

TM 9-1345-200

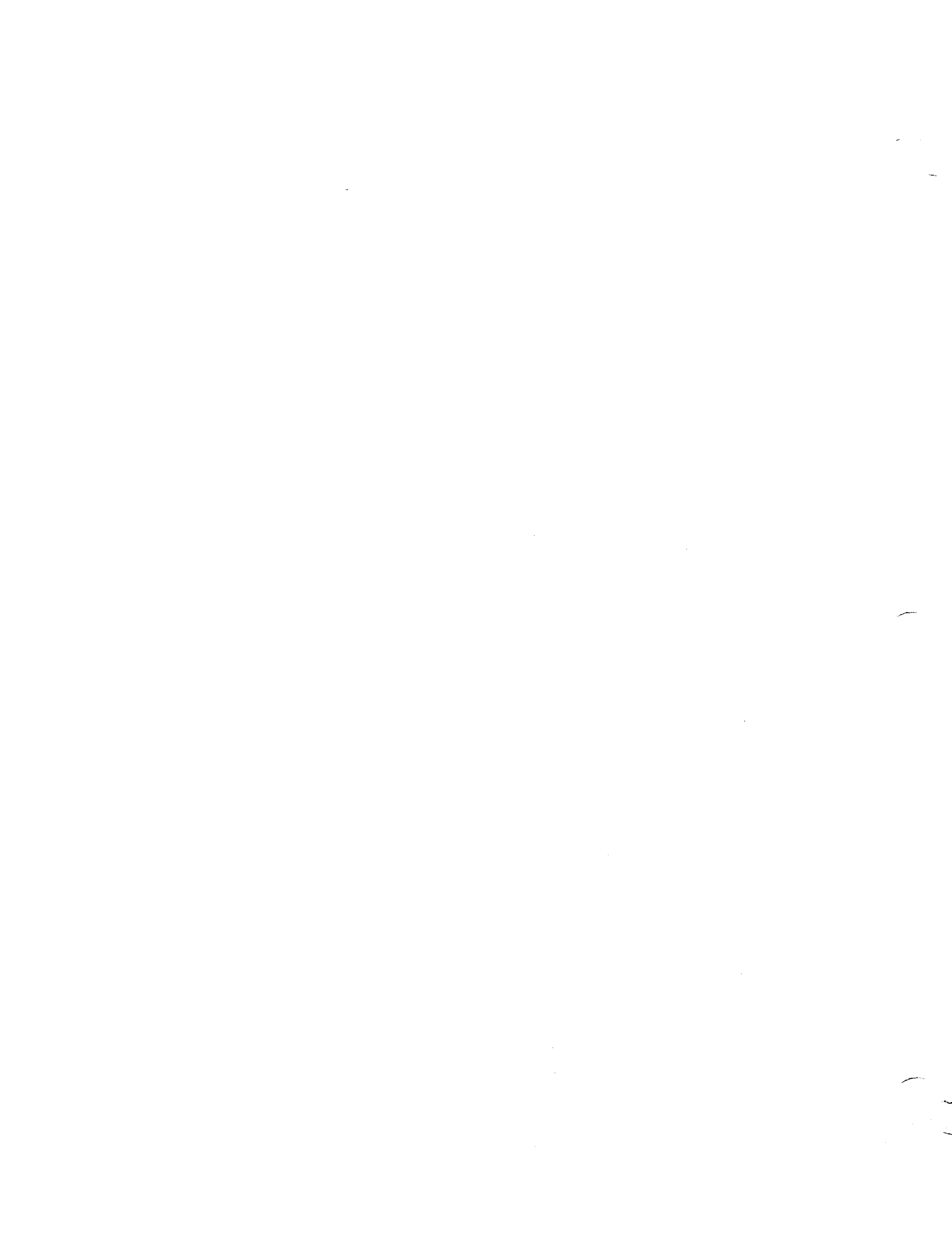
DEPARTMENT OF THE ARMY TECHNICAL MANUAL

LAND MINES



HEADQUARTERS, DEPARTMENT OF THE ARMY

1964



Technical Manual

No. 9-1345-200

HEADQUARTERS,
DEPARTMENT OF THE ARMY
WASHINGTON 25, D. C. 8 June 1964

LAND MINES

			Paragraph	Page
CHAPTER	1.	GENERAL		
	Section	I.		
		INTRODUCTION		
		Scope	1	3
		Arrangement of text	2	3
		Forms and reports	3	4
		Errors and omissions	4	4
		II.		
		General Discussion		
		Land mines	5	4
		Boobytraps	6	8
		Mine complete round	7	8
		Classification	8	11
		Identification	9	11
		Care, handling, and preservation	10	13
		Packing and marking for shipment	11	15
		Transportation	12	15
CHAPTER	2.	ANTIPERSONNEL MINES		
	Section	I.		
		Service Antipersonnel Mines and Fuzes		
		General	13	16
		Mine, antipersonnel, M2A4 with fuze, mine, combination, M6A1	14	18
		Fuze, mine, combination, M6A1	15	21
		Mine, antipersonnel, M3 with fuze, mine, combination, M7A1	16	21
		Fuze, mine, combination, M7A1	17	23
		Mine, antipersonnel, M16A1 with fuze, mine, combination, M6O5	18	24
		Fuze, mine, combination, M6O5	19	29
		Mine, antipersonnel, M18A1 and accessories	20	29
		Mine, antipersonnel, M18 (T48) with carrying kit, M68 (T66) or M69 (T67)	21	42
		Mine, antipersonnel, nonmetallic (NM), M14 with integral fuze	22	45
		II.		
		Practice Antipersonnel Mines and Fuzes		
		General	23	48
		Mine, antipersonnel, M3 empty with fuze, mine, combination, M7A1, inert	24	50
		Mine, antipersonnel, M2 (all mods) inert with fuze, mine, combination, M2, M2A1 or M6A1 inert	25	50
		Mine, antipersonnel, M16A1 inert with fuze, mine, combination, M6O5 inert	26	51
		Mine, antipersonnel, practice, M8 and fuze, mine, combination,	27	51
		Fuze, mine, combination, practice, M10 or M10A1 practice	28	54
		Mine, antipersonnel, NM, M17 (T34) with integral fuze	29	55
CHAPTER	3.	ANTITANK MINES		
	Section	I.		
		Service Antitank Mines and Fuzes		
		General	30	58
		Mine, antitank, HE, heavy, M15 with fuze, mine, AT M603 and activator, M1	31	59
		Fuze, mine, antitank, M603	32	63

*This manual supersedes TM 9-1940, 17 May 1956, including C1, 5 June 1957, C2, 7 October 1957, C4, 30 August 1961, and C5, 24 April 1962; TB 9-1940-13, 18 June 1956; TB 9-1345-200/1, 13 July 1960; TB 9-1345-200/3, 29 September 1960, including C1, 18 June 1962; and TB 9-1345-200/4, 2 October 1961, including C2, 5 August 1963; that portion of TB 3-300-2, 27 May 1959 which pertains to bursters for land mines, and so much of TB Cml 76, 2 September 1960, and TM 3-300, 14 August 1956, including C2, 5 May 1958, C3, 25 August 1959, and C5, 24 May 1962, as pertains to land mines.

		Paragraph	Page
	Mine, antitank, HE, heavy, M21 with fuze, mine, combination, M607 . . .	33	64
	Mine, antitank, NM, M19 (T18) with fuze, mine, combination M606	34	71
	Activator, antitank mine, M1 and M2 (T3E1)	35	84
	II. Practice Antitank Mines and Fuzes		
	General	36	85
	Heavy practice antitank mines	37	87
	Light practice antitank mines	38	91
	Mine, antitank, NM, M19, inert with fuze, M606, inert.	39	96
	Activator, antitank mine, practice, M1	40	96
CHAPTER	4. INCENDIARY BURSTER AND CHEMICAL MINES		
Section	I. Incendiary Burster		
	General	41	98
	II. Chemical Mines		
	General	42	100
	Mine, land, chemical, 1-gallon	43	100
	Mine, chemical agent, VX, M23	44	102
CHAPTER	5. RELATED ITEMS		
	General	45	105
	Demolition materials	46	105
	Pyrotechnics	47	107
	Antipersonnel mine clearing devices	48	107
	Antitank mine clearing devices	49	109
CHAPTER	6. DESTRUCTION OF LAND MINES TO PREVENT ENEMY USE		
	General	50	116
	Methods	51	116
APPENDIX	I. REFERENCES		118
	II. COMPLETE ROUND DATA		121
	III. INDEX OF FORMER NAMES		123
INDEX			124

CHAPTER 1

GENERAL

Section I. INTRODUCTION

1. Scope

a. This manual provides technical information on the identification, care, handling, and use of land mines in Federal supply classification (FSC) 1345 and their components. It also provides general technical information on items from other FSC classes which are used with these land mines.

b. For information on doctrine and technique for the tactical employment of land mines and related items, refer to FM 20-32.

c. This manual differs from TM 9-1940, May 1956, as follows:

(1) Adds information on:

- (a) Mine, antipersonnel, M16A1, and fuze, mine, combination, M605
- (b) Mine, antipersonnel, M18 (T48) w/carrying kit M68 (T66)
- (c) Mine, antipersonnel, M18 (T48) w/carrying kit M69 (T67)
- (d) Mine, antipersonnel, M18A1 (T48E3), and accessories
- (e) Mine, antipersonnel, M3, inert
- (f) Mine, antitank, HE, NM, M19 (T18)
- (g) Mine, antitank, practice, M20 (T38)
- (h) Mine, antitank, heavy, HE, M21
- (i) Fuze, mine, M606 (T1202E2)
- (j) Fuze, mine, antitank, M607
- (k) Burster, incendiary, M4
- (l) Mine, land, chemical, HD, 1-gallon

(m) Mine, chemical agent, VX, M23

(2) Changes the information on nomenclature, marking, and packaging for a number of items.

(3) Deletes information on:

- (a) Fuze, mine, chemical AT, NM, M12, practice
- (b) Mine, antitank, HE, heavy, M6A2 w/fuze, mine, M603

(c) Mine, antitank, HE, light, M7 w/o fuze

(d) Mine, antitank, HE, light, M7A2 w/fuze, mine, AT, M603

(e) Mine, antitank, practice, NM, M9 w/ or w/o fuze, mine, AT, chemical, M12, practice

(f) Some FSC class 1370 items (demolition materials)

(g) Some FSC class 1375 items (pyrotechnics)

2. Arrangement of Text

a. Chapter 1 outlines the manual and provides general information on the types of mines, complete rounds, explosive trains, classification, identification, care, handling and preservation, storage, packing and marking for shipment, and transportation.

b. Chapter 2 contains physical descriptions, data, and technical instructions for the use of antipersonnel mines and relative items.

c. Chapter 3 contains physical descriptions, data, and technical instructions for the use of antitank mines and related items.

d. Chapter 4 contains physical descriptions, data, and technical instructions for the use of chemical mines and related items.

e. Chapter 5 contains general technical information on items from other FSC classes which are used with land mines.

f. Chapter 6 contains instructions for the destruction of land mines and components to prevent enemy use.

g. Appendix I contains a list of references to be used in conjunction with this manual.

h. Appendix II contains complete round data on land mines.

i. Appendix III contains a list of former

item names with their current Federal item name.

3. Forms and Reports

a. Authorized Forms. The forms generally applicable to units using or maintaining land mines and components are listed in Appendix I. For a listing of all forms refer to DA Pam 310-2. For instructions on the use of these forms, refer to FM 9-6.

b. Field Report of Accidents. Accidents or malfunctions involving the use of ammunition which occur during training or combat will be reported immediately to the qualified ammunition representative under whose supervision the ammunition for the unit involved is maintained or issued. The report will be made by the officer in charge or by the senior non-commissioned officer or enlisted man of the unit involved. All available pertinent facts will be included in the report. It is the duty of the qualified ammunition representative to investigate thoroughly all cases of malfunction or accident observed by him or reported to him and to report all such cases as outlined in AR 700-1300-8.

c. Fires. Fires or explosions followed by fire involving loss of life or damage to property in excess of fifty dollars will be reported in accordance with AR 385-40. Fires involving in-use vehicles are exempt from this requirement.

d. Report of Hazardous Conditions Involving Military Explosives or Ammunition. Report actual or potentially hazardous concentrations of ammunition or explosives and hazardous conditions which appear inadequately covered by existing regulations to U.S. Army Materiel Command for review by Armed Services Explosive Safety Board. See AR 385-60 for further instructions.

4. Errors and Omissions

Any errors in, or omissions from this manual will be reported on DA Form 2028 and forwarded direct to the Commanding Officer, Picatinny Arsenal, Dover, New Jersey, ATTN: SMUPA-DC5.

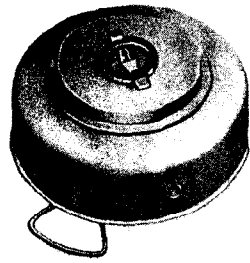
5. Land Mines

a. General. Land mines (fig. 1) are explosive items which may be planted in the path of the enemy to hinder his movement or to deny him access to certain territory. The mines are generally concealed and so rigged that they will be initiated by the enemy's presence or contact (fig. 2) except in instances where the mines may be initiated by remote control. Mines may produce casualties by direct explosive force, fragmentation, shaped-charge effect, or by release of harassing agents or lethal gas. A detailed discussion of tactical employment of land mines may be found in FM 3-5, FM 20-32, and FM 31-10.

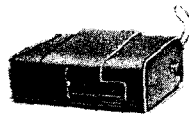
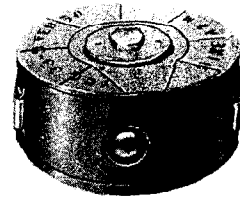
b. Description. Since land mines have various uses, they come in a variety of types, sizes, and shapes and may also differ in material, quantity or type of explosive charge, incendiary or chemical content, or fuze type. Some mines are boobytrapped to discourage neutralization; others have built-in mortars which project them into the air for wider fragment distribution. Directional fragmentation-type mines are aimed by sighting mechanisms and some mines are aimed by remotely controlled firing devices. Except for chemical mines, which have no explosive charge, most mines are fuzed to detonate near the target.

(1) *Body.* The bodies, some of which have actuator or secondary fuze wells, usually serve as a fuze holder and explosive charge container. Depending upon the degree of nondetectability or fragmentation desired, cast or sheet metal or plastics are used in body construction. For identification, they are marked and painted as described in paragraph 9.

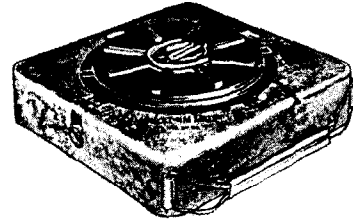
(2) *Explosive charge.* The major component of the nonchemical mine is the explosive charge, which provides the energy necessary for the mine to accomplish its mission. This energy may come in direct contact with the target, or may be used to propel a fragmented projectile or a single, solid metal slug



HEAVY



LIGHT



NON-METALLIC

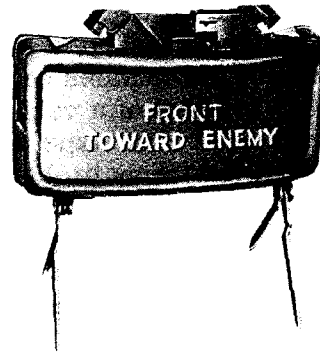
ANTI-TANK



BOUNDING TYPE

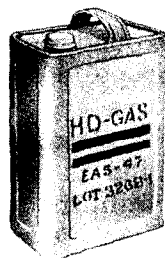


BLAST TYPE

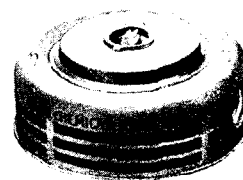


FRAGMENTATION TYPE

ANTI-PERSONNEL



CHEMICAL



ORD D749

Figure 1. Representative types of land mines.

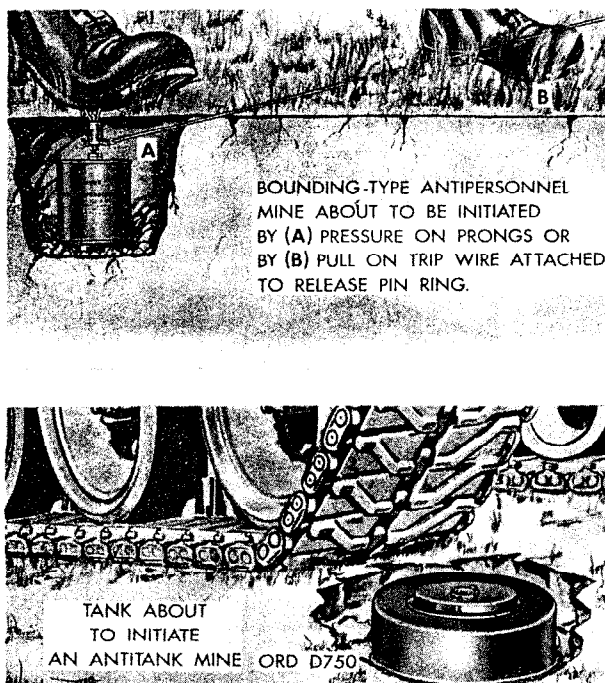


Figure 2. Initiating actions on antipersonnel and antitank mines.

by means of a shaped charge. Anti-vehicular mines usually depend upon direct contact, but a shaped charge aimed at the sides or belly of a tank or wheel of a vehicle is sometimes used. The type of explosive used for the main charge — tetryl, TNT, H6, Comp B, Comp C4, or the like — is selected on the basis of highest detonation constant with ease of loading, compatibility, logistics, etc.

- (3) *Fuzes*. The mechanical or electromechanical land mine fuze is usually activated by direct pressure from the target, such as being runover or stepped upon, or by pressure exerted upon a trip-wire or tilt-rod. Fuzes contain safety elements to inhibit accidental firing, and most mines are issued fuzed; however, special-purpose fuzes may be used with the demolition materials described in chapter 4.

c. *Types*.

- (1) *Antipersonnel (APERS) mines*. Antipersonnel mines (fig. 1) are designed for use against enemy

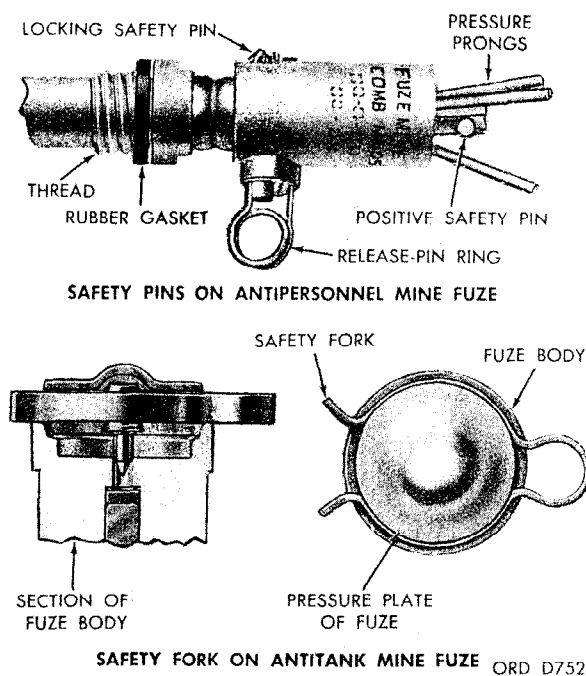


Figure 3. Safety devices on antipersonnel and antitank mine fuzes.

personnel. The two basic types of antipersonnel mines are:

- (a) *Fragmentation*. This type mine depends on its ability to cover a fairly wide area with high-velocity fragments. The effective range of fragmentation mines is much greater than that of the blast type. There are three basic fragmentation-type mines.
1. *Bounding*. This type mine is placed beneath the surface of the ground. When the mine explodes, a fragmentation projectile is expelled from the mine body. The ascending projectile explodes at a height of approximately 2 meters above the ground, causing fragments to be propelled laterally in all directions.
 2. *Fixed nondirectional*. This type mine is placed on, or just beneath, the surface of the ground. When the mine explodes, fragments are propelled upward and outward in all directions.
 3. *Fixed directional*. This type mine is placed on the ground or attached to an obstacle, such as

a tree, pole, etc., and at the expected path of the enemy. When the mine explodes, fragments are propelled outward in a fanshaped pattern (60 degree arc) above the ground. This type mine may be initiated by the approaching enemy or a remote control device.

- (b) *Blast*. This type mine (fig. 1) depends for its effect on direct force developed by its explosion. The mine functions without delay while still in contact with the enemy who has initiated it.
- (2) *Antitank mines*. Antitank mines are used to immobilize or destroy enemy tanks or other vehicles. Blast type mines are generally employed in minefields and are usually laid on, or slightly below, the surface of the ground. They consist of a charge of high explosive, usually 3 to .22 pounds in current standard mines, in a metallic or nonmetallic casing fitted with a primary fuze, with provisions for attachment of one or two secondary fuzes. Ordinarily, antitank mines require a pressure of 300 to 400 pounds for actuation, but they can be exploded by being stepped on by running troops. One of the newer type antitank mines (par. 33) derives its effectiveness to immobilize or destroy enemy tanks from its ability to project a mass of steel upward at a high velocity. The two general classes of antitank mines are heavy and light.
- (3) *Chemical mines*. These mines are designed to disperse chemical agents from fixed locations, and to provide area contamination in barrier and nuisance minefields. The chemical agent may be in liquid or vapor form. The chemical mine may be used in anti-tank minefields or elsewhere as an anti-personnel mine. Composite minefields containing chemical land mines and HE antipersonnel antitank mines are particularly effective.

The presence of HE mines reduces traversal speed, thereby forcing greater exposure to chemical contaminants. The presence of chemical mines slows breaching operations as it discourages rapid mine-clearing techniques. Chemical land mines may be initiated by action of the enemy or by remote control. Chemical mines are shipped empty, with the exception of the chemical mine M23. Refer to TM 3-255 for filling instructions and refer to FM 3-5, FM 20-32 and FM 31-10 for tactical employment of chemical land mines. All chemical mines depend on blast effect for dispersing the chemical agent. The weather, type terrain, and soil affect the period of time for which these chemical agents are effective. There are two representative types of chemical mines, persistent and nonpersistent.

- (a) Persistent chemical mines are those whose agents remain in effect, at point of release, for 10 minutes or more.
- (b) Nonpersistent chemical mines are those remaining in effect for less than 10 minutes.
- (4) *Improvised mines*. An improvised mine is one which is made of any available material. Improvised mines are used when standard mines are not available or are incapable of producing the desired results.

Warning: In view of the nature of improvised mines, appropriate precautions should be observed in laying, marking, reporting, and breaching of minefields.

- (5) *Phony mines*. Phony mines, as the name implies, are not real mines. They usually consist of scrap material or some disturbed earth improvised in the field to simulate an actual mine emplacement. Phony minefields may be used to supplement a live minefield. They are laid principally to deceive, delay,

and confuse the enemy. Phony mines should not be confused with inert issue mines, which are used for training in handling live issue mines. For information on employment of phony mines, refer to FM 20-32.

- (6) *Practice and training mines.* Practice mines are of the same size, weight, and shape as service mines but contain a small smoke puff and noise charge consisting of black powder or pyrotechnic composition instead of a high explosive. Inert mines, which are usually the metal or plastic parts of service mines, either empty or filled with inert materials such as sand, are provided for training in handling. Inert mines contain no explosives or pyrotechnic mixtures.

6. Boobytraps

A boobytrap is an explosive charge which is exploded when an unsuspecting person disturbs an apparently harmless object, or performs a presumably safe act. A boobytrapped mine is any mine having a supplementary fuze or separate charge so arranged that it will detonate the mine when the mine is disturbed, even though the main fuze has been removed. Most anti-tank mines have one or more secondary fuze wells but current antipersonnel mines do not. These wells are of two types: those adapted to receive firing devices with a base coupling and those adapted to receive an activator. (An activator is an explosive item which is essentially a detonator-booster acting as an adapter between the firing device and the mine, through the secondary fuze well.) Those mines which do not contain secondary fuze wells may be boobytrapped by connecting a firing device to the mine so as to explode a separate charge when the mine is disturbed. There are three types of boobytrapping devices—antilift, antipull, and antitilt—which are activated by firing devices or by an improvised electrical circuit connected to electrical blasting caps. Boobytraps may also be improvised

from a nonelectrical blasting cap and explosive material such as demolition blocks or coils of detonating cord. Several methods of boobytrapping mines are shown in figures 4 and 5. For further information on boobytrapping, see FM 5-31.

7. Mine Complete Round

a. Definition. A mine complete round consists of all explosive and non-explosive components of a mine necessary for it to function. A complete round may be issued with all components in the same packing container or with components shipped separately for assembly in the field. A table of complete round data may be found in appendix II.

b. Explosive Train. An explosive train is a sequence of explosive elements beginning with a small amount of highly sensitive explosive, followed by other elements of progressively larger amounts and lesser sensitivity, until the large, relatively insensitive main charge is reached. This ratio of sensitivity to quantity is maintained in the interest of greater safety. To insure that the full potentiality of the main high-explosive charge is realized, a specific sequence must be followed from the triggering of the fuze to the detonation of the main charge. At minimum, a primer, a detonator having at least two explosives, a booster, and a main charge are required. At times, however, the train becomes more complicated and other elements are needed. The bounding type mine (fig. 6) is a good example. The explosive trains for antipersonnel and antitank mines are described in (1) and (2) below.

- (1) *Antipersonnel mines.* The explosive trains in the bounding type antipersonnel mine are shown in figure 6. This type mine has two explosive trains: propelling charge explosive train and high explosive train. Operation of the propelling charge explosive train causes ejection of the fragmentation shell or body from the outer case. When the shell or body reaches a predetermined height from the surface

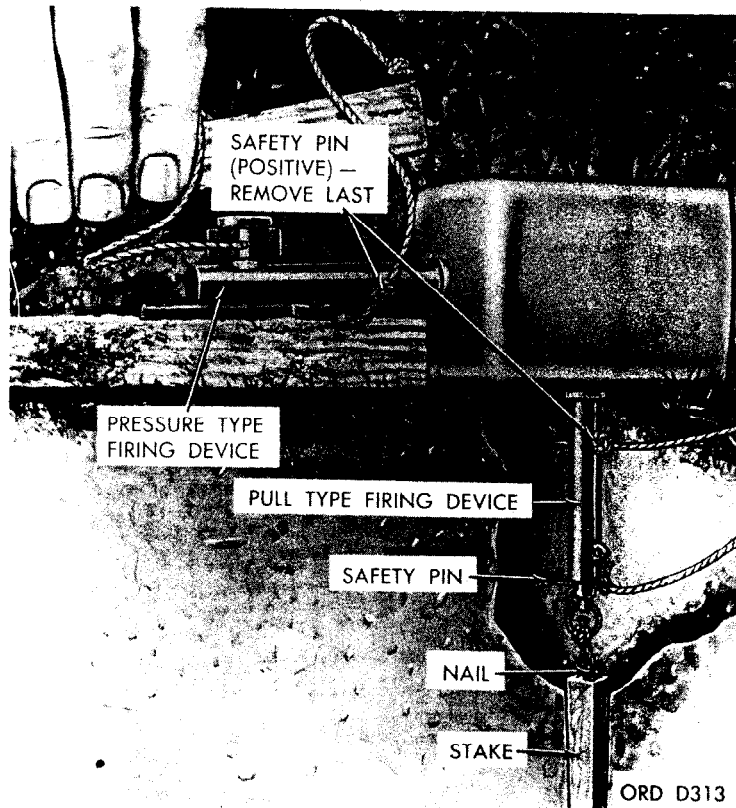


Figure 4. Boobytrapped antipersonnel mine.

of the ground, the high explosive train detonates, causing fragments of the shell or body to be dispersed in a circular pattern. The two explosive trains mentioned above are described as follows:

- (a) *Propelling charge explosive train.* The components of the propelling charge explosive train are shown in figure 6. This explosive train functions as described in 1 through 5 below.
1. *Percussion primer.* The fuze firing pin strikes the percussion primer and initiates the priming composition which is very sensitive and capable of being initiated by mechanical shock. The percussion primer emits a small, intense spit of flame downward.
 2. *Delay charge.* The flame from the percussion primer ignites the delay charge which burns for a predetermined period.

3. *Relay charge.* The delay charge ignites the relay charge which activates the igniter charge.
4. *Igniter charge.* The relay charge ignites the igniter charge which burns with sufficient intensity to set off the propelling charge.
5. *Propelling charge.* The propelling charge throws the high-explosive-filled shell or body

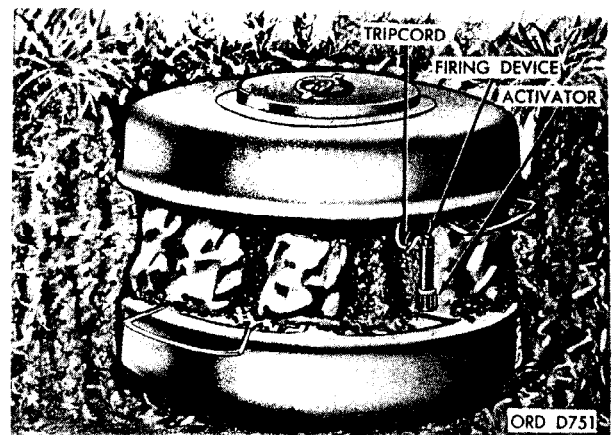
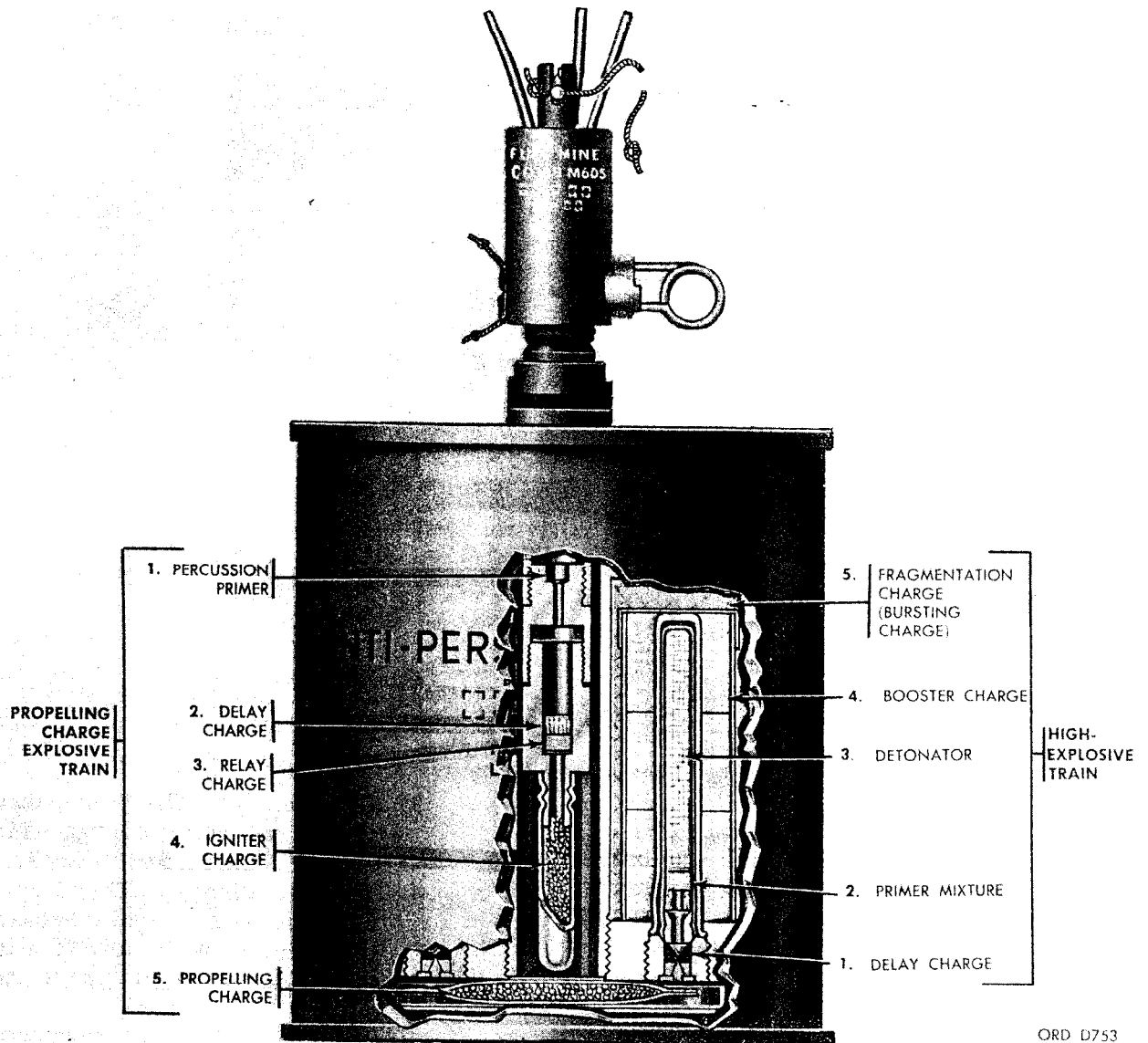


Figure 5. Boobytrapped antitank mine.



ORD D753

Figure 6. Explosive trains in bounding type antipersonnel mine.

into the air and also initiates the delay charge of the high-explosive train.

(b) *High-explosive train.* The components of the high-explosive train are shown in figure 6. This explosive train functions as described in 1 through 5 below.

1. *Delay charge.* The propelling charge ignites the delay charge as it propels the high-explosive projectile from the mine case. The delay charge burns, delaying detonation of the high-explo-

sive until the projectile attains sufficient height to produce an effective fragmentation pattern upon detonation.

2. *Primer mixture.* After the time lag has elapsed, the delay charge sets off the primer mixture.

3. *Detonator charge.* The flash from the primer mixture sets off the detonator charge.

4. *Booster charge.* The detonation wave from the detonator charge sets off the booster charge. The booster charge re-

inforces and strengthens the detonation wave, thus assuring detonation of the main charge.

5. *Fragmentation (bursting) charge.* The detonation wave from the booster charge sets off the fragmentation charge, which ruptures the projectile case and projects the fragments in all directions at high velocity.

(2) *Antitank mines.* The explosive trains in a typical antitank mine are shown in figure 7. All antitank mines have a main or primary explosive train which is initiated by action of the weight of the vehicle on the fuze. This explosive train is essentially the same as the high-explosive train described in (b) above except that a delay charge is not always included and the primer mixture is set off directly by the mechanical action of the fuze. Delay elements, however, may be added to give the tank time to move well over the mine before the explosion takes place (fig. 45). The mine may also have one or more secondary explosive trains which are substantially the same as the primary explosive train, differing principally in the mechanical arrangement of the assembled fuzes. The secondary explosive trains are usually part of the boobytrapping installations (par. 6).

8. Classification

a. Land mines are classified, according to their use, as "antipersonnel" and "antitank". Under very limited conditions, an antitank mine might be used for antipersonnel purposes, but if so used it would be very inefficient. Antipersonnel mines are ineffective against tanks. Antitank mines could be used under special conditions for improvised demolition purposes, and some demolition explosives could be used as improvised mines.

b. Land mines are classified according to purpose as "service" or "practice," and according to filler as "high-explosive" or "inert." In the case of service antitank

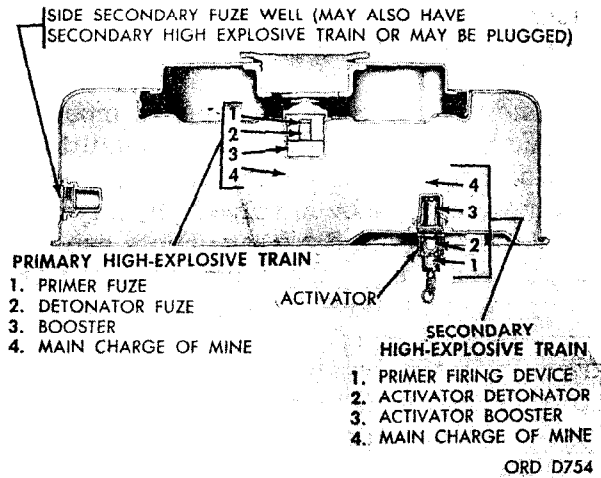


Figure 7. Explosive trains in antitank mine.

mines, the designation "HE" appears in the nomenclature. In the case of practice mines, the word "practice" appears in nomenclature. In the case of inert mines, which are used for training in handling, the word "inert" or "empty" appears in the nomenclature.

9. Identification

a. *General.* Land mines are identified by standard nomenclature, lot number, model, painting, marking, and ammunition identification code symbol. Such means of identification are used on all packing containers and, unless the item is too small, on the item itself.

b. *Standard Nomenclature.* Standard nomenclature is established so that each item may be identified specifically by name. The standard nomenclature for ammunition and explosive items consists of an item name and a colon (:) followed by sufficient additional information about the item of supply to differentiate between items having the same item name. An example of complete nomenclature for a mine is: MINE, ANTITANK: HE, heavy, M15, and fuze, mine, AT, M603 and activator, M1.

c. *Ammunition Lot Number.* When ammunition is manufactured, an ammunition lot number, which becomes an essential part of the marking, is assigned in accordance with pertinent specifications. The lot number for mines consists of the

loader's initials or symbols, and the lot number. This lot number is stamped or marked on every mine and on all packing containers. It is required for all purposes of record, including reports on condition, functioning, or accidents, in which the ammunition may be involved. In any one lot of ammunition, the components used in the assembly are manufactured under as nearly identical conditions as practicable.

d. Model. To identify a particular design, a model designation is assigned at the time the item is classified as an adopted type. This model designation becomes an essential part of the standard nomenclature and is included in the marking on the item. The present method of model designation consists of the letter M followed by an Arabic numeral. Modifications are indicated by adding the letter A and appropriate Arabic numerals. Thus, "M6A1" indicated the first modification of an item for which the original model designation was M6. Modifications which are functionally identical with the original model but which have manufacturing differences may be designated by the letter B and an Arabic numeral. When a particular design has been accepted for a limited procurement and service test, only the model designation is indicated by the letter T or XM and an Arabic numeral, and modifications by the addition of E and an Arabic numeral. In such cases, if the design subsequently should be standardized, the M designation is assigned; hence there may be encountered some lots still carrying the original T designation (not yet remarked to show the later standardized M designation). There is no direct relationship between the numerical designations of a T item and that of the item when standardized and assigned an M designa-

tion. Items of Navy design are designated MK (abbreviation for "Mark") instead of M, and Navy modifications are designated "Mod" and appropriate Arabic numeral instead of A and appropriate Arabic numeral.

e. Painting and Marking.

(1) *Painting.* Ammunition is painted to retard rusting of exposed metal parts, to aid in identification of type, and to indicate type of filler, such as high or low explosive, or toxic.

(a) HE mines and related items are painted olive drab with yellow markings. Some items may also have yellow stripes or bands, or have their closing plugs painted yellow.

(b) Practice mines are painted blue and marked in white. Under "new" system, practice mines containing low explosives are tan color — blue, white and brown.

(c) Inert mines are painted black (old) or blue (new) with markings, including the word "INERT", in white. The M2 and M3 series either have a 1/4-inch hole on each side or have the filler cap omitted, thus providing an 1-3/4-inch hole on one side.

(d) There are two systems of color-coding for chemical ammunition. That of older manufacture is in accordance with the *Five-Element Marking System* and that of more recent manufacture with the *Standard Ammunition Color-Coding System*. Table IA compares the two systems.

Note. All chemical ammunition has a background color of gray.

Table IA. Color Coding Systems for Chemical Ammunition

Type of ammunition	Five-element marking system	Standard ammunition* color-coding system
Persistent casualty chemical agents.	Gray, green markings, and two green bands or stripes.	Gray, green markings, two 1/2-inch green bands or stripes.
Nerve agents-----	Gray, green markings and either two or three green bands or stripes.	Gray, green markings, * three 1/2-inch green bands.
Incendiary burster-----	Olive drab and 1 yellow band-----	Light red, marking in black and 1 yellow band.

*Under "Standard Ammunition Color-coding System" only, chemical ammunition containing high explosive has one 1/4-inch yellow band in addition to other markings.

Caution: Ammunition which has been color-coded and marked according to the older system (TM 9-1900 and TM 3-300) will be on hand for several years. Therefore, special care should be taken to assure that all ammunition, whether color-coded according to the older or the newer system, is properly and fully identified.

f. Data Card. An ammunition data card prepared in accordance with pertinent specifications for each lot of ammunition. Copies are forwarded with each shipment of ammunition. In addition to the ammunition lot number, the data card gives the lot numbers of the components and other pertinent information concerning the ammunition.

g. Federal Stock Number and Department of Defense Ammunition Code. The Federal stock number (FSN) replaces the Ammunition Identification Code (AIC) and the Ordnance Stock Number (OSN). An FSN is assigned to each end item of ammunition as packaged, and, unless there is a difference in packaging or packing, no two items bear the same FSN, nor is more than one FSN assigned to the same item. The Department of Defense Identification Code (DODIC) is used in requirement studies, worldwide reporting of stocks, and to denote interchangeability between items within FSC group 13. The FSN and DODIC are used in conjunction (i.e., 1345-096-3155 (C605)) as means of positive identification in requisitioning. The FSN consists of a 4-digit FSC class code number plus a 7-digit Federal item identification number (FIIN). For example, in FSN 1345-096-3155 the 1305 is the Federal Supply Classification (FSC) class code and the "-096-3155" is the FIIN. The class code indicates the commodity group (13) and the class (45) to which the item belongs. The FIIN is a group of nonsignificant digits used to provide positive identification to the item (a given FIIN is assigned to one FSN only, and is never duplicated or reused). The DODIC, composed of a letter and three digits, denotes interchangeability between like items of ammunition or explosive supply within group 13. This code is used in two ways: as a parenthetical suffix to a FSN, such as

"1345-096-3155 (C605)," or as a hyphenated suffix to a FSC classification code such as "1345-C605." In the second form it is known as a "DOD Ammunition Code". When requisitioning ammunition, the using unit will normally use the DOD ammunition code. However, if a particular item, model, or pack is desired, requisition by FSN and DODIC is authorized, but justification for such requests must be shown on the requisition. FSN's suffixed with identical DODIC's are functionally interchangeable and are considered as suitable substitutes for one another for supply purposes.

10. Care, Handling, and Preservation of Mines

Warning: Mines must be handled with care at all times. The explosive elements in fuses, primers, detonators, and boosters are particularly sensitive to mechanical shock, friction, static electricity, and high temperature. Boxes of crates containing mines should not be dropped, dragged, tumbled, walked on the corners, or struck, as in lining up a stack. The boxes should be electrically grounded whenever practicable and protected from high temperature.

a. General.

- (1) Mines are packed to withstand conditions ordinarily encountered in the field. Items that are not water-proofed are packed in moisture-resistant containers. Care must be taken to keep containers and packing boxes from becoming broken or damaged. All broken containers and packing boxes must be repaired immediately and careful attention given to the transfer of all markings to the new parts. Such containers should not be opened until the mines are about to be used or prepared for use. Items unpacked but not used should be repacked and the containers sealed. Such items should be used first in subsequent operations in order that stocks of opened containers and packing boxes may be kept to a minimum. When the ammunition packing box contains a metal liner,

the liner should be sealed and air-tested at 3 to 5 pounds per square inch, if equipment is available.

- (2) When it is necessary to leave mines in the open, raise them, on dunnage, at least 6 inches from the ground and cover them with a double thickness of paulin (tarpaulin), leaving enough space for the circulation of air. Drainage trenches should be dug around the stacks to prevent water from running under the pile.
- (3) Mines and components in their packings should be protected against moisture.
- (4) Boxes should not be opened in a magazine or at an ammunition dump, nor should they be opened within 100 feet of any store of explosive. Safety tools, if available, should be used in unpacking and repacking operations. Safety tools are those made of copper, wood, or other material incapable of producing sparks when struck.
- (5) No attempt will be made to fuze a mine closer than 100 feet to a magazine or other such stores of explosives or ammunition.
- (6) No disassembly of mines or components thereof will be permitted except as specifically authorized by the Army Materiel Command.
- (7) Safety pins, safety forks (clips), and other safety devices are designed to prevent accidental initiation of the mine while being handled. They should be left in place until the last possible moment before arming a mine, which should be done as prescribed in arming procedures for the particular item. Before removing (picking up) mines, safety devices should be replaced, that is, the mines should be properly disarmed.
- (8) Make certain that firing device wells, cap wells, activator wells, and fuze cavities are clear of obstruction and free of foreign matter before attempting to install the fuze or detonator.
- (9) Mines will usually function satis-

factorily at temperatures of -40° F. to 160° F. Most mines are not appreciably affected by temperature changes.

Caution: If the temperature fluctuates around freezing, steps must be taken to prevent moisture or water from accumulating around the mine and subsequently freezing. The mine may become neutralized by the formation of ice. See FM 20-32 for information on laying mines in winter weather.

- (10) Mines may be reused (taken up and relaid) any number of times provided that proper procedures as explained in this manual and in FM 20-32 are observed and that no components show evidence of damage or deterioration.

b. Field Storage and Preservation. The following conditions govern field storage of mines, fuzes, and detonators.

- (1) Mines are usually stored in isolated buildings or abandoned pill boxes which have been designated for this purpose. When specially constructed magazines are not available, buildings used should afford good protection against moisture and dampness, have adequate ventilation, and be on well-drained ground. They must not be heated with open fires or stoves.
- (2) Mines that must be stored in the open are stacked in small piles and protected from dampness and weather with tar paper and paulins.
- (3) Boxes, cases, and other mine containers must be clean and dry when stored. Before storing, damaged containers should be repaired or replaced, but not within 100 feet of magazines.
- (4) No oily rags, paint, turpentine, or other flammable material are to be left in a magazine.
- (5) Mines should be piled by type in small piles so arranged that individual containers are accessible for inspection and air can circulate freely. The tops of piles should be below the level of the eaves to avoid

the heated space directly below the roof. The bottom of the piles should be raised off the floor or ground at least 2 inches. Stacks must not be so high that containers or mines on the bottom will be crushed.

- (6) Individual magazines, or stacks of mines stored in the open, should be separated by distances adequate to prevent propagation of an explosion from one to another. Refer to TM 9-1300-206 (TM 9-1903) for such distances.
- (7) Magazines or storage areas must be kept free of dry leaves, grass, trash, empty boxes, scrap, lumber, and similar flammable material. A 50-foot firebreak should surround each magazine.
- (8) Smoking, carrying matches, or using lights other than approved electric lights is forbidden in magazines or mine-storage areas.
- (9) Store mines in accordance with prescribed procedures.
- (10) Captured enemy mines and explosives should be stored in dumps at least a quarter of a mile from the nearest dump of "friendly" ammunition. Mixed storage of enemy

and "friendly" ammunition is not permitted. For further storage precautions, see TM 9-1300-206 (TM 9-1903).

11. Packing and Marking for Shipment

a. Packing data for land mines and their components are given in SM 9-5-1345 (Conventional) or SM 3-1-1345 (Chemical).

b. In addition to nomenclature and lot number, packages offered for shipment are marked with the Interstate Commerce Commission shipping name of classification of the article, the names and addresses of consignor and consignee, volume, and weight, and the Department of Defense identification code which replace the ammunition identification code symbol formerly used.

12. Transportation

Transportation of explosives by rail or truck in the United States is regulated by "Interstate Commerce Commission Regulations for Transportation of Explosives and Other Dangerous Articles by Freight," published by the Bureau of Explosives, 30 Vesey Street, New York, N.Y. Refer also to AR 55-155 and AR 55-228.

CHAPTER 2

ANTIPERSONNEL MINES

Section I. SERVICE ANTIPERSONNEL MINES AND FUZES

13. General

a. *Uses.* Antipersonnel (APERS) service mines are used primarily as a hazard to restrict or delay movement of enemy foot troops by denying them access to certain areas. For this reason the number of casualties caused by these mines is of secondary importance. Antipersonnel mines are usually set off by enemy action (fig. 2), but some are so rigged that they may be initiated by a friendly observer when enemy troops move within range. Antipersonnel mines are not effective against armored vehicles; however, light, thin-skinned vehicles, such as trucks and jeeps, may be damaged or their occupants injured by a near by detonation. Special care must be taken in camouflaging antipersonnel mines because foot troops move slower and can therefore more readily detect poorly concealed installations. More detailed information on uses and tactical employment of the antipersonnel mines may be found in FM 20-32.

b. *Mines.* Representative types of antipersonnel mines are shown in figure 1. There are two general types of land mines — "fragmentation" and "blast effect". Fragmentation mines depend for

their effect upon high-velocity projection of fragments of the metal case. Blast type mines depend for their effect upon the shock of the explosion. For a more detailed general discussion of the types of antipersonnel mines, see paragraph 5c.

c. *Fuzes.* Functioning of antipersonnel mines is initiated by various types of fuzes. The fuze serves to transform mechanical action, such as pressure on the fuze or pull on the trip cord, into an explosive force which detonates the high-explosive charge or into a burning action which ignites the propelling charge of a bounding-type antipersonnel mine. A fuze which provides explosive force is called a *detonating fuze*; which provides burning action is called an *igniting fuze*.

Note. Detonating fuzes and igniting fuzes are functionally different and therefore are not interchangeable.

The initiating action for an APERS fuze is normally either pressure directly on the fuze or a pull on a trip wire attached to the fuze (fig. 2).

d. *Data.* Tabulated data on antipersonnel mines and fuzes may be found in table I. Additional data may be found in paragraphs 14 and 22.

Table I. Service Antipersonnel Mines and Fuzes

Service Antipersonnel Mines					
Nomenclature	Packing description	Weight as shipped (lb.)	Shipping case dimensions (in.)		
			Length	Width	Height
MINE, ANTIPERSONNEL: M2 and fuze, mine, combination M6A1.	Packed 1 mine w/1 spool of four 26-ft length of steel wire/ctn, 10 ctn (10 mine w/accessories)/wdn bx.	93.4	32	13-1/4	9-1/2
MINE, ANTIPERSONNEL: M2A1, and fuze, mine, combination M6A1.	Packed 1 mine w/1 spool of four 26-ft length of steel wire/ctn, 10 ctn (10 mine w/accessories)/wdn bx.	93.4	32	13-1/4	9-1/2
MINE, ANTIPERSONNEL: M2A3 and fuze, mine, combination M6A1.	Packed 1 mine w/1 spool of four 26-ft length of steel wire/ctn, 10 ctn (10 mine w/accessories)/wdn bx.	76.6	22-3/4	10-1/4	9-3/8
MINE, ANTIPERSONNEL: M2A4 and fuze, mine, combination M6A1.	Packed 1 mine w/1 spool of four 26-ft length of steel wire/ctn, 6 ctn (6 mine w/accessories)/wdn bx.	45.3	15	10-1/4	9-3/8

Table 1. Service Antipersonnel Mines and Fuzes—Continued

Service Antipersonnel Mines—Continued					
Nomenclature	Packing description	Weight as shipped (lb.)	Shipping case dimensions (in.)		
			Length	Width	Height
	Packed 1 mine w/1 spool of four 26-ft length of steel wire/ctn, 10 ctn (10 mine w/accessories)/wdn bx.	76.6	22-3/4	10-1/4	9-3/8
MINE, ANTIPERSONNEL: M3 and fuze, mine, combination M7A1.	Packed 4 mine w/4 fuze and 4 spool of steel wire/wdn bx. Packed 6 mine w/6 fuze and 6 spool of steel wire/wdn bx.	----- 75.6	----- 17-7/8	----- 8-3/4	----- 9-1/2
MINE, ANTIPERSONNEL: M16 and fuze, mine, combination M605.	Packed 4 mine w/4 fuze M605/mtl ctnr and 4 spool trip wire & 1 wrench M25/wdn bx.	44.8	15-5/8	10-1/8	8-1/2
MINE, ANTIPERSONNEL: M16A1 and fuze, mine, combination M605.	Packed 4 mine w/4 fuze M605/mtl ctnr and 4 spool trip wire and 1 wrench M25/wdn bx.	44.8	15-5/8	10-1/8	8-1/2
MINE, ANTIPERSONNEL: M18 (T48) w/carrying kit M-68 w/sights.	Packed 1/kit, 6 kit/wtrprf wrppd ctn, 1 ctn (6 mine)/wdn bx.	32.0	23-3/4	10-1/8	9-3/8
MINE, ANTIPERSONNEL: M18 (T48) w/carrying kit M-68 (T66).	Packed 1 mine w/1 blasting cap and 1 battery holder assy in carrying kit M68, 6 kit (6 mine)/fbrbd ctn, 1 ctn/wdn bx.	41.0	23-3/4	10-1/8	9-3/8
MINE, ANTIPERSONNEL: M18 (T48) w/carrying kit M-69 (T67).	Packed 5 mine w/5 electric blasting cap and 5 spool wire/carrying kit M69 (T67), 2 kit (10 mine)/wdn bx.	45	14-1/8	11-1/2	15-1/2
MINE, ANTIPERSONNEL: M18A1 w/accessories.	Packed 1 mine w/accessories in M7 band (6 mine and 6 band)/wdn bx.	-----	-----	-----	-----
MINE, ANTIPERSONNEL: NM, M14 w/integral fuze.	Packed 90 mine/ctn (w/90 detonator M46 in set-up-box) and 6 wrench M22/wdn bx. Packed 90 mine/ctn (w/90 detonator M46 in set-up-box) and 9 wrench M22 wdn bx.	44.1 45.70	19-3/4 19-3/4	17-1/4 17-1/4	8-3/4 8-3/4
Service Antipersonnel Mine Fuzes					
Nomenclature	Packing description	Weight as shipped (lb.)	Shipping case dimensions (in.)		
			Length	Width	Height
FUZE, MINE: combination M6A1.	Packed 3/ctn, 16 ctn (48 fuze)/wdn bx.	32.3	22-3/4	10-1/4	9-1/2
	Packed 3/crdbd ctn, 4 ctn/strprf pkg, 4 pkg (48 fuze)/wdn bx.	32.8	32-5/8	10-3/8	9-3/8
	Packed 3/ctn, 30 ctn (90 fuze)/wdn bx.	56.0	32	13-1/4	9-1/2
	Packed 3/ctn, 2 ctn/wtrprf pkg, 15 pkg (90 fuze)/wdn bx.	56.0	32	13-1/4	9-1/2
FUZE, MINE: combination M7A1.	Packed 3/ctn, 16 ctn (48 fuzes)/wdn bx.	30.1	22-3/4	10-1/4	9-1/2
	Packed c/crdbd ctn, 4 ctn/wtrprf pkg, 4 pkg (48 fuze)/wdn bx.	33.0	22-5/8	10-3/8	9-3/8
	Packed 3/ctn, 2 ctn/wtrprf pkg, 8 pkg (48 fuzes)/wdn bx.	33.0	22-5/8	10-3/8	9-3/4
	Packed 3/ctn, 30 ctn (90 fuze)/wdn bx.	56.0	32	13-1/4	9-1/2
	Packed 3/ctn, 2 ctn/strprf pkg, 15 pkg (90 fuze)/wdn bx.	56.0	32	13-1/4	9-1/2

14. Mine, Antipersonnel, M2A4 with Fuze, Mine, Combination, M6A1 (fig. 8)

a. *General.* The antipersonnel mine M2A4 is of the "bounding type." To obtain a more effective fragmentation pattern, the main charge (bursting charge, contained in a heavy steel tube) is projected several feet into the air by a propelling charge before it is exploded. If the main charge were exploded in the ground most of the fragments would be imbedded in the earth and the effective fragments would be few in number and the effective radius very small.

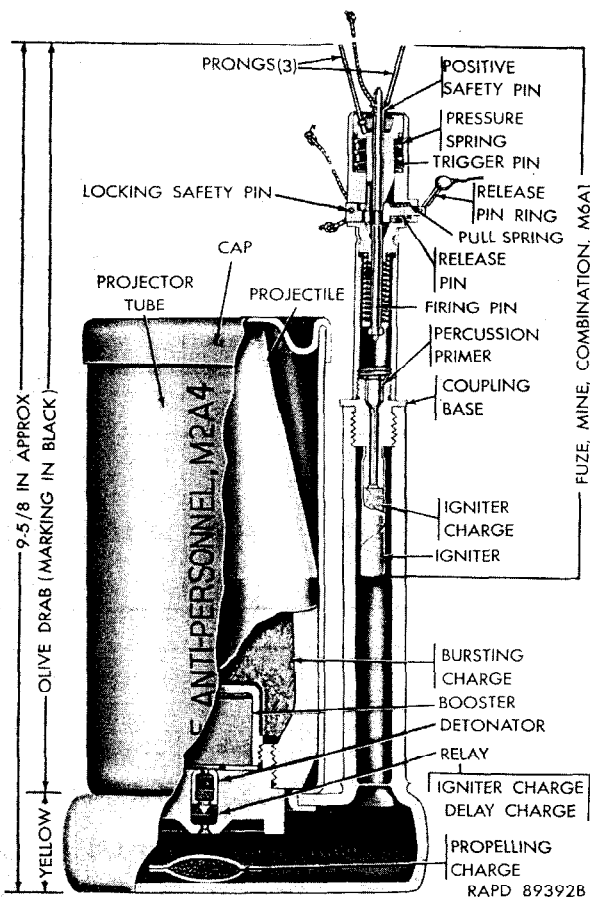


Figure 8. Mine, antipersonnel, M2A4 with fuze, mine, combination, M6A1.

b. *Description.* This mine consists of a combination mine fuze M6A1 (par. 15), a propelling charge and a projectile all contained in a steel case as shown in figure 8. The fuze is screwed into the tube attached to the base of the mine case. This

base also contains the propelling charge. The projectile, which is a modified 60-mm mortar shell, is contained in the projector tube attached to the base. When the mine is triggered, the projectile acts as a mortar. Detailed data on this mine and fuze are listed in (1) and (2) below. Several earlier models of the M2 series are available, as shown in table I. Except for minor improvements in design, the M2A 4 is identical to earlier versions of the M2. The information in c through h below applies to all models of the M2 series.

(1) *Mine.*

Model number — M2A4.

Type — bounding, fragmentation.

Weight, loaded and fuze — 5.01 pounds.

Dimensions — height, fuzed, 9-5/8 inches; diameter plus portion of base for fuze, 3-3/4 inches.

Material — steel.

Fuze well — capped (hex cap) as shipped; located in the tube extending upward from base.

Relay — consists of delay and igniter charges — located in base plug of projectile.

Detonator — consists of primary and secondary detonating charges — located adjacent to relay in base plug of projectile.

Booster (tetryl) — located adjacent to detonator in base plug of projectile.

Weight of explosive charge (TNT) — 0.34 pound.

Weight of expelling charge (black powder) — 40 grains, located in base of mine near opening to delay charge in base plug of projectile.

Painting — body, olive drab; base, yellow.

Marking — nomenclature of mine, month and year loaded, and lot number (including loader's initials and symbol) — all in black.

Shipping cap — hexagonal shipping cap is on coupling base which is in fuze well as shipped. Coupling base contains primer and is fitted with crimped-on igniter.

- (2) *Fuze* (par. 15).
 Model — number M6A1.
 Components — firing mechanism and primed coupling base with crimped-on igniter.
 Type — combination.
 Weight of igniter charge (black powder) — 10 grains.
 Length — 7.18 inches (approx.).
 Thread size — 9/16 inch.
 Material — zinc-base alloy.
 Safeties — locking safety pin (cotter pin type) in release pin at end opposite release pin ring; positive safety pin (cotter pin type) in end of firing pin between pressure prongs.
 Painting — olive drab.

c. Functioning.

- (1) Pressure of 8 to 20 pounds acting on one or more of the three prongs of the fuze, or, pull of 3 to 10 pounds on a trip wire attached to the release pin ring of the fuze causes release of firing pin which is then forced downward by the firing pin spring and strikes the primer.
- (2) Primer projects a flame to igniter charge.
- (3) Igniter transmits flame to propelling charge.
- (4) Propelling charge transmits flame to delay charge and projects the shell (modified 60-mm mortar shell) from mine.
- (5) Delay charge then transmits flame to ignite charge, which causes detonator, booster, and bursting charge to function bursting the shell at a height of approximately two to three meters.

d. Laying and Arming.

- (1) Prepare a hole in the ground with a firm foundation at the bottom and a depth such that the fuze prongs, with the mine emplaced, extend about 1/4-inch to 3/4-inch above ground level.
- (2) After unpacking a mine and a firing mechanism (packed in the carton with the mine) (fig. 9), test the locking safety pin and the positive safety pin for freedom from bind-

ing. If either of these safety pins binds when twisted in their holes, turn in the mine to appropriate technical personnel for inspection.

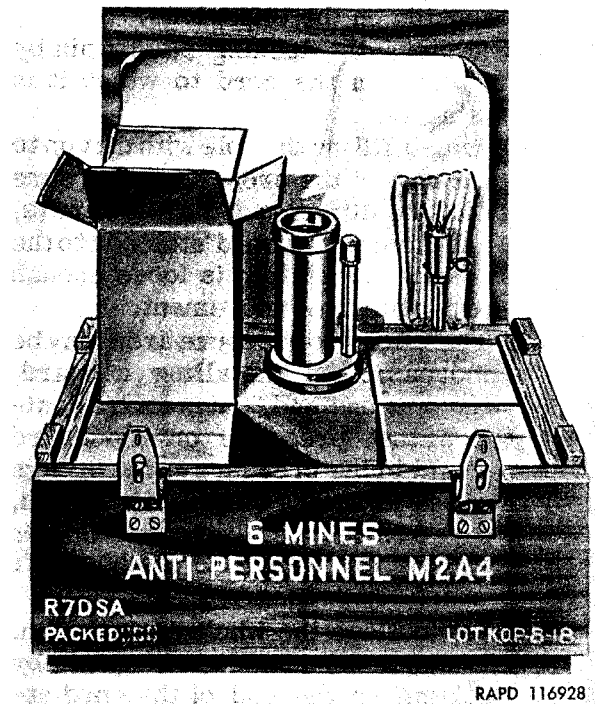


Figure 9. Packing box for antipersonnel mine M2A4 and fuze M6A1.

- (3) Unscrew the hexagonal shipping cap from the coupling base in the mine, inspect the fuze well for foreign matter, and screw the firing mechanism to the coupling base hand-tight.
- (4) Place the mine upright in the hole so that the trips of the prongs on the fuze protrude above ground level ((1) above). Pack dirt tightly around and over the mine to just below the release pin level. After emplacement, check mine for stability by attempting to move the mine laterally. If the mine moves, pack dirt more solidly around the mine.
- (5) Install one or more trip wires by attaching them first to firmly driven stakes and then to the release pin ring, leaving enough slack in the trip wires to allow the top of the fuze to rotate to receive a direct

pull on the release pin ring from any one of the trip wires. This is necessary for proper functioning of the fuze.

Caution: Be sure that there is no tension on the trip wires.

- (6) Remove the locking safety pin by pulling on the cord to which it is attached.
- (7) Finish filling the hole with dirt up to the tips of the prongs, making sure that the dirt around the trip wire (s) and around the cord attached to the positive safety pin is loose enough to permit free movement.
- (8) The effective pressure area may be increased by installing a board, fixed at one end, and in such a position that pressure on the board would bring pressure on the prongs of the fuze. If a board is installed, care must be exercised *not to allow the weight of the board to exert any pressure on the fuze.*
- (9) Camouflage the whole installation.
- (10) Remove the positive safety pin by pulling on the end of the cord attached to it, thus arming the fuze.

Warning: Do not disturb the trip wires.

- (11) Save the hexagonal shipping cap and both safety pins for use in disarming the fuze.

e. Boobytrapping. This mine has no provision for a secondary boobytrapping fuze. Boobytrapping will be done only by especially trained personnel. Refer to FM 5-31.

f. Disarming and Removal (Neutralizing).

Warning: Do not attempt to disarm or remove any mine that is frozen in or to the ground.

- (1) Carefully inspect the installation for boobytraps and boobytrapping devices before *each* of steps (2) through (7) below.
- (2) Carefully remove the camouflage material and pressure board, if any.
- (3) Carefully remove the dirt from around the top of the mine to expose both the positive safety pin

hole and the locking safety pin hole.

- (4) Insert the positive safety pin *first*, and then insert the locking safety pin.
- (5) Disconnect the trip wires.
- (6) Remove the remaining dirt from the hole and remove mine.
- (7) Unscrew the firing mechanism from the fuze, taking care *not* to remove the coupling base containing the primer from the mine.
- (8) Replace the hexagonal shipping cap and return the mine and firing mechanism to their original condition and packing.

g. Effectiveness.

- (1) Casualty radius, approximately 10 meters.
- (2) Danger radius, approximately 150 meters.
- (3) Ten percent more effective than antipersonnel mine M16A1 (par. 18).

h. Special Precautions.

- (1) No attempt will be made to disassemble the mine beyond unscrewing the firing mechanism from the base coupling when a mine is removed from the emplaced position.
- (2) Mines with loose projector caps or with a loose primer in the base coupling will not be used until inspection by ordnance personnel shows that the igniter charge and propelling charge have not been damaged by moisture, and the projector cap and the primed base coupling with igniter charge (primer and igniter assembly) have been resealed.
- (3) Although the mine is water resistant, it should not be expected to function after prolonged submergence in water.

Note 1. The mine may be laid and removed any number of times if not damaged or deteriorated, and if the above instructions are followed. Do not use mines if either the mine projector cap or the coupling base containing the primer are loose, except as provided in (2) above.

Note 2. Hexagonal shipping and storage

cap is removed from base coupling in the field and replaced with firing mechanism.

15. Fuze, Mine, Combination, M6A1

a. Description. This fuze (fig. 8), which is used with all antipersonnel mines, M2 series, consists of a tripronged firing mechanism, and a base coupling fitted with a percussion cap primer and a black powder igniter. This base coupling assembly is assembled to the mine as issued and the firing mechanism is packed separately in the mine packing box. The base coupling assembly is protected by a hexagonal shipping cap. Completely assembled fuzes may also be requisitioned separately (Table I). The firing mechanism consists of a cylindrical head and body, the head being slightly larger in diameter. The head contains a spring-loaded trigger pin to which the three pressure prongs are attached. The head also contains a spring-loaded release pin with the locking safety pin and with a release pin ring for attachment of a pull or trip wire. The head and body of the firing mechanism contain a firing pin which consists of a 1/8-inch steel rod recessed near the center for engagement of the release pin. The positive safety pin is located near the top of the firing pin between the prongs of the firing mechanism head. See paragraph 14b(2) for additional data on this fuze.

b. Functioning. The firing mechanism is initiated by a pull on a trip wire attached to the release pin ring, thus releasing the firing pin, or by pressure on one or more of the prongs of the head. Such pressure depresses the trigger pin which operates the release pin which, in turn, releases the firing pin. A pull of 3 to 10 pounds on the release pin ring or a force of 8 to 20 pounds on one or more of the prongs protruding from the top of the head depresses the head about 9/32-inch and causes the fuze to function.

Warning: When the fuze is unpacked for use, it should be inspected to insure that the trigger pin in which the prongs are set (fig. 8) is fully seated, and that the safety pins do not bind. If the fuze fails to meet any of these requirements, it is unsafe and should not be used.

16. Mine, Antipersonnel, M3 and Fuze, Mine, Combination, M7A1

a. General. Antipersonnel mine M3 is a fragmentation-type mine. It consists of a high-explosive charge in a heavy cast iron case. It is normally placed at the surface of the ground, as shown in figure 4. However, its effective radius can be increased if it is raised several feet off the ground. Its effective radius is considerably reduced when the mine is buried. The mine case has three fuze wells which permit boobytrapping on a variety of fuzing arrangements.

b. Description. (fig. 10).

(1) *Body.* The cast-iron body is filled with 0.90 pound of flake TNT. There are threaded fuze wells in two opposite sides and one end. The fuze (M7A1), which consists of a firing mechanism and a primed base coupling to which a nonelectric blasting cap is crimped, may be inserted in any one of these wells. As shipped, the holes are closed with slotted plastic plugs. In one end, opposite the end containing the threaded well is a filling hole which is closed with a metal disk. Additional information may be found in table I.

(2) *Fuze.* The fuze M7A1 is described in paragraph 17.

Note. Fuze M7A1 is not interchangeable with the M6A1 (par. 15).

c. Functioning. A pressure of 8 to 20 pounds on any of the prongs of the fuze or a pull of 3 to 10 pounds on the release pin ring will release the firing pin. The firing pin strikes the primer. A small, intense spit of flame from the primer explodes the nonelectric blasting cap crimped to the base coupling of the fuze, which in turn explodes the TNT bursting charge. The exploding charge fragments the cast iron case and propels the fragments at high speed in all directions away from the blast.

d. Installation and Arming. Remove a mine from the packing case (fig. 12). Prepare the mine for use by testing the safety pins (cotter pins) on the fuze (fig. 13) for freedom from binding. The mine may be installed with any one or all of the fuzes

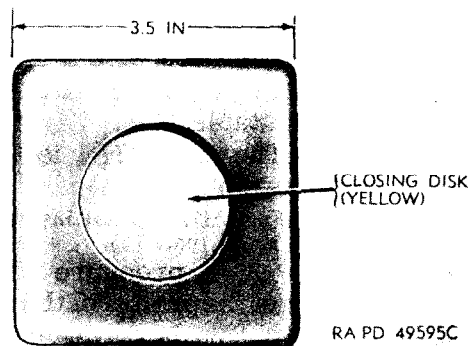
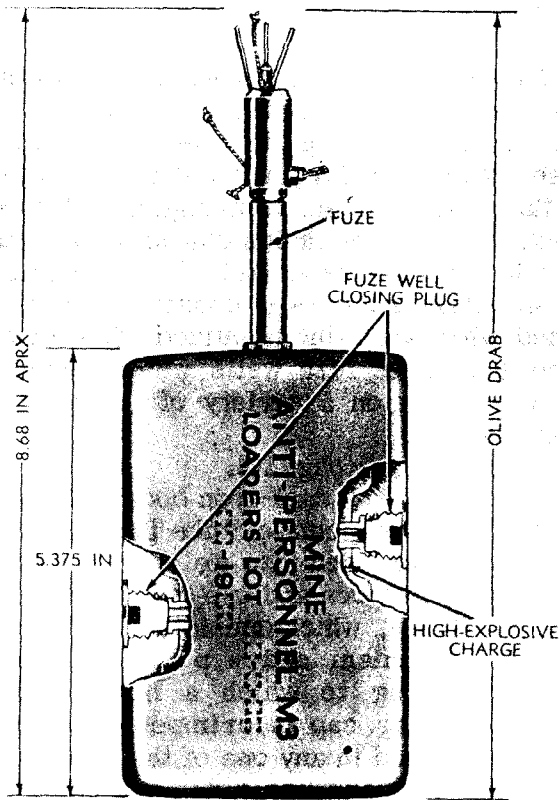


Figure 10. Mine, antipersonnel, M3 and fuze, mine, combination, M7A1.

arranged for trip-wire operation, pressure operation, or both.

(1) For trip-wire operation

(a) Anchor the mine firmly so that it will not move when the trip wire is pulled. The mine may be secured by partially burying it and packing it with earth, or by tying or taping it to a tree, stakes, or other immovable object.

(b) Remove one, two, or three of the closing plugs depending upon how many fuzes are to be used for the

particular operation. Use wrench packed with mines. Conceal the plugs for possible future use in disarming in accordance with FM 20-32.

- (c) Inspect the threaded well to insure absence of foreign matter.
- (d) Screw in the fuze or fuzes, making sure that the nonelectric blasting cap is attached.
- (e) Attach the trip wires to anchor stakes and then to the release pin ring of the fuze, making certain that most of the slack of the wire is taken up but that the wire is not tight enough to exert any pull on the ring. If more than one trip wire is attached to a single fuze, leave enough slack in the trip wire to allow the top of the fuze to rotate just enough to receive a direct pull on the release pin ring by any one of the trip wires. This is necessary for proper functioning of the fuze.

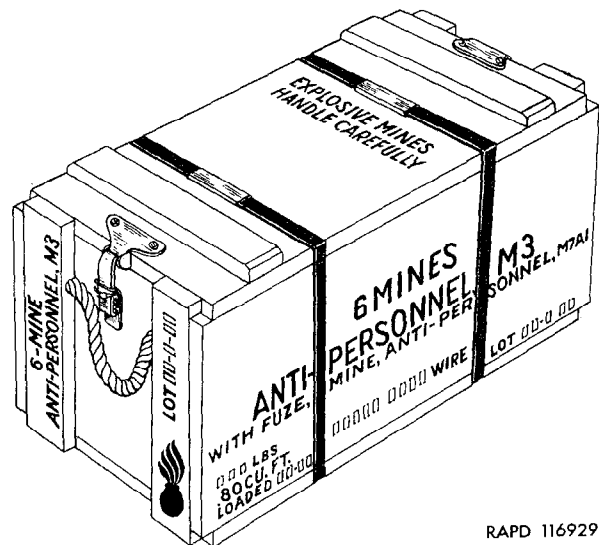


Figure 11. Packing box for antipersonnel mine, M3 and fuze, M7A1.

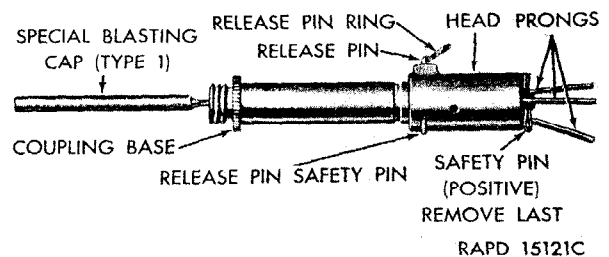


Figure 12. Fuze, mine, combination, M7A1.

- (f) Camouflage the installation in accordance with FM 5-20.
 - (g) Arm the fuze or fuzes by first pulling out the release pin safety pin and then pulling out the safety pin (positive) located between the three prongs. Neither safety pin may bind.
 - (h) Do not adjust or disturb the trip wires.
- (2) *For pressure operation.*
- (a) Place the mine in a hole with top of prongs of a fuze one-fourth of an inch below ground level.
 - (b) A pressure board may be placed to bear very lightly on prongs of mine.
- Warning: If a pressure board is used, it must be so placed that it exerts practically no pressure on prongs.**
- (c) Cover and camouflage the mine.
 - (d) Arm the fuze or fuzes by first pulling out the release pin safety pin (locking safety pin) and then pulling out the firing pin safety pin (positive safety pin) located between the three prongs. Neither may bind.

e. *Arming From a Distance.* If desired, a 10- to 18-inch piece of No. 16 wire attached to a long cord may be inserted in place of the locking and positive safety pins (always remove the positive safety pin last) so that the arming may be done from a distance.

f. *Boobytrapping.* This mine may be boobytrapped to prevent disturbance or removal, by using the firing devices (with nonelectric blasting caps) described in paragraph 41. The firing devices with blasting caps are screwed into the fuze wells not occupied by the main fuze. Figure 4 shows a mine M3 with antilift and anti-disturbance boobytrapping arrangements. Before attempting to use the various firing devices available, personnel should study the instructions for their use contained in TM 9-1375-200.

g. *Disarming and Removal (Neutralizing) a Trip-Wire Installation.*

- (1) Inspect carefully for boobytraps.
- (2) Insert the firing pin safety pin

(positive) first, and then insert the release pin safety pin (locking).

- (3) Disconnect the trip wires.
- (4) Remove the mine.
- (5) Remove the fuze or fuzes, including base coupling with blasting cap attached.
- (6) Replace the closing plugs and return the mine and its components to their original packings.

h. *Disarming and Removal (Neutralizing) a Pressure Installation.*

- (1) Inspect carefully for boobytraps.
- (2) Remove pressure board, if any.
- (3) Insert the firing pin safety pin ("positive" safety pin).
- (4) Remove the mine.
- (5) Remove the fuze or fuzes, including base coupling with blasting cap attached.
- (6) Replace the closing plugs and return the mine and its components to their original packings.

Note. The mine may be laid and removed according to the above instructions any number of times if not deteriorated or damaged.

i. *Effectiveness.*

- (1) Effective radius, 10 meters when detonated at surface of ground.
- (2) Effective radius may be increased by detonating above ground.
- (3) Fragments may be thrown more than 100 meters.

Warning: Make sure that friendly troops within a radius of 100 meters of a laid mine are adequately protected.

17. Fuze, Mine, Combination, M7A1

This fuze (figs. 12 and 13) consists of a three-pronged firing mechanism of the same type used with the fuze M6A1 (par. 15) and a primed base coupling which is fitted with a blasting cap. The base coupling used with the fuze M7A1 is a 1/4-inch shorter than the one used with fuze M6A1. A blasting cap is employed by fuze M7A1 because it is used with the antipersonnel mine M3 in which the high explosive is directly exploded by the cap, whereas the igniter of the fuze M6A1 used with M2 series mines ignites a propelling charge in the bottom of the mine.

Warning: When the fuze is unpacked for use, it should be inspected to insure that the trigger pin is seated against the crimping at the top of the head, that the release pin is fully seated, and that the safety pin (cotter pin) does not bind. If the fuze fails to meet any of these requirements, it is unsafe and should not be used. For information on installation, arming, and neutralizing, refer to paragraph 16. As shipped, the fuze M7A1 is a complete assembly consisting of firing mechanism and primed base coupling with crimped-on blasting cap. This complete assembly is packed separately but in the same packing box with the mine. The fuzes are also packed for the separate issue, the method of packing being identical to that for fuzes M6A1. See table I for details.

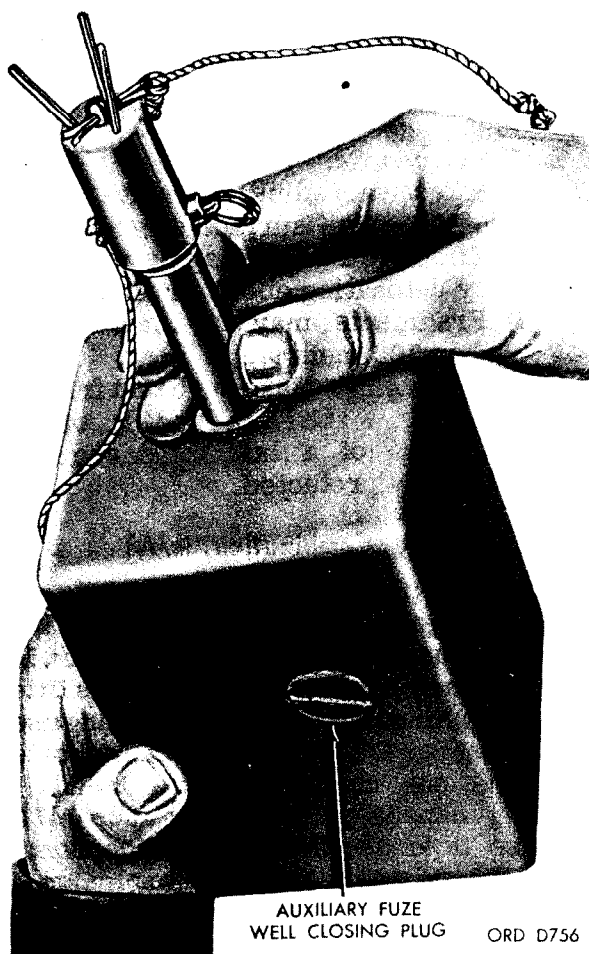


Figure 13. Installing fuze M7A1 in anti-personnel mine M3.

18. Mine, Antipersonnel, M16A1 with Fuze, Mine, Combination, M605

a. General. This mine (fig. 14) is of the bounding fragmentation type and functions similarly to mine M2A4 described in paragraph 14. The M16A1 has an explosive charge three times larger than the M2A4 and therefore has a more effective fragmentation pattern and a larger effective radius.

b. Description. This mine consists of a combination mine fuze M605 (par. 19), a propelling charge, and a projectile, all contained in a sheet steel case (fig. 15). The fuze screws into the top of the case and extends through the center of the projectile to the bottom of the case, where the expelling (propelling) charge is located. The remaining space inside the case is occupied by the projectile. Detailed data on this mine and fuze are listed in (1) and (2) below. Additional data may be found in table I. An earlier model, the M16, is also available for issue as shown in table I. The principal differences between the M16A1 and M16 are in the construction of the detonators and boosters. Figure 16 shows the differences between the two models. The information in *e* through *i* below pertains to both models.

(1) Mine.

Model number - M16A1.

Type - bounding, fragmentation.

Weight, loaded and unfuzed - 7-7/8 pounds (approx.)

Dimensions - height, shipping, 5-1/2 inches (approx.)

height fuzed, 8 inches (approx.)

diameter, 4-1/16 inches.

Material - steel and cast iron.

Fuze well - in center of mine, closed with hexagonal shipping plug, as shipped.

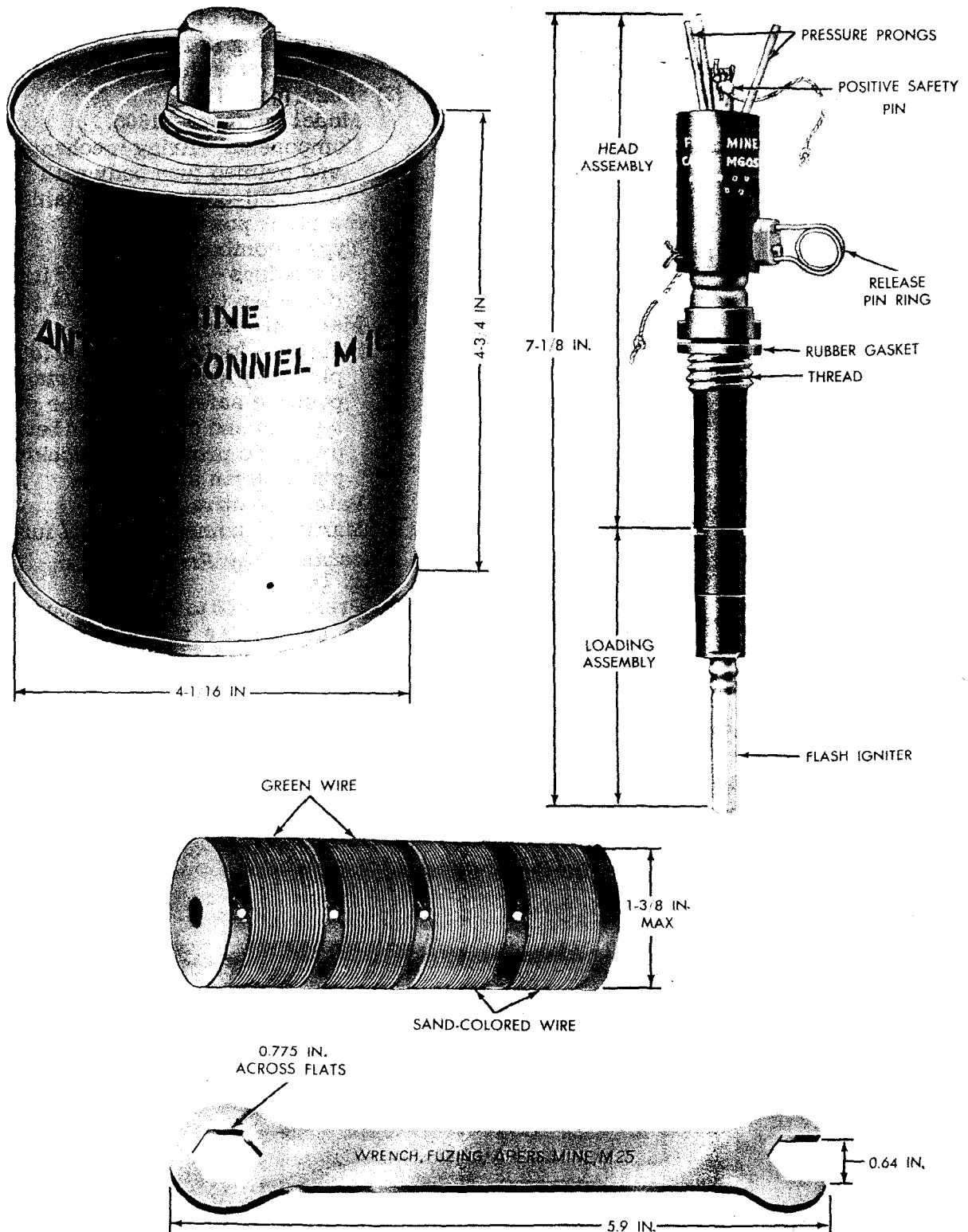
Two delay charges.

Two detonators.

Two boosters (tetryl).

Weight of bursting charge (TNT) - 1 pound.

Weight of expelling charge (black powder) - 75 grains (approx.).



ORD D757

Figure 14. Items contained in antipersonnel mine M16A1 packing case—antipersonnel mine M16A1, combination mine fuze M605, trip wire, and fuze wrench, M25.

Painting - olive drab.
 Marking - nomenclature of mine,
 month and year loaded, and lot
 number (including loader's
 initials and symbol) - all in
 yellow.
 Shipping plug - hexagonal shipping

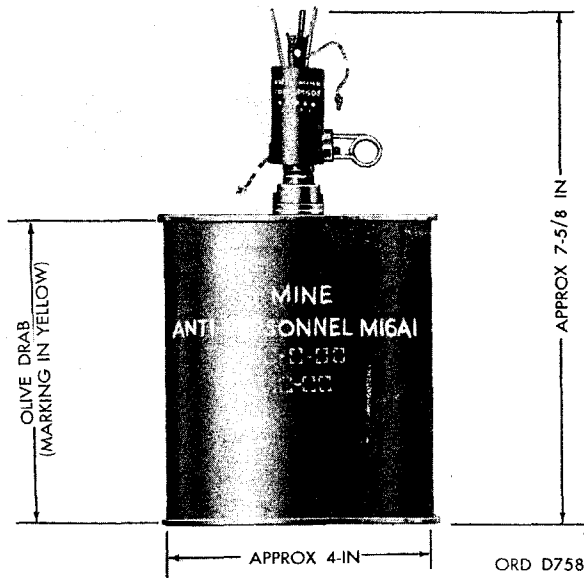


Figure 15. Mine, antipersonnel, M16A1 and fuze, mine combination, M605.

plug is in place in the fuze well
 (in center of mine) as shipped.
 This plug is removed and
 replaced with fuze in the field.
 (2) *Fuze.* (par. 19).
 Model number - M605.
 Components - firing mechanism
 and primed fuze body with
 crimped-on igniter containing
 a black powder charge.
 Type - combination.
 Dimensions - length, 7-1/8 inches;
 diameter (overall), 1-3/4 inch.
 Material - metal.
 Safeties - locking safety pin (cotter
 pin type) in release pin ring;
 positive safety pin (cotter pin
 type) in end of firing pin between
 pressure prongs; interlocking
 pin between safety pins.
 Painting - olive drab.
 Marking - nomenclature of fuze.

c. *Functioning by Pressure*
 (fig. 16).

(1) Pressure of 8 to 20 pounds on either
 of the three prongs of the fuze
 compresses the pressure spring.

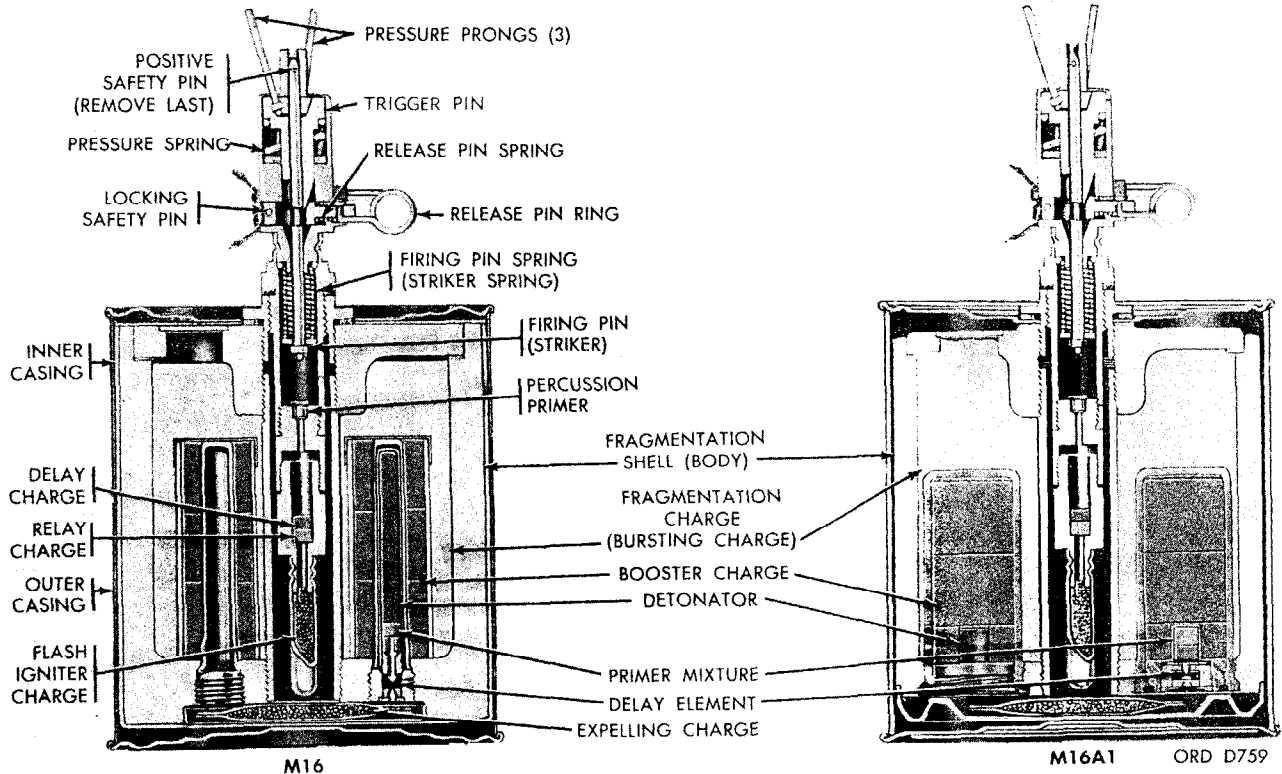


Figure 16. Comparison of antipersonnel mines M16 and M16A1.

- (2) Pressure spring forces the trigger downward.
 - (3) Wedge-shaped tip of trigger forces release pin outward to position where firing pin (strike) is released.
 - (4) Firing pin spring forces firing pin downward.
 - (5) Firing pin hits primer, which ignites the fuze delay charge.
 - (6) Fuze delay charge while burning allows time for person stepping on prong(s) to move from directly above mine.
 - (7) Fuze delay charge then ignites the fuze relay charge, which ignites the fuze igniter charge.
 - (8) Fuze igniter charge ignites the mine propelling (expelling) charge.
 - (9) Mine propelling charge projects cast-iron shell upward from mine body and at the same time ignites the two detonator delay charges.
 - (10) When shell is approximately one meter above the ground the detonator delay charges have burned through, initiating the detonators.
 - (11) Detonators explode boosters which in turn explode bursting charge.
 - (12) Explosion of bursting charge shatters shell, projecting metal fragments in all directions.
 - (13) The mine will explode even if restrained by a weight or barrier, from being projected upward.
- e. Functioning by Pull.*
(fig. 14).
- (1) Pull of 3 to 10 pounds on a trip wire attached to the release pin ring of the fuze pulls release pin outward to position where firing pin (striker) is released.
 - (2) Functioning from this point on is the same as described in *d*(4) through *d*(13) above.
- f. Installing and Arming.*
- (1) Unscrew the hexagonal shipping plug from the fuze well of the mine, using the closed end of fuzing wrench M25 issued with the mine.
 - (2) Examine the fuze well and flash tube for evidence of obstruction or foreign matter. To remove obstructions or foreign matter, turn the mine upside down and gently tap its bottom. If any mines appear to be damaged or in an unsatisfactory condition, they should be carried to a safe place and destroyed with explosives by authorized personnel as prescribed in TM 9-1300-206 (TM9-1903).
- (3) Carefully examine the fuze assembly, including the crimping at the top of the fuze where it touches the top of the trigger, for evidence of damage. Check the safety pins to see that they move freely in the safety pin holes. Be sure the rubber gasket is around the fuze case.
 - (4) Screw the fuze assembly into the fuze well of the mine and tighten it securely against the rubber gasket, using the open end of the combination wrench M25.
 - (5) Dig a hole about 6 inches deep and about 5 inches in diameter.
Note. When buried so that the tops of the pressure prongs are about even with the surface of the ground, sympathetic detonation will occur when mines M16 are laid approximately 1.5 to 2 meters apart.
 - (6) Place the mine in the hole. It can be installed so that it will detonate by pressure alone; or it may be installed with trip wires, in which case the mine can be detonated either by pressure on the pressure prongs or by pull on the trip wires, as described in (a) and (b) below.
 - (a) *For pressure actuation.* Cover the mine with spoil (dirt) from the hole, pressing it firmly into place around the sides of the mine. Leave the release-pin ring and pressure prongs exposed. Arrange the pull cords on the safety pins for easy withdrawal. Camouflage the installation in accordance with instructions in FM 20-32. Remove the locking safety pin. After the locking safety pin is removed, the interlocking pin can be removed from the positive safety pin, which is located between the prongs. Finally, remove the positive safety pin, thus arming the fuze.

Warning: If the positive safety pin is hard to remove the fuze should be replaced with a new one.

- (b) *For trip-wire actuation.* Cover the mine with spoil (dirt), pressing it firmly in place around the sides of the mine. Leave the release-pin ring and pressure prongs exposed. Drive two anchor stakes approximately 10 meters (approx. 33 feet) from the mine. Locate the stakes so that wires, when attached, will form a wide "V." A third trip wire and anchor stake may be installed, if desired. This prevents any lateral movement of the enemy. Fasten a separate wire to each anchor stake, then fasten the free ends to the release pin ring of the fuze. Follow the steps outlined in (a) above for removing the safety pins.

Warning: Do not install the trip wires so taut that they exert pull on the release pin ring, as this might cause the mine to detonate accidentally when the safety pins are removed.

g. Boobytrapping. No secondary fuze wells for boobytrapping are provided in the mine M16, and boobytrapping will be done only by especially trained personnel. Refer to FM 5-31.

h. Disarming and Removal.

- (1) After locating the mine and checking for boobytraps, carefully uncover the top and examine it for evidence of malfunctioning or damage from blast.

Warning: If the mine is damaged, do not attempt to neutralize it. Either destroy it in place with a prepared charge, or attach a 50-meter length of wire or rope to the head of the fuze and, from a protected position, pull the mine from the hole. Be sure to examine such protected position for mines before occupying it.

- (2) If the mine does not appear to be damaged, insert the original or a

like safety pin (cotter pin), a length of steel wire, or a nail of proper diameter through the positive safety pin hole (located between the prongs of the fuze).

- (3) Insert the safety pin, a length of steel wire, or a nail through the locking safety pin hole (located in the head of the fuze, opposite the release pin ring).

Warning: The positive safety pin must be inserted FIRST. In case the fuze malfunctions, the positive safety pin stops any action that starts.

- (4) Cut all slack trip wires attached to the release pin ring.

Warning: Never cut a taut wire until the other end has been examined to see that it is not anchored to another mine.

- (5) Carefully dig around the sides and bottom of the mine and check for boobytrapping devices. (If the mine is boobytrapped, proceed as outlined in Warning in (1) above.)

- (6) Lift the mine from the ground.

- (7) Unscrew and remove the fuze assembly from the mine.

- (8) Replace the shipping plug.

- (9) Restore mine to original condition and packing.

i. Effectiveness.

- (1) Casualty radius when exploded, approximately 30 meters.

- (2) Danger radius 200 meters.

- (3) The mine M16 is a highly effective weapon, capable of killing or injuring personnel in the vicinity of the mine. It is more effective than the M2 series bounding type antipersonnel mine (para. 14). This mine is primarily employed in mixed mine fields to protect antitank mines against enemy breaching parties. However, it can be used by itself in the preparation of ambushes or in the nuisance mining of areas likely to be occupied by enemy troops.

- (4) Since both the pressure prongs and trip wires will be exposed after the mine is installed, the M16 is

best employed where at least 3 inches of natural cover is available. When installed for trip-wire actuation, a maximum of front can be covered with a single mine. Normally, 2 trip wires are used with each mine. The spool of trip wire packed with each mine contains 4 separate 12 meter lengths. Two are green, and two are sand colored. Always select the color that blends best with the terrain or vegetation. If it is necessary to install this mine in bare or sparsely-covered ground, the use of trip wires is undesirable; a soldier walking erect is not likely to detect the pressure prongs unless alerted to the presence of the mines.

j. Special Precautions.

- (1) No attempt will be made to disassemble the mine (except as required in *e* and *g* above), to unscrew the shipping plug in preparation for fuzing, or to unscrew and remove the fuze in neutralizing operations.
- (2) Mines with broken or jammed outer casing or fuzes from jammed or dented metallic containers will not be used until inspection by ammunition personnel shows that neither the propelling charge of the mine nor the fuze has been damaged by moisture or otherwise.

19. Fuze, Mine Combination, M605

a. General. This fuze consists of two main assemblies, the head assembly and the loading assembly (figs. 14, 15, and 17). Although somewhat similar in design, the M605 and the M6A1 (par. 15) are not interchangeable.

b. Head Assembly. The head assembly contains the firing mechanism and safety devices. It includes the three pressure prongs projecting from the top of the fuze case, the positive safety pin which passes through the firing pin between the pressure prongs, the interlocking pin located on the side of the head and assembled to both the positive and locking safety pins, and the locking safety pin which passes through one

side of the fuze case and through one end of the release pin. Attached to the other end of the release pin is the release-pin ring to which trip wires may be attached. Threads for assembling the fuze in the fuze well of the mine are located about midway on the head assembly. At this point the fuze case is shaped to permit the use of a wrench in tightening the fuze to the mine. The interlocking pin is designed to assure that the safety pins will be withdrawn in the proper sequence, that is, the locking safety pin first and the positive safety pin last.

c. Loading Assembly. The loading assembly, which is screwed to the head assembly to complete the fuze assembly, consists of the primer assembly and the delay and relay charge assembly to which the igniter is crimped.

d. Functioning. See paragraph 18 for functioning.

e. Wrench, Fuzing, Antipersonnel Mine, M25. This combination box and open-end wrench (fig. 14) is stamped from a piece of strip steel 6 inches long, 1-1/4 inches wide and about 1/8-inch thick. The box end has a hexagonal opening, 0.775-inch across flats, to engage the shipping plug of antipersonnel mine M16A1 (par. 18). The open-end has an opening of 0.64-inch to engage the shoulder on the combination mine fuze M605, which is used with the M16A1 mine.

20. Mine, Antipersonnel, M18A1 and Accessories

a. General. The antipersonnel mine M18A1 (fig. 18) is a directional, fixed fragmentation mine that is used primarily for defense of bivouac areas, outposts, and against infiltration tactics. This mine is also effective against thin-skinned vehicles such as jeeps, automobiles, trucks, etc., readily perforating the outer body and injuring or killing the occupants. The fragments will also puncture tires, gas tanks, crankcases, radiators, and engine accessories. When detonated, a fan-shaped sheaf (pattern) of spherical steel fragments is projected in a 60-degree horizontal arc covering a casualty area of 50 meters to a height of 2 meters. Each mine is issued in a bandoleer containing

one mine with accessories and instructions for use (fig. 18 and 19). See table I for detailed information on packing.

b. Description.

(1) *Mine.* Mine M18A1 (fig. 17) is a curved, rectangular, olive-drab, molded case of fiberglass filled polystyrene (plastic). It is 8-1/2 inches long, 1-3/8 inches wide, 3-1/4 inches high, and weighs 3.5 pounds. In the front portion of the case is a fragmentation face containing 700 steel spheres (10.5 grains) embedded in a plastic matrix. The back portion of the case, behind the matrix, contains a 1.5-pound layer of composition C-4 explosive. The fragmentation face is convex horizontally to direct the fragments in a 60-degree arc and concave vertically to control the vertical dispersion of the fragments. Additional components of this mine are: two detonator wells with shipping plug priming adapters, a molded slit-type peepsight, and two pairs of scissor type folding legs. These components are described in (a) through (c) below.

(a) *Detonator wells.* The two detonator wells, located in the top of the mine, enable the mine to be fired from two locations or to be fired by nonelectric single or dual priming. The 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 adapter is used to hold an electric or nonelectric blasting cap in place when the mine is armed.

Note. The shipping plug-priming adapter is merely reversed when the mine is to be armed.

(b) *Peepsight and arrows.* The molded slit-type peepsight and arrows (fig. 17), located on top of the mine, are used to aim the mine.

(c) *Legs.* The two pairs of scissor-type folding legs, located on the

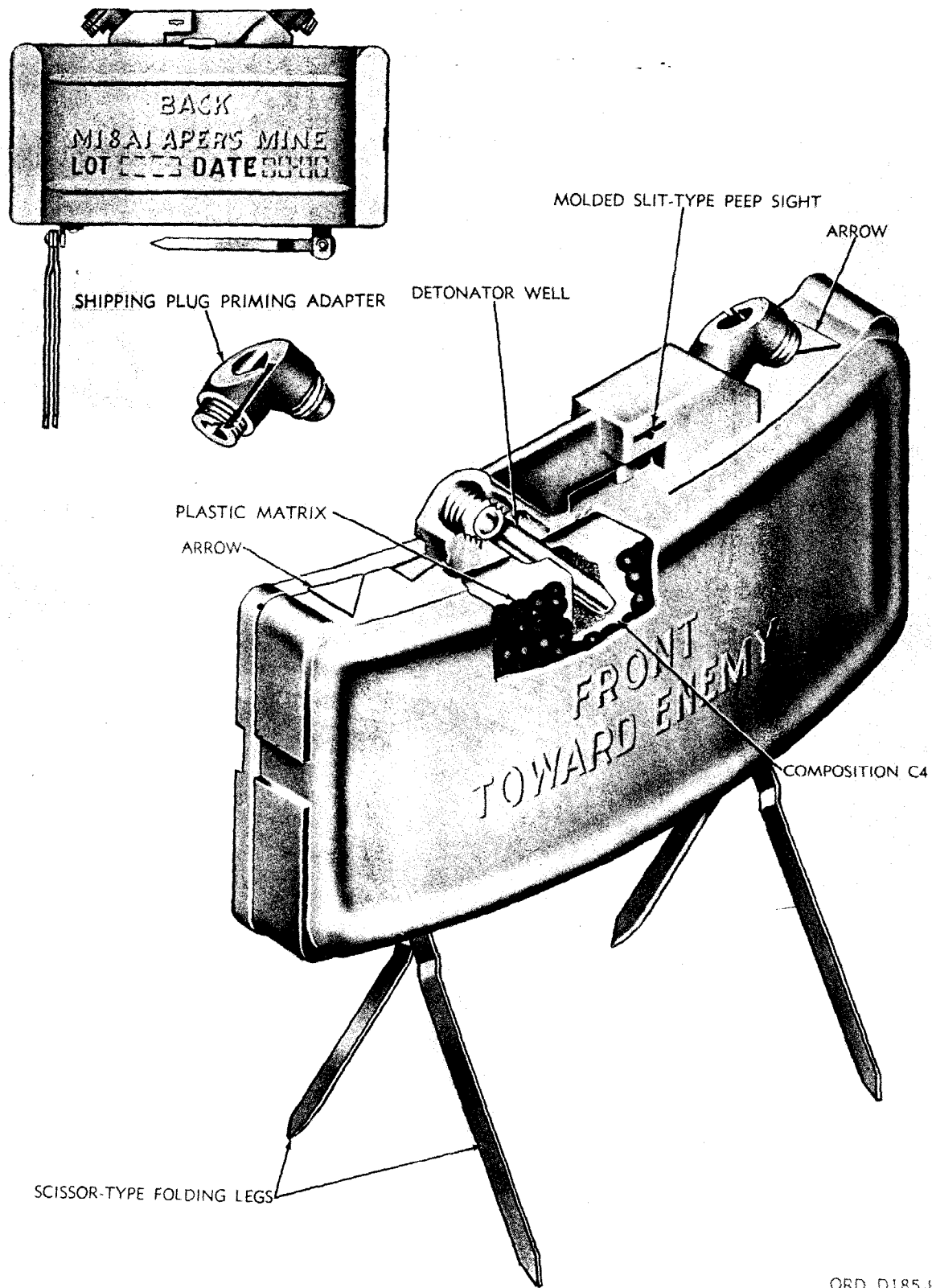
bottom of the mine, enable the mine to be emplaced on all types of surfaces. The mine can also be tied to posts, trees, etc.

(2) *Accessories.*

(a) *Firing device M57.* The firing device M57 (fig. 18) is handheld pulse generator which, by a single actuation of the handle, produces a double (one positive, one negative) electrical pulse. This device is about 4 inches long, 1-3/8 inches wide, 3-1/4 inches high, and weighs 3/4-pound. At one end of the firing device is a rubber connector with a dust cover.

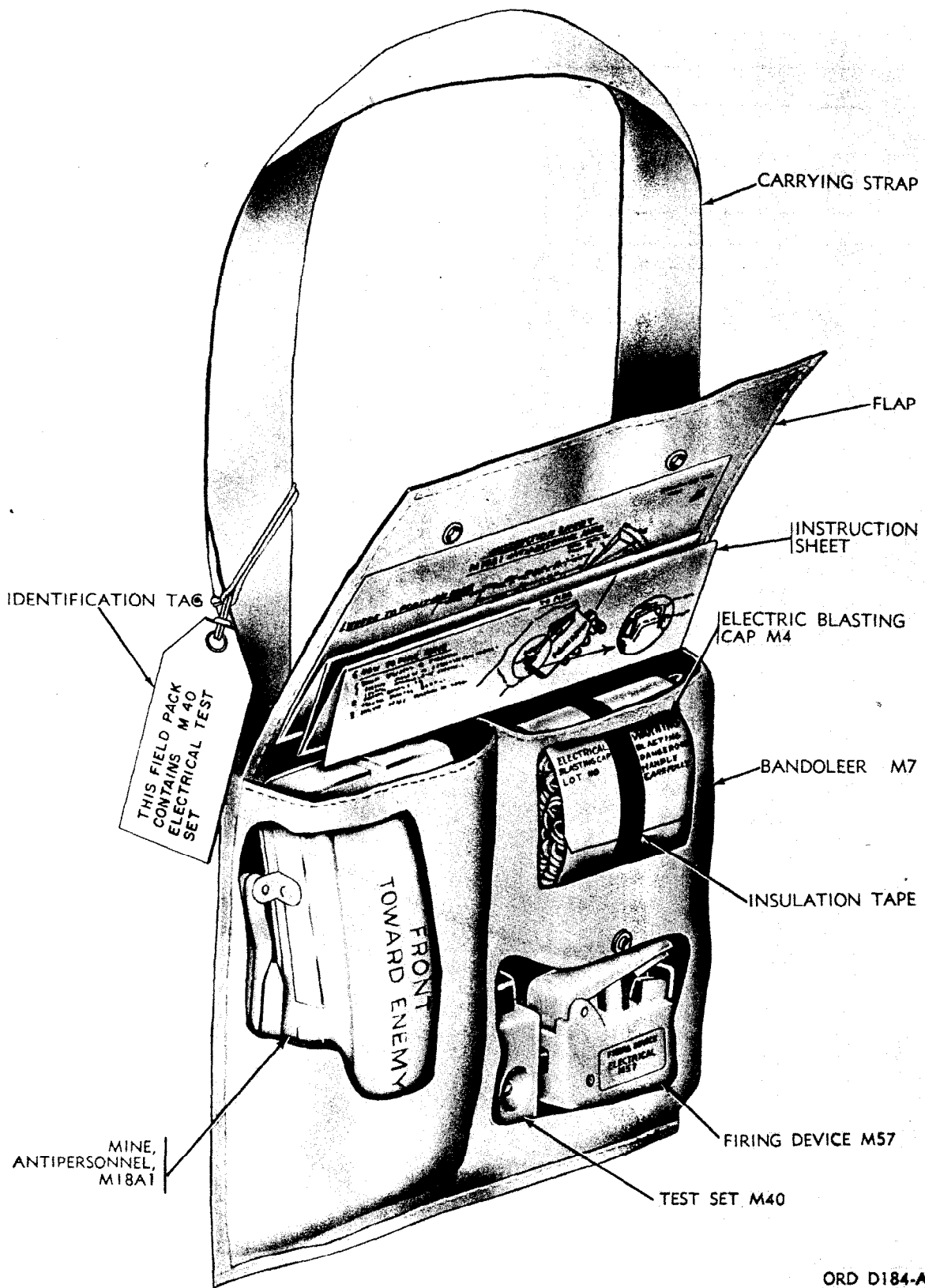
(b) *Test set M40.* The test set M40 (fig. 18) is an instrument used for checking the continuity of the initiating circuit of this mine. This test set is 3-1/2 inches long, 1-1/2 inches wide, 1-3/8 inches high and weighs 1/2-pound. Rubber connectors protrude from each end, one with a combination shorting plug and dust cover and the other with a dust cover only. A small window is provided for observing the flashes of an indicating lamp.

(c) *Electric blasting cap M4.* The electric blasting cap M4 (fig. 18) consists of an electric blasting cap M6 attached to 100 feet (30 meters) of firing wire. Attached to the firing wire connector is a combination shorting plug and dust cover. The shorting plug prevents accidental functioning of the blasting cap by static electricity and the dust cover prevents dirt and moisture from entering the connector. The blasting cap assembly is wrapped around a flat paper and then rolled to form a package 6 inches long, 4 inches wide, and 2 inches high. This assembly should be uncoiled without tangling or kinking. A piece of insulating tape is used to hold the package together.



ORD D185-B

Figure 17. Mine, antipersonnel, M18A1.



ORD D184-A

Figure 18. Antipersonnel mine M18A1 and accessories packed in bandoleer M7.

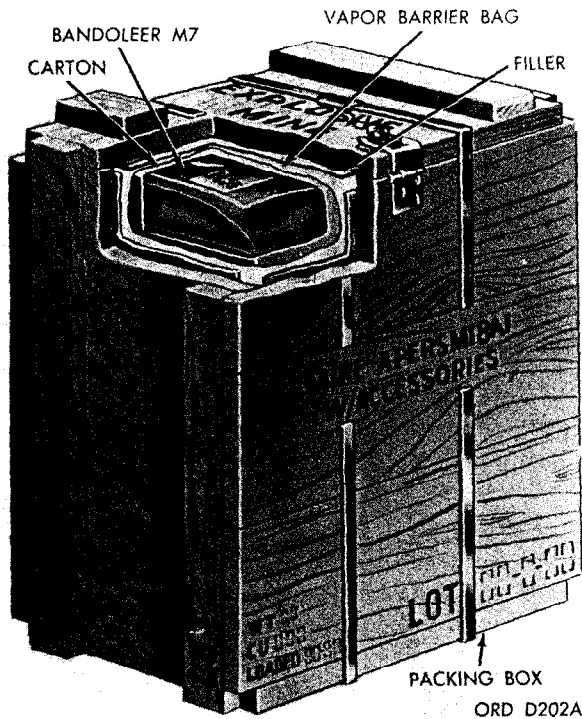


Figure 19. Packing box for antipersonnel mine M18A1.

(3) *Bandoleer M7*. The bandoleer M7 (fig. 18) is constructed of water resistant canvas (olive-drab color) with snap fasteners to secure the flaps. The bandoleer has two pockets; one pocket contains the mine and the other pocket contains a firing device, a test set, and an electric blasting cap assembly. The packed bandoleer measures 9-1/4 inches long, 11-1/2 inches wide, and 2 inches high. A 2-inch wide web strap, which is used as a shoulder carrying strap, is sewn to the bag. An olive-green water repellent instruction sheet is sewn to the inside flap.

Note. Only one of the six bandoleers in each packing box (fig. 20) contains a test set. The bandoleer containing the test set is identified by an identification tag on the carrying strap (fig. 18).

c. Casualty Effect and Danger Area.

(1) *Fragmentation*. The mine M18A1 delivers 700 highly effective steel fragments in a fan-shaped pattern approximately 2 meters high and

60-degrees wide at a range of 50 meters (fig. 21). These fragments are effective up to a range of 100 meters and can travel up to 250 meters forward of the mine.

(2) *Backblast*. Within an area of 16 meters (fig. 20) to the rear and sides of the mine, backblast can cause injury by concussion and secondary missiles. Up to 100 meters to the rear and sides of the mine, all friendly personnel must be under cover for protection from secondary missiles.

(a) *Radius of 0 to 16 meters from the mine*. Friendly troops are prohibited in this area.

(b) *Radius of 16 to 100 meters from the mine*. The minimum safe operating distance from the mine is 16 meters. At this distance, the operator should be in a foxhole or dugout (fig. 21) or lie prone, preferably in a depression. All friendly troops, including the operator, within 100 meters of the mine should take cover behind a boulder, a tree, or the like to prevent being injured by flying secondary missiles, sticks, stones, pebbles, etc.

d. Functioning. When the mine M18A1 has been armed, the actuation of the firing device handle (safety bail in armed position) will provide sufficient energy (electrical) to detonate blasting cap M6. The detonation of the blasting cap, in turn, detonates the high explosive charge (comp. C-4). Detonation of the high explosive charge causes fragmentation of the plastic matrix and projection of the spherical fragments outward in a fan-shaped pattern (fig. 20). The mine functions effectively in temperatures ranging from -40° to +125°F. This mine is sufficiently waterproof to function satisfactorily after having been submerged in salt or fresh water for 2 hours.

e. Laying and Aiming.

Note. Remove the mine and accessories (fig. 18) from the bandoleer. Read the instruction sheet attached to the flap of the bandoleer before proceeding with the following instructions.

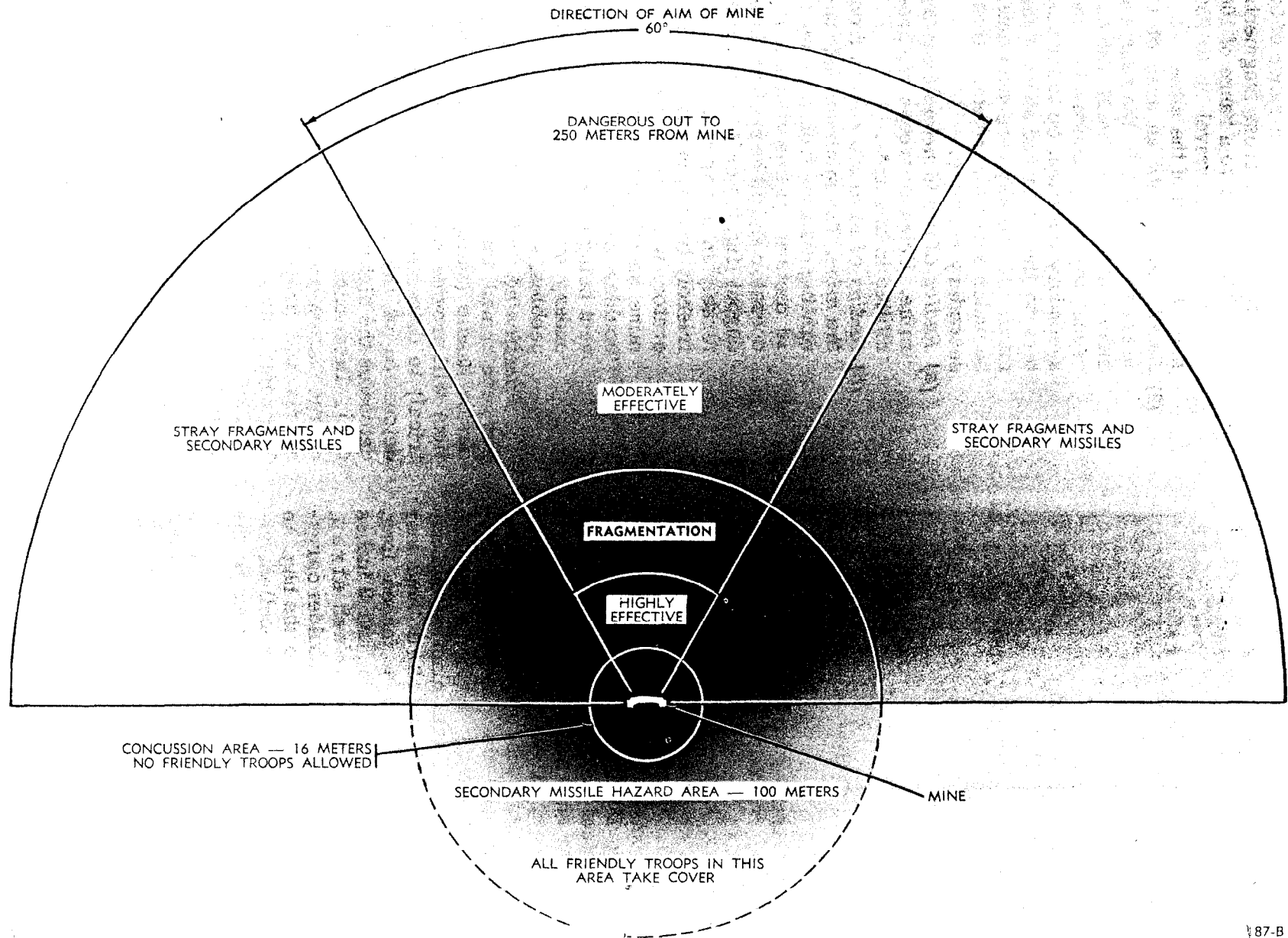
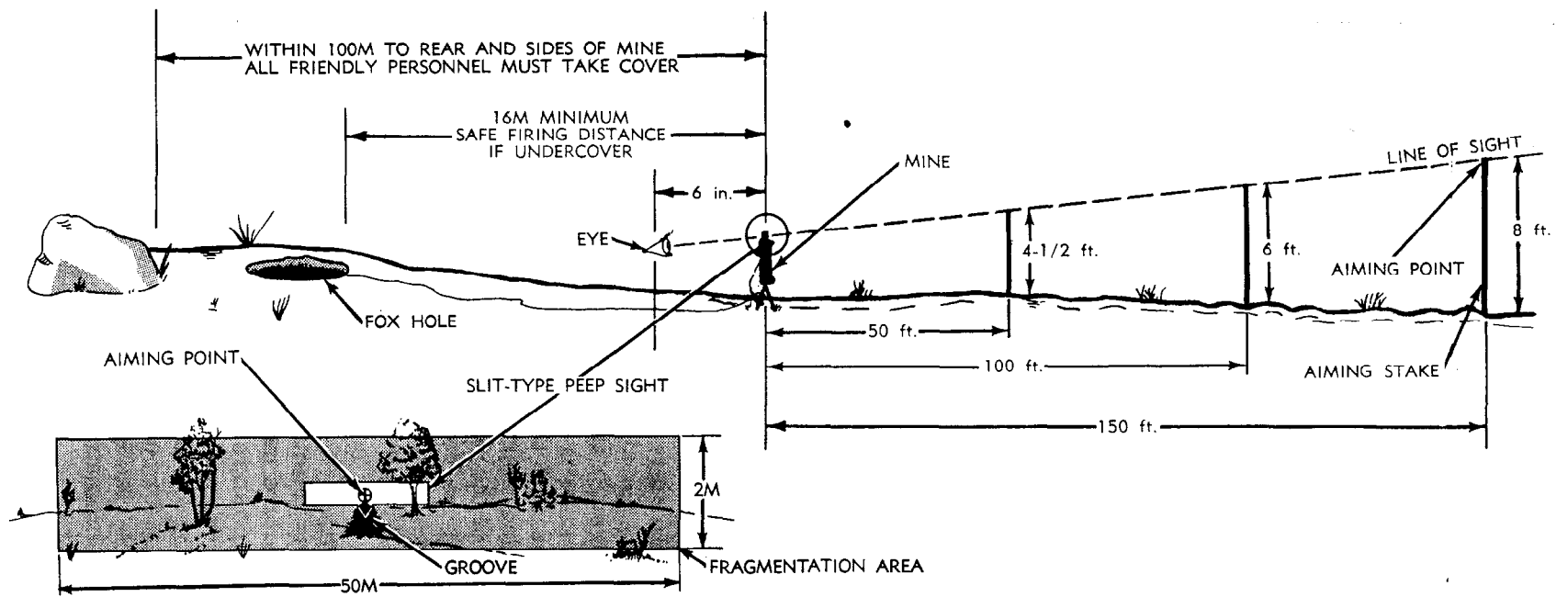


Figure 20. Casualty areas and danger areas of antipersonnel mine M18A1.



The mine should be sighted on a point 8 ft. high at a distance of 150 ft., or one of the alternative points shown.

ORD D188-B

Figure 21. Emplacement of antipersonnel mine M18A1.

Warning: Position the mine so that friendly troops forward and to the side of the mine (figs. 20 and 21) will not be endangered. The firing position should be at least 16 meters to the rear or to the sides of the mine.

- (1) Turn the legs downward and spread about 45-degrees. Twist the legs so that one leg protrudes ahead and one behind the mine, and position the mine with the surface marked "FRONT TOWARD ENEMY" and the arrows on top of the case pointing 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 as support. To prevent tipping in windy areas or when legs cannot be pressed into the ground, carefully spread legs to the maximum possible (approximately 180-degrees), so that legs will be fore and aft.
- (2) Select an aiming object (tree, bush, etc.) or use an aiming stake that is approximately 50 meters from the mine and projects approximately 1 meter above the ground (fig. 21).
- (3) Position the eye approximately 6 inches away from the mine and aim the mine by sighting through the slit-type peepsight. The groove of the sight should be in line with the aiming point. The aiming object should be in the center of the desired coverage area and the bottom edge of the peepsight should be parallel to the ground to be covered with fragment spray.

f. Arming and Electrical Firing.

- (1) Unscrew the shipping plug priming adapter and retain for future use.
- (2) Remove the insulation tape and unroll the paper form from the electric blasting cap assembly (fig. 18). Retain paper form and tape for possible future use. Hold the blasting cap while unwinding approximately 3 meters of the firing wire.

Warning: Make certain that the combination shorting plug and dust

cover is assembled to the connector of the blasting cap assembly before placing the blasting cap in the detonator well.

- (3) Wind the firing wire around the leg two or three times on the same side of the mine as the detonator well to be used (fig. 22).
- (4) 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; then screw the shipping plug priming adapter and the blasting cap into the detonator well.

Warning: Make certain the face of the mine marked FRONT TOWARD ENEMY and the arrows on top of the mine point in the direction of the enemy.

- (5) Unwind the remaining firing wire to the firing position. If possible, bury the firing wire to protect from artillery fire and to prevent easy detection.

Note. Retain paper roll form for future use during disarming.

Warning: The mine firing position should be in a foxhole; or in a shielded or protected position, at least 16 meters behind or to the side of the emplaced mine.

Note 1. If possible, perform tests in g below before firing mine M18A1.

Note 2. If the area has been subject to recent mortar or artillery bombardment, retesting of the blasting cap assembly is required.

- (6) 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. Assemble (plug in) the two connectors.

Warning: Before connecting the blasting cap assembly to the firing device (fig. 22), the safety bail must be in the "safe" position. Make sure that all personnel are under

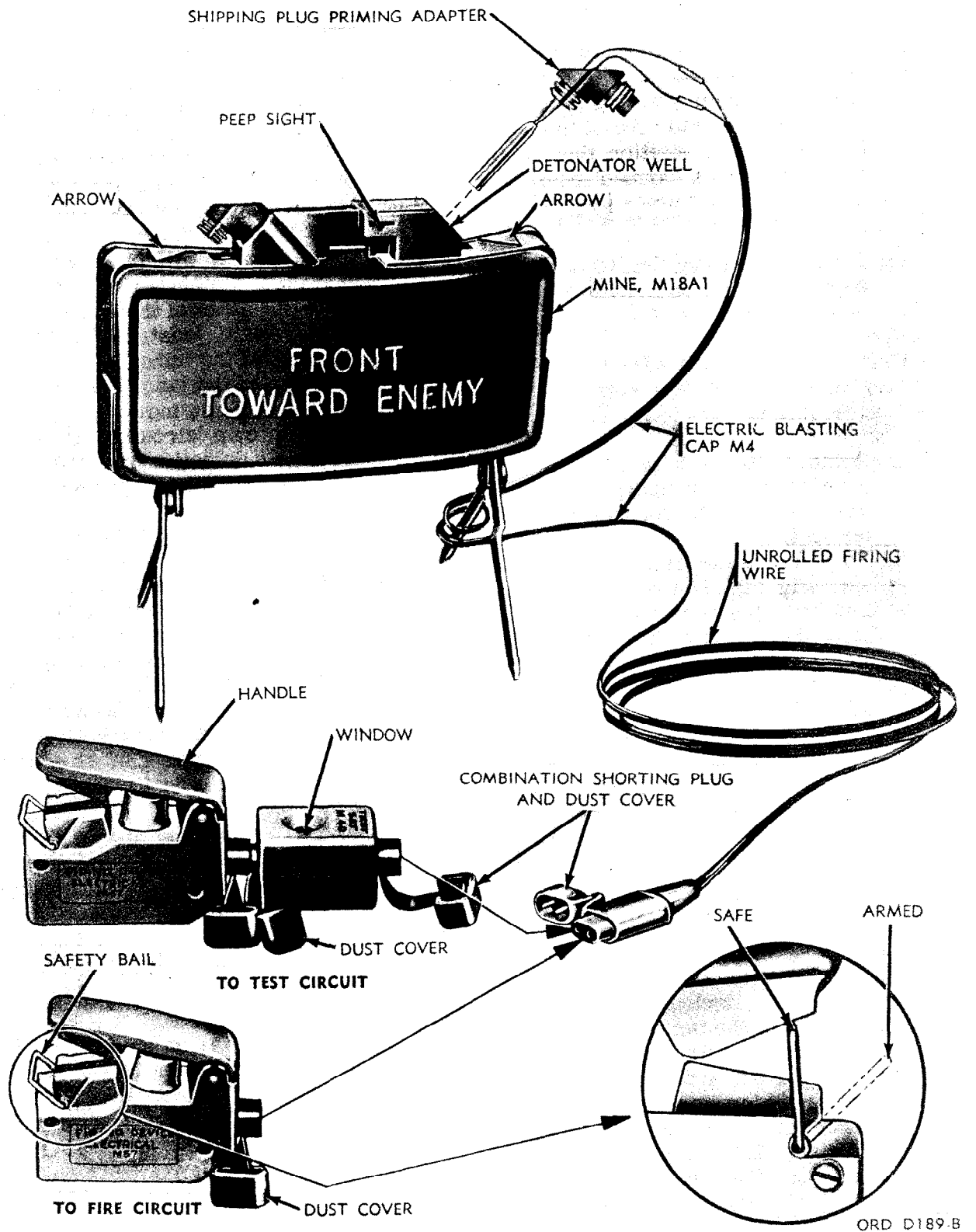


Figure 22. Arming and testing antipersonnel mine M18A1.

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.

- (7) After performing testing (g below) the mine is ready for firing. To fire the mine, position the firing device bail in the "armed" position.

Note. When enemy troops approach within 20 to 30 meters of the front of the mine, fire the mine.

- (8) Fire by actuating the firing device handle with a firm quick squeeze and release.

g. Testing.

Warning: Before and after completion of firing device and blasting cap continuity tests, ascertain that the firing device bail is in the "safe" position.

- (1) Remove the dust cover from the connector of the firing device and from the female connector of the test set.
- (2) Plug the test set into the firing device (fig. 22). Leave the combination shorting plug and dust cover assembled on the other end of the test set.
- (3) 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 test set window.

Note. The window of the test set should be held against the eye when checking the firing device and the blasting cap assembly. It minimizes the risk of enemy observation in the dark and improves the ability of the operator to see the lamp flashing even in the bright sunlight.

- (4) Flashing of the lamp indicates that the firing device is functioning properly. If the lamp does not flash (on and off), the firing device should be discarded and replaced with another firing device. After completion of the firing device test, place the firing device bail in the "safe" position.

Note. If the test set indicates that several firing devices are faulty, retest with another test set prior to discarding since the test may be defective.

- (5) Remove the shorting plug and dust cover from the connector of the

blasting cap and from the end of the test set. Plug the connector of the blasting cap into the test set. Position the firing device bail to "armed" position. Actuate the handle of the firing device.

Warning: Before connecting the blasting cap to the test set and firing device (fig. 22), the safety bail must be in the "safe" position, and all personnel will be under cover at least 250 meters away from the front and sides of the mine and under cover at least 100 meters to the rear of the mine.

- (6) Flashing of the lamp in the window of the test set indicates that the blasting cap circuitry is satisfactory. If defective, replace blasting cap and test for serviceability as indicated above.

h. Nonelectric Firing. Subparagraphs (1) and (2) below provide instructions for laying, aiming, and arming of the mine using two nonelectric blasting cap M7 (par. 41), a piece of detonating cord approximately 25 feet long, a pull wire, and a pull-type or pull-friction-type firing device, such as the M1 or the M2. Subparagraph (3) below provides instructions for laying, aiming, and arming of the mine using a dual firing or a dual priming system.

Warning: To arm the mine by the methods below, a thorough knowledge of the utilization of explosives and demolition materials, the use and installation, of land mines and boobytraps is required. Refer to FM 5-31 and TM 9-1375-200.

Note: Waterproofing and periodic replacement of detonating cord should be made in accordance with instructions provided in FM 5-25.

- (1) *Pull-wire initiation of mine M18A1.*
 - (a) Laying and aiming the mine are performed in the same manner as that used for electric firing. Refer to e above for laying and aiming.
 - (b) Crimp a blasting cap M7 to a pull-type device, using cap crimping pliers (with fuse cutter) M2 for this operation (par. 42).
 - (c) Fasten one end of the detonating cord to the blasting cap that is

attached to the firing device ((b) above) by means of tape (A, fig. 23).

- (d) Fasten the firing device securely to a firmly emplaced stake (A, fig. 23), by means of tape, wire, twine, or anchor cord.
- (e) Slip the slotted end of the shipping plug priming adapter over the other end of the detonating cord.
- (f) Insert the detonating cord end fully into the second blasting cap. Crimp the cap to the detonating cord, using the cap crimping pliers M2 for this operation.
- (g) Seat the cap (with the detonating cord) into the shipping plug priming adapter and carefully insert the cap into the well.
- (h) Secure the cap in the well by carefully screwing the shipping plug priming adapter into the detonator well.
- (i) Attach a pull wire securely to the pull ring of the firing device. The pull wire should be of sufficient length to allow actuation of the firing device from a protected position at least 16 meters rearward (minimum safe distance protected position) from the emplaced mine (A, fig. 23).

Warning: 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 or trip wire. If the mine becomes dislodged, it will be aimed in a direction other than intended.

(2) *Trip-wire initiation of mine M18A1.*

- (a) Laying and aiming of the mine are performed in the same manner as that used for electric firing. Refer to e above for laying and aiming.
- (b) The preliminary steps used to arm the mine are the same procedures used in (1)(a) through (h) above.
- (c) The trip wire, stretched across

a trail or other avenue of approach, and the firing device must be securely attached to two firmly emplaced stakes at a distance of approximately 20 meters forward of the mine (B, fig. 23).

(3) *Nonelectric method using dual firing or dual priming systems.*

Note. Refer to FM 5-25 for details for using dual firing or dual priming systems.

(a) *Dual firing.*

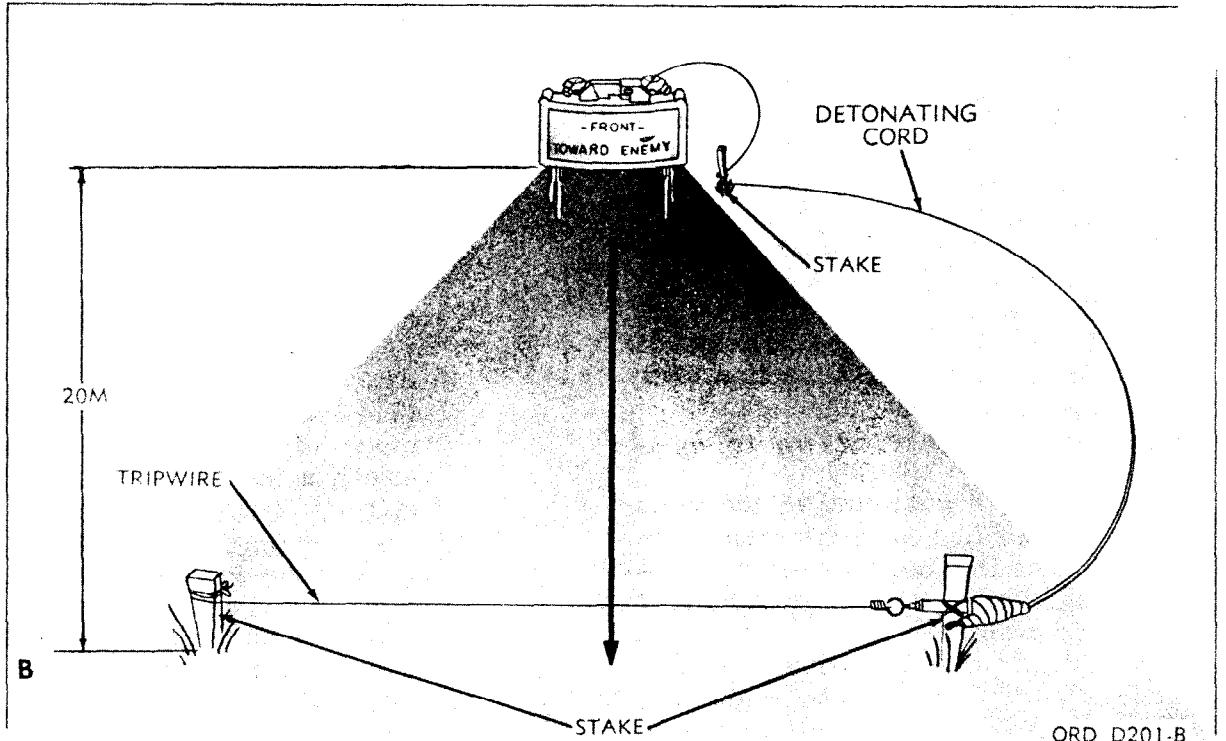
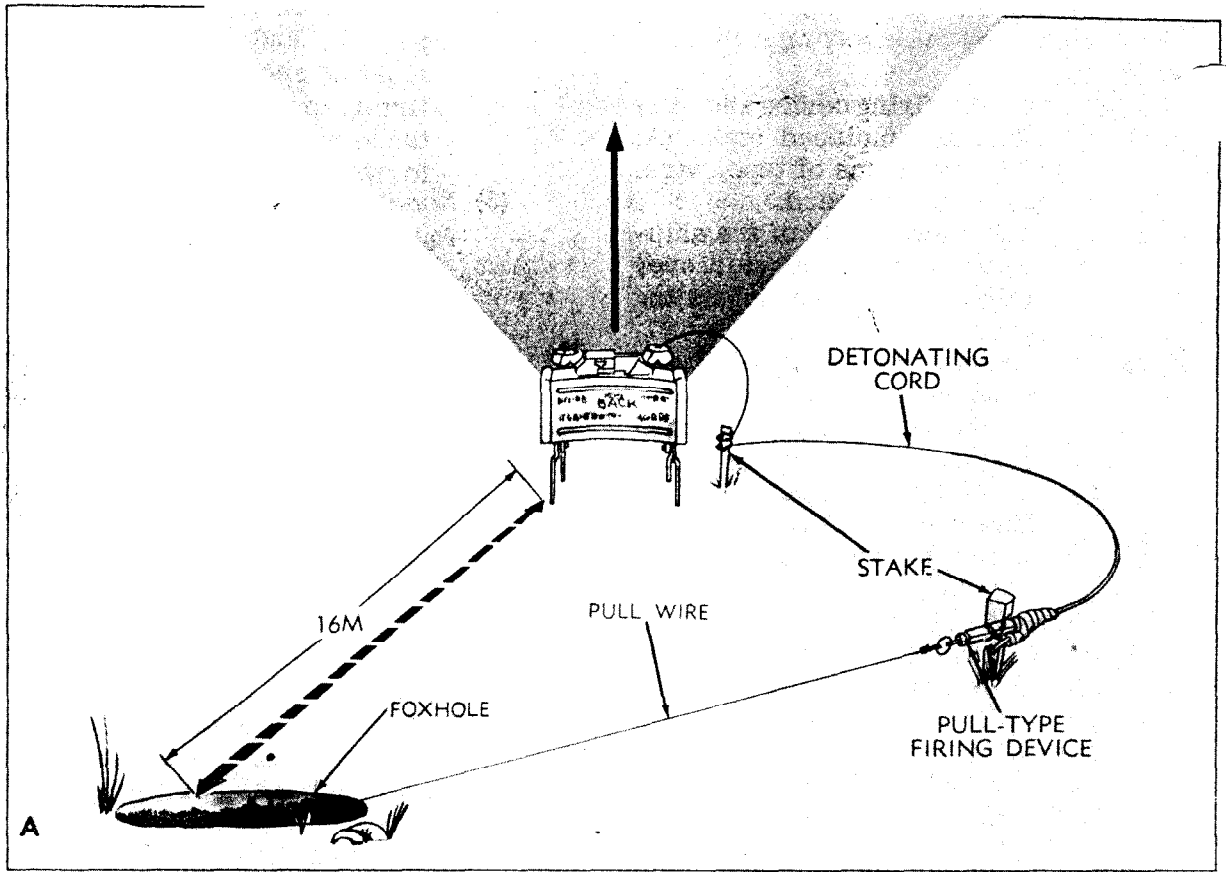
1. Obtain two 10-meter (33-foot) lengths of detonating cord, four nonelectric blasting caps M7, and two pull-type firing devices.
2. Remove both shipping plug priming adapters from the mine. Push one end of each piece of detonating cord through the holes in the adapters.

Note. Push cord through holes far enough to allow blasting caps to be crimped to the cord ends.

3. Crimp end of each piece of detonating cord to a blasting cap M7, using cap crimper M2. Pull access of detonating cord through holes in the adapters so that blasting caps seat against the bottom of the adapters.
4. Screw shipping plug priming adapters in the detonator wells. Unwind detonating cord while moving back to safe firing distance (fig. 21).
5. Emplace mine and detonating cord as instructed in h(1) (a) to (h) above, and shown in figures 21 and 23.
6. Attach a pull-type firing device (FM 5-25) to the free end of each piece of detonating cord, and attach a pull wire or trip wire (h(1) or (2) above).

(b) *Dual priming.*

1. Follow the instructions in (a) 1 through 5 above.
2. Make a ring mine in accordance with instructions contained in FM 5-25.
3. When emplaced one behind the other, the foremost one (nearest the enemy) must be fired first.



ORD D201-B

Figure 23. Antipersonnel mine M18A1 ready for firing - A. By observer, B. By enemy.

Mines emplaced side-to-side in a line may be fired in any order or simultaneously.

Note. To prevent tipping in windy areas or when the legs cannot be pressed into the ground, carefully spread legs to the maximum possible (approximately 180-degrees), so that the legs will be fore and aft.

4. The mine and the danger area around the mine must be visible from the firing position in order that any friendly personnel in the vicinity of the mine may be seen.

Warning: A dislodged or overturned mine is a potential hazard to friendly personnel and should not be fired.

i. Disarming and Destruction.

Warning 1: Render the firing device safe by returning the safety bail to the SAFE position (fig. 22) prior to performing the steps below.

Warning 2: Duds or mines which appear to have been run over by a vehicle or otherwise damaged after emplacement should be considered as unsafe. Destroy as in (2) below.

(1) *Disarming.*

(a) *Mine with electrical components.*

1. Disconnect the firing wire from the firing device. Replace the combination shorting plug and dust cover on the blasting cap assembly connector, and the dust cover on the firing device connector.
2. Unscrew and remove the shipping plug priming adapter (fig. 18) containing the blasting cap from the mine. Remove the blasting cap and the firing wire from the shipping plug priming adapter.
3. Reverse the shipping plug priming adapter and screw the plug end of the shipping plug priming adapter into the mine.
4. Remove the firing wire from the stake beneath the mine or around the mine leg. Reroll the blasting cap and firing wire on the paper form and secure this

assembly with the piece of insulation tape.

5. Remove the mine from its emplacement and repack the mine and its accessories in their respective pockets in the bandoleer.

Note. Check to assure that all accessories are removed from mine before repacking.

(b) *Mine with nonelectric components.*

Warning 1: Check to assure the firing device has not been fired or the mine run over. If the firing device has fired or the mine appears to be a dud, destroy the mine.

Warning 2: Render the firing device safe by replacing all safety pins prior to performing the steps below.

Caution 1: Nonelectric blasting caps and detonating cord crimped together can be separated only by cutting the blasting cap free of the detonating cord, using a nonsparking knife.

Caution 2: If facilities are not available for cutting the blasting cap free of the detonating cord, and these components are not to be reused immediately, the crimped explosive components should be destroyed in accordance with instructions contained in TM 9-1300-203 and TM 9-1375-200.

1. Disconnect the pull-wire or trip-wire from the firing device.
2. Unscrew and remove shipping plug priming adapters containing the blasting caps from the mine. Cut the blasting cap free of the detonating cord, using a nonsparking knife.
3. Return the blasting cap to storage container, and pull the detonating cord end free of the shipping plug priming adapters.
4. Reverse the shipping plug priming adapter and screw it in the detonator well, plug end down.
5. Remove the mine from its emplacement position and repack.

Store accessory items in original or appropriate containers.

- (2) *Destruction.* Any mine considered a dud or otherwise in an unsafe condition should not be handled or jarred but should be destroyed as instructed in TM 9-1300-203.

21. Mine, Antipersonnel, M18 (T48) with Carrying Kit, M68 (T66) or M69 (T67)

a. General. This mine is an earlier model of mine M18A1 which is described in paragraph 20. The difference between the two models may be seen by comparing figure 24 with figures 17 and 22. The use and functioning of the M18 is similar to the use and functioning of M18A1, described in paragraph 20.

b. Description.

- (1) The antipersonnel mine M18 (T48) comes in two versions, with or without a peepsight, otherwise both versions are identical. The mine consists of a curved rectangular plastic case containing high explosive and steel fragments. The forward face contains the steel fragments and is designed to produce a fan-shaped spray which can be aimed at a prescribed target area. The arrow marked on the top of each mine indicates the direction of aiming. The mine has three folding-type legs and cloth tabs on each side. The legs of the mine are

used to emplace it above ground, whereas the cloth tabs are used to tie or nail the mine to trees or posts. The mine is covered with green and brown fleck in a camouflage pattern to reduce detection. The mine is capable of causing a severe or fatal wound within 35 meters and casualties at ranges up to 50 meters. The principal dimensions of the mine are as follows:

Length	9-1/4 in.
Width	3-1/4 in.
Thickness (approx) . . .	1- in.
Length of outer legs . . .	4-1/2 in.
Length of center legs (approx)	6- in.
Weight (approx)	2-1/2 lb.

See table I for additional data.

- (2) *Carrying kit M68 (T66).* This kit is a bandoleer type (fig. 25) carrier for personnel and contains one antipersonnel mine, battery holder with protective wood block, blast-cap with lead wire in a cardboard tube, and instruction sheet in a canvas carrying case. Dry cell flashlight batteries are not packed in the kit; however, they are obtainable.
- (3) *Carrying kit M69 (T67).* This kit is a haversack (fig. 26) for use by armored and mechanized units and contains five antipersonnel mines, five blasting caps with lead wires

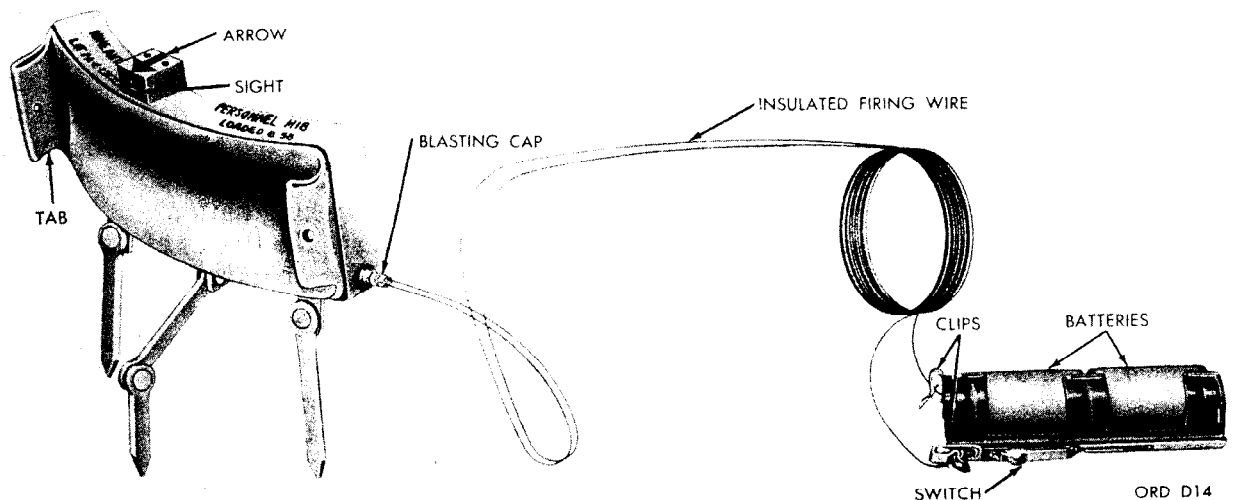


Figure 24. Mine, antipersonnel, M18 (T48)—ready for firing.

(each cap with wire in a cardboard tube) packed in a protective box, five spools of insulated electric wire (100 feet per spool), one utility belt, one box of electrical tape, and five instruction sheets in a canvas haversack.

c. Arming and Laying.

- (1) Using the point of a caliber .30 cartridge or a similar shaped object, puncture the tape at either end of the mine and form a hole in the explosive for insertion of the blasting cap.
- (2) Carefully remove special electric blasting cap (type II, J2, PETN) from the cardboard tube and insert into the hole provided, making certain that firm or positive contact between the explosive charge and the blasting cap has been achieved.
- (3) For emplacement above ground, unfold the legs of the mine and press them firmly into the ground.

Warning: The center leg of the mine, when emplaced in the ground,

must be placed forward of the mine to provide maximum stability.

Note. For installation on a tree or post, the legs should remain folded and the mine secured by tying or nailing through the holes provided in the cloth tabs of the mine. For either method of installation, the arrow on the top of the mine is pointed at the center of the fragmentation pattern (which is 0.83 meters high at a distance of 35 meters).

- (4) After placement of the mine, completely unwind the 16 meters (50 feet) of lead wires and run them to the firing position. The lead wires may be laid on top of the ground, but if time permits the wires should be buried under soil to reduce the possibility of being dislodged or cut by artillery fragments.

d. Preparation and Firing.

Utilization of mine M18 (T48) with carrying kit M68 (T66) (fig. 25).

- (a) Remove the protective wood blocks from battery holder.
- (b) Insert two 1-1/2-volt flashlight batteries into the battery holder, making certain that forward end

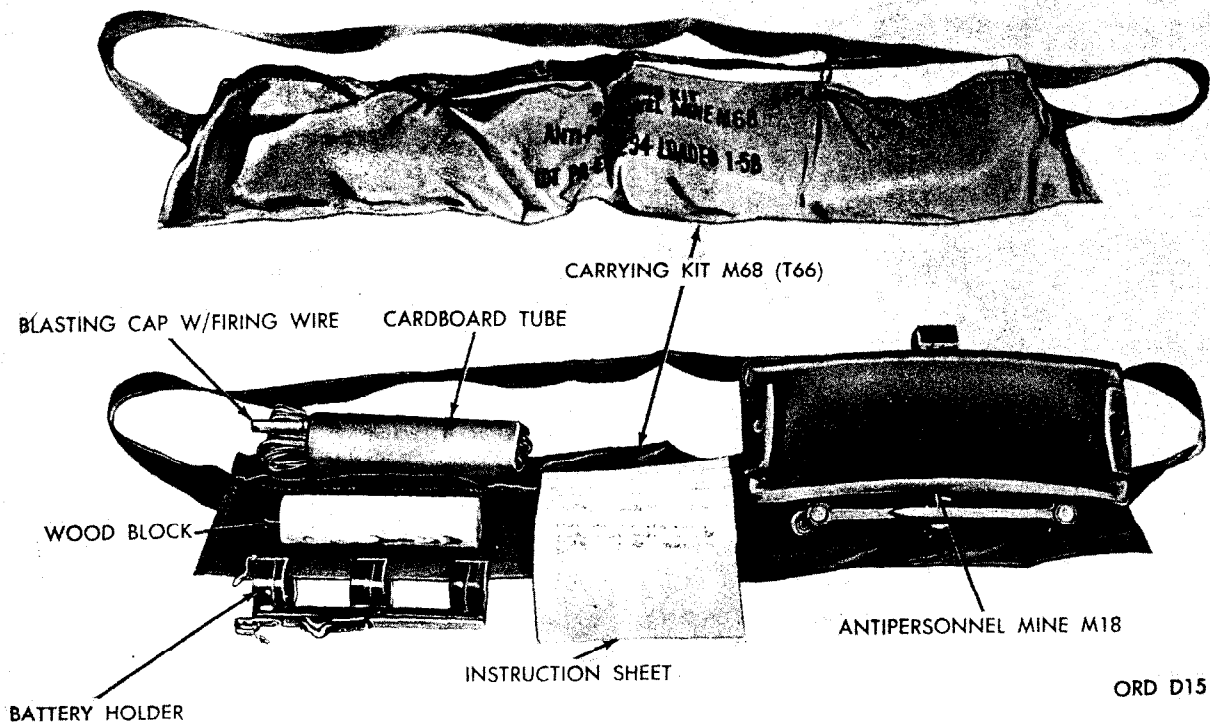


Figure 25. Mine, antipersonnel, M18 (T48) with carrying kit M68 (T66).

of each battery is facing the clip of the holder.

Warning: The switch of the battery holder must be in the OFF position.

- (c) Carefully attach the lead wires to the clips of the battery holder. The mine is now ready to be fired.
 - (d) The mine is fired by firmly pushing the switch to the ON (full forward) position.
 - (e) If additional lead wire is required, add 3 volts (in series) for each 16 meters (50 feet), utilizing additional batteries and battery holders.
- (2) *Utilization of Mine M18 (T48) with carrying kit M69 (67) (fig. 26).*
- (a) The mine packed in this carrying kit is fired by connecting the lead wires to the battery of a tank or other vehicle.
 - (b) If additional lead wire is required, 3 volts must be available at the power source for each 16

meters (50 feet) of lead wire used.

- (3) *Utilization of mine M18 (T48) v other firing devices.* This mi. may also be fired by using pull-type firing devices and nonelectric blasting caps with sufficient length of detonating cord to bridge the distance between the mine and the firing device as described in paragraph 20b.

e. Disarming.

- (1) If dry cell batteries and battery holder(s) were utilized, make certain that switches are in the OFF (rearmost) position, and remove lead wires from the clips of the holder.
- (2) Short the lead wires by twisting the bare ends together.
- (3) Carefully remove the blasting cap from the mine.
- (4) Rewind lead wires and return blasting cap and wire to original cardboard tube.
- (5) Remove the mine from its installed

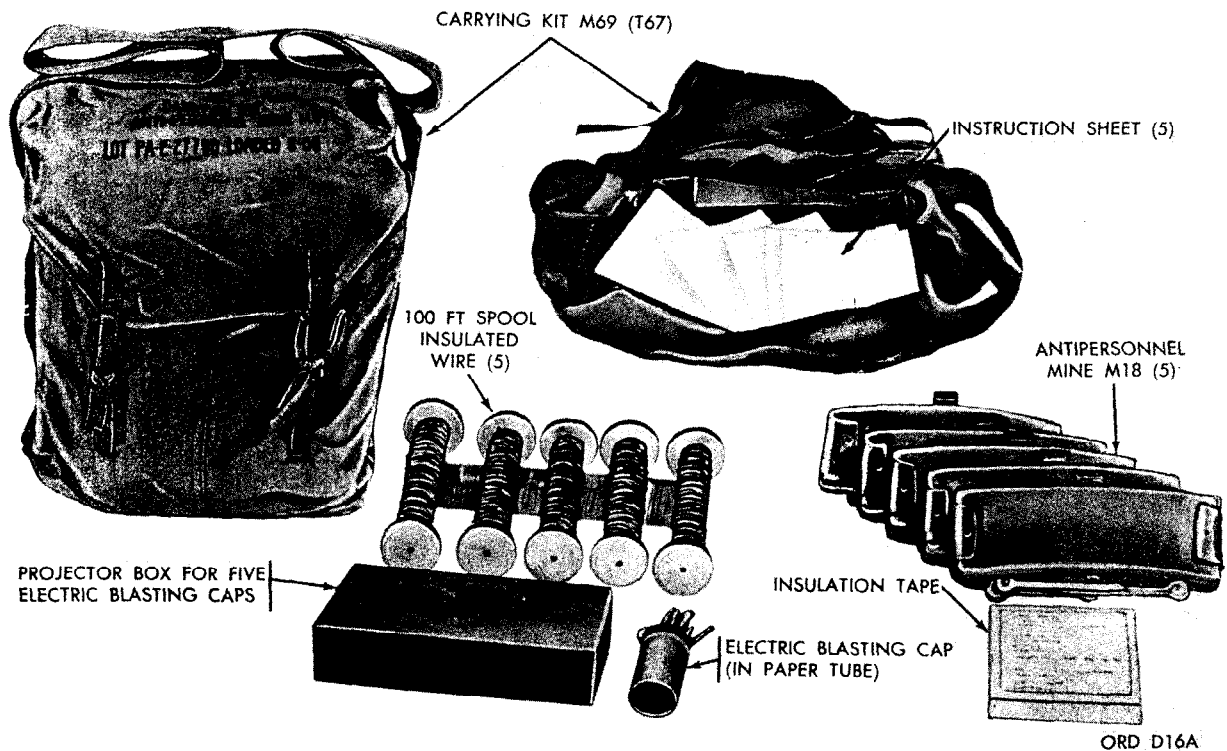


Figure 26. Mine, antipersonnel, M18 (T48) with carrying kit, M69 (T67).

position, fold the legs if required, and return it to its original packing.

Caution: Provided the original packing is not available, care should be taken to prevent water from accumulating in the hole after removal of the blasting cap.

f. Precautions in Use.

Warning: Stones or mine debris may be thrown to the rear of sides at the time of firing. Personnel within 100 meters to the rear or sides of the mine must not be exposed. The mine must be fired only from protected or shielded positions no closer than 16 meters from the mine.

- (1) Follow the precautions contained in paragraph 21 *i*.
- (2) Keep batteries dry and warm in cold weather so that the mine can be successfully detonated.
- (3) Use fresh or fully charged batteries at all times.

22. Mine, Antipersonnel, Nonmetallic (NM), M14, with Integral Fuze

a. General. This mine (figs. 27 and 28) is a nonmetallic, blast type, high-explosive antipersonnel mine consisting of a main charge of tetryl (1 ounce), and an all-plastic body with an integral plastic fuze having steel firing pin. Because it is small

it can be used in large numbers and may readily be concealed. This mine is capable of inflicting a serious casualty since it explodes in direct contact with the enemy. Being of practically all plastic construction, it is nondetectable by magnetic mine detectors.

b. Description. The mine is cylindrical in shape. Six ribs on the outside of the body provide strength and serve as a means for identifying the mine in darkness. For safety, the plug-type plastic detonator holder with detonator, is packaged separately within the same shipping container as the mine. The detonator holder is to be installed in the base of the mine (figs. 28 and 29). During shipment, the hole in the base of the mine is closed by a shipping plug. The shipping plug is similar in external shape to the detonator holder except that the shipping plug has a circular head while the detonator holder has a hexagonal head. The pressure plate has a yellow indicating arrow and is indented to accommodate the mine and fuze wrench. Two letters, "A" and "S", on the top of the fuze body signify "armed" and "safe" respectively. The slots in the pressure plate are for insertion of the steel, U-shaped safety clip (fig. 28). The pull cord is for use in removing the safety clip from the mine when testing and arming. Beneath the safety

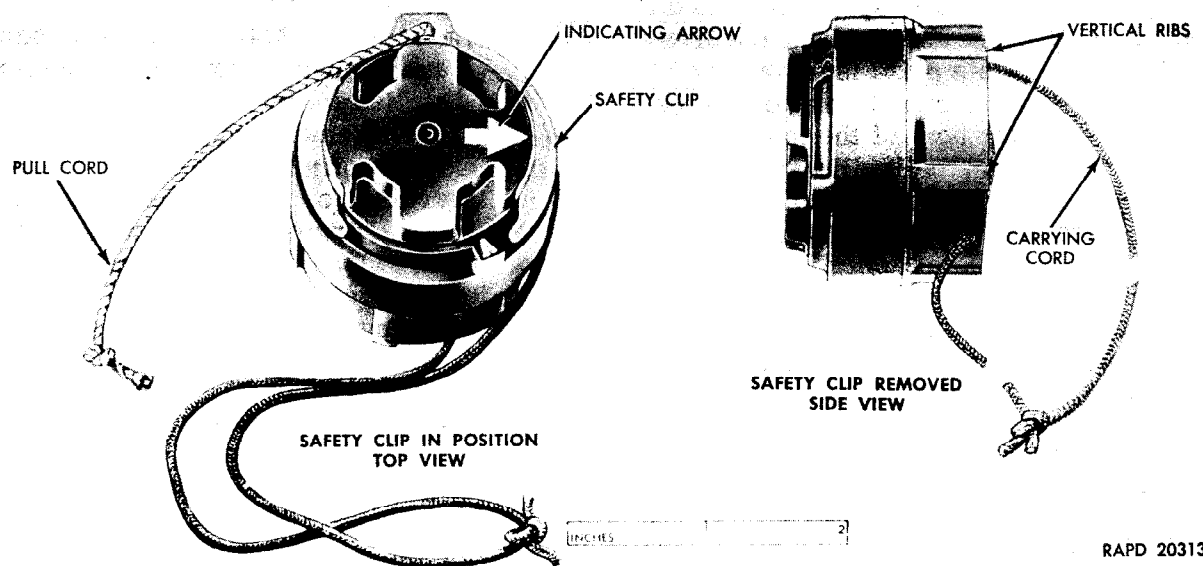
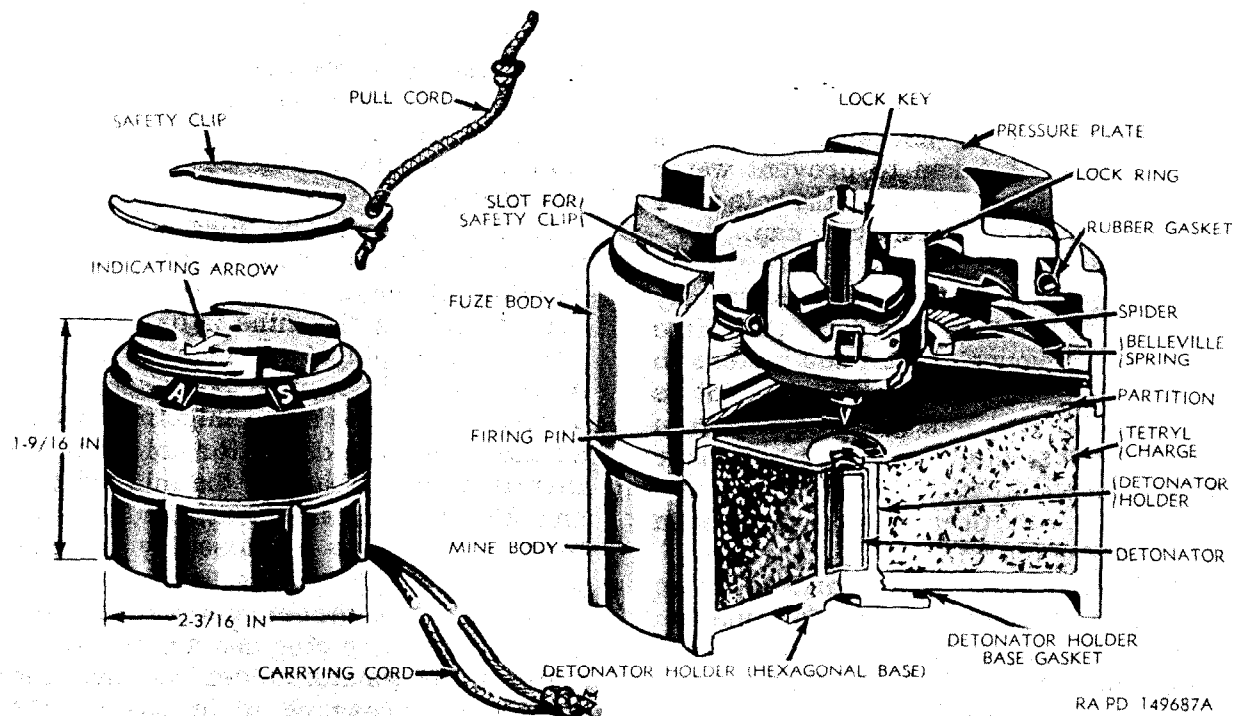


Figure 27. Mine, antipersonnel, NM, M14, with integral fuze.



RA PD 149687A

Figure 28. Nonmetallic antipersonnel mine M14 with safety clip removed and detonator installed.

clip slots is a circular groove for a rubber gasket which makes a watertight joint between the pressure plate and the fuze body. A lock key is fastened to the center of the under side of the pressure plate. The lock key holds the lock ring firmly when the arrow on the pressure plate is pointed to "S". The lock ring prevents the mine from firing prematurely. The spider spaces the parts within the fuze and supports the pressure plate when this plate is in the "safe" position. The three projections on the inside of the center hole of the spider prevent the lock ring, belleville spring, and firing pin assembly from rotating when the pressure plate is turned. The belleville spring with the attached lock ring and firing pin assembly is seated against the spider and is held in place by a ridge on the rim of the partition. The partition also holds the main charge in place and prevents any explosive from getting into the firing mechanism of the fuze. Data on this mine is listed in (1) and (2) below. Additional data may be found in table I.

(1) *Mine data.*

Model number - M14.
Type - blast.

Weight, loaded and fuzed (integral fuze and detonator) - 3-1/3 ounce (approx.).

Weight of explosive char (tetryl) - 1 ounce.

Dimensions - height, 1-9/16 inches; diameter, 2-3/16 inches.

Material - plastic.

Fuze - integral.

Detonator - M46, in plastic hexagonal-head detonator holder (installed in the field).

Booster - none required.

Color - olive drab.

Marking (on bottom) - nomenclature, symbol of parts manufacture, loader's lot number, month and year loaded.

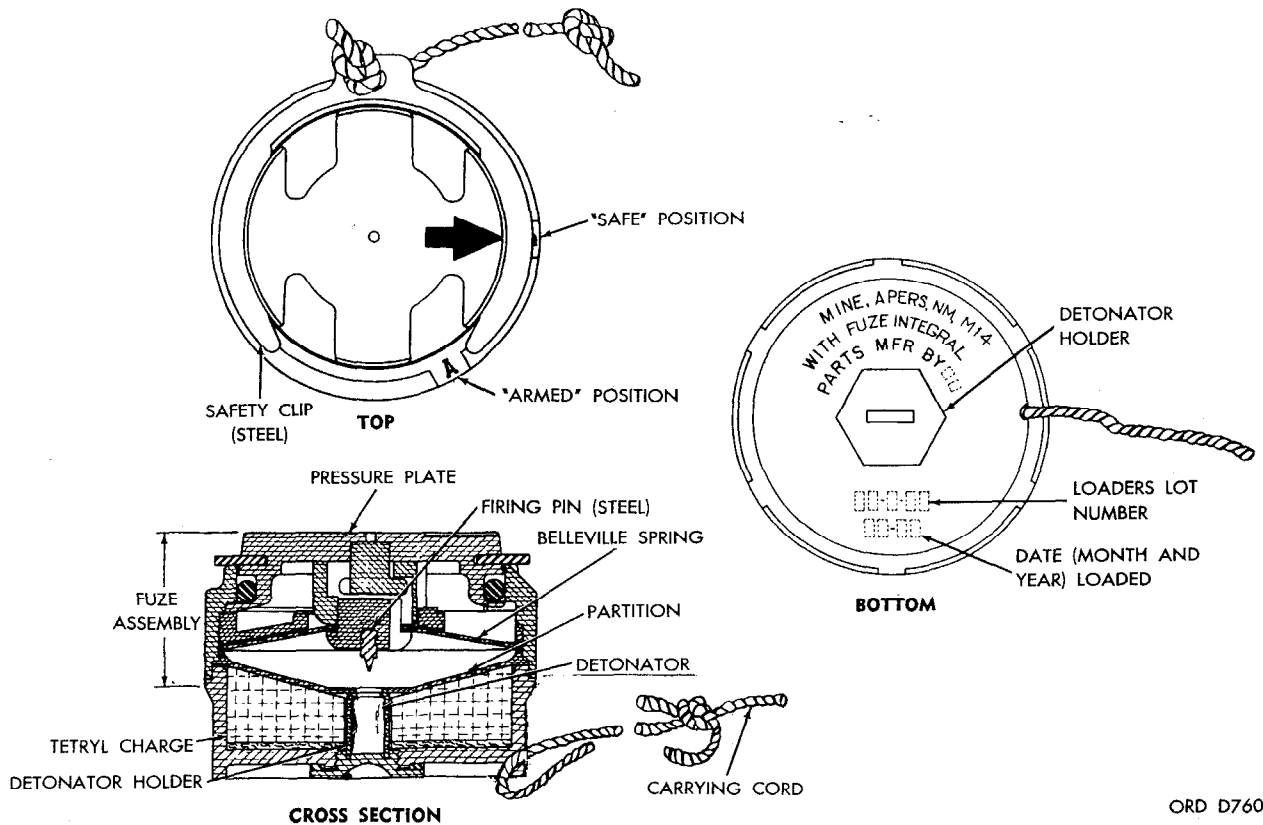
Shipping plug - circular-head partially slotted shipping plug, in place as shipped, to be replaced in the field by detonator holder.

(2) *Fuze data.*

Model number - none.

Components - pressure plate, lock key, spider, lock ring, belleville spring, and firing pin.

Type - belleville spring - integr?



ORD D760

Figure 29. Mine, antipersonnel, NM, M14—top, bottom and cross section.

Material - plastic (except steel firing pin).

Safeties - clip (U-shaped) with pull cord; provision for turning pressure plate from safe position (yellow pointer at S) to armed position (yellow pointer at A).

Color - olive drab.

c. Functioning.

- (1) A force of 20 to 35 pounds will depress pressure plate.
- (2) Pressure plate depresses lock key.
- (3) Lock key forces lock ring to slide through notches in inner ring of spider and depresses the belleville spring.
- (4) Belleville spring snaps into reverse, driving firing pin into detonator.
- (5) Detonator explodes main charge.
- (6) Mine will function satisfactorily in temperature ranging from -40° to $+125^{\circ}$ F.

d. Laying and Arming.

- (1) Unscrew the shipping plug from the bottom of the mine body using

wrench (fig. 30). Inspect detonator well for foreign material. Remove foreign material when found.

- (2) Turn the pressure plate in a clockwise direction with the wrench (arming tool), so the indicating arrow points to "A" (fig. 28). This places the pressure plate in the armed position. Withdraw the safety clip to determine if the mine will malfunction. Replace the safety clip.
- (3) Screw the detonator holder with

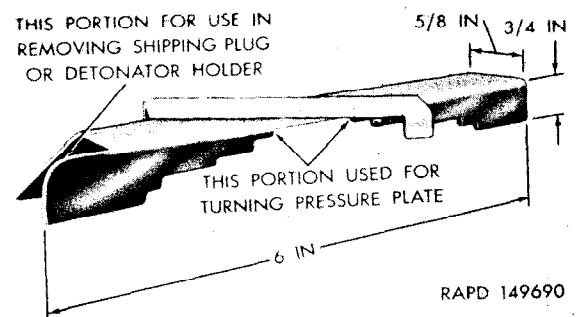


Figure 30. Wrench, mine and fuze, M22, for antipersonnel mine M14.

attached detonator gasket into the detonator well. Use the wrench (arming tool) to screw the detonator holder down tightly against the detonator gasket to obtain a water-tight joint.

Warning: Do not exert any pressure on the pressure plate.

- (4) Place the mine in the ground so that the pressure plate extends just above ground level, otherwise a shoe or boot may bridge the mine. Be sure the ground beneath the mine is sufficiently stable to support the mine when pressure is applied to the pressure plate. If the ground is not sufficiently stable, place a block of wood or other nonmetallic object in the bottom of the hole to provide a firm surface for the mine to rest upon.
- (5) Remove the safety clip by pulling the safety clip pull cord. Retain the safety clip for possible future use.
- (6) Camouflage the mine and remove any excess spoil from the immediate vicinity of the installation.

Warning: Use extreme care when handling the detonators for this mine. A severe shock, such as dropping the detonator on a solid surface, may cause it to function. Detonators should never be carried in pockets or otherwise on the person. After the mine has been armed it should be handled with care. Do not drop or throw it. Place it in position carefully.

Note. In camouflaging the mine, use mixture of material such as dirt, clay, grass, gravel, and fine twigs, arranged so that they are not likely to be washed away by heavy rain.

e. Boobytrapping. No provision is made for boobytrapping the mine. There are no secondary fuze wells.

f. Disarming and Removal.

Caution: If there is evidence of damage, boobytrapping, or malfunctioning, do not attempt to disarm the mine. Mark spot for subsequent destruction in place as prescribed in TM 9-1903.

- (1) Remove camouflage material and carefully uncover the concealed mine. Do not exert pressure on the pressure plate.
- (2) Enlarge the hole carefully and examine the ground around and underneath the mine for evidence of damage, malfunction, or improvised boobytrapping.
- (3) Before the mine is otherwise disturbed, insert the safety clip in the slots in the pressure plate. If the safety clip cannot be inserted relatively easily, it is an indication that the mine has malfunctioned or has been damaged. In such cases, mark the spot and discontinue further attempt to disarm the mine.
- (4) Using the mine-and-fuze wrench, turn the pressure plate in a counterclockwise direction from "A" to "S".
- (5) Remove the mine from the ground.
- (6) Unscrew the detonator holder from the bottom of the mine body, using the mine-and-fuze wrench.
- (7) Replace the shipping plug and gasket.
- (8) Restore the mine to its original condition and packing.

g. Effectiveness.

- (1) Not effective against armored vehicles.
- (2) When buried so that top of pressure plate is flush with ground (normal procedure), it will cause a non-lethal casualty to any person who steps on it.

Section II. PRACTICE ANTIPERSONNEL MINES AND COMPONENTS

23. General

a. Uses. The practice antipersonnel

mines described in paragraphs 24 through 28 simulate many of the service antipersonnel mines described in paragraphs 14

through 22. The various types of practice antipersonnel mines (empty, inert, practice) are used to train personnel in the recognition, care, handling, and use of antipersonnel mines.

b. Types. The antipersonnel mines and fuzes which are designated "inert" or "empty" have metal or plastic parts identical to those of service mines. These inert mines may be filled with inert material, such as sand, or they may be empty. The inert mines and fuzes contain no explosive of any kind and are used only in training for handling mines. Inert fuzes are also provided for use with inert and empty mines. These inert fuzes have no explosive or pyrotechnic components. The antipersonnel mines and fuzes which are designated "practice" are of the same size, shape, weight, and casing material as the service mines and fuzes they simulate. These practice mines contain no high explosive but they may contain small smoke puff and noisemaking charges of low explosive (black powder or pyrotechnic composition) to simulate the explosion of a service mine. These practice mines are provided for practice and training in identification, care, handling, and use of antipersonnel service mines. Practice fuzes

are provided for use with practice mines. The firing mechanisms of these fuzes are fitted with primers and igniters which, when initiated, ignite the spotting or propelling charge in the mine.

c. Precautions. The following safety precautions will be observed in the use of practice and training mines.

- (1) Do not mix service, practice, and inert mines and fuzes. Practice and inert mines should be painted their proper color and have the appropriate identifying terms stencilled upon their bodies.
- (2) Inert antipersonnel mines, since they contain no explosive, are safer to handle and therefore should be given preference for training purposes. Personnel should be trained to handle all ammunition and ammunition components as potentially dangerous, even though the items have been designated "inert" or "empty."
- (3) The rules, regulations, and precautions pertaining to service mines and their components in AR 385-63 and this manual, pertain also to practice antipersonnel mines.

Table II. Practice Antipersonnel Mine, Fuzes, and Components

Practice Antipersonnel Mines					
Nomenclature	Packing description	Weight as shipped (lb.)	Shipping case dimensions (in.)		
			Length	Width	Height
MINE, ANTIPERSONNEL: M3 empty and fuze, mine combination M7A1 inert.	Packed as required -----	----	-----	-----	-----
MINE, ANTIPERSONNEL: M2 (all mods) inert and fuze, mine, combination M2 or M-2A1 inert.	Packed as required -----	----	-----	-----	-----
MINE, ANTIPERSONNEL: M2 (all mods) inert and fuze, mine, combination M6A1 inert.	Packed 1 mine, 1 fuze/ctn, 10 ctn (10 mine and 10 fuze)/wdn bx.	39.0	22-3/4	10-1/4	9-3/8
MINE, ANTIPERSONNEL: M-16A1 inert and fuze, mine combination M605 inert.	Packed 4 mine w/4 fuze M605/strprf paper wrapper and 4 spool trip wire and 1 wrench M25/wdn bx.	40.0	15-5/8	10-7/8	8-1/2
MINE, ANTIPERSONNEL PRACTICE: M8 and fuze, mine, combination M10 or M10A1 practice.	Packed 2 mine w/2 fuze and 20 set of replacement parts/wdn bx.	31.0	20-3/4	12-1/4	9
	Packed 2 mine w/2 fuze and 20 set of replacement parts and 5 spool wire in ctn, 1 ctn/strprf pkg, 1 pkg/wdn bx.	37.0	16-1/2	11-3/8	13-3/8

Table II. Practice Antipersonnel Mine, Fuzes, and Components—Continued

Practice Antipersonnel Mines—Continued					
Nomenclature	Packing description	Weight as shipped (lb.)	Shipping case dimension		
			Length	Width	H.
MINE, ANTIPERSONNEL PRACTICE: NM, M17 (T34).	Packed 125 mine/ctn, 1 ctn and 6 arming wrench M22/wdn bx.	41	16-3/4	14-1/4	11-3/8
Practice Antipersonnel Mine Fuzes					
FUZE, MINE: combination M10 or M10A1 (w/o primer-igniter).	Packed as required -----	---	-----	-----	-----
FUZE, MINE: combination M10A1 (w/primer-igniter).	Packed 4/mtl cntr, 60 cntr (240 fuze)/wdn bx.	125	22	17-1/8	18
Components for Practice Antipersonnel Mines					
Nomenclature	Packing description	Weight as shipped (lb.)	Shipping case dimensions (in.)		
			Length	Width	Height
BODY, ANTIPERSONNEL MINE: for practice APERS MINE M8.	Packed as required -----	-----	-----	-----	-----
CAP, ANTIPERSONNEL MINE: for mine, APER, practice M8.	Packed as required -----	-----	-----	-----	-----
CHARGE, SPOTTING, MINE: for mine, APER, practice M8.	Packed as required -----	-----	-----	-----	-----
PRIMER-IGNITER, MINE FUZE: for mine, combination M10 or M10A1.	Packed as required -----	-----	-----	-----	-----
SIMULATOR, ANTIPERSONNEL MINE, PROJECTILE: for mine, apers, practice M8.	Packed as required -----	-----	-----	-----	---

24. Mine, Antipersonnel, M3 Empty with Fuze, Mine, Combination, M7A1, Inert

This mine and fuze are similar to their service counterparts described in paragraphs 16 and 17, except that the mine case is empty and the combination fuze is loaded with inert material. The metal parts of the empty mine are duplicates of those used for the service mine, from which it may be distinguished by its color (black), and by the word "INERT" stencilled in white. The mine and fuze are used for training in the care, handling and use of their service counterparts. The mine may be ordered separately.

25. Mine, Antipersonnel, M2 (All Models) Inert with Fuze, Mine, Combination M2, M2A1 Inert

a. General. This mine (fig. 31) simulates antipersonnel service mines of the M2 series. Its metal parts are identical to those of the service mine; however, it is readily distinguished from them by four holes drilled in the projector, its color (black), and the word "INERT" stencilled on it in white.

b. Description. The mine consists of a base plate, a piece of sheet tubing attached to the base plate, an inert shell contained in the tube, and a 1/4-inch pipe nipple and

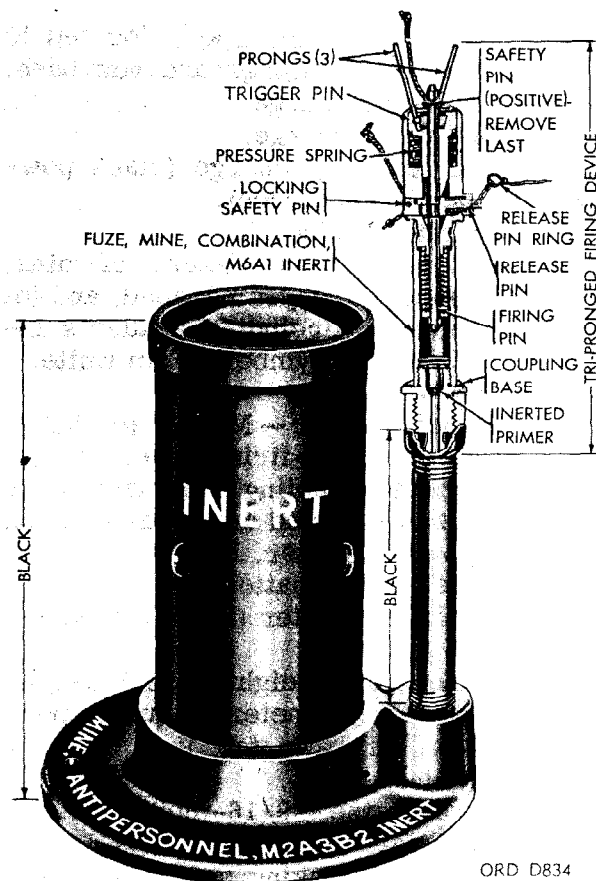


Figure 31. Mine, antipersonnel, M2A3B2, inert and fuze, mine combination, M6A1, inert.

pipe coupling which serves as a fuze well for the fuze. The inert base coupling of the fuze is assembled to the pipe coupling and is protected during shipment and handling by a hexagonal cap. An inerted fuze M6A1 is used. For description of the service fuze M6A1, refer to paragraph 15.

c. Functioning. A load of 8 to 20 pounds applied on any one of the fuze pressure prongs or a pull of 3 to 10 pounds on the release pin will release the firing pin, causing it to strike the inert primer in the base coupling of the fuze. No other action occurs, since the mine is completely inert.

d. Laying and Arming. The same procedure will be used in laying and arming this inert antipersonnel mine as is prescribed in paragraph 14 for the antipersonnel service mine.

e. Boobytrapping. Practice in boobytrapping will be conducted under the

supervision of trained personnel. The same procedure will be used in disarming and removal of this inert antipersonnel mine as is prescribed in paragraph 14 for the antipersonnel service mine.

f. Precaution. No special precautions are required in training with the inert antipersonnel mine (par. 23). However, personnel in training should become familiar with all the general rules in care, handling, and preservation on the mine (par. 10) and the precautions applying to the service counterpart of the mine (par. 14).

26. Mine, Antipersonnel, M16A1 Inert with Fuze, Mine, Combination M605 Inert

The metal parts for this mine and fuze are identical to those used for their service counterparts (pars. 18 and 19). The mine and fuze are loaded with inert material and, except for the firing mechanism of one fuze, will not function. This mine and fuze are used for training in the care, handling, and use of their service counterparts.

27. Mine, Antipersonnel, Practice, M8 and Fuze, Mine Combination, Practice, M10 and M10A1

a. General. This practice mine, which simulates the M2 series of antipersonnel service mines, is shown, with fuze M10A1 installed, in figure 32. The metal parts for this mine are identical to those of the service mine M2A4 (par. 14) except for the projectile. The projectile in the M8 is made of cardboard and contains a spotting charge assembly which resembles a blank-loaded shotgun shell with a delay fuze element instead of a primer. The M8 practice mine may be used many times by replacing the following separately requisitionable components which are fired or damaged in use: fuze igniter and primer assemblies (primer coupling base with black powder igniter crimped on), mine caps (covers), cardboard projectiles, and spotting charges. Firing mechanisms (tri-pronged) and igniter and primer assemblies are in separate containers in the same box (fig. 33) with the mine and are to be assembled

to the mine in the field. See table II for information on packing and replacement components. A firing mechanism and an igniter and primer assembly constitutes the fuze. Note that no propelling charge is used in this mine although a propelling charge is used in the M2 series antipersonnel mines. The igniter charge in the fuze expels the cardboard projectile. For description of practice fuses M10 and M10A1, refer to paragraph 28.

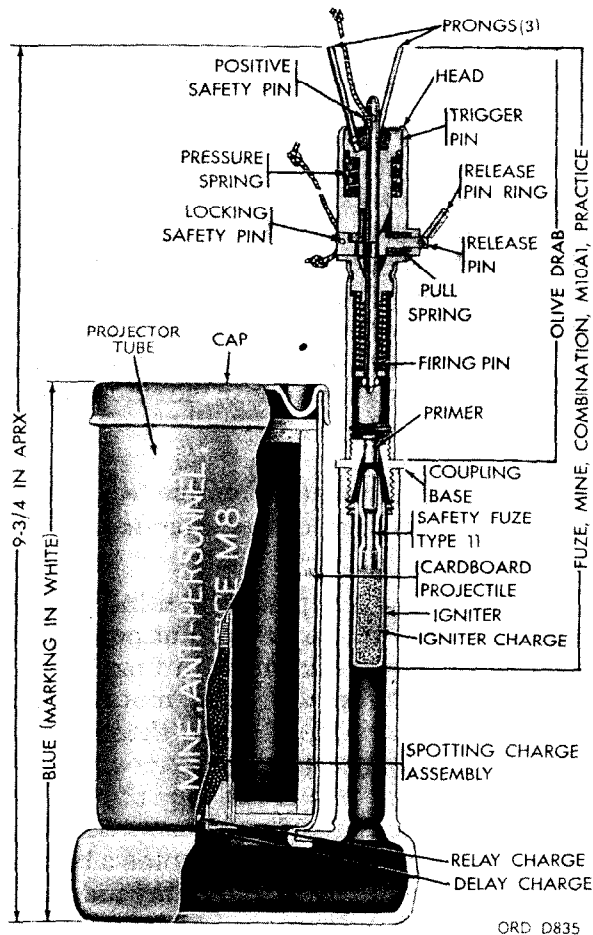


Figure 32. Mine, antipersonnel, practice, M8 and fuze, mine combination, M10A1.

b. Description.

(1) Mine.

Model number — M8.
 Weight, unfuzed — 3.63 pounds.
 Dimensions — height, fuzed, 9-3/4-inches; diameter plus portion of base for fuze, 3-3/4-inches.
 Material — steel.

Fuze well — uncapped, located in tube extending upward from base.
 One delay charge.
 One relay charge.
 One spotting charge (black powder — 0.38 ounce).
 Painting — blue.
 Marking — nomenclature of mine, month, and year loaded, and lot number (including loader's initials and symbol) all in white.

(2) Fuze.

Model number — M10A1 (or M10).
 Components — firing mechanism; primed coupling base with safety fuze delay and crimped-on black powder igniter.
 Type — combination.
 Weight of igniter (black powder) — 15 grains.
 Dimension — height (fuzed), 9-3/4-inches; diameter including portion of base for fuze well, 4 inches.
 Thread size — 9/16-inch.
 Material — zinc base alloy.
 Safeties — locking safety pin (cotter pin type) in release pin at end opposite release pin; positive safety pin (cotter type) in end of firing pin between pressure prongs.
 Painting — olive drab.
 Marking — nomenclature of fuze.

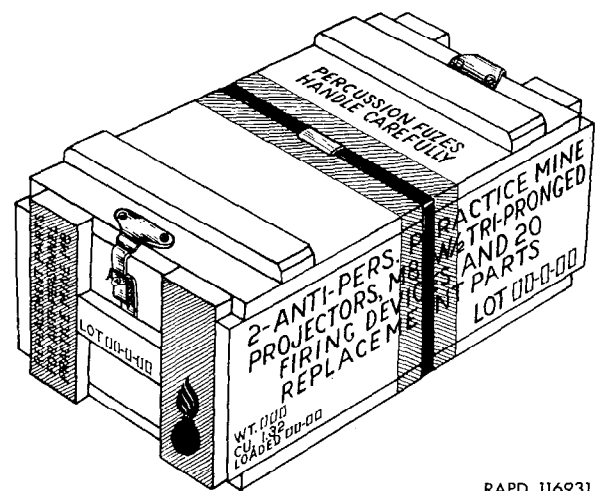


Figure 33. Packing box for two antipersonnel practice mine M8 and 20 of each replacement part.

c. *Functioning.* Actuation of the firing mechanism by an applied load of 8 to 20 pounds on any of the prongs of the head, or by a pull of 3 to 10 pounds on the release pin by means of a trip wire, causes the firing pin to hit the primer. The primer ignites a delay train which burns for 4 to 5 seconds before igniting the igniter charge. The igniter charge ignites the delay element in the spotting charge and expels the cardboard projectile (canister) from the projector, blowing off the mine cap. After a short delay during which the part of the projectile containing the spotting charge rises about 6 feet in the air, the flame from the delay element initiates the spotting charge. The spotting charge explodes with a loud report and emits smoke.

d. *Laying and Arming.*

- (1) Remove a mine, a firing mechanism, and igniter-and-primer assembly (an igniter-and-primer assembly consists of a coupling base fitted with both a primer and an igniter), a spotting charge, and a cardboard projectile from their packings.
- (2) Test both the locking safety pin (located in end of the release pin opposite to the release pin ring) and the positive safety pin (located in the firing pin between the pressure prongs) for freedom from binding, by twisting the safety pins gently with the fingers.
Caution: If either of these safety pins is not free enough to be removed easily when arming the fuze, a damaged firing mechanism is indicated. Such a firing mechanism should be replaced.
- (3) Assemble the firing mechanism to the igniter-and-primer assembly, thus completing the fuze M10A1.

Note. Use only the black 4-½-second delay flash igniter.

- (4) Inspect the fuze well of the mine and remove any foreign material.
- (5) Screw the fuze into the fuze well of the mine as shown in figure 34, grasping the knurled edge of the base coupling.

Note: If the base coupling has a hexagonal edge, use antipersonnel mine fuze wrench M25.

- (6) Fit the spotting charge into the cardboard projectile (canister).

Note. The spotting charge does not always fit easily into the cardboard projectile. Do not strike the spotting charge when inserting it. Either enlarge the projectile hole, or twist and press the spotting charge in with a steady pressure.

- (7) Insert the cardboard projectile with spotting charge into the projector tube and snap the mine cap (cover) over the projector.

Caution: This should be done after the fuze is installed.

- (8) Lay the mine in a hole (about 10 inches deep) on a firm foundation with the tips of the fuze prongs extending just above ground level. Pack dirt around mine up to the mine cap until the mine is solidly and firmly emplaced.

Note. Do not cover the projector with dirt or rocks.

- (9) Install one or more trip wires by attaching them first to firmly-driven anchor stakes and then to the release-pin ring, leaving enough slack to allow the top of the fuze to rotate and thus receive a direct pull on the release pin ring from any one of the trip wires. This is necessary for proper functioning of the fuze.
- (10) Remove the locking safety pin by pulling on the cord to which it is attached.
- (11) Camouflage the installation in accordance with instructions in FM 20-32.
- (12) Remove the positive safety pin (located between the three prongs) by pulling on the cord to which it is attached, thus arming the fuze.
Caution: Do not disturb the trip wires.
- (13) Save the safety pin for subsequent disarming of the fuze.
Note. The mine may be installed for pressure and trip-wire operation or it may be installed for pressure operation only by omitting the trip wires.

e. *Disarming and Removal (Neutralizing).*

- (1) Carefully inspect the installation for boobytrapping devices.
- (2) Carefully remove the camouflage material.
- (3) Insert the positive safety pin first, then insert the locking safety pin.
- (4) Disconnect trip wires.
- (5) Remove the mine from the hole.
- (6) Remove the fuze. Unscrew the firing mechanism from igniter and primer assembly.
- (7) Remove the mine cap from the mine projector and remove the cardboard projectile. Remove the spotting charge from the cardboard projectile.
- (8) Restore mine, firing mechanism, igniter and primer assembly, spotting charge, cardboard projectile, and mine cap to their original condition and packings.

f. Functioned Mine and Fuze.

- (1) The mine body and the firing mechanism of the fuze which have functioned are reusable. The fired igniter-and-primer assembly (primed base coupling with crimped-on igniter) should be either replaced by a new one or prepared for reuse by renewing the primer and igniter.
- (2) To be reused, the functioned firing mechanism must be recocked and its safety pins replaced. To recock, place the end of a stick, pencil, or nail against the firing pin and push it back until it is held in place by the release pin.
- (3) After restoring the mine body and fuze (firing mechanism, and igniter-and-primer assembly) to their original condition, either place them in their original packing or prepare them for immediate reuse by following the procedure in above, using replacement parts as required.

g. Special Precautions.

- (1) When this practice mine functions, the mine cap and part of the cardboard projectile are projected upward; hence, to prevent injury in case of accidental functioning, the

hands or other parts of the body should not be directly over the mine at any time.

- (2) If the spotting charge fails to the cardboard projectile is propelled into the air. Personnel must be alert to avoid the falling projectile. The falling cardboard projectile must be recovered and the unfired spotting charge removed.
- (3) Do not open replacement part containers until ready for use.
- (4) Protect spotting charges and igniter-and-primer assemblies in opened containers from exposure to moisture.

**28. Fuze, Mine, Combination, Practice
M10 or M10A1**

a. General. This fuze is a combination fuze of the pull-pressure type, used to ignite the spotting charge in antipersonnel practice mine M8. It is shown in figure 32 assembled to the mine. The M10A1 fuze can be used interchangeably with the M10, the principal difference being in the primer. The difference between the M39A1 primer which is used with the fuze M10 and the MK 5 primer which is used with fuze M10 is that the M39A1 has a sharper pointed anvil and a flat bottom cup, thus providing more reliable functioning.

b. Description. This fuze consists of a tri-pronged firing mechanism and a base to which an igniter containing 15 grains of black powder is attached. The base also contains a primer and a safety fuze which provides a delay of 4 to 5 seconds. The firing mechanism consists of a cylindrical metal case containing a trigger pin, a release pin, and a firing pin, each pin being fitted with a coil spring to provide the force necessary to activate the fuze. Two safety pins render the fuze safe during shipment and handling. One safety pin (locking safety pin) passes through the end of the release pin and bears against the body of the fuze; the other safety pin (positive safety pin) passes through that part of the firing pin which protrudes between the prongs and above the top of the fuze (par. 27b.).

- (1) The three prongs are assembled to

the hollow trigger pin which is held against the top of the casing by pressure of the trigger pin spring. The wedge-shaped portion at the base of the trigger pin bears on the release pin.

- (2) The release pin has a keyhole-shaped slot. The narrow portion of the slot engages the notch in the firing pin to hold the firing pin in the cocked position.
- (3) The firing pin is a steel rod approximately 1/8-inch in diameter and has a circumferential groove or 2 slots where it passes through the release pin.

c. Functioning.

- (1) When a sufficiently heavy load (8 to 20 pounds) is applied to any of the prongs, the trigger pin is forced downward and acts against the release pin to force the release pin outward. This action disengages the narrow portion of the keyhole-slot from the notch or groove in the firing pin, and the firing pin is driven by its spring into the primer and fires it.
- (2) A pull of 3 to 10 pounds on the trip wire attached to the release-pin ring will pull the release pin outward. This releases the firing pin, which is then driven by its spring into the primer, firing it.
- (3) The functioning of the primer ignites the safety fuze which, after 1 to 2 seconds, ignites the black powder igniter charge.

d. Arming and Disarming. Refer to paragraph 27d and 27e.

**29. Mine, Antipersonnel, NM, M17 (T34)
with Integral Fuze**

a. General. This mine (fig. 34) is the practice version of mine, antipersonnel, NM, M14, with integral fuze (par. 22). The M17 like the M14, is detectable by metallic-type mine detectors, and is not reusable. Unlike the M14, the M17 provides a 1 to 2 second delay between activation and functioning. The mine cannot cause injury to the person initiating it or personnel in the immediate vicinity. To pro-

vide the visible and audible signal required for the practice mine, the M17 contains an expelling charge, a smoke charge and two small firecrackers. The expelling charge blows the fuze portion of the mine and the two firecrackers out of the ground. The firecrackers function either in the air or on top of the ground. The smoke charge stays in the ground and burns for approximately 5 seconds, causing a smoke cloud to issue from the hole made by the expelled fuze. The M17 practice mine has the following characteristics: force of 20 to 35 pounds applied to the pressure plate of the armed mine will cause the mine to function. A man's weight is sufficient to activate a mine M17 buried to a depth of 1/2-inch or less. The M17 is designed to withstand exposure to alternate freezing and thawing periods.

b. Description.

(1) *Mine.*

Model number — M17 (T34)

Type — practice (simulating blast type)

Weight (with integral fuze) — 4 ounces (approx.)

Weight of smoke tube charge (smoke composition) — 200 grains

Weight of expelling charge (black powder) — 60 grains (approx.)

Weight of firecracker detonator charge — 1.75 grains (approx.)

Dimensions — height, 1-9/16 inches; diameter, 2-3/16 inches

Material — plastic

Fuze — integral

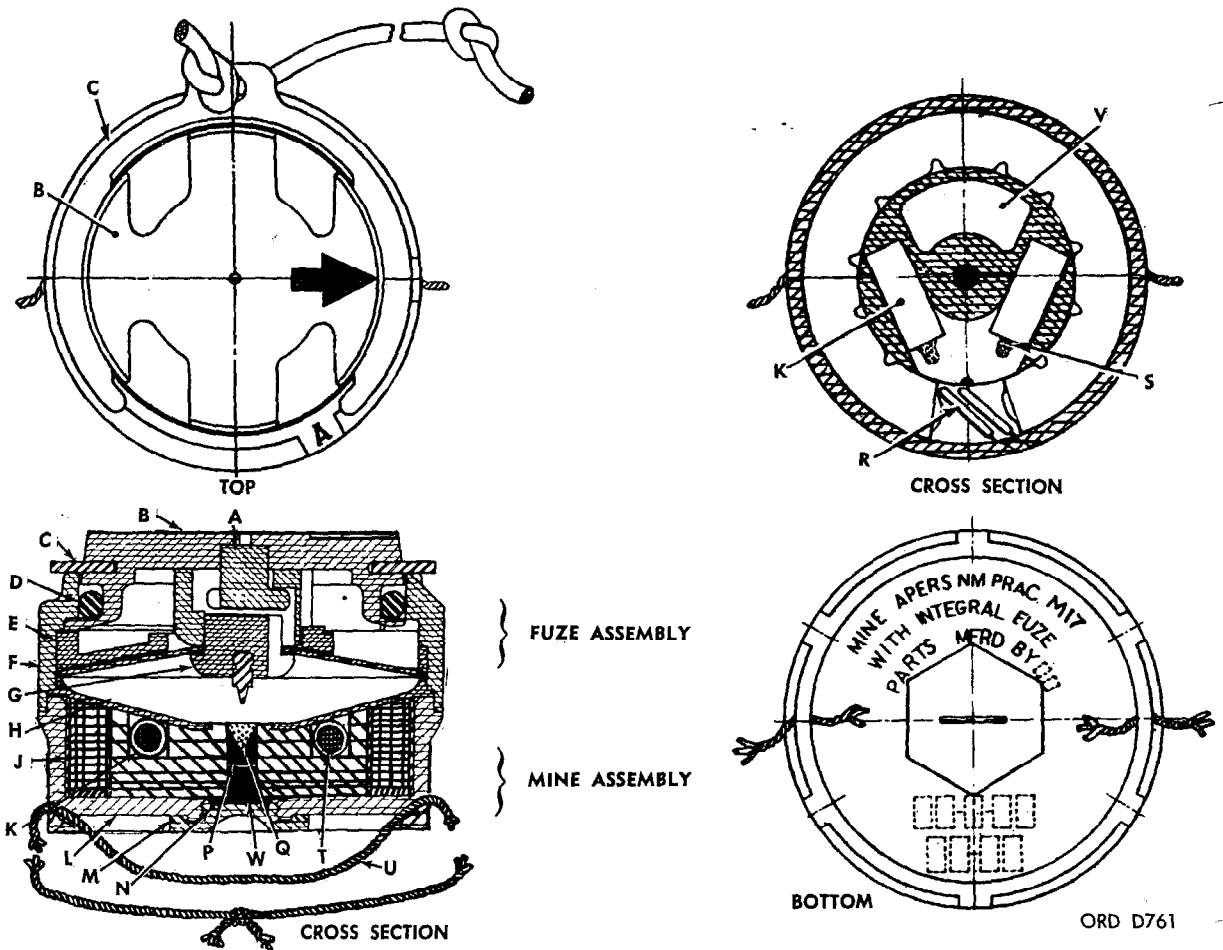
Color — blue (arming arrow in white)

Marking (on bottom) — nomenclature, symbol of parts, manufacturer, loader's lot number, month and year loaded.

Plug (in bottom) — head of plug is same size and shape (hexagonal) as head of detonator holder of M14 mine, which the M17 simulates.

(2) *Fuze.*

Components — pressure plate, lock key, spider, lock ring, Belleville spring, and firing pin.



- A—Key lock (plastic)
- B—Plate, pressure (plastic)
- C—Clip, safety (steel)
- D—Gasket (rubber)
- E—Spider (plastic)
- F—Body, fuze (plastic)
- G—Firing pin assembly (consists of plastic belleville spring, plastic lock ring, and firing pin assembly)
- H—Partition (plastic)
- J—Smoke tube assembly
- K—Firecracker assembly

- L—Body, mine (plastic)
- M—Gasket, plug (rubber)
- N—Plug (plastic)
- P—Fuze, delay
- Q—Charge, initiating
- R—Igniter, prime charge (quick match)
- S—Igniter, firecracker (quick match)
- T—Charge container
- U—Cord, carrying
- V—Expelling charge
- W—Igniter

Figure 34. Mine, antipersonnel, practice, NM, M17 (T34) top, bottom, and cross section.

Type — belleville spring - integral
 Material — plastic (except steel firing pin)

Safeties — steel clip (U-shaped) with pull cord; provision for turning pressure plate from safe position (white pointer at A)

Color — blue

c. *Functioning.* Until the mine is armed,

the safety clip prevents downward motion of the pressure plate. If the safety clip is removed, the mine remains safe until the pressure plate is turned from the safe (S) position to the armed (A) position (fig. 35). This motion disengages the key lock from the lock ring and turns the pressure plate clear of the spider, permitting downward motion of the pressure plate. Any weight

on the pressure plate will then be transmitted to the firing pin spring assembly. If a weight of 20 to 35 pounds is so applied, the belleville spring will snap through center, causing the firing pin to initiate the primer charge. The initiating charge then ignites the fuze delay which burns for 1 to 2 seconds before initiating the igniter. The igniter initiates the prime charge igniters which in turn initiate the smoke charge and the firecrackers. The igniter also initiates the expelling charge which blows the fuze assembly out of the ground.

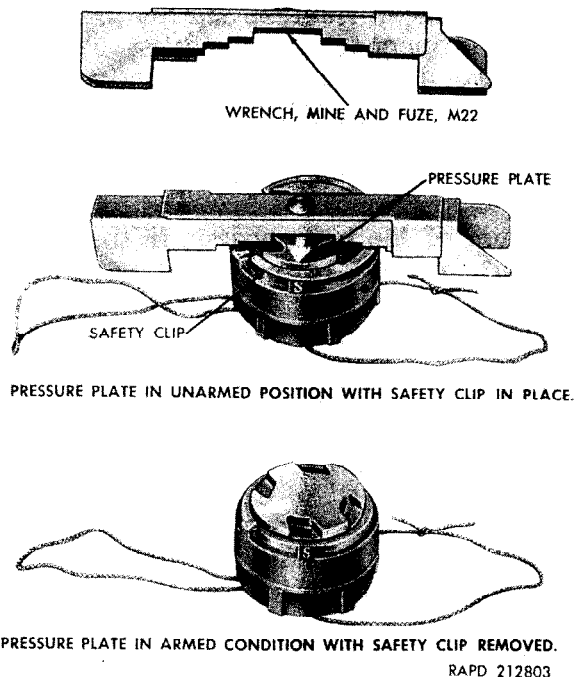


Figure 35. Mine, antipersonnel, practice, NM, M17 (T34)—method of using arming wrench.

d. Preparation for Use. The mine is assembled and shipped with the arrow on the pressure plate turned to safe (S) and with the safety clip in place. The plug in base of the M17 mine must not be removed. Unlike the M14 mine, it is not necessary to remove a shipping plug and insert a detonator. The mine M17 is complete as shipped.

e. Laying and Arming.

- (1) Make certain that the safety clip is in place.
- (2) Using the arming wrench M22 (fig. 35) turn the pressure plate from

(S) in a clockwise direction, until the arrow on the pressure plate points to (A).

- (3) Lay the mine in a small hole in the ground so that pressure plate is within 1/2-inch of the surface of the ground. The ground beneath the mine should be sufficiently firm to support the mine when pressure is applied to the pressure plate. The mine should be anchored, using the carrying cord, in such a manner that the mine will not float above ground level should there be a heavy rainfall.
- (4) Hold the mine firmly with one hand, without touching the pressure plate. With the other hand, remove the safety clip by pulling the safety clip pull cord. The mine is now fully armed.

Caution: Do not touch pressure plate of fuze while arming the mine. Retain safety clip for possible future use.

f. Disarming.

Caution: Check for boobytrapping before removing camouflage material.

- (1) If there is any evidence of boobytrapping, damage, or malfunctioning, or if the safety clip cannot be replaced, discontinue any attempt to disarm the mine.
- (2) Carefully remove camouflage material and insert the safety clip into the slots in the pressure plate before the mine is otherwise disturbed.
- (3) Turn the pressure plate from (A) in a counterclockwise direction with the arming wrench until the arrow points to (S).

g. Precautions.

- (1) **In use.** All precautions normally followed in the storage, shipment, handling, and use of military pyrotechnics should be followed. Refer to TM 9-1370-200.
- (2) **In storage.** The practice mine should be stored in accordance with instructions contained in TM 9-1903.

CHAPTER 3

ANTITANK MINES

Section I. SERVICE ANTITANK MINES, FUZES AND COMPONENTS

30. General

a. Uses. Antitank mines are used primarily to restrict or delay movement of enemy vehicles. An antitank mine is so placed in the ground that it will be triggered by movement of enemy tanks, vehicles, or attempted removal by enemy troops. Antitank mines will usually destroy a small unarmored vehicle. Although they may not always destroy an armored tank they can be relied on to incapacitate it, usually by damaging its tracks. Heavy antitank mines are likely to be triggered by foot troops unless they attempt to run across or disturb them. Detailed information on uses and tactical employment of antitank mines may be found in FM 20-32.

b. Mines. Representative types of antitank mines are shown in figure 1. An example of both a light and a heavy antitank mine is shown in this illustration. Light antitank mines are now obsolete; however, inert, empty, and practice models of light antitank mines are available (see table IV, and par. 38). Most antitank mines are of the blast type and depend on the explosive

force developed by the explosion for their effect. For a more detailed general description of antitank mines see paragraph 5.

c. Fuzes and Other Components. Various types of fuzes are used to activate antitank mines. The fuze serves to transform the mechanical initiating action (pressure) on the fuze to an explosive force which initiates the high-explosive train of the mine. Antitank mines require a booster which serves to amplify the explosive force of the detonator in the fuze and to assure initiation of the main charge in the mine. Antitank mines are provided with secondary fuze wells for use in boobytrapping the mine (par. 6). A secondary fuze usually consists of a standard firing device (par. 42) screwed into an activator (par. 35), which serves as an adapter-detonator the firing device.

d. Data. Tabulated data on antitank mine fuzes and components may be found in table III. Additional data may be found in paragraphs 31. through 35.

Table III. Service Antitank Mines, Fuzes, and Components.

Service Antitank Mines					
Nomenclature	Packing description	Weight as shipped (lb.)	Shipping case dimensions (in.)		
			Length	Width	Height
MINE, ANTITANK: HE, heavy M15 w/fuze, mine, AT M603 and activator M1.	Packed 1 mine (w/fuze and 1 activator, ea in can M182)/wdn bx.	49.0	18	15-1/8	7-1/2
MINE, ANTITANK: HE, heavy M21 and fuze, mine, combination M607 and booster M120.	Packed 2/wtrprf barrier bag, 2 bag (4 mine w/2 wrench M26)/wrbnd bx.	90.8	22-1/8	20-1/8	16
MINE, ANTITANK: HE, NM, M19 (T18).	Packed 2 mines (w/2 fuze M606, 1 wrench M22 and 2 detonator holder assy in crdbd ctn, overpacked in barrier material bag and 2 activator M2 in indiv mtl cntr)/wdn bx.	71.8	16-3/8	10-3/8	16
MINE, ANTITANK: HE, NM, M19 (T18E4) w/fuze mine M606 (T1202E2).	Packed 2 mine (w/2 fuze and 1 wrench)/wdn bx.	71.8	16-3/8	10-3/8	16

Table III. Service Antitank Mines, Fuzes, and Components—Continued

Service Antitank Mines—Continued					
Nomenclature	Packing description	Weight as shipped (lb.)	Shipping case dimensions (in.)		
			Length	Width	Height
MINE, ANTITANK: HE, NM, M19 (w/fuze M606, w/activator M2).	Packed 2/support/bag, 2 bag (4 mine and 1 arming wrench M22)/wrbd bx.	----	-----	-----	-----
Service Antitank Mine Fuzes					
FUZE, MINE: AT M603-----	Packed 1/mtl cntr, 144 cntr (144 fuze)/wdn bx.	58.9	16-3/8	17-7/8	13-3/8
	Packed 1/mtl cntr, 180 cntr (180 fuze)/wdn bx.	71.6	16-3/8	14-7/8	13-3/8
MINE, ANTITANK: HE, Heavy M6 w/fuze, mine, AT(M603) and activator M1.	Packed 2 mines (w/2 fuzes and 2 activators) in a wdn bx.	60	17-5/8	16-3/16	8-3/4
MINE, ANTITANK: HE, light M7 w/fuze, mine, AT M603.	Packed 12 mines in rows of 3, w/12 fuzes and 12 activators all packed in a wdn bx.	71.5	18-3/8	10-1/2	7-1/4
	Packed 12 mines w/12 fuzes -----	77	23-3/8	11-3/4	9-1/2
Components of Service Antitank Mines					
Nomenclature	Packing description	Weight as shipped (lb.)	Shipping case dimensions (in.)		
			Length	Width	Height
ACTIVATOR, ANTITANK MINE: M1.	Packed 1/mtl cntr, 100 cntr (100 activator)/wdn bx.	47.9	22-1/4	9-3/4	14-1/2
	Packed 1/mtl cntr, 132 cntr (132 activator)/wdn bx.	65.3	26-7/8	15-3/4	9-3/8
	Packed 1/mtl cntr, 144 cntr (144 activator)/wdn bx.	54.4	16-3/8	14-7/8	13-3/8
	Packed 1/mtl cntr, 168 cntr (168 activator)/wdn bx.	-----	-----	-----	-----
ACTIVATOR, ANTITANK MINE: M2 (T3E1).	Packed 1/mtl cntr, 180 cntr (180 activator)/wdn bx.	54.5	16-3/8	16-3/4	14-3/4
ARMING PLUG, ANTITANK MINE: M4 or M4B1 (w or w/o spring).	Packed as required -----	-----	-----	-----	-----
ARMING PLUG, ANTITANK MINE: M4 or M4B1.	Packed 144/wdn bx-----	70.0	15	13-3/8	11-1/2
BOOSTER, ANTITANK MINE: M120 (w/retainer).	Packed 200/ctn, 6 ctn (1,200 booster and 1,200 retainer)/wdn bx.	63.11	16-1/8	13-3/4	13-1/2
RETAINER, ANTITANK MINE BOOSTER.	Packed 25,000/fbrbd drum-----	93.0	16	16	18-1/2

31. Mine, Antitank, HE, Heavy, M15 with Fuze, Mine, AT, M603 and Activator, M1

a. General. This is a high capacity mine (figs. 36 and 37) intended for use against heavy tanks. A minimum force of 565 ± 174 pounds on the fuze is required to initiate this mine therefore it will not

ordinarily be initiated by foot troops. However, it is possible that the mine could be detonated by a running soldier.

Warning: Friendly troops should avoid areas mined with antitank mine M15.

b. Description.

(1) Mine.

Model number — M15

Weight, unfuzed - 30 pounds
 Weight of explosive charge
 (Comp B) - 22 pounds
 Dimensions - height, 4-7/8 inches;
 diameter, 13-1/8 inches.

Material - steel

Fuze well - main (primary) fuze well located in center of mine.

Fuze arming mechanism - arming plug M4 or M4B1. This plug is in place over main fuze well of mine as shipped. This plug (fig. 31) has a steel shutter which moves from a side position as the setting knob is moved from SAFE through DANGER to ARMED position. Arming plug M4 or M4B1 may be used with HE antitank mines of the M6 series or the M15 series. Arming plug M4 is used with AT practice mine M12.

Caution: The setting knob should never be left pointing to DANGER. Secondary (boobytrapping) fuze wells:

Number and location - two wells, one located in side and one in bottom; covered by tape, as shipped.

Type of secondary (boobytrapping) fuze for which threaded - any firing device (par. 42) and activator M1 (par. 35).

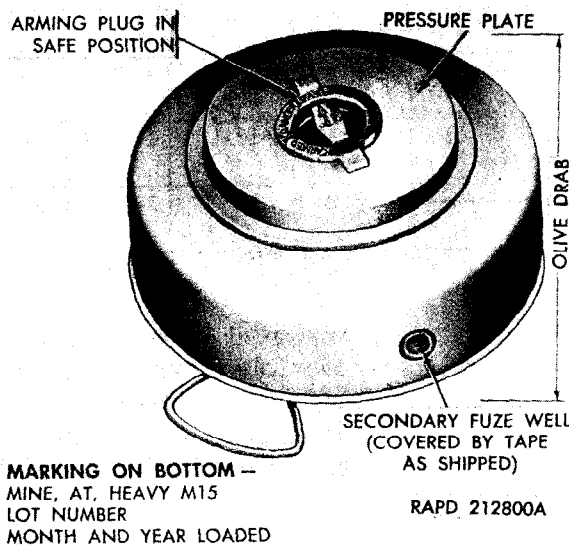


Figure 36. Mine, antitank, HE, heavy, M15.

Booster - booster M120 in bottom of main fuze well; no other booster required.

Painting - olive drab.

Marking - nomenclature, lot number, month and year loaded, and loader's initials - on bottom of mine in yellow.

(2) *Fuze (primary).*

Model number - M603

Type - mechanical, belleville spring

Weight - 1.56 ounces

Weight of explosive (primer detonator, lead azide, and RDX) - 7 grains (approx.).

Dimensions - height, 1.17 inches; diameter, 1.125 inches.

Material - steel

Safeties - safety clip (fork)

Painting - unpainted

Marking - nomenclature stamped in metal

(3) *Fuze (secondary) (boobytrapping).*

Firing device type and model number - any regular type having 9/16-inch thread, usually pull-type M1.

Activator name and model number - activator M1.

c. *Functioning.*

- (1) When the shutter of the arming plug (fig. 38) is in the "ARMED" position, a force of 300 to 400 pounds on pressure plate of mine depresses the belleville spring of the mine, causing the shutter to depress the pressure plate of the fuze.
- (2) The fuze pressure plate depresses the fuze belleville spring which snaps into reverse, driving firing pin into the detonator and exploding it.
- (3) Explosion of the detonator explodes the booster (M120) which, in turn, explodes the main charge.

d. *Laying and Arming.*

- (1) Unscrew the arming plug from the mine, using the arming wrench (fig. 39) as shown in figure 40.
- (2) Inspect the fuze well and arming

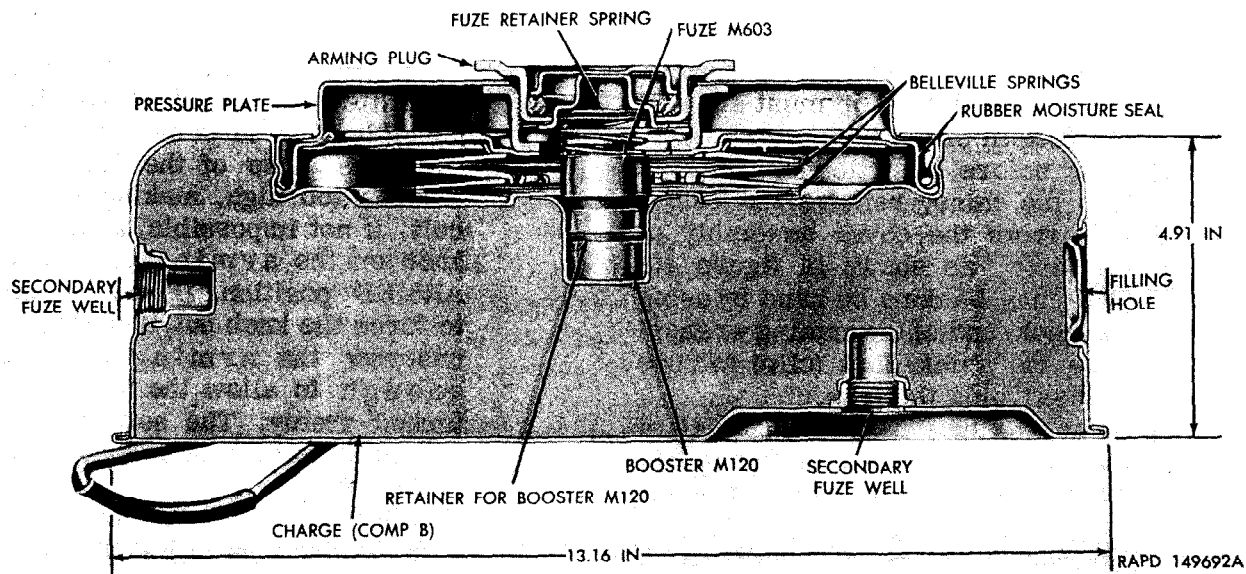


Figure 37. Mine, antitank, HE, heavy, M15 (T27)—cross section with fuze M603 installed.

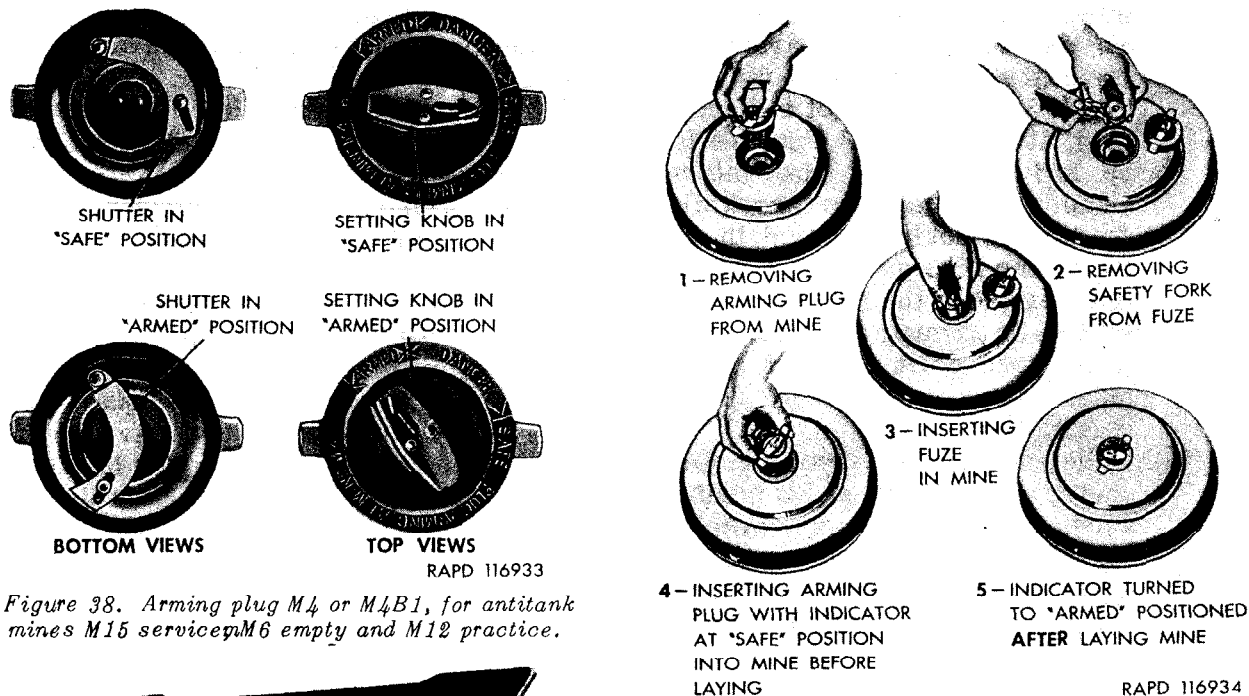


Figure 38. Arming plug M4 or M4B1, for antitank mines M15 service, M6 empty and M12 practice.

Figure 40. Five steps in method of fuzing and arming antitank mine M15 with fuze, mine, AT, M603.

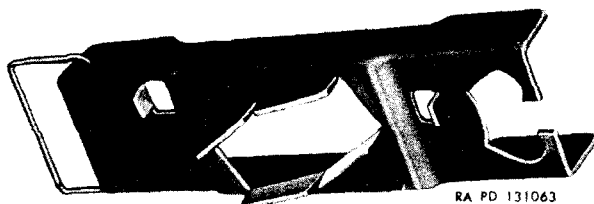


Figure 39. Wrench, arming plug, M20, for arming plug M4 or M4B1.

plug threads to see that no foreign material is present. Remove foreign material when found.

Warning: Ice in the fuze well during fuzing operations can cause a serious accident. During freezing weather make sure none is present.

Note. Check to be sure booster retainer is seated in fuze well. If booster retainer is not present, replace mine.

- (3) After removing it from its metal shipping container, inspect fuze M603 for serviceability. The green end of the detonator must show in the bottom of the fuze.
- (4) Just before insertion of the fuze into the mine, remove the safety fork from the cover assembly of the fuze, as shown in figure 40. This may be done by hand by using the hook-end of the arming wrench. Save the safety fork (clip) for use in disarming the fuze.
- (5) Insert the fuze into the fuze well of the mine, as shown in figure 40, pushing it down gently until it seats.

Note. Always insert the main (primary) fuze before installing secondary fuzes.

Warning: No pressure must be put on the pressure plate of the fuze when inserting it into the fuze well. To assure proper clearance between the fuze pressure-plate button and the shutter of the arming plug, it is essential that the fuze be fully seated on the internal shoulder of the mine fuze well. If the fuze is not fully seated, the button on the fuze pressure plate will interfere with the movement of the shutter in arming the fuze. Hence, if the fuze does not seat fully, it must be removed and the cause investigated.

- (6) Make sure that the setting knob and shutter are in the SAFE position, screw the arming plug with helical spring fuze retainer into the mine securely as shown in figure 40 using the arming wrench to assure a watertight joint.
- (7) Lay the mine on a firm foundation with the top surface of the pressure plate not more than 1-1/2 inches beneath the ground level.
- (8) Just before the mine is covered, arm the mine by turning the setting knob with red pointer from "SAFE" through "DANGER" to "ARMED" as shown in figure 40. The arming wrench may be used for this purpose. The fuze will not function if

the pointer on the arming plug points to SAFE.

Caution: Because of tolerances permitted in manufacture, it is possible that in some cases the pressure plate of the fuze M603 extends too high, making it difficult, if not impossible, to turn the knob on the arming plug to the ARMED position. Do not attempt to force the knob but, if necessary, unscrew the arming plug just enough to allow the knob to be turned freely. The setting knob should at no time be left pointed to DANGER.

- (9) Camouflage the mine in accordance with instructions in FM 20-32.

e. Boobytrapping. Boobytrapping of the mine M15 requires activator M1 (par. 35) and a firing device of the pull, or pull-release type (par. 46) and wire or trip wire (fig. 5).

- (1) Remove mine M15 from packing and inspect for and remove foreign material.
- (2) Remove tape and shipping sleeve from secondary fuze well (side well, bottom well, or both).
- (3) Inspect secondary fuze well carefully to make certain it is free of foreign material.
- (4) Remove plug and its gasket from head of activator (activator M1), and screw the activator hand-tight into the secondary fuze well of the mine. Retain plug and gasket for future use.
- (5) Check to assure that the small rubber gasket is in place inside the activator. Screw firing device hand-tight into activator (the firing device does not have a blasting cap).
- (6) Install trip wires as required, fastening them to anchor posts *first* and to the firing device of mine *last*. Make sure there is no tension on the wires, except on the pull-release type firing device (par. 46), which must be installed by special troops only.

f. Disarming and Removal (Neutralizing).

- (1) Carefully uncover the concealed mine and examine the side and bottom secondary fuze wells for boobytrapping devices (secondary fuzes).

Warning: Trip wire may have been installed that will initiate a secondary fuze by either pull or release.

- (2) Do not cut taut trip wires, but cut all slack trip wires.

Warning 1: If taut wires are encountered when attempting to neutralize the mine, do not cut the wires, under any circumstances. The best procedure is to attach a long rope or wire to the mine without disturbing the taut trip wire and then remove the mine from the ground by pulling on the long rope or wire from a protected position, making sure that such protected position is not mined. If this method is not practicable, the matter should be referred to specially trained personnel.

Warning 2: When removing the mine with a long rope or wire, use extreme caution - the mine may detonate.

- (3) Replace all safety pins in the firing devices, always replacing the "positive" safety pin *first* then remove the trip wire.
- (4) Unscrew the activator. Replace plug and gasket in head of activator.
- (5) Turn the setting knob of the arming plug to the "SAFE" position.
- (6) Unscrew firing device from activator.
- (7) Remove arming plug by unscrewing it in a counterclockwise direction.
- (8) Remove the fuze, grasping the fuze pressure plate with the fingers, and insert the safety fork (clip) under the pressure plate. The fuze should come out easily.

Warning: Do not attempt to remove the fuze if it is frozen in place or difficult to remove.

- (9) Unscrew the actuator from the secondary fuze well(s). Replace the plug and gasket in the head of the actuator.
- (10) Screw arming plug with retainer spring into place hand-tight, with pointer on setting knob pointing to "SAFE".
- (11) Replace tape over secondary fuze well.
- (12) Pack the mine and fuze in its original position in its packing container.

Note. The mine may be laid and removed any number of times, provided neither fuze nor mines show evidence of damage or deterioration.

g. Effectiveness.

- (1) If buried 3-inches deep, this mine will disable a medium tank such as the 90-mm gun tank M48 by breaking the track.
- (2) If laid flush with ground, it will disable a medium tank such as the 90-mm gun tank M48 by breaking the track and bogies (road wheels or other parts of the suspension system).

32. Fuze, Mine, AT, M603

a. General. Antitank mine fuze M603 (figs. 37, 41 and 42) is an instantaneous mechanical-pressure type fuze. This fuze is used and packed with (fig. 43) antitank mine M15 (par. 31). Fuze M603 is also available as a separately issued item. (See table III.)

b. Description. The fuze consists of an aluminum body 1-1/8 inches in diameter and 1-3/16 inches high. The body contains a firing pin assembly, a cover assembly, a safety fork (clip), and a detonator. The firing pin assembly consists of a firing pin and two steel Belleville springs held together by a retainer which is crimped to the firing pin. The cover assembly consists of a metal cover for the top of the fuze body and a pressure plate which is attached to the cover in such a manner that the safety fork may be inserted between the fuze body and the pressure plate. The detonator well contains a detonator crimped to the body of the fuze. A projection at the bottom of the fuze body permits

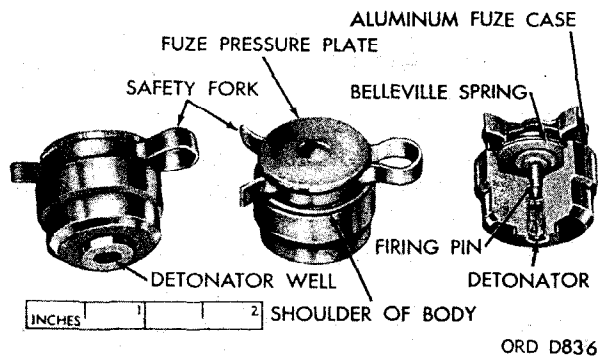


Figure 41. Fuze, mine, AT, M603—bottom, top and cross section.

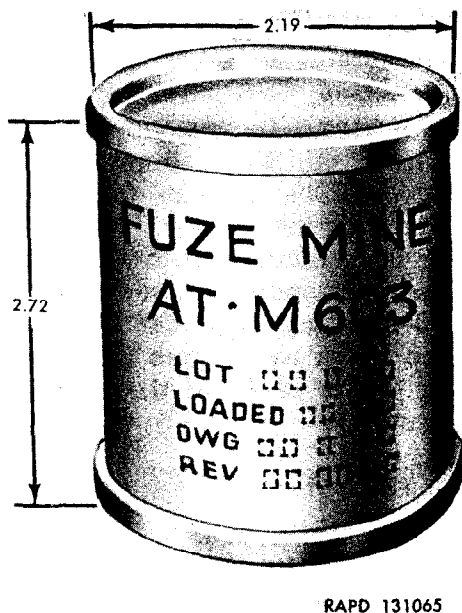


Figure 42. Metal ammunition container for fuze, mine, AT, M603.

the detonator (bottom end identified by its green color), to come into close proximity with the booster charge. All mines using fuze M603 have a booster M120 in the bottom of the fuze well.

c. Functioning. This fuze will function when a load of 140 to 240 pounds depresses its belleville spring, causing it to snap into reverse and drive the firing pin into the detonator. When this fuze is used in heavy antitank mine M15, a minimum load of 565 ± 174 pounds is needed on the pressure plate to overcome belleville spring resistance and actuate the mine.

d. Precautions in Use.

- (1) As the fuze contains a detonator, all precautions prescribed for

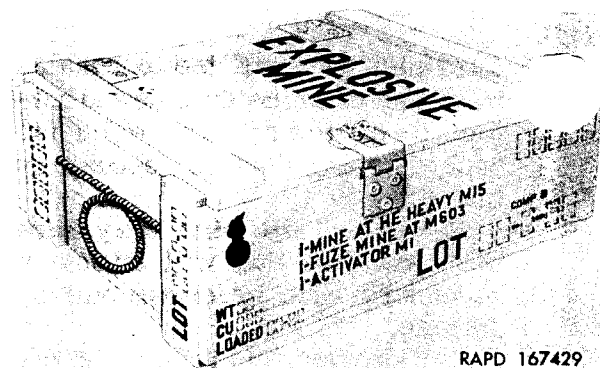


Figure 43. Packing box for mine, antitank, HE, heavy, M15.

handling high explosives should be observed. Refer to paragraph 10.

- (2) When used with heavy antitank mine M15, the safety fork (clip) should not be removed until immediately before the mine is fuzed. The setting knob of the arming plug of mine M15 should not be turned to the armed position until all other operations except final covering of the pressure plate of the mine with earth or other camouflaging material have been completed.
- (3) For cautionary measures in loading and arming, disarming and removal (neutralizing), in connection with the use of this fuze in heavy antitank mine M15, refer to paragraph 31.

e. Temperature Limits. The fuze M603 operates normally at temperatures between -40°F. and 125°F.

33. Mine, Antitank, HE, Heavy, M21 with Fuze, Mine, AT, M607

a. General. Antitank mine M21 with antitank mine fuze M607 (fig. 44) is used primarily for destroying tanks and other types of tracked and wheeled vehicles. The fuze M607, with extension rod adapter and extension rod, can be actuated by contact with any portion of the frontal width of a tank or other vehicle. With the extension rod adapter and extension rod removed, the fuze may be used as a pressure-type fuze. Mine M21 derives its effectiveness against armor from the energy produced by the high-explosive charge (Com

NOTE

M21 mines manufactured before September 1963 have extension rod adapters whereas the extension rods of M21 mines manufactured after that date thread directly into the M607 fuze. Descriptions of the mine and fuze bodies, and the operating instructions for both types of mines are the same.

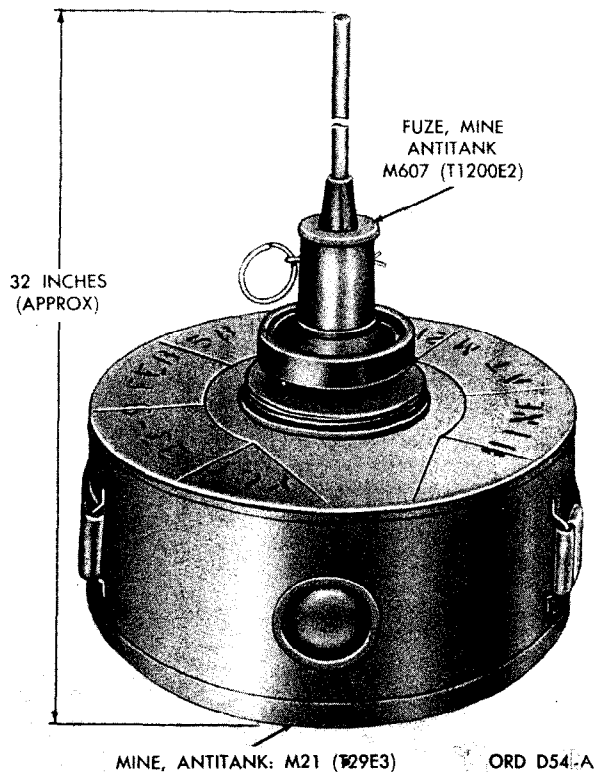


Figure 44. Mine, antitank, HE, M21 and fuze mine, antitank M607.

propelling a mass of steel in an upward direction at velocity sufficient to perforate the tank belly armor.

b. Description.

- (1) *Antitank mine M21.* Antitank mine M21 (fig. 45) is 9 inches in diameter, 4-1/2 inches in height, and contains approximately 11 pounds of high-explosive (Comp H6). The mines are painted olive drab with markings in yellow. The adjustable carrying strap attached to the mine is used for hand or shoulder carrying of the mine. The strap can also be used for lifting the mine from an emplacement. The approximate weight of the mine, without fuze M607, is 17-1/4 pounds. The mine is composed of a cover assembly and a body.

- (a) The cover assembly of the mine contains a shipping plug assembly, a charge cap assembly, a cover assembly, and a black powder expelling charge. The purpose of the threaded hole in

the charge cap assembly is to receive fuze M607.

- (b) The body of the mine consists of the following components: mine body with its concave steel plate, firing pin assembly, and high-explosive charge (Comp H6). The delay assembly consists of a primer M42, a delay element and a relay assembly.

Note. Booster M120 is not shipped in the booster cavity of mine M21. It is shipped in the same packing support, but separate from the mine.

- (2) *Antitank mine fuze M607 (T1200E2).* Antitank mine fuze M607 (T1200E2) (fig. 46), is 4 inches in length without the extension rod and extension rod adapter, and approximately 2-3/4 inches in diameter. The 3/4-inch external threads at the base of the fuze are protected during shipment by a closure assembly and gasket. The fuze assembly consists of the following components: pressure ring, cap, body, tilt rod, band, stop, pull-ring assembly, plastic collar, seal, bearing cap, Belleville spring, retainer ring, O-ring, firing pin assembly, fork, detonator M46, gasket, and closure assembly. The band and the stop are held together by the pull ring assembly until the fuze is armed. The 24-inch extension rod and the extension rod adapter are shipped unassembled (fig. 47).

Note. The fork of the closure assembly (fig. 47) prevents the firing pin from accidentally striking detonator M46 during shipment or handling.

c. Functioning.

- (1) *Fuze, M607.* The fuze will function with or without the extension rod and the extension rod adapter.
 - (a) With the extension rod and the extension rod adapter (fig. 48), assembled to the fuze (after the pull-ring assembly, stop, and band have been removed), the tilting of the extension rod with a minimum horizontal force of

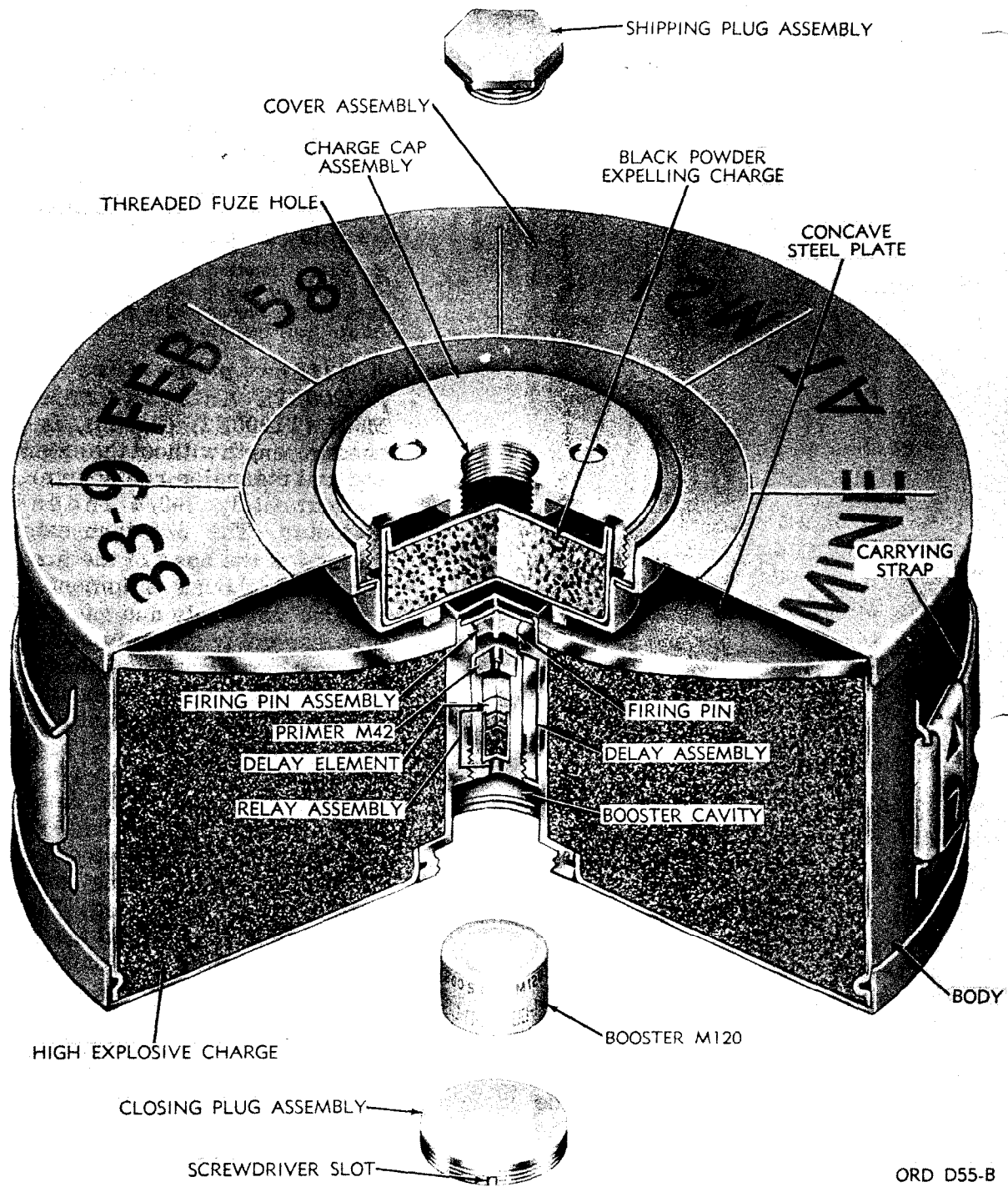


Figure 45. Mine, antitank, HE, M21-sectional view.

3.75 pounds, acting through an angle of approximately 20 degrees or more, will shatter or break the plastic collar (fig. 46).

(b) When used without the extension rod and the extension rod adapter, a minimum force on the pressure ring of 290 pounds

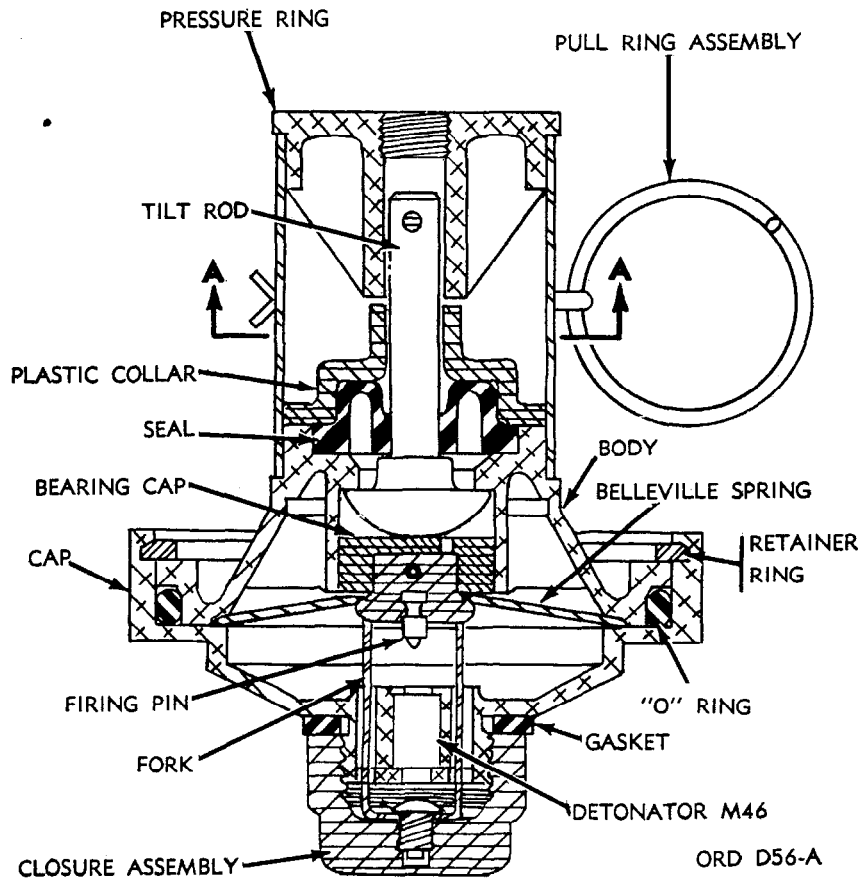
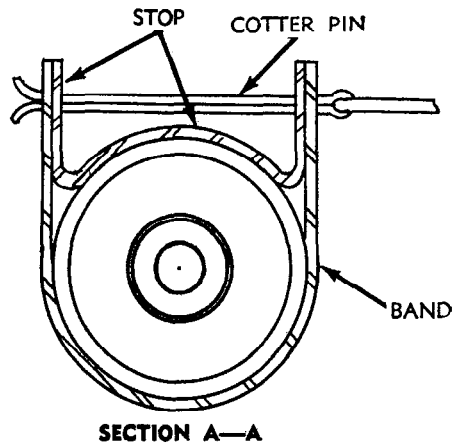
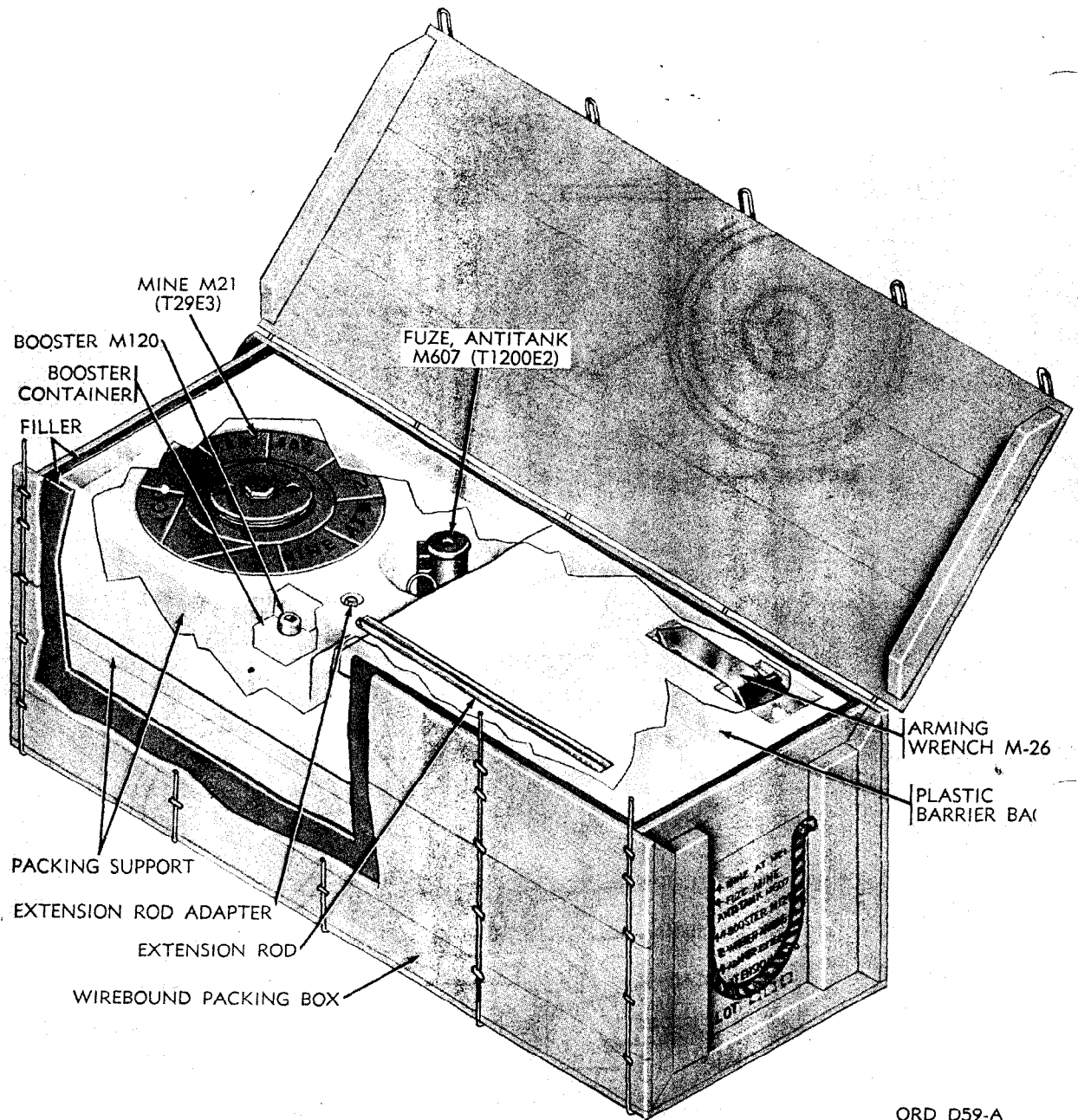


Figure 46. Fuze, mine, antitank, M607—cross sectional view.

acting through a distance of 1/8-inch, will shatter or break the plastic collar.
 (c) Once the plastic collar is shat-

tered or broken, the tilt rod presses against the bearing cap, forcing it downward, causing the belleville spring (fig. 46) to snap



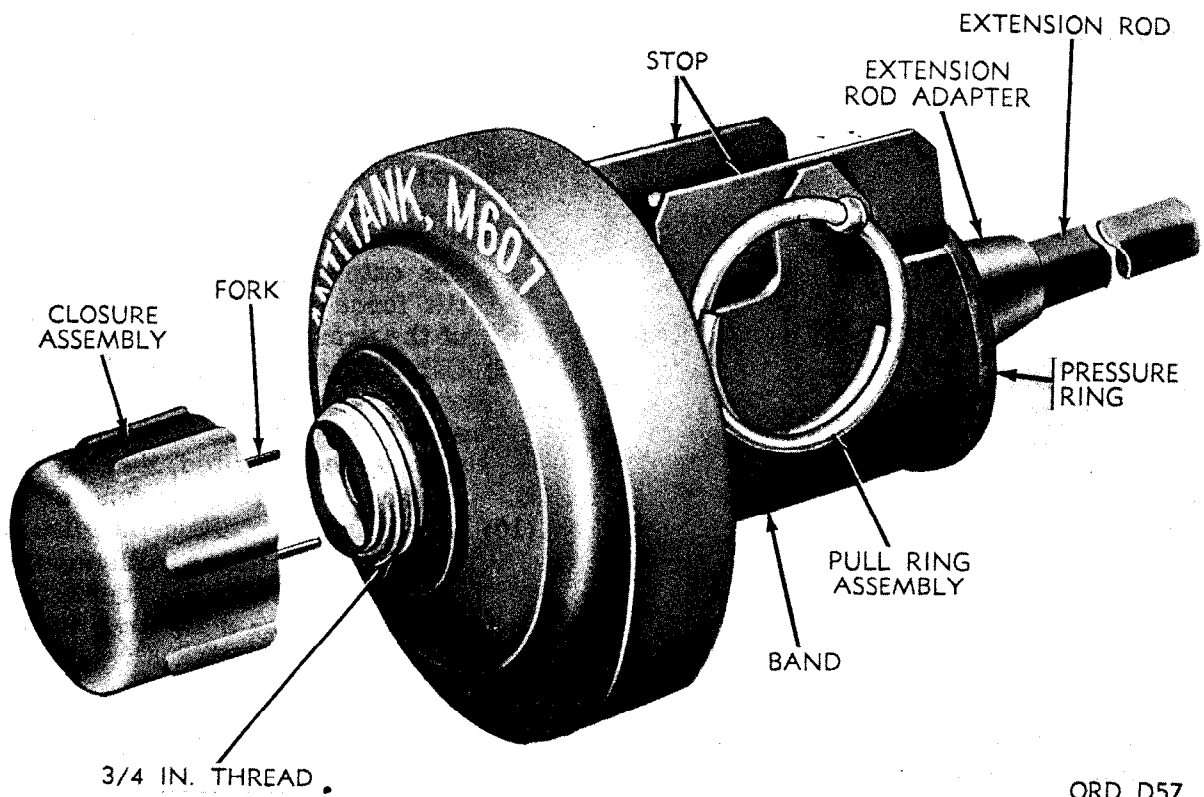
ORD D59-A

Figure 47. Packing for antitank mine M21 and components.

into reverse position. The reversing action of the spring drives the firing pin of the firing pin assembly into detonator M46 and explodes the detonator, which, in turn, fires the black powder expelling charge of the mine (fig. 45).

- (2) *Mine M21.* The blast from the black powder expelling charge (fig.

45) blows off the fuze assembly, the cover assembly, and the dirt or camouflage material which covers the mine. The pressure created by the burning of the black powder expelling charge drives the firing pin into the primer M42, causing the primer to ignite. The ignition of the primer, in turn, ignites the delay assembly. After



ORD D57

Figure 48. Fuze, mine antitank, M607—before installation in mine M21.

0.15-second time delay, the relay assembly is detonated. The detonation of the relay assembly detonates booster M120, which then detonates the high-explosive charge (Comp H6). The detonation of the high-explosive charge blows the body of the mine apart and causes the steel plate to be projected upward at a high velocity.

d. Laying and Arming.

Warning: Only the disassembly and reassembly of components as authorized herein may be performed. Unauthorized disassembly of ammunition in the field is dangerous and is prohibited except under a specific directive.

- (1) Remove mine and components from packing support and packing box (fig. 50), and inspect for serviceability. Unserviceable items will be replaced.

Note. Check fuze closure assembly (fig. 46) to make sure that it is firmly seated against the fuze base. The fork of the clos-

ure assembly prevents accidental movement of the firing pin.

Warning: Make sure that the cotter pin of the pull ring assembly holds the stop and band securely in place under the pressure ring.

- (2) Using the screwdriver end of the arming wrench M26 (fig. 49) remove the closing plug assembly (fig. 45) from the bottom of the mine and remove any foreign material found in booster cavity. Insert the booster, either end first, into the booster cavity, then reassemble the closing plug securely, using the arming wrench.
- (3) Using the shipping plug end of arming wrench M26, remove the shipping plug assembly. Remove any foreign material found in the fuze cavity.
- (4) Using the closure assembly end (fig. 52) of fuze wrench M26, remove closure assembly (fig. 49) from the fuze and assemble fuze

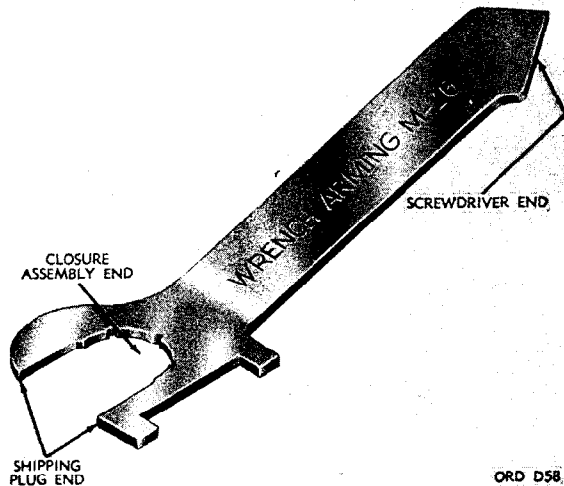


Figure 49. Wrench, arming M26.

hand-tight into the threaded fuze hole (fig. 48) of the mine.

- (5) Prepare a hole in the ground 10 to 12 inches in diameter and 6 inches deep.

Note. Make certain that the bottom of the hole is firm and level so that the mine will lie squarely on the ground. When the extension rod adapter and extension rod are assembled to the mine, the extension rod should be in a vertical position (not tilted in any direction).

- (6) Place the mine in the hole and press the dirt firmly around the mine up to the level of the top of the fuze body, taking care not to cover any part of the band.

Warning: Take care not to strike the mine or fuze.

- (7) Screw the extension rod into the extension rod adapter. Screw this assembly, hand-tight, to the pressure ring of the fuze. If pressure ring is to be used as a pressure-firing device, retain extension rod and extension rod adapter for future use.
- (8) Arm the mine by removing the pull ring assembly, the band, and the stop. Retain above items for future use. Remove dirt from around the plastic.

Warning 1: The mine should not be armed until just before camouflaging.

Warning 2: After arming, exercise care not to tilt the extension rod or the pressure ring as the fuze may be initiated by a minimum force of 3.75 pounds on the end of the extension rod or a minimum tilt force of 45 pounds on the side of the pressure ring.

- (9) Camouflaging material around the extension rod should be placed in such a manner as not to interfere with its being tilted, thereby preventing the fuze from functioning.
- (10) Cover and camouflage the mine and fuze in accordance with instructions contained in FM 20-32.

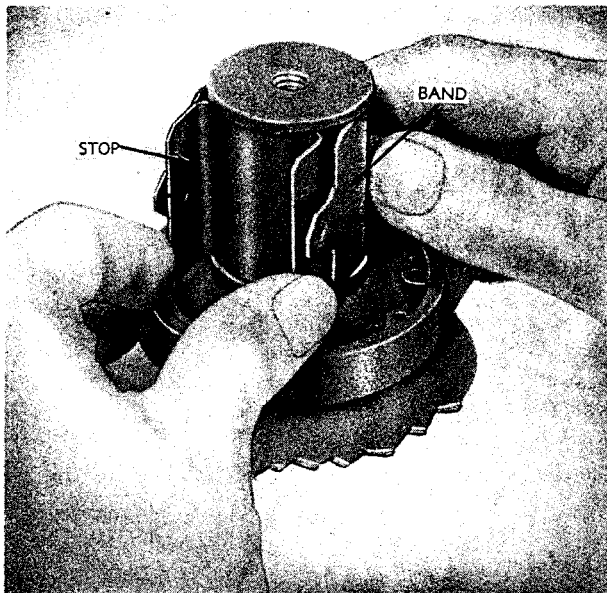
Note. Avoid use of the extension rod in open areas where it may be easily detected.

e. Disarming and Removal.

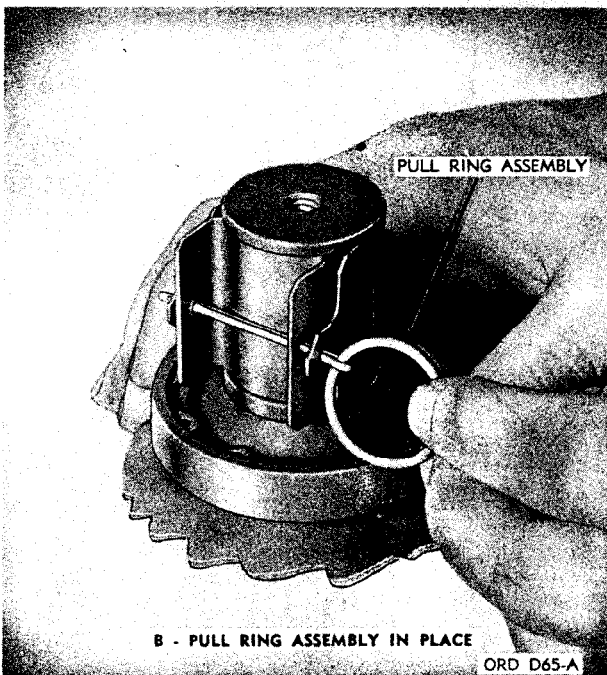
Warning: If, during disarming, it is noted that either the extension rod or the pressure ring appear deformed or tilted, or the plastic collar is shattered or broken, keep personnel away from the mine and notify an explosives disposal officer immediately.

Note. Exercise care during disarming to prevent entry of dirt or other foreign matter into the fuze or mine openings.

- (1) Carefully inspect mine for booby-trapping devices before attempting to uncover the mine.
- (2) Remove the camouflage material, taking care not to disturb the extension rod or the pressure ring until the band, the stop, and the pull-ring assembly have been reassembled to the fuze.
- (3) Carefully disarm the fuze by reassembling the band, the stop, and the pull-ring assembly to the fuze, as shown in figure 50. Squeeze the cotter pin ends together in order to reinsert it easily. After inserting, spread the ends of the cotter pin to approximately 40 degrees.
- (4) Unscrew extension rod and extension rod adapter, taking care not to damage the rod or the adapter.
- (5) Remove the mine from the hole.



A - BAND AND STOP IN PLACE



B - PULL RING ASSEMBLY IN PLACE

ORD D65-A

Figure 50. Disarming antitank mine fuze M607.

The carrying strap may be used for lifting the mine.

- (6) Unscrew the fuze from the mine. Screw on the closure assembly, using closure assembly end of arming wrench (fig. 50), to the base of the fuze.
- (7) Replace and secure the shipping plug assembly in the top of the

mine, using the shipping plug end of the arming wrench.

- (8) Unscrew the closing plug assembly from the bottom of the mine, using the screwdriver end of the arming wrench.
- (9) Remove the booster; replace and secure the closing plug, using the screwdriver end of arming wrench.
- (10) Repack the mine and its components in the packing support and the packing box (fig. 47).

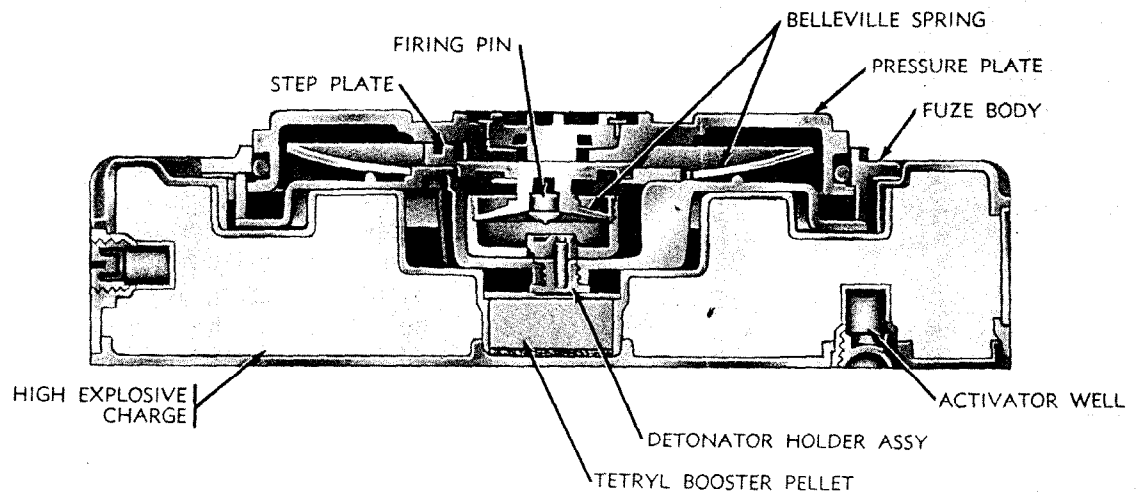
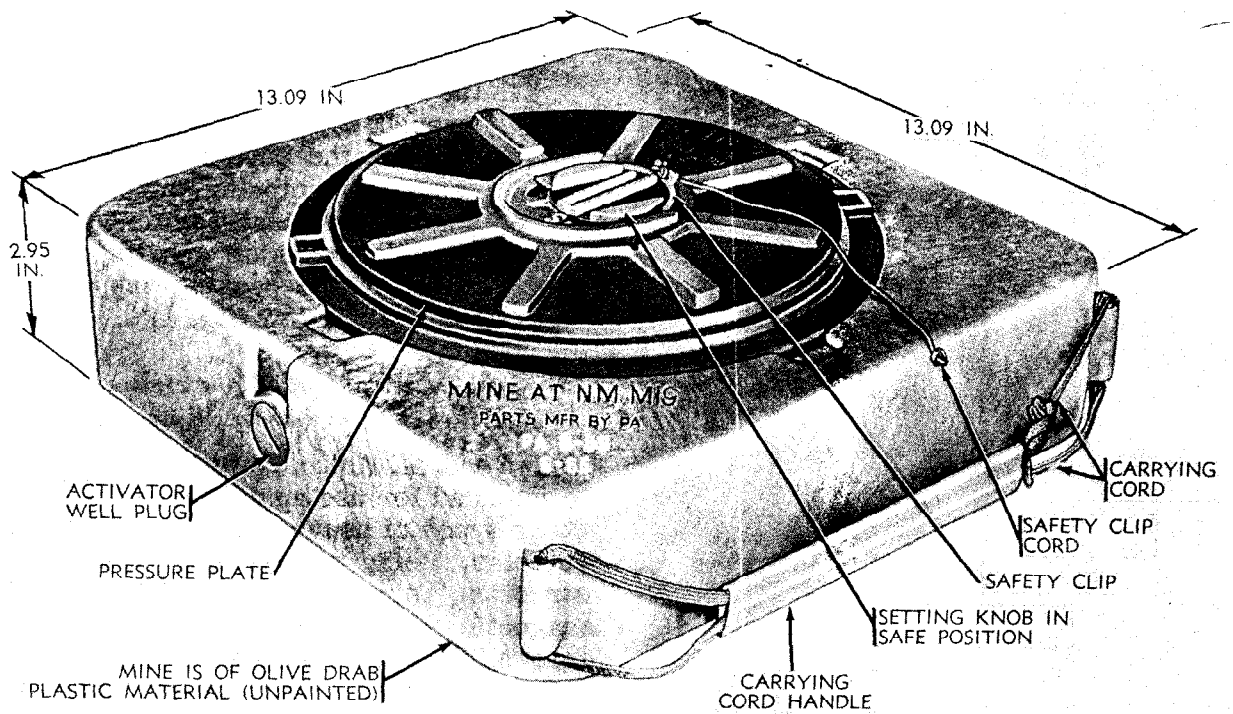
34. Mine, Antitank, HE, Nonmetallic (NM) M19 (T18E4) with Fuze, Mine, M606

a. General. Antitank mine M19 (fig. 51) is intended for use against heavy tanks and other types of heavy-tracked and wheeled vehicles. Being of nearly all plastic construction, mine M19 is nondetectable by magnetic mine detectors. The mine uses fuze M606, which is a mechanical-pressure type fuze. This fuze is also constructed of plastic material. The fuze M606 will function effectively at temperatures between -40°F to 125°F .

b. Description. The mine (fig. 51) is box-shaped, 13.09 by 13.09 by 2.95 inches, and contains 21 pounds of Comp B. The mine case is of olive drab plastic material with both embossed and yellow markings. It can easily be identified in the dark by its box shape. The mine is packed with the primary fuze assembled but with the detonator removed.

c. Components.

- (1) The mine body holds the high-explosive charge, the tetryl booster pellet, and the fuze. It has two activator wells, one located in the side and the other in the bottom, which are threaded to receive activators if the mine is to be booby-trapped. As shipped in mines of earlier manufacture the activator wells were closed with plugs and gaskets; in those of more recent manufacture, the wells are closed with strips of adhesive tape.
- (2) The fuze body contains the pressure plate, Belleville spring, setting knob, step plate, firing pin assembly and detonator.



ORD D583.

Figure 51. Mine, antitank, NM, M19 and fuze, mine antitank, M006.

(3) The belleville spring supplies the power to snap the firing pin assembly into the detonator when the pressure plate is forced downward.

(4) The setting knob is keyed with the step plate so that the step plate is rotated when the setting knob is turned.

- (5) The safety clip prevents the setting knob from moving.

d. Functioning.

- (1) When the setting knob on top of the setting plate (fig. 51), is in the safe position (S), the mine cannot function by action of the main fuze, since the ~~detonator~~^{FIRING PIN} is out of line with the ~~firing pin~~^{DETONATOR} and the position of the step plate prevents depression of the pressure plate. Turning the setting knob to the armed position (A), aligns the ~~detonator~~^{FIRING PIN} with the ~~firing pin~~^{DETONATOR} and rotates the step plate to a position in which the pressure plate can be depressed, permitting functioning of the main fuze. The mine is packed and shipped with a safety clip (fig. 29) in place to prevent accidental movement of the setting knob.
- (2) After the safety clip has been removed and the setting knob turned to the armed position (A), a minimum force of 350 to 500 pounds on the pressure plate depresses the belleville spring of the fuze.
- (3) The belleville spring snaps into reverse, driving the firing pin into the detonator and exploding it.
- (4) Explosion of the detonator initiates the booster pellet which, in turn, explodes the main charge of the mine.

e. Laying and Arming.

- (1) Remove the fuze mine assembly from packing.
- (2) Remove the fuze from the mine, using the arming wrench M22 (con-

(3) Check if in Safe (S) position and clip in place. Reject defectives.

(a) Remove shipping plug from fuze detonator hole. Visually check position of firing pin. If armed (firing pin centered in hole) reject fuze. If not armed (firing pin at edge of hole) continue to next operation.

(b) Remove Safety Clip.

(c) Turn to Armed position (A) with M22 wrench. Do not use excessive force after striking stop. Force used should just be enough to overcome the friction load that is felt during turning from S to A.

(d) Visually check position of firing pin. If not armed (firing pin at edge of hole) reject fuze. If armed (firing pin centered in hole) continue to next operation.

(e) Turn to Safe (S) position with M22 wrench. Observe same precautions with regard to excessive force after striking stop as indicated in (c) above.

(f) Visually check position of firing pin. If still in armed position (firing pin centered in hole) reject fuze. If not armed (firing pin at edge of hole) continue with next operations.

(g) Replace safety clip.

NOTE

Purpose of inspection is to detect broken stop lug that actuates the firing pin holder.

- (5) Insert fuze into mine and lay mine on a firm foundation in hole with a 45-degree side slope and of sufficient depth to cover the mine with 1-1/2 inches of dirt.
- (6) Remove safety clip and turn setting knob to armed position (A), using arming wrench.
- (7) Cover with dirt and camouflage in accordance with FM 20-32, or plant in water as described in paragraph 34j below.

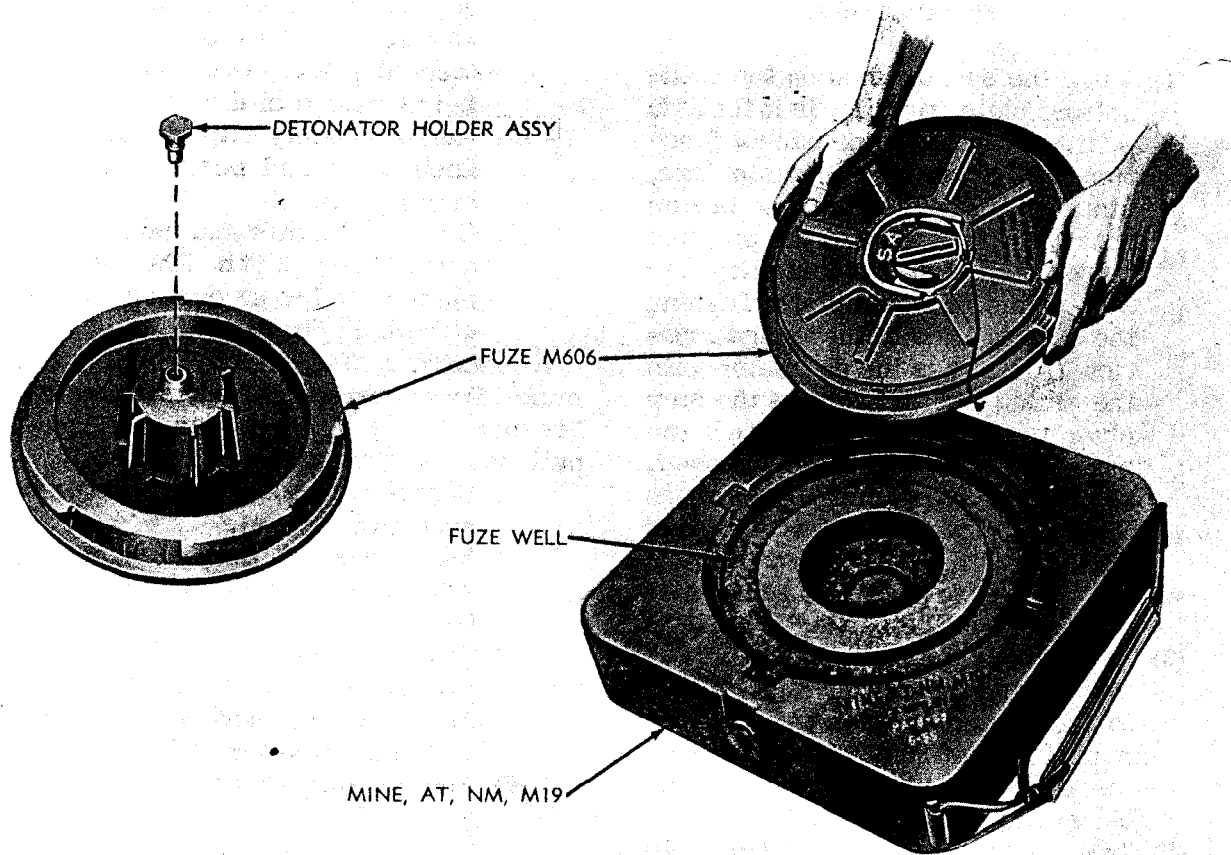
f. Boobytrapping. Boobytrapping of the mine M19 required antitank mine activator M2 (par. 35), a firing device of the pull or pull-release type and a trip wire(s).

- (1) Remove closure from one or both activator well(s).
- (2) Make certain that each activator well used is free of foreign matter.
- (3) Remove activator plug and its gasket from head of activator M2 and screw the activator hand-tight into the activator well of the mine.
- (4) Making sure that the small rubber gasket is in place inside the activator, screw firing device hand-tight into activator.
- (5) Install trip wires, as required, fastening them to anchor posts first and to the firing device last.
- (6) Arm the firing device by removing safety pins, always removing the "positive" safety pin last.
- (7) Save and conceal all safety pins, the activator plug and its gasket, and the activator well closure for future use in disarming and removal.

g. Disarming and Removal (Neutralizing).

- (1) Carefully uncover the concealed mine and examine the side and bottom wells for boobytrapping devices (secondary fuzes). Trip wires may have been installed that will initiate a secondary fuze by either pull or release.
- (2) Never cut taut wires, but cut all slack trip wires.

Warning 1: If taut wires are encountered when attempting to neu-



ORD D591

Figure 52. Placement of detonator holder assembly into fuze M606 and of fuze M606 into mine M1.

tralize the mine, do not cut the wires under any circumstances. The best procedure is to attach a long rope or wire to the mine without disturbing the taut trip wire, then, from an unmined protected position, remove the mine by pulling the rope or wire. If this method is not practicable, the matter should be referred to specially trained personnel.

Warning 2: When removing the mine with a long rope or wire, use extreme caution, because the mine may detonate.

- (3) Replace all safety pins in the firing devices, always replacing the positive safety pin first. Refer to TM 9-1375-200 for instructions pertaining to the particular firing device involved.

- (4) Unscrew firing device from activator.
- (5) Unscrew activator. Replace plug and rubber gasket in head of activator. Replace the closure for the activator well.
- (6) Turn the setting knob to the SAFE position.

(7) Remove the mine fuze, grasping the fuze pressure plate with the fingers. The fuze should come out easily. Remove detonator holder and inspect to assure that firing pin is in the unarmed position (firing pin at edge of hole). Reject fuze if firing pin is still in the armed position (firing pin centered in hole). Assemble shipping plug to fuze if available, or tape over hole.

(8) Remove the trip wire and replace plug(s) in activator well(s), if available, or tape over hole(s)

(9) Restore the mine and fuze to its original configuration and packing. The mine may be laid and removed any number of times provided neither fuzes nor mines show evidence of damage or deterioration.

h. EFFECTIVENESS, WHEN BURIED 1-1/2

inches deep, the mine will completely immobilize light and heavy tanks by track damage and will immobilize trucks of the 2-1/2 ton size.

i. Sympathetic Detonation.

- (1) When buried 1-1/2 inches deep, sympathetic detonation will occur when mines are ~~15~~ ¹⁰ feet apart.
- (2) When buried 2-inches deep, sympathetic detonation will occur when mines are 15 feet apart.
- (3) When laid on top of ground, sympathetic detonation will occur when mines are 25 feet apart. ^{OR UNCOVERED,}
- (4) Satisfactory reliability of actuation and elimination of sympathetic detonation is obtained when mines are buried under 1-1/2 inches of dirt cover, with 45-degree side slope of holes, and six yards center-to-center distance between adjacent mines.

j. Amphibious Use.

- (1) *General.* Mine M19 is two to three times as effective in water as it is

on land in immobilizing tracked or wheeled vehicles, because water tends to amplify the shock waves. Vehicles which strike mines emplaced in water not only have their tracks or wheels destroyed as is the case when striking mines buried in the ground, but also have their support members destroyed as well. Smaller vehicles are flipped over on their backs and almost completely destroyed. Because of this ability of water to amplify and transmit shock waves to a much greater degree than does land, mines equipped with pressure-actuated fuzes are subject to sympathetic detonation at greater distance than is the case on land. To avoid sympathetic detonation, mines M19 with fuzes M606 planted in water must be at least 14 feet apart in two-foot water and at least 24 feet in five-foot water (fig. 53).

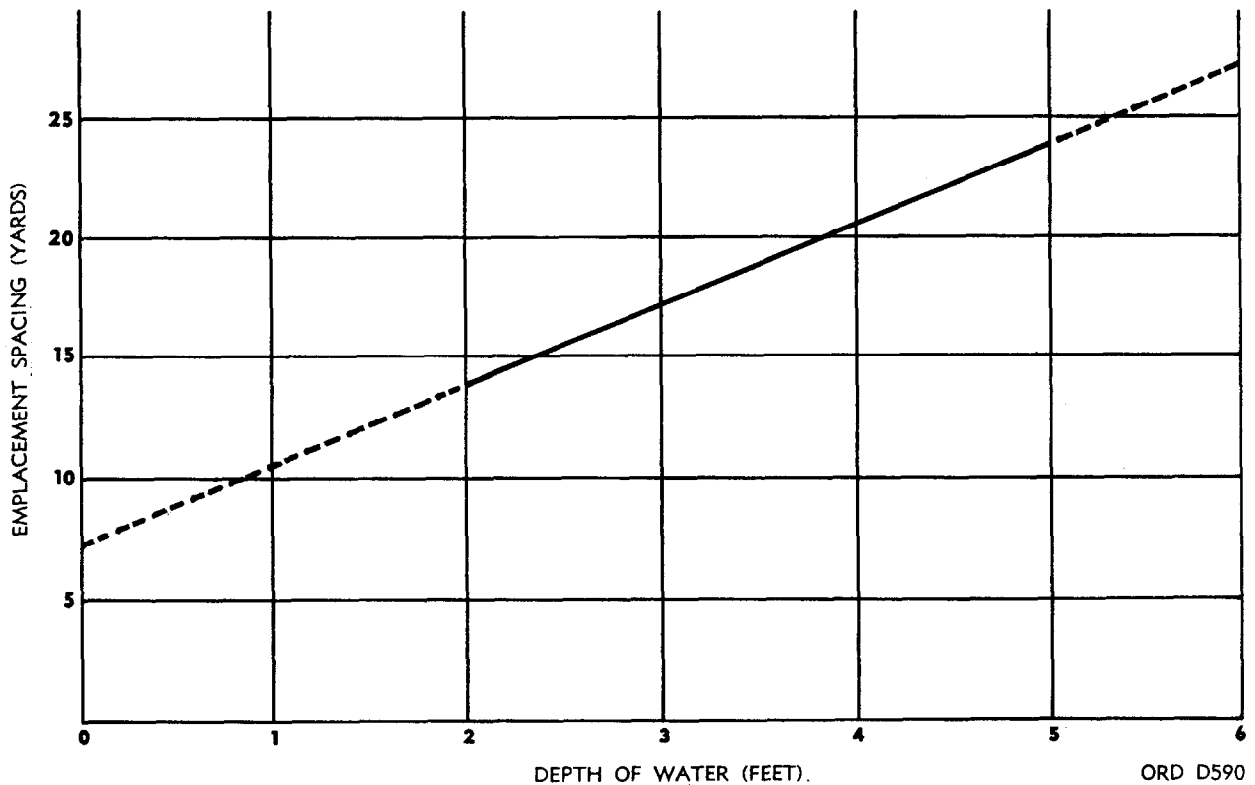


Figure 53. Emplacement of mine M19 in water so as to prevent sympathetic detonation.

(2) *Equipment.* (fig. 52).

- (a) *Outrigger.* The materials needed to construct and use the field-improvised outrigger are: two green limbs three feet long and 1 inch or less in diameter, (barbed-wire stakes, signposts, fence rails, or similar items having the proper dimensions may be used, but green limbs are recommended because they are stronger and less likely to float than are those which are dried-out or dead), and two pieces of 3-foot clothesline, twine, or similar material.
- (b) Two lensatic compasses mounted upon individual plane tables.
- (c) One 6-foot rod marked off in one-foot increments and, preferably, in alternate colors.
- (d) Two 100-foot lengths of clothesline, rope, twine, or similar material, marked off in 1-foot intervals.

(3) *Use of stream characteristics.*

Note. Before beginning actual emplantation, prepare a "Minefield Plan" showing essential features of the terrain, such as those described below. Use this plan as a guide in choosing the minefield site and to record the location of emplaced mines.

Choose the area to be mined so as to take the greatest advantage of the characteristics of the stream and adjacent area. Water depth within the minefield should not exceed 3-1/2 feet, since deeper water is difficult to work in and since fuzes activated by direct contact are usually ineffective against floating vehicles in water deeper than four feet. Because of difficulty in maintaining footage and balance in faster water, current velocity should not exceed three knots. Should the site chosen contain a mud bottom, the mud depth should not be greater than 18 inches, and there should be a hard base underneath, since the enemy is unlikely to choose a fording-point in which his vehicles are likely to become mired. Avoid

areas where gravel, rock, stumps, and the like exceed mine size. If such areas are used, so prepare the field that the mines and fuzes will be exposed to the wheels or tracks of passing vehicles. Since sand in inland waters is continuously moving downstream, it may be difficult to locate and remove mines planted on or downstream from sandbars. Be sure to indicate such locations on the minefield plan. Armored vehicles are most likely to enter and exit from streams at points where the incline is 60-degrees or less. After entering the stream, they often travel up- or downstream for a distance before leaving it. The trail most likely to be followed by vehicles fording the stream can be predicted if careful examination is made of the natural formation along river banks and the location of underwater obstacles if found.

(4) *Emplacement of mine M19 in water.*

Note 1. Check the minefield plan to assure that all information determining procedure outlined above has been correctly entered, non-fordable areas crossed-out, and all minefield reference points recorded.

Note 2. If mines are to be planted along its banks as well as in the stream, plans should be similar, differing principally in that water-implanted mines must be further apart than are land-implanted ones, to minimize sympathetic detonation (par. j(1)).

Note 3. Preparation for firing (except for arming) of mines and fuzes which are to be planted in water should be done on land, as near to the intended minefield as practicable.

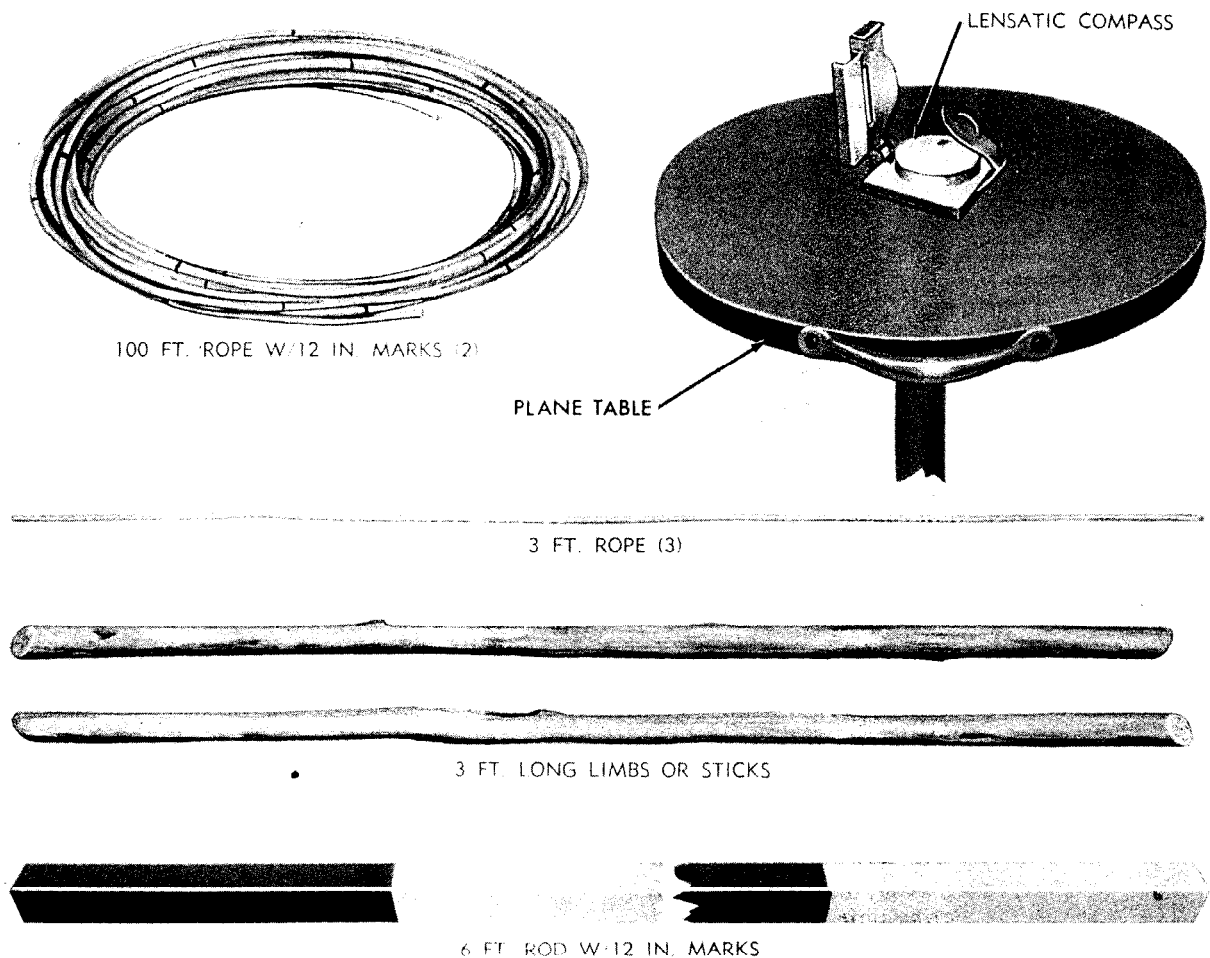
Note 4. Coat all fuze threads and wells with a waterproof lubricant, a heavy grease, or some similar preparation, to minimize chances of water leaking into the mine and to ease fuze installation.

Caution 1: When planting mines in streams and rivers, men should always work in pairs.

Caution 2: When working in water, watch for sudden drops in the level of the bed.

- (a) Remove the mine and the fuze from their shipping container and set the fuze aside, upside down.

Caution: Check to assure safe



ORD D587

Figure 54. Equipment for amphibious emplacement of mine M19.

clip is attached to the setting knob. If the setting knob is not in the "S" position, rotate it into that position. Should the safety clip be missing, replace it before handling fuze.

(b) Using the arming wrench M22 provided, remove the white plastic shipping plug from the bottom of the fuze M606.

(c) Assemble the detonator holder assembly containing the detonator M50 to the fuze. Thread the assembly into the well until it is hand-tight, then complete the tightening by using the arming wrench M22 (fig. 52).

Caution: If arming wrench M22

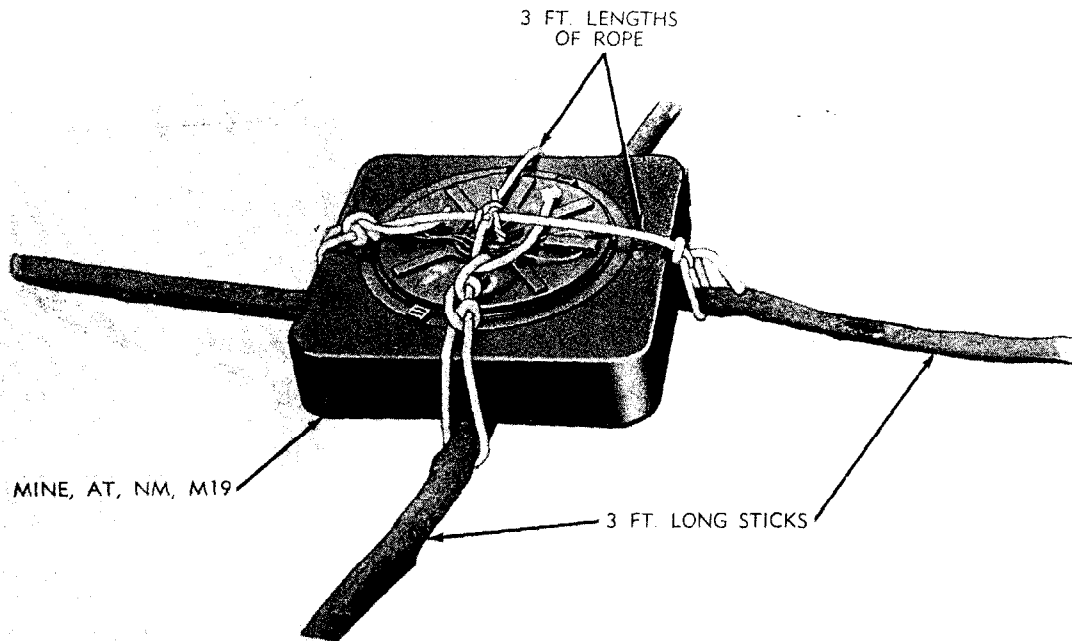
is unavailable, be sure that the substitute tool is nonmagnetic and nonsparking.

(d) Spread a waterproof lubricant or a heavy grease on the fuze sealing gasket. Thread the fuze in the mine fuze well, using the wrench provided.

(e) To prepare the outrigger (par. j(2) and fig. 54) fasten two 3-foot green limbs to the underside of the mine and secure with two 3-foot lengths of rope, as shown in figure 55.

(f) With the fuze in a horizontal position, carry the mine to its emplacement position.

Warning: Do not arm the fuze



ORD D586

Figure 55. Attachment of mine M19 to field outrigger.

until the mine is emplaced, and approach the emplacement position from the downstream side.

Note. To prevent dragging the outrigger or contacting objects in the stream, carry the mine by grasping its sides, not by its carrying handle.

(5) *Plotting, recording and reporting mine emplacement.*

(a) Emplacements should be recorded and reported as directed by FM 5-31, FM 30-21, and FM 37-10. The mine laying procedures presented in FM 20-32 should be followed when planting mines in inland waters, except that additional distance between mines is required to preclude sympathetic fuze initiation (par. j(1) and fig. 53). Mines planted in inland waters are difficult to remove or recover by conventional means available to field personnel. *Therefore, it is recommended that amphibious mines be removed only by explosive breaching unless the tactical situation dictates that these mines be recovered for reuse or removed*

by other means. Accurate records of amphibious mine emplacement positions can be obtained using one of the following methods: triangulation, rope, or grid.

Note. Scattered mines, laid without any basic pattern, add to casualties and to problems in breaching or clearing the mine fields. Indiscriminate mining should therefore be used only when the tactical situation makes the need for removal extremely unlikely.

(b) *Triangulation method.*

Location of mines through the use of "triangulation" may be accomplished using plane tables and compasses (fig. 56).

Note. When the mines are placed in the water, it is essential that they be correctly emplaced and positioned to preclude any movement which would invalidate the recordings made at the time of the mine emplacement, and to eliminate the possibility of sympathetic fuze initiation.

1. Survey the stream or river to determine characteristics of its current velocities, depth, and bottom characteristics (par. 34 j(3)).
2. Set up the two plane tables or

the same side of the stream, about 5 feet from the edge of the stream and from 20 to 40 yards from each other. The tables are located, and leveled, and the compasses placed in position.

Note. Plotting points can also be established across the stream if desired.

3. Open the cover of the lensatic compass and set the compass on top of the table inside of the inscribed circle in the center of the board to so orient the compass that the arrow points to the north.

Caution: Allow no metallic objects, such as canteens and rifles, near the compass.

4. Establish a base line by sighting in each lensatic compass on the opposite plotting point. Record on the minefield record the difference (in degrees) between north and the opposite plotting point.
5. Use a six-foot rod to measure the stream depth to mark the point where the first mine is to be planted. Sight-in both lensatic compasses on man holding a 5 to 6-foot rod.
6. Have a second man bring the mine with outrigger attached to the emplacement position while the sighting is being made.
7. Once the sightings are finished, place the mine on the stream bottom.

Warning: Do not arm the fuze at this time.

Note. Have the man who brought the mine from shore remain at the first emplacement position or location.

8. Record the water depth, the type of mine, the type of fuze used, the location of antipersonnel devices nearby, boobytrapping employed, and the variation in degrees between the base line and the planting site.
9. To avoid sympathetic detonation, plot the position for and plant remaining mines in ac-

cordance with paragraph 34j(1) and figure 53.

Caution: Do not try to gauge distances or the positions of mines already laid through the use of land marks, which can be deceiving. One man should stand at the position where a mine has been planted until the second man has paced off the required distance to the next position. The second man should remain in the new location while the first man goes ashore and returns with a mine for planting.

Note. Determine placement of additional mines within the first two plotting points in accordance with information in paragraph 34j(1) and the distance between the plotting points.

10. Remove the safety clip from the setting knob, and, using arming wrench M22, arm the fuze of the first mine.

Caution: Always arm the fuze from the downstream side of the mine.

11. Remove the plane tables when all of the mines are planted in the area covered by the two plotting points. To ensure that the exact positions for these points will be found when recovering the mines, it is necessary to drive stakes into the ground, or, mark in some other suitable manner the exact points where plotting points No. 1 and No. 2, etc., were located during planting. A permanent physical landmark should always be used to mark the upstream end of the mine field plotting point No. 1.

Note. For ease in interpreting plotting records used to locate mines to be removed, number plotting points consecutively, in a downstream direction. Thus, in a four-mine minefield, point one is furthest upstream and point four furthest downstream.

(c) *Rope method* (fig. 56).

Note. When the mines are placed in water, it is essential that they be correctly emplaced and positioned to preclude any

movement which would invalidate the recordings made at the time of emplacement, and to eliminate the possibility of sympathetic fuze initiation.

1. Survey the stream or river to determine the general characteristics of its current velocities, depth, and bottom characteristics (paragraph 34j(3)).
2. Select two trees on the side of the stream, about 5 feet from its edge, and from 20 to 75 feet apart. If trees are not available, drive sticks or limbs into the ground.
3. Tie one end of one of the two 100-foot lengths of rope (par. 34j(2)), to one of the two trees, at a point 2 to 3 feet above ground level and, pulling the rope taut, tie the other end to the second, at a point 2 to 3 feet above ground level.
4. Select an emplantation point for the first mine which, as nearly as conditions permit, is in line with the upstream tree or stake. Drive the six-foot rod (par. 34j(2)), into the stream bed at this point.
5. Tie one end of the remaining 100-foot rope to the six-foot rod at a point approximately 2 feet above the surface of the water. Tie the other end of this rope to the one stretched between the two trees (or stakes), so that the two ropes are perpendicular to each other.
6. Record on the minefield plan the distance from the point of intersection of the two ropes to the upstream tree, and from the same intersection to the six-foot rod.
7. Place a mine with attached outrigger (par. 34j(4) and fig. 55), at the point where the six-foot rod is driven into the stream bed. Record the stream depth at this point, type of mine and fuze used, location of any nearby antipersonnel devices, and a

description of any boobytrapping employed.

Warning: Do not arm the fuze at this time.

Note. Have the person who plants the mine remain with it until it is armed.

8. Select the second emplantation point so that its position relative to the first such point is in accord with the instructions contained in paragraph 34j(1), and illustrated by figure 53. Move the six-foot rod with rope attached, to the new position and retie the ropes so that the rope between the two trees (or stakes) is perpendicular to the one affixed to the six-foot rod.
9. Arm the *first* mine by removing the setting knob safety clip and, using the arming wrench M22, turning the knob to the "A" position.

Caution: Always arm a mine from the downstream side.

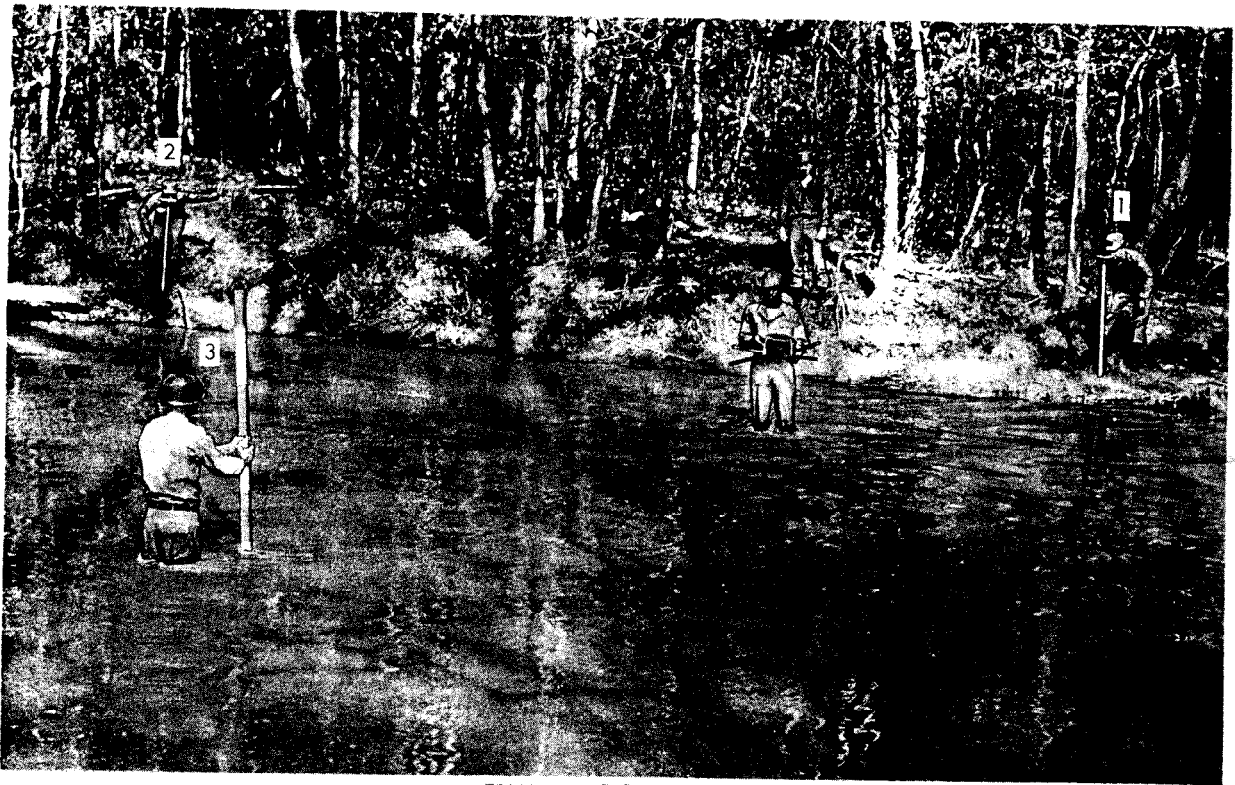
10. Repeat steps 1 through 9 above for each mine until the downstream limit of the minefield is reached.

(d) *Grid method.*
(fig. 57).

Note. The grid method of locating and recording amphibious mine emplacement is recommended for use where both banks of a stream are accessible to friendly troops.

1. Determine and record the characteristics of the stream and adjacent territory as directed in paragraph 34j(3).
2. Tie one end of a rope to an object such as a tree, post or driven stake located at the high-water line on one side of the stream, and, pulling the rope taut, tie the other end to a similar object at the high-water line on the opposite bank. Record on the minefield plan the length of that portion of the rope which is between the two high-water lines.

Note. Should the distance between these two points be greater than 80



• TRIANGULATION METHOD



ROPE METHOD

ORD D588

Figure 56. Triangulation and rope methods of emplacement.

feet, use both 100-foot lengths of rope, and should it become necessary to affix the rope to trees or other objects which are on the inland-side of the high-water line, designate the high-water line by tying a marker to the rope above that point.

3. Select the spot where the first mine is to be planted and mark it by driving the six-foot rod into the stream bed at that point. Carry the mine-and-outrigger assembly, holding it by placing one hand on either side (never by its handle) and in a horizontal position, to the emplantation point and carefully place it on the stream bed.

Warning: Do not arm the mine at this time.

4. Mark the spot where the mine is planted by tying a rag or other object to the overhead rope at that point. Record on the minefield plan such data as: nature and purpose of the marker, distance of the marker from the nearest tree (or other object) to which the rope is tied, and other information which might aid in relocating the mine.

Note. Have the person who brought it from the shore remain with the first mine until the second is planted and marked.

5. Record on the minefield plan the water depth at point of emplantation, type of mine and fuze used, location of any nearby antipersonnel mines, and information on any boobytrapping used.
6. To avoid sympathetic detonation, locate second and all subsequently planted mines in accordance with paragraph 34j(1) and figure 53.
7. Mark the location of the second mine by tying an identifying object to the rope, record relevant data, and then arm the first mine.

Caution: Always arm fuzes of water-emplanted mines from the downstream side.

8. Repeat steps 1 through 8 until width of stream has been covered.
9. Move the rope to the next downstream position and repeat steps 1 through 9, then repeat steps 1 through 10 until downstream end of the minefield has been reached.

Note. Retain rope, with markers attached, as an aid in removal of minefield, should this become desirable.

(6) *Removal of amphibious minefields.*

Warning: Removal of water-emplanted mines by methods other than explosive breaching (TM 9-1375-200), is extremely hazardous and is not recommended. If the situation demands such removal, proceed with utmost caution.

Minefields planted in accordance with (1) through (5) above can, if the minefield plan is available, be removed by reversal of the procedure by which it was laid. For minefields established by the grid method it is necessary to use the same rope (with markers attached), as was used to plant field; for those planted by either the rope or the triangulation method, duplications of the original equipment may be used to remove the mines. To remove mines laid in accordance with the rope or grid method, consult the minefield plan and set up ropes in same location and manner as when field was planted. For those laid by the triangulation method, set up and level the plane tables and lensatic compasses in the exact spots they occupied during emplantation, and proceed as follows:

- (a) Place the compass inside the circle inscribed on the table top, open its cover, and orient it by turning it until the arrow points north.
- (b) Sight-in on the water at the angle indicated on the minefield plan for the last-planted mine. The two sightings (one from each

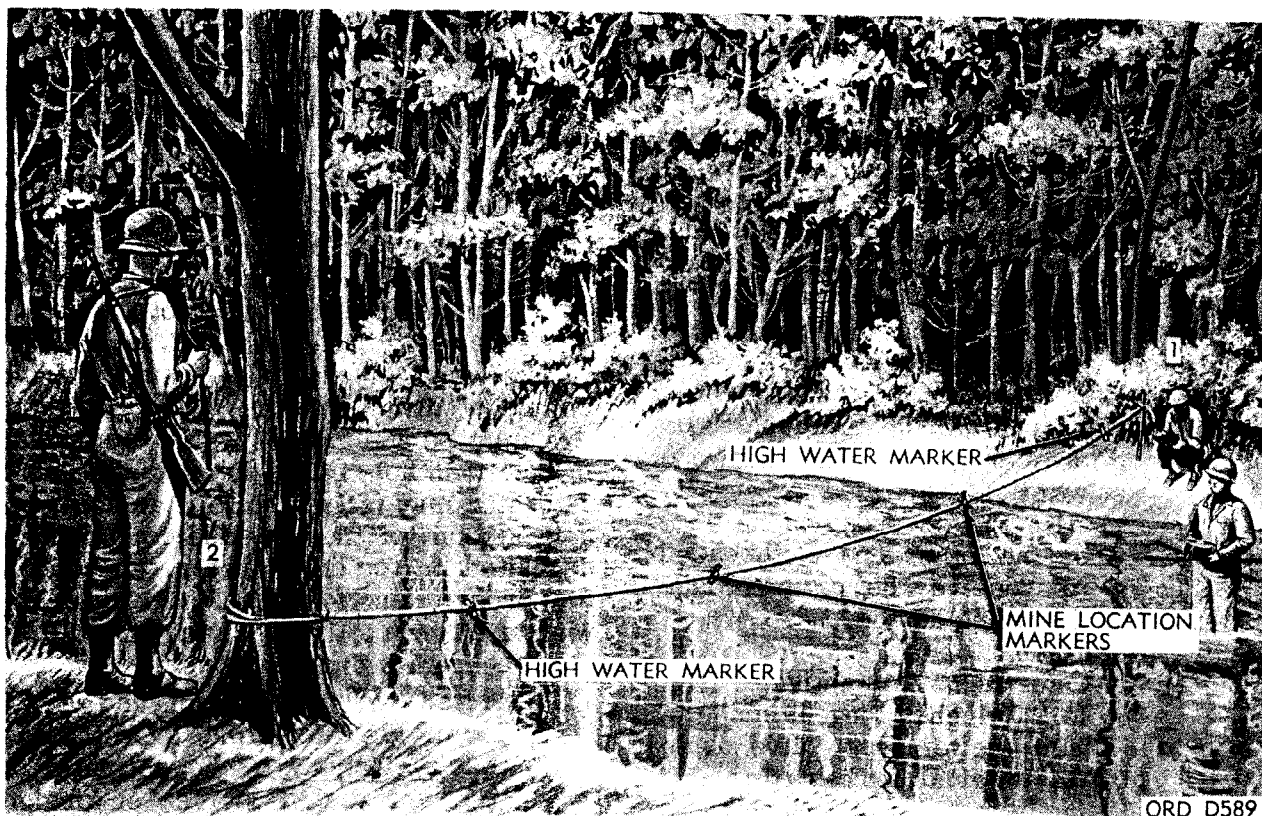


Figure 57. Grid method of minefield emplacement.

compass), cross at the point where the mine was planted.

- (c) Have the two-man recovery team proceed slowly and carefully to a point two yards below (downstream) the point where the two sightings cross and carefully feel for the mine. (For probing instructions, see FM 20-32.)
- (d) Remove foreign material from its top and, using arming wrench M22, disarm the mine by turning the fuze-setting knob to the "S" position.
- (e) Take the mine ashore and repeat the above procedure until the field has been cleared.

Warning 1: In recovering mines from water, enter the stream at a point two to three feet downstream from the point indicated by the minefield plan as the lower limit of the field,

remove the last-planted mine first, and then work upstream until the upper limit of the field has been reached. Always approach and work from the downstream side of the mine.

Warning 2: Where the current speed is in excess of three miles per hour, recovery should be attempted only if absolutely necessary.

Warning 3: Mines may have drifted slightly in a downstream direction, and/or contain anti-personnel devices (booby traps or adjacent antipersonnel mines), installed at the time of planting (these will show on the minefield plan), or have been added later.

Warning 4: Where evidence is found which indicates that the fuze is deformed or that the mine is otherwise damaged, vacate the area and notify EOD personnel.

35. Activator, Antitank Mine: M1 and M2 (T3E1)

a. *General.* These activators are essentially detonator-boosters. They may be used with any one of several kinds of firing devices (usually the pull-type or pull-release-type), to supply an antitank mine with a secondary fuze for antilift or boobytrapping purposes. Activator M1 is used with antitank mine M15 (par. 31), and activator M2 is used with nonmetallic antitank mine M19 (par. 34). The activator performs the function of an adapter for the firing device to the mine. One end of the activator is threaded externally for insertion in the secondary fuze well of the mine, the other end is threaded internally to receive the primed base coupling of the firing device.

b. *Description.*

(1) *Activator M1.* This activator (fig. 58) is 2.1-inches long, is made of a black (newer type, olive drab) plastic material and has a threaded closing plug and gasket. It contains a detonator and has a cylindrical, unthreaded cup which is cemented to the opposite end of the body, and contains a tetryl booster charge. The thread, which screws into the mine, is 3/4-inch in diameter. Note that activator M1 will

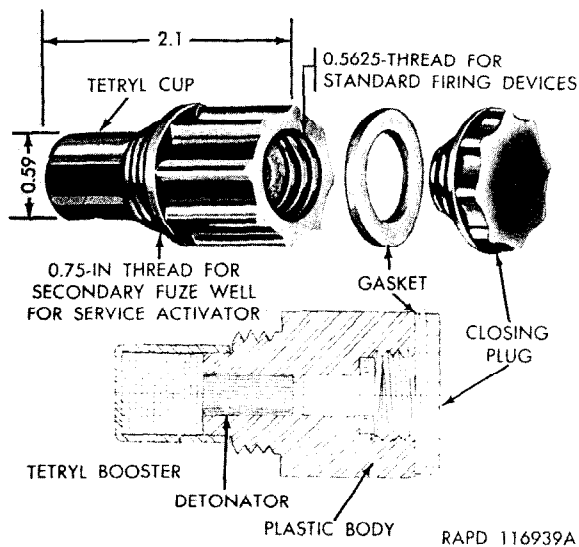


Figure 58. Activator, antitank mine, M1.

not fit the secondary fuze well of antitank practice mine M12 (par. 38), and that practice activator (par. 40) will not fit the antitank mine M15.

(2) *Activator M2.* This activator (fig. 60) is similar to activator M1 ((1) above), except that its overall length is 1.9-inches and it is made from olive drab plastic.

c. *Precautions Against Activator Misfires.* Activator misfires resulting from failure of the detonator or the booster to fire may be due to cap-sealing compound in the flash hole of the firing device. The detonator may fail to ignite if an appreciable amount of the wax-like compound is deposited on top of detonator. Therefore, for proper functioning of activator M1, when used with a firing device, the following precautions must be observed:

(1) After removing the plug and gasket from the activator, examine the cavity in body of the activator to be sure that it is free of foreign matter.

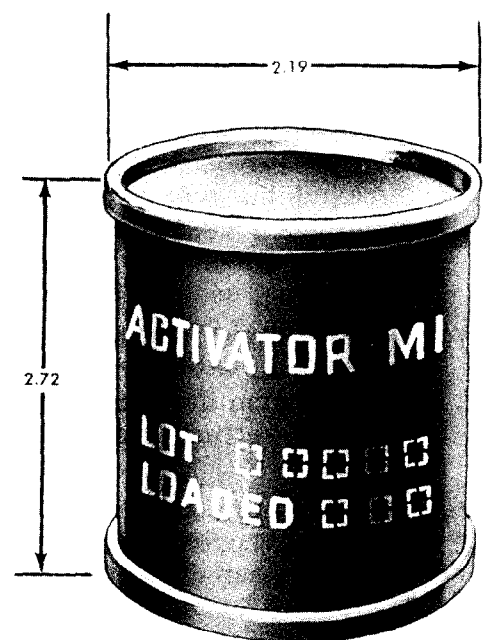


Figure 59. Metal ammunition container for activator M1.

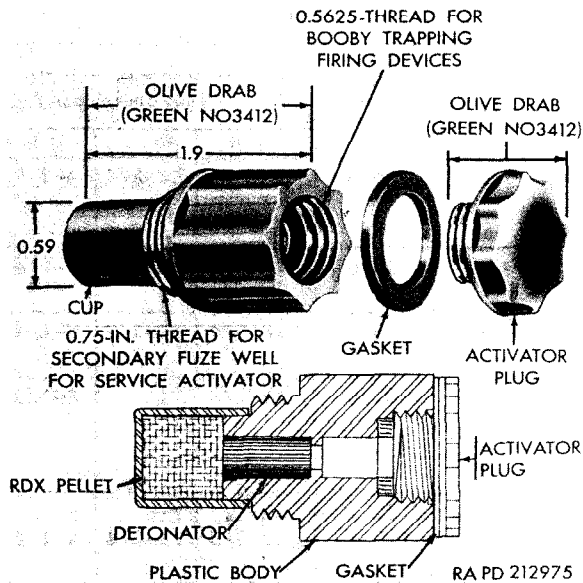


Figure 60. Activator, antitank mine, M2.

- (2) The activator should be screwed hand-tight into the secondary fuze well.
- (3) After removing the protective cap from the nipple on the base coupling of the firing device, examine the tip, and, especially the flash hole in the tip, to be sure they are free of cap-sealing compound or other foreign matter.
- (4) The firing device should be screwed hand-tight into the activator. Arm the firing device in accordance with method prescribed for its particular type (see paragraph 42 and TM 9-1375-200).

Section II. PRACTICE ANTITANK MINES AND FUZES

36. General

a. The all practice antitank mines and fuzes are of the same size, shape, weight, and casing material as the service mines and fuzes they simulate. These practice mines contain no high explosive, but they do contain small smoke-puff and noise-making charges of low explosive (black powder or pyrotechnic composition), to simulate the explosion of a service mine. These practice mines are used for training in identification, care, handling, and use of antitank service mines.

b. The inert antitank mines and fuzes have metal or plastic parts, identical to those of service mines and fuzes. The inert mines are filled with nonexplosive material such as sand, or they may be left empty. The inert mines and fuzes contain no explosive of any kind and are used only in practice and training in handling mines.

c. Safety precautions governing the use of practice and inert mines include:

- (1) Make sure that all mines are

properly color-coded and marked and that service, practice, and inert mines are kept segregated from each other.

- (2) Although inert mines do not of themselves require special safety precaution, safety regulations governing the use of service mines should nonetheless be observed when using inert mines to establish and maintain habits necessary to the safe handling of explosives.

Note. Tanks unaccompanied by ground troops need observe no special safety precautions when negotiating minefields containing only practice or inert antitank mines.

- (3) All regulations found in this manual, or in AR 385-65, which apply to service or practice mines, will be observed when using practice antitank mines.

d. Data relating to various antitank mines appear in table IV and paragraphs 37 through 40.

Table IV. Practice Antitank Mines, Fuzes, and Components

Practice Antitank Mines					
Nomenclature	Packing description	Weight as shipped (lb.)	Shipping case dimensions		
			Length	Width	Height
MINE, ANTITANK: heavy M6 empty w/inert fuze M600 and inert activator M1.	Packed 1/mtl cr M153-----	16.3	14	13-3/4	4-1/8
MINE, ANTITANK: light M7 empty (w/o fuze).	Packed 8/mtl bx -----	45.0	18-3/4	10-1/2	7-1/4
MINE, ANTITANK: light M7 empty (w/o fuze).	Packed 12/mtl bx -----	65.0	18-3/4	10-1/2	7-1/4
MINE, ANTITANK: light M7A1 empty and fuze, mine, AT, chemical, M600 or M601 inert.	Packed 8 mine (w/8 fuze packed 1/can M182, 4 can/ctn, 2 ctn) (8 fuze)/mtl bx M156.	50.0	19-1/8	11	8-1/8
MINE, ANTITANK: light M7A2 empty and fuze mine, AT M603 inert.	Packed 10/mtl bx M156----- Packed 12 mine (w/12 fuze in indiv mtl cntr/wdn bx.	27.1 27.0	19-1/8 23-3/8	11 11-3/4	8-1/8 9-1/2
MINE, ANTITANK: heavy M6 inert (w/o fuze and activator).	Packed 2/wdn bx-----	57.0	17-5/8	16-3/4	8-3/4
MINE, ANTITANK: light M7 inert w/fuze, mine, AT, chemical, M600 or M601 inert.	Packed 8 mine (w/8 fuze packed 1/can M182, 4 can/ctn, 2 ctn) (8 fuze)/mtl bx M156.	50.0	19-1/8	11	8-1/8
MINE, ANTITANK: light M7A2 inert loaded, w/fuze, mine, AT M603 inert.	Packed 10/mtl bx M156-----	58.0	19-1/8	11	8-1/8
MINE, ANTITANK: NM, M19, inert loaded (w/fuze, M606, inert).	Packed 2 mine (w/2 fuze M606, 1 wrench M22 and 2 detonator assy/crdbd cntr, overpacked in barrier material bag and 2 activator in indiv mtl cntr)/wdn bx.	75.0	16-1/4	10-5/8	16
MINE, ANTITANK, PRACTICE: heavy M12 or M12A1 (w/o fuze).	Packed 1/mtl cr M153A1 ----- Packed w/wdn bx -----	18.5 38.8	14 17-1/2	13-3/4 16	4-1/8 9-3/4
MINE, ANTITANK, PRACTICE: heavy M20 (T38).	Packed 3 mine w/arming wrench/wdn bx.	50.4	16-3/4	14-7/8	17-1/2
MINE, ANTITANK, PRACTICE: light M10 (w/o fuze).	Packed 12/mtl bx M156----- Packed 12/wdn bx-----	70.3 76.0	19-1/8 18-5/8	11 14-7/8	8-1/8 9-1/2
Practice Antitank Mine Fuzes					
FUZE, MINE: AT, practice M604.	Packed 1/mtl cntr, 180 cntr (180 fuze)/wdn bx.	77.4	16-1/2	14-7/8	12-7/8
Practice Antitank Mine Components					
ACTIVATOR, ANTITANK MINE: practice M1.	Packed 1/mtl cntr, 100 cntr (100 activator)/wdn bx. Packed 1/mtl cntr, 180 cntr (180 activator)/wdn bx.	38.5 54.5	25-3/4 16-3/8	7-1/8 16-3/4	13-1/2 14-3/4
COVER, ANTITANK MINE: for mine, HE, M7A2 and mine, practice M10 and M-10A1.	Packed 50/bndl, 40 bndl (2,000 cover)/wrdbnd bale.	92.0	35	27	10

37. Heavy Practice Antitank Mines

a. *General.* Although there are only two standard heavy service antitank mines listed in table III, there are several types of heavy practice antitank mines listed in table IV. Some of these are inert or empty practice models of a service mine which is now obsolete, however, they may be used in some phases of training personnel in the care, handling and use of heavy service antitank mines. The heavy practice antitank mines available are described in *b* through *d* below.

b. *Mine, Antitank, Heavy, M6 Empty or Inert.* This mine (fig. 55), is available either empty or inert-loaded and with or without the inert fuze M603, and activator M1, practice or inert (par. 40). This mine is made from metal parts identical to those of obsolete service mine M6. The mine M6 is similar in appearance, use and functioning to mine M15 (par. 31). The principal difference is that the M6 is only 3-3/8 inches high (thick) where as the M15 is 4-7/8 inches high. The inert fuze M603 is made from metal parts identical to those of service fuze M603 (par. 32). The mine is used for training in laying and arming, boobytrapping (using a firing device without primer), and disarming and removing (neutralizing). In such training, exactly the same procedure and observance of safety precautions will be followed as in performing those operations with their service counterparts, which contain high explosive. For instruction in those operations, refer to paragraph 34. Inert mines are painted black with marking in white.

Note. If this mine is requisitioned packed without fuze and without activator, an inert fuze M603 and an inert activator M1 must also be requisitioned.

c. *Mine, Antitank, Practice, Heavy M12 or M12A1 and Fuze, Mine, AT, Practice, M604.*

(1) *General.* This practice mine (figs. 62 and 63) is used for training personnel in the precautions and proper method to be observed in the care, handling, and laying of high-explosive heavy service antitank mine M15 (par. 31). Except for the smoke charge contained in the main fuze, and, when secondary

(boobytrapping) fuzes are used, the detonator and smoke charges in practice activator M1, and the primer in the firing device which is fitted to the practice activator, this mine is inert. The mine is shipped empty and is to be loaded with sand (11-1/8-pounds (approx.)) in the field. When so loaded, its weight will be approximately that of the now obsolete M6 series high-explosive mine which it simulates (see *b* above). The mine is so laid that the weight of an intermediate or heavy tank passing over it causes the main fuze to function.

(2) *Description of mine.*

Model number — M12.

Weight, sand-loaded — 20 pounds.

Weight of smoke charge — none.

Dimensions — height, 3-1/2 inches; diameter, 13-1/4 inches.

Material — steel.

Fuze well — main fuze well is in center of mine underneath arming plug.

Arming mechanism — arming plug M4 is in place over main fuze well, as shipped. This plug (fig 38), has a steel shutter which moves from a side position to a center position as the setting knob is moved from "SAFE" through "DANGER" to "ARMED" position.

(3) *Functioning.*

(a) A minimum force of 565 ± 174 pounds depresses the pressure plate and the belleville spring of the fuze.

(b) Depression of the mine pressure plate and belleville spring causes depression of the arming plug shutter (armed position). Depression of the shutter in turn depresses the pressure plate and belleville spring of the fuze.

(c) Belleville spring of the fuze snaps into reverse, driving the firing pin into the charge of the fuze.

(d) The igniter charge of the fuze ignites the smoke composition of the fuze.

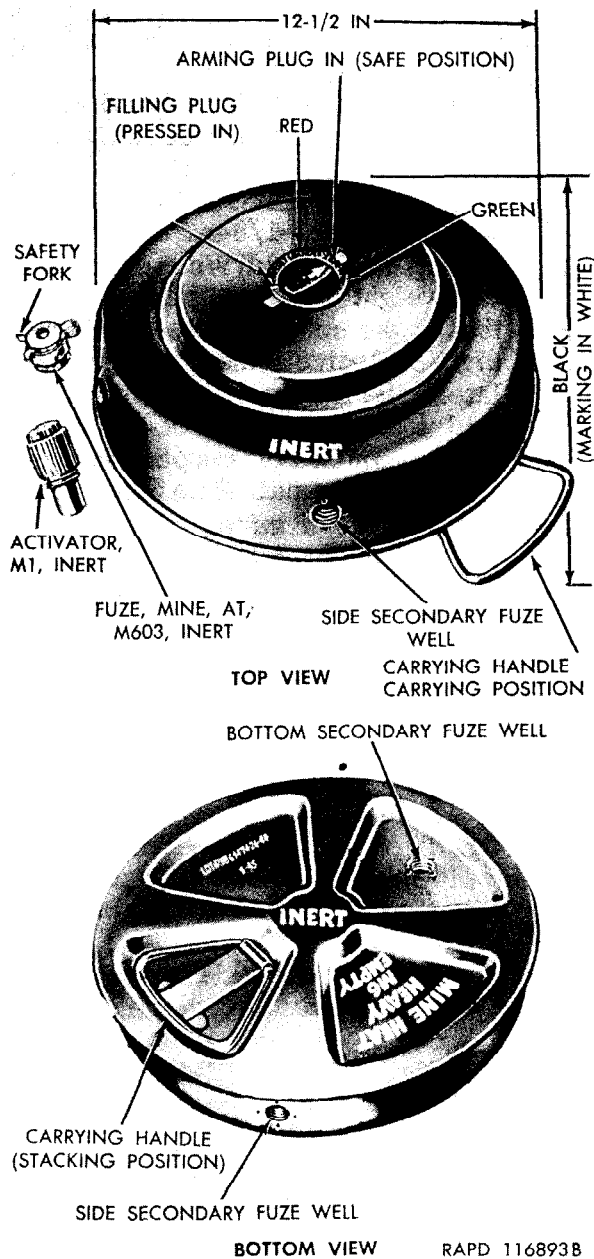


Figure 61. Mine, antitank, heavy, M6, empty.

(e) The smoke composition explodes, emitting a cloud of smoke and creating a noise.

(4) *Laying and arming.*

Caution: Always insert the primary (main) fuze before installing secondary (boobytrapping) fuzes.

(a) Using the arming plug wrench M20 (fig. 39), unscrew the arming plug from the mine.

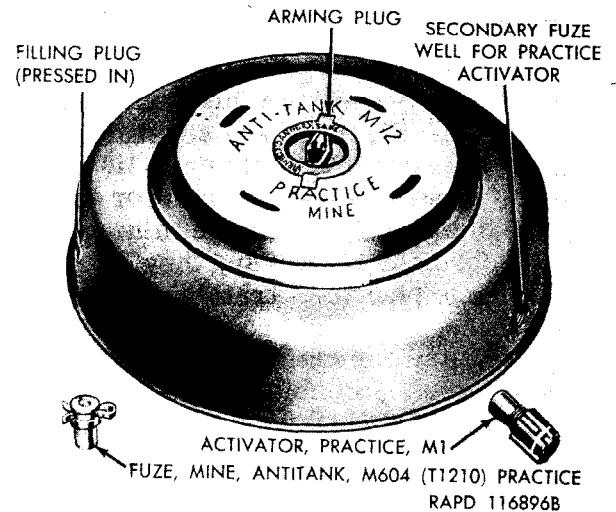


Figure 62. Mine, antitank, practice, heavy, M12 with practice fuze M604 and practice activator M1.

(b) Inspect the fuze well and arming plug threads to see that no foreign matter is present.

Warning: It is particularly important during freezing weather to see that there is no ice in the fuze well as the presence of ice during fuzeing may cause a serious accident.

(c) Remove fuze M604 from its metal shipping container and inspect it for serviceability.

(d) Just before inserting the fuze into the mine, use the hook end of the arming wrench to remove the safety fork from the cover assembly of the fuze. Save and conceal the safety fork (clip) for use in disarming the fuze.

Caution: Make sure fuze well is clear of foreign material.

(e) Insert the fuze gently into the primary fuze well of the mine until it seats firmly (fig. 63).

Warning: No pressure must be put on the pressure plate of the fuze when inserting it into the fuze well.

Note. To assure proper clearance between the fuze pressure-plate button and the shutter of the arming plug, it is essential that the fuze be fully seated on the internal shoulder of the mine fuze well.

(f) Making sure that the setting knob

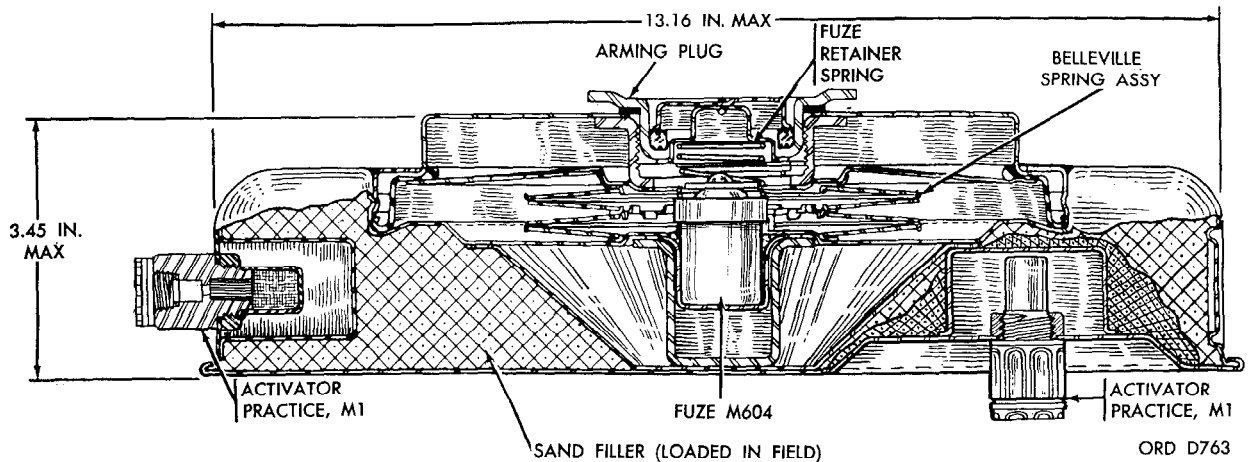


Figure 63. Mine, antitank, heavy, practice, M12, and fuze, mine antitank, practice, M604—cross sectional view.

and shutter are in the SAFE position, screw the arming plug into the mine wrench tight to assure a watertight joint.

- (g) Lay the mine on a firm foundation with the top surface of the pressure plate not more than three inches beneath the ground level.
- (h) Just before the mine is covered, arm the mine by turning the setting knob red pointer from SAFE through DANGER to ARMED. The arming wrench may be used for this purpose. The fuze will not function if the pointer on the arming plug points to SAFE.

Caution: Because of tolerances permitted in the manufacture of antitank mines, the pressure plate of the fuze M604 may be too high, making it difficult, if not impossible, to turn the knob on the arming plug to the ARMED position. Do not attempt to force the knob but unscrew the arming plug just enough to allow the knob to be turned freely. The setting knob should at no time be left pointing to DANGER.

- (i) Camouflage the mine in accordance with instructions in FM 20-32.
- (5) *Boobytrapping.* Boobytrapping of

the practice mine M12 requires a practice activator (par. 40), the correct primed firing device (par. 42), and one or more trip wires.

- (a) Remove the tape and the shipping sleeve from the secondary fuze well (side well, bottom well, or both).
- (b) Inspect the secondary fuze well carefully to make certain it is free of foreign matter.
- (c) Remove the plug and its gasket from the head of practice activator M1 and screw the activator hand-tight into the secondary fuze well of the mine.
- (d) Making sure that the small rubber gasket is in place inside the activator, screw the firing device hand-tight into activator (the firing device requires no blasting cap when used with an activator). Install trip wires as required.
- (e) Arm the firing device by removing its safety pins, always removing the positive safety pin last.
- (f) Save and conceal the safety pins and the activator plug and its gasket for use in disarming and removal.
- (6) *Disarming and removal (neutralizing).*

- (a) Carefully uncover the concealed mine and examine the side and bottom secondary fuze wells for boobytrapping devices (secondary fuzes). Trip wires may have been installed which will initiate a secondary fuze by either pull or release.
- (b) Do not cut any taut trip wires, but cut all slack trip wires.

Warning 1: If taut trip wires are encountered when attempting to neutralize the mine, do not cut the wires under any circumstances. The best procedure is to attach a long rope or wire to the mine without disturbing the taut wire and then from a protected position remove the mine from the ground by pulling on the long rope or wire. If this method is not practicable, the matter should be referred to EOD personnel.

Warning 2: When removing the mine with a long rope or wire, use extreme caution — mine may detonate.

- (c) Replace all safety pins in the firing devices, always replacing the positive safety pin first. Refer to TM 9-1375-200 for instructions pertaining to the particular firing device involved.
- (d) Unscrew the firing devices from the activators.
- (e) Unscrew the activator. Replace the plug and its gasket in the head of the activator.
- (f) Turn the setting knob of the arming plug to the SAFE position.
- (g) Remove the arming plug by unscrewing it in a counterclockwise direction.
- (h) Remove the fuze by grasping the fuze pressure plate with the fingers. It should come out easily. Do not attempt to remove the fuze if it is frozen in place. Insert the safety fork (clip) in the fuze.
- (i) After removing the fuze, screw arming plug back into place hand-

tight with pointer on setting knob pointing to SAFE.

- (j) Remove the trip wire and replace tape over secondary fuze well.
- (k) If required, remove sand from mine.
- (l) Restore the mine and fuze to its original position and packing. The mine may be laid and removed any number of times provided neither fuzes nor mines show evidence of damage or deterioration.
- (7) *Functioned mine and fuze.* If mine and fuzes have functioned and the mine casing is undamaged, replace the main fuze with a new fuze, replace the practice activator with a new one, and retain the firing mechanism of the firing device. The base coupling with fired primer may be discarded or reprimed, depending on its condition. The firing mechanism may be recocked by placing the end of a stick, pencil, or nail against the firing pin and pushing it back until it is held in place by the release pin. Install safety pin. Restore mine, new fuze, new practice activator, and firing device to original condition and packing.

d. Mine, Antitank, Practice, Heavy, M20 (T38) and Fuze, Mine, Antitank, Practice, M604.

- (1) *General.* This practice mine (figs. 64 and 65) is used for training in the proper methods and precautions to be observed in the care, handling, laying and arming, boobytrapping, and disarming of high-explosive heavy antitank mine M15. The mine is issued empty with arming plug assembled but without primary or secondary fuze. It is to be loaded with sand (21.2 lbs.) and fuzed in the field. The mine (fig. 58) is a flat cylindrical steel casing (4.91-in. high by 13.13-in. diameter), similar externally to the high-explosive mine M15 (par. 31) which it simulates. Similar to the service mine M15 —

the practice mine has a wire carrying handle, which folds under the mine when not in use, and uses the arming plug M4. It differs from the mine M15 chiefly in having three filler holes in the side and perforations in the top and around the side secondary fuze well. The mine is laid so that the weight of an intermediate or heavy tank passing over it causes the primary fuze to function. The mine may be boobytrapped by installation of one or two secondary fuzes, each consisting of practice antitank mine activator M1 and any regular type firing device having 9/16-inch threads. Depending upon the type of firing device used, the mine can be caused to function by pull or release of either of two trip wires attached to the firing device. Except for the smoke charge and primer M45 in fuze M604, and the smoke charge and igniting charge in practice activator M1, the mine is inert.

- (2) *Use.* The laying and arming, boobytrapping, functioning, disarming and removal (neutralizing), and the recovery and refuzing for re-use of practice mine M20 and practice fuze M604 are similar to those for practice mine M12 and practice fuze M604 (which supersedes practice fuze M602).
- (3) *Wrench, arming plug, mine, M20.* Because of tolerances permitted in the manufacture, the pressure plate of the fuze M604 may interfere with the movement of the arming plug shutter which is on the bottom of the arming plug. The shutter moves from an outside to a center position as the arming knob is turned from the SAFE to the ARMED position. To predetermine whether there will be proper clearance, an arming wrench M20 of recent manufacture is provided with a depth gage consisting of a lip projecting from its side. Use the depth gage as follows:

- (a) After insertion of the fuze into the fuze well of the mine, and before screwing the arming plug into place, lay the arming wrench on its side on top of the pressure plate of the mine so that the depth gage extends into the fuze well towards the fuze.
 - (b) That the end of the gage touches the pressure plate of the fuze indicates improper clearance. The lack of proper clearance can be remedied by screwing the arming plug into the mine slightly less than its full normal distance so that the arming plug shutter can be moved freely to the ARMED position.
- (4) *Painting and marking.* The mine is painted blue with marking which includes the nomenclature, manufacturers number and symbol, and month and year manufactured in white.

38. Light Practice Antitank Mines

a. General. There are no standard service counterparts to the light practice antitank mines. Formerly there was an M7 series of light service antitank mines. Although these mines are now obsolete, empty and inert models of the M7 series and a practice mine M10 which simulates the M7 series are available for use in training in the care, handling, and use of antitank mines.

b. Mine, Antitank, Light M7 Series, Empty or Inert with Fuze, Mine, Antitank, M603, Inert.

- (1) *General.* The mine is constructed of metal parts identical to those of the M7 series service mines and employs an inert fuze. The mine is used for training in laying and arming, boobytrapping (using a firing device without primer and without blasting cap) and disarming and removal (neutralizing).
- (2) *Description* (fig. 66).

(a) *Mine.*

Model number — M7 series, empty or inert.

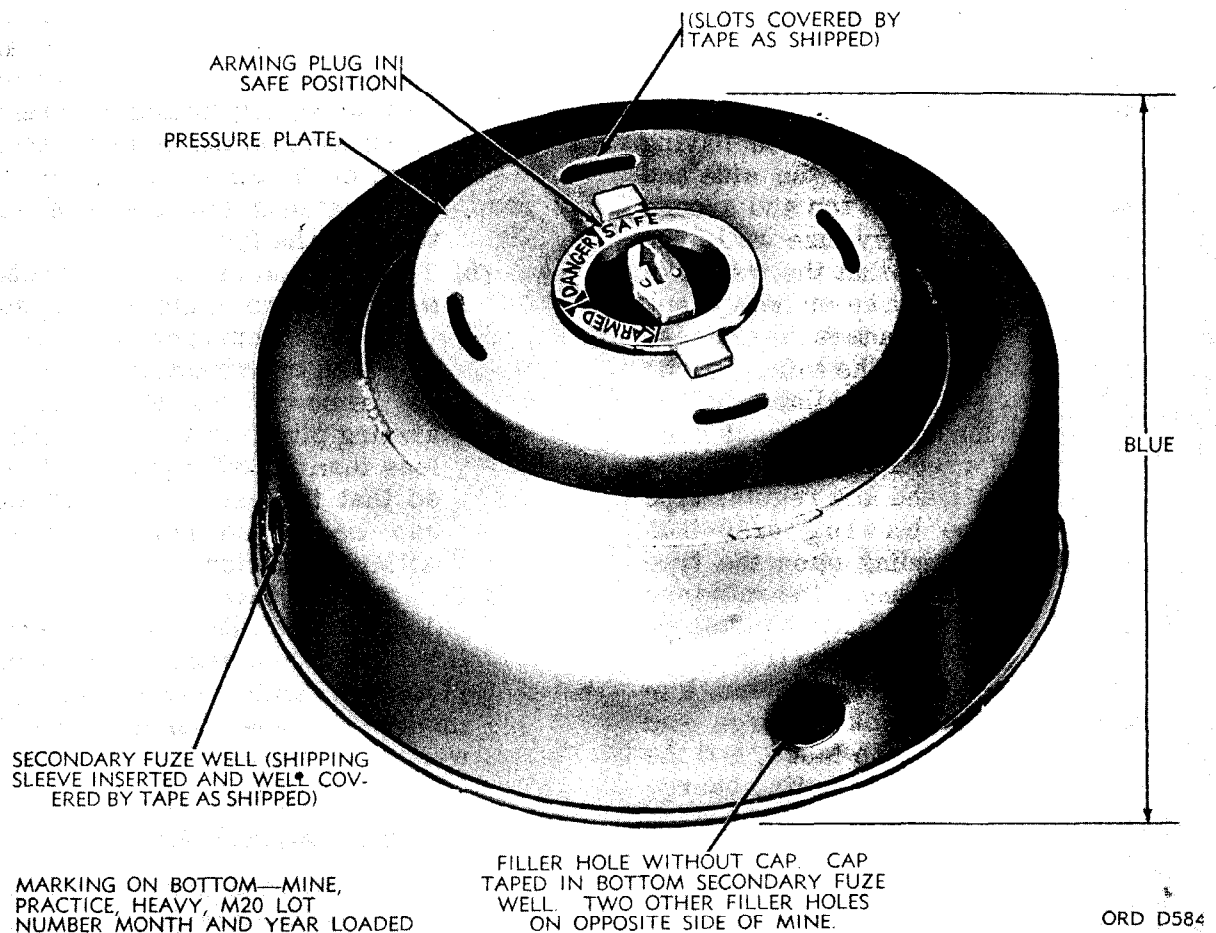


Figure 64. Mine, antitank, practice, heavy, M20.

Weight, unfuzed — 4-7/8 pounds (inert models).
 Weight of inert filler — 3-5/8 pounds.
 Dimensions — height, 2-1/2 inches; length, 7 inches; width, 4-1/2 inches.
 Material — steel.
 Fuze well — main (primary) fuze located in center of top of mine.
 Fuze arming mechanism — sliding pressure plate.
 Secondary fuze well (fitted with carrying plug and cord as shipped).
 Number and location — one well located in one end of mine.
 Type of boobytrapping (secondary) fuze for which threaded — inert firing device with inert blasting cap.

(b) *Fuze (primary)* (fig. 66).
 Model number — M603, inert.
 Type — mechanical, belleville spring.
 Weight — 1.56 ounces.
 Dimensions — height, 1.17 inches; diameter, 1.125 inches.
 Material — steel.
 Safeties — safety clip (fork).

(c) *Fuze (secondary) (boobytrapping)*.
 Inert firing device type and model number — any regular type having 9/16-inch thread.
 Activator model number — no activator used.

(3) *Functioning.*

(a) A minimum force of 140 to 240 pounds on the pressure plate of the armed mine depresses pressure plate of fuze.

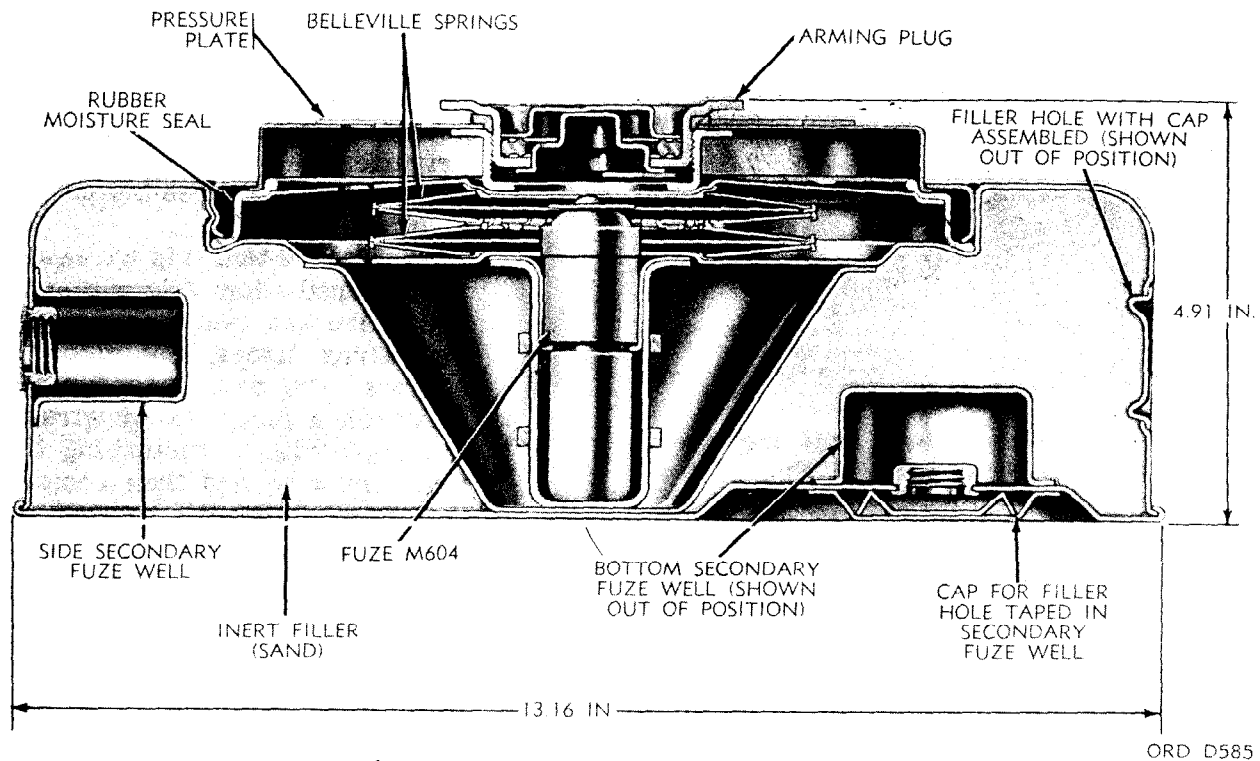


Figure 65. Mine, antitank, practice, heavy, M20 (T38) and fuze, mine, M604—cross sectional view.

- (b) The belleville spring of the fuze snaps into reverse and drives the firing pin into the detonator.
- (c) Since both mine and fuze are inert-loaded, there is no further action.
- (4) *Laying and arming.*
 - (a) Slide the pressure plate of the mine aside to expose the fuze well.
 - (b) Inspect fuze well to see that no foreign matter is present.
 - (c) Remove inert fuze M603 from its container and inspect to see that it is serviceable and that the end of the detonator shows in the bottom of the fuze.
 - (d) Just before inserting the fuze into the mine, remove the safety fork (clip) from the cover assembly of the fuze. The fingers or the hook end of the arming wrench may be used for this purpose.
 - (e) Insert the fuze gently into main (primary) fuze well of the mine

until it seats. To assure proper clearance between the fuze pressure plate button and the steel pad on underside of pressure plate of the mine, the fuze must be fully seated on internal shoulder in fuze well (fig. 66).

Caution: Always insert the main fuze before installing secondary fuzes. No pressure must be put on the pressure plate of fuze when inserting it into fuze well.

- (f) Slide the mine pressure plate into position over fuze. Center the pressure plate so that the rivets in the sides of mine are in the vertical slots of pressure plate. The fuze is now armed.
- (g) Lay the mine on a firm foundation in a place not likely to be flooded. The pressure plate side may be up or down. Whichever side is up should be flush with, or not more than one inch below,

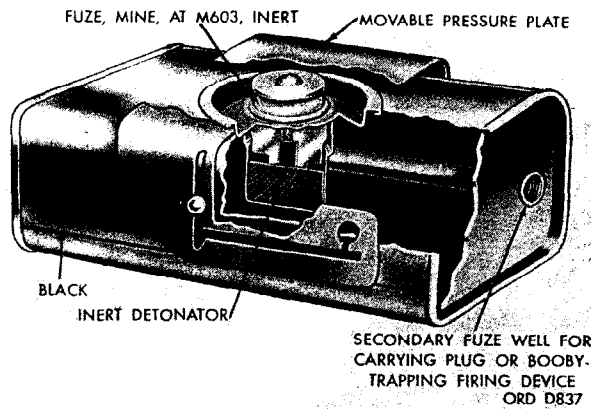


Figure 66. Mine, antitank, light, M7A2, inert and fuze, mine, antitank, M603 inert.

ground level, with the longer axis of the mine parallel to the probable approach of the enemy.

- (h) Camouflage in accordance with instructions in FM 20-32.
- (5) *Boobytrapping.*

- (a) Unscrew the carrying plug with the ring handle from the secondary (boobytrapping) fuze well and inspect the secondary fuze well to make certain it is free of foreign material.
- (b) Crimp an inert blasting cap to a base coupling.
- (c) Screw the base coupling with crimped-on blasting cap to the firing device. Insert the blasting cap hand-tight into the secondary fuze well.

Note. Use fuzing wrench M25 if the edge of the base coupling is hexagonal.

- (d) Install trip wire(s) as required and arm the firing device by removing safety pins, always removing the positive safety pin last.

Note. Save and conceal all safety pins for future use in disarming and removal.

- (6) *Disarming and removal (neutralizing).*
 - (a) Carefully uncover the camouflaged mine and examine it for any boobytrapping device (secondary fuze). Trip wires may have been installed which will

initiate a secondary fuze by either pull or release.

Caution: Great care must be taken with regard to antilift boobytrapping devices (secondary fuzes).

- (b) Do not cut taut wires but cut all slack trip wires.

Warning: If taut trip wires are encountered when attempting to neutralize the mine, do not cut the wires under any circumstances. The best procedure is to attach a long rope or wire to the mine without disturbing the taut trip wire and then remove the mine from the ground by pulling on the long rope or wire from a protected position, making sure that such protected position is not mined. If this method is not practicable, neutralize the secondary fuze according to procedure prescribed in FM 20-32.

Warning: When removing the mine with a long rope or wire, use extreme caution — mine may detonate.

- (c) If the secondary fuze has only slack trip wire attached to it, cut it and replace safety pins in the firing device, replacing the positive safety pin first.
- (d) Unscrew secondary fuze well by grasping the knurled edge of the base coupling, or if the edge of the base coupling is hexagonal, by using fuzing wrench M25.
- (e) Unscrew the base-coupling-with-blasting-cap attached from the firing device. Restore the base coupling and the firing device to its packing.
- (f) Slide pressure plate away from its position over the fuze and remove the fuze.
- (g) Insert the safety fork (clip) into the primary fuze.
- (h) Restore the mine and the fuze each to its original packing container.

c. Mine, Antitank, Practice, Light M10 and Fuze, Mine, Antitank, Practice, M604.

(1) **General.** This practice mine (fig. 67) is used for training personnel in the precautions and methods to be observed in the care, handling, and laying of high-explosive service antitank mines. Except for the smoke charge contained in the firing device (when used as secondary fuze), this practice mine is inert. The mine is shipped empty and is to be loaded with sand in the field. When so loaded, its weight will be approximately that of the obsolete M7 series high-explosive antitank mine which it simulates. The mine is so laid that the weight of a truck or light tank passing over it will cause the main fuze to function.

(2) **Description.**

(a) **Mine.**

Model number — M10, simulates the M7 series mines (b above).

Type — practice.

Weight, unfuzed — 4-7/16 pounds.

Dimensions — height, 2-1/2 inches; length, 7 inches; width, 5 inches.

Material — steel.

Fuze well — main (primary) fuze well located in top center of mine.

Fuze arming mechanism — sliding pressure plate.

Secondary (boobytrapping) fuze well:

Number and location — one, located in end of mine.

Type of secondary (boobytrapping) fuze for which threaded — any regular firing device ((c) below).

Painting — blue.

Marking — nomenclature, loader's lot number and symbol, month and year loaded — in white.

Carrying plug — mine is fitted with carrying plug and cord, as shipped.

Closing cap — as shipped, the closing cap is separate from the mine. The mine is loaded with

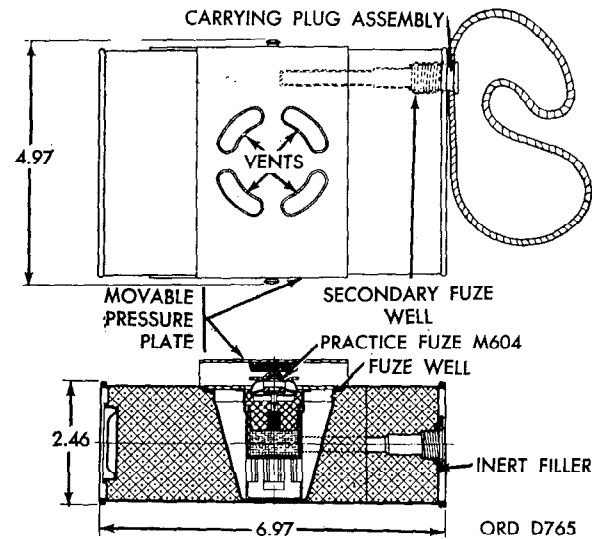


Figure 67. Mine, antitank, light, practice, M10 and fuze mine, antitank, practice, M604.

sand in the field and the filling hole is then closed with the closing cap.

(b) **Fuze (primary).**

Model number — M604.

Type — practice.

Weight — 2-1/2 ounces.

Weight of smoke charge — 17 grains.

Dimensions — height, 1-3/4 inches; diameter, 1-1/8 inches.

Material — steel.

Safeties — safety clip (fork).

Painting — none.

Marking — nomenclature, stamped in metal.

(c) **Fuze (secondary) (boobytrapping).**

Firing device type and model number — any regular type firing device having 9/16-inch thread, usually pull-type M1 or pull-friction type M2.

Note: No igniter charge or blasting cap should be used on the firing device.

(3) **Functioning.**

(a) A minimum force of 140 to 240 pounds on striker plate of the armed mine depresses the pressure plate of the fuze, causing the belleville spring of the fuze

to snap into reverse, driving the firing pin into the igniter of the fuze, causing it to function.

- (b) The igniter of the fuze ignites the smoke charge of the fuze.
- (c) Functioning of smoke charge causes a cloud of smoke to rise from mine, accompanied by a noise.

(4) *Laying and arming.* This operation is the same as that of the mine M7A2 with the fuze M603 (b above). After mine has functioned, it may be taken up and, if in good condition, refitted with a new fuze M604 and a new or reprimed firing device, and reused.

(5) *Boobytrapping.* This operation is the same as that of the M7 series mines (b above) except that no blasting cap or igniter is used on the firing device.

(6) *Disarming and removal (neutralizing).* This operation is the same as that of the M7 series mines with the fuze M603 (b above) except that if the firing mechanism of the firing device has functioned, it may be recocked by placing the end of a stick, pencil or nail against the firing pin and pushing it back until it is held in place by the release pin.

d. *Fuze, Mine, Antitank, Practice, M604.*

(1) *General.* This fuze (fig. 67) is used with the light practice antitank mine M10 (c above).

(2) *Description.* The fuze consists of an aluminum body containing a belleville spring, and fitted with a firing pin, an igniter charge, and a smoke composite charge weighing 17 grains.

(3) *Functioning.* A minimum force of 140 to 240 pounds on the pressure plate of this fuze depresses the belleville spring in the fuze, causing it to snap into reverse and drive the firing pin into the igniter, which then ignites the smoke composition charge. A cloud of smoke issues from the top of the mine, accompanied by a noise. Mines

which use this fuze have no booster. The space occupied in the fuze well by the fuze M604 equals the space occupied by the fuze M603 and the booster M120 together in the fuze well of service mines.

39. *Mine, Antitank, NM, M19, Inert with Fuze, M606 Inert*

This mine and fuze are completely inert (contain no explosive). It is used for training in handling the heavy-type nonmetallic antitank mine M19. The mine is constructed of parts identical to those used in the M19 service mines, and employs an inert fuze. The mine is used for training in laying and arming, boobytrapping (using a firing device without primer), disarming and removing (neutralizing). In training, follow exactly the same procedure and observance of safety precautions as if high-explosives containing service mines were being used (par. 34).

40. *Activator, Antitank Mine, Practice M1*

a. *General.* This activator (fig. 68) is used to adapt the heavy antitank practice mine M12 to the use of a practice boobytrapping firing device. It contains an igniter, and a smoke charge for spotting purposes.

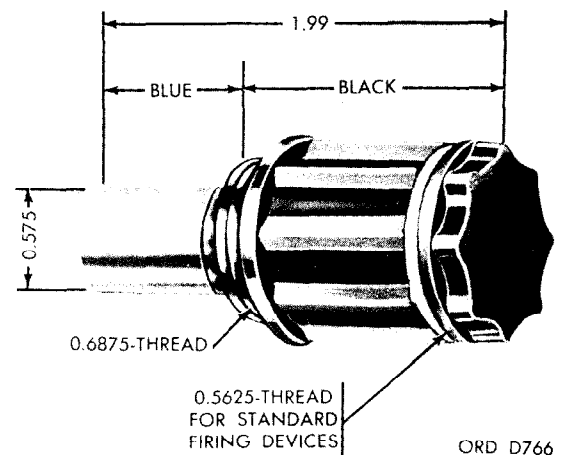


Figure 68. Activator, antitank mine, practice, M1.

b. Description.

- (1) The practice activator is made of black (newer type, blue) plastic parts and contains an igniting charge of photographic flash powder and a smoke charge of white smoke composition. The booster cup, which contains the smoke charge, is blue. The body has eight equally spaced longitudinal ribs and is internally threaded to receive a firing device (9/16-inch thread diameter); this end is closed during shipment by a threaded plug.

The other end is externally threaded (0.6875-inch thread diameter) to fit the secondary fuze well for practice activator in the mine.

Note. The practice activator M1 has an external thread that will not fit any mine except the practice mine M12.

- (2) The activator operates when the action of a firing device initiates the igniter charge which, in turn, ignites the smoke charge, thus releasing a puff of white smoke with accompanying noise.

CHAPTER 4

INCENDIARY BURSTER AND CHEMICAL MINES

Section I. INCENDIARY BURSTER

41. General

a. *Uses.* The incendiary burster M4 is used, primarily, with field-improvised incendiary munitions. When immersed in a container (5-gallon can, used shell case, ammunition container, 55-gallon drum) filled with thickened fuel, the M4 will burst the container and scatter flaming fuel over a large area. The number of bursters required is determined by the size of the container and the amount of fuel it contains. This type of munition can be used to boobytrap flame-type mines.

b. *Description.*

(1) *Incendiary burster M4.* This incendiary burster contains the following major components: steel burster tube, shipping plug, plug and cap, outer and inner plastic tube, pyrotechnic-ignition mixture, tetryl pellets, and burster cap. Two or more bursters may be joined by removing the plug from one burster and the cap from another and joining the two open ends by means of the bayonet-type fitting.

(a) *Burster tube.* This tube is a steel cylinder approximately 12-inches long with a wall thickness of 1/16-inch. Its outside diameter is 1-3/4-inches. The tube is closed at one end by a plug and at the other end by a cap. A preformed packing (O-ring) is seated in a channel beneath a shoulder near the plug end of the tube. When the plug is inserted, the preformed packing forms a tight seal with the surface of the plug. The plug end of the tube is slotted to form a bayonet-type connection with the plug. Two steel pins are provided near the cap end of the tube for a bayonet-type connection with the cap.

(b) *Plug.* This plug is a tight-fitting steel closure for the detonator end of the burster tube. A threaded hole through the end of the plug is built to accommodate the fuze, blasting cap, or detonating cord used to detonate the filling. Two steel pins near the end of the plug make possible a bayonet-type connection between tube and plug. A discardable plastic shipping plug is inserted in the detonator hole of the plug during shipment and storage of the burster, to protect the contents from moisture and dirt. The shipping plug is removable when the burster is used.

(c) *Cap.* A tight-fitting steel cap is the closure for the other end of the burster tube. Preformed packing is seated in a channel inside the cap, beneath the cap shoulder, to provide a tight seal between tube and cap.

(d) *Filler.* The explosive-incendiary filling is contained in two concentric cellulose nitrate plastic tubes, each 10-1/2 inches long. The inside diameter of the inner tube is 3/4-inch; it is filled with tetryl pellets having a slightly smaller diameter, so that in effect the inner tube contains a solid column of tetryl. The outer plastic tube has an inside diameter of about 1-3/16 inches. The inner tube is held in correct relative position in the middle of the outer tube by a plastic burster cup seated inside one end of the inner tube. The lip of this cup is cemented on its lower side to the ends of both tubes. A plastic end cap is cemented to the outer ends

of both tubes to hold the tubes in their correct relative positions. The space between inner and outer tubes is filled with a pyrotechnic ignition mixture. The burster is preassembled with explosive-incendiary tubes cemented in place inside the steel burster.

- (2) *Accessories.* The burster M4 can be fired either electrically or mechanically, by fuze, blasting cap, detonating cord, or any standard boobytrap firing device. The M206A2 detonating fuze may be used to fire the burster provided the mating between the fuze and burster is improvised. Either electric or nonelectric blasting caps can be used. Detonating cord may be used by passing it through the hole in the burster plug and

extending well into the burster cup. Any of the following firing devices (TM 9-1375-200) may also be used in boobytrapping the burster M4.

- (a) Pressure firing device, M1A1.
- (b) Pressure-release firing device, M5.
- (c) Pull-friction firing device, M2.
- (d) Pull-release firing device, M3.

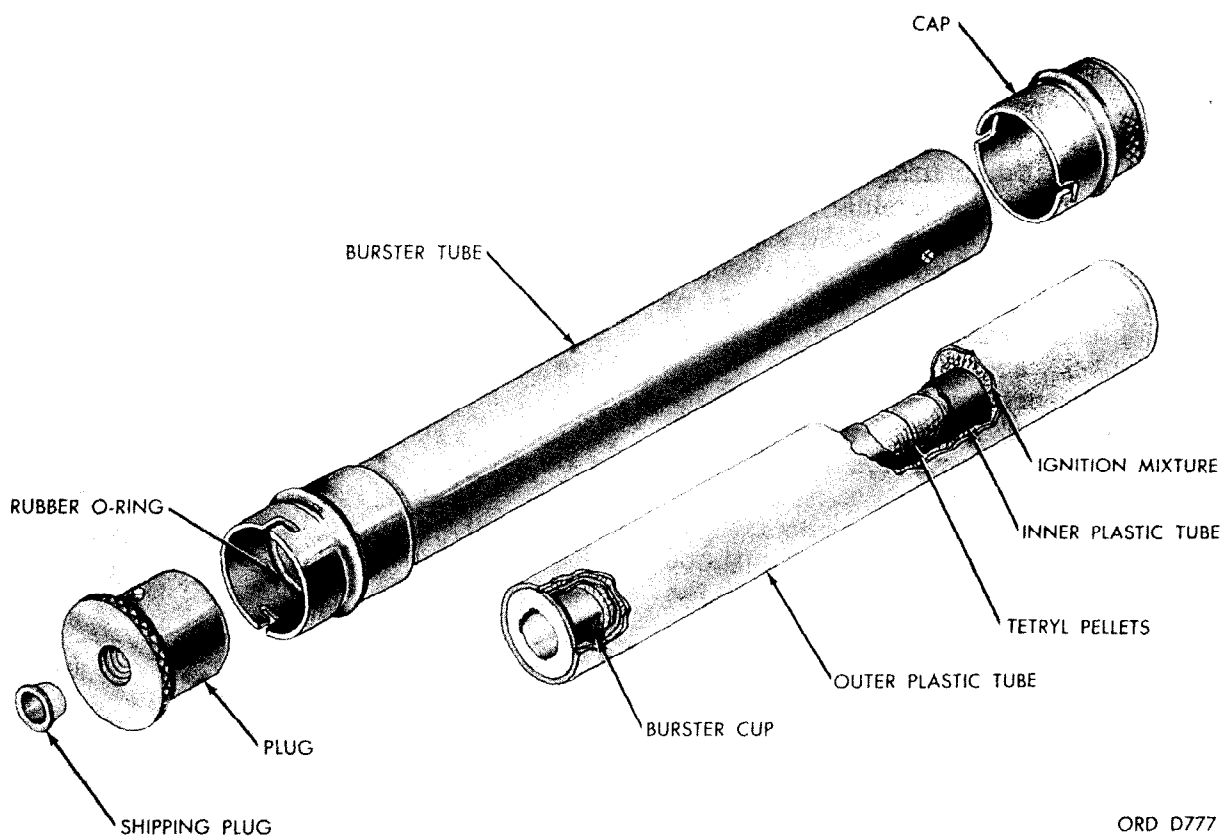
The threaded base coupling of any of these devices can be screwed into the hole in the plug of the burster tube.

c. Fuzes and Other Components. The functioning of bursters can be initiated by a fuze, blasting cap, detonating cord, or any standard boobytrap device.

d. Data. Tabulated data on the bursters may be found in table V.

e. Functioning.

- (1) Initiation of fuze, blasting cap, detonating cord, or any standard



ORD D777

Figure 69. Burster, incendiary, M4.

boobytrap device will ignite the explosive material in the burster cup.

- (2) Detonation of the burster cup material ignites the tetryl pellets.
- (3) The ignition of the tetryl pellets ignites the pyrotechnic-ignition mixture.
- (4) Ignition of the pyrotechnic-ignition mixture bursts the metal burster tube.

f. Effectiveness. The size and shape of the ground dispersion pattern depends largely on wind speed and direction close

to the ground. Under calm conditions, the coverage to be expected from the dispersion of a 5-gallon can of fuel in an upright position is an area approximately 20 to 37 yards wide. Detonation of two bursters: a 55-gallon drum of fuel will cover an area approximately 104 to 120 yards wide.

Note. Fuel composition in an upright position is also a factor in the ground coverage pattern.

g. Boobytrapping. The burster M4 may be boobytrapped to prevent disturbance or removal by using any of the firing devices listed in (2) above. See TM 9-1375-200 and FM 5-31 for boobytrapping instructions.

Section II. CHEMICAL MINES

42. General

a. Uses. Chemical mines may be used to disperse chemical agents from fixed locations to provide area contamination in barrier and nuisance mine-fields. The chemical agent employed may be in liquid or vapor form. The chemical mine, an antipersonnel mine, may be used in anti-tank minefields or elsewhere for triggering by ground troops. The presence of chemical mines in a minefield slows breaching operations as it discourages rapid mine-clearing techniques. Chemical land mines may be initiated by action of the enemy or by remote control. More detailed information on use and tactical employment of chemical land mines may be found in FM 3-5, FM 20-32, and FM 31-10.

b. Mines. Representative types of chemical mines are shown in figure 1. For a detailed general discussion of chemical mines, see paragraph 5.

c. Fuzes and Other Components. The functioning of chemical mines is initiated by a fuze or burster, depending upon the type of mine. The 1-gallon mine uses a bursting charge made of detonating cord. An electric blasting cap or detonating cord is used to detonate the detonating cord bursting charge. The 1-3/4-gallon mine (M23) uses a fuze for primary fuzing. When employed as an antipersonnel mine an activator and firing device are actuated by a trip wire.

d. Data. Tabulated data on chemical

land mines are given in table V. Additional data may be found in paragraphs 43 through 44.

43. Mine, Land, Chemical, 1-Gallon

a. General. The chemical mine can be used to disperse distilled mustard (HD) or Levenstein mustard (H). It can be employed in combination with high-explosive mines in minefields.

b. Description. The 1-gallon chemical mine (fig. 70) consists of an unpainted but marked 1-gallon metal can with a carrying handle and a threaded cap. The cap is lined with a gasket made of cork or rubber and faced with lead foil. Two short copper wires are soldered to one side of the mine for use when attaching a burster

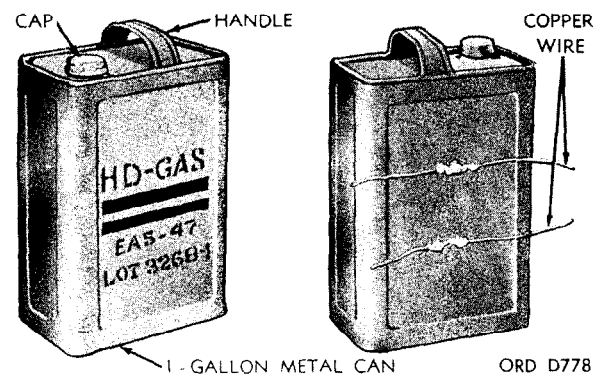


Figure 70. Mine, land, chemical, 1-gallon.

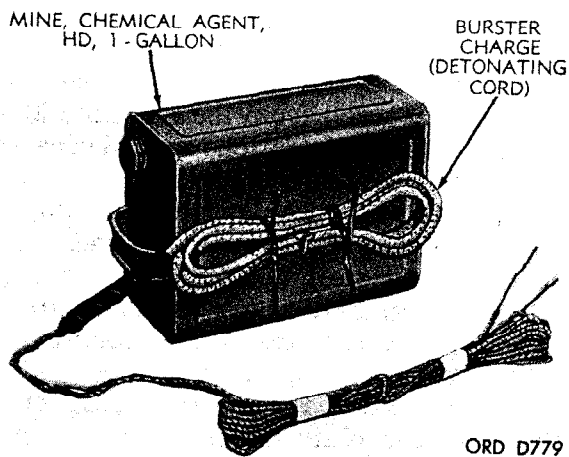


Figure 71. Mine, land, chemical, 1-gallon.

charge (fig. 71). Detailed data on this mine is listed below.

Description of mine.

Model number — none.

Type — bursting.

Weight, loaded — 11 pounds (varnish-can type HD mines are filled by depots and supplied to the field in that condition).

Capacity — 1.1 gallons.

Dimensions — height, 10-9/16 inches; width, 6-9/16 inches; depth 4-1/8 inches.

Material — light gage metal.

Bursting charge — 4 foot length of detonating cord.

Weight of filler — 9.9 pounds (1-gallon) (HD).

Painting — unpainted.

Marking — green with two green bands.

c. Functioning.

(1) *Electrically.*

Upon completion of the electrical circuit, current is transmitted to the electric blasting cap which causes the electric blasting cap to function and detonates the bursting charge, the force of which bursts the mine and disperses the chemical agent over a wide area.

(2) *Nonelectrically.*

Burning safety fuse sets off the blasting cap which causes the detonating cord to detonate, bursting the mine and dispersing the chemical agent over a wide area.

d. Laying and Arming.

Warning: A protective mask and protective clothing must be worn when preparing and laying chemical land mines.

- (1) Prepare a hole in the ground with a firm foundation at the bottom and of appropriate dimensions (b above).
- (2) Attach a 4-foot length of detonating cord to the side of the mine with the copper wires provided for that purpose.
- (3) Tape either an electric blasting cap or a length of detonating cord lengthwise along and in firm contact with the detonating cord burster charge.

(a) When using an electric blasting cap, leave the ends of the blasting cap wires connected to each other until ready to connect them to the electric firing circuit.

(b) When using detonating cord as a detonator, use a square knot to tie it to the bursting charge.

- (4) Place the mine, bursting charge down, in the hole leading the blasting cap detonating cord or wires out of the hole.
- (5) Cover the mine with approximately 4-inches of earth.
- (6) Camouflage as instructed in FM 20-32.
- (7) If an electric firing circuit is used for detonation, connect the blasting cap wires to an electrical firing circuit.
- (8) If a nonelectric blasting cap is used, attach a safety fuse of sufficient length to allow time for firing personnel to move to safety.

e. Disarming and Removal.

Warning: A protective mask and protective clothing must be worn when disarming and removing chemical land mines.

- (1) Carefully coil wires or detonating cord.
- (2) Remove camouflage material.
- (3) Remove dirt covering the mine.
- (4) Remove the mine from the hole and return to its packing container.

Note. Filled mines should not be stored for more than 30 days and should be vented periodically to prevent pressure from building up and to minimize leaks.

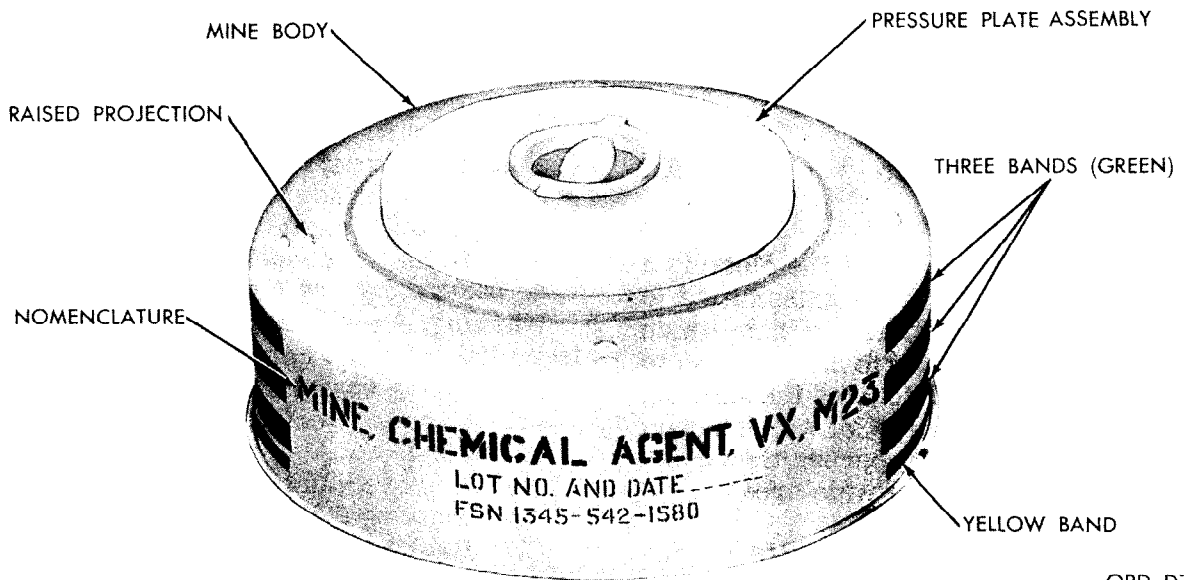
f. Effectiveness. An exploding bursting charge disperses the chemical filling of the mine over a radius of approximately 5 yards. Such areas present a hazard to personnel for a time varying from hours to days. The effectiveness of the chemical agent is dependent on the method of dissemination, the weather, and the condition of the surface of the terrain in the target area.

44. Mine, Chemical Agent, VX, M23

a. General. The chemical mine, M23 (fig. 66) is prefilled and is used to disperse a nerve agent (VX). The mine M23 may be fuzed for contact or remote static detonation and may be used as an antitank mine or antipersonnel mine. When used as an antitank mine, a fuze M603 (par. 32) is used in the primary fuze well. When used as an antipersonnel mine the M23 is booby-trapped by using an activator M1 and a firing device M1A1, M2, M3, or M5 in either the side or bottom secondary fuze well.

b. Description. The chemical agent mine M23, similar in size and shape to the antitank mine M15 (par. 31), consists of a

mine body made of the same type steel used in the mine M16A1. The chemical land mine M23 can be distinguished visually and by touch from the AT mine M16A1 by eight raised projections spaced in pairs around the periphery of the top of the chemical mine (at 90-degree intervals). A primary fuze well, a side fuze well, and a bottom fuze well are provided for fuzing the mine (fig. 73). The side fuze well is part of a burster tube which contains a tetryl burster held in place by a retaining ring. The bottom fuze well is part of a cover adapter plate which holds a Composition B burster cone in place. Both the side and bottom fuze wells are closed with removable caps. The pressure plate assembly consists of a pressure plate, a belleville spring, a fuze retainer spring, and an arming plug. Later model mines use a coil spring instead of a belleville spring. The fuze retainer spring holds the booster and fuze in the primary fuze well when the arming plug is installed. Fuze M603 (see par. 32) is used for primary fuzing. An activator, M1 (see par. 35), used with a firing device (see par. 46), is used for secondary fuzing when the mine is employed as an antipersonnel mine.



ORD D780

Figure 72. Mine, chemical agent, VX, M23.

Mine, chemical agent, VX, M23 is packed and shipped three to a packing container (fig. 74).

(1) *Mine.*

Model number — M23.
 Type — bursting.
 Weight (unfuzed) — 22-3/4 pounds.
 Weight of filling — 10-1/2 pounds.
 Dimensions — height, 5 inches; diameter, 13 inches.
 Material — steel.
 Primary fuze well — located in center of mine top.
 Secondary (boobytrapping) fuze wells: Two fuze wells, one located in side and one in the bottom; covered with plastic caps.
 Type of secondary (boobytrapping) — fuze for which threaded; firing device M1A1, M2, M3, or M5 and activator M1.
 Booster — M120 in bottom of main fuze well.
 Painting — gray.
 Marking — green with three 1/2-

inch green bands and one 1/4-inch yellow band.
 Capacity — 1-3/4 gallons.

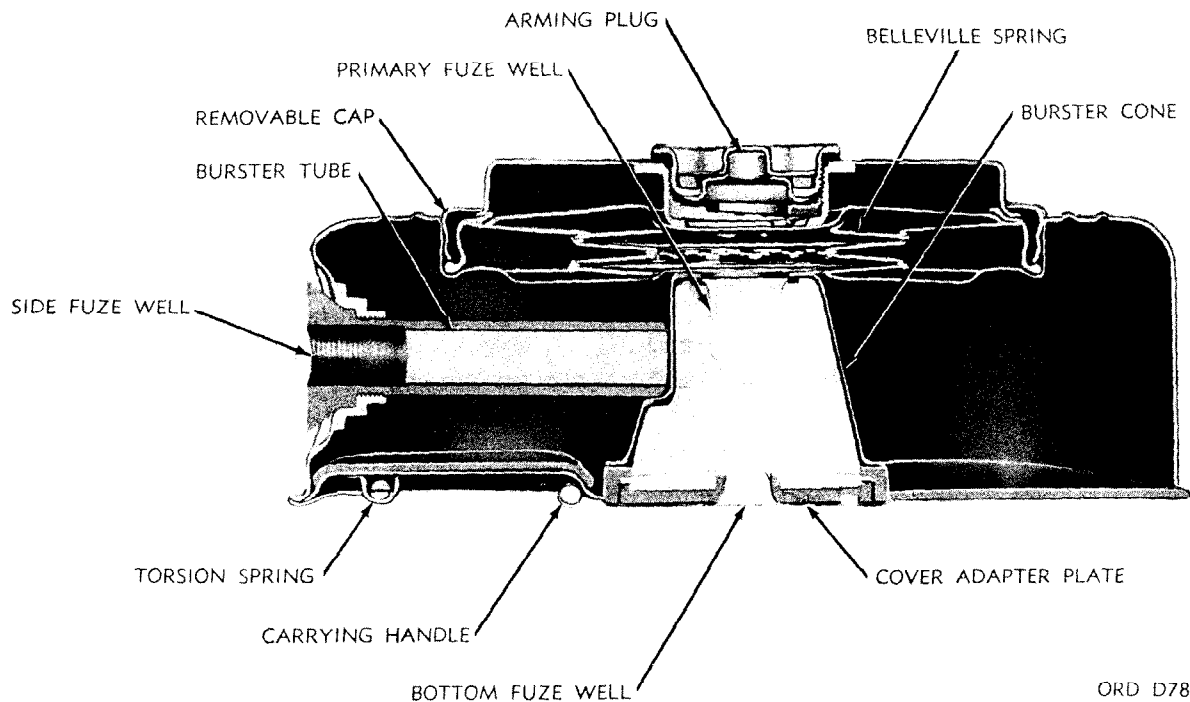
(2) *Fuze (par. 32).*

Model number — M603.
 Type — mechanical, belleville spring or coil spring.
 Weight — 1.56 ounces.
 Weight of explosive (primer mixture, lead ozide, and RDX) — 7 grain (approx.).
 Dimensions — height, 1.17 inches; diameter, 1.125 inches.
 Material — steel.
 Safeties — safety fork (clip).
 Painting — uncolored.
 Marking — nomenclature stamped in metal.

(3) *Fuze (secondary) (boobytrapping).*

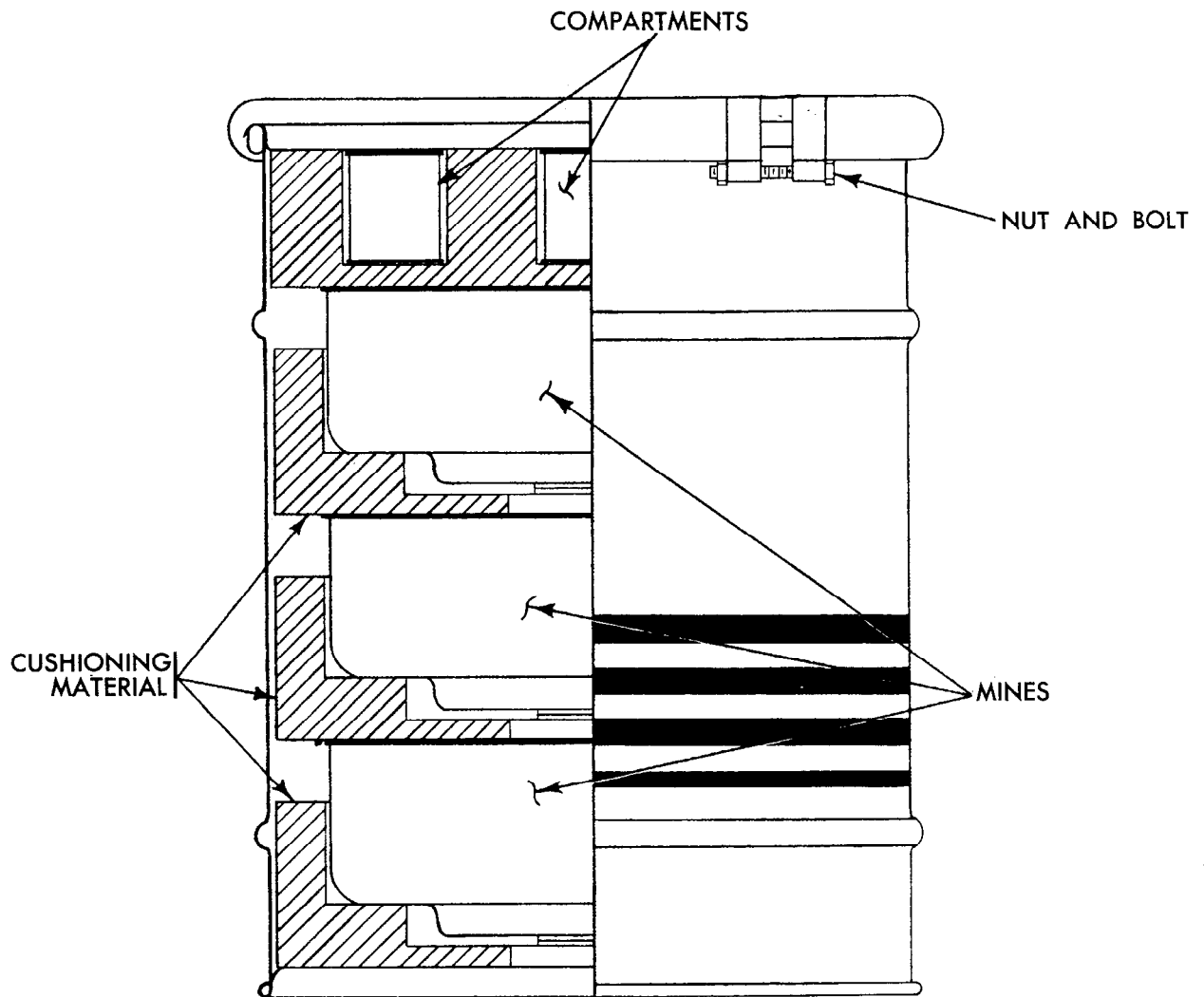
Firing device:

Delay type, M1.
 Pull-friction type, M2.
 Pull-release type, M3.
 Pressure type, M1A1.
 Pressure-release type, M5.



ORD D781

Figure 73. Mine, chemical agent, VX, M23—cross section.



ORD D782

Figure 74. Packing for mine, chemical agent, VX, M23.

c. Functioning. For functioning refer to antitank mine M15 (par. 31).

d. Laying and Arming. For laying and arming of the chemical mine M23 see antitank mine M15 (par. 31).

Warning: A protective mask and protective clothing must be worn when preparing and laying of chemical land mines.

e. Boobytrapping. Boobytrapping of the mine M23 requires activator M1 (par. 35) and a firing device (par. 46) with trip wires. Refer to paragraph 31 for boobytrapping procedures.

f. Disarming and Removal.

Warning: A protective mask and pro-

TECTIVE clothing must be worn when disarming and removing chemical land mines.

For disarming and removal procedures see paragraph 31.

g. Effectiveness. The effective burst radius for the mine buried under 3 to 5 inches of earth is about 4 meters. By bursting in the ground, the liquid contaminant mixes thoroughly with the dirt cover. A burst from the buried position thus gives a more lasting contamination than one from a mine placed on the surface of the ground. The liquid contamination density is high at the point of burst and decreased rapidly as the distance from the burst point increases.

CHAPTER 5

RELATED ITEMS

45. General

The land mine fuzes and components described in chapters 2, 3, and 4 all belong to Federal Supply Classification (FSC) class 1345. There are also a number of other items belonging to other FSC classes, which are used in conjunction with, or in lieu of, the land mines, fuzes, and components described in chapters 2, 3, and 4. These other materials belong principally to FSC classes 1375, demolition materials, and 1370, pyrotechnics, and are described in paragraph 46 through 49.

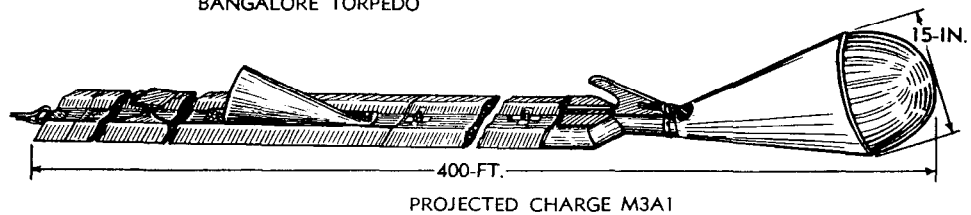
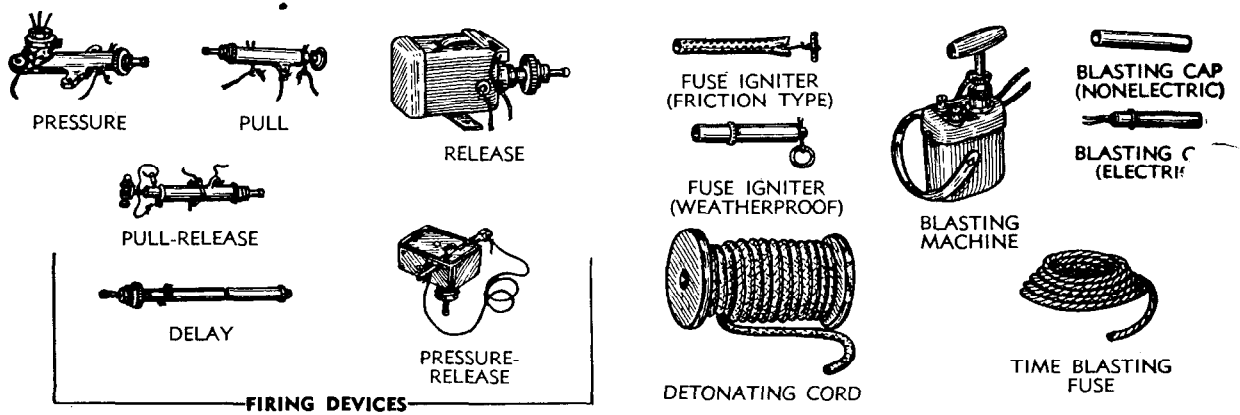
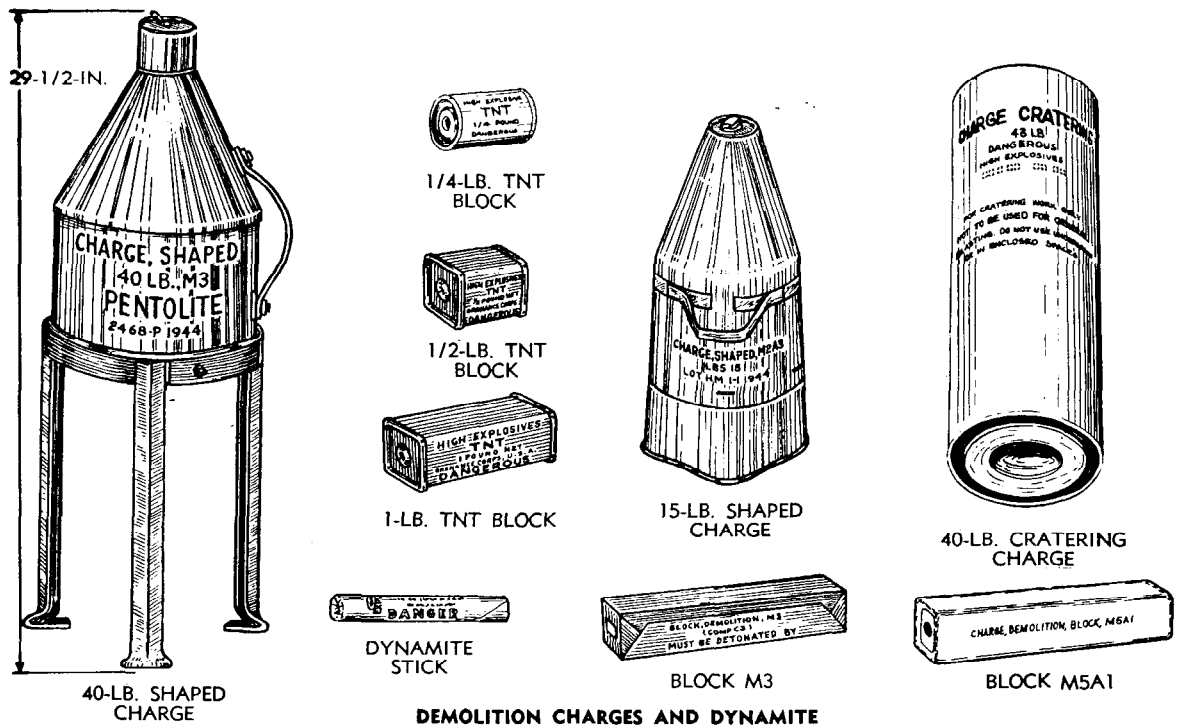
46. Demolition Materials

a. General. The term "demolition materials" refers to a variety of explosive charges of different sizes and shapes, explosive-initiating devices designed for use with such charges, explosive and nonexplosive mechanical devices, and apparatus such as instruments, tools, and equipment used with charges for performing various military demolition functions. Representative demolition materials are shown in figure 75. All of these materials belong to FSC class 1375. Most demolition materials can be used in one way or another in land mine operations; however, in this paragraph, only demolition charges which may be substituted for land mines under special conditions, and firing devices which are used for secondary fuzing and boobytrapping, will be discussed. Detailed descriptions of demolition materials and instructions for use may be found in TM 9-1375-200 and a complete list of all demolition materials available may be found in SM 9-5-1375. For more detailed information on the field use of demolition materials, see FM 5-25. Antipersonnel and antitank mine carrying devices also belong to FSC class 1375. These devices are described in paragraphs 49 and 50.

b. Demolition Charges. The various types of demolition charges available are

shown in the upper portion of figure 75. As a field expedient, any of these explosive charges may be used as land mines. The assembled fuze, consisting of a firing device with a blasting cap attached thereto, is screwed into the fuze well of the demolition charge. For plastic demolition charges, which have no fuze well, the blasting cap is inserted into the mass of plastic explosive. The fuzed demolition charge is then set into place and set initiating action as in an ordinary land mine. Demolition devices containing explosive charges weighing from 1/4 of a pound to 40 pounds are available. The blast effect of a particular land mine can be approximated by assembling demolition charges with weights equal to the explosive weights of the land mine.

c. Firing Devices. A firing device is a mechanism used to initiate a train of fire for detonation of demolition charges, boobytraps, or mines, usually but not necessarily, as part of a nonelectric system. A firing device is a separate item of issue and must be requisitioned separately from land mines or demolition charges which are used for making improvised land mines. Firing devices are of two general shapes, tubular and box (fig. 76). The tubular types of firing devices consist of a head, a case, which contains a firing pin, and a base coupling which contains a primer. They are arranged for actuation by pressure, pull or release of pull according to the design of the particular model (fig. 76). The box-type firing devices, consisting of a rectangular steel body and base coupling, operate by the pressure release method. The base coupling fitted to all types contains a percussion primer. All firing devices are physically interchangeable, as base couplings have the same thread (9/16 of an inch) for attachment to mines or explosive charges. The base coupling of the pull-type and the delay-type (which is seldom used with land mines) firing devices are not removable.



OBSTACLE AND MINE FIELD CLEARING DEVICES

ORD D312

Figure 76. Representative types of demolition materials.

The base coupling on all other types of firing devices are removable. The various initiating actions for firing devices are shown in figure 76. When firing devices are used with demolition charges, a blasting cap is crimped to the end of the firing device. When a firing device is used as a secondary fuze for boobytrapping of heavy antitank mines, a blasting cap is not used. The base coupling of the firing device is screwed directly into an activator which is in turn screwed into a secondary fuze well of the mine. When used with antipersonnel mine M3 or light antitank mines a blasting cap is used with the firing device. Inert firing devices which contain an inert percussion primer are provided for training. Inert firing devices used for training purposes are to be employed in exactly the same manner and with the care and precautions as the explosive items comprising the firing devices simulated. Hence, it is essential that personnel in training be fully conversed with all procedures and instructions given in TM 9-1375-200 pertaining thereto.

47. Pyrotechnics

a. *General.* Pyrotechnics are items of ammunition used in military operations for producing light for illumination, smokes or lights for signalling or sound to simulate battle noises and effects. The pyrotechnic items described in this paragraph are trip flares and boobytrap simulators. Trip flares can be used as land mines to be initiated by enemy troops to provide a warning of approach. Boobytrap simulators can be used for training in the techniques of boobytrapping mines. These devices are described in *b* and *c* below. For detailed information on these pyrotechnic items see TM 9-1370-200.

b. Trip Flares.

- (1) *Flare, surface, trip, parachute, M48.* This flare (fig. 77) is used primarily to give warning of enemy marauders or infiltrating hostile troops and for illumination of such troops. The flare burns with a white or yellowish light. It is in effect a one shot mortar, fired by a trip wire, which projects an illumi-

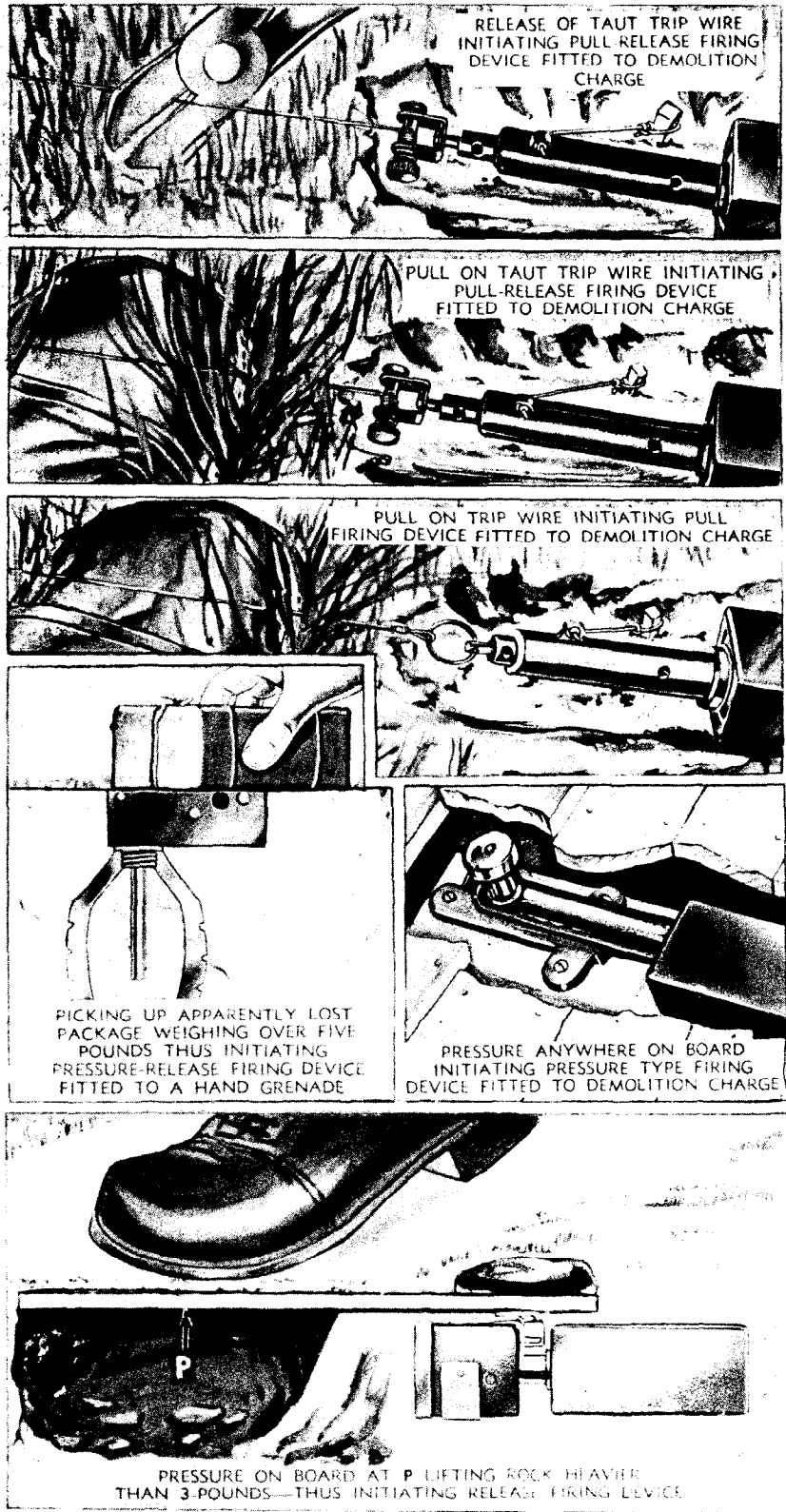
nating projectile into the air. The projectile consists of an illuminant charge and a parachute in a flare case which is projected vertically to an altitude of 80 to 130 meters where the parachute supported candle is lighted and expelled from the flare case. It effectively illuminates exposed objects on the ground to a distance of approximately 300 meters, depending upon the character of the terrain. The flare resembles, and functions in a manner similar to, the M2 series antipersonnel mines described in paragraph 14. For a detailed description of and instructions for use, see TM 9-1370-200.

- (2) *Flare, surface, trip, M49.* This trip flare (fig. 78) resembles a chemical hand grenade in size and shape, except that it is provided with brackets for attachment to a tree or post, and a trigger mechanism for firing. It is intended for the same purposes as the parachute trip flare M48 (see (1) above). The flare burns with a yellowish light and illuminates an area up to approximately 300 meter radius, depending upon the character of the terrain. The trip fuze M12 is similar to fuzes used for cylindrical hand grenades, but acts without delay when released.

c. *Simulators, Boobytrap, Flash, M117.* This flash simulator consists of a cylindrical body with a flat metal nailing bracket protruding from one end. It is for use during maneuvers and in troops training where there is need for a small pyrotechnic device which can be installed as a safe boobytrap. It functions with a loud report and flash when a victim unwittingly trips it. This device is intended to provide training in the installation and uses of boobytraps as well as instill caution in troops who may become exposed to traps set by an enemy. For detailed description and instructions in its use see TM 9-1370-200.

48. Antipersonnel Mine Clearing Devices

a. *General.* Antipersonnel-mine clear-



ORD D336A

Figure 76. Representative methods of using firing devices in boobytrap installations.

ing devices are called projected charge demolition kits (figs. 74 and 75). A kit such as the cable, detonating, antipersonnel-mine-clearing M1, consists of a flexible linear explosive charge and the apparatus for projecting it. This kit is used primarily to clear narrow lanes in enemy antipersonnel minefields. The explosive charge of the mine-clearing device consists of a special detonating cable which is projected from a launcher, across the minefield, by a jet propulsion unit. The cable is then exploded by a delay detonator.

b. Description. The major components of the antipersonnel mine clearing device M1E1 are: a storage and carrying case, a 170-foot length of detonating cable, a propulsion unit, a launcher unit, and the firing equipment. The cylindrical aluminum storage and carrying case (fig. 81), which is 16-1/2 inches in diameter, 20 inches long, and weighs 92 pounds, contains and houses the remaining major components. The explosive charge consists of 19 strands of nylon-covered detonating cord, each containing 100 grams of oil-soaked PETN per foot. The total weight of the explosive material (PETN) is approximately 46 pounds. The launcher unit consists of a folding stand constructed of aluminum angles with two connected legs. The propulsion unit (assembly) consists of a rocket unit, a length of wire rope attached to the front end of the detonating cable, a length of time fuse, and two weatherproof fuze lighters M2. A 15-second delay detonator is used to detonate the detonating cable. An oak tent stake, used to anchor one end of the detonating cable, is also included in the carrying case. Simulated cables of 1/2-inch wire rope, 1-1/8-inch sisal rope, or inert loaded cables, with live propulsion units, live fuze lighters, and live 15-second delay detonators, may be used for training. For further information refer to TM 9-1375-200.

49. Antitank Mine Clearing Devices

a. General. Antitank mine and obstacle clearing devices are issued as kits containing all materials necessary for assembly. The completely assembled devices

(fig. 75), called "demolition snakes," "projected charges," or "bangalore torpedoes." The projected charge is used principally to breach antitank minefields, but it can also be used to breach bands of log posts, steel rails, antitank ditches, or small concrete obstacles. The bangalore torpedo is used primarily to breach areas of obstacles listed above. The demolition snake M3A1 consists of sections made up of two parallel linear explosive charges encased in corrugated metal plates bolted together to form a rigid assembly which can be towed or pushed by a light or medium tank (fig. 82). This demolition snake is exploded by action of a bullet-impact fuze that is actuated by fire from a machine gun mounted on a tank.

b. Description.

(1) *Projected charge M3A1.* An assembled projected charge (fig. 82) consists of two parallel, linear, corrugated-aluminum or steel plates bolted together to form a rigid assembly. It is flexible in the vertical plane to permit it to pass over rough ground and rigid enough in the horizontal plane to maintain a relatively true course when being pushed. The assembled projected charge, shown in a cross-section in figure 83, is 14 inches wide, 5 inches high, and 400 feet long. Projected charges fabricated from steel plates weigh 12,500 to 15,000 pounds; those fabricated from aluminum plates weigh 9,000 pounds. Each may contain as much as 4,500 pounds of explosives. For information on tactical uses of projected charges and their effects on minefields and other obstacles, see FM 5-25, TM 5-220 and FM 20-32. For a detailed description of the available antitank projected charges and instructions for use, see TM 9-1375-200.

(2) *Torpedo, bangalore M1A1.* This demolition device (fig. 75), which is made up of 5-foot lengths of high-explosive-filled steel tubes with connecting sleeves, may be

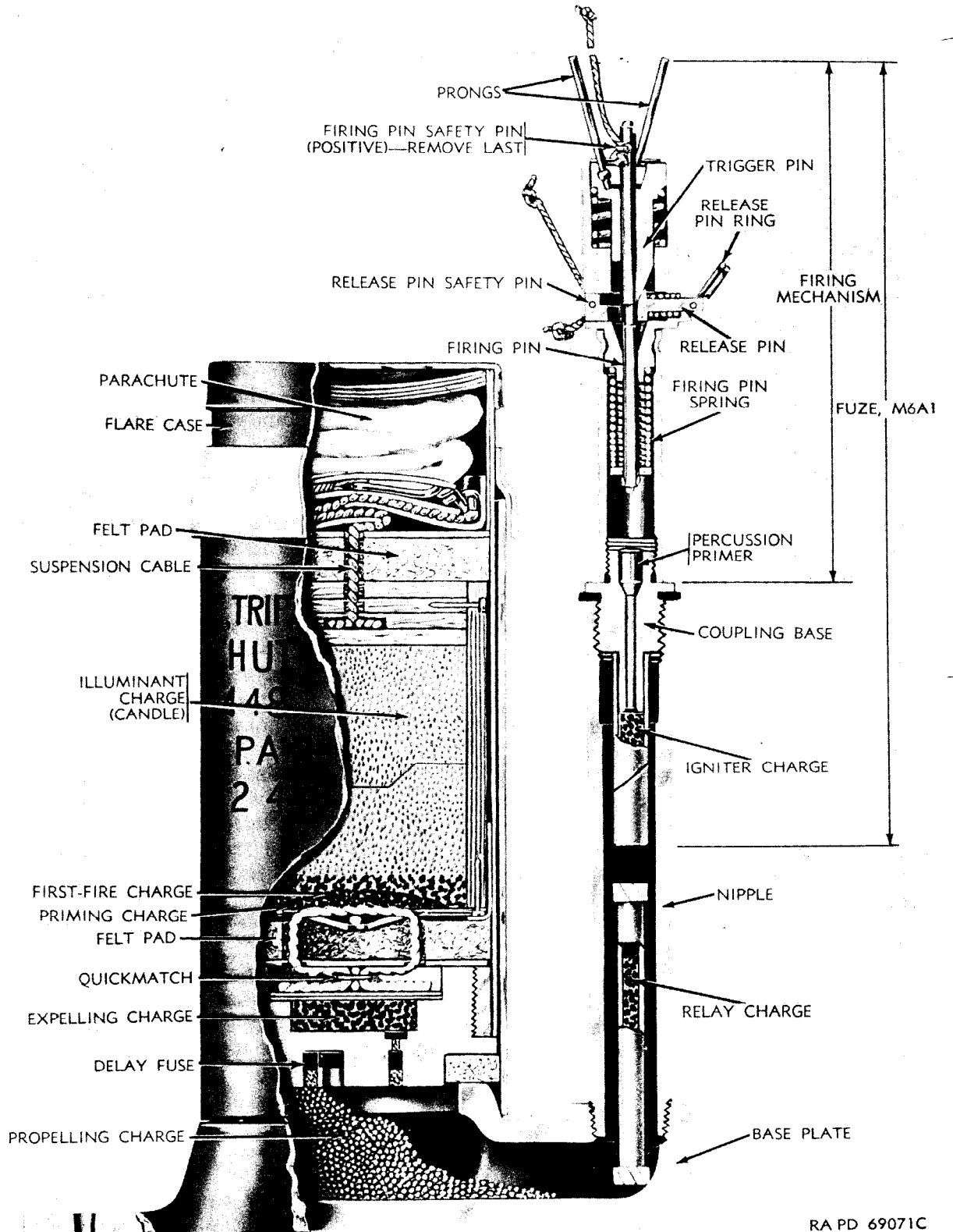


Figure 77. Flare, surface, trip, parachute, M48.

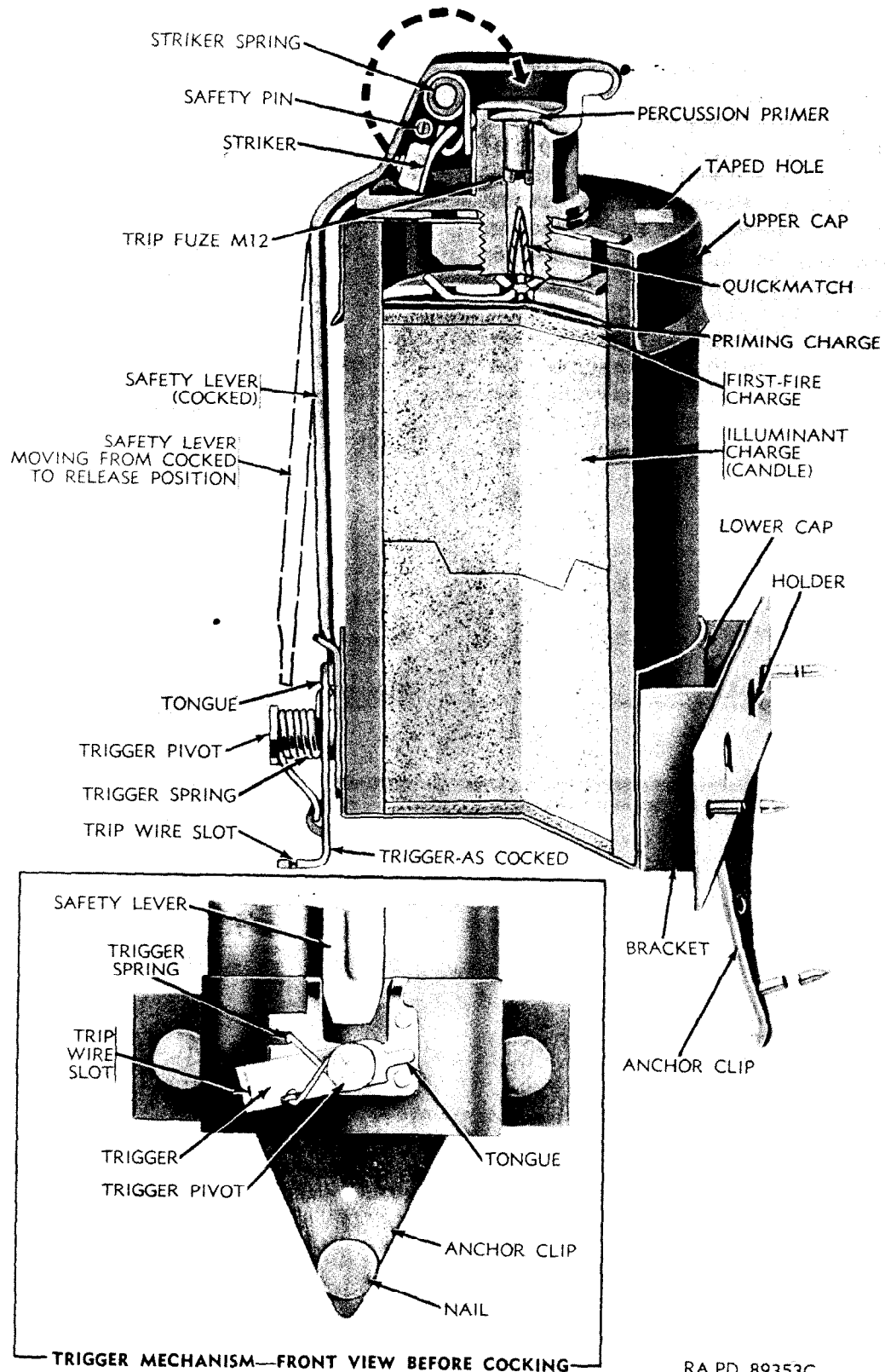


Figure 78. Flare, surface, trip, M49.

used for blasting a path through an antipersonnel minefield, wire entanglements or other obstructions. The individual tubes, called "loading assemblies", may also be used as explosive charges in the demolition snake (par. 1). The complete item of issue consists of 10 loaded assemblies, 10 connecting sleeves, and 1 nose sleeve. Each loading assembly (5 feet long by 2-1/8 inches in diameter) is filled with amatol, with about 4-inches of TNT at each end. Total weight of explosive in each loaded assembly is about 9 pounds. Each end of the tube contains a threaded well to accommodate a firing device with

crimped-on nonelectric blasting cap or a delay detonator. Six turns of detonating cord wrapped around one end of a loading assembly, to which is connected an 8-15 second delay detonator, may be used as a firing device. Detonation of one loading assembly will result in detonation of the entire series if properly connected. The connecting sleeve is a short tube into which the ends of the loading assemblies fit and are held by spring clips. The nose sleeve, located at the end of a loading assembly, has a round point for ease in pushing the torpedo past or through obstacles.

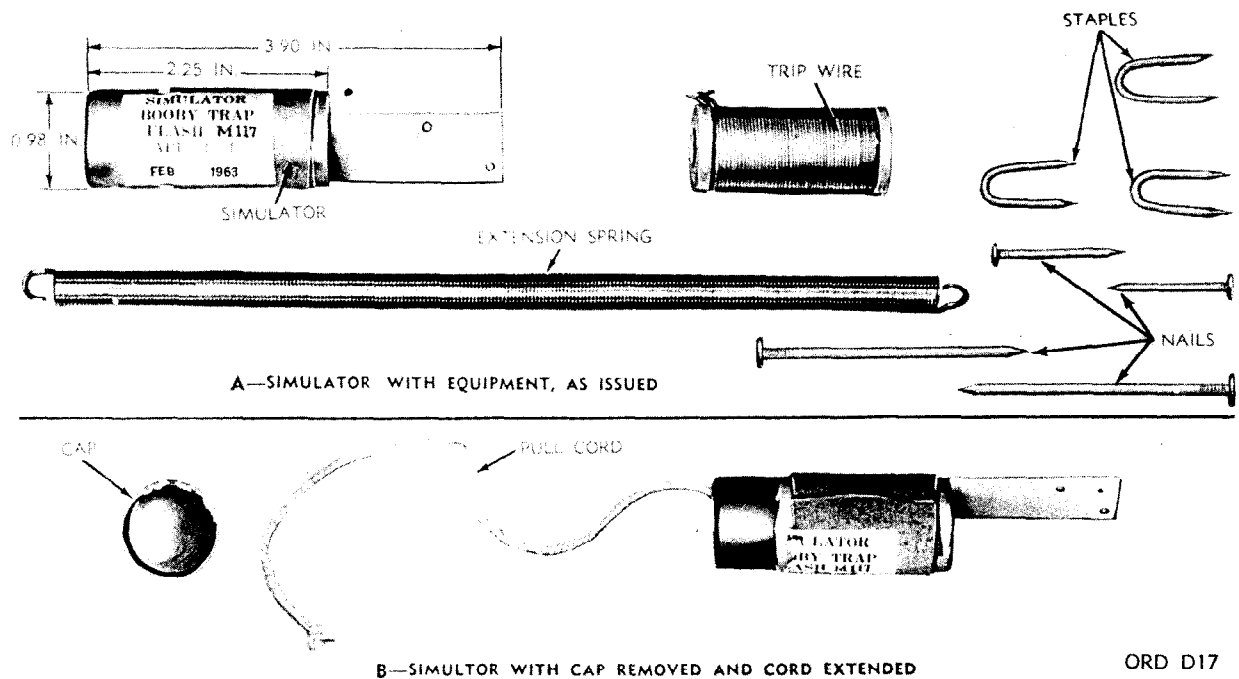
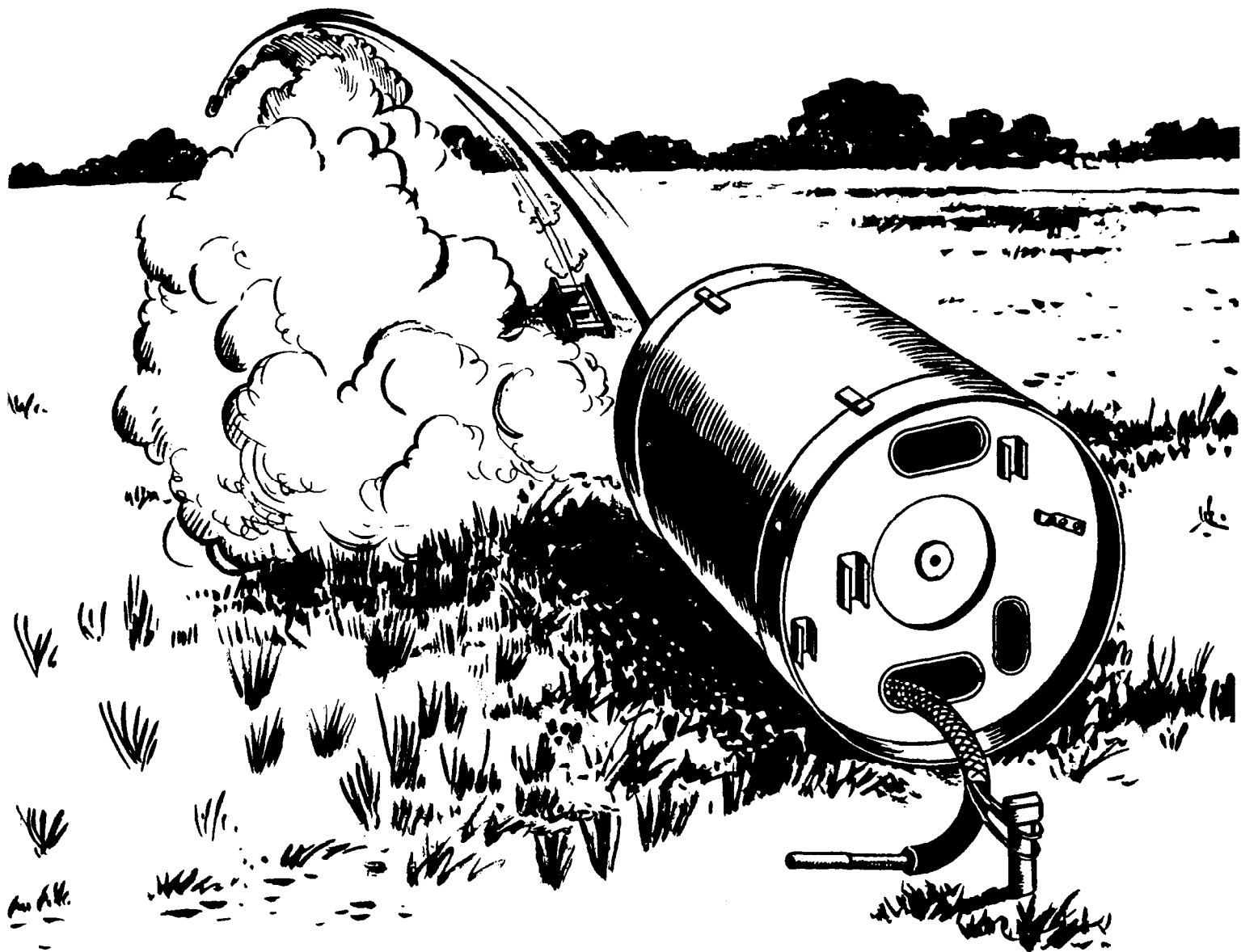


Figure 79. Simulator, Boobytrap, Flash, M117.



RA PD 131039

Figure 80. Antipersonnel mine clearing device laying detonating cable across mine field.

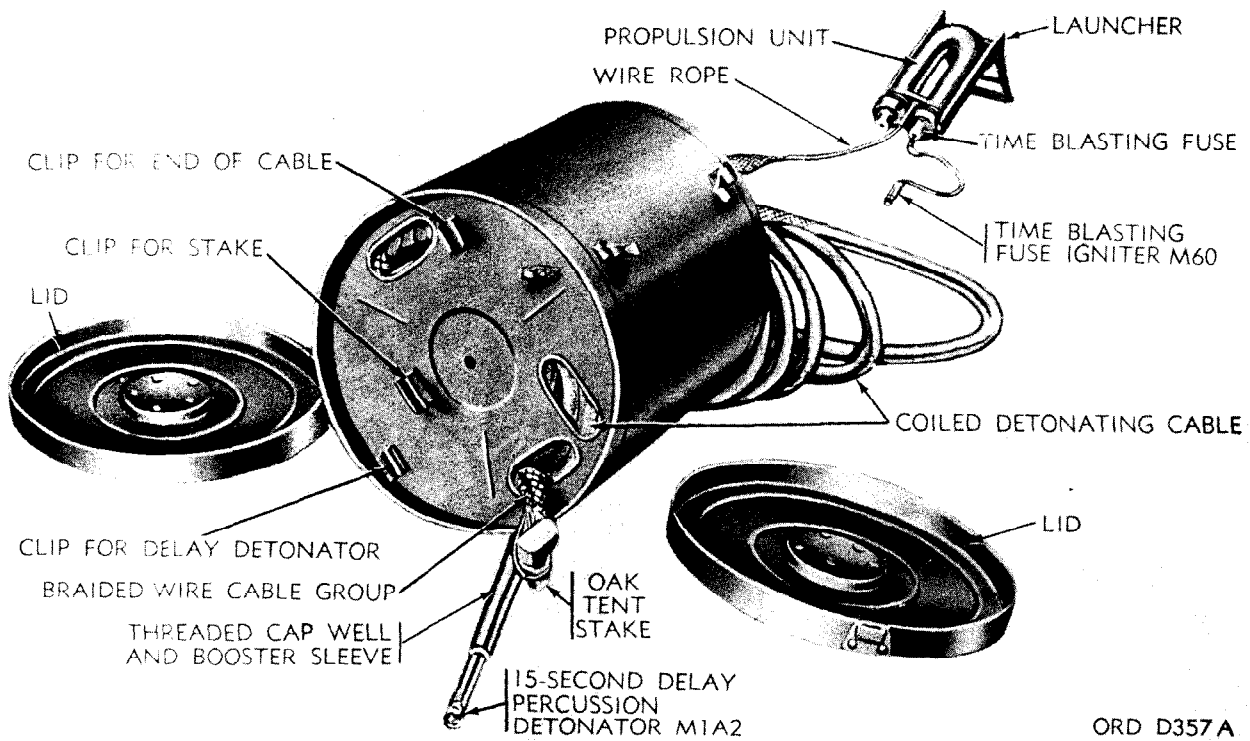


Figure 81. Projected charge demolition kit M1E1 emplaced for firing.

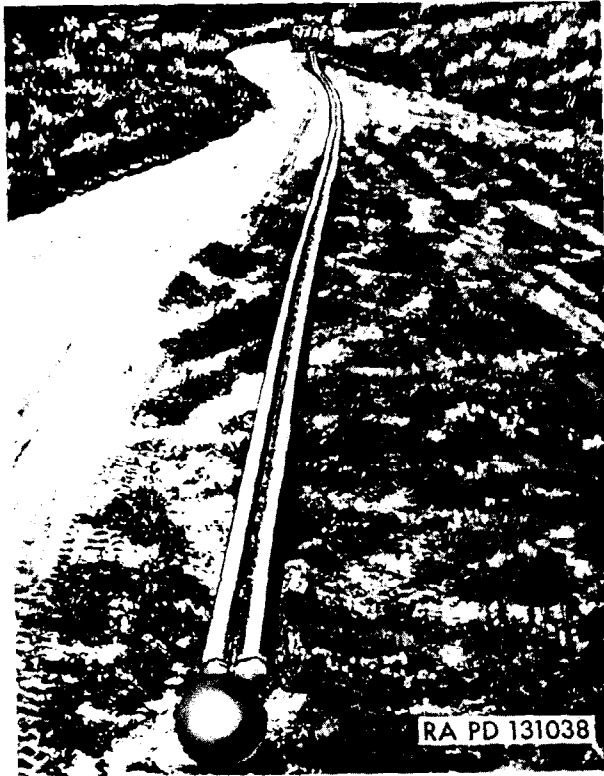


Figure 82. Antitank mine clearing device being pushed into position by medium tank.

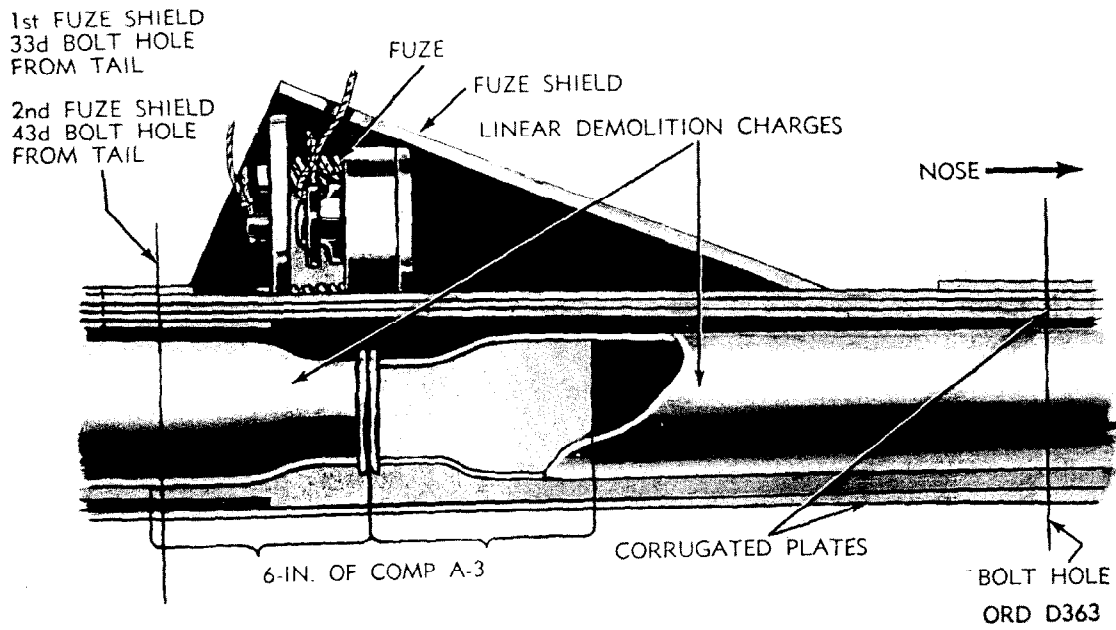


Figure 83. Longitudinal section of projected charge M3A1 at fuze.

APPENDIX I

REFERENCES

1. Publication Indexes

The following indexes should be consulted frequently for latest changes or revision of references given in this appendix and for new publications relating to material covered in this technical manual.

Indexes of Army Motion Pictures, Film Strips, Slides, and Phono-Recordings.	DA Pam 108-1	safety
Military Publications:		
Index of Administrative Publications	DA Pam 310-1	
Index of Blank Forms	DA Pam 310-2	y de-
Index of Doctrinal, Training, and Organizational Publications	DA Pam 310-3	The
Index of Graphic Training Aids and Devices	DA Pam 310-5	ence,
Index of Supply Manuals; Ordnance Corps	DA Pam 310-29	y for
Index of Technical Manuals, Technical Bulletins, Supply Bulletins, Supply Manuals (types 4, 6, 7, 8, and 9) Lubrication Orders, and Modification Work Orders.	DA Pam 310-4	use.
Index of Ordnance Publications (Navy)	OPO	oked igh-

2. Supply Manuals

Ammunition and Explosives: Class 1305 -- Ammunition, through 30-Millimeter.	SM 9-5-1305	aps, ems tem with ves
Ammunition and Explosives: Land Mines	SM 9-5-1345	
Ammunition and Explosives: Military Pyrotechnics, All Types	SM 9-5-1370	
Ammunition and Explosives: Solid Propellants, and Explosive Devices.	SM 9-5-1375	ked ive
Stock List of All Items, Price List	SM 9-2-1	x-
Index of Graphic Training Aids and Devices	DA Pam 310-5	ete in- 1- if-

3. Forms

The following forms pertain to the material covered in this manual:

DA Form 2415, Ammunition Condition Report		ge
DD Form 6, Report of Damaged or Improper Shipment		v-
The Army Equipment Record System and Procedures *	TM 38-750	ry nd e
* For instructions on the use of DA Forms, refer to	TM 38-750	

4. Other Publications.

a. Ammunition, All Types.

Ammunition, General	TM 9-1900	r- e. c it) l y , d ed re
Ammunition: Federal Stock Number and Department of Defense Ammunition Code.	TB 9-AMM-5	
Ammunition: Restricted or Suspended	TB 9-AMM-2	
Care, Handling, Preservation, and Destruction of Ammunition.	TM 9-1300-206	
Disposal of Supplies and Equipment: Ammunition.	SR 755-140-1	
Distribution of Ammunition for Training	AR 710-1300-1	
Explosives: Responsibilities and Procedures for Explosive Ordnance Disposal.	AR 75-15	

Military Explosives	TM 9-1910
Safety: Identification of Inert Ammunition and Ammunition Components	AR 385-65
Safety: Regulations for Firing Ammunition for Training, Target Practice, and Combat	AR 385-63
Tables of Allowance: Training Allowances	TA 23-100
<i>b. Camouflage.</i>	
Camouflage, Basic Principles and Field Camouflage	FM 5-20
<i>c. Decontamination.</i>	
Decontamination	TM 3-220
Small Unit Procedures in Nuclear, Biological, and Chemical Warfare.	FM 21-40
<i>d. Destruction to Prevent Enemy Use.</i>	
Explosives and Demolitions	FM 5-25
Care, Handling, Preservation, and Destruction of Ammunition . . .	TM 9-1300-206
<i>e. General.</i>	
Army Safety Program	SR 385-10
Chemical, Biological, and Radiological Operations	FM 3-5
Chemical Corps Reference Handbook	FM 3-8
Department of Defense Ammunition Code	SB 708-100
Federal Supply Classification: Part I. Groups and Classes	SB 708-401
Ground Chemical Munitions	TM 3-300
Land Mine Warfare	FM 20-32
Logistics (General): Malfunctions Involving Ammunition and Explosives.	AR 700-1300-8
Military Chemistry and Chemical Agents	TM 3-215
Military Security: Safeguarding Defense Information	AR 380-5
Military Symbols	FM 21-30/AFR 55-3
Military Terms, Abbreviations, and Symbols:	
Authorized Abbreviations	AR 320-50
Dictionary of United States Army Terms	AR 320-5
Military Training	FM 21-5
Ordnance Ammunition Service	FM 9-5
Ordnance Corps Equipment Data Sheets	TM 9-500
Ordnance Maintenance and General Supply in the Field	FM 9-10
Ordnance Service in the Field	FM 9-1
Safety: Accident Reporting and Records	AR 385-40
Techniques of Military Instruction	FM 21-6
Ordnance Major Items and Major Combination and Pertinent Publications.	SB 9-1
Fire Report	AR 385-12
Supply and Service Installations and Activities:	
Depots — Organization and Command Relationship	AR 780-10
Expendable Property	AR 735-4
Tactics and Techniques of Chemical, Biological, and Radiological (CBR) Warfare.	FM 3-5
<i>f. Shipment and Limited Storage.</i>	
Logistics (General): Report of Damaged or Improper Shipment . .	AR 700-58
Military Traffic Management Regulations	AR 55-355
Packaging and Shipping of Materiel: Army Shipping Document . . .	TM 38-705
Transportation and Travel: Transportation by Water of Explosives and Hazardous Cargo	AR 55-228
Administration	AR 210-10

g. Training Aids.

Index of Doctrinal, Training, and Organizational Publications . . . DA Pam 310-3
Index of Graphic Training Aids and Devices DA Pam 310-5
Targets, Target Material, and Training Course Lay Outs TM 9-855
Techniques of Military Instructions FM 21-6

h. Maintenance and Repair.

Maintenance of Supplies and Equipment Spot Check Inspection AR 750-925
and Reports; Ordnance Corps Material.
Ordnance Maintenance: Materials Used for Cleaning, Pre- TM 9-247
serving, Abrading, and Cementing Ordnance Material, and
Related Materials Including Chemicals, Lubricants, Indi-
cators, and Hydraulic Fluids.

i. Shipment and Limited Storage.

General Packaging Instructions for Ordnance General Supplies TM 9-200
Issue of Supplies and Equipment Preparation, Processing, AR 725-5
and Documentation for Requisitioning, Shipping and Receiving.
Logistics (General): Report of Damaged or Improper Shipment AR 700-58
Marking and Packing of Supplies and Equipment: Marking of TB ORD 379
Supplies for Shipment.
Demolition Equipment Set, Explosive Initiating, Electric SM 9-4-4940-A09
and Nonelectric.
Demolition Equipment Set, Explosive Initiating, Nonelectric SM 9-4-4940-A10
Bureau of Explosives Pamphlets No. 6 and No. 6A,
Bureau of Explosive, 63 Vesey St.,
New York 7, N.Y.
Consolidation Freight Classification No. 22
Freight Classification Guide CTB 42

APPENDIX II

COMPLETE ROUND DATA

1. Antipersonnel Mines

Mine and fuze	Firing device
PRACTICE	
MINE, ANTIPERSONNEL: M2 (all mods) inert and fuze mine combination M2 or M2A1 inert. MINE, ANTIPERSONNEL: M2 (all mods) inert and fuze mine combination M6A1 inert.	FIRING DEVICE: M17.
MINE, ANTIPERSONNEL: M16A1 inert and fuze mine combination M605 inert. MINE, ANTIPERSONNEL, PRACTICE: M8 and fuze mine combination M10 or M10A1 practice, consists of: 1 mine body 1 antipersonnel mine cap (cover) 1 mine spotting charge 1 mine combination fuze M10 or M10A1 practice (consisting of Mechanism and 1 mine fuze primer-igniter including primed coupling base, delay element and igniter charge) 1 antipersonnel mine projectile simulator MINE, ANTIPERSONNEL, PRACTICE: NM M17 (T34) w/integral fuze.	None.
SERVICE	
MINE, ANTIPERSONNEL: M2 series and fuze mine combination M6A1.	None.
MINE, ANTIPERSONNEL: M3 and fuze mine combination M7A1 -----	FIRING DEVICE: w/nonelectric blasting cap.
MINE, ANTIPERSONNEL: M16 and M16A1 and fuze mine combination M605. MINE, ANTIPERSONNEL: M18 w/M68 and M69 Kits uses Type #2 blasting cap assy. MINE, ANTIPERSONNEL: M18A1 w/accessories used M4 blasting cap assy. MINE, ANTIPERSONNEL: NM, M14 w/integral fuze.	None.

2. Antitank Mines

Mine	Fuze	Activator	Firing device
PRACTICE			
MINE, ANTITANK: heavy, M6 empty or inert.	FUZE MINE: AT, M-600 inert.	ACTIVATOR, AT MINE: M1 inert.	FIRING DEVICE: w/inert coupling base.
MINE, ANTITANK: light M7 empty or inert.	FUZE MINE: AT, Chemical M600 or M-601.	None.	
MINE, ANTITANK: light M7A1 empty.			
MINE, ANTITANK: light, M7A2 empty or inert.	FUZE, MINE: AT, M-603 inert.		None.
MINE, ANTITANK: NM, M-19 inert.	FUZE MINE: M606 inert.	ACTIVATOR: M2.	

APPENDIX II-Continued
COMPLETE ROUND DATA-Continued

Mine	Fuze	Activator	Firing device
PRACTICE - Continued			
MINE, ANTITANK, PRACTICE: heavy M12 or M12A1	FUZE MINE: AT practice M604.	ACTIVATOR: AT, MINE M1, practice.	FIRING DEVICE: M2.
MINE, ANTITANK, PRACTICE: heavy M20 (T38). MINE, ANTITANK, PRACTICE: light, M10.			FIRING DEVICE: M3 Pull release.
MINE, ANTITANK, PRACTICE: NM M9.	FUZE, MINE: AT Chemical NM M12 practice.	None.	None.
SERVICE			
MINE, ANTITANK: HE, heavy M6A2. MINE, ANTITANK: HE, heavy M15.	FUZE, MINE: AT M-603.	ACTIVATOR: AT MINE: M1.	FIRING DEVICE: w/ primed coupling base and w/o blasting cap.
MINE, ANTITANK: HE, heavy M21.	FUZE, MINE: combination M607.	None.	None.
MINE, ANTITANK: HE, light M7 and M7A2.	FUZE, MINE: AT M-603.		FIRING DEVICE: M45.
MINE, ANTITANK: HE, NM M19 (T18).	FUZE, MINE: M606.	ACTIVATOR: M2.	None.

APPENDIX III

INDEX OF FORMER ITEM NAMES

(1) Former item name	(2) Federal item name
ACTIVATOR	ACTIVATOR, ANTITANK MINE
BOOSTER	BOOSTER, ANTITANK MINE
CAP	CAP, ANTIPERSONNEL MINE
CHARGE	CHARGE, SPOTTING, MINE
COVER	COVER, ANTITANK MINE
FUZE, mine	FUZE, MINE
IGNITER ASSEMBLY	PRIMER-IGNITER, MINE FUZE
MINE, antipersonnel	MINE, ANTIPERSONNEL
MINE, antipersonnel, practice	MINE, ANTIPERSONNEL, PRACTICE
MINE, antitank	MINE, ANTITANK
MINE, antitank, practice	MINE, ANTITANK, PRACTICE
PLUG, arming, AT mine	ARMING PLUG, ANTITANK MINE
PROJECTILE, (simulated) (tube Assy)	SIMULATOR, ANTIPERSONNEL MINE PROJECTILE
RETAINER, booster	RETAINER, ANTITANK MINE BOOSTER

INDEX

	Paragraph	Page		Paragraph	Page
Accidents, report of	3b	4	Fires	3c	4
Activator, antitank mine, M1	35b(1)	84	Hazardous conditions	3d	4
Activator, antitank mine, M2	35b(2)	84	Fuze, mine antipersonnel, service:		
Activator, antitank, practice, M1	40	96	Combination: M6A1	15	21
Ammunition Identification Code (See Dept. Defense Ident Code)			M7A1	17	23
Ammunition Lot Number	9c	11	M6O5	18	24
Antipersonnel mines: (See also Mines, antipersonnel)			Fuze, mine antipersonnel, practice:		
Fragmentation type	5c(1)	6	Combination: M7A1 inert	24	50
Blast type	5c(1)	6	M2, M2A1, or M6A1 inert	25	50
Antipersonnel mine fuze (See Mine, fuze, antipersonnel)			M6O5 inert	26	51
Antitank mines (See also Mines, antitank)			M10 or M10A	28	54
Heavy type	37	87	Fuze, mine antitank, service:		
Light type	38	91	M6O3	32	63
Antitank mine fuze (See Mine, fuze, antitank)			M6O7	33	64
			M6O6	34	71
Bandoleer, M7	20(3)	33	Fuze, mine antitank, practice:		
Boobytrapping mines	6	8	M6O4	37c,d	87,90
Boobytraps	6	8		38c,d	95,96
Care, handling and preservation	10	13	M6O3 inert	38b	91
Classification	8	11	M6O6 inert	39	96
Combination mine fuze (See Mine, fuze, antipersonnel)			Handling and preservation care (See Care, handling and preser- vation)		
Complete round data (Appendix II)	7a	8	Identification	9	11
Complete round mine (See Mine complete round)			Improvised mines	5c	6
Data card	9f	13	Lot Number, Ammunition	9c	11
Demolition charges	46b	105	Mine, antipersonnel, practice:		
Demolition materials	46	105	General	23	48
Department of Defense Identifi- cation Code	9g	13	M3 empty	24	50
Destruction of ammunition to pre- vent enemy use:	50	116	M2 inert	25	50
Methods of destruction	51	116	M16A1 inert	26	51
Electric blasting cap, M4	20(2)(c)	30	Mine, antipersonnel, service:		
Errors and omissions	4	4	General	13	16
Explosive train	7b	8	M2A4	14	18
Federal Stock Number	9g	13	M3	16	21
Field storage and preservation (See storage and preservation)			M16A1	18	24
Fires	3c	4	M18A1 w/accessories	20	29
Firing device, M57	20(2)	30	M18 w/carrying kit	21	42
Firing devices	41b,c	98,99	M14 nonmetallic	22	45
Flare, trip:			Mine, antitank, practice:		
Parachute trip surface flare, M48	47b(1)	107	General	36	85
Trip surface flare, M49	47b(2)	107	Heavy: M6 empty or inert	37b	87
Former Item Names	App. III	123	M12	37c	87
Forms and reports:			M20	37d	90
Authorized forms	3a	4	Light: M7 series empty or inert	38b	91
Accidents, field report	3b	4	M10	38c,d	95,96
			M19 inert	39	96
			Mine, antitank, service:		
			General	30	58
			M15	31	59
			M21	33	64
			M19 nonmetallic	34	71
			Mine-clearing devices:		
			Antipersonnel mine	44	102

	Paragraph	Page		Paragraph	Page
Antitank mine	45	105	Service antipersonnel mines and fuzes (table I)	13d	16
Complete round:			Service antitank mine fuze (See Fuze, antitank, service)		
Data table	7a	8	Service antitank mines, fuzes, and components (table III)	30d	58
Explosive train	7b	8	Simulator, boobytrap, flash, M117	47c	107
Mine fuze (See Fuze, mine)			Storage and preservation, field . .	10b	14
Mines, land:			Tables:		
Description	5b	4	Color Coding of Chemical Mines (table IA)	9d	12
Types	5c	6	Service antipersonnel mines and fuzes (table II)	13d	16
Model	9d	12	Practice antipersonnel mines, fuzes, and components (table III)	23d	50
Nonmetallic mine (See Mine, antipersonnel also, Mine, antitank)			Service antitank mines, fuzes, and components (table IV) . .	30d	58
Packing and marking for shipment	11	15	Practice antitank mines, fuzes, and components (table IV)	36d	85
Painting and marking	9e	12	Complete round data (appendix II)	7a	8
Phony mines	5c	6	Test set, M40	20(2)	30
Practice activator, M1 (See Activator, antitank)			Training mines (See Mine, antipersonnel, practice also Mine, antitank, practice)		
Practice mines (See also Mine, antipersonnel, practice)	23,36	48, 85	Transportation	12	15
Practice antipersonnel mine fuze (See Fuze, mine antipersonnel)			Trip flares (See Flares, trip)		
Practice antipersonnel mines, fuzes, and components (table II)	23d	50			
Practice antitank mine fuze (See Fuze, mine antitank)					
Practice antitank mines, fuzes, and components (table IV)	36d	85			
Service antipersonnel mine fuze (See Fuze, antipersonnel, service)					

By Order of Secretary of the Army:

EARLE G. WHEELER,
General, United States Army,
Chief of Staff.

Official:

J. C. LAMBERT,
Major General, United States Army,
The Adjutant General.

Distribution:

Active Army:

USASA (2)	USAARTYCDA (2)
DCSLOG (1)	USAAVNCDA (1)
CNGB (1)	USACBRCD (2)
CofEngrs (2)	USACARMSCD (2)
CofT (1)	USACECDA (1)
USCONARC (3)	USAECDA (2)
USACDC (2)	USAICDA (2)
USAWECOM (2)	USAINTCDA (1)
USAMICOM (5)	USAMPCDA (1)
USASMCOM (5)	USAOCDA (2)
USAECOM (2)	USAQMCDA (1)
ARADCOM (2)	USASWCDA (2)
ARADCOM Rgn (2)	USAOSA (2)
OS Maj Comd (2) except	PG (2) except
USAREUR (5)	Ord PG (10)
OS Base Comd (2)	Ord Arsenals (2) except
LOGCOMD (2)	Picatinny (32)
MDW (1)	Proc Dist (1) except
Armies (3) except	Chicago Proc Dist (None)
First USA (5)	Svc Colleges (2)
Corps (2)	Br Svc Sch (2)
USA Corps (2)	USA Ammo Proc & Sup Agcy (3)
Div (2)	Fld Comd, DASA (1)
Instl (2)	USA Trn Comd (2)
Svc Colleges (2)	PMS Sr Div Ord Units (1)
Br Svc Sch (2)	POE (2)
GENDEP (OS) (2)	Mil Msn (1)
Ord Sec, GENDEP (OS) (5)	MAAG (2)
Ord Dep (OS) (5)	JBUSMC (2)
Army Dep (2) except	JUSMAGG (2)
Savanna (30)	Units org under fol TOE:
Letterkenny (4)	3-500 (KA) (2)
USAADCDA (2)	5-5 (2)
USAARMCDA (2)	5-500 (2)
	9-500 (BB,FA,IA,KA,KB,KC) (2)

NG: State AG (3); Units - Same as Active Army except allowance is one copy to each unit.

USAR: None.

For explanation of abbreviations used, see AR 320-50.