

TM 9-2013

DEPARTMENT OF THE ARMY TECHNICAL MANUAL

ORDNANCE MAINTENANCE

CAL. .30
MACHINE GUN
M37 (TANK)



DEPARTMENT OF THE ARMY • JANUARY 1955

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TM 9-2013

TECHNICAL MANUAL}
No. 9-2013

DEPARTMENT OF THE ARMY
WASHINGTON 25, D. C., 7 January 1955

ORDNANCE MAINTENANCE:

CAL. .30 MACHINE GUN M37 (TANK)

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CHAPTER 1

INTRODUCTION

Section I. GENERAL

1. Scope

a. These instructions are published for the information and guidance of personnel responsible for field and depot maintenance of this materiel (figs. 1 and 2). They contain information on maintenance which is beyond the scope of the tools, equipment, or supplies normally available to using organizations. This manual does not contain information which is intended primarily for the using organization, since such information is available to ordnance maintenance personnel in the pertinent operator's technical manuals or field manuals.

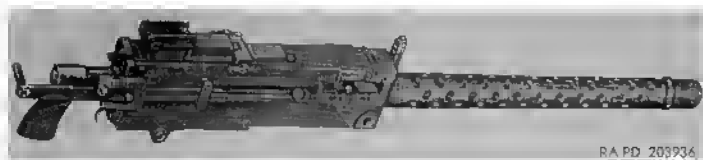


Figure 1. Cal. .30 machine gun M37 (tank)—right-side view.

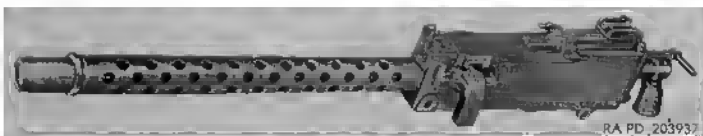


Figure 2. Cal. .30 machine gun M37 (tank)—left-side view.

b. This manual contains a description of and procedures for removal, disassembly, inspection, repair, rebuild, and assembly of the cal. .30 machine gun M37 (tank). The appendix contains a list of current references, including supply and technical manuals and other available publications applicable to the materiel.

c. TM 9-2012 contains operating and lubricating instructions for the materiel and contains all maintenance operations allocated to

using organizations in performing maintenance work within their scope.

d. 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-Pnb.

2. Field and Depot Maintenance Allocation

The publication of instructions for complete disassembly and rebuild is not to be construed as authority for the performance by field maintenance units of those functions which have been restricted to depot shops and arsenals. In general, the prescribed maintenance responsibilities will apply as reflected in the allocation of maintenance parts listed in the appropriate columns of the current ORD 8 supply manual pertaining to this weapon. Instructions for depot maintenance are to be used by maintenance companies in the field only when the tactical situation makes the repair functions imperative. Provisions of parts listed in the depot guide column of ORD 8 supply manuals will be made to field maintenance only when the emergency nature of the maintenance to be performed has been certified by a responsible officer of the requisitioning organization.

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 units maintaining these weapons are listed in the appendix. No forms other than those approved for the Department of the Army will be used. For a complete listing of all forms, see current SR 310-20-6. Additional forms applicable to using personnel are listed in the operator's manual. For instructions on use of these forms, refer to FM 9-10.

c. *Field Report of Accidents.*

(1) *Injury to personnel or damage to materiel.* The reports necessary to comply with the requirements of the Army safety

program are prescribed in detail in 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 lubricants, and/or preserving materials, or technical inaccuracies noted in 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 so that other organizations may benefit.

Note. Do not report all failures that occur. Report only REPEATED or RECURRENT failures which indicate unsatisfactory design or material. See also SR 700-45-5 and the printed instructions on DA Form 468.

Section II. DESCRIPTION AND DATA

4. Description

The cal. .30 machine gun M37 (tank) is an automatic, recoil-operated, link-belt fed, air-cooled weapon. The gun is designed for fixed or flexible use. Repositioning of certain component parts of the cover assembly, bolt assembly, and feed aperture permits feeding of ammunition from either the left-hand or right-hand side (figs. 3 and 4).

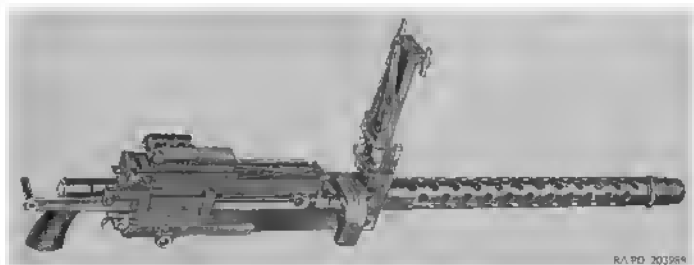
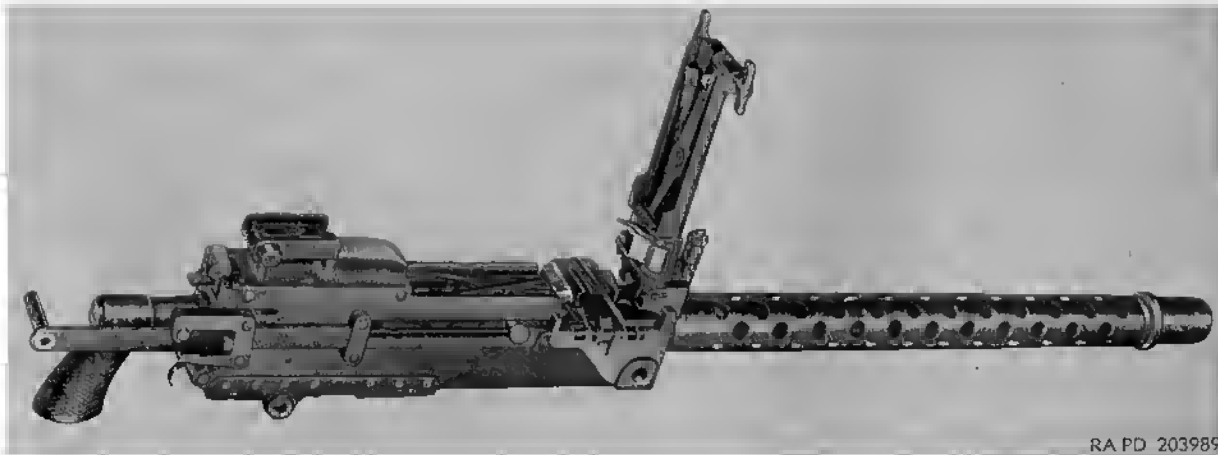


Figure 3. Cal. .30 machine gun M37 (tank)—left-hand feed.



RA PD 203989

Figure 4. Cal. .30 machine gun M37 (tank)—right-hand feed.

5. Tabulated Data

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

CHAPTER 2

PARTS, SPECIAL TOOLS, AND EQUIPMENT FOR FIELD AND DEPOT MAINTENANCE

6. General

Tools, equipment, and maintenance parts over and above those available to the using organization are supplied to ordnance field maintenance units and depot shops for maintaining, repairing, and/or rebuilding the materiel.

7. Parts

Parts not listed in an ORD 8 manual but required by depot shops in rebuild operation may be requisitioned from the listing in the corresponding ORD 9 manual and will be supplied if available, when the need is substantiated. Requisitions for ORD 9 parts will contain a complete justification of requirements.

8. Common Tools and Equipment

Standard and commonly used tools and equipment having general application to this materiel are listed in ORD 6 SNL J-8, Section 6; and J-10, Sections 1 and 2; and are authorized for issue by TA and TOE.

9. Special Tools and Equipment

The special tools and equipment tabulated in table I are listed in Department of the Army Supply Manual ORD 6 SNL J-12. This tabulation contains only those special tools and equipment necessary to perform the operations described in this manual, is included for information only, and is not to be used as a basis for requisitions.

Note. Special tools sets in ORD 6 SNL J-12, in addition to special tools, also contain standard and commonly used tools and equipment specifically applicable to this materiel.

Table I. *Special Tools and Equipment for Field and Depot Maintenance*

Item	Identifying No.	References		Use
		Fig.	Par.	
ANVIL, riveting, adj. parallel type, spotting and riveting side plates, cal. .30 (DEPOT MAINTENANCE ONLY).	6595341	7	20d.....	For riveting bottom plate and top plate to side plates.
ANVIL, riveting, cal. .30 (DEPOT MAINTENANCE ONLY).	7106331	5	20d.....	To rivet short top plate rivit 5020711 through side plates to top plate.
ANVIL, riveting, cal. .30 (DEPOT MAINTENANCE ONLY).	7106332	5	20d.....	To rivet side plates and bottom plate.
ANVIL, riveting, extractor and feed cams, cal. .30 (DEPOT MAINTENANCE ONLY).	7106311	5	20d.....	To rivet extractor cam and extractor feed cam.
ATTACHMENT, delinking, cal. .30, M8.	7162737	10	-----	To delink cartridges from belt.
BOX, bolt group spare parts.	7148550	-----	-----	To store spare parts.
BRUSH, cleaning, cal. .30.	5564174	5	-----	To clean bore of barrel.
BRUSH, cleaning chamber, M6 (bristle).	6108828	-----	-----	To clean chamber.
CASE, cleaning rod, cal. .30 M1.	5506573	10	-----	To store jointed cleaning rod 6508237.
COVER, spare barrel.	5593026	9	-----	To cover spare barrel.
DRIFT, bolt switch pin, cal. .30.	8407287	6	42a.....	To remove spring pins holding bolt switches.
DRIFT, cover detent pawl, cal. .30.	8407288	6	55j.....	To remove spring pin holding cover detent pawl.
DRIFT, ejector pin, cal. .30.	8407289	6	42a.....	To remove ejector pin.
EXPANDER, adapter ears, cal. .30 (DEPOT MAINTENANCE ONLY).	6316037	5, 39, 40	57c(1)(c)---	To spread the adapter ears apart.
EXTRACTOR, ruptured cartridge case, cal. .30, MK IV.	5503854	5	15c.....	To remove separated cartridge case from chamber.
GAGE, breech bore, cal. .30.	5564343	6	13b, 14b(5), 16b(1), 52a(3), 53a 63c (2).	To measure breech bore.

Table I. *Special Tools and Equipment for Field and Depot Maintenance—Con.*

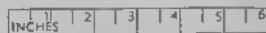
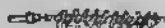
Item	Identifying No.	References		Use
		Fig.	Par.	
GAGE, firing pin protrusion, cal. .30, min 0.060 in, max 0.068 in.	7319929	6	13b, 46a.---	To measure protrusion of firing pin.
GAGE, plug, no go, firing pin hole, cal. .30, diam 0.081.	5077203	6	13b, 15c, 43a(6), 44a(2).	To check firing pin hole diameter.
GAGE, snap and width bottom plate ears, cal. .30 (DEPOT MAINTENANCE ONLY).	7319922	6, 39, 40	13b, 57c(1)(c).	To check inside and outside width of mounting ears.
HIDER, flash, cal. .30, M6, assy.	5750054	9	55g, 56d(3), 58f.	To hide muzzle flash.
HOLDER, rivets, bottom plate, cal. .30 (DEPOT MAINTENANCE ONLY).	6315346	6	20d.-----	To hold rivets.
MACHINE, link, loading, hand operated, M3, cap 20 rd.	5910219	10	-----	To link and delink cartridges.
PEIN, riveting, machine, cal. .30 (DEPOT MAINTENANCE ONLY).	7106294	8	20d.-----	To form rivets.
PEIN, riveting, machine, cal. .30 (DEPOT MAINTENANCE ONLY).	7106300	8	20d.-----	To form rivets.
PEIN, riveting, machine, cal. .30 (DEPOT MAINTENANCE ONLY).	7106302	8	20d.-----	To form rivets.
PEIN, riveting, machine, cal. .30 (DEPOT MAINTENANCE ONLY).	7106303	8	20d.-----	To form rivets.
PEIN, riveting, machine, cal. .30 and .50 (DEPOT MAINTENANCE ONLY).	7106304	8	20d.-----	To form rivets.
POST, anvil, riveting, cal. .30 (DEPOT MAINTENANCE ONLY).	7106293	7	20d.-----	To rivet trunnion block to side plate.
POST, anvil, riveting, cal. .30 (DEPOT MAINTENANCE ONLY).	7106327	7	20d.-----	To rivet top plate to side plate.
REFLECTOR, barrel, cal. .30.	7265788	9, 25	52(2)-----	To inspect bore of barrel.
REFLECTOR, barrel, cal. .30.	7265789	9	-----	To inspect bore of barrel.
ROD, cleaning, jointed, cal. .30, M1 (3 section w/handle).	6508237	10	-----	Use with patch or brush to clean bore.

Table I. Special Tools and Equipment for Field and Depot Maintenance—Con.

Item	Identifying No.	References		Use
		Fig.	Par.	
ROD, cleaning, cal. .30, M2A1.	6508398	10	-----	Use with patch or brush to clean bore.
TOOL, carbon, removing, front barrel bearing, cal. .30.	7106460	7	21b.....	To remove carbon from front barrel bearing.
WRENCH, barrel bearing plug, cal. .30.	6147277	9	55g-----	To disassemble and assemble front barrel bearing.
WRENCH, combination, M6.	5568334	8, 13	33-----	To disassemble, assemble, and adjust back plate adjusting screw.



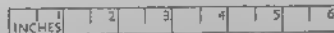
RIVETING ANVIL—7106332

EXTRACTOR AND FEED CAMS
RIVETING ANVIL—7106311

CLEANING BRUSH—5564174

RUPTURED CARTRIDGE CASE
EXTRACTOR MK-IV—5503854

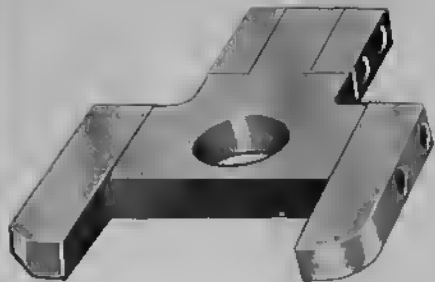
ADAPTER EARS EXPANDER—6316037



RIVETING ANVIL—7106331

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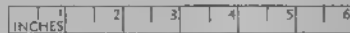
Figure 5. Special tools and equipment.



BOTTOM PLATE EARS SNAP
AND WIDTH GAGE—7319922



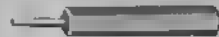
FIRING PIN PROTRUSION
GAGE—7319929



BOTTOM PLATE RIVET HOLDER—6315346



BREECH BORE GAGE—5564343



FIRING PIN HOLE NO GO
PLUG GAGE—5077203



BOLT SWITCH PIN DRIFT—8407287



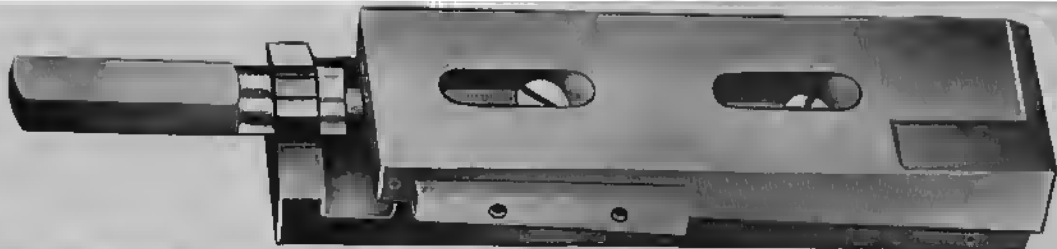
COVER DETENT PAWL DRIFT—8407288



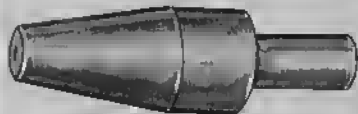
EJECTOR PIN DRIFT—8407289

RA PD 203991

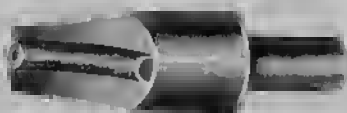
Figure 6. Special tools and equipment.



PARALLEL TYPE ADJUSTABLE
RIVETING ANVIL—6595341



RIVETING ANVIL
POST—7106327



RIVETING ANVIL
POST—7106293



FRONT BARREL BEARING CARBON
REMOVING TOOL—7106460



RA PD 203992

Figure 7. Special tools and equipment.

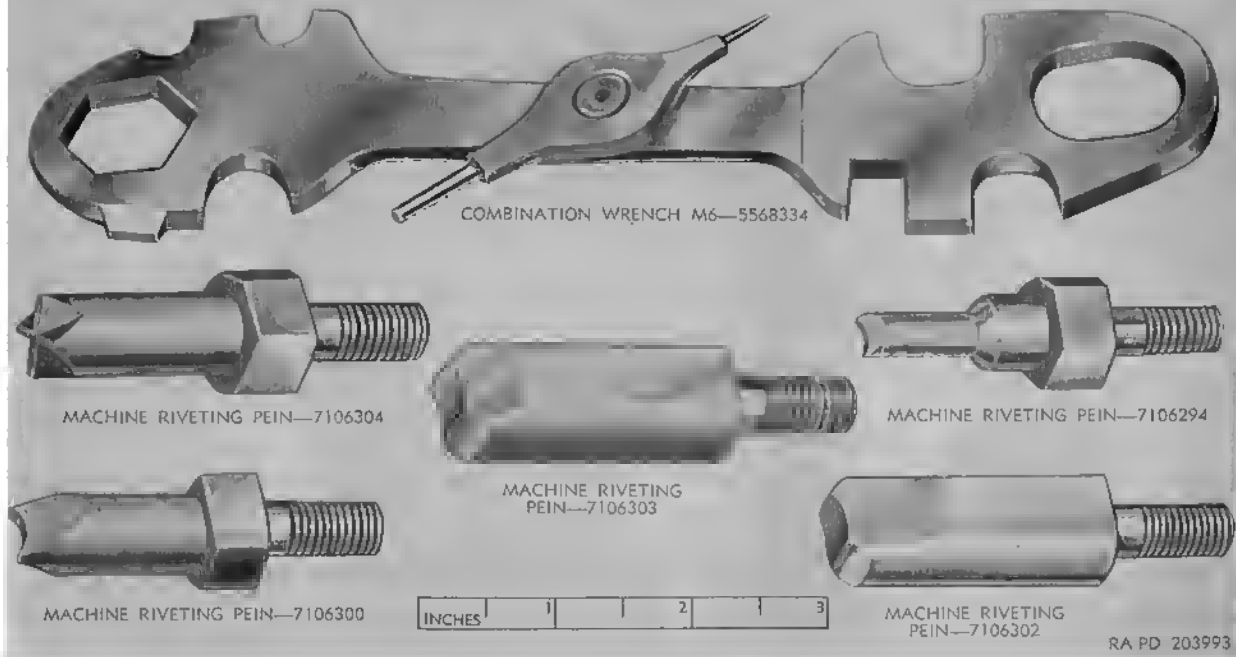


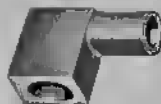
Figure 8. Special tools and equipment.



FLASH HIDER ASSEMBLY M6—5750054

BARREL BEARING PLUG
WRENCH—6147277

CHAMBER CLEANING BRUSH M6—6108828

BARREL REFLECTOR—
7265789BARREL REFLECTOR—
7265788

COVER SPARE BARREL- 5593026



SPARE BARREL COVER—5593026

RA PD 134608

Figure 9. Special tools and equipment.

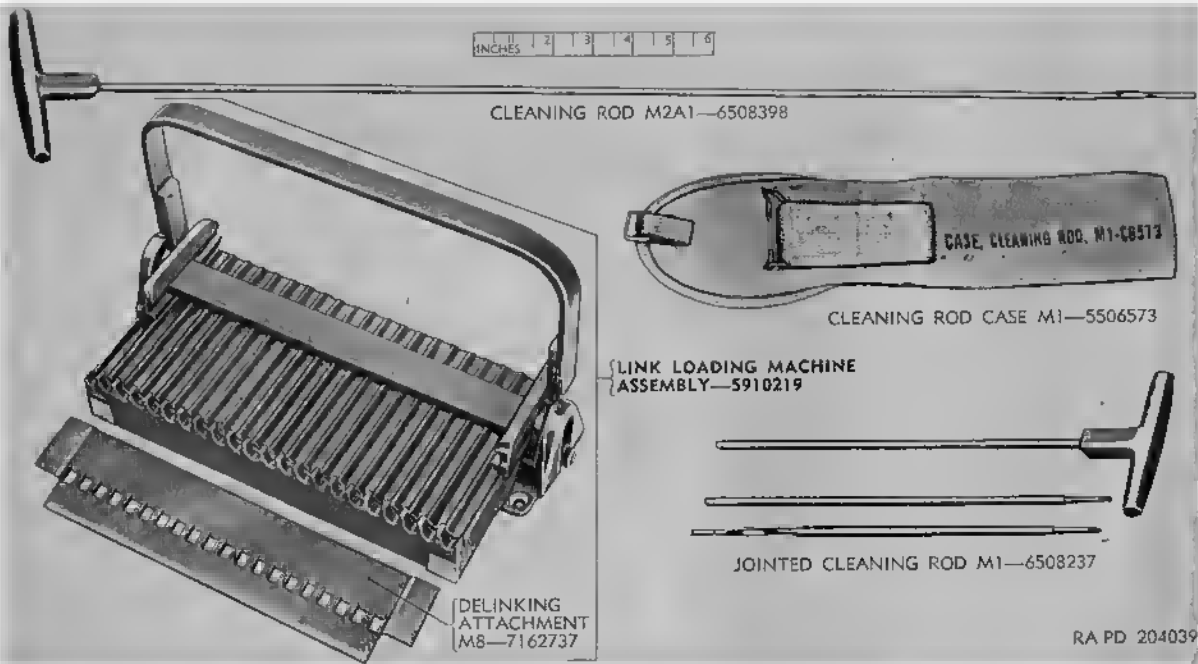


Figure 10. Special tools and equipment.

CHAPTER 3

INSPECTIONS

Section I. GENERAL

10. Scope

This chapter provides specific instructions for the technical inspection by ordnance maintenance personnel of materiel either in the hands of troops or when received for repair in ordnance shops. It also briefly describes the in-process inspection after repair or rebuild has been completed. Troubleshooting information is incorporated wherever applicable as a normal phase of inspection.

11. Purposes of Inspection

Inspections are made for the purpose of—

- a. Determining the condition of an item as to serviceability.
- b. Recognizing conditions which would cause failure.
- c. Assuring proper application of maintenance policies at prescribed levels.
- d. Determining the ability of a unit to accomplish its maintenance and supply missions.

12. Categories of Technical Inspection

In general, five categories of inspection are performed by ordnance maintenance personnel.

a. *Overall Inspection.* This is a periodic overall inspection performed by a contact party on materiel in the hands of troops and an inspection performed by maintenance company personnel when materiel is evacuated to the ordnance company. The inspection of materiel evacuated is more thorough and includes check and repair of minor points that would not be required in the inspection performed by a contact party.

b. *Preembarkation Inspection.* This inspection is conducted on materiel in alerted units scheduled for oversea duty to insure that such materiel will not become unserviceable or worn out in a relatively short time. It prescribes a higher percentage of remaining usable

life in serviceable materiel to meet a specific need beyond minimum serviceability.

c. In-Process Inspections. These are inspections performed in the process of repairing (field maintenance) or rebuilding (depot maintenance) the materiel as prescribed in chapter 4. This is to insure that all parts conform to the prescribed standards, that the workmanship is in accordance with approved methods and procedures, and that deficiencies not disclosed by the preliminary inspection are found and corrected. Detailed instructions are contained in chapter 4. A tabulated listing of these same repair and rebuild standards is also provided in table II (par. 13) for ready reference.

d. Final Inspection. This is an acceptance inspection performed by a final inspector, after repair or rebuild has been completed, to insure that the materiel is acceptable for return to user or for return to stock according to the standards established. Detailed instructions are contained in chapter 5.

e. Spot-Check Inspection. This is a periodic overall inspection performed on only a percentage of the materiel in each unit to determine the adequacy and effectiveness of organizational and field maintenance.

Section II. TECHNICAL INSPECTION

13. General

Warning: Before starting a technical inspection, be sure to clear the weapon. Do not touch the trigger until the weapon has been cleared. Inspect the chamber to insure that it is empty and check to see that no ammunition is in position to be introduced. Avoid having live ammunition in the vicinity of the work.

a. Preparatory Procedures.

- (1) Check to see that the weapon has been cleaned of all corrosion-preventive compound, grease, excessive oil, dirt, or foreign matter which might interfere with proper functioning or obscure the true condition of the parts.
- (2) Make an overall inspection of the weapon for general appearance, condition, operation, and manual functioning. Use dummy cartridges.

b. Inspection Guide. Table II is provided as a check list to be used as a guide for the inspection of weapons in the hands of troops. The overall inspection column lists the standard denoting minimum serviceability and the next column lists the standards for preembarkation inspection.

Note. The additional columns are provided for comparative information only to show the standards which are desired when the weapon is repaired and rebuilt in ordnance field or depot shops.

Table II. Inspection Guide for Cal. .30 Machine Gun M37 (Tank)

Point to be inspected	Overall inspection	Preambarkation inspection	Final inspection field maintenance	Final inspection depot maintenance
FINISH-----	Light gray to dense black in color. Exterior parts having distinct shine are for training use only.	Light gray to dense black in color. Exposed surfaces will be dull enough to prevent glare.	Exposed surface will have a dull finish and will be free of bends and cracks.	Approximate new finish.
BACK PLATE----	Fit tightly in casing assembly but removable without excessive force.	Fit tightly in casing assembly but removable without excessive force.	Fit tightly in casing assembly but removable without excessive force. Adjusting screw, plunger, and spring must work freely and positively. Adjusting screw will not protrude more than one full thread beyond buffer plate and will be tightened to 22 to 26 foot-pounds. Buffer disks will be replaced if frayed or discolored. Safety will engage properly and operate with ease.	Fit tightly in casing assembly but removable without excessive force. Adjusting screw, plunger, and spring must work freely and positively. Adjusting screw will not protrude more than one full thread beyond buffer plate and will be tightened to 22 to 26 foot-pounds. Buffer disks will be replaced if frayed or discolored. Safety will engage properly and operate with ease.
BARREL-----	Free of corrosion, bulges, and rings. Pits not to exceed $\frac{3}{8}$ inch in length.	Free of corrosion, bulges, and rings. Pits not to exceed $\frac{3}{8}$ inch. Breech bore reading, using breech bore gage	Each gun will be equipped with a new barrel unless the condition of the old barrel approximates that of a new one. Used bar-	Each gun will be equipped with a new barrel unless the condition of the old barrel approximates that of a new one. Used bar-

BARREL
EXTENSION.

Free of sharp edges.

Breech lock will work freely. Upper forward beveled edge will be free from wear and well defined.

Barrel locking spring will prevent rotation of barrel during firing.

Will not be bent to the extent of binding barrel in front barrel bearing.

BARREL
JACKET
GROUP.

BOLT.....

Belt will be free of sharp corners and burrs on its various operating surfaces.

T slet will be free of carbon and corrosion.

5564343 must not exceed 0.304 inch.

Free of sharp edges.

Breech lock will work freely. Upper forward beveled edge will be free from wear and well defined.

Barrel locking spring will prevent rotation of barrel during firing.

Will not be bent to the extent of binding barrel in front barrel bearing.

Belt will be free of sharp corners and burrs on its various operating surfaces.

T slet will be free of carbon and corrosion.

rels must pass a visual inspection and the breech bore reading, using breech bore gage 5564343 will not exceed 0.304 inch.

Free of sharp edges.

Breech lock will work freely with a minimum of looseness in its slet. Upper forward beveled edge will be free from wear and well defined.

Barrel locking spring will prevent rotation of barrel during firing.

Will not be bent to the extent of binding barrel in front barrel bearing. Will be held tight in place on receiver by flat-head screw.

Belt will be free of sharp corners and burrs on its various operating surfaces.

Maximum depth of T slet permitted is 0.126 inch; maximum depth of T slet groove is 0.055 inch.

rels must pass a visual inspection and the breech bore reading, using breech bore gage 5564343 will not exceed 0.304 inch.

Free of sharp edges.

Breech lock will work freely with a minimum of looseness in its slet. Upper forward beveled edge will be free from wear and well defined.

Barrel locking spring will prevent rotation of barrel during firing.

Will not be bent to the extent of binding barrel in front barrel bearing. Will be held tight in place on receiver by flat-head screw.

Belt will be free of sharp corners and burrs on its various operating surfaces.

Maximum depth of T slet permitted is 0.126 inch; maximum depth of T slet groove is 0.055 inch.

Table II. Inspection Guide for Cal. 30 Machine Gun M37 (Tank)—Continued

Point to be inspected	Overall inspection	Preembarkation inspection	Final inspection field maintenance	Final inspection depot maintenance
BOTTOM PLATE GROUP.	Will be straight and tightly riveted. Breech lock cam screw will be staked inside receiver in two places. Breech lock cam will have perceptible float.	Will be straight and tightly riveted. Breech lock cam screw will be staked inside receiver in two places. Breech lock cam will have perceptible float.	Will be straight and tightly riveted. Breech lock cam screw will be drawn up tight, then loosened $\frac{1}{8}$ to $\frac{1}{4}$ turn and staked inside receiver in two places. Breech lock cam must float. Check inside and outside width of mounting ears using bottom plate ears snap and width gage 7319922. Inside minimum width is 1.5 inches. Outside maximum width is 2.312 inches. Maximum diameter of mounting hole will not exceed 0.445 inch.	Will be straight and tightly riveted. Breech lock cam screw will be drawn up tight; then loosened $\frac{1}{8}$ to $\frac{1}{4}$ turn and staked inside receiver in two places. Breech lock cam must float. Check inside and outside width of mounting ears using bottom plate ears snap and width gage 7319922. Inside minimum width is 1.5 inches. Outside maximum width is 2.312 inches. Maximum diameter of mounting hole will not exceed 0.445 inch.
COVER GROUP.	Will not bind or have excessively loose fit. Cover detent pawl will operate smoothly and hold cover open. Cover latch will work smoothly and hold cover closed securely.	Will not bind or have excessively loose fit. Cover detent pawl will operate smoothly and hold cover open. Cover latch will work smoothly and hold cover closed securely.	Will not bind or have excessively loose fit. Cover detent pawl will operate smoothly and hold cover open. Cover latch will work smoothly and hold cover closed securely.	Will not bind or have excessively loose fit. Cover detent pawl will operate smoothly and hold cover open. Cover latch will work smoothly and hold cover closed securely.

EXTRACTOR.....

FIRING PIN HOLE.

Extractor cam surface in cover will be free of burs and excessive wear.

Belt feed lever action will be free from binding and interference.

Free of burs and cartridge engaging lip will not have feather edge.

Extractor plunger spring will provide adequate tension on extractor plunger.

Ejector will work smoothly and freely under tension of ejector spring.

Visual elongation is basis for rejection.

Extractor cam surface in cover will be free of burs and excessive wear.

Belt feed lever action will be free from binding and interference.

Free of burs and cartridge engaging lip will not have feather edge.

Extractor plunger spring will provide adequate tension on extractor plunger.

Ejector will work smoothly and freely under tension of ejector spring.

Visual elongation is basis for rejection.

Extractor cam surface in cover will be free of burs and excessive wear.

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Extractor plunger spring will provide adequate tension on extractor plunger.

Ejector will work smoothly and freely under tension of ejector spring.

Check for elongated hole. Maximum diameter is 0.081 inch and will not permit entrance of firing pin hole no go plug gage 5077203.

Check protrusion using, firing pin protrusion gage 7319929. Min.—0.066 inch. Max.—0.068 inch.

Extractor cam surface in cover will be free of burs and excessive wear.

Belt feed lever action will be free from binding and interference.

Free of burs and cartridge engaging lip will not have feather edge.

Extractor plunger spring will provide adequate tension on extractor plunger.

Ejector will work smoothly and freely under tension of ejector spring.

Check for elongated hole. Maximum diameter is 0.081 inch and will not permit entrance of firing pin hole no go plug gage 5077203.

Check protrusion, using firing pin protrusion gage 7319929. Min.—0.066 inch. Max.—0.068 inch.

Table II. Inspection Guide for Cal. 30 Machine Gun M37 (Tank)—Continued

Point to be inspected	Overall inspection	Preambarkation inspection	Final inspection field maintenance	Final inspection depot maintenance
FRONT SIGHT GROUP.	Will be in alinement and free from distortion. Front sight post assembly will remain raised during firing of gun.	Will be in alinement and free from distortion. Front sight blade should be firmly fastened in place. Front sight post assembly will raise and lower without binding and will remain raised during firing.	Will be in alinement and free from distortion. Front sight blade will be firmly fastened in place. Front sight post assembly will raise and lower without binding and will remain raised during firing.	Will be in alinement and free from distortion. Front sight blade will be firmly fastened in place. Front sight post assembly will raise and lower without binding and will remain raised during firing.
HEAD SPACE AND TIMING.	Check head space.....	Check head space.....	Check head space.....	Check head space.
LOCK FRAME....	Accelerator lugs will be free of excessive wear and claws will not bind on barrel extension.	Accelerator lugs will be free of excessive wear and claws will not bind on barrel extension.	Accelerator lugs will be free of excessive wear and claws will not bind on barrel extension.	Accelerator lugs will be free of excessive wear and claws will not bind on barrel extension.
TRIGGER PULL	-----	-----	Min.—7 pounds..... Max.—12 pounds.....	Min.—7 pounds Max.—12 pounds
REAR SIGHT GROUP.	Will not be distorted. Graduations will be clearly defined. Rear sight windage screw will be sufficiently tight to eliminate change of	Will not be distorted. Graduations will be clearly defined. Rear sight windage screw will be sufficiently tight to eliminate change of	Will not be distorted. Graduations will be clearly defined by use of graduation filler 51-70-1A. Rear sight windage screw will be sufficiently	Will not be distorted. Graduations will be clearly defined by use of graduation filler 51-70-1A. Rear sight windage screw will be sufficiently tight to

	adjustment during firing.	adjustment during firing.	tight to prevent change of adjustment during firing. Maximum end play is 0.010 inch.	prevent change of adjustment during firing. Maximum end play is 0.010 inch.
CASING.....	Will not be distorted, cracked, or otherwise damaged. Feedway to be free of burrs and excessive wear.	Will not be distorted, cracked, or otherwise damaged. Feedway to be free of burrs and excessive wear.	Will be free of cracks, bends, and tightly riveted together. Maximum diameter of front mounting hole is 0.567 inch.	Will be free of cracks, bends, and tightly riveted together. Maximum diameter of front mounting hole is 0.567 inch.

14. Inspection of Materiel in the Hands of Troops

a. General. Refer to TM 9-1100 for responsibilities and fundamental duties of inspecting personnel, the necessary notice and preparations to be made, forms to be used, and general procedures and methods to be followed by inspectors. Materiel to be inspected includes organizational spare parts and equipment and the stocks of cleaning and preserving materials. In the course of this technical inspection, the inspector will accomplish the following:

- (1) Determine serviceability, i. e., the degree of serviceability, completeness, and readiness for immediate use, with special reference to safe and proper functioning of the materiel. If the materiel is found serviceable, it will be continued in service. In the event it is found unserviceable or incipient failures are disclosed, the deficiencies will be corrected on the spot or advice given as to corrective measures when applicable, or if necessary, the materiel will be tagged for delivery to and repair by ordnance maintenance personnel.
- (2) Determine causes of mechanical and functional difficulties that troops may be experiencing and check for indications of neglect, improper handling, storage, security, and preservation due to lack of knowledge or misinformation.
- (3) Check on application of all authorized modifications to see that no unauthorized alterations have been made, or that work beyond the authorized scope of the unit is being attempted. In addition, check the index in SR 310-20-4 and the current modification work order files for any additional modification work orders promulgated subsequent to the printing.
- (4) Instruct the using personnel in proper preventive maintenance procedures where found inadequate.
- (5) Check on completeness of the organizational maintenance allowances and procedures for obtaining replenishments.
- (6) Check storage conditions of general supplies and ammunition.
- (7) Initiate a thorough report on materiel on "deadline," with reasons therefor, for further appropriate action.
- (8) The inspector should report to the responsible officer any carelessness, negligence, unauthorized modifications, or tampering. This report should be accompanied by recommendations for correcting the unsatisfactory conditions.

b. Machine Gun.

- (1) Inspect gun to see that there are no glaring surfaces.
- (2) Check operation of trigger safety.
- (3) Check functioning of gun, using dummy ammunition.
- (4) Check head space.

- (5) Check barrel bore for excessive pitting. Use breech bore gage 5564343 (fig. 6) to determine serviceability.
- (6) Check trigger pull minimum—7 pounds; maximum—12 pounds.
- (7) Check bolt group for proper assembly.
- (8) Check back plate for fit in receiver. It must fit tightly but must not bind.
- (9) Back plate adjusting screw will not protrude more than one full thread beyond end of buffer tube.
- (10) Check cover group operation.
- (11) Check springs for free length (table V, par. 66).
- (12) Check retracting bar lock operation.

15. Inspection of Materiel Received in Ordnance Shops

a. Paragraph 14 applies also to the inspection of materiel received in ordnance shops.

b. If materiel received in ordnance shops is not tagged to indicate the nature of the repair, steps should be taken to determine the cause of the unserviceability, the extent of the required repairs and an estimate of the parts required.

c. Table III lists malfunctions, probable causes, and corrective action to be taken.

Table III. Troubleshooting

Malfunction	Probable causes	Corrective action
Failure to feed.....	Belt feed lever pin worn or broken. Belt feed pawl spring weak or broken.	Replace belt feed lever pin. Check or replace belt feed pawl spring (par. 39c).
Failure to fire.....	Tight head space. Lightly struck primer. Firing pin spring weak or broken. Scar spring weak or broken.	Check head space (par. 59). Check firing pin protrusion (par. 46a). Check or replace firing pin spring (par. 43b). Check or replace scar spring (par. 43d).
Failure to load.....	Separated cartridge case due to loose head space. Ejector broken. T slot obstructed due to thick rim on cartridge.	Remove separated case from chamber; use ruptured cartridge case extractor 5503854. Replace ejector (par. 43h). Remove cartridge (par. 44b). Check T slot (par. 43a (3)).
Ruptured primer...	Elongated firing pin hole.	Check firing pin hole, using firing pin hole no go plug gage 5077203 (par. 43a (6)).

16. Pre-Embarkation Inspection of Materiel in Units Alerted for Oversea Movement

a. General.

- (1) Materiel will not be considered unserviceable for overseas use because of lack of modification unless such modification affects the safety of personnel; is essential to functioning of the materiel; or is prescribed by an URGENT Department of the Army modification work order (MWO).
- (2) Metal finishes range from dense black to medium light gray. Certain weapons are manufactured with an unusual shade of neutral gray finish. This finish (gray zinc phosphate) is an accepted Department of the Army standard, and these weapons will not be rejected for this reason alone. A worn surface is objectionable from the standpoint of visibility when it is capable of reflecting light, somewhat as a mirror does. Bright sights will not be permitted on weapons for overseas use. Check to see that all sights have a dull black or gray finish on all surfaces.
- (3) Light pitting of the barrel, even though plainly visible, is not cause for rejection. Barrels, which have pits cutting into the lands, are unserviceable.
- (4) Looseness and play in such components as sights, back plates, and bolts may be cause for rejection.

b. Machine Guns.

- (1) Check breech bore, using breech bore gage 5564343 (fig. 6). If reading exceeds 0.304 inch, the barrel must be retained in the zone of interior and used for training purposes only.
- (2) Check side plates for cracks or deformation at slot for back plate.
- (3) Check cover and barrel jacket to see that they are not excessively loose in the trunnion block.

CHAPTER 4

REPAIR AND REBUILD

Section I. GENERAL

17. General

a. Information and instructions contained herein are supplementary to instructions for the using organization contained in TM 9-2012.

b. In this manual, the main groups of the weapon are disassembled, inspected, replaced or repaired, and assembled. For information on removal and installation of groups, refer to TM 9-2012. A group is a number of parts or assemblies, or both, which either function together or are intimately related to each other and should be considered together.

c. A rebuild flow chart and an operation route sheet, which specify the various steps necessary in repair and rebuild of the weapon, are contained in this chapter for the use of maintenance shops engaged in repair and rebuild for return to stock.

d. Information for ordnance maintenance units engaged in repair for return to user and information for maintenance shops engaged in repair and rebuild for return to stock are covered together, but wherever the operation is not authorized for the field level of maintenance, a note is added such as (DEPOT MAINTENANCE ONLY) to indicate the prescribed level of maintenance.

e. Where different standards or tolerances are prescribed for field and for depot levels, the desired standard for the particular level is similarly indicated in parentheses.

18. Cleaning

a. General. Refer to TM 9-2012 for using arms information on cleaning, cleaning agents, and precautions to be observed in cleaning. Information for ordnance personnel is given in *b* through *d* below.

b. Cleaning Materiel Received From Storage. Materiel received in ordnance shops from storage is usually packed in a heat-sealed, flexible, water-vaporproof aluminum foil with a Kraft creped paper liner coated on the interior with a volatile corrosion inhibitor (VCI).

Generally, the materiel is coated with special preservative lubricating oil and need not be degreased. Materiel coated with rust-preventive compound will be cleaned by one of the methods in (1) through (3) below, whichever is applicable or available.

Note. Do not clean buffer disks and wooden or plastic parts by dip-tank or vapor-degreaser method; use hand method.

- (1) *Dip-tank method.* Disassemble as required, place parts in a perforated metal basket, and submerge and agitate in a tank containing volatile mineral spirits. Repeat, using a second tank with clean thinner. Extent of treatment in each tank will depend on the ease with which the preservatives are dissolved. Wipe dry with wiping cloth and dip in special preservative lubricating oil.
- (2) *Vapor-degreaser method.* Tanks containing a heated solution of trichlorethylene or perchlorethylene (type II) are used mostly for degreasing items that are very greasy or oily and are not readily cleaned by the dip-tank method. Place parts in a perforated metal basket and submerge just below the vapors in the tank and keep until all grease or oil melts and runs off the parts in the basket.

Warning: Personnel operating vapor degreasers are cautioned not to breathe the vapor fumes.

Remove from tank and dip in special preservative lubricating oil.

- (3) *Hand method.* Apply volatile mineral spirits by swabbing large parts of the gun to remove the rust-preventive compound. To clean small parts, place them in a bath and scrub them with a brush or with a lintless wiping cloth saturated with volatile mineral spirits. Care must be exercised to insure that all springs, spring wells, and other recesses have been thoroughly cleaned. Close visual inspection, after wiping all surfaces with a clean wiping cloth, will reveal any remaining rust-preventive compound. If the cleaning has not been thorough, the cloth will show a brownish stain. Dry the components with a clean, dry, lintless wiping cloth. When dry, dip all the components in special preservative lubricating oil.

c. Cleaning After Repair or Rebuild.

- (1) After repair or rebuild operations and prior to assembly, remove shop dirt and other foreign matter from all metal surfaces. This can be done by the dip-tank method (b (1) above), the vapor-degreaser method (b (2) above), or by cleaning with cloths soaked in volatile mineral spirits.

- (2) In the dip-tank method, agitation for approximately 1 minute in each tank is sufficient; in the vapor-degreaser method, treatment for about 2 to 3 minutes is sufficient.

d. Cleaning After Shop Inspection. After in-process shop inspections, dip parts in a tank containing fingerprint remover oil (type A), remove (use rubber gloves), and dry thoroughly with dry compressed air (provided with moisture filter traps) or by wiping with clean, lint-free dry cloths.

19. Lubrication

a. Guns should be kept clean and oiled for rust prevention at all times. Keep a light film of oil on all parts undergoing repair and rebuild operations to prevent rust from forming. For detailed instructions on lubricating this materiel, refer to TM 9-2012.

b. Authorized cleaning materials for lubricating weapons are listed in ORD 3 SNLK-1.

20. General Repair and Rebuild Methods

a. The repair and rebuild of cal. .30 machine gun M37 (tank), with its equipment, consists largely in the replacement of worn or broken parts.

b. When parts or assemblies are broken or worn so as to render them unserviceable, they must be replaced. In most cases, replace the unserviceable part; however, if removal of these parts from the assembly is not warranted in view of the urgency of the tactical situation or the value of the part or parts, the entire assembly should be replaced.

c. Special tools for maintenance and repair of the gun are listed in table I (par. 9). Substitute tools must not be used without authorization of the ordnance officer in charge. In such cases, the tools must not mutilate parts.

d. Tightening of loose rivets or replacement of rivets, where necessary, in an operation restricted to depot maintenance only. The appropriate special anvil, holder, pein, and post (figs. 5, 6, 7, 8, 9, and 10), will be used to maintain the guns.

21. Removal of Excessive Carbon and Rust

a. During firing, hard carbon gradually accumulates in the front barrel bearing. This carbon, if not removed, will eventually cause the barrel to bind, and may cause the gun to cease functioning. When cleaning, these parts should be inspected for carbon.

b. Carbon is removed easily with the front barrel bearing carbon removing tool 7106460 (fig. 7). Disassemble front barrel bearing from barrel jacket (par. 55f).

c. Light rust may generally be removed with a cloth moistened with light oil or rifle-bore cleaner. If this does not suffice, use crocus cloth

or fine abrasive cloth. Take care not to scratch or alter cleaned surfaces, to remove thoroughly all dirt and abrasive, and to recoil surfaces before assembling the parts.

22. Removal of Burs From Threads, Screwheads, and Working Surfaces

During the entire life of the gun, polishing and stoning are necessary to relieve friction and to remove burs set up by firing. Burs on screwheads, threads, and like surfaces should be removed with a fine file. Burs on such working surfaces as the cam grooves on top of the bolt, engaging surfaces of the sear slide, sear, and firing pin point, and any roughness on working parts such as the accelerator, breech lock, and breech lock cam, should be removed with a fine sharpening stone.

Caution: Care should be observed to stone and file evenly and lightly and not to remove more metal than is absolutely necessary, and to maintain correct contour of surface worked on. Parts or assemblies should never be altered in any way that would affect interchangeability of parts.

23. Finish of Metals

a. A class A or class B, type II phosphate finish will be used unless otherwise specified herein.

b. During the process of refinishing, the barrels will be protected from acids, alkali, or phosphate solutions by plugging the muzzle and breech with corks.

c. It will not be necessary to refinish parts that already have a good quality finish and that refinishing will not definitely improve.

d. All metal parts will be free of rust.

24. Barrels

Barrels will be free of rust, powder fouling, bulges, or rings. Muzzle will be free of burs. Fine pits are allowed if they do not materially affect the sharpness of lands. Pits are allowed in the chamber if they are not sufficiently large to cause extraction difficulties. Barrels will be replaced if lands are excessively worn or, if pits are as wide as the lands, grooves, or are more than three-eighths of an inch.

25. Springs

Replace all springs that are corroded, weak, distorted, or fail to meet specifications (table V, par. 66). Springs will be load-tested as specified in the table.

26. Repair of Damaged Machined and Polished Surfaces

Rough spots, scores, burs, galling, and gouges will be smothered so that the part will efficiently perform its normal function. The finish

of the repaired part will approximate that of the original finish. In performing any of the above operations, critical dimensions will not be altered.

27. Functioning of Safeties

All manually operated safety features will be tested for satisfactory operation.

28. Function-Firing

Cal. .30 machine guns M37 (tank) will be function-fired with the number of rounds specified tabulated in *a* and *b* below after rebuild. Barrels considered worn beyond serviceability limits (slave barrels) should be used if possible. Guns that fail to meet the function-firing test are to be corrected by replacement of defective component or by performing such repair as required.

a. Dummy ammunition fed by hand from each side (use of dummy ammunition optional) 10 rds.

b. Ball ammunition fired from each side, 25 rds.

29. Marking of Rebuilt Weapons

All rebuilt machine guns will be stamped with the initials of the rebuilding establishment in the United States; weapons rebuilt by overseas base shops will not be stamped. Initials identifying the establishment rebuilding a machine gun are stamped on the right-side plate directly to the left of the serial number. If the weapon is subsequently rebuilt at another establishment, the new identifying initials will be placed directly below those preceding. If the weapon is rebuilt at the same establishment as before, new initials need not be added. The establishment and the initials to be used are as follows:

Augusta Arsenal.....	AA
Benicia Arsenal.....	BA
Mt. Rainier Ordnance Depot.....	MA
Raritan Arsenal.....	RA
Red River Arsenal.....	RRA
Rock Island Arsenal.....	RIA
Springfield Armory.....	SA

Section II. REBUILD FLOW CHART AND OPERATIONS ROUTE SHEET

30. Flow Chart

A flow chart illustrating the sequence of operations necessary during rebuild of the weapon is provided in figure 11. This chart is intended for the information of depot maintenance organizations rebuilding the weapon by assembly line procedures for return to stock. The flow chart and the operations route sheet are provided to assist the shop foreman in shop layout, job assignments, and setting up for rebuilding

a quantity of weapons. Check the listing in the current Pam 310-4 for any modification work orders or technical bulletins or TB's that would require additional set-ups.

31. Operations Route Sheet

The operation route sheet (table IV) supplements the rebuild flow chart (fig. 11). The operation numbers correspond to the numbers of the chart. Special tools, gages, fixtures, and machines required for an operation are indicated opposite the operation.

REBUILD FLOW CHART
CAL. .30 MACHINE GUN M37 (TANK)

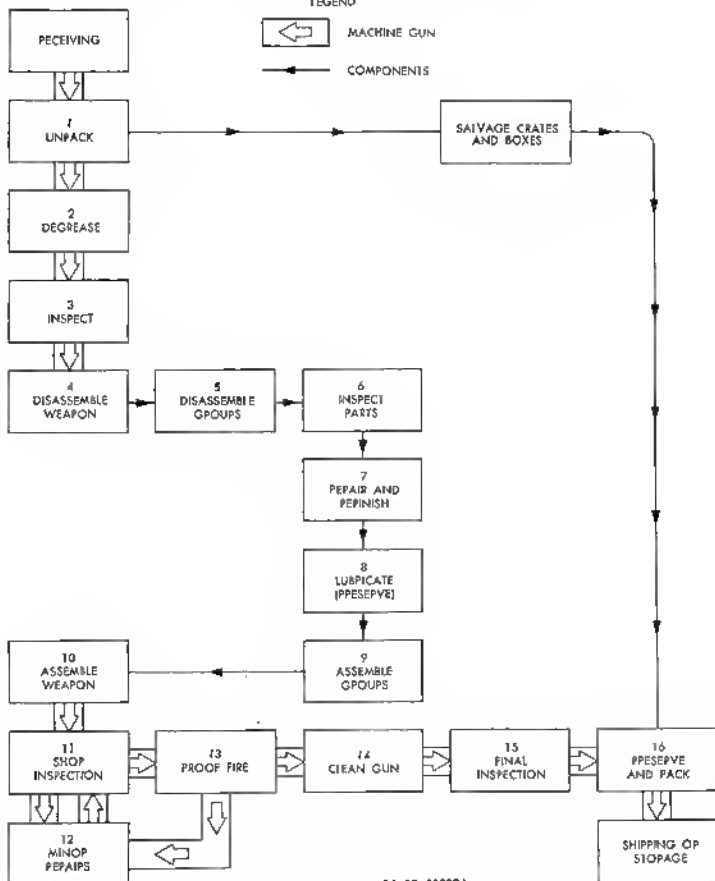
LEGEND



MACHINE GUN



COMPONENTS



PA PD 203994

Figure 11. Rebuild flow chart for cal. .30 machine gun M37 (tank).

Table IV. Operation Route Sheet for Cal. 30 Machine Gun M37 (Tank)

Operation No.	Operation	Machine	Tools	Gages
1	Unpack.			
2	Degrease-----	Degreaser.		
3	Inspect for serviceability.			
4	Disassemble weapon-----		5568334 6147277	
5	Disassemble groups-----		5568334	
6	Inspect all parts			
	Inspect barrel chamber and bore-----		7265788	5564343
	Inspect trunnion block mounting hole.			
	Inspect rear mounting ears-----		6316037	7319922
	Inspect buffer disks.			
	Inspect bolt T slot and firing pin hole.			5077203
	Inspect bolt feed lever-----		6315346	
	Inspect casing for loose rivets, cracks, or dents.		6595341 7106293 7106294 7106300 7106302 7106303 7106304 7106311 7106327 7106331 7106332 7106460	
7	Inspect front barrel bearing-----			
	Repair and refinish.			
	Make necessary repairs or replacement.		-	
	Sandblast and refinish parts requiring refinishing.		-	
8	Lubricate to preserve parts.			
9	Assemble groups-----		5568334	
	Check firing pin protrusion-----			7319929
	Tighten breech lock cam screw; then back off $\frac{1}{16}$ to $\frac{1}{4}$ turn			
	Stake on inside two places.			
10	Assemble weapon-----		5568334 6147277	
11	Shop inspection head space.			
12	Minor repairs.			
	Note. Repeat operations 9, 10, and 11 if repair work was performed.			
13	Proof-fire (Use slave barrel).			
14	Clean gun (Replace slave barrel).			
15	Final inspection and record serial number.			

32. Removal

Refer to TM 9-2012 for removal of back plate assembly.

33. Disassembly

Disassemble back plate assembly (fig. 12) and buffer assembly as prescribed in TM 9-2012, using combination wrench M6 5568334 (fig. 13).

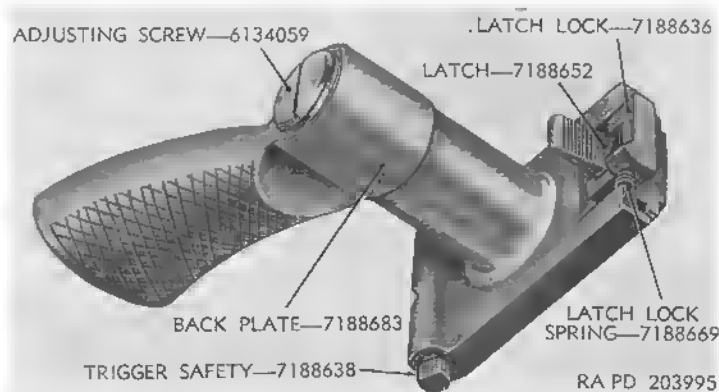


Figure 12. Back Plate Assembly.

34. Inspection

a. General. Check all parts for damage, cracks, excessive wear that may cause malfunctions, burrs, rust, foreign matter in recesses, and free action of mating parts.

b. Buffer Plate (fig. 14). Check buffer plate for binding in back plate.

c. Buffer Disk (fig. 14). Check for frayed or discolored disks.

d. Adjusting Screw (fig. 14). Check threads.

e. Back Plate (fig. 14). Back plate must not bind in guideways of the casing.

f. Safeties (fig. 14). Check trigger safety for ease of operation and proper engagement.

35. Repair and Rebuild (Field and Depot Maintenance)

a. Replace all broken, worn, or otherwise unserviceable parts. Remove burrs and rust as outlined in paragraphs 21 and 22.

b. Back plate adjusting screw, adjusting screw plunger, and adjusting screw spring must work freely and positively.

c. The back plate assembly must not bind in the guideways of the casing, and should be free enough to permit its removal.



Figure 13. Removing adjusting screw, using combination wrench M6 5568334.

d. Replace frayed or discolored buffer disks.

e. Adjusting screw must not protrude more than one full thread (or $\frac{3}{16}$ in.) beyond end of buffer tube and must be tightened 22 to 26 foot-pounds.

f. Adjusting screw plunger and spring must operate freely and, when tightened to specified torque, the plunger must be seated in its recess.

36. Assembly

Refer to TM 9-2012 for assembly of the back plate assembly.

37. Installation

For installation procedure, refer to TM 9-2012.



Figure 14. Back plate assembly—exploded view.

38. Removal and Disassembly

Refer to TM 9-2012 for removal and disassembly of cover group (fig. 15).

39. Inspection

- a. Belt Feed Lever.* Check for burrs and wear on bolt contact lug and on boss or slide end of belt feed lever.
- b. Belt Feed Pawl* (fig. 16). Check for wear and cracks.
- c. Belt Feed Pawl Spring* (fig. 16). Check free length of spring (table V, par. 66).
- d. Cover Extractor Spring and Cam.* Check action of the spring. The spring should be strong and with positive engagement in cut-out in cover extractor cam surface.
- e. Cover.*
 - (1) Cover extractor cam surface will be free of excessive wear and sharp edges. Surfaces will be smooth and free of burrs.
 - (2) Check cover assembly for cracks and breaks.

40. Repair and Rebuild (Field and Depot Maintenance)

- a.* Cover will not bind or have excessively loose fit in trunnion block.
- b.* All operating surfaces on the belt feed levers will be free of excessive wear and will not be bent or distorted.
- c.* Belt feed lever action will be free from binding and interference.
- d.* Cover extractor cam surface will not be worn to the extent that functioning is affected.
- e.* Serviceable cover assemblies (without serial numbers) which are removed for finishing will be identified by stamping gun serial number on the inside cover.
- f.* The cover detent group must hold the cover open and work freely.
- g.* The cover assembly will contain the belt feed lever pin group. Replace belt feed lever pin and spring pins if they show even slight signs of wear and looseness.
- h.* The cover latch will hold the cover securely closed.
- i.* The belt feed pawl, belt feed pawl arm, and belt feed slide will be replaced if worn or broken.
- j.* Check the belt feed pawl spring for free length given in table V (par. 66). Replace if worn or broken.
- k.* The belt feed pawl pin assembly should hold the belt feed pawl and arm securely. Replace the pin assembly if worn or broken.

41. Assembly and Installation

Assemble and install cover group as prescribed in TM 9-2012.

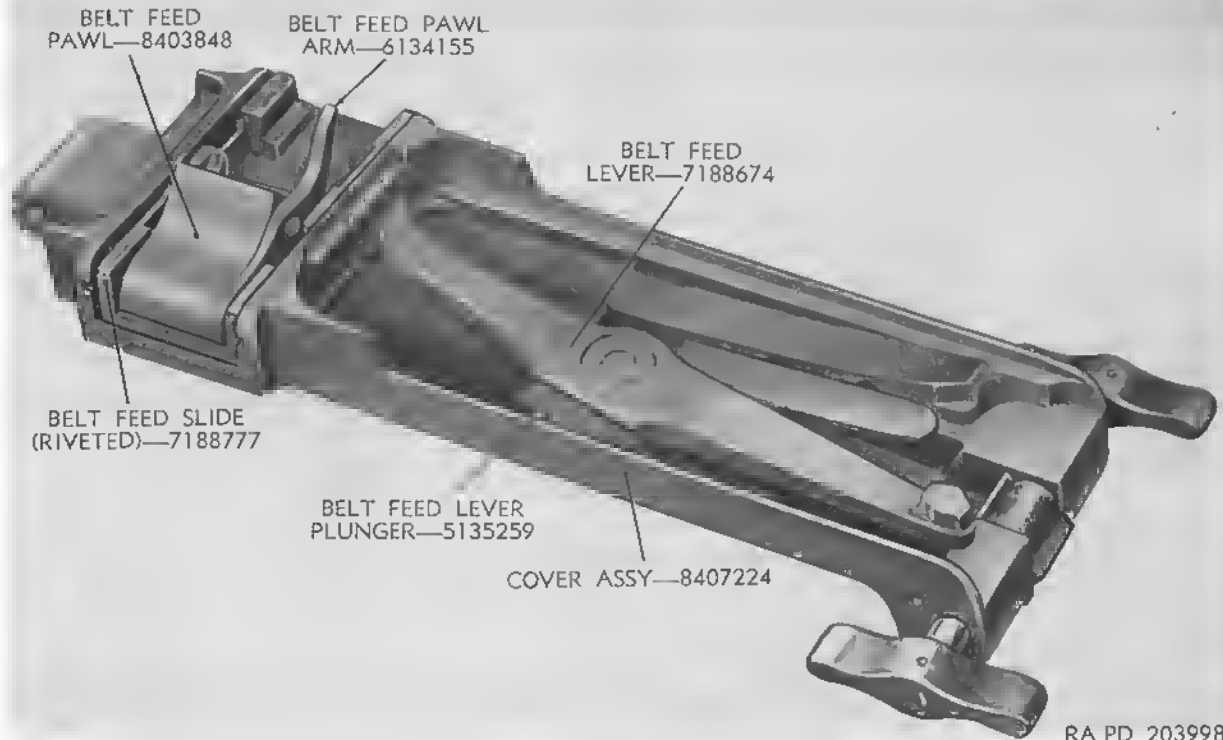
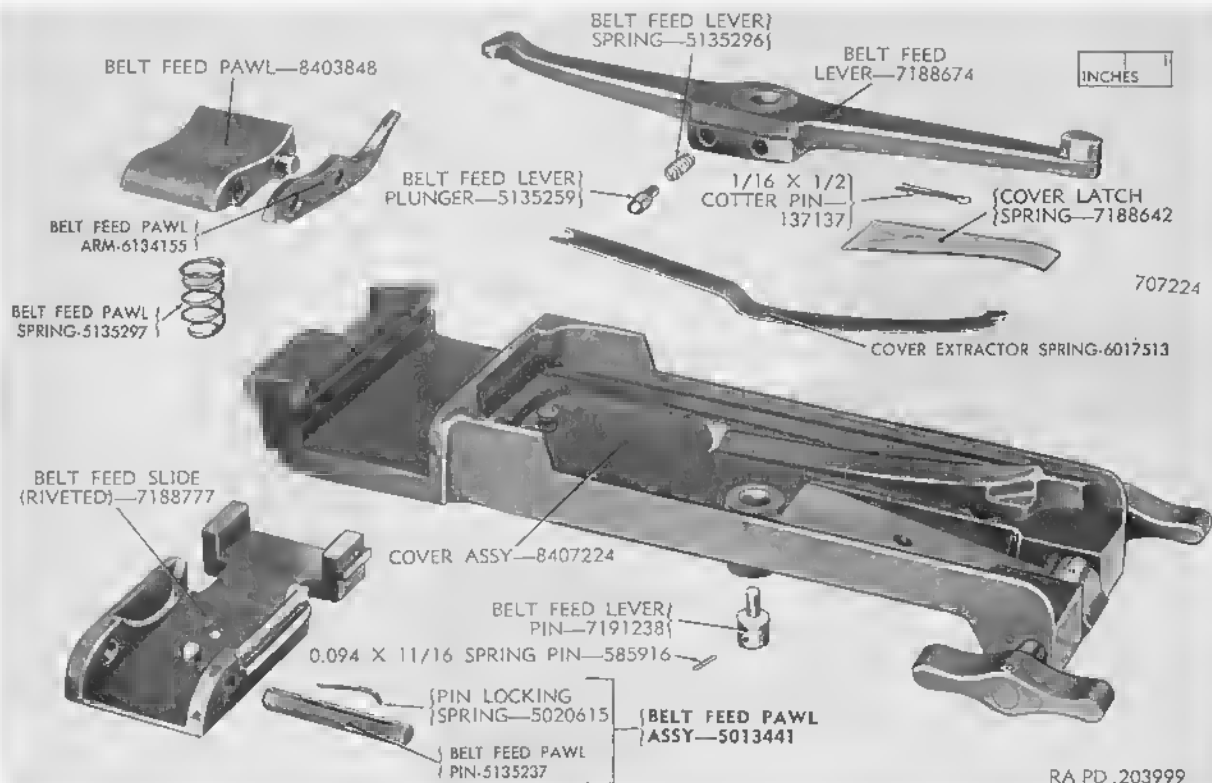


Figure 15. Cover group—right-hand feed arrangement.



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Figure 16. Cover group—exploded view.

42. Removal and Disassembly

a. *Bolt Group.* Remove and disassembly bolt group (fig. 17) as prescribed in TM 9-2012. Use cal. .30 bolt switch pin drift 8407287 (fig. 6) to remove 0.156 x 3/4 spring pins holding the two bolt switches. Use cal. .30 ejector pin drift 8407289 (fig. 6) to remove the ejector pin.

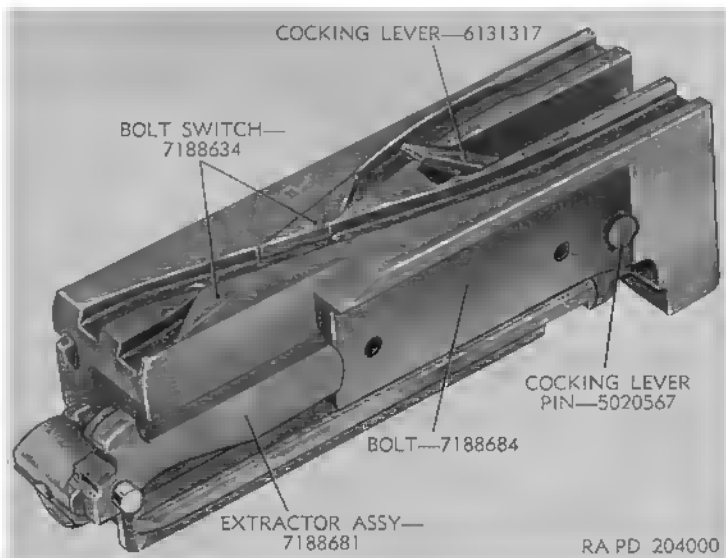


Figure 17. Bolt group.

b. *Driving Spring Assembly* (fig. 18).

- (1) Remove staking over ends of collar stop pin and drift out pin.
- (2) Remove collar and driving spring.

43. Inspection

a. *Bolt* (fig. 19).

- (1) Examine for cracks in the body and burs on the bolt guides.
- (2) Inspect to ascertain smoothness of the bolt rails.
- (3) Inspect smoothness of the cartridge T slot. It must be free from brass or other residue.
- (4) Inspect smoothness of the belt feed lever tracks in the top of the bolt.
- (5) Examine the recoil plate in the face of the bolt for carbon and corrosion.

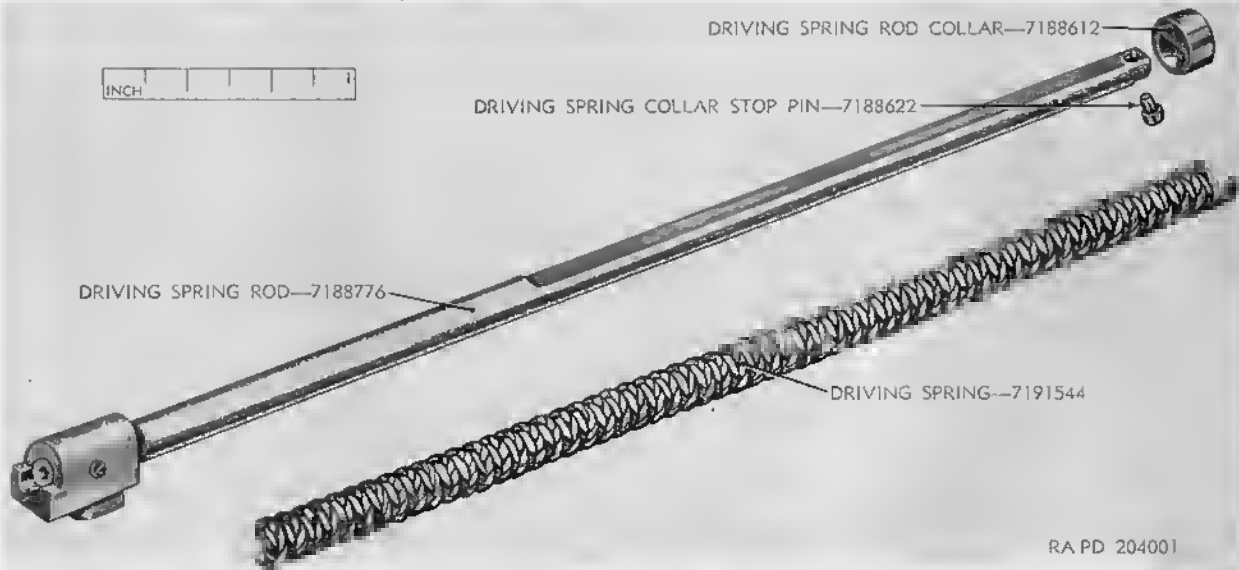


Figure 18. Driving spring assembly.

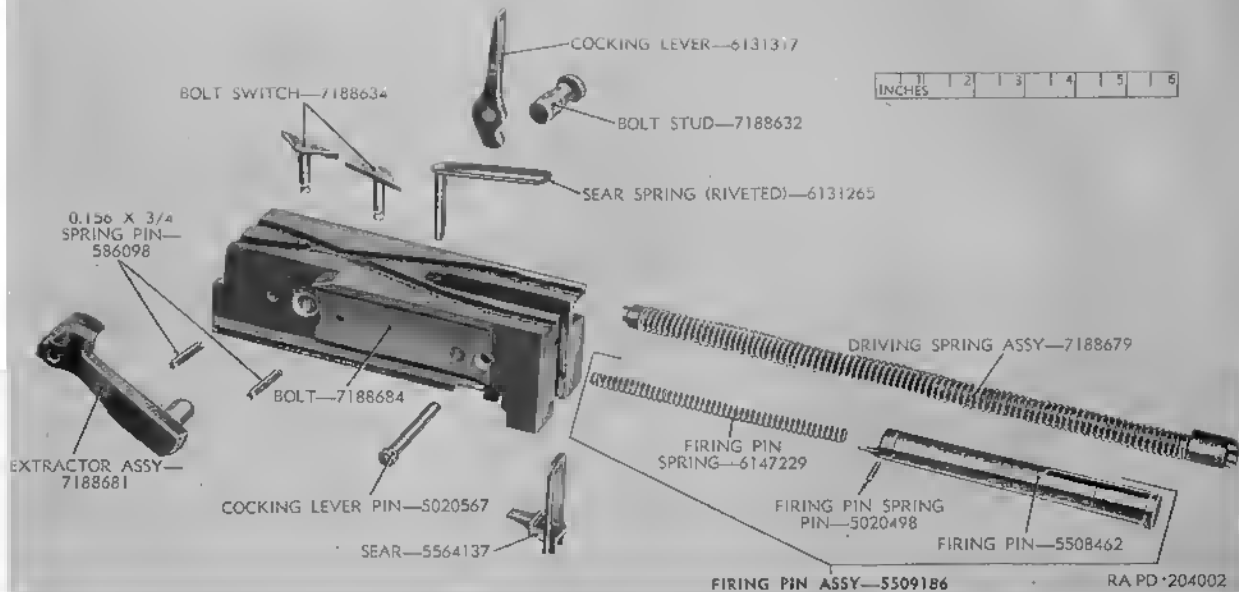


Figure 19. Bolt group—exploded view.

- (6) Check the size of the firing pin hole with the firing pin hole no go plng gage 5077203 (fig. 6). If the gage enters the hole, the bolt is unserviceable.

Note. Unserviceable bolts having recoil plates which are serviceable (except for the enlargement of the firing pin hole) and serviceable bolts found to have oversized firing pin holes, should be sent to Rock Island Arsenal for recorking. Broken or otherwise unserviceable bolts may be disposed of locally.

- (7) To determine if the face of the bolt is set back, place a micrometer depth gage across the top of the lips of T slot and adjust the gage until it contacts the face of the bolt. This dimension should not exceed 0.126 inch.

b. Firing Pin Assembly (fig. 19).

- (1) Examine the firing pin point to see that it is not broken, burred, or damaged.
- (2) Examine the firing pin spring in the firing pin assembly to ascertain that it is strong and free and without rust or cracks.

Note. Free length of firing pin spring is $4\frac{1}{4}$ inches. If the spring is damaged or short in free length, it must be replaced by a new one.

- (3) Check the firing pin assembly for free movement in the bolt.
- (4) If either the point or the sear notch becomes damaged, the firing pin should be replaced.

c. Cocking Lever.

- (1) Inspect the surfaces of the cocking lever to see that it is free from burs.
- (2) Inspect to see that the radius is smooth, and that the lever is neither bent nor broken.

d. Sear Spring (Riveted).

- (1) Examine the spring for cracks around the pin.
- (2) See that the pin is firmly riveted in the spring.
- (3) There should be no set in the spring.

e. Sear.

- (1) Check the sear to see that it has not been damaged or deformed.
- (2) The ribs and slideways should be smooth and free from burs.

f. Driving Spring Assembly.

- (1) Be sure that there is no set or kink in the driving spring.
- (2) Check for free length ($13\frac{5}{16}$ in.). If the length varies more than one-half inch, replace with a new one.

g. Driving Spring Rod.

- (1) Inspect driving spring collar and head for burs, and ascertain that head retains spring assembly firmly in place.
- (2) Inspect the driving spring rod for burs, and ascertain that it is straight.

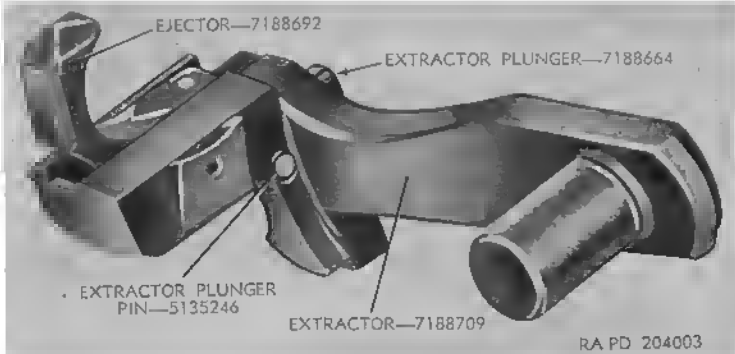


Figure 20. Extractor assembly—left-hand feed arrangement.

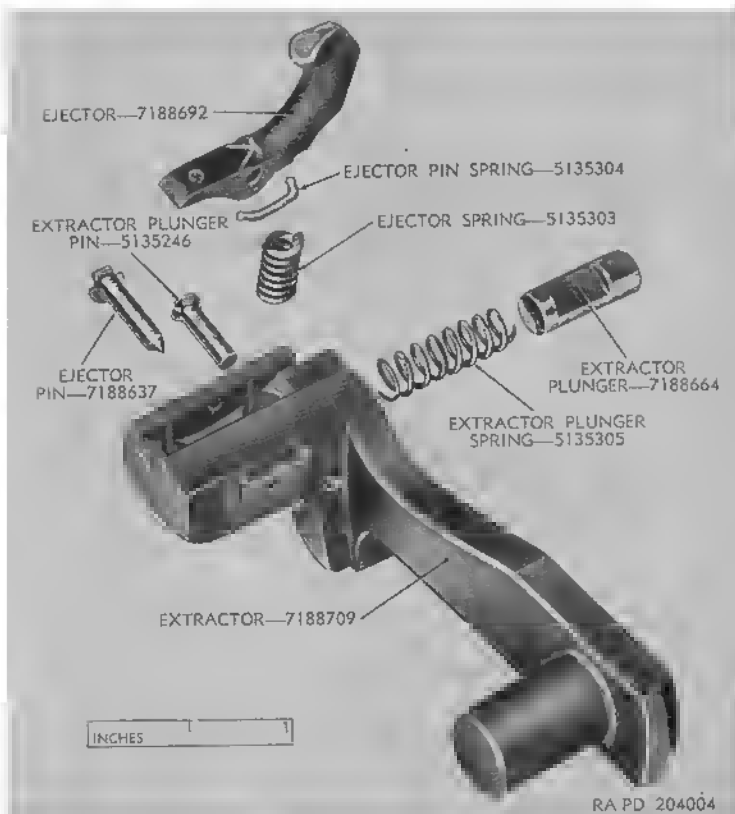


Figure 21. Extractor assembly—right-hand feed arrangement—exploded view.

h. Extractor Assembly.

- (1) Inspect for weak extractor cam plunger spring, broken or worn ejector (fig. 20), and loose extractor plunger pin or ejector pin (fig. 21).
- (2) Examine the ejector and extractor plunger (figs. 20 and 21) for burrs.
- (3) Inspect the face of the ejector to see that it is free from burrs and brass. Its contact outline should not be worn.
- (4) Inspect the ejector to see that the ejector pin is flush with extractor surface. When assembled into the gun, its action should be free.
- (5) Examine the extractor to see that it is not bent and that the claw is not worn or buried.

44. Repair and Rebuild (Field and Depot Maintenance)

a. General.

- (1) The bolt must be free of sharp corners and burrs on its various operating surfaces. Maximum depth of the T slot is 0.126 inch; maximum depth of the T slot groove is 0.055 inch.
- (2) The firing pin hole in recoil plate must not permit the entrance of no go end of firing pin hole no go plug gage 5077203 (par. 43a(6) and fig. 6). Visual elongation of the firing pin hole also constitutes a basis of rejection.
- (3) The recoil plate must be flush with the face of the bolt, and be seated firmly.
- (4) The firing pin protrusion must be within the limits given in paragraph 46a or firing pin will be rejected.
- (5) The cocking lever must be straight, free of burrs, and work smoothly in the bolt. The operating angular profile must be well-defined and free from wear.
- (6) The extractor must be free of burrs and the cartridge engaging lip must not have a feather edge.
- (7) The stud on the end of extractor must not fit loosely in the bolt.
- (8) The ejector must work smoothly and freely under tension of the ejector spring.
- (9) The ejector pin must be tight.
- (10) The extractor plunger spring must provide adequate tension on plunger.

b. Removing a Cartridge From the T Slot. When a fired cartridge case has been caught in the T slot it is generally caused by one of two faults: either the cartridge rim is too thick or the T slot is defective. In either case the cartridge must be removed by driving it from the T slot.

Caution: Be sure that the firing pin is not protruding through the face of the bolt when the cartridge is driven off. It is best to remove the firing pin assembly from the bolt before this operation is performed.

45. Assembly and Installation

Assemble and install the bolt group as directed in TM 9-2012.

46. Functional Check

a. Firing Pin. Inspect to see that firing pin protrudes through face of bolt between 0.066 and 0.068 inch, using firing pin protrusion gage 7319929 (fig. 6).

b. Cocking Lever. Lever should have a little play in the cocking insert in the top plate.

Section VI. LOCK FRAME GROUP

47. Removal and Disassembly

For removal and disassembly of the lock frame group, follow instructions given in TM 9-2012.

48. Inspection

a. Guides. Inspect to see that all slots, holes, and guides are not worn and that side plates are not warped. Inspect the accelerator bar for wear and burrs.

b. Accelerator.

- (1) Examine the accelerator (figs. 22 and 23) for burred or worn surfaces.

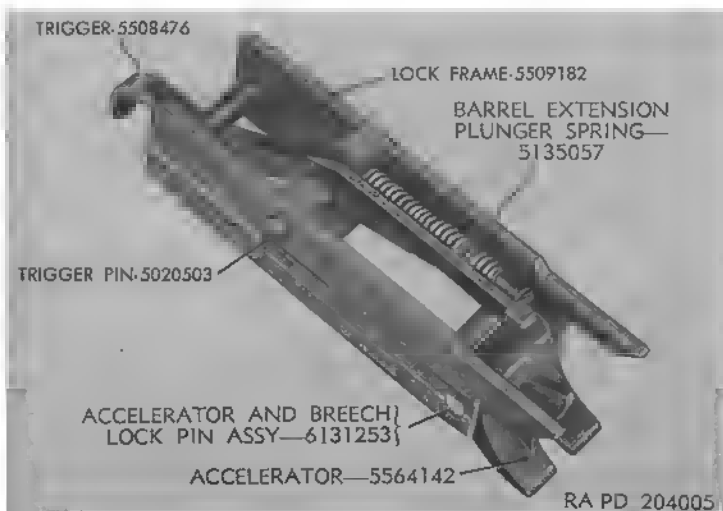
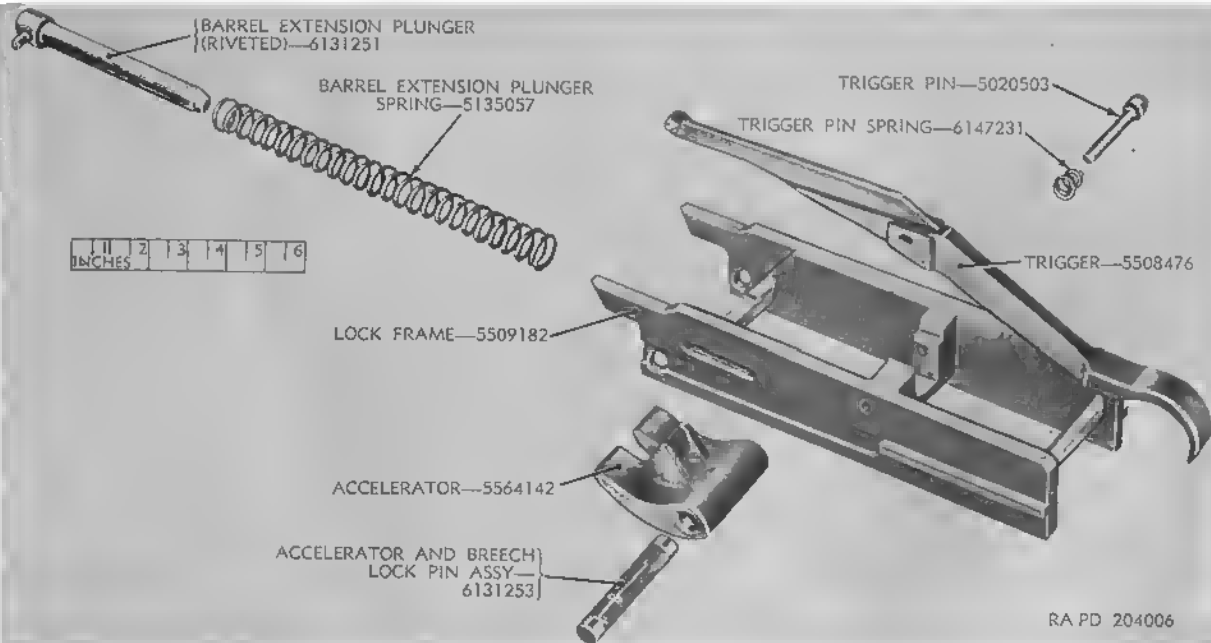


Figure 22. Lock frame group.



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Figure 28. Lock frame group—exploded view.

- (2) Inspect the pin locking spring to see that it is functioning properly in the accelerator and breechblock pin, and is in its place in lock frame and accelerator.

c. Trigger and Trigger Pin Spring.

- (1) Inspect the trigger (fig. 22) for bends, breaks, and wear. Check the trigger alignment in the lock frame.
- (2) Inspect the trigger pin spring (fig. 23) to see that it is not kinked or deformed and is functioning properly.

d. Barrel Extension Plunger Spring.

- (1) Inspect the barrel extension plunger spring (fig. 23) to see that it is not kinked or deformed.
- (2) Test the function of the barrel extension plunger and note the free length of the barrel plunger spring. If length of spring differs by more than one-quarter of an inch from 3.56 inches, it should be replaced.

49. Repair and Rebuild (Field and Depot Maintenance)

a. Accelerator and breechblock pin assembly holes will be in proper alignment and free from wear affecting retention of pin.

b. There must be no binding between accelerator claws and barrel extensions.

c. Accelerator lugs will be free of deformation and wear affecting functional parts.

d. If lock frame is cracked or broken, it must be replaced.

50. Assembly and Installation

Refer to TM 9-2012 for instructions on the assembly and installation of the lock frame group.

Section VII. BARREL AND BARREL EXTENSION GROUP

51. Removal and Disassembly

Follow instruction in TM 9-2012 on removal and disassembly of barrel and barrel extension group (fig. 24).



Figure 24. Barrel and barrel extension group.

52. Inspection

a. Barrel.

- (1) Inspect the barrel (fig. 24) as a whole from the standpoint of serviceability. Before inspecting the barrel, all metal and other fining must be removed and the barrel wiped dry. Accuracy of fire is the main point to consider when inspecting a barrel. Accuracy is reduced in varying degrees by bulges, erosion, and pits in the bore. The extent to which these defects will reduce accuracy is determined by two methods; namely, visual inspection and bore-gaging.
- (2) For visual inspection, using barrel reflector 7265788 (figs. 9 and 25), hold the barrel so that its interior is illuminated and examine the bore. If the barrel is not bent or otherwise deformed, if the bore appears free from bulges and large pits, and if the lands are sharp and uniformly distinct, it is serviceable, providing it is in good condition otherwise. Examine the breech end of the bore. If the lands are worn away so that the first 6 or 8 inches of the bore are smooth, the barrel is unserviceable and should be scrapped. A bulge is indicated by a shadowy depression or ring in the bore. It may often be detected also by a bulge or raised ring on the exterior surface. If the barrel is pitted to the extent that the sharpness of the lands is affected, or if it has a pit or pits in the lands or grooves large enough to permit passage of gas around the bullet (that is, a pit the width of a land or groove and three-eighths of an inch long or longer), the barrel will be scrapped. Proper care and cleaning of the barrel as outlined in paragraph 18 will usually prevent such damage to the bore.
- (3) Unlined barrels inspected and found serviceable by visual test will be bore-gaged, using the breech bore gage 5564343 (fig. 6). Insert the breech bore gage into the breech end of the barrel; if the gage reads more than 0.304, the barrel is unserviceable and should be scrapped.

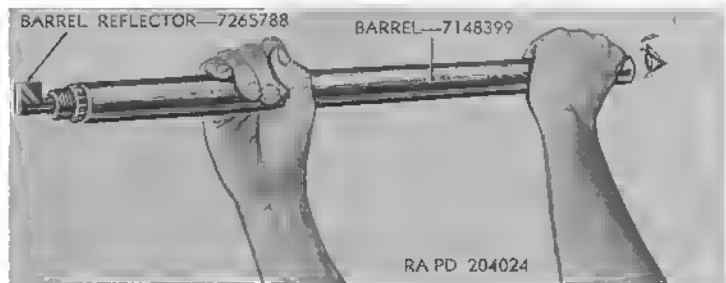


Figure 25. Inspecting barrel, using barrel reflector 7265788.



Figure 26. Barrel extension group.

- (4) Lined barrels are inspected visually only as in (2) above. Lined barrels, which are unserviceable, should have their liners salvaged and shipped to Springfield Armory (b below).
- (5) Unlined barrels rejected in (3) above will be used for function-firing purposes.

b. Barrel Extension Group (figs. 26 and 27).

- (1) Inspect for burred or worn surface; broken or missing pin spring; worn or burred accelerator and breech lock pin; worn threads; and weak, broken, or loose barrel locking spring.

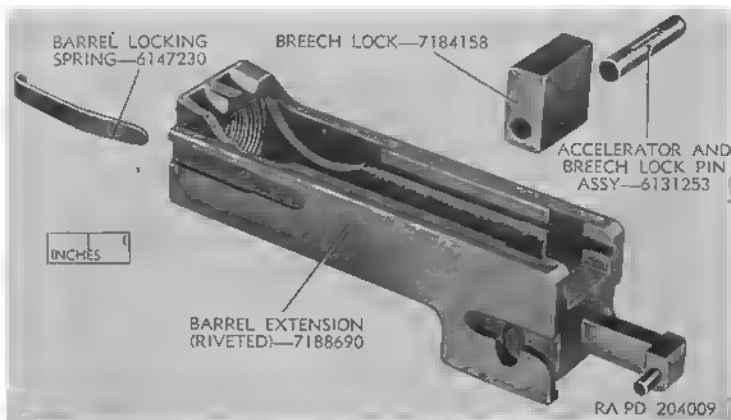


Figure 27. Barrel extension group—exploded view.

- (2) The barrel threads should make an easy fit but not a loose fit with the barrel.
- (3) Test for undue looseness of the breech lock in its recess, and for cracks or flaws in the portion of the barrel extension that supports the breech lock.
- (4) Visually inspect the breech lock for burrs or damage.
- (5) In operation of the gun, the extractor assembly, in dropping to its lowest position, sometimes causes a burr on the top of the left side of the barrel extension, and a similar burr is occasionally caused by the ejector on the right side. These burrs should be carefully removed.
- (6) Inspect the stud on barrel extension for looseness of riveting.
- (7) Check the pin locking spring.

53. Repair and Rebuild (Field and Depot Maintenance)

a. Barrel.

- (1) Each gun must be equipped with a new barrel unless the condition of the old barrel approximates that of a new one. In this connection, used barrels must pass a visual inspection and the breech bore reading, using breech bore gage 5564343 (fig. 6), will not be in excess of 0.304 inch.
- (2) Barrels on hand and removed from guns receiving complete rebuild will be inspected for serviceability. If they are visually serviceable and have sharp and distinct lands, they should be bore-gaged, using breech bore gage 5564343 (fig. 6) and inspected for completeness, assembly, and workmanship.
- (3) Unlined barrels rejected will be used for function-firing purposes.

b. Salvage of Stellite Liners.

- (1) Lined barrels rejected will be disposed of as described in (a) and (b) below.
 - (a) Barrels will be cut off 9 inches from the breech end. Cutting may be accomplished by any available means, such as shearing, cutting wheel, or cutting torch. The dimension, 9 inches, is approximately 1 inch beyond the end of the liner to prevent squeezing the liner in the tube by shearing and/or welding the liner to the tube with the cutting torch.
 - (b) The section containing the liner will be shipped to Springfield Armory for salvage of the Stellite liner.
- (2) An alternate method of removal of the liner for those installations having adequate heating facilities is described in (a) through (d) below.
 - (a) Heat barrel or barrel section with Stellite liner to 1,700° to 1,800° F. and hold for 1 hour at that temperature.

Note. Prior to salvage, barrels may be cut to such a length as required for convenience of handling or for insertion into furnace.

(b) Quench in water.

Note. Container for water should be of at least 5-gallon capacity.

(c) Break barrel or barrel section cracked by quenching ((b) above) by impact and remove liner.

Note. Barrel or barrel section may be broken by dropping from a height of 4 feet or more onto a suitable surface such as a 12 x 12 x 1-inch steel plate, or 3-inch square steel bar; by holding muzzle end and striking breech end against an anvil; or by hitting the section with a sledge hammer.

(d) Ship salvaged liner to Springfield Armory.

c. *Barrel Extension.*

- (1) The barrel extension must be free of sharp edges.
- (2) The barrel extension must have proper radii on bolt ways, breech lock cam ways, and breech lock ways.
- (3) The breech lock must work freely, with a minimum of looseness in its slot.
- (4) The upper forward beveled edges of the breech lock must be free from wear and well defined.
- (5) The barrel locking spring must function to prevent rotation of the barrel during firing of the gun.

54. Assembly and Installation

Refer to TM 9-2012 for instructions on assembly and installation of barrel and barrel extension group.

Section VIII. CASING GROUP

55. Disassembly of Casing Group

a. *Casing Group.* The casing group (fig. 28) consists of the rear sight group, front sight group, casing assembly, retracting bar group, front barrel bearing group, and cover detent pawl group.

b. *Rear Sight Group.*

- (1) Remove rear sight leaf assembly (figs. 29 and 30) from the top plate on casing assembly as described in (a) and (b) below.
 - (a) Remove staking over ends of rear sight windage knob pin and drift out pin (fig. 30). Remove rear sight windage knob, click plunger, and click plunger spring.
 - (b) Unscrew rear sight windage screw from leaf and top plate. Lift out rear sight leaf assembly.
- (2) Disassemble rear sight leaf assembly as described in (a) through (d) below.
 - (a) Remove staking and drive out rear sight elevating screw retaining pin (fig. 30).
 - (b) Withdraw rear sight elevating screw (fig. 30).

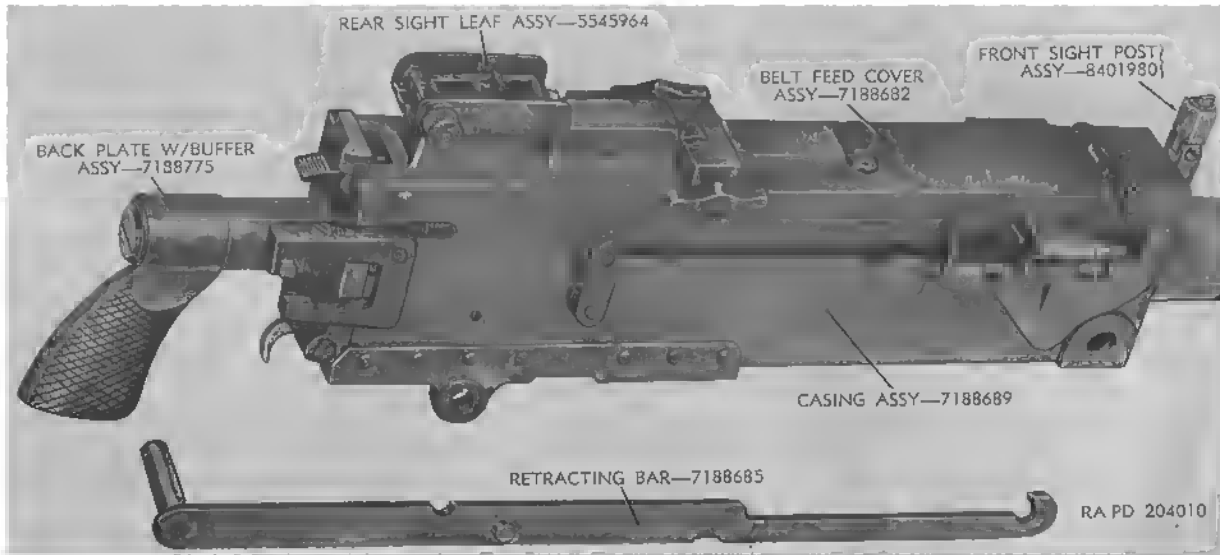


Figure 28. Casing group.

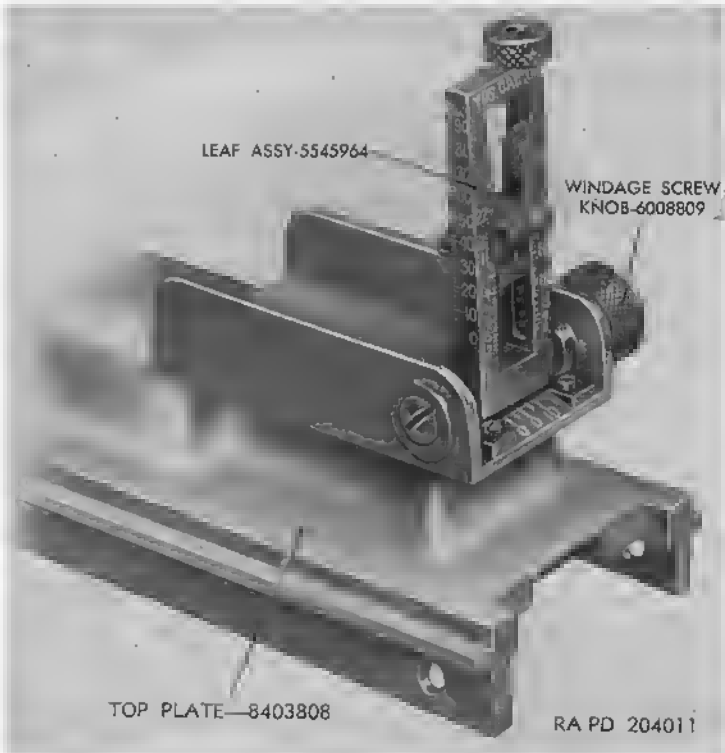


Figure 29. Rear sight group.

(c) Remove rear sight slide from rear of leaf (fig. 30).

(d) Remove rear sight elevating screw knob, click plunger, and click plunger spring (fig. 30).

c. Front Sight Group. Remove front sight group by unscrewing front sight body screw (figs. 31 and 32). To disassemble front sight group follow instructions given in TM 9-2012.

d. Breech Lock Cam. Remove the breech lock cam (figs. 33 and 34) from the bottom plate in the casing assembly by unscrewing the breech lock cam screw (fig. 34). It will be necessary to exert pressure to unscrew this screw, as it has been staked on the inside or top side of cam.

e. Belt Holding Pawl (fig. 34). Withdraw the belt holding pawl pin assembly to the rear, holding the belt holding pawl depressed until the pin assembly has cleared its hole in the pawl. Withdraw the pin assembly from the bracket; then lift the pawl and belt holding pawl spring from the casing.

f. *Cartridge Stops* (fig. 34). Withdraw the opposite belt holding pawl pin assembly to the rear. Lift out front and rear cartridge stops and link chute.

g. *Front Barrel Bearing*. Using the barrel bearing plug wrench—6147277 (fig. 9), unscrew front barrel bearing (fig. 35) in a counter-clockwise direction, which at the same time removes the front barrel bearing lock band. The band may be released from the bearing by

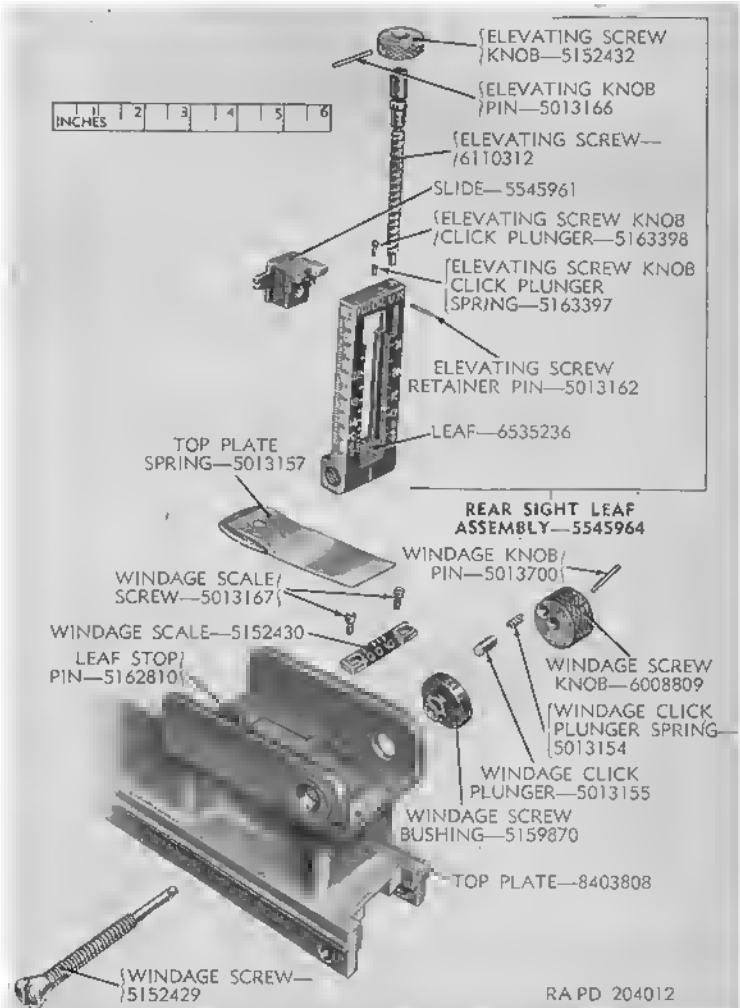
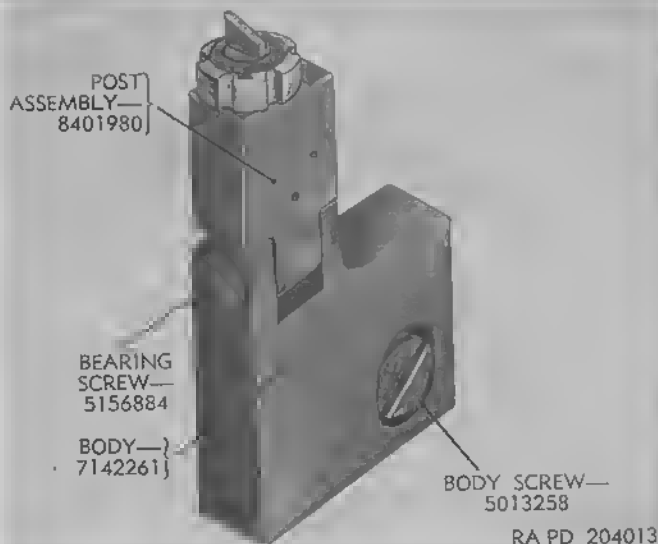


Figure 30. Rear sight group—exploded view.



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Figure 31. Front sight group.

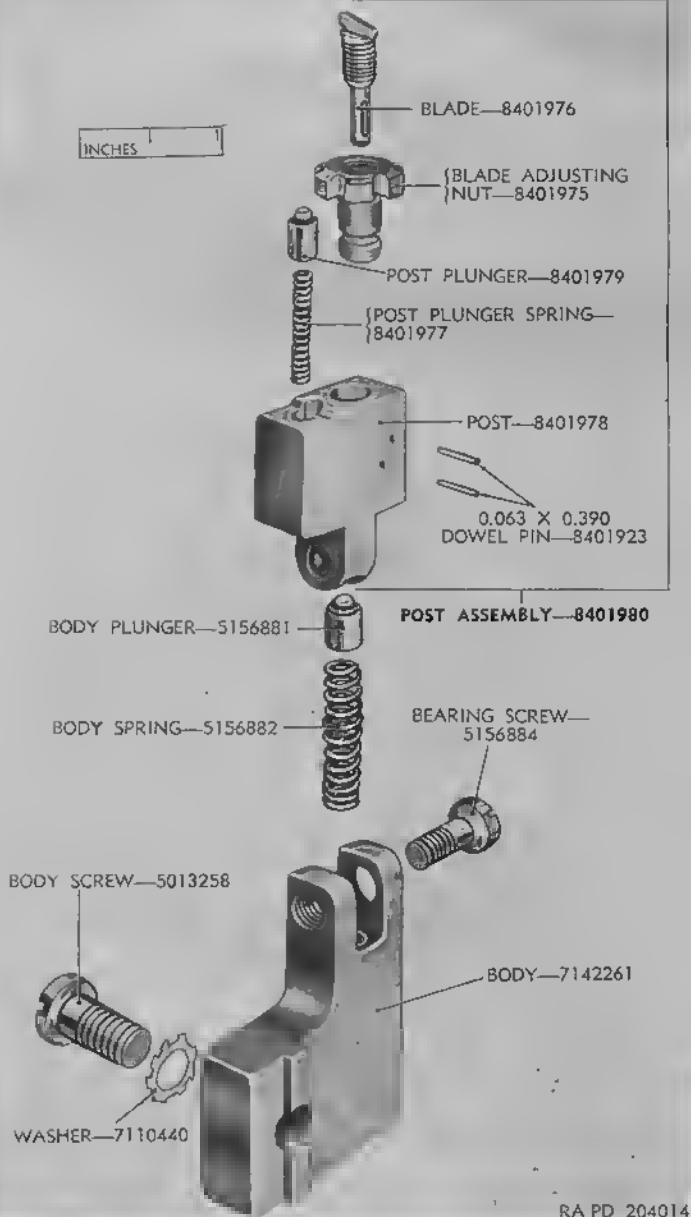
driving it off. If a flash hider MG assembly is used, use a wrench in grooves in side of flash hider to unscrew the flash hider. Drive off the staked front barrel lock band.

h. Barrel Jacket. Unscrew the flat-head screw from the barrel jacket (fig. 35) and trunnion block. It will be necessary to exert pressure as this screw is staked to the jacket. Using a ring jet burner, heat the contact surfaces of the jacket and trunnion block until the solder is liquid enough to release the jacket; then unscrew the jacket.

i. Retracting Bar Group. The front and rear retracting guides and spacers (figs. 36 and 37) are riveted to the right side plate of the gun. The retracting bar is retained in the slide guides by means of the retracting bar guide plunger, plunger spring, and plug, all assembled in the rear guide. The retracting bar lock, lock plunger, and lock plunger spring are assembled in the rear guide and retained by the retracting bar lock retaining pin.

- (1) To remove the retracting bar, pull bar to rear, lifting it free of its holding notch, until it is clear of the guides.
- (2) To remove the guide plunger, back the threaded plug part way out to relieve compression on the guide plunger spring.

Caution: Do not unscrew plug too far as it will fly out. Be careful that plunger and spring do not fly as they are under about 4 pounds pressure when assembled.



RA PD 204014

Figure 32. Front sight group—exploded view.



Figure 33. Section of casing assembly.

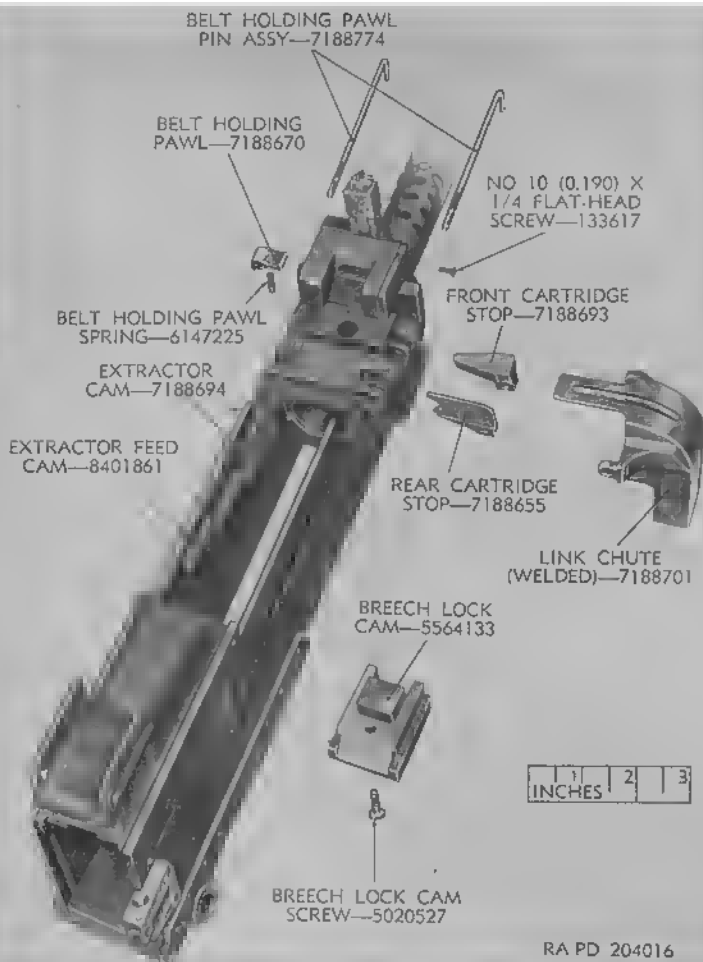


Figure 34. Casing assembly—partially exploded view.

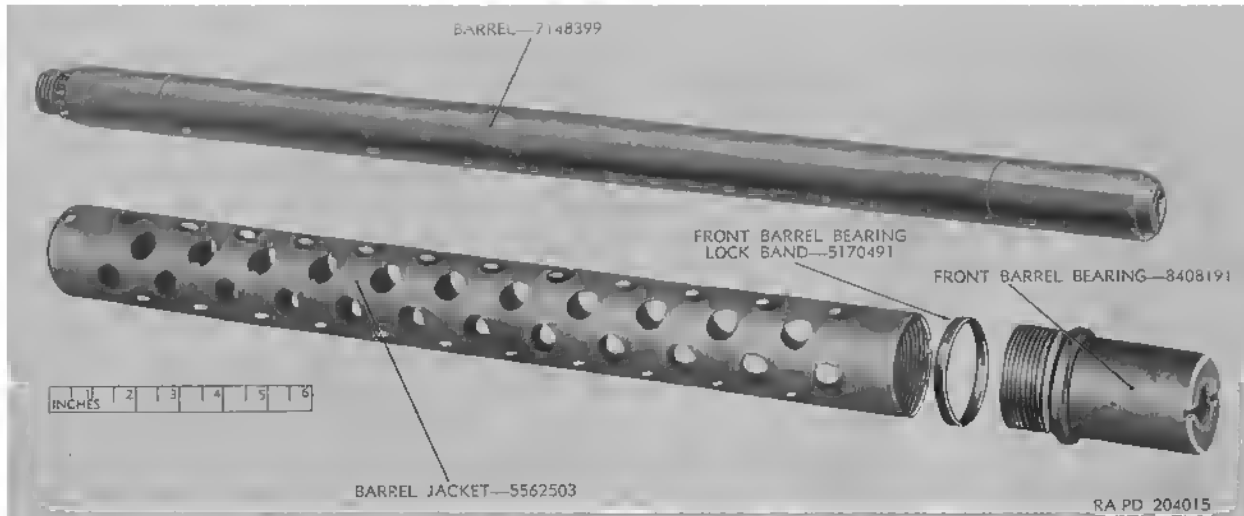
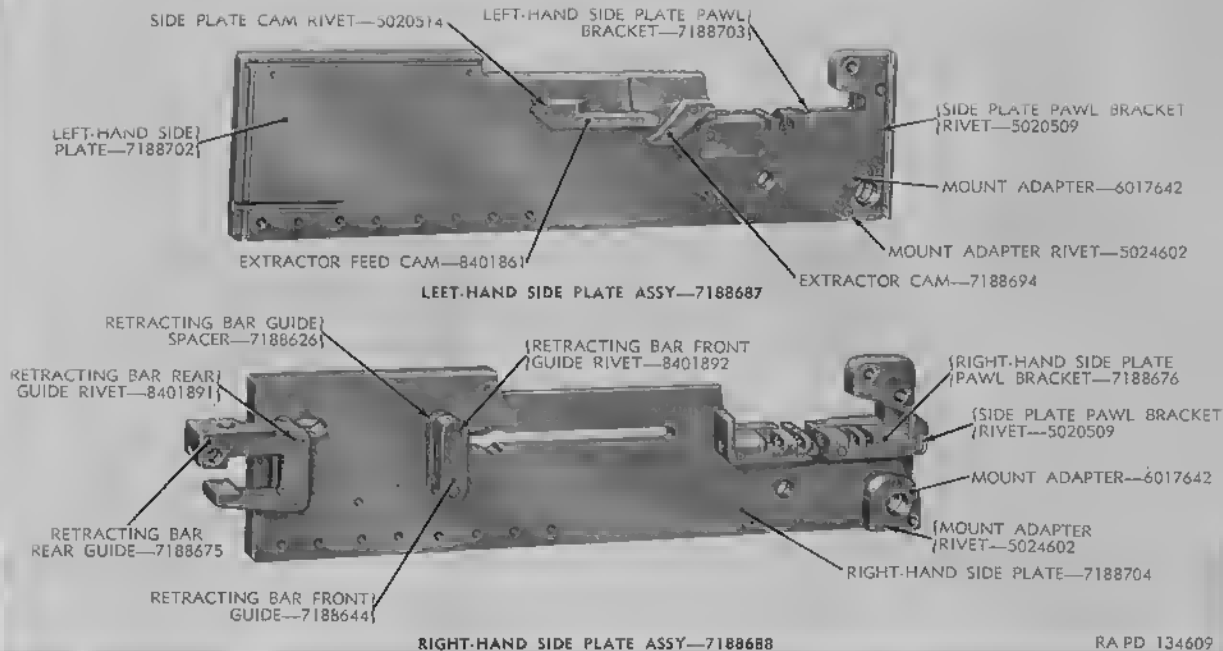


Figure 85. Barrel jacket group—exploded view.



RA PD 134609

Figure 36. Side plate assemblies.

- (3) To remove lock, drive out the lock retaining pin, as both ends are staked. Slide the lock laterally from the rear guide, being careful not to lose the lock plunger and plunger spring.

j. *Cover Detent Pawl Group.* To disassemble the cover detent pawl group (fig. 38), follow the instructions given in TMI 9-2012. Use enl. .30 cover detent pawl drift 8407288 (fig. 6) to remove the 0.078 x $\frac{3}{4}$ spring pin from the trunnion block and cover detent pawl.

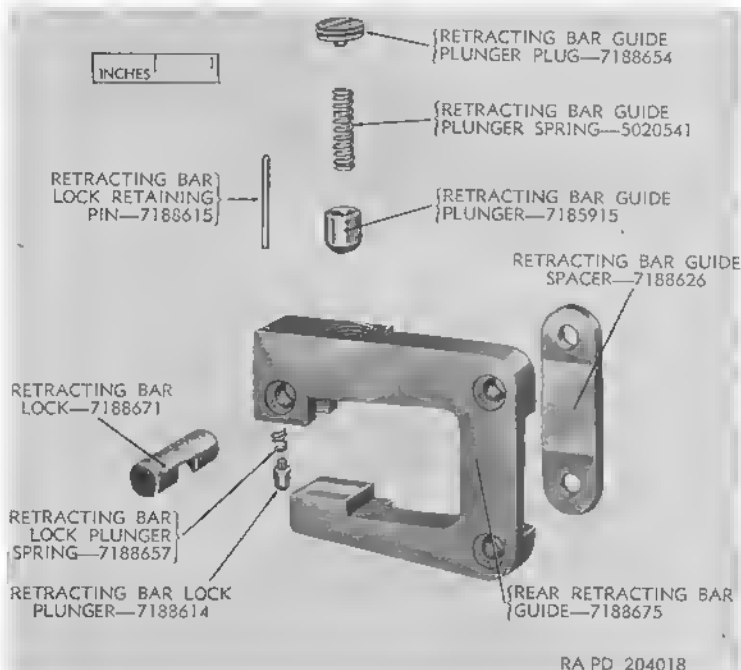


Figure 37. Rear retracting bar group.

56. Inspection

a. Cover Latch.

- (1) Check the cover latch to make sure that its contact surfaces are free of burrs and that it holds the cover securely.
- (2) Inspect the cover latch spring for breaks or cracks. Replace the spring if damaged.

b. Rear Sight Group.

- (1) Inspect the sight as a whole to see that its retaining pins are peened and are holding. See that the windage screw bushing is firmly staked in the top plate and does not turn.

- (2) Check visibility of numerals and graduations on the sight and the windage scales.
- (3) Check the movement of the sight slide; the sight slide should be movable but firm. Check the clicks.
- (4) Check the relative vertical alinement of the sight on the top plate. It should be positioned at a 90° angle.

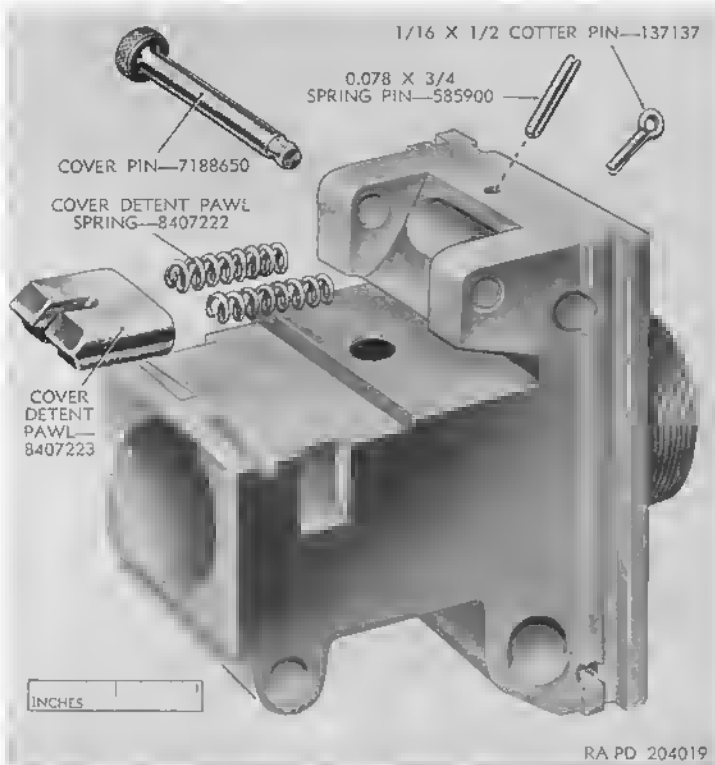


Figure 38. Cover detent pawl group—exploded view.

- (5) Check the tension of the right spring by its holding action on the leaf.
- (6) Check the lateral movement of the sight leaf by turning the windage adjusting nut. Check the click plunger for positive holding.
- (7) Check the hinged spring action of the leaf with respect to the base.

c. Front Sight Group.

- (1) Check the front sight body for looseness on the trunnion block.
- (2) Check the hinged action of the front sight post assembly. It should hold solidly when in the upward or folded position.
- (3) Check position of the front sight blade. It should be positioned in the center of the post, with the high side to the rear.
- (4) Check all front sight pins for tightness.
- (5) Inspect the blade and the front sight blade adjusting nut for looseness.
- (6) Check front plunger and front sight plunger spring for wear.

d. Barrel Jacket Group.

- (1) Check the straightness of the jacket; the barrel should insert without sticking or binding.
- (2) Check the barrel jacket for looseness on the trunnion block; no loose solder should be showing, and the flat-head locking screw should be tight and staked.
- (3) Check the barrel bearing for excessive carbon deposits and cracks. The bearing should be holding securely to jacket, with locking band staked. If a flash hider M6 assembly is used instead of barrel bearing, check the bearing surface on hider for cracks and excessive carbon deposits.
- (4) The barrel jackets of cal. .30 machine guns M37 (tank) must be held tight in place on the casing assembly by the setscrew.

e. Casing Group Components.

- (1) Inspect the belt holding pawl, link chute, cartridge stops, and breech lock cam (fig. 34) to make sure that all are in place and are held securely. Inspect the breech lock cam for wear and burrs. Test the spring action of the belt holding pawl spring for weakness.
- (2) Check belt holding pawl brackets for looseness on casing.
- (3) Check the solidity of the top plate, bottom plate, trunnion block, cocking insert mount adapters, belt holding pawl brackets, extractor cam, and extractor feed cam.
- (4) Make an overall check of holding rivets and slideways for solidity, smooth surface, burrs, and cracks.
- (5) The bolt guideways should be checked for burrs.
- (6) The back plate guideways should be checked for burrs, and the rear end of the casing for cracks near the back plate guideways.
- (7) Inspect cover detent pawl group for operation of cover and spring action. Check components for burrs on contacting surfaces. Also check action of cover detent pawl springs.

57. Repair and Rebuild (Field and Depot Maintenance)

a. Casing Group.

- (1) The casing must be straight and free of excessive wear at the feedway and other important functional points. Barrel jackets and side plates must not be distorted, cracked, or otherwise damaged.
- (2) Maximum diameter of front mounting hole is 0.567 inch.
- (3) Loose rivets will be tightened or replaced if necessary (par. 20 *d*). Replaced rivets must present a workmanlike appearance (DEPOT MAINTENANCE ONLY).
- (4) Unservicable casings, which cannot be repaired, will be reported for disposition instructions (after a sufficient quantity has accumulated) to Rock Island Arsenal, Rock Island, Illinois, ATTENTION: ORDBC-D.
- (5) Front and rear cartridge stops will be tight and free of wear and distortion (DEPOT MAINTENANCE ONLY).
- (6) Front sight body will be tight and free of distortion that would tend to affect accuracy.
- (7) Cocking lever insert and operating slot must be smooth, with the edges free of burrs and sharpness.

b. Sight Groups.

- (1) Rear sight component parts must not be distorted so as to interfere with functioning. Graduations must be clearly defined by use of white graduation filler, specification 51-70-1A, where necessary.
- (2) The rear sight windage screw must be sufficiently tight to eliminate change of adjustment from vibration during firing. The maximum permissible end play is 0.010 inch.
- (3) The front sight must be in alignment and free from distortion. The blade should be firmly fastened in place.
- (4) When the front sight blade is out of alignment, place the gun on 1,000-inch range, having a target marked off with a vertical line 1 inch wide and 20 inches long. With the sight set at 700 yards and windage at zero, align gun on the center of the target and fire a burst of 10 rounds. If shots go to the right of the line, depress front sight plunger and plunger spring, loosen the front sight blade adjusting nut, and tap the front sight blade slightly to the right; if shots go to the left of the line, the front sight blade should be tapped to the left. Then tighten the adjusting nut, relay, reload, and fire. Repeat this operation until proper alignment is obtained.
- (5) The front sight must raise and lower without binding, but must not be loose.

c. *Bottom Plate Group.*

(1) *General.*

- (a) The bottom plate must be straight and tightly riveted.
- (b) The maximum diameter of rear mounting hole is 0.445 inch.
- (c) Check inside width of bottom plate mounting ears (fig. 39), using bottom plate ears snap and width gage 7319922 (figs. 6, 39, and 40). If distance between ears is too narrow, use adapter ears expander 6316037 (figs. 5, 39, and 40) to spread the adapter ears apart. Check outside width with snap end of gage 7319922. (DEPOT MAINTENANCE ONLY.)

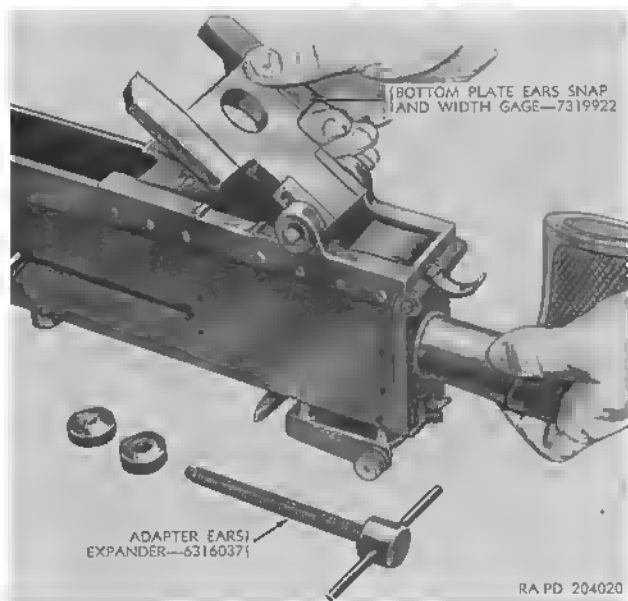


Figure 39. Checking inside width of mounting ears.

- (2) *Breech lock cam.* The breech lock cam screw must be drawn up tight, then loosened one-sixth to one-quarter turn from the tight position and staked on the inside of the casing in two places adjacent to the clearances that are provided in the breech lock cam. There will be a perceptible float.

d. *Barrel Jacket Group.*

- (1) The barrel jackets will not be bent to the extent of binding the barrel in front barrel bearing.
- (2) In some cases, the barrel may become loose on the trunnion block and allow excessive barrel whip, with a resulting un-

controlled dispersion of fire. When a condition of this type is encountered, it may be corrected in the manner described in (a) through (e) below.

- (a) Disassemble the gun and then remove the barrel jacket from the gun and file a small amount of metal from the rear end of the jacket.
- (b) Assemble the jacket to the gun and tighten against the trunnion block.
- (c) Mark the new position for the barrel jacket locking screw hole.

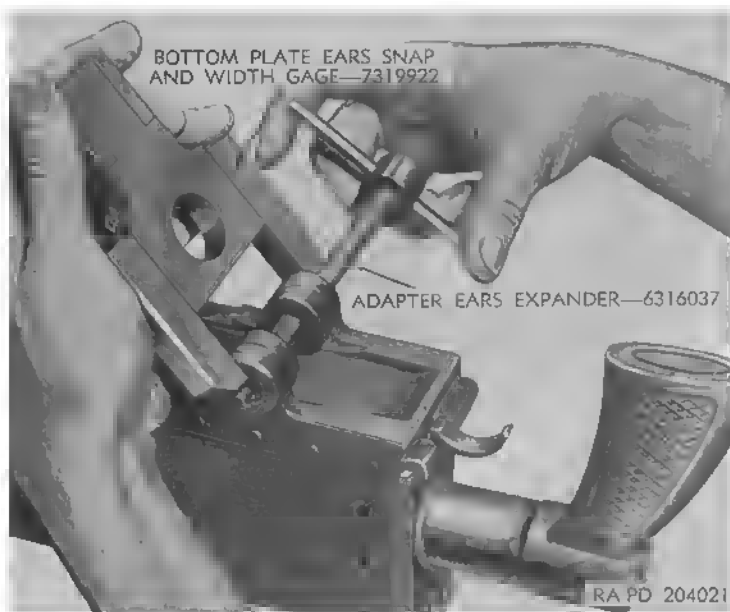


Figure 40. Checking outside width of mounting ears.

- (d) Drill, tap, and countersink a new hole for the flat-head screw.
- (e) Sweat-solder the barrel jacket and trunnion block together. Re-tap the screw hole, screw in flat-head screw, and stake in place.

58. Assembly

a. Rear Sight Group.

- (1) Replace the rear sight windage scale so that its readings are facing to the rear; then screw in the two rear sight windage screws.

- (2) Place the rear sight top plate spring into the rear top plate. See that it fits securely.
- (3) Match the rear sight slide with the rear sight leaf and hold in position. Insert the rear sight elevating screw in the leaf and screw into the slide. Insert the elevating screw knob click plunger spring (compression, 0.040 OD, 5 coils) and rear sight elevating knob plunger in the leaf, and slip the rear sight elevating screw knob on the shank of the screw. Align the knob pin holes with the hole in the shank, insert the rear sight elevating knob pin (stght, sq-ends, 0.0512 x 0.37), and peen the knob over the pin, both sides. Insert the rear sight elevating screw retaining pin (stght, sq-ends, 0.0512 x 0.200) in the face of the leaf, and peen.
- (4) Place the rear sight leaf assembly in position on the top plate spring with numerals facing rearward, and insert the rear sight windage screw from the left through the hole in the top plate and screw windage screw through the sight leaf assembly until it protrudes from the opposite side of top plate. Insert the windage click plunger spring (compression, 0.118 OD, 10½ coils) and windage click plunger into the windage screw knob, and press the knob on the windage screw until the pin holes align. Drive in the rear sight windage knob pin (stght, sq-ends, 0.0635 x ¼) and peen.

b. Front Sight Group. Refer to TM 9-2012 for assembly instructions for front sight group.

c. Breech Lock Cam. Place breech lock cam on the bottom plate so that the high side faces forward, making sure that it is properly seated. Insert the breech lock cam screw through the bottom of the bottom plate, tighten, then loosen one-sixth to one-quarter turn. Then stake the screw at two places on the inside of bottom plate adjacent to the slots provided in breech lock cam.

d. Belt Holding Pawl. Start the belt holding pawl pin assembly into the holes in belt holding pawl bracket. Place the belt holding pawl spring compression, 0.15 OD, 13 coils in the well and the belt holding pawl in its position with the thin end down and the spring well immediately over the spring; depress the pawl till pin holes align, and drive belt holding pawl pin assembly home.

e. Barrel Jacket. Assemble the barrel jacket, if it has been disassembled, by applying heat to both the trunnion block and the end of the jacket. Apply solder, and screw on the jacket until the retaining screw hole in the jacket aligns with the hole in the trunnion block. Tap and countersink hole for No. 10 x ¼ flat-head screw in jacket. Screw in the flat-head screw and file off excess solder.

f. Front Barrel Bearing, Lock Band, and Flash Hider MG Assembly. Assemble the front barrel bearing lock band to the front barrel

bearing, screw the barrel bearing into the barrel jacket until tight, then stake bearing lock band to bearing and crimp to jacket. If flash hider M6 assembly is used, screw the hider assembly into the barrel jacket, using a crescent wrench on the grooves on sides of hider to tighten and crimp the front barrel lock band at crimping slot on jacket.

g. Retracting Guide.

- (1) Place the guide plunger spring (compression 0.175 OD, 12 coils) in the guide plunger, and the plunger in the hole in the rear guide.
- (2) Place the guide plunger plug on the plunger spring and press down and turn until the threads catch. Take care that the plug does not fly out during assembly, as the spring exerts about 4 pounds pressure when assembled.
- (3) Screw in the plug flush with the top of the hole in the guide.
- (4) Place the retracting bar lock plunger spring (compression, 0.15 OD, 8 coils) in the lock plunger, and insert in the well on the rear guide. Depressing the plunger against the plunger spring, replace the retracting bar lock and install the retracting bar lock retaining pin (stght, sq-ends, 0.0625 x 0.906). Stake both ends of the pin.

h. Cover Detent Group.

- (1) Place the springs in the well in the detent pawl and insert the pawl in the seat in the trunnion block, compress the spring, install the 0.078 x $\frac{3}{4}$ spring pin through hole in trunnion and groove in pawl.
- (2) Place cover in open position at about a 45° angle.
- (3) Align bolt holes and push the cover pin through; insert the $\frac{1}{16}$ x $\frac{1}{2}$ cotter pin, and spread the prongs.
- (4) Test the action of the detent pawl by raising the cover.

Section IX. HEAD SPACE

59. Checking Head Space

The head space of a military weapon, with the cartridge fully seated in the chamber, is the distance between the base of the cartridge and the face of the bolt. The head space 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 positioned against the rear end of the barrel.

60. Adjusting Head Space

a. In the cal. .30 machine gun M37 (tank), head space is adjusted by obtaining the proper distance between the forward part of the bolt and rear end of barrel. Guns should be fully assembled when adjusting head space.

b. To adjust head space, follow instructions in TM 9-2012.

FINAL INSPECTION

Section I. RETURN TO USER

61. General

a. Final acceptance for materiel repaired in maintenance shops for return to user depends largely upon the care exercised during repair procedures. It is therefore important that the in-process inspections in chapter 4 be carefully performed during repair.

b. Materiel turned in for repair may be assumed to have defects caused by use or neglect. Inspection after repair is directed to wearing surfaces, parts that might crack or break due to high stress or fatigue, and evidence of corrosion. The defects do not evidence themselves by uniform reduction in a given dimension but show up as a chipped edge, a partially worn surface, or an eccentric hole.

62. Specific Inspection Procedures

Inspection of the cal. .30 machine gun M37 (tank) will include the following:

- a. A thorough check of the visual appearance of the weapon.
- b. A check for proper application of all modification work orders and the presence of pertinent completed forms (App, par. 3).
- c. A check of the operation of the weapon, paying particular attention to required parts.
- d. An examination to insure proper lubrication (par. 19).
- e. A function-firing test of the gun if a new or repaired barrel has been installed (par. 28).
- f. Application of pertinent field maintenance inspection procedures listed in table II (par. 13).

63. Inspection of Weapons To Accompany Troops Oversea

a. *General.* Standards for machine gun materiel apply only to materiel in the hands of troops alerted for overseas duty. Serviceable materiel will be inspected in accordance with standards set forth in this section.

b. *Inspection Standards.* Inspectors will determine the deficiencies most common to materiel being inspected and will make an extensive

search of the materiel for any symptoms designating those failures. Those weapons classified as serviceable will be checked as "satisfactory for oversea shipment" or "unsatisfactory for oversea shipment" in accordance with specifications listed in paragraph 62.

- (1) Materiel will not be considered unsuitable for oversea use because of lack of modification unless such modification affects the safety of personnel; is essential to functioning of the materiel; or is prescribed by an URGENT Department of the Army modification work order (MWO). RED-BORDERED War Department modification work orders that are still in effect will be considered as urgent modification work orders.
- (2) Newly manufactured and issued materiel, which has been inspected and accepted in accordance with Department of the Army specifications, are not to be rejected except for well-grounded reasons. All such rejections will be reported immediately to higher authority.
- (3) Satisfactory metal finishes for weapons range from dense black to medium light gray. Certain weapons are manufactured with an unusual shade of neutral gray finish. Since this finish (gray zinc phosphate) is an accepted Department of the Army standard, these weapons will not be rejected by inspectors or troops for this condition. Rigid restrictions on shiny metal surfaces will not be carried to an extreme. A worn surface is objectionable from the standpoint of visibility when it is capable of reflecting light, somewhat as a mirror does. No weapon will be rejected for oversea use unless exterior parts have a distinct shine. Bright rear sights will not be permitted on weapons for oversea use. Check to see that all rear sights have a dull black or gray finish on all surfaces.
- (4) Light pitting of barrel, even though plainly visible, is not cause for rejecting a weapon. It does not affect the accuracy materially, but is a disadvantage because it interferes with subsequent cleanings. A barrel that is uniformly pitted out with the edges of the lands sharp is acceptable, provided the breech bore reading of the barrel is satisfactory. Only those barrels showing developed pits, or pits cutting into the lands, are unsatisfactory.
- (5) Looseness and play in such components as sights, covers, back plates, bolts, and adaptors may be cause for rejection. In many cases, however, the importance of such defects is exaggerated. Looseness and play must be considerable to affect the accuracy of a weapon beyond its natural dispersion. All weapons must have play between working components to

permit them to operate in localities where sand and dust are prevalent. A weapon may be completely useless if its working parts are fitted with insufficient clearance.

- (6) Minor defects in metal components do not normally affect their being acceptable. Scratches and toolmarks on barrels are ordinarily of no importance.

c. Inspection of Guns. Inspection standards for specific weapons must be observed during inspection of materiel in the hands of troops alerted for overseas duty. Cal. .30 machine gun M37 (tank) will be inspected as follows:

- (1) Perform all pertinent inspection checks outlined in *b* above.
- (2) Check breech bore dimension, using breech bore gage 3564343 (fig. 6). Reading must not be greater than 0.304 inch. If it exceeds this figure, the barrel must be retained in the zone of interior and used for training purposes only, in accordance with existing regulations.

Note. The ordnance officer will furnish breech bore gage 3564343 for checking barrels.

- (3) Check side plates for cracks or deformation at slot for back plate.
- (4) Check belt feed cover assembly and barrel jacket to see that they are not excessively loose in the trunnion block.

Section II. RETURN TO STOCK

64. General

a. Final inspection for return to stock requires that the rebuilt weapons will approximate new materiel. Materiel which has been rebuilt, contains many used parts that may function correctly for a given period. Even if the dimensions of such parts are worn considerably below new part tolerances, functioning and interchangeability will not be adversely affected and the parts are consequently acceptable. Consequently the inspection of materiel after rebuild will differ from the inspection procedure used in the manufacturing plant in that attention will be directed to wearing surfaces, parts that might crack or break due to high stress or fatigue, and evidence of corrosion. These defects do not evidence themselves by uniform reduction in a given dimension but show up as a chipped edge, a partially worn surface, or an eccentric hole.

b. A gage used in manufacturing is a means of comparing an unknown dimension with a known one to judge whether a part comes within requirements of drawings and specifications. After a part is worn through use, the change in dimension is more easily detected in many cases by comparing with adjacent surfaces. Visual inspection, therefore, is far more applicable in these cases and gaging is limited

to those dimensions that are critical and that may be advantageously measured rather than compared. Inspection of noncritical parts is limited to appearance and the presence of cracks or flaws. Tolerances for noncritical parts are for manufacturing purposes only and for insuring interchangeability, and are not to be used in final inspection for rebuild.

65. Specific Procedures

a. A careful check of in-process inspection procedures must be made during repair and/or rebuild, as provided in chapter 4, since final acceptance of the assembled weapon depends largely upon the care exercised in process.

b. This phase of inspection must be coordinated, in so far as possible, with the rebuild standards given in table II (par. 13). Weapons not up to standards will be reprocessed and reinspected.

c. Upon completion of the inspection, guns will be properly cleaned (par. 18) and lubricated (par. 19) and the correct rust-preventive applied before being boxed.

d. All guns will be function-fired as specified in paragraph 28 before storage.

66. Coil Spring Standards

All coil springs will be replaced with new springs during the repair or rebuild of the materiel described in this manual. New spring standards are listed in table V.

Table V. Coil Spring Standards

Spring	Part No.	Number of coils	Mean assembled height (in.)	Load at mean assembled height (lb)	Minimum operating height (in.)	Load at minimum operating height (lb)
Adjusting screw plunger.....	5135053	18	0.700	3.7 ± 0.4	0.669	4.6 ± 0.4
Back plate latch.....	7188658	10	0.655	4.24 ± 0.42	0.405	12 ± 1.2
Back plate latch lock.....	7188669	4	0.281	1.29 ± 0.13	0.151	7.00 ± 0.70
Barrel extension plunger.....	5135057	24	1.85	13.9 ± 1	1.222	$19. \pm 1$
Belt feed lever.....	5135296	8	0.3125	5.5 ± 1	0.220	8.7 ± 1.5
Belt feed pawl.....	5135297	6	0.406	4.25 ± 0.75	0.190	8.4 ± 1.5
Belt holding pawl.....	6147225	¹ 13	0.500	3.25 ± 0.50	0.360	6.75 ± 0.50
Cover detent pawl.....	8407222	13	0.735	10 ± 0.8	0.687	12 ± 1.0
Driving.....	7191544	58	8.900	11.4.....	4.454	20.5
Ejector.....	5135303	6	0.23	16.0 ± 2	0.171	26.00 ± 4.5
Elevating screw knob.....	5163397	5	0.106	2 ± 0.5	0.093	2.68 ± 0.50
Extractor plunger.....	5135305	9½	0.420	3.25 ± 0.5	0.303	4.6 ± 0.7
Firing pin.....	6147229	50	2.46	15.5.....	2.376	16.20
Front sight body.....	5156882	15	0.593	9.75.....	0.527	11.33
Front sight post plunger.....	8401977	14	0.407	1.00 ± 0.08	0.312	2.95 ± 0.25
Retracting bar guide plunger.....	5020541	12	0.508	4.3 ± 0.4	0.383	8.6 ± 0.8
Retracting bar lock plunger.....	7188657	8	0.281	2.50 ± 0.25	0.250	3.70 ± 0.37
Trigger pin.....	6147231	4	0.242	2 ± 1	0.135	-----
Trigger safety.....	7188668	13	0.531	0.98 ± 0.08	0.343	2.07 ± 0.16
Windage click plunger.....	5013154	10½	0.25	2 ± 0.56	0.206	2.67 ± 0.75

¹ Approximately.

APPENDIX

REFERENCES

1. Publication Indexes

Special regulations in the 310-20 series; DA Pam's 108-1, 310-3, and 310-4; 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. Destruction to Prevent Enemy Use.

Group R, Ammunition Land Mines and Components; Demolition Explosives and Related Items; and Ammunition for Simulated Artillery, Booby Trap, Hand Grenade, and Land Mine Fire----- ORD 3 SNL R-7

b. General.

Introduction and Index*----- ORD 1

c. Repair and Rebuild.

Group K 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
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 0003)----- ORD 6 SNL J-10, Sec. 2

d. Weapon.

Gun, Machine, Cal. .30, M37 (Tank)----- ORD (*) SNL A-89

*See SR 310-20-29, Index of Supply Manuals—Ordnance Corps, for published types of manuals of the Ordnance section of the Department of the Army Supply Manual.

3. Forms

The following forms are applicable to this materiel:

- DA Form 9-71, Locator and Inventory Control Card
- DA Form 9-72, Ordnance Stock Record Card
- DA Form 9-77, Job Order Register
- DA Form 9-78, Job Order
- DA Form 9-79, Parts Requisition
- DA Form 9-80, Job Order File
- DA Form 9-81, Exchange Part of Unit Identification Tag
- DA Form 446, Property Issue Slip
- DA Form 447, Property Turn-in Slip
- 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 828, Job Time Ticket—Individual
- DA Form 829, Rejection Memorandum
- DA Form 865, Work Order
- DA Form 866, Consolidation of Parts
- 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. Camouflage.

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

b. Decontamination.

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

c. Destruction to Prevent Enemy Use.

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

d. General.

Inspection of Ordnance Materiel in the Hands of Troops..... TM 9-1100
Safety: Accident Reporting..... SR 385-10-40
Supplies and Equipment: Unsatisfactory Equipment Report..... SR 700-45-5
(Reports Control Symbol CSGLD-247 (RI))

e. Repair and Rebuild.

Abrasive, Cleaning, Preserving, Sealing, Adhesive, and Related Materials Issued for Ordnance Materiel..... TM 9-850
Instruction Guide: Welding Theory and Application..... TM 9-2852
Lubrication..... TM 9-2835
Maintenance Supplies and Equipment: Maintenance Responsibilities and Shop Operation..... AR 750-5
Painting Instructions for Field Use..... TM 9-2851

f. 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.....	TB 9-088C-A
Preparation of Ordnance Materiel for Deep Water Fording.....	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.....	SR 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 Material Other Than Ammunition and Army Aircraft.....	TB ORD 835
Supplies and Equipment—Motor Vehicles.....	AR 700-105

g. Weapons.

Fundamentals of Small Arms.....	TM 9-2205
Small Arms, Materiel, and Associated Equipment.....	TM 9-2200

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

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JOHN A. KLEIN,
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9-49, Sp Wpns Dir Spt Co (1)

9-57A, Fld Sup Co (1)

9-227, GM Dir Spt Co (1)

9-347, Ord Tire Rebuild Co (1)

9-367, Sup Depot Co (1)

9-387, Ammo Depot Co (1)

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.

