

# TM 9-2012

DEPARTMENT OF THE ARMY TECHNICAL MANUAL

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OPERATION AND  
ORGANIZATIONAL MAINTENANCE

## CAL. .30 MACHINE GUN M37 (TANK)



DEPARTMENT OF THE ARMY • DECEMBER 1954

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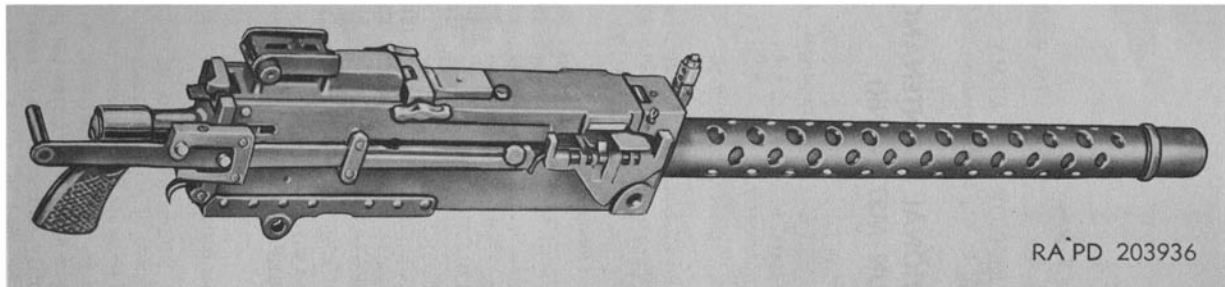
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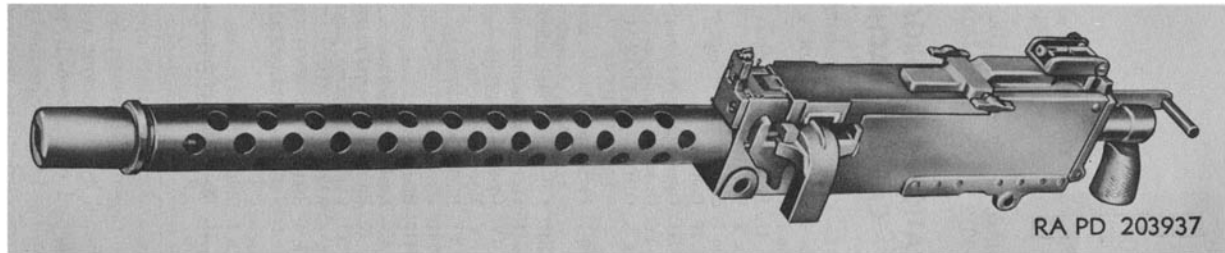
TECHNICAL MANUAL } DEPARTMENT OF THE ARMY  
 No. 9-2012 } WASHINGTON 25, D. C., 31 December 1954

## OPERATION AND ORGANIZATIONAL MAINTENANCE: CAL. .30 MACHINE GUN M37 (TANK)

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*Figure 1. Cal. .30 machine gun M37 (tank)—right-side view.*



*Figure 2. Cal. .30 machine gun M37 (tank)—left-side view.*



# CHAPTER 1

## INTRODUCTION

### Section I. GENERAL

#### 1. Scope

a. These instructions are published for the information and guidance of the personnel to whom this materiel is issued. They contain information on the operation and organizational maintenance of the cal. .30 machine gun M37 (tank) (figs. 1 and 2) and ammunition.

b. The appendix contains a list of current references, including supply and technical manuals, and other available publications applicable to the materiel.

c. This first edition is being published in advance of complete technical review of all concerned. Any errors or omissions will be brought to the attention of the Chief of Ordnance, Washington 25, D. C., ATTN: ORDFM-Pub.

#### 2. Organizational Maintenance Allocation

In general, the prescribed organizational maintenance responsibilities will apply as reflected in the allocation of tools and spare parts in the appropriate columns of the current ORD 7 G-group supply manual pertaining to this weapon and in accordance with the extent of disassembly prescribed in this manual for the purpose of cleaning, lubricating, or replacing authorized spare parts. In all cases where the nature of repair, modification, or adjustment is beyond the scope or facilities of the using organization, the supporting ordnance maintenance unit should be informed in order that trained personnel with suitable tools and equipment may be provided or other proper instructions issued.

#### 3. Forms, Records, and Reports

a. *General.* Responsibility for the proper execution of forms, records, and reports rests upon the officers of all units maintaining this equipment. However, the value of accurate records must be fully appreciated by all persons responsible for their compilation, maintenance, and use. Records, reports, and authorized forms are normally utilized to indicate the type, quantity, and condition of materiel to be inspected, to be repaired, or to be used in repair. Properly

executed forms convey authorization and serve as records for repair or replacement of materiel in the hands of troops and for delivery of materiel requiring further repair to ordnance shops in arsenals, depots, etc. The forms, records, and reports establish the work required, the progress of the work within the shops, and the status of the materiel upon completion of its repair.

*b. Authorized Forms.* The forms generally applicable to using organizations are listed in the appendix. For a current and complete listing of all forms, see SR 310-20-6.

*c. Field Report of Accidents.*

(1) *Injury to personnel or damage to materiel.* The reports necessary to comply with the requirements of Army safety program are prescribed in detail in the SR 385-10-40 series of special regulations. These reports are required whenever accidents involving injury to personnel or damage to materiel occur.

(2) *Ammunition.* Whenever an accident or malfunction involving the use of ammunition occurs, firing of the lot which malfunctions will be immediately discontinued. In addition to any applicable reports required in (1) above, details of the accident or malfunction will be reported as prescribed in SR 385-310-1.

*d. Report of Unsatisfactory Equipment or Materials.* Any suggestions for improvement in design and maintenance of equipment and spare parts, safety and efficiency of operation, or pertaining to the application of prescribed petroleum fuels, lubricants, and/or preserving materials, or technical inaccuracies noted in the Department of the Army publications will be reported through technical channels as prescribed in SR 700-45-5 to the Chief of Ordnance, Washington 25, D. C., ATTN: ORDFM, using DA Form 468, Unsatisfactory Equipment Report. Such suggestions are encouraged in order that other organizations may benefit.

*Note.* Do not report all failures that occur. Report only REPEATED or RECURRENT failures or malfunctions which indicate unsatisfactory design or materiel. However, reports will always be made in the event that exceptionally costly equipment is involved. See also SR 700-45-5 and printed instructions on DA Form 468.

## Section II. DESCRIPTION AND DATA

### 4. Description

The cal. .30 machine gun M37 (tank) (figs. 1 and 2) is an automatic, recoil-operated, link-belt fed, air-cooled weapon. The gun is designed for fixed or flexible use. Depending on the positioning of some of the component parts, ammunition can be fed from either the left or the right side of the gun. A metallic link belt of the disintegrating type

is used in feeding. The cal. .30 machine gun M37 (tank) (formerly T153) may be used with the following mounts:

Cal. .30 machine gun tripod mount M1917A1

Weapon tripod mount M74.

## 5. Nameplates

The name of the weapon and the serial number are located on the right side of the casing just below the rear sight.

## 6. Tabulated Data

### *a. Dimensions.*

Weight of gun (aprx).....	21 lb
length overall.....	41 $\frac{1}{64}$ in
Length of barrel.....	24 in
Space to rear required for removing barrel (aprx).....	30 in
Space required to open cover.....	8 $\frac{3}{4}$ in
Caliber.....	.30

*b. Ammunition.* For information on ammunition, refer to Chapter 4.

## Chapter 2

### Operating Instructions

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#### Section I. SERVICE UPON RECEIPT OF MATERIEL

##### 7. General

*a.* When a new or reconditioned weapon is first received by the using organization, it is the responsibility of the officer in charge to determine whether the materiel has been properly prepared for service by the supplying organization and to be sure it is in condition to perform any mission to which it may be assigned when placed in service. For this purpose, inspect all assemblies, subassemblies, and accessories to be sure they are properly assembled, secure, clean, and correctly adjusted and/or lubricated. Check all tools and equipment against the appropriate ORD 7 G-group supply manual to be sure every item is present and determine that they are in good condition, clean, and properly mounted or stowed.

*b.* Make a record of any missing parts and of any malfunctions. Correct any deficiencies as quickly as possible.

*c.* Pay special attention to small parts as they are the more likely to become lost and may seriously affect the proper functioning of the weapon.

*d.* The machine gun should be cleaned and prepared for service in accordance with instructions given in paragraph 9.

##### 8. New Materiel

*a.* New machine guns received from storage are packed in heat-sealed, water-vaporproof barrier bags. Guns previously were packed in water-vaporproof bags and cotton stockinette (Saran packing).

*b.* Guns packed using these methods are completely coated with a light film of special preservative oil and are serviced as described in (1) through (3) below.

(1) Remove gun and packing from crate.

(2) Remove protective covering from gun.

(3) The gun is now ready for use. However, to insure that there is no corrosion present, missing parts, or incorrect assembly, proceed as described in (a) through (h) below.

- (a) Disassemble gun (pars. 50 through 84).
- (b) Clean oil film from all parts. Check front face of bolt and other surfaces subject to powder fouling and corrosion.

*Note.* All new machine guns are test-fired and therefore certain parts will have their protective finish worn away. This is a normal condition and is not to be construed as excessive wear.

- (c) Clean bore, using cleaning rod M2A1—6508398 (fig. 21) and patches.
- (d) Clean chamber, using the chamber cleaning brush M6—6108828 (fig. 19).
- (e) Check gun to be sure that all modifications have been applied.
- (f) Lubricate (pars. 31, 32, and 33) and assemble gun.
- (g) Check head space and adjust if necessary (par. 17).
- (h) Check spare parts and accessories with the appropriate ORD 7 G-group Department of the Army supply manual.

## 9. Used Materiel

Used materiel requires the same inspection and service as prescribed for new materiel (par. 8). In addition, check all components for signs of excessive wear and corrosion. Check for missing parts and correct any deficiencies.

## 10. Disassembly of Gun Prior to Cleaning

Remove the following groups for cleaning as indicated below:

- Back plate group (par. 51)
- cover group (par. 57)
- Bolt group (par. 63)
- Lock frame group (par. 69)
- Barrel and barrel extension group (par. 75)
- Casing and barrel jacket group (par. 81).

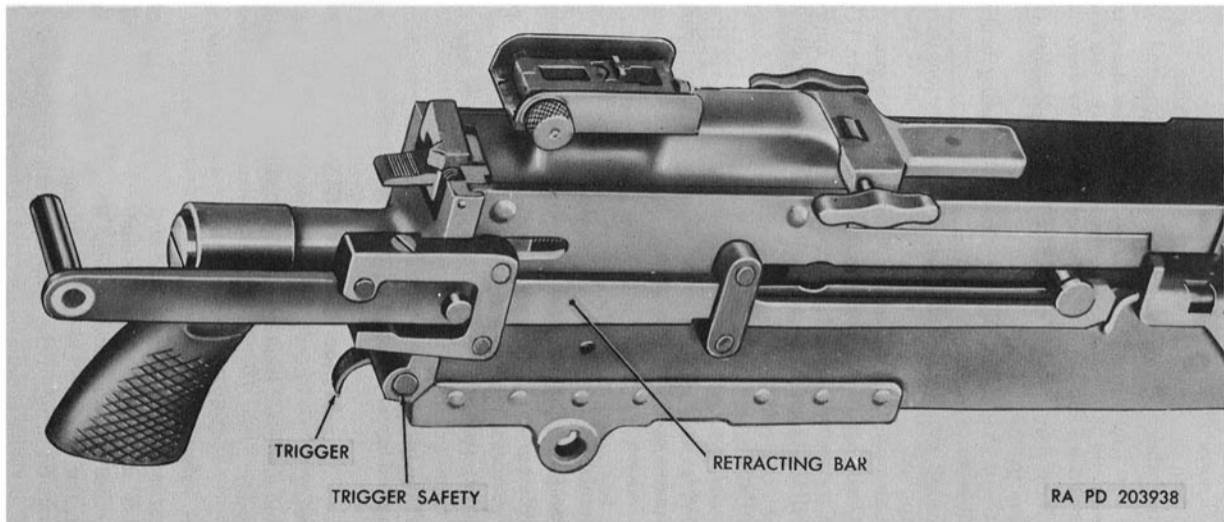
## Section II. CONTROLS

### 11. General

This section describes, locates, and illustrates all controls provided for the materiel.

### 12. Trigger Safety

The trigger safety (fig. 3) is located at the bottom of the back plate. The letter "S" is marked on the flat surface at the right end of the safety; the other end is marked with the letter "F". With the safety to the right, the letter "S" is visible and the trigger is locked, preventing accidental firing of the weapon. With the safety to the left, the letter "F" is visible and the trigger may be operated.



*Figure 3. Operating controls.*

### 13. Retracting Bar

The retracting bar permits manual retraction of the bolt for loading, unloading, and correction of firing stoppages. By pulling the retracting bar to the rear and depressing it, the retaining slot in the bar engages the rear retracting bar guide. Holding the bolt in the rear position, lock the retracting bar in this position by pushing retracting bar lock to the left. This is a precautionary measure to prevent the bolt from springing forward with possible injury to personnel. To release, push the retracting bar lock to the right and raise the retracting bar. During firing, the retracting bar is in the forward position and does not move.

### 14. Trigger

When the trigger (fig. 3) is activated, the sear is moved downward in the bolt. This action releases the firing pin and it is driven forward to fire the cartridge by the compressed firing pin spring. When the trigger is released, the firing pin is retained by the sear and firing ceases.

## Section III. OPERATION UNDER USUAL CONDITIONS

### 15. General

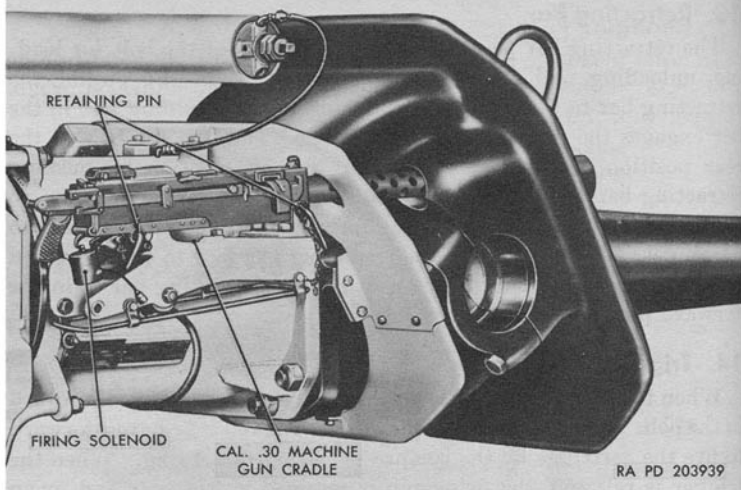
This section contains instructions for the mechanical steps necessary to operate the cal. .30 machine gun M37 (tank) under conditions, moderate temperatures and humidity. For operation under unusual conditions, refer to Section IV.

### 16. Mounting of Gun

*a. Installation of Gun in Tank.* Place the cal. .30 machine gun M37 in the machine gun cradle (fig. 4) on the right side of the combination gun mount. Aline the front mounting holes in the gun and mount and insert the machine gun front locking pin. Swing the machine gun elevating and traversing mechanism up to aline its mounting hole with the rear mounting hole of the machine gun and insert the machine gun rear locking pin. Connect the firing cable to the machine gun firing solenoid mounted on the cradle. The gun is fired electrically by a solenoid which is operated by switches located on gunner's and commander's control handles.

*b. Tripod Mounts.* When the cal. .30 machine gun M37 is mounted on the cal. .30 machine gun tripod mount M1917A1, the link chute must be removed to avoid interference. This is not necessary when the gun is mounted on the weapon tripod mount M74.





*Figure 4. Cal. .30 machine gun cradle.*

## **17. Checking and Adjusting Head Space**

*a.* One of the most important adjustments for proper functioning of the weapon is the head space adjustment. Head space is the distance between the rear end of a cartridge fully seated in the chamber and the rear end of the barrel. Improper adjustment of the head space will cause firing stoppage and possible damage to the gun.

*b.* The head space adjustment is correct when the breech lock rides smoothly up the breech lock cam into the fully locked position making positive contact with the forward wall of the breech lock recess and the forward end of the bolt is positioned against the rear end of the barrel.

*c.* To adjust the head space, pull the bolt to the rear about three-quarters of an inch. Screw the barrel into the barrel extension (fig. 5), using the nose of a cartridge in the barrel notches until the recoiling parts will not go into battery under pressure of the driving spring when the bolt is released. Then unscrew the barrel from the barrel extension one notch at a time, checking after each notch until the barrel, barrel extension, and bolt will just go fully forward into the battery without being forced. Then unscrew the barrel one additional notch. If correctly adjusted, the recoiling parts will go into battery without the least bind, and with a solid metallic sound when eased forward from approximately 1 inch out of battery position.

## 18. Changing Feed

In order to change a gun from left hand feed to right hand feed or vice versa, repositioning of parts must be carried out in the bolt group, cover group, and casing group (figs. 6 and 7).

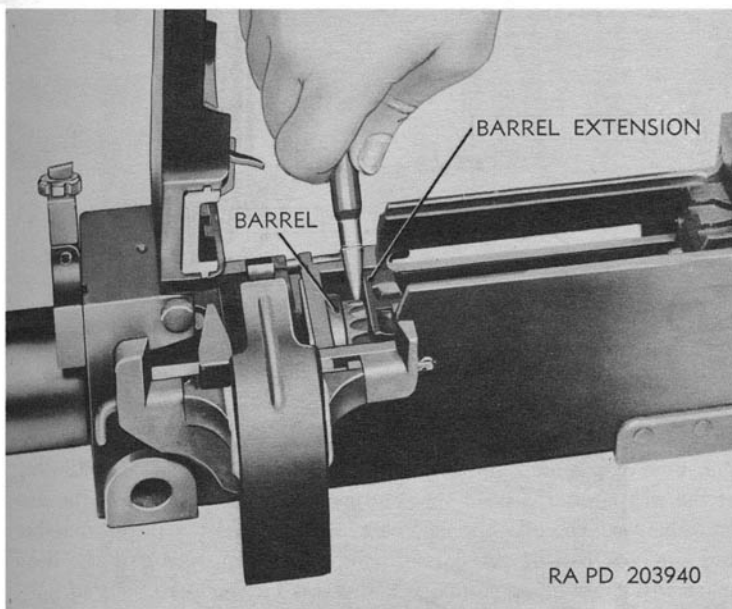
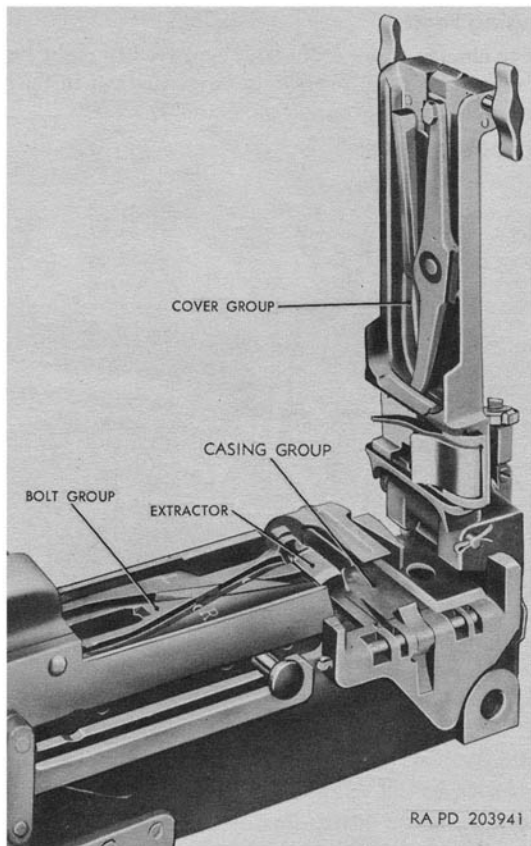


Figure 5. Adjusting head space.

### a. Bolt Group.

- (1) Remove the bolt group from gun (par. 63).
- (2) Disengage extractor assembly (fig. 8) from bolt by rotating it upward until it rests against the projecting stop. Slide the extractor assembly out of the bolt.
- (3) Using a drift, drive out the two 0.078 x  $\frac{3}{4}$  spring pins (fig. 9). If difficulty is encountered in removing the pins without damage, refer to higher echelon maintenance.
- (4) Using the nose of a cartridge, pry out the two bolt switches (fig. 10). Reposition bolt switches by inserting them in the holes on the adjacent track.
- (5) Replace the two 0.156 x  $\frac{3}{4}$  spring pins.
- (6) Using a drift, remove the ejector pin from the extractor (fig. 11). If difficulty is encountered in removing the pin without damage, refer to higher echelon maintenance. Then remove the ejector pin spring and ejector as a unit from the extractor assembly. Reposition the ejector spring in the op-



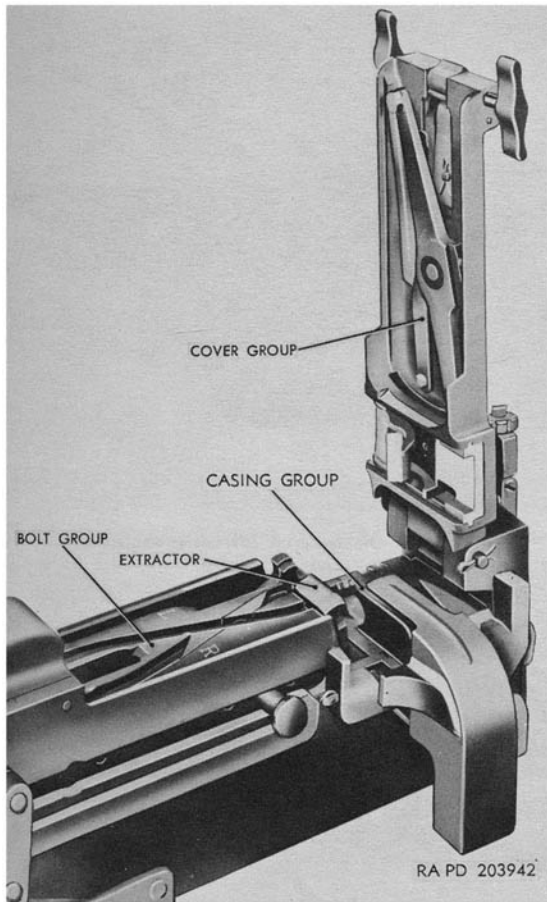
*Figure 6. Right hand feed arrangement.*

posite slot. Reassemble the extractor with the ejector in the opposite position (figs. 12 and 13).

(7) Install extractor assembly in bolt.

*b. Belt Feed Cover Assembly.*

- (1) Using a drift, drive out the  $0.094 \times \frac{11}{16}$  spring pin, remove the belt feed lever pin, and slide the belt feed lever from the belt feed cover assembly (figs. 14, 15, and 16). If difficulty is encountered in removing the pin without damage, refer to higher echelon maintenance.
- (2) Remove the belt feed slide from cover and with a drift, remove the belt feed pawl pin.
- (3) Relocate the belt feed pawl arm on the opposite side of the belt feed pawl. Align the belt feed pawl and arm on the slide and replace the belt feed pawl pin.

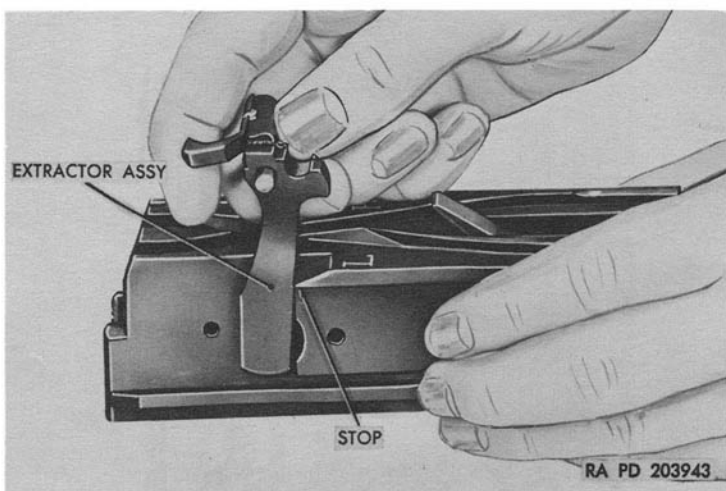


*Figure 7. Left hand feed arrangement.*

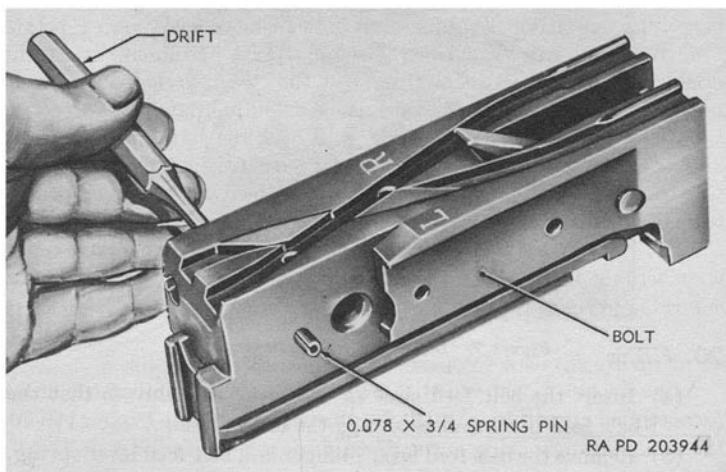
- (4) Insert the belt feed slide in the cover assembly so that the belt feed pawl arm is toward the cover latch.
- (5) Remove the belt feed lever plunger and belt feed lever spring, and replace in the alternate hole in the belt feed lever.
- (6) Insert belt feed lever in cover assembly slot, allowing it to engage with the notch in the belt feed slide.
- (7) Align the holes in the belt feed lever and cover and replace the belt feed lever pin.
- (8) Drive in the  $0.094 \times \frac{1}{16}$  spring pin.

*c. Casing Group.*

- (1) Withdraw the two belt holding pawl pin assemblies (fig. 17).
- (2) Reposition the front and rear cartridge stops, link chute,



*Figure 8. Disengaging extractor assembly.*



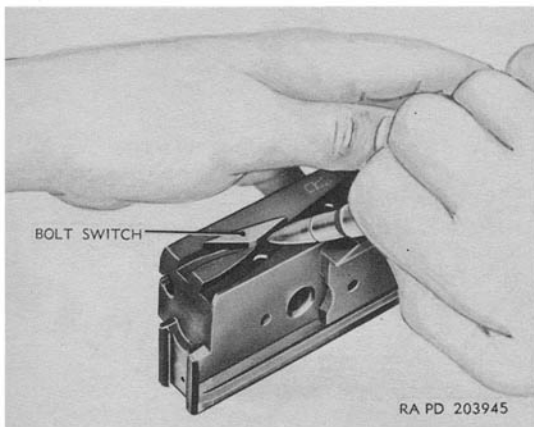
*Figure 9. Driving out spring pins.*

and the belt holding pawl and belt holding pawl spring in the recesses on the opposite side of the casing.

(3) Replace the belt holding pawl pin assemblies.

## 19. Loading, Feeding, and Chambering

The placing of an ammunition belt into the feedway of the gun is referred to as loading. Feeding is the mechanical action, subsequent



*Figure 10. Removing bolt switches.*

to loading, which extracts a round from the belt and places it in the T slot of the bolt. Chambering is the seating of the round in the chamber. The operating procedures are described in *a* through *c* below.

*a.* With the belt feed cover assembly open or closed, insert the double loop end of the ammunition belt (fig. 18) into the feed opening until the first cartridge is beyond the belt holding pawl.

*b.* If open, close cover assembly, pull back the retracting bar fully and release, allowing the bolt to go forward freely. This places the first cartridge of the belt in position on the feedway to be gripped by the extractor assembly.

*c.* Pull the retracting bar back again and release it. This action chambers the first cartridge and the extractor assembly grips the next cartridge in the belt.

## **20. Firing**

After the gun is charged with a cartridge in the chamber, the firing is controlled by pulling or releasing the trigger. If the trigger is held, the gun continues firing automatically.

## **21. Correction of Malfunctions and Stoppages by Immediate Action Only**

If the gun fails to fire, pull the bolt to the rear, release it, and attempt to fire. If the gun still fails to fire, note position of the bolt stud.

*a.* If bolt stud is forward, tap belt feed cover assembly and straighten belt at point where it enters the feed aperture. Pull bolt to rear twice and release, fire.

*b.* If belt feeds when manually charged, raise cover assembly and remove first round from belt. Close cover assembly, reload, and fire.

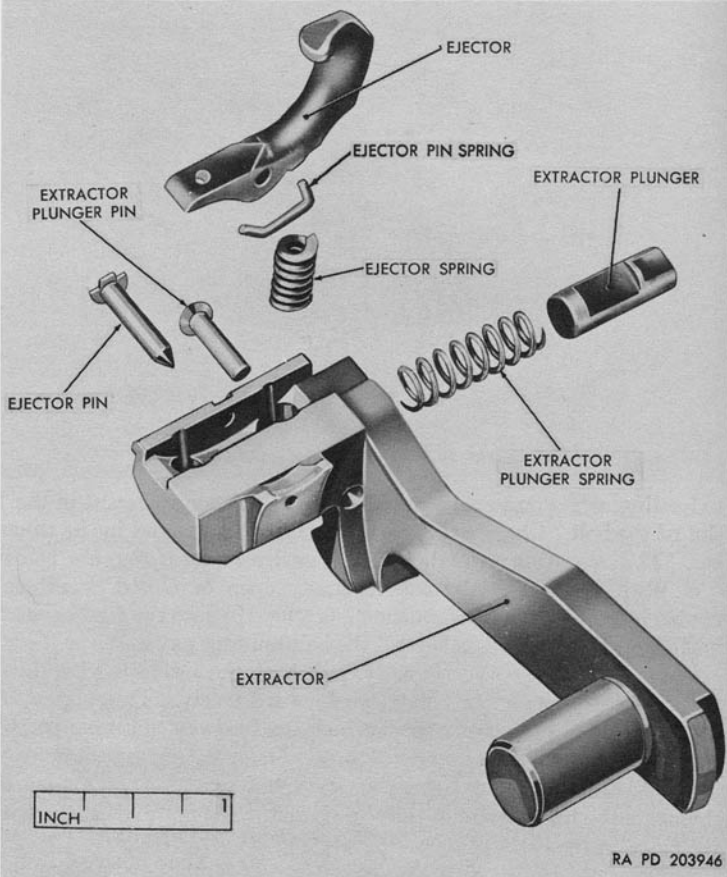


Figure 11. Extractor assembly—exploded view.

*c.* If belt feeds when manually charged and gun still fails to fire, change bolt, reload, and fire.

*d.* If bolt stud is not forward, attempt to hit the bolt stud forward with heel of hand. When attempting this be careful not to raise the trigger.

*e.* If bolt goes forward, fire.

*f.* If bolt does not go forward, raise cover assembly and check for jammed belt links or other types of malfunctions. Eliminate cause of stoppage, reload, and fire.

*g.* If the gun fails to fire after immediate action has been taken, it is probable that the stoppage is of an unusual type and will require a more detailed correction as described in Section V on troubleshooting.



INCHES 1 2

EJECTOR AND EJECTOR PIN SPRING

EJECTOR SPRING

EJECTOR  
PIN

EXTRACTOR

RIGHT-HAND FEED

EJECTOR AND EJECTOR PIN SPRING

EJECTOR SPRING

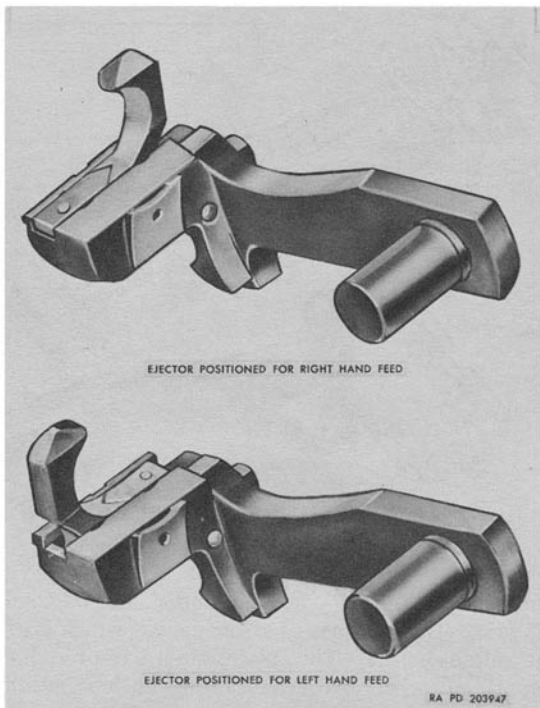
EJECTOR  
PIN

EXTRACTOR

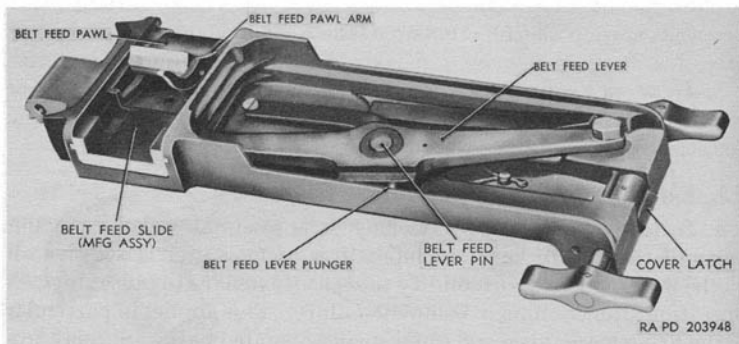
LEFT-HAND FEED

RA PD 134611

Figure 12. Ejector group disassembled for right-hand and left-hand feed.



*Figure 13. Ejector assembly—right-hand and left-hand feed arrangement.*



*Figure 14. Belt feed cover assembly—left hand feed arrangement.*

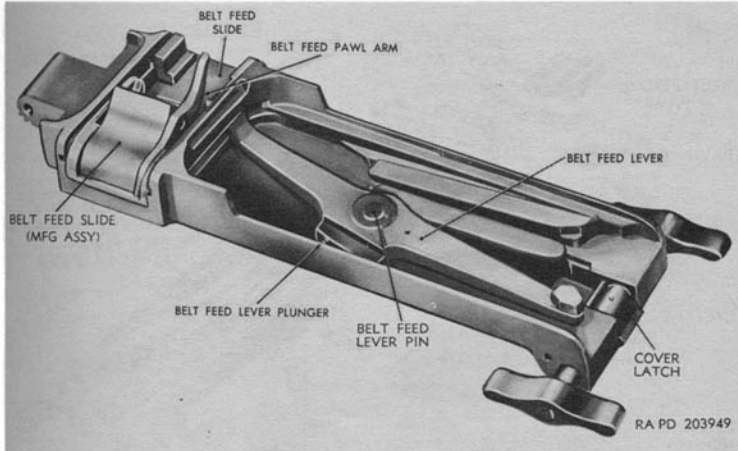


Figure 15. Belt feed cover assembly—right hand feed arrangement.

## Section IV. OPERATION UNDER UNUSUAL CONDITIONS

### 22. General Conditions

a. The mechanical steps of operation under unusual conditions are the same as for operation under usual conditions which are covered in Section III of this chapter. The only difference in procedure is in the servicing of the gun with regard to cleaning and lubrication to insure proper functioning in locations where extremes of atmosphere, temperature, and humidity occur. Special care will be observed with regard to cleaning and lubrication of the gun. Such care is necessary to insure proper operation and functioning of the weapon and to guard against excessive wear of the moving parts and deterioration of the materiel.

b. Under any conditions, the bore and chamber of the barrel must be wiped free of excess oil before firing or mounting the gun in the tank for combat.

### 23. Extreme-Cold Weather Conditions

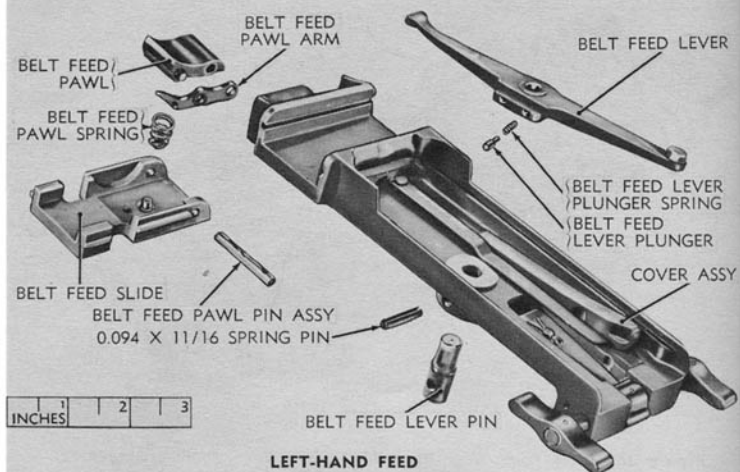
a. In temperatures below freezing, it is essential that the moving parts of the gun be kept absolutely free of moisture. Excessive oil on the working parts will solidify to such an extent as to cause sluggish operation a functioning or complete failure. This applies in particular to the firing mechanism and small spring-operated parts. Special care should be taken to eliminate all grease, excess oil, and fouling from the following parts and assemblies—

Muzzle end of barrel

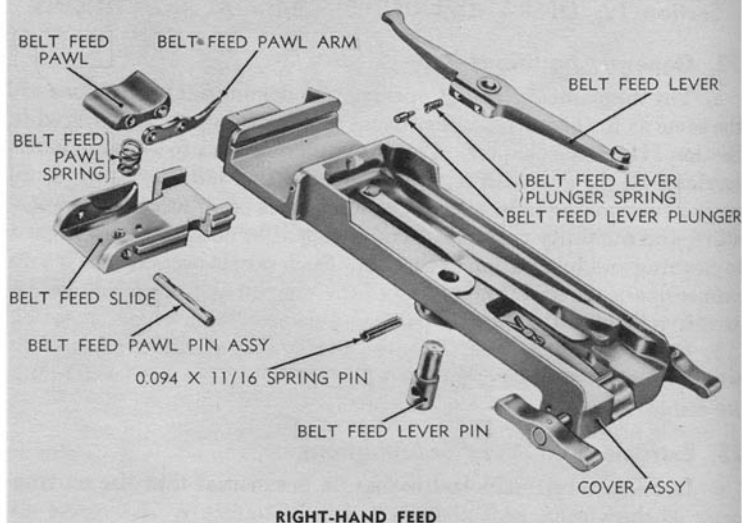
Belt feed pawl and belt holding pawl springs and seats

Bore and chamber of barrel

Driving spring assembly and its tunnel in bolt



**LEFT-HAND FEED**



**RIGHT-HAND FEED**

RA PD 134610

*Figure 16. Belt feed cover assembly disassembled for right hand and left hand feed.*

Belt feed lever plunger, spring, and seat  
 Firing pin assembly and its tunnel in bolt  
 Extractor assembly, its recess in bolt, and the ejector spring and seat  
 Barrel plunger and spring

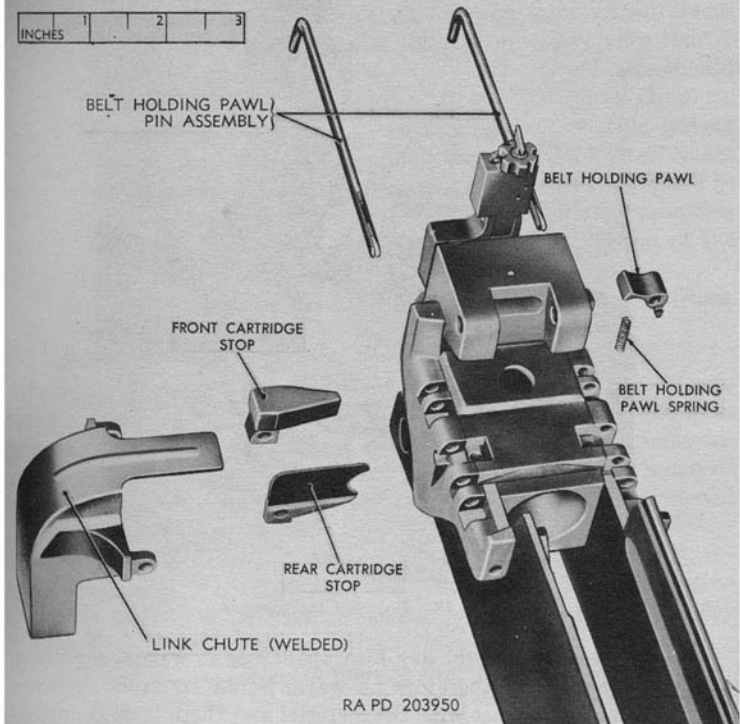
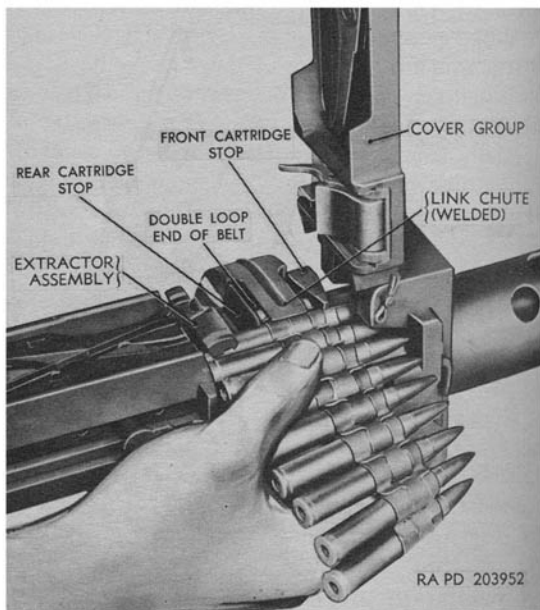


Figure 17. Casing group.

b. If guns are left mounted in the tanks, the exposed parts should be carefully covered for protection and to prevent frosting.

c. When guns are removed from the tank and taken into a warmer area such as a heated building, a condensation of moisture vapor will occur upon the cold surface. This condition is known as "sweating". It can be prevented as described in (1) through (6) below.

- (1) Do not bring any cold materiel indoors unless it is absolutely necessary. It is best to leave it outdoors, but protected from snow with proper covers.
- (2) If it is necessary to bring guns or other equipment from low temperatures to room temperature, use "anticondensation" containers. These containers can be specially made tight-fitting cloth-framed boxes or any other fairly airtight containers with heat-conducting walls. Place the cold equipment in the container. Have the container at outside temperature so that it will contain cold dry air. Close the top, bring it indoors, and allow it to come to the warming-up



*Figure 18. Loading the weapon.*

process. The cold dry air expands as it warms, breathing outward, and therefore no warm liquid air from the room comes in contact with the materiel and there is no condensation on it. When the materiel is entirely at room temperature, sweating will not occur when it is removed from the container.

- (3) If condensation occurs on the gun, it must be disassembled (pars. 50 through 84), cleaned, thoroughly dried, and lubricated after it reaches room temperature, to prevent rust or corrosion. Do not operate the materiel before thoroughly drying, as the moisture will form an emulsion with the oil or grease, necessitating removal of the emulsified lubricant and lubrication from the materiel. Do not move materiel having moisture caused by condensation on it into the outdoor temperature as the parts will become covered with frost and may not function.
- (4) If guns are to be mounted in the tank immediately, they should be coated with special preservative lubricating oil as outlined in paragraph 31.
- (5) If the guns are not to be mounted in the tank immediately, medium preservative lubricating oil should be used to prevent rusting, and the guns should be inspected weekly. Be-

fore mounting guns in the tank for combat, the medium oil should be thoroughly removed with dry-cleaning solvent or volatile mineral spirits, and the gun should be very lightly lubricated as outlined in paragraph 31. Great care should be used to insure the removal of all excess oil from the guns, especially from moving parts. Firing pin assembly, driving spring, tunnels in bolt in which they operate, switch recess, springs and spring seats, sear, and like places also should be free of excess oil. Excess oil will congeal at low temperatures and cause sluggish action or even malfunction of the gun.

(6) Remove all excess oil from bore and chamber before firing.

## **24. Operation in Extreme-Hot Weather Conditions**

*a.* In hot climates, the thin film of oil necessary for machine guns under combat conditions will be quickly dissipated. Inspect guns frequently and renew oil film as often as is necessary to prevent rusting and to assure the gun being ready for combat when kept mounted in the tank. Clean guns frequently to remove dust or grit that will stick to oiled surfaces.

*b.* Keep guns covered as much as possible.

*c.* Perspiration from the hands is a contributing factor to rusting because it contains acid. When handled, guns should be wiped dry frequently and the oil film maintained.

*d.* When guns are not to be mounted in the tank, they should be cleaned with rifle-bore cleaner and then lubricated with medium preservative lubricating oil if their use is not anticipated for a prolonged period of time (20 days or more). Before mounting guns in tanks, remove the medium oil thoroughly and lubricate the guns as outlined in paragraph 31. Remove all excess oil from bore and chamber before firing.

*e.* Where humidity is high, take special care to inspect unexposed surfaces such as the bore and chamber, casing, spring and spring seats, firing pin assembly, and driving spring tunnels in bolt, and like places where rusting might occur and not be quickly noticed. Watch screws and pins to prevent rust attacking and "freezing" them in place.

## **25. Excessively Sandy or Dusty Conditions**

*a.* In localities where dust and sandstorms are prevalent, guns should be kept carefully covered at all times, whether mounted in the tanks or not. Dust and sand will enter the mechanism and bore and stick on lubricated surfaces, forming a gummy paste that may clog the gun and cause malfunction. This paste will also act as an abrasive and will cause undue wear of the moving parts of the gun.



*b.* Under such conditions, remove guns from the tank as often as practical and thoroughly clean and lubricate. Lubrication should be confined to moving parts and contacting surfaces and should be as light as possible for proper functioning of the gun.

*c.* After a dust or sandstorm, guns should be disassembled and thoroughly cleaned, inspected, and lubricated as in *b* above. Remove all excess oil from bore and chamber before firing.

## **26. Excessively Moist or Salty Atmosphere**

*a.* Salt air is conducive to quick rusting as the salt has a tendency to emulsify the oil and destroy its rust-preventive qualities. When mounted in the tank, guns should be kept lightly lubricated and inspected frequently and treated in a manner similar to that prescribed for guns in hot climates in paragraph 24.

*b.* If guns are dismantled, they should be thoroughly cleaned and lubricated with medium preservative lubricating oil if their use is not anticipated for a prolonged period of time (20 days or more). If special preservative lubricating oil is used, guns should be inspected daily. Inspection should be thorough, with particular attention given to unexposed parts.

*c.* Before mounting guns in the tank, they should be thoroughly cleaned to remove all excess oil and then lubricated as outlined in paragraph 31. Remove all excess oil from bore and chamber before firing.

## CHAPTER 3

# ORGANIZATIONAL MAINTENANCE INSTRUCTIONS

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### Section I. PARTS, SPECIAL TOOLS, AND EQUIPMENT FOR OPERATION AND ORGANIZATIONAL MAINTENANCE

#### 27. General

Tools, equipment, and spare parts are issued to the using organization for operating and maintaining the materiel. Tools and equipment should not be used for purposes other than prescribed and, when not in use, should be properly stored in the chest and/or roll provided for them.

#### 28. Parts

Spare parts are supplied to the using organization for replacement of those parts most likely to become worn, broken, or otherwise un-serviceable, providing replacement of these parts is within the scope of organizational maintenance functions. Spare parts, tools, and equipment supplied for the cal. .30 machine gun M37 (tank) will be listed in the appropriate ORD 7 G-group Department of the Army supply manual, which is the authority for requisitioning replacements.

#### 29. Common Tools and Equipment

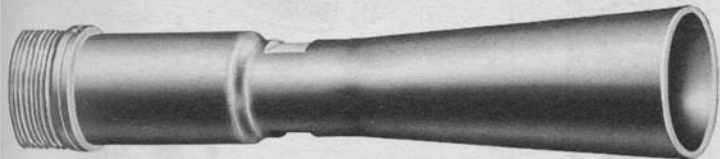
Standard and commonly used tools and equipment having general application to this materiel are listed for issue by the ORD 7 G-group manual and by T/A and TOE.

#### 30. Special Tools and Equipment

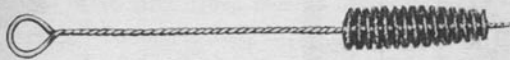
All special tools and equipment designed for operation, organizational maintenance, repair, and general use with the materiel are listed in Table I for information only. This table is not to be used for requisitioning replacements.

*Table I. Special Tools and Equipment for Operation and Organizational Maintenance*

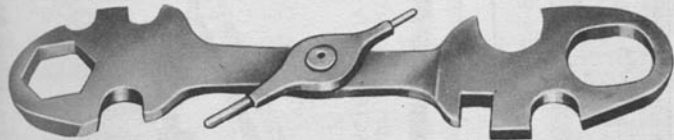
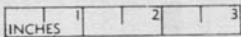
Item	Identifying No.	References		Use
		Fig.	Par.	
BOX, bolt group spare parts.	7148550	---	-----	To store spare parts.
BRUSH, cleaning, cal. .30.	5564174	20	36d(1)(a)---	To clean bore of barrel.
BRUSH, cleaning, chamber, M6 (bristle).	6108828	19	8b(1)(d), 36d(1))a).	To clean chamber.
CASE, cleaning rod, cal. .30, M1.	5506573	21	-----	To store jointed cleaning rod—6508237.
COVER, spare barrel---	5593026	20	-----	To protect and store spare barrel.
EXTRACTOR, ruptured cartridge case, cal. .30, MK IV.	5503854	20	49-----	To remove ruptured cartridges from breech.
HIDER, flash, cal. .30, M6, assy.	5750054	19	80, 81c, 84g-	To prevent flash at gun muzzle.
MACHINE, link loading, hand operated, M3, cap 20 rd.	5910219	21	-----	To link and delink cartridges.
REFLECTOR, barrel, cal. .30.	7265788	20, 49	77a-----	To inspect bore of barrel.
ROD, cleaning, jointed, cal. .30, M1 (3 section w/handle).	6508237	21	36d(1)(a)---	Use with patch or brush to clean bore.
ROD, cleaning, cal. .30, M2A1.	6508398	21	8b(1)(c), 36d(1)(a) and (b).	Use with patch or brush to clean bore.
WRENCH, barrel bearing plug, cal. .30.	6147277	20	81a, 84f----	To remove front barrel bearing.
WRENCH, combination, M6.	5568334	19	52c, 54a, 81a, 84f.	To disassemble, assemble, and adjust back plate adjusting screw, To disassemble and assemble front barrel bearing.



FLASH HIDER ASSEMBLY M6—5750054



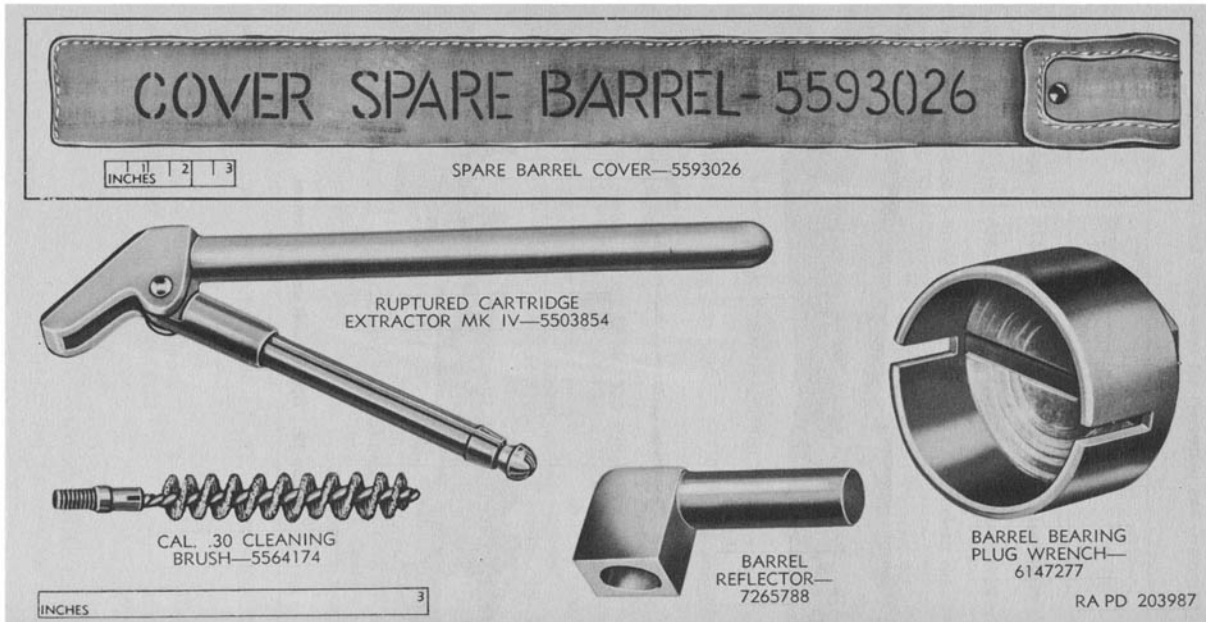
CHAMBER CLEANING BRUSH M6—6108828



COMBINATION WRENCH M6—5568334

RA PD 203986

*Figure 19. Special tools and equipment.*



*Figure 20. Special tools and equipment.*

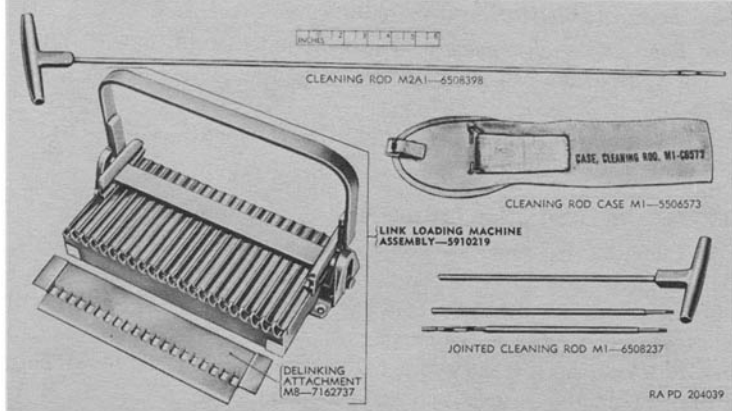


Figure 21. Special tools and equipment.

## Section II. LUBRICATION AND PAINTING

### 31. Lubrication Chart

The lubrication chart prescribes cleaning and lubrication procedures as to points to be lubricated, intervals, and lubricants to be used under various conditions.

### LUBRICATION CHART

#### GUN, MACHINE, CAL. .30 M37 (TANK)

FEEDING AND FIRING MECHANISM.	Weekly and after firing, clean with rifle-bore cleaner (CR). Dry and oil with PL, medium above 32° F.; PL, special below 32° F. In humid and salt air areas, use PL, medium.
BORE AND CHAMBER	After firing and on 3 consecutive days thereafter, clean with rifle-bore cleaner (CR). After fourth cleaning, dry and oil with PL, medium above 32° F.; PL, special below 32° F. Wipe clean before firing. When gun is not being fired, renew oil film weekly.
BARREL PLUNGER	<p><b>NORMAL TEMPERATURES</b>—Clean with dry-cleaning solvent or volatile mineral spirits, dry thoroughly, and apply a light coat of PL, medium above 32° F. on all surfaces.</p> <p><b>EXTREME LOW TEMPERATURES</b>—Clean with carbon tetrachloride and dry thoroughly. No oil is to be used.</p>

CR—CLEANER, rifle-bore

PL—OIL, lubricating, preservative

### **32. General Lubrication Instructions**

*a. Lubrication Equipment.* The weapon is supplied with lubrication equipment adequate for its maintenance. This equipment will be cleaned both before and after use.

*b. Cleaning.* Prior to lubrication, all guns should be cleaned by one of the methods outlined in paragraph 36.

### **33. Special Lubrication Instructions**

*a.* Lubrication should be accomplished carefully and sparingly. All excess oil should be wiped from the gun. This is particularly important with regard to the bolt, barrel, and chamber of barrel. Oil or grease in chamber of the barrel will raise the breech pressure to a hazardous point when the gun is fired and may result in a blown bolt, a ruined bolt, and serious injury to personnel.

*b.* Excess oil holds grit and foreign matter blown on the gun and as a result may clog the recoiling parts and cause a malfunction or stoppage. In any case, the abrasive action of the grit and foreign matter will cause excessive wear of the moving parts.

*c.* Smoking of the gun when firing may indicate excessive lubrication.

*d.* Remove excess oil from the bore and chamber of the barrel before firing or mounting guns for combat.

*Note.* The term lubrication as used in this manual applies both to lubricating moving contacting surfaces to minimize friction and to covering stationary parts with an oil film to prevent corrosion.

### **34. Painting**

*a.* Instructions for the preparation of the materiel for painting, methods of painting, and materials to be used are contained in TM 9-2851.

*b.* Do not paint over name plate, serial numbers, or lubricated working surfaces. Name plates will be kept coated with clear lacquer; if they become rusty or corroded, they will first be carefully cleaned.

## **Section III. PREVENTIVE MAINTENANCE SERVICES**

### **35. General**

Preventive maintenance services prescribed by Army regulations are a function of using organization level of maintenance. This section contains preventive maintenance services allocated to operating personnel (crew) (table II, par. 38) and to the organizational maintenance personnel (mechanic) (table III, par. 39).



## 36. Cleaning

### a. General.

- (1) Rifle-bore cleaner is used for cleaning the machine gun after it has been fired or for periodic cleaning as outlined in preventive maintenance services.
- (2) Rifle-bore cleaner contains volatile solvents that evaporate at temperatures above 150° F., thus reducing the cleaning action. Therefore, after firing, the weapon should not be cleaned until it has cooled to the point where the barrel can be touched with the bare hand.
- (3) Maximum cleaning efficiency and protection against rusting will be obtained when rifle-bore cleaner is used undiluted. When necessary to conserve the supply, it may be diluted up to 50 percent with water without materially reducing the cleaning action, provided prevailing temperatures are above 32° F. The rust-preventive qualities will be reduced, however, and surfaces so cleaned must be immediately dried and coated with oil.

b. *Daily.* Inspect bore and chamber for rust. Check guns for rust.

### c. Before Firing.

- (1) Thoroughly clean the bore and chamber of all dirt, oil, or foreign matter.
- (2) Wipe off surplus oil from bolt, feedway, and belt feed cover assembly, using a clean wiping cloth wet with proper oil and then wrung out.
- (3) Wipe outer surfaces of gun, using a clean wiping cloth wet with proper oil and then wrung out.

### d. After Firing.

- (1) *Bore and Chamber.* The cleaning procedure prescribed in (a) and (b) below is to be followed at the end of the day's firing. If no further firing is anticipated, it is to be repeated on 3 consecutive days thereafter.
  - (a) Place two cleaning patches in the slot of the cal. .30 cleaning rod M2A1—6508398 (fig. 21), saturate the patch with rifle-bore cleaner, and move the rod with patches back and forth through the barrel several times. If rust or foreign matter are not removed by the rifle-bore cleaner, attach cal. .30 cleaning brush—5564174 (fig. 20) to the cleaning rod and run the brush through the barrel several times. Make certain that the brush goes all the way through the barrel before reversing direction. Use chamber cleaning brush M6—6108828 (fig. 19) to clean barrel chamber. A light coating of rifle-bore cleaner should be allowed to remain in the bore and chamber between cleanings to prevent rust.

- (b) After fourth cleaning following firing, if no firing is anticipated within next 24 hours, place clean dry patches in the slot of the cal. .30 cleaning rod M2A1—6508398 and thoroughly dry bore and chamber. With clean dry patches wet with special preservative lubricating oil and then wrung out, apply a light film of oil to the bore and chamber by running the patches through the bore.

*Note.* Remove excess oil from bore and chamber if guns are to be fired.

(2) *Parts other than barrel.*

- (a) With rifle-bore cleaner, thoroughly clean all surfaces that have been exposed to powder gases.
- (b) During firing, hard carbon gradually accumulates in the front barrel bearing. This carbon deposit must be carefully removed with scraper or crocus cloth, and the parts lubricated immediately.
- (c) Dirt and foreign matter must be removed from all other parts. Thoroughly dry all components and immediately apply a light coating finish of special preservative lubricating oil. Handle cleaned parts with gloved hands as acid from the hands accelerates corrosion.

*e. Service for Periods up to One Week.* If the guns have not been fired, renew oil film in the bore and chamber every 5 days, using a single patch saturated in special preservative lubricating oil. When operating from areas of high humidity or salt spray, and guns are not being maintained in readiness for immediate action, use medium preservative lubricating oil. In this case, the medium oil must be thoroughly removed and guns lubricated with the special oil before being placed in action. Wipe all oil from bore and chamber before firing or preparing for combat. Inspect for traces of rust formation.

*f. Care of Spare Parts and Equipment.* Complete sets of spare parts, tools, and equipment shall be maintained at all times, kept lubricated to prevent rusting, and inspected at frequent intervals. When in actual use, but not everyday use, they should be coated with medium preservative lubricating oil. When in use, they should be cleaned with dry-cleaning solvent or volatile mineral spirits and lightly lubricated with special lubricating oil.

### 37. General Procedures

The general preventive maintenance described in *a* through *f* below will be observed in addition to schedules in paragraph 38.

*a.* The importance of a thorough knowledge of how to clean and lubricate materiel cannot be overemphasized. The kind of attention given to this gun largely determines whether the gun will shoot accurately and function properly when needed.

*b.* Rust, dirt, grit, gummed oil, and water cause rapid deterioration of all parts of the materiel. Particular care should be taken to keep all bearing surfaces and exposed parts clean and properly lubricated. Wiping cloths riflebore cleaner, and lubricants are furnished for this purpose. Remove all traces of rust from surfaces with crocus cloth, which is the coarsest abrasive to be used by organizational personnel for this purpose.

*c.* Spare parts, tools, and equipment will be inspected for completeness, serviceability, and interchangeability. Missing or damaged items will be replaced or turned in for repair. Use only tools that are provided and see that they fit properly. Tools that do not fit will fail or cause damage to parts.

*d.* At least every 6 months, check to see that pertinent modification work orders have been applied. A list of current modification work orders is published in DA Par. 310-4. No alteration or modification will be made by organizational personnel, except as authorized by official publications.

*e.* Each time the gun is disassembled for cleaning or repair, carefully inspect all parts for cracks, excessive wear, rust, and like defects that might cause a malfunction of the gun. See Section V, this chapter, on trouble-shooting and corrections for information on certain parts which, when worn, damaged, or improperly adjusted cause definite malfunctions. Use this section as a guide during inspection. Thoroughly clean and properly lubricate all parts before assembly. Replace all springs that are broken or kinked.

*f.* Each time a gun is assembled, it should be given an operational check after head space has been checked. This check consists of operating the gun by hand, using the retracting bar. When possible, a belt of dummy cartridges should be fed through the gun to check feeding, extraction, chambering, and ejection.

### **38. Preventive Maintenance Schedule (Crew)**

*a.* To insure continued satisfactory performance, it is necessary that the weapon be inspected periodically in order that defects may be discovered and corrected before they result in serious damage or failure. Any defects or unsatisfactory operating characteristics beyond the scope of correction by the operator must be reported at the earliest opportunity to the designated individual in authority.

*b.* The services set forth in table II *a* are to be performed by the crew (1st echelon).

Table II. Preventive Maintenance Schedule (Crew)

Point	Preventive maintenance	Detailed instructions
	<i>Before Firing</i>	
Bore and chamber	Clean	Swab with dry cloths to remove oil, dirt, and foreign matter.
Bolt	Clean and lubricate.	Wipe off excess oil, using clean wiping cloth. Apply oil film by wiping with a clean cloth wet with proper oil and then wrung out.
Belt feed cover assembly.	Clean and lubricate.	Wipe off excess oil, using clean wiping cloth. Apply oil film by wiping with a clean cloth wet with proper oil and then wrung out.
Feed aperture	Clean and lubricate.	Wipe off excess oil, using clean wiping cloth. Apply oil film by wiping with a clean cloth wet with proper oil and then wrung out.
Casing	Clean	Wipe outer surfaces of gun, using a clean wiping cloth wet with proper oil and then wrung out.
	<i>After Firing</i>	
Bolt	Clean and lubricate.	Remove all dirt and foreign matter. Dry thoroughly and immediately apply a light coating of special preservative lubricating oil.
Extractor assembly	Clean and lubricate.	Remove all dirt and foreign matter. Dry thoroughly and immediately apply a light coating of special preservative lubricating oil.
Lock frame	Clean and lubricate.	Remove all dirt and foreign matter. Dry thoroughly and immediately apply a light coating of special preservative lubricating oil.
Barrel extension	Clean and lubricate.	Remove all dirt and foreign matter. Dry thoroughly and immediately apply a light coating of special preservative lubricating oil.
Belt feed cover assembly.	Clean and lubricate.	Remove all dirt and foreign matter. Dry thoroughly and immediately apply a light coating of special preservative lubricating oil.
Bore and chamber	Clean	Follow instructions in paragraph 36d(1)(a) and (b).
Front barrel bearing	Clean	Remove carbon deposits carefully with scraper or crocus cloth and lubricate parts immediately
Casing	Clean and lubricate.	Remove carbon deposits carefully with scraper or crocus cloth and lubricate parts immediately.
Bore and chamber	Lubricate	If gun has not been fired, renew oil film every 5 days, using a single patch saturated in special preservative lubricating oil.

### 39. Preventive Maintenance Schedule (Mechanic)

a. The battery mechanic is issued necessary tools and either performs or supervises all authorized disassembly, maintenance, and adjustments. Service by battery mechanic includes a systematic check to see that all crew preventive maintenance (table II, par. 38) has been properly performed at the prescribed intervals and that the materiel is in the best possible operating condition. The crew should have the materiel in a reasonably clean condition for scheduled maintenance service by battery mechanic.

b. The services set forth in table III are to be performed as supervised by the battery mechanic at the designated intervals in addition to any preventive maintenance required as a result of the checks and services by the crew.

Table III. Preventive Maintenance Schedule (Mechanic)

Point	Preventive maintenance	Detailed instructions
Gun (as a unit)-----	<i>Weekly</i> Overall check-----	Check to determine whether proper and effective maintenance is being performed by the operator.

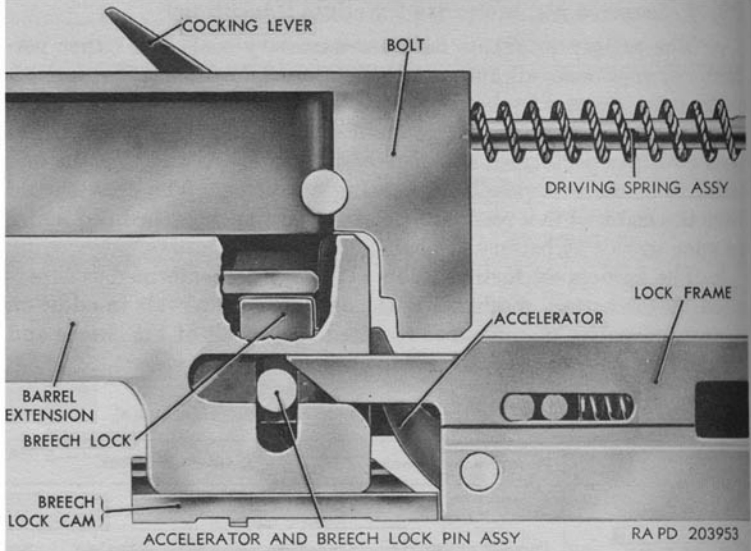
## Section IV. CYCLIC FUNCTIONING

### 40. General

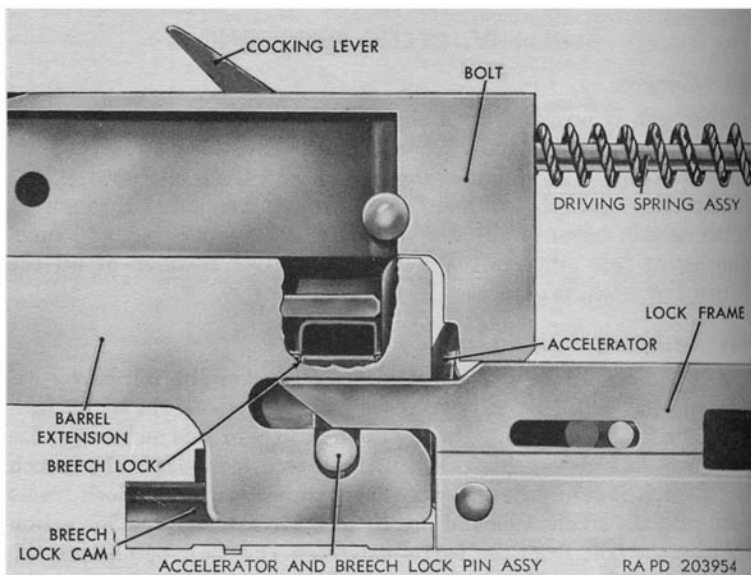
This gun is operated by a short recoil type of mechanism. The force of recoil causes many parts to move simultaneously or in their proper order. The action of these parts and their relationship, one to the other, is explained more clearly in paragraphs 41 through 46. With certain minor differences, the construction, operation, and functioning of this gun are identical with similar features of all the Browning machine guns used by the armed forces.

### 41. Recoiling

a. The burning gases force the recoiling parts (barrel, barrel extension, and bolt (fig. 22)) backward about five-eighths of an inch from the firing position. During the first half of this movement, the parts are locked together. When the breech lock clears the breech lock cam, it is forced down by the front projections of the lock frame acting on the accelerator and breech lock pin assembly. This action unlocks the bolt from the barrel extension (fig. 23), permitting the bolt to continue to the rear. As the barrel extension comes to the rear, the barrel plunger spring is compressed, and the rear of the barrel extension strikes the accelerator, turning it backward.



*Figure 22. Bolt and barrel extension in locked position.*



*Figure 23. Bolt and barrel extension in unlocked position.*

b. As the accelerator (fig. 24) turns backward, its tips strike the bottom projections of the bolt and accelerate it to the rear. The claws of the accelerator engage the shoulder of the T lug on barrel extension and lock the barrel extension to the lock frame. The barrel plunger spring is thus held compressed.

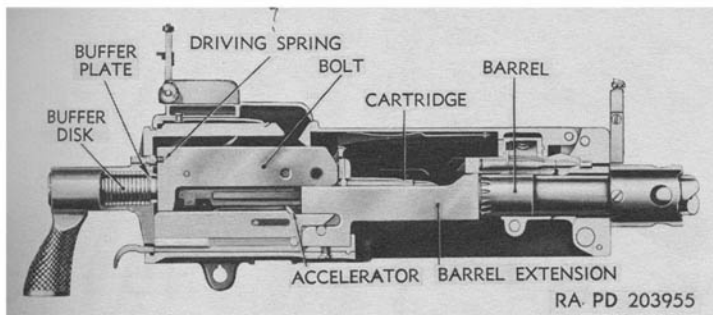


Figure 24. Recoiling parts in rear position.

## 42. Extracting and Ejecting

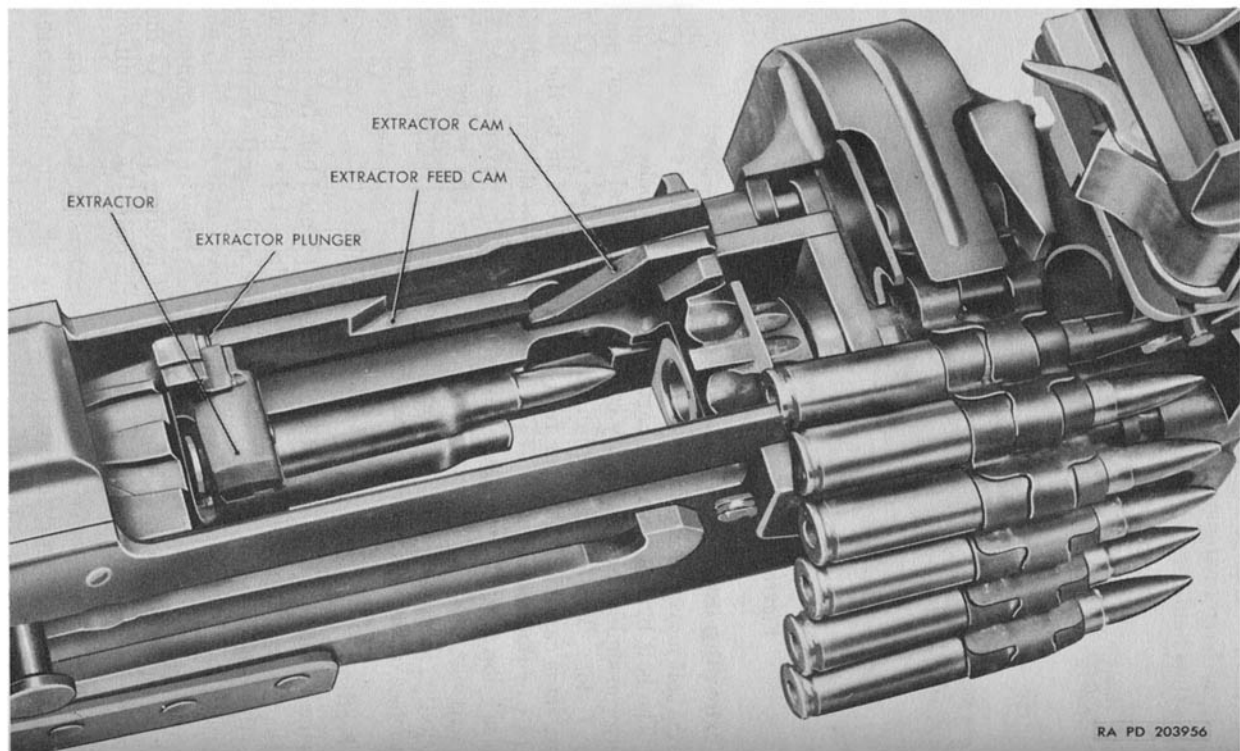
As the bolt moves backward, it compresses the driving spring assembly. The bolt brings with it a cartridge from the belt, held by the extractor assembly, and an empty case from the barrel chamber, held in the T slot. The extractor plunger rides along the top surface of the extractor cam and extractor feed cam until forced in by the beveled part of the extractor feed cam, thus permitting the extractor to be forced down by the extractor cam surface in the cover assembly. The cartridge held by the extractor assembly (fig. 25) enters the T slot, ejecting the spent shell. The extractor plunger is now at the bottom surface of the extractor feed cam.

## 43. Feeding

As the bolt moves backward, the stud on the pivoted belt feed lever rides in a diagonal groove in the top of the bolt and the lever motion forces the belt feed slide (fig. 26) out of the gun and over the ammunition belt. The belt feed pawl and belt feed pawl arm as a unit, attached to the belt feed slide, engage the next cartridge of the ammunition belt, which is held in position by the belt holding pawl. As the bolt moves forward, the belt feed pawl and arm pulls the ammunition belt into the gun.

## 44. Cocking

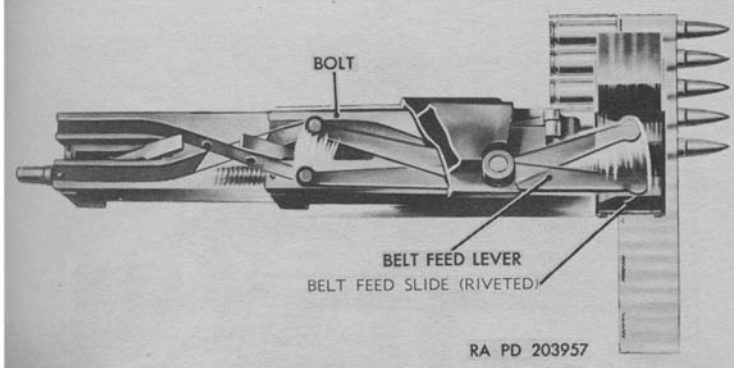
As the bolt moves backward, the upper end of the cocking lever (fig. 27) is forced forward in the cocking lever recess against cocking lever insert, bringing the lower end to the rear. The lower end brings



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*Figure 25. New cartridge entering "T" slot.*





*Figure 26. Feeding action.*

with it the firing pin assembly, compressing the firing pin spring against the pin on the sear spring. As the trigger is now disengaged from the sear, the action of the sear spring pulls the sear upward, allowing the shoulder of the firing pin to engage the notch in the sear.

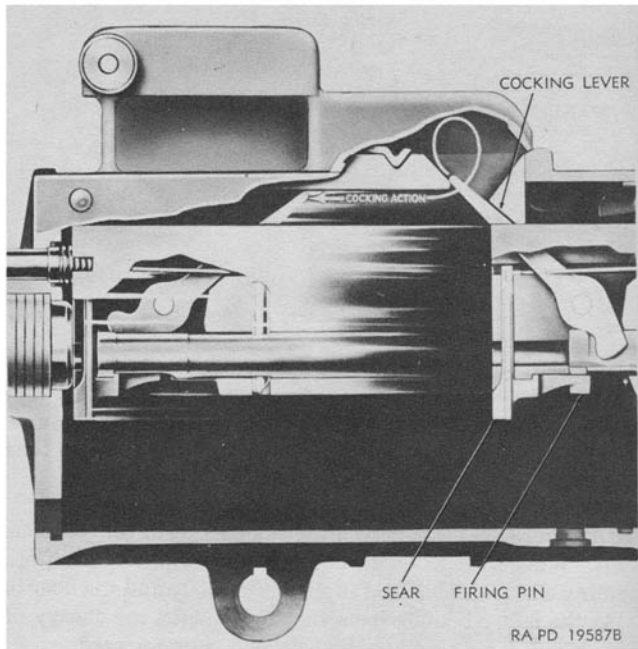
#### **45. Counterrecoiling**

*a.* The driving spring assembly absorbs a portion of the recoil energy of the bolt. When the rear of the bolt strikes the buffer plate (fig. 24), its remaining energy is absorbed in the buffer plate and the fiber buffer disks. As the bolt rebounds from the buffer plate, the energy of the disks and spring is returned to the bolt as it goes forward.

*b.* When the bolt starts forward from the position shown in figure 24, the extractor assembly is guided downward by the action of the bottom surface of the extractor feed cam on the extractor plunger. This causes the extractor assembly (fig. 28) to force the cartridge down the T slot, in line with the barrel chamber. The upper end of the cocking lever is forced backward, causing the lower end to move forward, away from the rear of the firing pin. If the firing pin assembly is prematurely released, it is re-engaged by the cocking lever and eased forward so that the firing pin cannot contact the primer of cartridge until after the breech has been locked.

*c.* As the bolt goes forward, its bottom projections strike the accelerator and turn it forward. This action unlocks the barrel extension from the lock frame and releases the barrel plunger spring. When the accelerator has been tripped, the barrel extension and the barrel are moved forward by the forward force of the bolt action through the accelerator and by the expansion of the barrel plunger spring.

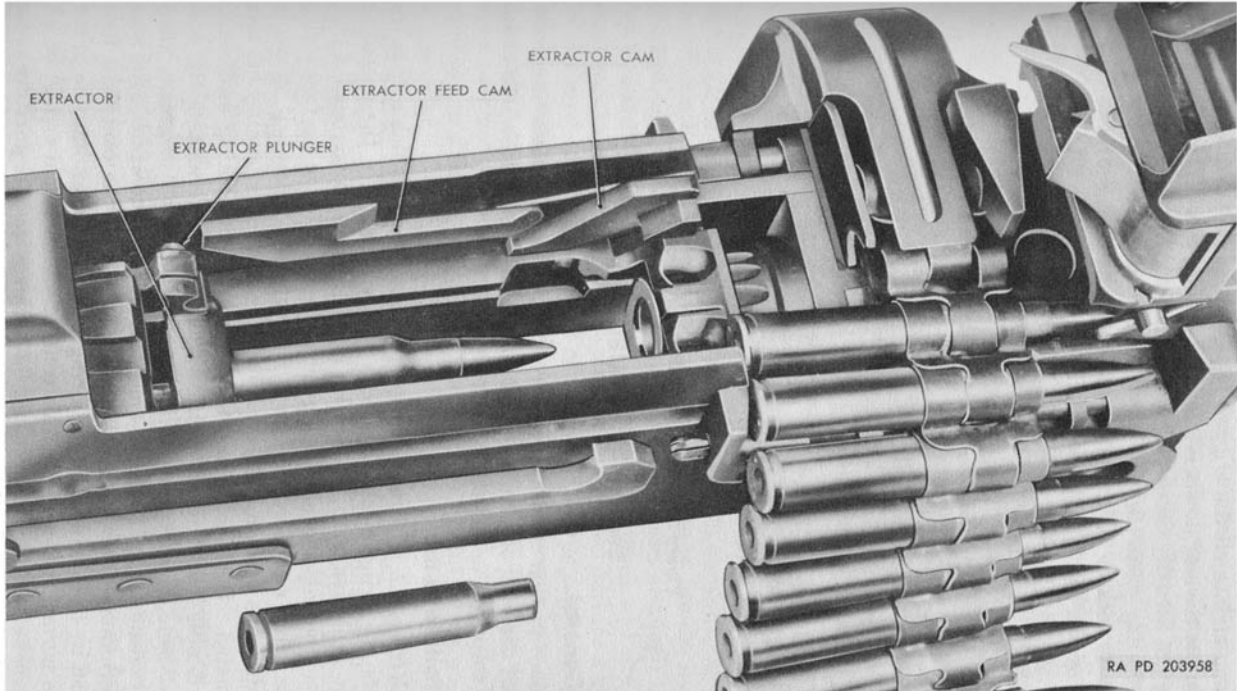
*d.* When the bolt goes forward, the extractor assembly rises as the plunger moves along the top surface of the extractor cam. As the ejector rises as part of extractor assembly it pivots on the ejector pin



*Figure 27. Cocking action.*

and is cammed outward by the cartridge held in the T slot, at the same time compressing the ejector spring. This causes the bottom of the ejector to clear the cartridge surface. The ejector spring will then return the ejector to the normal position. The extractor then grips the first round in the belt and is held down firmly by the cover extractor spring, ready to extract the round. The breech lock is forced upward by the breech lock cam and locks the breech just before the recoiling parts reach the firing position. The breech lock engages in a recess cut in the bottom of the bolt and locks the bolt firmly to the barrel extension.

e. As the bolt goes forward, the stud on the pivoted belt feed lever moves in the diagonal groove, forcing the belt feed slide inward. The belt feed pawl carries the first cartridge against the cartridge stops, ready to be gripped by the extractor assembly. The next cartridge is carried over the belt holding pawl, which rises behind it and holds it in position to be engaged by the belt feed pawl on its next movement outward.



*Figure 28. Ejecting and chambering.*

## 46. Firing

If the trigger is held raised, as the sear moves forward with the bolt, the cam surface on the trigger engages the cam surfaces on the sear and forces the sear down, releasing the firing pin. The release of the firing pin actually takes place about one-sixteenth of an inch before the recoiling parts (fig. 29) reach the forward position, but after the breech is locked. This action prevents battering of the trunnion block by the barrel extension.

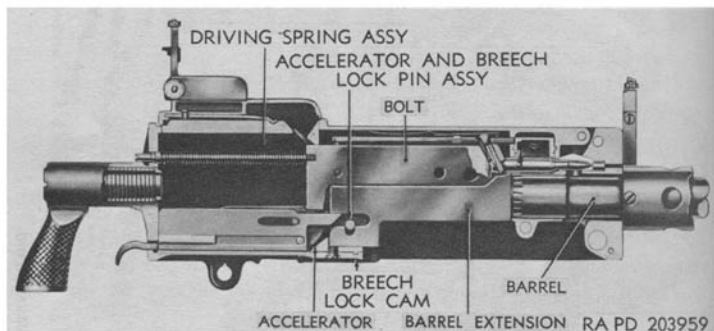


Figure 29. Recoiling parts in forward position.

## Section V. TROUBLESHOOTING

### 47. General

A malfunction is an improper or faulty action of some component part of the weapon or ammunition that may result in failure to fire, other stoppage, or damage to the gun.

### 48. Failure to fire

*a. Misfire.* A misfire is a *complete failure to fire* which may be due to a faulty firing mechanism or a faulty element in the propelling charge explosive train. A misfire in itself is not dangerous but since it cannot be immediately distinguished from a delay in the functioning of the firing mechanism or from a hangfire (*b* below), it should be considered as a possible delayed firing until such possibility has been eliminated. Such delay in the functioning of the firing mechanism, for example, could result from the presence of foreign matter such as grit, sand, frost, ice, or improper or excessive oil or grease, which might create initially a partial mechanical restraint which, after some indeterminate delay, is overcome as a result of the continued force applied by the spring, and the firing pin then driven into the primer in the normal manner. In this connection, no round should be left in a hot weapon any longer than the circumstances require due to the possibility of a cook-off (*c* below).

*b. Hangfire.* A hangfire is a delay in the functioning of a propelling charge explosive train at the time of firing. The amount of the delay is unpredictable but in most cases will fall within the range of a split second to several minutes. Thus, a hangfire cannot be distinguished immediately from a misfire and therein lies the principal danger—that of assuming that a failure of the weapon to fire immediately upon actuation of the firing mechanism is a misfire whereas in fact it may prove to be a hangfire. It is for this reason that the time intervals prescribed in *d* below should be observed before opening the bolt after a failure to fire. These time intervals, based on experience and consideration of safety, have been established to minimize the danger associated with a hangfire and to prevent the occurrence of a cook-off.

**Caution:** During the prescribed time intervals, the weapon will be kept trained on the target and all personnel will stand clear of the muzzle and the path of recoil.

*c. Cook-off.* A cook-off is a functioning of any or all of the explosive components of a round chambered in a very hot weapon due to heat from the weapon. If the igniter or the propelling charge should cook off, the projectile *may* be propelled (fired) from the weapon with normal velocity even though no attempt was made to fire the igniter by actuating the firing mechanism. In such a case, although there may be uncertainty as to whether or when the round will fire, the precautions to be observed are the same as those prescribed for a hangfire (*b* above). *However, should the bursting charge explosive train cook off, injury to personnel and destruction of the weapon may result.* To prevent a cook-off, a round of ammunition which has been loaded into a very hot weapon should be fired or removed within the time prescribed in *d* below, to prevent heating to the point where a cook-off may occur.

**Caution:** In case of an explosive round, chambered in a very hot weapon which can neither be fired nor removed as prescribed in *d* below, all personnel will stand clear of the weapon until such time as the weapon and chambered round are cool, to avoid the danger from a possible cook-off of the explosive projectile.

*d. Procedures for Removing a Round.*

- (1) *General.* After a failure to fire, due to the possibility of a hangfire or cook-off (*b* and *c* above), the precautions in (2) and (3) below, as applicable, will be observed until the round has been removed from the weapon and the cause of failure determined.
- (2) *Before removal of round.*
  - (a) Keep the weapon trained on the target and all personnel clear of the muzzle.

- (b) In case of an explosive round chambered in a very hot weapon, which can neither be fired nor removed as prescribed in (3) below, all personnel will stand clear of the weapon until such time as the weapon and the chambered round are cool, to avoid the danger from a possible cook-off of the explosive projectile.
  - (c) Before retracting the bolt, either to remove the round or recock as the case may be, personnel not required for the operation will be cleared from the vicinity.
  - (d) Make additional attempts to fire as prescribed in (3) below.
- (3) *After removal of round.* The round, after removal from the weapon, will be kept separate from other rounds until it has been determined whether the round or the firing mechanism is at fault. If the round is determined to be at fault, it will continue to be kept separate from other rounds until disposed of. On the other hand, if examination reveals that the firing mechanism was at fault, the round may be reloaded and fired after correction of the faulty firing mechanism.

## 49. Malfunctions of Gun

In Table IV the probable causes of malfunctions of the gun are listed and corrective measures are indicated.

## Section VI. BACK PLATE ASSEMBLY

### 50. General

The back plate assembly includes the back plate, buffer disks, buffer plate, and trigger safety. The back plate assembly encloses the rear end of the casing and is mounted by interlocking grooves on each side of the back plate and on each side of the side plates. It is locked into position by the back plate latch and latch lock.

### 51. Removal

With the right thumb, press the latch lock (fig. 30) to the right, releasing the latch. Place the left hand on the grip with the thumb pressing the back plate latch down. With the latch released from top plate, the back plate assembly can be raised straight up until it is free of the casing.

### 52. Disassembly

a. Remove the trigger safety (fig. 31) by pressing to the right, or "S" position; twist one-half turn and pull out. The trigger safety spring plunger and trigger safety spring can then be removed.

b. To disassemble the back plate latch and latch lock, use a drift to drive out the back plate latch lock pin and back plate latch pin. Re-

Table IV. Troubleshooting

Malfunctions	Probable causes	Corrective action
Failure to feed-----	Belt feed lever pin worn or broken.	Notify ordnance maintenance personnel.
	Belt feed lever bent or worn.	Replace belt feed lever (par. 58a).
Failure to fire-----	Belt feed pawl spring weak or broken.	Replace belt feed pawl spring (par. 58d).
	Tight head space-----	Adjust head space (par. 17).
	Broken barrel extension.	Remove the broken part and replace with a serviceable barrel extension. Adjust the head space and assemble the gun to resume firing.
	Lightly struck primer--	Replace firing pin assembly (par. 64e).
Failure to load-----	Firing pin spring weak or broken.	Replace firing pin assembly (par. 64e).
	Sear spring weak or broken.	Replace sear spring (par. 64d).
	Separated cartridge case due to loose head space.	Remove separated case from chamber, using ruptured cartridge case extractor MK IV-5503854; tighten.
Ruptured primer---	Ejector broken-----	Check head space (par. 17). Replace extractor assembly (par. 64a).
	"T" slot obstructed due to thick rim on cartridge.	Remove cartridge.
	Elongated firing pin hole.	Replace bolt (par. 63b).

move the back plate latch lock spring and the back plate latch spring plunger and spring.

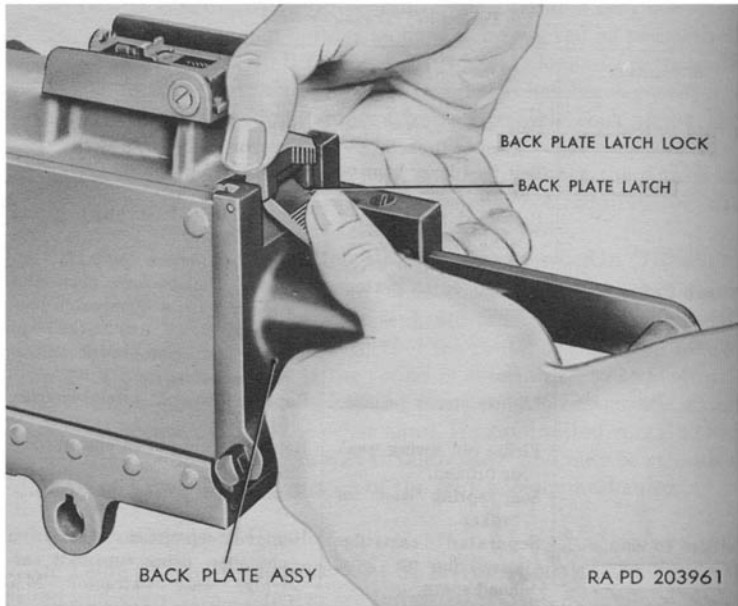
c. Unscrew the back plate adjusting screw, using combination wrench M6-5568334 (fig. 19), and remove the adjusting screw plunger and spring. Remove the buffer disks and buffer plate through the rear end of the back plate.

### 53. Maintenance

Inspect for signs of wear, rust, and corrosion. Wipe all parts dry and apply a light coating of special preservative oil.

### 54. Assembly

a. Insert the buffer plate through the rear of the back plate. Install the buffer disks behind the buffer plate. Install the adjusting screw plunger spring (compression, 0.159 OD, 18 coils), the adjusting screw



*Figure 30. Removal of back plate group.*

plunger, and the adjusting screw. Tighten adjusting screw with combination wrench M6—5568334 (fig. 19) so that no more than one thread protrudes above the back plate.

*b.* Place the trigger safety spring plunger and trigger safety spring (compression, 0.183 OD, 13 coils) in position, and insert the trigger safety, holding the marked notches on the ends to the front. When the safety is fully inserted, twist to its normal position engaging the plunger.

*c.* To assemble the back plate latch and lock, insert the back plate latch spring (compression, 0.234 OD, 10 coils) and latch spring plunger, and with the latch in place, install the back plate latch pin (dowel, 0.156 x  $1\frac{7}{64}$ ). Hold the latch lock and back plate latch lock spring (compression, 0.214 OD, 4 coils) in position and insert the back plate latch lock pin (dowel, 0.125 x  $2\frac{5}{32}$ ). Stake each end of latch pin and latch lock pin.

## 55. Installation

Engage the back plate grooves with the corresponding grooves in the side plates of the casing and slide down. Release the latch lock by pressing to the right, and with the left hand depress the latch. Release the latch and lock it into place. Check to see that back plate is positively locked.



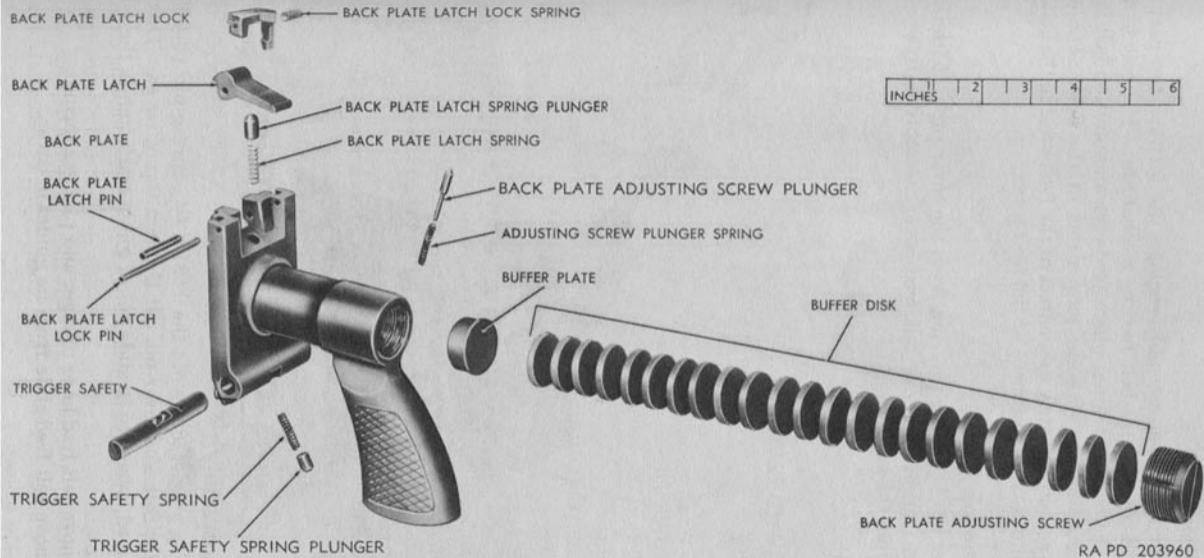


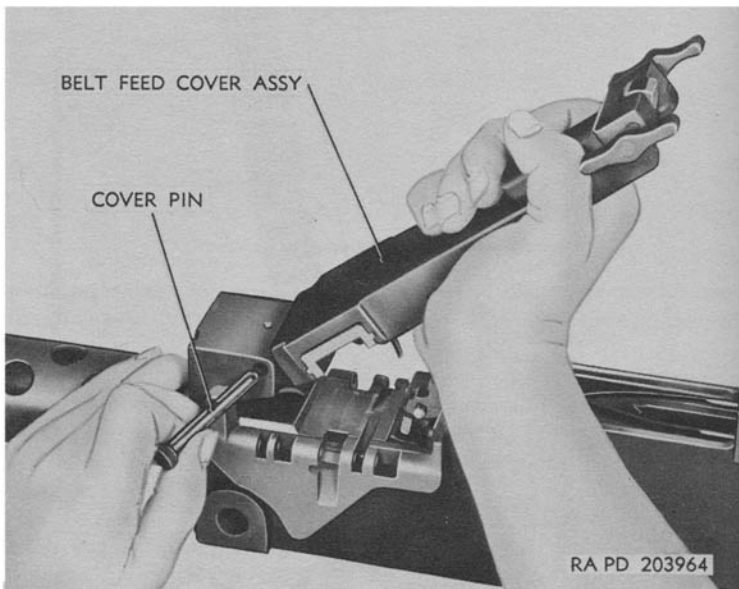
Figure 31. Back plate group—exploded view.

**56. General**

The belt feed cover assembly encloses the forward top part of the casing and contains the belt feeding mechanism. The belt feed lever actuates the belt feed slide, which feeds the ammunition belt into the gun in coordination with the movements of the bolt. The coordination is accomplished by the contact of the feed lever in the bolt track, which controls the movement of the feed lever.

**57. Removal**

Extract the  $\frac{1}{16} \times \frac{1}{2}$  cotter pin from the cover pin. Withdraw the cover pin (fig. 32) and the belt feed cover assembly is free to be removed from the gun.



*Figure 32. Removal of belt feed cover assembly.*

**58. Disassembly**

*a.* Using a drift, drive out the  $0.094 \times \frac{11}{16}$  spring pin (fig. 33) and remove the belt feed lever pin out through top of cover. This leaves the belt feed lever free to slide out of guide and notch in the belt feed slide.

*b.* Remove belt feed lever plunger and plunger spring.

*c.* Remove belt feed slide from its guides in cover.

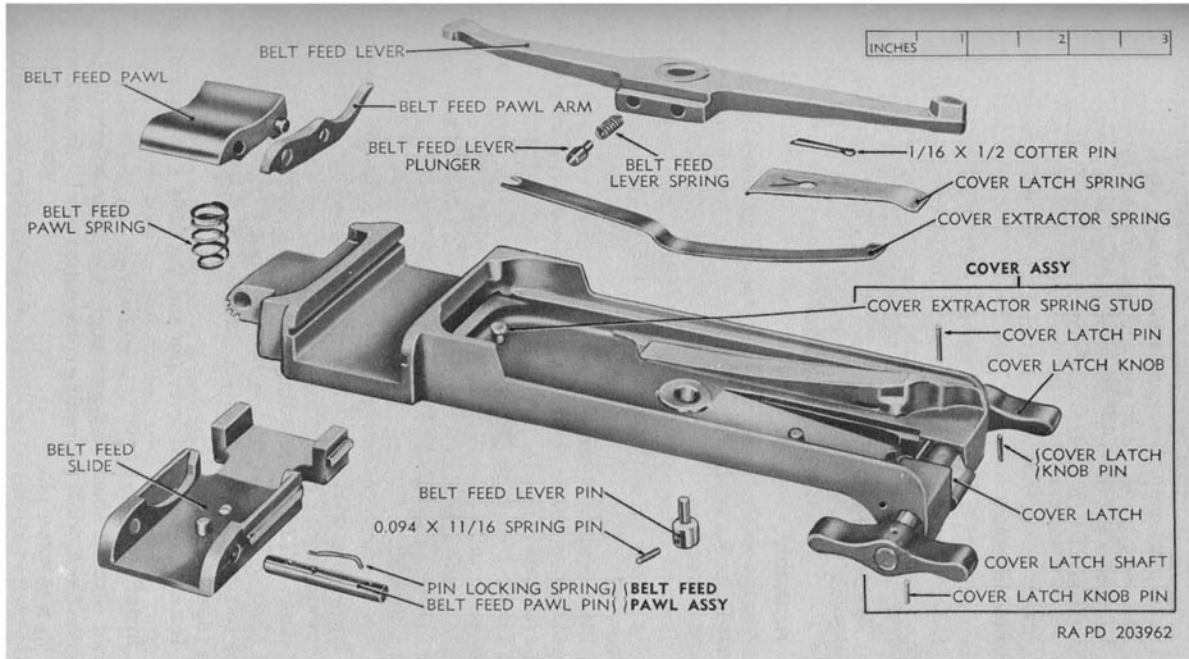


Figure 33. Cover group—exploded view.

d. Push out belt feed pawl pin assembly, which will enable the belt feed pawl, pawl spring, and pawl arm to be separated.

e. Remove  $\frac{1}{16} \times \frac{1}{2}$  cotter pin and lift off cover latch spring.

f. Slide rear end of cover extractor spring out of the slot under the cover extractor cam surface and lift free of cover extractor spring stud.

## 59. Maintenance

Make sure the belt feed slide moves freely in its guides. Test the belt feed lever and the belt feed pawl for proper functioning. Remove any burrs from the cover latch, cover extractor cam surface, belt feed lever pin, belt feed slide, and belt feed pawl and arm. Replace cover extractor spring, belt feed pawl spring, belt feed pawl pin assembly, and  $\frac{1}{16} \times \frac{1}{2}$  cotter pins, if they are weak or broken.

## 60. Assembly

a. Engage notched end of the extractor spring under the head of the extractor spring stud, sliding other end into its seat under the extractor cam surface.

b. Position cover latch spring on its stud with the narrow end resting on rear lip of the cover latch. Install  $\frac{1}{16} \times \frac{1}{2}$  cotter pin in spring stud.

c. Place feed pawl arm on its pin on the side of belt feed pawl (depending on left or right feed) with the contours following those of the feed pawl (figs. 14, 15, and 16).

d. Install feed pawl spring on slide with small end over stud. Place pawl and arm on spring in slide so that large end of spring seats in aperture in underside of feed pawl. Aline pin holes in pawl, arm, and slide, and push the pawl pin assembly through until flush with both sides.

e. Insert assembled slide, pawl, and arm in cover guide slot from side (depending on right or left feed) with the pawl arm always on the side toward rear of cover.

f. Insert belt feed lever spring (compression, 0.152 OD, 8 coils) and feed plunger in either well in belt feed lever (right or left feed). Place belt feed lever in position with foot in notch in side of feed slide (figs. 14, 15, and 16).

g. Install the belt feed lever pin and the  $0.094 \times \frac{11}{16}$  spring pin.

## 61. Installation

Hold cover at about 45-degree angle and aline hole with those in trunnion block, while depressing cover detent pawl. Insert cover pin and  $\frac{1}{16} \times \frac{1}{2}$  cotter pin.

### 62. General

The bolt group includes the firing pin assembly, sear, the sear spring, cocking lever, extractor assembly, and the driving spring assembly. The functions of the bolt includes firing the weapon, cocking the weapon after firing, extracting, chambering, and ejecting cartridges; and, by use of the bolt feed lever stud tracks in the bolt, it controls the coordination of the ammunition belt feed.

### 63. Removal

a. To remove the driving spring assembly (fig. 34) use a cartridge, engaging the cartridge nose in the recessed end of the driving spring assembly. Push fully forward and to the left until the driving spring rod head is free of its slot in the right side plate assembly. It is then free to be withdrawn from the weapon.

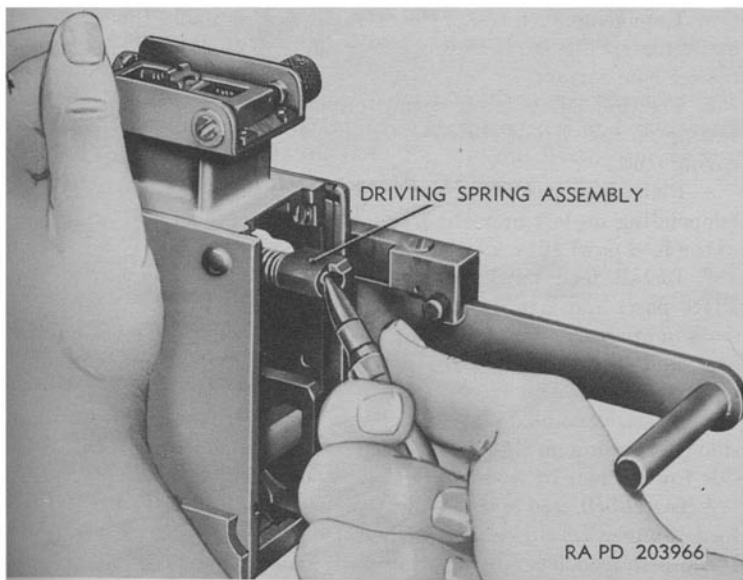
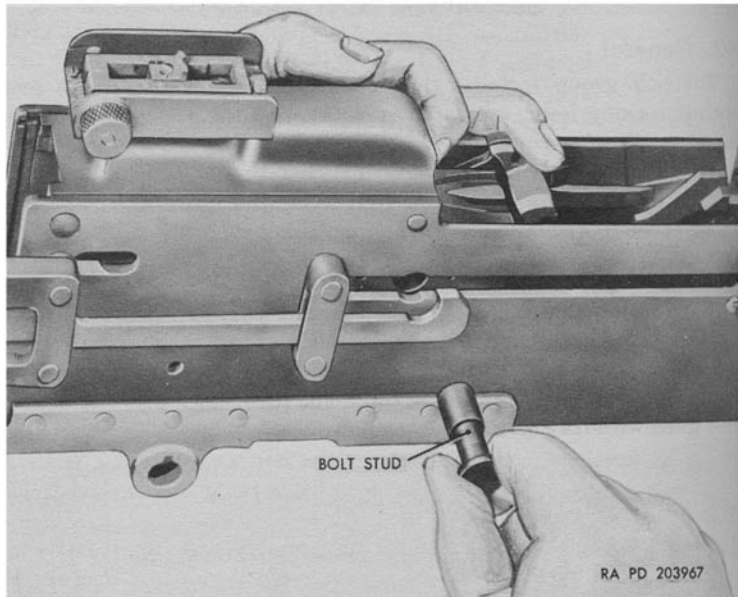


Figure 34. Removal of driving spring assembly.

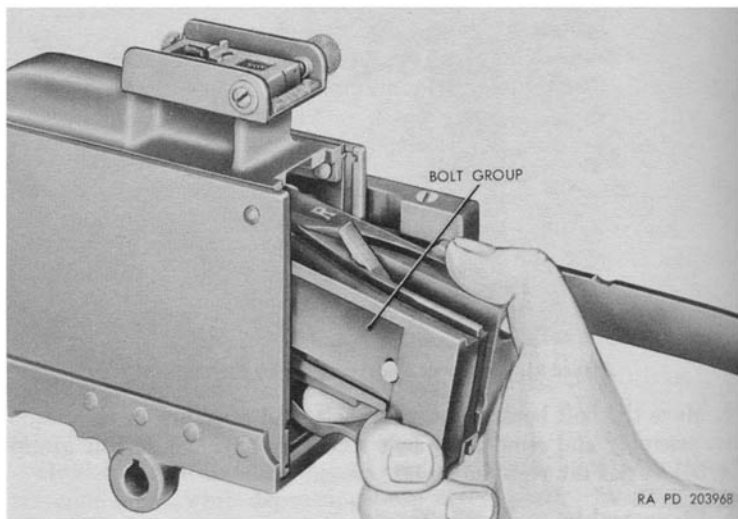
b. Move the bolt back to meet the bolt stud aperture in right side plate assembly and remove the bolt stud (fig. 35). Slide bolt group (fig. 36) out of the right side plate assembly.

### 64. Disassembly

a. Remove the extractor assembly (fig. 8) by rotating upward to the stop and sliding it out from side of the bolt. To disassemble the extractor assembly for either inspection or reversing feed, use a drift to



*Figure 35. Removal of bolt stud.*



*Figure 36. Removal of bolt group.*

drive out the ejector pin (fig. 11). The ejector and ejector spring are then free for removal or reversing. Use the drift again to drive out the extractor plunger pin. The extractor plunger and spring are then free for removal.

b. Drive out the cocking lever pin (fig. 37) and remove the cocking lever.

c. Using the cocking lever as tool, rotate the sear spring (fig. 38) into the recess in the side of the bolt until it clears the sear. The sear is then free for removal.

d. Use the cocking lever again to move the sear spring to its original position in the slot; then push the pin on the sear spring up until the sear spring is free of the bolt.

e. Remove the firing pin assembly (fig. 39) and disassemble firing pin assembly by using a drift to drive out the firing pin spring pin. This allows the firing pin spring to fall out of firing pin.

f. The two bolt switches are removed by driving out the forward and rear 0.156 x  $\frac{3}{4}$  spring pins (fig. 9). The bolt switches (fig. 10) can then be lifted out by inserting the nose of a cartridge under the beveled edges and prying upward.

g. To disassemble the driving spring assembly, drive out the driving spring collar stop pin from the driving spring rod and remove the driving spring collar from the rod. Remove the driving spring from the rod.

## 65. Maintenance

Inspect all parts for signs of rust, corrosion, and wear that might affect efficient operation of the weapon. Be sure driving spring rod is not bent. Check extractor assembly for excessive battering. See that bolt stud does not bind in slot in side plate. Replace worn or broken parts if necessary.

## 66. Assembly

a. Place firing pin spring (compression, 0.259 OD, 50 coils) in forward end of firing pin. Compress spring and insert firing pin spring pin (stght, 0.0945 x 0.489).

b. Slide the firing pin assembly into its channel with the sear engaging shoulder on rear of firing pin toward the bottom of the bolt.

c. Insert the sear spring and rotate it into the slot in the side of the bolt to provide clearance for the sear.

d. Install the sear in its channel in the bolt and slide upward to the top of channel. Then rotate the sear spring from its slot to engage the lip of the sear holding it in place.

e. Place the cocking lever in position engaging the firing pin slot with the shoulder of lever to the rear, compressing firing pin spring. Insert the cocking lever pin.

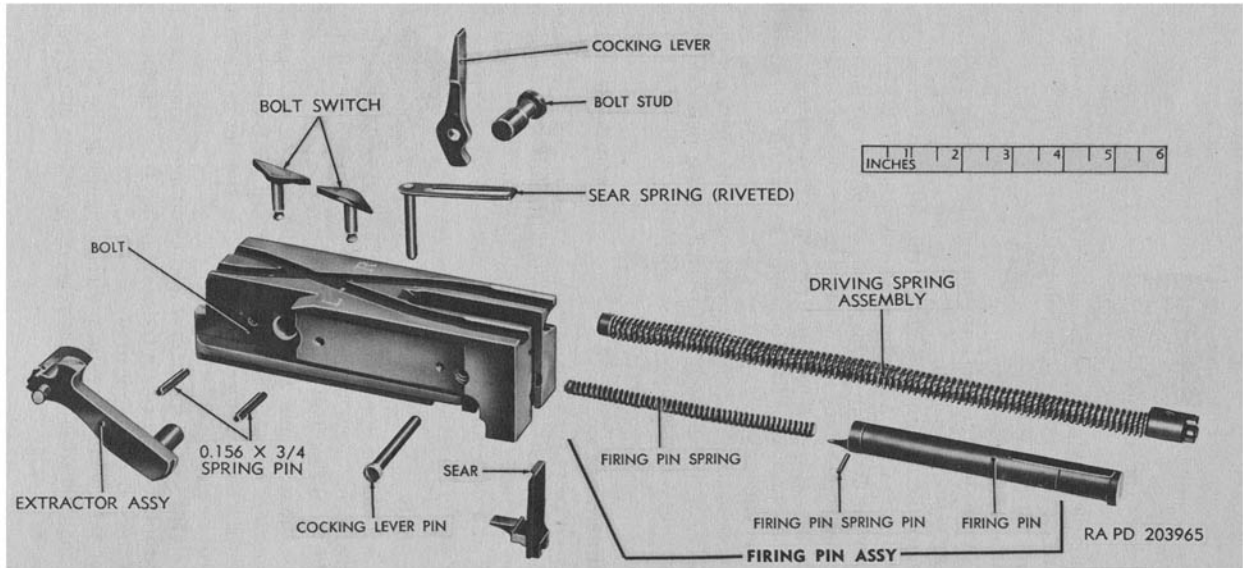
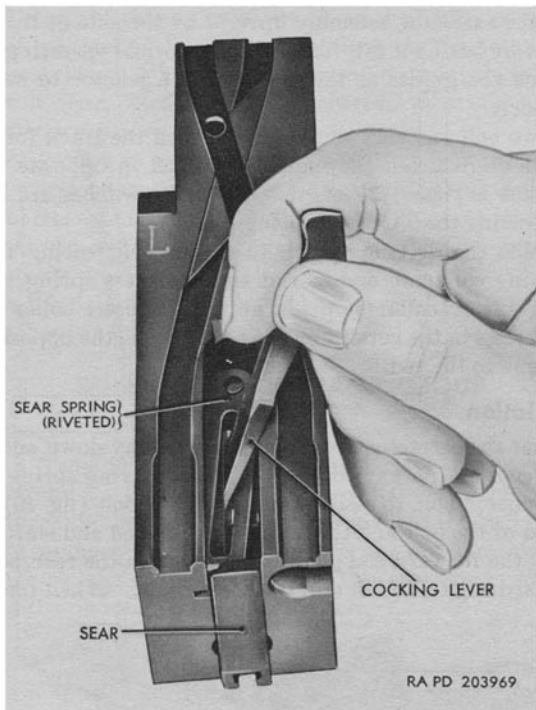


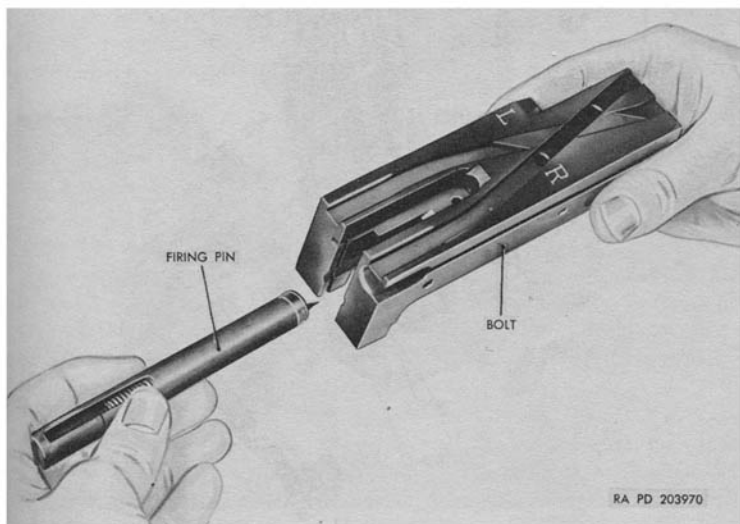
Figure 37. Bolt group—exploded view.





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*Figure 38. Removal of sear and sear spring.*



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*Figure 39. Removal of firing pin assembly.*

f. Hold the extractor assembly upright by the side of the bolt and install it before letting it fall forward to its normal operating position. This permits the guides at the rear of the extractor to become engaged properly.

g. The two bolt switches can be installed in the track for right or left feed, as desired, but they must be placed in opposite tracks so that one track is clear full length. The bolt switches are locked in place by inserting the  $0.156 \times \frac{3}{4}$  spring pins.

h. Assemble the driving spring to the driving spring rod. Put driving spring collar on end of rod and compress spring until hole for driving spring collar stop pin appears. Insert collar stop pin so head end rests in the cut-out on the rod. Stake the opposite end of collar stop pin to the rod.

## 67. Installation

a. See that the extractor assembly is all the way down and that the cocking lever is all the way forward. Insert driving spring assembly into its channel in bolt, to assist in installing the bolt (fig. 40). Grasp the rear end of the bolt and the driving spring rod and start bolt into casing with the forward end slightly higher than the rear, so that the lower forward edge does not trip the accelerator. When forward end

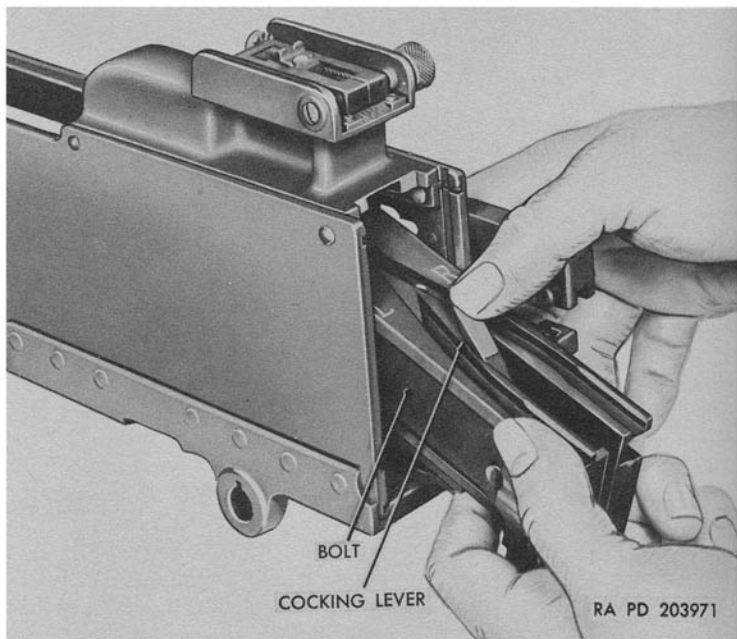


Figure 40. Installing bolt group.

of the bolt starts to ride up on its guides in the barrel extension, raise rear end of bolt and push it in horizontally. As the bolt stud hole in the bolt comes into line with the corresponding aperture in the side of the right side plate, place the retracting bar, forward and curved notch in line with the aperture, and insert the bolt stud.

*b.* If accelerator is tripped when installing bolt, withdraw bolt, withdraw bolt, lock frame, barrel extension, and barrel, and lock accelerator to barrel extension. Return groups to original position. It is not necessary to completely withdraw the barrel extension to engage the accelerator.

*c.* Press the driving spring assembly forward and to the right to engage the head in its slot in the side plate.

## **Section IX. LOCK FRAME GROUP**

### **68. General**

The lock frame group includes the accelerator, the barrel plunger and spring, and the trigger. The forward fingers of the frame act as cams in unlocking the breech lock during recoil of the barrel extension. The barrel plunger and spring provide an auxiliary recoil spring directly against the barrel extension. The accelerator increases the velocity of the rearward motion of the bolt.

### **69. Removal**

Use the nose of a cartridge to push in the trigger pin (fig. 41) through the hole in the rear of the right side plate assembly. Pull the lock frame group, barrel extension, and barrel, which are assembled together, out the rear of the casing until the lock frame is clear. It can be detached without complete removal of the barrel extension simply by tripping the accelerator (fig. 42).

### **70. Disassembly**

*a.* Remove the trigger by pushing out the trigger pin (fig. 43) from the left side. Remove the trigger pin spring.

*b.* Push out the accelerator and breech lock pin assembly and remove the accelerator.

*c.* The barrel extension plunger and barrel plunger spring are removed by depressing the spring slightly and pushing toward center of lock frame. This moves the plunger stud free of its guide slot in lock frame and allows the plunger to expand free of its mounting.

### **71. Maintenance**

Keep the breech lock pin cam surfaces at the forward end lock frame smooth. Remove any burs on the accelerator. Check the barrel plunger action, and check the barrel plunger spring for wear. Replace worn or broken parts if necessary.

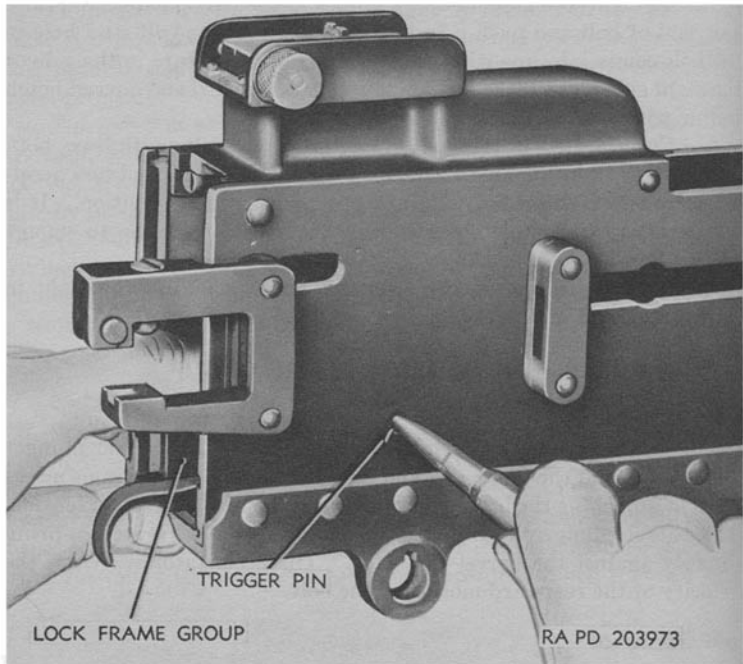


Figure 41. Removal of lock frame group.

## 72. Assembly

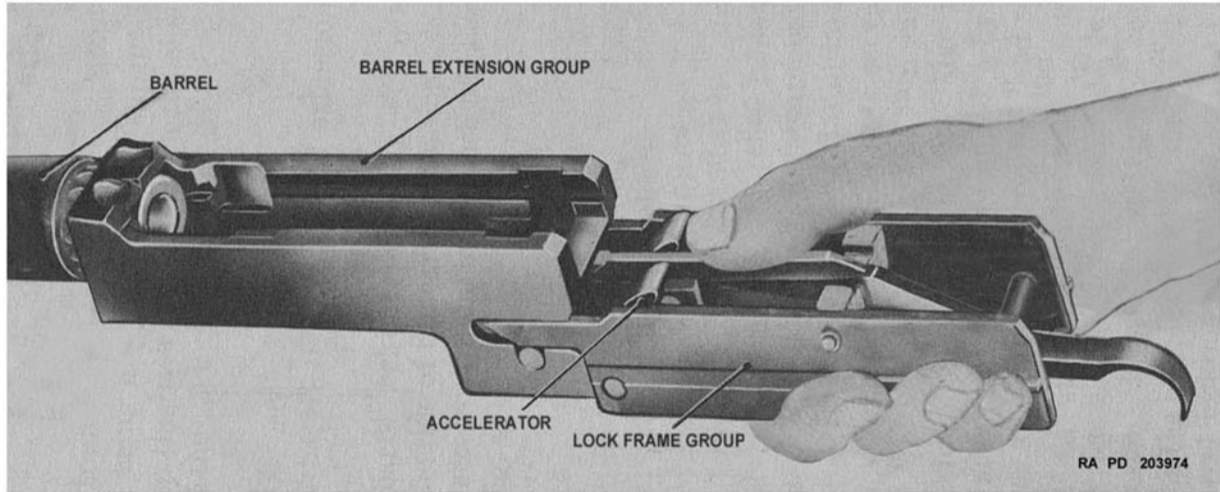
a. Insert rear of barrel extension plunger into barrel extension plunger spring (compression, 0.382 OD, 24 coils) and then into hole in retaining lug of lock frame and compress the plunger and spring until the stud plunger is opposite its slot in the lock frame. Engage the plunger stud and release the plunger, allowing the slot to limit the movements of the barrel plunger.

b. Align the holes of the accelerator with the corresponding holes in the end of the lock frame and insert the accelerator and breech lock pin assembly so that neither end protrudes beyond the sides of the lock frame.

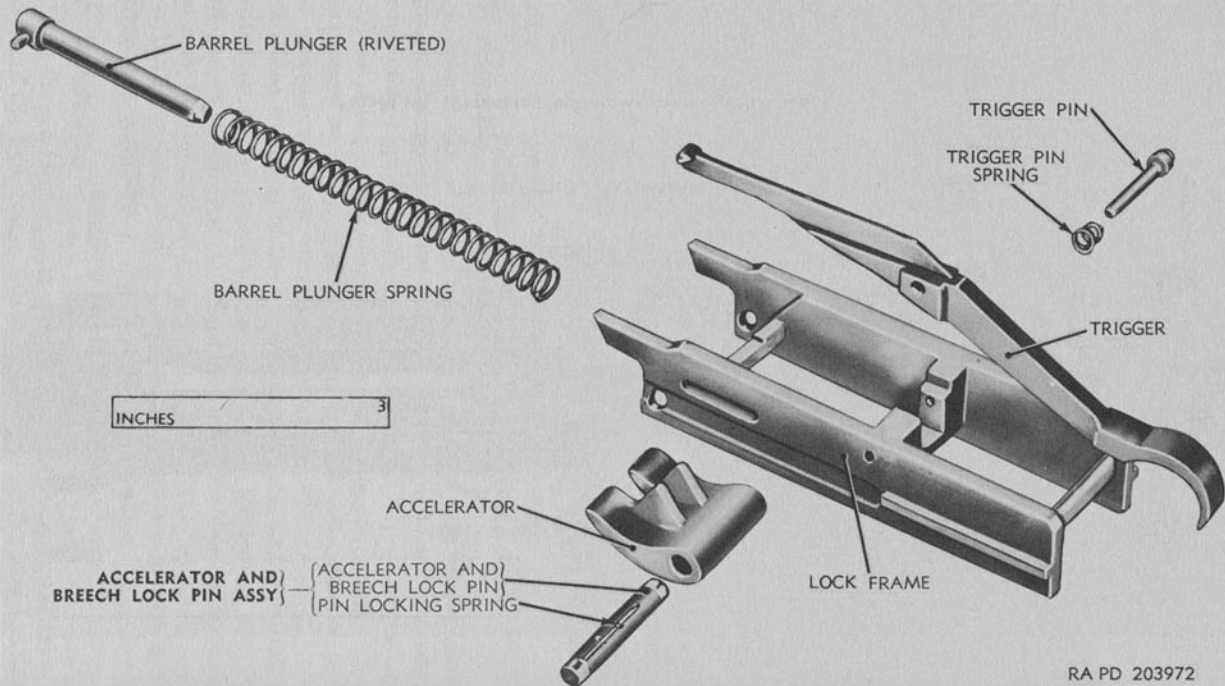
c. With the trigger alined in position insert the trigger pin and trigger pin spring (compression, 0.22 OD, 4 coils).

## 73. Installation

Hold the accelerator up in normal position and start the front projection of the lock frame into the guideways in the barrel extension. Barrel extension plunger will engage stud on barrel extension. Press forward until the accelerator turns backward between the rear end of the barrel extension and the T lug on barrel extension and locks



*Figure 42. Detaching lock frame from barrel extension.*



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Figure 43. Lock frame group—exploded view.

the lock frame to the barrel extension. Press down tips of the accelerator with thumb to insure positive locking. Slide the barrel, barrel extension, and lock frame into the casing (fig. 44). Engage side guides of lock frame into slots in side plates until the trigger pin engages the hole in the right side plate.

## Section X. BARREL AND BARREL EXTENSION GROUP

### 74. General

This group consists of two main parts, the barrel and the barrel extension (fig. 45). The barrel extension contains the breech lock and a projection supporting the barrel plunger stud. The barrel and barrel extension start the recoil action of the bolt.

### 75. Removal

After the lock frame has been released and removed, the barrel and barrel extension, being attached, are already partly removed from the casing. Grasp the back of the barrel extension and pull it, with the barrel, out of the back of the casing.

### 76. Disassembly

a. Separate the barrel from the barrel extension (fig. 46) by unscrewing the barrel.

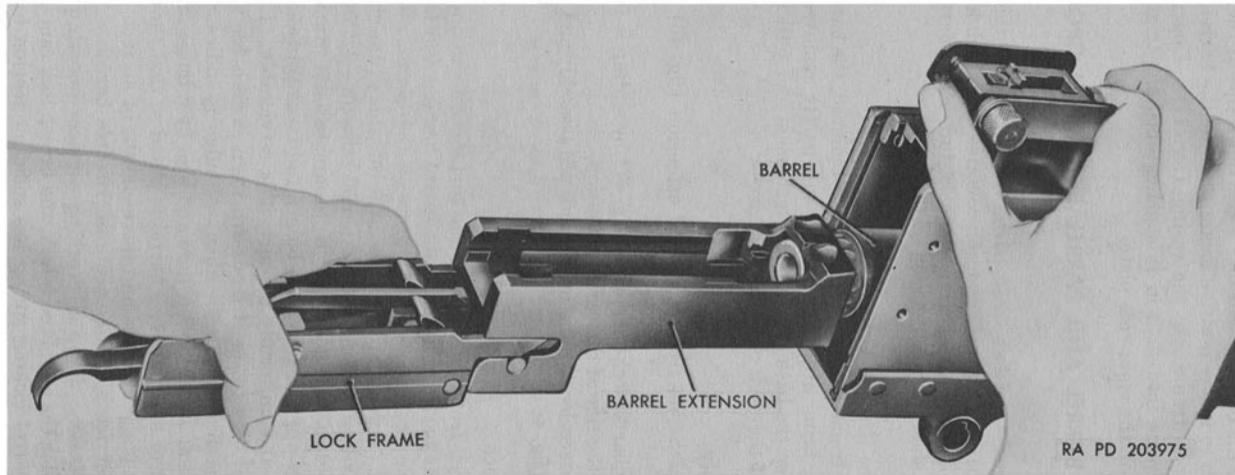
b. Remove the barrel locking spring (fig. 47) by sliding it forward out of its seat in the side of the barrel extension.

c. Push out the accelerator and breech lock pin assembly and remove the breech lock (fig. 48).

### 77. Maintenance

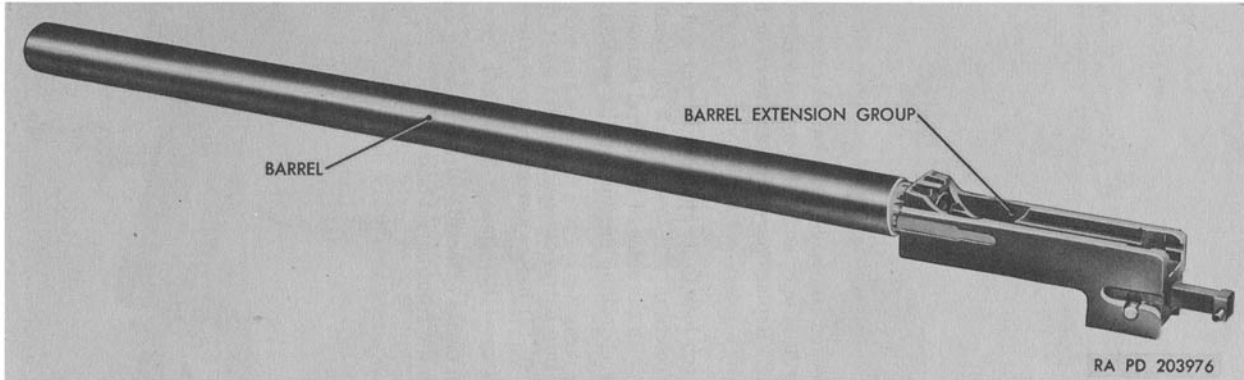
a. *Barrel.* Keep front and rear bearing surfaces smooth and working freely in their bearings in the front barrel bearing and trunnion block. If fouling (carbon deposit) forms on the barrel, remove it with emery cloth. Remove any burs set up at the edge of the chamber. Examine barrel visually, using cal. .30 barrel reflector—7265788 (fig. 49) holding barrel so that its interior is illuminated and examine the bore. If the bore appears free from bulges and large pits and if the lands are sharp and uniformly distinct, it is serviceable. Examine the breech end of bore to see if lands are worn smooth for the first 6 to 8 inches, making it unserviceable. A bulge is indicated by a shadowy depression or ring in the bore and also by a bulge or raised ring on the exterior surface. If a barrel is pitted so that the pitting is the width of a land or groove and three-eighths of an inch long or longer, it is unserviceable. Replace unserviceable barrels.

b. *Barrel Extension.* Keep all working surfaces smooth, particularly those in which the bolt, breech lock, and breech lock cam operate. Make sure the barrel locking spring has sufficient tension to insure



*Figure 44. Installation of lock frame, barrel extension, and barrel.*





*Figure 45. Barrel and barrel extension.*

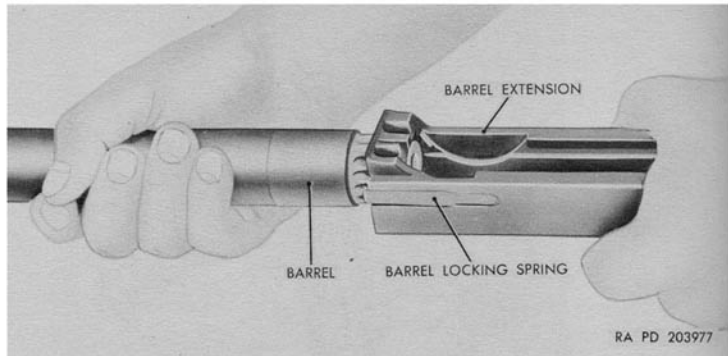


Figure 46. Separating barrel from barrel extension.

the barrel being locked securely to the barrel extension and that the nose of the spring fit snugly and fully into the barrel notches.

*c. Replace Parts.* Replace parts that are worn or broken.

## 78. Assembly

*a.* Place the breech lock in its aperture in rear end of barrel extension, and insert accelerator and breech lock pin assembly so that the pin ends are flush with the sides of the barrel extension.

*b.* Slide the barrel locking spring into its sear in the side of the barrel extension.

*c.* Screw barrel into barrel extension as far as it will go, then adjust head space (par. 17) before assembling group to gun.

## 79. Installation

Slide barrel and barrel extension through casing and barrel jacket until it is seated in the front barrel bearing.

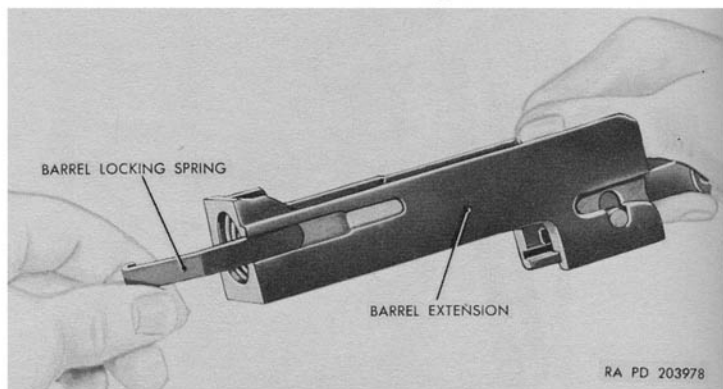


Figure 47. Removal of barrel locking spring.

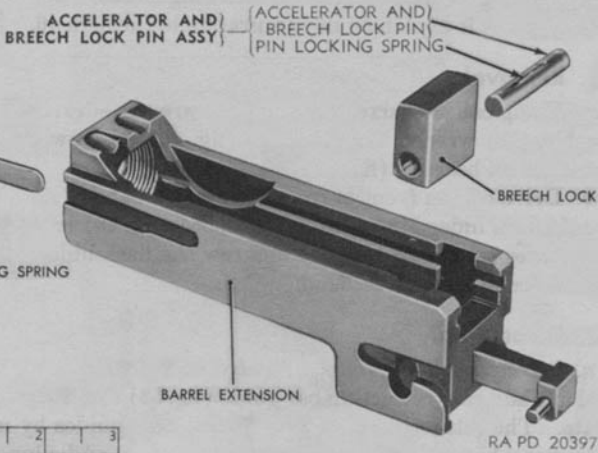


Figure 48. Barrel extension—exploded view.

## Section XI. CASING AND BARREL JACKET GROUP

### 80. General

This group consists of two main parts, the casing and barrel jacket group. The purpose of the casing and barrel jacket group is to house the working mechanism of the gun as well as to act as a support of the fixed parts and mount attachment, which contribute to its operation. It also acts, through the barrel jacket, and front barrel bearing to support and protect the barrel. If a cal. .30 flash hider M6 assembly—5750054 (fig. 19) is used the front barrel bearing and front barrel bearing lock band are removed and the flash hider M6 assembly is staked to the jacket. The flash hider then serves as the support for

BARREL REFLECTOR—  
7265788

BARREL

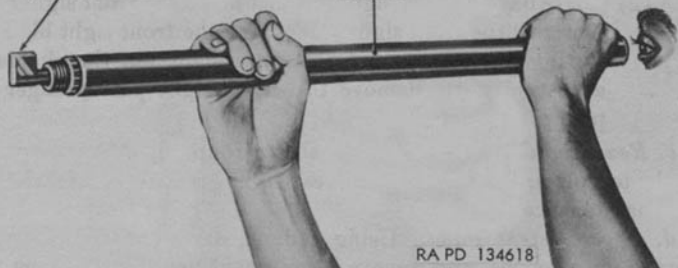


Figure 49. Inspecting barrel, using barrel reflector—7265788.

the recoiling barrel. Detail functioning of the components of the casing group is explained in paragraphs 40 through 46.

## 81. Removal

a. Using cal. .30 barrel bearing plug wrench—6147277 (fig. 20) and combination wrench M6—5568334 (fig. 19) unscrew and remove the front barrel bearing (fig. 50).

b. Drive off the front barrel bearing lock band.

c. If flash hider M6 assembly—5750054 (fig. 19) is used, use wrench in grooves on side of hider to unscrew the flash hider. Drive off the staked front barrel lock band.

## 82. Disassembly

a. *Retracting Bar Group.* The front retracting bar guide (figs. 51 and 52) and rear retracting bar guide (fig. 53) are riveted to right side plate. The retracting bar is retained in the guides by means of the retracting bar guide plunger, plunger spring, and plunger plug, all assembled in the rear guide. The retracting bar lock, lock plunger spring, and lock plunger are also assembled in the rear retracting bar guide and are held in position by the retracting bar lock retaining pin.

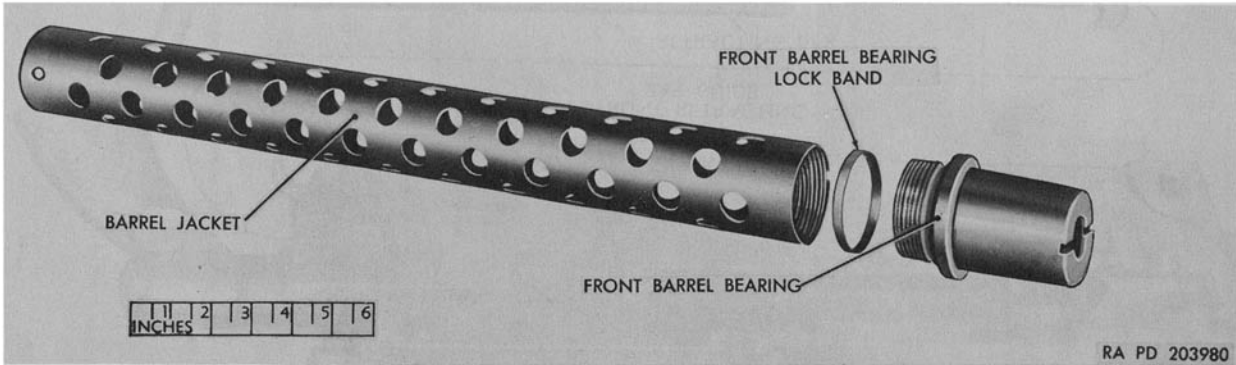
- (1) To remove the retracting bar, pull to rear and lift it free of its holding notch until it is clear of guides.
- (2) Unscrew the retracting bar guide plunger plug. Be careful as the plug is under considerable spring pressure. Remove the guide plunger and guide plunger spring.
- (3) Drive out retracting bar lock retaining pin and slide out retracting bar lock. Retracting bar lock plunger and lock plunger spring can then be removed.

b. *Front Sight Group.* Remove front sight group by unscrewing front sight body screw (fig. 54), and remove front sight washer. To disassemble front sight group, proceed as outlined in (1) and (2) below.

- (1) Remove front sight bearing screw and lift out front sight post assembly, also front sight body plunger and body spring.
- (2) Drive out the front sight pin that holds the front sight blade. Unscrew the front sight blade from the front sight blade adjusting nut. Drive out the front sight pin that holds the adjusting nut. Remove the front sight post plunger and post plunger spring.

c. *Rear Sight Group.* The rear sight group (fig. 55) is assembled to the top plate. Disassembly of rear sight group is restricted to depot maintenance personnel.

d. *Cover Detent Pawl.* Using a drift, drive out the 0.078 x  $\frac{3}{4}$  spring pin (fig. 56), and remove cover detent pawl and springs.



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Figure 50. Barrel jacket group—exploded view.

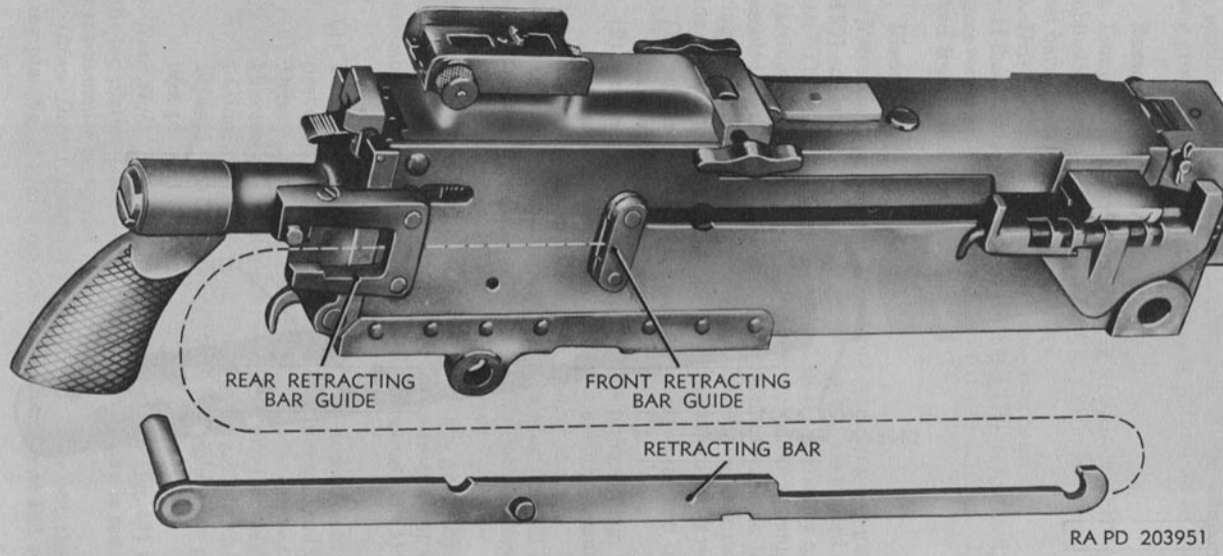
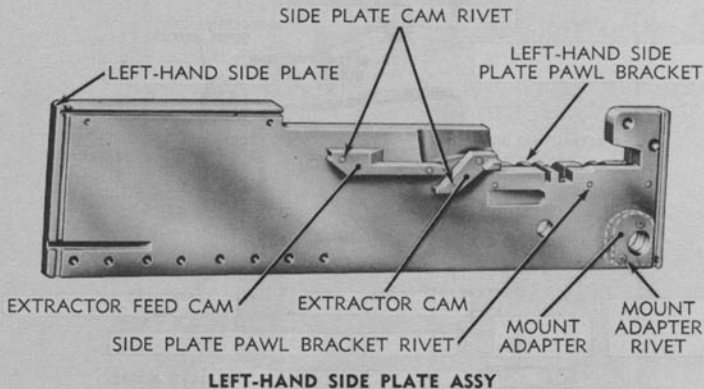
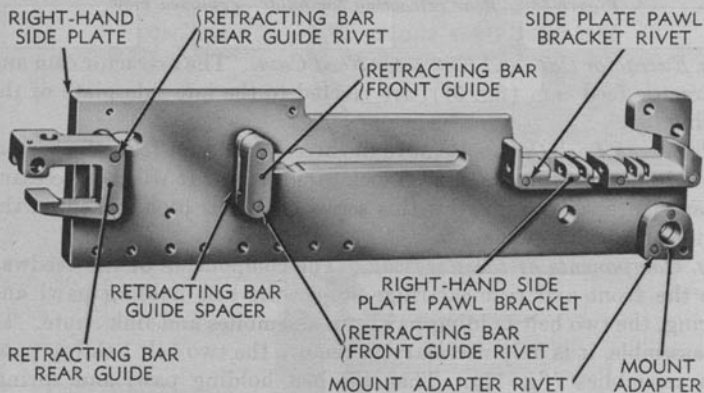


Figure 51. Retracting bar group.



**LEFT-HAND SIDE PLATE ASSY**



**RIGHT-HAND SIDE PLATE ASSY**

RA PD 134614

*Figure 52. Side plate assemblies—exploded view.*

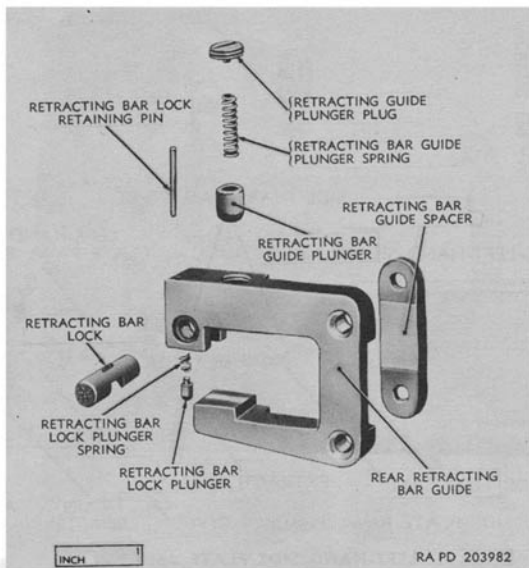


Figure 53. Rear retracting bar guide—exploded view.

*e. Extractor Cam and Extractor Feed Cam.* The extractor cam and extractor feed cam (fig. 57), are riveted to the left side plate of the casing.

*f. Breech Lock Cam.* Remove the breech lock cam from the bottom plate by unscrewing the breech lock cam screw. It will be necessary to exert pressure to unscrew this screw, as it has been staked on the inside or top side of cam.

*g. Components of the Feedway.* The components of the feedway are the front and rear cartridge stops, the belt holding pawl and spring, the two belt holding pawl pin assemblies and link chute. To disassemble, it is only necessary to remove the two belt holding pawl pin assemblies (fig. 17). Then the belt holding pawl and spring, front and rear cartridge stops, and link chute can be removed.

### 83. Maintenance

*a.* The front barrel bearing band lock should be replaced if worn or broken.

*b.* Test the retracting bar for smooth functioning. Keep working surfaces of retracting bar front and rear guides smooth and free from burrs.

*c.* Check the hinged action of the front sight post. It should hold solidly when in the upward or folded position. Replace front sight body screw and front sight washer if worn or broken.



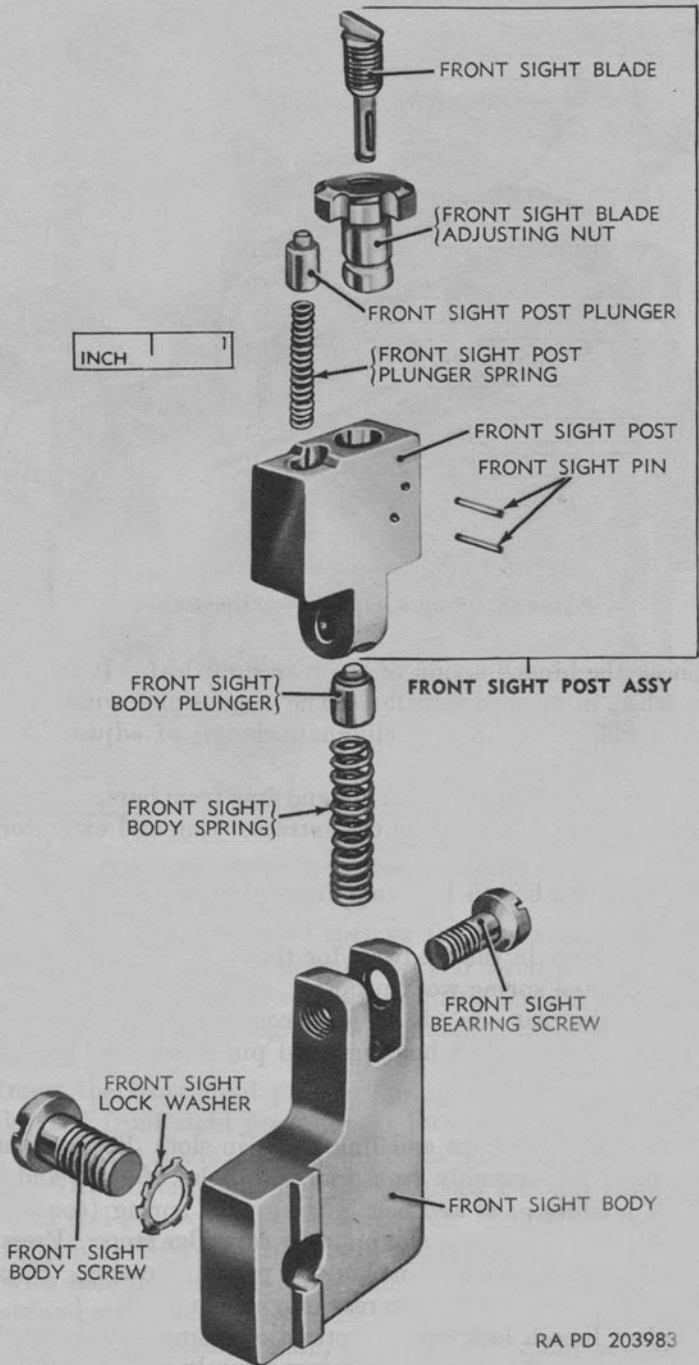
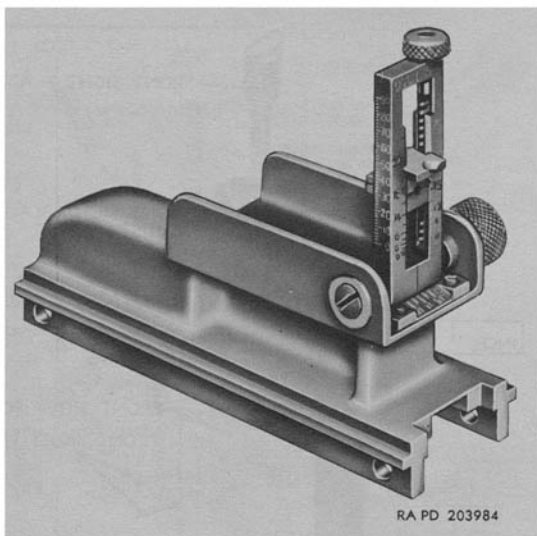


Figure 54. Front sight group—exploded view.



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*Figure 55. Rear sight group—assembled view.*

*d.* Check the hinged action of the rear sight leaf. It should hold solidly when in upward position. The rear sight windage screw should be sufficiently tight to eliminate change of adjustment from vibration during firing.

*e.* Keep cover detent pawl smooth and free from burs.

*f.* Remove burs, if any, from the extractor cam and extractor feed cam.

*g.* Examine the breech lock cam frequently for wear, and remove all burs.

*h.* Remove burs in the feedway for the belt. Make sure the belt holding pawl and spring work properly, and that the cartridge stops particularly the rear one, are in good condition. To remedy, stone worn parts. Replace belt holding pawl pin if worn or broken.

#### **84. Assembly**

*a.* Place cartridge stops and link chute in slot. Replace one belt holding pawl pin assembly from rear into holes of stops and chute. Place belt holding pawl and belt holding pawl spring (compression, 0.15 OD, 13 coils) in center slot opposite cartridge stops. Press pawl against spring tension and aline holes in pawl and casing. Place belt holding pawl pin assembly from rear into hole in pawl.

*b.* Replace breech lock cam in bottom of casing with beveled face to rear. Tighten the breech cam screw securely and stake the screw on the top side of the cam.

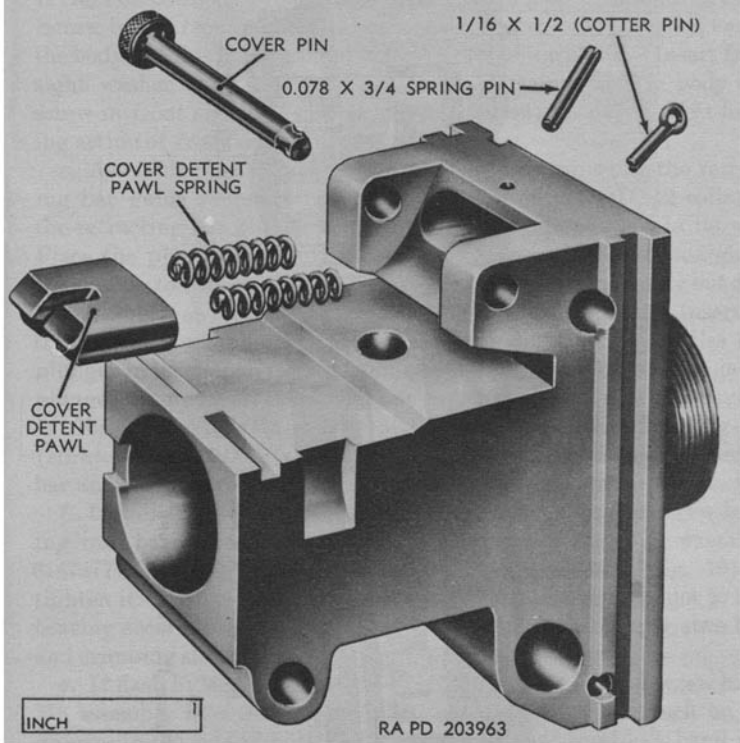


Figure 56. Cover detent group—exploded view.

c. Replace cover detent pawl springs (compression, 0.275 OD, 13 coils) in their wells in cover detent pawl and insert pawl into groove in trunnion block. Press pawl against spring tension and drive the 0.078 x  $\frac{3}{4}$  spring pin through hole in trunnion block and groove in cover detent pawl.

d. Insert the front sight plunger spring (compression, 0.123 OD, 14 coils) and front sight post plunger into hole in front sight post. Insert front sight blade adjusting nut into post and depress the post plunger. Drive front sight pin (dowel, 0.063 x 0.390) through hole in the post and groove on the adjusting nut. Stake both ends of this front sight pin. Screw in the front sight blade and aline slot in the blade with hole in the post. Drive another front sight pin through this hole and stake both ends of this pin to the post. Place the front sight body spring (compression, 0.224 OD, 15 coils) and then the front sight body plunger into the well in the top of front sight body. Insert the front sight post assembly into the slot in the body so that

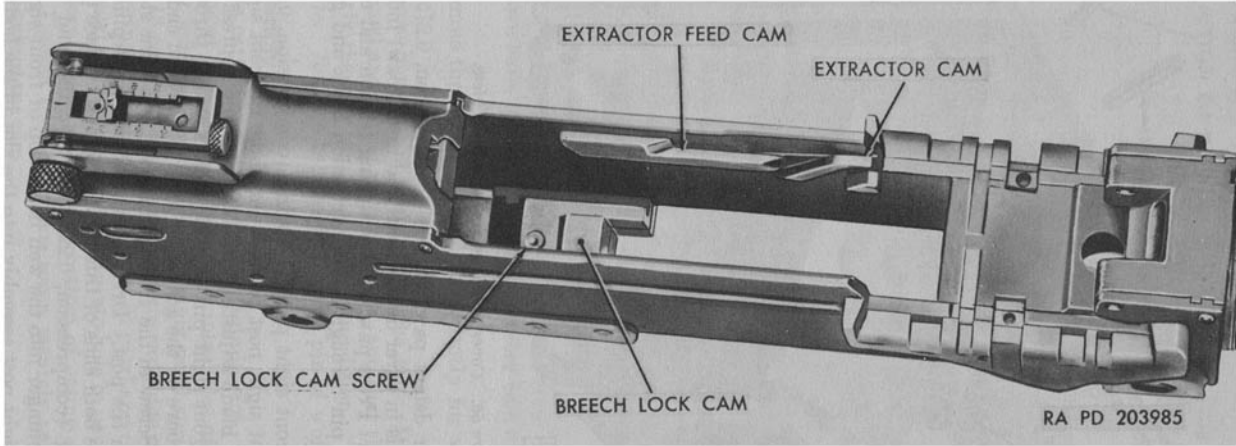


Figure 57. Casing group.

it rides on the body plunger and align hole in post with holes in body. Screw in the front sight bearing screw and stake the threaded end to the body. Align body group into slot on trunnion block. Insert front sight washer (lock, No. 11,  $1\frac{1}{64}$  ID,  $\frac{3}{8}$  OD) into hole in body and screw in front sight body screw (No. 14 (0.242) x 0.647). Test hinging action of front sight post assembly.

*e.* Assemble rear retracting bar guide group by placing the retracting bar guide plunger spring (compression, 0.175 OD, 12 coils) in the retracting bar guide plunger. Replace guide plunger in its well. Place the plug on the spring and press down and screw in tightly. Stake plug to rear guide. Take care that the plug does not fly out during assembly, as the spring exerts about 4 pounds pressure. Insert retracting bar lock plunger spring (compression 0.15 OD, 8 coils) and plunger in its well on the rear guide. Depressing lock plunger against plunger spring insert retracting bar lock. Turn lock until flat surface is aligned with hole in rear guide and drive in lock retaining pin (stght, sq-ends, 0.0625 x 0.906), staking both ends. Insert retracting bar and test for free movement in guides and free movement of lock.

*f.* Install front barrel lock band on barrel bearing and screw bearing into barrel jacket, using cal. .30 barrel bearing plug wrench—6147277 (fig. 20) and combination wrench—5568334 (fig. 19) to tighten it. Crimp band into grooves of jacket at crimping slot to lock bearing securely in place and stake to bearing hole making sure hole and crimping slot are not adjacent.

*g.* If flash hider M6 assembly—5750054 (fig. 19) is used, screw hider M6 assembly into the barrel jacket, using a crescent wrench on the grooves in the side of hider and crimp the front barrel lock band into crimping slot on jacket.

## CHAPTER 4

### AMMUNITION

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#### 85. General

The information in this section pertaining to the several types of cartridges authorized for use in the cal. .30 machine gun M37 (tank) includes a description of the cartridges, means of identification, care, use, and ballistic data. Detailed information pertaining to ammunition is contained in TM's of the 9-1900 series.

#### 86. Classification

Based upon type of bullet and use, the ammunition for use in this machine gun is classified as outlined in *a* through *h* below.

*a.* Armor-piercing cartridges, for use against armored aircraft and lightly armored vehicles, concrete shelters, and other bullet-resisting targets.

*b.* Armor-piercing-incendiary cartridges, for use against targets where the armor-piercing and incendiary effects are both desired.

*c.* Ball cartridges, for use against personnel and light materiel targets.

*d.* Blank cartridges, for use in simulated fire, signalling, and firing salutes.

*e.* Dummy cartridges, for training in loading, and unloading and inspection of the weapon.

*f.* Frangible ball cartridges, for use for training and simulating combat conditions. The bullet disintegrates on contact with a sufficiently resistant object.

*g.* Incendiary cartridges, for use against flammable targets, especially fuel and oil systems on aircraft and vehicles.

*h.* Tracer cartridges, for use to reveal the path of the bullet. Secondary purposes are for incendiary effect and for signalling.

#### 87. Identification

*a. General.* The marking on all original packing containers, both boxes and cartons (figs. 63, 64, and 65), clearly and fully identifies the ammunition *except* as to grade. For grades, see *f* below. The significance of the AIC symbol and silhouette as part of the marking is explained in *g* below. The ammunition lot number including its importance is described in *d* and *e* below. The cartridges themselves as marked and stamped as outlined in (1) and (2) below.

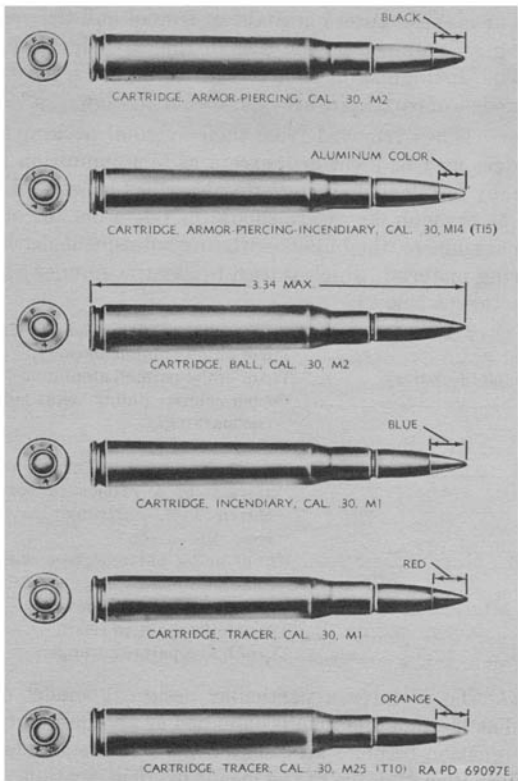
- (1) The manufacturer's initials or symbol and the year of loading are stamped on the base of the cartridge case.
- (2) The distinguishing characteristics of the several types and models of cartridges are described in *b* below.

*b. Types.* When removed from their original packing containers, the cartridges may be identified, except as to ammunition lot number and grade, by physical characteristics described below and illustrated in figures 58 through 60. Care should be taken not to confuse these original markings on the bullets with any subsequent markings made with coloring material, which is used to identify gunner's hits during target practice (*h* below).

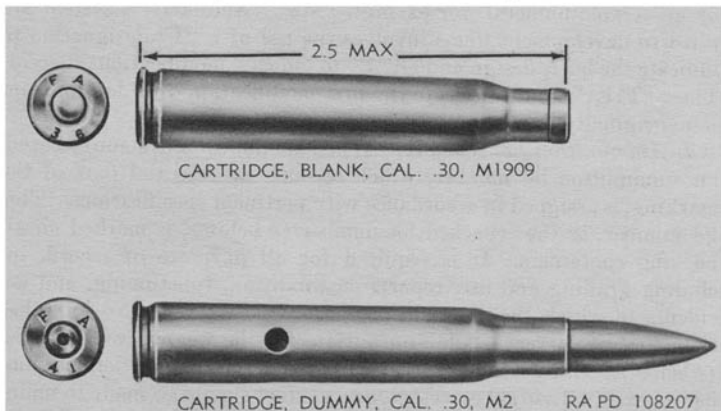
<i>Type</i>	<i>Distinguishing characteristics</i>
Armor-piercing-----	Tip of bullet painted black.
Armor-piercing-incendiary-----	Tip of bullet painted aluminum color.
Ball-----	Copper-colored gilding metal jacket on bullet (no markings).
Blank-----	No bullet is present.
Dummy-----	Three holes are drilled in the body of case and absence of a primer in base. Prior to March 1944, cartridge case and bullet were tin-coated.
Frangible-----	Tip of bullet painted green with white rear annulus.
Incendiary M1-----	Tip of bullet painted blue.
Tracer M1-----	Tip of bullet painted red.
Tracer M25-----	Tip of bullet painted orange.

*c. Model.* To identify a particular design, a model designation is assigned at the time the item is classified as an adopted type. This model designation becomes an essential part of the standard nomenclature of the item and one of the means of identification. The present system of model designation consists of one letter "M" followed by an Arabic numeral, for example "M2". Similarly, a system applied to development items involves the use of a "T" designation to indicate the basic design and an "E" to indicate modifications thereof. Thus, "T1E1" would indicate the first modification of a development item originally designated "T1".

*d. Ammunition Lot Number.* When ammunition is manufactured, an ammunition lot number, which becomes an essential part of the marking, is assigned in accordance with pertinent specifications. This lot number, or the repacked lot number (*e* below), is marked on all packing containers. It is required for all purposes of record, including grading and use, reports on condition, functioning, and accidents in which the ammunition might be involved. No lot other than that of current grade appropriate for the weapon will be fired (*f* below). Since it is impracticable to mark the ammunition lot number on each individual cartridge, every effort should be made to maintain the ammunition lot number of cartridges that are removed from



**Figure 58. Cal. .30 service cartridges.**



**Figure 59. Cal. .30 blank and dummy cartridges.**



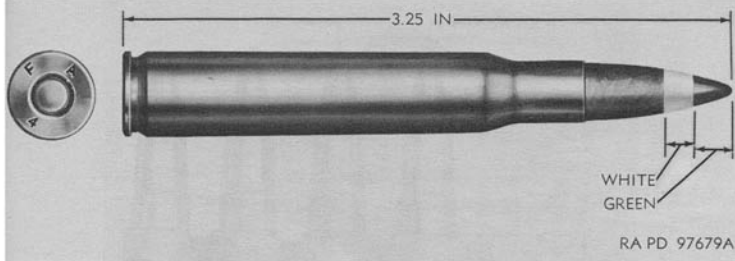


Figure 60. Cartridge, ball, frangible, cal. .30, M22 (T44).

their original packings. Cartridges, other than blank and dummy, for which the ammunition lot number has been lost are placed in grade 3 (unserviceable ammunition which will not be issued or fired; see *f* below; therefore, when cartridges are removed from the original packings they should be marked or tagged so that the ammunition lot number may be preserved. The letter "S" preceding the serial number of an ammunition lot indicates that the cartridge case is made of steel. Rounds of ammunition assembled with steel cartridge cases are authorized for all training requirements only.

*e. Repacked Lot Number.*

- (1) Since ammunition in metallic link belts (figs. 61 and 62) may consist of more than one type of cartridge and hence would require two or more lot numbers marked on each packing box and in records, a single repacked lot number is assigned by the repacker to replace the original ammunition lot numbers. This repacked lot number is marked on one end, and on the top of each packing box. The ammunition lot numbers of the cartridges comprising a repacked lot are listed on the reference card placed inside the packing box.
- (2) The repacked lot number consists of the words "REPACKED LOT", the initials of the repacker, the letter "L" for linked cartridges, and the lot number assigned by the repacker.

*f. Grades.* Small-arms ammunition is graded primarily on the qualities which make the lot especially suited for use in a particular class of weapons; for example, a lot of ammunition assigned grade AC is especially suited for use in aircraft weapons. Current grades of all existing lots of small-arms ammunition are established by the Chief of Ordnance and are published in Department of the Army Technical Bulletin 9-AMM 4. Only those lots of appropriate grade will be fired. Grade 3 indicates unserviceable ammunition which will not be issued or fired; however, ammunition placed in grade 3 due to loss of ammunition lot number, but which can be identified as having been in serviceable lots issued to a specific organization, may be reissued after visual

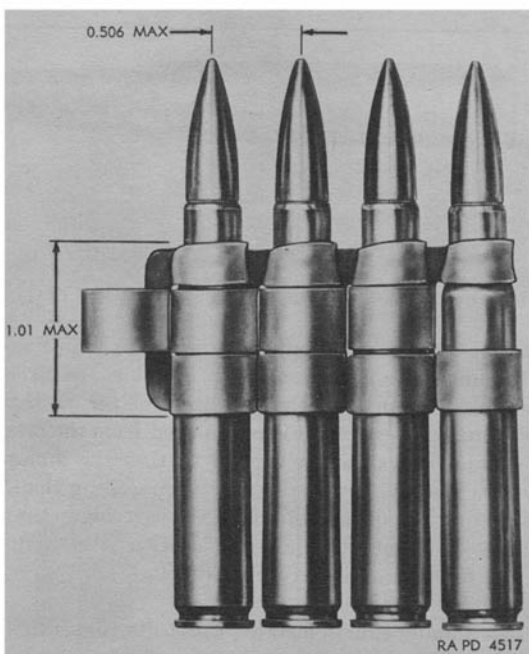


Figure 61. Section of cal. .30 linked belt.

inspection, but only for local training purposes in ground machine guns.

*g. Marking.* In addition to the required markings on packing boxes for shipping purposes, the following are also stenciled or marked on the boxes (figs. 63, 64, and 65).

- (1) Ammunition lot number or repacked lot number.
- (2) Types and ratio, or type, of the cartridges within the box; for example, "4 BALL M2, 1 TR M1" or "AP".
- (3) Gross weight of the packing box.
- (4) Cubical displacement of the packing box.
- (5) Silhouettes on one side and one end of packing boxes containing cartridges in linked belts to indicate the type of inner packings; for example, for cartridges packed in metallic

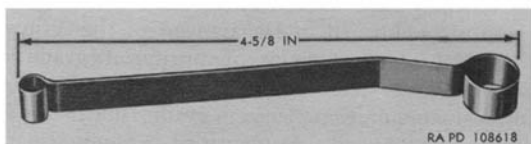


Figure 62. End, metallic belt, cal. .30, M1.

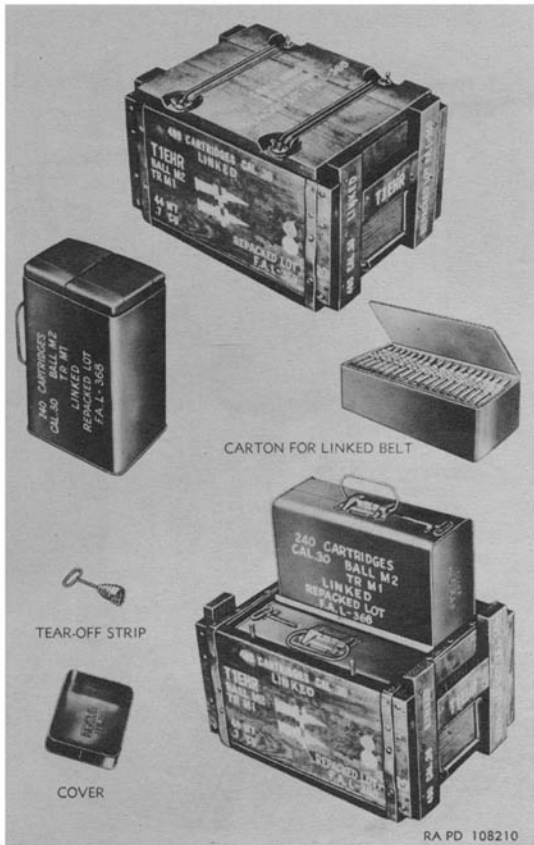


Figure 63. Box containing linked cal. .30 cartridges in cartons in M8 metal cans.

link belts, the silhouette shown in figures 63 and 64 is used. The absence of a silhouette indicates that the ammunition is packed in cartons. For cal. .30 cartridges the silhouettes are vertical; for cal. .50 cartridges they are diagonal.

- (6) AIC (Ammunition Identification Code) symbols are published in Department of the Army Supply Manual ORD 3 SNL T-1. These AIC symbols indicate a specific cartridge or combination of cartridges, having a specific grade and packing.

*h. Coloring Bullet Tips.* The number of hits made upon a target by a certain machine gun or group of machine guns when others are firing upon the same target is sometimes determined by coating the tips of bullets with coloring material. The bullets from each weapon

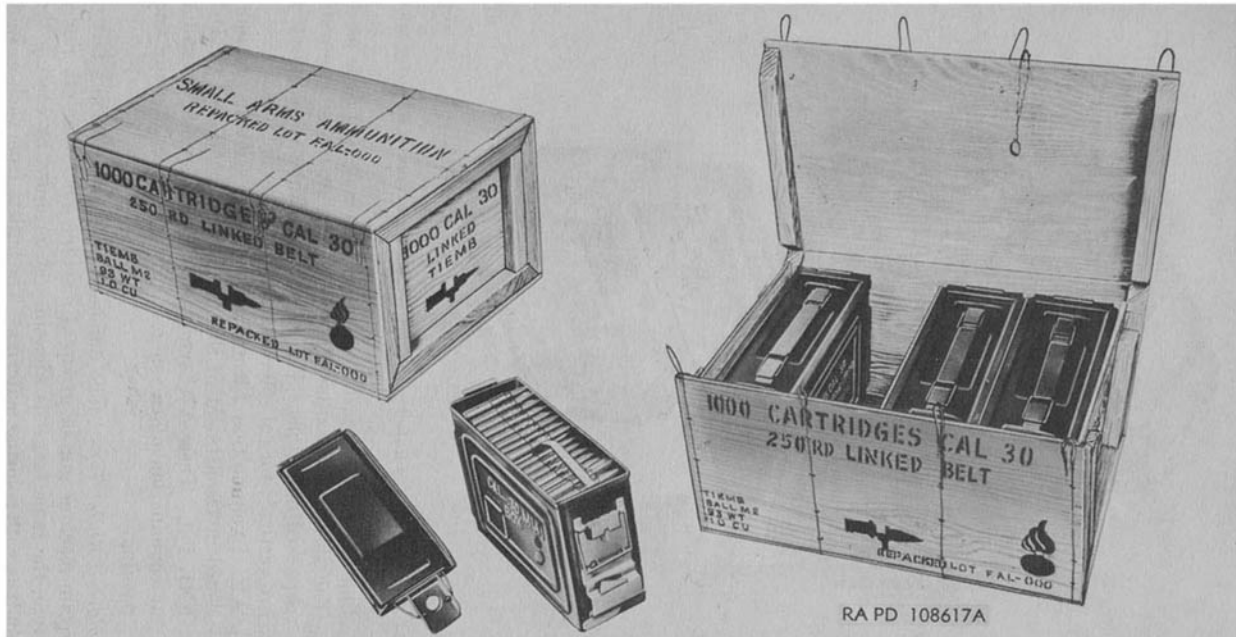


Figure 64. Wirebound box containing linked cal. .30 cartridges in M1A1 ammunition boxes.

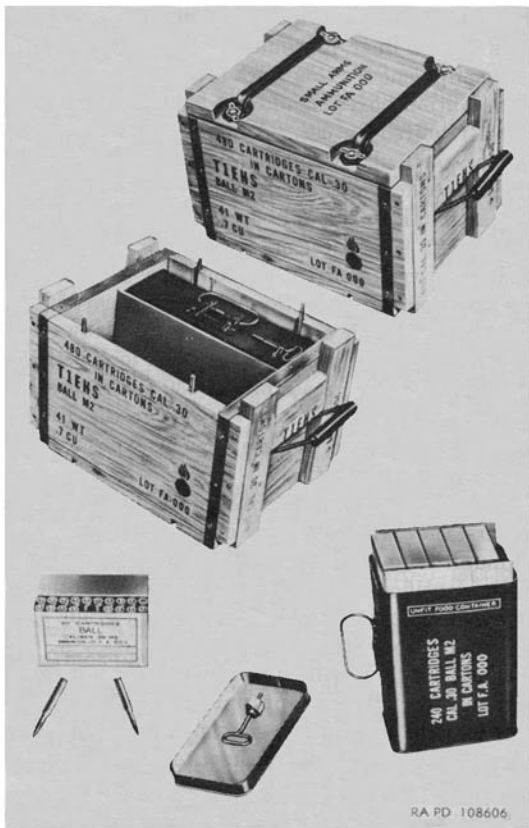


Figure 65. M9 box containing cal. .30 cartridges in cartons, in M8 metal cans.

or group of weapons are coated with a distinctive color, which upon striking the target leaves a colored smear indicating the weapon from which fired. For the method of application, see TM 9-855. Cartridges which have been so coated must have the coloring removed before being returned to storage.

## 88. Care, Handling, and Preservation

### a. General.

- (1) Ammunition is packed to withstand conditions ordinarily encountered in the field. Small-arms ammunition, as compared with other types of ammunition, is not dangerous to handle. Care, however, must be observed to keep packings from becoming broken or damaged. All broken packings must be repaired immediately and careful attention given to the

transfer of all markings to the new parts. If the box contains a metal liner, it should be air-tested and sealed provided that equipment for this work is available.

- (2) Ammunition boxes should not be opened until the ammunition is required for use. Ammunition removed from its container, particularly in damp climates, is apt to corrode, thereby rendering the ammunition unserviceable.
- (3) The ammunition should be protected from sand, mud, moisture, frost, snow, ice, oil, grease, or other foreign matter. If it gets wet or dirty, it should be wiped off at once. If verdigris or light corrosion forms on cartridges, it should be wiped off with a clean dry cloth. However, cartridges should not be polished to make them look better or brighter.
- (4) The use of oil or grease on cal. .30 cartridges is prohibited.
- (5) Ammunition should not be exposed to the direct rays of the sun for any length of time. Such exposure may seriously affect its firing qualities.
- (6) Whenever cartridges are taken from original packing containers, they will be tagged or otherwise marked so that the ammunition may be identified as to ammunition lot number. Such identification is necessary to prevent otherwise serviceable ammunition from being placed in grade 3, through loss of ammunition lot number.
- (7) Rounds not fired will be returned to their original condition and packing and be appropriately marked. Such rounds will be used first in subsequent firings in order that stocks of opened packings may be kept to a minimum.

#### *b. Storage.*

- (1) Whenever practicable, small-arms ammunition should be stored under cover. This applies particularly to tracer ammunition which is subject to rapid deterioration if it becomes damp, and may even ignite spontaneously. When it is necessary to leave small-arms ammunition in the open, raise it on dunnage at least 6 inches from the ground and cover it with a double thickness of paulin, leaving enough space for the circulation of air. Where practicable, dunnage strips should be placed under each layer of ammunition boxes. Suitable trenches should be dug to prevent water from running under the pile.
- (2) Ammunition, when stored, should be segregated by caliber, type, and lot. (Refer to TM 9-1900.)
- (3) In a fire, small-arms ammunition does not explode violently. There are small individual explosions of each cartridge, the case flying in one direction and the bullet in another. It is unlikely that the bullets or cases will fly over 200 yards.

- (4) Small-arms ammunition in storage should be protected from extreme heat in order to avoid decomposition of the propellant powder and the tracer mixture in tracer ammunition. The combination of high temperatures and a humid atmosphere is particularly detrimental to the stability of the powder and the tracer mixture.
- (5) When only a part of a box of ammunition is used, the ammunition remaining in the box should be protected against unauthorized handling and use by firmly fastening the cover in place.

## 89. Authorized Rounds and Ballistic Data

*a. Rounds.* The following ammunition (par. 87*b*) of appropriate grade (par. 87*f*), is authorized for use in this machine gun (figs. 56 through 58). It will be noted that the nomenclature (standard nomenclature) completely identifies the cartridge as to type, caliber, and model. Links authorized for separate issue are also listed in table V.

*b. Ballistic Data.* The maximum ranges, muzzle velocities, weights of rounds, and times of flight to 600 yards of the service types of cal. .30 ammunition authorized for use in this machine gun are given in table V. For additional data see SR 385-310-1, section VI. Terminal ballistic data appear in TM 9-1907.

*c. Penetration.* Armor-piercing bullets will perforate 1/2-inch homogeneous armor plate at 200 yards at normal impact and 3/10-inch face hardened armor plate at 200 yards at normal impact.

## 90. Preparation for Firing

*a.* After removal from packing materials, belts of ammunition are ready for insertion into the feed mechanism of the machine gun.

*b.* Ammunition prepared for firing but not fired will be returned to their original condition and packings. Partially full boxes should be marked to indicate the number of rounds contained in a box. Such boxes of ammunition will be used first in subsequent firings in order that stocks of opened packings may be kept to a minimum.

## 91. Precautions in Firing

*a.* Ammunition which is seriously corroded should not be fired.

*b.* Cartridges which have been seriously damaged should not be fired, for example, those which have badly dented or scratched cases, or loose bullets.

*c.* No cal. .30 ammunition will be fired until it has been positively identified by ammunition lot number and grade as published in the latest revision or change to Department of the Army Technical Bulletin 9-AMM4.

*d.* Do not fire cartridges with oil or grease on them without first removing the oil or grease with a clean dry cloth, nor those which

Table V. Authorized Rounds for the Cal. .30 Machine Gun M37 (Tank)

Standard nomenclature	Average muzzle velocity (fps)	Time of flight to 600 yards (sec)	Maximum range		Approximate weight of cartridge (gr)
			Elevation (deg)	Range (yd)	
<b>SERVICE AMMUNITION</b>					
CARTRIDGE, armor-piercing, cal. .30, M2-----	2, 770	0. 96	30	3, 160	414
CARTRIDGE, armor-piercing-incendiary, cal. .30, M14 (T15)-----	2, 830	0. 88	30	3, 300	398
CARTRIDGE, ball, cal. .30, M2-----	2, 800	0. 89	30	3, 500	396
CARTRIDGE, incendiary, cal. .30, M1-----	3, 020	-----	30	2, 875	386
CARTRIDGE, tracer, cal. .30, M1 <sup>1</sup> -----	2, 750	-----	30	3, 350	396
CARTRIDGE, tracer, cal. .30, M25 (T10) <sup>2</sup> -----	2, 710	-----	30	3, 200	386
CARTRIDGE, tracer, cal. .30, M25 (T72E1) <sup>3</sup> -----	2, 710	-----	30	3, 200	386
CARTRIDGE, tracer, cal. .30, T102E1.-----	-----	-----	-----	-----	-----
<b>TRAINING AMMUNITION</b>					
CARTRIDGE, blank, cal. .30, M1909 <sup>4</sup> -----	-----	-----	-----	-----	207
CARTRIDGE, dummy, cal. .30, M2-----	-----	-----	-----	-----	340
CARTRIDGE, ball, frangible, cal. .30, M22 (T44)-----	1, 360	-----	30	1, 600	-----
<b>LINKS</b>					
LINK, metallic belt, cal. .30, M1-----	-----	-----	-----	-----	<sup>5</sup> 0. 01

cal.—caliber

deg—degree (angle)

E —indicates modification of experimental or development type item.

fps—feet per second

gr —grains

M —model

T —indicates experimental or development type item.

yd —yard

<sup>1</sup> Range of trace, 1,000 yards.

<sup>2</sup> Dim trace to 150 yards; bright trace to 1,000 yards.

<sup>3</sup> Dim trace to 50 yards; bright trace to 1,000 yards.

<sup>4</sup> Blank cartridges with felt wads should not be used for firing in automatic guns.

<sup>5</sup> Approximate weight of one link.

have become overheated due to exposure to the direct rays of the sun or other sources of high temperature. Such cartridges, if fired, may develop hazardous chamber pressures.

e. Only blank ammunition sealed with a thin paper closing cup or wad will be used in this machine gun.



f. It is dangerous to fire machine guns loaded with blank cartridges at personnel representing an enemy at distances of less than 20 yards, as the closing paper cup or disk may fail to break up.

g. Misfires in which the primer explodes but fails to ignite the powder charge may prove dangerous when blank ammunition is being fired. In a misfire of this kind some of the powder may be blown into the bore of the weapon. A series of such rounds in which the powder fails to ignite due to moisture or other causes will result in an accumulation of powder sufficient to cause serious damage when ignited by a normal cartridge. When misfires are encountered in blank ammunition in excess of 5 percent, the firing of the lot will be suspended and the matter reported to the Chief of Ordnance.

## 92. Packing

Cal. .30 service cartridges are packed as indicated in Table VI and as illustrated in figures 63 through 65. The weights shown in the table may vary slightly, dependent upon the particular type of cartridge. For additional packing data, see Department of the Army Supply Manual ORD 3 SNL's T-1 and T-5.

*Table VI. Packing Data for Cal. .30 Ammunition*

Packing	Volume (cu ft)	Weight (lb)
IN CARTONS		
Packed 20/ctn, 12 ctn/mtl can M8, 2 can (480 rd)/wdn bx M9. Dimensions of box: 13 $\frac{3}{8}$ x 10 $\frac{1}{8}$ x 8 $\frac{3}{8}$ .	0.70	41.0
Packed 20/ctn, 22 ctn/cal. .50 mtl bx M2, 2 bx (880 rd)/wrbnd cr. Dimensions of box: 14 $\frac{7}{8}$ x 13 x 18 $\frac{3}{8}$ .	0.94	70.0
Packed 20/ctn, 11 ctn/mtl bx M1A1, 4 bx (880 rd)/wrbond cr. Dimensions of box: 17 $\frac{7}{8}$ x 12 $\frac{1}{4}$ x 8 $\frac{3}{8}$ .	1.03	74.0
Packed 20/ctn, 24 ctn/wxd cntr T1, 2 cntr (960 rd)/wdn bx T1. Dimensions of box: 15 $\frac{5}{8}$ x 12 $\frac{7}{8}$ x 9 $\frac{3}{8}$ .	1.12	74.0
Packed 20/ctn, 50 ctn (1,000 rd)/mtl-lnd wdn bx----- Dimensions of box: 19 $\frac{1}{2}$ x 12 $\frac{1}{2}$ x 7.	0.99	72.0
Packed 20/ctn, 26 ctn/mtl can M21, 2 can (1,040 rd)/wdn bx M23. Dimensions of box: 15 $\frac{5}{8}$ x 13 $\frac{1}{4}$ x 11 $\frac{3}{8}$ .	1.28	84.0
Packed 20/ctn, 75 ctn (1,500 rd)/mtl-lnd wdn bx M1917----- Dimensions of box: 18 $\frac{1}{2}$ x 9 $\frac{1}{2}$ x 14 $\frac{3}{8}$ .	1.49	110.

Table VI. Packing Data for Cal. .30 Ammunition—Continued

Packing	Volume (cu ft)	Weight (lb)
<b>IN METALLIC LINK BELTS</b>		
Packed 120/belt in ctn, 2 ctn/mtl can M8, 2 can (480 rd)/wdn bx M9. Dimensions of box: 13 $\frac{3}{8}$ x 10 $\frac{1}{8}$ x 8 $\frac{3}{8}$ .	0. 70	46. 0
Packed 100/belt, 4 belt/mtl bx M2, 2 bx (800 rd)/wrwnd bx..... Dimensions of box: 14 $\frac{7}{8}$ x 13 x 8 $\frac{3}{8}$ .	0. 94	70. 0
Packed 100/belt, 12 belt (1,200 rd)/mtl-lnd wdn bx M1917..... Dimensions of box: 18 $\frac{1}{2}$ x 9 $\frac{1}{2}$ x 14 $\frac{7}{8}$ .	1. 49	103.
Packed 100/belt, 15 belt (1,500 rd)/mtl-lnd wdn bx M1917..... Dimensions of box: 18 $\frac{1}{2}$ x 9 $\frac{1}{2}$ x 14 $\frac{7}{8}$ .	1. 49	111.

<b>IN METALLIC LINK BELTS</b>		
Packed 100/belt, 14 belt and 50/belt, 2 belt (1,500rd)/mtl-lnd wdn bx M1917. Dimensions of box: 18 $\frac{1}{2}$ x 9 $\frac{1}{2}$ x 14 $\frac{7}{8}$ .	1. 49	108.
Packed 100/belt, 9 belt (900 rd)/wdn bx T1..... Dimensions of box: 15 $\frac{1}{8}$ x 12 $\frac{7}{8}$ x 9 $\frac{5}{8}$ .	1. 12	72. 0
Packed 250/belt, 1 belt/mtl-bx M1A1, 4 bx (1,000 rd)/wrwnd bx. Dimensions of box: 17 $\frac{3}{4}$ x 12 $\frac{1}{4}$ x 8 $\frac{3}{4}$ .	1. 08	86. 0
Packed 20/ctn, 250 ctn (5,000 link)/wdn bx..... Dimensions of box: 19 $\frac{1}{4}$ x 12 x 13 $\frac{3}{8}$ .	1. 65	65. 8
Packed 20/ctn, 250 ctn/wtrprf env, 1 env (5,000 link)/fbr cntr.. Dimensions of box: 19 x 11 $\frac{3}{4}$ x 12.	1. 55	61. 0

bx—box  
cal.—caliber  
cntr—container  
cr—crate  
ctn—carton  
cu ft—cubic foot  
env—envelope  
fbr—fiber

lb—pound  
mtl—metal  
mtl-lnd—metal-lined  
rd—round  
wdn—wooden  
wrwnd—wirebound  
wtrprf—waterproof  
wxd—waxed

## CHAPTER 5

# SHIPMENT AND STORAGE AND DESTRUCTION OF MATERIEL TO PREVENT ENEMY USE

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### Section I. SHIPMENT AND STORAGE

#### 93. Shipping Instructions

##### a. Domestic Shipping Instructions.

- (1) *Preparation.* When shipping the cal. .30 machine gun M37 (tank) interstate or within the zone of interior, the officer in charge of preparing shipments *will be responsible* for furnishing guns to the carriers for transport in a *serviceable* condition, properly cleaned, preserved, packaged, and packed as prescribed in paragraph 95.

*Note.* Personnel withdrawing guns that have been packaged in volatile corrosion inhibitor treated material (VCI), must not remove guns from VCI package. However, the box may be opened for inspection, if necessary. If the VCI package has been damaged or broken, the gun will be removed, inspected for serviceability, processed, packaged, and packed, as prescribed in paragraph 95.

- (2) *Army shipping documents.* Prepare all Army shipping documents accompanying freight in accordance with TM 38-705.

##### b. Oversea Shipping Instructions.

- (1) *Inspection.* Inspect guns destined for oversea use, prior to shipment, to determine their completeness and serviceability. Replace any defective guns.

*Note.* Guns that are packaged in VCI material must not be removed from package for inspection. However, the box may be opened for inspection, if necessary. If the VCI package has been damaged or broken, the gun will be removed from package, inspected for serviceability, and processed, packaged, and packed as prescribed in paragraph 95.

- (2) *Preparation for shipment to ports.* Prepare guns destined to ports of embarkation for oversea shipment the same as prescribed for domestic shipment (*a* above).

## 94. Storage Instructions

### a. Limited-Storage Instructions.

#### (1) Receiving inspections.

- (a) Report on DD Form 6, Report of Damaged or Improper Shipment, all guns received for storage in a damaged condition or improperly prepared for shipment, in accordance with SR 745-45-5. Report of guns received in an unsatisfactory condition (chronic failure or malfunction) will be made on DA Form 468 in accordance with SR 700-45-5.
  - (b) Immediately upon receipt, guns that have not been inspected and prepared for limited storage, must be given a limited technical inspection and processed, packaged, and packed as prescribed in paragraph 95. Results and classification will be recorded and packed with the gun.
  - (c) Perform a systematic inspection and replace or repair all missing or broken parts. If repairs are beyond the scope of the unit and will cause guns to be out of service for an appreciable length of time, place them in limited storage and attach tags specifying repairs needed. Report of these conditions will be submitted by the unit commander for action by an ordnance maintenance unit.
- (2) *Inspection during storage.* Perform a visual inspection periodically to determine general condition. If corrosion is found, remove it, and clean and treat with the prescribed preservatives.

*Note.* Guns that have been packaged in VCI material must not be removed from package for inspection. However, the box may be opened for inspection, if necessary. If the VCI package has been damaged or broken, the gun will be removed from package, inspected for serviceability, and processed, packaged, and packed as prescribed in paragraph 95.

#### (3) Storage site.

- (a) Personnel must carefully note the storage site to determine whether location is adequate.
  - (b) Whenever possible, store guns in a room where moisture content of air is kept at a low relative humidity (40 percent or less) and at an even temperature. When it is found necessary to store guns outdoors, cover and protect them against the elements as prescribed in TB ORD 379.
- (4) *Removal from limited storage.*
- (a) If guns are not shipped or issued upon expiration of the limited-storage period, they must be further inspected and treated for standby or long-term storage as prescribed in *b* below.

- (b) If guns to be shipped will reach their destination within the limited-storage period, they need not be reprocessed upon removal from storage, unless inspection reveals it to be necessary according to anticipated intransit weather conditions.

*Note.* All guns being reissued through the depot supply system to troops within the continental limits of the United States must meet the requirements of TB ORD 385. This is NOT required for so-called reissues, exchanges, or redistribution among troop units, where the depot supply system is not involved.

- (c) Guns will be serviced in accordance with paragraphs 7 through 10 when it has been ascertained that they are to be placed into immediate service. Lubricate as prescribed in paragraphs 31 through 33.
- (d) Repair and/or replace all items tagged in accordance with (1)(c) above.

*b. Standby and Long-Term Storage.*

(1) *Maintenance in storage inspection.*

- (a) Maintenance in storage inspection must be performed by qualified ordnance maintenance personnel.
- (b) Inspection of guns will be performed in an area expressly set aside for that purpose or in a maintenance shop, when such facilities are available.

*Note.* Guns that have been packaged in VCI material must not be removed from package for percentage inspection. However, the box may be opened for inspection, if necessary. If the VCI package has been damaged or broken, the gun will be removed, inspected for serviceability, and processed, packaged, and packed as prescribed in paragraph 95.

- (c) Inspect at least 1 percent of guns in storage semiannually. If result of the 1 percent inspection reveals defective guns, then inspect 10 percent of the guns. If additional defective guns are discovered, then inspect entire lot and process, package, and pack in accordance with paragraph 95.

## **95. Processing, Packaging, and Packing Instructions**

*a. Cleaning.*

*Note.* It is of utmost importance that all parts be spotlessly cleaned prior to the application of preservatives. Cloth or synthetic rubber gloves must be worn while handling guns, during processing.

- (1) Scrub all parts that have been subjected to burned powder residue with a phosphor-bronze wire brush and rifle-bore cleaner.
- (2) Clean all metal parts by scrubbing with cloths soaked in dry-cleaning solvent or volatile mineral spirits followed by wiping with clean solvent-soaked cloths. Rinse with fingerprint

remover oil, followed by final rinsing with clean solvent. Dry all parts thoroughly with clean, dry, lint-free cloths.

#### *b. Preservation.*

- (1) Immediately after cleaning and drying, dip the assembled gun in a bath of special preservative lubricating oil (type P-9).
- (2) Remove gun from bath and allow all excess oil to drain before packaging.

*Note.* To accelerate drainage, the oil may be heated during application to a temperature not exceeding 120° F.

#### *c. Packaging.*

- (1) Fabricate a steel base, and two steel supports and weld together to form a mounting bracket for the gun, using dimensions and details shown in figure 66.
- (2) Construct a plywood panel base with three  $\frac{7}{16}$ -inch diameter holes drilled through the panel for mounting the steel bracket, as shown in figure 69.
- (3) Insert three  $\frac{3}{8} \times 1\frac{1}{4}$  carriage bolts through the three holes in the plywood panel ((2) above).
- (4) Cut two  $3 \times 13\frac{1}{4}$  gaskets from waterproof gasket material. Cut three undersize holes in the gasket material to allow for passage of the three carriage bolts ((3) above) through the gaskets.
- (5) Coat both sides of one gasket with water-resistant adhesive, place the gasket over the three carriage bolts, and press into position, so that the gasket adheres to the panel.
- (6) Cut three holes, slightly undersize, in a sheet of 51 x 28 water-vaporproof barrier-material to allow for the passage of the three carriage bolts through the material. Place the water-vaporproof barrier-material over the carriage bolts. Press firmly against gaskets.
- (7) Coat one side only of the second gasket with water-resistant adhesive and place the adhesive side of gasket over the carriage bolts on top of the barrier-material. Press into position so that the gasket adheres to the water-vaporproof barrier-material.
- (8) Place a sheet of 51 x 28 light duty volatile corrosion inhibitor (VCI) treated material over the water-vaporproof barrier-material and apply pressure to allow the three carriage bolts to puncture the paper. The VCI treated material must be placed so that the treated side of the material is facing up.
- (9) Place the mounting bracket in position over the three carriage bolts and secure with nuts and lock washers.
- (10) Place the gun in the mounting bracket so that the holes in the casing of the gun aline themselves with the holes in mounting bracket supports, as shown in figure 67, A and B.

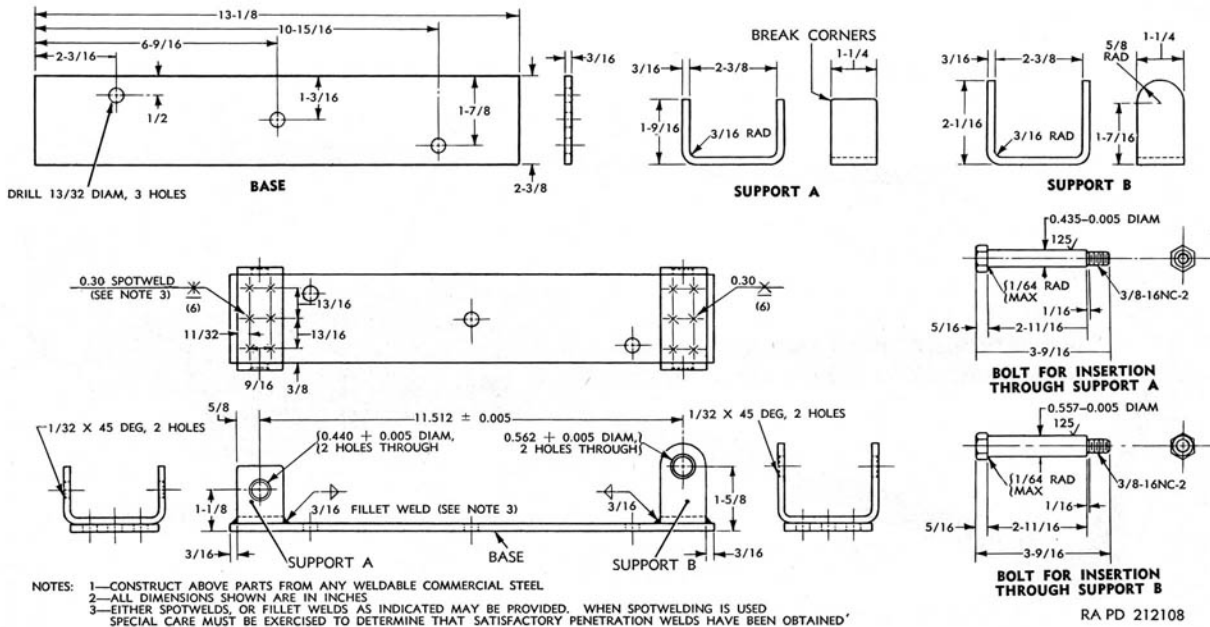
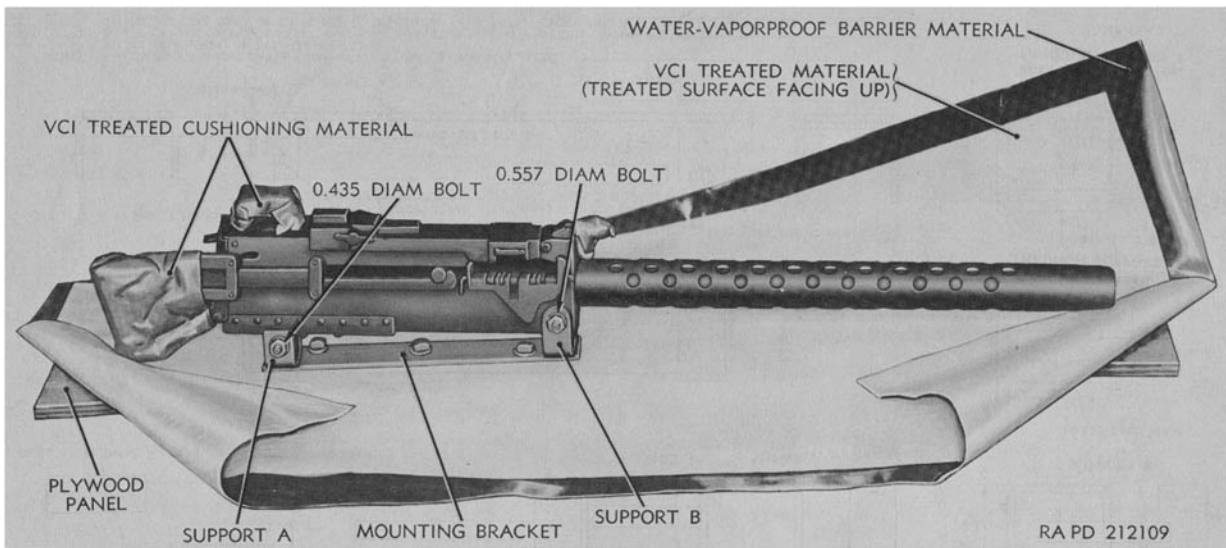


Figure 66. Cal. .30 machine gun M37 (tank)—mounting bracket details.

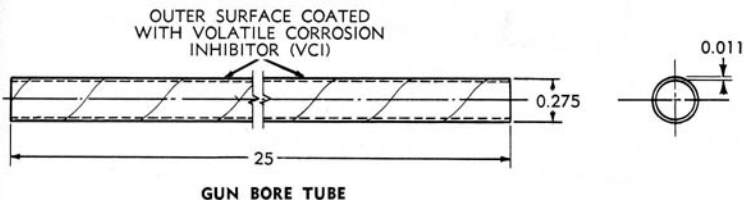


*Figure 67. Cal. .30 machine gun M37 (tank)—method of securing gun to mounting bracket and plywood panel.*



Insert the two  $\frac{5}{8} \times \frac{39}{16}$  bolts through the holes in bracket supports (A and B) and the holes in the casing, and secure with nuts and washers.

- (11) Insert a spirally wound VCI treated paper tube (fig. 68) into the bore of the barrel. The penetration of the VCI tube should extend through full length of the barrel and allow 1 inch of the paper tube to protrude over the end of the barrel. Bend the protruding end of the tube over to facilitate future removal.



**GUN BORE TUBE**

NOTE: ALL DIMENSIONS SHOWN ARE IN INCHES

RA PD 212111

Figure 68. Cal. .30 machine gun M37 (tank)—volatile corrosion inhibitor (VCI) bore tube.

- (12) Cushion all sharp surfaces of the gun with at least two thicknesses of VCI treated material and secure with water-resistant gummed paper tape.
- (13) Wrap the VCI treated material around the gun so that the material conforms, as much as possible, to the contour of the gun.
- (14) Draw the outer water-vaporproof barrier-material around the VCI wrapped gun and apply a three-fourths-inch heat-seal to all seams except a small opening. Exhaust air with a vacuum pump and heat-seal the remaining opening. Apply a label indicating the following:

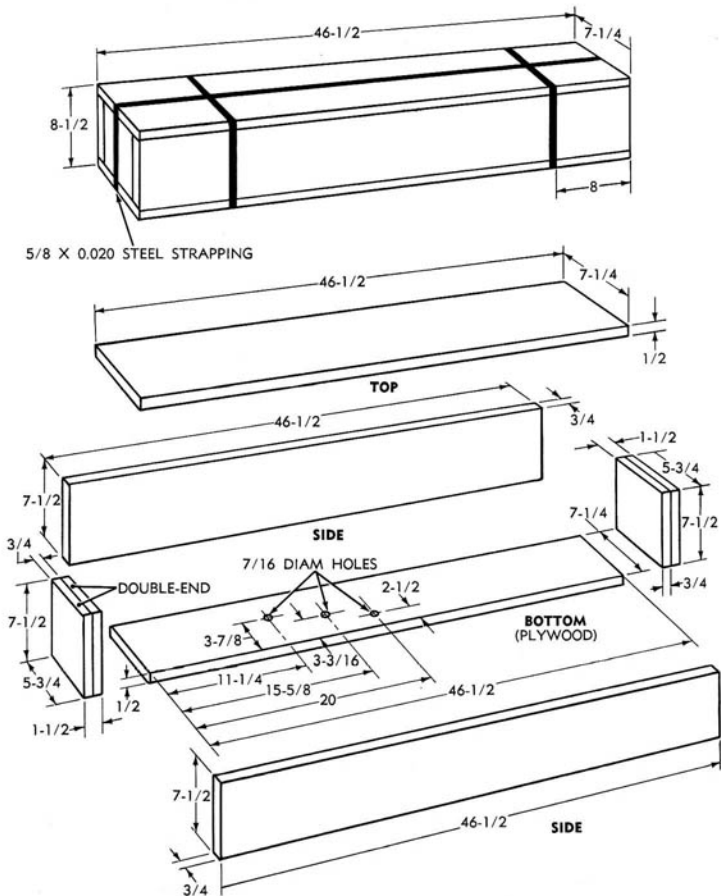
Preserved with VCI—Do Not Open Except for Use or Inspection.

#### d. Packing.

- (1) Construct two sides, top, and two double ends for a modified style 2 shipping container, using dimensions and details shown in figure 69.

*Note.* Construct double ends so that the grain of each outside end is perpendicular to the grain of each inside end.

- (2) Assemble the box by nailing the sides to the bottom plywood panel, on which the gun is mounted, with sevenpenny nails, evenly spaced. Nail the double ends to the sides and bottom with double rows of fivepenny nails. Nail the top of box to



NOTES:

1—ALL DIMENSIONS SHOWN ARE IN INCHES

2—CONSTRUCT DOUBLE-ENDS OF BOXES SO THAT GRAIN OF INSIDE ENDS ARE PERPENDICULAR TO GRAIN OF OUTSIDE ENDS

RA PD 212110

Figure 69. Cal. .30 machine gun M37 (tank)—shipping container details.

the sides with sevenpenny nails, evenly spaced, and each end of the top to the double ends with double rows of fivepenny nails.

*Note.* Clinch ends of all nails and remove all splinters that may protrude through the inside of box and cause damage to barrier material.

- (3) Apply three  $\frac{5}{8}$  x 0.020 flat metal straps around container, as shown in figure 69. All straps must be drawn tight, so as to sink into the edges of the container. Apply strap seals and crimp. Staple all straps to the box with cement-coated staples, spaced at 6-inch intervals.

*Note.* Strapping will be applied, just prior to shipment.

*e. Marking.*

- (1) *Domestic.*

- (a) After gun has been packed, the standard marking information required to mark containers for domestic shipment will be printed or stenciled directly on one surface, either the side or end of shipping container. This information will include standard nomenclature, stock number, or other identifying number, quantity and size, weight (WT), package number (where required), domestic address label, caution labels and markings (where required), date packed (month and year), identification symbol of installation performing packaging, and method of preservation (including VCI code number and type of preservative used). In addition, if weapon has been packed for immediate use or limited storage the container will be conspicuously marked Pkd Immed Use or Pkd Ltd Stg, as applicable. Two sides of the container will be stenciled with the following notation, in letters 1 inch high:

Preserved with VCI—Do Not Open Except for Use or Inspection.

*Note.* When set markings, packing list, and special and technical data markings are necessary, they will be used and applied in accordance with specific instructions from the officer in charge.

- (b) Do not apply labels or mark containers unless contents have been actually inspected and processed.
- (2) *Oversea.*
    - (a) When destined to ports of embarkation for oversea shipment, the container will be labeled or stenciled as prescribed for domestic shipment ((1) above) and, in addition, will include the cubage (CU), oversea address, and service color marking (see SR 746-30-5).
    - (b) Each container shipped to a port in less than a carload lot (LCL) or less than truckload (LTL) will also bear a

domestic address; old addresses and irrelevant data will be effectively removed or obliterated prior to shipment. A label not exceeding 28 square inches (yellow corners not required on label) will be used for domestic addresses. Label will be securely attached to container and will be covered with water-resistant label adhesive. Stenciling of domestic addresses on containers is not permitted.

## 96. Loading and Blocking Instructions

For general loading rules and methods and procedures for loading and blocking boxed items in boxcars, see TM 9-1005 and TB 9-OSSC-A.

## Section II. DESTRUCTION OF MATERIEL TO PREVENT ENEMY USE

### 97. General

*a.* Destruction of the cal. .30 machine gun M37 (tank), when subject to capture or abandonment in the combat zone, will be undertaken by the using arm only when, in the judgment of the unit commander concerned, such action is necessary in accordance with orders of, or policy established by, the army commander. When these guns are in the possession of ordnance maintenance personnel, or in storage, destruction will be in accordance with FM 9-5, and applicable portions of the information below.

*b.* The information which follows is for guidance only. Certain of the procedures outlined require the use of explosives and incendiary grenades, which normally may not be authorized items. The issue of these and related materials, and the conditions under which destruction will be effected, are command decisions in each case, according to the tactical situation. Of the several means of destruction, those most generally applicable are—

Mechanical— Requires axe, pick mattock, sledge, crowbar, or similar implement.

Burning — Requires gasoline, oil, incendiary grenades, or other flammables.

Demolition — Requires suitable explosives or ammunition.

Gunfire — Includes artillery, machine guns, rifles using rifle grenades, and launchers using antitank rockets. Under some circumstances hand grenades may be used.

In general, destruction of essential parts by mechanical means will usually be sufficient to render the machine gun useless. However, selection of the particular method of destruction requires imagination

and resourcefulness in the utilization of the facilities at hand under the existing conditions. Time is usually critical.

*c.* If destruction to prevent enemy use is resorted to, the machine gun must be so badly damaged that it cannot be restored to a usable condition in the combat zone either by repair or cannibalization. Adequate destruction requires that all parts essential to the operation of the machine gun, including essential spare parts, be destroyed or damaged beyond repair. However, when lack of time and personnel prevents destruction of all parts, priority is given to the destruction of those parts most difficult to replace. Equally important, the same essential parts must be destroyed on all like materiel so that the enemy cannot construct one complete unit from several damaged ones.

*d.* If destruction is directed, due consideration should be given to—

- (1) Selection of a point of destruction that will cause greatest obstruction to enemy movement and also prevent hazard to friendly troops from fragments or ricocheting projectiles which may occur incidental to the destruction.
- (2) Observance of appropriate safety precautions.

## **98. Destruction of the Cal. .30 Machine Gun M37 (Tank)**

*a. General.* If time, personnel, and materials are available, the destruction of the machine gun (if installed) should be accomplished by mechanical means in conjunction with the destruction of the tank. If it is inadvisable to destroy the machine gun in conjunction with the destruction of the tank, the machine gun should be removed from its mounting and destroyed by one of the methods outlined below.

*b. Method No. 1—By Smashing.* Using an axe, pick mattock, sledge, or other heavy implement, smash the feed mechanism, retracting bar group, back plate assembly, cover group, casing, barrel jacket, and barrel. Elapsed time: About 2 minutes.

*c. Method No. 2—By Demolition.*

- (1) Place the machine gun on the ground.
- (2) Prepare a 1-pound charge of EXPLOSIVE, TNT (using a 1-lb block or equivalent together with the necessary detonating cord) and place the charge on the casing.
- (3) For priming, either a nonelectric blasting cap crimped to at least 5 feet of safety fuse (safety fuse burns at the rate of 1 ft in approx 40 sec; test before using), or an electric blasting cap and firing wire may be used. Safety fuse, which contains black powder, and nonelectric blasting caps must be protected from moisture at all times. The safety fuse may be ignited by a fuse lighter or a match; the electric blasting

cap requires a blasting machine or equivalent source of electricity.

**Caution:** Keep the blasting cap, detonating cord, and safety fuse separated from the charges until required for use.

*Note.* For the successful execution of methods of destruction involving the use of demolition materials, all personnel concerned will be thoroughly familiar with the pertinent provisions of FM 5-25. Training and careful planning are essential.

- (4) Detonate the charge. If primed with nonelectric blasting cap and safety fuse, ignite and take cover. If primed with electric blasting cap, take cover before firing the charge. Elapsed time: About 2 minutes.

*d. Method No. 3—By Burning (Incendiary Grenades).*

- (1) Place the machine gun on the ground.
- (2) Raise the cover group.
- (3) Place an incendiary grenade on the bolt group.
- (4) Fire the grenade. Elapsed time: About 1 minute.

# APPENDIX

## REFERENCES

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### 1. Publication Indexes

Special regulations in the 310-20 series; DA Pam 108-1; and FM 21-8 should be consulted frequently for latest changes or revisions of references given in this appendix and for new publications relating to materiel covered in this manual.

### 2. Supply Manuals

The following manuals of the Department of the Army Supply Manual pertain to this materiel:

*a. Ammunition.*

Ammunition, Rifle, Carbine, and Automatic Gun... ORD 3 SNL T-1  
Shipping and Packaging Containers and Materials,  
Including Such Items as Bandoleers, Belts,  
Clips, Links, and Ends for Small-Arms Ammu-  
nition..... ORD 3 SNL T-5

*b. Destruction to Prevent Enemy Use.*

Land Mines and Components; Demolition Explo-  
sives and Related Items; and Ammunition for  
Simulated Artillery, Booby Trap, Hand Gre-  
nade, and Land Mine Fire..... ORD 3 SNL R-7

*c. General.*

Introduction and Index..... ORD 1

*d. Maintenance and Repair.*

Cleaners, Preservatives, Lubricants, Recoil Fluids,  
Special Oils, and Related Maintenance Materials... ORD 3 SNL K-1

Items of Soldering, Metallizing, Brazing, and  
Welding Materials; Gases and Related Items... ORD 3 SNL K-2

Lubricating Equipment, Accessories and Related  
Dispensers..... ORD (\*) SNL K-3

Lubricating Fittings, Oil Filters, and Oil Filter  
Elements..... ORD 5 SNL H-16

Miscellaneous Hardware..... ORD 5 SNL H-2

Shop Set, Small Arms, Field Maintenance... ORD 6 SNL J-8, Sec 6

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(\*) See SR 310-20-9, Index of Supply Manuals—Ordnance Corps, for published types of manuals of the Ordnance section of the Department of the Army Supply Manual.

## Special Tool Sets for Small Arms and Automatic

Weapons (SNL Groups A and B).....	ORD 6 SNL J-12
Standard Hardware.....	ORD 5 SNL H-1
Tool Set, Armorers' (MOS 0511).....	ORD 6 SNL J-10, Sec 1
Tool Set, Small Arms Repairman (Ordnance) (MOS 0903).....	ORD 6 SNL J-10, Sec 2

*e. Weapon.*

## Group A, List of All Service Parts of Gun,

Machine, Cal. .30, M37 (Tank).....	ORD (*) SNL A-89
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### 3. Forms

The following forms are applicable in this materiel:

DA Form 9-3, Processing Record for Shipment and Storage of Vehicles and Boxed Engines.	
DA Form 468, Unsatisfactory Equipment Report.	
DA Form 811, Work Request and Job Order.	
DA Form 811-1, Work Request and Hand Receipt.	
DA Form 867, Status of Modification Work Order.	
DD Form 6, Report of Damaged or Improper Shipment.	

### 4. Other Publications

The following explanatory publications contain information pertinent to this materiel and associated equipment.

#### *a. Ammunition.*

Ammunition, General.....	TM 9-1900
Ammunition Inspection Guide.....	TM 9-1904
Classified.....	TM 9-1907
Regulations for Firing Ammunition for Training, Target Practice, and Combat.....	SR 385-310-1
Small-Arms Ammunition.....	TM 9-1990

#### *b. Camouflage.*

Camouflage, Basic Principles.....	FM 5-20
Camouflage of Individuals and Infantry Weapons.....	FM 5-20A

#### *c. Decontamination.*

Decontamination.....	TM 3-220
Defense Against CBR Attack.....	FM 21-40

#### *d. Destruction to Prevent Enemy Use.*

Explosives and Demolitions.....	FM 5-25
Ordnance Service in the Field.....	FM 9-5

(\*) See SR 310-20-9, Index of Supply Manuals—Ordnance Corps, for published types of manuals of the Ordnance section of the Department of the Army Supply Manual.



*e. General.*

Report of Malfunctions and Accidents Involving Ammunition and Explosives (During Training or Combat) (Reports Control Symbol CSGPA-390).....	SR 700-45-6
Safety: Accident Reporting (Reports Control Symbol CSGPA-147).....	SR 385-10-40
Supplies and Equipment: Unsatisfactory Equipment Report (RCS CSGLD-247 R1).....	SR 700-45-5

*f. Maintenance and Repair.*

Abrasive, Cleaning, Preserving, Sealing, Adhesive, and Related Materials Issued for Ordnance Materiel.....	TM 9-850
Lubrication .....	TM 9-2835
Maintenance Supplies and Equipment:	
Maintenance Responsibilities and Shop Operation.....	AR 750-5
Painting Instructions for Field Use.....	TM 9-2851

*g. Shipment and Limited Storage.*

Army Shipping Document.....	TM 38-705
Long Term Storage, Maintenance, and Care and Preservation in Storage of Small Arms Materiel....	SR 743-110-1
Instruction Guide: Ordnance Preservation, Packaging, Packing, Storage, and Shipping.....	TM 9-1005
Marking and Packing of Supplies and Equipment:	
Marking of Oversea Supply.....	SR 746-30-5
Ordnance Storage and Shipment Chart, Group A, Major Items and Major Combinations of Group A .....	TB 9-OSSC-A
Preparation of Ordnance Materiel for Deep Water Forging.....	TM 9-2853
Preservation, Packaging, and Packing of Military Supplies and Equipment.....	TM 38-230
Processing of Motor Vehicles and Related Unboxed Materiel for Shipment and Storage.....	SB 9-4
Protection of Ordnance General Supplies in Open Storage .....	TB ORD 379
Shipment of Supplies and Equipment: Report of Damaged or Improper Shipment.....	SR 745-45-5
Standards for Oversea Shipment and Domestic Issue of Ordnance Materiel Other Than Ammunition and Army Aircraft.....	TB ORD 385
Supplies and Equipment—Motor Vehicles.....	AR 700-105

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## BY ORDER OF THE SECRETARY OF THE ARMY:

M. B. RIDGWAY,  
*General, United States Army,*  
*Chief of Staff.*

## OFFICIAL:

JOHN A. KLEIN,  
*Major General, United States Army,*  
*The Adjutant General.*

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NG: Same as Active Army except allowance is one copy for each unit.  
 USAR: None.

Unless otherwise noted, distribution applies to ConUS and Overseas.  
 For explanation of abbreviations used, see SR 320-50-1.

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