

BASIC FIELD MANUAL

BROWNING MACHINE GUN, CALIBER .30, HB, M1919A4 GROUND



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**BROWING MACHINE GUN, CALIBER .30, HB M1919A4
GROUND**

(The matter contained herein supersedes chapter 1, part seven, Basic Field Manual, July 1, 1937.)

MECHANICAL TRAINING

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SECTION I

DESCRIPTION

■1. PRINCIPLE OF OPERATION. — The machine gun, caliber .30, M1919A4, is recoil operated, belt fed, and air cooled. In recoil operation the rearward force of the expanding powder gas (kick) furnishes the operating energy. The moving parts, while locked together at the moment of the explosion, are left free within the receiver to be forced to the rear by the recoil. This movement is controlled by means of various springs, cams, and levers, and is utilized to perform the necessary mechanical operations of unlocking the breech, extraction and ejection of the empty case, and feeding in of the new round, as well as cocking, locking, and firing the mechanism. (See fig. 1.) The receiver mechanism is for all practical purposes the receiver of the Browning machine gun, M1917.

■2. COOLING SYSTEM. — The machine gun, caliber .30 M1919A4, is provided with a heavy barrel which is exposed to the air. This factor serves to keep the gun at operating temperatures under normal conditions, i.e., at the rate of about 60 rounds per minute for about 30 minutes.

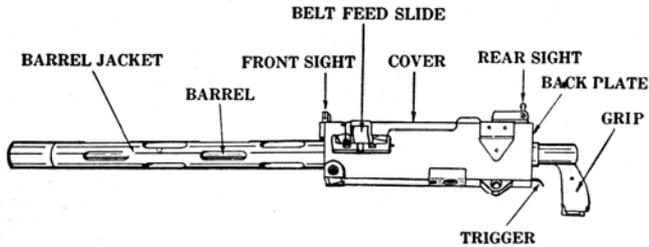


FIGURE 1.—Browning machine gun, M1919A4

■3. FEED BELT. — Woven fabric belts of a capacity of 150 rounds, equipped with brass strips at each end to facilitate loading, are normally used with the ground light machine gun.

■4. MOUNTINGS.

a. The ground light machine gun normally is mounted on the light machine gun tripod M2, a description of which is given in section VI.

b. In motorized or mechanized units, the light machine gun is mounted on vehicular mounts of several types, but a light machine gun tripod M2 is usually carried for each gun to be used when the gun is fired from the ground.

■5. GENERAL DATA. — General data for the light machine gun and mount are as follows:

■6. SIGHTS.

a. Front. — The front sight consists of a front sight blade, a front side body, a front sight post, and a plunger mechanism. The front sight post pivots on the front sight bearing screw when folded for convenience in packing. The plunger mechanism provides a locking device to keep the front sight post in its upright position when the gun is being fired. The front sight is attached to the front end of the receiver by means of a screw. The height of the front sight is such that when the rear sight slide is set at an elevation a bullet fired from the gun will strike a target at a distance corresponding to the elevation set on the rear sight.

b. Rear. —

(1) The rear sight (fig. 2) is of conventional type. It consists of a rear sight leaf, carrying a peep in the slide mounting, pivoted on the rear sight base, and adjustable for windage. The rear sight base mounts the rear sight leaf and rear sight leaf spring. It is secured to the left side plate of the receiver by three screws in the flange of the base.

(2) The rear sight leaf is graduated for elevation in 100yard divisions up to 2,400 yards. The peep of the rear sight slide is 0.081 inch in diameter. Motion of the rear sight slide is accomplished by rotation of the elevating screw knob.

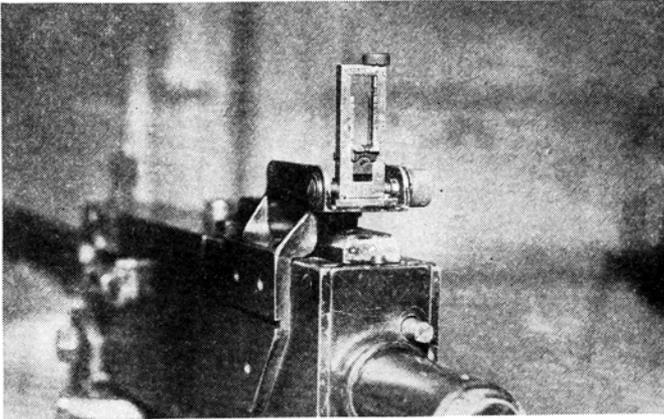


FIGURE 2.—Rear sight.

This elevating screw mechanism is equipped with a mil click device which may be used in conjunction with a mil scale engraved on the left side of the rear sight leaf to measure or establish angles of elevation in mils.

(3) The windage screw mechanism also incorporates a mil click device. Adjustment of the rear sight leaf in windage is accomplished by rotation of the windage screw knob. Amount of motion permitted is 10 mils right or left from zero.

(4) The sight radius is 13.94 inches.

■7. PINTLE. — The pintle of the light machine gun (ground), although technically not a part of the gun, is permanently assembled thereto by a bolt through the trunnions of the pintle and the trunnion hole of the receiver of the gun. Failure to keep this bolt tight will result in inaccuracy of fire. This pintle is tapered and mates with the corresponding tapered pintle bushing of the tripod mount M2 head. This tapered pintle thus serves as a tight wearing union between the receiver of the gun and its mounting. The pintle is secured in its mounting by the engagement of a spring actuated pintle latch of the mounting in a corresponding annular groove of the pintle.

■8. ELEVATING AND TRAVERSING MECHANISM.

a. As with the pintle, the elevating and traversing mechanism is not technically a part of the gun. However, the elevating and traversing mechanism is permanently secured to the receiver of the gun by a bolt through the head of this mechanism and the elevating bracket of the gun. In guns of new manufacture, the elevating bracket is integral with the bottom plate.

b. The elevating and traversing mechanism, when used with the tripod M2, consists of an upper elevating screw; a lower elevating screw; an elevating handwheel assembly secured to the head of the lower elevating screw; a housing mating with the lower elevating screw; a traversing block mounted by a swivel joint to the lower elevating screw housing.

(1) The upper elevating screw terminates at its upper end in an offset head which incorporates a recess for the bolt which assembles the entire elevating and traversing mechanism to the gun. The mechanism is properly assembled to the gun when the offset head points to the rear, thus permitting the mechanism to be folded to the rear and seated in its recess in the duralumin grip. The inner elevating screw is externally threaded to mate with the internal threads of the lower elevating screw. It is equipped

with a longitudinal slot in which is seated an engraved scale. This scale is utilized to indicate plus or minus increments of elevation given the mounted gun. It is subdivided into 50-mil graduations and is read by noting the position of the upper edge of the traversing bar and the traversing slide lock lever preferably engaged. (When firing on rapidly moving ground targets, the traversing clamp is not engaged, although the traversing block must be retained in firm contact with the traversing bar.)

(2) Movement of the light machine gun in traverse, when mounted on the tripod M2, is accomplished by moving the gun right or left as desired, the traversing clamp being disengaged from the traversing bar but the traversing block remaining in firm contact with the traversing bar.

SECTION II

DISASSEMBLING, ASSEMBLING, AND CHANGING PARTS

■9. GENERAL.

a. Disassembling may be considered under two general heads: first, removal of groups to the extent required for ordinary cleaning and minor repairs; and, second, detailed disassembling, involving removal of all components from each group.

b. A group is a number of parts, contained in a common housing, which function as a unit.

c. The removal of the different groups from the gun and complete disassembling of the groups to be disassembled by the using services can be accomplished with the tools provided.

■10. REMOVAL OF GROUPS FROM GUN.

a. Backplate.

(1) Pull back on latch and raise cover. With the left hand pull back bolt handle and hold it in the rearmost position.

(2) Insert rim of a cartridge in slit in end of driving spring rod. With slit horizontal, push in driving spring rod as far as it will go and turn it clockwise one-quarter turn until slit is vertical. In this position the lugs on it will engage in their recesses in the bolt.

(3) Push bolt handle forward about an inch to free the rear end of driving spring rod from backplate.

(4) Push latch forward and lift out backplate.

b. Bolt handle.—Pull bolt all the way back and remove bolt handle.

c. Bolt.—Remove bolt from rear end of receiver being careful not to handle driving spring rod.

d. Lock frame.—Insert nose of cartridge through hole in the right side of receiver and push in on trigger pin. Grasp trigger and pull lock frame, barrel extension, and barrel out of receiver. Hold barrel in one hand, lock frame in the other, and push forward on accelerator. This separates lock frame and barrel extension.

e. Barrel extension and barrel.—Unscrew barrel extension from barrel.

f. Latch.—With the left hand, palm up, against the rear of the receiver to prevent dropping the latch spring, pull latch to rear until it separates from the plate. Guns of recent manufacture have the latch spring riveted to the latch

g. Latch spring.—If not riveted lift the latch spring from its pin in the latch.

h. Cover.

(1) *Guns of early manufacture.*

- (a) Turn cover pin spring up and remove pin,
- (b) Remove cover.
- (2) *Guns of new manufacture.*
 - (a) Remove cotter pin from cover bolt.
 - (b) Place screwdriver blade of combination tool in slot in cover bolt to prevent it from turning and with a wrench remove the nut.
 - (c) Remove cover bolt, cover catch spring, and fixed and movable plates.
 - (d) Remove cover.

NOTE.—To prevent undue wear, the cover and latch should not be removed except when necessary for cleaning or replacement of parts.

■11. REPLACING GROUPS IN GUN.—In general, the groups are replaced in the gun in reverse order.

a. (1) *Guns of early manufacture.*—Replace cover. Insert cover pin and lock it by turning cover pin spring forward into its seat in trunnion block. Some models have a cover pin which is locked by inserting and spreading a cotter pin through a hole in the cover pin.

(2) *Guns of new manufacture.*—Replace cover. Place cover latch spring on bolt and position the fixed and movable plates. Insert cover bolt into cover hole. Place screwdriver blade of combination tool in slot in cover bolt to prevent it from turning, and assemble nut to cover bolt using a wrench until the desired tension is obtained. Replace cotter pin.

b. Seat rounded end of latch spring in latch seat, placing hole in spring over pin, bent side of spring away from latch. Holding spring in place with the fingers, push latch onto top plate from the rear, free end of the spring to the front, then force the latch home. *If the spring is allowed to slip from its seat, the latch will not function, and the spring will jam the latch so that it cannot be removed without breaking.*

c. Screw barrel into barrel extension until barrel locking spring begins to engage in barrel notches.

d. Insert barrel and barrel extension into receiver until the forward end of barrel extension is opposite the rear end of receiver.

e. Holding barrel extension with one hand, take lock frame in other hand, with index finger beneath and supporting accelerator. Place claws of accelerator in front of and against T-lug. Insert front projections of lock frame into slots of barrel extension and push forward until accelerator turns backward, locking lock frame to barrel extension. Push down tips of accelerator to insure positive locking.

f. Push parts into gun, forcing trigger pin inward to clear it from right side plate, and push forward until a click is heard as trigger pin springs out into its seat in the right side plate. (If barrel hangs on front barrel bearing, reach forward under jacket and align it.)

g. Push cocking lever forward and insert bolt, pushing down on rear end of trigger to prevent ejector from tripping accelerator.

h. Insert bolt handle through large opening at rear of slot and push it forward about 1 inch, being sure that collar on handle is inside right side plate.

i. Push forward on latch and replace backplate.

j. Hold bolt handle fully back with left hand. Place rim of cartridge in slit in end of driving spring rod, and turn rod one-quarter turn counterclockwise until slit is horizontal. This releases driving spring. Allow bolt to go forward.

k. Make head space adjustment as follows:

- (1) Pull bolt to rear about $\frac{3}{4}$ inch.

(2) Screw barrel into barrel extension (by using point of a cartridge or the combination tool in barrel notches) until the action will just close (recoiling parts will go fully forward) without being forced.

(3) Then unscrew barrel two notches.

CAUTION: Care must be exercised to avoid roughening the barrel surface during the adjustment. Also, the packing must not bind the barrel, as a false adjustment will result in such a case.

l. Position belt feed lever stud over Cam groove in bolt and close cover.

m. Pull trigger.

NOTES. —

1. HEAD SPACE.

a. The head space of a military weapon with a cartridge fully seated in the chamber is the distance between the base of the cartridge and the face of the bolt.

b. In Browning machine guns, the head space is adjusted by obtaining the proper distance between the forward part of the bolt and the rear end of the barrel. The head space adjustment must be checked before firing.

2. EFFECT OF HEAD SPACE. ADJUSTMENT.

a. General. — Probably the most important adjustment of the machine gun is the head space adjustment. Tests show that shot patterns are not adversely affected by the head space when the guns are adjusted as outlined above. In fact, better uniformity of shot patterns will be obtained when the guns are operated with the above adjustment which is based on the fundamental design of the weapon. Tests have also proved that guns may be damaged and in some cases put out of action by using unapproved methods of adjusting the head space. Many reports show that difficulties with improperly guided belts and with firing mechanisms have been attributed to undue concern over head space adjustment.

b. Insufficient head space. — When the head space adjustment is too tight, poor functioning will result, as the breech lock will not fully enter its recess in the bolt. This condition may damage the barrel extension, bolt, or breech lock. Extraction trouble may also occur due to improper timing of locking and unlocking. Further, with a tight head space adjustment the gun operates sluggishly because of the binding of the moving parts.

c. Excessive head space. — If the head space is too great, a separation of the cartridge case may occur. Should there be any weakness in the head of the cartridge case, such as a split case, the possibility of a rupture is increased by excessive head space.

3. QUICK HEAD SPACE ADJUSTMENT. — After the head space adjustment has been determined by the method described in paragraph 11k, the notch in which the barrel locking spring is engaged may be marked with a center punch. Then to make the correct head space adjustment, during the assembly of the gun, screw the barrel all the way into the barrel extension and then unscrew the barrel until the barrel cocking spring is in the marked notch.

■ 12. DETAILED DISASSEMBLING OF BOLT.

a. Turn the extractor up and remove it to the left (fig. 5).

b. Great care should be exercised in removing the driving spring rod from the bolt as the force of the driving spring when released can easily cause the rod to slip away

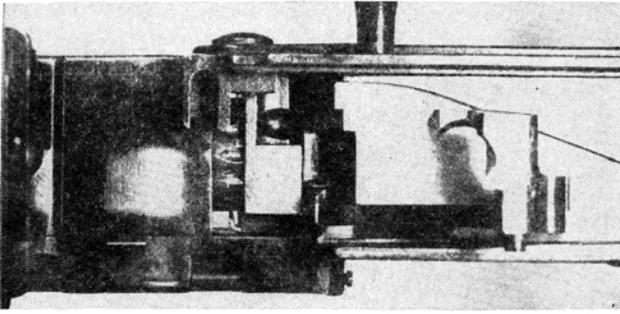


FIGURE 3. — Tight head space adjustment.

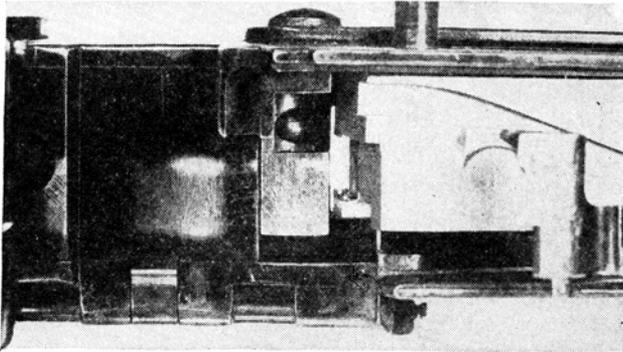


FIGURE 4. — Loose head space adjustment.

from the hand and possibly result in serious injury. To remove driving spring rod, place protruding end of rod on the table or a block of wood. With bolt firmly grasped by the right hand (palm of the hand over face of bolt), press down and at the same time turn bolt one-fourth turn to the left until lugs on rod leave their recess in bolt. Slowly release pressure on bolt, allowing it to rise under the action of driving spring until about 3 inches of rod protrude. With the left hand grasp protruding portion of rod and spring; raise both hands and the bolt from the table, keeping rod and spring in their same position relative to bolt. Separate rod and spring from bolt with a quick jerk. The quick, separating jerk will not allow spring to kink. Separate driving spring rod and driving spring.

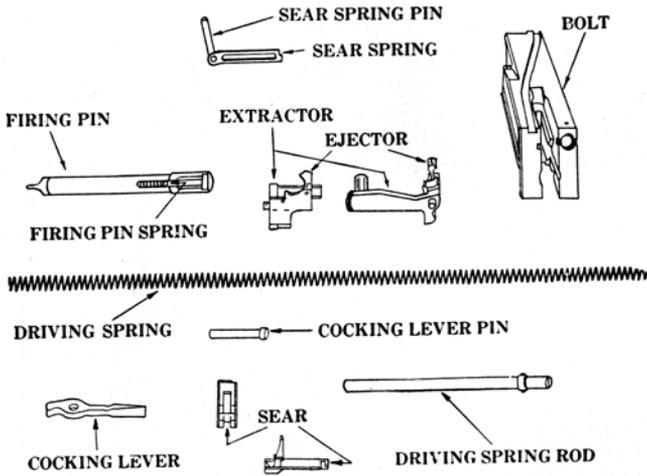


Figure 5. — Bolt group.

c. Turn the top of cocking lever to the rear of bolt and withdraw cocking lever pin to the left of bolt.

d. Lift out cocking lever.

e. Release firing pin by pushing down on sear. Hold bolt in the left hand, the front end toward the body, top up, with the index finger of the left hand beneath and supporting the sear. Use the nose of a cartridge, placed near the end of sear spring, to push downward and to the right on spring to seat it in cut in bolt. This releases sear which is removed at the bottom of bolt.

f. Turn sear spring back to the left to clear the cut. Push nose of a cartridge into the hole in the bottom of bolt to start sear spring pin moving. To complete the removing of sear spring, place the top end of cocking lever well under sear spring and pry down against the edge of bolt.

g. Place the palm of the right hand over the rear of bolt, tilt the rear end of bolt down, and firing pin will drop out.

■ 13. ASSEMBLING OF BOLT.

a. Place firing pin in bolt, striker downward and to the front, and tilt the front of bolt downward until striker projects through the small hole in the front of bolt.

b. Replace sear spring by pushing with a cartridge on top of pin, avoiding pressure on spring proper.

c. Hold bolt in the left hand, front end toward the body, top up. With point of a cartridge placed near the end of sear spring, push downward and to the right to seat it in cut in bolt.

d. Push sear upward from the bottom, notched projection toward the front of bolt, and hold with first finger of the left hand while pressing downward and to the left on sear spring with a cartridge to engage the end of sear spring in sear.

e. Replace cocking lever, making certain that the rounded nose on the lower end is to the rear of bolt so that it will properly engage in the recess in firing pin.

f. Insert cocking lever pin from the left side of bolt. The upper end of cocking lever should be to the rear of bolt before inserting pin, as this aligns cocking lever for the return of pin.

g. Cock by pressing forward on cocking lever. Turn cocking lever to the rear and press down on sear with a cartridge to release firing pin and test the correctness of the assembly. Recock the assembly.

h. *The same care should be exercised in assembling the driving spring rod to the bolt that is exercised in removing it.* Place driving spring on driving spring rod. With the back end of the rod resting on a table or a block of wood, gather as much of the spring on the rod as can be held compressed by the thumb and fingers of the left hand. With bolt securely held in the right hand, the front end of bolt in the palm of the hand, slip bolt over the end of spring. Push downward to compress spring and allow lugs on rod to enter slot in bolt. Turn bolt slowly 90° clockwise until slit in rod is crosswise to slot in bolt.

i. Insert pin on extractor into the rear one of the two large holes in the left side of bolt, extractor pointing up. Turn extractor downward toward the front to engage collar on extractor under collar cut in bolt.

■ 14. DETAILED DISASSEMBLING OF LOCK FRAME (fig. 6).

a. Grasp head of trigger pin between the thumb and first finger of the right hand and remove it to the right. Lift out trigger. If pin is too tight to permit its removal in this manner, it must be drifted out. DO not remove trigger pin spring except when necessary.

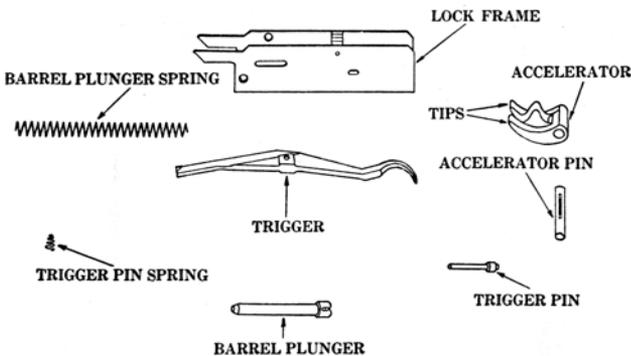


Figure 6. – Lock frame group.

b. Push out accelerator pin and remove accelerator.

c. Hold lock frame with the left hand, projections pointing upward, slot to the left, separator between the second and third fingers, first and second fingers gripping barrel plunger spring. With the thumb of the right hand, press down and out on barrel plunger to disengage plunger guide pin from slot. Allow spring, with plunger, to rise slowly. Lift out spring and remove it from barrel plunger.

■ 15. ASSEMBLING LOCK FRAME.

a. Assemble barrel plunger spring to barrel plunger, being careful that the more tightly fitting end of barrel plunger spring is pushed up against the head of barrel plunger. Hold lock frame with the left hand, projections pointing upward, slot to the left, lock frame separator between the second and third fingers. Seat the end of barrel plunger spring in the recess in lock frame separator, barrel plunger guide pin facing the slot in lock frame. Using the first and second fingers of the left hand to prevent spring from buckling, press down with the thumb of the right hand on the end of barrel

plunger until barrel plunger guide pin can be seated in the slot. Care should be taken that the action of the spring does not cause the plunger to slip out of the hand.

b. Replace accelerator with the tips up and the rounded surface to the front. Insert accelerator pin, taking care that both ends of pin are flush with the sides of lock frame.

c. Push the front end of trigger up between separator and spacer, placing the center in its square seating. If trigger pin spring has been removed, seat spring on trigger pin, placing the small end of spring toward the head of pin. Replace pin from the right.

■16. DETAILED DISASSEMBLING OF BARREL EXTENSION (fig. 7).

a. Insert the rim of a cartridge under the front edge of barrel locking spring and pull it out to the front.

b. Push out breech lock pin and remove breech lock.

■17. ASSEMBLING BARREL EXTENSION.

a. Place breech lock in its slot, taking care that the double beveled surface is up and to the front. Insert breech lock pin and insure that both ends of pin are flush with the sides of barrel extension.

b. Insert barrel locking spring in the seating in the left side of barrel extension, hook inward, and force home as far as it will go.

■18. DETAILED DISASSEMBLING OF COVER (fig. 8).

a. Remove cotter pin or cap from belt feed lever pin. Remove belt feed lever pin.

b. Withdraw belt feed lever from belt feed slide and remove slide.

c. Insert the nose of a cartridge between cover extractor spring and the notch in cover extractor cam. With the thumb of the left hand over spring, pry out on spring to disengage from cut. Lift out spring from its seat against stud.

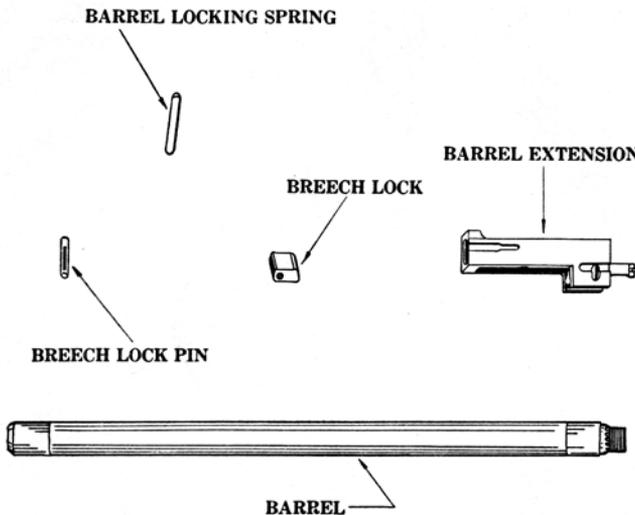


FIGURE 7. — Barrel and barrel extension group.

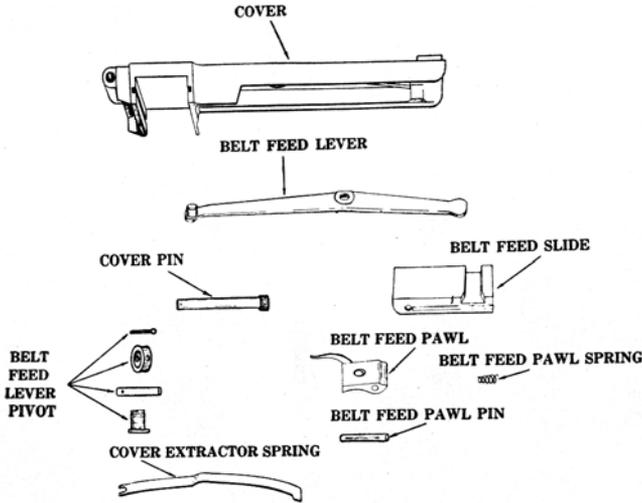


FIGURE 8. — Feed group.

■19. ASSEMBLING COVER.

- a. Place the forked end of cover extractor spring under stud on cover. Press downward with the thumb on the other end of spring, at the same time pushing toward stud, and seat projection of spring in the notch of cover extractor cam.
- b. Replace belt feed slide in its grooves in cover, taking care that pawl is pointing to the right as cover goes on the gun.
- c. Place front end of belt feed lever in the cut, stud on lever away from cover and to the rear. Insert belt feed lever pivot pin. Replace cotter pin or cap.

■20. DISASSEMBLING OF PARTS DISMOUNTED ONLY FOR REPAIR.

- a. Shock absorbing group. - Unscrew adjusting screw and remove adjusting screw plunger and spring. Remove buffer disks (in later guns these are replaced by heavy recoil spring), buffer plug, buffer ring, and buffer plate through the rear end of the grip. Replace in the reverse order.
- b. Belt holding pawl.

- (1) Hold down belt holding pawl and withdraw belt holding pawl split pin to the rear.
- (2) Lift off belt holding pawl.
- (3) Lift belt holding pawl spring from its seating.
- (4) Replace in the reverse order.

■21. CHANGING PARTS. — If the time element is important, a broken minor part should be replaced by substituting a complete spare part which contains it. Thus a broken firing pin would be remedied by changing bolts. Replacement parts in the spare parts box should be repaired as soon as opportunity permits. In event the bolt, barrel, or barrel extension is changed, *adjust the head space*.

SECTION III

CARE AND CLEANING

■22. GENERAL. — It is essential that the gun be maintained in the best mechanical condition at all times. It must always be kept clean and covered with a light coating of oil. Particular attention must be paid to the bore. Care and cleaning will not be confined to the gun alone but will include the tripod and all accessories. Belts and ammunition must be kept clean and dry.

■23. GUN, TRIPOD, AND SPARE PARTS.

a. Bore. — When firing is completed the bore should be cleaned immediately as follows:

- (1) Disassemble groups from gun.
- (2) Place barrel with barrel extension attached, muzzle down, in a vessel containing hot water and soap or hot water alone.
- (3) Use cleaning rod with flannel patch to pump water back and forth through the bore for about 1 minute. (A soft wire brush may be used to remove particles which are stuck to the bore.)
- (4) Dry and clean bore thoroughly then apply a light coat of lubricating oil.
- (5) Inspect daily and repeat the above treatment until the bore shows no signs of corrosion.

b. Moving parts. — The moving parts should be kept clean and lubricated before, during, and after firing. In lubricating the parts during firing, care should be exercised to apply oil frequently but sparingly to those parts where actual friction exists. These include the cam groove and the cocking lever. Excess oil generates smoke which interferes with observation.

c. Front barrel bearing. — Carbon is deposited in the front barrel bearing during firing of the gun. If this deposit is not removed periodically, it will eventually cause the barrel to bind. To remove—

- (1) Using a combination tool, unscrew front plug.
- (2) Soften carbon with oil and scrape it out.
- (3) Replace plug.

NOTE. — Before guns are stored, the front barrel bearing should be removed and the carbon deposits thoroughly removed from the bearing and barrel jacket.

d. Tripod.

(1) Keep all moving parts lightly oiled. Avoid leaving excessive oil in interior of tripod head as dirt and sand will collect and interfere with positive locking of legs. The pintle bushing should be cleaned and lightly oiled. Oil should not be placed in the seating of the traversing dial, as it will cause dirt to collect and interfere with easy dial adjustment.

(2) All steel parts of the M2 tripod are given special treatment to prevent rusting. This protection may eventually wear through where sliding parts are in contact and rust will then occur. In the removal of such rust only the finest crocus cloth should be used and this sparingly.

(3) AU parts of the M2 tripod are carried in local stock by the Ordnance Department. In case of dents or bending of parts that interfere with smooth operation in mounting and dismounting the tripod, temporary repair by either filing down dents or straightening the bent part may be necessary. However, the damaged part should be replaced at the earliest opportunity by Ordnance Department personnel.

e. Spare parts. — Spare parts must be kept free of dirt and moisture and be lightly coated with oil. When first received, all traces of rust-resisting compound should be removed.

■24. CARE DURING COLD WEATHER.

a. Use aircraft instrument and machine gun lubricating oil (U. S. A. Spec. 2-27D) for a lubricant.

b. Test the gun frequently to see that it functions properly.

■25. CARE DURING GAS ATTACK.

a. Cover ammunition, if practicable.

b. Oil gun and mount to prevent corrosion (effective for about 12 hours). Cosmoline resists gas corrosion more than lighter oil.

c. Cover gun with a waterproof cover, if practicable.

d. As soon as possible after a gas attack, wash all of the parts of the gun in the neutralizing solution issued for the purpose, or in its absence boiling water containing soda. Dry them and then cover them with a light coat of oil.

e. Remove all traces of gas from the ammunition with the neutralizing solution issued for the purpose, then dry thoroughly.

■26. POINT TO BE OBSERVED BEFORE, DURING AND AFTER FIRING. — The following list of points to be observed before, during, and after firing will be found useful as a guide for the proper care of the gun. It will also serve as a guide for inspection.

	Before	During	During temporary cessation	After
Bore	Look through and clean		Clean bore	Clean and lightly oil bore with a patch.
Moving Parts	Oil and test for worn or broken parts. See that parts function without excessive friction	Keep oiled	Inspect and oil; clean dirt from belt holding pawl.	Remove bolt, lock frame, barrel extension, and barrel. Clean, oil, and release firing pin.
Head Space	Make correct adjustment and test (note, par. 11). Examine barrel locking spring	Tighten if several separated cases occur.	Test	Adjust correctly and test. Examine barrel locking spring.
Rear sight and wind gage	Clean and free from grease. See that sight is in good mechanical condition. Set sight at 500 and wind gage at zero	Keep properly set	Keep properly set	Clean and oil. Set sight at 500 and wind gage at zero.

Tripod	Set tripod firmly with no lost motion. Verify that traversing bar sleeve latch is properly seated.	Keep firmly set.	Examine	Clean and oil.
Belts and ammunition	Secure sufficient supply of ammunition. Inspect ammunition. Keep belts dry	Keep belt in line with feed opening. Watch ammunition supply		Clean, repair, and refill all belts. Separate live rounds from empty cases. Inspect ammunition. Refill oilcan.
Oil	See that oilcan is full		Refill oilcan.	Refill oilcan.
Spare parts and tools	Keep clean and oiled. See that kits are complete	Keep within reach	Make repairs. Replace broken or worn parts.	Check, replace broken or missing parts, clean, and oil.

SECTION IV

MECHANICAL FUNCTIONING

■27. GENERAL. — The soldier should have a practical working knowledge of the mechanical operation of the machine gun so that he will be able to keep it in action during combat. Although many parts of the gun operate simultaneously, the subject of functioning is divided into phases to facilitate instruction. The explanation of mechanical functioning begins with the gun assumed to be loaded and ready to fire.

a. To half load. — With cover open or closed, enter belt through feedway from left to right. Pull belt through feedway until the first round is in place on the right of beltholding pawl. Close cover if open. Pull bolt fully to the rear and release it.

b. To load. — Load is executed the same as half load except that bolt is pulled to the rear and released twice.

c. To unload. — Raise cover, remove belt, pull bolt to the rear and hold it, look or feel to see that there is no ammunition in the gun, lower extractor, release bolt, lower cover, and then pull trigger.

d. To clear gun. — Raise cover, remove belt, pull bolt to the rear and hang it in its rearmost position by engaging extractor cam plunger in rear of extractor feed cam, and inspect the gun to see that there is no ammunition in it. As an additional precaution, a wooden clearing block will be inserted between the face of the bolt and the rear end of the barrel.

■28. TRIGGER ACTION. — As the trigger is pivoted, its rear end is raised if its forward end is lowered. The trigger cams on the front end of trigger, through their engagement with cams on sear, force sear down against the action of sear spring until the shoulder of firing pin is released by sear notch. The firing pin spring then forces firing pin forward to strike primer.

■29. BACKWARD MOVEMENT OF RECOILING PARTS (figs. 9 and 10). — The explosion forces the recoiling parts (barrel, barrel extension, and bolt) backward about 5/8 inch. During the first half of this movement the parts are locked together.

When the breech lock clears the breech lock cam, it is forced down by the front projections of the lock frame acting on the breech lock pin. This unlocks the bolt from the barrel extension, permitting the bolt to continue to the rear. As the barrel extension comes to the rear, the barrel plunger spring is compressed, and the rear of the barrel extension strikes the accelerator and turns it backward.

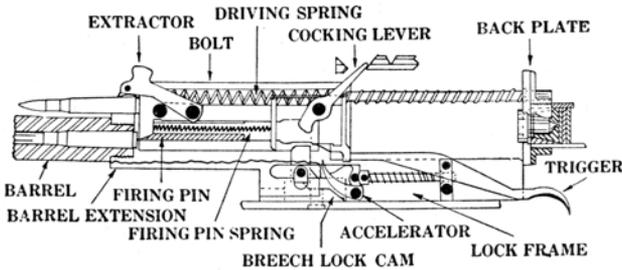


FIGURE 9.—Relation of parts in forward position.

■30. BACKWARD ACTION OF ACCELERATOR (figs. 9 and 10).—AS the accelerator turns backward its tips strike the bottom projections on the bolt and accelerate it to the rear.

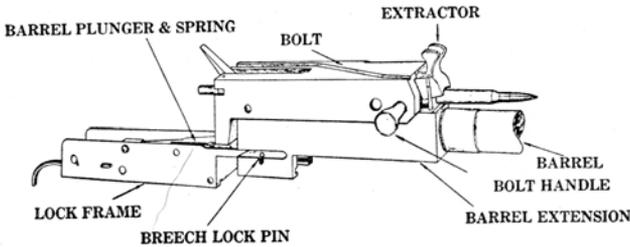


FIGURE 10.—Barrel, bolt, lock frame, and barrel extension in firing position.

The claws of the accelerator engage the shoulder of the T-lug and lock the barrel extension to the lock frame. The barrel plunger spring is thus held compressed. The accelerator stop prevents the accelerator from turning backward too far.

■31. BACKWARD MOVEMENT OF BOLT (figs. 9 and 11).—As the bolt moves backward the driving spring is compressed. The bolt brings with it a cartridge from the belt, held by the extractor, and an empty case from the chamber, held in the T-slot. The extractor cam plunger rides along the top

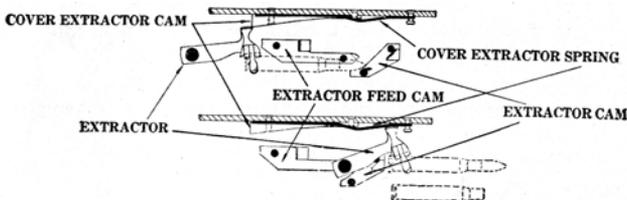


FIGURE 11.—Extracting and loading mechanism.

of the extractor cam and extractor feed cam until forced in by the beveled part of the extractor feed cam. This permits the extractor to be forced down by the cover extractor cam, and the plunger springs out behind the extractor feed cam.

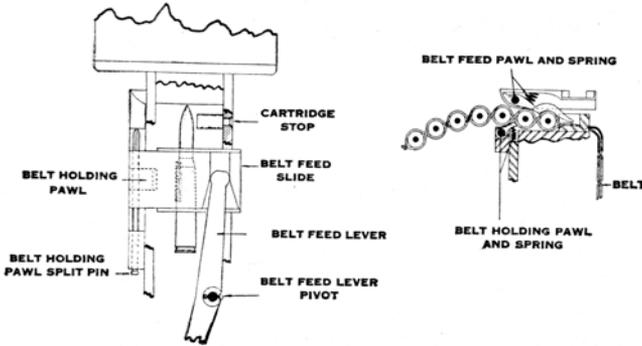


FIGURE 12.—Belt feed mechanism.

■32. FIRST ACT OF FEEDING (fig. 12).—As the bolt moves backward, the stud on the pivoted belt feed lever moves to the right in the cam groove, thus forcing the belt feed slide to the left. The belt feed pawl engages on the left of the first cartridge which is held in position by the belt holding pawl. In the event the extractor fails to withdraw the leading round from the belt, the finger of the belt feed pawl, riding on the top of this unextracted round, will hold the feed pawl raised in a position where it cannot engage on the left of the next cartridge. It thus prevents double feeding.

■33. COCKING ACTION (fig. 13).—AS the bolt moves backward, the upper end of the cocking lever is forced forward in the cocking lever recess, bringing the lower end to the rear. The lower end brings with it the firing pin, thus compressing the firing pin spring against the sear spring.

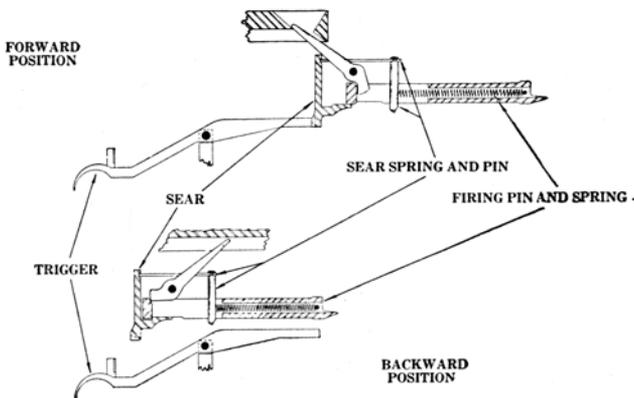


FIGURE 13. Cocking mechanism.

The shoulder of the firing pin engages the notch in the sear, which is pulled upward by the action of the sear spring, the trigger cams now being disengaged from the sear.

■34. ACTION OF DRIVING SPRING (fig. 14).—When the rear of the bolt strikes the buffer plate, its remaining force is absorbed in the coiled spiral spring and the buffer disks. The force of the rearward motion of the bolt being absorbed by the buffer mechanism, the driving spring then forces the bolt forward.

■35. FORWARD MOVEMENT OF BOLT (fig. 11).—When the bolt starts forward, the extractor is guided downward by the action of the extractor feed cam on the extractor cam plunger. This causes the extractor to force the cartridge down the T-slot in line with the chamber. The ejector knocks the empty case from the T-slot and holds the cartridge in line with the chamber. The upper end of the cocking lever is forced backward, causing the lower end to move forward away from the rear of the firing. If the the pin is prematurely released, it is reengaged by the cocking lever and eased forward so that the striker cannot contact the cartridge primer until after the breach has been locked.

■36. RELEASE OF RECOILING PARTS (fig. 14) —AS the bolt goes forward its bottom projections strike the accelerator and turn it forward. This unlocks the barrel extension from the lock frame and releases the barrel plunger spring. When the accelerator has

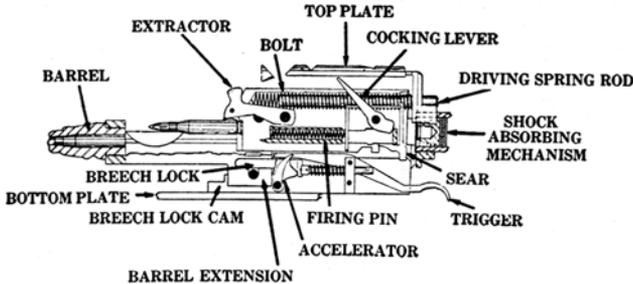


FIGURE 14.— Relation of parts in backward position.

been tripped, the barrel extension and the barrel are moved forward by the forward force of the bolt acting through the accelerator and the expansion of the barrel plunger spring.

■37. LOADING AND LOCKING ACTION (figs. 11 and 14) .—During the latter part of the forward movement of the bolt, the extractor rises as the plunger moves along the top of the extractor cam. When the extractor rises, the ejector is cammed outward, leaving the cartridge in the chamber gripped by the T-slot. The extractor grips the first round in the belt and is held down firmly by the cover extractor spring, ready to extract the round. The breech lock is forced upward by the breech lock cam and locks the breech just before the recoiling parts reach the firing position. The breech lock engages in a recess cut in the bottom of the bolt and thus locks the bolt firmly to the barrel extension and against the rear end of the barrel.

■38. SECOND ACT OF FEEDING (fig. 12) .—AS the bolt goes forward the stud on the pivoted belt feed lever moves to the left in the cam groove, forcing the slide to the right. The belt feed pawl carries the first cartridge to the right against the cartridge stops, ready to be gripped by the extractor. The next cartridge is carried over the belt holding pawl which rises behind it and holds it in position to be engaged by the belt feed pawl on its next movement to the left.

■39. TRIGGER ACTION IN AUTOMATIC FIRE (figs. 9, 13, and 14).—If the trigger is

held raised, as the sear moves forward with the bolt the trigger cams engage the sear cams and force the sear down, releasing the firing pin. The gun thus fires automatically, repeating the operations of functioning already described. The release of the firing pin actually takes place about 1/16 inch before the recoiling parts reach the forward position but after the breech is locked.

SECTION V

STOPPAGES AND IMMEDIATE ACTION

■40. DEFINITIONS.—

- a. A "stoppage" is any unintentional cessation of fire.
- b. "Immediate action" is the procedure used for the prompt reduction of usual stoppages.

■41. STOPPAGES.—

- a. Prevention.—Stoppages will be reduced to the minimum if the gunner has a practical working knowledge of his weapon and applies the points which should be observed before firing. Prevention is the best remedy for all stoppages.
- b. Causes.—

(1) A stoppage will occur if the gun fails to feed, fails to load, or fails to fire.

(a) If the gun fails to feed, the cause for the stoppage will be found in the ammunition belt or in the feed mechanism.

(b) If the gun feeds but fails to load, the cause will be found in the receiver. A broken part or an obstruction on the T-slot or in the chamber is the usual cause.

(c) If the gun feeds and loads but fails to fire, the cause will be found in the firing mechanism unless the primer of the cartridge is defective.

(2) The table following includes a comprehensive list of possible stoppages. It will serve as a guide during instruction in stoppages or immediate action.

TABLE OF STOPPAGES

Stoppages	Method of preparing for instruction in immediate action and stoppages
1. Misfire due to defective primer.	1. Place a dummy cartridge in belt.
2. Short round.	2. Place a short round in belt.
3. Bulged round.	3. Insert bulged round in belt.
4. Tight loop in belt. ¹	4. Do not prepare
5. Empty loop in belt.	5. Leave an empty loop in belt.
6. Stretched or torn belt. ¹	6. Do not prepare.
7. Thin rim, permitting nose of bullet to drop below chamber. ¹	7. Do not prepare
8. Belt improperly loaded.	8. Pull cartridge partially out of belt
9. Battered or thick rim of cartridge.	9. Place a battered or thick rimmed cartridge in belt.
10. Failure to remove round from chamber	10. Place a dummy cartridge with rim filed off in the chamber.
11. Set back primer. ¹	11. Do not prepare.
12. Separated case which is removed from chamber by new round when bolt is pulled to the rear.	12. Drive the front portion of a cartridge securely on a dummy cartridge. Pull bolt to the rear and place cartridge properly on the face