DEPARTMENT OF THE ARMY
TECHNICAL MANUAL

TM 9-2111-1
(FORMERLY TM 9-1211)

DEPARTMENT OF THE AIR FORCE TECHNICAL ORDER TO 11W3-5-3-122

FIELD MAINTENANCE

CAL. .30 BROWNING AUTOMATIC RIFLE M1918A2

POST ARMORY

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SAN FRANCISCO, CALIFORNIA

DEPARTMENTS OF THE ARMY AND THE AIR FORCE
FEBRUARY 1957

This manual is correct to 22 January 1957

*TM 9-2111-1 TO 11W3-5-3-122

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DEPARTMENTS OF THE ARMY AND
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WASHINGTON 25, D. C., *28 February 1957*

CAL. .30 BROWNING AUTOMATIC RIFLE M1918A2

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***This manual supersedes TM 9-1211, 15 September 1947, and those portions of TB ORD 507, 1 April 1953, and TB ORD 587, 20 December 1954, pertaining to the equipment described in this manual.**

CHAPTER 1

INTRODUCTION

Section I. GENERAL

1. Scope

a. These instructions are published for the use of personnel responsible for field maintenance of this materiel. They contain information on maintenance which is beyond the scope of the tools, equipment, or supplies normally available to using organizations. This publication does not contain information which is intended primarily for the using organization since such information is available to ordnance maintenance personnel in FM 23–15.

b. This publication contains a description of and procedures for removal, disassembly, inspection, repair, and assembly of the cal. .30 Browning automatic rifle M1918A2. The appendix contains a list of current references, including supply and technical manuals, forms, and other available publications applicable to the cal. .30 Browning automatic rifle M1918A2.

c. FM 23–15 contains operating and lubricating instructions for the materiel and all maintenance operations allocated to using organizations in performing maintenance work within their scope.

d. This publication differs from TM 9–1211, as follows:

(1) Adds information on—

(*a*) Inspections.

(*b*) Cal. .30 jointed cleaning rod M1.

(2) Revises information on—

(*a*) Field maintenance allocation.

(*b*) Forms, records, and reports.

(*c*) Parts, special tools, and equipment for field maintenance.

(*d*) Repair of the weapon.

2. Field Maintenance Allocation

The publication of instructions for complete disassembly 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 ORD 8 SNL A–4. 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 manual will be made to field maintenance only when 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 compilation, maintenance, and use. Records, reports, and authorized forms are normally utilized to indicate the type, quantity, and condition of materiel to be inspected, repaired, or 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. 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. For a complete listing of all forms, see DA Pam 310–2. 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. 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 700–45–6.

d. Report of Unsatisfactory Equipment or Materials. Any deficiencies detected in the equipment covered herein, which occur under the circumstances indicated in AR 700–38 should be immediately reported in accordance with the applicable instructions in cited regulation.

Section II. DESCRIPTION AND DATA

4. Description

(figs. 1 and 2)

a. The cal. .30 Browning automatic rifle M1918A2 is an air-cooled, gas-operated, magazine-fed, shoulder-type weapon. It is primarily composed of a barrel and receiver group, trigger guard assembly, gas cylinder and forearm group, slide and piston group, rear sight assembly, buffer group, hinged butt plate assembly, magazine assembly, bipod assembly, and bolt group.

b. The trigger guard assembly, located on the bottom of the receiver, acts as a housing for the trigger mechanism, ejector, magazine catch, and cyclic change lever.

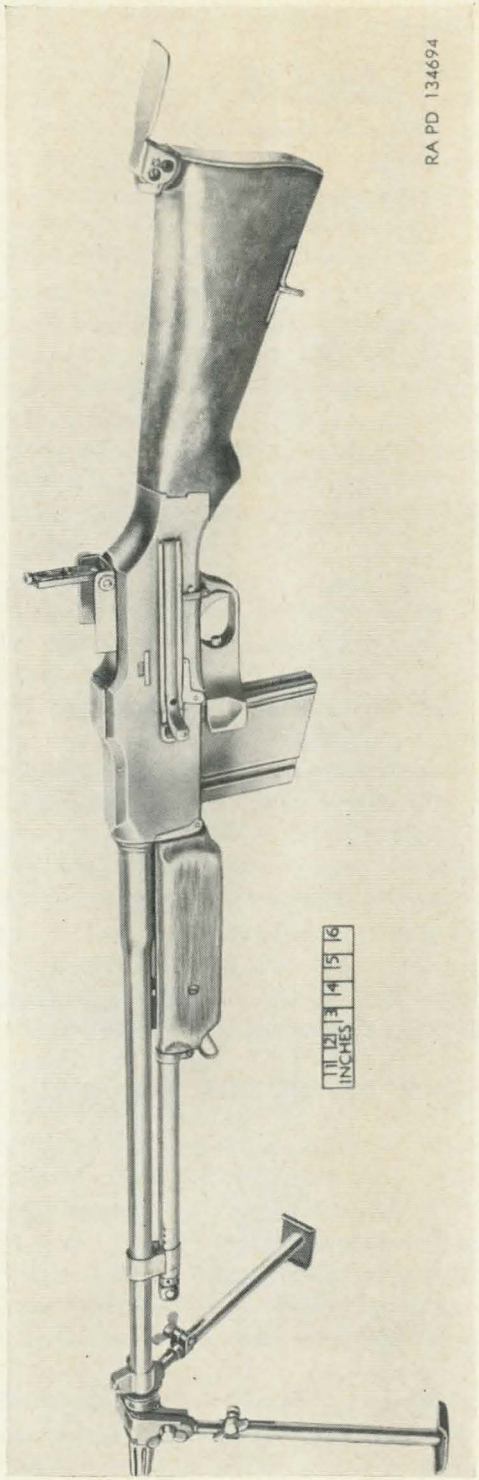

Figure 1. Cal. .30 Browning automatic rifle M1918A2—three-quarter left rear view.

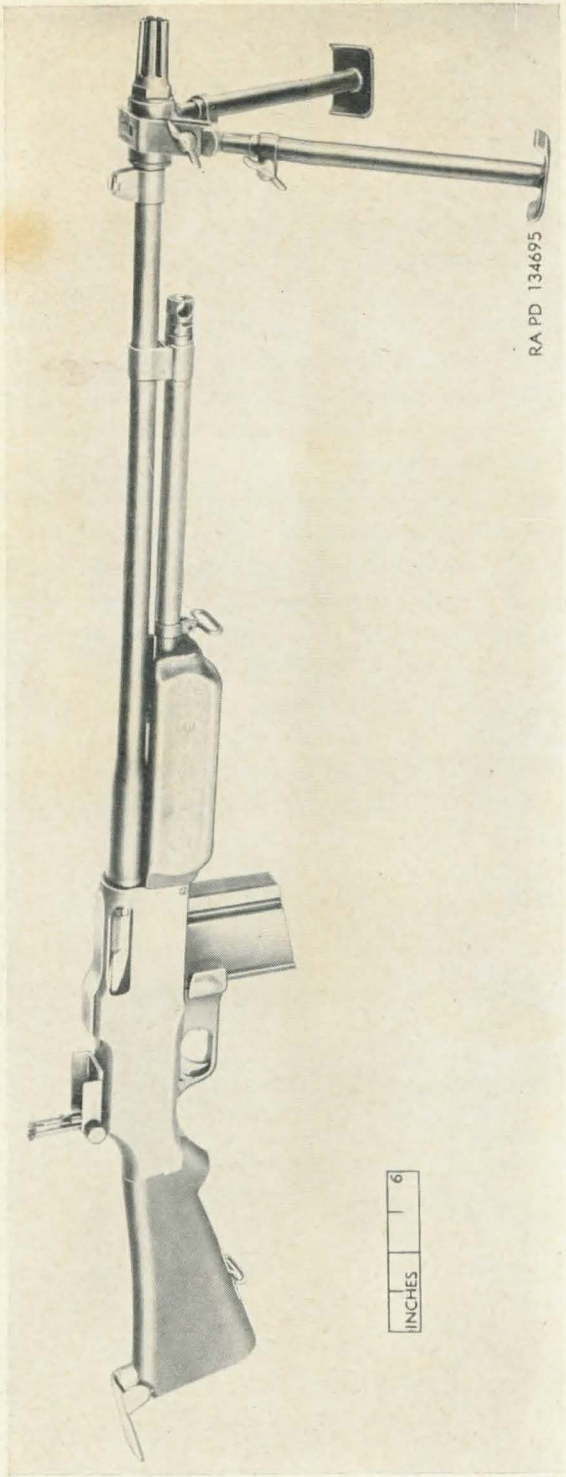

Figure 2. Cal. .30 Browning automatic rifle M1918A2—three-quarter right front view.

c. On the front of the receiver, just below the barrel, is the gas cylinder and forearm group, within which the slide and piston group reciprocates, actuated by gas pressure and the recoil spring.

d. The rear sight assembly is located on the top of the receiver just forward of the butt stock.

e. Inside the butt stock is the buffer tube, which houses the buffer group, composed of alternate cones and cups, and the actuator which, combined with the actuator spring, operates in the passage formed by the actuator tube.

f. The rear end of the stock is closed by the hinged butt plate assembly.

g. The magazine assembly, located on the bottom of the receiver towards the front, holds 20 rounds.

h. The bipod assembly is mounted with the flash hider and bipod bearing on the front of the barrel.

i. The bolt group, housing the firing pin and extractor, operates inside the receiver.

j. The rifle is furnished with a cyclic rate mechanism housed in the butt stock with a trigger guard mechanism. The cyclic rate mechanism allows two rates of automatic fire, 550 rounds per minute (normal cyclic rate) and 350 rounds per minute (slow cyclic rate).

5. Tabulated Data

Weight (complete with bipod and magazine assemblies)	19.4 lb
Weight (less bipod)	17 lb
Weight of bipod assembly	2.38 lb
Weight of magazine assembly	0.44 lb
Weight of moving parts	2.25 lb
Weight of barrel	3.65 lb
Length of rifle	47.8 in.
Length of barrel	24.07 in.
Length of rifling	71.1 cal. (21.41 in.)
Rifling:	
Number of grooves	4
Right-handed twist (one turn in)	33.3 cal. (10 in.)
Depth of grooves	0.0040 in.
Cross-sectional area of bore	0.0740 sq in.
Type of mechanism	gas-operated
Feeding device	magazine
Capacity of feeding device	20 rds
Rate of fire	500 to 650 rds per min (fast automatic) 300 to 450 rds per min (slow automatic)
Cooling system	air
Sight radius	31.125 in.
Trigger pull	10 lb max; 6 lb min
Ammunition types	ball; AP; tracer

CHAPTER 2

PARTS, SPECIAL TOOLS, AND EQUIPMENT FOR FIELD MAINTENANCE

6. General

Tools and equipment and maintenance parts over and above those available to the using organization are supplied to ordnance field maintenance units for maintaining and repairing the materiel.

7. Parts

Maintenance parts are listed in ORD 8 SNL A–4, which is the authority for requisitioning replacements.

8. Common Tools and Equipment

Standard and commonly used tools and equipment having general application to this materiel are listed in ORD 6 SNL's J–8, Section 6 and J–10, Section 2, and are authorized by TA and TOE.

9. Special Tools and Equipment

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

Note. Special tool 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 Maintenance

Item	Identifying No.	References		Use
		Fig.	Par.	
BLOCK, vise, bbl holding, S.	6316006	4, 10	50*a*(2)	To provide positive retention and prevent distortion of barrel when clamped in vise.
BRUSH, cleaning, chamber, cal. .30, M1.	6528362	4	----------	To clean the chamber.
EXTRACTOR, ruptured cartridge case, cal. .30, Mk II.	5507912	4	----------	For extracting ruptured cartridges.
FILLER, magazine, cal. .30.	5507913	4	----------	To aid in loading magazine rapidly.

Table I. Special Tools and Equipment for Field Maintenance—continued

Item	Identifying No.	References		Use
		Fig.	Par.	
GAGE, breech bore, cal. .30.	5564343	3	18*b*, 51*a*(2)(*c*), 88	To gage the lands at the breech end of the barrel to determine its serviceability.
GAGE, headspace, cal. .30, 1.940 in.	7319944	3, 5	27*b*(1), 88	To gage the distance between the shoulder of the chamber and the face of the bolt.
GAGE, headspace, cal. .30, 1.950 in.	7319954	3, 5	27*b*(2), 88	To gage the distance between the shoulder of the chamber and the face of the bolt.
GAGE, plug, NO GO, gas cyl, cal. .30, dia 0.053.	5077204	3, 28	23*f*, 68*b*(3), 88	To gage the inside diameter of the gas cylinder.
GAGE, ring, NO GO, piston dia, cal. .30, dia 0.494.	5077201	3, 25	20*b*, 64*c*(2), 88	To gage the diameter of the piston.
REFLECTOR, bbl, cal. .30.	7265788	4	51*a*(2)(*b*)	To provide a light reflecting surface for visual inspection of rifle bore without removing the barrel from receiver.
ROLL, tool, canvas empty, M12.	6507389	4	----------	
TOOL, alinement, buffer tube, cal. .30.	6316001	4, 16	53*a*(2)	To position the buffer tube in receiver so that one of eight grooves in head of buffer tube lies centrally horizontal with top of receiver.
Composed of:				
PARALLEL	7113327	4, 16	53*a*(2)	
PLUG	7113326	4, 16	53*a*(2)	
SPACER	7113328	4, 13, 20	50*c*(5), 53*a*(2)	
TOOL, cleaning, gas cylinder.	7268211	3, 27	23*f*, 65*a*, 68*b*(2)	To remove carbon from gas cylinder and face of piston.
TOOL, comb	7266450	4	67*b*(4), 69*c*, 70*a*	To assemble and disassemble weapon (FM 23–15).
WRENCH single, open end, receiver and bbl.	6316005	4, 10	50*a*(2)	To remove receiver from barrel.

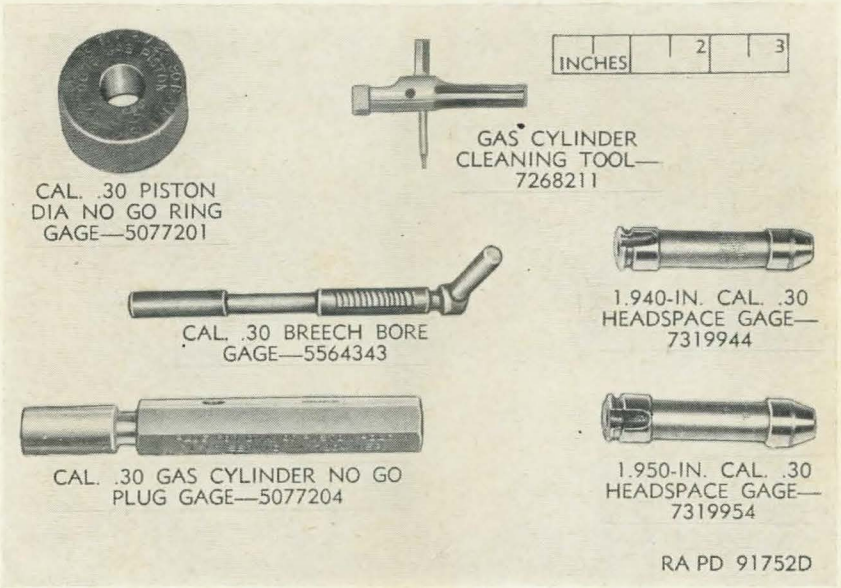

Figure 3. Special tools for field maintenance.

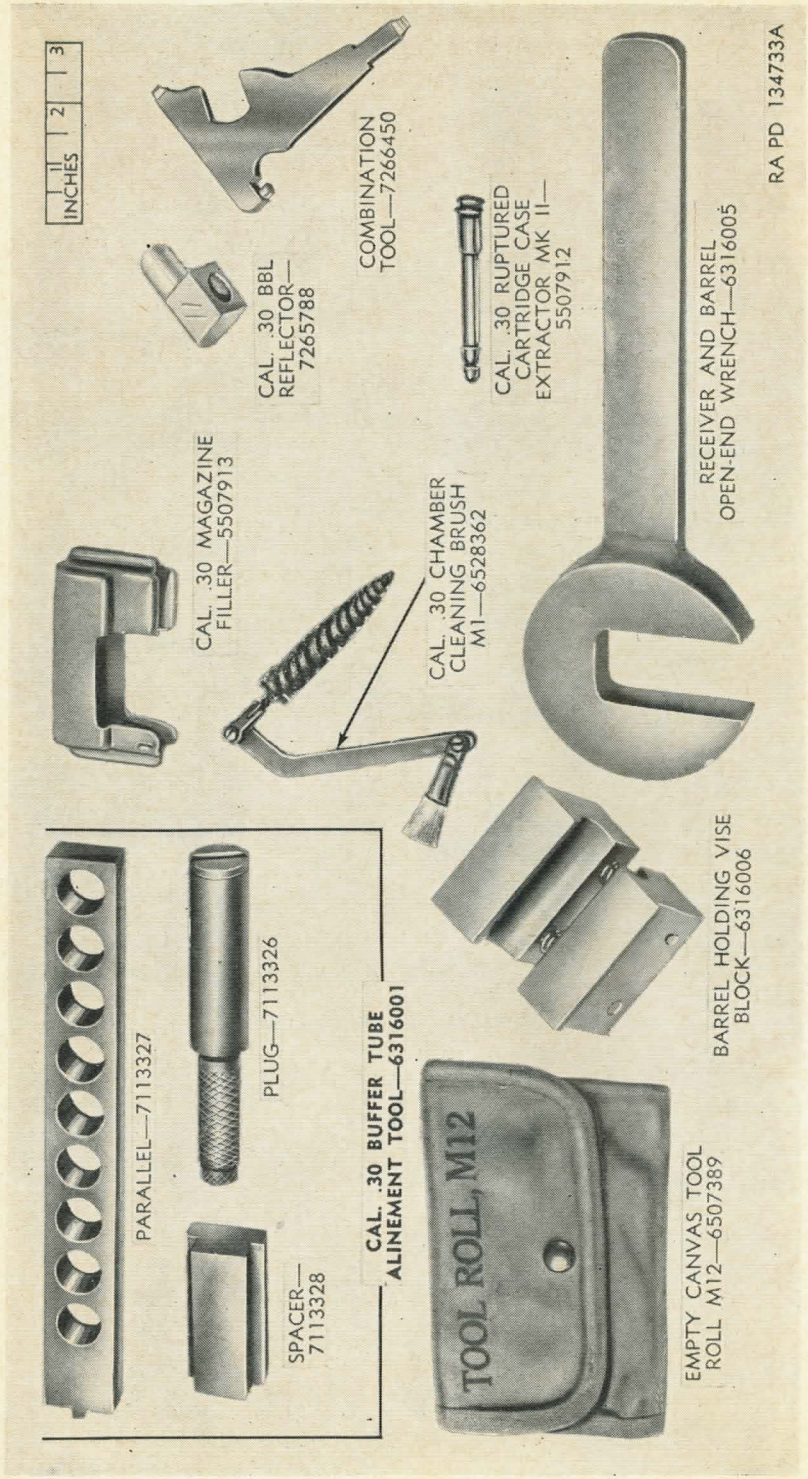

Figure 4. Special tools and equipment for field maintenance.

CHAPTER 3

INSPECTIONS

Section I. GENERAL

10. Scope

Paragraphs 10 through 31 provide 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 of materiel during repair and the final inspection after repair has been completed. Troubleshooting information is incorporated wherever applicable as a normal phase of inspection.

11. Purpose of Inspections

Inspections are made for the purposes of (1) determining the condition of an item as to serviceability, (2) recognizing conditions that would cause failure, (3) assuring proper application of maintenance policies at prescribed levels, and (4) determining the ability of a unit to accomplish its maintenance and supply missions.

12. Categories of 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 evacuated materiel is more thorough and includes check and repair of minor points that should 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 the materiel. 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.

d. Final Inspection. This is an acceptance inspection performed by a final inspector after repair has been completed, to insure that the materiel is acceptable for return to user 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. INSPECTION OF MATERIEL IN HANDS OF TROOPS

13. Precautions

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

14. General

a. 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.

b. 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.

c. Make an overall inspection of the weapon for general appearance, condition, operation, and manual functioning. Use dummy or drill cartridges.

d. 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.

e. Determine causes of mechanical and functional difficulties that troops may be experiencing and check for apparent results of lack of knowledge, misinformation, neglect, improper handling and storage, security, and preservation.

f. Check on application of all urgent modifications, and if any unauthorized alterations have been made, or if work beyond the authorized scope of the unit is being attempted, MWO ORD A4–W6 which provides the rifle with the latest gas cylinder assembly is considered mandatory; however, also check DA Pam 310–4 and the current modification work order files for any additional work orders promulgated subsequent to this printing.

g. Instruct the using personnel in proper preventive-maintenance procedures where found inadequate.

h. Check on completeness of the organizational maintenance allowances and procedures for obtaining replenishments.

i. Satisfactory metal finishes for weapons range from dense black to medium light gray. Certain small arms 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. Check to see that all rear sights have a dull black or gray finish on all surfaces.

j. Wooden components must not be cracked in such a way as to interfere with the structural strength. Surface cracks, bruises, or dents that do not affect their strength should not cause rejection.

k. Light pitting of the 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. Pits in the chamber large enough to cause extraction difficulties will be cause for rejection. Ringed bores or bores ringed sufficiently to bulge the outside surface are cause for rejection.

l. Looseness and play in such components as sights, gas cylinders, etc., 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, especially automatic guns, 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.

m. Minor defects in metal components do not normally affect their being acceptable. Scratches and tool marks on barrels are ordinarily of no importance.

15. Rifle

a. Hand-operate and check assemblies and parts for functioning and smoothness of operation.

b. Inspect fit of magazine in receiver and functioning of magazine catch and catch release with magazine.

c. Using magazine and dummy cartridges, test the loading function of bolt and functioning of the extractor and the ejector. When inspecting, use a serviceable magazine, as a worn retaining lug on the magazine may allow magazine to drop, thus affecting the feed function of the bolt.

d. Inspect locking action of bolt lock and bolt.

e. Fire several rounds of service ammunition, and examine primers of fired casings. If primer shows indications of being set back in firing pin hole of bolt, due to an enlarged firing pin hole or recessive wear of bolt face, replace the bolt.

Warning: Test-fire when and where conditions permit, considering safety and expediency.

16. SIGHTS

a. Check front sight base for looseness on the barrel, and check blade for looseness in the base.

b. Blade must be straight and top of the blade square and properly darkened.

c. Inspect rear sight base for looseness on receiver.

d. Inspect windage scale for looseness on base.

e. Check spring for functioning.

f. Inspect functioning of elevating screw and leaf with slide. Both must operate freely and retain setting.

g. Windage knob will turn freely by hand and retain set. An acceptable dull finish is required on all parts.

17. Bipod Group

a. Inspect bipod assembly for proper fit on flash hider bearing.

b. Inspect bipod assembly for looseness on barrel.

c. Inspect for missing or broken friction washer and sight cover.

d. Sliding legs will move readily to any position and will be locked and held by the bipod leg thumbscrews.

18. Barrel and Receiver Group

Note. Weapon must be field-stripped (FM 23–15) to perform pertinent gage checks.

a. Inspect headspace as described in paragraph 27.

b. Check breech bore dimension, using breech bore gage 5564343 (fig. 3). Insert the gage into the chamber. Looking through the ejection port and using the calibrated scale of the gage, read indication that appears just flush with the rear face of the barrel. It should be 0.310 inch or less.

c. Inspect receiver for wear, burs, rust, and foreign matter.

d. Inspect for loose bolt supports.

e. Inspect bolt lock recess in top of receiver. Check especially where lock seats when bolt is locked. Burs here will affect headspace.

f. Inspect operating handle for functioning and free movement in slideways. Inspect plunger for free movement and spring tension.

g. Top plate should not be loose and a drive fit is required.

19. Bolt Group

a. Inspect firing pin hole for out-of-round.

b. Check firing pin protrusion. It should be approximately three thirty-seconds inch.

c. Check firing pin for broken point, wear, burs, and fracture.

d. Remove extractor. Check spring for set or fracture, and check lips of extractor for wear.

e. Check bolt link and lock for excessive wear, burs, and galling. Check holes for out-of-round.

20. Slide and Piston Group

a. Check fit between piston and slide.

b. Total endplay of piston should approximate one-eighth inch in any direction and face of piston must not strike gas cylinder body when slide is in fully forward position. Gage piston, using NO GO gage 5077201 (fig. 3). Piston head should not enter gage. To gage, first clean piston thoroughly of all carbon and fouling, and determine that surfaces of head ring are smooth and polished. Wipe piston head and gage with a slightly oiled cloth and try to pass gage over piston head. (Only light pressure should be exerted on gage.)

c. Inspect slide for burs, deformation, galling, or battered rear end.

d. Check hammer pin hole for out-of-round.

21. Trigger Guard Assembly

a. Check functioning by hand operation.

b. Check change lever for movement in all positions and ability to retain setting.

c. Check ejector for burs, fracture, or deformation.

d. Check all springs for tension and set.

e. Check magazine release and catch for proper functioning.

22. Buffer and Actuator Group

a. Check actuator for free movement in actuator tube.

b. Check actuator spring for kinks, rust, and free length.

c. Check buffer head assembly for burs, missing key, and sear release for free movement and correct assembly. Check cones and cups for set and proper assembly.

23. Gas Cylinder Group

a. Inspect gas cylinder for dents, cracks, deformation, and distortion.

b. Check gas port in the gas cylinder body to be sure it is free of carbon or other foreign matter.

c. Check gas cylinder body for burred or stripped threads.

d. Check the three gas ports in the gas regulator for carbon or other foreign matter.

e. Be sure that dust shield is present.

f. Inspect gas cylinder body for wear, using gas cylinder gage 5077204 (fig. 3). This is a NO GO gage and should not enter the gas cylinder body. Before gaging the cylinder, clean thoroughly to remove all carbon deposits and foreign matter, using gas cylinder cleaning tool 7268211 (fig. 4). Use crocus cloth to polish, and if necessary, wipe cylinder and gage with a slightly oiled cloth and try to insert gage into cylinder. If the gage enters, it is unserviceable. (Only light pressure should be exerted on gage.)

24. Stock and Forearm Group

a. Butt plate will fit properly and screws will not be stripped or have mutilated heads.

b. Butt swivel will be secure, screws will not be mutilated, and swivel screw will be tight and staked.

c. Butt stocks will be checked for warping, loose fit, and cracks.

d. Forearm will be inspected in accordance with instructions in paragraph 14*j*.

25. Trigger Pull

a. Test trigger pull for smoothness and pressure exerted. Trigger pull should be clean, without creep, and smooth in action. The force exerted to release slide is not less than 6 pounds, nor more than 10 pounds. If the pull is rough, not within specified limits, or excessive creep is present, check for wear or burs on sear and slide notch or for interference between trigger and housing.

Note. The word "creep" is interpreted to mean any perceptible movement in the trigger pull between the time the slack is taken up and the slide is released, with pressure applied at a uniform rate of increase over a period of not less than 10 seconds.

b. In testing trigger pull of rifles, the inspector will use two weights, one of 6 pounds and one of 10 pounds.

c. Check to insure that the change lever is set at the A or F position and that the rifle is cocked. Rest the trigger weight on the floor or ground, and insert the hook of trigger weight wire through the trigger guard body bow to bear on the trigger, so that pressure is applied one-quarter inch from the lower end or tip of trigger. With the barrel of the rifle held at a 30° angle to the vertical, carefully raise the weight from the floor. If the 6-pound weight pulls or the 10-pound weight fails to pull the trigger to release the slide, correct (par. 46*e*). Exercise care during the test to determine that the wire contacts the trigger only, that it does not rub against the trigger guard body or stock, and that wire and axis of bore are parallel and perpendicular.

26. Equipment

a. Make sure all spare parts and equipment are on hand and in good condition.

b. Slings will be complete assemblies with keepers, frogs, and hooks attached. Leather slings will be soft and pliable. When the sling is bent double over a 1-inch round bar, there should be no cracking of the leather. Leather slings will not be issued when the present supply is depleted. Web slings will not be rotted or badly stained. Special attention should be given to the points at which metal is attached, to see that rust has not weakened the sling. Slightly soiled web slings may be scrubbed with a mild soap. However, care should be taken to preserve the olive-drab color.

27. Headspace

a. General.

(1) *Definition.* Headspace of cal. .30 Browning automatic rifle M1918A2 is the distance between the shoulder of the chamber and the face of the bolt when the bolt is in "locked position."

(2) *Effect of headspace on operation.* If headspace is insufficient, the bolt does not fully lock behind the cartridge without being forced. If headspace is excessive, the cartridge has too much play in the chamber when the bolt is locked behind it. Either condition is unsafe.

(3) *Causes of variation in headspace.* As component parts of the rifle are manufactured to close tolerances and headspace is carefully checked at manufacture, a variation usually is due to wear, causing excessive headspace to develop. However, assembly of parts with maximum tolerances results in either excessive or insufficient headspace. Excessive headspace due to wear is caused by advanced chamber shoulder in the barrel, worn face of bolt, worn locking shoulder of bolt lock, or worn locking recess in receiver.

b. Gaging Headspace (fig. 5). Headspace is gaged with the firing pin and extractor removed from the bolt, recoil spring and guide removed from the slide and piston group, operating handle removed from the receiver, and the trigger guard assembly removed from the rifle. With the inspector's bore reflector, examine the chamber to make certain that it is clean. Place the bolt assembly (minus firing pin and extractor), with bolt link assembled, in the receiver. Then install the slide and piston group (minus spring and guide), and fit the hammer into its seat in slide and insert hammer pin. Work the slide back and forth several times by hand to insure that the parts are correctly assembled. Install the gas cylinder and forearm group, and lock it in position with gas cylinder retaining pin. With slide pushed fully forward, note the relative position of the hammer pin with reference to the forward part of its slot inside of

receiver. It will be found that there is a clearance of from one thirty-second to three sixty-fourths inch between the hammer pin and the forward part of the slot. This position of the hammer pin is referred to as the "locked position."

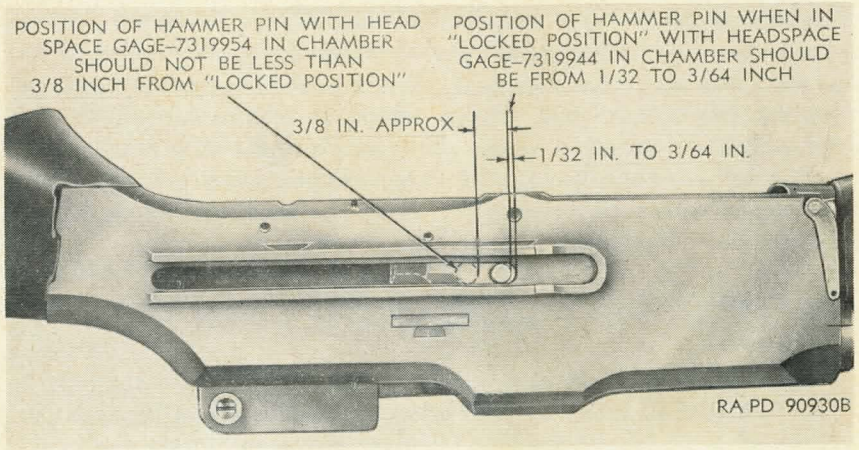

Figure 5. Gaging headspace.

(1) *Minimum headspace.* To test for minimum headspace, place the 1.940-inch headspace gage 7319944 (fig. 3) in the chamber and move the slide forward. Note the position of the hammer pin. It should be in the locked position (fig. 5). If the hammer pin is in the locked position, the minimum headspace is correct. If the hammer pin is stopped before reaching the locked position, the headspace is insufficient and should be corrected by depot maintenance.

Note. Never use force against the gage to obtain locked position.

(2) *Maximum headspace.* To test for maximum headspace, place the 1.950-inch headspace gage 7319954 (fig. 3) in the chamber and move the slide forward until stopped by the gage. Note position of hammer pin. It should be not less than three-eighths inch from the locked position (fig. 5). If the hammer pin is not stopped on or before it is in this position, the headspace is excessive and should be corrected by depot maintenance.

Section III. PREEMBARKATION INSPECTION

28. Rifle

a. Proceed as in paragraphs 13 through 27 and in *b* and *c* below.

b. Do not reject the rifle for oversea use unless exterior parts have a distinct shine; also, bright rear sights will not be permitted on weapons for oversea use.

c. The breech bore dimension (par. 18*b*) should be 0.306 inch or less.

29. Organizational Spare Parts, Tools, and Equipment

Examine all spare parts, tools, and equipment for completeness and serviceability. Replace any defective items. It is not normally necessary to inspect items in sealed packages, since they have been inspected for serviceability prior to packaging and during storage.

Section IV. INSPECTION OF MATERIEL RECEIVED IN ORDNANCE SHOPS

30. General

A technical inspection similar to that in paragraphs 14 through 27 is performed. In addition, the extent of repairs necessary is determined and an estimate is made of the parts required. A troubleshooting inspection is performed, as necessary, to localize malfunctions and apply corrective measures.

31. Troubleshooting

Table II lists malfunctions, their probable causes, and proposed corrective actions. For troubleshooting information within the scope of organizational maintenance, see FM 23–15.

Table II. Troubleshooting

Malfunction	Probable causes	Corrective action
Failure to feed	Dirty or dented magazine body.	Replace magazine (pars. 76 and 79).
	Weak or broken magazine spring.	Replace magazine (pars. 76 and 79).
	Worn or broken magazine catch.	Replace magazine catch (pars. 44 and 47).
Failure of slide to cock	Damaged sear or sear notch in slide.	Replace slide or sear (pars. 44 and 47).
	Broken sear spring	Replace sear spring (pars. 44 and 47).
	Burs or foreign matter in sear notch.	Clean and remove burs (pars. 44 and 47).
	Failure of bolt to retract sufficiently.	Correct (pars. 44 and 47).
Failure to fire	Weak recoil spring	Replace recoil spring (pars. 63 and 66).
	Worn or broken firing pin.	Replace firing pin (pars. 54 and 57).
	Worn or broken sear spring.	Replace sear spring (pars. 44 and 47).
	Defective sear or hammer	Replace sear (pars. 44 and 47) or hammer (pars. 54 and 57).
Weak ejection	Worn ejector	Repair ejector (pars. 44 and 47).

Table II. Troubleshooting—continued

Malfunction	Probable causes	Corrective action
Failure to eject	Dirty or clogged gas ports.	Clean and properly adjust gas cylinder assembly (pars. 67 and 70).
	Broken ejector	Replace ejector (pars. 44 and 47).
	Weak or broken ejector lock and/or ejector lock spring.	Replace ejector lock and/or spring (pars. 44 and 47).
Failure to extract	Damaged or broken extractor claw.	Replace extractor (pars. 54 and 57).
	Broken or missing extractor spring.	Replace extractor spring (pars. 54 and 57).
Failure to pull off with change lever set at F or A. Muzzle depressed.	Sear spring not correctly positioned.	Reposition sear spring (pars. 44 and 47).

CHAPTER 4

REPAIR

Section I. General

32. General

a. Information and instructions contained herein are supplementary to instructions for the using organization contained in FM 23–15.

b. In this publication, the main groups of the weapon are disassembled, inspected, replaced or repaired, and assembled. For information on disassembly of the weapon permitted by organizational maintenance personnel, refer to FM 23–15.

33. Cleaning and Lubrication

a. General. Refer to FM 23–15 for using arms information on cleaning, cleaning agents, and precautions to be observed in cleaning. Information for ordnance personnel is given in *b* through *e* below.

b. Cleaning Materiel Received From Storage.

(1) Materiel received in ordnance shops from storage will be cleaned by any available applicable cleaning process (TM 9–1005).

(2) If some time is to elapse before the start of repair or rebuild operations, apply a light grade of preservative oil to all polished metal surfaces to prevent rusting.

c. Cleaning After Repair. After repair operations and prior to assembly, remove shop dirt and other foreign matter from all metal surfaces by any available applicable cleaning process (TM 9–1005).

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. Apply preservatives as soon as possible after cleaning.

e. Lubrication. Oil and lubricate the rifle in accordance with instructions in FM 23–15. General instructions on lubrication are covered in TM 9–2835. Lubricating materials are listed in ORD 3 SNL K–1 and their uses are explained in TM 9–850.

34. General Repair Methods

a. Disassembly and Assembly Procedures.

(1) In disassembling a unit, remove the major subassemblies and assemblies whenever possible. Subassemblies may then be disassembled, as necessary, into individual parts.

(2) During assembly, subassemblies should be assembled first and then installed to form a complete unit.

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

b. Replacement of Parts.

(1) Unserviceable and unrepairable assemblies will be broken down into items of issue and serviceable parts will be returned to stock. Parts or assemblies that cannot be repaired or reclaimed to the standards set forth in this publication will be replaced as indicated.

(2) When assembling a unit, replace taper pins and cotter pins with new ones, if possible. If screws or nuts are damaged, they should be replaced.

(3) All springs should be replaced if they are broken, kinked, cracked, or fail to function properly.

(4) If a required new part is not available, reconditioning of the old part is required. Such parts should be examined carefully after reconditioning to determine their serviceability.

c. Use of Tools.

(1) Care must be exercised to use tools that are suitable for the task to be performed, in order to avoid mutilation of parts and/or damage to tools.

(2) Special tools (ch. 2) are provided for maintenance of the rifle. These tools should be used only for the purpose for which they are intended.

d. Welding and Riveting. For welding instructions and welding materials, refer to TM 9–2852 and ORD 3 SNL K–2.

e. Repairing Damaged Threads. Damaged threads should be repaired by use of a thread restorer or by chasing on a lathe.

f. Finished Surfaces. Repaint all surfaces on which paint has deteriorated or become damaged (TM 9–2851).

35. Removal of Excessive Carbon and Rust

Light rust and carbon may generally be removed with a cloth moistened with light oil or rifle-bore cleaner solvent cleaning compound. If this does not suffice, crocus cloth or fine abrasive cloth may be used. Care should be observed not to scratch or alter surfaces cleaned and to thoroughly remove all dirt and abrasive before assembling the parts. Avoid the use of any abrasive that may remove phosphate coating, zinc plating, or cadmium plating.

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

During the entire life of the weapon, 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 or roughness on working surfaces 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 surfaces worked on. Parts or assemblies should never be altered in any way that would affect interchangeability of parts.

37. Wooden Components

Dents or mutilations that do not affect strength or general appearance may be sanded out. Wood dough (plastic wood substitute) may be used, if practicable. Unvarnished wooden components, such as hand guards, will be sanded all over. Patching is pemitted where strength is not affected. Components cracked in such a manner that strength is affected will be replaced. Unvarnished wooden components should be treated with fungicide solution G–4 (powdered form) mixed in linseed oil mixture.

38. Repair of Damaged Machined and Polished Surfaces

Rough spots, scores, burs, galling, and gouges will be smoothed 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 these operations, critical dimensions will not be altered.

39. Barrels

a. Barrels will be free of corrosion, powder fouling, bulges, and rings. Muzzles will be free of burs. Fine pits are allowed if they do not affect the sharpness of lands materially. Pits are allowed in the chamber if they are not large enough to cause extraction difficulties. Barrels will be replaced if lands are worn to the extent that accuracy is affected or if pits are as wide as the lands, grooves, or are more than three-eighths inch long.

b. Powder burns, exterior irregularities, and deformations not affecting the functioning or appearance are acceptable.

40. Springs

Replace all springs that are corroded, weak, or distorted.

41. Functioning of Safeties

Test all manually operated safety features for satisfactory operation.

42. Function-Firing

a. Following repair, fire each rifle as follows, if facilities are available in third or fourth echelon:

Rounds	*Gas port*	*Change lever position*
20	Medium	Full Automatic
20	Medium	Reduced automatic

If weapons do not function satisfactorily, additional rounds are authorized. Weapons that fail to meet the test are to be corrected by replacement of defective component or by performing such repair as required.

b. All weapons will be cleaned as soon as possible after all firing tests have been completed and each day thereafter for 3 days, making a total of 4 consecutive days. An alternate method of scheduling cleaning operations is to clean all weapons immediately after function-firing and two successive times following the first cleaning; cleaning intervals should be at least 16 hours with not more than 72 hours between any two successive cleanings.

c. Special care should be taken to insure that bolt faces, pistons, breech end of receiver, and other parts subjected to burned powder residues are thoroughly cleaned. These parts should be scrubbed with a bristle brush moistened with rifle-bore cleaner solvent cleaning compound.

d. A single cleaning of the bore and chamber of function-fired weapons with steam or hot water (not less than 200° F.) is acceptable in lieu of the cleaning in *b* above. The steam or hot water may be applied by hand or machine and the bore and chamber air-dried. The bore and chamber will then be scrubbed with a snug-fitting wire brush dipped in rifle-bore cleaner solvent cleaning compound. Three dry patches will then be passed through the bore and chamber, followed by one patch saturated with prescribed oil.

43. Operations Route Sheet

The information in table III illustrates the sequence of operations necessary during repair of the weapon. Special machines, tools, and gages required for an operation are indicated opposite the operation.

Table III. Operations Route Sheet for Cal. .30 Browning Automatic Rifle M1918A2

Operation No.	Operation	Machine	Tools	Gages
1	Unpack.			
2	Degrease	See TM 9–1005.		
3	Record serial numbers.			
4	Disassemble into subassemblies		7266450	
5	Disassemble subassemblies		7266450	
6	Clean all parts.			
7	Inspect wooden components.			
8	Inspect metal components:			
	Inspect for excessive wear in bolt lock shoulder in receiver.			
	Inspect bolt assembly.			
	Inspect gas cylinder		5564144	5077204
	Inspect gas piston			5077201

Table III. Operations Route Sheet for Cal. .30 Browning Automatic Rifle M1918A2—continued

Operation No.	Operation	Machine	Tools	Gages
	Inspect all other parts for serviceability.			
9	Remove barrel from receiver if necessary.	Vise	6316006, 6316005	
10	Inspect barrel and receiver:			
	Inspect barrel visually for pits and dents.		7265788	
	Inspect bore			5564343
11	Assemble barrel to receiver or rebarrel if necessary.	Vise	6316006, 6316005	
12	Do necessary repairing of parts as required.			
13	Inspect.			
14	Do necessary polishing of parts as required.			
15	Inspect.			
16	Repair and sand stocks and forearms.			
17	Inspect.			
18	Sandblast parts requiring refinishing.			
19	Refinish.			
20	Inspect.			
21	Assemble subassemblies		7266450	
22	Assemble subassemblies to rifle		7266450	
23	Inspect.			
24	Function-fire.			
25	Do necessary repairing. *Note.* Do operations 23 and 24 again if repair is performed.			
26	Clean rifle.			
27	Final inspection.			
28	Record serial number.			
29	Preserve and pack.			

Section II. TRIGGER GUARD ASSEMBLY

44. Removal and disassembly

Refer to FM 23–15 for removal and disassembly of the trigger guard assembly (fig. 6).

45. Inspection

a. General. Inspect all parts for damage and excessive wear that might cause malfunction, burs, rust, foreign matter in recesses, deformation, and free action with mating parts.

b. Trigger (Riveted) (figs. 6 and 7). Inspect trigger for full action on pin with respect to guard. Inspect connector pin to see if it is riveted securely in place. Rear projections at the heel of trigger must be free

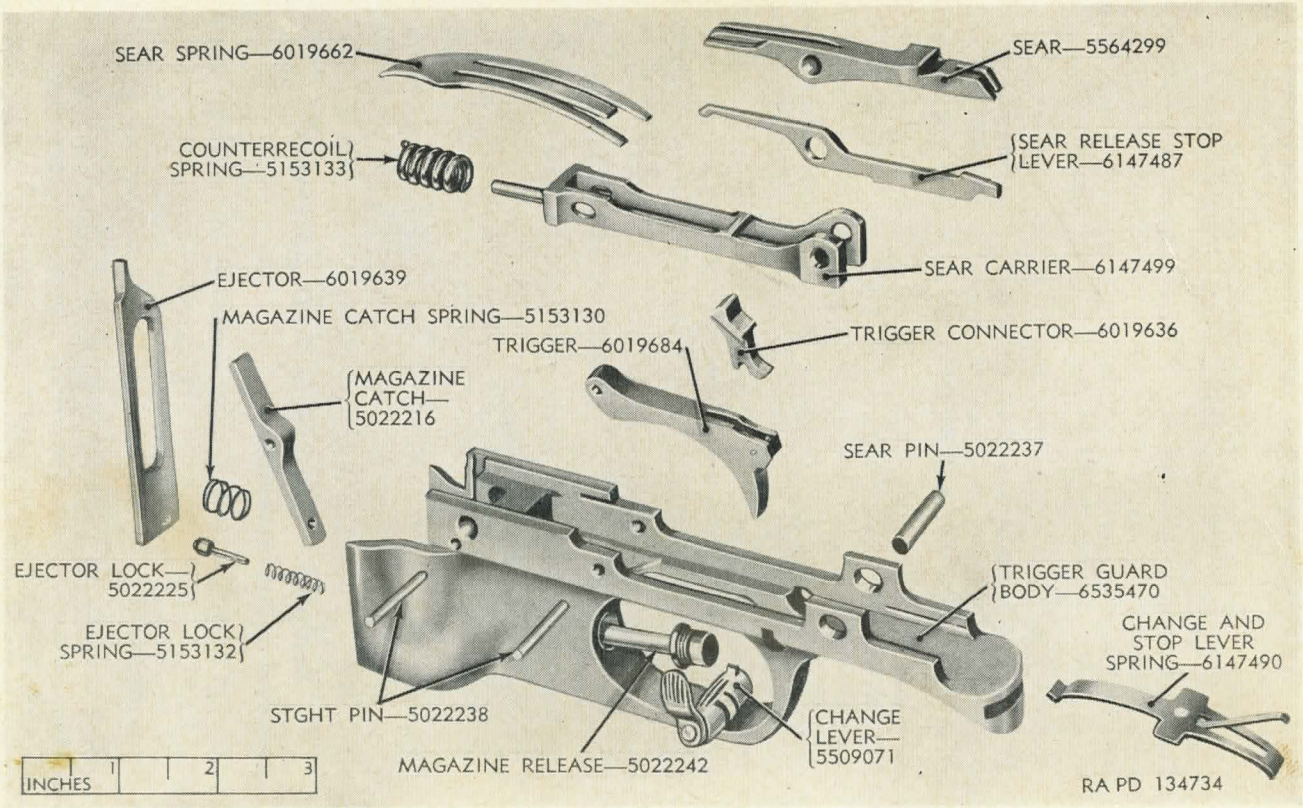

Figure 6. Trigger guard assembly—exploded view.

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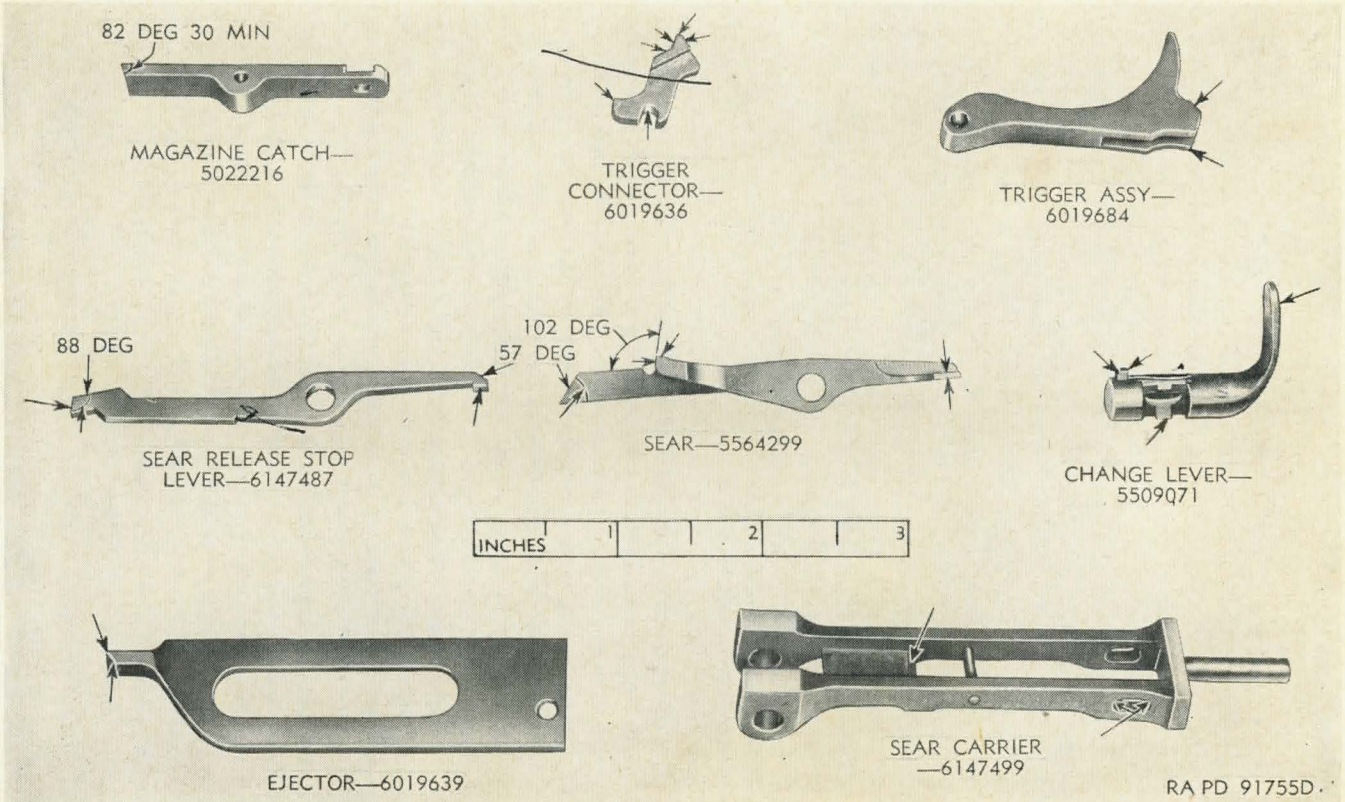

Figure 7. Important points to be inspected on trigger guard assembly parts.

of wear that would affect operation of safety. Top rear corner should be sharp, not beveled, at point where it enters the notch in change lever. Inspect heel and tip for sufficient clearance with bore of guard for full retraction.

c. Trigger Connector (figs. 6 and 7). Inspect top bearing surface of trigger connector where it contacts sear and sear release stop lever. This is a critical surface, as excessive wear or burs may affect function of sear and stop lever. Inspect rear toe of connector where it contacts tongue in change lever aperture and front sloping surface (sear carrier ramp) for wear and burs. Profile must be clearly defined and all operating and camming surfaces free of excessive wear that may affect functioning.

d. Sear (figs. 6 and 7). Inspect sear for looseness on pin. Inspect sear pin for undue wear at ends and for burs. (Wear of pin at end is increased due to movement in elongated hole in trigger guard.) Inspect sear for deformation, wear, and burs on forward lower camming surface contacting connector and on rear upper camming surface contacting sear release. Rear beveled camming surface must be perfectly smooth. Inspect sear notch faces (rear and top) for wear and burs. Sear notch should be smooth and free from knife or wire edge.

Note. Sear pin holes in trigger guard and trigger pin holes in sear carrier are elongated to allow play of mechanism, relative to counterrecoil spring, to absorb jar of counterrecoil on the mechanism.

e. Sear Spring (fig. 8).

(1) Determine if sear spring is of latest design. Modify sear springs of early manufacture, which do not have the $\frac{3}{32}$-inch notch at the rear end, to conform to the latest design (par. 46*g*).

(2) Inspect sear spring for functioning with sear and connector, looseness in retaining slots in trigger guard body, deformation, fracture, and wear. The two side prongs of spring should bear evenly on shoulders on forward end of sear. Center prong lies below forward end of stop lever and bears on forward ramp of connector. Prongs are even when at rest and curved downward. Forward end of spring should be well seated in its lateral notch in trigger guard body.

f. Sear Release Stop Lever (figs. 6 and 7). Inspect sear release stop lever for wear and burs on forward lower surface where it contacts connector and on rear surface where sear release strikes. Rear nose may become expanded due to action of sear release and thus bind in sear.

g. Sear Carrier (Riveted) (figs. 6 and 7). Inspect sear carrier for loose, fractured, worn, or burred connector stop (riveted on right end). Inspect connector camming surface for wear and burs.

h. Change Lever (figs. 6 and 7). Inspect change lever for functioning with connector and trigger, deformation, and free movement in trigger guard body (should be close fit). The change lever moves freely in its various positions, operates as intended, and remains in the selected position.

i. Change and Stop Lever Spring (Riveted) (fig. 6). Inspect change and stop lever spring for functioning with change lever (should bear firmly in notches) and sear release stop lever, deformation, and cracks. Inspect stop lever prong for fracture, looseness on rivet, and excessive deformation, causing weak action on stop lever.

j. Magazine Catch (figs. 6 and 7). Inspect nose of catch for wear and burs (edge should be sharp). Catch must securely hold a loaded magazine.

k. Magazine Catch Release (fig. 6). Inspect magazine catch release for free movement in trigger guard body and catch, deformation, and fractured nose.

l. Ejector (figs. 6 and 7). Inspect nose of ejector for deformation, wear, and burs. Upper forward corner of nose should be well defined. If nose is bent or worn, it fails to eject properly; if too long, it binds on bolt and causes weak ejection. It must fit the trigger guard body. It must fit the trigger guard with sufficient freedom to permit normal removal without perceptible looseness.

m. Ejector Lock (fig. 6). Inspect ejector lock for free movement in well in trigger guard housing.

n. Trigger Guard Body (fig. 6). Inspect trigger guard body for deformation, for worn and burred spring retaining grooves, and receiver retention groove (rear end). Trigger guard body assembles freely to the receiver without apparent looseness or sideplay.

o. Counterrecoil, Ejector Lock, and Magazine Catch Springs (fig. 6). Inspect springs for function and fracture.

46. Repair

a. General. Replace all broken, worn, or otherwise unserviceable parts. Remove burs and rust as explained in paragraphs 35 and 36.

b. Weak Ejection. Weak ejection of cartridge case is caused by the neck of ejector scraping on bolt, the neck being bent or too short, or the nose being worn. To correct, grind off nose, being careful to maintain angle; straighten or replace ejector. Space between ejector and bolt is not more than one thirty-second inch.

c. Slide Fails to Cock. This condition is due to damaged sear, broken sear spring, burs, foreign matter in sear notch in slide, or failure of bolt to move far enough to the rear on recoil movement to cock the slide. Examine parts; clean and replace if necessary.

d. Stoning Nose of Sear. If nose of sear or sear notch in slide becomes worn or burred, stone lightly with a fine-grained sharpening stone. Exercise care to maintain retentive angle and stone to polish only. If too much metal is removed from top face of sear, the face becomes too shallow to retain slide, due to interference of rear end of sear (release cam extension) with the slide, thus holding sear notch out of engagement. Test sear retentive action after stoning, and if found questionable, replace sear. Dress in slide in like manner.

e. Correcting Trigger Pull.

(1) *Light trigger pull.* Light trigger pull is caused by foreign matter or burs in sear notch of slide or nose of sear. Such burs or foreign matter prevent nose of sear from seating fully in sear notch in slide. To correct, remove foreign matter or stone burred surfaces as explained in *d* above. Replace badly burred or damaged parts. A light pull is also due to a weak or broken sear spring that does not seat the sear fully in the notch in slide; correct by replacing sear spring.

(2) *Excessive trigger pull.* Excessive trigger pull is caused by binding on components of trigger group, foreign matter in trigger guard body, or burs on trigger, connector, sear pin, or sear; correct by removing foreign matter and stoning burred surfaces.

f. Fitting New Trigger Guard. In fitting new trigger guard to receiver, it may be found that trigger guard retaining pin holes in trigger guard body and receiver are not concentric. In such event, stone off rear beveled surface of trigger guard or mating lug on receiver slightly to aline holes. Use fine-grained sharpening stone.

g. Modifying Sear Spring. File rounded notch in sear spring with small rattail (Swiss pattern) file to the dimensions prescribed in figure 8. The notch facilitates removal and reduces breakage of sear spring.

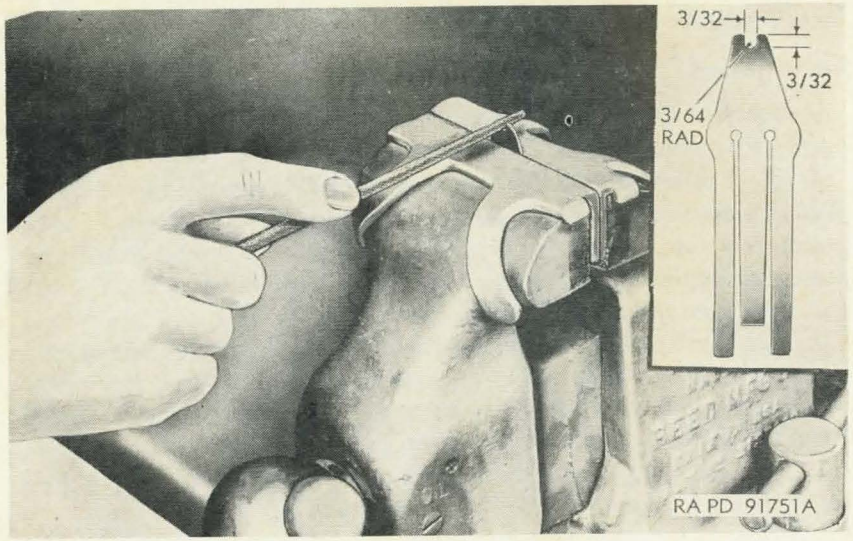

Figure 8. Filing notch in sear spring.

47. Assembly

Refer to FM 23–15 for assembly of the trigger guard assembly (fig. 6).

48. Functional Check

a. Inspect trigger guard assembly for looseness, functioning, and cofunctioning of its assemblies and parts. Trigger guard assembly assembles freely to receiver without apparent looseness or sideplay.

b. Check function of trigger, connector, and sear spring with trigger guard assembly held horizontal, tipped forward, and tipped back. If sear spring is not bearing properly on forward shoulders of sear and center prong on connector, the connector will not function properly when trigger guard assembly is tipped. Check functioning of trigger, sear, and stop lever, when change lever is set at A position (normal cyclic rate), F position (slow cyclic rate), and S position (safe) (fig. 9).

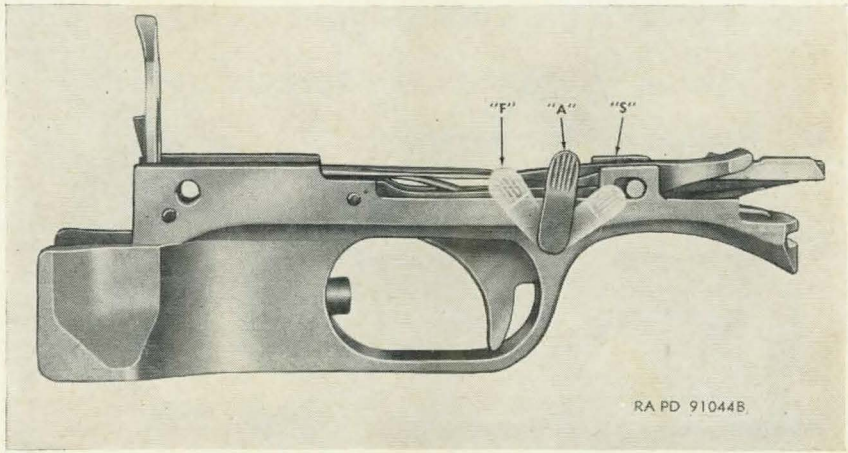

Figure 9. Various positions of change lever on assembled trigger guard assembly.

(1) *Change lever set at A (vertical position)* (fig. 9). When change lever is set at A position and trigger is retracted, the connector raises the forward end of sear and sear release stop lever together and holds them up as long as trigger is held fully retracted. Thus the rear end of the sear is depressed and held from engagement with sear notch in slide, while the rear end of sear release stop lever is also depressed, preventing sear release from striking camming surface on rear end of sear. When trigger is released, sear and sear release stop lever both return to their normal positions.

(2) *Change lever set at F (forward position)* (fig. 9). When change lever is set at F position and trigger partially retracted, the connector raises the forward end of sear and sear release stop lever together. As trigger is further retracted, the connector, still rising, is cammed from under front of sear by camming surface on sear carrier, and continues to raise forward end of sear release stop lever, and holds it in raised position as long as

trigger is held fully retracted. Therefore, the sear is free to function when acted upon by the sear release, while the rear end of the sear release stop lever is depressed to a point where it will not block the action of the sear release upon the camming surface of rear end of sear. This action produces the slow cyclic rate of fire.

(3) *Change lever set at S (rear position)* (fig. 9). When change lever is set at S position, the trigger is blocked by the change lever and prevented from rising, lifting the connector, and disengaging the sear.

49. Installation

Refer to FM 23–15 for installation of the trigger guard assembly.

Section III. BARREL AND RECEIVER GROUP

50. Removal and Disassembly

a. Removal of Barrel From Receiver (fig. 10).

(1) Only remove the barrel from the receiver when replacement is necessary or for gaging depth of chamber.

(2) Place barrel in barrel holding vise block 6316006 (fig. 4) and clamp in vise. Fit receiver and barrel open end wrench 6316005 (fig. 4) on receiver, and unscrew (right hand thread) receiver from barrel.

b. Disassembly of Barrel Assembly (fig. 11).

(1) Never remove components attached to barrel except when replacements are necessary or for the purposes of salvaging.

(2) Drive off front sight blade, if necessary to replace.

(3) Drive out the front sight key pin, drive the front sight base off to the front, and remove the front sight key.

(4) Drive out gas cylinder tube bracket pin and drive gas cylinder tube bracket off to the front.

c. Disassembly of Receiver Group (fig. 12).

(1) Slide the operating handle out of its guides on the receiver.

(2) Press in on the operating handle plunger and push out the operating handle plunger pin toward the countersunk side of the plunger. Then remove the plunger and spring.

(3) Lift the bolt guide spring out of its seat in the bolt guide with the rim of a cartridge. Remove the guide and spring from the receiver.

(4) Depress change lever stop spring assembly until clear of groove in change lever stop spring retaining pin, shake pin from receiver, rotate spring down, and push stop from aperture in receiver.

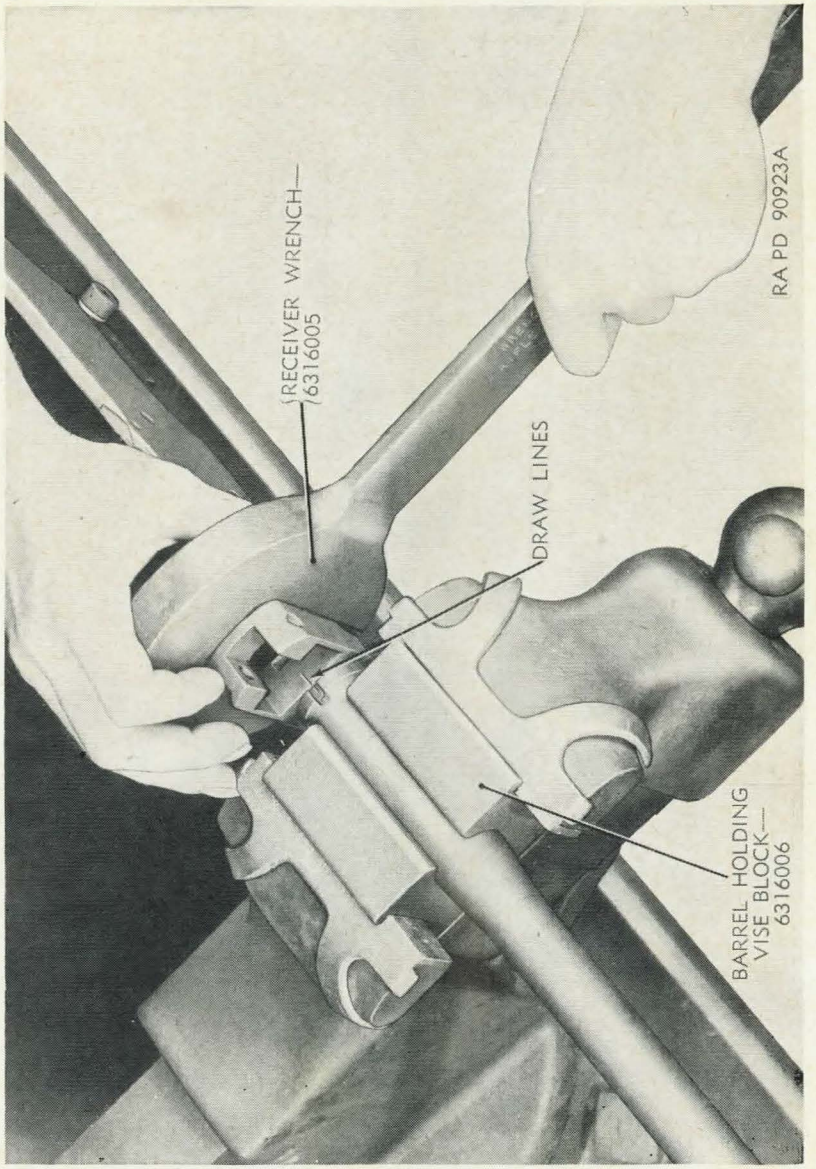

Figure 10. Removing barrel from receiver.

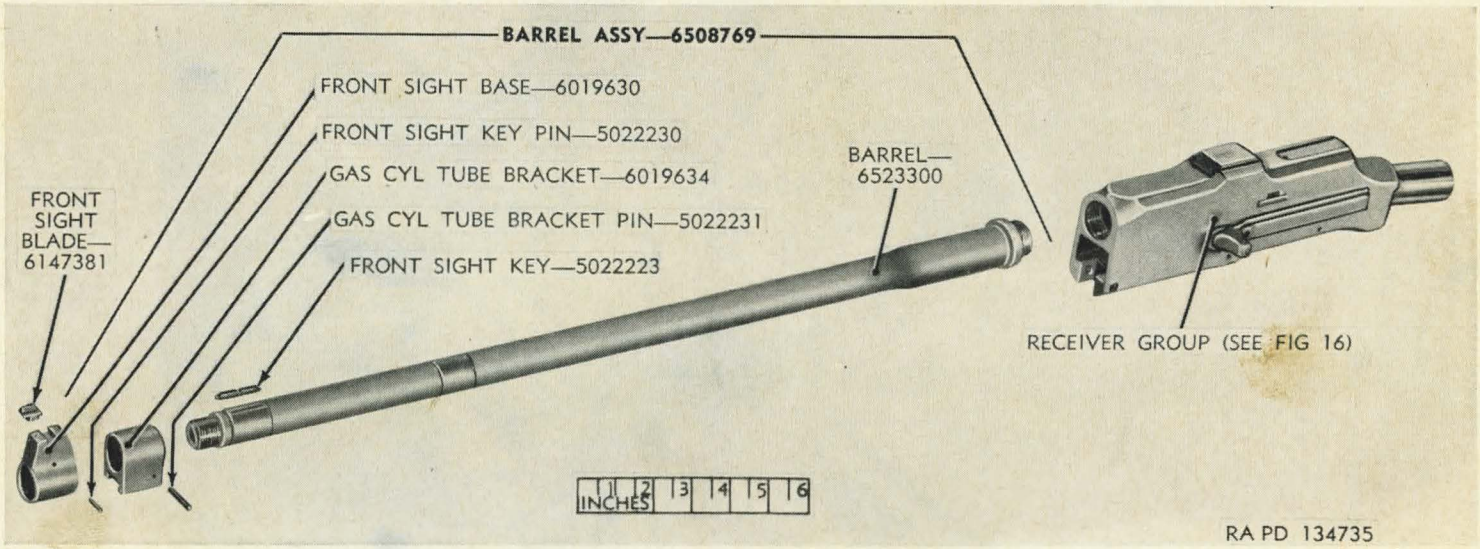

Figure 11. Barrel assembly—exploded view.

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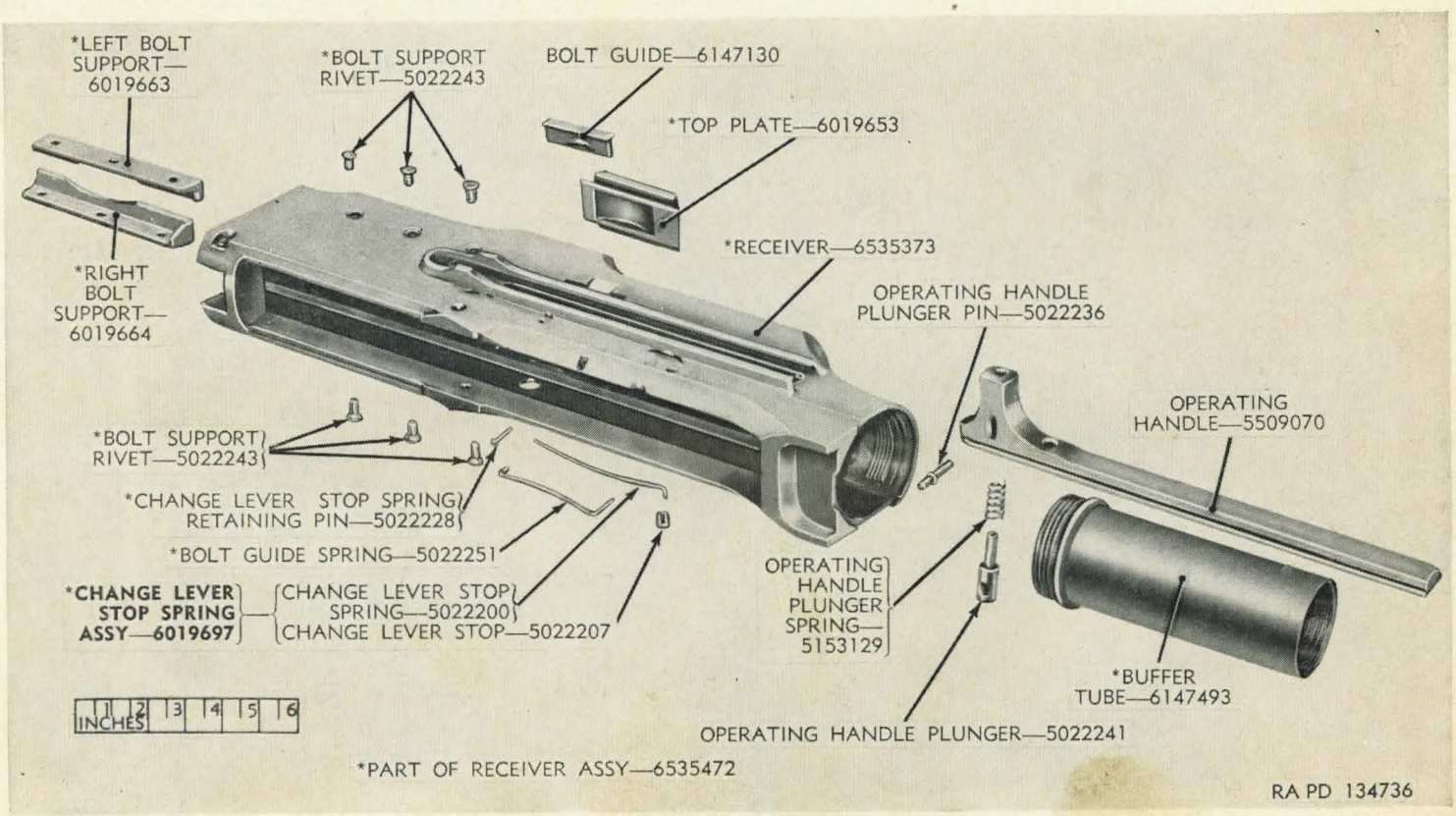

Figure 12. Receiver group—exploded view.

(5) Buffer tube is threaded into receiver and is never removed except for replacement or repair. To remove, clamp receiver in vise with leather jaws, first inserting buffer tube alinement tool spacer 7113328 (fig. 4) inside faces of receiver walls to prevent springing of the receiver, and then unscrew buffer tube with strap wrench (fig. 13).

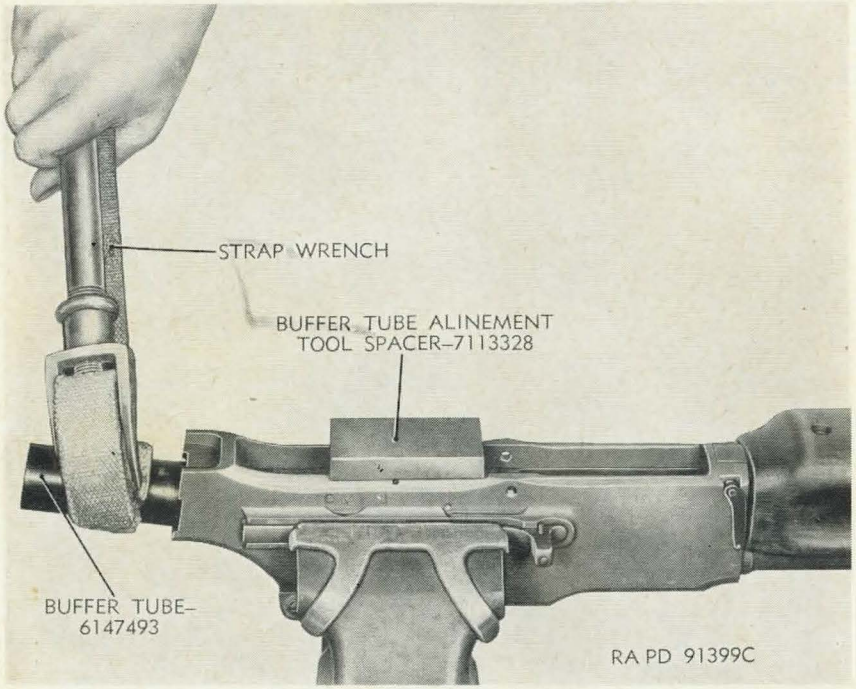

Figure 13. Removing buffer tube.

(6) If necessary, remove top plate of receiver by driving out of grooves to front of receiver, using a block of hardwood as shown in figure 14.

51. Inspection

a. Barrel.

(1) *General inspection.* Inspect barrel for deformation, alinement in receiver, crossed threads, rust, corrosion, wear, burs, and foreign matter in gas port and extractor aperture. Barrel must aline exactly with receiver when assembled, in order that rear end of gas cylinder tube will fit mating slot in receiver; front sight will aline properly; and extractor aperture will be correctly positioned, drilled, and pinned during manufacture of the rifle after barrel is assembled to receiver. A draw mark is then placed in barrel and receiver for proper alinement upon assembly. If draw marks do not qualify, fashion a shim from shim metal.

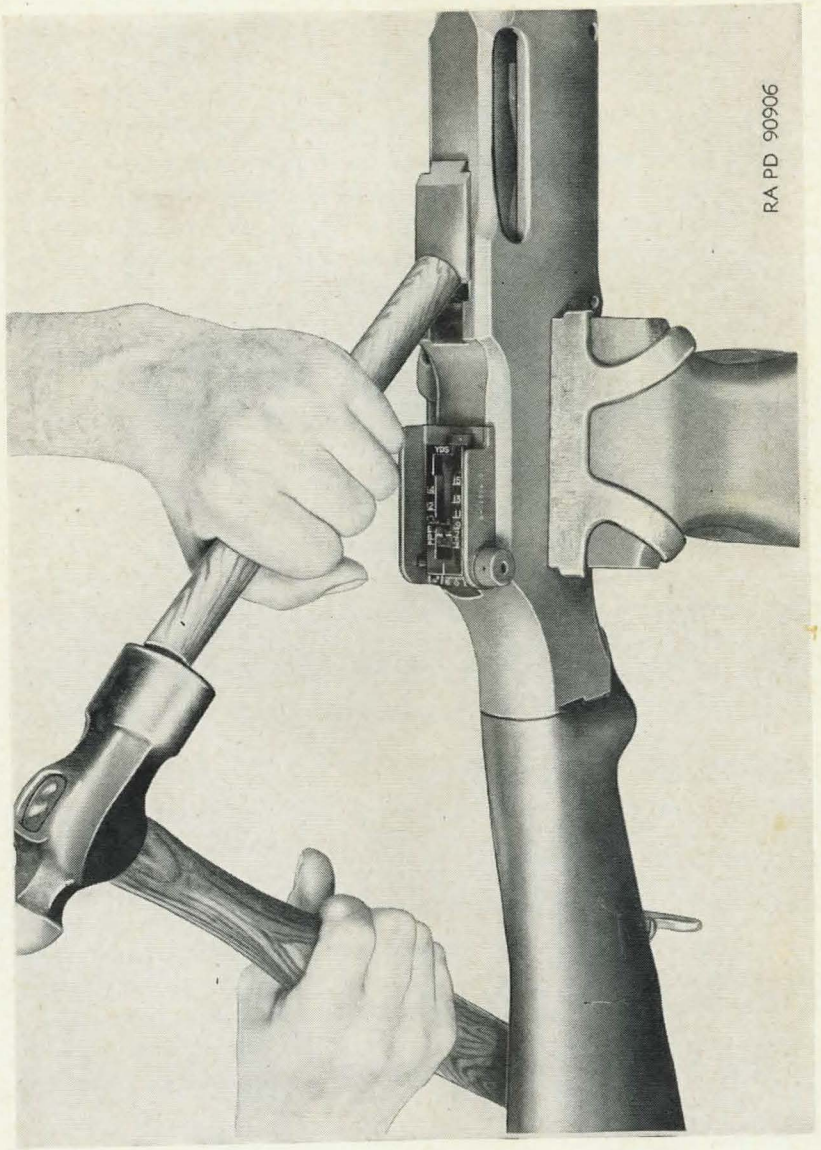

Figure 14. Driving top plate from receiver.

(2) *Inspection for serviceability.*

(*a*) *General.* Inspect the barrel (fig. 11) as a whole from the standpoint of serviceability. Before inspecting the barrel, all metal and other fouling 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.

(*b*) *Visual inspection.* For visual inspection, using barrel reflector 7265788 (fig. 4), 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. A bulge is indicated by a shadowy depression or a 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 inch long or longer), the barrel will be scrapped.

(*c*) *Bore gaging.* Barrels inspected and found serviceable by visual test will be bore-gaged, using breech bore gage 5564343 (fig. 3). Barrel will be replaced if gage reading exceeds 0.310 inch in hands of troops in field or 0.306 inch at preembarkation inspection.

b. Gas Cylinder Tube Bracket (fig. 11). Inspect gas cylinder tube bracket for looseness on barrel, missing or loose pin, alinement of gas port with barrel port, and for worn or burred dovetailed mating grooves. (Bracket is a drive-fit on barrel and gas port is drilled through bracket and barrel after assembly at manufacture.)

c. Front Sight Group (fig. 11). Inspect front sight base for looseness on barrel; missing, loose, or burred key; and worn keyway (on barrel). Inspect for missing front sight key pin, looseness of pin in base, and for looseness with key. Inspect front sight blade for position (stakes), looseness in base mating dovetail, worn or burred dovetail (male and female), deformation, and shine.

d. Receiver (fig. 12).

(1) Inspect receiver for excessive wear, deformation (pinched sides due to squeezing in vise), burs, rust, and foreign matter in recesses.

(2) Inspect for loose rivets in bolt supports and for cracks in barrel end and bridge.

(3) If barrel and buffer tube are removed, inspect for crossed threads.

(4) Inspect bolt lock recess in top of receiver for wavy surface, wear, and burs, especially where lock seats when bolt is locked. Inspect surface by reflecting light on it from a small mirror or a bright tool. This surface is critical and affects headspace.

(5) Inspect top plate for looseness (should be drive-fit).

(6) Inspect buffer tube for tightness on receiver. It should be free of dents that would cause buffer cones and cups to freeze and must contain eight splines.

(7) Inspect receiver for recess cut (fig. 15). This recess cut should be drilled by depot maintenance on all receivers not having it in accordance with drawing D6535373.

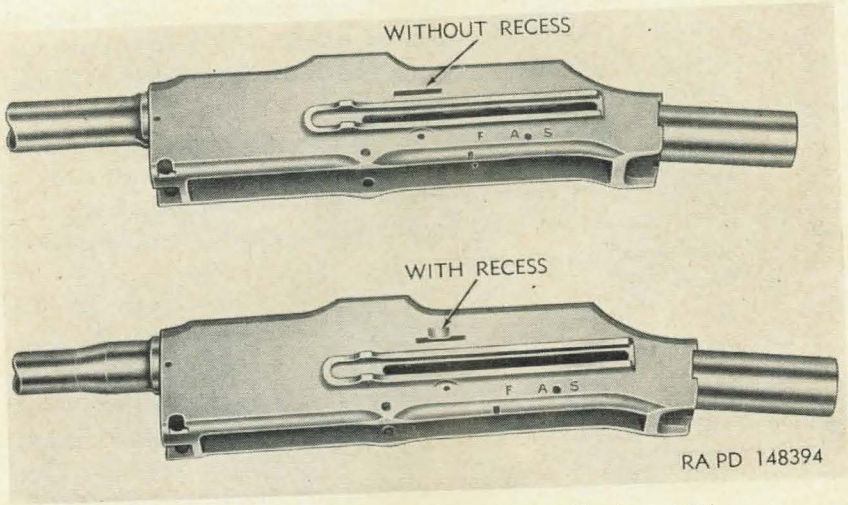

Figure 15. Comparison of receiver with and without recess cut.

e. Operating Handle Group (fig. 12). Inspect operating handle for functioning and free movement in its slideway. Inspect plunger for functioning and free movement in well. Inspect plunger spring for functioning and fracture.

f. Bolt Guide Group (fig. 12). Inspect bolt guide for sustained functioning with bolt, looseness with spring, looseness of spring in receiver aperture, and weak spring action.

g. Change Lever Stop Group (fig. 12). Inspect change lever stop for functioning with spring, wear, and burs, looseness on spring (riveted), and weak spring. Inspect spring for looseness in receiver aperture. Inspect pin for looseness.

h. Gas Cylinder Tube Retaining Pin. Inspect retaining pin for spring retention with depression in receiver, locking function of key in undercut in receiver (left side). Inspect spring for looseness on pin (riveted), deformation, or fracture. If spring becomes loose from pin, pin of earlier

manufacture cannot be rotated to be withdrawn from receiver; however, pin 5022232 of latest manufacture has a screwdriver slot on end for removal of pin when spring breaks.

52. Repair

a. General. Replace all broken, worn, or otherwise unserviceable parts. Remove burs and rust as explained in paragraphs 35 and 36.

b. Replacing Unserviceable Barrel.

(1) Disassemble barrel from receiver (par. 50).

(2) Assemble new barrel assembly, which includes front sight base and gas cylinder tube bracket. Screw up barrel until draw marks on barrel and receiver register. Assemble gas cylinder tube to bracket; then check fit and alinement of rear tang and retaining pin holes in tang and receiver. If tang of tube does not mate without binding, turn barrel until this is accomplished. Barrel should draw up tightly to receiver so there is no possibility of vibrating loose. If there is no draw mark on barrel, draw up until tube alines as above and check position of extractor cut by assembling bolt with extractor assembled.

(3) If barrel does not draw up to proper position, dress rear face of shoulder in a lathe.

(4) Never alter the receiver to obtain draw-fit. When barrel is alined, check alinement of gas cylinder tube, front sight, and extractor cut. If barrel requires much shimming or dressing to aline, headspace may be affected.

c. Front Sight Blade Out of Alinement. This is usually due to enlarged dovetailed aperture in base. Peen lightly along upper edges, aline sight blade (by eye), and stake, using old stake mark. Base pin may be missing; if so, replace and aline blade.

d. Rough or Wavy Surface of Bolt Locking Recess in Receiver. If surface of bolt locking recess in receiver is burred or wavy, correct by removing top plate (par. 50*c*(6)) and stoning rough or wavy surface smooth with a fine-grained sharpening stone Exercise care to stone evenly and remove as little metal as possible, as this surface affects headspace. Check headspace (par. 27) after stoning.

e. Loose Spring on Gas Cylinder Tube Retaining Pin. If spring becomes loose from body of pin, it may be impossible to withdraw pin by ordinary methods for replacement. In such event, attempt to revolve and shake pin out of aperture or pull out with needle-nosed pliers.

f. Dents in Buffer Tube. Shallow dents in buffer tube are often removed by reaming with an expansion reamer set to the original inside diameter of tube. Larger dents may be swaged out, first by using rod the size of inside diameter of tube and then reaming. If dents are deep enough to cause possible weakening of wall of tube due to this procedure, replace the tube. Test components in tube after repair for free movement.

53. Assembly and Installation

a. Assembly of Receiver Group (fig. 12).

(1) Install top plate, being careful not to deform the dovetail.

(2) Install buffer tube on receiver as shown in figure 20, being sure that one of the eight grooves in the head of the tube lies centrally horizontal with the top of the receiver with nose down. Clamp receiver in vise, first inserting the spacer 7113328 (fig. 4) of the buffer tube alinement tool 6316001 between inside faces or receiver walls to prevent squeezing of receiver, and insert parallel 7113327 (fig. 4) of buffer tube alinement tool into receiver, with keyed end toward buffer tube end of receiver as shown in figure 16. Start the buffer tube into the ends of the receiver and insert plug 7113326 (fig. 4) of buffer tube alinement tool as shown in figure 16. Tighten buffer tube with strap wrench until plug engages keyed end of parallel.

Note. Buffer tube must be at tightest possible position at which the plug and parallel will engage, using shim or shims, if necessary.

(3) Install change lever stop spring assembly in receiver and secure with change lever stop spring retaining pin.

(4) Insert the longer turned-over end of bolt guide spring in its hole inside the receiver. Then install the bolt guide and hold it while the spring is pushed over until the shorter turned-over end engages the groove in bolt guide.

(5) Install operating handle plunger spring (0.263-in. O D, 5 coils) in the operating handle. Insert operating handle plunger and secure with operating handle plunger pin. Be sure pin is installed with ridge in countersunk side of plunger.

(6) Insert operating handle group in slideway on receiver.

b. Assembly of Barrel Assembly (fig. 11).

(1) Install gas cylinder tube bracket, being sure to aline gas port holes. Secure bracket in place with gas cylinder tube bracket pin (0.1257 x 0.855).

(2) Position front sight key in groove on barrel and install front sight base. Secure them in place with the front sight key pin (0.0907 x 0.505).

(3) Install front sight blade and realine sights.

c. Installing Barrel Into Receiver (fig. 10). When installing the barrel, always be certain that it is tight enough in the receiver never to work loose. Screw the barrel into the receiver until the draw line matches that of the receiver. Then assemble the gas cylinder tube to determine whether the gas cylinder tube bracket on the barrel alines properly with the receiver, so gas cylinder tube rear tang slides easily into its aperture in receiver. If it does not, turn the barrel slightly until the alinement is correct. When assembled, check extractor cut in rear face of barrel for position. For assembling new barrel, refer to paragraph 52.

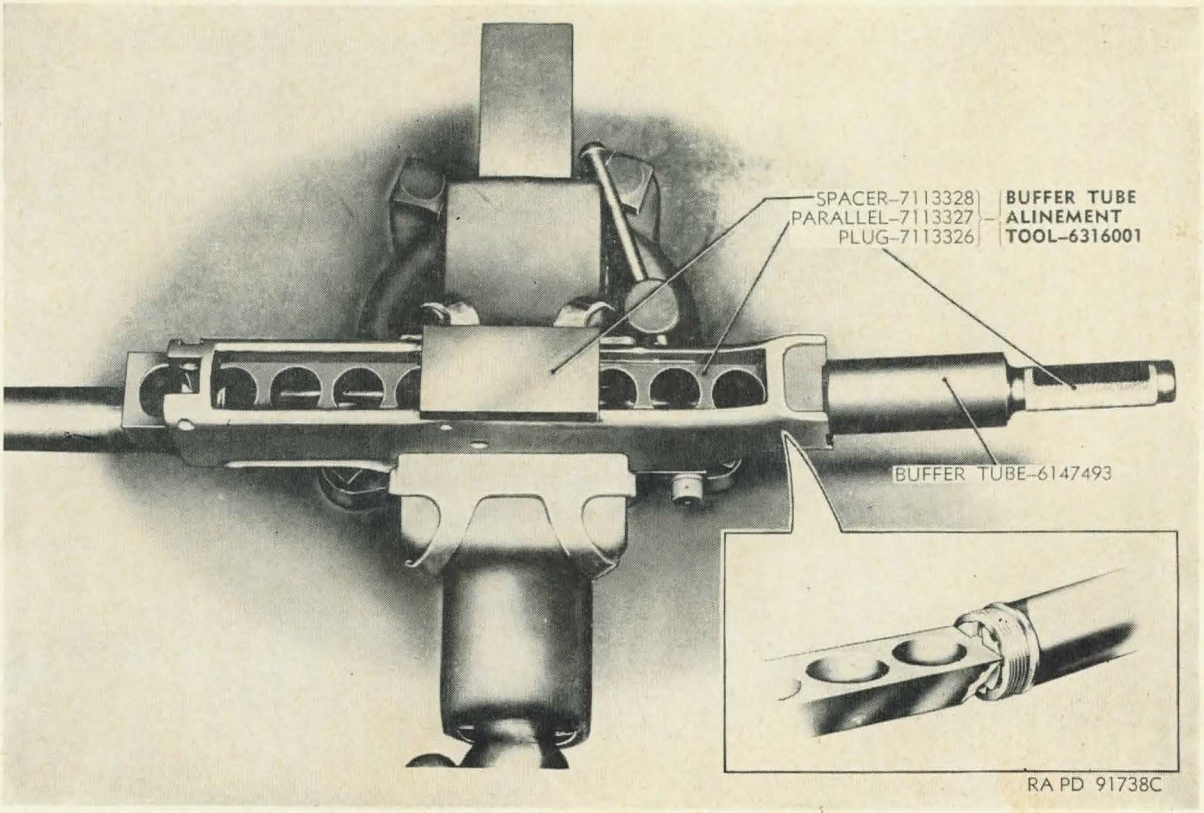

Figure 16. Assembling buffer tube to receiver.

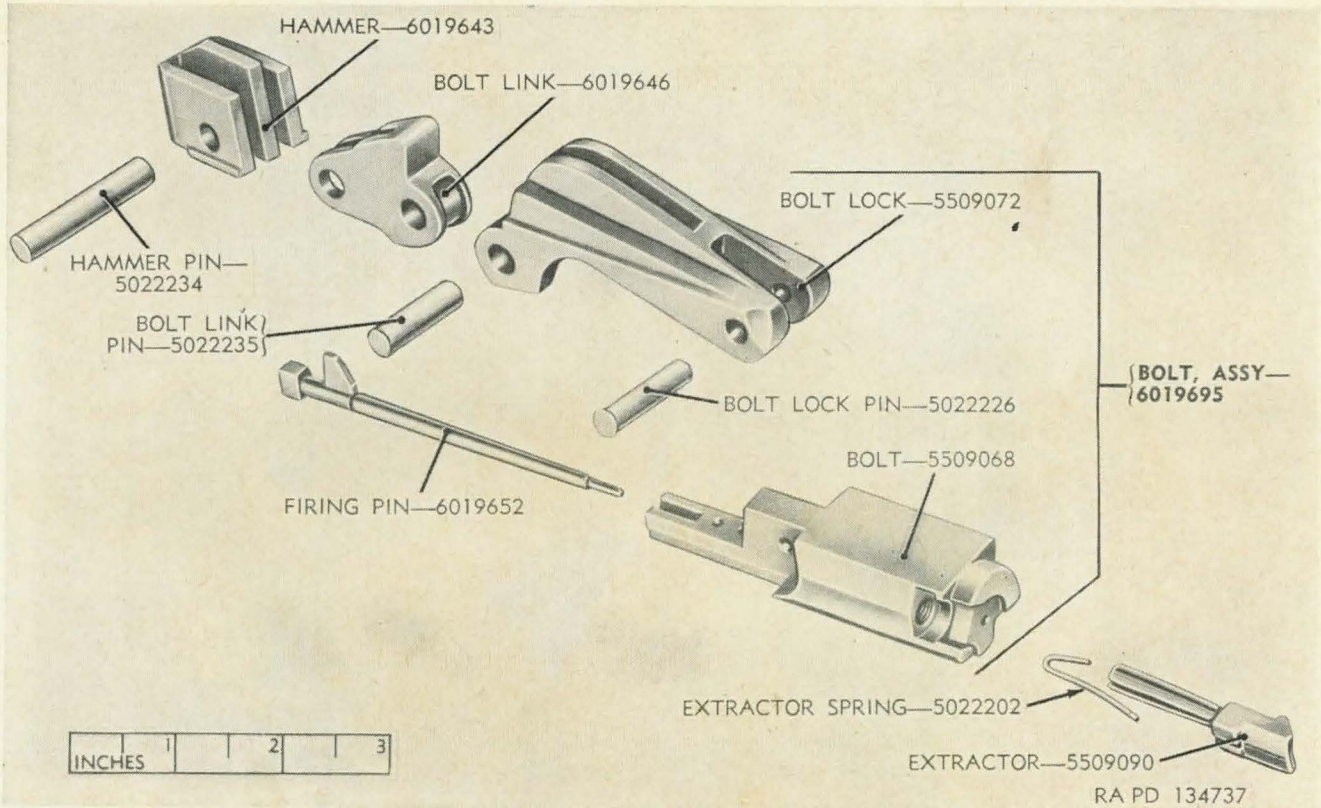

Figure 17. Bolt group—exploded view.

Section IV. BOLT GROUP

54. Removal and Disassembly

Refer to FM 23–15 for removal and disassembly of the bolt group (fig. 17).

55. Inspection

a. General. Inspect parts for damage, excessive wear which might cause malfunction, burs, rust, foreign matter in recesses, deformation, and free action with mating parts. Figure 18 shows important points to be inspected.

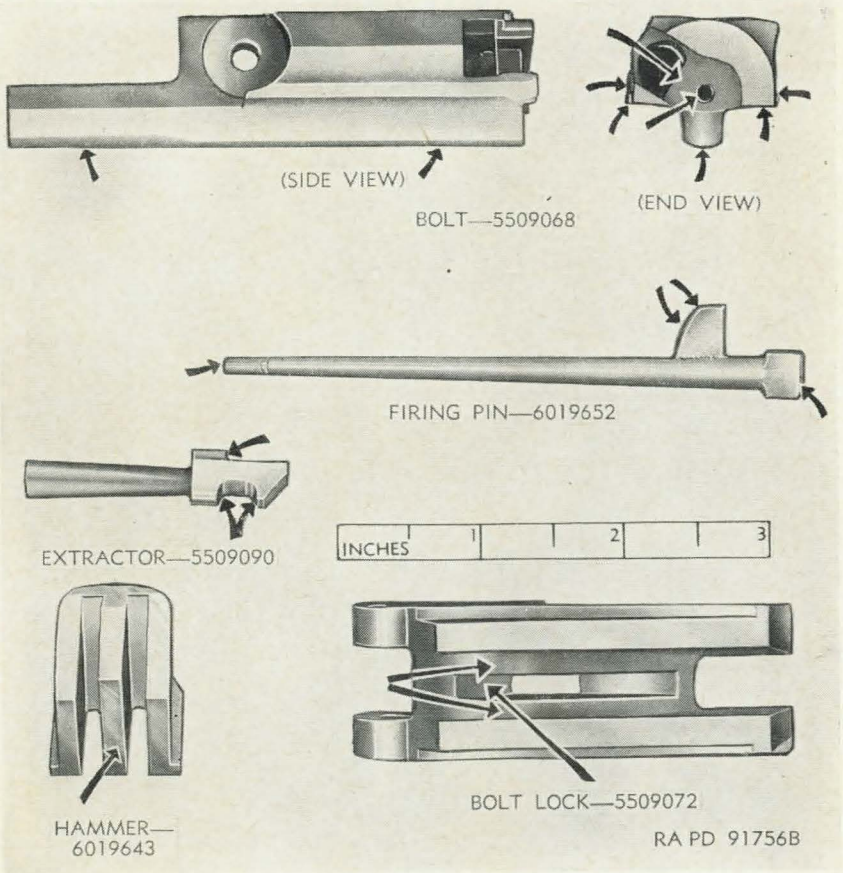

Figure 18. Inspection points on bolt group parts.

b. Bolt (fig. 17). Inspect bolt for excessive sideplay and looseness with bolt lock and bolt lock pin (riveted). Inspect firing pin hole for enlargement, and inspect face for corrosion and recessive wear. Firing pin holes are gaged by fifth echelon organizations. Inspect lower surfaces contacting bolt supports and center feed rib for wear and burs.

c. Bolt Lock (fig. 18). Inspect rear top shoulder where lock contacts receiver locking aperture for wear and burs. This is an important surface, as it affects headspace (par. 27). Inspect lower rear cam surface where lock rides up on bolt supports and firing pin camming surface for wear and burs.

d. Extractor (fig. 18). Inspect extractor spring for fracture, weak action, and looseness in extractor body. Claw nose and retaining shoulder are square, not beveled.

e. Firing Pin (fig. 18). Firing pin should slide freely in well and protrusion of nose from forward face of bolt should be approximately three thirty-seconds inch. If firing pin protrudes too far, it will result in punctured primers. Inspect firing pin nose for pits. Nose must be smooth and round. The camming surface contacted by the bolt lock and rear surface contacted by the hammer must be free of wear that would affect action of firing pin.

f. Bolt Link and Bolt Link Pin (fig. 18). Inspect link for excessive looseness with bolt lock and hammer. When assembled, the link bears on rear camming face of bolt lock.

g. Hammer and Hammer Pin (fig. 18). Inspect hammer for excessive looseness with link and slide. Inspect center rib of hammer which strikes head of firing pin for wear and burs. Hammer pin must fit snugly in the hammer and bolt link.

56. Repair

a. General. Replace all broken, worn, or otherwise unserviceable parts. Remove burs and rust as explained in paragraphs 35 and 36.

b. Bolt Assembly. If it is necessary to replace one of the parts of the bolt assembly, drive out the bolt lock pin, using a suitable drift. This is a headed pin riveted on one side when assembled. After replacing the unserviceable part, install a new pin and rivet in place.

57. Assembly and Installation

Refer to FM 23–15 for assembly and installation of bolt group (fig. 17).

58. Functional Check

Check free movement of bolt, bolt lock, link, and hammer attached to slide and piston, but with recoil spring disassembled.

a. Rearward Movement. When bolt is locked, the hammer pin should be approximately 0.19 inch in advance of the link pin and the center rib of hammer slightly in the rear of head of firing pin. When slide is retracted, it imparts no motion to the bolt until it has traveled back 0.19 inch from extreme forward position. At this point, the hammer pin should be directly under the bolt link pin. From this point, the bolt and bolt lock start to move, and by the time the slide has traveled 1.20 inches, the bolt should be drawn completely down out of the locking re-

cess and away from locking shoulder of the receiver. As bolt lock revolves down from locked position, it should cam the firing pin from the face of the bolt. Slide should continue back until it strikes buffer and then rebound 0.10 inch before engaging sear notch.

b. Forward Movement. On forward movement, when slide is about 2 inches from its forward position, bolt lock should begin to ride over rear shoulders of bolt supports which cam up its rear end. The bolt link pin passes over dead center, with respect to bolt lock pin and hammer pin, and the bolt lock is forced up by link into locking recess in receiver and thus levers bolt home; the hammer pin passes dead center under bolt link pin. At this point, the firing pin should be released from its slot in the under side of bolt lock and in a position to be struck by the hammer; the hammer moves forward 0.10 inch and strikes firing pin head and then should move forward another one-sixteenth inch, driving the firing pin to its fully forward position.

Section V. BUTT STOCK, BUFFER, AND ACTUATOR GROUP

59. Removal and Disassembly

Refer to FM 23–15 for removal and disassembly of butt stock, buffer, and actuator group (figs. 19 and 20).

60. Inspection

a. General. Inspect parts for damage, excessive wear that might cause malfunction, burs, rust, foreign matter in recesses, deformation, stripped threads on screws and in screw holes, and free action with mating parts.

b. Butt Stock (fig. 19 or 20). Inspect butt stocks for cracks, scoring, and surfaces protruding beyond metal. Inspect butt stocks for stripped threads in the butt plate and swivel screw holes.

c. Hinged Butt Plate Assembly (fig. 19 or 20). Inspect hinged butt plate assembly for deformation and free action. The hinged butt plate must work freely when it is rotated and must be securely held in its open position by the bearing ball in the inner butt plate.

d. Buffer and Sear Release Group.

(1) Inspect reciprocation of buffer head and buffer spring and for free movement in buffer tube. Inspect tube for position and looseness in receiver and worn or burred head keyways. Buffer tube and receiver are qualified at assembly so that keyways aline properly with receiver. One of the eight keyways in forward end of buffer tube should be vertically alined with centerline of bore and receiver so as to position sear release vertically, with nose down, when buffer head is assembled and limit the horizontal forward movement of sear release.

(2) Inspect buffer head and four friction cups and cones (fig. 21) for free action in tube. Inspect cones for expansion seating in

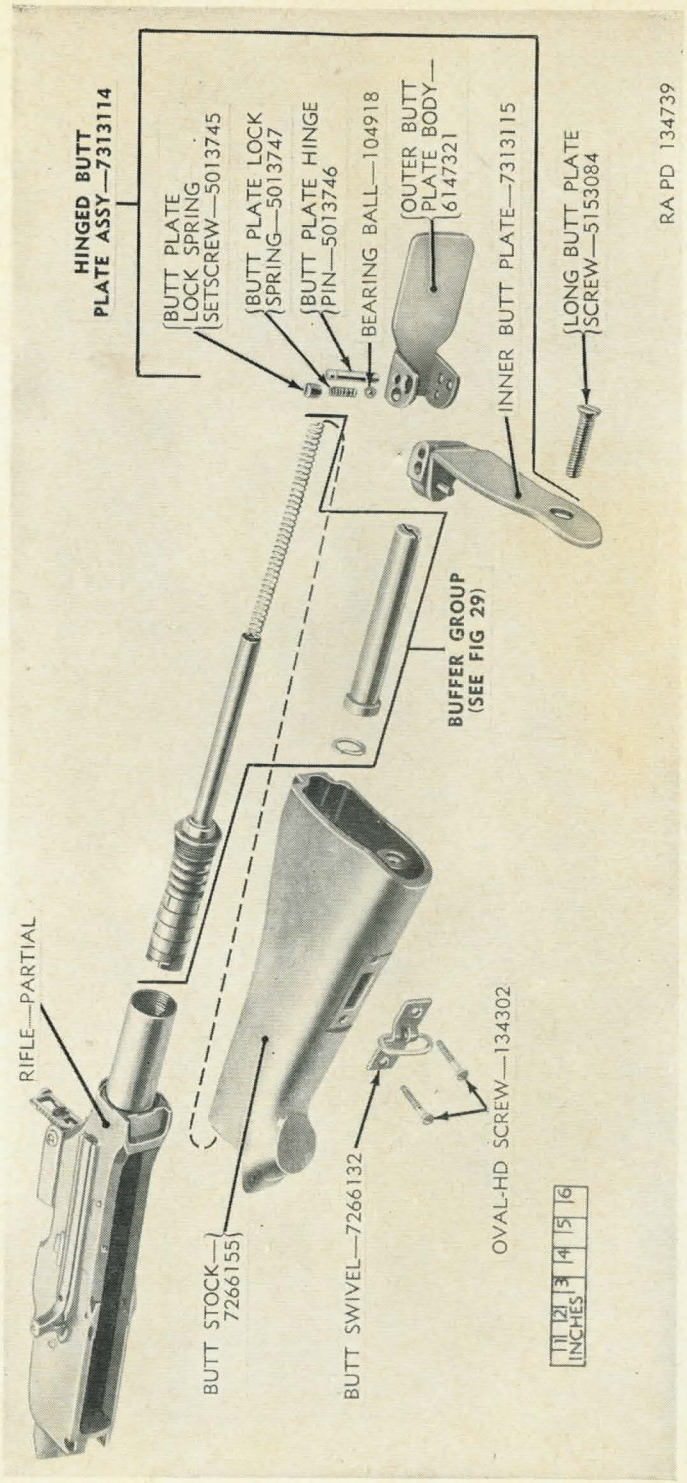

Figure 19. Butt stock group—exploded view (present manufacture).

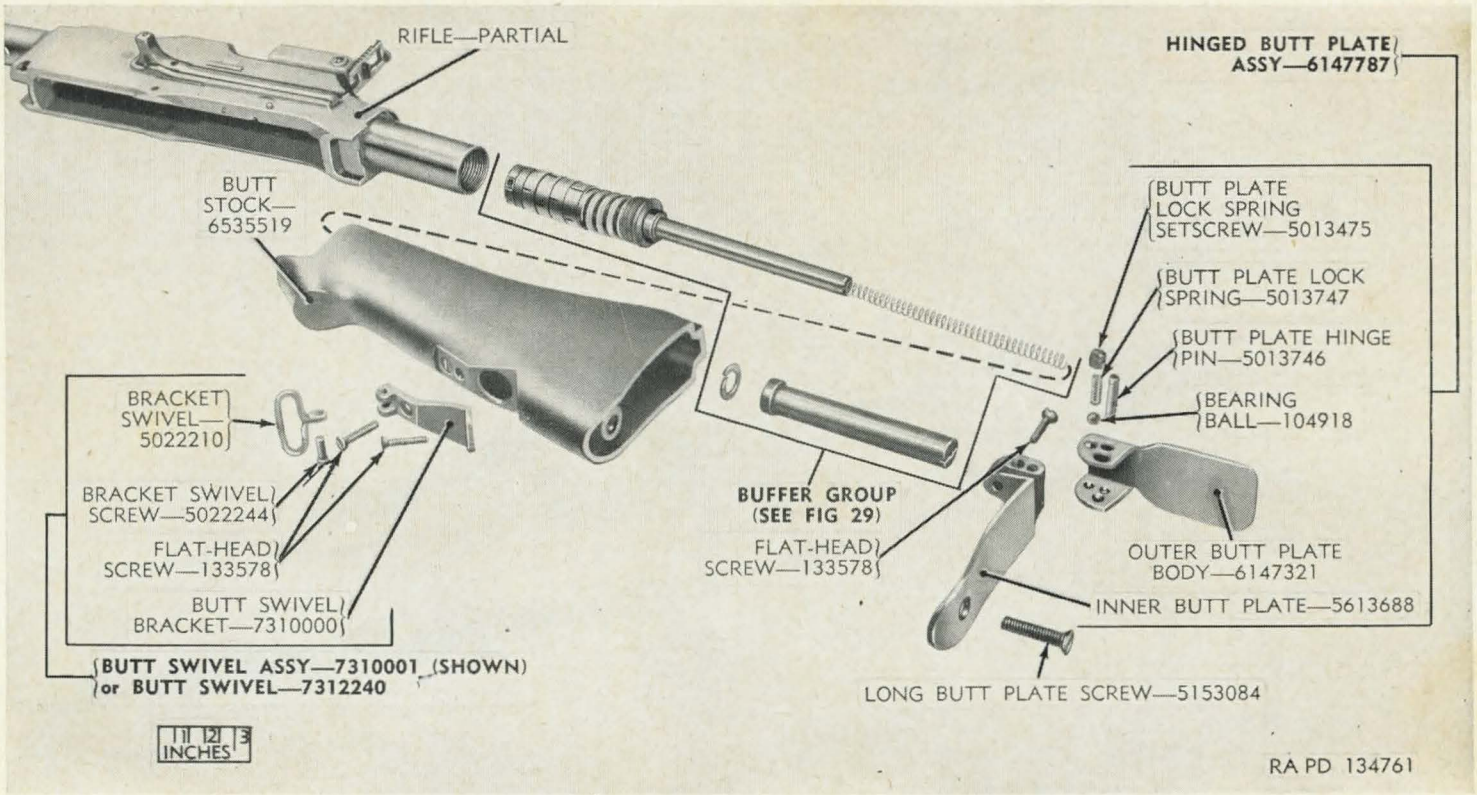

Figure 20. Butt stock group—exploded view (early manufacture).

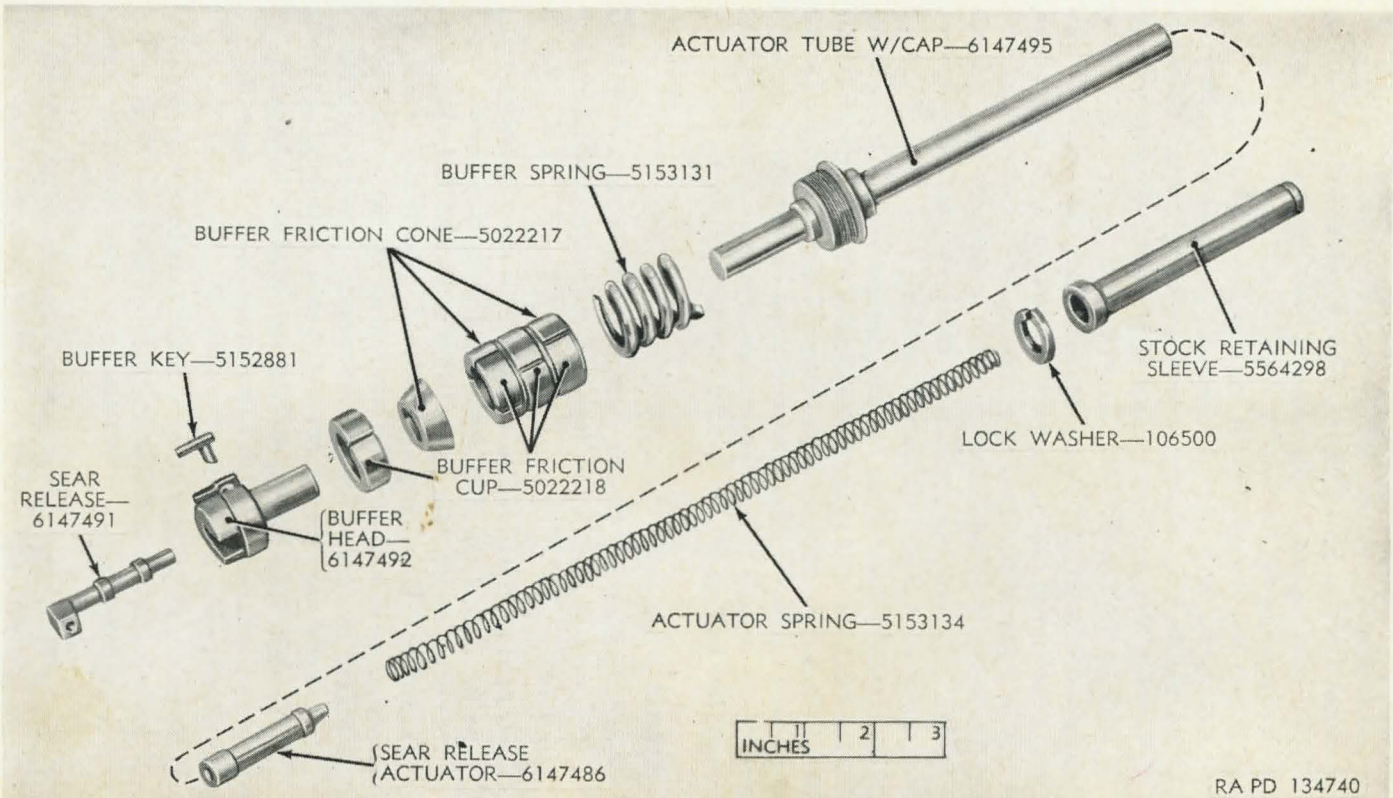

Figure 21. Buffer and actuator group—exploded view.

mating cups (cones should not seat fully in cups when at rest) and for cracks. Cups and cones must be free of any burs or wear that would cause them to freeze together.

(3) Inspect protrusion of buffer head from face of tube. This dimension should be approximately one-eighth inch. Inspect buffer spring for functioning, fracture, and set.

(4) Inspect sear release (fig. 21) for free movement in buffer head (should be flush with forward face of buffer head when retracted) and for binding in notch. Inspect camming face of nose for wear and burs. Lower forward edge of nose should be slightly beveled and perfectly smooth.

e. Actuator Group (fig. 21). Inspect actuator and sear release for cofunction under spring action. Inspect actuator tube for looseness in buffer cap (cap brazed to tube). Tube should be smooth and polished inside. Inspect free movement of actuator in actuator tube (should slide freely). Assemble actuator with blunt end forward. Inspect actuator spring for functioning, fracture, and set.

f. Stock Retaining Sleeve Group (fig. 21). Inspect stock retaining sleeve for clearance with actuator tube and looseness of stop in sleeve and collar on sleeve. Stop and collar are both brazed on sleeve. Stock retaining sleeve screws on actuator tube by means of mating threads on stop and in tube. Hole in stop is air compression relief vent. Inspect stock retaining sleeve lock washer for locking function and cracks.

61. Repair

a. General. Replace all broken, worn, or otherwise unserviceable parts. Remove burs and rust as explained in paragraphs 35 and 36.

b. Butt Stock.

(1) Stripped threads are often encountered in the screw hole located in the heel of the butt stock using inner butt plate of early manufacture (fig. 20), due to frequent removal of the butt plate assembly. If the butt stock is found unserviceable, due to the above mentioned threads being stripped, the stock may be utilized by eliminating the requirement of a screw. This is accomplished in the manner described in (*a*) through (*c*) below:

(*a*) Machine a steel pin to the dimensions shown in figure 22.

(*b*) Tack-weld pin to lug in butt plate as shown in figure 22.

(*c*) Finish off, if necessary, with a fine file.

(2) To reduce stripping of threads, remove the large screw from the inner butt plate assembly before removing small screw in heel of the butt stock. Install the small screw first when assembling.

(3) Use helicoil screw thread inserts to repair stripped threads in the butt plate screw holes and/or the swivel screw holes on butt stocks.

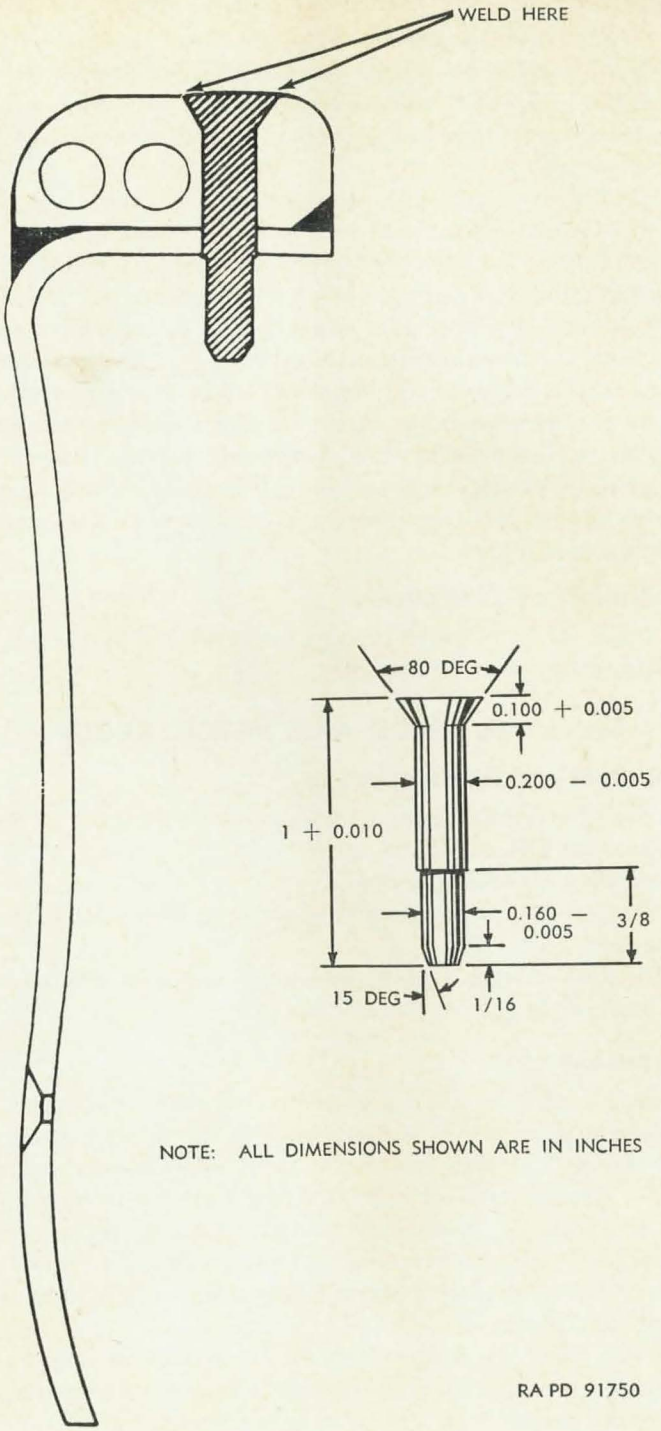

Figure 22. Modification of inner butt plate of early manufacture.

c. Actuator Tube.

(1) Shallow dents in actuator tube are often removed by reaming with an expansion reamer set to original inside diameter of tube. If dents cannot be removed with an expansion reamer, tube will be rejected. Test components in tube for free movement after repairing.

(2) Remove rust and clean foreign matter from inside of actuator tube in accordance with instructions in paragraph 35.

d. Frozen Buffer. If buffer head becomes frozen in buffer tube due to broken cups, remove operating group, trigger mechanism, butt stock, actuator tube with cap, and buffer spring. Soak jammed parts with dry-cleaning solvent, mineral-spirits paint thinner, or special preservative lubricating oil and drive out from front of buffer, using a hardwood plug. If parts do not dislodge easily, remove buffer tube from receiver (par. 50*c*(5)), place on hardwood block, and drive out parts as above. If cups and cones are frozen together, soak in dry-cleaning solvent or mineral-spirits paint thinner and tap edge of cup until loose. Clean parts thoroughly, test, oil, and install.

62. Assembly and Installation

Refer to FM 23–15 for assembly and installation of butt stock, buffer, and actuator group (figs. 19 and 20).

Section VI. SLIDE AND PISTON GROUP

63. Removal and Disassembly

a. Removal From Rifle. Refer to FM 23–15 for removal of slide and piston group (fig. 23 or 24).

b. Disassembly of Slide Assembly.

(1) Remove pin securing piston to slide (fig. 23 or 24) and unscrew piston.

(2) On rifles of early manufacture where a plug is screwed into the head of the piston, remove the plug.

64. Inspection

a. General. Inspect free action of piston and slide with respect to gas cylinder tube and receiver. Piston and slide should slide freely in gas cylinder tube and receiver when rifle is tilted with recoil spring disassembled. Inspect piston retaining pin for looseness in slide and wear in piston and slide. A loose fit is provided between piston and slide, when assembled, to insure proper alinement and free movement of slide in receiver. Total end-play of piston in any direction should be approximately one-eighth inch.

b. Slide (fig. 23 or 24). Inspect slide for deformation of sides by pinching or springing, which may cause binding with operating mechanism or receiver, badly dented rear end (indicating frozen buffer), and worn hammer pin hole.

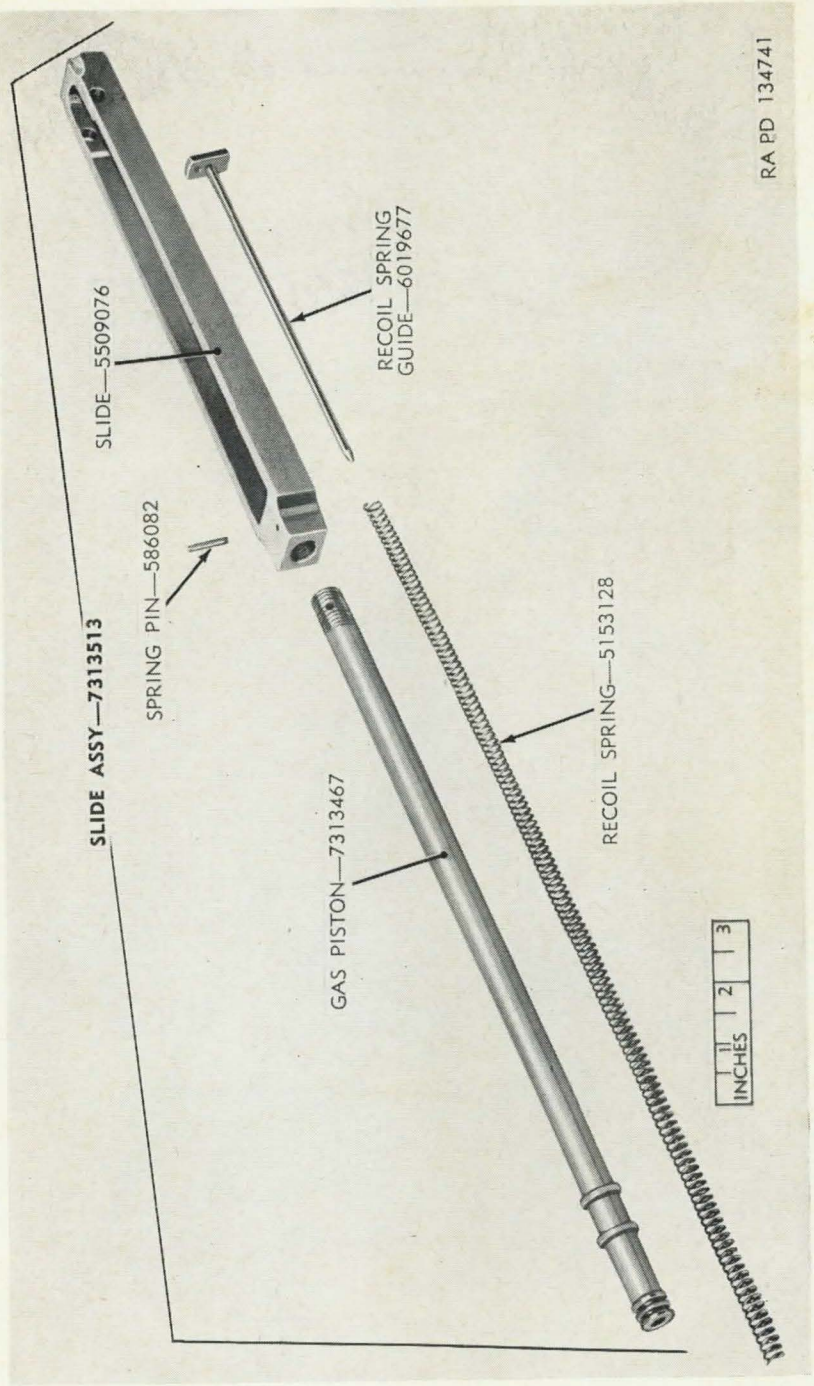

Figure 23. Slide and piston group—exploded view (present manufacture).

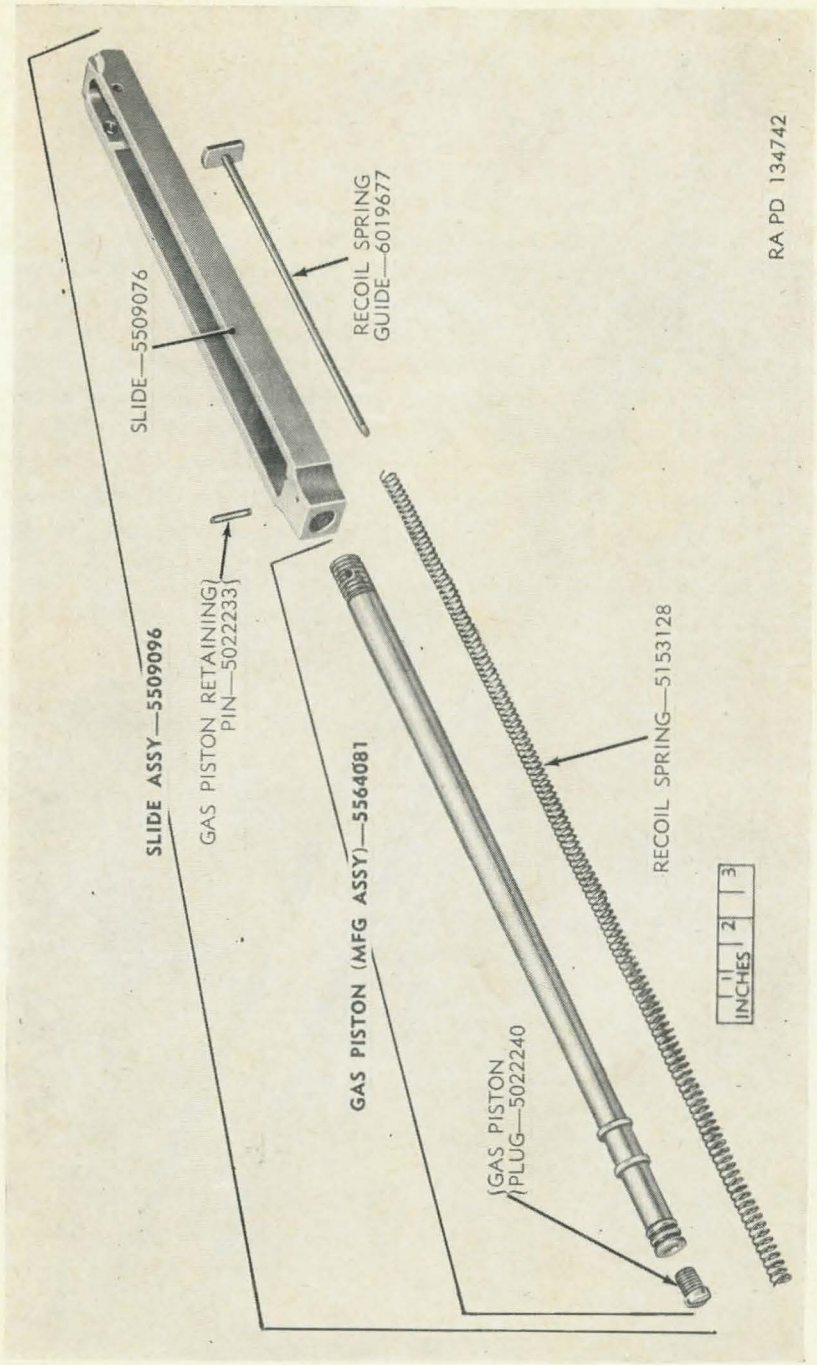

Figure 24. Slide and piston group—exploded view (early manufacture).

c. Piston

(1) *General.* Inspect piston (fig. 23 or 24) for deformation, wear, and burs on head of piston and on gas check bearing rings. Inspect body for missing or fractured bushing. Bushing is held by light drive-fit against forward shoulder of counterbore in piston body and is not to be removed. If damaged, replace piston. Inspect piston for carbon or rust.

Note. On rifles of early manufacture where a plug is screwed into the piston (fig. 24), inspect plug for looseness in head and for rust; where plug lies below face of piston, inspect for carbon in recess.

(2) *Gaging.* Gage piston head with 0.494-inch piston diameter NO GO ring gage 5077201 (fig. 25). Piston head should not enter gage. To gage, first clean piston thoroughly of all carbon and fouling and determine that surfaces of head ring are smooth and polished. Wipe piston head and gage with a slightly oiled cloth and try to pass gage over piston head. If piston enters gage, it is unserviceable. Piston must not be oval in shape, and there must be no signs of light between gage and piston head when held to the light. (Only light pressure should be exerted on gage.)

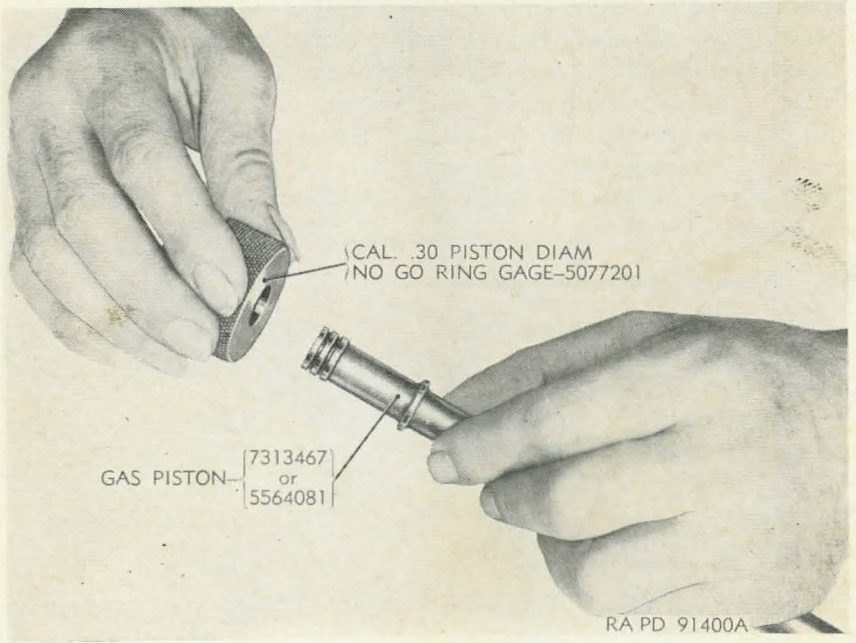

Figure 25. Gaging piston head.

d. Recoil Spring and Guide. Inspect recoil spring for functioning, fracture, kinks, and set. Inspect spring guide for deformation, loose head (riveted), fit, and retention in retaining shoulders in receiver.

65. Repair

a. General. Replace all broken, badly worn, or otherwise unserviceable parts. Remove rust, carbon, and burs as explained in paragraphs 35 and 36. Remove carbon from piston rings with drift of gas cylinder cleaning tool 7268211 (fig. 3).

b. Alinement of Piston and Slide. The piston and slide are assembled to a loose fit at manufacture. The piston is screwed into slide and backed off sufficiently to allow some play in union; slide and piston are then tested for free sliding fit in receiver and gas cylinder tube. If satisfactory, pinhole is drilled and pin inserted. Pinhole is enlarged to give the ⅛-inch play described (par. 64*a*).

Note. The slide is not furnished as a spare part; therefore, if the slide is found to be unserviceable, replace the entire assembly consisting of the slide and piston. If the piston is still serviceable, remove and salvage for further use.

c. Frozen Piston. When piston becomes locked or "frozen" in gas cylinder, submerge barrel in dry-cleaning solvent or mineral-spirits paint thinner until gas cylinder is covered and soak for 1 hour. If this does not loosen piston, place butt stock on solid surface and, with wooden block, tap lightly on operating handle. Often, considerable force is required to loosen piston. Clean rust and corrosion from piston, gas cylinder, and tube; polish and oil. Remove all dry-cleaning solvent or mineral-spirits paint thinner with a clean cloth.

d. Deformed Side Rails of Slide. Side rails of slide may become bent in or out, causing binding with operating mechanism or receiver. Rails can be spread or sprung in by using wooden wedges, clamping in vise with copper jaws, or with the hands. Test slide after repair for free sliding movement by tilting rifle.

e. Undersized Piston. Undersized pistons are salvaged by fifth echelon organizations by chrome plating.

66. Assembly and Installation

a. Assembly of Slide Assembly.

(1) Insert gas piston plug (fig. 24) in piston on rifles of early manufacture.

(2) Insert gas piston retaining pin (0.1257 x 0.74 straight pin) (fig. 24) for early manufacture or spring pin (⅛ x 11/16) (fig. 33) for present manufacture.

b. Installation on Rifle. Refer to FM 23–15 for installation of slide and piston group (fig. 23 or 24).

Section VII. GAS CYLINDER AND FOREARM GROUP

67. Removal and Disassembly

a. Removal of Gas Cylinder Group. Refer to FM 23–15 for removal of gas cylinder group.

b. Disassembly of Gas Cylinder Group (fig. 26).

(1) Slide forearm shield to rear and remove.

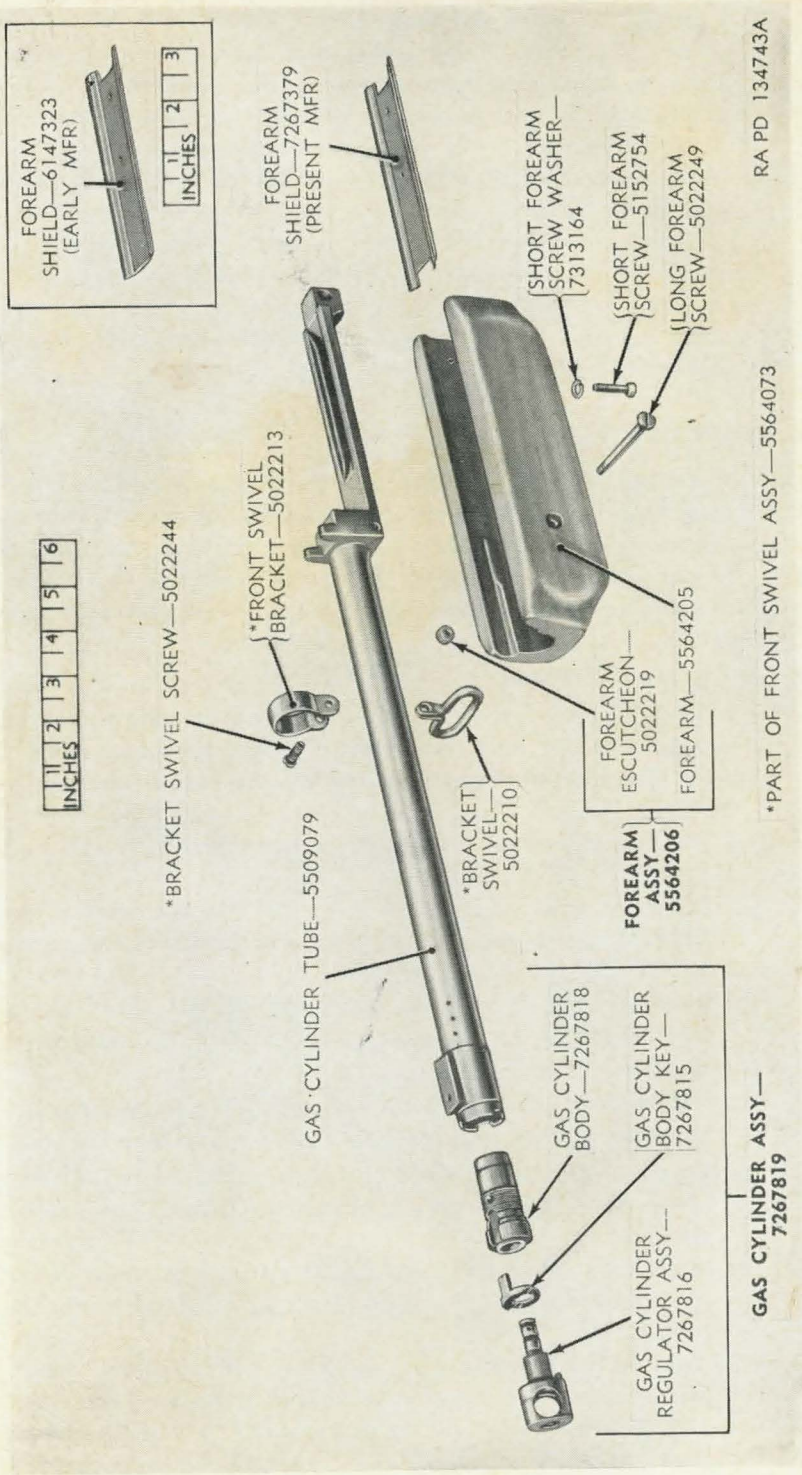

Figure 26. Gas cylinder and forearm group—exploded view.

(2) Unscrew the short and long forearm screws, and remove the screws, the forearm screw washer, and the forearm from the gas cylinder tube. The long forearm screw is staked to the escutcheon. Never remove the forearm escutcheon except for repair; to remove, insert the screw and pull out.

(3) If replacement is necessary, remove the bracket swivel screw and bracket swivel. Spring the front swivel bracket off over the gas cylinder tube.

(4) Observe regulator setting to determine position of gas cylinder regulator. Unscrew gas cylinder assembly, remove gas cylinder key and, with combination tool 7266450 (fig. 4), remove gas cylinder body.

68. Inspection

a. Gas Cylinder Tube (fig. 26). Inspect gas pad for alinement with port in rifle barrel bracket and for carbon. If barrel is not alined properly with receiver or if tube is deformed, the tang will not slide into aperture freely. Inspect interior and exterior of tube for dents and rust. Tube should be smooth and polished on inside. Inspect the six gas escape ports for foreign matter.

b. Gas Cylinder Assemblies.

(1) Inspect gas ports for carbon and foreign matter and cylinder for crossed threads, wear, and burs. Inspect gas pressure relief vent in gas cylinder regulator (fig. 26) for carbon and foreign matter.

(2) Clean the gas cylinder assembly as prescribed in (*a*) through (*e*) below.

(*a*) Insert the large recess cutter of the gas cylinder cleaning tool 7268211 (fig. 3) into the large recess of the gas cylinder body (A, fig. 27) and rotate the tool.

(*b*) Insert the long recess cutter of the tool 7268211 into the regulator recess of the gas cylinder body (B, fig. 27) and rotate the tool.

Caution: Always insert the tool through the large unthreaded opening to avoid damage to the threads in the body.

(*c*) Insert the short recess cutter of the tool 7268211 into the recess of the gas cylinder regulator assembly (C, fig. 27) and rotate the tool.

(*d*) Insert the drift of the tool 7268211 into the gas ports of the gas cylinder regulator assembly (D, fig. 27) and rotate the tool.

(*e*) Clean all parts with a cloth saturated with rifle-bore cleaner solvent cleaning compound. Inspect ports for cleanliness. Dry parts but do not oil the inside of the body or the outside of the regulator assembly.

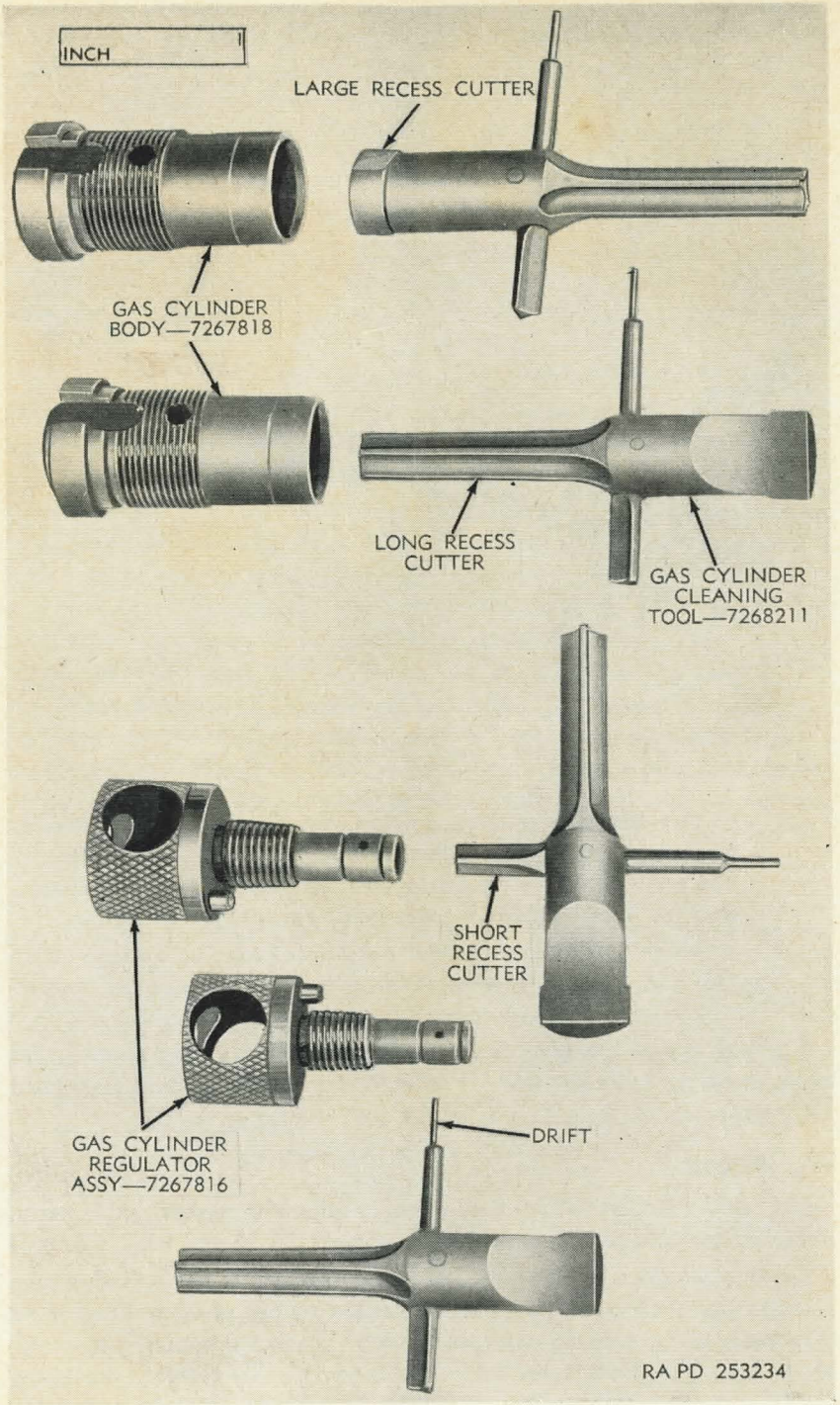

Figure 27. Cleaning the gas cylinder assembly.

(3) Inspect gas cylinder body for wear, using 0.503-inch gas cylinder plug gage 5077204 (fig. 28). This is a NO GO gage and should not enter the gas cylinder body. Wipe cylinder body and gage with a slightly oiled cloth and try to insert the gage into the cylinder body (fig. 28). If the gage enters cylinder body, it is unserviceable and is to be replaced. (Only light pressure should be exerted on gage.)

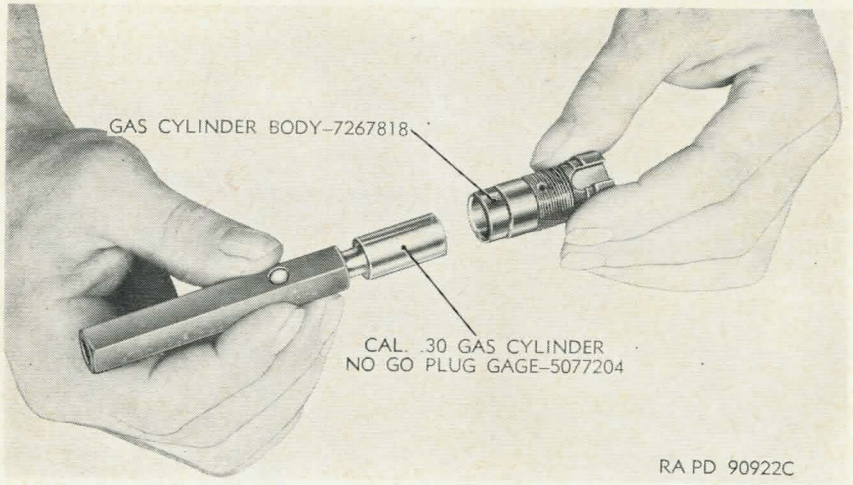

Figure 28. Gaging gas cylinder body.

(4) Inspect the gas cylinder regulator (fig. 26) for ease in installing in body, clogged port holes, carbon deposit, burs or wear; inspect the body key for distortions that would affect functioning and for burs or wear; inspect body pin for serviceability.

c. Forearm Group (fig. 26). Inspect wooden forearm for loose escutcheon, scoring, and cracks. Inspect shield grooves for cracks and inspect shield for deformation. Inspect escutcheon for worn threads.

d. Front Swivel Bracket (fig. 26). Inspect front swivel bracket for looseness on gas cylinder tube. It should be positioned firmly just ahead of forearm.

69. Repair

a. General. Replace all broken, worn, or otherwise unserviceable parts. Remove burs and rust as explained in paragraphs 35 and 36.

b. Gas Cylinder Tube Out-of-Line With Receiver. If gas cylinder tube is out-of-line with receiver, it may be caused by one of several factors: a deformed tube, a missing gas cylinder tube bracket retaining pin, or the barrel being improperly assembled to receiver. To correct, straighten the tube, replace pin, and/or reposition barrel with receiver (par. 52*b*). Test functioning of slide and piston with tube after repairs.

Note. The gas cylinder tube bracket pin hole is drilled at manufacture after the barrel is alined to receiver, with respect to extractor cut, to insure alinement of gas cylinder tube bracket and tube with receiver, together with extractor cut and front sight base. This fact should be taken into consideration when assembling new parts.

c. Frozen Gas Cylinder Body. If gas cylinder body is frozen in gas cylinder tube, remove tube from rifle, clamp in vise with copper jaw, and unscrew gas cylinder body with combination tool 7266450 (fig. 4).

d. Removing Rust From Gas Cylinder Tube. Remove rust, if light, with rifle-bore cleaner solvent cleaning compound and a clean cloth or with a fine abrasive or crocus cloth. Wipe surface with a slightly oiled cloth after rust is removed. To clean gas cylinder tube, use rifle cleaning rod and patches. Clean same as rifle bore. If necessary, use crocus cloth.

e. Dents in Gas Cylinder Tube. Dents may be removed from gas cylinder tube in the same manner as described in paragraph 61*c* for removing dents from actuator tube. Correct edges of retaining slots in receiver for tang of gas cylinder tube, if damaged, and replace damaged retaining pin assembly.

f. Fitting New Gas Cylinder Tube to Receiver. In fitting new gas cylinder tube to receiver, it may be found that pinholes in tang of tube and receiver are not concentric. In such event, stone rear tang on gas cylinder tube to fit, using fine-grained sharpening stone. Make certain tube is properly alined before attempting to fit (*b* above).

g. Cracked Forearm. Replace the forearm if cracked sufficiently to weaken or if it indicates that the crack may spread. Oftentimes, a starting crack is checked by drilling a small hole just ahead of it. If slide grooves in forearm show superficial cracks, the section may, if not too great, be dressed out and smoothed with a sharp blade. If cracks are in areas where strength of forearm will not be affected, repair as prescribed in (1) through (5) below.

(1) Place forearm in a vise or under pressure so that the cracks are drawn together.
(2) Drill holes, using a No. 55 drill (0.052 in.) for the reinforcing screws (BO21–7190954).
(3) Install reinforcing screws by gripping in the chuck of a hand drill.
(4) Cut off screw and file flush so that no rough edges protrude.
(5) Inspect for general appearance. Determine that strength of forearm has not been affected.

Note. If reinforcing screws are not available through normal supply channels, they can be fabricated as shown in figure 29.

h. Dried-Out Wood of Forearm. In dry climate, the wood of the forearm is apt to dry out and shrink. Occasional applications of raw linseed oil help keep wood in condition. Apply oil to wood only, allow to remain a few hours to be absorbed, then wipe off and polish with a clean, dry cloth. Exercise care not to allow linseed oil to get into crevices or mechanisms, as it will "gum up" when dry.

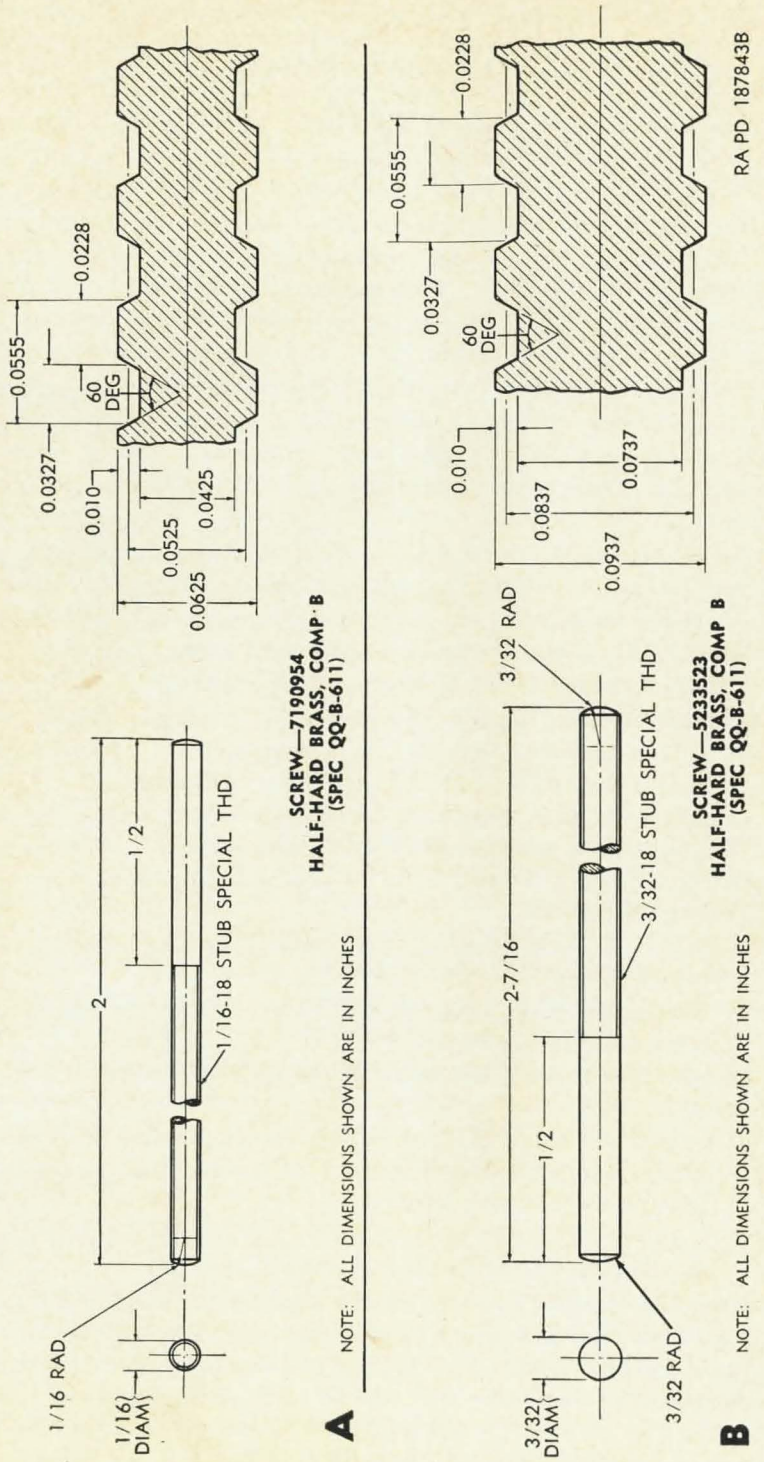

Figure 29. Fabrication of reinforcing screws.

i. Loose Escutcheon in Forearm. If escutcheon becomes loose in wood of forearm and wood is "chewed up" so new seating cannot be made, coat bottom and sides of aperture with plastic natural wood substitute, reseat escutcheon while plastic wood is still moist, and allow to harden before tightening screw. If plastic wood is not available, apply glue or shellac and insert escutcheon.

70. Assembly and Installation

a. Assembly of Gas Cylinder and Forearm Group (fig. 26).

(1) Using combination tool 7266450 (fig. 4), screw the gas cylinder body into the gas piston tube until tight; unscrew until key notch alines with notch of tube directly beneath the barrel. Install gas cylinder key (fig. 26) to lock the body to the gas piston. Screw the gas cylinder regulator assembly into the body as far as possible. Adjust regulator assembly to the setting observed at time of disassembly.

(2) Snap front swivel bracket back onto tube and, with the bracket swivel in position, install the bracket swivel screw.

(3) Install forearm escutcheon and set the gas cylinder tube in position in the forearm. Install the long forearm screw. Position the forearm screw washer and install the short forearm screw.

(4) Slide forearm shield into slots in wood, concave face up (aperture to rear for shield of early manufacture).

b. Installation. Refer to FM 23–15 for installation of gas cylinder and forearm group.

Section VIII. REAR SIGHT ASSEMBLY

71. Removal and Disassembly

a. Removal of Rear Sight Assembly From Receiver. Remove the rear sight assembly from receiver by first unscrewing the base setscrew and then, using a block of hardwood, driving the base out of the receiver to the rear (fig. 30).

b. Disassembly of Rear Sight Assembly.

Note. The key letters shown below in parentheses refer to figure 31.

(1) Drive out windage screw knob pin (D) from windage screw knob (E) and remove knob from windage screw. Remove windage screw knob click plunger (G) and spring (F).

(2) Unscrew windage screw (A) to the left, and remove leaf assembly (C) and base spring (H). Remove windage scale screws (J) and windage scale (K).

(3) Drive out elevating screw knob pin (C1) from elevating screw knob (C2) and remove knob from elevating screw (C3). Remove elevating screw knob click plunger (C4) and spring (C5). Drive out elevating screw retaining pin (C7) and unscrew elevating screw from leaf (C8). Remove slide (C6) from top front of leaf.

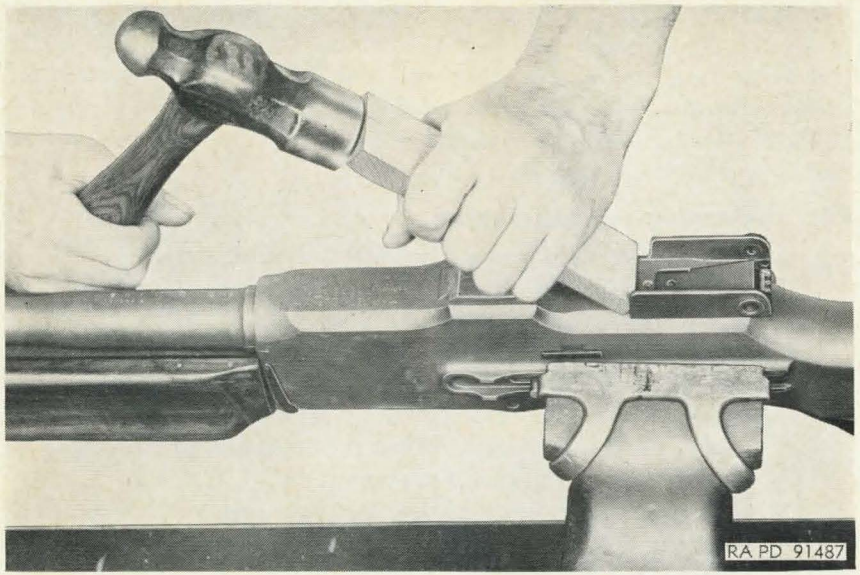

Figure 30. Driving rear sight base off receiver.

72. Inspection

a. General. Inspect parts for damage, excessive wear, burs, rust, foreign matter in recesses, deformation, and for free action with mating parts. Inspect screws and screw holes for stripped threads.

b. Base Group. Inspect rear sight base for looseness on receiver. Inspect windage scale for looseness on base. Inspect spring for weak function and fracture.

c. Windage Screw Group. Inspect click plunger for functioning with knob. Inspect click plunger spring for functioning and fracture.

d. Leaf Group. Inspect functioning of elevating screw in leaf and with slide. Inspect click plunger for functioning. Inspect screw for missing or loose retainer pin. Inspect plunger spring for functioning and fracture.

73. Repair

Replace all broken, worn, or otherwise unserviceable parts. Remove burs and rust as explained in paragraphs 35 and 36.

74. Assembly and Installation

Note. The key letters shown below in parentheses refer to figure 31.

a. Assembly of Rear Sight Assembly.

(1) Install slide (C6) in leaf (C8) and insert elevating screw (C3); then secure in place with the elevating screw retaining pin (0.512 x 0.200) (C7). Insert elevating screw knob click plunger (C4) and spring (0.071-in. O D, 5 coils) (C5) in hole on top of leaf. Place elevating screw knob (C2) on elevating screw and secure with elevating screw knob pin (0.512 x 0.37) (C1).

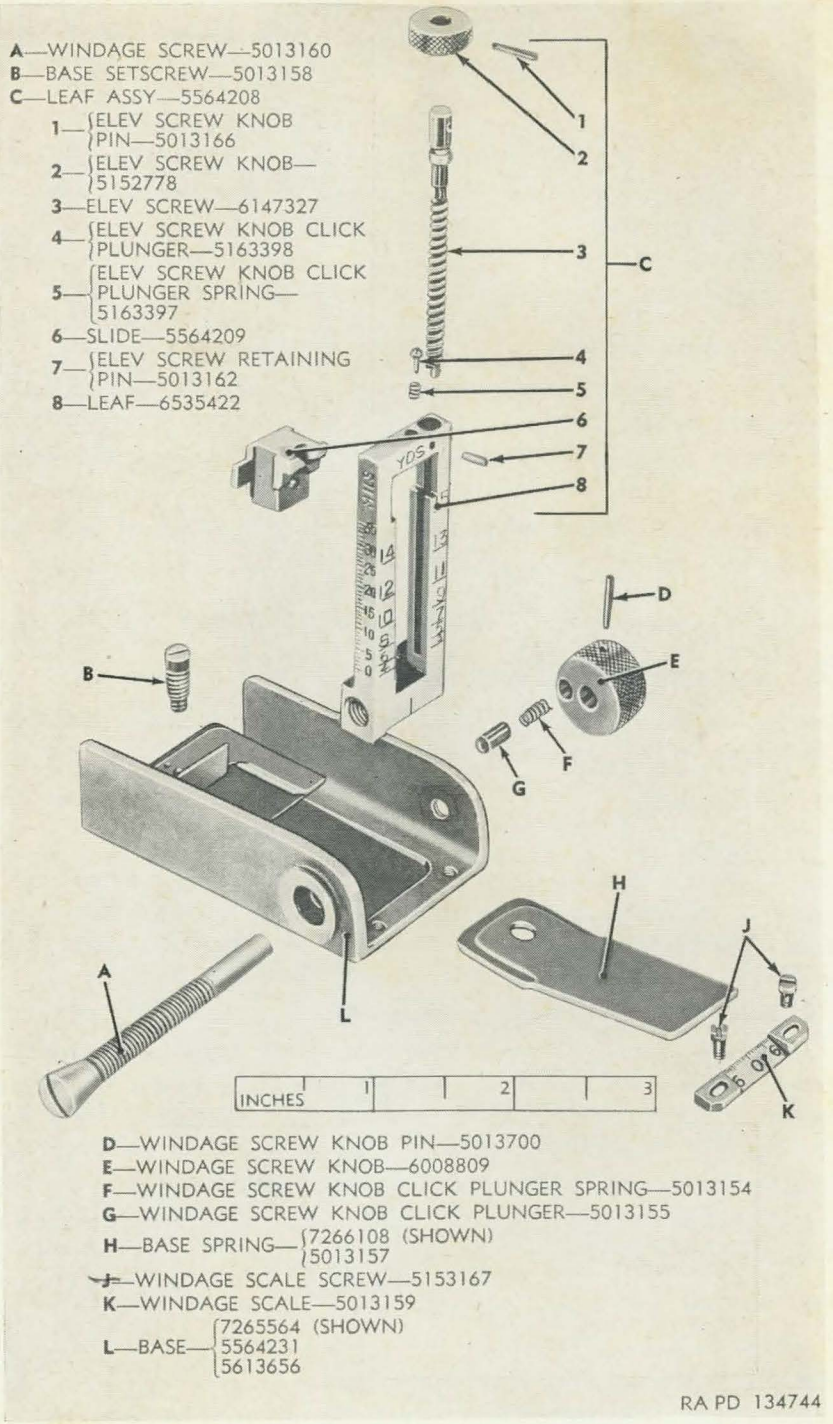

Figure 31. Rear sight assembly—exploded view.

(2) Install base spring (H) and windage scale (K) on sight base (L); then secure windage scale with two windage scale screws (J). Position leaf assembly (C) and screw windage screw (A) in place.

(3) Insert windage screw knob click plunger (G) and spring (0.118-in. O D, 10½ coils) (F) in hole in windage knob screw (E) and place knob on end of windage screw. Secure knob with a windage screw knob pin (0.0635 x 5/16, stght) (D).

b. Installation of Rear Sight Assembly on Receiver. Drive sight base onto receiver and then secure with the base setscrew (B).

75. Functional Check

a. Check hinge and locking function of leaf assembly with windage screw and base spring.

b. Check functioning of elevating and windage screws and click mechanism.

c. Check O setting of windage scale for front sight alinement (aline by eye).

Section IX. MAGAZINE ASSEMBLY

76. Removal and Disassembly

Refer to FM 23–15 for removal and disassembly of magazine assembly (fig. 32).

77. Inspection

(fig. 32.)

a. Tube. Inspect magazine tube for dents, deformed or burred lips, and worn or burred catch lug. If lug or catch is worn sufficiently to allow magazine to drop slightly after insertion, feeding of cartridges may be affected.

b. Base. Inspect base for looseness in tube.

c. Follower. Inspect follower for binding in tube under spring tension. Follower with spring assembled slides smoothly up and down tube when depressed and released by a blunt instrument or cartridges. When inspecting, bear on entire top surface of follower, not at one point only.

d. Spring. Inspect spring for deformation, fracture, and set.

e. Magazine and Parts. Inspect magazine and parts for rust and corrosion and interior of tube for foreign matter.

78. Repair

a. The magazine is expendable and is replaced as an assembly. No replacement spare parts are furnished for repair.

b. If catch lug on magazine is worn to the extent where proper retention is doubtful, scrap the magazine.

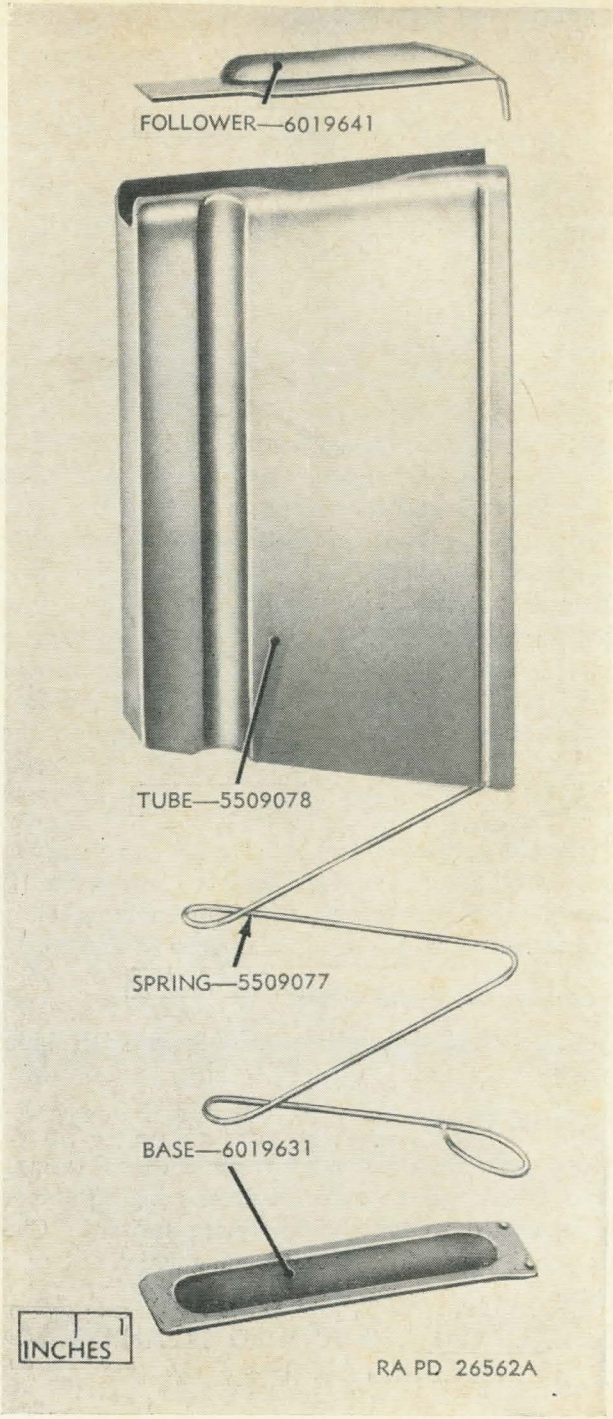

Figure 32. Magazine assembly—exploded view.

79. Assembly and Installation

Refer to FM 23–15 for assembly and installation of magazine assembly (fig. 32).

Section X. BIPOD ASSEMBLY

80. Removal and Disassembly

Refer to FM 23–15 for removal and disassembly of the bipod assembly (fig. 33).

81. Inspection

(fig. 33)

a. Washer, Thumbscrews, and Keys. Inspect for loose or broken washer spring on washer body (tack-welded). Inspect clamping thumbscrews for stripped threads. Inspect keys for fracture and deformation.

b. Body. Inspect bipod body for deformation of cylinder and leg-locking slots for wear, cracks, and burs.

c. Bipod Legs. Inspect leg joints for looseness on tubes (brazed), loose fit in body mating apertures, locking action, wear, and burs. Inspect tubes for deformation and for burs and foreign matter in keyways.

d. Sliding Legs (LH and RH). Inspect clamps for looseness on tube (brazed), spring action, and stripped or burred threads. Inspect for loose and deformed feet (welded). Inspect sliding legs for binding or excessive looseness on leg tubes; they should slide freely without binding or shake.

82. Repair

a. When rebuilding rifles, replace bipod assemblies of early manufacture (fig. 45) with bipod assemblies conforming to latest design (fig. 33).

b. Replace all broken, worn, or otherwise unserviceable parts. Remove burs and rust as explained in paragraphs 35 and 36.

83. Assembly and Installation

Refer to FM 23–15 for assembly and installation of the bipod assembly (fig. 33).

84. Functional Check

Check bipod assembly for looseness on flash hider (bearing); should be "slip on" fit. Check spring washer for functioning with bipod assembly. Washer is assembled to barrel with spring forward. Check locking function of thumbscrews, folding and locking action of legs, and locking of sliding legs.

Section XI. CAL. .30 JOINTED CLEANING ROD M1

85. Inspection

Inspect the cleaning patch section (fig. 34) of the cal. .30 jointed cleaning rod M1 for deformation or other signs of unserviceability.

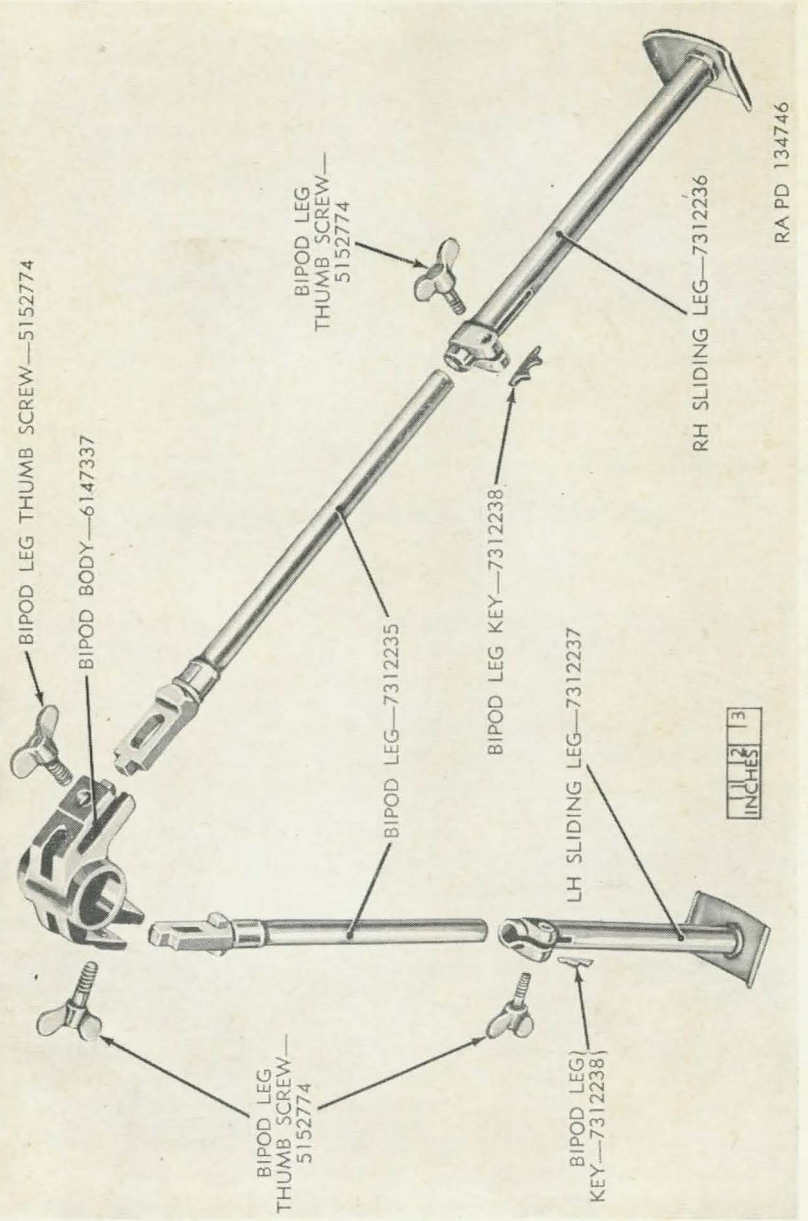

Figure 33. Bipod assembly—exploded view.

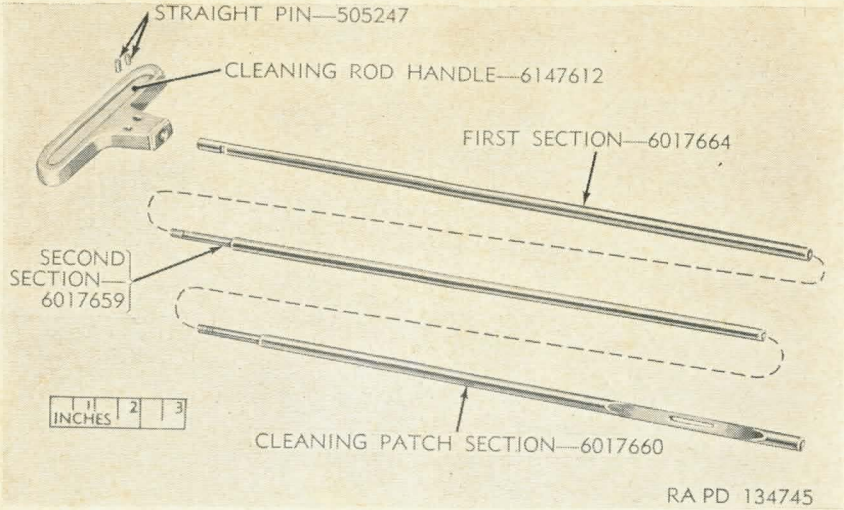

Figure 34. Cal. .30 jointed cleaning rod M1—exploded view.

86. Replacement

If the cleaning patch section is unserviceable, replace.

CHAPTER 5

FINAL INSPECTION

87. General

Materiel to be returned to user must meet the standards and tolerances prescribed in chapter 4.

88. Inspection Guide

Table IV is provided as a guide for the final inspection of weapons after repair and before return to the user.

Table IV. Final Inspection

Point to be inspected	Final inspection
FINISH	Dull enough to prevent glare.
FOREARM	Seasoned cracks, small dents, and insignificant cracks are acceptable.
BUTT STOCK (PLASTIC)	Cracks that are not at critical points are acceptable.
BORE	Fine uniform pitting but with sharp lands is acceptable.
BREECH BORE	Maximum 0.306 inch. Use gage 5564343.
FRONT SIGHT	Securely assembled with no burs or malformations.
REAR SIGHT	Must be secure on receiver. Elevation and windage scales to function smoothly throughout range. Graduations to be legible.
HAMMER PIN	No check.
BOLT LOCK	No check.
BOLT LINK PIN	No check.
BIPOD ASSY	Refer to figs. 44 and 45 to see if bipod assembly is of latest design.
HEADSPACE	Minimum 1.940 inch. Use gage 7319944. Maximum 1.950 inch. Use gage 7319954.
PISTON DIA	Minimum 0.494 inch. Use gage 5077201.
SLIDE ASSY	Check for out-of-round of hammer pin hole. Check sear notch for wear.
GAS CYLINDER DIA	Maximum 0.503 inch. Use gage 5077204.
TRIGGER PULL	Minimum 6 pounds. Maximum 10 pounds.
FIRING PIN HOLE	No check.
FIRING PIN PROTRUSION	Approximately $\frac{3}{32}$ inch.

APPENDIX

REFERENCES

1. Publication Indexes

Department of the Army pamphlets of the 310-series and DA Pam 108–1 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 publication.

2. Supply Manuals

The following manuals of the Department of the Army supply manual pertain to this materiel:

a. Destruction to Prevent Enemy Use.

Ammunition Explosives, Bulk Propellants, and Explosive Devices	SM 9–5–1375
Pyrotechnics, Military, All Types	SM 9–5–1370
Land Mines and Components	SM 9–5–1345

b. General.

Index of Supply Manuals; Ordnance Corps	DA Pam 310–29
Introduction and Index	ORD 1

c. Repair and Rebuild.

Abrasives, Adhesives, Cleaners, Preservatives, Recoil Fluids, Special Oils, and Related Items	ORD 3 SNL K–1
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
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 0903)	ORD 6 SNL J–10, Sec. 2

d. Weapon.

Rifle, Automatic, Cal. .30, Browning, M1918A2	ORD (*) SNL A–4

3. Forms

The following forms pertain to this materiel:

* See DA Pam 310–29, Index of Supply Manuals; Ordnance Corps, for published types of manuals of the Ordnance section of the Department of the Army supply manual.

DA Form 9–71, Locator and Inventory Control 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 421, Stock Record Card
DA Form 468, Unsatisfactory Equipment Report
DA Form 811, Work Request and Job Order
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 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.

Common Classification Code	AR 711–50
Inspection of Ordnance Materiel in the Hands of Troops	TM 9–1100
Accident Reporting	SR 385–10–40
Unsatisfactory Equipment Report	AR 700–38

e. Operation.

Fundamentals of Small Arms	TM 9–2205
Small Arms Materiel and Associated Equipment	TM 9–2200

f. Repair and Rebuild.

Abrasive, Cleaning, Preserving, Sealing, Adhesive, and Related Materials Issued for Ordnance Materiel	TM 9–850
Welding Theory and Application	TM 9–2852
Lubrication	TM 9–2835
Research and Development, Type Classification, Modernization Coding, and Modification of Materiel	AR 705–5
Ordnance Maintenance and General Supply in the Field	FM 9–10

Painting Instructions for Field Use	TM 9–2851
Rebuild Standards for Small Arms Materiel	TB ORD 366
g. Shipment and Limited Storage.	
Army Shipping Document	TM 38–705
Field Inspection and Serviceability Standards for Small Arms Materiel	TB ORD 587
Ordnance Preservation, Packaging, Packing, Storage, and Shipping	TM 9–1005
Marking of Oversea Supply	SR 746–30–5
Ordnance Storage and Shipment Chart Group A Major Items and Major Combinations of Group A	TB 9–CSSC–A
Twin Cal. .50 Machine Gun Pedestal Mounts M46 and M65	TM 9–230
Report of Damaged or Improper Shipment	AR 700–58
h. Weapon.	
Browning Automatic Rifle, Caliber .30, M1918A2	FM 23–15
Packaging of Small Arms Materiel With Volatile Corrosion Inhibitor (VCI)	TB ORD 623

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[AG 474.2 (28 Jan. 57)]

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OS Maj Comd	Army Terminals
OS Base Comd	OS Sup Agencies
Log Comd	Ord PG
MDW	Ord Arsenals
Armies	Mil Dist
Corps	Ord Proc Dist
Div	MAAG
Ord Gp	Mil Msn
Ord Bn	JBUSMC
Ord Co	JUSMAG (Greece)
Ft & Cp	Fld Comd, AFSWP
Gen & Br Svc Sch	

NG: State AG; units—same as Active Army.

USAR: None.

For explanation of abbreviations used, see SR 320–50–1.

U. S. GOVERNMENT PRINTING OFFICE: 1957—400520