

CHAPTER 5

GROUND PYROTECHNIC SIGNALS

Ground pyrotechnic signals are classified as either hand-held or ground smoke signals. They are used for signaling and illuminating missions.

5-1. CHARACTERISTICS

Ground pyrotechnic signals rise to a height of 180 to 250 meters before functioning, unlike the old rifle smoke grenades that functioned either on impact or shortly after firing.

a. Hand-held Signals. These signals are issued in their own launching mechanism and are designed to reach a minimum height of 200 meters. This group of signals includes single-star parachutes, five-star clusters, and smoke parachutes. The hand-held signals replaced all rifle-projected pyrotechnic ground signals and chemical grenades.

b. Ground Smoke Signals. These signals are self-contained units used by ground soldiers to signal aircraft or to convey information (prearranged signal). The signal consists of a cylindrical smoke pellet, a fuze (thermalite-type ignitacord), an igniter cap, an internal retaining ring, and a striker ring assembled in an aluminum photocan container. These signals produce a smoke cloud that lasts for 13 to 30 seconds. They replaced rifle-projected smoke signals.

5-2. CAPABILITIES AND USES

These signals are capable of signaling for communications or illuminating a small area.

a. Signaling (Communication). Effective control of units on the battlefield depends largely on communication. Radio, telephone, voice, messenger, and arm-and-hand signals are communication means that at times are made ineffective by the tactical situation. Pyrotechnic signals are used in such situations to supplement or to take the place of normal communication means. Pyrotechnic signals are prescribed at command level and are prearranged in accordance with SOIs.

b. Illuminating. The illuminating capabilities of pyrotechnic signals are somewhat limited because of their

size. They can be used, however, to light a small area for snort periods when two or more illuminating signals are used at the same time.

5-3. HAND-HELD SIGNALS

Star clusters, star parachutes, and smoke parachutes are three hand-held signals used by the Army.

a. Star Clusters. Star clusters are used for signaling and illuminating. They are issued in an expendable launcher, which consists of a launching tube and a firing cap (1, 2, 3, and 4, Figure 5-1). These signals produce a cluster of five free-falling pyrotechnic stars.

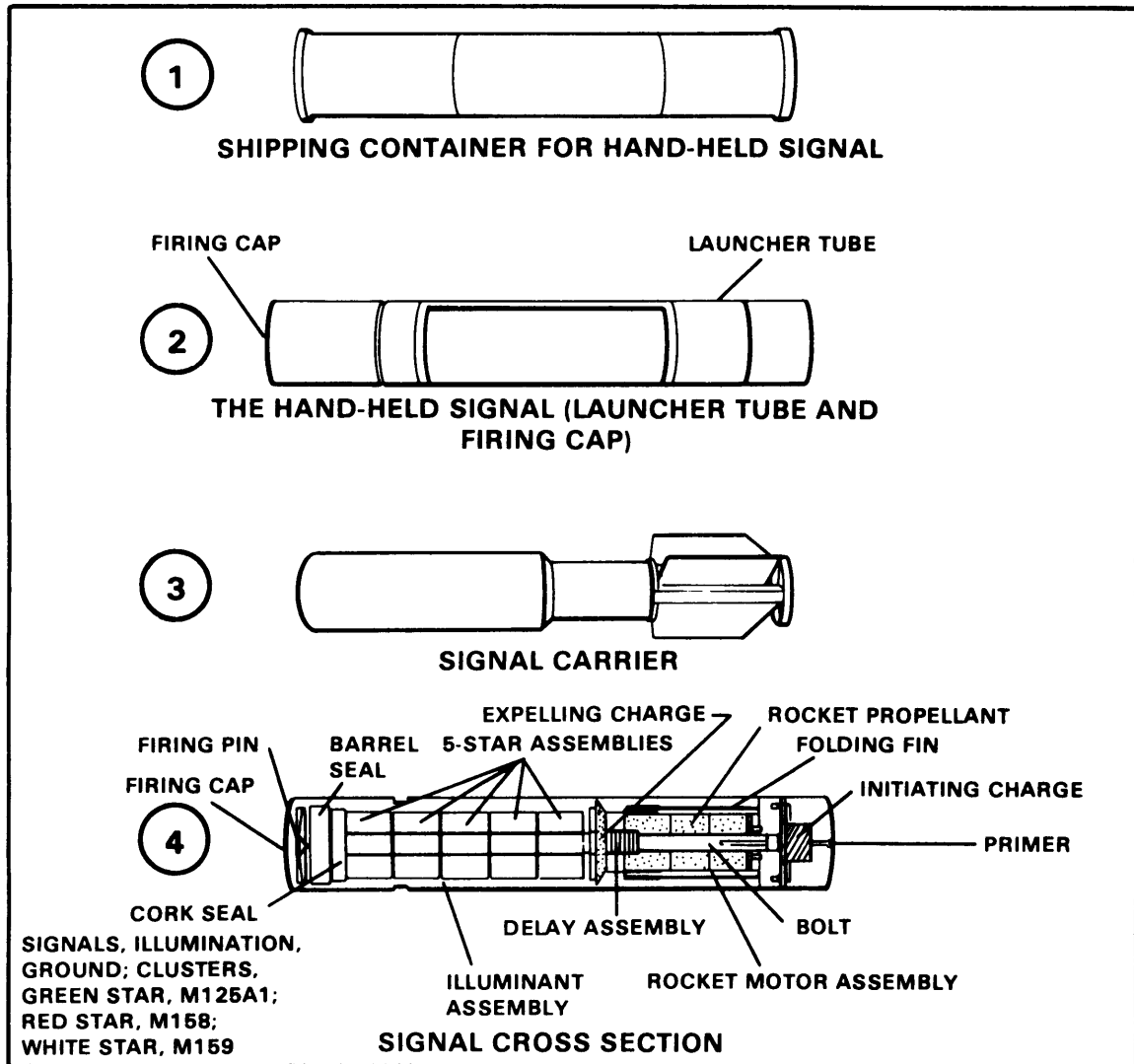


Figure 5-1. Ground pyrotechnic signals.

(1) Types. The current types of star clusters include the M125 and M125A1, green star cluster; the M158, red star cluster; and the M159, white star cluster.

(2) Operation. Operation of hand-held signals should be as follows: (This will not always agree with the instructions found on the launcher tube.) For more detailed information on safety and precautions, refer to TM 9-1370-206-10.

(a) Hold the signal in the left hand, red-knurled band down, with the little finger in alignment with the red band (Figure 5-2).

(b) Withdraw the firing cap from the upper end of the signal.

(c) Point the ejection end of the signal away from the body and slowly push the firing cap onto the signal until the open end of the cap is aligned with the red band.

(d) Grasp the center of the signal firmly with the left hand, holding the elbow tight against the body with the signal at the desired trajectory angle and the firing cap at the bottom. Turn the head down and away from the signal to avoid injury to the face and eyes from particles ejected by the small rocket (Figure 5-2).

(e) Strike the bottom of the cap a sharp blow with the palm of the right hand, keeping the left arm rigid.

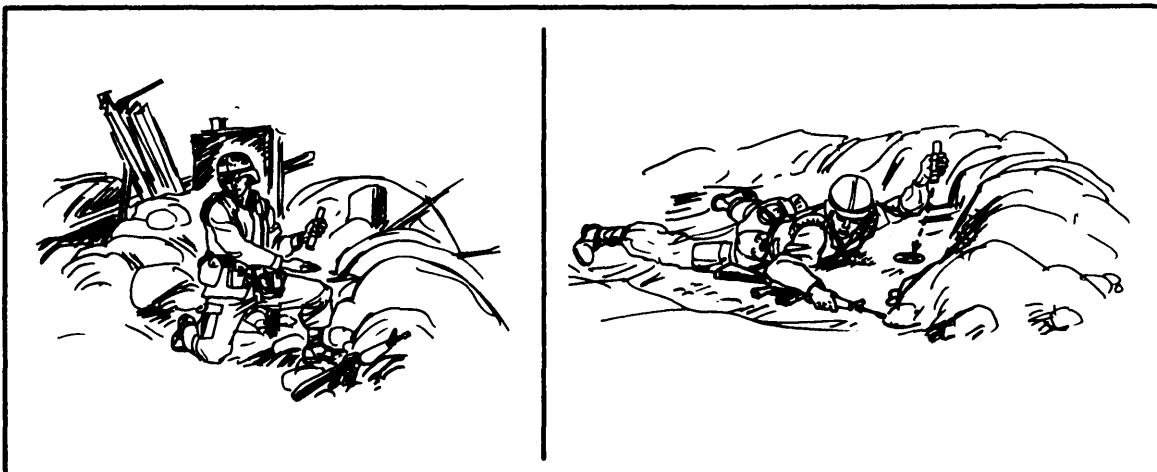


Figure 5-2. Firing the hand-held signal.

NOTE: Before firing the signal, the firer must make sure he has overhead clearance.

(3) Function. When the firing cap is struck, the firing pin is forced into the base of the launcher tube at the primer. When the primer is struck, the flash from the primer ignites an initiating charge of black powder at the base of the signal. Gases from the burning initiating charge expel the signal from the launcher tube (rocket barrel) with a slight recoil. As the signal is expelled, four flexible steel fins unfold to stabilize the signal during flight. After the signal rises approximately 6 meters, the rocket motor, which was ignited by the propelling gases, begins to burn fully, forcing the signal to a height of 200 to 215 meters (650 to 700 feet). At that point, a delay element ignites an ejecting charge, which in turn forces the five-star illuminant cluster out of the nose of the signal body.

(4) Firing data. Star clusters burn 6 to 10 seconds. Their rate of descent is 14 meters (45 feet) per second.

b. Star Parachutes. Star parachutes are also used for signaling and illuminating. They are issued in an expendable launcher that consists of a launching tube and a firing cap. These signals produce a single parachute-suspended illuminant star.

(1) Types. The current types of star parachutes include the M126A1, red star parachute; the M127A1, white star parachute; and the M195, green star parachute.

(2) Operation. These signals are fired in the same manner as star clusters.

(3) Function. These signals function in the same manner as star clusters.

(4) Firing data. The M126- and M127-series of star parachutes rise to a height of 200 to 215 meters. The M126 burns for 50 seconds and the M127 burns for 25 seconds. Their average rate of descent is 2.1 meters per second. The signal can be seen for 50 to 58 kilometers (30 to 35 miles) at night.

c. Smoke Parachutes. Smoke parachutes are used for signaling only. They are issued in an expendable launcher that consists of a launching tube and a firing cap. These signals produce a single, perforated colored smoke canister that is parachute-suspended.

(1) Types. The current types of smoke parachutes include M128A1, green smoke parachute; the M129A1, red smoke parachute; and the M194, yellow smoke parachute.

(2) Operation. These signals are fired in the same manner as star clusters.

(3) Function. These signals function in the same manner as star clusters.

(4) Firing data. Smoke parachutes rise to a height of 200 to 215 meters. The signals emit smoke for 6 to 18 seconds, forming a smoke cloud which persists for 60 seconds. Their rate of descent is 4 meters per second.

5-4. SURFACE TRIP FLARES

Surface trip flares outwardly resemble antipersonnel mines or hand grenades (Figure 5-3). Their primary use is to warn of infiltrating troops by illuminating the field. They may also be used as signals or as booby traps. When activated, the flare produces 50,000 candlepower of illumination.

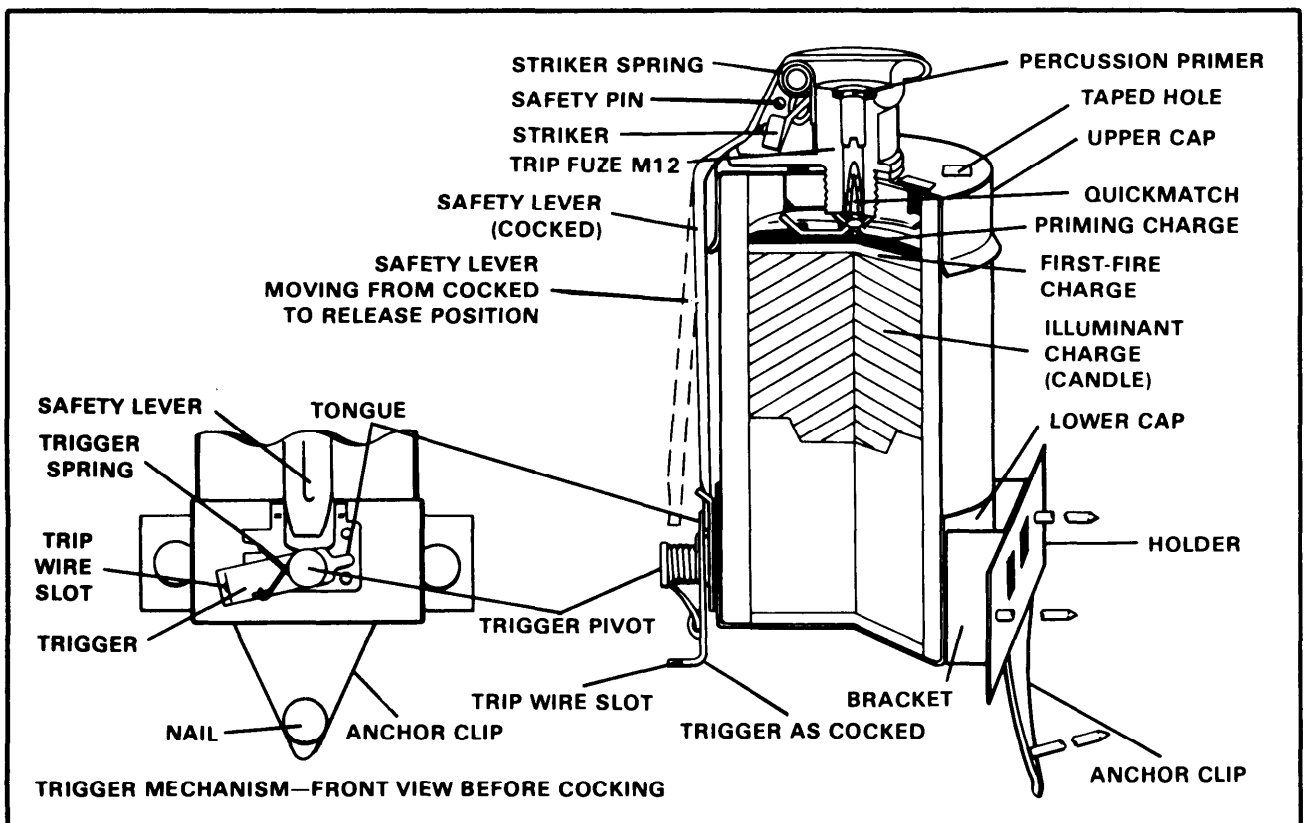


Figure 5-3. Surface trip flares.

5-5. SIMULATORS

Simulators are used in training to imitate the sounds and effects of combat detonations.

a. The booby trap simulator M117 (Figure 5-4) is used during training and military exercises. This device allows training in the installation and use of booby traps. When tripped/activated, the simulator functions with a loud report and flash.

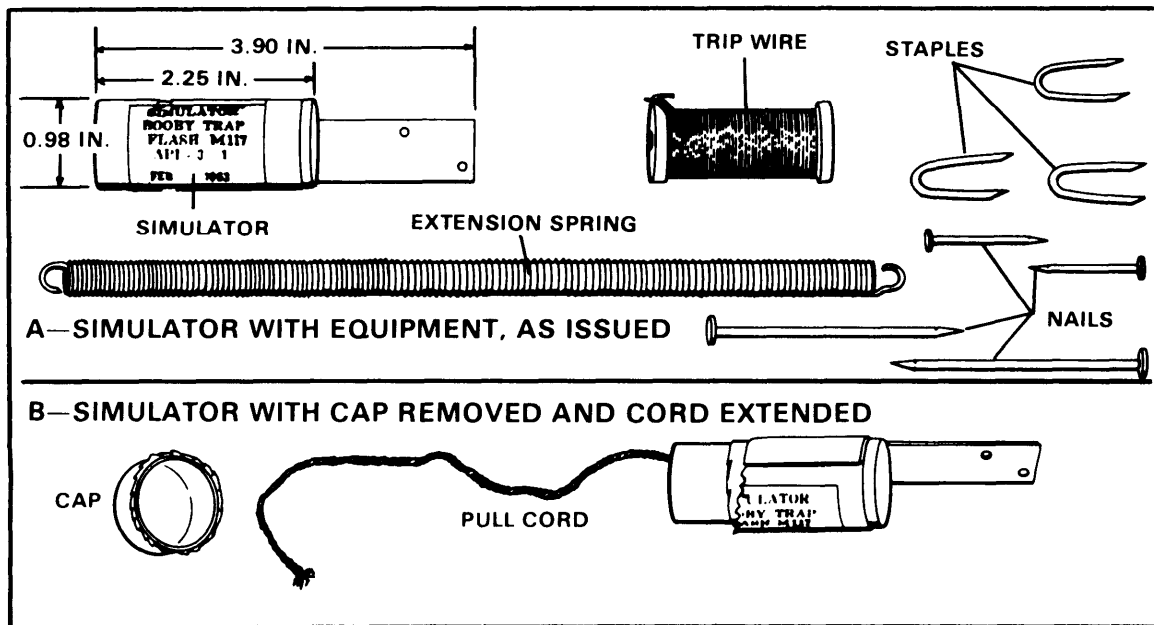


Figure 5-4. M117 simulator.

b. The ground burst simulator M115A2 (Figure 5-5) is used to create battle noises and flash effects during training. It produces a high-pitched whistle that lasts 2 to 4 seconds. The detonation produces a flash and loud report.

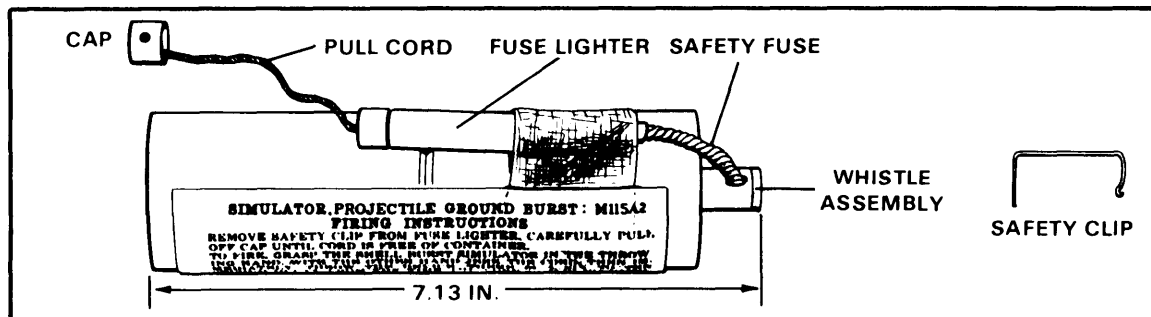


Figure 5-5. M115A2 simulator.

c. The hand grenade simulator M116A1 (Figure 5-6) is used to create battle noises and flashes during training. It differs from the ground burst simulator in that it is shorter and does not emit a high-pitched whistle before detonation. The hand grenade simulator is thrown in the same manner as a live grenade. It creates a loud report and a flash 5 to 10 seconds after ignition.

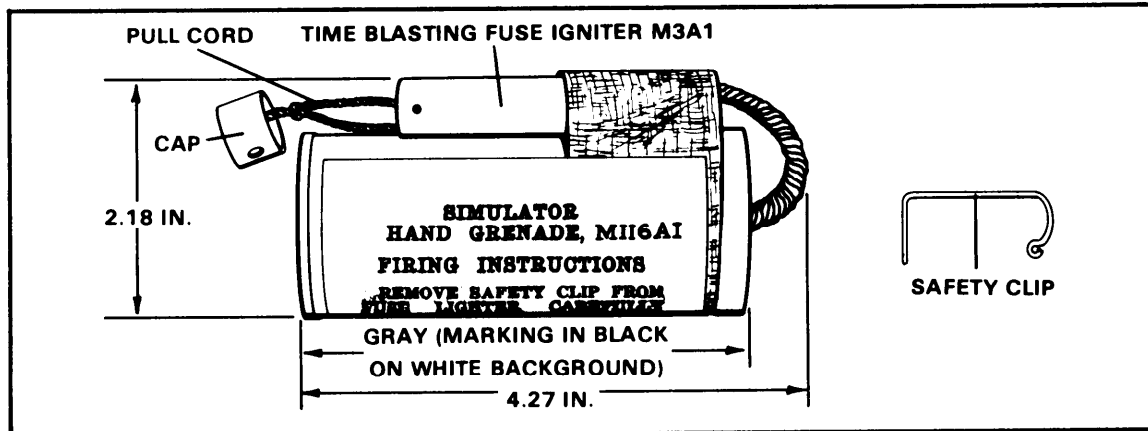


Figure 5-6. M116A1 simulator.

d. The explosive simulator M80 (Figure 5-7) is used during training to depict booby traps and land mines, and also in deactivation training programs. It is used to simulate hand grenades, booby traps, land mines, and rifle or artillery fire.

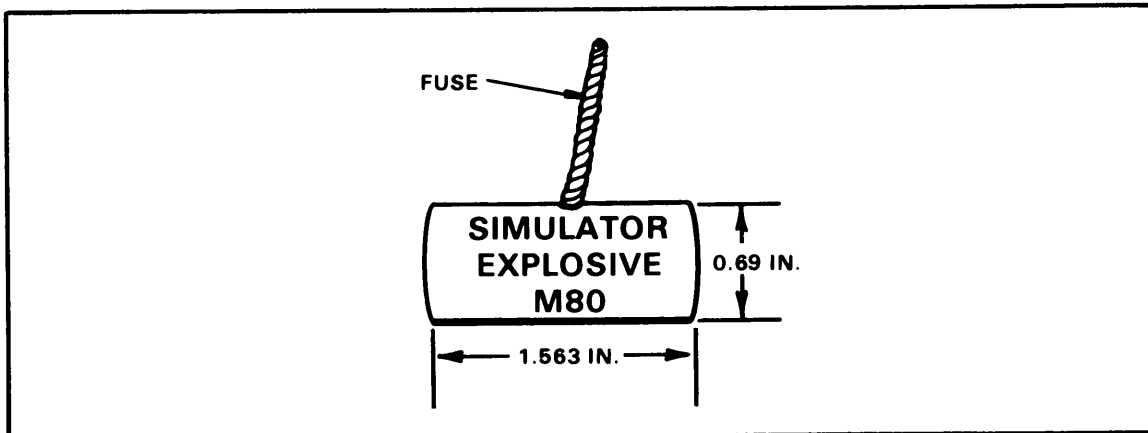


Figure 5-7. M80 simulator.

5-6. ILLUMINATION GROUND SIGNAL KITS

The pen gun flare supports the small-unit leader in fire control, maneuver, and initiating operations such as ambushes.

a. Kit 1. This pen gun flare is identified by a threaded projector with the projectiles being contained in a cloth bandoleer. Each of the signals listed below may be fired from a hand-held projector while encompassed in a bandoleer.

- o Red illumination ground signal, M187.
- o White illumination ground signal, M188.
- o Green illumination ground signal, M189.
- o Amber illumination ground signal, M190.

(1) Contents. The projector and the bandoleer plus seven projectiles/signals make up the signal kit (Figure 5-8). All signals may be obtained and fired separately. The M185 red signal kit contains only red signals. The M186 signal kit contains three red, two white, and two green signals.

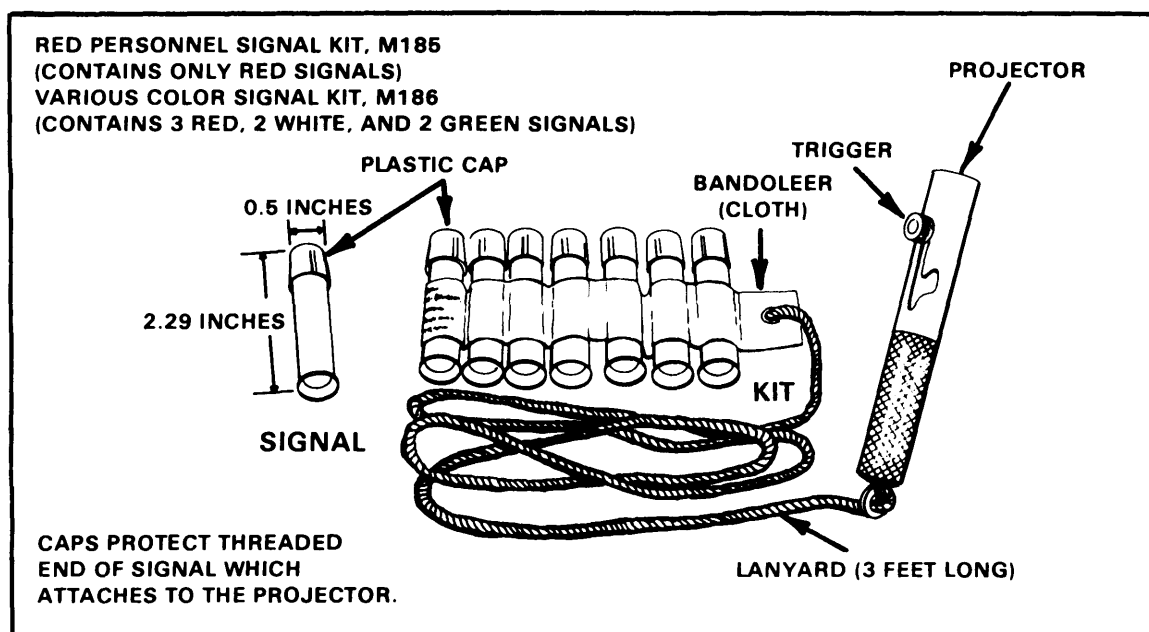


Figure 5-8. Signal kit 1.

(2) Operation. Select the signal to be fired by color. If the bandoleer contains more than one signal of the chosen color, use the one farthest from the lanyard. Remove and discard the plastic cap. Cock the projector by moving the trigger to the safety slot. Carefully thread the projector onto the signal, taking care not to dislodge the trigger from the safety slot. Aim in the

chosen direction. Fire by moving the trigger to the bottom of the firing slot and releasing it with a snap. If the expended signal is on the end of the bandoleer, or if the signals between the expended signal and the end have been used, cut the bandoleer and discard the waste. Return the partially used kit to the barrier bag and seal with tape.

b. Kit 2. This pen gun flare is identified by a force-fitted projector and a plastic bandoleer. With this kit, the projectiles must be removed from the bandoleer before being fired.

(1) Contents. This kit contains only red illumination ground signals. The projector and the bandoleer plus seven signals make up this kit (Figure 5-9). The burning time for these signals is 10 seconds at 100,000 candlepower.

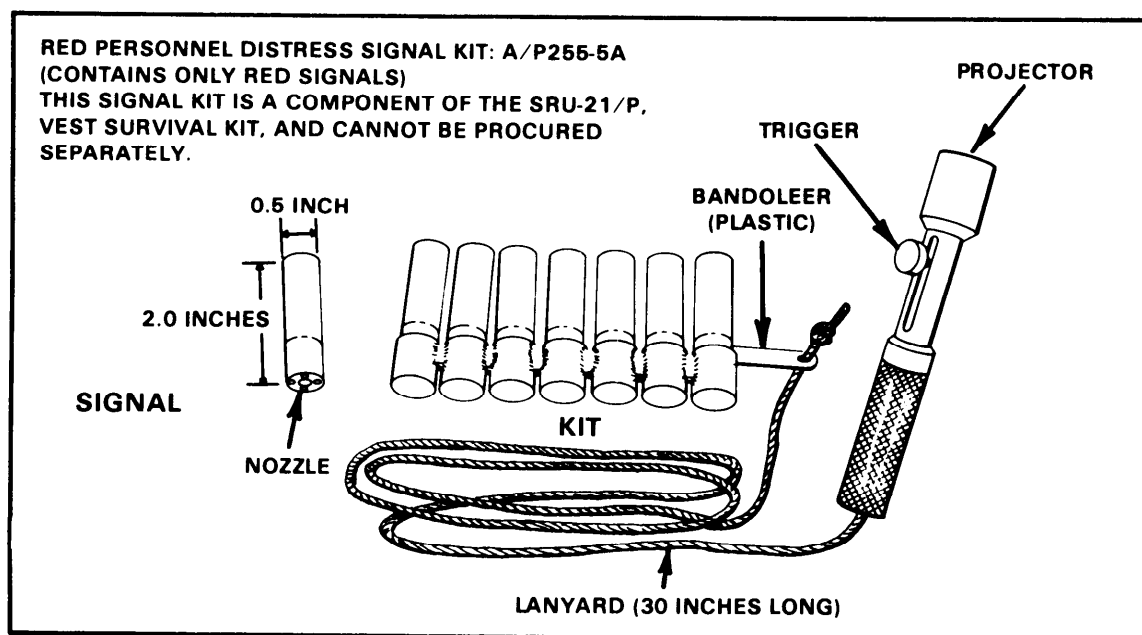


Figure 5-9. Signal kit 2.

(2) Operation. To operate this signal, select and remove the signal to be fired from the bandoleer using the one farthest from the lanyard. Carefully insert the nozzle end of the signal into the projector as far as it will go. Fire by pulling the trigger knob to the rear of the slot and releasing with a snap. Retain the bandoleer for future use. Return the partially used kit to the plastic bag and seal with tape.