DEPARTMENT OF THE ARMY TECHNICAL BULLETIN

LAUNCHER AND 35-MM CARTRIDGES: TACTICAL CS, 16-TUBE, E8

HEADQUARTERS, DEPARTMENT OF THE ARMY
AUGUST 1966

DEPARTMENT OF THE ARMY TECHNICAL BULLETIN

LAUNCHER AND 35-MM CARTRIDGES: TACTICAL CS, 16-TUBE, E8

Headquarters, Department of the Army, Washington, D.C.

21 November 1968

TB 3-1310-255-10, 31 August 1966, is changed as follows:

Add Note after the following:

Page 4, paragraph 4.
Page 16, table 1.
Page 25, paragraph 20*c*.

Note. E8 launchers manufactured after November 1968 will not contain spike (7, fig. 5) or inclinometer (5. fig. 6).

Page 29, paragraph 22*b*. The Warning is superseded as follows:

Warning. **Do not attempt to stabilize the launcher by placing any object in the holes in the trails; they may change the direction of fire, or they may become loose and cause injury to personnel. When firing at 27%° elevation, always use the tether spike and a 70-pound sandbag or equivalent weight on each trail. When firing at 400, 550, or 75° elevation, use the tether spike and, if time permits, place a 70-pound sandbag or equivalent weight on each trail to reduce launcher motion.**

By Order of the secretary of the Army:

W. C. WESTMORELAND,
General, United States Army
Chief of Staff.

Official:

KENNETH G. WICKHAM,
Major General, United States Army,
The Adjutant General.

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Instl (2)
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Dep (5)
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USA Msl & Muns Cen & Sch (2)
USAIC (2)
USATTC (1)
PG (5)
Arsenals (3) except
Edgewood Arsenal (50)
USAAPSA (10)
Ft Knox FLDMS (10)

ARNG: None.

USAR: None.

For explanation of abbreviations used, see AR 320-50.

*U.S. GOVERNMENT PRINTING OFFICE: 1969-342-015/2444

DEPARTMENT OF THE ARMY TECHNICAL BULLETIN

LAUNCHER AND 35-MM CARTRIDGES: TACTICAL CS, 16-TUBE, E8

Headquarters, Department of the Army, Washington, D.C.

18 April 1968

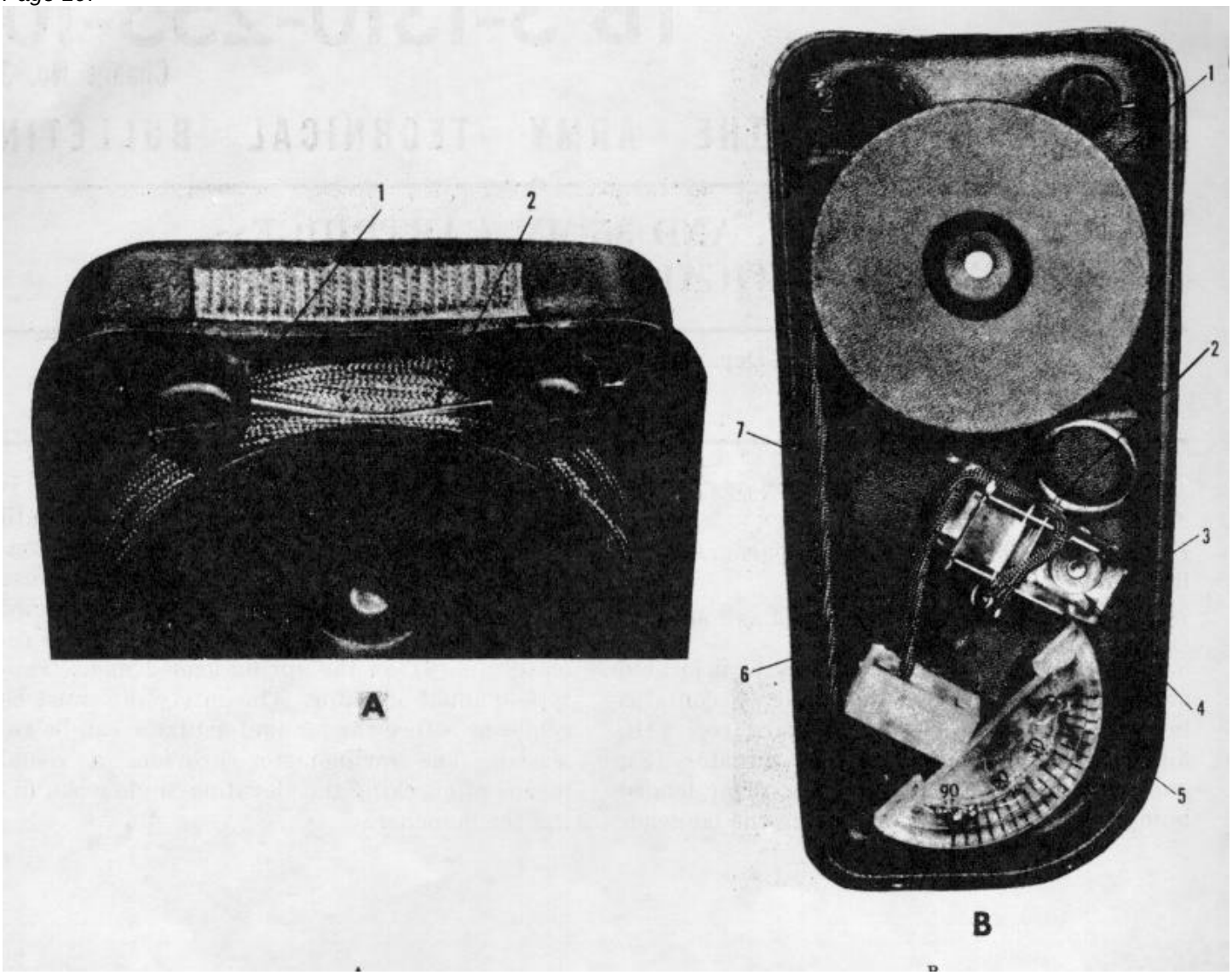
TB 3-1310-255-10, 31 August 1966, is changed as follows:

Page 3. Delete "US Army" from paragraph 2*d*, line 8.

Page 4. Paragraph 6 is superseded as follows:

6. Firing Well. The firing well (fig. 6) is located on the side of the launcher module. It contains binding posts (1A, fig. 6), lanyard reel (1B, fig. 6), mousetrap-type manual actuator (3), and an inclinometer (5). The two spring-loaded binding posts are used when firing the launcher electrically. The shorting bar (2A, fig. 6) is connected between the two binding posts until time of electrical firing. The lanyard reel contains 20 feet of lanyard cord (7B, fig. 6) for use when firing the launcher manually. The lanyard is connected to the safety pin (2) and firing release pin (6) on the spring-loaded mousetrap-type manual actuator. The safety pin must be removed before the manual actuator can be released. The inclinometer provides a visual means of checking the elevation angle when firing the launcher.

Page 10.



A

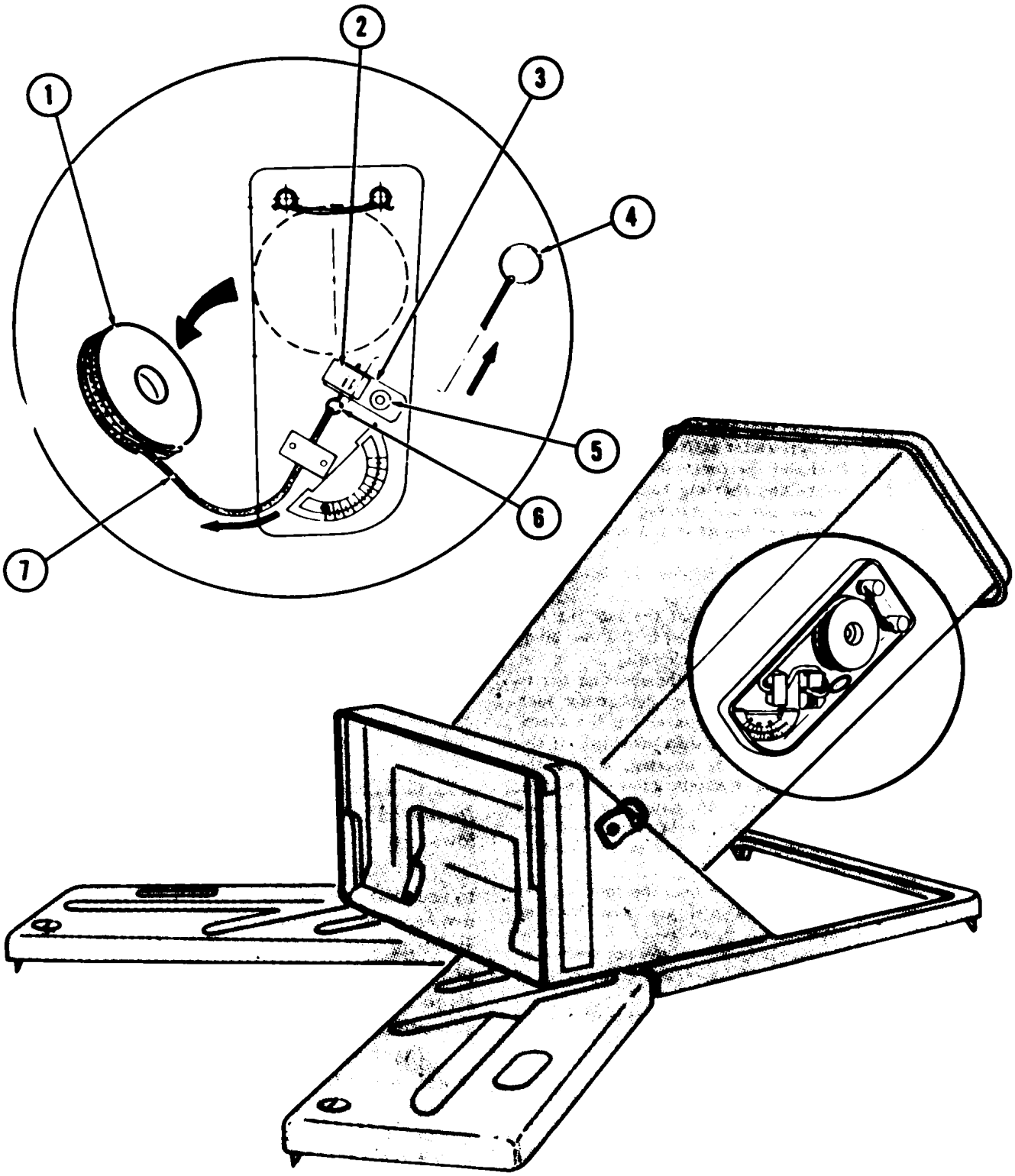
1 Binding post
2 Shorting bar

B

1 Lanyard reel
2 Safety pin
3 Mousetray-type manual actuator
4 M42 percussion primer
5 Inclinometer
6 Firing release pin
7 Lanyard cord

Figure 6. (Superseded) Firing well.

Page 14.



1 Lanyard reel
2 Striker arm
3 Manual activator
4 Safety pin
5 Primer
6 Firing release pin
7 Lanyard

Figure 10. (Superseded) ES launcher-manual functioning.

Page 16. Last sentence in each warning in paragraphs 14 and 15 is changed to read as follows:

Do not stand or place any portion of the body in front of or over top of the firing end (top cover) of the munition.

Table 1 is superseded as follows:

Table 1. Visual Inspection

Inspect	*Acceptable condition*
1 Firing well (fig. 6)	**Warning: The firing well contains the firing devices for activating the launcher. If the firing well cover is damaged, the launcher may be in an armed condition. Isolate the launcher and notify higher authority.** *a*. The firing well cover fits snugly on the firing well and is free of cuts, rips, nicks, holes, or other damage. **Warning: The firing well contains the devices for activating the launcher.** **If any of the components, such as the safety pin, shorting bar, and/or firing release pin are missing or defective, isolate the launcher and notify higher authority.** *b*. Carefully remove the firing well cover. (1) Assure that the shorting bar is securely connected to the two binding posts. If the shorting bar is not connected, connect the shorting bar to the binding posts by depressing each binding post and inserting the shorting bar into the slots provided. If the shorting bar is missing, isolate the launcher and obtain another shorting bar (number 16 gauge uninsulated copper wire 2% inches long) and connect the shorting bar to the binding posts. (2) Assure that the shorting bar and lanyard reel are positioned as shown in A figure 6. If the shorting bar and lanyard reel are not positioned as shown in A, figure 6, proceed as follows: (a) Reposition lanyard reel as close as possible to the two binding posts. (b) Push down on the center of the shorting bar until the shorting bar rests securely on the lanyard cord on the lanyard reel as shown in A, figure 6. (c) Check to assure that the shorting bar is still securely connected to the two binding posts. (3) Assure that the safety pin, firing release pin, lanyard cord and reel are free of cracks, dents, and 4 other damage and are in position as shown in figure 6. (4) Assure that the inclinometer is free of cracks or other damage. The marking should be legible. Stand E8 launcher on base on level ground; ball on inclinometer should be on 90' elevation. Lay on flat surface; ball should move to 0O elevation. **Warning: When replacing the firing well cover on the firing well. do not press on the area of the firing well cover located over the binding posts in the firing well (fig. 6). Failure to follow this instruction could cause the shorting bar to separate from the binding posts.** (5) Secure the firing well cover on the firing well.
2. Launcher module (fig. 2)	The launcher module is free of cuts, rips, nicks, dents, cracks, and holes; securely mounted to the base; and all covers in place.
3. Top cover (fig. 4)	The top cover fits snugly on the launcher module and is free of cuts, rips, nicks, holes, and other damage. *Do not remove top cover.*
4. Harness (fig. 7)	Harness is free of cuts, rips, broken clips, and missing parts.
5. Firing platform (fig. 5)	*a*. Platform is free of nicks, dents, cracks, broken or missing parts. *b*. The trail retaining strap securely locks the trails in position and is free of cracks or missing rivets. *c*. The backrest is free of cuts, rips, broken or missing snaps.

Page 29. Paragraph 24*a*(1) is superseded as follows:

(1) Remove the firing well cover. Check to see that the safety pin and firing release pin are securely engaged. Check to assure that the shorting bar is connected to the two binding posts.

Page 30. Paragraphs 24*b*(3) and 24*b*(5) are superseded as follows:

(3) Check to assure that the shorting bar is connected to the two binding posts. Rewind the lanyard cord onto the lanyard reel and place the lanyard reel in the firing well as close to the two binding posts as possible. Push down on the center of the shorting bar until the shorting bar firmly contacts the lanyard cord on the lanyard reel as shown in A, figure 6. Recheck the connection of the shorting bar to the binding posts.

(5) **Warning: When replacing the firing well cover on the firing well, do not press on the area of the firing well cover located over the binding posts in the firing well (fig. 6). Failure to follow this instruction could cause the shorting bar to separate from the binding posts. Secure the firing well cover on the firing well.**

Page 31.

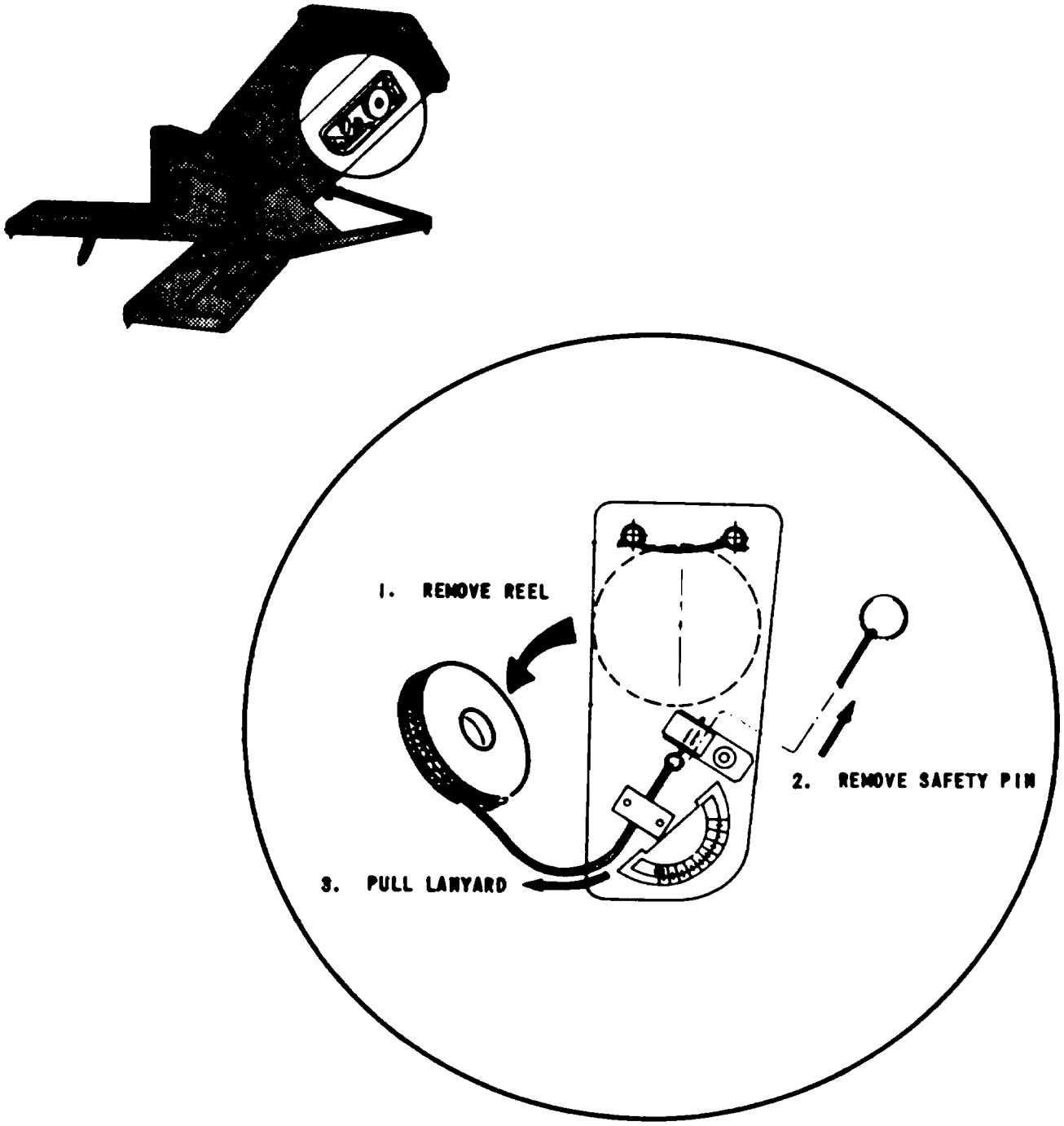


Figure 15. (Superseded)Manual firing sequence.

Page 32. Paragraphs 24*e*(3) and 24*e*(5) are superseded as follows:

(3) Depress the launcher binding posts (1A, fig. 6) and insert the shorting bar (2) between the binding posts of each launcher. Position the lanyard reel in the firing well as close to the two binding posts as possible. Push down on the center of the shorting bar until the shorting bar firmly contacts the lanyard cord on the lanyard reel as shown in A figure 6. Recheck the connection of the shorting bar to the binding posts.

(5) **Warning: When replacing the firing well cover on the firing well, do not press on the area of the firing well cover located over the binding posts in the firing well (fig. 6). Failure to follow this instruction could cause the shorting bar to separate from the binding posts. Secure the firing well cover on the firing well.**

Page 34. Paragraph 27*h*, line 5 is changed to read as follows: "sion primer (4B, fig. 6) as these primers are"
Page 35. Paragraph 29 is superseded as follows:

29. Shipment. The E8 launcher is classified by the Department of Transportation (DOT) as a class C poison (tear gas) and a class C explosive.
Paragraph 30 is superseded as follows:

30. Storage. The E8 launcher is classified for storage in accordance with TM 9-1300-206 as follows:

a. Quantity Distance-Class 3
b. Compatibility Group--A
c. Chemical Group-B

By Order of the Secretary of the Army:

HAROLD K. JOHNSON,
General, United States Army,
Chief of Staff.

Official:

KENNETH G. WICKHAM,
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USAIC (2)
USA Msl & Muns Cen & Sch (2)
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PG (5)
Arsenals (3)
USAAPSA (10)
Ft Knox FLDMS (10)

NG: None.

USAR: None.

For explanation of abbreviations used, see AR 320-50.

☆U.S. GOVERNMENT PRINTING OFFICE: 1969-342-015/2445

DEPARTMENT OF THE ARMY TECHNICAL BULLETIN

LAUNCHER AND 35-MM CARTRIDGES: TACTICAL CS, 16-TUBE, E8

Headquarters, Department of the Army, Washington, D.C.
5 July 1967

TB 83-1310-255-10, 31 August i966, is changed as follows:

Page 2. Safety Precaution is added as follows:

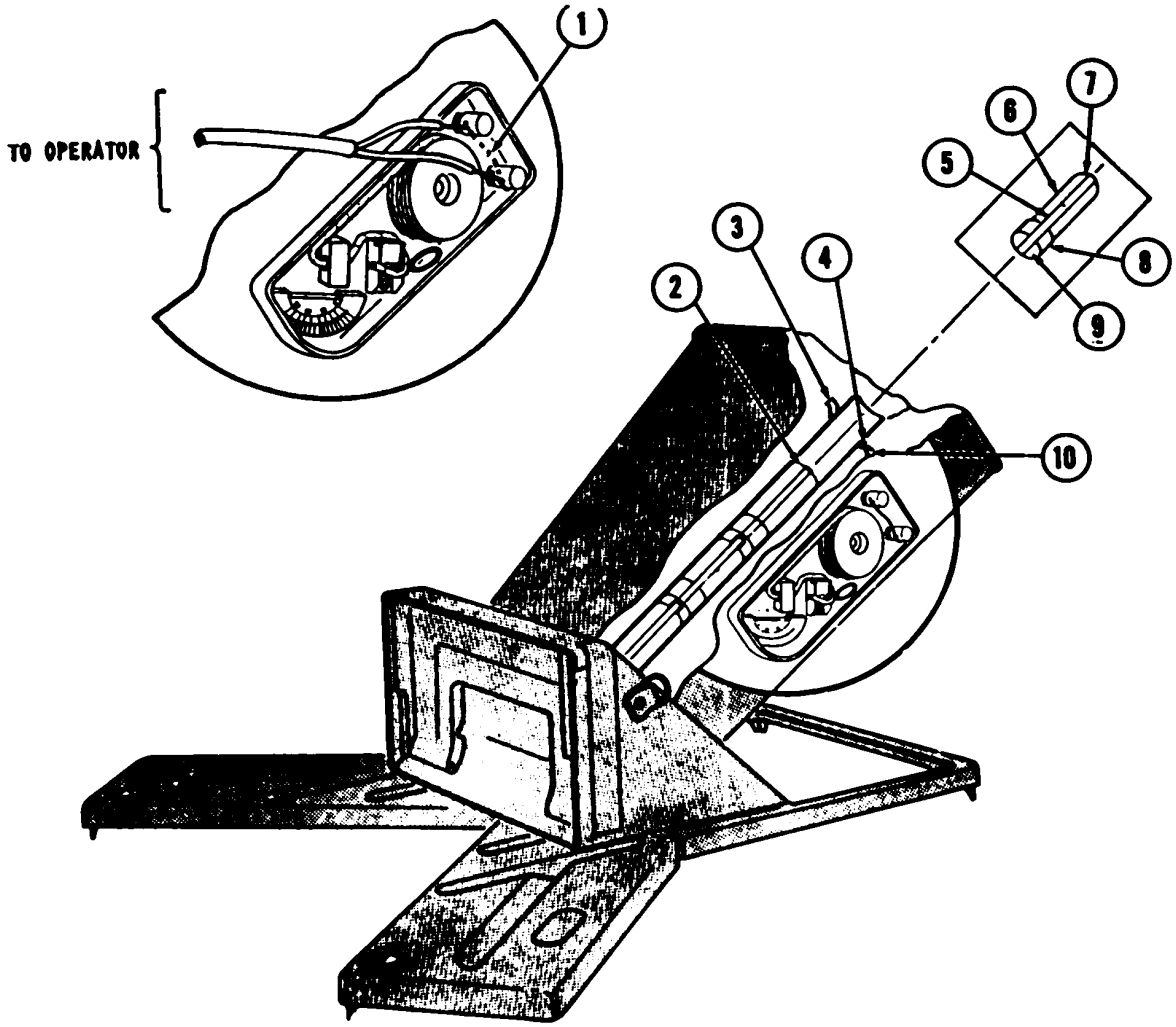
Never attempt to electrically fire a vehicle-mounted E8 launcher.

Page 29. Warning is added before paragraph 24*a* as follows:

Warning. **Never attempt to electrically fire a vehicle-mounted E8 launcher.**

TAGO 76A-July 300-465^{0} -67

Page 13.



1 Shorting bar
2 Pyrotechnic disc
3 Branch fun strip
4 Electric squib
5 Cartridge fuse strip
6 E23 cartridge
7 Pyrotechnic disc
8 Propellant cup
9 Lacquered diaphragm
10 Main fuse train

Figure 9. (Superseded) E8 launcher-electrical functioning..

Page 30. Paragraph 24*d* is superseded as follows:

d. Electrical Firing. One or more E8 launchers may be fired electrically at one time (figs 9 and 17). Refer to FM 5-25, Explosives and Demolitions, for techniques in electrical firing systems,

Warning . Always make sure that the two conductor electrical firing wire is NOT connected to any power source before preparing the launcher(s) for electrical firing.

Warning. DO NOT make any electrical connections to any E8 launcher until the two-conductor electrical firing wire is completely uncoiled with all kinks removed.

(1) Uncoil the two-conductor electrical firing wire and remove all kinks

(2) Strip the insulation from one end of each wire lead and twist the stripped wire lead ends together as a twisted pair. These wire leads are to be connected to the power source when performing step (7) below.

TAGO 76A

(3) Depress each binding post and carefully remove each shorting bar. Release the binding posts. Retain the shorting bars for replacement if required.

Caution. Removal of excessive insulation from the wire leads in the firing wire can cause the munition(s) to malfunction if the bare wire leads come in contact with each other.

(4) Strip the insulation from each wire lead on the opposite end of the firing with

(5) Depress each binding post on each launcher and slide one wire lead into each binding post as shown in figure 9. Release the binding posts.

Note. When firing multiple units, strip the insulation from each wire lead at the correct location on the firing wire and connect one wire lead to each launcher binding post as shown In figure 17. It does not matter if the stripped wire leads are interchanged between launcher binding posts (6) Inspect all units to insure that all shorting bars have been removed and the bare wire leads connected to the binding posts are not touching each other.

(7) Untwist the twisted pair (performed in step (2) above) and connect the wire leads to the electrical power source.

(8) Fire the launcher(s).

Warning. If the launcher fires, follow the procedures outlined in paragraph 27. If the launcher does not fire, make at least two additional attempts to electrically fire the launcher before going to the troubleshooting instructions outlined in paragraph 26.

Page 32. Paragraph 24*e* is superseded as follows:

e. Replacing Shorting Bar (Electrical Firing). If one or more launchers are electrically connected and it is decided not to fire the launchers, complete all the steps outlined below before moving any E8 launcher.

Warning. Do not move any E8 launcher and do not coil any two-conductor electrical firing wire until the firing wire is removed from the binding posts of all E8 launchers and the shorting bar is replaced in all launchers.

(1) Disconnect the firing wire from the power source and twist the en(!s of the stripped wire leads together as a twisted pain.

(2) Remove the firing wire leads from all launcher binding posts.

(3) Depress the launcher binding posts (1, fig. 6) and insert the shorting bar (2) between the binding posts of each launcher.

(4) Inspect the manual safety pin (4) and firing release pin (8) in the firing well to insure both are secure.

(5) Secure the firing well cover on the firing well.

(6) Repack launcher.

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Page 33.

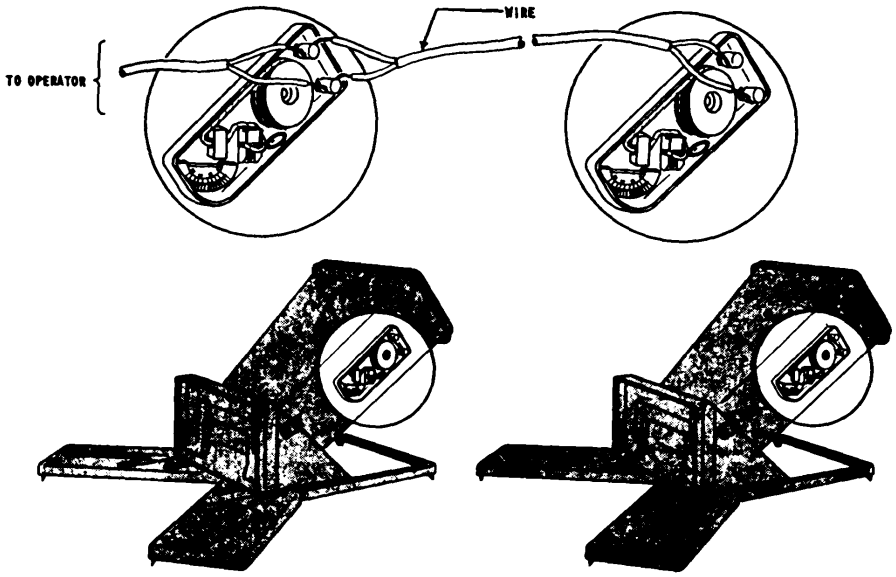

Figure 17. (Superseded) Electrical connection diagram for multiple-unit firing.

By Order of the secretary of the Army:

HAROLD K. JOHNSON,
General, United States Army,

Official: *Chief of Staff.*
KENNETH G. WICKHAM,
Major General, United States Army,
The Adjutant General.

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MOTBY (1)
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EAMTMTS (1)
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WAMTMT8 (1)
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USAAMC (2)
USAECFB (2)
USAPC (2)
USAIC (2)
CMFO, Ft Knox (10)

NG: None.

USAR: None.

For explanation of abbreviations used, see AR 320-50.

TAGO 78A

☆U.S. GOVERNMENT PRINTING OFFICE: 1969-342-015/2446

DEPARTMENT OF THE ARMY TECHNICAL BULLETIN

LAUNCHER AND 35-MM CARTRIDGES TACTICAL CS, 16-TUBE, E8

Headquarters, Department of the Army, Washington, D.C.
8 May 1967

TB 3-1310-255-10, 31 August 1966, is changed as follows:
Page 2. Safety Precautions are superseded as follows:

SAFETY PRECAUTIONS

Do not open a damaged E8 launcher shipping container; isolate and notify proper authority.

Always use caution when opening the shipping container or handling an E8 launcher.

Do not use an E8 launcher whose firing well components are missing or defective; isolate and notify proper authority.

Never lift an E8 launcher module by the top cover; lift it by the carrying strap. When unpackaged, never stand or place any portion of the body in front of or overtop of the firing end (top cover) of an E8 launcher.

Do not attempt to stabilize the launcher by placing any object in the holes of the trails; they may change direction of the fire or they may become loose and cause injury to personnel.

TAKE COVER when the safety pin and firing release pin become disengaged.

Never pull or jerk the lanyard when unwinding the reel or while reinserting the safety pin through the eyering.

Maintain a distance of 5 feet when operating the launcher.

Wear a field protective mask when firing an E8 launcher.

Notify proper authority whenever cracks, dents, or other deformities are noted in an E8 launcher or its components.

In the event of a failure to fire during either manual or electrical firing of the E8 launcher, wait 16 minutes before following the applicable troubleshooting instructions in paragraph 2*b*.

Never attempt to recock a striker when both the firing release pin and safety pin have been pulled free from the mousetrap-type manual actuator. Notify EOD personnel for disposition of launcher.

Inspect the E8 launcher firing tubes after firing to verify that all E23 cartridges have been fired.

After firing the launcher electrically, detonate the M42 primer before disposing of the launcher.

When an E8 launcher has failed to fire and after troubleshooting instructions have been completed, always wait 30 minutes before notifying proper authority to dispose of the launcher.

Notify Explosive Ordnance Disposal (EOD) personnel whenever fired cartridges fail to ignite or launcher fails to function.

Pages 16, 17, and 29. Last sentence in warnings in paragraphs 14, 15, 16, and 21 is superseded as follows:

Do not stand or place any portion of the body in front of or over top of the firing end (top cover) of the munition.

Page 29. Paragraph 22*b* warning is superseded as follows:

Warning: Do not attempt to stabilize the launcher by placing any object in the holes of the trails; they may change the direction of the ire or they may become loose and cause injury to personnel. If time permits, secure the launcher by using the tether spike, digging in, or placing weights on the trails to reduce launcher motion. When firing at 271/2^0 elevation from loose sand, gravel, snow, or ice, use tether spike and a 70-pound sandbag or equivalent weight on each trail.

Page 30. Paragraphs 24*a*(5), and 24*c*(4) warnings are superseded as follows:

Warning: If the launcher fires, follow the procedures outlined in paragraph 27. If the launcher does not fire, and the lanyard and firing release pin do not come clear of the munition, make at least two additional attempts to pull the lanyard to fire launcher before going to the troubleshooting instructions outlined in paragraph 26.

Paragraph 24*d*(5) warning is superseded as follows:

Warning: If the launcher fires, follow the procedures outlined in paragraph 27. If the launcher does not fire, make at least two additional attempts to electrically fire the launcher before going to the troubleshooting instructions outlined in paragraph 26.

Page 32.

25. (Superseded) **Firing Under Adverse Weather Conditions**. The E8 launcher is equipped with a plastic outer case, a built-in moisture barrier, a watertight top, and a firing well with a cover for protection against adverse weather conditions. The entire launcher can be submerged in water without danger of accidental firing; it will function normally following submersion.

Warning: A strong wind or shifting wind direction could cause the agent cloud to overtake the firing position.

Page 33.

26. (Superseded) **Firing Troubleshooting Procedure**. In the event of a failure to fire during either manual or electrical firing of the E8 launcher, wait 16 minutes before following the applicable troubleshooting instructions contained in tables 3 and 4.

Table 3. Manual Firing Troubleshooting Instructions

Warning: Do not stand in front of or over top of firing end (top cover) of the E8 launcher while trouble-shooting or performing corrective action.

Probable cause	*Corrective action*
1. Safety pin still in place.	Carefully recock the striker arm and insert firing release pin. Remove safety pin and reefer the launcher (para 24*a*).
2. Firing release pin failed to release.	*a* If the firing release pin is bent, isolate launcher and refer to paragraphs 32 through 35 for disposition. *b* .If lanyard was caught, straighten it out so that it is free and refire the launcher (para 24*a*).
3. Broken lanyard.....	Tie together broken ends of lanyard and reefer (para 24*a*) .
4. Hung striker (a condition where the spring loaded striker arm does not swing completely over to strike the M42 primer after the firing release and safety pin have both been pulled free).	Isolate launcher and refer to paragraphs 32 through 35 for disposition.
5. M42 primer failed to fire when struck by the striker.	Isolate launcher and refer to paragraphs 32 through 35 for disposition.

Table 4. Electrical Firing Troubleshooting Instructions

Warning: **Do not stand in front of or over top of firing end (top cover) of the E8 launcher while trouble-shooting or performing corrective action.**

Warning: **Disconnect electrical wires from power source and twist ends of wires together in a twisted pair before performing troubleshooting instruc-tions in table 4.**

Probable cause	*Corrective action*
1. Shorting bar(s) not removed.	Remove shorting bar(s) and fire (para 24*d*).
2. Improper connections....	a. Check to see that insulation has been stripped from wires. b. Check to see that the lead-in wires are separated and not shorting out. c. Check to see that wires are routed correctly when firing multiple units (fig. 17). d. Check for electrical continuity of the circuit.
3. Misfire -	Isolate launcher and refer to paragraphs 32 through 35 for disposition.

Page 34.

27. (Superseded) **Inspecting Fired Launchers**. After the E8 launcher has functioned, wait 30 minutes and then check to, determine whether all E23 cartridges have been ejected from the tubes in the launcher module.

Warning: Always approach and remain to the rear of the E8 launcher during this inspection. Do not place body in front of or over top (firing end) of E8 launcher module.

a. Count the tulles visible in the top of the launcher module

b. If 16 tubes are not visible, isolate launcher and refer to, paragraph 32 through 35 for disposition.

c. If 16 tubes are visible, this indicates that at least the top E23 cartridge in each tube has been ejected.

d. Obtain a rigid rod ¼ inch to ½ inch in diameter and about 3 feet long. Place at 90° bend in the rod approximately 1 foot front either end.

e. Place the 2-foot length of the rod along the outside of the launcher module.

f. With the longer end of the rod resting on the top of the baseplace ((11), fig. 4), mark the rod where it meets tile top (firing end) of the launcher module.

g. Place two pieces of pressure-sensitive tape over the end of the 2-foot length.

h. Hold the l-foot length of the rod as close to the end as possible and carefully insert the longer end into each of the 16 tubes.

Note. **When the rod is inserted into each tube, the mark placed on the rod should be about the same level Is the top of the launcher module when the paper tubes are empty.**

i. If the mark made on the rod is 4 inches or higher above the top of the launcher module, at least one E23 cartridge is still in the tube. Isolate launcher and refer to paragraphs 32 through 35 for disposition.

Note. **The walls of the tubes will partially collapse due to the firing function. It may be necessary to force the rod down so that its travel is not being hindered by a partially collapsed tube.**

j. When it has been determined that all 16 tubes are clear of E23 cartridges, for an electrically fired launcher complete the manual firing procedures to detonate the I142 percussion primer ((6), fig. 6) as these primers are detonated during manual firing only.

Paragraph 28*c* is rescinded.

Page 36.

35. (Superseded) **Disposal.** Disposal of E8 launchers may be accomplished. In no case will they be disposed (if unless specifically authorized by the local army commander. Procedures for disposal are contained in TM 9-1300-206 and (C) TM 3-1385-203.

Page 37. Appendix reference is added as follows:

(C) TM 3-1385-203. Explosive Ordnance Disposal (EOD, Procedures for Launcher and 35-MM Cartridge Tactical ('S, 16-Tube E8.

By Order of the Secretary of the Army:

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USAAMC (2)
USAECFB (2)
USAPC (2)
USAIC (2)
USCONARC (25)
ARADCOM (5)
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USAMUCOM (5)
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USACDCEC (10)
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Div (5)
Bde (2)
Regt/Gp/bat gp (2)
Bn (2)
Instl (2)
USMA (10)
Svc Colleges (10)
Br Svc Sch (10) except
USACMLCS (50)
Dep (5)
POE (1)
USA Tml Comd (1)
Army Tml (1)
Arsenals (3) except
Edgewood (50)
PG (5)
FLDMS, Ft Knox (10)

NG: None.
USAR: None.
For explanation of abbreviations used, see AR 320-50.

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HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., *31 August 1966*

LAUNCHER AND 35-MM CARTRIDGES: TACTICAL CS, 16-TUBE, E8

SAFETY PRECAUTIONS

Do not open a damaged E8 launcher shipping container; isolate and notify proper authority.

Always use caution when opening the shipping container or handling an E8 launcher.

Do not use an E8 launcher whose firing well components are missing or defective; isolate and notify proper authority.

Never lift an E8 launcher module by the top cover; lift it by the carrying strap. When unpackaged, never stand or place any portion of the body in front of an E8 launcher.

Do not attempt to stabilize the launcher by placing any object in the holes of the trails; they may change the direction of the fire or they may become loose and cause injury to personnel.

TAKE COVER when the safety pin and firing release pin become disengaged.

Never pull or jerk the lanyard when unwinding the reel or while reinserting the safety pin through the eyering.

Maintain a distance of 5 feet when operating the launcher.

Wear a field protective mask when firing an E8 launcher.

(Personnel not wearing a field protective mask must remain 2,000 feet from the target area!) Notify proper authority whenever cracks, dents, or other deformities are noted in an ES launcher or its components.

Inspect the E8 launcher firing tubes after firing to verify that all E28 cartridges have been fired (para 27).

After firing the launcher electrically, detonate the M42 primer before disposing of the launcher.

When an E8 launcher has failed to fire and after troubleshooting instructions have been completed, always wait 80 minutes before notifying proper authority to dispose of the launcher.

Notify Explosive Ordnance Disposal (EOD) personnel whenever fired cartridges fail to ignite.

SECTION I

INTRODUCTION

1. Scope.

This bulletin contains information necessary to operate the Launcher and 35-MM Cartridges: Tactical CS, 16-Tube, E8 (ES launcher). Prior to operation of an E8 launcher, operating personnel must be familiar with all the instructions in this bulletin.

2. Records and Reports

a. Accidents involving injury to personnel or damage to material will be reported as specified in AR 385-40.

b. Accidents or malfunctions in combat or training will be reported as specified in AR 700-1300-8.

c. Records and reports will be completed as outlined in Army Equipment Record Procedures Manual TM 38-750.

d. The direct reporting by the individual user of errors, omissions, and recommendations for improving this bulletin is authorized and encouraged. DA Form 2415 (Ammunition Condition Report) will be used for reporting these improvement recommendations. This form will be completed in pencil, pen, or typewriter and forwarded direct to Commanding Officer, U.S. Army Edgewood Arsenal, ATTN: SMUEA-TSE-TPE, Edgewood Arsenal, Md. 21010.

3. Use

The E8 launcher is intended for use by combat and service elements of the field army to disperse tactical CS into the atmosphere to temporarily incapacitate the enemy without inflicting physical harm. A direct hit may cause bodily harm.

SECTION II

DESCRIPTION AND DATA

4. General

This section contains a description of the E8 launcher and its components. Instructions on the functioning, packaging, and identification of the launcher and its major components are included.

5. B8 Launcher

a. Launcher Components. The E8 launcher (fig. 1) consists of a launcher module (fig. 2) and a firing platform (fig. 3). The launcher is lightweight (approximately 33.5 pounds) and may be transported, emplaced, sighted, and fired by one man. The launcher is received loaded with cartridges and mounted on the firing platform. After firing and completing inspecting fired launchers procedures (para 27), the entire unit is discarded.

b. Operation. The launcher fires 64 cartridges (Cartridge, 35-mm, Tactical CS, E23 (E23 cartridge) from 16 tubes arranged in a rectangular pattern which gives a wide impact pattern on the target. The typical agent cloud generated when fired from a stably emplaced launcher at a 40° elevation will be a rectangle 40 meters wide by 150 meters deep with a spread to a maximum range of 250 meters. After the cartridge lands, the agent is emitted for 10 to 15 seconds.

c. Launcher Module and Harness. The launcher module (fig. 4) contains 16 reinforced kraft paper tubes (4), each containing four E23 cartridges (13). The tubes are encased in polyurethane foam (14) and are embedded in epoxy resin (12) to hold them in place in the baseplate (11). The E23 cartridges are separated in the tubes by plastic separator caps (15) and cardboard separator discs (16). The plastic outer case (9), foil vapor barrier (3), top cover (1), and firing well cover (8) provide protection from the weather. The carrying harness is attached to the plastic case by a metal band and two attachment rings (10).

d. Firing Platform. The firing platform (fig. 5) provides a base for carrying and firing the launcher module. It consists of a back pad (1), position panel (2), and stability platform (4). The back pad is snapped into position for comfort when carrying the E8 launcher. The position panel (2) has six positions for locking the launcher module in six different firing elevations. The stability platform (4) consists of a base (5), tether spike (3), and two trails (6 and 8) with spikes (7) to restrict the launcher from changing position during firing. The launcher may be carried to a static defense position without the firing platform by connecting the clips (5, fig. 7) to the launcher module attachment rings as shown in figure 2.

6. Firing Well

The firing well (fig 6) is located on the side of the launcher module. It contains binding posts (1), lanyard reel (3), mousetrap-type manual actuator (5), and an inclinometer (7). The two spring-loaded binding posts are used when firing the launcher electrically. The shorting bar (2) is connected between the two binding posts until time of electrical firing. The reel (3) contains 20 feet of lanyard cord (9) for use when firing the launcher manually. The lanyard is connected to the safety pin (4) and firing release pin (8) on the spring-loaded mousetrap-type manual actuator. The safety pin must be removed before the manual actuator can be released. The inclinometer provides a visual means of checking the elevation angle when firing the launcher.

7. Carrying Harness

The carrying harness (fig. 7) is connected to the launcher by a metal band (2) and attachment rings (4) with two clips (5). The carrying harness consists of two padded, adjustable shoulder straps (1). Adjustment of each shoulder strap is accomplished by lengthening or shortening the adjusting straps (8). A quick-release cord

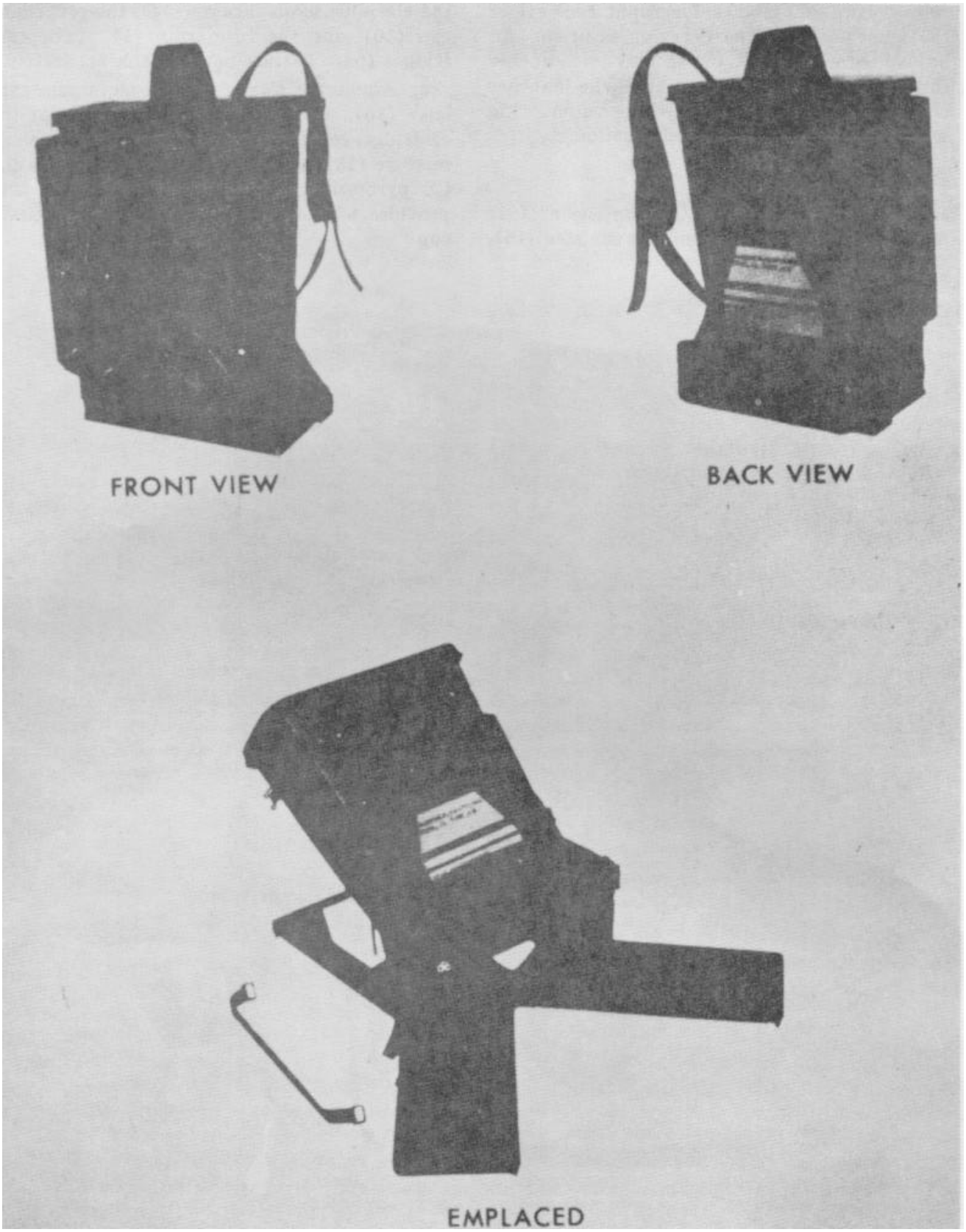


Figure 1. E8 launcher.

(7) allows for rapid removal of the launcher from the carrying position. An adjustable waistband (13) secures the launcher in the carrying position and holds the launcher close to the back to prevent excessive bouncing when running or taking evasive action.

8. E23 Catridge

The E23 cartridge (fig. 8) consists of four major assemblies: the aluminum canister (15), the elastomeric diaphragm (14) the propellant cup (10), and the fuse train (1). (The cartridges (para 5b) are not available separately.)

a. Aluminum Canister. The aluminum canister (15), which forms the main body of the cartridge, contains 38 grams of CS pyrotechnic mixture in the canister and provides a means of attaching the propellant cup.

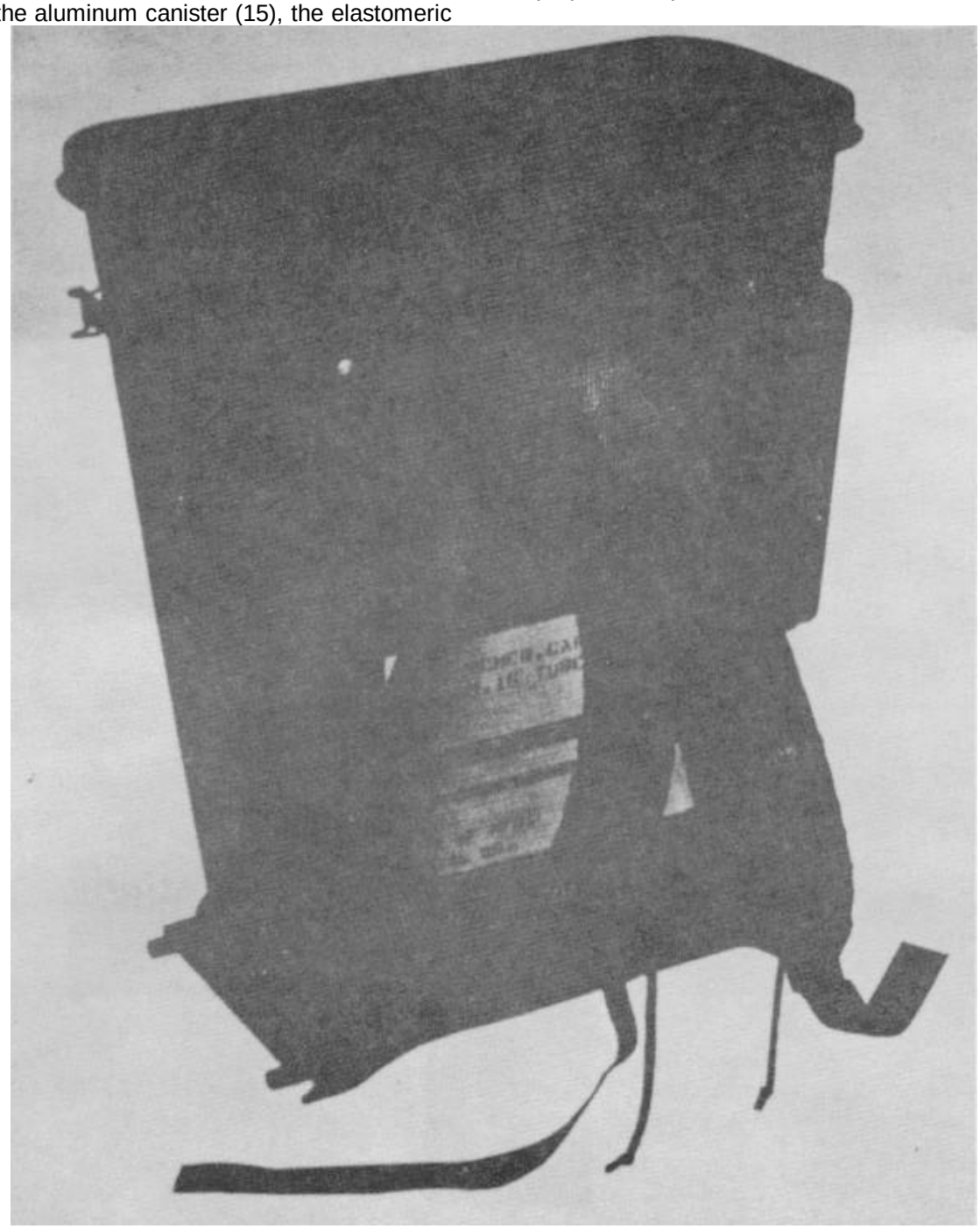


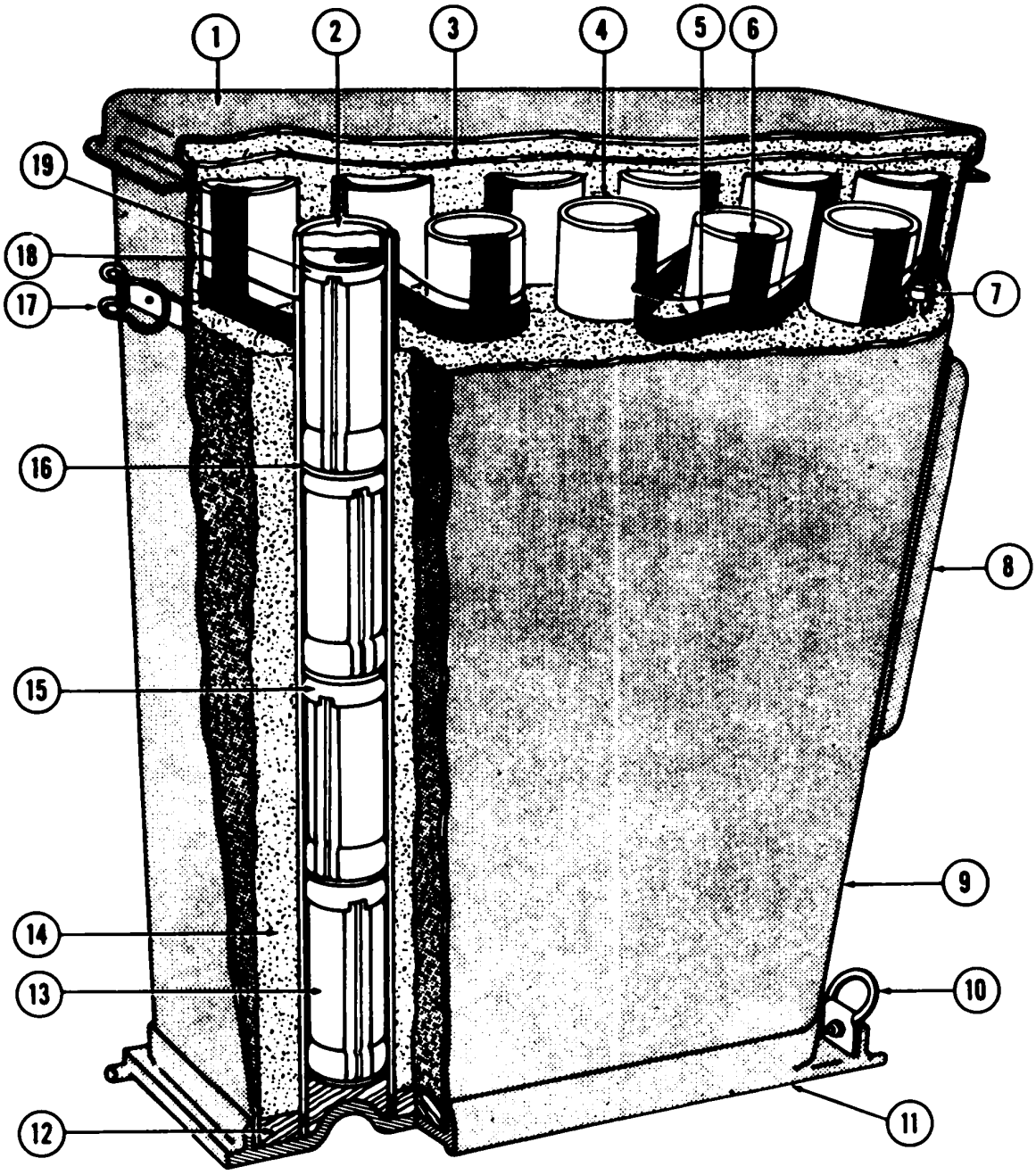
Figure 2. Launcher module.

b. Elastomeric Diaphragm. The elastomeric diaphragm (14) has a small off-center nozzle (17). The diaphragm is fastened over the aluminum canister with binding twine.

c. Propellant Cup. The propellant cup (10), threaded into the disc in the base of the aluminum canister, contains black powder (11) and the time-delay fuse assembly (9). A lacquered diaphragm (6) is cemented over the propellant cup to retain the black powder.

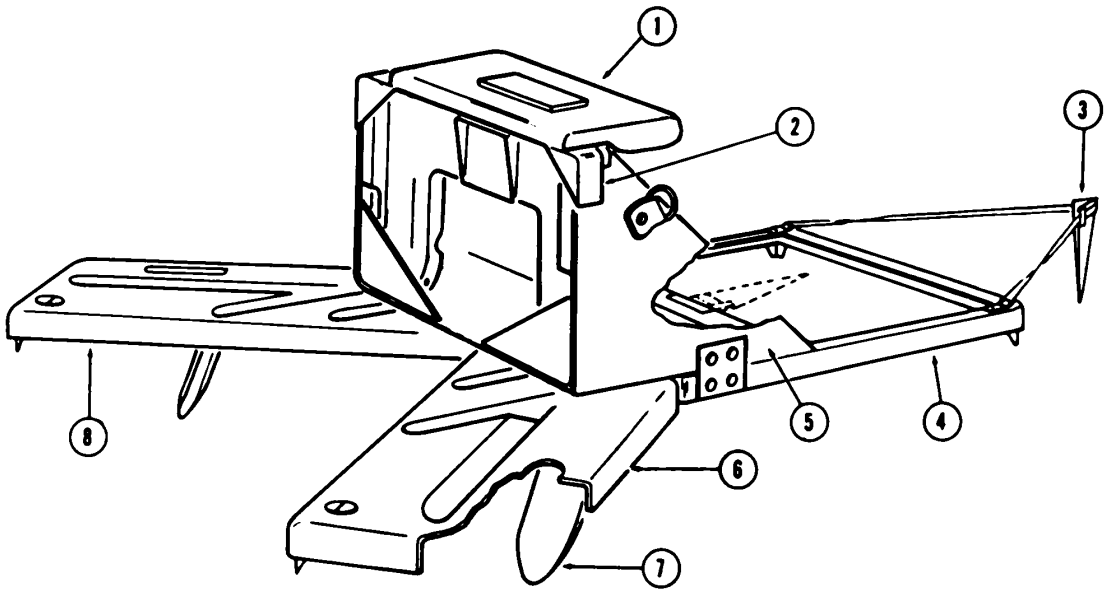
d. Fuse Train. The fuse train (1) consists of a pyrotechnic disc (2) mounted on the upper face of the cartridge, and pyrotechnic fuse strips (3), secured to each side of the cartridge by pressure-sensitive lead-foil tape (4). The fuse train is mounted externally on the elastomeric diaphragm and propellant cup.

Figure 3. Firing platform.



1 Top cover
2 Foam cap
3 Foil vapor barrier
4 Paper tube
5 Main fuse train
6 Fuse strip
7 Electrical squib
8 Firing well cover
9 Plastic case
10 Carrying harness attachment ring
11 Baseplate
12 Epoxy resin
13 E23 cartridge
14 Polyurethane foam
15 Plastic separator cap
16 Cardboard separator disc
17 Trail release catch
18 Auxiliary fuse train
19 Plastic separator cap, flanged

Figure 4. Launcher module - cutaway view.



1	Back pad	5	Base
2	Position panel	6	Trail (right hand)
3	Tether spike	7	Spike
4	Stability platform	8	Trail (left hand)

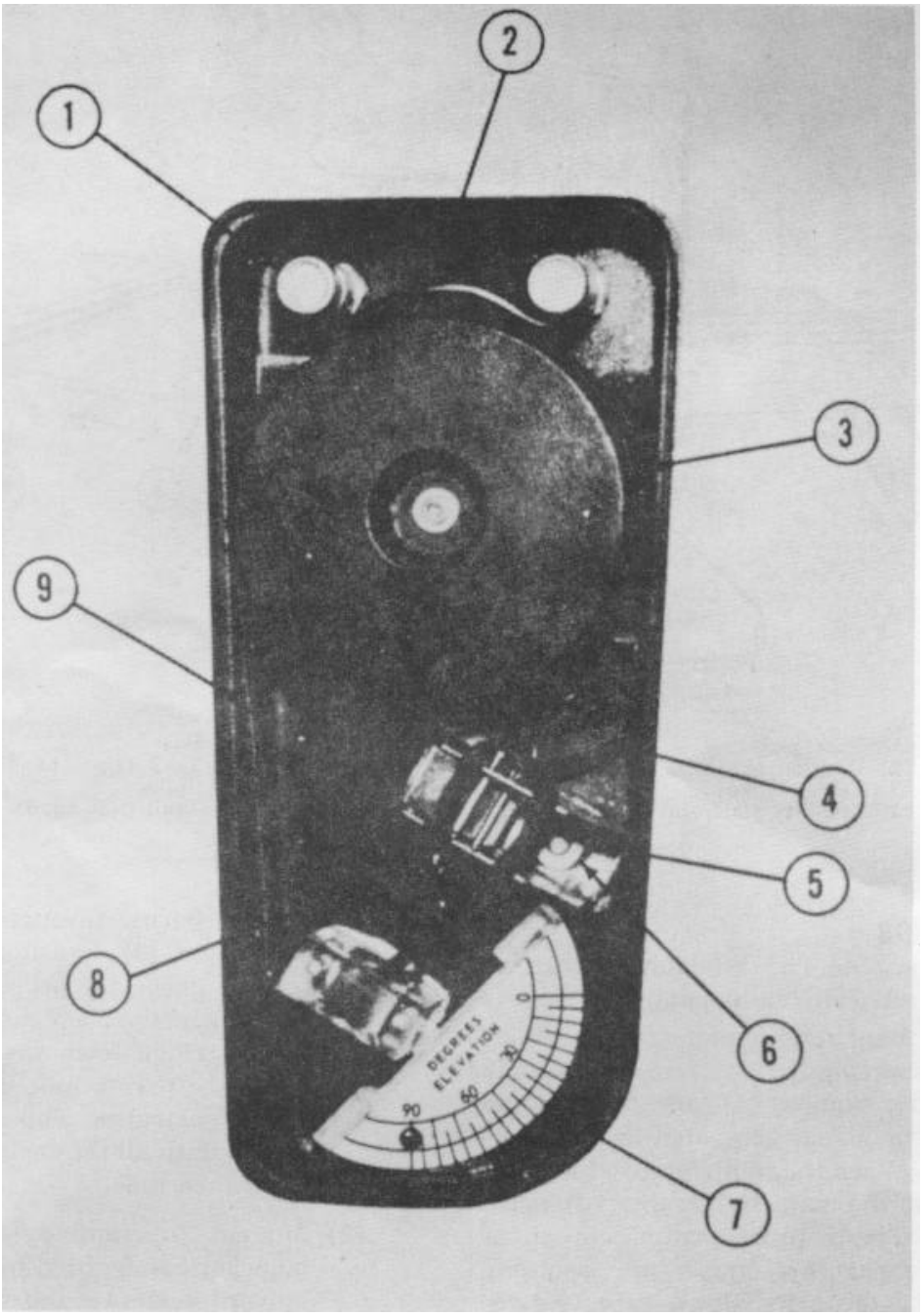
Figure 5. Firing platform (components).

9. Functioning

a. E8 Launcher. The E8 launcher can be fired either electrically or manually.

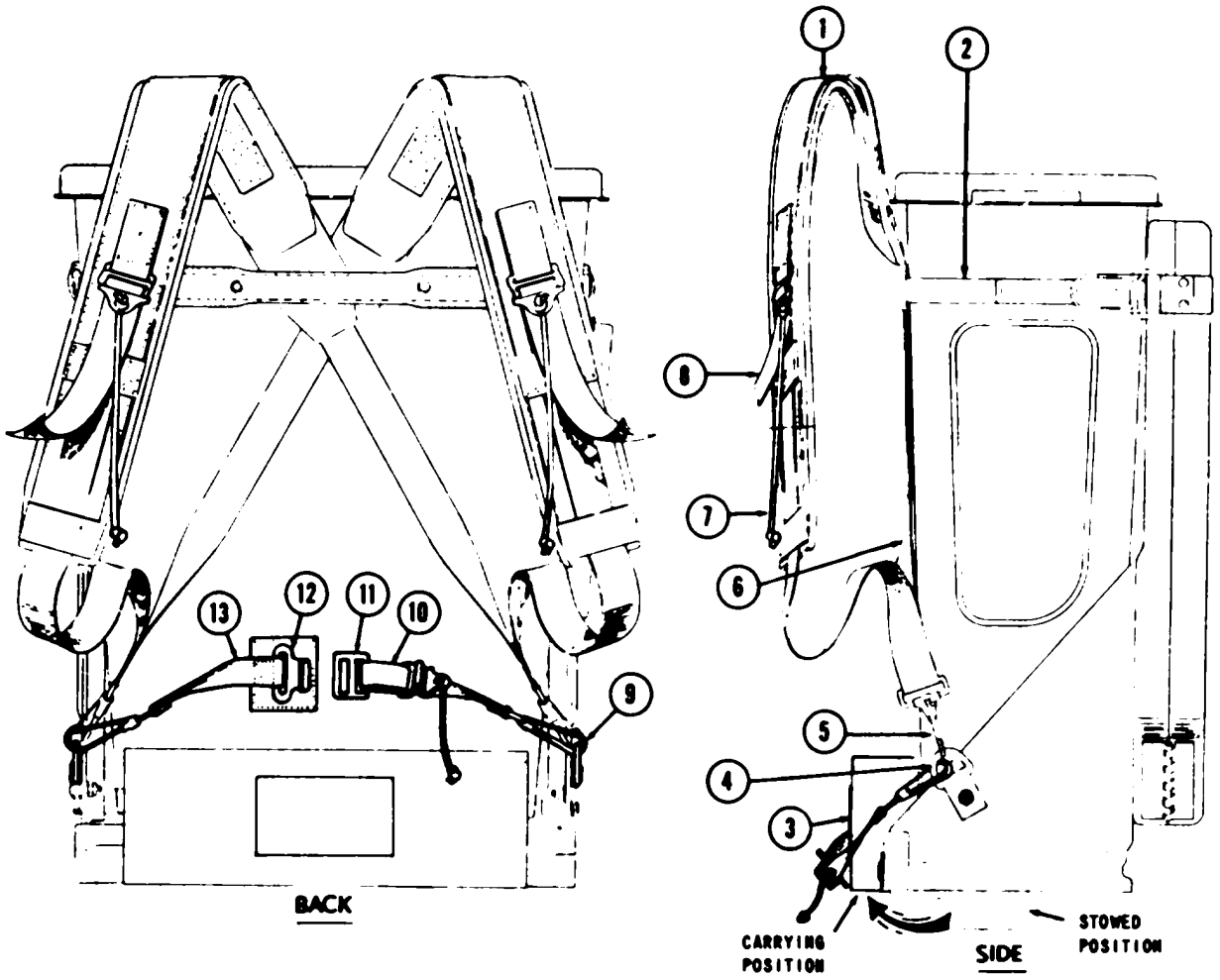
(1) Electrical functioning (fig. 9). With the shorting bar (1) removed, the M2 electric squibs (4) are fired by an electric signal generated by the operator. When the squib ignites, the flame starts the main fuse train (10) burning. The main fuse train connects to 16 branch fuse strips (3), each connected to an individual tube. As the branch fuse strip burns to completion, the pyrotechnic disc (7) of the first E23 cartridge (6) of each tube is ignited. Remaining tubes are fired in a predetermined sequence. The pyrotechnic disc transfers the flame to the cartridge fuse strip (5). The fuse strip burns down both sides of the cartridge, burns through a lacquered diaphragm (9), and ignites the black -powder inside the propellant cup (8). Burning of the black powder will eject the cartridge from the launcher and ignite the pyrotechnic disc (2) on the second cartridge. This sequence is repeated until all the cartridges are fired from each tube.

(2) Manual functioning (fig. 10). The launcher can be fired by removing the lanyard reel (1) and safety pin (4) and pulling on the lanyard (7). As the lanyard is pulled, the firing release pin (6) slides out of the spring-loaded mousetrap-type manual actuator (3) and releases the striker arm (2). The spring-powered striker arm swings over and strikes the M42 percussion primer (5). After a delay of 5 seconds, heat from the burning primer ignites the primer fuse train.



1 Binding post
2 Shorting bar
3 Lanyard reel
4 Safety pin
5 Mousetrap-type manual actuator
6 M42 percussion primer
7 Inclinometer
8 Firing release pin
9 Lanyard cord

Figure 6. Firing well.

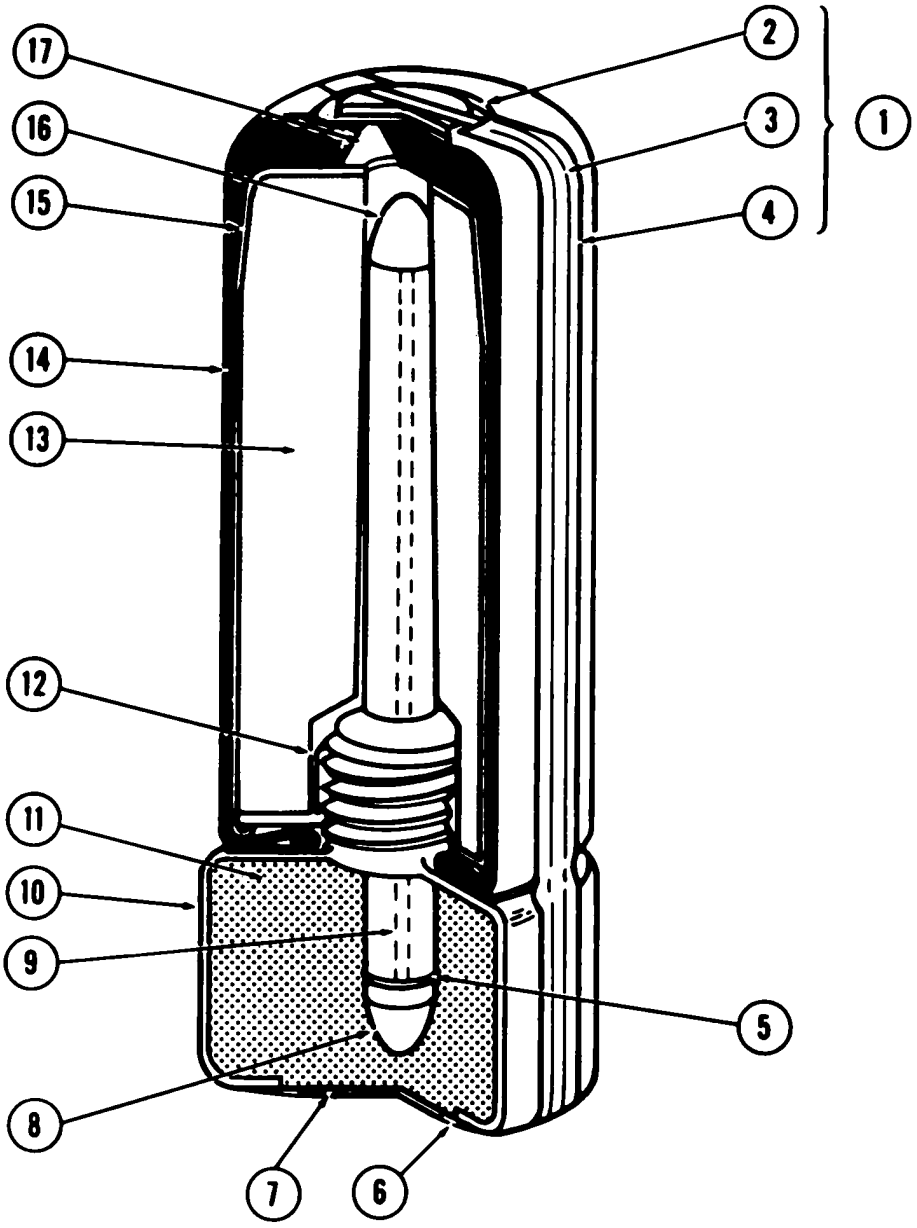


1 Shoulder strap
2 Metal band
3 Back pad
4 Attachment ring
5 Clip
6 Support strap
7 Quick-release cord
8 Adjusting strap
9 Clip
10 Adjusting strap
11 D-ring
12 Hook
13 Waistband

Figure 7. Carrying harness.

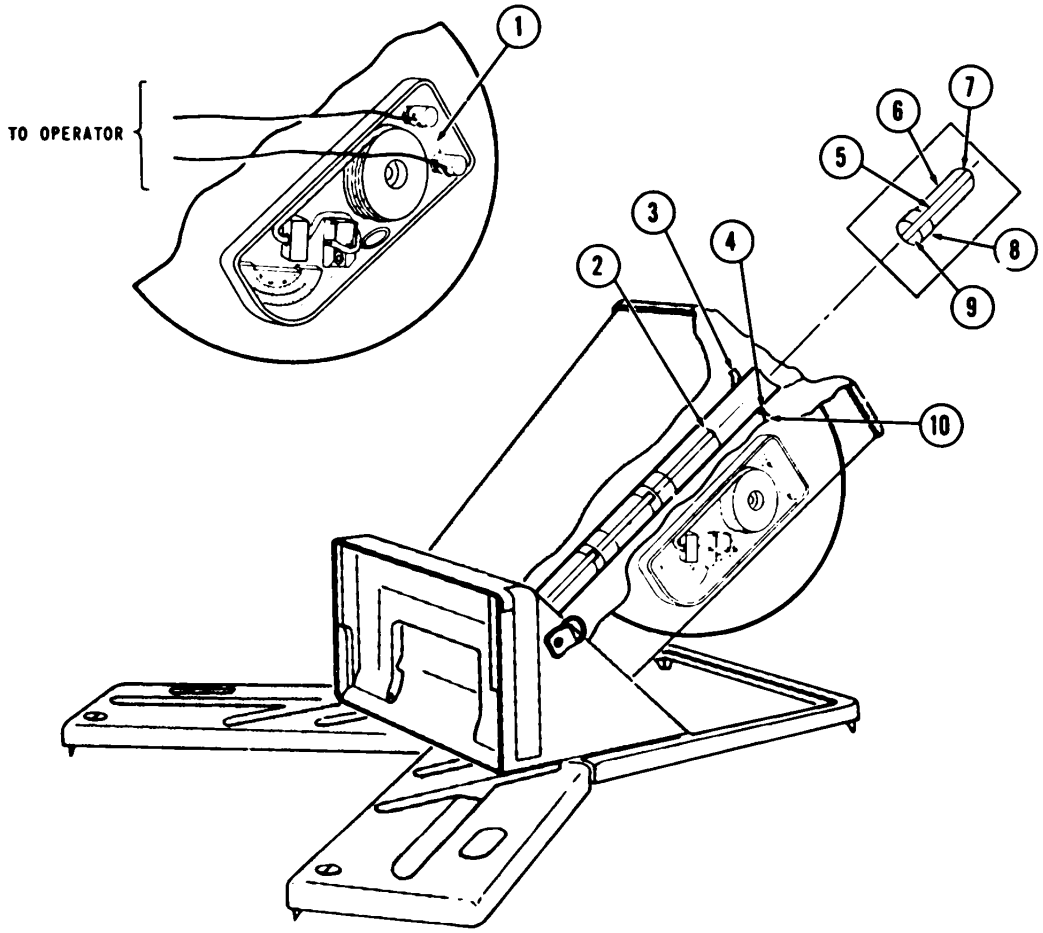
The primer fuse train ignites the main fuse train. The remainder of the firing cycle is identical to that described in (1) above after squib ignition.

b. E23 Cartridge. The functioning cycle of the E28 cartridge (fig. 8) begins when the heat from the pyrotechnic pad (7) burns through the lacquered diaphragm (6) and ignites the black powder (11) as described in a(l) above. When the black powder ignites, the gas produced expels the cartridge from the launcher. At the same time the black powder ignites, the first-fire coating (8) is ignited and in turn ignites the 5 to 6-second time-delay fuse (9) inside the cartridge. At the end of the delay time, the delay fuse ignites the igniter coating (16) which in turn ignites the CS pyrotechnic mixture (13). The pressure builds up within the canister opening the canister opening the nozzle (17).



1 Fuse train
2 Pyrotechnic disc
3 Pyrotechnic fuse strip
4 Lead-foil tape
6 Crimp ring
6 Lacquered diaphragm
7 Pyrotechnic pad
8 First-fire coating
9 Time-delay fuse
10 Propellant cup
11 Black powder
12 Threaded disc
13 CS pyrotechnic mixture
14 Elastomeric diaphragm
15 Aluminum canister
16 Igniter coating
17 Nozzle

Figure 8. E23 catridge-cutaway view.



1 Shorting bar
2 Pyrotechnic disc
3 Branch fuse strip
4 Electric squib
5 Cartridge fuse strip
6 E23 cartridge
7 Pyrotechnic disc
8 Propellant cup
9 Lacquered diaphragm
10 Main fuse train

Figure 9. E8 launcher-electrical functioning.

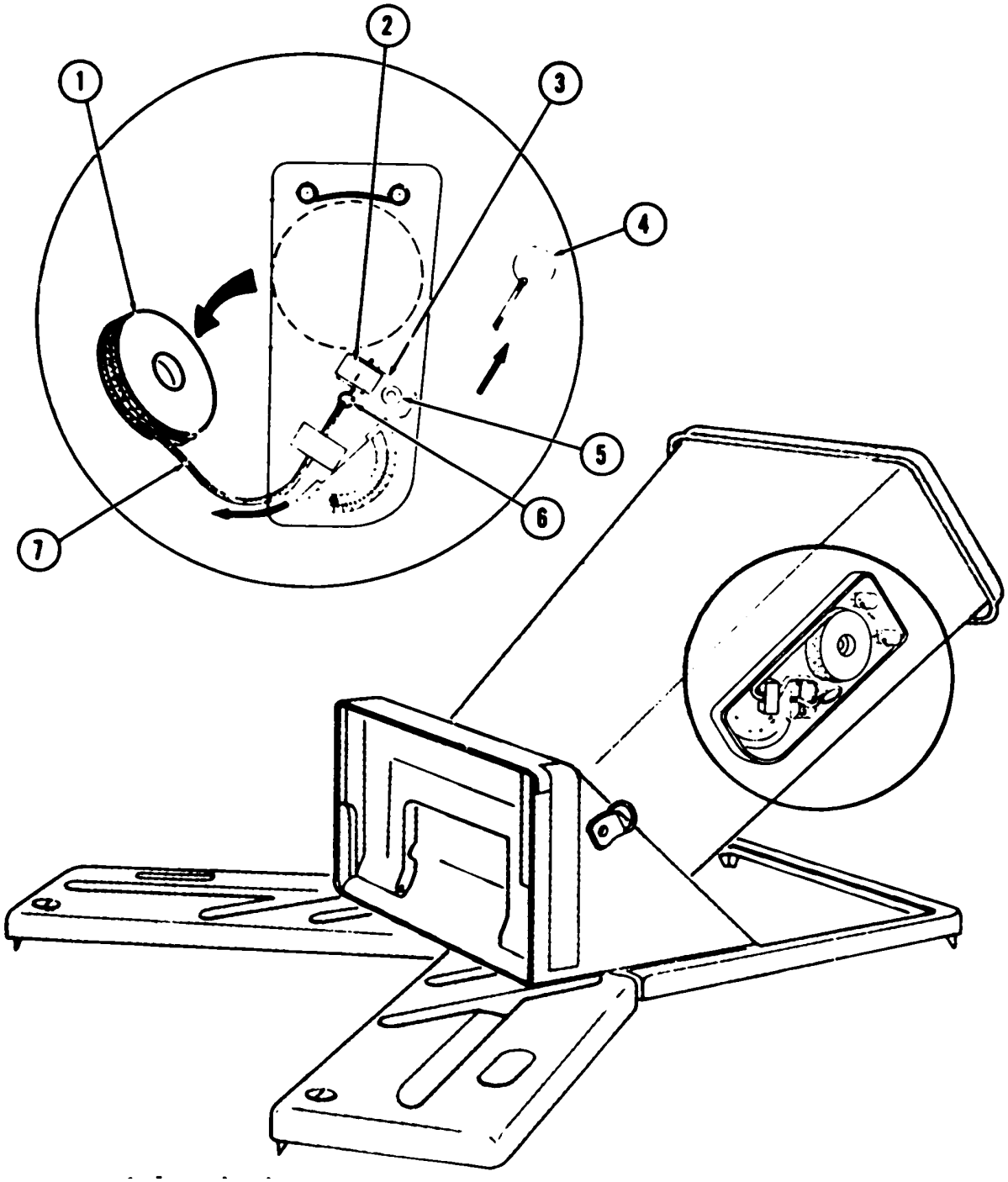
The mixture burns for 10 to 15 seconds. Thrust exerted by the burning mixture propels the cartridge along the ground in a zigzag path while the agent is being released.

10. Packaging

The E8 launcher is wrapped with a 1-inch layer of cushioning material and then sealed in a plastic bag. The sealed bag is inclosed in a fiberboard box and the box is sealed with tape. The sealed fiberboard box is packaged in a cleated plywood shipping container and secured with nails and steel straps.

11. Identification

a. Shipping Container. The shipping container has the nomenclature, weight, cubage, manufacturer's name and address, and Federal stock number stenciled on its side and on the end.



1 Lanyard reel
2 Striker arm
3 Manual activator
4 Safety pin
5 Primer
6 Firing release pin
7 Lanyard

Figure 10. E8 launcher -manual functioning.

One red band and one brown band are painted on a gray background around the center of the shipping container. The red band indicates a nonpersistent-effect riot control agent; the brown band indicates a low explosive. Opposite top corners of the shipping container are painted cobalt blue, indicating a chemical item.

b. E8 Launcher. The E8 launcher module (fig. 2) has the nomenclature, serial number, manufacturer, date of manufacture, and lot number stenciled on the back. The color coding used on the shipping container is painted on the launcher module in the area between the carrying harness support straps.

12. Tabulated Data

All numerical data are approximate.

a. Packaged E8 Launcher:

Length	=	19 in.
Height	=	23 in.
Depth	=	13 in.
Weight	=	60 lb.
Cube	=	3.5 cu ft.

b. Unpackaged E8 Launcher (Stowed Position):

Length	=	18.9 in.
Height	=	8.9 in.
Width	=	15.0 in.
Weight	=	83.5 lb.

SECTION III

SERVICE UPON RECEIPT

13. General

This section contains instructions for unpacking and inspecting the E8 launcher prior to distribution for use.

14. Unpacking

Warning: **The E8 launcher is a low-explosive chemical munition containing a nonpersistent-effect riot control agent. Use care when opening the shipping container to prevent accidental activation of the munition. Do not attempt to open the shipping container if damage is found. Isolate and notify proper authority. Do not stand or place any portion of the body directly in front of the munition.**

Cut the steel straps and remove the nails from the top. Lift off the top and remove the fiberboard box. Cut the tape on the fiberboard box and open it. Remove the sealed bag and cut it open.

15. Inspection

Warning: **The E8 launcher is a low-explosive chemical munition containing a nonpersistent-effect riot control agent. Use care when handling the unit to prevent accidental activation of the munition. Do not stand or place any part of the body directly in front of the munition.**

After the E8 launcher has been removed from the shipping container, visually inspect the launcher as described in table 1. Notify higher authority when any launcher is incomplete or damaged.

Table 1. Visual Inspection

Inspect	*Acceptable condition*
1. Harness (fig. 7).	Harness is free from cuts, rips, broken clips, and missing parts.
2. Firing platform.(fig. 6).	*a*. Platform is free from nicks, dents, cracks, broken or missing parts. *b*. The trail retaining strap securely locks the trails in position and is free from crack or missing rivets *c*. The backrest is free from cuts, rips, broken or missing snaps
3. Top cover (fig. 4).	The top cover fits snugly on the launcher module end is free from cuts, rips, nicks, holes, or other damage. *Do not remove top cover.*
4. Firing well cover (fig. 4).	The firing well cover fits snugly on the firing well and is free from cuts, rips, nicks, holes, or other damage. ***Warning:*** **The firing well contains the firing devices for activating the launcher. If the firing well cover is damaged the launcher may be in an armed condition**
5. Firing well (fig. 6).	Carefully remove firing well cover. The shorting bar is connected to the two upper terminals end is free of corrosion. If the shorting bar is missing, isolate the launcher. Obtain another shorting bar and then put it in place. The safety pin, firing release pin, and the lanyard reel should be in position and free from cracks, dents, and other damage. The lanyard should not be frayed. ***Warning:*** **The firing well contains the device for activating the launcher. If any of the components, such the safety pin or firing release pin is missing or defective, immediately notify higher authority.** The inclinometer is free from cracks or other damage. The marking should be legible. Stand E8 launcher on base on level ground; ball on inclinometer should be on 90° elevation. Lay on flat surface; bell should move to 0° elevation. Replace firing well cover.
6. Launcher module (fig. 2).	The launcher module is free of cuts, rips, nicks, dents, cracks, and holes; securely mounted to the base; and all covers in place.

SECTION IV

OPERATING INSTRUCTIONS

16. General

This section provides instructions for carrying, dismounting, emplacing, and operating the E8 launcher.

Warning: **Take care when handling the E8 launcher to prevent accidental activation. Do not stand directly in front of the munition**

17. Carrying Position

To mount the E8 launcher in the proper carrying position, fold down the back pad (3, fig. 7), grasp the shoulder straps, and swing the launcher up onto the back in the same way as a field pack. Adjust the launcher adjusting straps to obtain the most comfortable position. (The adjusting straps are shortened by a downward pull on the straps; the straps are lengthened by lifting up the buckle and slipping the strap until the desired length is obtained.) Connect the waistband by slipping the hook (12) into the D-ring (11). Adjust the waistband until the launcher is snug against the back. (The waistband is adjusted in the same manner as the shoulder straps.)

18. Dismounting and Emplacement

Note. **Wherever possible, the launcher should be dug-in, sandbagged, or otherwise secured for stability.**

Use the procedure shown in figure 11 when dismounting and emplacing the launcher from a standing or kneeling position. Refer to paragraph 19 for instructions on dismounting and emplacing the launcher from the prone position.

19. Dismounting and Emplacement From Prone Position

a. Roll over onto left side.

b. Release the waistband.

c. Using the left hand, reach across and grasp the quick-release cord on the right shoulder strap.

d. Pull the quick-release cord with a rapid upward motion until the adjusting strap is free of the buckle.

e. Roll back into the prone position.

f. Free left arm from shoulder strap. The launcher should now be on its side with the firing well resting on the ground and the top cover facing the target.

g. Roll back on the right side. With the left hand, release the nearest trail retainer catch allowing the storage band to swing clear of the launcher.

h. Swing the left trail to the rear into its firing position.

i. Roll the launcher over into firing position (the left trail should then be in the correct firing position (8, fig. 5)).

j. With the left hand, grasp the bottom of the base (5) near the position panel (2) and lift up right side of launcher. Swing the right trail (6) to the rear into firing position.

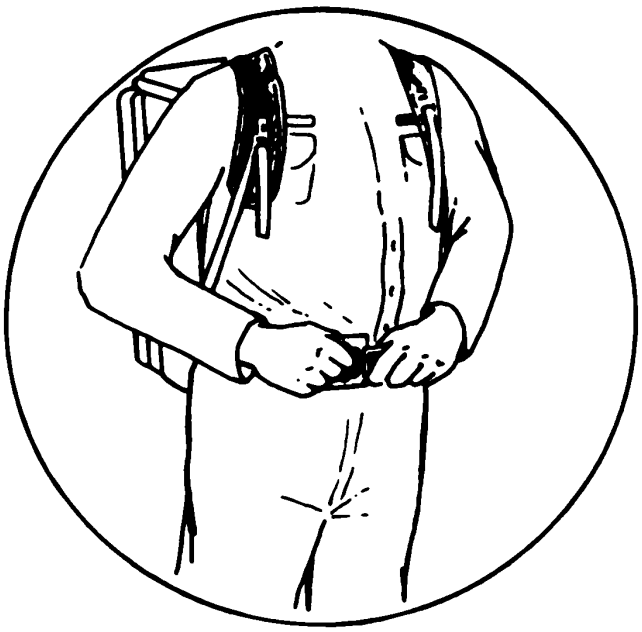
k. Proceed as described in figure 11, steps 7 through 13.

20. Aiming

The E8 launcher can be quickly and easily emplaced, sighted, and fired by one man. However, to insure accuracy, several factors must be considered when aiming the munition: impact pattern, range, slope of terrain, and wind direction and speed.

a. Impact Pattern (fig. 12). The E8 launcher fires 64 E23 cartridges from 16 tubes arranged in a rectangular pattern with the tubes positioned to give a wide impact pattern on the target. The dimensions of the impact pattern when fired from a stably emplaced launcher under ideal conditions (wind below 5 knots) at 40° elevation is 40 meters wide by 125 to 175 meters deep.

Note. **The shape and size of the impact pattern are greatly affected by changes in wind direction and speed. Firing into the wind will shorten and widen the pattern; firing with the wind will lengthen and narrow the pattern.**

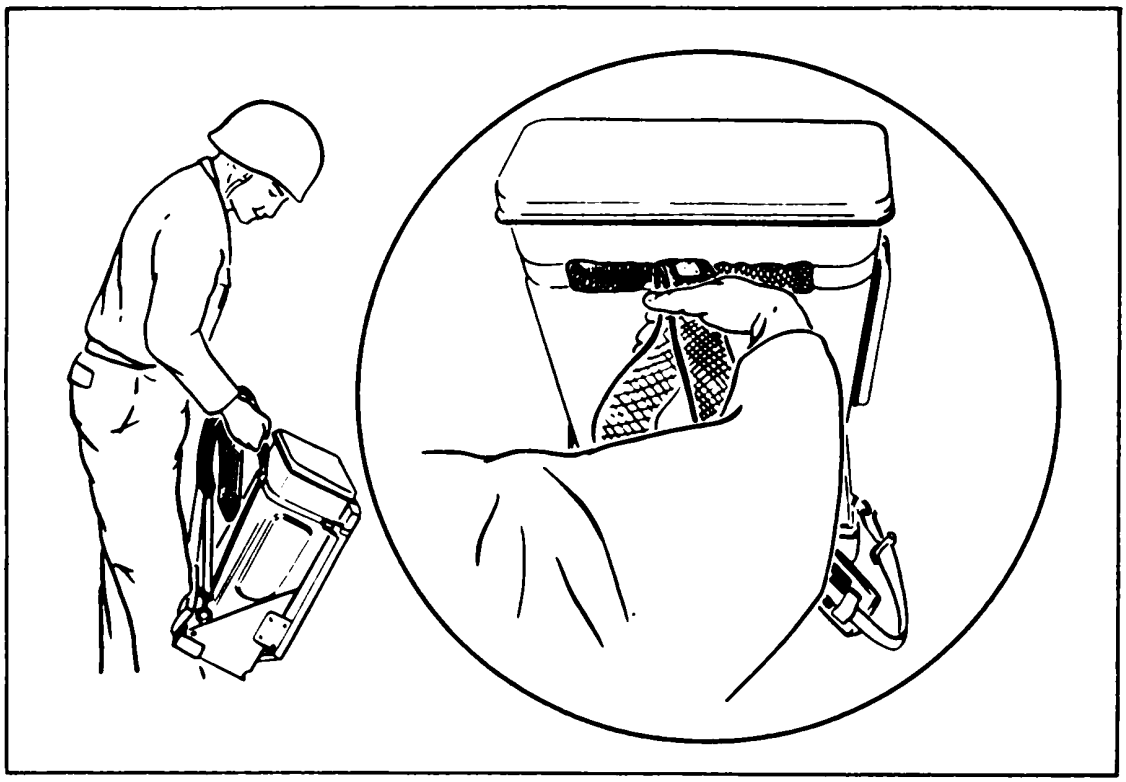


STEP 1. GRASP BOTH ENDS OF THE WAISTBAND, PULL EACH END TOWARD THE CENTER, AND SLIP THE .HOOK OUT OF THE D-RING,. RELEASE THE WAISTBAND AND ALLOW THE TWO STRAPS TO FALL FREE.

STEP 2. PULL THE QUICK RELEASE CORD WITH A RAPID UPWARD MOTION UNTIL THE ADJUSTING, STRAP IS FREE OF THE BUCKLE AND THE LAUNCHER DROPS FROM SHOULDER.. ONLY ONE RELEASE CORD NEED BE PULLED TO, REMOVE THE LAUNCHER.

Figure 11. (1). Dismounting and emplacement of E8 launcher.

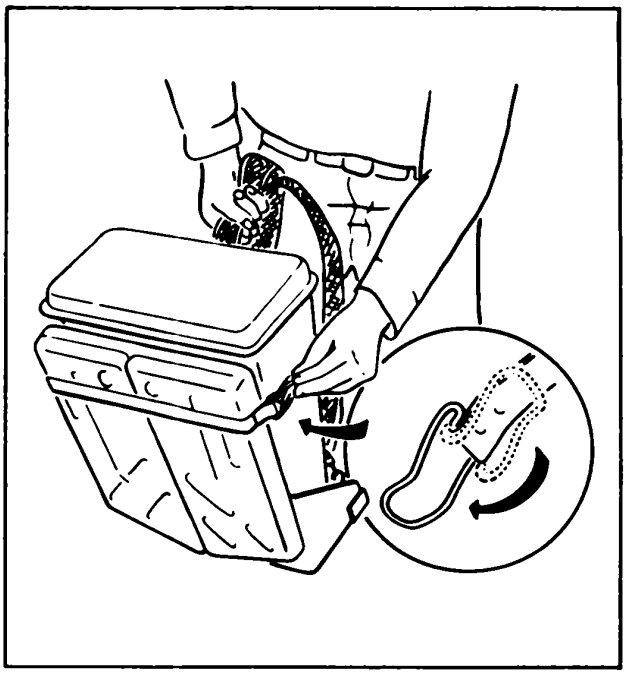
STEP 3. ALLOW THE LAUNCHER TO SLIDE OFF THE OTHER SHOULDER ONTO THE ARM.

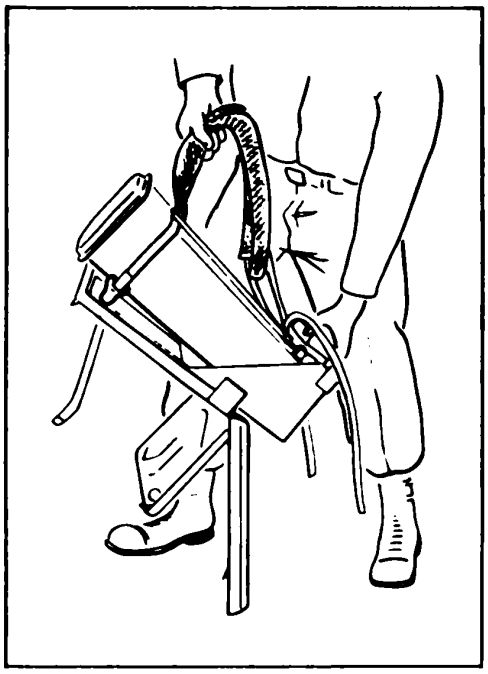


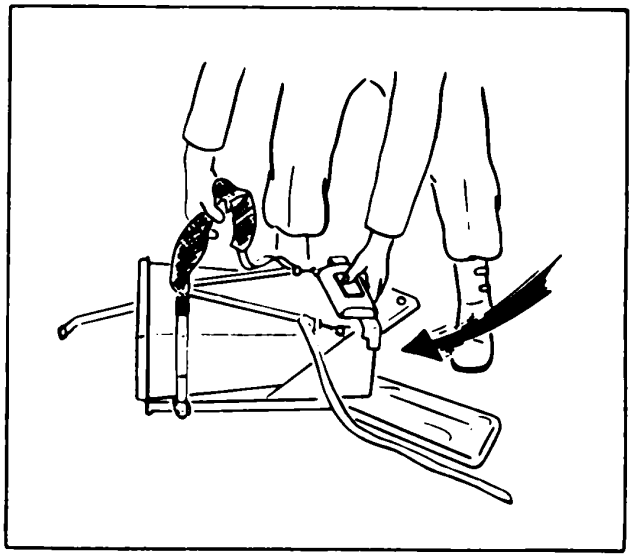
STEP 4. GRASP BOTH SHOULDER STRAPS AT JUNCTION CLOSE TO METAL BAND WITH ONE HAND.

Figure 11 (2). Dismounting and emplacement of E8 Launcher--Continued.

STEP 5. USING, THE FREE HAND, OPEN: THE NEAREST TRAIL RETAINER CATCH ALLOWING TRAIL STOWAGE BAND TO SWING, FREE FROM THE LAUNCHER .

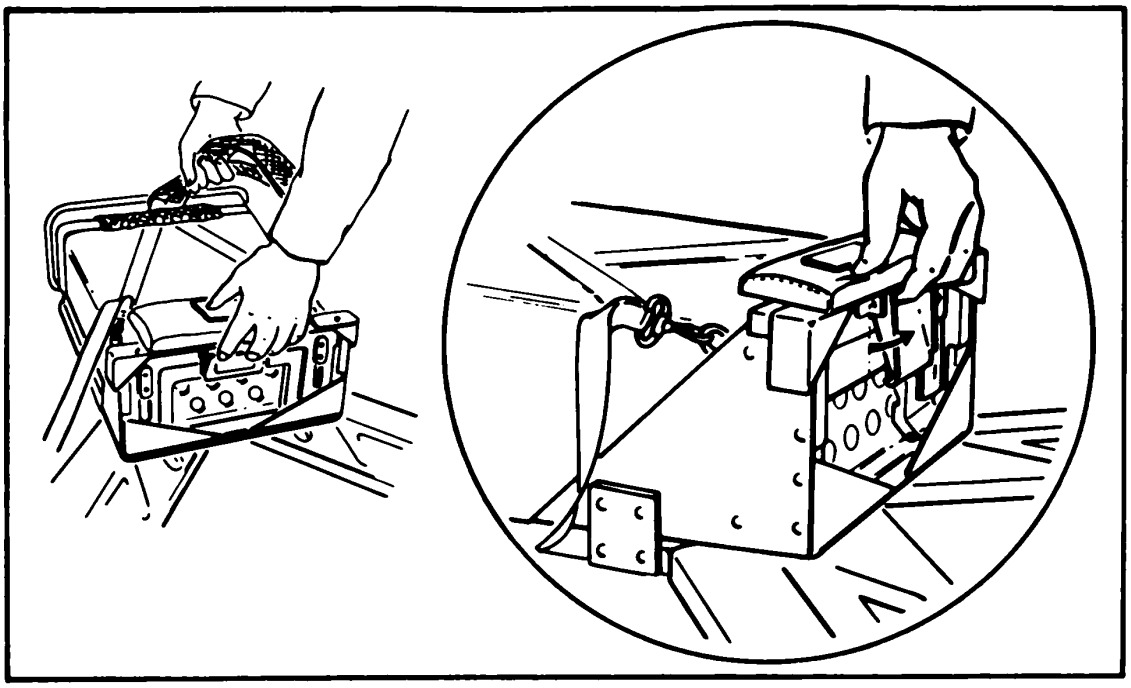






STEP 6. GRASP THE BASE OF THE LAUNCHER WITH THE FREE -HAND AND PLACE THE LAUNCHER ON THE GROUND WITH A QUICK DOWNWARD AND FORWARD MOTION. THE DOWNWARD AND FORWARD MOTION WILL SNAP THE TRAILS BACK INTO FIRING, POSITION.

Figure 11 (3). Dismounting and emplacement of E8 launcher--Continued



STEP 7. STILL HOLDING THE SHOULDER STRAPS, USE THE FREE HAND TO RELEASE THE BACK LATCH. THE BACK LATCH IS PRELEASED BY SQUEEZING, UPWARD WITH THE FINGERS.

STEP 8. USING A SHARP UPWARD MOTION; DISENGAGE THE SUPPORT LUGS.

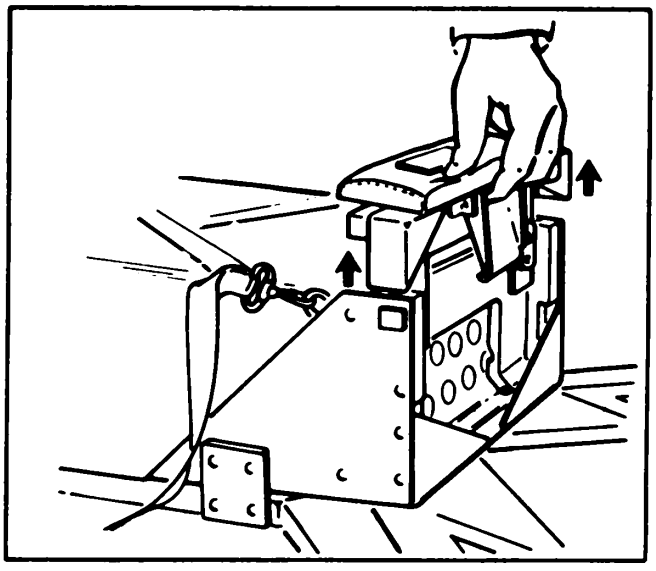
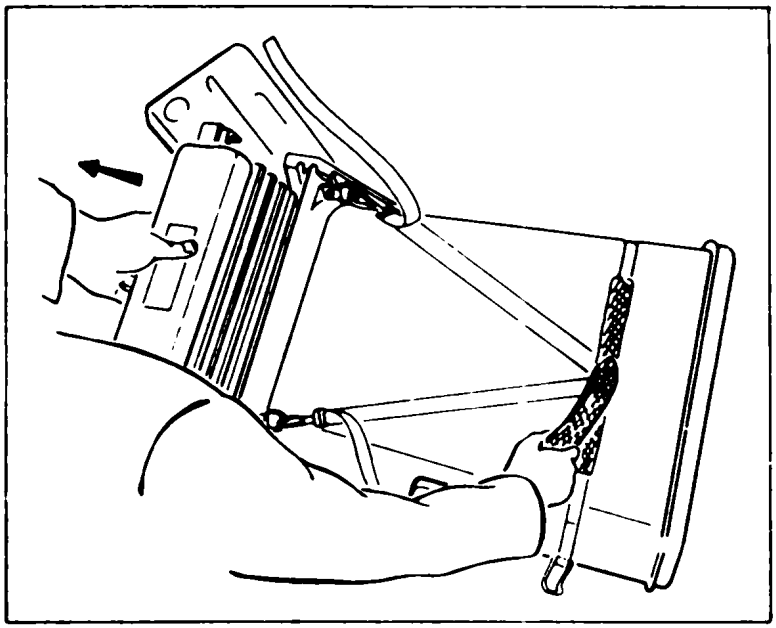
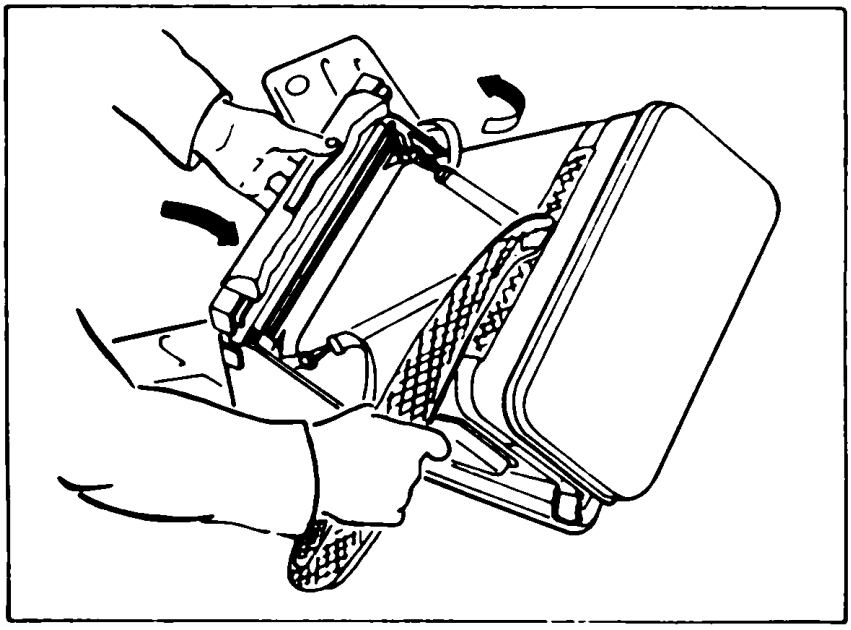


Figure 11 (4). Dismounting and emplacement of E8 launcher -Continued.



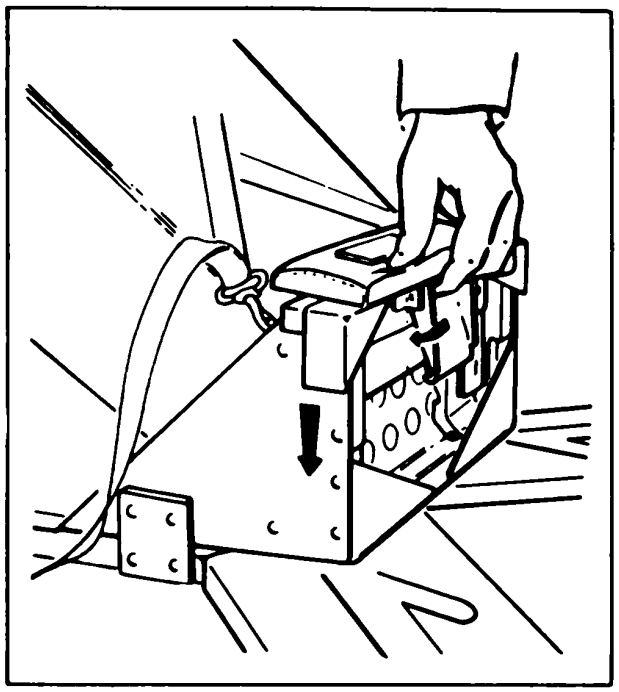
STEP 9. MOVE THE POSITIONING PLATE ASSEMBLY AS FAR TO THE REAR AS POSSIBLE.



STEP 10. RAISE OR LOWER THE LAUNCHER MODULE TO THE DESIRED ELEVATION. MAKE SURE THAT CARRYING HARNESS DOES NOT BECOME ENTANGLED WITH POSITION. MECHANISM. MOVE THE POSITIONING PLATE FORWARD AND ADJUST LAUNCHER MODULE UNTIL THE DESIRED NOTCH IS ENGAGED. (REFER TO PARAGRAPH 20.)

Figure 11 (5). Dismounting and emplacement of E8 launcher--Continued.

STEP 11. PUSH DOWN THE POSITIONING PLATE ASSEMBLY. MAKE SURE THAT THE BACK LATCH IS LOCKED IN PLACE. RELEASE THE CARRYING HARNESS AND FOLD IT OVER THE LAUNCHER.



STEP 12. REMOVE THE TETHER, SPIKE FROM STOWED POSITION. UNROLL THE NYLON STRAPS AND DRIVE THE SPIKE IN THE GROUND DIRECTLY IN FRONT OF THE FIRING PLATFORM.

NOTE

THE TETHER MUST BE USED WHEN FIRING FROM THE 0° 27 1/2° POSITIONING IF TIME PERMITS, IT SHOULD BE USED WHEN FIRING, FROM ALL POSITIONS.

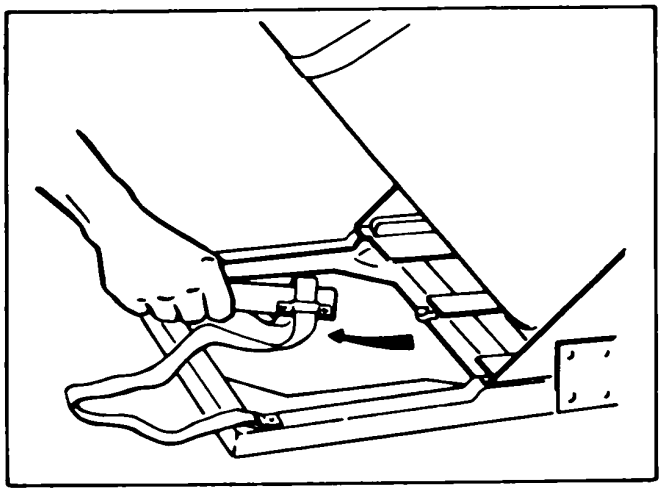
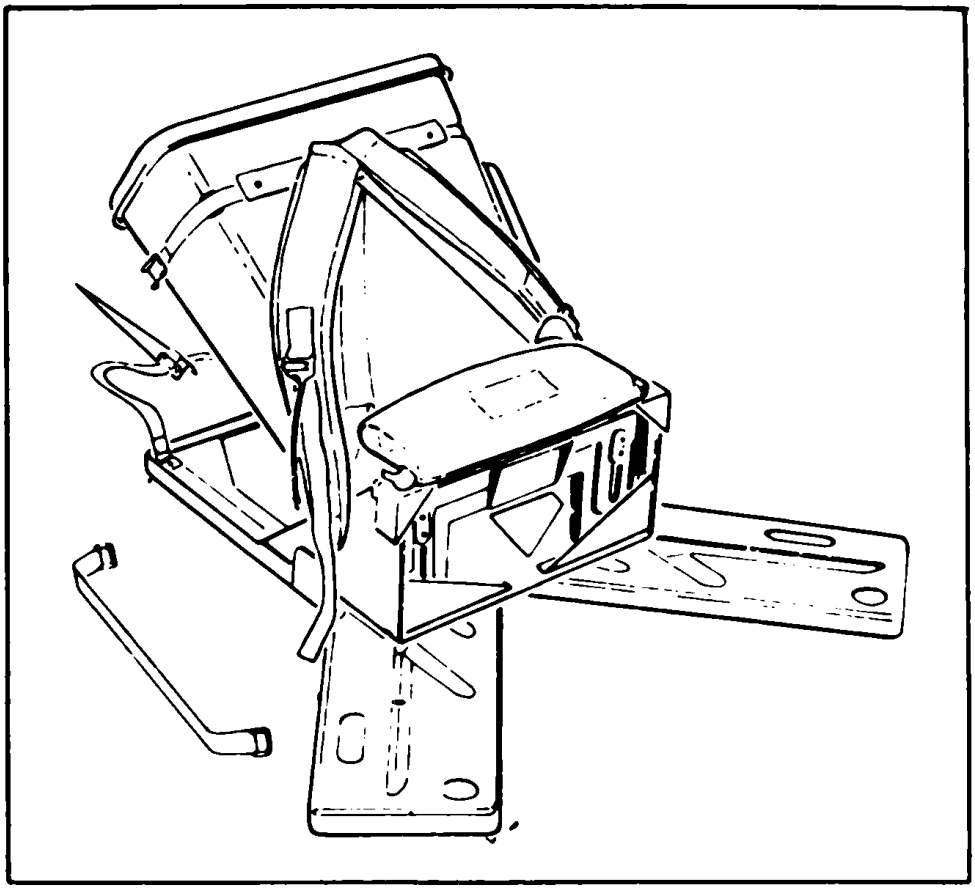


Figure 11 (6). Dismounting and emplacement of E8 launcher-Continued.



STEP 13. VISUALLY INSPECT THE LAUNCHER FOR SECURITY. MAKE SURE THAT CARRYING HARNESS STRAPS OR FOREIGN MATERIAL DO NOT INTERFERE WITH THE OPERATION.

CAUTION

DO NOT PLACE ANY OBJECT I, THE HOLES OF THE TRAILS AS A FIELD EXPEDIENT.

Figure 11 (7). Dismounting and emplacement of E8 launcher--continued.

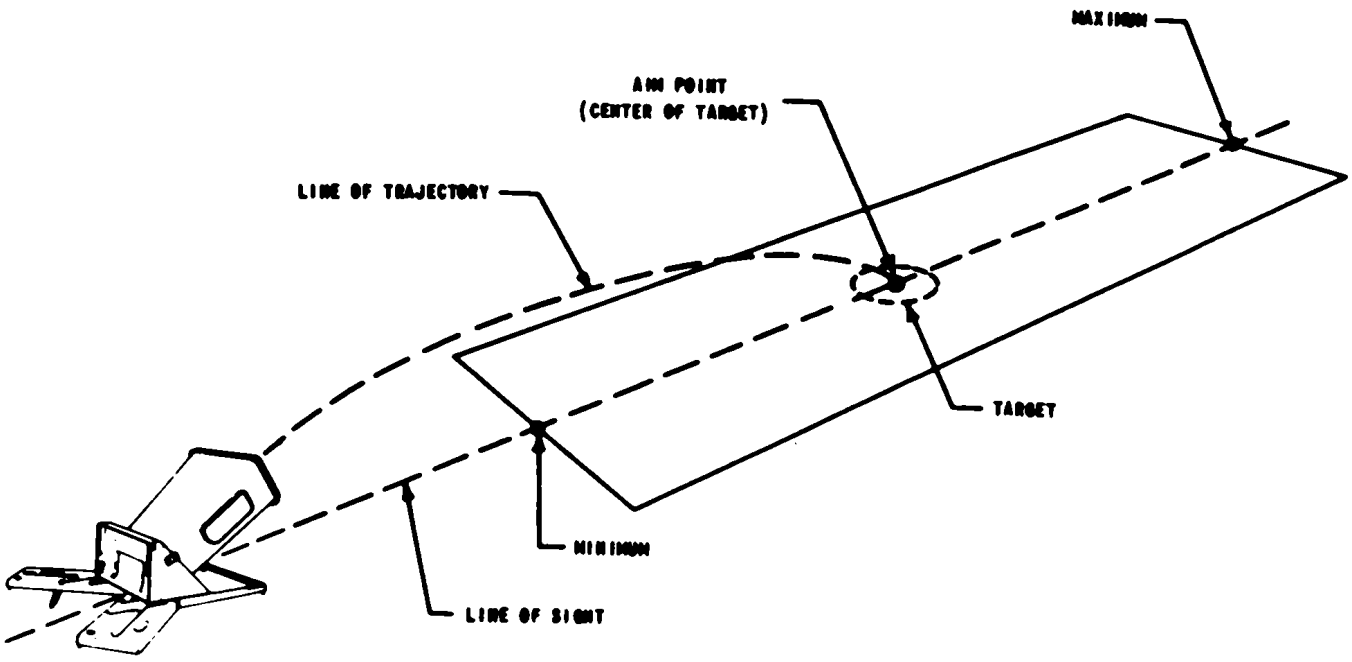


Figure 12. Typical sighting and impact pattern for E8 launcher.

b. Range. The basic range of the ES launcher is influenced by both fixed and adjustable elements. The propellant charge of each cartridge, the position of the cartridge in the tube, and the angle of the tube within the launcher module are all fixed and cannot be adjusted or changed. However, the angle of elevation of the launcher is adjustable by using the positioning plate assembly (steps 9-11, fig. 11). There are six positions provided: 0°, 27-1/2°, 40°, 55°, 75°, and 90° elevation (fig. 13).

c. Slope of Terrain. The slope of the terrain will affect the choice of firing positions. To choose the correct position, estimate the distance to the target, then refer to table 2. Locate the center of target distance closest to the estimate of distance to the target and obtain notch position. Unsling the launcher (steps 1-3, fig. 11) and place on the ground in the "as carried" position. Remove the firing well cover and check the inclinometer reading. Emplace the launcher (steps 4-1) using the notch position obtained from table 2. Check the inclinometer reading and reselect the notch that is closest to obtaining the desired degree of elevation. If firing downhill and the inclinometer reading is more than 6° off the desired degree mark, use the next higher degree position. If firing uphill and the inclinometer reading is more than 5° off the desired mark, use the next lower degree position.

d. Wind Direction and Speed. Table 2 has been provided as a guide when firing under ideal conditions (wind under 5 knots). Adjustments should be made for headwind, tailwind, and crosswind.

e. Obstructions. When aiming the E8 launcher, check for obstructions overhead. If an obstruction does exist, either move to a new position to engage the target or remove the obstruction. If these are not practical, compensate by using notch number 2.

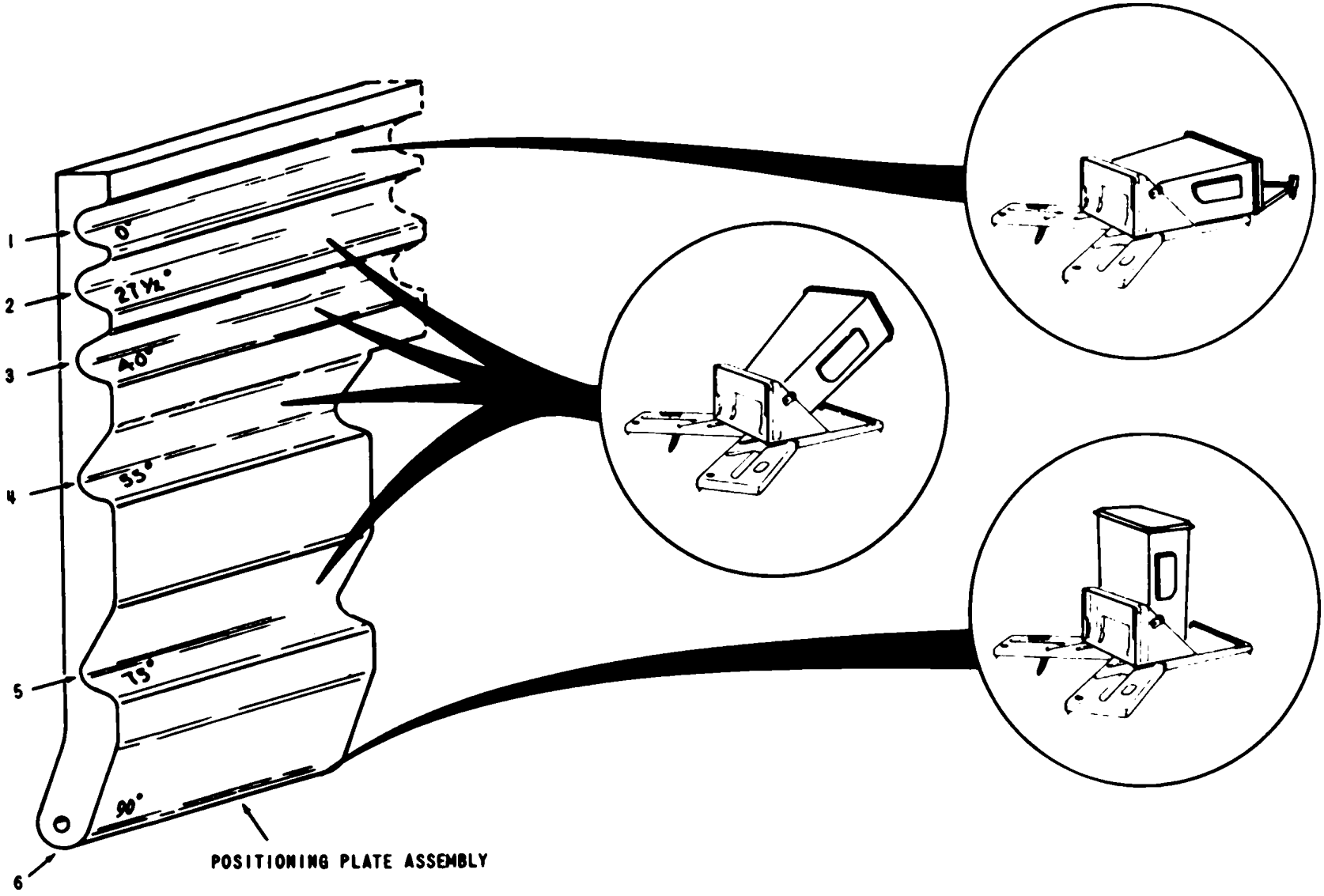


Figure 13.. Elevation angle adjustment positions.

Table 2. Aiming Instructions

1	2	3		4	5	6	7	8
					Impact pattern (meters)			
Range to Center of Target	Use conditions	Firing stand		Effective firing angle	Range from E8 launcher [2]		Width	Special Instructions
		Notch position	Elevation degrees		minimum	maximum		
Point Blank	Position Overrun ..... Hilly Terrain	1.....	0.....	0°	.....	.....	.....	Refer to paragraph 21
150	Upslope Firing Position	2.....	27 1/2.....					
	Level Firing Position	3.....	40.....	35°-45°...	75.....	250.....	40.....	Refer to paragraph 22
	Downslope Firing Position.	4.....	55.....					
75	Engage shorter range targets or overcome terrain features.	5.....	75.....	75°	30.....	125.....	55.....	Refer to paragraph 22
0	To cover position	6.....	90.....	90 °	-30 ..... (behind firing position)	-30	75.....	Refer to paragraph 23

[1] Position number 4 and 6 may be used depending upon slope of launcher position.
[2] Range shortened by approximately 10 to 20 meters for 4 miles per hour Head wind. Effective firing angle may be modified to accommodate wind conditions by selecting the next higher or lower notch position.

f. Darkness. If firing during darkness, locate notch 2, 3, or 4 by feel and choose correct notch according to the field of fire.

21. Aiming at 0° Elevation

The 0° elevation (notch number 1) is referred to as the "as carried" position and is used when firing position is being overrun by the enemy or when firing from hilly terrain. To aim the launcher at 0^0, unsling and emplace the unit (fig. 11). Visualize a line through the center of the munition out to the center of the target and perform the following special instructions:

a. Place a 70-pound sandbag or equivalent weight on each trail to prevent the munition from rotating as a result of recoil.

b. Remove the tether spike and drive it into the ground approximately 1 foot in front of the launcher.

c. Pull the quick-release cord and completely disengage the adjusting strap.

d. Fold the end of the shoulder straps and place them between the launcher module and firing platform as shown in figure 14.

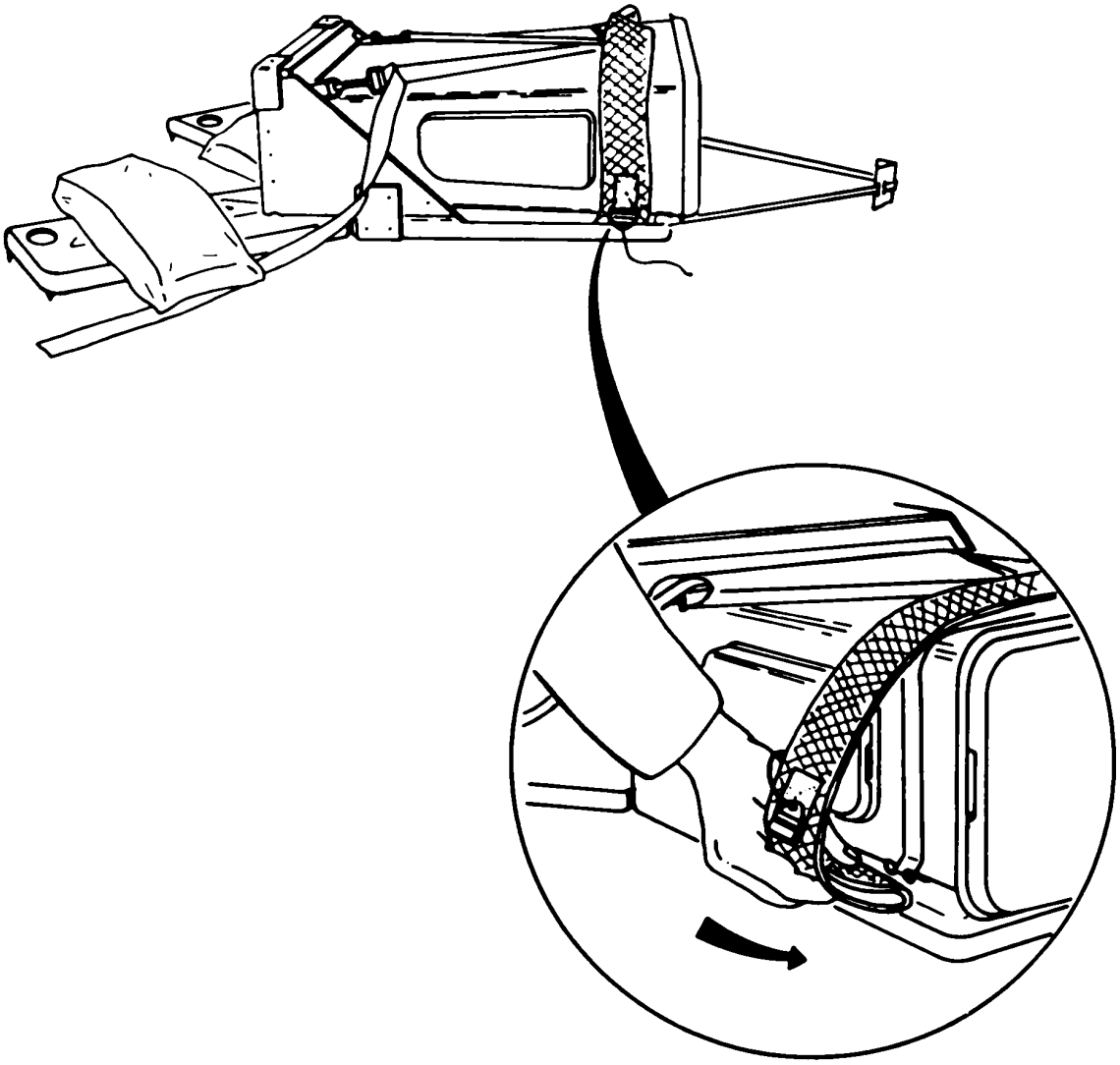


Figure 14. Folded shoulder straps for firing at 0° elevation.

Warning: **Do not lift launcher module by holding the top cover. Do not place any part of the body directly in front of the munition.**

Note. **The end of the shoulder strap should be folded under until it is approximately under the buckle. This procedure will form a cushion under the launcher module and give a slight positive firing angle which will assist in clearing grass, stones, or other obstructions immediately in front of the module.**

22. Aiming at 271/2°, 40°, 55°, and 75° Elevation

The 27-1/2°, 40°, 55°, and 75° elevations (notch number 2, 3, 4, and 5, respectively) are referred to as the "normal" positions. However, the 40° position (most stable) is marked with green for easy identification and should be used whenever possible. To aim the launcher at any of the "normal" positions, unsling and emplace the unit (fig. 11) and proceed as follows:

a. Visualize an imaginary line from the firing position through the center of the target.

b. Position the launcher so that it is level and the line to the target passes through the center of the launcher (fig. 12).

Warning: **Do not attempt to stabilize the launcher by placing any object in the holes of the trails; they may change the direction of the fire or they may become loose and cause injury to personnel. If time permits, secure the launcher by using the tether spike, digging in. or placing weights on the trails to reduce launcher motion.**

c. Estimate the range in meters to the center of the target.

d. Estimate the direction and speed of wind.

Note. **A headwind will shorten and widen the impact pattern; a tailwind will lengthen and narrow the pattern.**

e. Refer to table 2 for nearest range to center of target.

f. Read over to column 3 and determine the correct notch position.

g. Set elevation angle with positioning plate as described in figure 11 and paragraph 20*b*.

h. Recheck the centerline and adjust for crosswind if necessary.

Note. **If a crosswind exists, fire slightly into the crosswind. Do not overadjust.**

23. Aiming at 90° Elevation

The 90° elevation (notch number 6) is used to cover the emplaced launcher. To aim the launcher at 90°, unsling and emplace the unit as described in figure 11 and proceed as follows:

Warning: The range and impact pattern for the 90° position will place the E8 launcher in the middle of the agent cloud (table 2).

a. Put on protective mask.

b. If firing manually, an extra 100-foot length or more (if downwind from the launcher) of a suitable cord may be tied to that supplied with the launcher so that the operator can remain outside the impact pattern. There will be approximately 15 seconds (3 to 5 seconds delay before firing, plus a cartridge flight time of 10 to 12 seconds) between time of firing and cartridge impact.

c. If firing electrically, be sure that electrical wires from the launcher are longer than the minimum range and width given in table 2.

24. Firing Procedures

The E8 launcher can be fired either manually or electrically at the direction of the local commander.

a. Manual Firing (fig. 15). To fire the E8 launcher manually, proceed as follows:

(1) Remove the firing well cover. Check to see that the safety pin and firing release pin are securely engaged.

Warning: **If the safety pin becomes disengaged, remove all tension from the lanyard and carefully reinsert the safety pin. If the firing release pin becomes disengaged and the safely pin is in place, the weapon may be recocked by using thumb pressure to depress the lever and reinserting the firing release pin. TAKE COVER if both the safety pin and firing release pin become disengaged. A 3 to 5 second delay is provided before the first round leaves the munition.**

(2) Remove the lanyard reel from the firing well with a steady outward pull.

(3) Unwind the lanyard from the reel by holding the reel loosely between the thumb and the first finger of the right hand.

Caution: **Do not pull or jerk the lanyard while unwinding the reel to the desired length.**

(4) Remove the safety pin just before firing by pulling up on the safety pin ring.

(5) Fire the munition by applying a firm pull on the lanyard. The lanyard and firing release pin will come clear of the munition indicating that the firing device has functioned.

Warning: **If the launcher fires, follow the procedures outlined in paragraph 27. If the launcher does not fire, follow the procedures outlined in paragraph 28.**

b. Replacing Safety Pin (Manual Firing). If the safety pin (the firing release pin must be in place) has been removed and it is decided not to fire the launcher, reinsert the safety pin Is follows: (1) Take the safety pin by the ring and insert the pin through the eyering located about 1 inch from the end of the lanyard fastened to the firing release pin.

Warning: **Do not pull or jerk the lanyard while inserting safety pin through eyering.**

(2) Insert the safety pin through the two holes in the manual activator.

(3) Rewind the lanyard onto the reel and place in proper position in the firing well.

(4) Inspect the safety pin and firing release pin to ensure both are securely fastened. Observe Warning (a above).

(5) Place firing well cover on firing well. Make sure that the cover fits securely.

(6) Repack launcher.

c. Multiple-Unit Manual Firing. To manually fire more than one launcher, perform steps described in a(l) through a(3) and proceed as follows: 30

(1) Gather all lanyard reels and unwind to desired length.

(2) Knot lanyards together near the reels (fig. 16).

(3) Remove all the safety pins from all launchers.

(4) Fire the launchers by applying a firm pull on the lanyards. The lanyards and firing release pins will come clear of the munitions indicating that the firing devices have functioned.

Warning: **If the launcher fires, follow the procedures outlined in paragraph 27. If the launcher does not fire, follow the procedures outlined in paragraph 28.**

d. Electrical Firing. One or more E8 launchers may be fired electrically. Refer to figure 9 for single unit or figure 17 for multiple-unit connections, and proceed as follows:

(1) Depress each binding post and carefully remove the shorting bar. Release binding posts.

Note. **The shorting bar passes through a hole running the entire width of the binding post.**

(2) Check to see that the electrical wires used between units are not connected to an electrical power source.

(3) Strip insulation from one end of each wire. Depress each binding post and slide wire into the hole in the binding post as shown in figure 9. Release binding posts.

Note. **When firing multiple units, connect all units as shown in figure 17 before connecting to a power source. Insure that the wire from the upper binding post of one unit is connected to the upper binding post of the next unit.**

(4) Visually inspect all units to insure that the shorting bars have been removed.

(5) Connect wires from the first unit to the electrical source and fire the unit(s). (Refer to FM 5-25 and TM 3-300 for description and use of electrical power sources.)

Warning: **If the launcher fires, follow the procedures outlined in paragraph 27. If the launcher does not fire, follow the procedures outlined in paragraphed 28.**

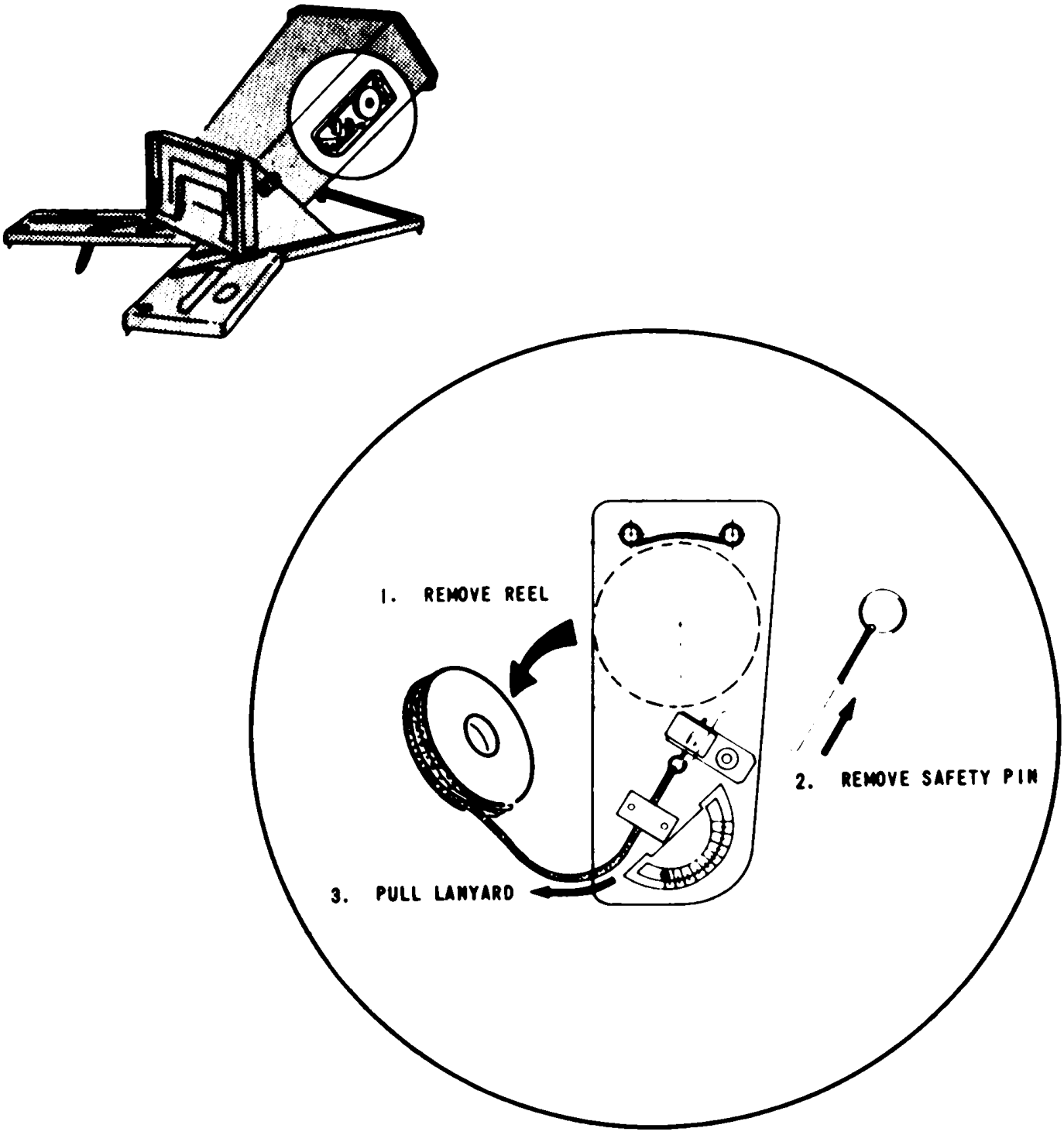


Figure 15. Manual firing sequence.

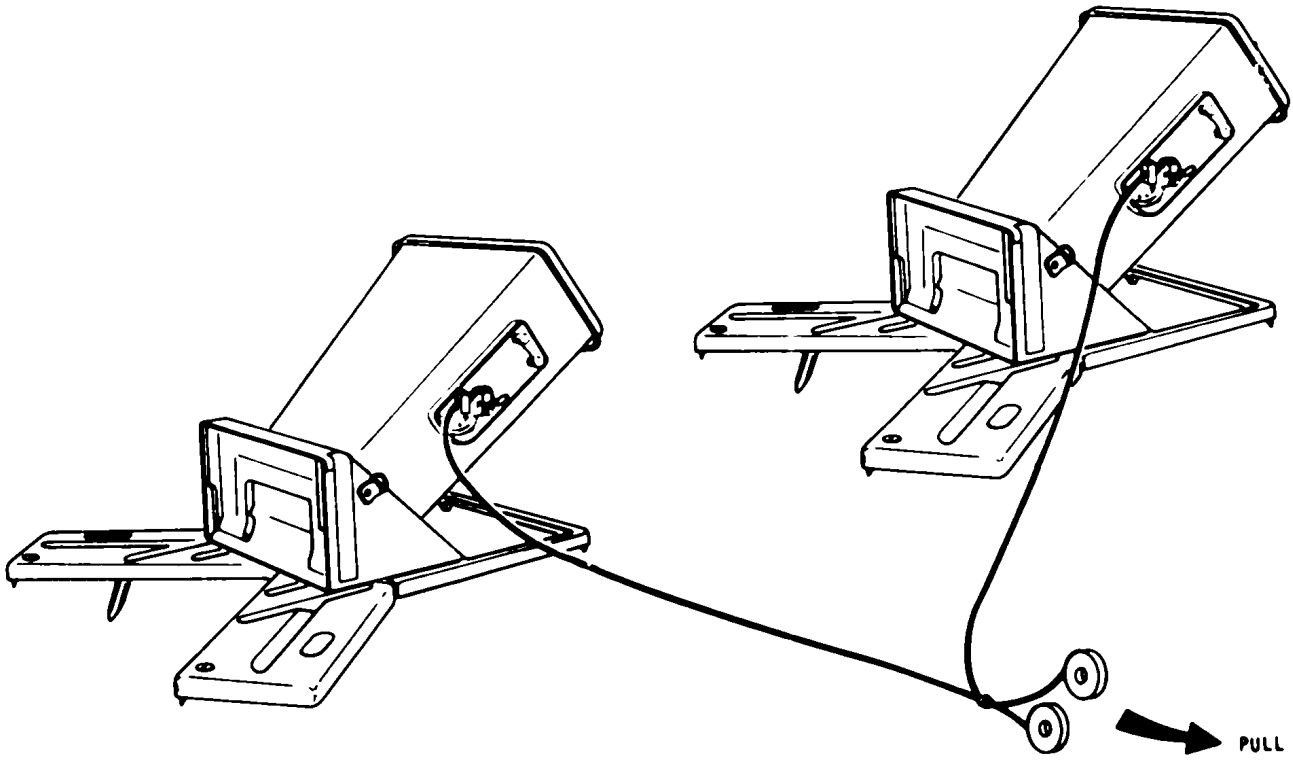


Figure 16. Multiple-unit manual firing diagram.

e. Replacing Shorting Bar (Electrical Firing). If one or, more launchers are electrically connected and it is decided not to fire, proceed as follows:

(1) Disconnect electrical wires from power source and twist the ends of the wires together as a twisted pair. (Refer to AMC Safety Manual AMCR 385-224, para 2716, for materials for detonating ammunition.)

(2) Remove electrical wires from binding posts.

(3) Depress each binding post and insert shorting bar.

(4) Inspect manual safety pin and firing release pin to insure both are securely fastened.

(5) Place firing well cover on firing well. Make sure that the cover fits securely.

(6) Repack launcher.

25. Firing Under Adverse Weather Conditions

The E8 launcher is equipped with a plastic outer case, a built-in moisture barrier, and watertight top and a firing well with a cover for protection against adverse weather conditions. The entire launcher can be submerged in water without danger of accidental firing; it will function normally following submersion. When firing the launcher during or immediately following rain or snow, perform the procedures in paragraphs 18 through 24 and the following special instructions:

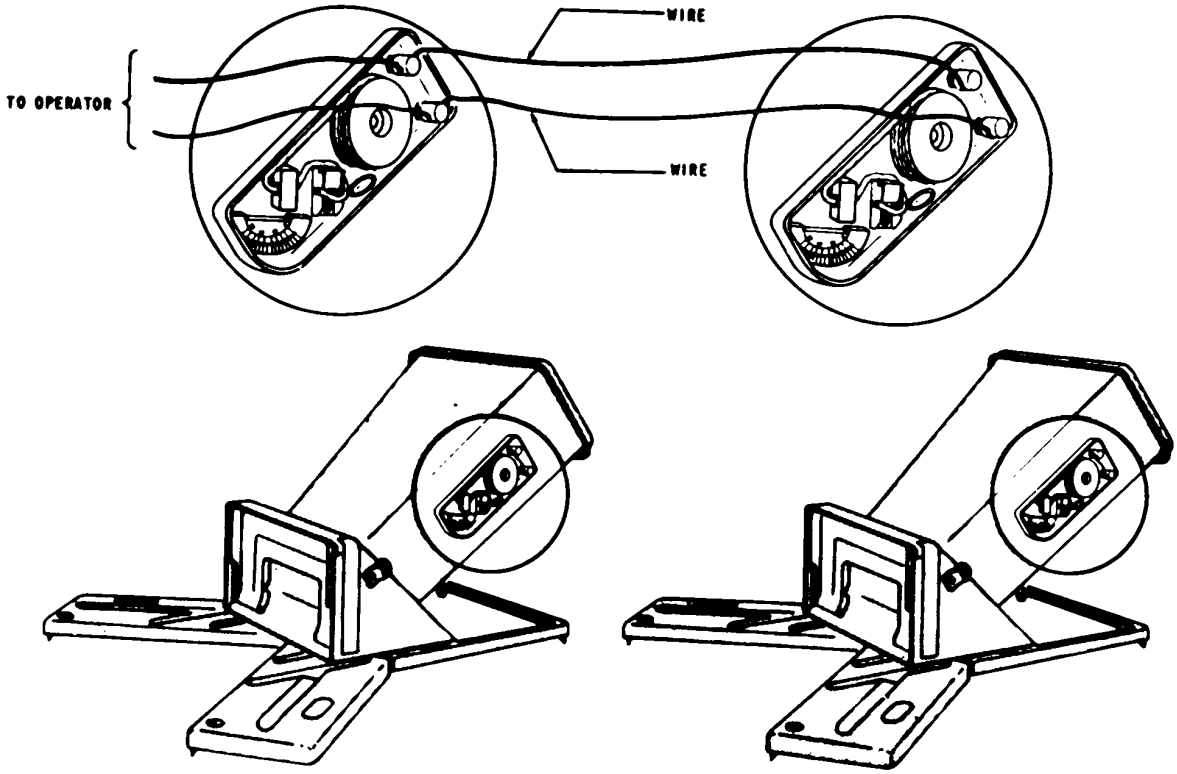


Figure 17. Electrical connection diagram for multiple-unit firing.

in paragraphs 18 through 24 and the following special instructions:

Note. **The E8 launcher can be fired throughout a temperature range of -5' F. to 130' F.**

a. Always emplace tether spike when munition is fired at 0° and 27-1/2° elevation. At other degree elevations, the use of the tether spike is desirable. When firing from loose sand, gravel, snow, or ice, place a 70-pound sandbag or equivalent weight on each trail.

b. Put on protective mask or have one readily available when firing during windy conditions.

Warning: **A strong wind or shifting wind direction could cause the agent cloud to overtake the firing position.**

26. Firing Troubleshooting Procedure

In the event of a misfire during either manual or electrical firing of the E8 launcher, follow table 3 or 4 for troubleshooting instructions as applicable.

Table 3. Manual Firing Troubleshooting Instructions

Warning: **Do not stand in front of the ES launcher at any time while troubleshooting or performing corrective sections.**

Probable cause	*Corrective action*
1. Safety pin still	Carefully recock the striker arm in place and insert firing release pin. Remove safety pin and refire the launcher (para 24*a*).
2. Firing release	*a*. f the firing release pin is bent, pin failed to isolate launcher and refer to release. paragraphs 32 through 35 for disposition. *b*. If lanyard was caught, straighten it out so that it is free and refire the launcher (para 24*a*).
3. Broken lanyard	Tie together broken ends of lanyard and refire (para 24*a*).
4. Defective M42 primer.	Isolate launcher and refer to paragraphs 32 through 35 for disposition.

Table 4. Electrical Firing Troubleshooting Instruction

Warning: **Do not stand in front of the E8 launcher at any time while troubleshooting or performing corrective actions.**

Probable cause	*Corrective action*
1. Shorting bar(s)	Remove shorting bar(s) and fire not removed. (para 24*d*).
2. Improper	a. Check to see that insulation connections. has been stripped from wires. b. Check to see that the lead-in wires are separated and not shorting out. c. Check to see that wires are routed correctly when firing multiple units (fig. 17). d. Check for electrical continuity of the circuit.
3. Defective M2 electrical squibs.	Isolate launcher and refer to paragraphs 32 through 35 for disposition.

27. Inspecting Fired Launchers

After the E8 launcher has functioned, wait 30 minutes and then check to determine whether all E23 cartridges have been ejected from the tubes in the launcher module.

Warning: **Always approach and remain to the rear of the E8 launcher during this inspection. Do not place body in front of or over top (firing end) of E8 launcher module.**

a. Count the tubes visible in the top of the launcher module.

b. If 16 tubes are not visible, isolate launcher and refer to paragraphs 32 through 35 for disposition.

c. If 16 tubes are visible, this indicates that at least the top E23 cartridge in each tube has been ejected.

d. Place a rigid rod (for example, rifle cleaning rod, stick, etc.) about 1 /4-inch to 1/2-inch diameter and about 30 inches long along the outside of the launcher module.

e. With one end of the rod resting on the top of the baseplate (11, fig. 4), mark the rod where it meets the top (firing end) of the launcher module.

f. Inest rod into each of the 16 tubes.

Note. **When the rod is inserted into each tube, the mark placed on the rod should be about the same level as the top of the launcher module when the paper tubes (4) ale empty.**

g. If the mark made on the rod is 4 inches or higher above the top of the launcher module, at least one E23 cartridge is still in the tube. Isolate launcher and refer to paragraphs 32 through 35 for disposition.

Note. **The walls of the tubes will partially collapse due to the firing function. It may be necessary to force the rod down so that its travel is not being hindered by a partially collapsed tube.**

h. When it has been determined that all 16 tubes are clear of E23 cartridges, for an electrically fired launcher complete the manual firing procedures to detonate the M42 percussion primer (6, fig. 6) as these primers are detonated during manual firing only.

28. Hangfires, Misfires, and Failure to Fire

a. Hangfire. A hangfire is a temporary failure or a delay in the action of a percussion primer, igniter, or propelling charge.

b. Misfire. A misfire is the failure of a primer or propelling charge of a projectile to function wholly or in part.

c. Failure to Fire. When a failure to fire occurs, it will initially be considered a hangfire. Make two additional attempts to fire the launcher at 10-second intervals. If the munition does not fire after the third attempt, follow directions in table 3 or 4 as applicable. When all applicable tasks listed in table 3 or 4 have been completed, wait 30 minutes before considering the hangfire a misfire. Notify proper authority to dispose of any misfire (para 32-35).

SECTION V

SHIPMENT AND STORAGE

29. Shipment

The E8 launcher is in ICC Clam A for shipment of chemical ammunition. Regulations governing shipment are contained in TM 8-250.

30. Storage

The E8 launcher is in Storage Group D for chemical agents; it must be stored in accordance with instructions contained in TM 3-250.

31. Maintenance

The E8 launcher is an expendable item. No maintenance is required.

SECTION VI

EVACUATION, DESTRUCTION, OR DISPOSAL TO PREVENT ENEMY USE

32. General

The E8 launcher when in danger of being captured by the enemy will be evacuated, destroyed, or disposed of. The authority to evacuate, destroy, or dispose of E8 launchers must be obtained from the responsible commander.

33. Evacuation

Evacuation of E8 launcher will be as directed by local Army commanders.

34. Destruction

Destruction of the E8 launchers may be accomplished by explosive, burning, or mechanical means. Destruction must be specifically authorized by the local Army commander and will be accomplished as directed in TM 9-1300206.

35. Disposal

Disposal of E8 launchers may be accomplished. In no case will they be disposed of unless specifically authorized by the local Army commander. Procedures for disposal are contained in TM 9-1300-206.

APPENDIX

REFERENCES

AMCR 385224	AMC Safety Manual.
AR 385-40	Accident Reporting and Records.
AR 700-1300-8	Malfunctions Involving Ammunition and Explosives.
FM 5-25	Explosives and Demolitions.
TM 3-215	Military Chemistry and Chemical Agents.
TM 3-250	Storage, Shipment, and Handling of Chemical Agents and Hazardous Chemicals.
TM 3-00	Ground Chemical Munitions.
TM 9-1300-206	Care, Handling, Preservation, and Destruction of Ammunition.
TM 38-750	Army Equipment Record Procedures.

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Bn (2)
Instl (2)
Svc College (10)
USMA (10)
Br Svc Sch (10) except
USACMLCS (50)
Army Dep (5)
Gen Dep (5)
Dep (OS) (5)
POE (1)
USA Tml Comd (1)
Army Tml (1)
Arsenals (3) except
Edgewood (50)
PG (5)
USAAPSA (5)
USAARMC (2)
USAAMC (2)
USAECFB (2)
USAPC (2)
USAIC (2)
CMFO, Ft Knox (10)

NG: None
USAR: None
For explanation of abbreviations used, see AR 320-50.

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