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FM 23–30, Hand and Rifle Grenades; Rocket, AT, HE, 2.36-inch, is published for the information and guidance of all concerned.

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BY ORDER OF THE SECRETARY OF WAR:
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(For explanation of symbols see FM 21–6.)

CONTENTS

(This manual supersedes FM 23-30, 15 June 1942, including C 1, 4 September 1942; C 2, 10 October 1942; C 3, 17 October 1942; C 4, 19 January 1943; C 5, 11 March 1943; C 6, 20 May 1943; C 7, 28 August 1943; Training Circular No. 104, War Department, 1942; Training Circulars Nos. 10, 46, 77, 80, 82, 93, and 120, War Department, 1943.)

Attention is directed to FM 21-7, "List of Training Films, Film Strips, and Film Bulletins," for details as to how appropriate training films and film strips are intended to be used, and how they are made available for training in the use of hand and rifle grenades, and the rocket, AT, HE, 3.5-inch.

CHAPTER 1
HAND GRENADES

SECTION I
GENERAL

1. TYPES. Hand grenades are divided into the following types:

a. Fragmentation grenades, containing an explosive charge in a body designed to fragment with the action of the bursting charge.

b. Offensive grenades, containing a high explosive charge in a paper body, designed for demolition effect.

c. Chemical grenades, containing a chemical agent which produces a toxic or irritant physiological effect, a screening or signal smoke, an incendiary action, or any combination of these.

d. Practice grenades, containing a reduced charge, to simulate fragmentation grenades.

e. Training grenades, containing no explosive or chemical.

2. FILLERS. The filler is the substance contained in the body of a grenade. Fillers used are—

a. EC (explosive company) blank fire smokeless powder. This is a commercial type granulated nitrocellulose powder, generally pink or yellow in color. It is less powerful than TNT and is exploded by ignition rather than detonation. Grenades loaded with this material can be issued fuzed and ready for use and are, in general, not susceptible to mass detonation.

b. Trinitrotoluene (TNT). TNT is stable but, unlike blank fire powder, it explodes by detonation. TNT in block form is used for demolitions.

c. Chloracetophenone (CN). This is a lachrymatory (tear) gas which produces a severe burning sensation in the eyes, causing intense weeping. In one type of irritant hand grenade, CN is combined with diphenylaminechlorarsine (*d* below).

d. Diphenylaminechlorarsine (DM). DM is a gas which causes a burning sensation in the nose and throat and a heavy or tight feeling in the chest. There is also a nauseating effect, the degree of which depends on the concentration of the gas and the length of exposure.

e. Hexachlorethane-zinc mixture (HC). Upon ignition, HC mixture produces a dense white smoke which is harmless. HC smoke grenades are used by the Army Air Forces and the Armored Command for signals.

f. Sulphur trioxide-chlorsulfonic acid mixture (FS). FS is a corrosive liquid which reacts with the atmosphere, producing an effective screening smoke.

g. Hydrocyanic acid (AC). AC is a clear colorless liquid which vaporizes to a clear colorless gas upon release from the container. It is a powerful nerve poison, nonpersistent, and has an odor of bitter almonds or crushed peaches. A weak concentration causes an unpleasant taste in the mouth, dizziness, headache, and a rush of blood to the head. In strong concentrations, death is instantaneous.

h. Gasoline (thickened) (NP). NP is a thickened incendiary material composed of a mixture of napalm and gasoline. It readily adheres to smooth surfaces and effectively ignites combustible materials.

i. Gasoline (thickened) (IM). IM is a thickened incendiary material which readily adheres to smooth surfaces. It effectively ignites combustible materials.

j. Thermate (TH). TH is an incendiary material composed of thermit and other ingredients which, upon igniting, develops a temperature of 5,000° F. Grenades filled with TH are used to melt together movable metal parts, and against materials which are difficult to ignite.

k. White phosphorus (WP). Upon ignition and contact with the air, white phosphorus burns to a white smoke. Grenades filled with WP are effective agents for screening small unit operations. White phosphorus is also an incendiary; the burning particles produce casualties and have a harassing effect on the enemy.

l. Colored smoke. This is a mixture of sulphur, potassium chlorate, sodium bicarbonate, and dye to produce the desired color. Grenades filled with colored smoke are used as signals for air-ground and ground-to-ground communication.

3. COMPONENTS. ***a. Time Fuze.*** (1) FOR DEMOLITIONS AND DESTRUCTION OF DUDS. The time fuze, or safety fuze, is a cord containing a slow-burning powder train. The time fuze issued to the service is known commercially as Bickford fuze and burns at the approximate rate of 15 inches per minute. Time fuze should always be tested before using to determine its rate of burning.

(2) FOR GRENADES. The time fuze in grenade firing mechanisms is cut to burn for varying lengths of time, depending upon the type of grenade. Two fuzes are used with fragmentation grenades: M10A2, cut to burn from

4.3 to 5.5 seconds; M10A3, cut to burn from 4.0 to 4.8 seconds. The M10A2 is commonly referred to as the 4½-second fuze; the M10A3 as the 4-second fuze. Fuzes used with chemical grenades are cut to burn for 2 seconds.

b. Detonators. A detonator is a metal capsule filled with a detonating explosive such as fulminate of mercury. Commercial detonators come in ten sizes, numbered 1 to 10. The higher numbered sizes are larger and contain increasing amounts of the denonating mixture. Nos. 6 and 8 are the ones used in grenades. Detonators are sensitive to heat, shock, and friction and should be handled carefully at all times.

c. Fuzes. The fuze is the mechanism that fires the grenade. Fuzes are described in detail and their functioning explained in TM 9–1985. All hand grenade fuzes are time and automatic. Time means that the grenade is fired after a certain lapse of time and not on percussion. Automatic means that the fuze begins to function automatically as it leaves the hand, providing the safety cotter pin has been removed, thus providing a safety factor by eliminating the necessity of starting the action of the mechanism before the grenade is on its way. As to the final action, fuzes may be classified as detonating or igniting.

(1) DETONATING FUZES. Detonating fuzes contain a detonator. The function of the detonator is either to set off the explosive charge or to burst the container and liberate the filler.

(2) IGNITING FUZES. Igniting fuzes contain a small quantity of black powder or a powder pellet that ignites the filler as though a lighted match were applied.

(3) IGNITER M3. The igniter M3 is used with the frangible grenade M1 (see par. 4***a*** (5)).

4. CHARACTERISTICS. ***a.*** The essential characteristics of hand grenades are as follows:

(1) FRAGMENTATION HAND GRENADE MK. II (figs. 1 and 2). The body of this grenade is made of cast iron and is about the size of a large lemon. The outside surface is deeply serrated horizontally and vertically to assist in forming uniform fragments when the grenade explodes. The bursting charge is 0.74 ounce of EC blank fire powder, and the grenade is fuzed with either the M10A2 igniting fuze with a 4½-second delay or the M10A3 igniting fuze with a 4-second delay. Fragments may fly over 200 yards.

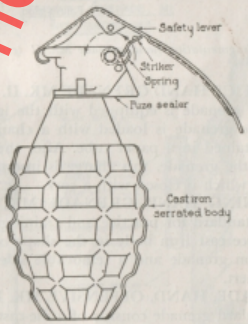


Figure 1. Fragmentation hand grenade Mk. II.

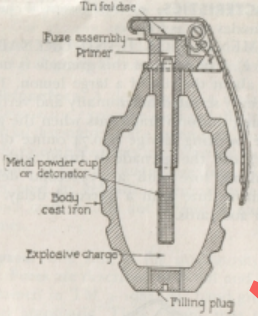


Figure 2. Fragmentation hand grenade Mk. II (cross section).

(2) PRACTICE HAND GRENADE MK. II. This standard practice grenade is equipped with the igniting fuze M10A1. The grenade is loaded with a charge of black powder contained in a paper tube. After the fuze is assembled in the grenade, this charge is inserted into the filling hole, which is closed with a cork.

(3) TRAINING HAND GRENADE MK. 1A1. This grenade is standard for practice and training. It consists of a one-piece cast iron body in the shape of the fuzed fragmentation grenade and a removable safety pin and ring. It is inert.

(4) GRENADE, HAND, OFFENSIVE MK. IIIA1. This limited standard grenade consists of a die-cast top which is threaded to receive the fuze, detonating, hand grenade M6A2, and a body of laminated cartridge paper which contains the high-explosive charge. This grenade is for

demolition. It may be used in the open more safely than the fragmentation grenade because there is no marked fragmentation. Grenade bodies and fuzes are shipped separately.

(5) FRANGIBLE GRENADE M1 (fig. 3). (*a*) This grenade is a common glass pint bottle equipped with a crimped metal cap and filled with the following chemical fillers: FS, AC, NP, and TM. No bursting charge is provided. Dispersal of contents is produced when the bottle is shattered by impact.

(*b*) When the frangible grenade M1 is filled with incendiary filler NP or TM, it is equipped with the M3 igniter (par. 2c (5)). This igniter consists of an igniter fuze

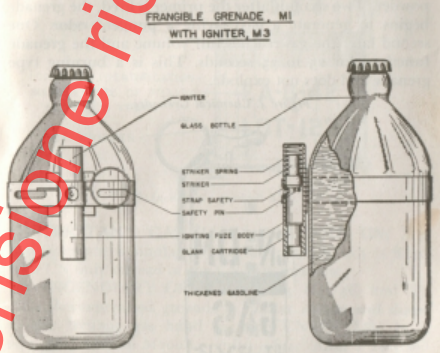


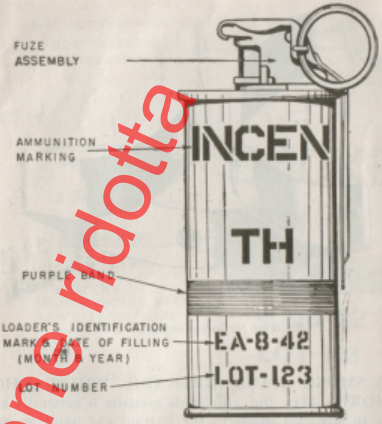
Figure 3. Frangible grenade M1, with igniter M3. (Safety pin ring may be either to the right or the left.)

body, a striker, and a blank cartridge, and is fastened around the bottle with a Timmerman strap. Before throwing, the safety pin must be removed. When thrown, the bottle breaks, releasing the strap and strap safety. This permits the striker, which is actuated by the striker spring, to ignite the blank cartridge. The flash from the blank cartridge ignites the contents of the broken bottle.

(6) IRRITANT GAS HAND GRENADE, CN-DM, M6 (fig. 4①). This grenade has a cylindrical body made of tin plate. The body contains perforations or vents which are covered with squares of adhesive tape. When the grenade functions these patches are blown or burned off and the gas escapes. The chemical filler is composed of a mixture of CN-DM and a small amount of blank fire powder. Two seconds after the primer is fired, the grenade begins to generate a gas having a pungent odor. One second later the gas reaches full volume and the grenade functions for 25 to 35 seconds. This is a burning type grenade and does not explode.

Figure 4. Chemical Grenades.

① *Irritant gas hand grenade CN-DM M6.*



③ *Incendiary grenade M14.*

(7) IRRITANT GAS HAND GRENADE, CN, M7. This grenade is similar to the M6 grenade but is filled with CN only instead of the CN-DM mixture.

(8) INCENDIARY GRENADE M14 (fig. 4③ and ⑧). This thermate-filled grenade is similar in size and shape to the irritant gas hand grenade CN-DM M6. It is equipped with an M200A1 igniting fuze. After a 2-second delay, the thermate ignites and burns for 30 seconds or longer. A clamp of strap metal is furnished with each grenade, into which the grenade can be placed to keep it from rolling when it ignites.

e. To throw frangible grenades (fig. 10). (1) All men must be trained in throwing frangible grenades at both stationary and moving targets. Bottles filled with water may be used as practice grenades.

(2) When the thrower is above the surface of the ground the grenade is grasped and thrown as shown in figure 10①, ②, ③, and ④. Note that the grenade is thrown with an underhand motion and allowed to roll off the finger tips so that it rotates about its longer axis. This prevents wobbling or tumbling in flight.

Figure 10. Throwing frangible grenades.

① *Grip used to throw frangible grenades.*

② *Throwing from crouching position.*

③ *Throwing from standing position. Bottle is thrown with underhand motion allowing it to roll off fingers. Throw with easy motion, not too hard.*

(3) Pyrotechnic signals equipped with the fin assembly to permit them to be fired from the launchers, as follows:

(*a*) Ground signal, white star; parachute, M17A1; cluster, M18A1.

(*b*) Ground signal, green star; parachute, M19A1; cluster, M20A1.

(*c*) Ground signal, amber star; parachute, M21A1; cluster, M22A1.

(*d*) Ground signal, red star; parachute, M51A1; cluster, M52A1.

NOTE. There is a "B2" model for each signal listed above (example, M17A1B2), which has a steel barrel instead of an aluminum one.

(4) Smoke rifle grenade (WP) T5.

b. Nomenclature. For nomenclature of antitank rifle grenades, see figure 14.

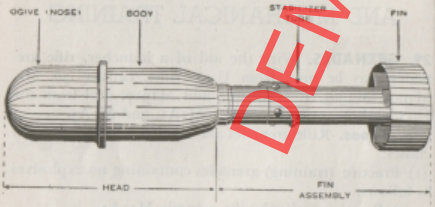


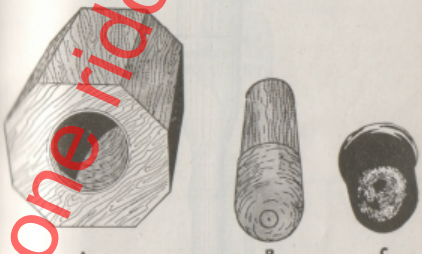
Figure 14. Nomenclature of antitank rifle grenades.

c. Characteristics. (1) PRACTICE ANTITANK RIFLE GRENADE M11A1. The design of this grenade is similar to that of the antitank rifle grenade M9A1. When damaged by repeated use the fin assembly or head may be replaced.

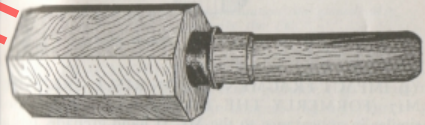
(2) PRACTICE ANTITANK RIFLE GRENADE M11A2. This inert grenade also is similar in shape and

weight to the M9A1 grenade. It is designed to permit replacement of any part damaged by repeated use, and therefore consists of four parts: a cast body, a nose (ogive), a stabilized tube, and a fin. The service life of the nose may be increased by light maintenance work consisting of restoring crimps with a small riveting hammer or pair of pliers, and removal of dents by means of a hardwood die and punch made to the exterior and interior dimensions, respectively, of the nose (fig. 15).

Figure 15. Repair of antitank rifle grenades.



Punch and die used for straightening dented nose (ogive). A — Die, B — Punch, and C — Dented nose.



Method of employing hardwood punch and die in straightening nose (ogive).

d. Prone with casual butt rest (figs. 30 and 31). In field firing, when firing from the prone position, any butt rest of which the firer may avail himself quickly (stump, vehicle rut, or other indentation in the ground) should be utilized. The right forearm is placed over the top of the butt of the rifle in order to hold it in firing position.

Figure 30. Prone position, casual butt rest (stump).

Figure 31. Prone position, casual butt rest (wheel rut).

e. From fox hole (fig. 32① and ②). In field firing, the soldier should fire from a standing type one-man fox hole. When the nature of the target permits, he should use the backwall of the fox hole as a butt rest.

41. RANGE ESTIMATION. a. General. (1) The firer must be well trained in hasty range estimation and its application to marksmanship. Because the weapon is normally employed quickly and at short ranges, the firer must estimate ranges by eye or by observation of fire.

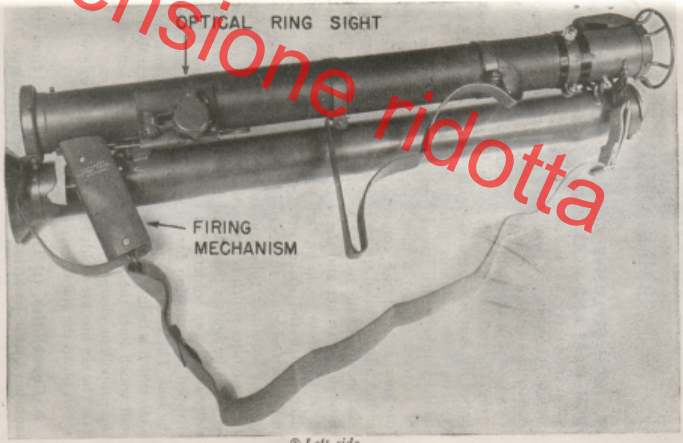
Figure 32. Firing from standing type one-man foxhole.

① *Standing position.*

② *Using backwall as butt rest.*

Figure 49. Launcher M9.

© *Right side.*



© *Left side.*

SECTION III

AMMUNITION

68. HIGH EXPLOSIVE ANTITANK ROCKETS, 2.36-INCH, M6A1 AND M6A3. *a. Description.* (1) (*a*) The rocket M6A1 (fig. 50) is 21.6 inches long and weighs 3.4 pounds. It consists of a head and a fin assembly. The head consists of an ogive (nose) and a body; the fin assembly is composed of the stabilizer tube and the fins.

(*b*) The rocket M6A3 has a rounded nose and a wheel-shaped fin, but is otherwise similar to the rocket M6A1.

(2) The body contains a high explosive charge. The stabilizer tube which screws into the body is closed at the forward end by a plug. Ahead of the plug is the fuze mechanism which consists of an inertia striker set behind a light coiled spring which is collapsed when forward motion of the rocket is stopped. A safety pin passes through the striker and the stabilizer tube and prevents the striker from going forward while the pin remains in place. When the striker does go forward it sets off a primer cap which in turn sets off the base detonator.

(3) The stabilizer tube contains the propellent charge and an igniter which is actuated electrically. The contact wires of the igniter pass through the Venturi nozzle, the short one being soldered to a fin, the long one being stripped of insulation for approximately 6 inches from the end. The end of the long contact wire is formed into a tab which is lightly taped to another fin. The cardboard wad which loses the Venturi nozzle is blown out when the propellent charge is ignited.

(4) The six fins are welded to the Venturi nozzle which screws on to the stabilizer tube.

b. Capabilities. (1) The rocket is discharged from the launcher by the jet action of the propellent charge. The

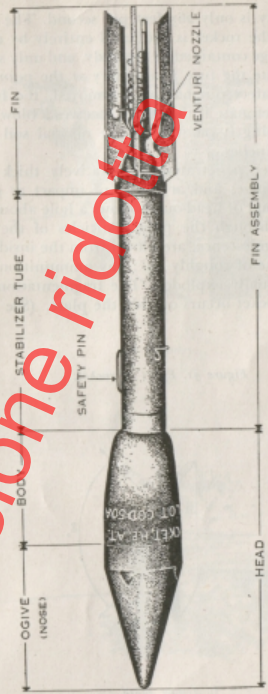


Figure 50. High explosive antitank rocket, 2.36-inch, M6A1.

ing all stages of training. All errors should be corrected immediately. The soldier must be impressed with the importance of exactness in every detail.

(4) The practice antitank rocket, 2.36-inch, M7A1 or M7A3 *only* will be used during preparatory exercises. The practice rounds are fully loaded with a propellent charge. Severe burns or injuries from the propellant or from the projectile itself may result unless extreme vigilance is maintained to insure that no batteries are in the launcher during any instruction in positions in which the loader serves the piece.

(5) For loading practice, it is advisable to make up dummy rounds from M7A1 or M7A3 rockets which have been fired and recovered.

b. Sighting and aiming (fig. 59). (1) PROPER SIGHT PICTURE. The proper sight picture for the launcher is no different from that for other weapons in that the hold is on the bottom of the target. The importance of proper sight pictures cannot be overemphasized. No sight picture can be obtained with launcher M1A1 beyond 300 yards. Elevation for ranges between 300 and 650 yards must be estimated. In all cases, the eyes should be kept in line with the sights. At all ranges, the front sight stud should be aligned midway of the peep sight as shown in figure 60.

(2) SIGHTING AND AIMING EXERCISES. (*a*) A launcher is placed on a rest and pointed at a blank sheet of paper mounted on a box which is 1,000 inches from the rest. Without touching the launcher or rest, the instructor takes a prone position and looks through the sight. He directs the marker, by command or improvised signal, to move the target until it is in correct alignment with the sight. (The target should be a small silhouette, approximately 6 inches in length with height in proportion, and forming the general outline of a tank.) He then commands: HOLD to the marker. The instructor moves

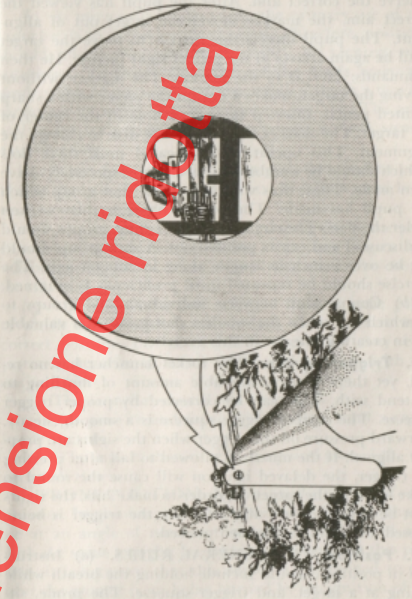


Figure 60. Proper sight picture, launcher M1A1.

INDEX