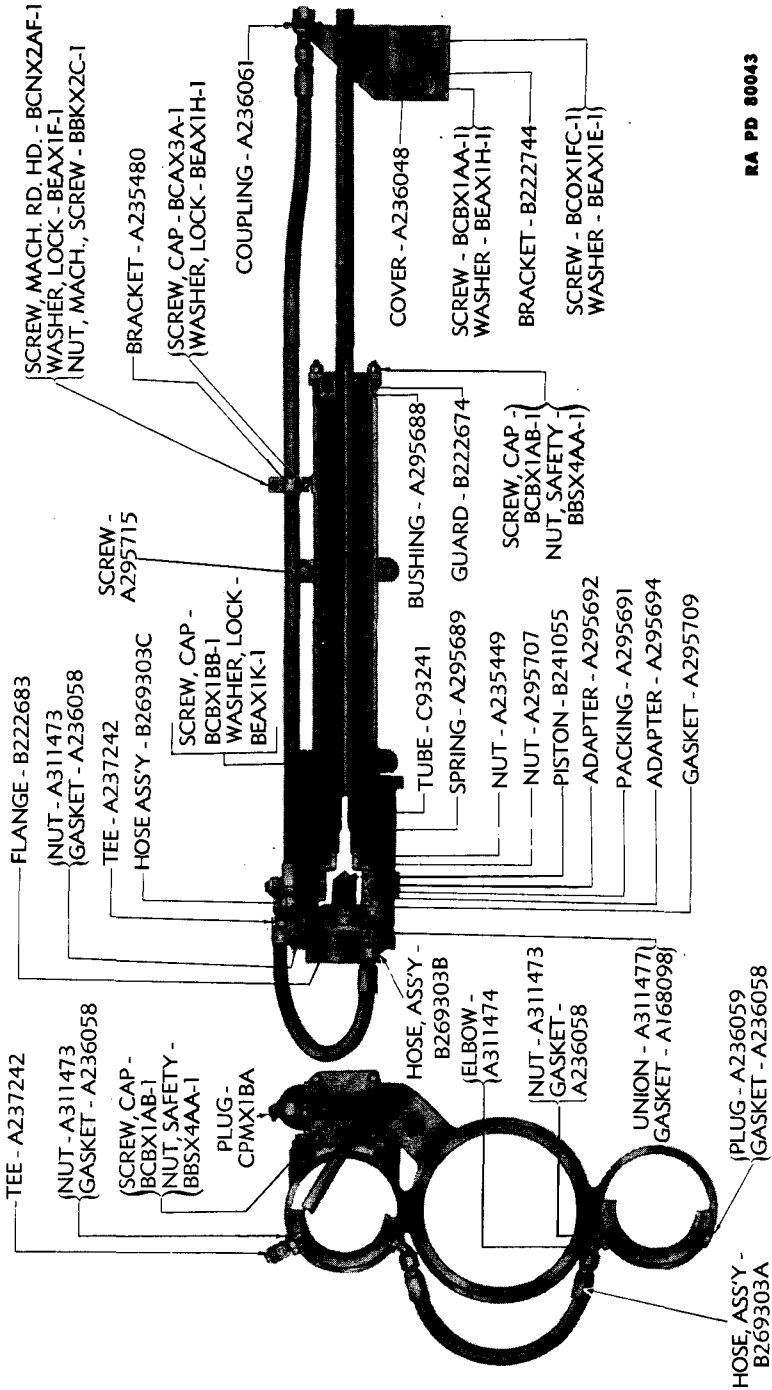


**Figure 64 – Removal of Recoil Cylinder Coupler Nut**



**Figure 65 – Removing Recoil Cylinder**

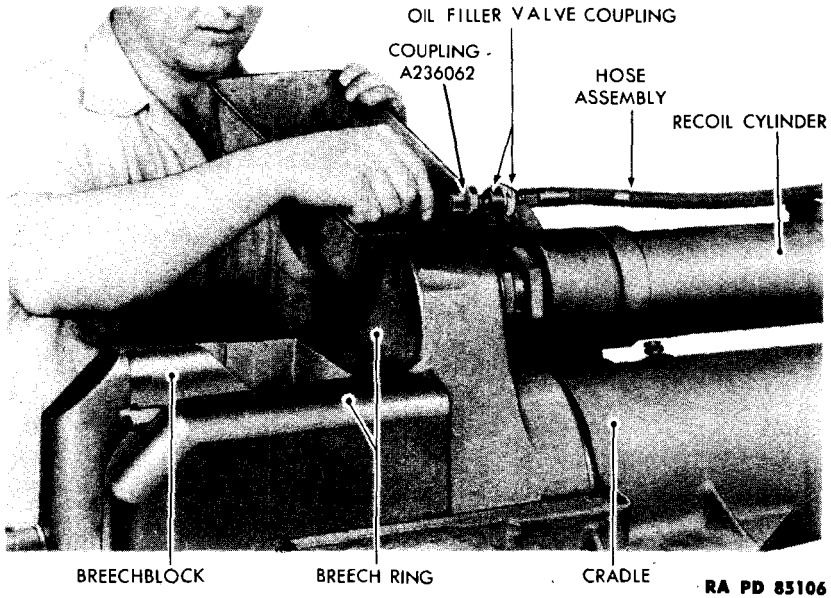
MAINTENANCE AND REPAIR INSTRUCTIONS



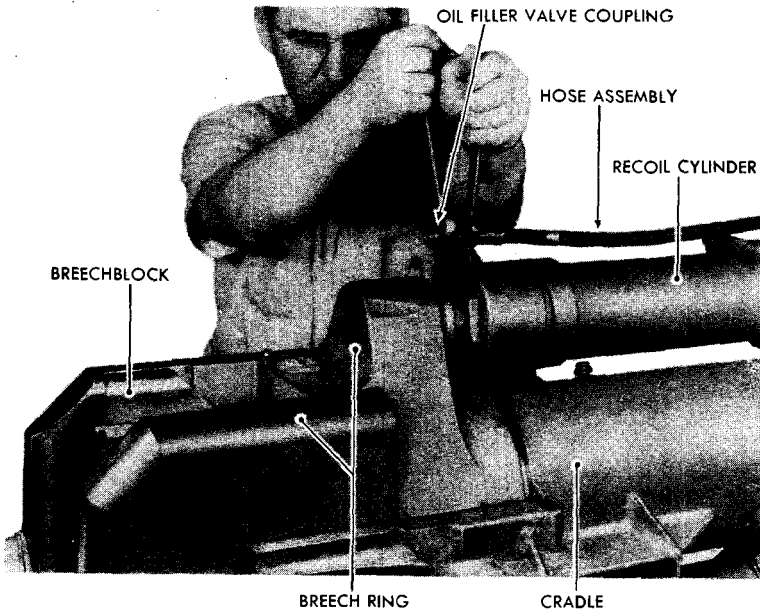
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Figure 66 -- Diagram of Replenisher

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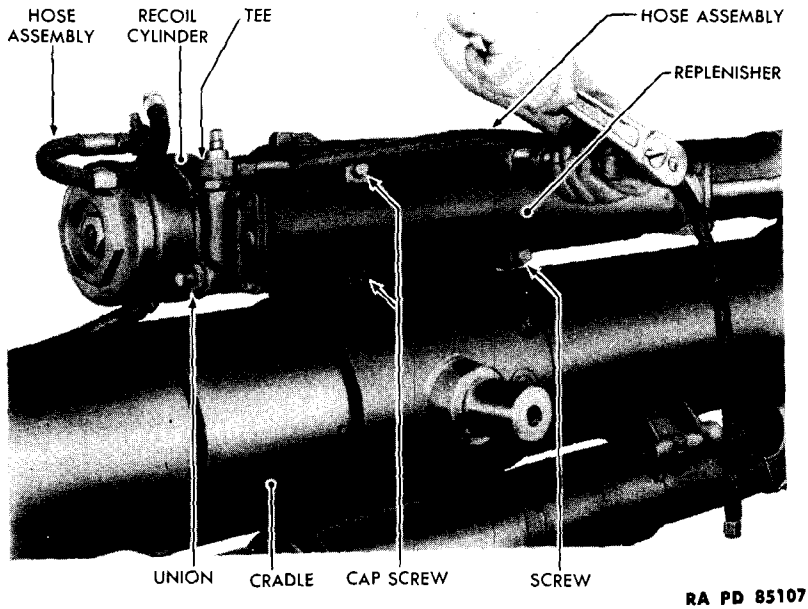


**Figure 67 – Releasing Oil Pressure from Replenisher**

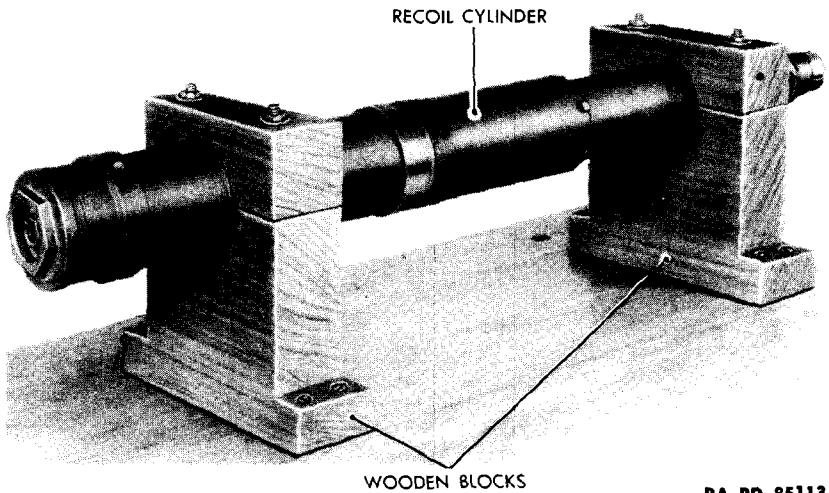


**Figure 68 – Disconnecting Coupling**

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**Figure 69 – Removal of Replenisher**



**Figure 70 – Suggested Method of Mounting Recoil Cylinder for Repair**

**34. REMOVAL OF REPLENISHER.**

a. Release Oil Pressure from Replenisher (fig. 67). Hold drain oil receptacle under oil filler valve coupling and screw coupling A236062 onto filling hose coupling to release oil pressure.

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**b. Remove Oil Filler Valve Coupling.** Remove five round-head screws and five washers that secure support flange of coupling to supporting bracket (fig. 66). Hold coupling while removing hose assembly (fig. 68). Then lift coupling from bracket.

**c. Remove Replenisher** (fig. 69).

(1) Disconnect hose assembly from union located on forward end of replenisher and tie hose assembly to upper recoil cylinder.

(2) Remove two cap screws and lock washers that secure forward end of replenisher to cradle, and two screws that secure rear end of replenisher to cradle. Remove replenisher and place on bench.

**35. DISASSEMBLY OF RECOIL CYLINDERS.**

**a. Remove Buffer.**

(1) Place recoil cylinder in wood blocks (fig. 70) or use any other suitable blocking arrangement which may be constructed with material that is available. The blocks suggested for use can be made from any available pieces of lumber that are large enough for this purpose. They may be fastened to any wooden base by means of wood screws and may be bolted together. It is necessary that the semicircular groove that is cut into them be a little smaller than the diameter of the recoil cylinder so that a tight fit may be had when the blocks are fastened together. If the recoil cylinder should slip in these blocks when attempting to remove buffer, place a piece of emery paper between the groove in the wood and the recoil cylinder.

**b. Disassembly of Recoil Cylinder Piston and Springs.**

(1) Place the spacer, which is part of piston puller assembly, inside recoil cylinder where buffer seats (fig. 72). Install buffer and tighten against spacer by hand. Screw buffer half a turn clockwise (wrench B224251) (fig. 71). This frees piston rod retaining nut at opposite end of recoil cylinder (fig. 73).

(2) Drive pin from piston rod end nut (fig. 73). Then remove nut (fig. 73).

(3) If piston rod end nut is too tight for manual removal, insert handle end of wrench TKLX1A in one of the slots provided in nut and loosen (fig. 74).

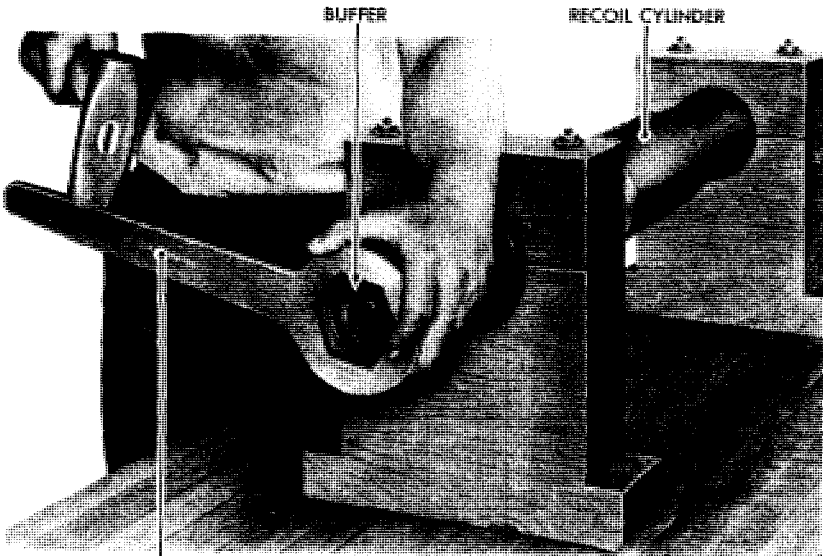
(4) Install piston puller assembly on end of piston, then slide sleeve, flange end first, over screw until flange fits snugly against washer (fig. 75).

(5) Assemble handle on screw and tighten sleeve against washer. A slight amount of pressure will be sufficient to compress the recoil cylinder springs (fig. 75).

(6) Manually remove buffer and lift out spacer (fig. 72).

(7) Hold screw firmly with one hand and turn handle in counter-clockwise direction. This releases the recoil cylinder springs (fig. 75).

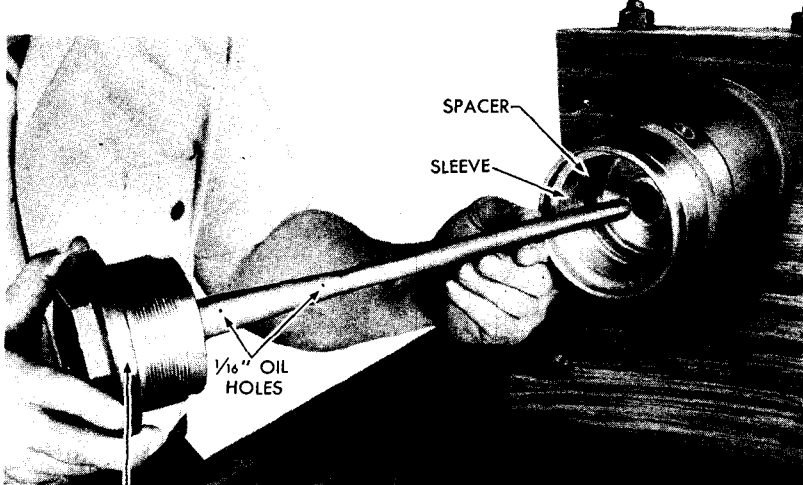
**MAINTENANCE AND REPAIR INSTRUCTIONS**



WRENCH - B224251

RA PD 85108

**Figure 71 – Removing Recoil Cylinder Buffer**



BUFFER

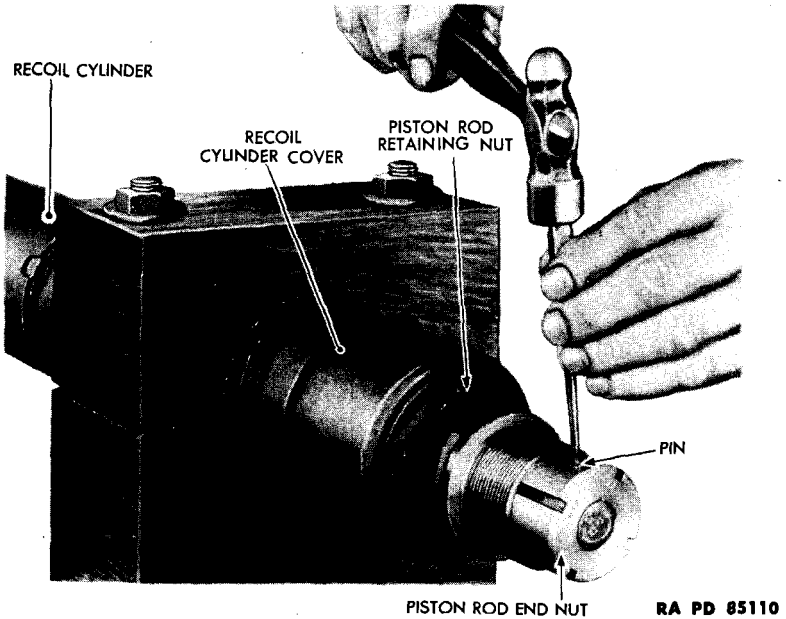
RA PD 85109

**Figure 72 – Installing Buffer and Spacer in Recoil Cylinder to Compress Recoil Cylinder Springs**

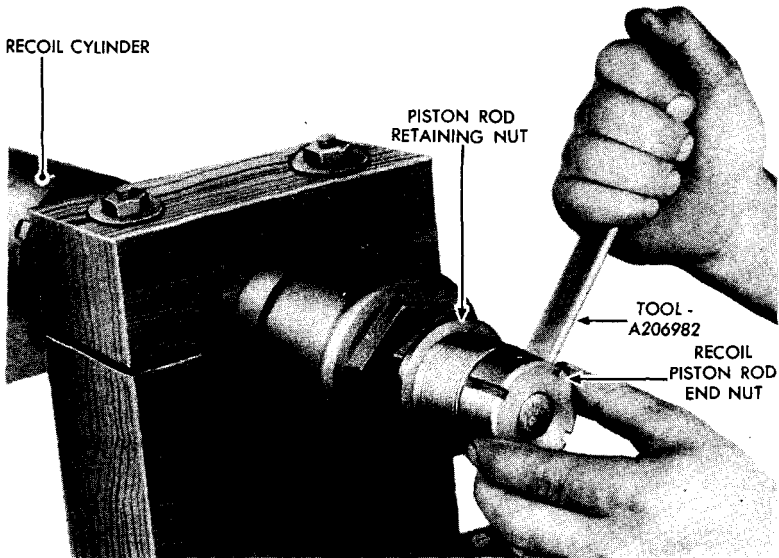
**CAUTION:** Personnel will stand clear of buffer end of recoil cylinder when springs are being released, since failure to hold screw firmly might result in sudden and violent release of the springs.

(8) Remove handle and sleeve from screw when springs are completely released (fig. 75).

**ORDNANCE MAINTENANCE – 75-MM GUN M4 AND  
AIRPLANE MOUNT M6**

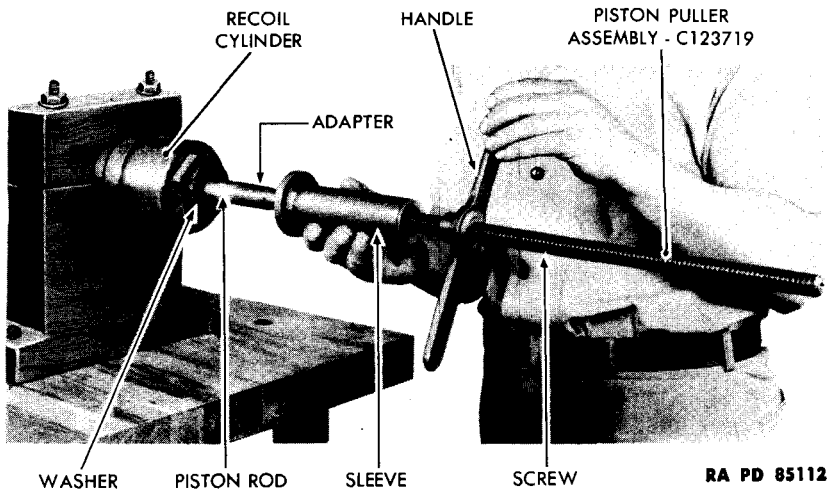


**Figure 73 – Driving Out Recoil Cylinder Piston Rod Nut Pin**



**Figure 74 – Removing Recoil Cylinder Piston Rod End Nut**

**MAINTENANCE AND REPAIR INSTRUCTIONS**



**Figure 75 — Installing Recoil Cylinder Spring Compression Tool Assembly**

**c. Remove Recoil Piston, Springs, and Spring Seat from Recoil Cylinder** (fig. 76). Pull piston, spring seat, spacer, two outer springs, and two inner springs from buffer end of cylinder. **CAUTION:** Care should be taken not to mar or scratch piston. Wrap soft cloth around piston head and carefully lay piston assembly aside.

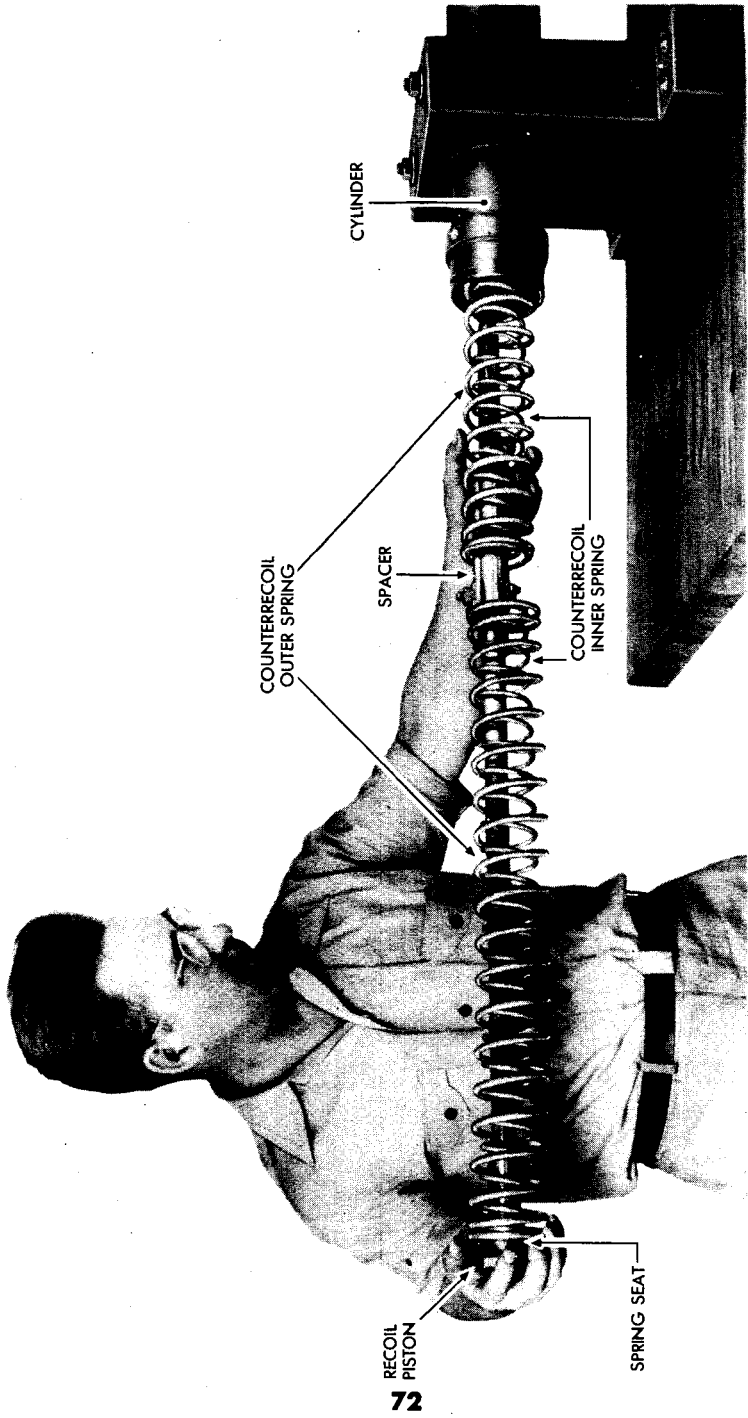
**d. Remove Recoil Cylinder Cover Assembly.** Loosen follower (adjustable spanner wrench TKLX1A) (fig. 78) to which is assembled a washer. Then remove cover (wrench B224251) (fig. 79). It is necessary to jar cover loose by striking wrench handle with a heavy hammer. **NOTE:** The following parts are assembled to cover and are removed with cover: washer, six screws, follower, retainer, bushing, washer, and packing (fig. 80).

**e. Remove Sleeve from Recoil Cylinder** (fig. 81). Loosen sleeve in recoil cylinder by placing hardwood block against buffer end of sleeve and driving sleeve partially out of cylinder. Then remove cylinder and sleeve from mounting blocks and pull sleeve from cylinder. Remove drain and refill plug and gasket from sleeve, then slide copper gasket off sleeve.

**f. Disassembly of Buffer** (fig. 82). Remove buffer screw from buffer (figs. 82 and 88). Tip orifice end (small end) of buffer upward to allow spring and valve to slide out of buffer. Remove nut from buffer, then pry out washer and packing. Copper gasket becomes flattened and thereby wedged in head of buffer. It is seldom necessary to remove this gasket. However, in case of leakage, it can be removed, but is destroyed when dug out of buffer and must be



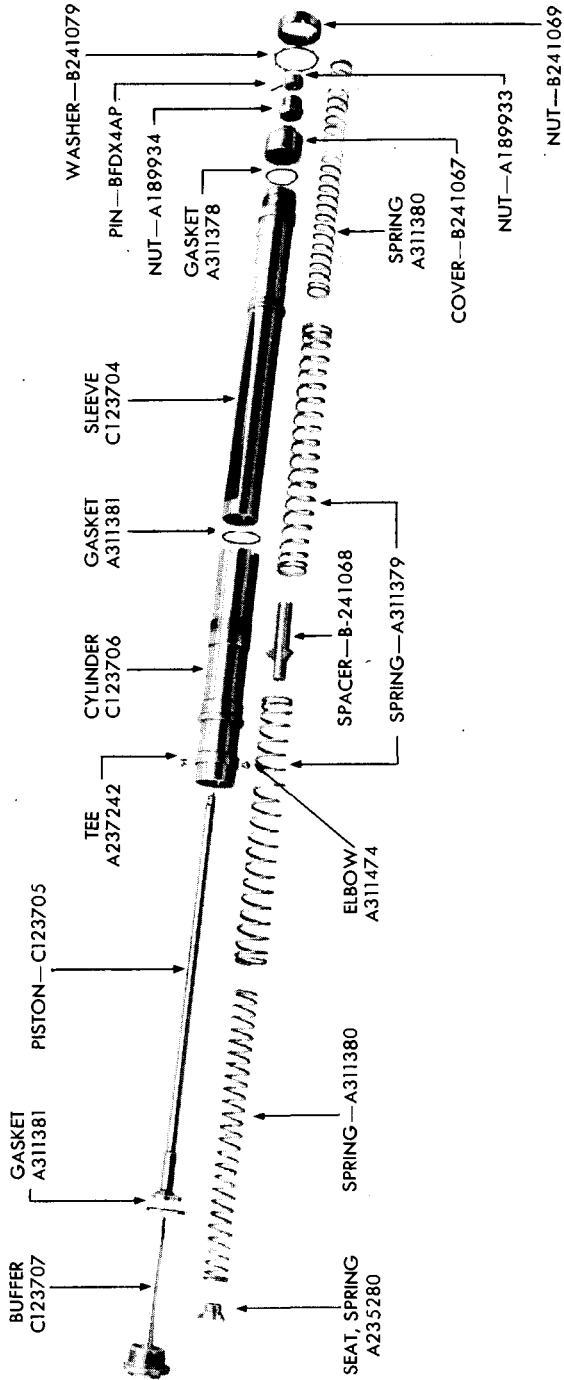
ORDNANCE MAINTENANCE — 75-MM GUN M4 AND  
AIRPLANE MOUNT M6



RA PD 85114

Figure 76 — Removing Recoil Piston and Springs

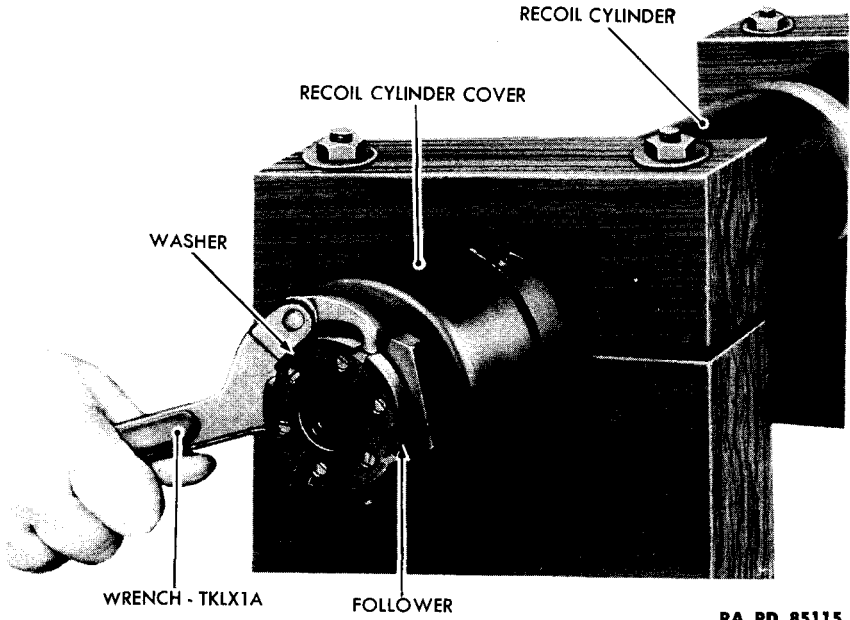
MAINTENANCE AND REPAIR INSTRUCTIONS



RA PD 47197

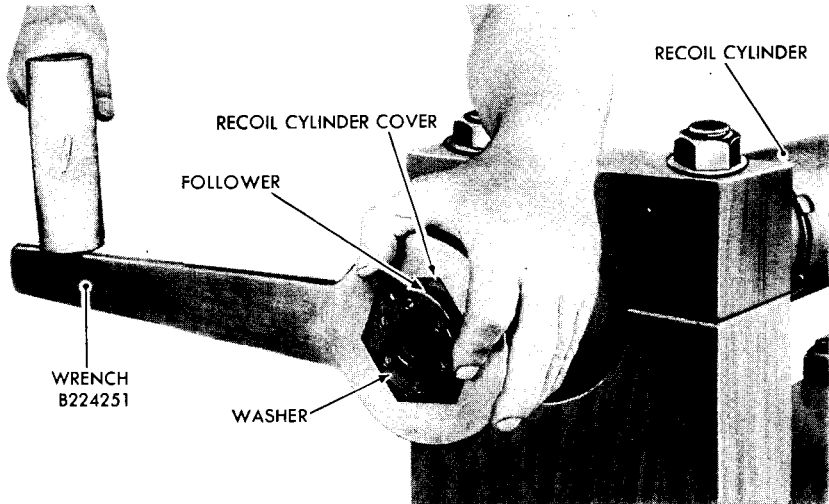
Figure 77 — Recoil Cylinder — Exploded View

**ORDNANCE MAINTENANCE – 75-MM GUN M4 AND  
AIRPLANE MOUNT M6**



RA PD 85115

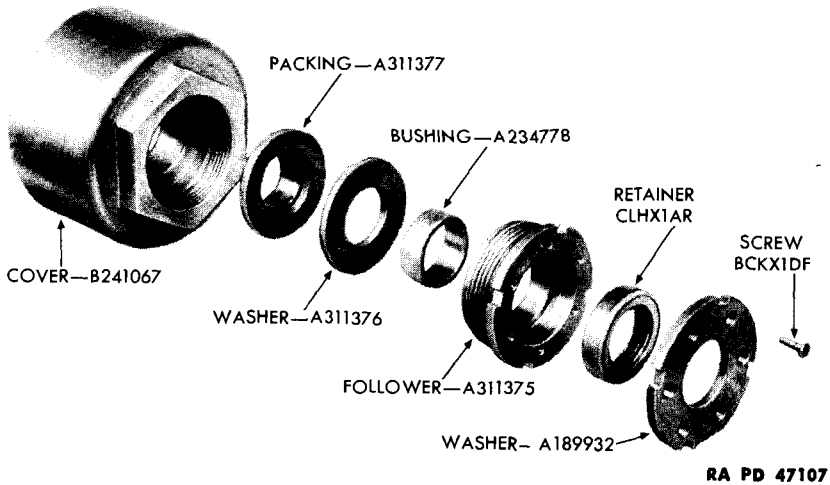
**Figure 78 – Loosening Follower on Recoil Cylinder  
Cover Assembly**



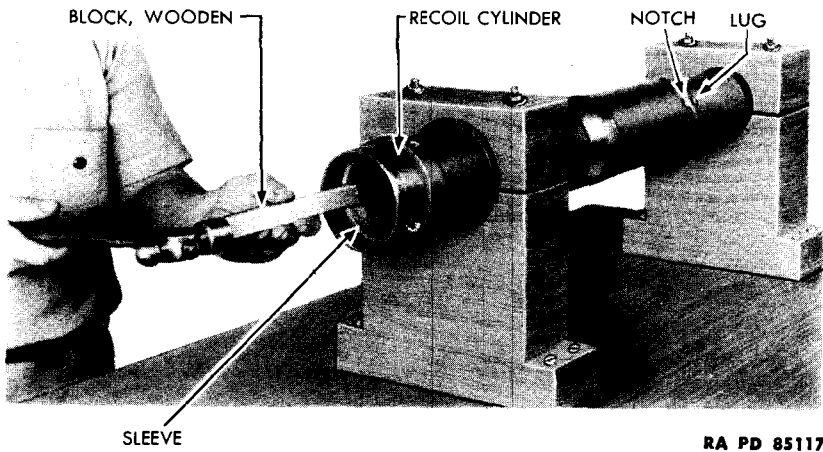
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**Figure 79 – Removing Recoil Cylinder Cover Assembly**

**MAINTENANCE AND REPAIR INSTRUCTIONS**



**Figure 80 — Recoil Cylinder Cover — Exploded View**

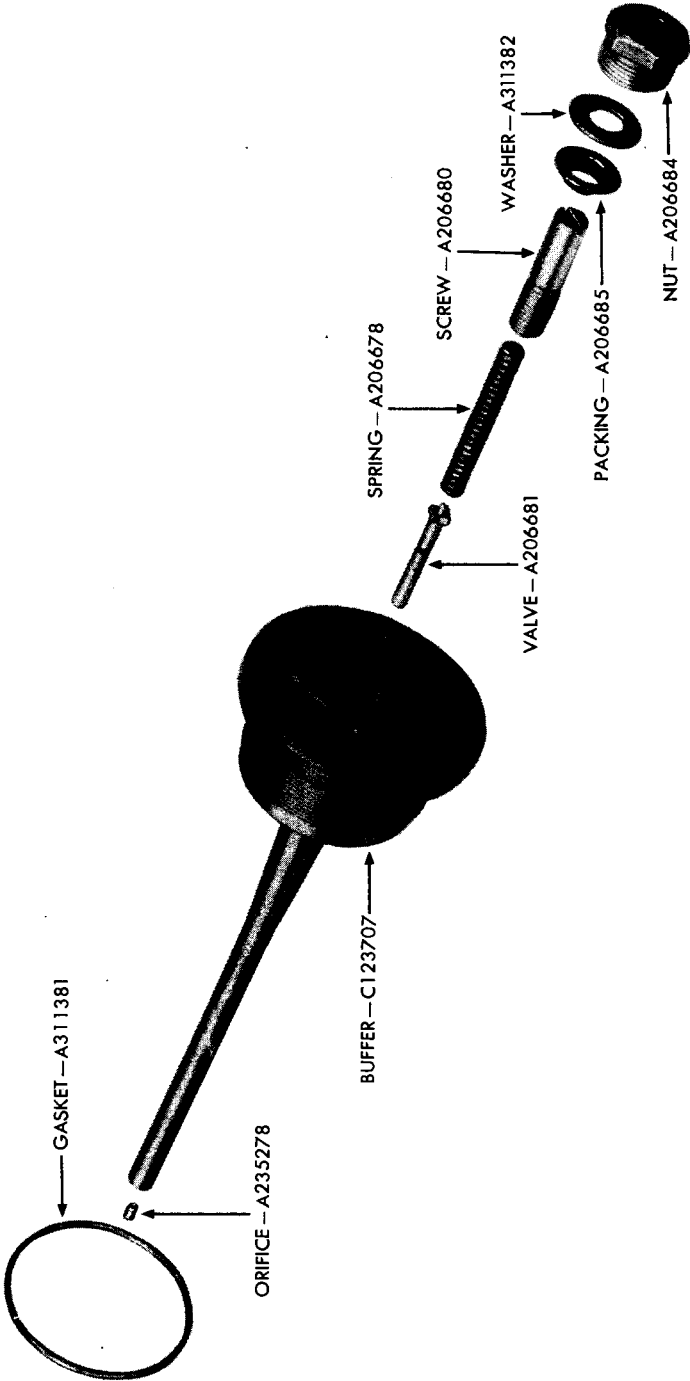


**Figure 81 — Removing Sleeve from Recoil Cylinder**

replaced. It can also be turned out of buffer with a lathe. (Notify heavy ordnance personnel.) Remove gasket by digging gasket out of buffer.

**g. Disassembly of Recoil Cylinder Cover.** Remove follower (adjustable spanner wrench TKLX1A) from cover (fig. 78). Remove six screws that secure washer to cover (fig. 80) and lift fiber washer from cover. Pry out leather washer from cover. Pry out packing from cover. Press out retainer and bushing from follower (par. 36 b (4)).

ORDNANCE MAINTENANCE — 75-MM GUN M4 AND  
AIRPLANE MOUNT M6



RA PD 47188

Figure 82 — Buffer Assembly — Exploded View

**MAINTENANCE AND REPAIR INSTRUCTIONS****36. INSPECTION AND REPAIR OF RECOIL CYLINDERS.****a. Inspection and Repair of Buffer Assembly (fig. 82).**

(1) Clean all parts thoroughly with SOLVENT, dry-cleaning, and dry with compressed air or CLOTH, wiping.

(2) Visually inspect buffer screw. If threads are flattened or damaged, file threads. Inspect screwdriver slot. If burred, remove rough edges with mill file.

(3) Visually inspect spring. If broken, replace. Examine end coils of spring. If burred, remove burs with mill file.

(4) Visually inspect valve. All openings and orifices should be clean and free from dirt and foreign matter. If valve openings are clogged, use a  $\frac{1}{16}$ -inch wire to remove dirt and foreign matter. Inspect edges of valve. If burred, roughened, or scratched, smooth out with mill file and polish valve with CLOTH, crocus.

(5) Visually inspect nut. If threads are burred, remove burs. If corners of nut are rounded or damaged, straighten edges of nut by filing.

(6) Visually inspect washer. If torn or distorted, replace.

(7) Visually inspect packing. If torn or damaged, replace.

(8) Visually inspect gasket while installed in buffer. If damaged so that it fails to seat properly and thereby causes leakage, notify proper personnel so that gasket can be removed on a lathe. Replace with new gasket.

**b. Inspection and Repair of Cover Assembly (fig. 80).**

(1) Visually inspect cover. If corners of nut end of cover are roughened or burred from use of loose fitting wrenches, remove roughened or burred surfaces. Examine internal threads. If burred, clean out threads.

(2) Examine packing. If distorted or torn, replace packing.

(3) Examine washer. If distorted or torn, replace washer.

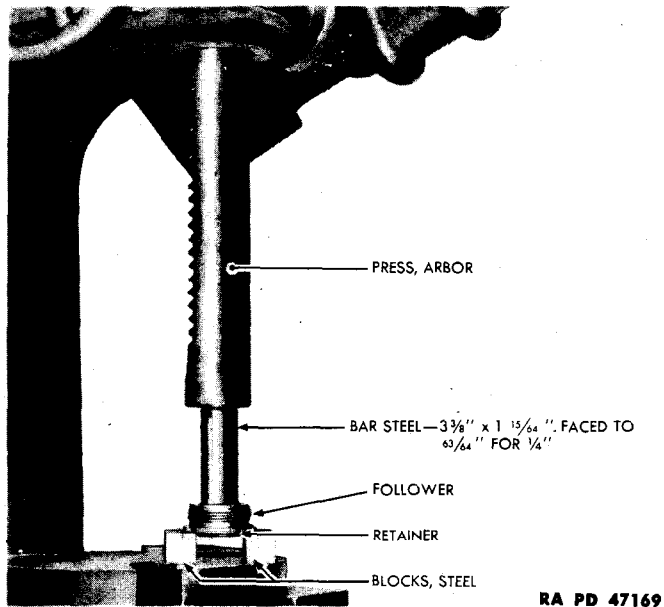
(4) Examine bushing which is assembled inside follower and if burred, remove burs and polish with CLOTH, crocus. If bushing is worn, drive out bushing (fig. 83). Place follower on two steel blocks (1 inch square by 4 inches) in arbor press in such a manner that the steel blocks will support follower and allow retainer and bushing to be pushed downward between the steel blocks and out of follower. Place small end of improvised driving tool (round steel bar,  $3\frac{3}{8}$  by  $1\frac{5}{6}$  inches faced to  $\frac{6}{16}$  inch for  $\frac{1}{4}$  inch) in follower and against bushing. Pull handle of arbor press downward and drive out retainer and bushing from follower.

(5) Examine threads of follower (fig. 80). If burred, remove burs. Examine screw holes in follower. If damaged, recut threads.

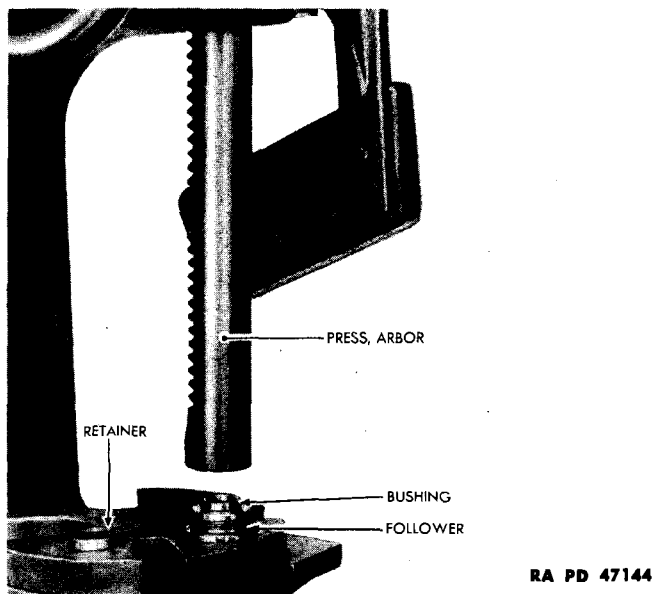
(6) Examine retainer. If scored or burred, replace retainer.

(7) Examine fiber washer. If distorted or torn, replace washer.

ORDNANCE MAINTENANCE — 75-MM GUN M4 AND  
AIRPLANE MOUNT M6



**Figure 83 — Removing Retainer and Bushing from Follower**



**Figure 84 — Installing Bushing in Follower**

## MAINTENANCE AND REPAIR INSTRUCTIONS

(8) Examine six screws. Remove screwdriver burs from head. If screwdriver slot is badly distorted, replace screws. If threads on screws are jammed or crossed, replace screws.

### 37. ASSEMBLY OF RECOIL CYLINDERS.

#### a. Install Sleeve in Recoil Cylinder.

NOTE: Before assembling the various part of recoil cylinder, all parts are to be thoroughly cleaned with SOLVENT, dry-cleaning, and dried with compressed air (if available), or CLOTH, wiping, soft. All threads and highly polished surfaces are to be coated with acidless mutton tallow, U. S. Army Specification 42-2-74, to protect these parts from galling.

(1) Secure cylinder in mounting blocks (fig. 81). Slide sleeve into cylinder. Be sure to aline oilholes provided in sleeve with fitting holes in cylinder. When these holes are properly alined the lugs on the sleeve will be alined with the notches in cylinder (fig. 81). Push lugs on sleeve into notches in cylinder (fig. 77). Partially install recoil cylinder securing nut (fig. 62) on threads of cylinder to protect the threads during balance of assembly and installation.

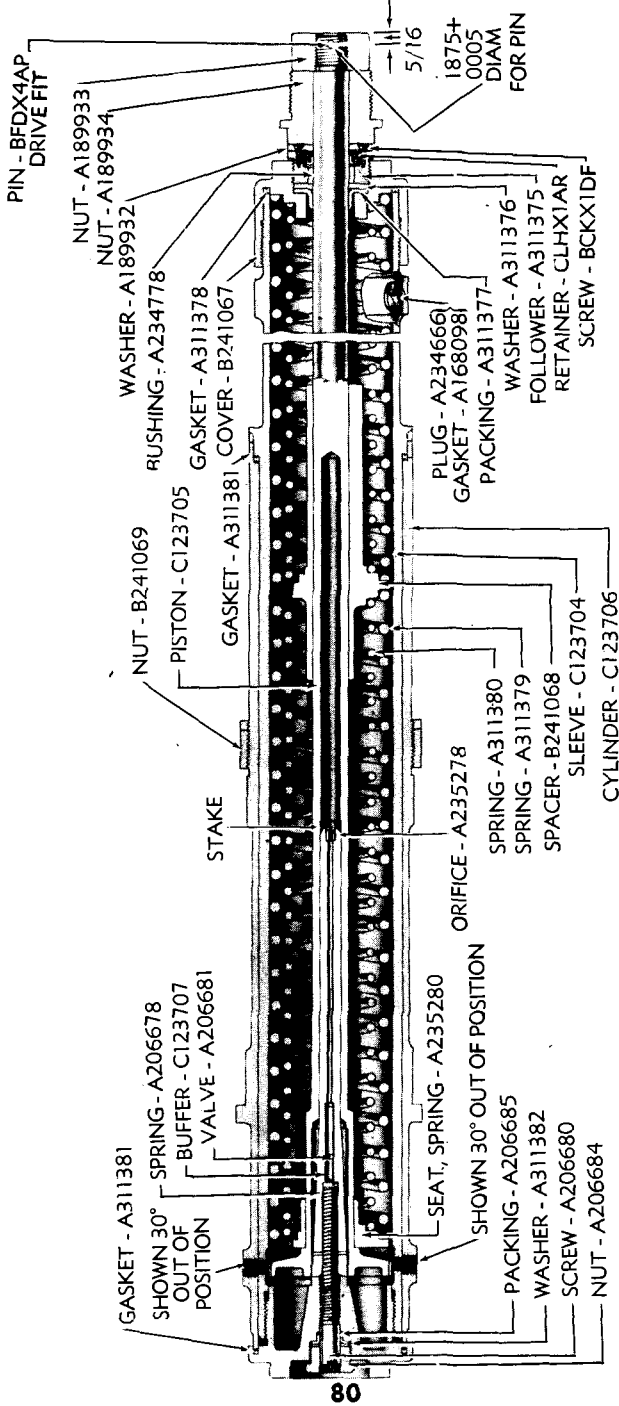
b. Assembly of Recoil Cylinder Cover. Place follower (flange end downward) on bed of arbor press (fig. 84). Then aline bushing with opening in follower and press bushing into follower. Turn follower over on bed of arbor press and install retainer in same manner as bushing. Place packing (small end first) into cover and push into place in cover. Aline leather washer with opening in cover and push washer against packing in cover. Screw follower with its assembled bushing and retainer into cover by hand and tighten firmly (adjustable spanner wrench TKLX1A) (fig. 78). Place fiber washer against follower with screw holes in washer alined with screw holes in follower. Then install six screws that secure washer to follower.

c. Install Recoil Cylinder Cover on Sleeve. The following parts are assembled to the cover and are installed with the cover: packing, washer, bushing, retainer, follower, six screws, and washer (fig. 80). Screw cover onto sleeve (wrench B224251) (fig. 79). Tighten cover securely by tapping wrench.

d. Install Recoil Springs and Piston Assembly. Install spring seat on piston with straight end of spring seat against piston head (fig. 76). Then install small inner spring and large outer spring against spring seat. Install spacer on piston with short end of spacer toward piston head. Install second small spring and second large spring on piston with ends of springs loosely seated against spacer (fig. 76). Install screw A311460 with adapter A311461 on end of piston (fig. 75). Then place assembled tube A237750 and tip A237749 over screw to prevent damage by screw threads to packing (fig. 86). Guide screw which is covered by tube and tip through hole provided in cover. Remove



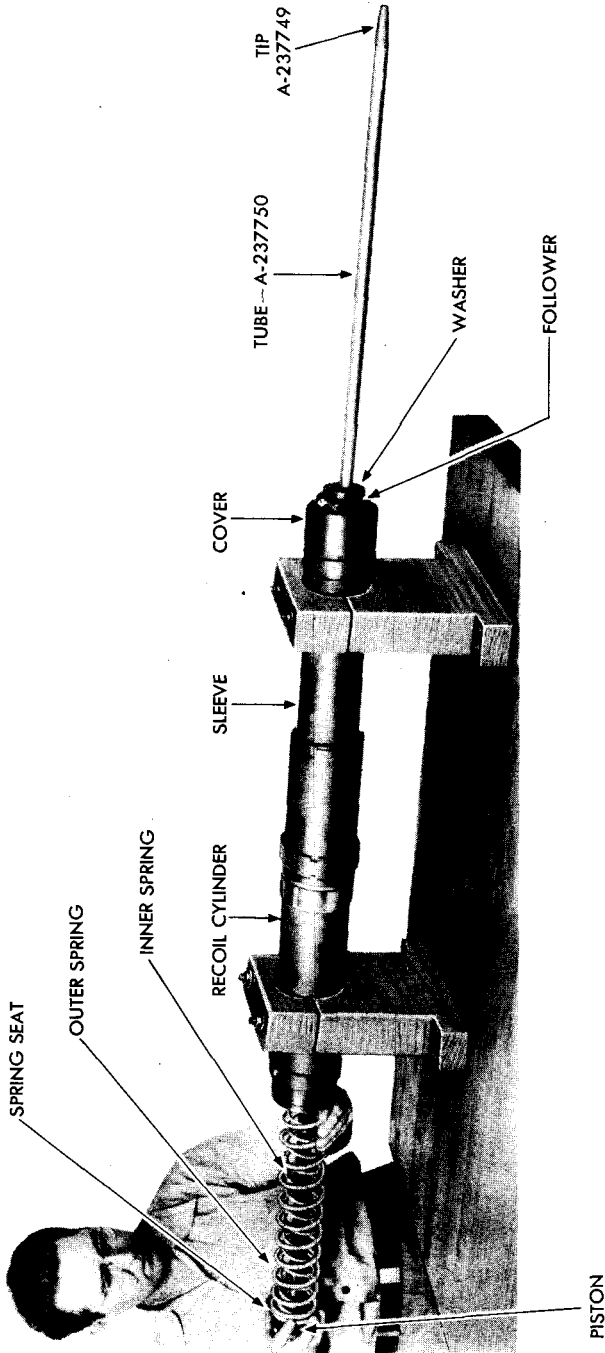
ORDNANCE MAINTENANCE - 75-MM GUN M4 AND  
AIRPLANE MOUNT M6



RA PD 80044

Figure 85 - Diagram of Recoil Cylinder

MAINTENANCE AND REPAIR INSTRUCTIONS



RA PD 85118

Figure 86 — Installing Piston and Springs in Recoil Cylinder

**ORDNANCE MAINTENANCE – 75-MM GUN M4 AND  
AIRPLANE MOUNT M6**

tube and tip from screw, then slide sleeve A311462, flange end first, over screw until flange fits snugly against fiber washer (fig. 75). Assemble handle B241092 on screw and tighten sleeve against washer. Continue to turn handle clockwise to pull piston, small springs, large springs, and spacer into their compressed position within the cylinder (figs. 75 and 85).

e. **Assembly of Buffer** (fig. 82). Place copper gasket in position inside head of buffer. Install packing against packing seat in buffer head with protruding section of packing first entering buffer. Install washer against packing. Screw nut into buffer fingertight. Place valve in position in buffer, using valve holder A237443. Slide valve, spring, and screw in the order named into buffer opening. Then tighten screw securely into position. Adjustment of buffer action is made by means of this screw after recoil system has been filled with oil (par. 38 e). Tighten nut securely.

f. **Secure Recoil Piston Assembly in Cylinder.** Place spacer A311463 in cylinder and against piston (fig. 72), then install buffer in cylinder. Screw buffer on handtight and then tighten buffer an extra one-quarter turn (wrench B224251) (fig. 71). This operation is to facilitate installation of retaining nut and piston rod end nut and pin on other end of piston (fig. 73). Remove piston puller assembly C123719 from piston (fig. 75). Slide recoil piston rod nut on piston up against washer on cover, then install piston rod end nut handtight on end of piston rod (fig. 73). Aline hole in nut with hole in piston and install pin. Stake pin in position.

**g. Install Buffer.**

**NOTE:** It is necessary to remove buffer from cylinder in order to remove spacer which was temporarily installed in cylinder (fig. 72).

(1) Unscrew buffer from cylinder (wrench B224251) and remove spacer (figs. 71 and 72). Then again install buffer in cylinder and tighten firmly. Draw sleeve and cylinder securely together by tapping handle of wrench.

**h. Install Drain Plug in Sleeve.** Install new gasket and drain plug in sleeve.

**i. Install Hose Connections** (fig. 59). Install elbow on lower side of upper recoil cylinder (new gasket, nut, and elbow are installed as a unit). Install plug loosely on tee, then install nut and new gasket loosely on tee. Screw this tee-fitting assembly in upper tapped hole provided in recoil cylinder and tighten.

**NOTE:** Assembly of lower recoil cylinder is same as upper recoil cylinder with the exception of position of drain plug and elbow. See diagram of replenisher (fig. 66).

**MAINTENANCE AND REPAIR INSTRUCTIONS****38. INSTALLATION OF RECOIL CYLINDERS.****a. Secure Recoil Cylinder to Breech Ring.**

(1) Thoroughly clean recoil cylinders, their recess in breech ring, and the cradle with SOLVENT, dry-cleaning, then thoroughly dry with compressed air (if available) or a CLOTH, wiping. Place a film of COMPOUND, rust-preventive, light, in back of breech ring recess where piston rod retaining nut (fig. 74) screws into breech ring, to prevent corrosion due to condensation. Rub a film of GREASE, graphited, light, on threads of breech ring recoil cylinder recess and on threads of retaining nut (fig. 74).

(2) It is necessary, at this time, to remove securing nut (adjustable spanner wrench TKLX1B) (fig. 62) which was temporarily installed on recoil cylinder to protect threads on the cylinder (fig. 63).

(3) Slide upper recoil cylinder through recoil cylinder mounting ring in cradle (fig. 65) with piston rod retaining nut toward breech ring. Be careful not to damage threads on cylinder during this operation. Aline key which is welded to cradle with keyway on front end of cylinder (fig. 65). Be sure tee is in its proper upward position.

(4) Place washer and securing nut over rear end of recoil cylinder with the four wrench slots of nut facing toward breech end of gun. Slide washer and nut toward their position adjacent to cradle (fig. 64).

(5) Guide piston rod end nut (fig. 65) into the threaded recess provided in breech ring, then secure cylinder to ring by screwing piston rod retaining nut into ring (fig. 64). Lock recoil piston rod nut into breech ring by installing copper plug (fig. 3) into hole provided in ring and jamming copper plug into threads of retaining nut by installing screw behind copper plug (figs. 63, 64, and 65).

**b. Secure Recoil Cylinder to Cradle.**

(1) Aline one finger on washer with notch provided in upper side of cradle, then bend finger of washer into notch of cradle (fig. 60).

(2) Screw securing nut onto threads of recoil cylinder (adjustable spanner wrench TKLX1B) (figs. 62 and 63). Tighten nut securely until nut is adjacent to washer. Make sure nut and washer are properly alined, then continue to tighten nut until keyway on cylinder is pulled into key on cradle (figs. 62 and 65).

(3) Locate the finger of washer which is alined with a corresponding notch in nut, then bend this finger into the notch (fig. 60).

**c. Install Hose Assemblies (fig. 59).**

(1) Before installing hose assemblies replace all gaskets, which are usually twisted and distorted during previous installation, and will cause oil leakage if used over again.

(2) Install hose assembly (short hose) which connects upper and lower recoil cylinders. Screw hose couplings onto elbows, one of which is located on lower front side of upper recoil cylinder, and the other on the upper front side of lower recoil cylinder. Tighten hose couplings securely.

ORDNANCE MAINTENANCE — 75-MM GUN M4 AND  
AIRPLANE MOUNT M6

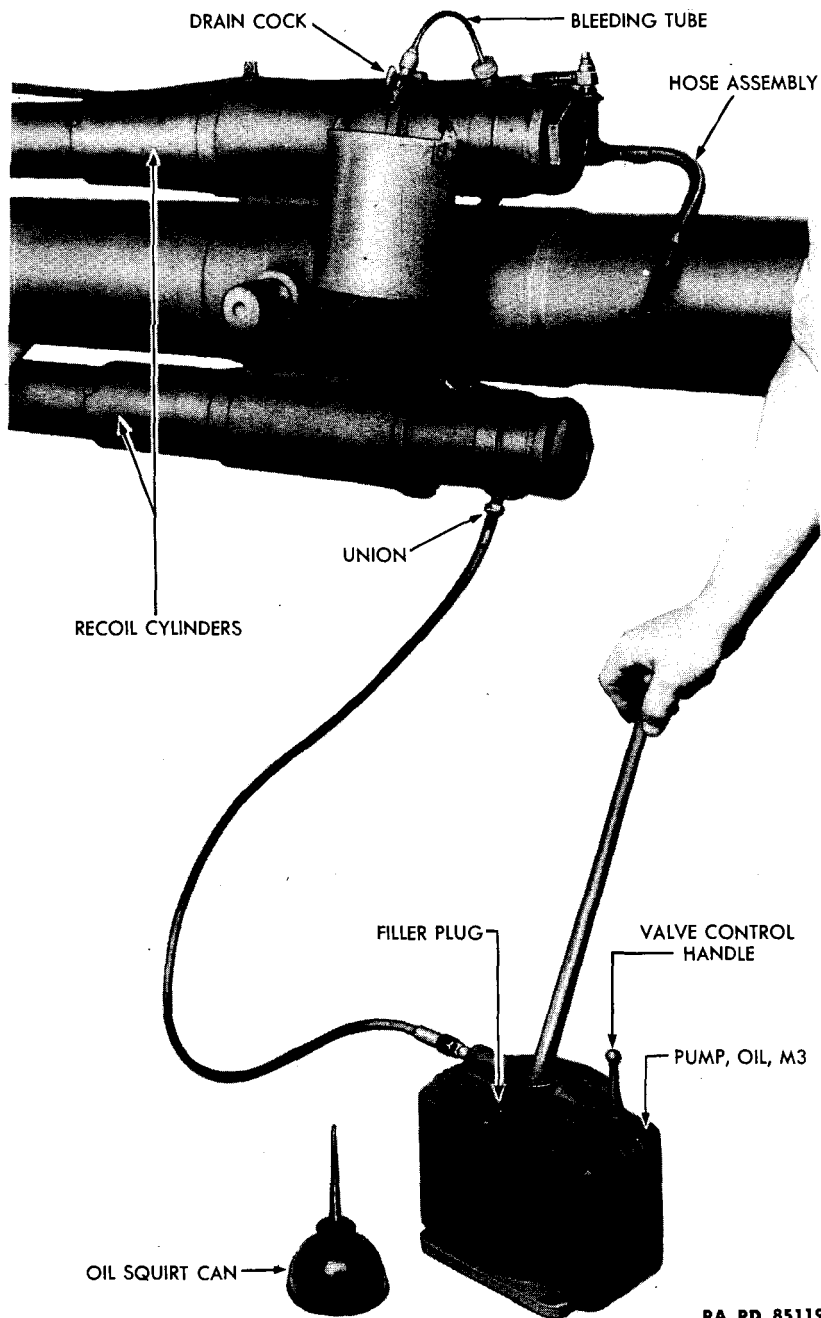


Figure 87 — Filling Recoil Cylinders  
84

**MAINTENANCE AND REPAIR INSTRUCTIONS**

(3) Install hose assembly to tee. Screw other end of hose assembly to union of replenisher.

(4) Plug and gasket will be installed in front lower side of recoil cylinder after filling recoil system with oil (subpar. d below).

**d. Fill Recoil Cylinders.**

(1) If possible, have muzzle end of gun approximately 2 inches higher than breech end of gun to facilitate purging system during filling of recoil cylinders.

(2) If plug and gasket have previously been installed, remove plug and gasket from lower front end of bottom recoil cylinder (fig. 61). Then assemble a gasket on union (A311479), and install union in plug hole in lower front end of bottom recoil cylinder (fig. 87).

(3) Attach oil hose assembly (B269301 less coupling A236062) to union (fig. 87).

(4) Disconnect hose assembly from tee. Then remove tee from upper recoil cylinder. Hold tee and unscrew nut. Remove nut and gasket from upper recoil cylinder (fig. 59).

(5) Install gasket on bleeding tube, then install bleeding tube into tee hole in upper cylinder. Hang a small pail from drain cock of bleeding tube to catch oil during purging operation (fig. 87).

(6) Open drain cock of bleeding tube to purge recoil system (fig. 87). Connect hose assembly to Oil Pump M3. Operate handle of Oil Pump M3 to pump recoil oil into cylinders. (Be sure right type of recoil oil is being used.) Examine warning tag which should be hung on gun indicating type of oil used, or refer to Lubrication Guide, chapter 3, section VII. Operate Pump M3 until both recoil cylinders are filled and a full stream of oil is coming out of the bleeding tube. Tap recoil cylinders lightly while pumping oil slowly into system until oil coming out of bleeding tube contains no air bubbles. Close drain cock of bleeding tube. (Closing the drain cock on bleeding tube prevents recoil oil being lost when the union is removed and replaced by plug.)

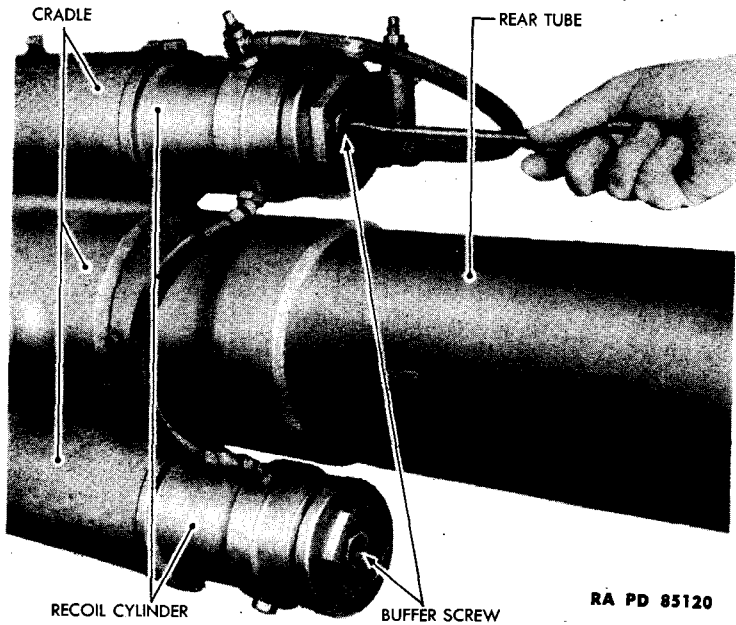
(7) Loosen union. Have plug with its new gasket assembled in one hand ready for installation. Unscrew union from lower recoil cylinder and quickly install plug in cylinder. Tighten plug securely (fig. 61).

(8) Remove bleeding tube from upper recoil cylinder. Then replace recoil oil which was lost when disconnecting union and installing plug (fig. 87). Shake hose assembly which connects upper and lower recoil cylinders, while squirting recoil oil into upper cylinder to facilitate the removal of any air from system.

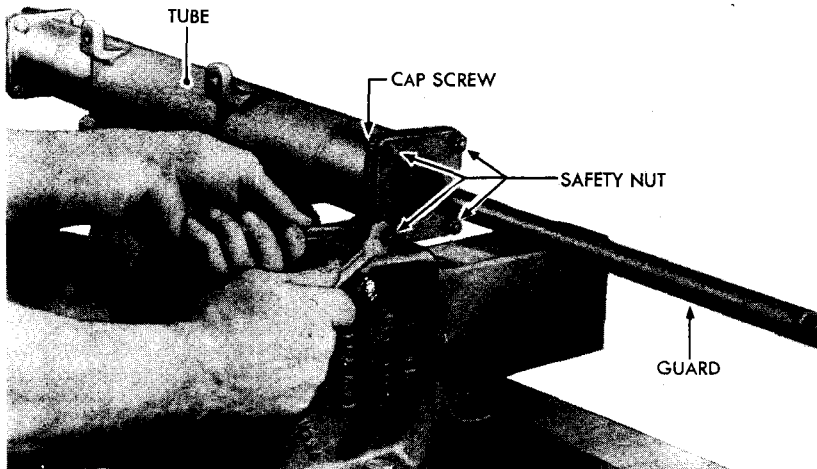
(9) Gradually lower muzzle of gun to its approximate level position to eliminate any air pockets that might have formed in system. Then visually check to see that cylinders are filled with recoil oil.

(10) Assemble new gasket and nut on tee, then install tee securely in opening provided in upper recoil cylinder (fig. 59).

**ORDNANCE MAINTENANCE — 75-MM GUN M4 AND  
AIRPLANE MOUNT M6**



**Figure 88 — Adjusting Buffer Action**



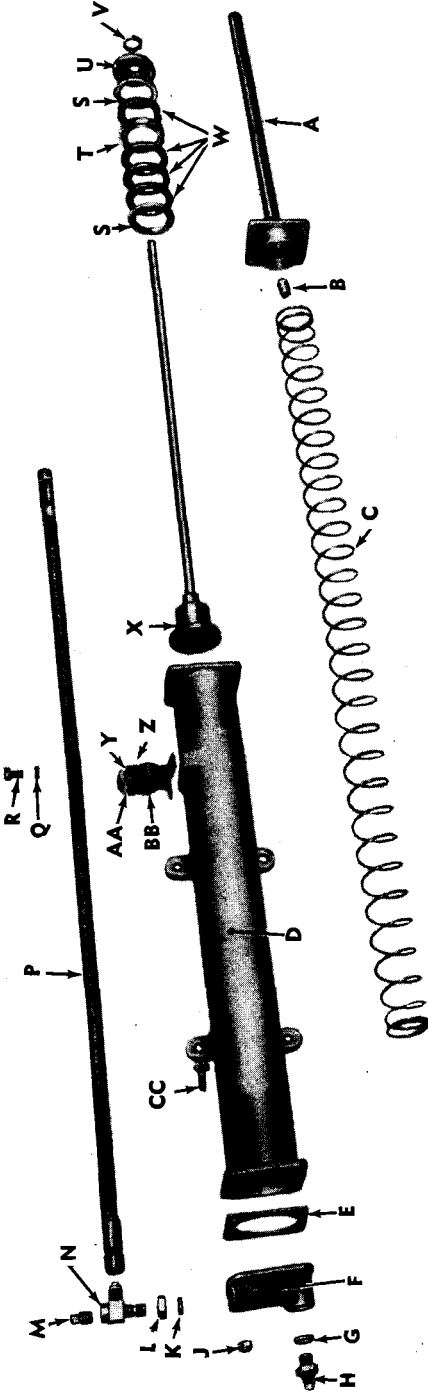
**Figure 89 — Removing Replenisher Piston Guard**

(11) Connect hose assembly to tee. Tighten hose coupling securely.

(12) Fill replenisher with recoil oil (TM 9-311, par. 31 d).

(13) Visually inspect all hose connections to see that there is no leakage of recoil oil.

MAINTENANCE AND REPAIR INSTRUCTIONS



- A — GUARD - B-222674
- B — BUSHING - A-295688
- C — SPRING - A-295689
- D — TUBE - C-93241
- E — GASKET - A-295709
- F — FLANGE - B-222683
- G — GASKET - A-168098
- H — UNION - A-311477
- J — NUT, SAFETY - BBSX4AA-1

- K — GASKET - A-236058
- L — NUT - A-311473
- M — PLUG - CPMX1BA
- N — TEE - A-237242
- P — HOSE ASSEMBLY - B-269303C
- Q — WASHER, LOCK - BEAX1H-1
- R — SCREW, CAP - BCAX3A-1
- S — ADAPTER - A-295694
- T — ADAPTER - A-295692

- U — NUT - A-295707
- V — NUT - A-235449
- W — PACKING - A-295691
- X — PISTON - B-241055
- Y — WASHER, LOCK - BEAX1F-1
- Z — SCREW - BCNX2AF-1
- AA — NUT - BBKX2C-1
- BB — BRACKET - A-235480
- CC — SCREW - CCBX1BB-1

RA PD 80042

Figure 90 — Replenisher — Exploded View



**ORDNANCE MAINTENANCE – 75-MM GUN M4 AND  
AIRPLANE MOUNT M6****e. Adjusting Buffer Action (fig. 88).**

**NOTE:** After filling recoil mechanism with recoil oil, it becomes necessary to adjust the buffing action of recoil system to prevent "slamming" of gun when returning to battery and to assure a smooth recoil action.

(1) Tighten buffer screw completely in buffer by turning screw clockwise as far as possible. Then turn screw counterclockwise until desired buffing action is obtained. **NOTE:** Turn screws in both cylinders an equal amount.

(2) Nine counterclockwise turns is the average number of turns to obtain proper buffing action when recoil system is filled with OIL, recoil, special. **CAUTION:** Do not loosen screw more than ten turns as screw may come out of buffer. **NOTE:** If screw should come out of buffer, replace screw then refill recoil cylinders (subpar. d above) and again adjust buffer (**NOTES:** subpar. e and e(1) above).

**39. DISASSEMBLY OF REPLENISHER.**

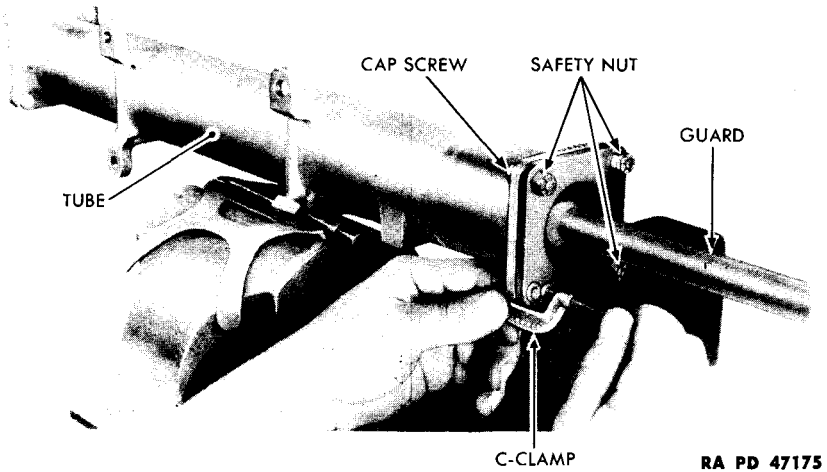
**a. Remove Replenisher Hose Assembly.** Unscrew coupling that holds hose assembly to tee (fig. 69). Remove two cap screws and lock washers that secure bracket to tube. Then lift off bracket and hose (fig. 90). Remove screw, lock washer, and nut that hold hose assembly in bracket and lift hose from bracket (fig. 90). Loosen lock nut that holds tee and unscrew tee to remove tee, lock nut, and gasket (figs. 66 and 90). Remove union. Gasket remains in flange (figs. 66 and 90).

**b. Remove Guard.** Place replenisher in soft-jawed vise (fig. 89) making sure not to clamp tube in vise, since to do so might cause tube distortion. Hold one safety nut and remove its companion cap screw that is one of four cap screws that secure guard to tube (fig. 89). Clamp guard to tube (fig. 91) and remove remaining three cap screws and safety nuts. C-clamp is needed to hold guard against tension of spring. Hold end of guard against tension of spring and remove C-clamp. Then slowly release pressure against spring to remove guard and spring. Care should be taken to prevent spring from flying out of tube.

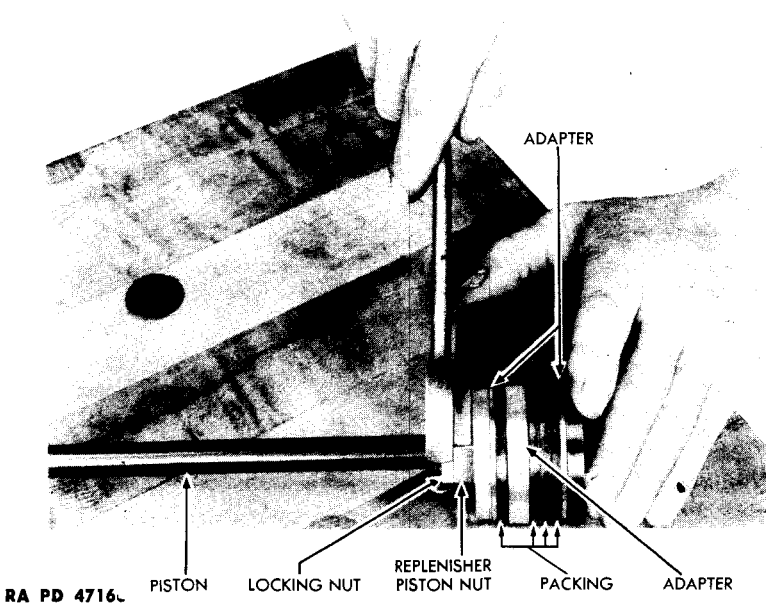
**c. Remove Flange (fig. 90).** Remove replenisher from vise. Then remove four cap screws and safety nuts that secure flange to tube. Lift off flange and remove gasket. Place thumbs against piston and push it toward guard end of tube. Then grasp piston rod and pull it from tube.

**d. Disassemble Piston Assembly.** Hold replenisher piston nut and unscrew locking nut (fig. 92). Slide locking nut off piston. Manually unscrew replenisher nut and slide it off piston. In the order named, slide adapter, packing, adapter, three packings, and adapter off piston (fig. 90).

**MAINTENANCE AND REPAIR INSTRUCTIONS**



**Figure 91 – Clamping Replenisher Guard to Tube**



**Figure 92 – Disassembly of Replenisher Piston**

**40. INSPECTION AND REPAIR OF REPLENISHER.**

a. **Inspect Guard** (fig. 90). Visually check guard for distortion. If distorted, replace. Visually check guard bushing for wear, burs, scratches, and mutilations. Remove burs and scratches with **CLOTH**, crocus. If worn or mutilated replace bushing. Drive out worn guard

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bushing with improvised tool ( $\frac{3}{16}$ - by 20-inch cold rolled steel rod and hammer). Tap replacement guard bushing into guard.

**b. Inspect Tube** (fig. 90). Visually check inside of tube for burs, scratches, and scoring. Remove burs, scratches, and scoring. Visually check both ends of tube for burs, scratches, and scoring. Remove burs, scratches, and scoring with CLOTH, crocus. Inspect four  $\frac{1}{16}$ -inch orifices in tube for foreign matter and clogging. Clear orifices with  $\frac{1}{16}$ -inch steel wire.

**c. Inspect Flange** (fig. 90). Visually check face of flange for burs, scratches and scoring. Remove burs, scratches, and scoring with CLOTH, crocus. Visually check threads of flange for burs. Remove burs. Visually check union gasket for wear. If worn, remove and replace with new gasket.

**d. Inspect Replenisher Flange Gasket** (fig. 90). Visually check gasket for torn condition. If torn, replace with new gasket.

**e. Inspect Piston** (fig. 90). Visually check piston for burs, scratches, and scoring. Remove burs, scratches, and scoring with CLOTH, crocus. Visually check four packings for distortion, wear, and torn edges. If distorted, worn, or torn, replace with new packings. Visually check threads of piston nut for burs. Remove burs with mill bastard file, one end sharpened. Visually check threads of locking nut for burs. Remove burs with mill bastard file, one end sharpened.

**f. Inspect Replenisher Spring** (fig. 90). Visually check spring for breakage. If broken, replace with new spring. Visually check ends of spring to make sure ends are rounded. If not rounded, round off ends with mill bastard file.

**g. Inspect Hose Assembly** (fig. 90). Visually check hose assembly for holes and breakage. If holes are found or hose assembly is broken, replace with new hose assembly. Manually check hose assembly couplings for freedom of rotation.

**h. Inspect Tee** (fig. 90). Visually check threads of tee for burs. Remove burs with mill bastard file, one end sharpened. Visually check threads of elbow nut for burs. Remove burs with mill bastard file, one end sharpened. Visually check tee gasket for torn condition. If torn, replace with new gasket. Visually check orifice of tee for dirt and foreign matter. If dirty, clean with SOLVENT, dry-cleaning, and CLOTH, wiping. Visually check threads of plug for burs. Remove burs with mill bastard file, one end sharpened.

**i Inspect Union** (fig. 90). Visually check threads of union for burs. Remove burs with mill bastard file, one end sharpened. Visually check orifice of union for dirt and foreign matter. If dirty, clean with SOLVENT, dry-cleaning, and CLOTH, wiping.

**MAINTENANCE AND REPAIR INSTRUCTIONS****41. ASSEMBLY OF REPLENISHER.**

a. **Assemble Replenisher Piston in Replenisher Tube.** All parts of replenisher are to be thoroughly cleaned with SOLVENT, dry-cleaning, and dried with compressed air (if available) or CLOTH, wiping. In order, slide thin adapter, three packings, and thick adapter on rod end of piston and slide them up against piston head (fig. 92). Then install the above assembly in replenisher tube with rod section of piston first inserted in flange end of tube (fig. 90). Grasp rod section of piston and pull piston with its assembled parts backward through the tube until thick adapter (fig. 92) is flush with guard end of tube (fig. 90). Slide another packing and second thin adapter onto rod section of piston, then screw piston nut tightly onto piston. Install locking nut onto piston and screw locking nut tightly onto piston nut.

b. **Install Piston Assembly in Replenisher Tube.**

(1) Push piston forward into tube until piston head is flush with flange end of tube (fig. 90).

(2) Place gasket and flange against flange end of tube with screw holes alined. Then install four cap screws and safety nuts to secure flange and gasket to tube (fig. 90). (Install cap screws with their heads toward guard end of tube.) Be sure the vertical opening in flange is alined in same direction as mounting supports (fig. 90).

(3) Place tube and piston in vise equipped with copper jaws. Then install spring over rod section of piston and into tube. Guide spring slowly into tube by grasping spring at guard end of tube. When spring is very nearly pushed into tube, place end of guard against end of spring and push spring into tube and end of guard into position at rear end of tube (fig. 90). Hold guard against spring tension, aline screw holes, then install a small C-clamp to hold spring in tube and guard in position on rear end of tube (fig. 91).

(4) Install three cap screws and safety nuts that secure guard to tube. Remove small C-clamp from guard and tube and install the fourth cap screw and safety nut (fig. 89).

(5) Install plug loosely on tee, then install nut and gasket loosely on tee (fig. 90). Screw this tee assembly into hole provided in top of flange. Continue to screw tee into flange until threads of tee are one full thread below the surface opening in flange. Then hold tee in position with hose connection facing rearward, and tighten nut to secure tee assembly in position.

(6) Install gasket on union, then install union in tapped hole provided in the lower forward end of flange (fig. 90).

(7) Connect hose assembly to tee.

c. **Install Bracket and Replenisher Hose (fig. 90).** Install screw, lock washer, and nut loosely in bracket. Then install hose assembly in bracket by separating the two parts of bracket and slipping the

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hose assembly into this opening provided in bracket. Secure bracket to tube by installing two cap screws and lock washers. Connect hose assembly to tee. Tighten hose assembly in bracket.

**42. INSTALLATION OF REPLENISHER.**

a. **Install Replenisher to Cradle** (fig. 69). Aline holes in mounting lugs welded to replenisher with tapped holes provided in cradle, then install two cap screws and lock washers that secure forward end of replenisher to cradle. Then install two screws that secure rear end of replenisher to cradle. Connect hose assembly to union located on forward end of replenisher.

b. **Pump Recoil Oil in Replenisher.** Refer to TM 9-311, paragraph 31 d, for information on filling and checking the replenisher.

**Section VI**

**CRADLE ASSEMBLY**

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General .....	43
Removal and disassembly of cradle assembly .....	44
Inspection and repair of cradle assembly .....	45
Assembly and installation of cradle assembly .....	46

**43. GENERAL.**

a. A complete description of the cradle is given in paragraph 10, TM 9-311.

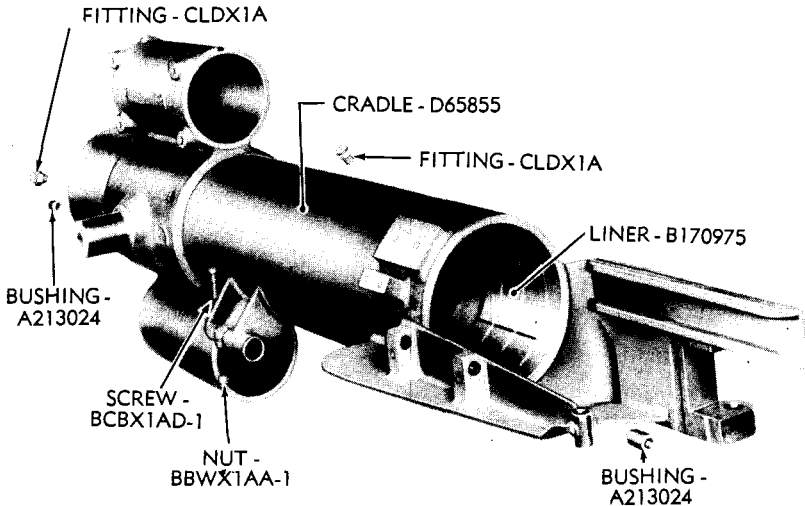
**44. REMOVAL AND DISASSEMBLY OF CRADLE ASSEMBLY.**

**a. Remove Cradle from Gun.**

(1) **NOTE:** The cradle is alined in position on gun tube and prevented from rotating from this position by means of a keyway on cradle (fig. 96) that engages a key (fig. 94) which is mounted on right side of breech ring. The cradle is secured to breech ring by means of recoil piston rod retaining nut on end of recoil cylinder (figs. 64 and 65). Recoil cylinder is further secured to breech ring by means of a screw and copper plug (figs. 3 and 63) that engage threads of recoil piston rod end nut (fig. 65).

(2) **NOTE:** In order to remove cradle, the recoil cylinders must be disconnected from breech ring (figs. 63 and 64). Great care will be taken when recoil cylinders remain mounted in cradle and are to be removed as a unit with cradle, so that cradle and recoil cylinder assembly do not rotate on gun tube and damage cylinders, or cause injury to personnel when keyway on cradle (fig. 96) becomes disengaged from key on breech ring (fig. 94).

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**Figure 93 – Cradle – Exploded View**

(3) In addition to the special tools needed for disassembly, a hoist capable of holding 2,000 pounds will be required along with two stands, one to support and hold the gun and the other to support and hold the mount. A strong beam will be needed to support the hoist. It will not be necessary to have a special tool for clamping the recoil cylinders for disassembly. The recoil cylinders can be disassembled while the mount is in the support stand and the recoil cylinders still in the cradle.

(4) **CAUTION:** Before disassembling the weapon, close the breech and make sure that the cartridge chamber is empty. Remove drain plugs on both recoil cylinders, replenisher outlet, and hose connections; drain oil from each recoil cylinder. Each cylinder holds 5 quarts 7 ounces. The replenisher and hose connections hold approximately 18 ounces. It will not be necessary to drain oil from cylinders unless the mount is to be disassembled.

(5) Using an Allen set screw wrench, remove the two Allen set screws from the breech ring lugs (figs. 3 and 63). These set screws lock the recoil piston rod retaining nut to the breech ring lugs. The set screws must be removed from the upper and lower breech ring lugs; there is one in the left side of each breech ring lug. For protection of the retaining nut threads, a bronze bushing is inserted in the hole in the breech ring lugs. (This may or may not come out when the set screw is removed. Do not try to remove it unless it is absolutely necessary for replacement.) Using the special wrench, start unscrewing the recoil piston rod retaining nuts from the breech ring (figs. 64 and 65). Unscrew the retaining nuts alternately from

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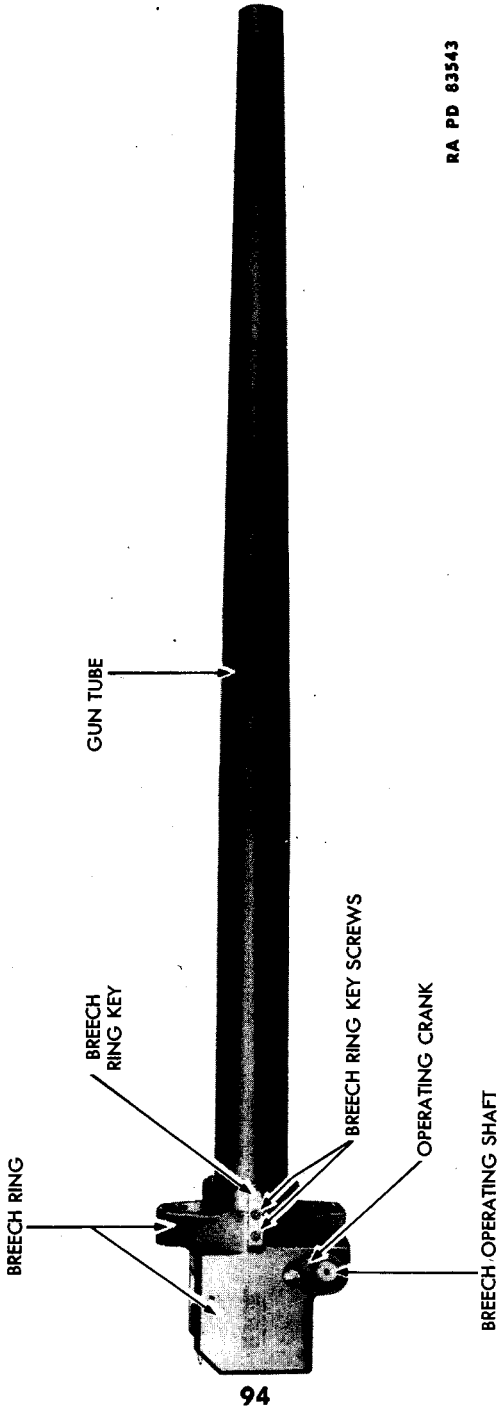


Figure 94 — Gun Tube and Breech Ring Assembly — Cradle Removed

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the breech lugs; that is, unscrew the retaining nut on the top lug one complete turn, and then the retaining nut on the bottom lug one complete turn. As the retaining nuts are unscrewed, the gun will start separating from the mount. After 2 to 2½ inches of the gun tube shows between the front of the breech ring and the cradle, the gun should be free from the mount.

(6) Roll the gun and mount under the hoist. Place the loop of the rope around the breech ring, and using the hoist, raise the gun until it can be seen to float freely in the mount and is not binding. Move the mount slowly forward off the gun until the gun and mount start to move away from each other. Have three or four men apply their weight, holding down on the front end of the gun tube and mount to keep the gun and mount from tipping and falling to the rear. Then lower the gun in the mount.

(7) With some slack in the rope, it is possible to move the rope up a little further on the breech ring (or, if possible, place the rope around the tube; double the rope; and place the hoist hook through the loop). Raise the gun again by means of the hoist until free, and then push the mount forward slowly. In this same manner of raising and sliding the mount forward and then lowering and inching the rope up further on the gun tube, the gun and mount can be separated. Be careful at all times to keep the weight applied to the front end of the gun tube and mount to prevent tipping. As the gun and mount separate, each movement should be smooth and short. Do not try to separate these heavy parts with just a few movements. It is advisable to make these moves very short and to separate these parts inch by inch. When the parts are far enough apart for the rope to be placed around the center of gravity mark on the barrel (marked C. of G.), the hoist will support and hold the gun. Then the gun can be raised by the hoist and the mount can be removed entirely from the gun. As the mount is moved forward, be careful that the spline collar on the barrel does not scratch or bur the three bronze bushings inside the mount. Guide both the gun and the mount in this movement.

(8) When the hoist is holding the gun, it is possible to roll the gun stand under the gun and lower the gun on it. Care should be taken to line up the gun on the stand so that there will be enough room for the breechblock to be lowered and raised without interference from the stand. The gun and mount are now separated and resting on their respective supporting mounts.

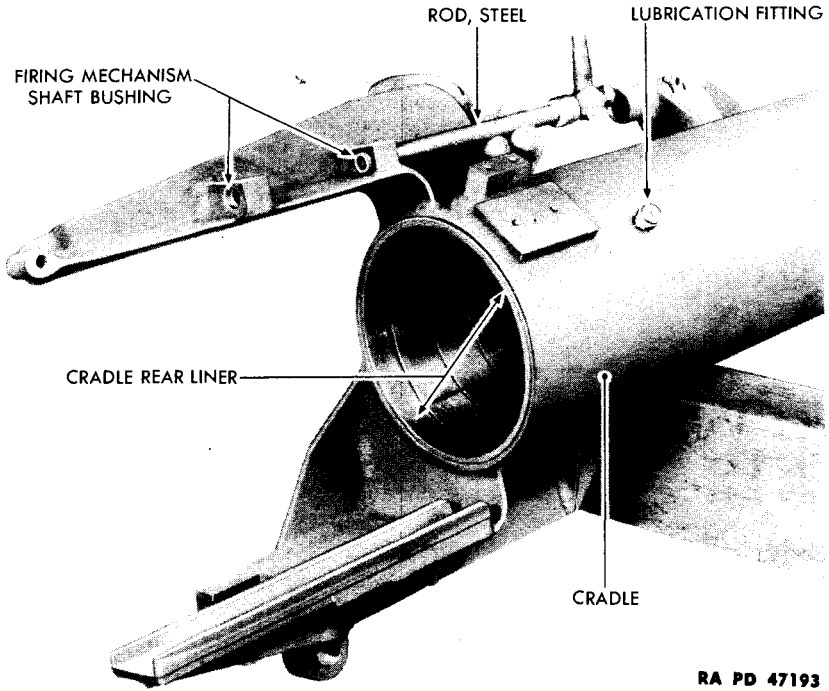
**b. Remove Recoil Cylinders from Cradle.** For removal of recoil cylinders, refer to paragraph 33.

**c. Remove Lubrication Fittings from Cradle.** Remove two lubrication fittings from cradle (figs. 93 and 96).

**d. Remove Firing Mechanism Shaft Bushings from Cradle.** It is necessary to use an improvised tool to drive firing mechanism shaft bushings from cradle (fig. 95). A steel rod  $\frac{9}{16}$  by 7 inches,

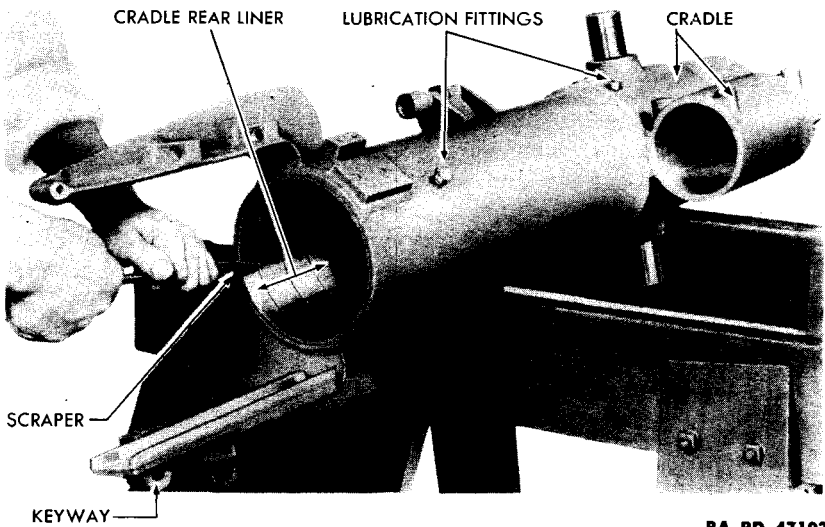


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**Figure 95 – Driving Out Firing Mechanism Shaft Bushing**



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**Figure 96 – Scraping Burs from Bronze Liner**

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is turned down for a length of  $\frac{1}{4}$  inch from face to  $\frac{3}{8}$ -inch diameter to provide a driving tool for bushing. Insert small end of this improvised tool against end of bushing and drive bushing out of cradle. Other bushing is removed in the same manner.

### 45. INSPECTION AND REPAIR OF CRADLE ASSEMBLY.

a. **Clean Parts.** All parts of cradle are to be thoroughly cleaned with SOLVENT, dry-cleaning, and thoroughly dried with compressed air (if available) or CLOTH, wiping.

b. **Inspect Bronze Liners.** Examine liners which are mounted inside cradle (fig. 96). If lines are scored, remove scores by scraping liner until smooth, using a long-handled bearing scraper (fig. 96), then polish liners with CLOTH, crocus. If liners are loose, cracked or badly worn, notify heavy ordnance personnel for replacement of liners.

c. **Inspect Lubrication Fittings.** Examine lubrication fittings. If clogged with dirt, soak fittings in SOLVENT, dry-cleaning, to remove dirt. If cracked, or internal spring is broken, replace fittings.

d. **Inspect Keyway (fig. 96).** Examine keyway. If scored, smooth keyway by scraping (flat and hook scrapers), and polish with CLOTH, crocus.

e. **Inspect Firing Mechanism Shaft Bushings (fig. 93).** Examine bushings. If cracked or badly worn, replace bushings. Slight scoring in these bushings will be removed after they are installed in cradle (par. 30 a).

f. **Install Recoil Cylinders in Cradle and Connect Cylinders to Breech Ring.** For installation of recoil cylinders, refer to paragraph 38 a and b. For installation of recoil cylinder hose assemblies, refer to paragraph 38 c. Fill recoil cylinders (par. 38 d).

### 46. ASSEMBLY AND INSTALLATION OF CRADLE ASSEMBLY.

**NOTE:** Before assembling the various parts of cradle assembly, make sure all parts are thoroughly cleaned with SOLVENT, dry-cleaning, and dried with compressed air or CLOTH, wiping. Then lubricate as per instructions in chapter 3, section VII.

a. **Install Firing Mechanism Shaft Bushings in Cradle.** For installation of bushing, refer to paragraph 30 a.

b. **Install Lubrication Fittings (fig. 93).** Screw two lubrication fittings into tapped holes provided in cradle, and tighten firmly.

c. **Install Cradle.**

(1) Clean gun tube thoroughly with SOLVENT, dry-cleaning, then thoroughly dry tube with compressed air or CLOTH, wiping. Examine the bearing surface at rear of gun tube. If burred, scored, or nicked, remove with fine-cut file, and smooth out surface with oil-stone. Clean bearing surface with SOLVENT, dry-cleaning, dry thoroughly with CLOTH, wiping, and lubricate with GREASE, O.D.,

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No. 00. Grasp cradle firmly and carefully guide cradle (bracket end of cradle first) over end of gun tube. Personnel will be careful not to scratch or score bronze liners which are mounted inside cradle on front tube retaining collar. Aline keyway on cradle with key mounted in breech ring, then carefully slide cradle against breech ring. Wipe up excess grease which may be present on breech ring end of cradle after sliding cradle into position.

(2) Assembling the gun to the mount will be just the reverse of disassembly; that is, the last part removed will be the first replaced. With the front tube removed from the mount, slide the mount over the gun, which is being held and balanced by the hoist with the rope doubled at the C. of G. The front tube will be assembled to the mount later as it is easier to line the spline collar and the retriever after the gun and mount are assembled. When the mount is sliding toward the gun, be sure that the spline collar does not scratch the bushings in the mount. Inch the mount back on the gun by raising the gun in the mount and moving the mount back on the gun. When the rope prevents further movement, lower the gun in the mount. Move the rope to the rear and raise the gun on the hoist; move the mount further to the rear. Slow, even movements are suggested to prevent serious accidents. In addition, be sure to have weight applied to front end of gun tube and mount to prevent their tipping and falling when these heavy parts are gradually assembled. When the rope has been moved as far back on the gun as possible, it must be removed and placed around the breech ring. The last move in assembling the gun and mount must be very slow, for the recoil piston rod retainer is threaded and will have to be alined with the matching threads in the breech ring lugs. Any force applied at this time may cause burring of these threads and will interfere with proper assembly.

(3) Tighten the recoil piston rod retainers in their respective lugs in the breech ring, using the special wrench. This connection must be as tight as possible. The two Allen set screws and the two bronze plugs will be installed in their respective holes in the breechring lugs. The two set screws will be tightened, locking the retainers in the breech ring.

**Section VII**

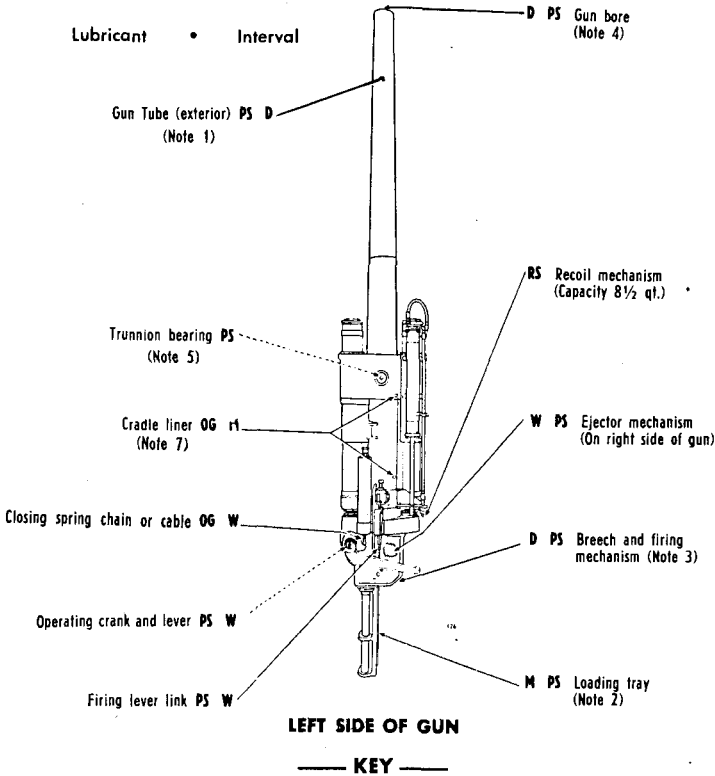
**LUBRICATION**

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**CAUTION** — Lubricate dotted  
Arrow Points on BOTH SIDES

Interval • Lubricant



LUBRICANTS	
OG—GREASE, O.D.	RS—OIL, recoil special PS—OIL, lubricating, preservative, special

INTERVALS
D — DAILY W — WEEKLY M — MONTHLY

**Figure 97 — Lubrication Guide**

RA PD 85124

**47. INTRODUCTION.**

a. Lubrication is an essential part of preventive maintenance, determining to a great extent the serviceability of parts and assemblies.

**48. LUBRICATION GUIDE.**

a. **General.** Lubrication instructions for this materiel are consolidated in a lubrication guide (fig. 97). These specify the points to be lubricated, the periods of lubrication, and the lubricant to be used.

b. Records of seasonal changes of lubricants and recoil oil should

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be copied in the Artillery Gun Book (O.O. Form 5825) in the same manner as Field Service Modification Orders are recorded.

**c. Lubrication Notes.** The following notes apply to the lubrication guide (fig. 97). Each note reference in the guide itself is to the subparagraphs below having the corresponding number:

(1) **GUN TUBE.** Daily, coat exposed exterior surface of gun tube with OIL, lubricating, preservative, special, to prevent rusting.

(2) **LOADING TRAY.** Monthly, disassemble and coat exterior of tube with OIL, lubricating, preservative, special.

(3) **BREECH AND FIRING MECHANISM.** Daily and after firing, clean all moving parts and exposed surfaces in SOLVENT, dry-cleaning, and oil with OIL, lubricating, preservative, special.

(4) **GUN BORE.** Daily and after firing, clean and coat with OIL, lubricating, preservative, special.

(5) **TRUNNION BEARINGS.** Coat with OIL, lubricating, preservative, special, at installation to prevent rusting.

(6) **OIL CAN POINTS.** Weekly, lubricate firing lever link, firing button, operating crank and cam, with OIL, lubricating, preservative, special.

(7) **POINTS TO BE SERVICED AND/OR LUBRICATED BY ORDNANCE MAINTENANCE PERSONNEL.**

(a) *Cradle Liner.* Every 6 months, disassemble, clean, and repack with GREASE, O.D., No. 00.

**49. REPORTS AND RECORDS.**

**a. Reports.** If lubrication instructions are closely followed, proper lubricants used, and satisfactory results are not obtained, a report will be made to the ordnance officer responsible for the maintenance of the materiel.

**b. Records.** Record of seasonal changes of lubricants and recoil oil will be kept in the Artillery Gun Book.

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**CHAPTER 4**

**REFERENCES**

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**50. PUBLICATIONS INDICES.**

Current publications relating to this materiel are as tabulated here.

- a. An up-to-date list of ordnance publications is maintained by subject and number in Index to Ordnance Publications: volume 1, supply functions; volume 2, training and maintenance functions ..... OFSB 1-1
- b. An up-to-date list of War Department training publications is maintained in ..... FM 21-6
- c. An up-to-date list of War Department training films is maintained in ..... FM 21-7

**51. STANDARD NOMENCLATURE LISTS.**

- a. Ammunition, fixed and semifixed, all types, for pack, light and medium field artillery, including complete round data ..... SNL R-1
- b. **Gun Materiel.**
  - Gun, 75-mm, M4; and mount, gun, airplane, 75-mm, M6 ..... SNL C-47
  - Major items of pack, light and medium field artillery; and armament of these calibers for airplane and combat vehicles ..... SNL C-1
- c. **Maintenance.**
  - Cleaning, preserving and lubricating materials, recoil fluids, special oils, and miscellaneous related items ..... SNL K-1
  - Soldering, brazing and welding material, gases and related items ..... SNL K-2
  - Tools, maintenance, for repair of pack, light and medium field artillery; and armament of these calibers for airplane and combat vehicles ..... SNL C-18

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**52. EXPLANATORY PUBLICATIONS.**

**a. Ammunition.**

- Ammunition, general . . . . . **TM 9-1900**
- Range regulations for firing ammunition for training and target practice . . . . . **AR 750-10**

**b. Gun Materiel.**

- 75-mm Aircraft gun, M4 and mount M6 . . . . . **TM 9-311**
- Gun, 75-mm, M4; mount, gun, airplane, 75-mm, M6 . . . . . **OFSB 6-C-47**

**c. Maintenance.**

- Chemical decontamination of materials and equipment . . . . . **TM 3-220**
- Cleaning, preserving, lubricating, and welding materials and similar items issued by the Ordnance Department . . . . . **TM 9-850**
- Cold weather lubrication and service of artillery materiel . . . . . **OFSB 6-5**
- Defence against chemical attack . . . . . **FM 21-40**
- General instructions for recoil fluid for light and medium artillery (37-mm to 240-mm, inclusive) . . . . . **OFSB 6-6**
- Ordnance field service in time of peace . . . . . **AR 45-30**
- Ordnance Maintenance: Star-gaging equipment, impression outfits and pressure gages . . . . . **TM 9-1860**

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