

Figure 28—D. P. 12,000-lb. and 22,000-lb. Bomb

WIRE-BARRAGE ROCKETS

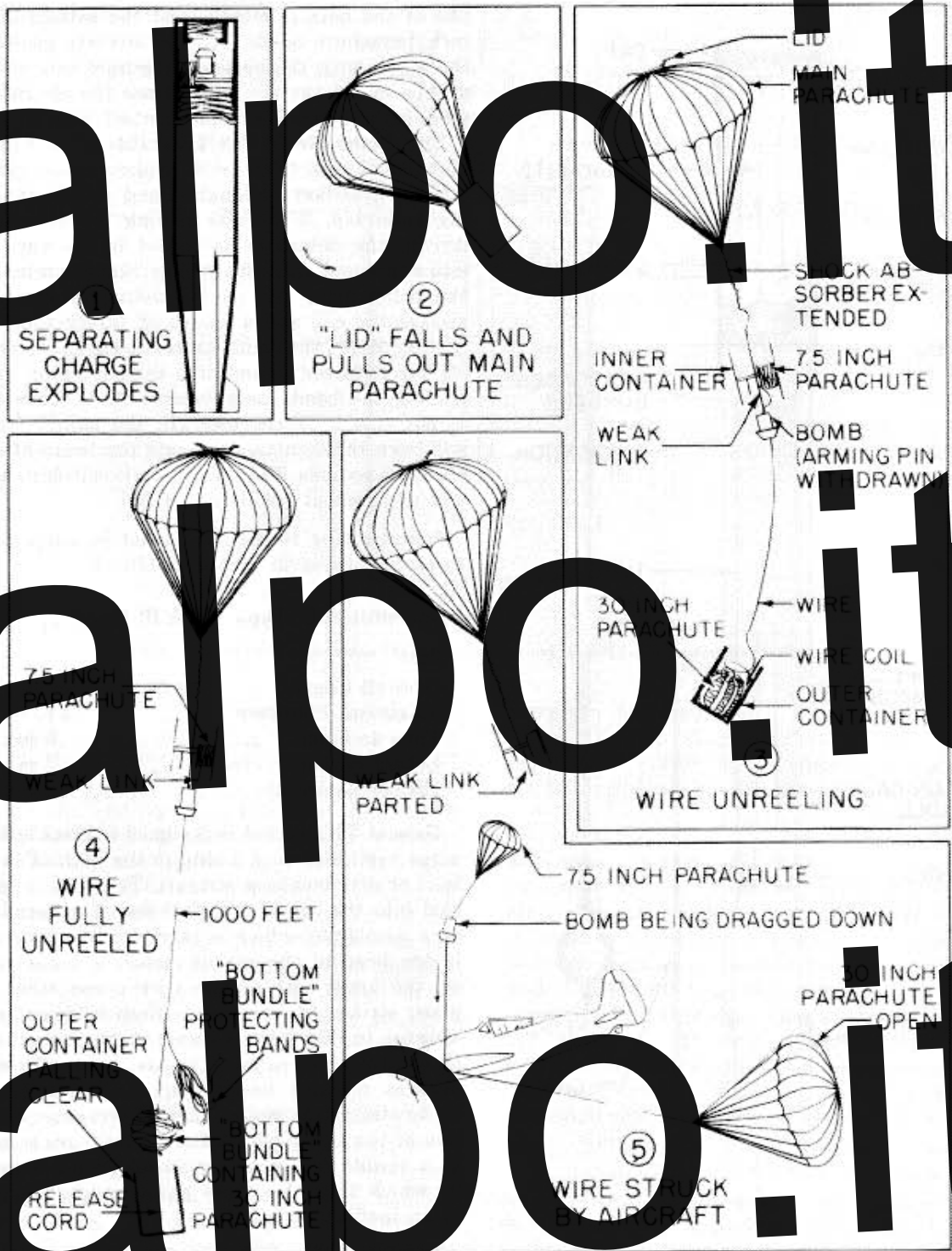


Figure 206—Operating sequence of A.A.D. Wire Barrage Rocket Type B Mk I

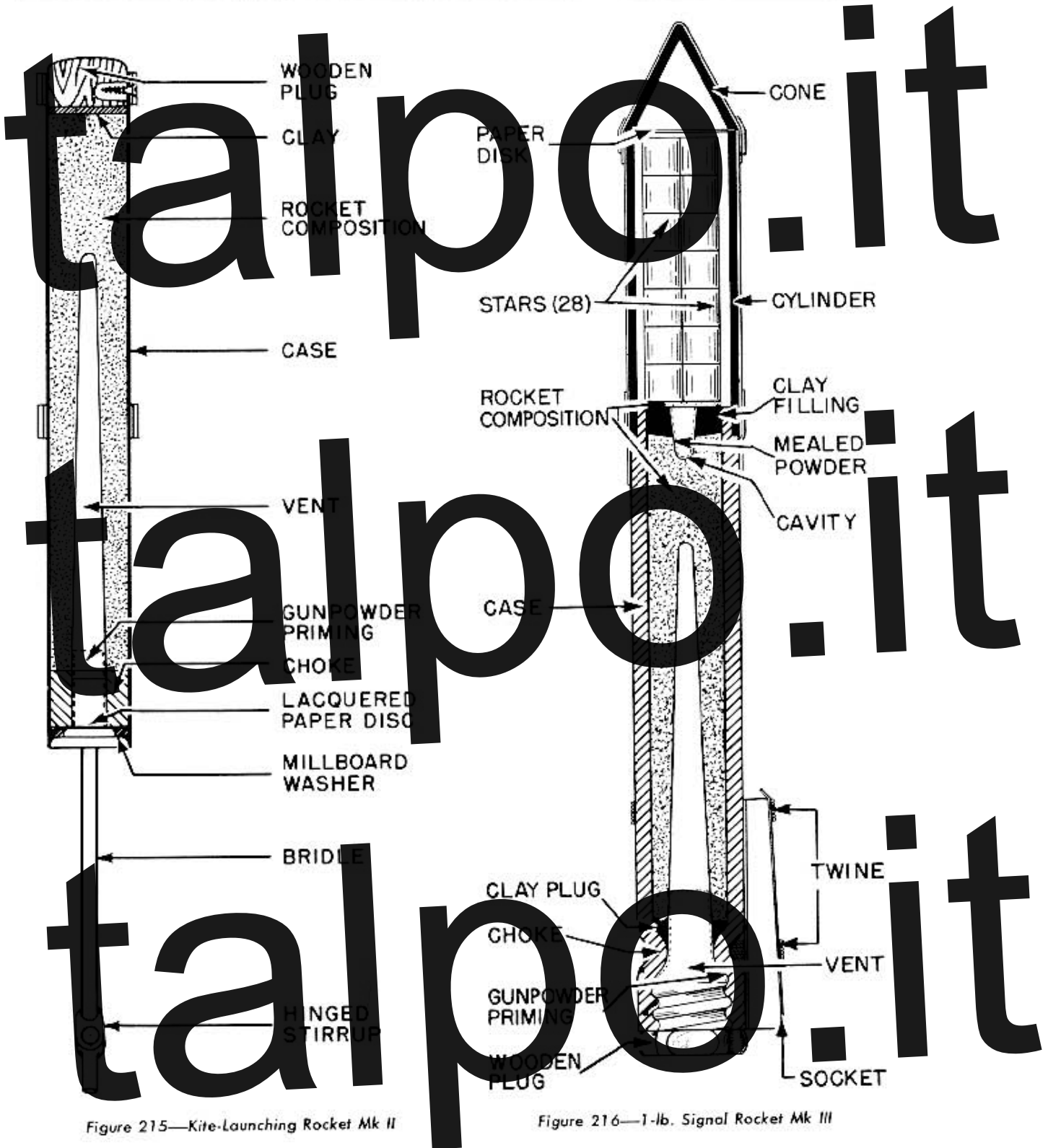


Figure 215—Kite-Launching Rocket Mk II

Figure 216—1-lb. Signal Rocket Mk III

Part 3—Chapter 5

PYROTECHNIC ROCKETS

Introduction

Pyrotechnic rockets are relatively small pyrotechnic items, similar in principle to the familiar sky rocket, which are used mainly for signaling, line-carrying, and illumination. In most cases they are fired from a hand projector.

These items generally use a type of construction in which the head and rocket tube are integral. The rocket tube is filled with a propellant composition having a tapered, conical vent hole in its center to facilitate burning. The after end of the tube is constricted, or contains a plug of narrower diameter than the rest of the tube in order to concentrate the expanding propellant gases. The choke and a short length of the vent tube interior are coated with gunpowder to assist in ignition of the propellant.

Kite-Launching Rocket Mk II (Service)**Data**

Over-all length 10.25 in.
Maximum diameter 1.25 in.

General: These rockets are used to enable kites to be raised easily from emergency dinghies. They are fired from a 1-in. signal pistol fitted with a barrel extension.

Description: The main rocket propellant composition is contained in the case, the nose of which is closed by a wooden plug and a layer of clay. The after end of the case houses a plaster-of-paris choke, which is covered by a millboard washer and a paper disc. A conical vent in the rocket propellant is aligned with a hole through the choke. The end of the vent nearest the choke is coated with gunpowder priming.

The rocket is fixed in a bridle having a hinged strap to which is attached a 2-ft wire cable. During flight, the cable end nearest the rocket is protected from heat by an asbestos sheath.

The free end of the cable carries a loop for connection with the kite tow-line.

The rocket is painted aluminum over-all, with manufacturing and filling information stencilled on the case in black letters.

Operation: When the pistol, loaded with rocket and cartridge, is fired, the flash from the cartridge ignites the gunpowder priming in the rocket, and the priming ignites the rocket propellant composition. The rocket travels upwards for a distance of about 200 ft. until the kite flying line is almost paid out. The kite-cover retaining pins, which are attached to the kite flying line, are then withdrawn. The kite opens automatically, and the kite cover falls away. The flying line then withdraws a split pin connecting the rocket tow-line to the top of the kite, and the rocket is separated from the kite.

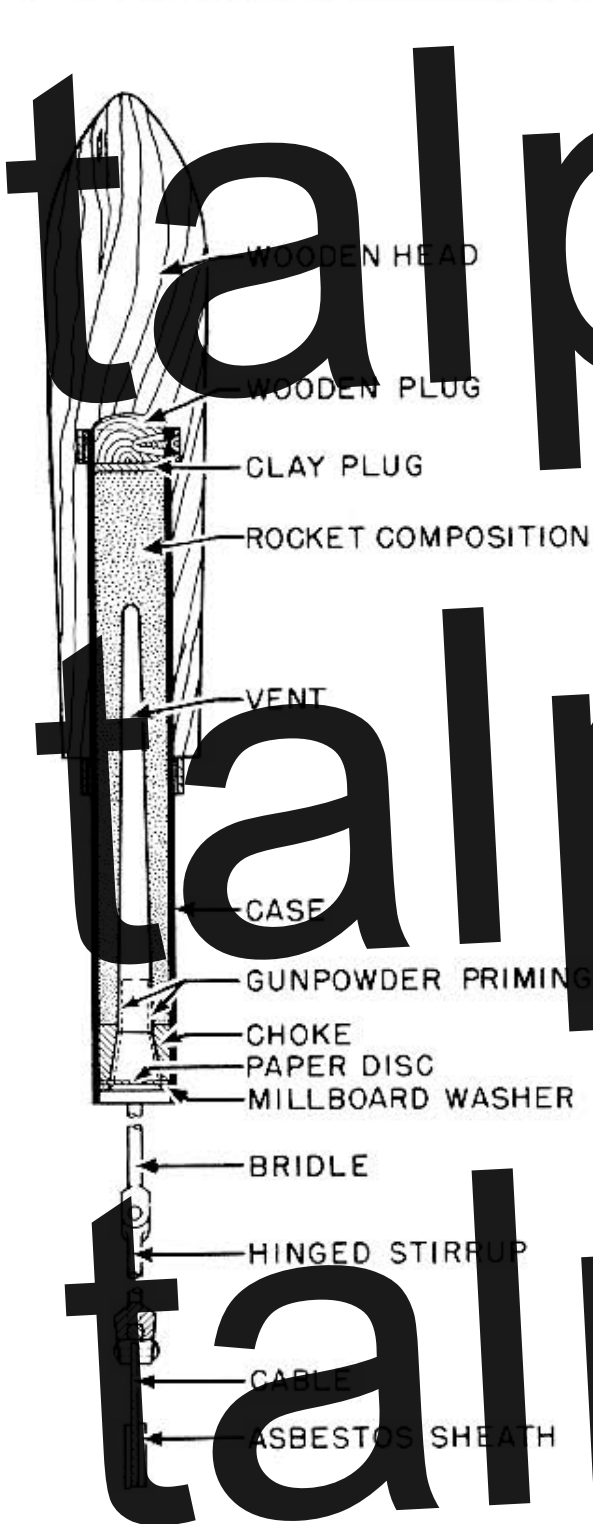
1-lb. Signal Rocket Mk III (Service)**Data**

Over-all length 16.4 in.
Maximum diameter 1.8 in.
Total weight 1 lb.
Color of stars White
Number of stars 28

General: This rocket is designed for day or night signalling.

Description: The components consist of a propellant composition filled case, closed by a wooden plug, and an upper cylinder containing 28 white stars.

The case consists of a rolled paper tube choked near the lower end to form a vent and threaded below the choke to receive the wooden plug. The tube is filled with rocket propellant composition, the center of which has a conical cavity. A clay filling plug with a tapered hole in its center is located in the top of the tube,



and the recess and the face of the clay are primed with mealed black powder. A small charge of rocket composition is dusted over the top face of the clay. A clay plug with a tapered hole is located immediately above the choke. The recess and the choke are primed with gunpowder. A metal socket for accommodating the stick is glued to the outside of the case and also bound to it with twine.

The cylinder consists of a rolled paper tube filled with 2½ white stars. It is closed at one end by a paper disc covered with a paper cone, and at the other end is attached to the case. The joints are sealed with paper strips.

The rocket is painted olive drab and carries a white instructional label around the case. Manufacturing and filling information is stenciled on the cylinder.

Operation: When the wooden plug is removed, the vent is exposed and the rocket is ignited by applying a lighted portfire to the vent. When the major part of the rocket composition has burned, combustion spreads through the cavity and primed hole in the clay, firing the rocket composition in the cylinder, and thereby ignites and ejects the stars. The burning stars are ejected at a height of about 900 ft. and burn for about nine seconds.

Buoyant Line-Carrying Rocket No. 2 Mk I (Service)

Data

Over-all length	28.0 in.
Maximum diameter	2.75 in.
Total weight	3.25 lb.

General: This rocket is fired from a hand-firing rocket projector, and is initiated by a 30-grain percussion cartridge. The rocket is designed for rescue purposes on marine craft and for use by airfields situated in coastal areas as a means of contacting crews of aircraft which have crashed into the sea immediately after take-off.

Description: The rocket consists of a wooden head made in two halves, held together with screws, which engage the head of the rocket tube. The rocket propellant composition is contained in the tube, the nose end of which is closed by a wooden plug and a clay plug. The

Figure 217—Buoyant Line-Carrying Rocket No. 2 Mk I

PYROTECHNIC ROCKETS

after end of the rocket tube houses a plaster-of-paris choke, which is covered by a millboard washer and an oiled paper disc. A conical vent is formed in the rocket propellant composition in line with a tapered hole in the choke. The end of the vent nearest the choke and the hole in the choke are coated with gunpowder priming.

A handle with a hinged stirrup is attached to the rocket and a tail consisting of a wire coil about 3 ft. long is secured to the stirrup. The part of the tail nearest the rocket is protected from the heat of the burning rocket composition by an asbestos sheath. The free end of the tail carries a loop for connection to a buoyant line.

The buoyant line consists of 250 yd. of orange colored cotton cord, which is specially treated so that it will float on water. It is coiled in a square cardboard container whose lid is secured by adhesive tape.

The wooden head is painted yellow over-all, and filling and manufacturing information is stenciled on the head in black letters.

Operation: When the projector, loaded with rocket and cartridge is fired, the flash from the cartridge ignites the gunpowder priming in the rocket and at the same time forces the rocket out of the projector. The gunpowder priming ignites the rocket composition, which then takes over and propels the rocket along its trajectory. The rocket draws the buoyant line out of its container, and, when expended, falls into the sea and floats on the surface.

3 3/4-lb. Illuminating Rocket No. 2 Mk I (Service)

Data	
Over-all length	30 in.
Maximum diameter	2 1/2 in.
Total weight	3.75 lb.
Height of elevation	750 ft.
Burning time	45 seconds
Candlepower	180,000

General: This rocket is currently employed only by the Air Sea Rescue Service to assist in search and rescue operations at night. It is fired from a hand-firing projector, and is initiated by a 30-grain percussion cartridge.

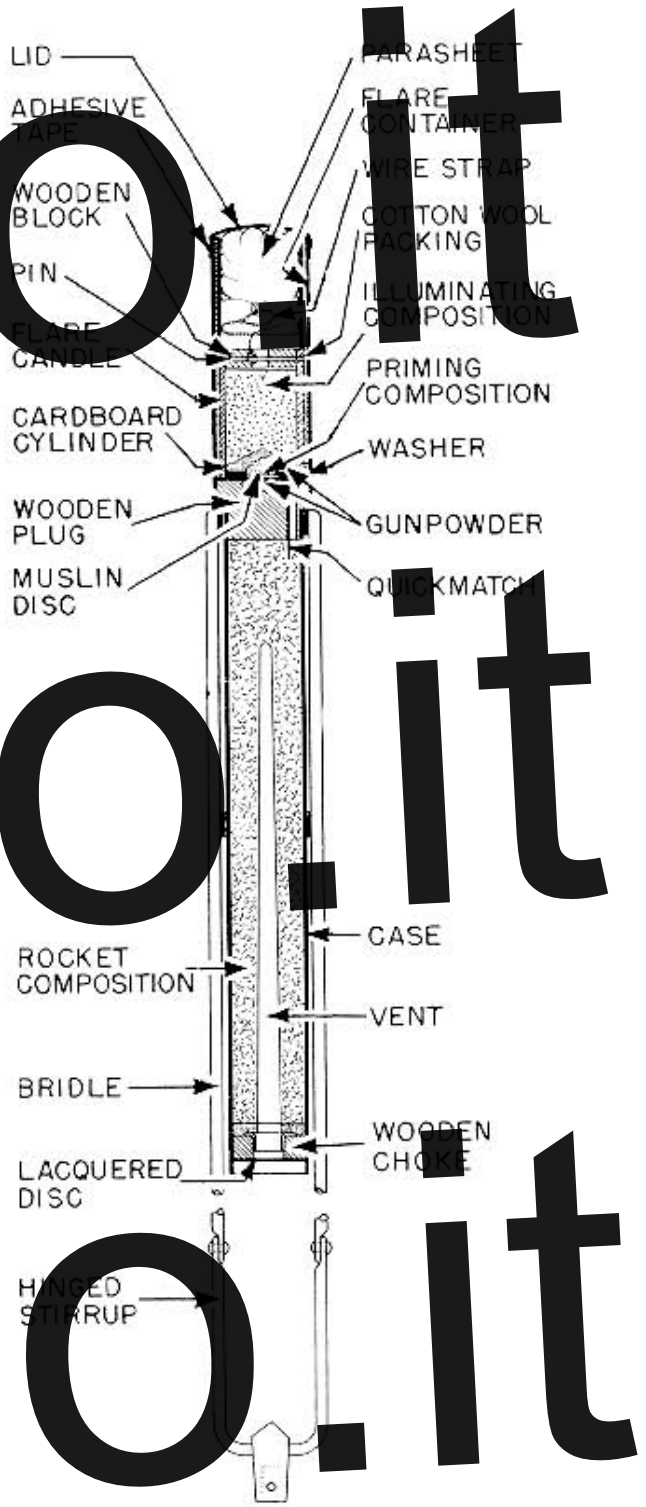


Figure 218—3 3/4-lb. Illuminating Rocket No. 2 Mk I

Description: The rocket consists of a steel rocket tube containing a rocket-propelling composition, which has a conical cavity in the center. The rocket tube is fitted at one end with a metal center. The rocket tube is fitted at the other end with a metal flare container housing a wooden plug, a flare candle, and a cotton parachute attached to the candle by a wire strap. Crimped into the other end of the tube is a wooden choke sealed by a paper disc.

Secured to the rocket tube is a steel bridle, which extends beyond the wooden choke and carries a hinged stirrup. One end of a steel rope tail is screwed to the base of the stirrup. The end of the tail is protected from the heat of the burning propellant composition by an asbestos sheath. The other end of the tail is spliced to form a loop to which is attached a 12-ft. hemp rope. The rope is coiled into a paper envelope, which has a cotton loop attached to it. The envelope, with the rope inside, is attached to the rocket by a rubber band when supplied.

The wooden plug in the flare container carries a recess which houses a small quantity of gunpowder and a length of quickmatch. The quickmatch contacts both the gunpowder and the rocket composition.

The flare candle consists of a cardboard cylinder held in place in the flare container with cotton-wool packing and closed at one end by a wooden block. This block has a pin passing through it to take one end of the wire strap of the parachute. At the other end of the cardboard cylinder is secured a washer, housing a gunpowder charge which is held in place by a muslin disc. Above this disc is placed a small amount of priming composition. An illuminating composition fills the remainder of the candle.

The parachute and the wire strap are packed into the flare container with packing cylinders, and the container is closed by a metal lid secured with adhesive tape.

The flare container is painted aluminum overall. The filling and manufacturing information is stenciled on the container in black letters.

Operation: When the projector, loaded with rocket and cartridge, is fired, the explosion of the cartridge breaks the paper disc, and the

flash passes through the choke and ignites the rocket-propellant composition. The gases generated by the composition then take over and force the rocket along its trajectory. When the rocket composition is almost burned through, it ignites the quickmatch. The flash from the quickmatch initiates the gunpowder in the wooden block. The flash from the gunpowder ignites the priming composition in the flare candle, which in turn fires the illuminating composition. Simultaneously, the pressure of the gases from the exploding gunpowder forces the lid from the flare container, and ejects the ignited candle and its attached parachute. The tail and the hemp rope act as flight stabilizers.

6¼-lb. Illuminating Rocket No. 1 Mk I (Service)

Data

Over-all length	22.5 in.
Maximum diameter	3.5 in.
Total weight	6.25 lb.
Height of ejection	200 ft. (approx.)
Burning time	45 sec. (approx.)
Candle power	300,000

General: This rocket is currently used by the Royal Observer Corps to indicate the presence of low-flying enemy aircraft to patrolling fighters, and by the Air/Sea Rescue Service to assist in sea rescue searches at night. The rocket is fired from a Type B Rocket Projector, Mk III or IV, using a 60-grain percussion cartridge.

Description: The rocket consists of a rocket tube, a sliding tail, and a flare container, which houses a burster charge, flare candle, and parachute. The rocket tube is filled with a rocket-propellant composition, having a conical cavity in the center, and is closed at one end by a gunmetal choke crimped in position. The choke is closed by a paper seal. At the other end of the rocket tube are a wooden block and a clay plug, with a hole to receive a length of quickmatch. The flare container is crimped to a metal junction head secured by screws to the wooden block. Housed in the junction head are a wooden washer, covered with primed cambric, and the burster charge, which is held in place by another wooden washer.

The flare candle consists of a rolled paper case, strengthened at one end by a tin-plate cup, and held in place by felt packing. The strengthened end of the case contains a fusible metal cup having a central hole. This cup houses a quantity of priming composition, which is held in place by a primed cambric disc and a paper washer. The main illuminating composition of the candle is held in place by a millboard disc. A suspension cup, riveted to the paper case, carries a piece of wire wrapped at both ends with adhesive tape. One end of a wire strap is looped around the middle of the wire. The other end of the wire strap is attached to a 36-in. parachute, which is packed into the flare container between a wooden washer, millboard spacers, and a wooden disc. The top of the flare container is closed by a metal lid secured in place with adhesive tape.

The sliding tail is of the drum type. When the rocket is fired, the tail slides along the rocket tube until arrested by the metal choke. A leaf spring attached to one of the tail fins then holds the tail in the extended position.

The flare container is painted aluminum over-all, with filling and manufacturing information stenciled on the container in black letters.

Operation. When the projector, loaded with rocket and cartridge is fired, the explosion of the cartridge breaks the paper seal on the rocket choke, and the flash passes through the choke to ignite the rocket-propellant composition. The gases generated by the burning propellant then carry the rocket along its trajectory. When the rocket composition is almost burned through, it ignites the quickmatch and the primed cambric, which in turn fires the burster charge. The flash from the burster charge ignites the flare candle and forces the lid from the flare container, ejecting the ignited candle and its attached parachute.

9-lb Illuminating Rocket Mk II (Service)

Data	
Over-all length	36 in.
Maximum diameter	6 in.
Weight	9 lb.
Height of section	1500 ft (approx)
Burning time	30-70 seconds
Candlepower	300,000

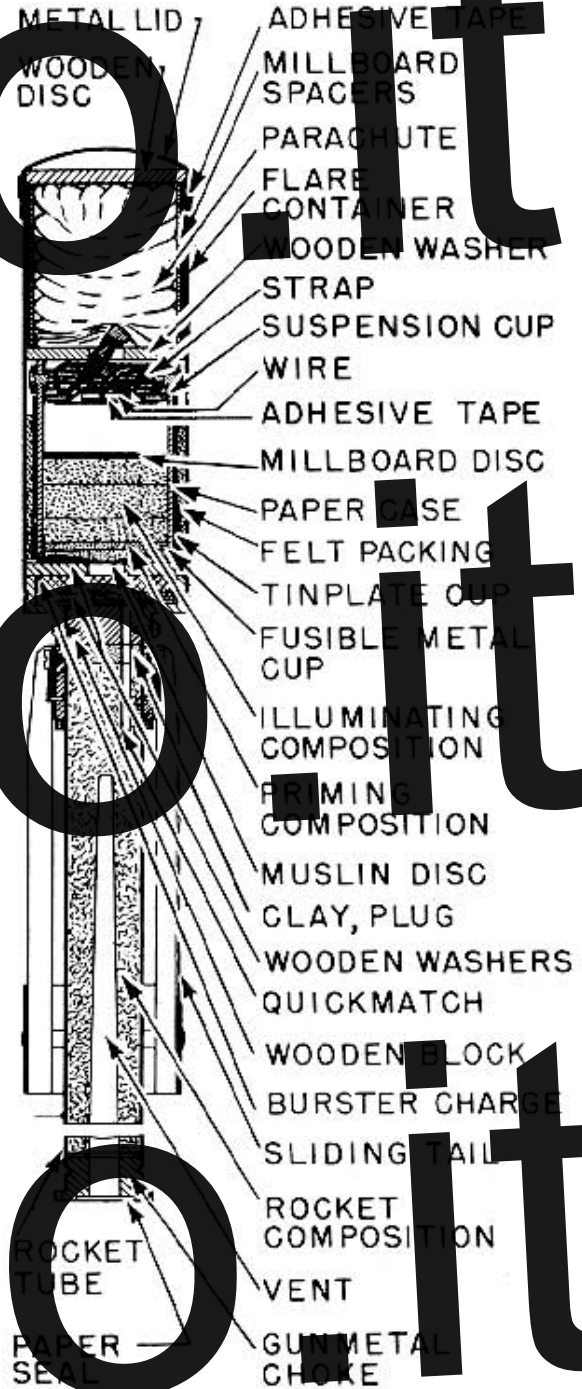


Figure 219—6 1/4-lb. Illuminating Rocket No 1 Mk I

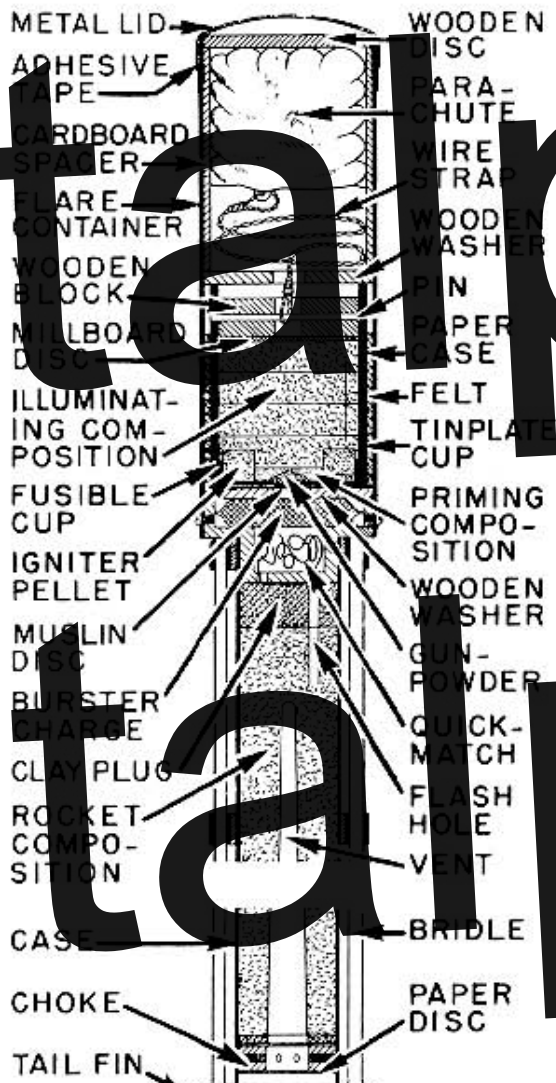


Figure 220—9.1b. Illuminating Rocket Mk II

General: This rocket is currently used only by the Royal Observer Corps to indicate to patrolling fighters the presence of low-flying enemy aircraft. The rocket is fired from a Type B Rocket Projector Mk IV, using a 60-grain percussion cartridge.

Description: The rocket consists of a steel rocket tube, a tail, and a metal flare container, which houses a parachute, flare candle, and burster charge. The rocket tube is filled with a propellant composition with a conical cavity in the center. At one end of the rocket tube is a gun-metal choke crimped in position and closed with a paper disc.

At the other end of the steel tube is a clay plug provided with flash hole. The flare container is fastened with screws to a metal junction head, which houses the burster charge and a length of quickmatch. The burster charge is held in position by a wooden washer, covered with primed cambric. Attached to the flare container is a waterproof sleeve, which fits over the projector barrel to prevent rain from entering the barrel when the projector is loaded.

The flare candle consists of a rolled paper case, strengthened at one end by a tin-plate cap and held in place with felt packing. The strengthened end of the cap contains a fusible metal cup having a central hole. Housed in this cup are a quantity of gunpowder, priming composition, and two igniter pellets. The gunpowder and priming composition are held in place by a muslin disc.

The main illuminating filling of the candle is pressed in position and held in place by a millboard disc. A wooden block, resting on the millboard disc, has a central hole to receive one end of a wire strap, which is looped around a metal rod passing through the wooden block. The block is riveted to the paper case. The other end of the wire strap is attached to a 36-in. parachute packed in the flare container between a wooden washer, cardboard spacers, and a wooden disc. The top of the flare container is closed by a metal lid secured to the container with adhesive tape.

The rocket is stabilized in flight by a tail secured to the rocket tube. The tail consists of four fins attached to a bridle, which is fitted to the rocket tube.

INTRODUCTION TO ROCKET FUZES

The flare container is painted aluminum overall, with filling and manufacturing information stencilled on the container in black letters.

Operation: When the projector, loaded with rocket and cartridge, is fired, the flash from the cartridge breaks the paper sealing disc, passes through the choke, and ignites the rocket propellant composition, which then forces the

rocket along its trajectory. When the rocket composition is almost burned through, the flame passes through the flash hole and ignites the length of quickmatch and the burster charge. The flash from the burster charge ignites the flare candle and forces the lid from the flare container, ejecting the ignited candle and its attached parachute.

Part 4—ROCKET FUZES

Chapter 1

INTRODUCTION

General

Rocket fuzes are mechanical devices which initiate the explosive system of the rockets in which they are used. Rocket fuzes, as well as bomb fuzes, contain the most sensitive initiating explosives of the explosive system, such as detonators, boosters, etc. No counterpart of the bomb pistol is used in rockets.

Nose fuzing of rockets is more common than base fuzing, as is shown by the comparative number of nose and base fuzes. This tendency can be explained to some extent by again noting the British emphasis on an aircraft rockets, which use impact or aerial-burst, nose fuzes, and by the fact that the inherent delay in base fuzes, acting on an inertia principle, makes them most practical for employment in the less widely used S.A.P. rockets.

Designation

Rocket fuzes are designated in the same

manner as bomb fuzes and pistols. A "Number" corresponding to the U.S. "Mark", and a "Mark", corresponding to the U.S. "Modification" and always expressed in Roman numerals, are used to designate a particular fuze. These numerical symbols are, of course, accompanied by the word "Fuze". Minor changes in marks are indicated by asterisks, capital letters, or lower-case letters.

Types of Fuzes

Rocket nose fuzes employ various types of action and arming. Instantaneous impact, instantaneous impact-self destroying, pyrotechnic-delay aerial burst, and mechanical-delay aerial burst are the common types of action. The Fuze No. 7B Mk I, also known as the Kealy fuze, is an interesting development of the use of electrical time setting in an attempt to eliminate "dead time".

Gas pressure arming and impact firing are the main features of the rocket base fuzes discussed in this section.

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rocket along its trajectory. When the rocket composition is almost burned through, the flame passes through the flash hole and ignites the length of quickmatch and the burster charge. The flash from the burster charge ignites the flare candle and forces the lid from the flare container, ejecting the ignited candle and its attached parachute.

Part 4—ROCKET FUZES

Chapter I

INTRODUCTION

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Gas pressure arming and impact firing are the main features of the rocket base fuzes discussed in this section.

ANTI-TANK GRENADES

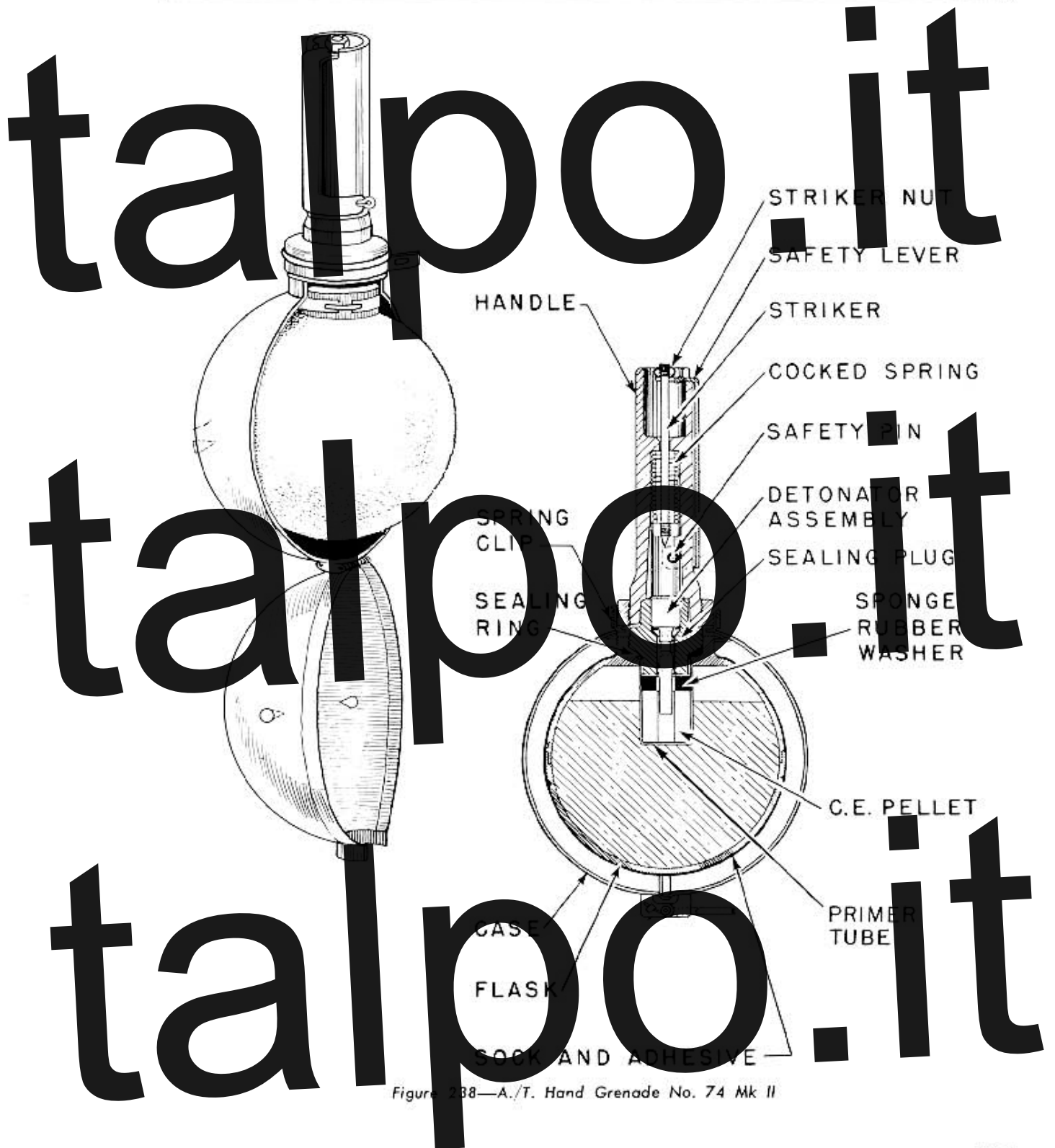


Figure 238—A./T. Hand Grenade No. 74 Mk II

SMOKE, ILLUMINATING, AND INCENDIARY GRENADES

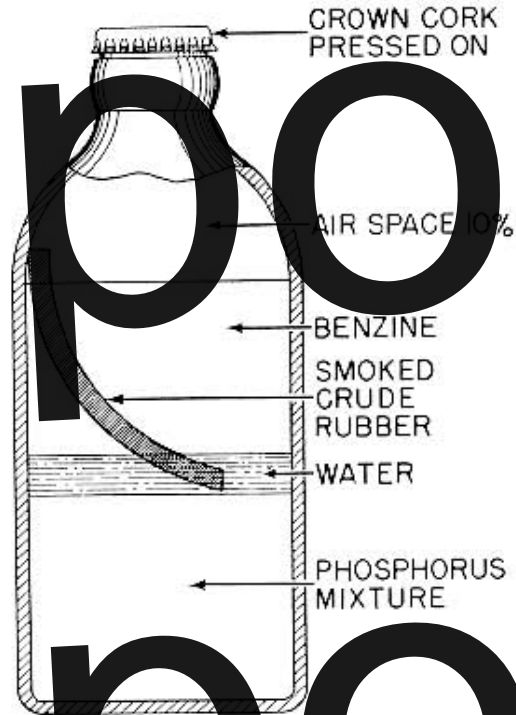


Figure 251—Incendiary Hand or Rifle Grenade No. 76 Mk I

A small hole connected to its outer end allows the flash of the cartridge to contact the ignition system, while a coned hole at its inner end leads to the gunpowder burster in the interior of the grenade. The ignition system, which is retained in the radial hole by a screwed plug, consists of a tube of primed cotton cambric, a layer of gunpowder, a delay pellet, and another small charge of gunpowder, which relays the flash to the gunpowder burster of the grenade. The paper-wrapped star rests on a millboard disc, which separates it from the gunpowder burster. The star composition is ignited by a layer of priming composition, in turn ignited by a small charge of sulphurless gunpowder, all of which are integral components of the star.

Operation: The base lid is removed and the grenade inserted into the discharger cup base-first. On firing, the propellant gases initiate the ignition system of the grenade and propel it into the air. The delay allows the grenade

to reach a height of approximately 250 ft. before the burster ejects and ignites the star.

Remarks: These grenades are used in the 2½-in. discharger cup and fired by means of the 0.303-in. H. Rifle-Grenade Cartridge Mk IZ. The 2-inch mortar signal and illuminating bombs have largely replaced this series.

Incendiary Hand or Rifle Grenade No. 76 Mk I (Obsolete)

Data

Total weight.....19 lb.
 Filling.....128 cc phosphorus mixture (75% phosphorus and 25% sulphide of phosphorus) 21 cc water, 110 cc benzine, and a stick of crude rubber 3½ in. long and ¼ in. in diameter.

Markings: Red caps indicate suitability for hand throwing only; green caps indicate suitability for hand throwing or projecting.

ANTI-PERSONNEL GRENADES

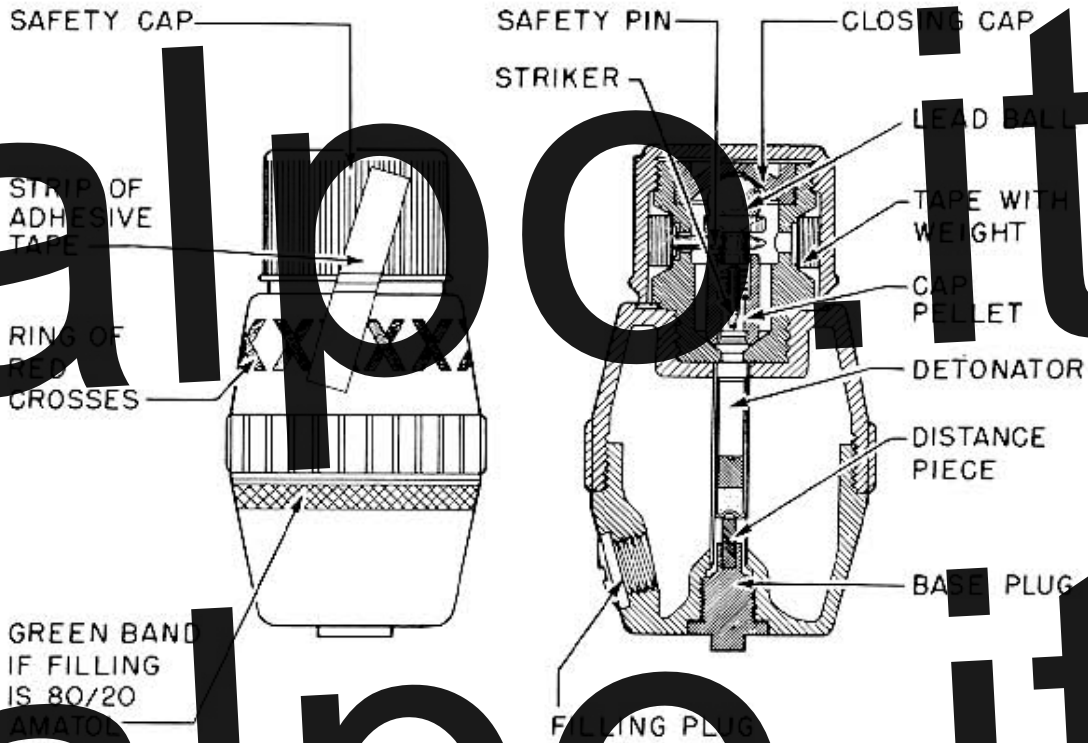


Figure 233—A./P. Hand Grenade No. 69 Mk I

When the striker is forced into the primer cap, which initiates the detonator and explodes the grenade.

Remarks: Once the tape has unbound and the safety pin is free of the striker, the grenade is in a very sensitive condition and should be carefully disposed of.

A./P. Hand Grenades No. 70 Mk I (Obsolete), Mk II (Obsolescent), and III (Service), and No. 71 (Obsolete)

Data

Over-all length	.....	4½ in.
Diameter	.....	1½ in.
Total weight	.....	2 lb.
Filling	.....	Mk II, Baratol or Amatol; Mk III, RDX/TNT
Fuzing	.....	No. 247 Mk I, II, or III
Delay	.....	None
Markings	.....	Body is banded near the top in red and banded near the middle with two yellow bands separated by a green band.

Description: The Grenade Mk II consists of a cast-iron body or fuze adapter, a base plug with a rubber spigot, and a filling-plug nose. The body is cup-shaped and threaded internally at the top to accommodate a fuze adapter. It is closed at the bottom by a threaded base plug to which is cemented a spigot. A rubber washer is interposed between the plug and the body. The adapter of zinc-base alloy is threaded internally to house a D.A. Percussion Fuze No. 247, Mk III, and is formed with a central perforation to position an aluminum detonator tube. A rubber washer is positioned between the fuze and the body. The filling hole in the side of the body is closed by means of a molding plug and a rubber washer. The body contains a filling of Baratol or Amatol.

The Grenade Mk III differs from the Mk II in that the filling hole and the thickening of the case at that point have been completely eliminated, and the Amatol or Baratol filling has been replaced by RDX/TNT 50/50, with a C.E. pellet.

Part 6—Chapter 2

ANTI-TANK MINES AND FUZES

A./T. Mine G.S. Mk II (Obsolete)

Data	
Diameter	1½ in.
Height	3¼ in.
Total weight	8½ lb.
Explosive weight.....	4 lb.
Explosive.....	TNT or Baratol
Material.....	Steel
Color.....	Sides and top dark green; bottom yellow, with cross of red and green
Fuzing.....	A./T. Contact Mine Fuze No. 1 Mk II
Pressure required.....	350 lb. (approx.)

Description: The Mine G.S. Mk II has three main components: loaded body, cover, and fuze.

The mine cover fits over the body and is supported by a leaf spring. Pins on the sides of the mine body engage bayonet sockets in the cover. The cover of this mine must never be removed after the mine is armed. Words to that effect are stamped on the cover of the mine.

The mine body is cylindrical in shape. Passing through the center of the mine is a cavity for the insertion of the mine fuze. During ordinary shipping and storage, this cavity is closed by a shipping plug. A booster charge in a ring-shaped container is placed in this central cavity. The remainder of the mine is filled with the explosive main charge. The mine is fired when the weight of a vehicle overcomes the leaf spring under the cover and allows the cover to force down the top of the fuze.

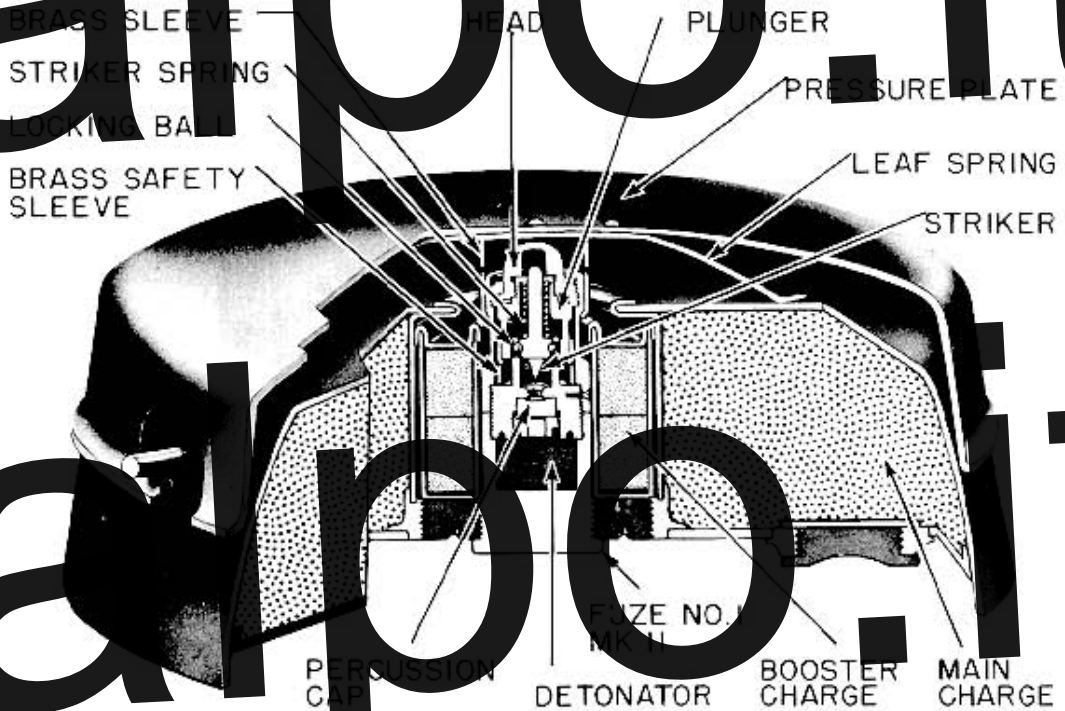


Figure 253—A./T. Mine G.S. Mk II