

BROWNING

.30 CAL. MACHINE GUN, HB, M1919A4

File W-141

WEAPONS DEPARTMENT  
Tank Destroyer School  
Camp Hood, Texas

Revised April 27, 1943

100

100

100

was developed to meet the need for concentration of fire power in fewer men and weapons.

Accuracy, ease of handling and concealment, and high rate of fire make the light machine gun ideal for anti-personnel use. In TD operations it has a peculiar additional value: by forcing tanks to keep "buttoned up", it restricts the commander's field of vision--and thereby the effectiveness of his fire.

Still a crack performer on its traditional ground mount, the light machine gun now serves as well on a pedestal mount in the  $\frac{1}{4}$ -ton truck.

#### Section 1. Characteristics and description.

2. Characteristics of fire.
3. Classes of fire.
4. Disassembly and assembly.
5. Functioning.
6. Stoppages and immediate action.
7. Gun drill.
8. Marksmanship.
9. Belt loaders and Accessories.
10. References.

#### Section 1

#### CHARACTERISTICS AND DESCRIPTION

##### I. DESCRIPTION OF GUN

- A. Characteristics.
  1. Recoil-operated.
  2. Air-cooled (heavy barrel).
  3. Belt-fed.
- B. Mountings.
  1. Ground mount, M2 consists of:
    - a. Tripod.
    - b. Elevating mechanism.
    - c. Pintle.
  2. Pedestal mounts.
    - a. M31--for  $\frac{1}{4}$ -ton truck (jeep), 4 x 4.
- C. General data.
  1. Maximum range--3450 yards.
  2. Most effective range--500 yards or less.
  3. Rear sight--graduated up to 2400 yards, and up to 90 mils.

4. Battle sight--500 yards.
5. Weights of parts.
  - a. Gun and mount--47.5 pounds.
  - b. Gun--30.25 pounds.
  - c. Barrel--7.35 pounds.
  - d. Elevating mechanism--3.25 pounds.
  - e. Pintle--2 pounds.
  - f. Tripod--12 pounds.
  - g. Mount (M2)--17.25 pounds.
  - h. Ammunition (100 rounds loaded in belts)--6.21 pounds.
6. Length of barrel--24 inches.
7. Rifling--4 lands, 4 grooves: uniform right-hand twist, one turn in 10 inches.
8. Caliber--.30 (of an inch).
9. Muzzle velocity (M2 ammunition)--2700-2800 feet per second.
10. Chamber pressure (M2 ammunition)--48,000 pounds per square inch.
11. Sight radius--13.94 inches.
12. Rates of fire.
  - a. Cyclic rate--400-550 rounds per minute.
  - b. A maximum usable rate--150 rounds per minute for approximately 10 minutes.
  - c. A normal rate--60 rounds per minute for approximately 30 minutes.
13. Height of gun above ground--14 inches.

## II. SUPSIDIARY PARTS

- A. Sights.
  1. Front--adjustable; attached to receiver (trunnion block).
  2. Rear--folding leaf; attached to receiver.
    - a. Graduated in 200-yard divisions up to 2400 yards.
    - b. Graduated up to 90 mils on left side of sight.
    - c. Windage adjustment up to 10 mils left and right of zero.
- B. Elevating and traversing mechanism--considered part of mount.
- C. Pintle--used to attach gun to M2 mount.  
Note: Pintle is part of mount.

## Section 2

### CHARACTERISTICS OF FIRE

#### I. TRAJECTORY

- A. A trajectory is the path of the bullet in its flight through the air.
- B. Characteristics.
  1. Curved, because of gravity and air resistance.
  2. Curvature increases with the range.
  3. Maximum ordinate is at a point  $\frac{2}{3}$  of the distance from gun to target.

#### II. BURST OF FIRE

- A. A burst of fire is a series of shots fired automatically.

#### III. CONE OF FIRE

- A. Each bullet in a burst of fire follows a slightly different path from every other one. This produces a group of varying trajectories called a cone of fire.

3. Characteristics.
  1. Elliptical in shape.
  2. Long axis of beaten zone extends in direction of fire.
  3. Long axis shortened or lengthened on sloping ground.
  4. Center of beaten zone must be on target to accomplish the maximum effect.
  5. Center 85% of beaten zone is the effective beaten zone.
  6. Center of the effective beaten zone is called the center of impact.
  7. The greater the range, the shorter and wider the beaten zone.

## V. DRIFT

- A. Drift is the movement to right or left of a bullet after it leaves the gun. It results from the spin imparted to the bullet by the twist of the rifling.

Note: In the light machine gun, as in most weapons, the rifling has a right-hand twist; the bullet therefore drifts to the right.

## Section 3

### CLASSES OF FIRE

#### I. WITH RESPECT TO GROUND

- A. Grazing fire.
  1. Trajectory does not rise above height of average man (68 inches) between muzzle of gun and beaten zone.
  2. Over level of uniformly sloping terrain, light machine gun can deliver grazing fire on ground targets up to a range of 750 yards.
- B. Plunging fire--danger area is practically confined to beaten zone.

#### II. WITH RESPECT TO TARGET

- A. Frontal fire--at right angle to front of target.
- B. Flanking fire--at right angle to side of target.
- C. Oblique fire--long axis of beaten zone is at an angle other than 90 degrees to long axis of target.
- D. Enfilade fire--long axis of beaten zone coincides with long axis of target.

#### III. WITH RESPECT TO GUN

- A. Fixed fire--delivered on a point target. Note this distinction: All point targets are stationary, but not all stationary targets are point targets. A house is an example of a stationary target; a sniper firing from an attic window of the house would be a point target.
- B. Traversing fire--distributed in width by successive changes in deflection.
- C. Searching fire--distributed in depth by successive changes in elevation.
- D. Combined searching and traversing fire--distributed in depth and width.

## Section 4

### Disassembly and Assembly

#### I. DISASSEMBLY (FIELD STRIP)

- A. Text method--preliminary step always is to remove all doubt gun is loaded by pulling bolt handle to rear (PALM UP) several times.
1. Raise front sight, so that it cannot be damaged by cover.
  2. Pull back on cover latch (right hand) and raise cover (left hand).
  3. Engage driving spring rod lugs in recess in bolt.
    - a. Pull bolt handle to rearmost position and hold it there (left hand).
    - b. Insert rim of cartridge in slit end of driving spring rod.
    - c. With slit horizontal, push in driving spring rod as far as it will go; turn to right (clockwise) until slit is vertical.
  4. Push bolt handle forward one inch or more to free end of driving spring rod from backplate.
  5. Push cover latch forward with both hands and remove backplate with left hand.
  6. Pull bolt back and remove bolt handle.
  7. Remove bolt from rear end of receiver by inserting two fingers of left hand inside receiver and pushing bolt out into right hand.  
Do not handle driving spring rod.
  8. Twist bolt one quarter-turn to right (clockwise), bringing extractor up; lay bolt down, with extractor up.
  9. Remove lock frame, barrel extension and barrel from receiver. (Lock frame may be detached from barrel extension before barrel extension is entirely removed from receiver).
    - a. Raise bolt handle latch.
    - b. Insert cartridge tip in hole in right side plate of receiver, and depress trigger pin.
    - c. Grasp spacer with two fingers of left hand and pull parts to rear. (Alternative method: Insert two fingers of left hand inside receiver and push back on barrel extension).  
Be careful not to allow barrel to burr breech lock cam during removal.
  10. Separate lock frame from barrel extension--with barrel in left hand and lock frame in right, push forward on tips of accelerator.
  11. Unscrew barrel from barrel extension.
  12. Review disassembled parts.  
Note: Step 11 completes partial disassembly, or field strip.  
Step 13, 14 and 15 describe removal of the cover group, which is done only for cleaning or repairs.
  13. Remove Cotter pin from cover bolt.
  14. Using screwdriver blade of combination tool in slit on cover bolt to prevent it from turning, remove nut.
  15. Remove cover bolt, cover catch spring and fixed and movable plates.
  16. Remove cover; review names of parts.

#### II. HEADSPACE

- A. Headspace in any military weapon, including the light machine gun, is the distance from the base of a cartridge fully seated in the chamber to the face of the bolt.
- B. We adjust for headspace in the light machine gun by obtaining the proper distance between the rear end of the barrel and the forward part of the bolt.

spring rod as follows:

- a. Holding bolt in right hand, depress driving spring rod by pressing down on firm surface; turn bolt one quarter-turn to left (counter-clockwise).
- b. Ease bolt up about four (4) inches and grasp spring with left hand; separate the two with a quick upward jerk of bolt.
- c. Withdraw driving spring from driving spring rod.
3. Rotate cocking lever to rear, and remove cocking lever pin.
4. Remove cocking lever.
5. Remove sear, as follows:
  - a. Trip sear with dummy cartridge.
  - b. Seat sear spring in cut in bolt.
  - c. Remove sear.
6. Remove sear spring and sear spring pin, as follows:
  - a. Seat spring in normal position.
  - b. Start sear spring pin out from bottom of bolt.
  - c. Pry out sear spring and sear spring pin from top side of bolt. Use cocking lever, being carefully to exert pressure against sear spring pin and not sear spring.
7. Remove firing pin by tilting bolt.
8. Review disassembled parts of bolt.

B. Additional essential nomenclature not covered previously.

1. Sear.
  - a. Sear cut--recess for sear spring.
  - b. Sear notch--recess for firing pin shoulder.
  - c. Sear table--flat projection from sear proper.
  - d. Sear cams--engage trigger cams.
2. Firing pin.
  - a. Firing pin spring--small spring inside firing pin.
  - b. Firing pin spring retaining pin--small pin that holds firing pin spring in position.
  - c. Firing pin shoulder--section of firing pin which fits into sear notch.
  - d. Striker--projection on firing pin that strikes primer.
3. Bolt.
  - a. Cam groove--diagonal cut across top of bolt.
  - b. Face of bolt--section from which firing pin protrudes.
  - c. Forward part of bolt--projections on each side of face of bolt.
  - d. I-slot--formed by face of bolt and forward part of bolt.

#### IV. ASSEMBLY OF BOLT

A. Text method.

1. Replace firing pin--striker downward and to front, shoulder down.
2. Replace sear spring and sear spring pin, exerting pressure against sear spring pin.
  - a. Seat sear spring in cut in bolt.
  - b. Push spring down and to right.
3. Replace sear.
  - a. Sear table goes up and toward face of bolt.
  - b. Sear spring is seated in sear cut.
4. Replace cocking lever, rounded toe end down and to rear. If cocking lever is properly seated, a click can sometimes be heard.
5. Replace cocking lever pin by inserting it from left side of bolt.
6. Test for correct assembly of bolt:
  - a. Rotate cocking lever to front, then to rear.
  - b. Trip sear by pushing down on top.
  - c. If assembly is correct, the piece will fire.

3. Remove barrel locking spring. This part is removed only for replacement or repair.
  4. Review disassembled parts.
- B. Additional essential nomenclature not covered previously.
1. Barrel extension.
    - a. T-lug--"T"-shaped projection on rear end of barrel extension.
    - b. Barrel plunger stud--on T-lug.
    - c. Half-moon recess--located on right side of barrel extension to allow ejector to be cammed out away from round in forward movement of bolt.

#### VIII. ASSEMBLY OF BARREL EXTENSION

- A. Text method.
1. Replace breech lock--double-beveled edge goes up and to front; this edge allows for initial slow extraction of old round.
  2. Replace breech lock pin. (Breech lock pin and accelerator pin are interchangeable).
  3. Replace barrel locking spring if it has been removed.

#### IX. DISASSEMBLY OF COVER

- A. Cover is detail-stripped only for replacements or cleaning.
- B. Text method.
1. Remove belt feed lever pivot cap screw and washer.
  2. Drift out belt feed lever pivot pin.
  3. Remove belt feed lever.
  4. Remove belt feed slide; remove belt feed pawl pin, belt feed pawl and belt feed pawl spring.
  5. Remove cover extractor spring, as follows:
    - a. Using dummy cartridge, pry out spring to right.
    - b. Lift out spring.
  6. Review disassembled parts.
- C. Additional essential nomenclature not covered previously.
1. Belt feed slide.
    - a. Belt feed pawl--section of slide which has serrated edge and finger-shaped projection.
    - b. Belt feed pawl spring--holds pawl away from slide.
    - c. Belt feed pawl pin--connects belt feed pawl to belt slide.
    - d. Belt feed pawl finger--projection on belt feed slide.
  2. Belt feed lever--note belt feed lever stud, round stud on end of belt feed lever that rides in cam groove.

#### X. ASSEMBLY OF COVER

- A. Text method.
1. Replace cover extractor spring.
    - a. Forked end of spring goes under stud on cover.
    - b. Seat projection of spring in notch of cover extractor cam.
  2. Replace belt feed slide; serrated edge of belt feed pawl goes to right.
  3. Replace belt feed pawl pin, belt feed lever, belt feed lever pivot pin and belt feed lever pivot cap screw and washer, and belt feed pawl spring.



7. Replace driving spring rod, as follows:
  - a. Place driving spring on driving spring rod.
  - b. With spring and rod in left hand, "milk" spring onto rod; at same time, slip bolt down onto spring.
  - c. Turn bolt one quarter-turn right (clockwise) to lock driving spring rod in bolt. Be sure rod is locked in bolt.
  - d. Be sure rod is locked in bolt. When properly locked, slit in driving spring rod is parallel to long axis of rear end of bolt.
8. Replace extractor; collar on extractor should be engaged under collar on bolt.

## V. DISASSEMBLY OF LOCK FRAME

- A. Text method.
  1. Remove trigger pin.
    - a. A nail or match may be used to drift pin out.
    - b. If trigger pin spring does not come out, leave it in position.
  2. Remove trigger.
  3. Remove accelerator pin, using dummy cartridge.
  4. Remove accelerator.
  5. Using care, remove barrel plunger and barrel plunger spring, as follows:
    - a. Grasp lock frame with two fingers of left hand, holding spring to side of lock frame.
    - b. Push down and to right with right thumb, separating parts.
    - c. Ease barrel plunger and barrel plunger spring out with right hand.
  6. Remove barrel plunger spring from barrel plunger.
  7. Review disassembled parts.
- B. Additional essential nomenclature not covered previously.
  1. Lock frame.
    - a. Forward projections--the two projections which act on breech lock pin.
    - b. Spacer--round metal bar in rearmost part of lock frame.
    - c. Separator--portion on which trigger rests.
    - d. Accelerator stop--round stud on right side of lock frame which prevents accelerator from rotating too far to rear.
    - e. Guide lugs--one on each side of lock frame.
    - f. Barrel plunger guide pin slot--oblong recess in left side of lock frame for barrel plunger guide pin.
  2. Accelerator.
    - a. Tips--rounded portions which act against rear of barrel extension.
    - b. Claws--triangular-shaped portions of accelerator which engage shoulder of T-lug.
  3. Trigger--note trigger cams, the beveled portion on foremost part of trigger.

## VI. ASSEMBLY OF LOCK FRAME

- A. Text method.
  1. Replace barrel plunger spring on barrel plunger. (Place smaller end of barrel plunger spring on barrel plunger first).
  2. Replace barrel plunger and barrel plunger spring on lock frame.
  3. Using care, replace barrel plunger and barrel plunger spring on lock frame.
  4. Replace accelerator, tips forward and claws up.
  5. Replace accelerator pin. (Accelerator pin and breech lock pin are interchangeable).

## XI. DISASSEMBLY OF BACKPLATE

- A. Backplate is disassembled only for instructional purposes or for replacement of parts.

## XII. DISASSEMBLY OF BELT HOLDING PAWL

- A. Performed for cleaning purposes only.

## XIII. ADDITIONAL NOMENCLATURE OF RECEIVER

- A. Inside receiver.
  - 1. Extractor feed cam--long flat cam on left side plate of receiver.
  - 2. Extractor cam--short cam on left side plate of receiver; it is in front of extractor feed cam and projects into receiver.
  - 3. Breech lock cam--located on bottom of receiver.
  - 4. Cocking lever recess--located in top of receiver; can be seen by removing cover latch.
- B. Trunnion block.
  - 1. Front cartridge stop--round projection in right front corner of trunnion block.
  - 2. Rear cartridge stop--rectangular projection immediately to rear of front cartridge stop.
  - 3. Belt feed pawl finger recess--"U"-shaped recess in rear cartridge stop.
  - 4. Bunter plate--front portion of receiver that nose of cartridge rides against while traveling across trunnion block.
- C. Right side plate of receiver--bolt handle guideway, the recess that allows bolt handle to move backward and forward.

## Section 5

### FUNCTIONING

#### I. GENERAL

- A. A gunner must have a practical working knowledge of his weapon to keep it in action in combat.
- B. Although many parts of the gun operate simultaneously, the subject of functioning is divided into phases to facilitate instruction.
- C. The functioning of the gun begins with the gun assumed to be loaded.

#### II. LOADING AND UNLOADING

- A. To half-load.
  - 1. With cover open, place belt on trunnion block.
  - 2. Close cover; stud on belt feed lever goes to left.
  - 3. Jerk belt to right, first round is carried to right of belt holding pawl.
  - 4. Pull belt fully to rear and release it.
  - 5. First round is now against cartridge stops.  
NOTE: If a new bolt is being loaded; the cover is lowered and the metal tab is pulled through in the same manner as above.
- B. To load (after gun has been half-loaded)--pull bolt fully to rear and release it.
- C. To unload.
  - 1. Raise cover.

5. Insert a clearing block.

Note: Extractor should be in raised position so as not to damage ejector with clearing block. The clearing is an added safety feature of range firing to insure positive clearing of the gun.

### III. PHASES OF FUNCTIONING

- A. To understand functioning, the soldier must know the definition of a cam: it is a fixed projection or beveled surface that changes the direction of a moving part.
- B. To facilitate instruction, functioning is divided into phases. The phases are as follows:
  1. Trigger action.
  2. Rearward movement of recoiling parts.
  3. Action of accelerator.
  4. Rearward movement of bolt.
  5. Cocking action.
  6. Action of driving spring.
  7. Forward movement of bolt.
  8. Release of recoiling parts.
  9. Loading and locking action.
  10. First act of feeding.
  11. Second act of feeding.
  12. Trigger action (automatic fire).
  13. Safety action of cocking lever.
  14. Action of muzzle plug.
- C. Trigger action (gun loaded and ready to fire).
  1. Trigger is pivoted: when rear end goes up, front end goes down.
  2. Trigger cams engage sear cams, forcing sear down against action of sear spring until:
    - a. Shoulder of firing pin is released from sear notch; (sear spring exerts a constant upward pressure).
    - b. Compressed firing pin spring expands, forcing firing pin forward to strike primer.
- D. Rearward movement of recoiling parts.
  1. Explosion forces recoiling parts (barrel, barrel extension and bolt) to rear. These parts are locked together for  $\frac{5}{8}$  inch of this movement.
    - a. During first  $\frac{5}{16}$ -inch of this movement:
      - (1) Parts are fully locked together.
      - (2) Breech lock rides on top of breech lock cam.
    - b. During last  $\frac{5}{16}$ -inch of movement, parts are partially locked as breech lock rides down breech lock cam.

Note: Though breech lock normally slides down breech lock cam, it might fail to do so at times, because of the rapid movement of parts during operation. It would then be forced down by front projections of lock frame acting on breech lock pin.
    - c. After full  $\frac{5}{8}$ -inch movement, parts are completely unlocked.
  2. Bolt, unlocked from barrel extension, continues to rear.
  3. Barrel extension coming on to rear, compresses barrel plunger spring by action of barrel plunger stud on groove in barrel plunger.
  4. Barrel extension pushes accelerator, rotating it to rear; at this point, claws of accelerator engage shoulders of Plug, locking barrel extension to lock frame.

E. Action of accelerator.

1. Tips of accelerator strike bottom projections of bolt and accelerate bolt to rear. Note how eccentric shape of accelerator causes tips to move faster than lower portion.
2. Accelerator, rotated to rear by barrel extension, causes claws of accelerator to engage shoulders of T-lug, locking barrel and barrel extension in rearward position.
  - a. Accelerator stop prevents accelerator from rotating too far to rear.
  - b. Barrel plunger spring is now held compressed because barrel extension is locked to lock frame.

F. Rearward movement of bolt.

1. Driving spring is compressed.
2. New round is extracted from belt (by extractor); old round is removed from chamber (by T-slot).
3. Cover extractor spring, acting against extractor, forces new round slightly into T-slot as round is leaving trunnion block.
4. Extractor cam plunger rides over extractor cam, then along extractor feed cam.
5. Extractor cam plunger is forced in by beveled portion of extractor feed cam.
6. Extractor is forced down by cover extractor cam; this action forces new round further into T-slot.
7. Extractor cam plunger springs out behind and below extractor feed cam.

G. Cocking action.

1. When bolt moves to rear, upper end of cocking lever, which is engaged in cocking lever recess on top of receiver, is rotated forward; lower or toe end moves to rear.
2. Firing pin is brought to rear by toe of cocking lever; shoulder of firing pin slides over sear table.
3. Firing pin spring is being compressed between sear spring pin and firing pin spring retaining pin as firing pin is brought to rear.
4. Firing pin shoulder engages in sear notch, (sear being pulled upward by action of sear spring).
5. Trigger cams are disengaged from sear cams as bolt moves to rear; (sear rides along trigger bar).

H. Action of driving spring.

1. Driving spring absorbs some of the shock of recoil.
2. Bolt strikes buffer plate; fiber disks or coil spring in buffer tube absorb remaining recoil.
3. Driving spring expands, forcing bolt forward.

I. Forward movement of bolt.

1. Extractor is guided downward by action of extractor feed cam on extractor cam plunger. This movement:
  - a. Forces new round fully into T-slot in line with chamber.
  - b. Insures that extractor cam plunger goes forward under extractor feed cam.
  - c. Allows extractor to ride forward on barrel extension until it reaches extractor cam.
2. Expended round is knocked out from T-slot by ejector (provided it hasn't fallen out previously due to gravity).
3. Ejector and T-slot hold new round in line with chamber.
4. Upper end of cocking lever is rotated to rear in cocking lever recess.
5. Toe end of cocking lever moves forward and away from firing pin.

J. Release of recoiling parts:

1. Lower projections of bolt strike accelerator, rotating it forward.

- into half-moon recess in barrel extension.
3. Cartridge, still gripped by T-slot, continues forward into chamber.
  4. Extractor is now held down firmly by cover extractor spring.
  5. Extractor engages rim of first round in belt (which is now against cartridge stops).
  6. As barrel extension moves forward, breech lock is forced up by breech lock cam; recoiling parts are locked together 5/16-inch short of being fully forward.
  7. When parts are fully forward, bolt is locked to barrel extension and against rear end of barrel of breech lock engaging in recess cut in bottom of bolt.
- L. First act of feeding.
1. As bolt moves back, belt feed lever stud moves from left to right in cam groove.
  2. Belt feed slide and belt feed pawl move to left.
  3. Belt feed pawl engages on left of first cartridge, held in position by belt holding pawl.
  4. If extractor fails to withdraw leading round from belt, finger of belt feed pawl will prevent double feeding; finger riding on top of unextracted round prevents serrated portion of pawl from engaging next round.
- M. Second act of feeding.
1. Bolt goes forward; belt feed lever stud moves from right to left.
  2. Belt feed slide moves to right.
  3. Belt feed pawl carries first round against cartridge stops.
  4. Next round is carried over belt holding pawl, which rises behind it, thus holding belt in gun.
- N. Trigger action (automatic fire).
1. Rear of trigger is held up.
  2. Sear is pulled down each time bolt goes forward, because sear and trigger cams engage.
  3. Bolt and barrel extension are locked together 5/16-inch short of being fully forward. The firing pin, however, is released 1/16-inch before parts are fully forward; sear cams and trigger cams engage each other at this point (that is, 1/16-inch before parts are fully forward).
  4. The action described in 3 above allows firing pin to strike primer of cartridge just as recoiling parts arrive fully forward.
- O. Safety action of cocking lever.
1. If firing pin is prematurely released:
    - a. Lower end (toe) of cocking lever engages firing pin.
    - b. Firing pin is now eased forward at same speed as bolt, due to rotation of upper end of cocking lever in cocking recess.
  2. Firing pin cannot contact primer until after breech is locked; cartridge will not be fired, because striker does not have sufficient force to activate primer.
- P. Action of muzzle plug.
1. Due to heavy barrel, additional force is needed to send recoiling parts to rear.
  2. This force is supplied by means of the muzzle plug, which traps a portion of the gas and stores it up between the sides of the muzzle plug and the front end of the barrel. In due time, sufficient pressure is built up so that the gas, acting on the front of the barrel, assists in recoil.

## SECTION 6

### STOPPAGES AND IMMEDIATE ACTION

#### I. DEFINITIONS

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

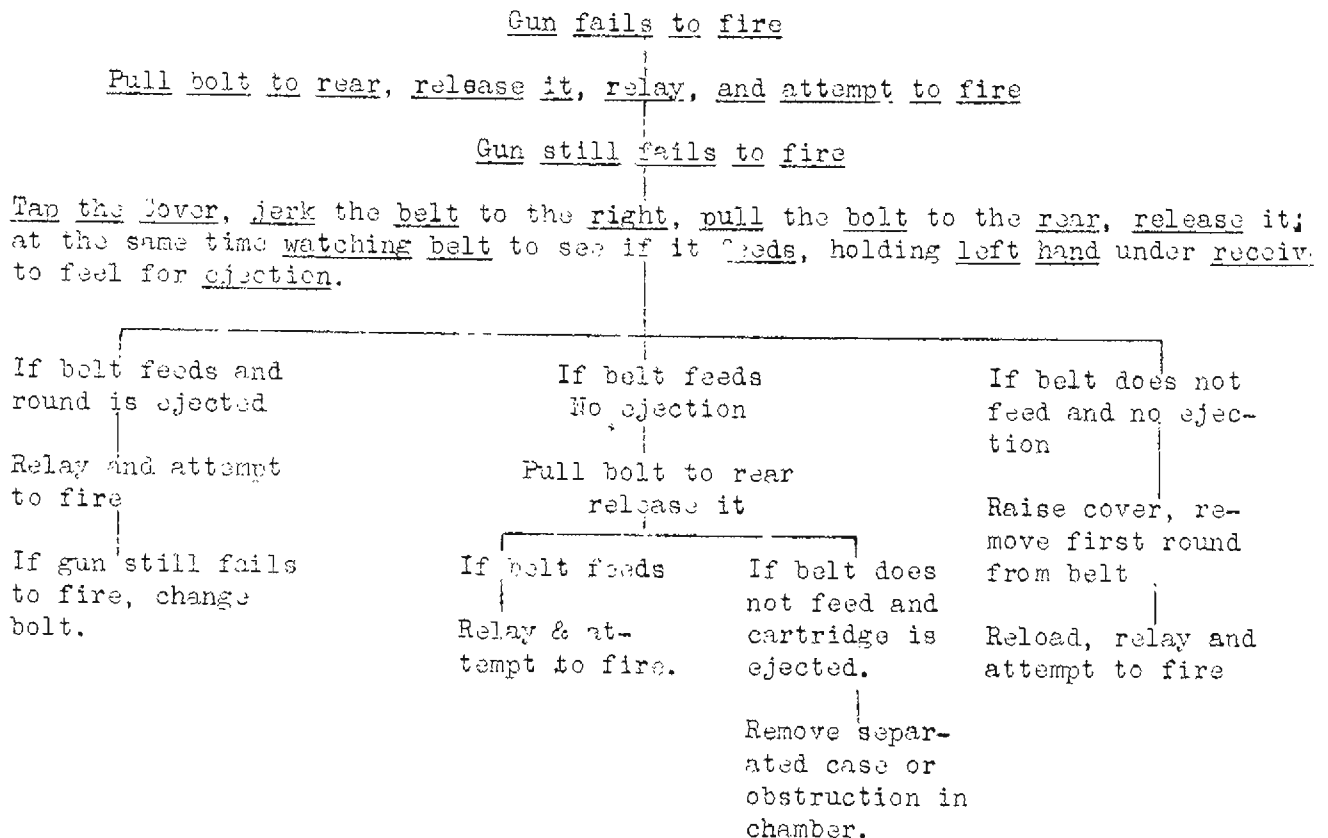
#### II. STOPPAGES

- A. General--prevention is the best remedy for all stoppages.
  - 1. Stoppages will be reduced to a minimum if the gunner has a practical working knowledge of his weapon, and applies the points which should be observed during fire.
  - 2. The commonest causes of stoppages are defective ammunition and improperly loaded belts.
- B. Stoppages fall into three classifications:
  - 1. Failure to feed.
  - 2. Failure to load.
  - 3. Failure to fire.
- C. Failure to feed.
  - 1. Feeding is the process of moving the cartridge from outside the gun through the feedway to rest against the cartridge stops.
  - 2. Common causes:
    - a. Empty loop in belt.
    - b. Stretched or torn belt.
    - c. Improperly loaded belt.
    - d. Bent or worn belt feed lever.
    - e. Worn or burred cam groove.
    - f. Worn belt feed pawl.
    - g. Weak belt holding pawl spring.
    - h. Weak cover latch spring.
- D. Failure to load.
  - 1. Loading is the process of taking the cartridge from the cartridge stops and fully seating it in the chamber.
  - 2. Common causes:
    - a. Short round.
    - b. Deformed round.
    - c. Tight loops in belt.
    - d. Defective rim on cartridge.
    - e. Obstruction in chamber.
    - f. Separated or ruptured case.
    - g. Weak or missing cover extractor spring.
    - h. Damaged extractor.
    - i. Broken ejector.
    - j. Broken or damaged T-slot.
    - k. Weak ejector spring.
- E. Failure to fire.
  - 1. Firing consists of exploding the round that has been placed in the chamber.
  - 2. Common causes:
    - a. Defective primer.
    - b. Set back primer.
    - c. Short firing pin.
    - d. Broken firing pin.
    - e. Weak or broken firing pin spring.

majority of stoppages.

- B. By following the procedure of immediate action, the gunner will be able to remedy most stoppages at once, without attempting to discover the cause.

### IMMEDIATE ACTION CHART



NOTE: This chart will not determine or locate broken parts, except in firing mechanism.

C. Additional steps.

1. If the procedure outlined, does not place the gun in action, the gunner must inspect the weapon thoroughly to determine the cause of the stoppage.
2. Stoppages caused by a defective feeding mechanism can sometimes be remedied temporarily by pulling the belt to the right with just sufficient force to assist the mechanism in positioning the leading round.

D. Tools used in immediate action.

1. Ruptured cartridge extractors.
2. Cartridge form, MK 2.
  - (1) Open cover.
  - (2) Place cartridge form on trunnion block against cartridge stops.
  - (3) Engage it with extractor.
  - (4) Hold down on extractor and load cartridge form slowly and smoothly into chamber.
  - (5) Be sure shoulder of form does not strike and burr edges of chamber.
  - (6) Strike bolt handle to be sure cartridge form is seated in separated cartridge.
  - (7) Pull bolt to rear and catch cartridge and cartridge form as they are ejected.
  - (8) Remove separated cartridge from cartridge form.

- b. Ruptured cartridge extractor, MK4.
  - (1) Draw bolt handle to rear and latch it.
  - (2) Insert nose of cartridge extractor into chamber, handle up.
  - (3) Push cartridge extractor forward to seat it firmly in the separated case.
  - (4) Pull backward on handle, withdrawing separated case and tool.
  - (5) Remove cartridge from ruptured cartridge extractor.
- 2. Cleaning rod--used to remove a whole case stuck in chamber.
  - a. Draw bolt handle to rear and latch it.
  - b. Remove next round from T-slot.
  - c. Grasp cleaning rod about six inches from the end, insert it into muzzle and force case from chamber.

CAUTION: Be sure face of bolt is not damaged by cartridge case or cleaning rod.

#### IV. RUNAWAY GUN

- A. A "Runaway" gun is one which fires automatically after being loaded, or continues firing after trigger has been released.
- B. Causes.
  - 1. Trigger bent downward.
  - 2. Worn firing pin shoulder.
  - 3. Worn sear notch.
  - 4. Weak sear spring.
- C. Remedies.
  - 1. Pull back on cover latch, allowing cover to rise. (This is considered the best method).
  - 2. Raise bolt handle latch, catching the bolt.
  - 3. Twist belt, preventing cartridges from entering feedway. (This may damage feeding mechanism).
  - 4. Pull a round from belt, as in spacing.
- D. After the runaway gun has been stopped, unload and disassemble it and replace defective part, or parts.

#### Section 7

#### GUN DRILL

##### I. GENERAL

- A. Purpose--to give gun crew complete confidence in their ability as a team to put the light machine gun in action with precision and speed.
- B. Gun drill is emphasized in the soldier's training so that correct procedure and technique in handling the gun will be instinctive and automatic in combat. In training, the unit is organized without regard to combat conditions; rather, in an orderly and systematic manner conducive to efficient control and instruction.
- C. Types of gun drill.
  - 1. Ground--moving gun from one position to another on the ground, and setting it up for action in each new position.
  - 2. Vehicular.
    - a. Taking gun from M31 pedestal mount in  $\frac{1}{4}$ -ton truck and preparing it for action on ground.
    - b. Taking gun from ground and setting it up on M31 mount ready for action.
- D. Fundamentals of gun drill.



## II. STEPS IN GUN DRILL

A. Gunner repeats all commands.

B. To secure equipment.

1. Command is SECURE EQUIPMENT FOR GUN DRILL.

2. Gunner secures tripod and ammunition box.

Note: If equipment is to be grounded, gunner takes prone position. Tripod is to his right, trails to rear and tripod head up; ammunition box is on his left, latch to front.

3. Assistant gunner secures gun.

Note: If equipment is to be grounded, assistant gunner takes prone position approximately five (5) yards to rear of gunner; gun is to his front, muzzle to the left and bolt handle up.

C. To examine equipment.

1. Command is EXAMINE EQUIPMENT FOR GUN DRILL.

2. Duties of crew members--ground drill.

a. Gunner examines tripod and ammunition box to see that:

- (1) Front leg and trail legs are closely folded.
- (2) Traversing bar sleeve latch and pintle latch are working properly.
- (3) Pintle bushing is free from dirt.
- (4) Ammunition box contains a full, properly loaded belt.
- (5) Ammunition box latch and carrying handle are in working order.

b. Assistant gunner examines gun and:

- (1) Pulls bolt handle to rear to make sure gun is not loaded.
- (2) Raises front sight and cover; checks headspace adjustment.
- (3) Closes cover, holding belt feed slide in position.
- (4) Lowers front sight.
- (5) Checks to see that muzzle plug and front barrel bearing are tight, and that barrel is clear.
- (6) Tests pintle for free movement; it should not be excessively loose.
- (7) Sees that elevating mechanism is attached to gun and is centered.
- (8) Pulls trigger to release firing pin spring.
- (9) Sets rear sight at 700 yards and windage at zero; lowers rear sight.

Note: After performing above examination, assistant reports GUN CORRECT, or such deficiencies as he has found. Gunner then reports ALL CORRECT, or such deficiencies as he has found or have been reported to him by assistant gunner.

3. Duties of crew members--vehicular drill.

a. Gunner unfastens strap holding tripod to M31 mount, checks to see that pintle is in tripod, then proceeds as in ground drill (C 2 above).

b. Assistant gunner performs same steps as in ground drill (C 2 b).

D. To put gun in action.

1. Command is ACTION.

2. Officer or NCO in charge of gun drill indicates point where gun will be mounted and general direction of fire.

3. Duties of crew members--ground drill.

Note: Some duties of gunner and assistant gunner are performed

simultaneously; others can be done only after certain steps have been completed by the other man. This can merely be suggested in the following table; actual gun drill will make it clear.

Gunner

Assistant Gunner

Repeats the command

Grasps right trail near tripod head in right hand, ammunition box in left hand

Springs up and carries tripod and ammunition box at a run to the designated point

Drops ammunition box off to left and swings front leg of tripod forward

Spreads rear trail legs, and drops to ground behind tripod

Prepares pintle latch to receive pintle

As gun is lowered onto tripod, grasps elevating mechanism in left hand and assembles it to traversing bar (deflection); with his right hand knocks down pintle latch

Raises front sight; grasps brass tip of ammunition belt and gives it a quick jerk to the right

Pulls bolt handle to rear twice with right hand (palm up), loading the gun

Takes correct position behind gun

Stays in the prone position, grip in his right hand, and grasps barrel jacket from above with his left hand

Springs to his feet, gun under his left arm (muzzle to rear), and runs to position on left of and facing tripod (left foot in space between the front leg and left trail)

Lowers gun onto tripod and drops into assistant gunner's position

Opens the ammunition box, grasping with right thumb and forefinger a fold of ammunition belt where brass tip joins fabric; inserts brass tip through feedway as far as possible, making sure that the belt is straight

Checks to see that the belt feeds properly; keeps alert for any signals from front or rear

4. Duties of crew members--vehicular drill

- a. Same as for ground drill, except that gunner removes pintle bolt and nut, and after gun is lowered onto tripod, replaces pintle bolt. Assistant gunner replaces nut.

E. To take gun out of action.

Pulls back on the latch with right hand, and raises cover with left hand

Lifts the extractor; removes belt from feedway, and packs it back in ammunition box, making sure box is tightly latched

Pulls bolt handle to rear with right hand (palm up), inspects chamber and T-slot, and lowers extractor with left hand

Lets bolt go forward and lowers cover with left hand

Raises the pintle latch, and trips the trigger with right hand; at same time, lowers front sight, then rear, with left hand

Springs to his feet; with left hand over and around barrel jacket and right hand on grip, removes gun from tripod

Loosens the traversing bar sleeve latch; pushes forward on tripod, lowering front leg; at same time closes the trails

Turns left about and runs to original position, grounding the gun--muzzle to left and bolt handle up

Grasps right trail leg near tripod head with right hand, ammunition box with left

Inspects the gun, as in B above

Springs to his feet, turns left about and returns to original position, grounding equipment as in B above

3. Duties of crew members--vehicular drill. Same as for ground drill, except:
  - a. Assistant gunner removes nut on the pintle bolt before springing to his feet to remove gun from tripod.
  - b. Gunner removes pintle bolt.
  - c. Assistant gunner replaces gun (minus the pintle) back on M31 mount.
  - d. Gunner returns ammunition box and tripod to vehicle after he has replaced pintle bolt and nut on pintle.

## Section 8

### MARKSMANSHIP

#### I. GENERAL

- A. Marksmanship is the basic step in training the gunner to use his weapon effectively in combat.
- B. Instruction in marksmanship is necessary in order to train a soldier to be proficient in killing with his weapon.
- C. If he is properly instructed, any man who is physically and mentally fit to be a soldier can learn to fire the gun efficiently.
- D. The gun responds in direct proportion to the mechanical skill with which it is operated.
- E. To become an expert machine gunner, a soldier must be trained thoroughly in the fundamentals of marksmanship. If these fundamentals have been properly emphasized, the gunner will subconsciously apply them in combat.

## II. FUNDAMENTALS OF MARKSMANSHIP

- A. accurate delivery of initial burst (to gain surprise effect).
- B. Mechanical skill in manipulating gun.
- C. Adjustment of fire by:
  - 1. Observation of:
    - a. Strike of bullet.
    - b. Flight of tracer.
  - 2. Frequent relaying of gun during firing.
- D. Speed in combining the above three factors.

## III. PREPARATORY EXERCISES

- A. General.
  - 1. Before a gunner can apply the fundamentals of marksmanship, he must learn to handle the gun; this step is taught most efficiently by preparatory exercises. Remember: "Good shots are made on the dry line, not on the range".
  - 2. Preparatory exercises will develop in the soldier fixed and correct habits of marksmanship before he begins range practice. This will conserve time and ammunition on the range.
  - 3. The five preparatory exercises in their proper sequence are:
    - a. Sighting and aiming.
    - b. Position.
    - c. Sight setting and laying.
    - d. Manipulation.
    - e. Preliminary gunners' test.
  - 4. Instruction in preparatory exercises must be thorough, carefully supervised and as individual as possible. Use the coach and pupil method whenever possible.
  - 5. During this marksmanship training, all possible aids and expedients should be used to full advantage. Practical work is a prime requisite: a soldier cannot be taught marksmanship by lecturing.
- B. Detailed discussion of preparatory exercises.
  - 1. Sighting and aiming exercises should be taught in the following order:
    - a. Teach correct alinement of sights on target from charts or sighting board.
      - (1) Teach correct sight picture
        - (a) Front sight blade should be centered both horizontally and vertically in peep.
        - (b) Bull should be centered directly on top of front sight.
      - (2) To obtain correct sight picture:
        - (a) Place cheek on grip; then raise or lower cheek until front sight blade is centered both horizontally and vertically in peep.
        - (b) Manipulate gun until bull is centered directly on top of front sight.
      - (3) Common mistakes.
        - (a) Failure to center front sight blade in peep.
        - (b) Taking a line of white between front sight blade and bull.
        - (c) Sighting into bull (black) with front sight blade.
    - b. Check knowledge of correct sight picture by use of sighting bar.
    - c. Have soldier make several shot groups (triangle) by actually using gun for sighting.
      - (1) This exercise should be conducted at the range at

gunner and man holding disk. With proper signals, no talking whatever is necessary.

2. Position.

- a. When using ground mount, all firing with light machine gun is done from the prone position.
- b. Essentials of gunner's position.
  - (1) Prone.
  - (2) Body extended directly behind gun.
  - (3) Legs well spread, toes out, heels flat on the ground.
  - (4) Eye in position in rear of peep sight or battle sight, with cheek resting on grip.
  - (5) Elbows across trail legs (riding the tripod down).
  - (6) Left hand on elevating handwheel, with thumb extended to traversing slide lock lever. (Pull down on elevating mechanism with left hand).
  - (7) Right hand around stock, with forefinger extended to trigger.
- c. RIDE THE MOUNT, NOT THE TRIGGER.
- d. Method of firing single shots and bursts:
  - (1) Single shot--fingers of right hand are extended and joined. Each shot is tapped off.  
Note: In advanced training, gunners may be taught to "milk" or pinch off single shots.
  - (2) Bursts--right hand is around stock, right forefinger extended to trigger. Trigger is tripped and released immediately to produce burst of two or three.
- e. Essentials of assistant gunner's position:
  - (1) Prone.
  - (2) Head below and to rear of feedway.
  - (3) Legs well spread, toes out, heels flat on the ground.
  - (4) Body extended at an angle to gun and in line with feedway.  
Note: Dispersion in firing of bursts can be cut to a minimum if assistant gunner pulls down on front tripod leg.
- f. When combat conditions require gun to be fired from vehicular mount, following position of gunner may be used:
  - (1) Left foot braced against mount base.
  - (2) Right foot on right rear wheel fender.
  - (3) Buttocks braced against rear seat.
  - (4) Left arm and left hand supporting gun.
  - (5) Right hand around stock and right forefinger extended to trigger.  
Note: When firing from vehicular mount, it is extremely difficult to control dispersion.
- g. Gunner may fire from the hip if combat conditions make it necessary.
  - (1) If targets suddenly appear while gun is being taken from ground to vehicular mount, assistant gunner may fire from hip.
  - (2) If high weeds hinder gunner's observation, ammunition boxes may be placed under each leg of M2 tripod mount, raising gun off ground.

3. Sight-setting and laying.

- a. Light machine gun target "A" is set up 1000 inches from pintle of gun.
- b. Instructor sees that gun is laid on target.
- c. Exercise starts with sight leaf down, slide set at 500 yards and windage scale at zero.
- d. Instructor announces range and aiming point.

- e. Gunner immediately sets off range and traverses gun to designated aiming point.
  - f. Gunner calls "UP" when he is laid on aiming point with proper range.
  - g. Instructor checks gunner's time from command of range to announcement of "UP" by gunner.
  - h. This exercise develops speed in changing range and laying on target; ten (10) seconds is considered good time, provided gun is properly laid.
4. Manipulation.
- a. Fire in combat is not limited to point targets; therefore, an exercise must be designed to develop accuracy and speed in shifting from one target to another and manipulating gun effectively to cover targets in width, depth or both.
  - b. Manipulation exercises are based on the "thumb rule": RIGHT IS UP; UP IS RIGHT.
    - (1) The light machine gun is manipulated with left hand.
      - (a) With left hand on elevating handwheel, turn thumb to the right and muzzle moves up. RIGHT IS UP.
      - (b) With left hand on traversing handwheel, turn thumb up and muzzle moves to right. UP IS RIGHT.
      - (c) Summarizing (a) and (b): Elevation--RIGHT IS UP: Traverse--UP IS RIGHT.
    - (2) For rapid shifting in traverse (other than on 1000-inch range), free traverse is used. Unlock traversing slide lock lever, and slide elevating mechanism along traversing bar with left hand.
  - c. Exercises in manipulation can be conducted with same set-up used in triangle exercises. Note that if 1000-inch "A" targets are set up 1000 inches from pintle of gun, one mil (one click) will move strike of bullet one inch.
  - d. Before attempting to manipulate gun to cover whole 1000-inch "A" target, center gun on target, as follows:
    - (1) Clamp traversing slide lock lever at zero on traversing bar, zero to left of block.
    - (2) Center traversing handwheel by turning all the way to one side, then backing off 30 mils. Do not count the clicks; read the 30 mils on traversing handwheel micrometer scale.
    - (3) Looking through sights, move trail legs of mount so that line of aim is on center of target (searching target).
    - (4) Stamp or pound shoes of tripod into ground until tripod is level.
5. Preliminary gunner's test.
- a. A soldier should not be permitted to go to the range unless he is entirely familiar with all subjects taught him on the gun.
  - b. This test normally would include all material covered thus far in this chapter.

#### IV. RANGE PRACTICE

4. Gunner should fire light machine gun on 1000-inch range at completion of his preparatory instruction.
  1. Gunner on range applies those fundamentals of marksmanship emphasized throughout his preparatory exercises.
  2. His efficiency in all phases of instruction and his ability to use the weapon skillfully are tested.
3. Targeting or zeroing the gun.
  1. General--Before any barrel is used in firing, it is targeted with gun in which it is to be used.

- (3) Gun's pintle bolt is reasonably tight (not tight enough to bind).
- (4) Oil has been removed from barrel with dry patch.
- (5) Gun is centered on target, tripod is level and shoes of tripod stamped or pounded into ground until tripod is settled.
- b. Proceed with zeroing as follows:
  - (1) Set rear sight at 400 yards and windage at zero.
  - (2) Lay gun on aiming paster and fire three (3) single shots, relaying after each shot.
  - (3) Be sure to relay after third shot. Then, clear gun, being careful not to disturb lay of gun.
  - (4) Determine center of shot group.
  - (5) If center of shot group is at middle point of lower edge of aiming paster, gun is properly zeroed. If not, mark center of group with an aiming paster.
  - (6) Have assistant gunner loosen screws on front sight, then manipulate front sight in elevation and for deflection until line of aim is on shot group.  
CAUTION:
    - (a) Do not disturb lay of gun.
    - (b) Loosen locking screw on front sight first and tighten it last.
    - (c) Do not burr screws.
  - (7) Relay on aiming paster and fire a confirming group (three shots) relaying after each shot is fired.
  - (8) Center of impact should be exactly at point of aim. If it is not, proceed again as above.
  - (9) To check sight setting necessary to engage traversing target and "crows nest" (fixed target), set rear sight at 800 yards (up six clicks from 400 yards), lay on aiming paster and fire three shots. Center of impact should be in center of "crow's nest".

## V. MOVING GROUND TARGETS

- A. Method of engaging rapidly moving targets.
  1. General.
    - a. Scout cars, reconnaissance cars, armored cars and truck convoys are rapid-moving targets. Therefore, they require different techniques of fire from those used against stationary or slow-moving targets.
    - b. To hit a target which is moving, bore of gun must be laid in direction and elevation so that bullet and target will meet.
    - c. Moving target marksmanship involves the fundamentals and technique of fire explained in detail below, plus the application of common sense.
  2. Fundamentals essential to expert firing at moving targets:
    - a. Accurate delivery of initial burst. (Gunner must estimate range and speed of target accurately).
    - b. Mechanical skill in manipulation.
    - c. Adjustment of fire from observation of strike of tracer.
    - d. Maintenance of adequate volume of fire in order to destroy target in shortest possible time.
    - e. Rapid shifting of fire to new targets.
    - f. Speed in combining the above mentioned fundamentals.
  3. Technique of fire--to be proficient gunners, men must be trained to:
    - a. Track fast moving targets in elevation by means of elevating handwheel, and in traverse by sliding traversing slide along traversing bar.

- b. Swing ahead of target to required lead, and fire a string of shots or bursts.
  - c. Continue to swing or follow through while firing.
  - d. Re-aim rapidly at target and swing out to proper lead, if target is lost momentarily.
  - e. Correct lead by observation of strike and flight of tracer. (Gunner should get his eye above sight to observe his tracer or strike).
  - f. Maintain fire on target until it is obviously disabled, or until ordered to shift to new target.
4. Type of fire:
- a. Little or no effect is gained if fixed fire is used.
  - b. Proper use of cone of machine gun fire is to manipulate gun so that cone of fire moves with target; gunner must maintain correct lead for target during delivery of fire.
  - c. Gun must be free in traverse for firing on moving ground targets; mechanical elevation of gun permits sufficiently rapid manipulation in elevation.
  - d. In delivery of fire, gunner should:
    - (1) Use automatic fire, or maximum rate of aimed single-shot fire.
    - (2) Adjust lead by observation of strike or tracer.
    - (3) Use battle sight to get initial burst into target, then get eye above sight and adjust fire by observation of the strike or tracer.
  - e. For final stages of an assault by hostile mechanization, maximum concentration of automatic fire within limits of gun will be used.

## B. Leads.

### 1. General:

- a. In order to hit a moving target, axis of bore of weapon must be pointed ahead of target at a point in line with direction of movement of target.
- b. Distance that weapon must be pointed ahead of target is distance which target will travel during time bullet is in its flight from gun to target.
- c. When distance bullet travels from gun to target is so great that there is an appreciable drop in trajectory, axis of bore must be given sufficient elevation to counteract drop of bullet.
- d. Greatest possible accuracy in manipulating gun should be used in establishing lead; in firing, too much lead is better than too little.
- e. Due to large size of moving targets, gunner can still hit target even though he has poorly estimated range, speed and leads. This is not bull's-eye shooting.

### 2. Computation of leads.

- a. Consists of mathematical calculation based on speed of targets, time of flight of bullet and direction of movement of target with respect to gun.
- b. Such calculations are not feasible under field conditions.
- c. Leads vary greatly, and it is not practicable to give a complete table of leads for all possible variations.



LESS than 10 m.p.h.	MORE than 400 yards	One target length
	LESS than 400 yards	One target length
MORE than 10 m.p.h.	MORE than 400 yards	Two target lengths
	LESS than 400 yards	One target length

- (1) Table covers majority of ground targets moving across front.
- (2) Rules from table will vary with direction of movement. For targets coming directly toward gun or going away, gun is pointed directly at target.
- (3) Due to size of target and limited time available, immediate application of fire based on lead table is absolutely essential. Adjustment by observation of strike or tracer follows:

#### C. Tracking.

1. Tracking consists of maintaining correct alignment of sights, with or without lead, on a moving target, by moving gun at same angular speed as that of target.
2. Battle sights will be used on moving targets even though vehicles are engaged at ranges greater than 500 yards.
  - a. Lay on rear end of target, swing across target out to correct lead and open fire.
  - b. Use maximum rate of fire consistent with efficient tracking.
  - c. The slower the speed and/or the shorter the range, the more rapid the fire at the target should be.
3. Point of aim (using battle sight).
  - a. If target is less than 400 yards away, gunner tracks along bottom edge of target.
  - b. If target is between 400 and 600 yards, gunner tracks through center of target.
  - c. If target is between 600 and 1000 yards, gunner tracks along top edge of target.

D. Preparatory exercises--see FM 23-45, paragraphs 124-128.

#### E. Range practice.

1. To test gunner's efficiency in firing on rapidly moving and surprise targets, combat shell firing is essential.
2. This will give gunner a chance to fire under conditions approximating those found in combat.

### Section 9 ACCESSORIES, SPARE PARTS AND BELT LOADERS

#### I. ACCESSORIES

- A. Authorized accessories can be found in SNL (Standard Nomenclature List) A-6 and T/ba (Table of Basic Allowances) for TD units (No. 18).
- B. Available accessories.
  1. Cleaning equipment: rods, brushes, oil can, etc.
  2. Equipment for training and instruction: Ordnance charts, .22-caliber subcaliber trainer and blank ammunition firing attachment.

Note: Instructional equipment will not be taken into the field.

3. Fire control equipment: binoculars, firing tables and watches (as listed in T/BA).
4. Special tools for care and maintenance: combination screwdriver, front barrel bearing plug socket wrench, ruptured cartridge extractor, asbestos mittens, etc. (Mittens are issued through QMC; not listed in SNL).

- C. Broken or unserviceable equipment should be replaced through supply section of Headquarters Company.

## II. SPARE PARTS

- A. Spare parts are carried in spare parts kit, which is modified ammunition box.
- B. Authorized contents of kit can be found in SNL A-6.
- C. In combat area, spare parts should be assembled into groups, and if a part breaks, the whole group should be replaced. For example, to correct a broken sear, the entire bolt would be replaced.
- D. In training areas, parts should be kept clean, unscratched and unbroken. Spare parts kit contains envelope to facilitate care of smaller parts.
- E. Like accessories, broken or unserviceable parts should be replaced immediately.

## III. BELT LOADERS

- A. Belt loaders are designed for rapid loading of fabric belts.
- B. Care and adjustment before operation.
  1. Fasten loader securely to a table or bench.
  2. Check for loose screws, a common result of long periods of operation.
  3. Check adjustment of needles. This is very important.
    - a. Points of needles must be evenly set in line, with .01-inch vertical distance between points of upper and lower needles.
    - b. Unqualified personnel should never be allowed to adjust needles. Malfunctions of belt loaders, especially if due to weak tension spring may be mistaken for improper adjustment of needles.  
If needles must be adjusted or replaced in lower needle bar, belt guide and belt guide cover assembly must be removed, as follows:
      - (1) Remove screws in top of belt guide.
      - (2) Pry up gently on guide with screwdriver blade.
      - (3) Lift belt guide out.
      - (4) Push upper needle bar away from magazine, and lift out needle bars.
      - (5) Replace parts in reverse order.
  4. Oil moving parts freely with light lubricating oil.
  5. Twist and stretch new belts so that loops will not be tight. Be sure fabric is grasped for this process; brass tips are not to be used as "handles".
- C. Operation.
  1. Positioning first round--first method.
    - a. Load one cartridge by hand at one end of belt; black thread along one edge of belt indicates side of loop through which nose of bullet should enter.
    - b. Fill cartridge guide

- g. Place belt in belt guide with black thread next to needle bars. The one cartridge already loaded by hand rests in top groove of lower feed wheel.  
Note: If machine has a magazine spring base of cartridge must be placed under end of spring.
- h. Start nose of "positioned" cartridge into belt loop.
- i. Lower upper needle bar.
- j. Replace belt guide cover.
- k. Lower upper feed wheel.
- l. Engage tension spring with tension spring hood (9).
- m. Turn crank with steady speed, and ammunition will be loaded into belt.  
Note: A downward thrust on crank will overcome apparent "hard spots" in turning.

2. Positioning first round--second method.

- a. Load two cartridges by hand at one end of belt. Crank is left hanging straight down; a round is not "positioned".
- b. Raise upper feed wheel.
- c. Swing out belt guide cover.
- d. Raise upper needle bar.
- e. Place belt in belt guide (black thread next to needle bars) with round in end loop resting in top groove of lower feed wheel.  
Note: Again, if machine has magazine spring, cartridge must be placed under end of spring.
- f. Lower upper needle bar.
- g. Close belt guide cover.
- h. Lower upper feed wheel.
- i. Hook tension spring.
- j. Turn crank.

D. Stoppages.

1. Common Causes.

- a. Frayed or torn belt loops.
- b. Needles broken or out of adjustment.
- c. Weak tension spring.
- d. Broken lower feed wheel locking lever.
- e. Bent needle bar lever.
- f. Jamming or double-feeding.
- g. New belt with tight loops.

2. Reducing stoppages.

- a. Keep screws tight.
- b. Keep needles adjusted.
- c. Load only belts that are in good condition.
- d. Mount machine properly.
- e. Do not force machine when it jams or double-feeds. If jammed round cannot be pushed back into magazine with firm pressure, lift off cartridge guide and remove magazine.
- f. Do not turn too fast.
- g. Keep moving parts oiled.
- h. Do not let loaded part of belt hang more than two feet.
- i. Stretch new belts.
- j. Raise upper needle bar to remove belt.

E. Care and adjustment after operation.

- 1. Remove cartridge guide and wipe clean.
- 2. Remove magazine and wipe moving parts.
- 3. Remove slide and wipe clean; connecting screw should be tightened.
- 4. Oil moving parts, replace slide and magazine and return belt loader to carrying chest.

5. Any broken or unserviceable part must be replaced. Parts are listed in SNL A-6.

#### Section 10

#### REFERENCES

- FM 23-45 Browning Machine Gun, Caliber .30 HB, M1919A4 Ground
- FM 23-50 Browning Machine Gun, Caliber .30 HB, M1919A4 (Mounted in Combat Vehicles)
- SNL A-6 Standard Nomenclature List No. A-6  
Gun, Machine, Cal. .30 Browning, M1919A2 and M1919A4,  
Fixed and Flexible and Ground Mounts.
- T/BA 18 Table of Basic Allowances for Tank Destroyer Units

Important: T/BA's are revised periodically. All prescribed for TD units will be No. 18; date of issue is the only means of distinguishing between current T/BA and obsolete ones.





## INTRODUCTION ON RANGE

Point out:

1. Safety Limits
2. Explain Rule on Duds.
3. Point out Targets on Range.
4. Location of firing points. (how numbered) (Groups, guns)
5. Location of belt loaders.
6. Location of brass racks.
7. Location of ammunition. (how to be drawn)
8. Explain rules on spacing ammunition.
9. Do not turn in partial belts, roll up empty belts & place in ammunition box in rear of firing line at direction of Range Officer.
10. Explain where Pit Detail is to report & instructions for them.
11. Location of brass tins.
12. Location of supply box.
13. Asst. instructors have patches & waste.
14. No. 2 signs for equipment.
15. Demonstrate correct method of firing, Ground Mounts & Vehicular Mounts.
16. No more than 2 bursts of 3 at each target except Moving-
17. Explain term "guns & groups for firing."
18. Moving Target has priority.
19. Do not fire on Moving target when it stops, or Surprise after it goes down.
20. Value of observation of fire, duties of both gunner & asst. gunner.
21. Hold down on elevating mechanism with Left hand (both mounts).
22. Free traverse (lock elevation).
23. Explain rule on Smoking.
24. Need for adjustment of fire into target.
25. How to move on range.
26. Don't waste ammunition by firing on Surprise Targets after Target goes down.
27. Obey command "CEASE FIRING."

## CLEANING DETAIL

1. Each order a job.
2. Location of cleaning water (hot water and clean water).
3. Point of inspection of barrel, tripod, elevating mechanism.
4. Location of supplies (time & place to turn them in).
5. All cleaning to be done on line.
6. Where & when equipment is to be loaded, & what it is to be loaded.
7. Barrels inspected dry; be sure to clean carbon from end of barrel before inspection; oil after inspection.
8. Brass brushes, if needed, can be drawn from supply box.
9. Asst. instructors have waste & patches, & will inspect parts they have been wiped off before assembly.
10. How to screw up elevating mechanism (elevating handwheel to bottom all the way up).
11. Be sure to "police" firing area before leaving.
12. Be sure to appoint Latrine Orderlies.

### 1545-----Clean Equipment

- # 1 Collect ammunition boxes & cleaning blocks, clean extra guns, down belt loaders, "police" area, stack brass, load, etc. as ordered by Range Officer.
- # 2 Moving parts (detail strip), remove pawls (Belt holding pawl feed pawl).  
Tripods & elevating mechanisms, skates & cradle.
- # 3 Barrel (clean) & assist # 2 on above.
- # 4 Fire in (PM), clean gun fired.  
Fire in (AM), supervise.

MACHINE GUN GROUP

Subject: .30 Caliber Machine G  
Weapons Department, TDS.  
W-139

C P (Change Pit Detail)  
D B (Draw Belt)

# .30 Caliber M.G. Range Card (Field Firing)

## ROTATION OF ORDERS

	D B				D B				D B											
Time	0900-0930	0930	0945	1000	1015	1030 1100	1105	1120	1140-1200	1300 1315	1315	1330 1345	1350	1405	1420	1435	1450	1505 1550	1550 000	
KEY		1	2	3	4	5	6	7	8			9	10	11	12	13	14	15		
GUNNER		3	2	3	2	3	1	3	1			3	1	2	1	2	1	2		
ASST. GUNNER		2	3	2	3	2	3	1	3			1	3	1	2	1	2	3		
BELT LOADER																				
BRASS STACKER		1	1	1	1	1	2	2	2			2	2	3	3	3	3	3		
DRY LINE																				
	Explain Range								NOON	Critique & Demonstration.								Clean Guns, etc.	Dismiss	

C P  
(5 Minutes)

C P  
(5 Minutes)

250 Rds.		SYSTEM OF FIRING	
KEY	SPACE		
1, 2, 6	25	Surprise Targets - 1 gun from group (slow) (individual guns)	Short Bursts ( 2 or 3 )
	25	Surprise Targets - 1 gun from group (slow) (individual guns)	Short Bursts ( 2 or 3 )
3, 4, 8	25	Moving Targets - 1 gun from group (Surprise while moving target is being shifted)	Short Bursts ( 2 or 3 )
	25	Moving Targets - 1 gun from group (Surprise while moving target is being shifted)	Short Bursts ( 2 or 3 )
5, 10, 11	25	Watch my Tracer - (1 gun from group or individual guns)	Short Bursts ( 2 or 3 )
	25	Long Range - (1 gun from group or individual guns)	Rapid Single Shot
7, 12, 13	25	Combination Surprise and Moving - (Individual guns or 1 gun from each group)	Rapid Single Shot
	25	Combination Surprise and Moving - (Individual guns or 1 gun from each group)	Short Bursts
9, 14, 15	25	Combination Watch My Tracer, Moving, Surprise, Individual guns or 1 gun from each Group.	Long Bursts (Moving), Rapid (Surprise), Short Bursts (W
E1, E2, E3	25	Combination Surprise and Moving - (1 gun from group or Individual guns)	Short Bursts
Extra	25	Combination Surprise and Moving - (1 gun from group or Individual guns)	Short Bursts

## Sequence of Fire Order:

1. Explain
2. Space
3. Load
4. Battle Sights or (Range)
5. Fire Control
6. Cease Firing
7. Clear Guns
8. Change Over

## Example of Fire Order

1. Explain:
  - a. All gunners & asst. gunners in position.
  - b. All gunners & asst. gunners give your attention to stand. Asst. gunner start spacing 25 in belts.
  - c. Gunner - This time we will start firing on surprise targets, no more than 2 bursts of 3 at any one target; do not fire after targets go down. Fire only when your group or gun number is called. Gunners SOUND OFF.
2. Space 25

3. Load
4. Battle Sights.
5. Surprise Targets
6. Bursts of 2 or 3
7. Gun #1, Group #1, all guns, or 1st group, etc.
8. Cease Firing (Easiest way is to man have all targets go down), Moving Targets.
9. Clear Guns.
10. Change Over.



corner square of each target, putting 1 shot in each of those squares, don't forget to change range when going from traversing to searching target.

2. Space 7.
3. Half-load.
4. Range 500.
5. Aiming Paster (NOTE: Gunner calls "UP" when laid, asst. gunner knocks gunner off in elevation & deflection & raises hand. Ready on R., L., C., look for hand "UP" of asst. R. Officer.)
6. Single shot (gunner's R. hand, palm up, or bolt handle).
7. Commence firing - Gunner repeats command, Commence, at command firing, gunner loads, re-lays, & fires.
8. Cease firing at command "CEASE." get all asst. gunner's attention, have them raise hands; R. Officer does likewise. At command "FIRING," drop arm, asst. gunner taps gunner. NOTE: Be sure to have target lined up before giving command "CEASE FIRING."
9. Clear guns or clear guns and step back, all clear on R., L., C.; get these reports from asst. R. Officer.
10. Change Over.

#### RANGE SET-UP (Point Out):

1. Location of firing points (now numbered).
2. Location of belt loaders.
3. Location of points to paste targets.
4. Location of extra ammunition (how to be drawn).
5. Location of brass racks & tins.
6. Location of supplies.
7. # 1, is to sign for equipment.
8. How to move on the range.
9. Explain rule on Smoking.
10. Do not turn in partially loaded belts.
11. Asst. instructors have field glasses, patches & waste.
12. Location of Clearing Lines "for command, 'step back'".
13. Location of line on which targets are to be lined up before Change-Over.

#### NOTE

##### To Clear Gun:

1. Raise cover.
2. Remove belt.
3. Pull bolt to rear.
4. Check chamber.
5. Raise extractor.
6. Insert clearing block.

#### HAIF-LOAD

1. Remove clearing block.
2. Let bolt go forward.
3. Place belt on trunnion block with first round to R. of belt holding pawl.
4. Lower cover.
5. Pull bolt to rear (Palm up) (one time only).

#### CLEANING DETAIL

1. Each order a job.
  2. Location of cleaning water & clean water).
  3. Point of inspection of barr tripod, elev. mech.
  4. Location of supplies (time turn them in)
  5. All cleaning to be done old
  6. Where & when equip. is to be & what to be loaded on.
  7. Barrel inspected dry; be sure carbon from end of barrel inspection; oil after inspection;
  8. Brass brushes, if needed; & supply box.
  9. Asst. instrs. have waste or & will inspect parts after before assembly.
  10. How to screw up elev. mech.
  11. Be sure to "police" firing before leaving.
  12. Be sure to appoint Latrine
- 3:30 Clean Equipment
- # 1 Moving parts (detail strip, belt holding pawl, belt for Tripod, & elev. mech.
  - # 2 Clean barrel & asst # 1 abo
  - # 3 Collect ammo. boxes & clear paste targets, clean extra down belt load rs, "police" stack brass, clean latrine as directed by R. Officer.
  - # 4 Fired in (PM) clean gun "i Fired in (AM) supervise.

#### MACHINE GUN GROUP

Subject: .30 Caliber Machine Gun  
Weapons Department, IDS  
W-138

.30 CALIBER MG RANGE CARD (1000" Firing)  
ROLE-PLAY OF GUNS

TIME	0830 0900		0915	1000	1020	1040	1100	1120	1140	1200	Noon	1330	1350	1415	1440	1505	1530	1555	
KEY	Zeroing, Practice, Demonstration	Zero Guns	1	2	3	4	5	6	7			Critique, Demonstration	8	9	10	11	12	1	
GUNNER			1	2	3	1	2	3	1		2		3	1	2	3	1	2	2
ASST. GUNNER			2	3	1	2	3	1	2		3		1	2	3	1	2	3	3
TARGET PASTER																			
BELT LOADERS - DRY			3	1	2	3	1	2	3		1		2	3	1	2			
BRASS STACKERS LINE																			

Note: Ammunition requirement per gun, 2 belts plus 1 carton (20) loose rounds. Use one belt plus 14 loose rounds  
 #1 Draw new belt at noon, use that belt plus remaining loose rounds in PM.  
 Note: Start taking down equipment in rear (belt loaders etc. one hour before firing is to cease so entire rear is  
 #2 ed up at command "CEASE FIRING."

SYSTEM OF FIRING

173 rounds plus 7 rounds per man to zero  
 (180)

KEY	SPACE	WHAT IS TO BE FIRED	FIRE CONTROL	TL
1, 2, 3	7	Crows nest and corners	Single shot	5 m
	12	Crows nest and center squares of each target	Strings of three	5 m
	7	Crows nest and second and fourth squares of each target	Single shot	5 m
4, 5, 6	8	Aiming paster, Crows nest and second and fourth square of each target	Single shot	5 m
	21	Crows nest and corners	Strings of three	5 m
	12	Crows nest and center square of each target	Bursts of three	5 m
7, 8, 9	5	Aiming paster - Check zero of gun	Single shot	5 m
	--	Dry run entire target	String of three	5 m
	48	Entire target - crows nest, traverse-right, search-up, oblique - right-up	String of three	5 m
10, 11, 12	5	Aiming paster - Check zero of gun	Single shot	5 m
	--	Dry Run	String of three	4 m
	--	Dry Run	String of three	4 m
	48	Entire Target (Record run)	String of three	4 m

Sequence of Firing (Range Fire Order):

1. Explain
2. Space
3. Half-load.
4. Range.
5. Aiming paster (ready on R. & L.)
6. Fire control
7. COMMENCE FIRING. (load, re-lay, fire).
8. CEASE FIRING.
9. Clear Guns. (step back)
10. Change over.

Example of Fire Order:

1. Explain:
  - a. All gunners & asst. gunners in position.
  - b. All gunners & asst. gunners give attention.
  - c. Asst. gunners start spacing 7 rounds in.
  - c. Gunner, this time we will fire the Crows

(continued on other side)