

CHAPTER 2
MECHANICAL TRAINING

Section I. INTRODUCTION

6. General

This section describes and illustrates the M18A1 antipersonnel mine and the electric and nonelectric firing systems that can be used to detonate the mine.

7. Detailed Description

a. Mine.

- (1) *Nomenclature* --Mine, antipersonnel, M18A1.
- (2) *Common name* _CLAYMORE.
- (3) *Type* -----Antipersonnel.
- (4) *Weight* -----3½ pounds.
- (5) *Dimensions* ----8½ inches long; 1 3/8 inches wide; 3¼ inches high (legs folded); 6¾ inches high (legs unfolded).

(6) *Firing unit construction.* The outer surface of the mine is a curved, rectangular, olive-drab, molded case of fiberglass-filled polystyrene (plastic). In the front portion of the case is a fragmentation face containing steel spheres embedded in a plastic matrix. The back portion of the case behind the matrix contains a layer of explosive.

(7) *Explosive* -----1 ½ pounds of composition C4.

(8) *Detonator wells.* Two detonator wells are located on the top of the mine which allows for single or dual priming. These wells are sealed by the plug ends of the shipping plug priming-adapters which prevent entry of foreign materials into the detonator wells. The slotted end of the shipping plug priming-adapters is used to hold an electric blasting cap in place when the mine is armed. The shipping plug priming-adapters is merely reversed when the mine is to be armed.

(9) *Peepsight and arrows.* The molded slit-type peepsight and arrows (fig. 10) located on top of the mine are used to aim the mine.

(10) *Legs.* Two pairs of scissors-type folding legs located on the bottom of the mine enable it to be emplaced on the ground. The mine can also be tied to posts, trees, etc.



b. Accessories.

(1) *M57 firing device.*

(a) One M57 electrical firing device is issued with each M18A1. This device is a hand-held pulse generator. A squeeze of the handle produces a double (one positive, one negative) 3-volt electric pulse of sufficient energy to fire the electric blasting cap through the 100 feet of firing wire which is issued with the mine. The M57 device is 4 inches long, approximately 1½ inches wide, ¾ inches high, and weighs three-fourths of a pound. On one end of the firing device is a rubber connecting plug with a dust cover.

The M57 firing device is shown in figure 5.

- (b) The safety bail on the M57 electrical firing device (fig. 6) has two positions. In the upper SAFE position, it acts as a block between the firing handle and the pulse generator. In the lower FIRE position, it is clear of the firing handle and allows the pulse generator to be activated. The M18A1 antipersonnel mine with the M57 firing device connected is shown in figure 7.
- (c) The M57 electrical firing device and firing wire should not be discarded after initial use. Another electric blasting cap can be attached to the firing wire and the M57 device can be used to fire other devices, such as fougasse bombs and demolition charges, provided no more than 100 feet of firing wire and one M6 blasting cap are used.

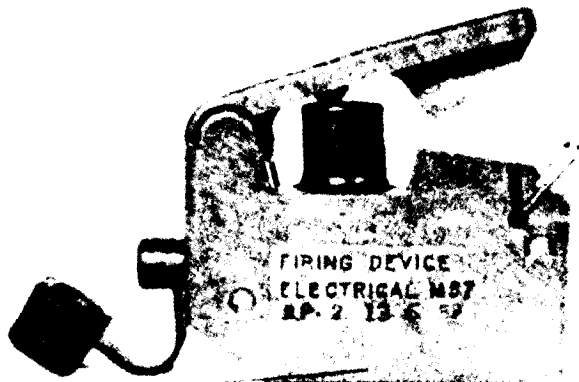


Figure 5. The M57 firing device.

- (2) *M4 electric blasting cap.* The M4 electric blasting cap (fig. 7) consists of an M6 electric blasting cap attached to 100 feet of firing wire. Attached to the firing wire connection is a combination shorting plug and dust cover. The shorting plug prevents accidental functioning of the blasting cap by static electricity; the dust cover prevents dirt and moisture from enter-

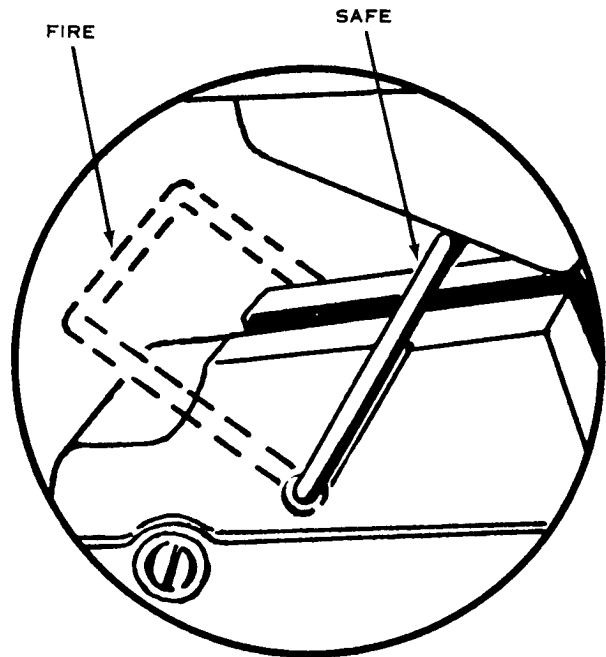


Figure 6. The M57 firing device safety bail.

ing the connector. The firing wire is wrapped around a flat paper and then rolled to form a package 6 inches long, 4 inches wide, and 2 inches high. A piece of insulating tape is used to hold the package together.

- (3) *M40 test set.* The M40 test set (figs. 17 and 18) is an instrument used for checking the continuity of the initiating circuit of the mine. (For further details on the M40 test set, see para 15.)

Note. Only one of the six bandoleers in each packing box contains a test set. The bandoleer containing the test set is marked by an identification tag on the carrying strap (fig. 2).

- c. *M7 Bandoleer.* The M7 bandoleer (fig. 2) is constructed of water resistant canvas (olive-drab color) and has snap fasteners which secure the flap. The bandoleer has two pockets; one pocket contains the mine and the other contains a firing device, a test set, and an electric blasting cap assembly. A 2-inch wide web strap, which is used as a shoulder carrying strap, is sewn to the bag. An instruction sheet is sewn to the inside flap (fig. 3).

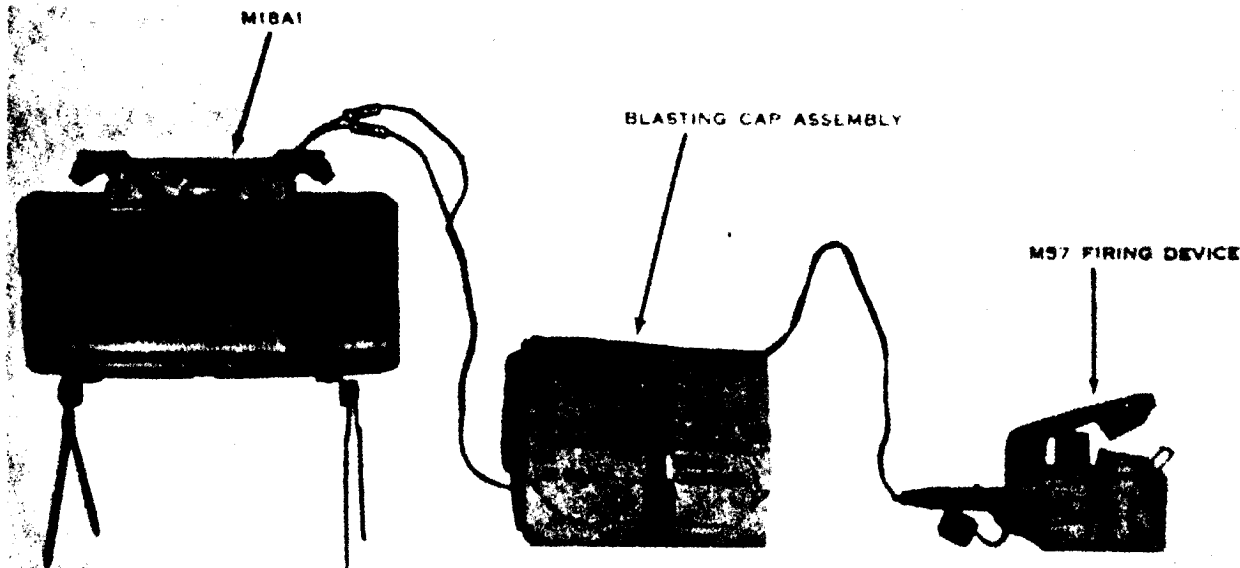


Figure 7. The M18A1 antipersonnel mine with the M57 firing device connected.

Section II. COVERAGE AND METHODS OF FIRE

8. Fire Discipline

Since the M18A1 mine can be fired only once, fire discipline is of paramount importance. The mine should not be used against single personnel targets; rather, it should be used for its intended purpose—massed personnel. When lead elements of an enemy formation approach within 20 to 30 meters of the mine, it should be detonated. If practicable, and to insure fire discipline, actual authority and responsibility for target selection and timely detonation should rest with squad leaders or their superiors.

9. Controlled Frontal Coverage

a. For effective coverage of the entire front of a position, mines can be placed in a line no closer than 5 meters and no farther apart than 45 meters. Preferred lateral and rearward separation distance is 25 meters (fig. 8).

b. If mines are placed in depth (from front to rear), the minimum rearward separation distance is 5 meters, provided secondary missiles are removed. This distance is sufficient

to prevent possible disturbance or damage to the rearward mines.

10. Methods of Fire

The M18A1 mine can be employed in either the controlled or uncontrolled role.

a. Controlled Role. The mine is detonated by the operator as the forward edge of the enemy approaches a point within the killing zone (20 to 30 meters) where maximum casualties can be inflicted. Controlled detonation may be accomplished by use of either an electrical or nonelectrical firing system (fig. 9). When mines are employed in the controlled role, they are treated the same as individual weapons and are reported for inclusion in the unit fire plan. They are not reported as mines; however, the emplacing unit must insure that the mines are either removed, detonated, or turned over to a relieving unit.

b. Uncontrolled Role. Uncontrolled firing is accomplished when the mine is installed in such a manner as to cause an unsuspecting enemy to detonate the mine. Mines employed in this manner must be reported and recorded as land mines.

Section III. FUNCTIONING AND INSTALLATION

11. Functioning

a. Electrical Firing. When the M18A1 is armed, actuating the M57 firing device handle (fig. 5) with the safety bail in the FIRE position provides sufficient electrical energy to detonate the M6 electric blasting cap. The detonation of the blasting cap, in turn, sets off the high explosive charge (composition C4). Detonation of the high explosive charge causes fragmentation of the plastic matrix and projects spherical steel fragments outward in a fan-shaped pattern (fig. 4). This mine is sufficiently waterproof to function satisfactorily after having been submerged in salt or fresh water for 2 hours.

b. Nonelectrical Firing. The M18A1 mine is deliberately detonated by the operator pulling or cutting a trip wire attached to a nonelectrical firing device (fig. 9). A nonelectric blasting cap attached to the firing device and crimped to a length of detonating cord sets off the detonating cord. At the other end of the detonating cord,

a second crimped nonelectric blasting cap, which is inserted in one of the detonator wells, detonates the mine.

12. Installation for Electrical Firing

a. Laying and Aiming.

- (1) Remove the mine and accessories (fig. 2) from the bandoleer. Read the instruction sheet (fig. 3) attached to the flap of the bandoleer before proceeding with the installation of the mine.
- (2) *The M57 firing device must be in the possession of the individual installing the mine. This prevents accidental firing by a second individual.*
- (3) Turn the legs downward and spread them about 45° apart. Twist both pairs of legs so that one leg protrudes ahead and one behind the mine, and position the mine so that the surface marked FRONT TOWARD ENEMY

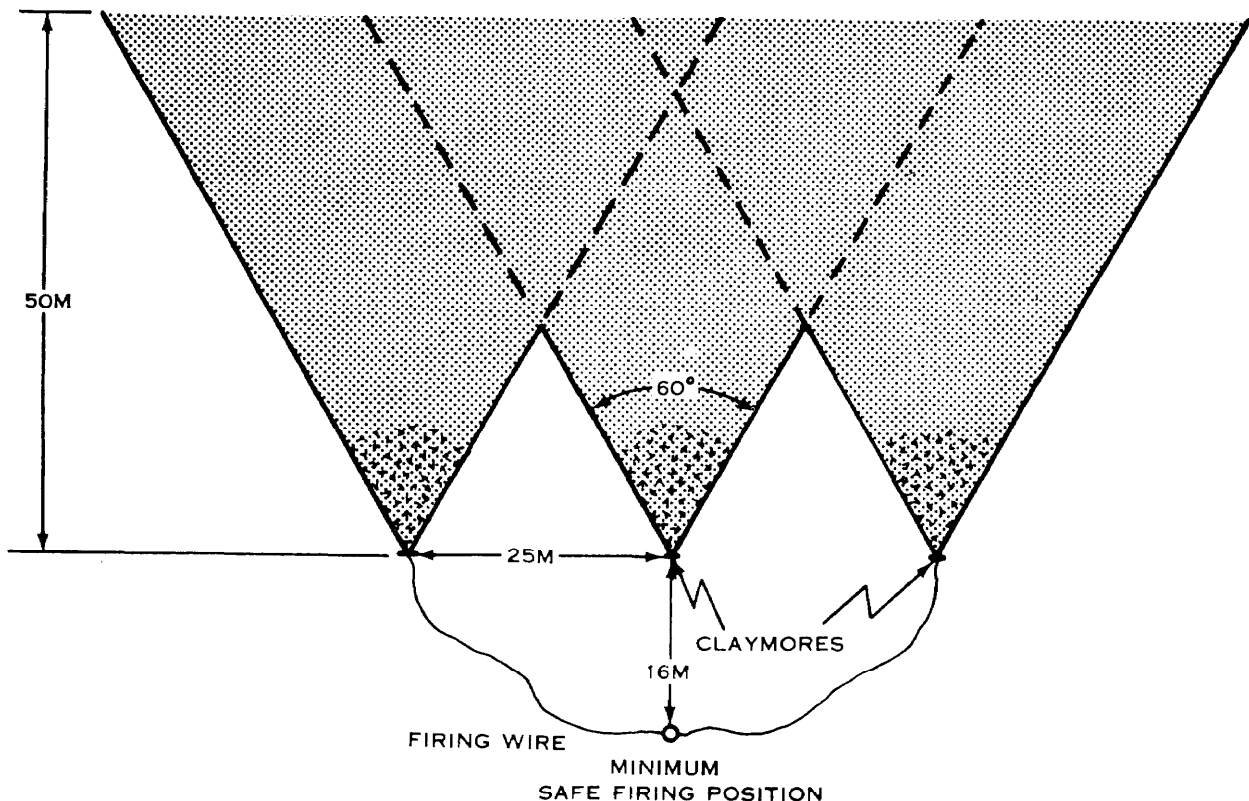


Figure 8. Diagram of lateral separation pattern of (CLAYMORES).

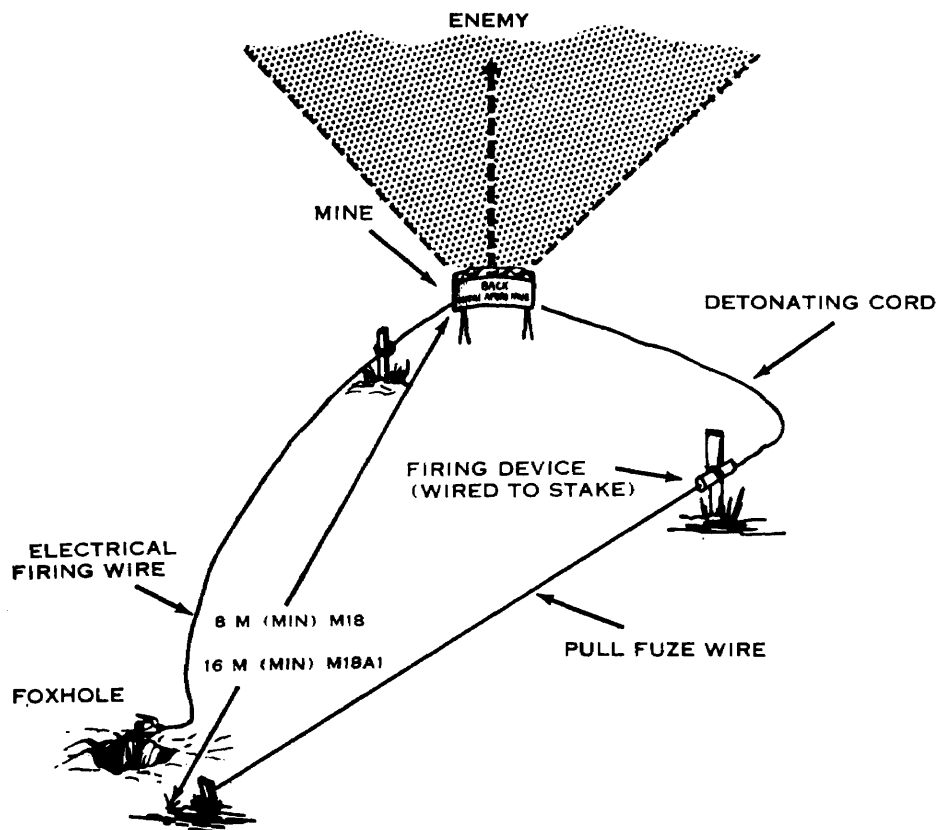


Figure 9. Diagram of the M18A1 antipersonnel mine installed for controlled nonelectrical and electrical detonation.

and the arrows on top of the case point in the direction of the enemy or the desired area of fire. On snow or extremely soft ground (mud), the bandoleer may be spread beneath the mine for support. To prevent the mine from tipping in windy areas, or when the legs cannot be pressed into the ground, carefully spread the legs to the maximum width (approximately 180°) so that the legs will be to the front and rear of the mine. A top view of the M18A1 antipersonnel mine is shown in figure 10.

- (4) Select an aiming point (tree, bush, etc.) that is approximately 150 feet from the mine and which projects approximately 8 feet above the ground (fig. 11). This approximates 2½ meters at a distance of 50 meters. Position the eye approximately 6 inches (15 cm.) away from the mine and aim the mine by sighting through the peepsight. The groove of the sight

should be in line with the aiming point. The aiming point should be in the center of the desired area of coverage, and the bottom edge of the peepsight should be parallel to the ground that is to be covered with the fragment spray.

b. Arming and Electrical Firing.

- (1) Unscrew either the right or left shipping plug priming-adapter, and reverse it to allow the firing wire to be placed into the slot provided in the priming-adapter portion (fig. 12). Remove the insulation tape and unroll the paper form from the firing wire. Make sure that the firing wire is uncoiled without tangling or kinking. Retain the paper form and the tape for possible future use. Hold the blasting cap while unwinding approximately 3 meters of the firing wire. Make certain that the combination shorting plug and dust cover are

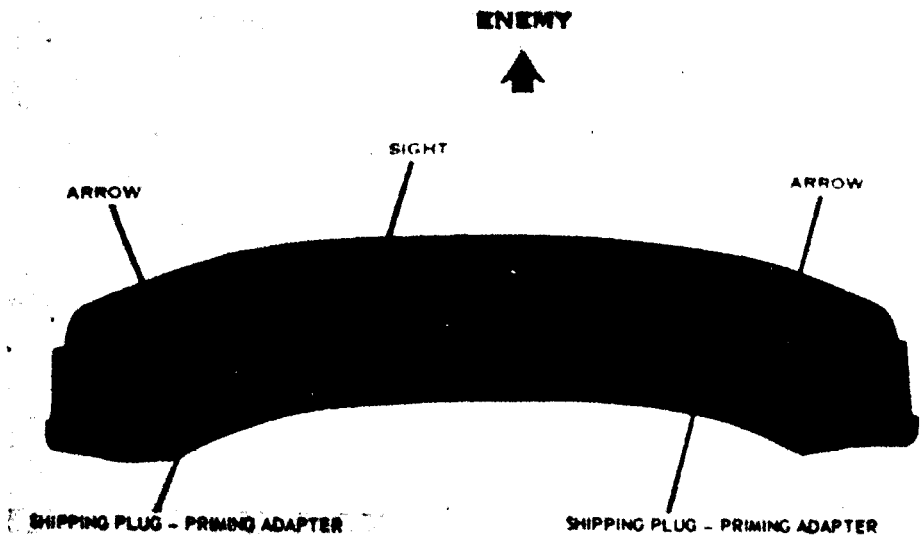
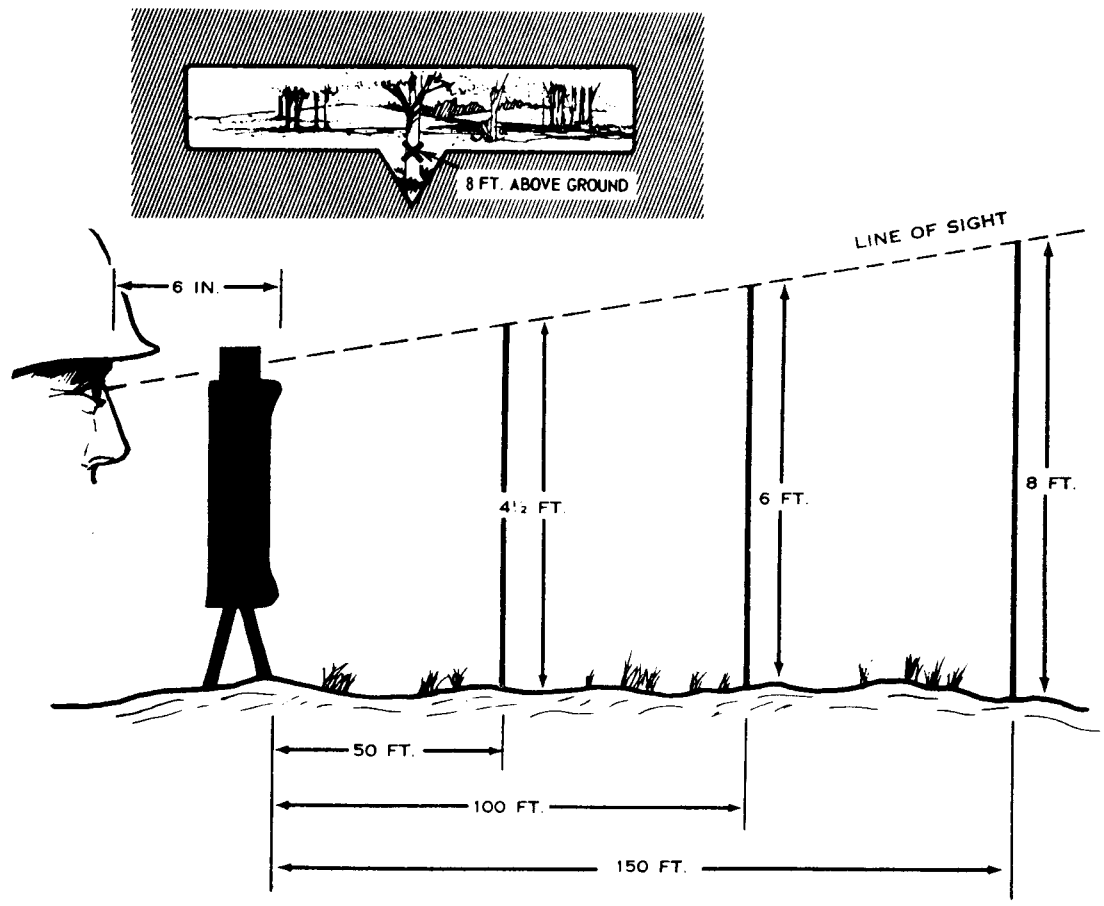


Figure 10. Top view of the M18A1 antipersonnel mine.



THE MINE SHOULD BE SIGHTED ON A POINT 8 FT. HIGH AT A DISTANCE OF 150 FT. OR ONE OF THE ALTERNATIVE POINTS SHOWN.

Figure 11. Aiming the M18A1 antipersonnel mine.



assembled to the connector of the firing wire before placing the blasting cap into the detonator well. Wrap the firing wire around a stake located approximately 1 meter from the mine to prevent the mine from becoming misaligned if the firing wire is disturbed.

- (2) A firing circuit test (para 15) should be conducted before the blasting cap is placed into the detonator well. This test checks the continuity of the firing circuit.
- (3) Slide the slotted end of the shipping plug priming-adapter on the firing wires of the blasting cap between the crimped connections and the blasting cap. Pull the excess wire through the slotted end of the shipping plug priming-adapter until the top of the blasting cap is firmly seated in the bottom portion of the shipping plug priming-adapter. Screw the shipping plug priming-adapter and the blasting cap into the detonator well.

Warning: Make certain that the face of the mine marked “front toward enemy” and the arrows on top of the mine point in the direction of the enemy.

- (4) Recheck the aim of the mine. Camouflage the mine and unwind the remaining firing wire to the firing position. If possible, bury the firing wire to protect it from artillery fire and detection. The operator should be in a foxhole, or in a covered position at least 16 meters behind or to the side of the emplaced mine. If possible, perform the tests in paragraph 15 before arming the M18A1. If the area is subjected to mortar or artillery bombardment, retest the circuit.
- (5) Remove the dust cover from the connector on the firing device; also, remove the combination shorting plug and dust cover from the end of the firing wire. Plug in the two connectors. Before connecting the firing wire to the M57 firing device (fig. 5),

the safety bail must be in the SAFE position. Before attaching the firing device, insure that personnel are under cover at least 250 meters away from the front and sides of the mine and at least 100 meters to the rear of the mine. The firing device should not be connected to the firing wire until the actual time of firing.

- (6) After testing (para 15), the mine is ready for firing. To fire the mine, position the firing device bail in the FIRE position.
- (7) Fire with a firm, quick squeeze of the firing device handle.

13. Installation for Nonelectrical Firing

A nonelectric firing system utilizing a ring main is shown in figure 13. Instructions for laying, aiming, and arming the mine using two nonelectric M7 blasting caps, a piece of detonating cord approximately 25 feet long, a pull wire, and a pull-type or pull release-type firing device, such as the M1 or the M3 is discussed in *a* and *b* below. Instructions for laying, aiming, and arming the mine using a dual firing system and a ring main is discussed in *c* below. To arm the mine by the methods described below, a thorough knowledge of explosives and demolition materials and the use and installation of land mines and boobytraps is required. Material on these subjects and techniques is contained in FM 3-5, FM 5-25, FM 5-31, FM 20-32, FM 31-10, TM 9-1375-200 and TM 9-1345-200.

a. Pull Wire Initiation of the Mine (controlled).

- (1) Laying and aiming the mine are performed in the same manner as for electrical firing. For details on laying and aiming, see paragraph 12 *a*.
- (2) Crimp a nonelectric blasting cap to a firing device. With the nonelectric blasting cap attached, fasten the firing device to the detonating cord with tape. Using tape, wire, twine or cord, fasten the firing device securely to a firmly emplaced stake (fig. 13). Insert the detonating cord into a second nonelectric blasting cap and crimp the cap to the detonating cord. Carefully insert the cap into the

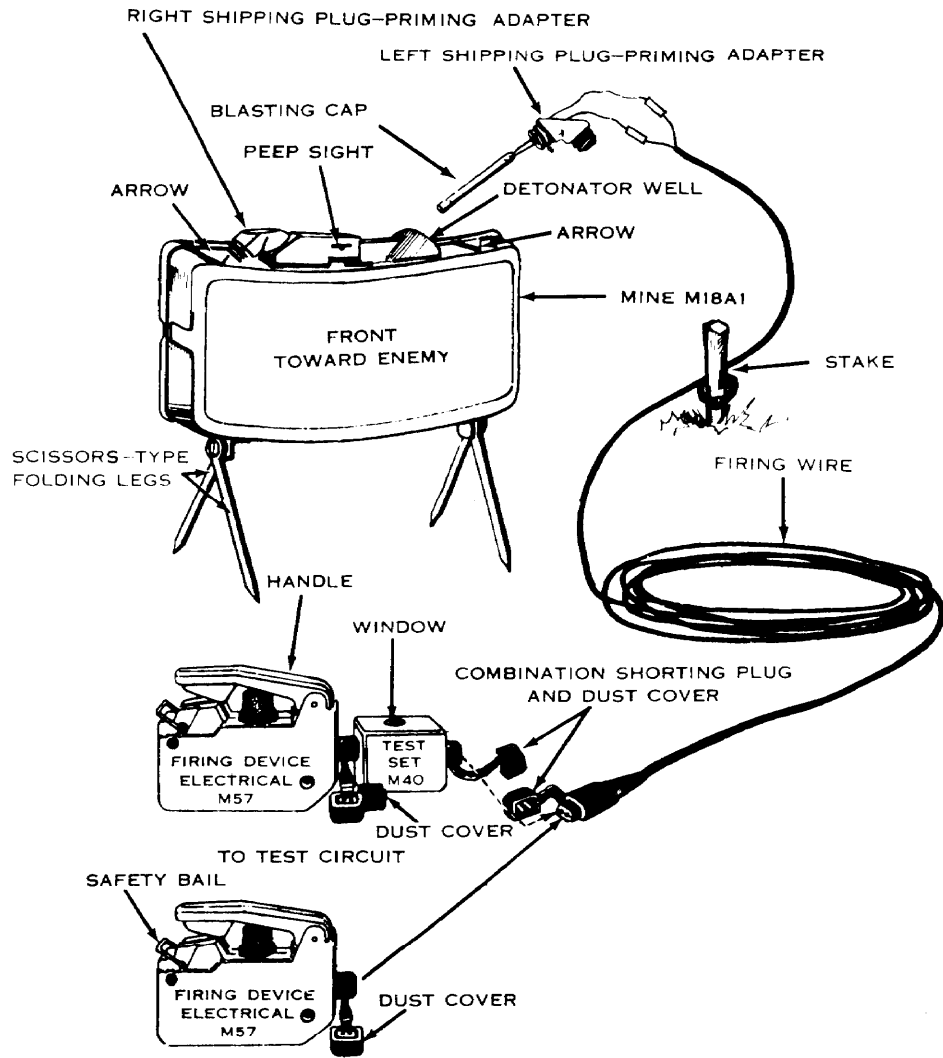


Figure 12. Arming and testing the M18A1 mine.

detonator well. Secure the cap in the detonator well by carefully taping or tying the detonating cord to the mine. A method of taping detonating cord to a nonelectric blasting cap is shown in figure 14.

- (3) Attach a pull wire securely to the pull ring of the firing device. The pull wire should be sufficiently long to allow actuation of the firing device from a protected position at least 16 meters to the rear of the mine. Care must be taken during emplacement to secure the firing device so that the mine will not be dislodged by a pull of the detonating cord of the tripwire.

b. Tripwire Initiation of the Mine (uncontrolled).

- (1) Laying and aiming the mine are performed in the same manner as for electrical firing. For details on laying and aiming, see paragraph 12 a.
- (2) The preliminary steps used to arm the mine are the same as those described in a (1) through (3) above.
- (3) The tripwire and the firing device, which are stretched across a trail or other avenues of approach, must be securely attached to two stakes firmly emplaced in the ground at a distance of 20 to 30 meters forward of the mine (fig. 15).

CONNECTION USED FOR
RING MAIN AND BRANCH LINES

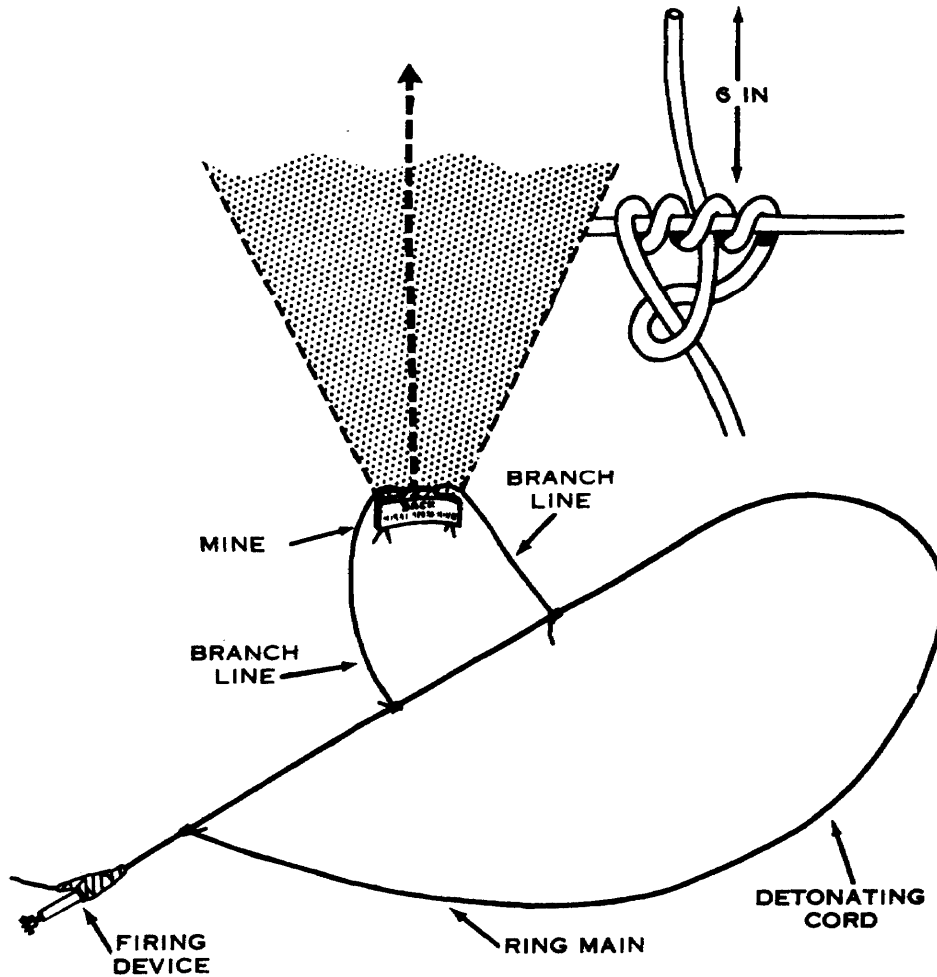


Figure 13. Nonelectric firing system.

c. Nonelectric Method Using Dual Firing or Ring Main.

(1) Dual firing.

- (a) Obtain two 10-meter lengths of detonating cord, four M7 nonelectric blasting caps, and two pull-type firing devices. Details for using dual firing or ring main systems are contained in FM 5-25.
- (b) Remove both shipping plug priming-adapters from the mine.
- (c) Crimp an M7 nonelectric blasting cap to the end of each piece of detonating cord. Insert the caps into the detonator wells, and carefully tape or tie the detonating cord to

the mine. While moving back to a safe firing position, unwind the detonating cord.

- (d) Emplace the mine and the detonating cord as described in a (1) through (3) above.
 - (e) Attach a pull-type firing device and a tripwire (or pull wire) to the free end of each piece of detonating cord (fig. 13). Use the procedures described in a or b above.
- (2) Ring Main.
- (a) Follow the instructions in (1) (a) through (d) above.
 - (b) Make a ring main as described in FM 5-25 (fig. 13).

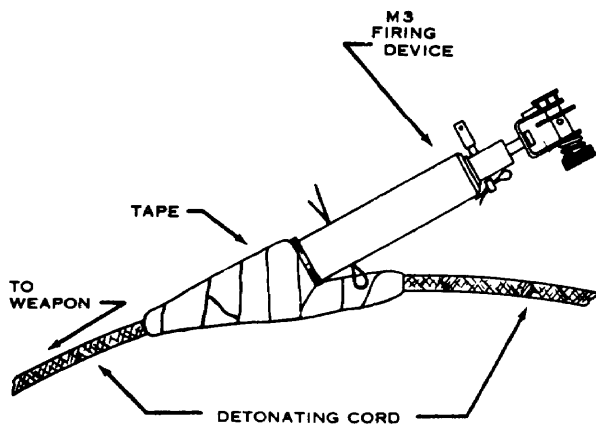


Figure 14. Method of taping M3 firing device to detonating cord.

- (c) When mines are emplaced one behind the other, the one nearest the enemy is generally fired first. Mines emplaced laterally may be fired in any order or simultaneously.
- (d) The mine and the danger area around the mine must be visible from the firing position so that friendly personnel in the vicinity of the mine may be seen.

14. Camouflage

a. Although the M18A1 is painted olive-drab to facilitate camouflaging, it is necessary to blend the mine into its surroundings to prevent its detection.

b. Only lightweight foliage, such as leaves and grass should be used to avoid increasing the secondary missile hazard to the rear of the mine.

c. Both the front and rear of the mine should be camouflaged with foliage. The firing wire should also be camouflaged or buried underground. If used, detonating cord should not be buried; however, it may be covered with light foliage. For the principles and methods of camouflage, see FM 5-20.

15. Testing

a. *M40 Test Set.* One M40 test set is provided with each case of six M18A1's. The test set is an instrument used for checking the continuity of the electrical firing circuit. A shipping tag on the carrying strap marks the bandoleer which contains the test set. The test

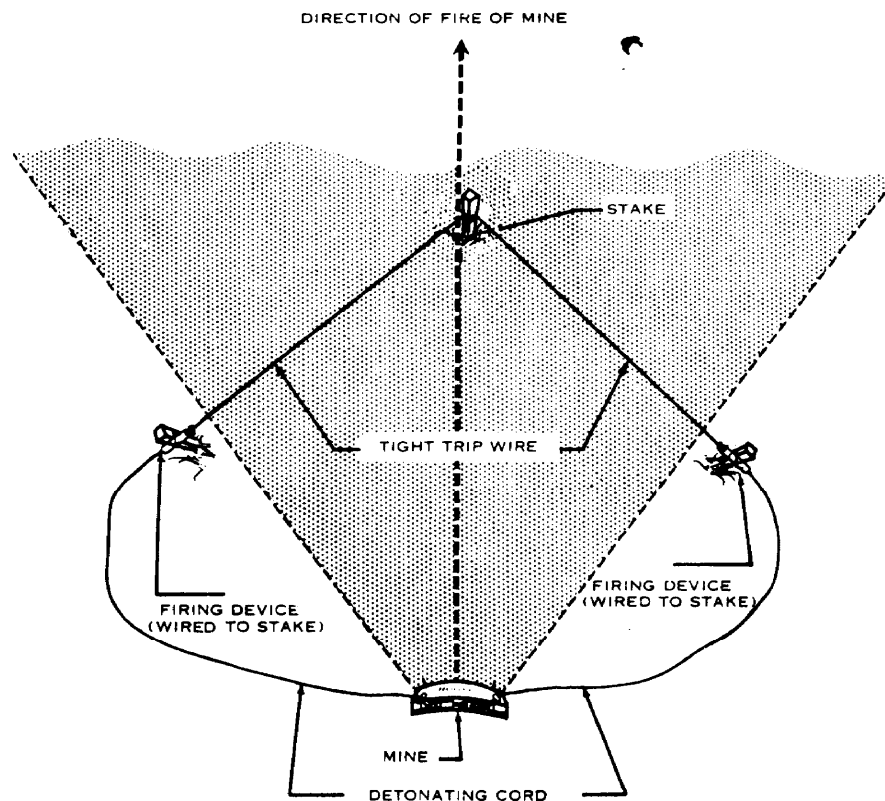


Figure 15. Diagram of the M18A1 antipersonnel mine installed for uncontrolled firing.

set is 2 inches long, 1½ inches high, and weighs 8 ounces. A small window is located on top of the test set and is used for observing the flashes of the indicating lamp (figs. 17 and 18). The M18A1 antipersonnel mine set up for circuit testing is shown in figure 16.

b. Detailed Circuit Testing Procedure. The firing circuit test should be conducted before the blasting cap is placed into the detonator well. This precaution will prevent the destruction of the mine if the testing set malfunctions and detonates the electric blasting cap. If the blasting cap is detonated during testing, it can be replaced by a standard electric blasting cap attached to the remaining firing wire. Before and after completion of the firing device and blasting cap continuity tests, ascertain that the firing device safety bail is in the SAFE position.

(1) *Testing the M57 firing device and the M40 test set.*

- (a) Remove the dust cover from the connector of the firing device and from the female connector of the test set. Plug the test set into the firing device (fig. 5). Leave the combination shorting plug and dust cover assembly on the other end of the test set. Position the firing device bail to the FIRE position and actuate the handle of the firing device with a firm, quick squeeze and observe the flashing of the lamp

through the window of the test set. The window of the test set should be held near the eye when checking the firing device and blasting cap circuitry. This minimizes the risk of enemy observation in the dark and enables the operator to see the lamp flashing, even in bright sunlight.

- (b) Flashing of the lamp indicates that the firing device is functioning properly. If the lamp does not flash (on and off), it could be caused by corrosion on the electric connectors of the test set. The firer can overcome this by connecting and disconnecting the shorting plug dust cover on the M40 test set. If the test set indicates that several firing devices are faulty, retest with another set since the first one may be defective. Side and top views of the M40 test set are shown in figures 17 and 18.

(2) *Testing the blasting cap.*

- (a) After determining that the firing device and test set are operative, remove the shorting plug dust cover from the connector of the firing wire and from the end of the test set. Plug the connector of the firing wire into the test set. Position the M57 firing device bail to the FIRE

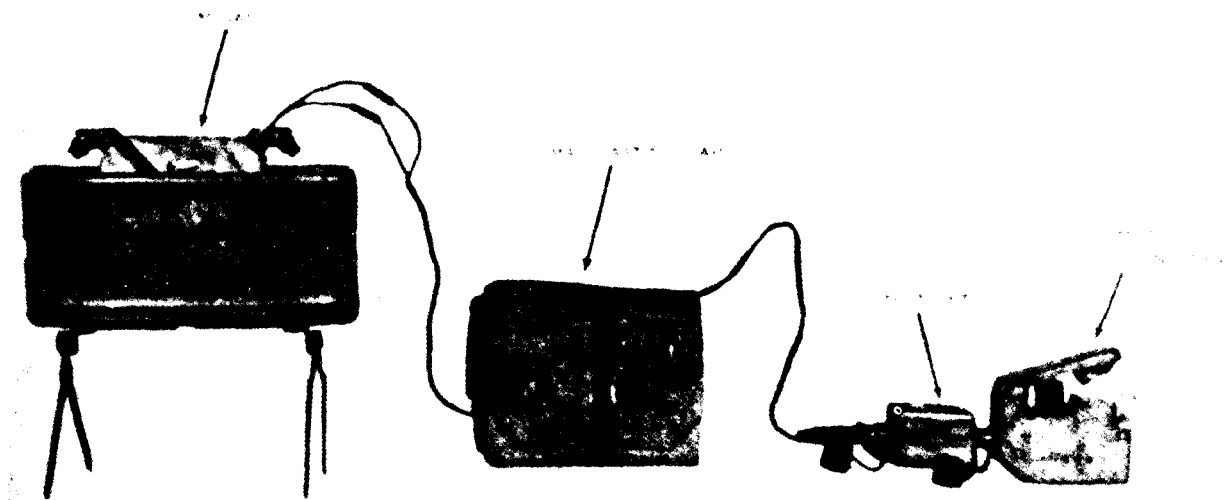


Figure 16. The M18A1 antipersonnel mine set up for circuit testing.

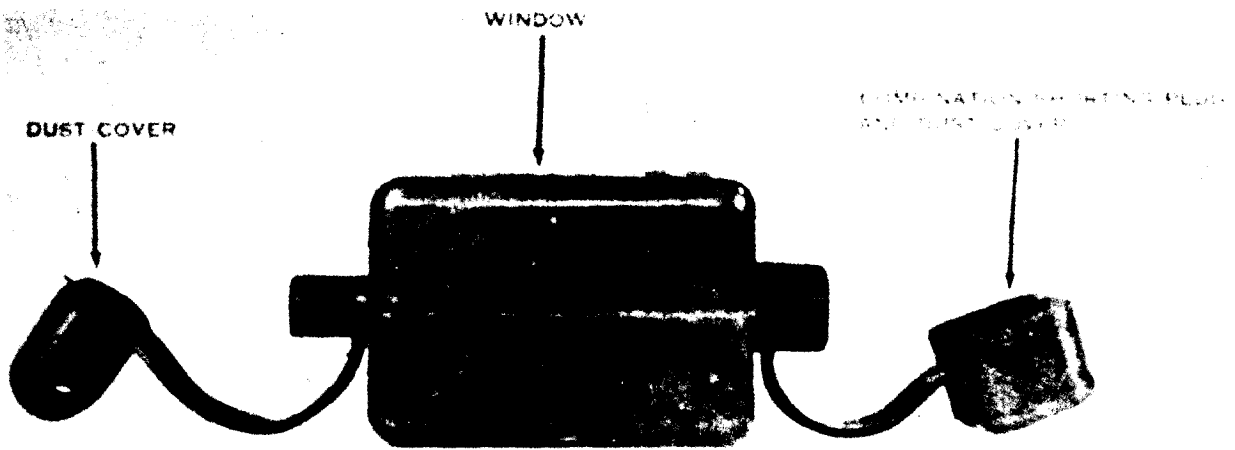


Figure 17. Side view of the M40 test set.

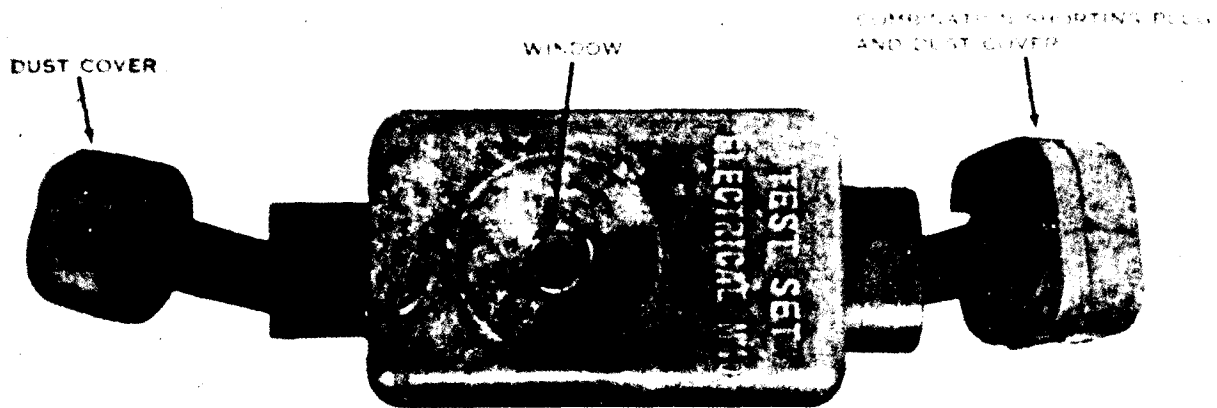


Figure 18. Top view of the M40 test set.

position. Insure that no friendly personnel are near the blasting cap, as it may detonate.

DETAILED CIRCUIT TESTING IS CONDUCTED WITHOUT THE BLASTING CAP INSERTED INTO THE DETONATOR WELL.

- (b) When the handle of the firing device is actuated, a lamp in the window of the test set will flash. This flash indicates that the blasting cap circuitry is satisfactory. If there is no flash, replace the blasting cap and retest.
- (c) Immediately after the circuit test, the firing device is disconnected from the firing wire and the shorting plug dust cover is connected

to the firing wire. The operator returns to the mine WITH THE FIRING DEVICE IN HIS POSSESSION and inserts the blasting cap into the detonator well. The operator then rechecks the aim of the mine and returns to his firing position.

- (d) If an extended period of time lapses between the circuit test and the insertion of the blasting cap into the detonator well, or if the area is subjected to artillery or mortar fire, another test should be conducted.

Note. If time available precludes the conduct of a circuit test with the blasting cap removed from the mine, then an abbreviated test may be conducted with the blasting cap inserted into the detonator

well. If an abbreviated test is conducted, all personnel must be under cover at least 250 meters away from the front and sides of the mine and 100 meters to the rear of the mine.

16. Disarming and Destruction

a. Disarming a Mine with an Electrical Firing System.

- (1) Prior to disarming the mine, the firing device safety bail must be in the SAFE position.
- (2) Disconnect the firing wire from the firing device. Replace the combination shorting plug dust cover on the firing wire connector and the dust cover on the firing device connector.
- (3) Unscrew and remove the shipping plug priming-adapter containing the blasting cap from the mine. Remove the blasting cap and firing wire from the shipping plug priming-adapter. Reverse the shipping plug priming-adapter, and screw the plug end of the adapter into the detonator well.
- (4) Remove the firing wire from the stake. Reroll the blasting cap and firing wire and place it in its cardboard container.
- (5) Remove the mine from its emplace-

ment. Repack the mine and its accessories into their respective pockets in the bandoleer.

b. Disarming a Mine with a Nonelectrical Firing System.

- (1) Prior to performing (2) through (6) below, render the firing device safe by replacing all safety pins.
- (2) Disconnect the pull wire or tripwire from the nonelectric firing device.
- (3) Remove the detonating cord and blasting cap from the detonator well.
- (4) Using crimpers, cut the blasting cap free of the detonating cord. Non-electric blasting caps and detonating cord crimped together can be separated only by cutting the blasting cap free of the detonating cord.
- (5) Replace the shipping plug priming-adapter and screw it into the detonator well, plug end down.
- (6) Remove the mine from its emplaced position and repack. Store accessory items in appropriate containers.

c. Destruction of Mine to Prevent Enemy Use. CLAYMORES can be most quickly destroyed by detonation or burning. For proper destruction procedures, see TM 9-1345-200.