RESTRICTED

FM 4–159

WAR DEPARTMENT

ANTIAIRCRAFT ARTILLERY FIELD MANUAL

SERVICE OF THE PIECE MULTIPLE GUN MOTOR CARRIAGE M15

28 September 1943

Dissemination of restricted matter.—The information contained in restricted documents and the essential characteristics of restricted material may be given to any person known to be in the service of the United States and to persons of undoubted loyalty and discretion who are cooperating in Government work, but will not be communicated to the public or to the press except by authorized military public relations agencies. (See also par. 18*b*, AR 380–5, 28 Sep 1942.)

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FM 4–159, Antiaircraft Artillery Field Manual, Service of the Piece, Multiple Gun Motor Carriage M15, is published for the information and guidance of all concerned.

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(For explanation of symbols see FM 21–6.)

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ANTIAIRCRAFT ARTILLERY FIELD MANUAL

SERVICE OF THE PIECE

MULTIPLE GUN MOTOR CARRIAGE M15

CHAPTER 1

GENERAL

■ 1. INTRODUCTION.—This manual prescribes the knowledge and skill required to serve effectively the multiple gun motor carriage M15. Variations in assigned matériel may necessitate changes in the prescribed drill.

■ 2. DESCRIPTION.—*a.* The multiple gun motor carriage M15 is an armored half-track vehicle capable of maneuvering over rough terrain (fig. 1). The carriage mounts one 37-mm automatic gun and two caliber .50 HB machine guns. The three guns are mounted with the axes of their bores parallel. The guns are fired with the mount in traveling position. The gun crew rides the mount in their firing positions, ready to open fire on a few seconds notice. The squad leader rides in the cab with the driver and operates the radio when on convoy. The driver operates the radio when the vehicle is stopped. All members of the gun crew act as antiaircraft lookouts.

b. An armored bucket is provided for protection of the gun crew. The bucket is open in the rear to permit servicing the weapon from the ground. The half-track vehicle is armored and provides protection for the driver and engine. An opening in the front of the bucket permits firing at minimum elevation.

c. The weapon is traversed and elevated by the lateral and vertical gun pointers, each operating a pair of handwheels. The armored bucket traverses with the mount. The vertical gun pointer fires the weapon.

d. Provision is made on the carriage for stowage of 3,400 rounds of caliber .50 and 240 rounds of 37-mm ammunition, spare barrel, and tools, in addition to small arms, hand grenades, and other auxiliary equipment.

■ 3. METHOD OF POINTING.—The sighting system M6 is used for pointing the weapon.

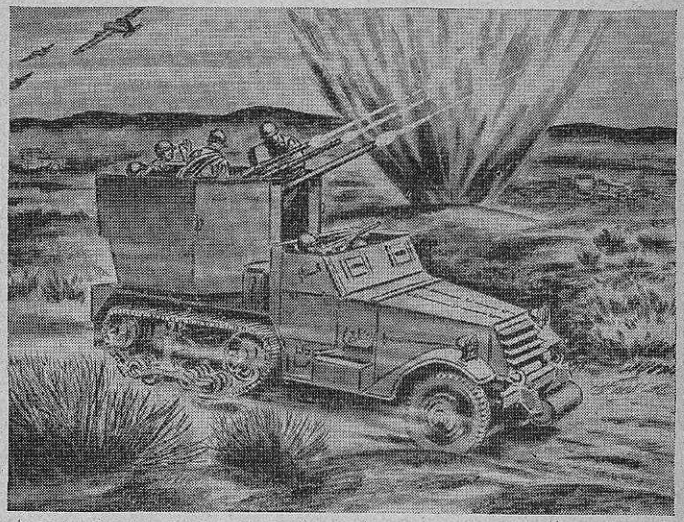


FIGURE 1.—Multiple gun motor carriage M15.

CHAPTER 2

ORGANIZATION

SECTION I

AUTOMATIC WEAPONS SQUAD

■ 4. GENERAL.—The automatic weapons squad is composed of seven enlisted men. The squad leader, who is a corporal, commands the squad. The lead setter (gunner) is second in command of the squad. Two gun pointers, two cannoneers, and the driver make up the balance of the squad (fig. 2).

■ 5. DUTIES OF PERSONNEL.—*a. Driver.*—The driver operates the vehicle. He is responsible for first-echelon maintenance of the vehicle. He keeps the squad leader informed as to the status of fuel, oil, and water in the vehicle. When the vehicle is halted and engaging targets, he operates the radio.

b. Cannoneers.—The two cannoneers serve the two caliber .50 machine guns and the 37-mm gun. They are responsible for the functioning of the guns and preparing of the ammunition. They keep the squad leader informed as to the status of ammuntion.

c. Gun pointers.—The gun pointers point the weapon by means of tracking telescopes (sights) and traversing handwheels. They must be able to track smoothly and accurately. The gun pointers MUST keep their eyes about 1 foot from the telescopes, and both eyes MUST be open. Each gun pointer uses his dominant eye in sighting. The vertical gun pointer fires the weapon by means of two foot pedals. The right pedal fires both machine guns and the left pedal fires the 37-mm gun. The gun pointers are responsible for the condition of their sights and the traversing and elevating mechanisms of the mount.

d. Lead setter (gunner).—The lead setter applies leads to the sighting system and adjusts the tracer stream to obtain

hits. He is responsible for the functioning and maintenance of the sighting system. The lead setter assists the squad leader in coordinating and supervising the duties of the squad members.

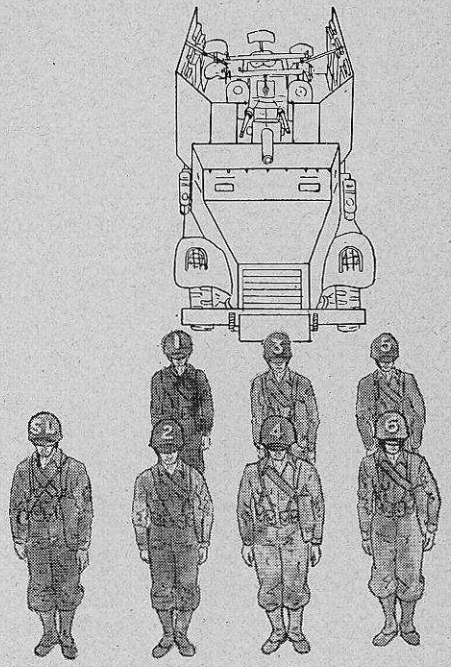


FIGURE 2.—Automatic weapons squad.

e. Squad leader.—The leader commands the squad. He is responsible for the training of the squad and its functioning as a team during combat. He initiates action for the replenishment of fuel, oil, water, and ammunition through his section leader.

■ 6. TRAINING.—Each member of the automatic weapons squad must be trained and proficient in the following subjects:

a. Nomenclature, operation, care, and adjustment of the 37-mm gun (TM 9–708 and 9–235) and the caliber .50 machine gun.

b. Nomenclature, operation, care, and adjustment of the combination gun mount M42 (TM 9–708) (to be included in TM 9–235).

c. Nomenclature, operation, care, and maintenance of the half-track vehicle (TM 9–708 and 9–710).

d. Drill of the squad; the assigned positions in the squad are rotated (CHANGE ORDER) until all members can perform any duty within the squad.

e. Selection of positions (FM 4–101 and 4–102).

f. Local defense and camouflage (FM 5–20, 4–101, and 4–102).

g. Direct fire gunnery (FM 4–151 and 4–110).

h. Antimechanized defense (FM 4–101, 4–102, and 4–151).

i. Combat signals (FM 17–5).

j. Map reading (FM 21–25).

k. Maintaining direction by compass, sun, and stars.

SECTION II

AUTOMATIC WEAPONS SECTION

■ 7. GENERAL.—*a.* The automatic weapons section is composed of two squads. The section is commanded by a sergeant who, in addition to his other duties as section leader, commands one squad of the section. The corporal of the other squad is the second in command.

b. The sergeant and the corporal should alternate between squads in training. Every effort must be made to develop coordination and balanced performance.

■ 8. DUTIES OF THE SECTION LEADER.—The section leader is responsible for the employment of the section and for the executing of its mission. He enforces current instructions as to status of alert in his section. He coordinates the occupation of the positions and selection of antitank positions. He is responsible for carrying out instructions as to camouflage and field fortifications, and the enforcement

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of camouflage and gas discipline. He initiates and maintains all necessary local security measures. He controls road and tactical movements of the section. The section leader plans, with the platoon sergeant, the details of supplying his section with food, water, ammuntion, and fuel. He submits such reports and sketches as may be required. The training and assignment of personnel, and the development of an efficient combat team at the primary training responsibilities of the section leader.

SECTION III

AUTOMATIC WEAPONS PLATOON

■ 9. GENERAL.—The automatic weapons platoon is composed of the platoon headquarters section and four automatic weapons sections (fig. 3). The platoon is commanded by a commissioned officer assisted by executive officer and a platoon sergeant.

■ 10. PLATOON HEADQUARTERS.—The platoon headquarters has two officers and five enlisted men. The enlisted men are the platoon sergeant, two drivers, radio operator, and a machine gunner. The section is provided with a ¼-ton truck and a half-track car M2 equipped with radio (one SCR–508, one SCR–284, and one SCR–593), one caliber .30 machine gun, and one caliber .50 machine gun, HB.

■ 11. DESIGNATION.—A numerical designation of each fire unit in the battery is used to speed up transmission of messages. Each fire unit is designated by a three-digit number. Unit figures designate the fire unit in the section. Tens indicate the section of the platoon. Hundreds designate the platoon. Thus the figure 132 refers to the second squad of the third section of the first platoon. Ciphers indicate either the entire section or platoon. For example, 120 indicates the second section of the first platoon, and 100 indicates the entire first platoon. (See fig. 3.)

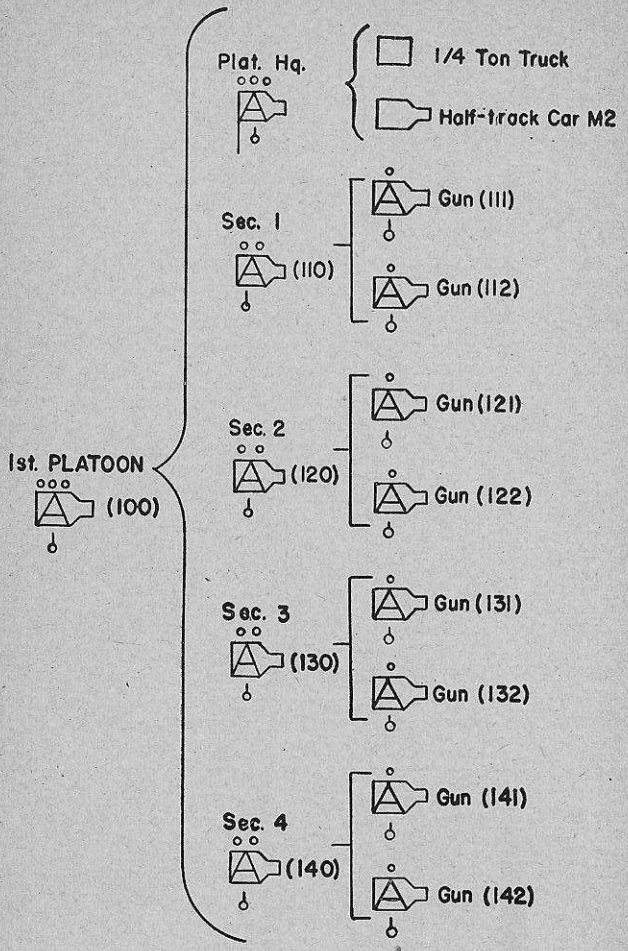


FIGURE 3.—Organization automatic weapons platoon.

CHAPTER 3

VEHICLE CHASSIS

■ 12. DESCRIPTION.—*a.* The chassis of the multiple gun motor carriage M15 is the same chassis as that used for the half-track personnel carrier M3 (see TM 9–710). Each vehicle is powered by a conventional six-cylinder gasoline engine and has a specially designed, commercial type, front-and-rear drive.

b. The chassis serial and model numbers are located on a plate attached to the right side of the instrument panel. The engine number is stamped on a pad on the left and to the front of the crankcase.

■ 13. MOBILITY.—The vehicle is designed for travel, both highway and cross-country. Ditches can be crossed if they are not so steep as to cause the vehicle's front roller to become embedded in the bank, and if the banks are not so close

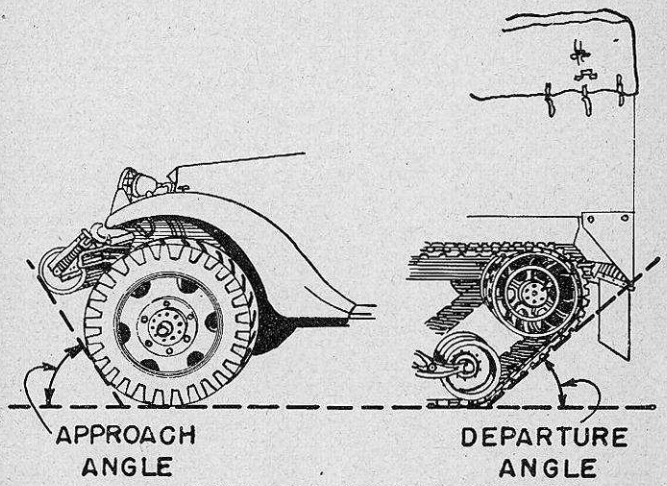


FIGURE 4.—Vehicle approach and departure angles.

together as to cause the rear overhang to dig in on the descending side of the ditch (fig. 4).

■ 14. CHASSIS ARMOR.—*a.* A folding armor shield on each door of the cab increases the height of the armor protection for the driver's compartment. These shields are hinged to the side doors and kept upright by vertical rods latched to the doors. The driver's compartment can be completely closed with armor except for two vision slits. The top has a detachable canvas cover (fig. 5).

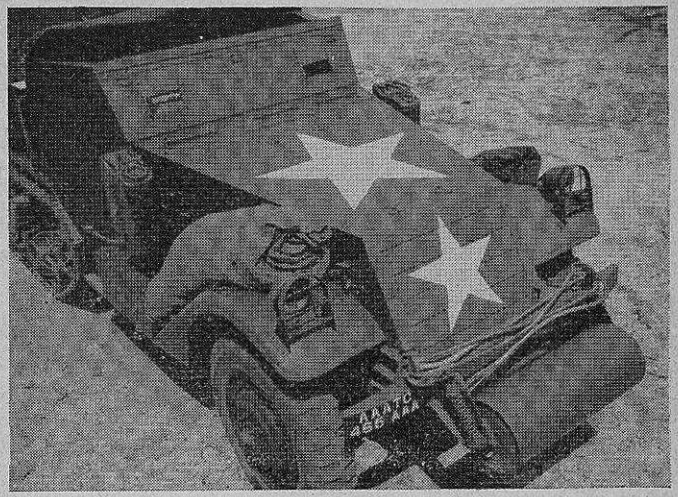
b. The radiator louvres, or shutters, are ¼-inch armor plate. The shutters are operated by a control lever at the right side of the driver's compartment and have three intermediate positions between *fully open* and *fully closed.*

c. Top and side protection is given the engine by an armor-plate hood, which is made of two double panels hinged together to aid in opening. Two latches on each side secure the hood when closed.

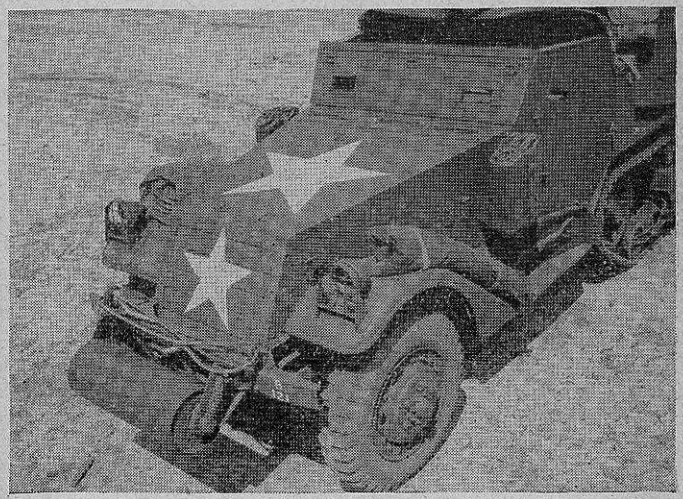
d. The windshield is of shatterproof glass and is split into two sections. Each half is held in position with clamps. A protective shield of ½-inch armor plate is hinged at the top of the windshield support frame, and is held open by three support rods. Before the windshield armor plate can be lowered into the closed position, the two halves of the glass windshield and the windshield wiper blades must be removed.

e. The driver's seat is adjustable. The squad leader's seat is hinged and can be folded. Loose seat cushions are provided, and these cushions may be opened by slide fasteners and blankets inserted (fig. 6).

■ 15. CONTROLS.—The controls are employed according to the usual automotive practice. The driver must become thoroughly familiar with the location and use of all control devices before attempting to operate the vehicle. The vehicle is steered by a conventional type of steering mechanism. The clutch and brake pedals are of the conventional type and are located in the usual positions relative to the base of the steering column. The choke control button is



① Right front, armor closed.



② Left front, armor closed.

FIGURE 5.

located under the speedometer on the instrument panel. For normal operation, the button is pushed all the way in against the panel. The throttle is controlled by a foot accelerator pedal, and by a throttle control button located below the ignition switch on the instrument panel. Hand control is useful for starting but not for driving. The transmission, transfer case, front axle engagement, and drive shaft brake levers are located and used in the customary manner. The ratios in the transfer case (auxiliary transmission) should not be changed when the vehicle is in motion. For detailed operating instructions, see TM 9–708 and 9–710.

■ 16. VEHICLE CHARACTERISTICS.—See TM 9–708 and 9–710.

■ 17. RADIO.—One vehicle in each section is equipped with the Radio Set SCR–510.

■ 18. CARE AND MAINTENANCE.—The multiple gun motor carriage M15 normally operates over rough terrain and of necessity receives hard usage. The care and maintenance of the vehicle is of vital importance to the successful employment of the weapon. THE DRIVER IS RESPONSIBLE FOR FIRST ECHELON MAINTENANCE OF THE VEHICLE. HE MUST INSPECT THE VEHICLE AT EVERY OPPORTUNITY. Due to the necessity for the weapon to move into and out of position rapidly, the driver must be alert to every opportunity to perform first-echelon maintenance. Care and maintenance of the vehicle is described in FM 25–10, TM 9–708, 9–710, 31–200, and 10–460.

CHAPTER 4

ARMAMENT

SECTION I

COMBINATION GUN MOUNT M42

■ 19. PURPOSE.—The combination gun mount M42 provides a means for laying, setting; and firing the 37-mm gun and the two caliber .50 machine guns (fig. 7). The pedestal upon which the gun mount is secured to the vehicle is composed of two parts: lower pedestal and upper pedestal. The gun mount is secured to the upper pedestal. The lower pedestal is secured to the vehicle.

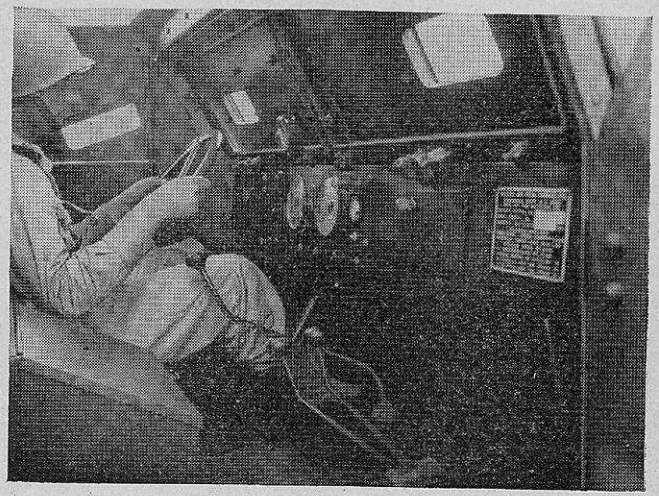
■ 20. TRAVERSING MECHANISM.—The traversing mechanism (fig. 8) is contained in the upright post on the left of the mount. Two handwheels are provided for traversing the mount. By sliding the handwheels laterally along their axes, either a fast or slow motion can be obtained. Complete 360° traverse is obtainable. Slow motion traverses the mount 3.75° for one turn of the handwheel. Fast motion traverses the mount 11.25° for one turn of the handwheel.

■ 21. ELEVATING MECHANISM.—The elevating mechanism is contained in the upright post on the right of the mount (fig. 7). Two handwheels are provided for elevating or depressing the weapon. By sliding the handwheels laterally along their axes either a fast or slow motion can be obtained. The limits of elevation are 0° and 85°. The minimum elevation when firing over the front of the vehicle is approximately 20°.

■ 22. FIRING MECHANISM (fig. 9).—*a*. The vertical gun pointer is provided with two foot pedals, the left pedal acting as a control for firing the 37-mm gun. This foot pedal is provided with a latch lever which is located to the left of the pedal. The gun pointer fires the weapon by disengaging the latch



① Rear of driver's cab.



② Instrument panels and controls.

FIGURE 6.

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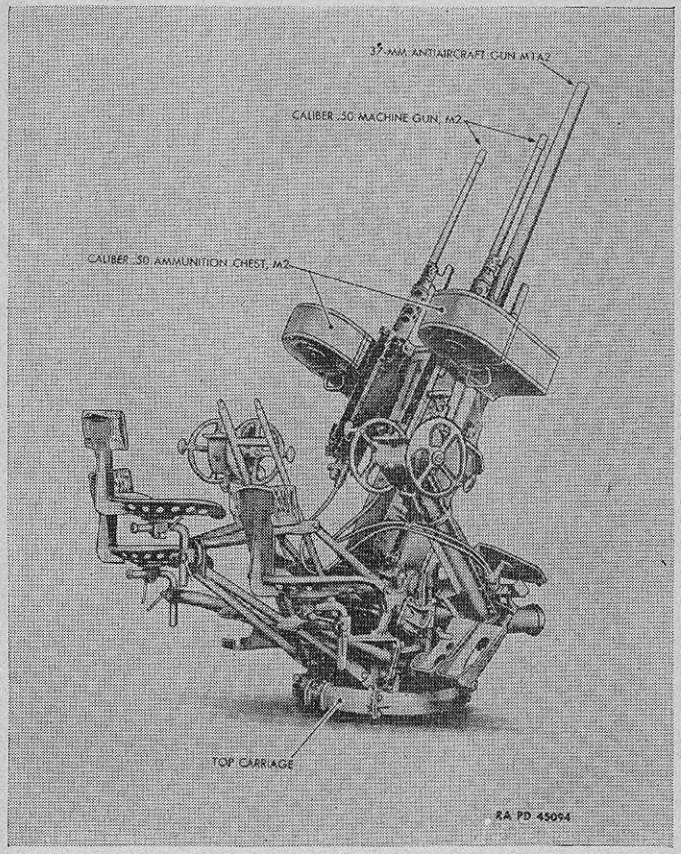


FIGURE 7.—Combination gun mount M42

(pressing the lever to the left) and then pushing the pedal down. The gun continues to fire as long as the foot pedal is depressed. When pressure on the pedal is released, the pedal rises and the latch automatically locks the pedal. A mechanical system of levers and links carries the motion of the foot pedal through the right trunnion bearing to the trigger connector bracket lever which passes through the hole in the trigger.

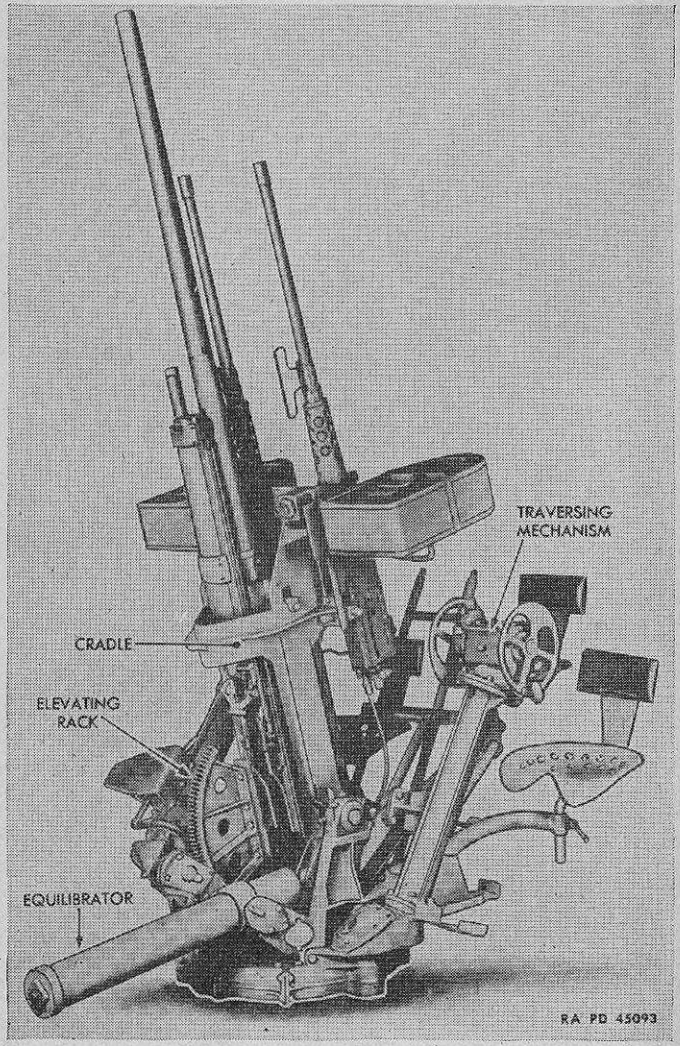


FIGURE 8.—Traversing mechanism.

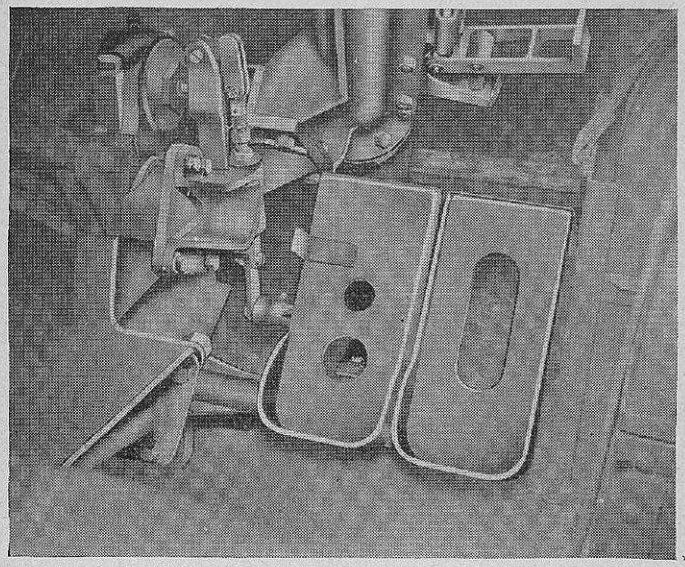


FIGURE 9.—Firing mechanism, combination gun mount M42.

b. The firing mechanism for the two caliber .50 machine guns consists of a foot-pedal assembly bolted to the lower portion of the elevating mechanism gear case. This foot pedal is operated by the right foot of the vertical gun pointer. Two cables run from this pedal to the caliber .50 machine guns mounted on opposite sides of the cradle. Both caliber .50 machine guns are fired simultaneously by pressing down on the pedal.

■ 23. EQUILIBRATOR MECHANISM.—The equilibrator counterbalances the handwheel load when elevating or depressing the gun and cradle. The equilibrator is spring operated. A rod is used to connect the equilibrator to the cradle. When the gun is lowered, the equilibrator spring is compressed; and when elevated, the spring is extended. Adjustment of the equilibrator mechanism is possible by means of two adjusting nuts which are made accessible by removing the front cap of the equilibrator (fig. 10).

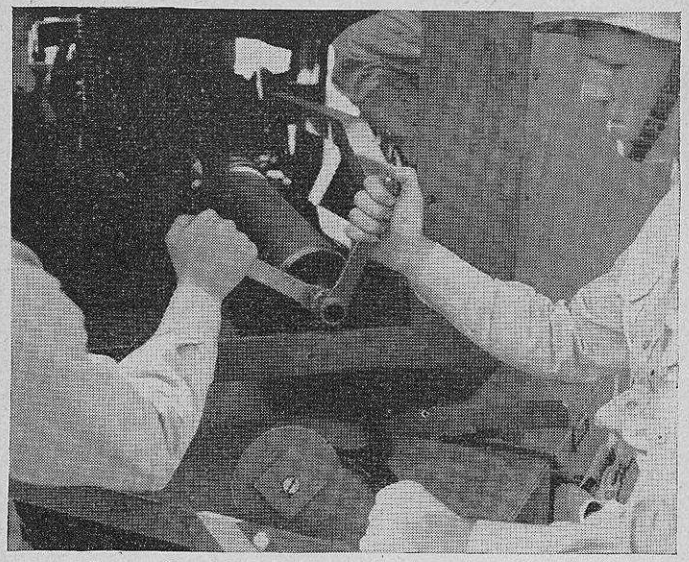


FIGURE 10.—Adjustment of equilibrator mechanism.

■ 24. CRADLE.—The cradle is secured to the top carriage by means of trunnion blocks. The elevating rack used for elevating the cradle is bolted to the bottom of the cradle and meshes with the elevating pinion at the base of the elevating mechanism. The equilibrator is attached to the rear end of the cradle. A horizontal slideway in each side plate of the cradle is used for locating and securing the gun. Two gun mounting keys, bolted to the front of the cradle, lock the gun

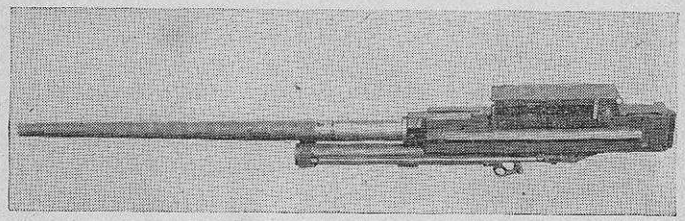


FIGURE 11.—37-mm gun M1A2.

in position. The cradle contains brackets for mounting the two caliber .50 machine guns.

■ 25. CARE AND MAINTENANCE.—Constant attention to cleaning, lubricating, and adjusting the combination gun mount must be given. Bearing surfaces, revolving parts, springs, screw threads, gear teeth, and exterior parts must be clean and free from dirt. When disassembling and assembling, precautions must be taken to prevent dirt from coming in contact with bearing surfaces. Instructions regarding care and maintenance are found in TM 9–708 and 9–235.

SECTION II

37-MM GUN M1A2

■ 26. DESCRIPTION.—The 37-mm automatic gun M1A2 (fig. 11) is a recoil-operated weapon using an ammunition clip which holds ten rounds. The cartridges are fed into the left side of the feed box. The empty cases are ejected through a longitudinal opening below the trunnion block and the empty clip is ejected through an opening in the right side of the feed box. Sustained fire is possible, since a new clip of ammunition may be fed into the mechanism without interruption of the firing. For the characteristics of the 37-mm gun M1A2, see TM 9–235.

■ 27. FUNCTIONING OF GUN.—The series of operations and motions of the various parts of the gun occur in a definite and interrelated manner. Each part receives its motion from some other part, and each functions in a very definite and specific moment of the firing cycle. Detailed operation of the 37-mm M1A2 gun is described in TM 9–235.

■ 28. DISASSEMBLING AND ASSEMBLING.—*a.* Disassembling and assembling of the 37-mm antiaircraft gun are duties which are performed frequently in the care and maintenance of the gun.

b. In all disassembling and assembling, proper tools for the performance of the work must be employed. Carelessness may cause burring or other injury of the parts. Burring of

parts, even though very slight, may impair the operation of the gun or render it temporarily inoperative.

c. The parts should not be removed from the gun except for essential training in matériel, for care and lubrication, or for replacement of broken or damaged parts.

d. See TM 9–235 for complete description of disassembling and assembling.

■ 29. INSPECTION AND ADJUSTMENT.—*a.* Inspection is for the purpose of determining the condition of the matériel, whether repairs or adjustments are required, and the remedies necessary to insure serviceability and proper functioning. Check that a record of all inspection and maintenance is kept in the Artillery Gun Book, O. O. Form No. 5825. Instructions for the use of the gun book are outlined in its introductory pages.

b. Inspection of the gun and carriage normally is carried out during all procedures necessary for operating the gun and carriages. Each time the carriage is emplaced, the operators carefully observe all of the mechanisms, together with the levers and handles necessary for their operation. If mechanisms gradually become more difficult to operate, thereby showing signs of a gradual wear or deformation of parts, this is carefully noted for a critical inspection and possible disassembly as soon as practicable. Inspection of the gun is carried on at all times that the gun is being handled, either under actual firing conditions or during cleaning and lubricating procedures. When firing, the action and behavior of the gun is noted. When disassembling, for the purpose of cleaning and lubrication, each part is checked for burs, rough surfaces, or any other signs of wear that disturb the true motion of the mechanisms. These deformations are removed immediately by using a fine abrasive. After lubrication and cleaning, these parts are checked for their proper action. With this procedure no further inspections are necessary unless the gun is to be stored. Normally, the gun is disassembled for cleaning, lubrication, and inspection immediately after firing. The gun is kept in this condition and ready for firing unless it is to be put away for storage, in which event proper preparation for storage will be made. Before firing, it is necessary for the operators

to ascertain that the gun and carriage are in perfect working condition. Proper coordination of cleaning, lubrication, inspection, correction, and operating procedures keep the matériel in perfect working condition at all times and prevent malfunctioning at critical moments. See TM 9–235 for care and maintenance.

■ 30. RECOIL SYSTEM.—*a.* The length of recoil of the 37-mm gun is very critical. The normal length of recoil of the gun is 10¾ inches (fig. 12). Before firing, the recuperator is checked to insure that it is filled with oil. The distance of recoil is also checked after the gun is fired.

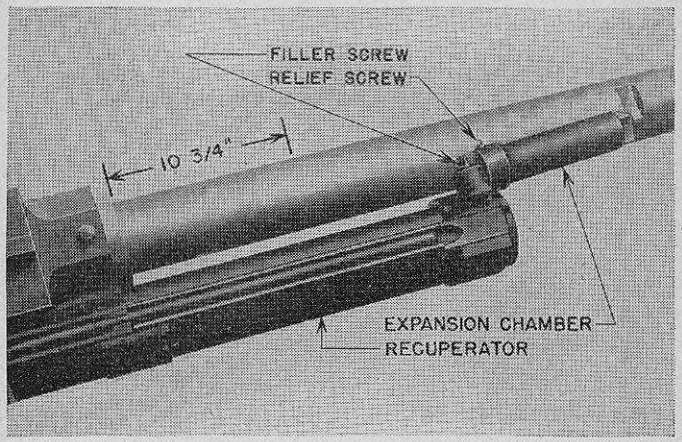


FIGURE 12.—Recuperator and filler plug.

b. The recuperator cylinder is located immediately under the tube. *Before filling the recuperator cylinder,* elevate the muzzle 5° above the horizontal. Remove the filler screw, which is located at the front end of recuperator cylinder, and the relief screw at the rear of expansion chamber. Fill recuperator with light recoil oil until oil is just visible in the bottom of the recess in the bottom of filler screw hole. Slap outside walls of recuperator cylinder. Continue filling and jarring the cylinder until all air is removed (the oil remains

stationary at the bottom of the filler screw hole when the cylinder is slapped). Replace filler screw and then the relief screw.

c. To measure the length of recoil, put a film of grease on the barrel for 12 or more inches forward from the trunnion block bushing. Fire one or more rounds from the gun. Measure the distance that the grease has been pushed forward by the bushing. This distance is the length of recoil. If length of recoil is too great, elevate muzzle to more than 5° and add a few drops of oil. If the length of recoil is too small, depress gun to less than 5° and remove a few drops of oil. Then recheck length of recoil by firing another round.

d. The length of recoil is checked whenever CEASE FIRING is given. When fire is commenced with a cold gun the length of recoil normally increases about ¼ inch during the first few rounds of continuous fire. Thereafter, the recoil remains almost constant. Allowance must be made for this increase in recoil as the gun warms up. Since the recoil of the 37-mm antiaircraft gun must be held within rather narrow limits to permit satisfactory operation, the recoil mechanisms are carefully adjusted at the factory. Further adjustment by battery personnel must not be made.

■ 31. LOADING AND UNLOADING AMMUNITION CLIPS.—*a. Loading.*—Place the clip, with prongs up, on a flat surface. Place one round at a time on the clip, so that the groove in the rotating band is in line with side wall projections. With one hand on the projectile and the other hand on the case, press the round straight down into place.

b. Unloading.—To unload ammunition from an ammunition clip, place the clip on a flat surface with the rounds up. Grasp a projectile with one hand and its case with the other, and with the thumbs pressing downward against the clip or adjacent cartridges, pull straight up. Removing by pulling on the end of the round may cause the projections of the side wall to be bent.

■ 32. LOADING GUN.—The first round is loaded into the 37-mm gun as described in chapter 6. Remaining rounds in the ammunition clip are fed into the gun automatically. A sec-

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ond clip is pushed *lightly into contact* with the first clip just before the last round of the first clip enters the feed box opening, contact being maintained until the clip holding the pawl grasps the second clip. Additional clips are fed into the feed box in the same manner until the command CEASE FIRING is

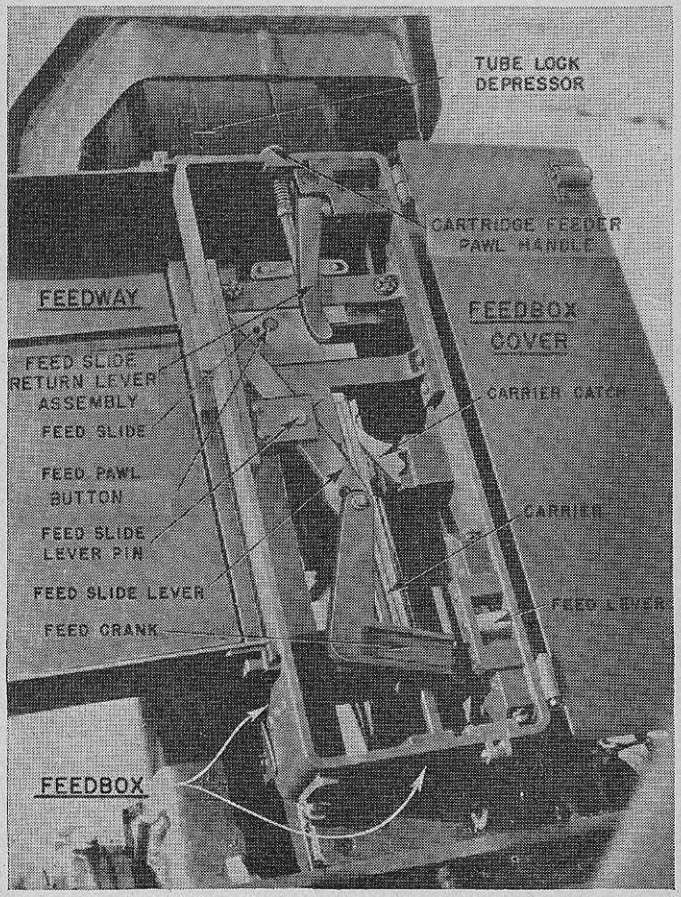


FIGURE 13.—Feed box, 37-mm gun M1A2.

given. During certain portions of the recoil and counter-recoil cycles there are times when the ammunition clip is free to move through the feed box if pushed by the loader. If this occurs, more than one round will be fed into the receiver and the gun will jam. To prevent this, the loader

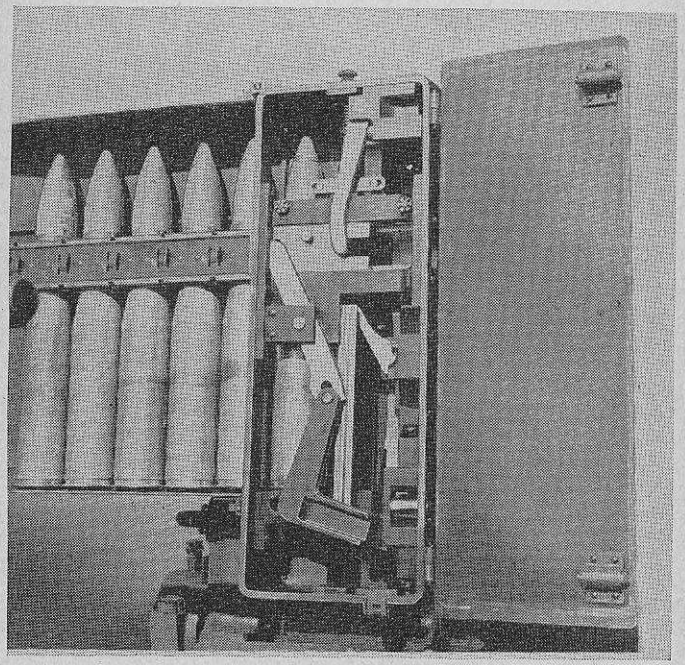


FIGURE 14.—Ammunition clip entering feed box.

must not exert too much pressure on the clip being fired when following it up with a second clip.

■ 33. UNLOADING GUN.—To unload the 37-mm gun, fold back the feed box cover, pull out on the cartridge feeder pawl handle, and raise the feed pawl lifter button. At the same time, draw the ammunition clip back and out of the feed box. Prime gun *with priming rod* to remove round from re-

ceiver. The unfired round is caught by hand as the lock frame is pulled to the rear. Inspect feed box and breech to see that they are empty. Push over carrier catch, allowing operating lever and lock frame to go forward.

■ 34. EXAMINING TRIGGER MECHANISM.—In examining the trigger mechanism, cock the piece by rotating operating *lever* to the rear. (It is not necessary to pull the *lock frame* to the rear. Push down on trigger pedal, and check to see that the hammer is released when the pedal is operated.

■ 35. COOLING GUN TUBE.—*a.* The tube of the 37-mm gun should be water-cooled after about 50 rounds of sustained fire at maximum rate. When single shots or bursts of less than 30 rounds are fired, the gun should be cooled after about 100 rounds. Never fire more than 100 rounds before cooling. If the trunnion block bushing grips the tube so that recoil is prevented, the tube is not being cooled often enough, the gripping being caused by excessive expansion of the tube from the heat of firing.

b. Elevate the gun to about 30°, pull lock frame to rear, insert brass tube of water delivery hose in breech end of tube, and then ease lock frame forward to hold brass tube in place. Pump water into tube until steam is replaced by a flow of water from muzzle. Attach water return hose to muzzle of gun by means of brass clamping attachment. Pump water through the gun tube for 2 or 3 minutes, or until a man can place his bare hand lightly on the tube without danger of being burned. When the gun has been cooled, pull lock frame to the rear, withdraw brass tube of water delivery hose, and allow water to drain from gun tube. Then unfasten clamping attachment of return hose and thoroughly dry the gun tube. Personnel must be cautioned about danger from escaping steam, while cooling the gun.

SECTION III

MACHINE GUN, CALIBER .50 M2, HB

■ 36. DESCRIPTION.—*a.* The machine gun, caliber .50, M2, HB, is a highly efficient automatic weapon built to precision standards. It is an air-cooled, alternate feed gun and,

as such, may be fed from either the right or left side. Manual cocking and loading of the gun is necessary before it is ready to function automatically. While firing, all mechanical action is automatically performed by the gun itself and it fires between 400 and 500 rounds per minute.

b. In order to maintain and adjust the gun properly, it is essential that its mechanical action be thoroughly understood.

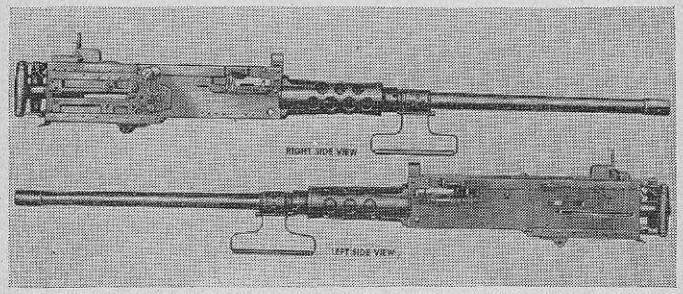


FIGURE 15.—Machine gun, caliber .50, M2, HB.

c. The Browning machine gun, caliber .50, M2, HB, is an *air-cooled* gun having a much heavier barrel than the aircraft gun or the water-cooled gun. (See fig. 15.) The heavy barrel retards overheating during automatic fire.

d. The gun uses a short, perforated barrel support. The heavy barrel is removed from the gun by unscrewing it from the barrel extension and withdrawing it toward the front. This permits removing a hot barrel and installing a cool one without disassembling the remaining mechanism of the gun. The handle assembly, shown just ahead of the barrel support, is used for carrying the gun or as a means of turning the barrel when assembling, disassembling, or adjusting the head space. It is moved to one side or down when the gun is being fired. ***Caution:*** Disengage handle before turning so that head space adjustment is not altered.

■ 37. OPERATION.—Each time a cartridge is fired, the mechanical action within the gun involves many moving parts. These parts are shown assembled in the cut-away section (fig. 16).

■ 38. SIDE PLATE TRIGGER.—The gun is fired with a side plate trigger on the multiple gun motor carriage M15. When the side plate trigger slide is pulled to the rear, the section of the side plate trigger cam forces the sear slide *inward*. This in turn forces the sear *downward*, releasing the sear notch from the shoulder of the firing pin. The firing pin spring forces the firing pin forward to fire the cartridge. Careful adjustment of the side plate trigger mechanism is required.

■ 39. OIL BUFFER.—Since the recoiling portions are heavier in the HB gun than in the water-cooled gun, it is unnecessary to have restriction in the oil buffer during recoil. **DO NOT FILL OIL BUFFER WITH OIL.** These alterations aid the gun in operating under extreme weather conditions.

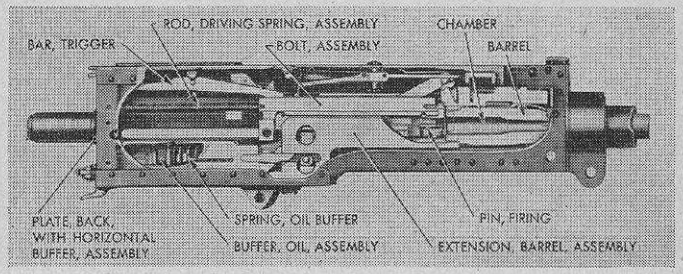


FIGURE 16.—Cut-away section, caliber .50, M2 machine gun.

■ 40. LOADING GUN.—Raise the cover and insert loaded ammunition belt into feedway until belt is held by feed pawl. Close cover and retract bolt *twice*. Release bolt and gun is ready to fire.

■ 41. UNLOADING GUN.—The procedure in unloading the gun is to raise the cover, remove the ammunition belt, and retract the bolt. Make a visual inspection of the feedway, T-slot, and chamber to insure that the gun is unloaded. Release the bolt, lower the cover, and press the trigger.

■ 42. DISASSEMBLING AND ASSEMBLING.—*a.* The disassembling, assembling, and adjusting of the machine gun are duties which are performed daily during the care and maintenance of the gun.

b. Removal of groups from the gun is the disassembling of the machine gun into its several part groups. These groups are the bolt group, oil buffer group, barrel extension group, cover group, backplate group, and casing group. The various part groups may be similarly disassembled into their several parts. This is not normally done except where parts must be repaired or replaced, or before the cleaning and oiling of the component parts.

c. In all disassembling and assembling, proper *tools* for the performance of the job must be employed. Carelessness can cause considerable damage to the matériel. For complete disassembling, a pair of pliers and a screwdriver of a suitable size are necessary. For field stripping, a cartridge is all that is needed.

■ 43. HEAD SPACE.—*a. Definition.*—Head space (with a cartridge fully seated in the chamber) is the distance between the base of the cartridge and the face of the bolt.

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

c. Effect of adjustment.—Head space adjustment is probably the most important adjustment of the machine gun. Shot patterns of the gun are improved when the guns are operating with the adjustment which is based on the fundamental design of the weapon. Guns may be damaged and in some cases put out of action by improper adjustment of head space. Use only the approved methods in making this adjustment thereby insuring correct adjustment.

d. Insufficient head space.—When head space adjustment is too tight, poor functioning results as the breech lock does 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. With a tight head space adjustment, the gun operates sluggishly because of the binding of moving parts.

e. 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.

■ 44. TIMING.—The purpose of timing is to insure that the machine gun is not fired too early or too late by the trigger. In extreme cases of early timing, the gun fires two shots and stops, because the gun was not able to extract a cartridge from the belt. Even though the gun may function, early timing results in poor performance and stoppages are to be expected. If the timing is too late, the gun does not operate smoothly and there is danger of damaging the gun.

■ 45. REPLACING BROKEN OR DAMAGED PARTS.—Broken or damaged parts are removed and replaced as soon as possible. Where immediate resumption of fire is essential, a minor part is replaced by replacing the complete part group in which it is contained. For example, a broken firing pin is replaced by changing bolts and a broken ejector by changing extractors. Where the complete bolt is changed, a check of the head space adjustment must be made. When the action ceases, the broken parts are replaced to make the defective part groups available for use as spares.

■ 46. STOPPAGES.—*a. Prevention.*—Stoppages are reduced to the minimum if the gunner has a practical working knowledge of his weapon and maintains it properly. *Prevention is the best remedy for all stoppages.*

b. Causes.—A stoppage occurs if the gun fails to feed, fails to load, or fails to fire.

(1) If the gun fails to feed, the cause for stoppage is found in the ammunition belt or feed mechanism.

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

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

*c. **Caution:** Never attempt to force the bolt forward to remedy a stoppage.* After any stoppage which appears to be caused by insufficient recoil, make sure that the bore

is clear before continuing firing. It is possible that such a stoppage, for example, one caused by incomplete ignition of the powder charge, may result in the bullet lodging in the bore. In case this happens and another round is fired before the bore is clear, the gun will be seriously damaged.

■ 47. CALIBER .50 AMMUNITION.—Ammunition is carefully inspected immediately after belting and then placed in ammuntion boxes to protect it against damage in handling. Inspection of ammunition includes the following:

a. See that each round is serviceable; that is, that there are no loose rounds (bullet loose in the case), short rounds (bullet pushed too far into the cartridge case), thick or thin rims, inset primers, or split, battered, or dented cases. Short rounds can be readily determined by stretching out the loaded belt and either passing it through a trough of the same width as the length of the rounds or placing the bases against one flat board, resting a second flat board against the bullet points, and noting the rounds which do not touch the second board. Thick or thin rims are observed by comparison with the rims of adjacent rounds. Cases with mouth splits may be detected by exerting a bending force on the bullet. An empty cartridge case placed over the bullet aids in this inspection. Body or shoulder splits may be detected by pressing on the cartridge case near the bullet. Inset primers are primers set too far in from the base of the cartridge.

b. See that the cartridges are properly alined in the belts.

c. See that the proper proportion of *tracer, armor piercing, and incendiary ammunition* is contained in each belt.

d. See that web belts are clean and dry and have no torn loops, or that the links of link belts are not bent or battered.

e. When caliber .50 ammunition is loaded into the belts for left-hand feed it must be loaded so that, when the points of the bullets are toward the front and the flat side of the links are down, the double loop of each link will be to the right. When loading for right-hand feed, the double link must be to the left.

f. In loading ammunition belts in the ammunition chests,

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the end of the belt having the open loop is rolled on the reel and the remainder of the belt folded into the body of the chest so that the end with the double loop lies on top ready to be fed into the receiver.

g. Ammunition should not be handled more than is necessary. If, for any reason, caliber .50 ammunition is removed from link belts and then loaded again, a careful inspection for short rounds must be made when the belting operation is completed.

SECTION IV

BORESIGHTING

■ 48. PURPOSE.—The purpose of boresighting is to make the axes of both telescopes parallel to the axes of the bore of the 37-mm gun and both caliber .50 machine guns. This requires that the axis of the bore of both caliber .50 machine guns be first alined parallel to the axis of the 37-mm gun. Then the sights are adjusted parallel to the axis of the bore of the 37-mm gun.

■ 49. AIMING POINT.—The aiming point selected is as distant from the gun as possible. It must be well defined and sharply outlined. Under no circumstances is the aiming point selected closer than 750 yards.

■ 50. METHOD.—*a.* Remove backplate and lock frame of 37-mm gun.

b. Remove backplate, driving spring, and bolt of each caliber .50 machine gun.

c. Traverse until aiming point is centered in bore of 37-mm gun. (See fig. 17.) Use of crosshairs and improvised boresighting tools will increase accuracy of boresighting.

d. Sight through bore of each caliber .50 machine gun and note deviation of axis of bore from aiming point.

e. Adjust each machine gun until its axis of bore is alined accurately on the target.

(1) Lateral adjustment is obtained at the *rear machine-gun mounting fork* (fig. 18).

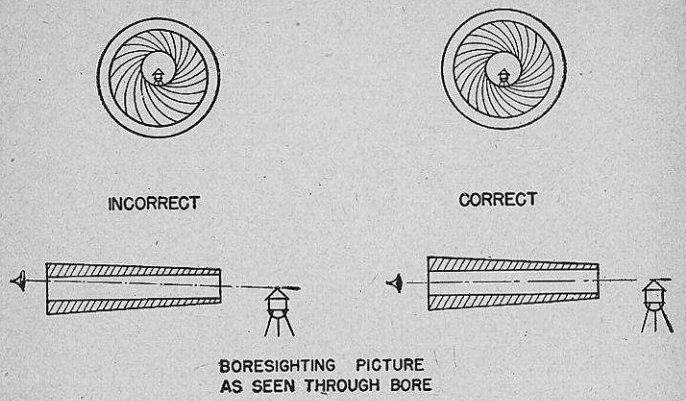


FIGURE 17.—Correct and incorrect method of placing axis of bore on aiming point.

(2) Vertical adjustment is obtained at the *front machine-gun mounting fork* (fig. 18).

f. Adjust telescopes as described in chapter 5 until their axes are alined on the aiming point.

g. Reassemble guns.

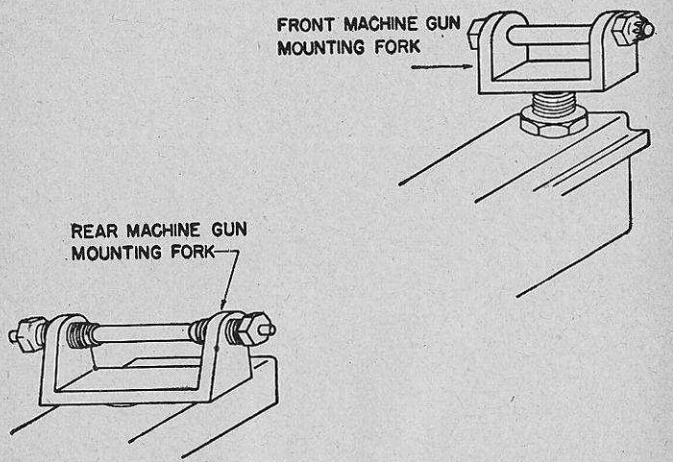


FIGURE 18.—Mounting forks for caliber .50 machine guns.

CHAPTER 5

SIGHTING SYSTEM M6

■ 51. FUNCTION AND USE.—*a.* The sighting system M6 is mounted on the multiple gun motor carriage M15 to provide a means of tracking and applying leads to both aerial and ground targets.

b. The telescopes of the sighting system are alined with the bore of the gun and mounted so that they move in azimuth and elevation with the gun. A deflection mechanism provides a means of setting in a maximum lead of plus or minus 400 mils, both in azimuth and elevation (fig. 19).

c. The system consists essentially of one M7 telescope mounted on the left side for tracking in azimuth, one M64 telescope mounted on the right side for tracking in elevation, a deflection mechanism (providing for both lateral and vertical deflection), and the necessary supports attached to the top carriage and cradle. Lighting equipment is also furnished to provide for night illumination of the reticles of the telescopes. The telescopes are 1 power and have 11° fields of view.

d. A detent mechanism is provided to prevent creep in the lateral and vertical deflection mechanisms due to vibration during firing and to permit changes in deflection by 5-mil steps.

e. The reticle of the azimuth telescope (M7) has a continuous vertical crosshair with which the lateral gun pointer tracks the target. The horizontal cross hair is broken at the center (fig. 20).

f. The reticle of the elevation telescope (M64) consists of horizontal lines representing range in yards, and a vertical center line. The zero range line is on the horizontal center axis of the reticle and extends across the full field of view. The vertical center line extends from the top limit of the field of view, is broken slightly above and below the horizontal center line, and extends downward through all the horizontal range lines, but not quite to the bottom of the

field of view. Range lines below the zero range line become progressively shorter and successively represent ranges of 400 yards, 800 yards, 1,300 yards, and 1,700 yards of range (fig. 20). As shown in the table in figure 20, these ranges correspond to elevations of 7.8 mils, 15.5 mils, 29.3 mils, and 44.1 mils. The range scale is graduated from data contained

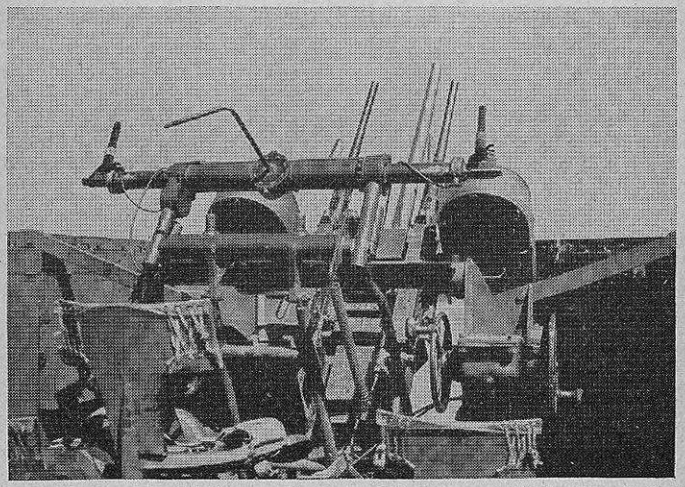


FIGURE 19.—M6 sighting system mounted on multiple gun motor carriage M15.

in Firing Table 37AA–N–2 (abridged) for 37-mm gun M1A2, muzzle velocity 2,050 feet per second, including initial jump, for armor-piercing shot M59. The inscription "37—M59," in small letters near the bottom of the field of view of the reticle, refers to this ammunition.

■ 52. ADJUSTMENT.—*a. General.*—Ordinarily, the system requires no adjustments, but it is checked occasionally to make certain that the telescopes are parallel with the bore of the gun. The gun is *boresighted* on a distant object or a test target and if the telescopes are out of adjustment, they are corrected. Adjustments are provided both for azimuth and elevation.

b. Preliminary.—(1) Place the gun carriage in a level position.

(2) Aline the gun on the test target by means of the boresights.

(3) Operate the deflection handle until the lateral deflection dial and vertical deflection scale indicate zero.

(4) The cross lines in both telescopes should then coincide with the respective cross lines on the test target.

Range (Yards)	Elevation (Mils)
400	7.8
800	15.5
1300	29.3
1700	44.1

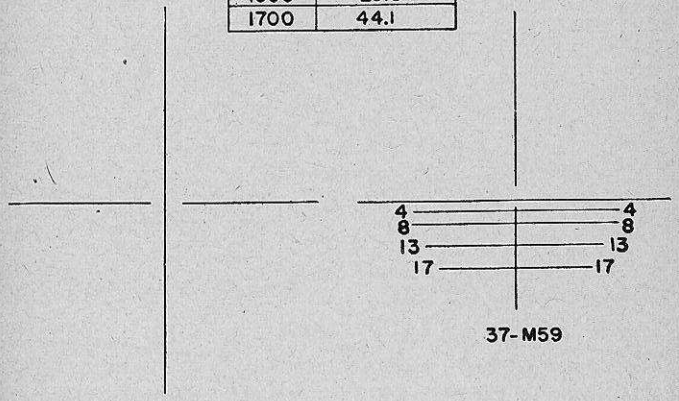


FIGURE 20.—Reticle sketch of telescopes in the M6 sighting system.

c. Azimuth adjustment.—(1) If both telescopes are out of adjustment, proceed as follows:

(*a*) Turn the deflection handle until the vertical cross line of the elevation telescope (the telescope on the right side) coincides with its cross line of the test target.

(*b*) Loosen the clamping screw on the azimuth telescope (left side) and turn the adjusting worm until the vertical

cross line of this telescope coincides with its cross line on the test target. Tighten the clamping screw, exercising care not to disturb the adjustment (fig. 21).

(*c*) Loosen the three screws clamping the azimuth deflection dial, and turn the dial as required until it indicates zero. Tighten the screws, exercising care not to disturb the adjustment.

(2) If the azimuth telescope alone is out of adjustment, proceed as described in (1) (*b*) above.

(3) If the elevation telescope alone is out of adjustment, it is not necessary to adjust it for azimuth unless the error is very great as the azimuth tracking is accomplished through the azimuth telescope.

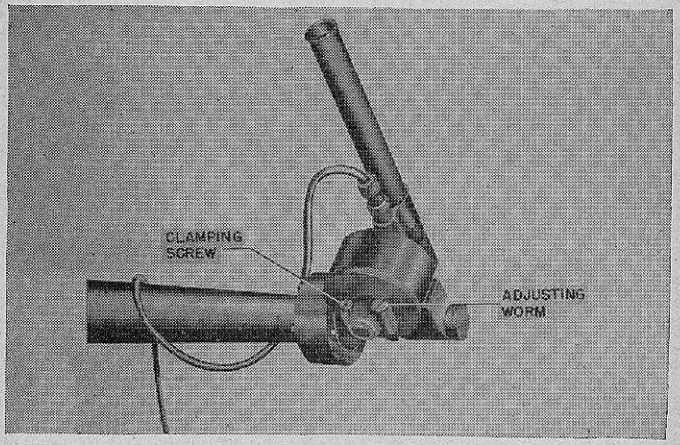


FIGURE 21.—Azimuth adjusting worm.

d. Elevation adjustment.—(1) Keep the gun bore sighted on the test target. Elevate or depress the deflection handle until the vertical deflection scale indicates zero.

(2) The horizontal cross lines of both telescopes should coincide with the respective lines on the test target.

(3) If both telescopes are out of adjustment, proceed as follows:

(*a*) Elevate or depress the handle until the horizontal

cross line of the elevation telescope (right side) coincides with the cross line on the test target.

(*b*) Loosen the setscrew on the scale assembly and slip the vertical deflection scale until it reads zero.

(*c*) The azimuth telescope (left side) should not be out of adjustment because the telescopes are adjusted at assembly by means of elongated holes in the flange of the tube assembly. After the proper adjustment the end bearings are pinned to the flanges and the two telescopes should always be in adjustment with each other.

(*d*) If the azimuth telescope is slightly out of adjustment in elevation, it should not be touched because the elevation tracking is done with the elevation telescope. Call ordnance personnel if large adjustments in elevation are required.

■ 53. SETTING IN DEFLECTIONS.—Both lateral and vertical deflections are set in by the same handle. Rotation of the handle sets in lateral deflections and vertical motion of the handle sets in vertical deflections. Turning the deflection handle to the RIGHT sets in a RIGHT deflection, LEFT, a LEFT deflection. Pushing the deflection handle UP sets in a DOWN deflection, DOWN, an UP deflection. The gunner must allow his hand to ride with the deflection handle as the gun is elevated or depressed, to avoid accidental changing of the vertical lead set-in.

■ 54. CARE AND MAINTENANCE.—*a. Handling precautions.*—The sighting system M6 is designed for field use. With reasonable care, it is entirely serviceable, but it will not stand rough handling or abuse. Avoid abuse of the telescopes and undue strain on the supporting members. Stops are provided limiting the lateral motion of the sighting system. ***Caution:*** *Do not attempt to travel past these stops, as injury to the deflection mechanism may result.* Unnecessary turning of screws or other parts not incident to the use of the system is forbidden.

b. Lubrication.—(1) *General.*—Oil cups are provided to permit lubrication of the segments and racks on each end of the system, the gearing mechanisms, and the internal bearings of the system.

(2) *Racks and gear segments.*—(*a*) An oil cup is mounted in the housing on the azimuth side to permit lubrication of the circular rack and the gear segment.

(*b*) A similar oil cup is mounted in the housing on the elevation side to permit lubrication of the circular rack and the gear segment.

(3) *Deflection gear.*—The same type of oil cup is mounted in the body to permit lubrication of the center rack, the gear, the pinion, and the adjacent internal bearings.

(4) Oil cups are also mounted in the bearings on each side of the system to permit lubrication of the vertical deflection gearing contained therein.

(5) An oil cup is provided in the supporting arm to permit lubrication of the detent gearing contained therein.

(6) The revolving shaft can be lubricated by dropping a few drops of the specified oil into the crevice on each side of the supporting bracket. The latest design contains oilite bearings in this bracket, which do not require lubrication.

(7) Exercise care that no oil gets on the optical parts. Wipe all excess lubricant off the instrument to prevent the accumulation of dust or grit. See TM 9–235 for further details of lubrication.

c. Cleaning optical parts.—(1) To obtain satisfactory vision, it is necessary that the exposed surfaces of the lenses and other parts be kept clean and dry. Corrosion and etching of the surface of the glass, which greatly interfere with the good optical qualities of the instrument, can be prevented or greatly retarded by keeping the glass clean and dry.

(2) For wiping optical parts, use only lens paper. To remove dust, brush the glass lightly with a clean camel's-hair brush. Rap the brush against a hard body in order to knock out the small particles of dust that cling to the hairs.

(3) Under no conditions are polishing liquids, pastes, or abrasives used for polishing or cleaning lenses.

(4) Exercise particular care to keep optical parts free from oil and grease. Do not wipe the lenses or windows with the fingers. To remove oil or grease from optical surfaces, apply ethyl alcohol with a clean camel's-hair brush and wipe gently with clean lens paper. If alcohol is not available, breathe heavily on the glass and wipe off with clean lens paper; re-

peat this operation several times until surfaces are clean.

(5) Moisture due to condensation may collect on the optical parts of the instrument when the temperature of the parts is lower than that of the surrounding air. This moisture, if not excessive, can be removed by placing the instrument in a warm place. Heat from strongly concentrated sources should never be applied directly, as it may cause unequal expansion of parts, resulting in breakage of the lenses or inaccuracies in observation.

d. Transportation and storage.—(1) *Telescope.*—(*a*) When being prepared for traveling or storage the telescopes should be removed from their holders, the dust caps put on, and the telescope placed in the packing chest provided.

(*b*) If exposed to wet weather, the telescopes are never put away damp but are dried thoroughly. They are stored in a warm dry place.

(2) *Lighting device.*—When storing the lighting device or whenever it is not in use, the dry cells are habitually removed from the battery tube to avoid damage to the tube due to the chemical reaction which takes place as the dry cells deteriorate. Exhausted batteries are removed from the tube immediately. Removal may become difficult if this precaution is not observed.

(3) *Gun and parts.*—When traveling, the gun is depressed and locked in traveling position with the sighting system in the corresponding position. The deflection scales are set to zero, and the sighting system is covered with the canvas cover provided.

CHAPTER 6

DRILL FOR AUTOMATIC WEAPONS SQUAD

SECTION I

GENERAL

■ 55. INFORMATION.—*a.* The drill is applicable to units equipped with the multiple gun motor carriage M15.

b. The drill is presented in chronological sequence of action. When combat action is imminent, the command sequence may start with LOAD or TARGET, depending on the conditions at the moment. Paragraph titles agree with primary commands. Each command is followed by the individual action performed under that command.

■ 56. INSTRUCTIONS.—*a.* The drill as prescribed will be adhered to strictly. Drill is conducted in silence except for commands and reports. Commands and reports are given in a clear and positive manner. Signals are substituted for commands whenever practicable. Errors are corrected instantly and on the spot. Drill is practiced until all reactions to commands are automatic, instant, and effective. Drill is conducted at the fastest pace at which the squad can operate smoothly. The squad leader is personally responsible for the efficiency of the squad in drill and action. The commands or signals ELEVATE, DEPRESS, RIGHT, or LEFT, given in pointing a gun, refer to the direction of motion of the muzzle.

b. BATTERY OFFICERS ARE PERSONALLY RESPONSIBLE FOR THE SUPERVISION AND COACHING OF THE SECTION AND SQUAD LEADERS IN THE CONDUCT OF DRILL.

■ 57. PERSONNEL.—The members of the automatic weapons squad are referred to by the following numbers and abbreviations:

SL Squad leader.
1 Gunner (lead setter).
2 Vertical gun pointer.
3 Lateral gun pointer.
4 Cannoneer.
5 Cannoneer.
6 Driver.

SECTION II

PRELIMINARY COMMANDS AND FORMATIONS

■ 58. FALL IN.

The automatic weapons squad assembles in two ranks at close intervals. 2 is four yards in front of the vehicle, opposite the right wheel. The balance of the squad forms to the left of 2, with 40 inches between ranks, even numbers in front rank, odd numbers in rear rank. For inspections SL takes post in the front rank and to the right of 2 (see fig. 22). For squad drill SL takes post in front of 4.

SL commands: FALL IN.

2 takes his post four yards in front of right front wheel.
2, 4, and 6 form the front rank.
1, 3, and 5 form the rear rank.

■ 59. COUNT OFF.

The squad being in formation—

SL commands: COUNT OFF.

1 to 6 report their numbers consecutively.

■ 60. CALL OFF.

The squad being in formation—

SL commands: CALL OFF.

Each member of the squad reports his assignment as follows:

1 reports, "Gunner."
2 reports, "Vertical gun pointer."
3 reports, "Lateral gun pointer."
4 reports, "Cannoneer."
5 reports, "Cannoneer."
6 reports, "Driver."

■ 61. CHANGE ORDER.

The squad being in formation—

SL commands: CHANGE ORDER.

All members of the squad change positions as follows:
SL falls out and takes place of 6.

1 takes place of SL.
2 takes place of 1.
3 takes place of 2.
4 takes place of 3.
5 takes place of 4.
6 takes place of 5.

CHANGE ORDER DRILL IS USED IN CONJUNCTION WITH THE TRAINING OF EACH MEMBER OF THE SQUAD IN ALL THE DUTIES PERFORMED BY THE SQUAD. IT MAY BE USED AT ANY TIME DURING DRILL.

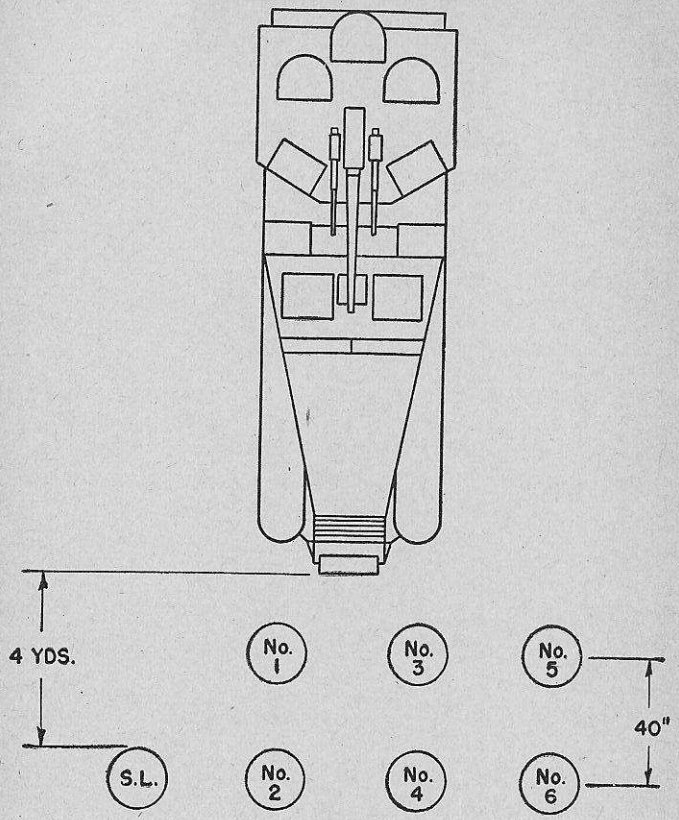


FIGURE 22.—Automatic weapons squad dismounted.

■ 62. MOUNT.

The squad being in formation—

SL commands: MOUNT.

1 to 6 about face.

4, 2, and 1 proceed to the left and mount right rear of vehicle in order named.

5 and 3 proceed to the right and mount left rear of vehicle in order named.

6 takes driver's seat in vehicle, starts engine.

SL determines that all members are mounted and safety belts fastened. SL takes seat beside 6 (fig. 23) and directs 6 to new position.

■ 63. DISMOUNT.

The squad being in the vehicle, the SL directs 6 to stop the vehicle.

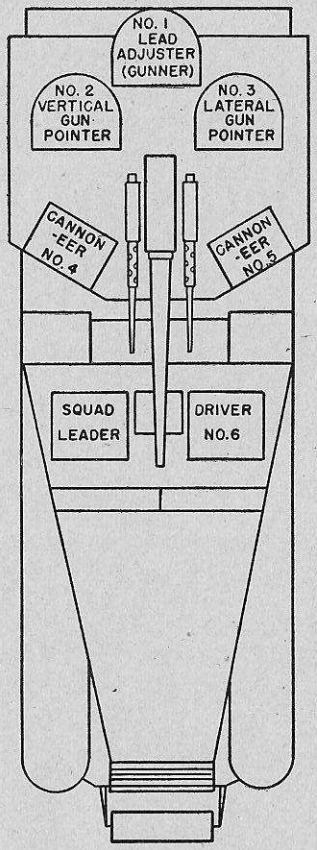


FIGURE 23.—Automatic weapons squad, mounted.

SL dismounts from cab and commands: DISMOUNT.
1, 2, and 4 dismount from right rear in order named, then proceed to front of vehicle and "fall in."
3 and 5 dismount from left rear in order named and proceed to front of vehicle and "fall in."
6 stops engine, dismounts from cab, and proceeds to front of vehicle and "falls in."

SECTION III

ACTION COMMANDS

■ 64. INTRODUCTION.—Action commands are those used when a squad occupies a combat position, or is actually fighting. The commands may be given from the march, in which case the vehicle pulls into a temporary position out of column. *The most effective fire is conducted from a halted vehicle.*

■ 65. PREPARE FOR ACTION.

SL directs 6 to position weapon will occupy, dismounts, and takes position where activities of gun crew can be observed. Members of the squad are at their stations. If the vehicle has been ready for action during the movement, guns are loaded, sights mounted, and traveling lock unlocked. The drill below is modified accordingly.

SL commands: PREPARE FOR ACTION.
6 stops vehicle at point designated by SL—takes position in cab ready to operate radio and relay messages to SL.
4 unlocks traveling locks assisted by 5—obtains loaded caliber .50 ammunition chest, mounts it on right machine gun—inspects 37-mm and caliber .50 ammunition on right side of carriage—takes position ready to serve right machine gun and remove empty clips from 37-mm feed box.
5 assists 4 unlocking traveling locks—obtains loaded caliber .50 ammunition chest, mounts it on left machine gun—obtains loaded 37-mm clip, lays it on feed tray ready to insert in feed box—inspects 37-mm and caliber .50 ammunition on left side of carriage—takes position ready to serve left machine gun and insert loaded clips in 37-mm gun.

3 obtains sight chest, removes sights from chest—replaces empty sight chest—hands elevation sight to 2—installs lateral sight in bracket, inserts light plug in receptacle—observes field of fire.
2 receives vertical sight from lateral gun pointer—installs sight in bracket—inserts light plug in receptacle—observes field of fire.
1 sets lateral and vertical deflections to zero—observes field of fire.

■ 66. EXAMINE GUN.

Whenever a position has been occupied and attack is not imminent, or after any engagement, the weapons and equipment are examined.

SL commands: EXAMINE GUN—observes action of squad as they examine their equipment.
1 examines action of sighting system as lateral and vertical leads are applied—returns deflection handle to zero—supervises other members of squad examining their equipment—inspects any malfunctions discovered.
5 inspects gun mechanism and mounting of left machine gun—determines that ammunition belt is NOT fed into receiver—on instruction from 2 cocks the piece—observes action of sideplate trigger when firing treadle is tested by 2—inspects 37-mm gun mechanism—determines that 37-mm clip is NOT engaged by feed mechanism—on instruction of 2 assisted by 4 cocks 37-mm gun—observes action of firing mechanism when firing pedal is tested.
4 inspects gun mechanism and mounting of right machine gun—determines that ammunition belt is NOT fed into receiver—on instruction from 2 cocks the piece—observes action of sideplate trigger when firing treadle is tested by 2—assists 5 inspecting 37-mm gun mechanism—inspects recuperator cylinder for proper supply of recoil oil at 5° elevation.
3 inspects sight—tests illumination of crosshairs in telescope—traverses weapon right and left in high and low speed.

2 inspects sight—tests illumination of crosshairs in telescope—instructs 4 and 5 to cock pieces—tests firing pedal for caliber .50 machine guns—tests firing pedal for 37-mm gun—elevates and depresses weapon in high and low speeds.
6 inspects gasoline, oil, and water supply—starts engine, warms it up slowly—inspects instrument panel—tests foot pedals—tests horn—inspects armor shutters, checks operation of radio—inspects lights—inspects front tires and half-track mechanism—inspects water chest and hose for cooling 37-mm gun.

■ 67. REPORT.

When the SL observes that the squad have completed their examination of the guns and equipment, he takes positions in rear of mount to receive the reports.

SL commands: REPORT.
1 reports, "Sighting system in order."
2 reports, "Elevating and firing mechanism in order."
3 reports, "Traversing mechanism in order."
4 reports, "Right machine gun and recuperator in order."
5 reports, "Left machine gun and 37-mm gun in order."
6 reports, "Vehicle (and radio) in order."

NOTE.—Should any malfunction exist that could not be corrected, it is reported to the SL by the member of the squad responsible for the inspection of the particular piece of equipment.

SL instructs 6 to report squad in order to section leader.

■ 68. LOAD.

The weapons are loaded when the field of fire is safe or in theaters of operation whenever action is eminent.

SL commands: LOAD.
1 repeats command LOAD—observes field of fire.
2 observes field of fire.
3 observes field of fire.
4 feeds caliber .50 ammunition belt into receiver—pulls bolt handle to rear twice—forces operating lever on

37-mm guns to rear until lock frame is held in rear position by carrier dog.
5 feeds caliber .50 ammunition belt into receiver—pulls bolt handle to rear twice—inserts loaded clip into feed box until first round forces carrier catch to right releasing carrier—determines that 37-mm gun is loaded as lock frame springs forward—closes feed box cover.
6 stands by radio to receive and relay messages.

■ 69. TARGET.

Upon the appearance of a target, SL, or any member of the fire unit who sights or hears the target calls out TARGET, and points out the approximate direction.

SL commands: TARGET—points in direction of target—grasps rear of platform and slews weapon to approximate field of fire—takes position where action of squad can be observed.
1 observes target indicated by SL—assists 2 and 3 in picking up target—estimates lateral and vertical leads—applies leads to sighting system—when 2 and 3 report "On" holds arm over head.
2 elevates weapon until target is sighted through telescope—tracks plane with horizontal crosshairs—reports "On"—when target is lost reports "Off target."
3 traverses weapon until target is sighted through telescope—tracks plane with vertical cross hair—reports "On"—when target is lost reports "Off target."
4 stands by ready to serve the weapon.
5 stands by ready to serve the weapon.
6 stands by radio (if so equipped) to receive and relay messages.

■ 70. FIRE.

The command for opening fire is given by the SL when the target is in range and has been recognized as an enemy plane. Fire on any one target is controlled by 1 after fire is opened.

SL commands: FIRE, when target is in range and he observes 1 holding arm over head.

1 repeats command FIRE—drops arm to side (1 controls firing until target is destroyed or new target is assigned by SL)—observes target and adjusts leads to cause tracer stream to intersect target—when 2 or 3 report "Off target" raises hand in front of forehead, palm to the front, and swings it up and down in front of face several times—commands: CEASE FIRING—assists 2 and 3 in picking up target again—when 2 and 3 report "On" commands: FIRE.
2 presses both foot pedals firing all guns full automatic—tracks planes, keeping horizontal cross hair on target.
3 tracks plane keeping vertical crosshair on target.
5 as first loaded 37-mm clip starts through feed box, pushes second clip lightly against first—maintains contact of clips until second clip is grasped by clip holding pawl—feeds additional clips into feed box in same manner—replaces empty caliber .50 ammunition chests on left machine gun.
4 removes empty clips from 37-mm gun—replaces empty caliber .50 ammunition chests on right machine gun—keeps carriage clear of empty brass and clips—*Caution:* Care must be exercised to prevent used links from sliding back along 37-mm gun casing and jamming trigger mechanism near trunnion causing runaway gun.
6 stands by radio to receive and relay messages.

■ 71. CEASE FIRING.

SL commands: CEASE FIRING, when target is destroyed or passes out of range or for reasons of safety firing should stop—assigns new target or commands firing be resumed on same target.
1 repeats command CEASE FIRING—continues to estimate and apply leads.
2 releases pressure on both foot pedals causing guns to cease firing—continues to track target.
3 continues to track target.
4 stands by—if stoppage has occurred, clears stoppage assisted by 5—checks 37-mm gun recoil.

5 stands by—if stoppage has occurred, clears stoppage assisted by 4.
6 stands by radio to receive and relay messages.

■ 72. CEASE TRACKING.

SL commands: CEASE TRACKING, when target passes out of range and there are no other targets to be engaged.
1 repeats command CEASE TRACKING—sets deflection scales to zero.
2 ceases tracking.
3 ceases tracking.
4 stands by—clears carriage of empty brass and links.
5 stands by—assists 4 clearing carriage of empty brass and links.
6 stands by radio to receive and relay messages.

■ 73. UNLOAD.

The guns are unloaded when the squad is about to move out and there is no danger of enemy attack or for reasons of safety.

SL commands: UNLOAD.
1 stands by.
3 stands by.
5 raises feed box cover—pulls out on cartridge feeder pawl handle and feed pawl button at same time—draws ammunition clip out of feed box—raises carrier until caught by carrier catch—as 4 retracts lock frame catches round as it falls out bottom of gun—examines chamber to see that it is empty—pushes carrier catch to right, allowing lock frame to go forward—stows partly used clip—raises cover of left machine gun—removes belt from receiver—retracts bolt handle to rear twice—examines chamber, T-slot, and feedway to see that gun is empty—closes cover.
4 retracts lock frame assisted by 5 who catches round as it falls out of bottom of gun—continues to retract lock frame until caught on carrier dog—raises cover of right machine gun—removes belt from receiver—retracts

bolt handle to rear twice—examines chamber, T-slot, and feedway to see that gun is empty—closes cover.

2 stands by—when 4 and 5 have indicated that all chambers are empty, releases tension in firing pin springs by pressing on both firing pedals.

6 stands by radio to receive and relay messages.

■ 74. MARCH ORDER.

SL commands: MARCH ORDER—supervises preparation of guns and carriage to move out—receives report from 6 on amount of fuel and water on hand—if time is available, directs the cleaning of the guns and carriage—receives report from 1 on amount of each caliber ammunition on hand—checks route over which squad will move out.

1 supervises cleaning and stowage of equipment—checks ammunition on hand—inspects traveling locks—reports to SL when guns are in march order.

2 removes sight and gives it to 3—assists 4 and 5 in cleaning and stowing equipment—elevates or depresses weapon for cleaning or for locking during travel.

3 removes sight and stows both sights—acts as air-guard during preparation for movement—traverses weapon to position for cleaning or for locking during travel.

4 assisted by 2 and 5 cleans guns and stows equipment—assisted by 5 loads empty 37-mm clips—installs full caliber .50 ammunition chest on right machine gun—loads caliber .50 ammunition chests.

5 assists 2 and 4 in cleaning guns and stowing equipment—assists 4 in reloading empty 37-mm clips—installs full caliber .50 ammunition chest on left machine gun—refills 37-mm ammunition containers with loaded clips—loads caliber .50 ammunition chests.

6 inspects gas, oil, and water supply—notifies SL amount of fuel on hand—inspects area adjacent to vehicle and determines that vehicle can move out—takes position in cab, starts engine to warm up—checks instruments on panel—checks radio—reports to SL when vehicle is ready to move out.

SL reports to section leader when squad is ready to move out.

■ 75. REST.

SL commands: REST. Carries out instructions as to air-guards, manning details, reliefs, gas discipline, camouflage and local security. He makes sure that full advantage is taken of the opportunity by the squad to improve position, prepare ammunition, and makes tests and adjustments. The squad should be given a chance to relax and rest, but the command "REST" does not mean "loaf."

CHAPTER 7

STOWAGE

■ 76. GENERAL.—Each multiple gun motor carriage M15 is provided with sufficient gun accessories, spare parts, and tools to maintain the weapon in the field. The compact arrangement of the matériel on the carriage requires that accessories and tools be kept in their proper place. The stowage lists in paragraphs 77, 78, 79, and 80 are to be used as guide and check lists. Each squad leader must organize his equipment so that it can be checked quickly. Each member of the squad must know the location of each accessory, spare part, and tool. Each item must be inspected frequently and kept in serviceable condition.

NOTE.—No stowage is provided for other individual weapons.

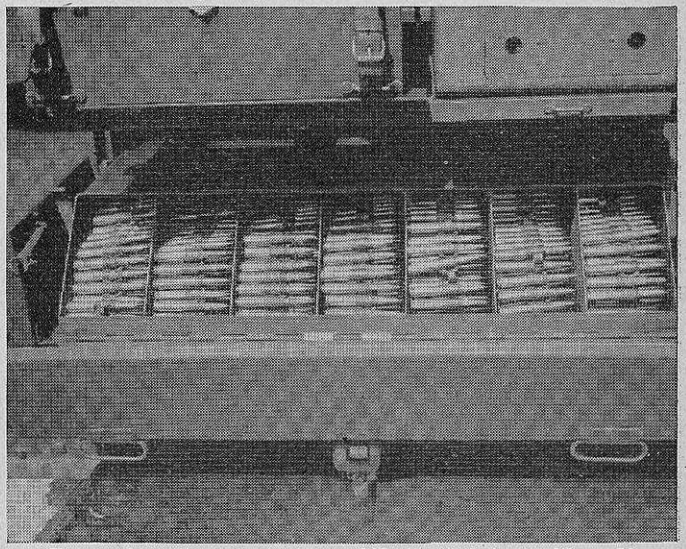


FIGURE 24.—Stowage of seven 200-round belts, caliber .50 ammunition.

■ 77. STOWAGE OF AMMUNITION AND ARMAMENT.

	Quantity required per vehicle	Where carried
Ammunition:		
Caliber .50 rounds, packed as follows:		
10 200-round chest	3, 400	On rotating platform in compartment.
7 200-round belts (fig. 24)		Rear of vehicle.
37-mm rounds (24 10-round clips) (fig. 25).	240	100 rounds on shield. 140 rounds in boxes on outside.
Armament:		
Gun, machine, caliber .50, M2, HB (sideplate triggers).	2	On combination gun mount M42.
37-mm gun, M1A2	1	On combination gun mount M42.
Caliber .30 M1 carbine	4	2 inside of gun shield. 2 inside of driver's compartment.

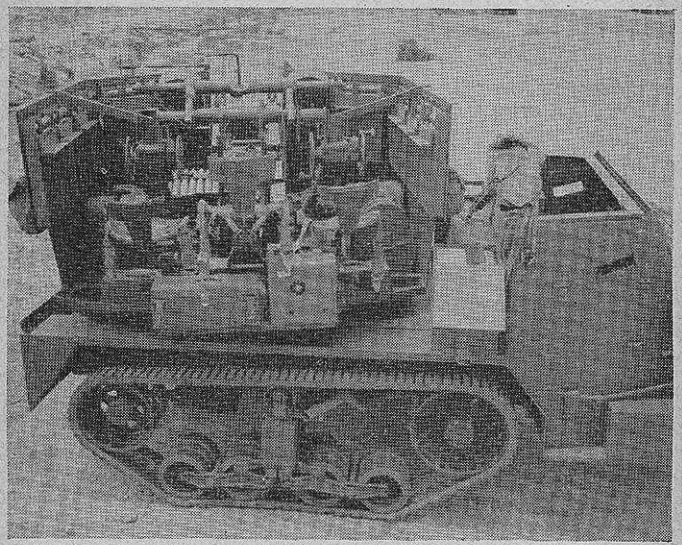


FIGURE 25.—Stowage of 24 10-round clips, 37-mm ammunition.

78. Stowage of Armament Accessories, Armament Spare Parts, and Armament Tools.

	Where carried
Accessories:	
Caliber .50 machine gun (fig. 26)	In steel chests M5, on rear platform floor, right and left sides.
37-mm gun (fig. 27)—	
Except cleaning staff	In tool chest on rear rack of gun mount.
Staff, cleaning, M5A2 (in two parts)	In clips on gun shield, front each side.
Spare parts:	
Caliber .50 machine gun—	
Except barrel assemblies	In steel chests, M5 on rear platform floor, right and left sides.
Barrel assemblies	In fighting compartment.
37-mm gun M1A2	In tool chest on rear rack of gun mount.
Tools:	
Caliber .50 machine (fig. 26)	In steel chests, M5, on rear platform floor, right and left sides.
37-mm gun, M1A2 (fig. 27)	In tool chest on rear rack of gun mount.

79. Stowage of Sighting Equipment.

Chest, sight, containing	Sight bracket.
1 M7 telescope w/covers.	
1 M64 telescope w/covers.	

80. Stowage of Miscellaneous Equipment.

Accessories and equipment, miscellaneous:	
Apparatus, decontaminating, 1½-qt., M11	Right of driver's seat.
Appliers, track chain	In tool box between driver and squad leader.
Book, O. O. Form 7255	Map compartment.
Bucket, canvas, folding w/spout, 8-qt	Rear of driver.
Cable, towing, ⅝" x 15'	On front bumpers.
Chains, tire, front wheel (w/bag)	In tool box between driver and squad leader.
Chains, track	In tool box between driver and squad leader.
Container, fuel, 5-gallon	Outside engine cowl.
Container, water, 5-gallon, QMC standard	Outside engine cowl.
Extinguisher, fire (2-lb. CO_2 and bracket assembly)	In front compartment.

	Where-carried
Accessories and equipment, miscellaneous—Continued.	
Kit, first-aid, 24-unit	In bracket front of lead adjuster.
Manuals	Map compartment.
Net, camouflage, 22 ft. x 22 ft	Right front fender.
Top, canvas, vehicle, consisting of—	Left front fender.
Cover, cab.	
Cover, shield.	
Cover, gun (for 37-mm and twin caliber .50 MG).	
Shield, rear, canvas.	
Equipment, signaling:	
Radio set, SCR–510 (one per section)	Driver's compartment, rear bulkhead.
Spare parts, vehicular (fig. 28)	In tool box between driver and squad leader.
Tools, pioneer:	
Ax (chopping, single-bit, 5-lb.)	Outside, below right door.
Handle, mattock	Outside, below left door.
Mattock, pick, M1 (w/o handle) 5-lb	Outside, below left door.
Shovel, short handle	Outside, below left door.
Tools, vehicular (fig. 28)	In tool box between driver and squad leader.

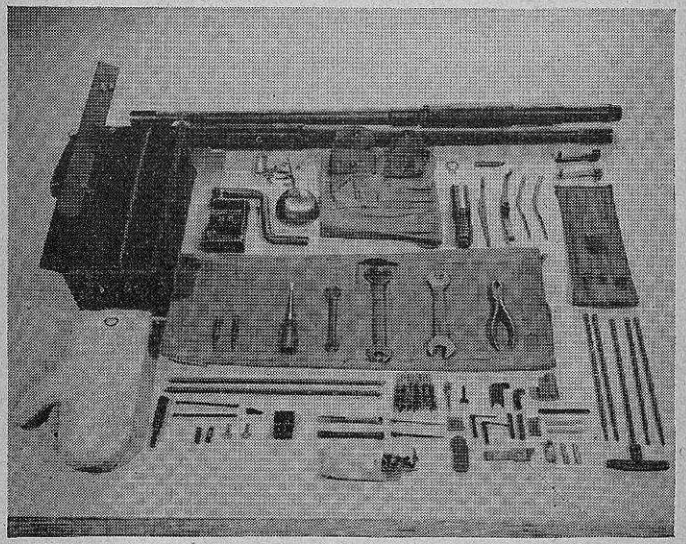


Figure 26.—Tools and accessories, caliber .50 machine gun.

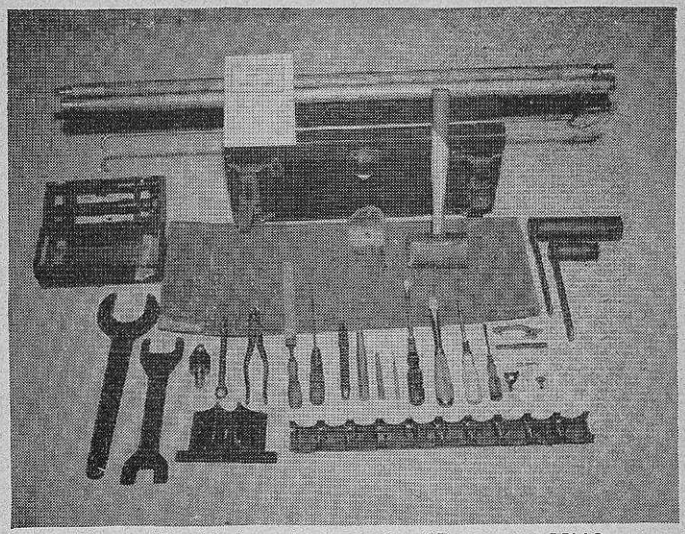


FIGURE 27.—Tools and accessories, 37-mm gun M1A2.

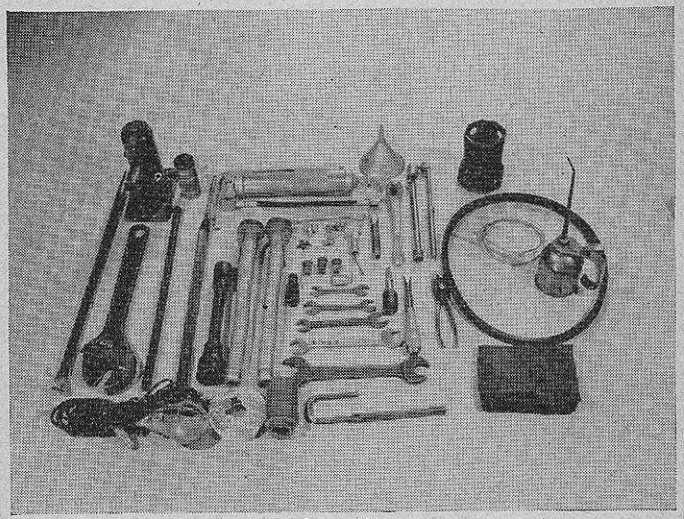


FIGURE 28.—Vehicle tools and spare parts.

CHAPTER 8

TECHNIQUE OF EMPLOYMENT

■ 81. SAFETY PRECAUTIONS.—*a.* Safety precautions to be observed in training are prescribed in AR 750–10 and FM 4–118 (when published). The principles indicated should be applied under combat conditions where circumstances permit.

b. The following additional precautions are prescribed for the safety of towing airplanes, or of personnel on the firing line:

(1) No live ammunition is allowed near the emplacements except when firing is to take place.

(2) The gun is unloaded except when firing or about to fire.

(3) When tracking a target, the vertical gun pointer does not release the latch on the trigger pedal until his sight is alined with the target.

(4) The gun is depressed considerably below the elevation of the towing airplane until the airplane has passed the line of sight.

(5) While a stoppage is being cleared, the gun is pointed at a safe part of the field of fire. This requirement does not prevent continued tracking of the target so long as the field of fire is safe.

(6) In all cases where aerial targets are towed over or close to the gun positions at low altitudes, provision must be made for the safety of personnel from a dragging towline cable. The cable may drag if the target is accidentally released or when the last target is dropped.

(7) A bell, horn, siren, or other device capable of making a loud noise, must be provided as an emergency signal for CEASE FIRING.

(8) If the 37-mm gun fails to discharge when the trigger pedal is depressed, the pedal is released and a second attempt made to fire *without recocking the gun.* If the gun still fails to fire, *wait 30 seconds before recocking the gun or attempting to remove and examine the round in the gun.* Then

remove the round. If the round cannot be removed within 45 seconds after the original misfire, and the gun is hot, play water on the barrel until it is cool. Then remove the round. If water is not available, stand clear of the gun until it is cool. Then remove the round.

■ 82. ACTION ON THE MARCH.—*a.* Except for minor variations, drill and fire action on the march are conducted in the same manner and by the same commands as under other conditions. However, time is not usually available to perform the duties enumerated under EXAMINE GUN.

b. During the march, personnel of the gun section are stationed in the carriage in positions which permit a careful watch for aerial targets to be maintained in all directions.

c. Squad leaders are given instructions relative to the engagement of targets prior to the beginning of the movement. Limited only by such instructions and the necessity for avoiding casualties to adjacent troops, fire is opened on hostile aircraft as soon as possible after they are observed to be in range. Whenever the squad leader hears the command or signal TARGET anywhere in the column, he directs the chauffeur to stop his vehicle, preferably at some point clear of the road. The gun is prepared for action with the maximum possible speed. Drill against time and competition between sections should be employed in this training. In the combat zone, sights should be mounted, gun unlocked, and ready to fire. The dust caps should be on the sights.

d. Squads fire individually, fire being adjusted by the observation of tracers.

■ 83. PREPARATION OF THE POSITION.—The preparation of positions is discussed in FM 4–101, 4–102, and 5–15. The position must have the maximum possible concealment and the personnel, weapons, and equipment the maximum possible protection consistent with efficient operation of the squad. Under no circumstances are personnel needlessly exposed. In most cases the amount of protection and concealment to be provided depends largely upon the time available. In taking measures for concealment of the position, it must be borne in mind that the position must be entirely free from trees or

other obstructions because of the danger of premature detonating of fired rounds.

■ 84. TRACKING TECHNIQUE.—*a.* The ability to fire effectively by direct-fire methods is dependent on hand-eye coordination. Practice, supervised by competent instructors, is the only method of developing this coordination. It is of the utmost importance that lead adjusters and gun pointers develop enough "feel" of their weapon to get on target quickly and accurately. The gun pointers must track the target accurately. Without accurate tracking, the leads applied by the lead adjuster have no value. The lead adjuster must have confidence in the tracking of the gun pointers. When the lead adjuster moves the tracer stream to the target he is using hand-eye coordination. Any deviation of the tracer stream from the target *must* be the result of not applying the proper lead. To reduce the error to only one source, the gun pointers must track the target accurately and smoothly. This can only be accomplished by hours of practice tracking with competent instruction.

b. FM 4–151 describes the methods of setting in leads on the sights. During combat the gunner does not look at the dials. He adjusts by "feel," knowing that each detent is 5 mils. The dial has no value in fire adjustment, as the gunner makes adjustment by observation of the tracers with respect to the target. The dials are useful only for instruction, boresighting, and setting in zero deflections.

c. The technique of tracking when engaging land or waterborne targets is given in FM 4–151.

CHAPTER 9

DESTRUCTION AND DECONTAMINATION

SECTION I

DESTRUCTION OF MATÉRIEL

■ 85. GENERAL.—*a. Principles.*—Tactical situations may arise when, due to limitation of time or transportation, it becomes impossible to evacuate all equipment. In such situations it is imperative that all matériel which cannot be evacuated be destroyed to prevent its capture intact by the enemy or its use, if captured by the enemy, against our own or allied troops. Methods for the destruction of matériel subject to capture or abandonment in the combat zone must be adequate, uniform, and easily followed in the field. Destruction must be as complete as available time, equipment, and personnel permit. If thorough destruction of all parts cannot be completed, the most important features of the matériel are destroyed, and the parts which are essential to the operation or use of the matériel and cannot be easily duplicated, are ruined or removed. *THE SAME ESSENTIAL PARTS MUST BE DESTROYED ON ALL LIKE UNITS TO PREVENT THE ENEMY'S CONSTRUCTING ONE COMPLETE UNIT FROM SEVERAL DAMAGED ONES. THE DESTRUCTION OF MATÉRIEL, SUBJECT TO CAPTURE OR ABANDONMENT IN THE COMBAT ZONE, IS UNDERTAKEN ONLY WHEN SO ORDERED BY DIVISION OR HIGHER COMMANDER.* To accomplish adequate and uniform destruction of matériel, it is essential that—

(1) All echelons prepare plans for the destruction of matériel in the event of imminent capture. Such plans must be flexible as to the available time, equipment, and personnel.

(2) All echelons be trained to effect the desired destruction of matériel issued to them. *Training will not involve the actual destruction of matériel.*

b. Methods.—The destruction procedures outlined below

are arranged *in order of effectiveness*. Destruction is accomplished by method No. 1, if possible. If method No. 1 cannot be used, destruction is accomplished by one of the other methods outlined, in the priority shown. Whichever method is used, the sequence outlined is adhered to. Uniformity of destruction is then obtained, whether or not the method is carried to completion. Certain of the methods outlined require special materials such as TNT and incendiary grenades, which are not normal items of issue. The issue of such special materials and conditions under which destruction is effected are command decisions in each case, according to the tactical situation.

■ 86. 37-MM GUN, M1A2.—*a. Method No. 1.*—(1) Open drain plug on recoil mechanism, allowing recoil fluid to drain. *It is not necessary to wait for the recoil fluid to completely drain before igniting the fuze as in (5) below.*

(2) Remove an HE shell from a complete round, and seat the shell in the chamber.

(3) Plug the bore for approximately two-thirds of its length, using a cleaning rod wrapped with cloth or waste to make it fit tightly in the bore. Mud, stones, or clay may be used to plug the bore in lieu of the cleaning rod.

(4) Cut down a ½-pound TNT block to fit snugly in the chamber behind the HE shell. Insert a tetryl nonelectric cap, with from 3 to 4 feet of safety fuze, into the TNT block. Close the breech as fully as possible without damaging the safety fuze.

(5) Ignite the safety fuze and take cover at least 100 yards from the gun. Elapsed time: 2 to 3 minutes, if cleaning rod is used to plug the bore and cut-down TNT block is carried with gun; longer, if other bore obstructions are used.

b. Method No. 2.—(1) See *a*(1) above.

(2) See *a*(3) above.

(3) Insert one complete HE round into gun.

(4) Take cover and fire the gun, using a lanyard 100 feet long. Elapsed time: 1 to 2 minutes, using cleaning rod to plug bore; longer, if bore is plugged with other foreign matter.

c. Method No. 3.—(1) Fire adjacent guns at each other at

point-blank range, using HE or AP shells. Several direct hits from a weapon of the same caliber on a vital spot such as the breech mechanism, recoil mechanism, or tube of the 37-mm gun, should adequately destroy the gun. Fire from cover, using lanyard.

(2) Destroy the last gun and carriage by the best means available.

d. Method No. 4.—(1) See *a*(1) above.

(2) Fire an HE round against a similar round jammed in the muzzle.

(3) See *b*(4) above.

■ 87. VEHICLES.—*a. Method No. 1.*—Remove and empty portable fire extinguishers. Puncture the fuel tank. Open the hood and place a 2-pound charge of TNT over the clutch housing at rear of cylinder block. Place a 1-pound charge on the left side of the engine as low as possible. Connect and fire the charges by the method described above. If charges are prepared beforehand and carried in the vehicle, *keep the caps and fuzes separated from the charges until used.*

b. Method No. 2.—Remove and empty the portable fire extinguishers. Puncture the fuel tanks, if readily accessible. Smash all vital elements (such as distributor, carburetor, radiator, engine block, air and oil cleaners, generator, control levers, crankcase, and transmission) with a heavy ax, pick, or sledge. Pour spare gasoline, oil, or distillate over entire unit and ignite.

■ 88. MACHINE GUN, CALIBER .50 M2.—*a. Method No. 1.*—Field strip. Use barrel as a sledge. Raise cover; lay bolt in feedway; lower cover on bolt; smash cover down over bolt. Deform back plate. Wedge buffer into rear of casing, allowing depressors to protrude; break off depressors by striking with barrel. Lay barrel extension on its side; hold down with one foot; break off the shank. Deform casing by striking side plates just back of the feedway. Elapsed time: 3½ minutes.

b. Method No. 2.—Insert a bullet point of complete round of ammunition into muzzle and bend case slightly, distending mouth of case to permit removal of bullet. Spill powder

from case, retaining sufficient powder to cover the bottom of case to depth of approximately ⅛ inch. Re-insert pulled bullet, *point first,* into the case mouth. Chamber and fire this round with the reduced charge; the bullet will stick in the bore. Chamber another complete round, fire by means of a 30-foot lanyard. Use the best available cover as this means of destruction may be dangerous to the person destroying the machine gun. Elapsed time: 2 to 3 minutes.

■ 89. AMMUNITION.—*a. General.*—Time does not usually permit the destruction of all ammunition in forward combat zones. When sufficient time and materials are available, 37-mm and .50-caliber ammunition may be destroyed as indicated below. At least 30 minutes are required to destroy adequately a normal supply of ammunition. In general, the methods and safety precautions outlined in chapter 4, TM 9-1900, should be followed whenever possible.

b. 37-mm ammunition.—(1) *Unpacked complete rounds.*—(*a*) Stack in small piles. Pile most of the available gasoline in cans and drums around the ammunition. Throw onto the pile all available inflammable material such as rags, scrap wood, and brush. Pour the remaining gasoline over the pile. Sufficient inflammable material must be used to insure a very hot fire. Ignite the gasoline and take cover.

(*b*) An alternate method is by sympathetic detonation, using TNT. Stack ammunition in two piles, about 3 inches apart, with the fuzes in each stack toward each other. Place TNT charges between the stacks. Use a minimum of 1 pound of TNT per ten rounds of ammunition. Detonate all TNT charges simultaneously from cover.

(2) *Packed complete rounds.*—(*a*) Stack the boxed ammunition in small piles. Cover with all available inflammable materials, such as rags, scrap wood, brush, and gasoline in drums or cans. Pour gasoline over the piles. Ignite the gasoline and take cover.

(*b*) The destruction of packed complete rounds by sympathetic detonation with TNT is not advocated for use in forward combat zones. To insure satisfactory destruction involves putting TNT in alternate boxes of ammunition, a time-

consuming job. In rear areas sympathetic detonation may be used to destroy a large supply of 37-mm ammunition, if destruction by burning is not feasible. Stack the boxes, placing in alternate boxes in each row sufficient TNT block to insure the use of one pound of TNT per ten rounds of 37-mm ammunition. Place the TNT blocks at the fuze end of the rounds. Detonate all TNT charges simultaneously. See FM 5–25 for details of demolition planning and procedure.

c. Caliber .50 ammunition.—(1) *Unpacked complete rounds.*—Same as *b*(1) above. Loose, caliber .50 ammunition is heaped, not stacked. Sympathetic detonation cannot be employed.

(2) *Packed complete rounds.*—Same as *b*(2) above, except that the ammunition must be broken out of the boxes before burning. Sympathetic detonation cannot be employed.

■ 90. PNEUMATIC TIRES.—*a. General.*—Rubber is such a critical item of supply, that whenever matériel is subject to capture or abandonment an attempt to destroy pneumatic tires must always be made, *even if time does not permit destruction of the remainder of the vehicle.* With adequate planning and training, however, the destruction of tires may be accomplished in conjunction with destruction of the vehicle without increasing the time necessary. Destroy all tires, including spares, on the vehicle by one of the following methods:

b. Method No. 1.—(1) Ignite an M14 incendiary grenade under each tire.

(2) To insure the best results when this method is combined with the destruction of TNT of the gun and carriage and of the vehicle, be certain that the incendiary fires are well started before detonating the TNT.

c. Method No. 2.—(1) Damage the tires with an ax, pick, or caliber .50 machine-gun fire. (If time permits, deflate the tires before damaging them.) Pour gasoline on the tires, dousing each one, and then ignite.

(2) When used in conjunction with vehicle destruction, the ensuing fire will usually destroy the vehicle adequately.

SECTION II

DECONTAMINATION

■ 91. PROTECTIVE MEASURES.—*a.* Unpainted metal parts are lightly coated with oil. Care must be taken that optical parts of instruments, leather, or canvas are not oiled. Ammunition is *not* oiled; it is kept in sealed containers.

b. Material not actually in use is covered with a waterproof cover if practicable.

■ 92. DECONTAMINATION.—Clean the guns, mounts, and vehicle after the attack. See FM 17–59, TM 9–850, and TM 3–series.

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