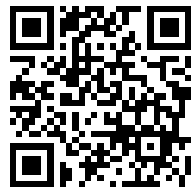

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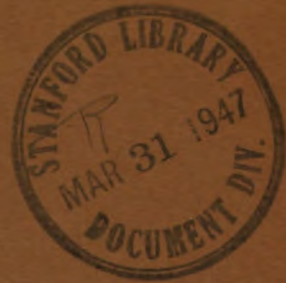
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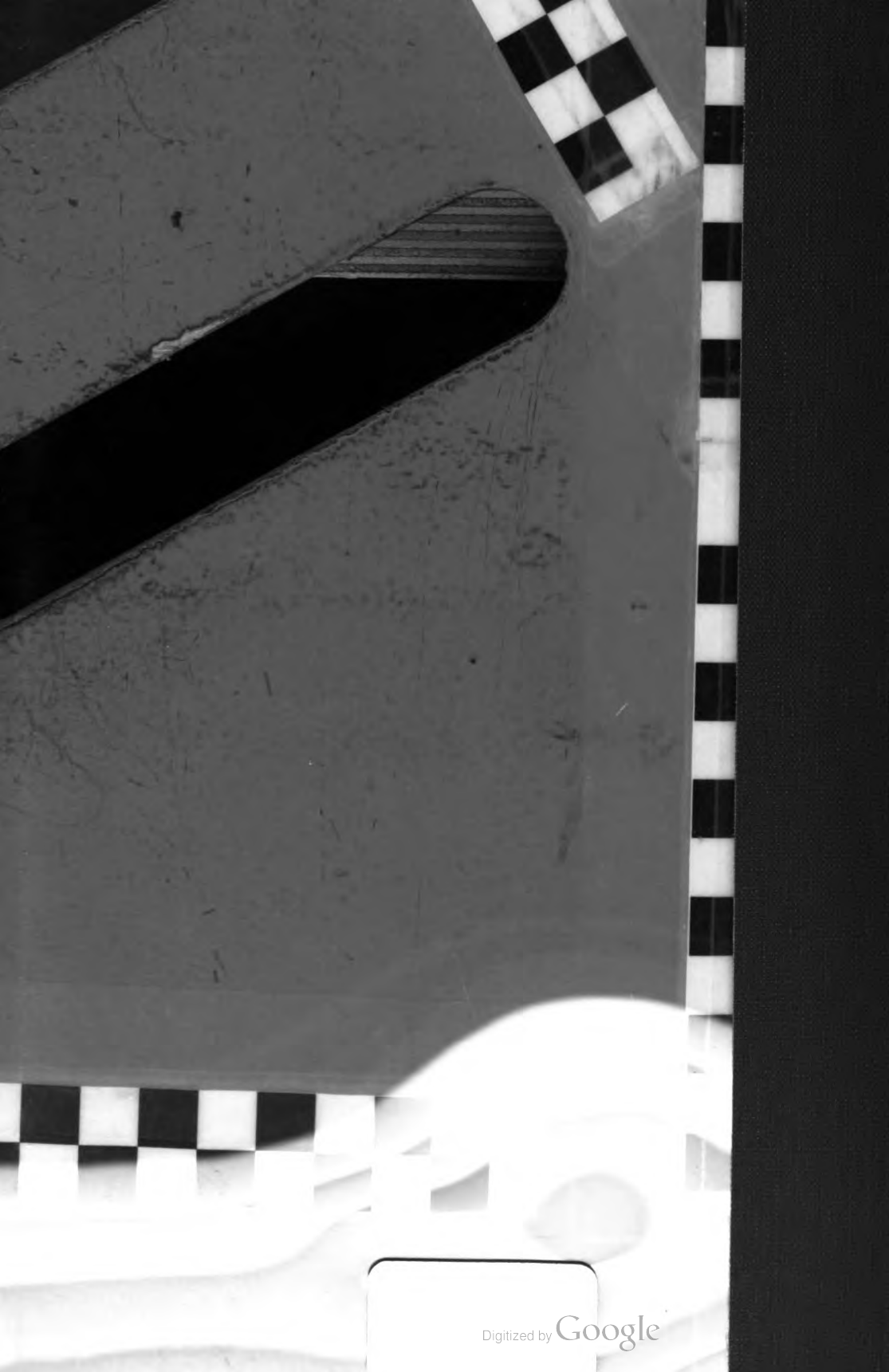
PYROTECHNIC PROJECTORS

ALL TYPES



DEPARTMENT

FEBRUARY 1947



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TM 9-290

WAR DEPARTMENT TECHNICAL MANUAL

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TM 9-290

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PYROTECHNIC
PROJECTORS
ALL TYPES



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BY ORDER OF THE SECRETARY OF WAR:

OFFICIAL: EDWARD F. WITSELL <i>Major General</i> <i>The Adjutant General</i>	DWIGHT D. EISENHOWER <i>Chief of Staff</i>
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For explanation of distribution formula, see FM 21-6.

CONTENTS

		<i>Paragraph</i>	<i>Page</i>
PART ONE. INTRODUCTION.			
<i>Section I.</i> General.			
	Scope.....	1	1
	Records.....	2	1
II. Description and data.			
	Description.....	3	2
	Tabulated data.....	4	4
PART TWO. OPERATING INSTRUCTIONS.			
<i>Section III.</i> General.			
	Scope.....	5	5
IV. Service upon receipt of equipment.			
	General.....	6	5
	New equipment.....	7	5
	Used equipment.....	8	6
V. Controls.			
	Controls.....	9	6
VI. Operation under usual conditions.			
	Ground signal projector M1A1.....	10	6
	Pyrotechnic pistol AN-M8 and mount M1.....	11	7
	Hand pyrotechnic projector M9.....	12	8
VII. Operation under unusual conditions.			
	General.....	13	8
	Extreme cold.....	14	8
	Severe dust or sand conditions.....	15	9
	High humidity, extreme moisture and salt water.....	16	9
VIII. Demolition to prevent enemy use.			
	General.....	17	10
	Demolition.....	18	10
PART THREE. MAINTENANCE INSTRUCTIONS.			
<i>Section IX.</i> General.			
	Scope.....	19	12
	Cleaners and preservatives.....	20	12
X. Lubrication.			
	Lubrication.....	21	12
	Methods.....	22	13
XI. Preventive maintenance service.			
	General.....	23	13
	Common preventive maintenance procedures.....	24	13
	Preventive maintenance schedules.....	25	14

	<i>Paragraph</i>	<i>Page</i>
XII. Malfunctions and corrections.		
Signal fails to fire.....	26	15
XIII. Ground Signal projector M1A1.		
General.....	27	15
Disassembly and assembly.....	28	16
Maintenance.....	29	17
XIV. Pyrotechnic pistol AN-M8 and pyrotechnic pistol mount M1.		
General.....	30	19
Disassembly and assembly.....	31	19
Maintenance.....	32	27
XV. Hand pyrotechnic projector M9.		
General.....	33	28
Disassembly and assembly.....	34	28
Maintenance.....	35	28
 PART FOUR. AMMUNITION.		
<i>Section XVI.</i> General.		
Ammunition.....	36	31
Classification.....	37	31
Identification.....	38	31
Care, handling, and preservation of pyrotechnics.....	39	32
Packing.....	40	33
XVII. Ammunition for ground signal projector M1A1 and for aircraft type projectors.		
Ammunition for ground signal projector M1A1.....	41	36
Ammunition for aircraft type projectors.....	42	36
 APPENDIX I. STORAGE AND SHIPMENT.....		42
 II. REFERENCES.....		47

This manual supersedes TM 9-290, 18 January 1943

PART ONE

INTRODUCTION

Section I. GENERAL

1. Scope

a. This manual is published for the information of the using arms and services. It contains information required for the identification, use and care of the following pyrotechnic projectors and the ammunition used therewith:

- (1) Ground signal projector M1A1.
- (2) Pyrotechnic pistol AN-M8 and pyrotechnic pistol mount M1.
- (3) Hand pyrotechnic projector M9.

b. No organizational spare parts or equipment are authorized for this matériel. Therefore, in all cases where parts must be replaced, the responsible ordnance service should be informed so that trained personnel with suitable tools and equipment may be provided, or proper instructions issued.

2. Records

a. **FIELD REPORTS OF ACCIDENTS.** When an accident involving ammunition occurs during practice, this incident will be reported as prescribed in AR 750-10 by the ordnance officer under whose supervision the ammunition is maintained or issued. Where practicable, reports covering malfunctions of ammunition in combat will be made to the Chief of Ordnance, giving the type of malfunction, type of ammunition, the lot number, and conditions under which fired.

b. **UNSATISFACTORY EQUIPMENT REPORT.** Suggestions for improvement in design, maintenance, safety, and efficiency of operation prompted by chronic failure or malfunction of the projector should be reported on WD AGO Form 468 (Unsatisfactory Equipment Report), with all pertinent information necessary to initiate corrective action. The report should be forwarded to the Office,

Chief of Ordnance, Field Service, Maintenance Division, through command channels in accordance with instruction No. 7 on the form. If Form 468 is not available, refer to TM 38-650 for list of data on unsatisfactory equipment report. Such suggestions are encouraged in order that other organizations may benefit.

Section II. DESCRIPTION AND DATA

3. Description

The characteristics of the matériel listed in paragraph 1a are as follows:

a. **GROUND SIGNAL PROJECTOR M1A1** (fig. 1). This is a single-loading, manually operated projector mounted on a support and fired by pulling a lanyard. It is used for projecting high burst ranging signals for field artillery training. The average height of the burst approximates 700 feet. It is issued for training purposes only.

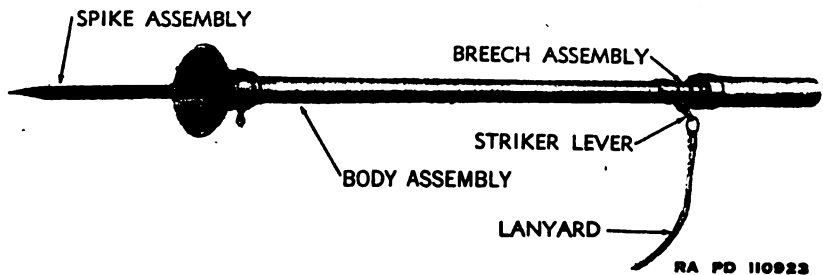


Figure 1. Ground signal projector M1A1.

b. **PYROTECHNIC PISTOL AN-M8 AND PYROTECHNIC PISTOL MOUNT M1** (fig. 2). This pistol is a double action, single-loading pistol gripped by the barrel in a mount attached in aircraft. The pistol can also be hand-fired without use of the mount. It is used for projecting all types of aircraft signals from an aircraft in flight, in signaling to troops on the ground, or to other aircraft.

c. **HAND PYROTECHNIC PROJECTOR M9** (fig. 3). This projector is single action and single loading. It can be fired by striking the hand knob with the hand or by striking the hand knob on the ground. It is used for projecting signals from the ground to aircraft in flight. The M9E4 projector (limited procurement) is similar to the M9 model except that the tube has a flanged sleeve for attaching the projector to a mount in aircraft.



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Figure 2. *Pyrotechnic pistol AN-M8 with pyrotechnic pistol mount M1.*

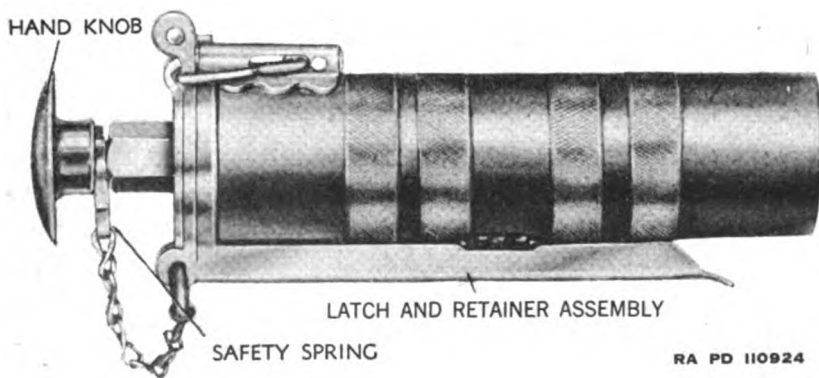


Figure 3. *Hand pyrotechnic projector M9.*

4. Tabulated Data

a. GROUND SIGNAL PROJECTOR M1A1.

Weight with support.....	12.67 lb.
Length, barrel and breech assembly.....	15 $\frac{3}{4}$ in.
Length, barrel breech, assembly and body (approx.).	49 in.
Length over-all with spike extended.....	57 $\frac{1}{2}$ in.
Bore, smooth:	
Diameter.....	1.636 in.
Length.....	11 $\frac{5}{8}$ in.

b. PYROTECHNIC PISTOL AN-M8 WITH MOUNT M1.

Weight of pistol.....	2.13 lb.
Weight of mount.....	1.12 lb.
Trigger pull.....	5-8 lb.
Length of barrel.....	4 $\frac{1}{8}$ in.
Diameter of bore.....	1.580 + .005 in.

c. HAND PYROTECHNIC PROJECTOR M9.

Weight.....	1 lb.
Length of barrel.....	6 in.
Length over-all.....	8 in.
Diameter of bore.....	1.575 + .010 in.

d. AMMUNITION. For complete data on ammunition see paragraphs 36 through 40.

PART TWO

OPERATING INSTRUCTIONS

Section III. GENERAL

5. Scope

Part two contains information for the guidance of the personnel responsible for the operation of this equipment. It contains information on the operation of the equipment with the description and location of the controls.

Section IV. SERVICE UPON RECEIPT OF EQUIPMENT

6. General

a. Upon receipt of new or used matériel, it is the responsibility of the officer in charge to ascertain whether it is complete and in sound operating condition. A record should be made of any missing parts and of any malfunctions, and any such conditions should be corrected as quickly as possible.

b. Attention should be given to small and minor parts as these are the more likely to become lost and may seriously affect the proper functioning of the matériel.

c. The matériel should be cleaned and prepared for service in accordance with instructions given in paragraph 7 or 8.

7. New Equipment

a. If the projector is coated with rust preventive, the preventive must be removed prior to inspection as follows:

(1) The projector should be disassembled as required and all parts cleaned with dry cleaning solvent or rifle bore cleaner.

(2) Clean the bore with waste to remove bulk of rust preventive compound. Then saturate a cloth in dry cleaning solvent or rifle bore cleaner and swab the bore until the rust preventive compound has been entirely removed.

b. Inspect for any broken or missing parts.

c. Inspect all operating parts for smoothness of operation.

8. Used Equipment

The services required to insure proper operation of the matériel are identical with the information given in paragraph 7 except for the following additional points:

- a. Check whether all Modification Work Orders have been applied. (See par. 24e.)
- b. Examine all parts for wear, burs, and scores.

SECTION V. CONTROLS

9. Controls

a. LANYARD (PROJECTOR M1A1). The lanyard is attached to the striker lever (fig. 1) and provides a means to fire the projector at a safe distance.

b. MOUNT LATCH (PISTOL AN-M8 AND MOUNT M1). The mount latch protrudes upward from rear of breechblock housing on top of barrel (fig. 2) and serves to lock the mount to the pistol or to unlock it.

c. BREECH LOCK (PISTOL AN-M8). The breech lock protrudes rearward from breechblock housing on top of barrel (fig. 2) and serves to close or open the breech.

d. TRIGGER (PISTOL AN-M8). The trigger is within the trigger guard (fig. 2): its purpose is to actuate the firing pin to fire the round.

e. LATCH (PROJECTOR M9). The purpose of the breech latch is to open or close the breech. (See fig. 3.)

f. SAFETY SPRING (PROJECTOR M9). The safety spring is attached to the breech by means of a chain. In the SAFE position, it fits around the body of firing pin between hand knob and firing pin nut (fig. 3) and prevents firing; in the FIRE position, it is disengaged from the firing pin body.

g. HAND KNOB (PROJECTOR M9). The hand knob at the rear of the projector is integral with a firing pin. (See fig. 3.) By striking the hand knob, the firing pin is actuated.

Section VI. OPERATION UNDER USUAL CONDITIONS

10. Ground Signal Projector M1A1

a. LOADING. If the spike is to be used, force it into the ground at whatever angle desired by pressing down on the projector. Make certain that the spike is securely attached to the body assembly. When the projector is held muzzle up, the striker inside

the breech should drop under its own weight, drawing the firing pin, which is threaded into it, away from the firing pin hole and forcing up the outside end of the lever with lanyard attached. Check this position of the firing pin by moving the lever up and down. If the primer should strike the firing pin when the signal is dropped in the projector, it might cause a premature discharge. Insert signal in the barrel, primer end first.

b. **FIRING.** Sit or kneel so that the head is below the muzzle of the projector. Steady projector with one hand and jerk the lanyard downward with the other hand.

c. **UNLOADING.** To unload, invert projector and allow signal to fall out in the hand.

11. Pyrotechnic Pistol AN-M8 and Mount M1

a. **ATTACHING PISTOL TO MOUNT.** Hold the pistol by the grip with the right hand. Position the recoil lugs of the barrel with the slots in the recoil sleeve of the mount. Push pistol fully forward and rotate pistol one-quarter turn, at which time the lug of the mount latch will snap into position in the slot of the recoil sleeve of the mount.

b. **LOADING.** (1) Before loading, test action of trigger and firing pin. When loading the cartridge type of signal, insertion must be made through the breech end of the barrel. However, rimless type signals can be loaded either through the muzzle or breech end. To load through the muzzle end, it becomes necessary to remove the pistol from the mount for loading. To remove pistol from the mount, retract the mount latch with the forefinger and turn the pistol one-quarter turn until the recoil lugs of the barrel are aligned with the slots of the recoil sleeve of the mount. Then withdraw the pistol from the mount. When firing from the mount, insert the signals through the breech end.

(2) To load the cartridge type signal, place the thumb of the right hand on the knurled portion of the breech lock and push upward. Breech will then drop open. Glance into the barrel chamber to detect any obstructions. Place the signal into the barrel chamber. Swing breech upward until it is positioned and locked by the breech lock.

(3) The rimless type signal can be inserted in the same way as the cartridge type. It may also be inserted by first removing the pistol from the mount, and then inserting the signal through the muzzle end until the ejector engages in the cannellure in the barrel of the signal. This method of inserting the rimless type is recommended only when the pistol is to be hand-fired and the signal is long enough to protrude from the barrel of the pistol. If the

signal is shorter than the barrel length, insertion should be made through the breech end. The pistol can also be hand-fired with either type of signal.

c. **FIRING.** The pistol is fired by a continuous squeeze on the trigger. Precaution should be taken to point the pistol to the rear flank and in such a manner that the pyrotechnic will not strike the aircraft whenever the pistol is hand-fired.

d. **UNLOADING.** In order to unload after firing, push the knurled part of the breech lock upward; the breech will then drop open. The base of the signal will protrude out of the chamber, having been driven out by the ejector. Grasp the empty signal and remove it from the chamber.

12. Hand Pyrotechnic Projector M9

a. **LOADING.** See that the safety spring is set at **SAFE**. (See fig. 3.) Open the projector and insert the signal through the breech end. Make certain the ejector engages the rim or groove of case. Close the breech and lock the latch.

b. **FIRING.** Release the safety spring. Hold projector with left hand, and with palm of right hand strike the hand knob. The signal can also be fired by striking the hand knob on the ground.

Caution: Keep face out of the line of fire.

c. **EJECTION.** Unlock the latch from the barrel. Open the projector to extract the case and allow it to fall out or remove it by hand.

Section VII. OPERATION UNDER UNUSUAL CONDITIONS

13. General

When operating the matériel under unusual conditions such as extreme high or low temperature, severe dust, or sand conditions, and locations near salt water, the precautions given in this section must be followed.

14. Extreme Cold

a. In temperatures below freezing, it is necessary that the matériel be kept absolutely free from moisture. It has also been found that excess oil on working parts will solidify to such an extent as to cause sluggish operation or complete failure.

b. The matériel should be disassembled and all metal parts completely cleaned with rifle bore cleaner before use in temperatures

below 0° F. Lubricate by wiping with a slightly oiled cloth, using preservative lubricating oil (special) at all temperatures.

c. Immediately upon being brought indoors, the matériel should be thoroughly oiled, with preservative lubricating oil (special) because moisture condensing on the cold metal in a warm room will cause rusting. After the matériel has reached room temperature, it should be wiped free of condensed water vapor, cleaned, and wiped with a slightly oiled cloth, using preservative lubricating oil (special).

d. If the projector or pistol has been fired, it should be thoroughly cleaned with rifle bore cleaner and then oiled. The bore may be swabbed out with an oiled cloth and when the piece reaches room temperature, it should be thoroughly cleaned and oiled as prescribed in paragraph 29*b* and *c*.

15. Severe Dust or Sand Conditions

a. In hot, dry climates where sand and dust are likely to get into the mechanism and bore, the piece should be wiped clean daily or oftener and, if necessary, disassembled to the extent that all parts can have a thorough cleaning.

b. Oiling and lubrication should be kept to a minimum, as oil will collect dust which will cause wear on the working parts. It should be lightly applied, and only to the surfaces or working parts showing signs of wear.

c. Perspiration from the hands is a contributing cause of rust on account of the acid content; and metal parts should be wiped dry frequently.

d. During sand or dust storms, all parts of the matériel should be kept covered as much as possible.

16. High Humidity, Extreme Moisture, and Salt Water

a. In climates where the temperature and humidity are high, or where salt air is present, and during rainy seasons, the matériel should be thoroughly inspected at frequent intervals and kept lightly oiled when not in use. The piece should be sufficiently disassembled at regular intervals to enable the drying and oiling of parts.

b. Care should be exercised to see that unexposed parts and surfaces are kept clean and oiled.

c. Under conditions of high humidity, extreme moisture, salt air, or salt water (except low temperatures) preservative lubricating oil (medium) should be used for lubrication.

Section VIII. DEMOLITION TO PREVENT ENEMY USE

17. General

a. The destruction of matériel subject to capture or abandonment in the combat zone will be undertaken by the using arm only when, in the judgment of the military commander concerned, such action is deemed necessary as a final resort to keep the matériel from reaching enemy hands.

b. Adequate destruction of the matériel means damaging it in such a way that the enemy cannot restore it to usable condition in the combat zone either by repair or by cannibalization. Adequate destruction requires that—

(1) Those parts essential to the operation of the matériel must be damaged beyond repair in the combat zone.

(2) The same parts must be destroyed on all matériel, so that the enemy cannot make up one operating unit by assembling parts from several partly destroyed units.

c. The tube and firing mechanism are the most vital parts and these are the first things to damage. Next in importance are mounting attachments.

18. Demolition

The procedure outlined below may require special tools such as heavy hammers, which may not normally be items of issue. The issue of such special tools and the conditions under which destruction will be effected are command decisions in each case, according to the tactical situation.

a. GROUND SIGNAL PROJECTOR M1A1. (1) Disassemble the projector as instructed in paragraph 28a, if time permits. With a heavy hammer, damage the barrel, breech, body assembly, and spike assembly. (See fig. 4.)

(2) If time does not permit disassembly, damage the projector by striking the barrel and breech assembly with a heavy hammer.

b. PYROTECHNIC PISTOL AN-M8 WITH MOUNT M1. (1) Disassemble the pistol as instructed in paragraph 31a and c, if time permits. With a heavy hammer, damage the barrel, mount latch, breech lock, frame, and mount. (See figs. 5, 6, and 9.) The frame group should be hit several times to make certain that all the firing parts therein are damaged.

(2) If time does not permit disassembly, open the breech and damage the pistol and mount by striking with a hammer or heavy object.

c. HAND PYROTECHNIC PROJECTOR M9. (1) Disassemble the pro-

jector as instructed in paragraph 34a, if time permits. With a heavy hammer damage the barrel, breech, firing pin, and latch with plunger. (See fig. 10.)

(2) If time does not permit disassembly, open the breech and damage projector by striking with a hammer or heavy object.

PART THREE

MAINTENANCE INSTRUCTIONS

Section IX. GENERAL

19. Scope

Part three contains information for the guidance of the personnel of the using organizations responsible for first and second echelon maintenance of this equipment. It contains information needed for the performance of the scheduled lubrication and preventive maintenance services, as well as descriptions of the major systems and units and their functions in relation to other components of the equipment.

20. Cleaners and Preservatives

The following cleaning and preserving materials are required for use with this matériel (information additional to that included in this manual with regard to use of cleaning and preserving materials is contained in TM 9-850) :

- Burlap, jute (8-oz., 40-in. wide).
- Cleaner, rifle bore.
- Cloth, crocus, sheet.
- Cloth, wiping, cotton.
- Oil, lubricating, preservative, medium.
- Oil, lubricating, preservative (special).
- Solvent, dry cleaning.
- Waste, cotton, white.

SECTION X. LUBRICATION

21. Lubrication

a. NORMAL CONDITIONS. Clean the matériel with rifle bore cleaner after firing and on 3 consecutive days thereafter. After the fourth cleaning, carefully wipe out all traces of rifle bore cleaner and coat the bore with preservative lubricating oil (special). Wipe dry and relubricate every 5 days between firings.

b. **UNUSUAL CONDITIONS.** Under conditions of high humidity, extreme moisture, salt air, or salt water (except low temperatures) preservative lubricating oil (medium) should be used for lubrication.

c. **INTERVALS.** Lubrication intervals should be reduced whenever the daily inspection reveals evidence of the formation of rust. It will usually be necessary to reduce the intervals when operating in areas characterized by high temperatures, dust and sand in the atmosphere, or high humidity.

22. Methods

a. **CLEANING.** (1) Unless otherwise specified, use rifle bore cleaner to clean or wash all metal parts, whenever partial or total disassembly is undertaken, or when renewing the protective lubricating film on exposed metal surfaces. The use of gasoline is prohibited.

(2) Care must be taken when cleaning internal mechanisms to insure complete removal of all residue or sediment. Necessary wiping should be done with a piece of clean cloth. Dirt or other foreign matter should not be allowed to get into the lubricant and lubricating openings.

b. **LUBRICATING.** Oil should be applied while the parts are being operated by hand to insure proper distribution of lubricant to all operating parts. Because of the extreme low temperatures prevailing at high altitudes, apply only a thin film of lubricant before flights. At other times, apply lubricant freely but avoid excessive and wasteful practices. Excessive lubrication will result in dust accumulations on operating parts and will cause wear and malfunctioning.

Section XI. PREVENTIVE MAINTENANCE SERVICE

23. General

Preventive maintenance services prescribed by Army Regulations are a function of using organization echelons of maintenance. This section contains preventive maintenance service allocated to crew (first echelon) and scheduled preventive maintenance service allocated to organizational (second echelon) maintenance.

24. Common Preventive Maintenance Procedures

The following general preventive maintenance will be observed in addition to that referred to in the schedules below:

a. Dirt, grit, gummed oil, and water cause rapid deterioration

of internal mechanisms and outer unpainted surfaces. Particular care should be taken to keep all bearing surfaces clean and properly lubricated. Wiping cloths and rifle bore cleaner are furnished for this purpose.

b. Powder fouling attracts moisture and hastens the formation of rust. If rust should accumulate, its removal from bearing surfaces requires special care in order that clearances will not be unduly changed. Crocus cloth should be used for this purpose. The use of coarse abrasives is strictly forbidden.

c. Check all safety features and operating mechanisms for functioning. Tighten loose parts.

d. Use only tools that are provided and see that they fit snugly on parts. Tools that do not fit will fail or cause damage to parts.

e. At least every 6 months, check to insure that all modifications have been applied. A list of current Modification Work Orders is published quarterly in FM 21-6. If a modification has not been applied, the local ordnance officer will be promptly notified. No alteration or modification which will affect the moving parts will be made by the using personnel, except as authorized by the Ordnance Department.

25. Preventive Maintenance Schedules

a. BEFORE FIRING.

<i>Point</i>	<i>Preventive maintenance</i>	<i>Detailed instructions</i>
Projector.	Check functioning.	Par. 29d (2).
Bore.	Clean and oil.	Par. 29c.
Operating parts and metal surfaces.	Clean and oil.	Par. 29c.

b. AFTER FIRING.

Projector.	Disassemble, clean, and oil.	Par. 29b.
	Remove burrs and scores.	Pars. 29d and 32d.
	Check springs.	Pars. 32d and 35d.
Bore.	Clean and oil.	Par. 29c.

c. WEEKLY.

Projector.	Renew oil film during nonuse.	Par. 29b
Barrel threads (M1A1 projector).	Clean threads during nonuse.	Par. 29d

Section XII. MALFUNCTIONS AND CORRECTIONS

26. Signal Fails to Fire

a. If signal fails to fire, make two more attempts to fire. If signal still fails to fire, count 30 slowly and then unload.

b. Examine signal; if primer is indented, reload with a new signal and fire.

c. If primer is not indented, or only slightly indented, disassemble the firing mechanism and examine all parts for burs, scores, wear, breakage, or deformations. If parts are broken, worn, or deformed, notify ordnance maintenance personnel. Polish roughened surfaces, clean, and oil.

d. If the projector is free of mechanical defects and the signal fails to fire, turn the ammunition over to ordnance personnel for examination.

Section XIII. GROUND SIGNAL PROJECTOR M1A1

27. General

a. The ground signal projector M1A1 (fig. 1) is a modification of the M1 model (now discarded), one of the differences being that the diameter of the bore is 0.02 inch smaller. The projector consists of a barrel, a breech which houses the firing mechanism, a body assembly, and spike assembly. The breech of the projector was originally designed to be mounted for support on the muzzle of a rifle, similar to a bayonet. The breech assembly is threaded onto the body assembly which is provided with a spike to keep the projector upright in the ground. This spike, when in use, is screwed into the center of the breech body, forming an extension to the breech body, and forced into the ground. When not in use, it can be unscrewed, inverted, and inserted inside the support through the base. It is retained in this position by screwing the head into the base in the reverse direction.

b. When the lanyard is pulled with a snap toward the ground and released, the firing pin striker lever is caused to rotate on the holder pin and, in so doing, the opposite end of the lever, which fits in a slot in the striker, will move the striker and firing pin up the breech to strike the primer. Its own weight and the pressure of the propellant gases will cause the striker (with firing pin) to return to its original position. In dry firing, the weight of the striker alone will cause the striker (with firing pin) to return to its original position.

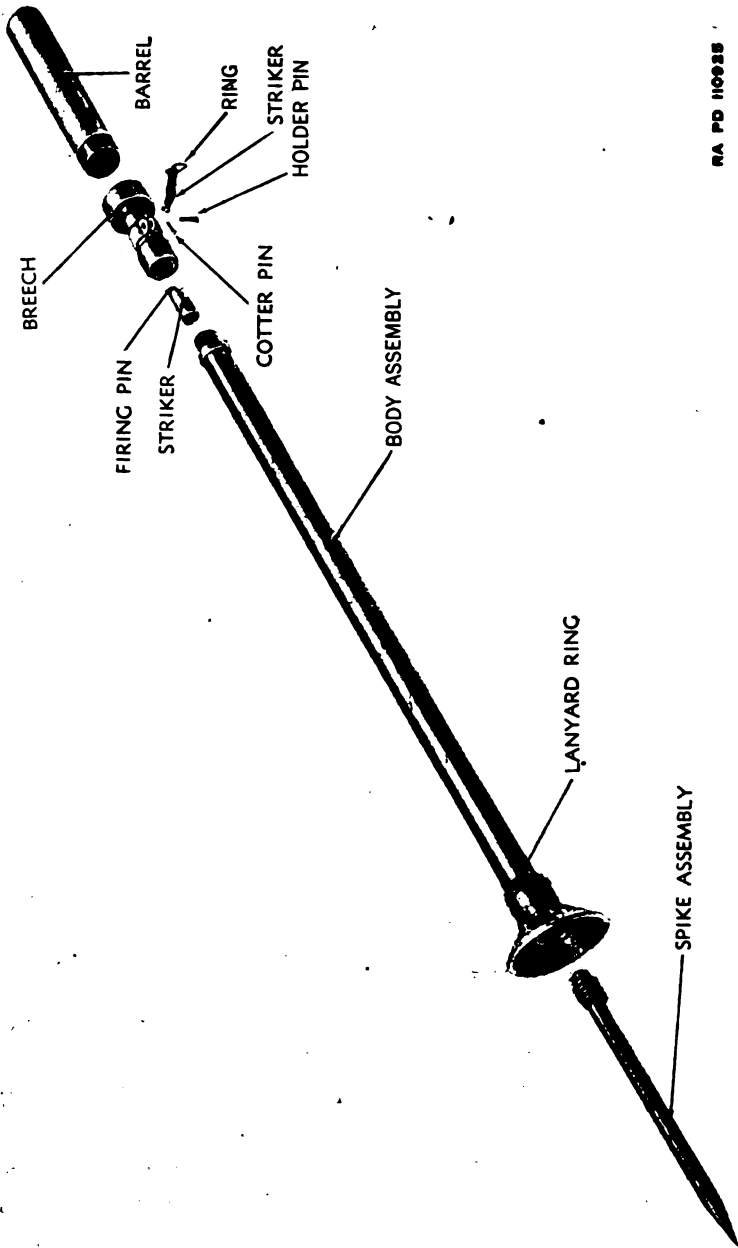


Figure 4. Parts of ground signal projector M1A1.

28. Disassembly and Assembly

a. **DISSASSEMBLY** (fig. 4). (1) Unscrew spike assembly from body assembly.

(2) Unscrew barrel from breech. It may be necessary to place

breech in a vise with wooden jaws and to unscrew the barrel with a strap wrench. The application of penetrating oil in advance of this operation is sometimes advantageous.

(3) Unscrew breech from body assembly. Withdraw cotter pin from holder pin and remove pin and lever.

(4) Remove striker. If necessary, unscrew firing pin from striker.

b. ASSEMBLY (fig. 4). (1) If firing pin has been removed, screw it into the striker and insert striker into breech (with firing pin leading).

(2) Insert operating (free) end of lever assembly between ears and through slot of breech into the striker so that bend in lever is toward firing pin. Align the holes in lever with holes in ears of breech and secure with holder pin. Secure holder pin with cotter pin.

(3) Screw barrel into breech.

(4) Screw spike assembly into body assembly. Except when in use, spike assembly should be screwed into body assembly in an inverted position.

29. Maintenance

a. GENERAL. Maintenance consists of cleaning, oiling, renovation of roughened surfaces, and replacement of worn or broken projectors.

b. CLEANING AND OILING.

Note. To provide satisfactory lubrication and protection against rust, always clean and dry all parts thoroughly before oiling.

(1) After firing, disassemble, clean, and oil all parts.

(2) Clean moving parts with rifle bore cleaner, wipe dry, and oil lightly by wiping with a patch dampened with preservative lubricating oil (special). All other metal surfaces except the bore will be cleaned similarly and wiped lightly with preservative lubricating oil (special).

(3) The barrel should be disconnected from breech and a swab saturated with rifle bore cleaner inserted in the bore and moved back and forth several times. Repeat this operation until swabs come out clean. If rifle bore cleaner is not available, use hot water and issue soap, or water alone, in which case the bore must be dried thoroughly afterward.

(4) The breech should be thoroughly cleaned of burned powder residue about the firing pin, as well as inside, to prevent striker from sticking.

(5) Oil the bore and mechanisms lightly with preservative lubricating oil (special). Wipe outside of projector with slightly

oiled rag. The threads on the parts should be cleaned during nonuse as often as necessary to insure proper functioning. For special care under extreme weather conditions, see paragraphs 13 through 16.

(6) During prolonged periods when the weapon is not fired, renew the oil film weekly, or more frequently if rust appears.

(7) To remove rust preventives or gummy deposits when the weapon is received from storage or has not been fired over a long period, clean the bore with dry cleaning solvent, wipe dry, and reoil.

c. CARE OF BORE. (1) It is vital to the accuracy of small arms matériel to maintain the bore in a rust-free condition. This is accomplished by cleaning thoroughly after firing and by maintaining a preservative coating on the bore surfaces at all other times. The procedure indicated below will be followed. The ordinary care, cleaning, and oiling described will be depended upon only for day-to-day preservation of small arms.

(2) Before firing, wipe all metal surfaces and moving parts to remove any accumulated dust or dirt and coat lightly with preservative lubricating oil (special).

(3) After firing, clean the bore thoroughly with rifle bore cleaner and leave a coating thereon; do not wipe dry. Repeat this procedure on the two following days.

(4) On the third day after firing, clean the bore again with rifle bore cleaner. Do not wipe dry if the weapon is likely to be fired within the next 24 hours. Otherwise, wipe dry and oil.

(5) If rifle bore cleaner is not available, the bore may be cleaned with a solution of $\frac{1}{4}$ pound of issue soap shaved into 1 gallon of hot water, or a solution of $1\frac{1}{2}$ tablespoonfuls of soda ash to each pint of hot water. Rinse the bore thoroughly with clear, warm water after cleaning, wipe dry, and oil. *Caution:* Do not use dry cleaning solvent. In the absence of soda ash, a solution of hot water and issue soap may be used, or hot water may be used alone.

(6) When the supply of rifle bore cleaner is limited, it may be diluted with 50 percent water in temperatures above 32° F. without materially reducing the cleaning efficiency. However, this will reduce the rust-preventive qualities; therefore, bores cleaned in this manner must be dried and coated with oil immediately.

d. REPAIR AND REPLACEMENT. (1) Inspect projector for general appearance, loose pins, and broken or missing parts.

(2) Check functioning and smoothness of operation. If the piece malfunctions or operates sluggishly, disassemble and clean

all parts with rifle bore cleaner or dry cleaning solvent. Wipe all parts dry, oil, reassemble, and check functioning.

(3) Check movement of striker in breech. If it binds, remove all burrs or scores with crocus cloth. Test security of firing pin in striker. If firing pin is loose in hand knob, or if point is bent, worn, or pitted, notify ordnance maintenance personnel.

(4) Remove any burrs from operating surfaces of lever and from holder pin.

(5) Inspect threads in barrel, breech, body, and spike for dirt dents and burrs. Clean, oil, and reassemble. If parts cannot be screwed home, notify ordnance maintenance personnel.

Section XIV. PYROTECHNIC PISTOL AN-M8 AND PYROTECHNIC PISTOL MOUNT M1

30. General

a. The matériel consists of a pistol and a spring-recoil type mount to which the pistol is locked by means of lugs on the barrel and on the recoil sleeve of the mount. The shock of recoil is absorbed by four symmetrically placed recoil springs; the shock of counterrecoil is absorbed by a cushioning gasket. Turning of the mount is prevented by the mount latch which mates with a slot of the recoil sleeve. When the pistol is removed from the mount, the recoil sleeve is covered with the cover chained to the mount.

b. As the trigger is squeezed, it rotates about its pin. The upper end of the trigger rotates forward and carries with it the trigger slide to which it is attached. The nose of the trigger pawl, which is attached to the trigger slide, engages the lower part of the hammer, forcing it to rotate about its pin. When the hammer is rotated sufficiently backwards the trigger pawl is slightly rotated about its pin on the trigger slide by the resisting action of the pawl trip roller. This action causes the nose of the trigger pawl to disengage from the hammer. The hammer then starts forward under the action of the hammer spring to strike the firing pin which, in turn, hits the primer. When the trigger is released, the spring action on the trigger slide will force the trigger to rotate to its original position. The forward end of the trigger slide will then force the hammer back to its original position.

31. Disassembly and Assembly

a. REMOVAL OF GROUPS (fig. 5). The groups should be disassembled in the following order:

(1) Unscrew trigger guard screw.

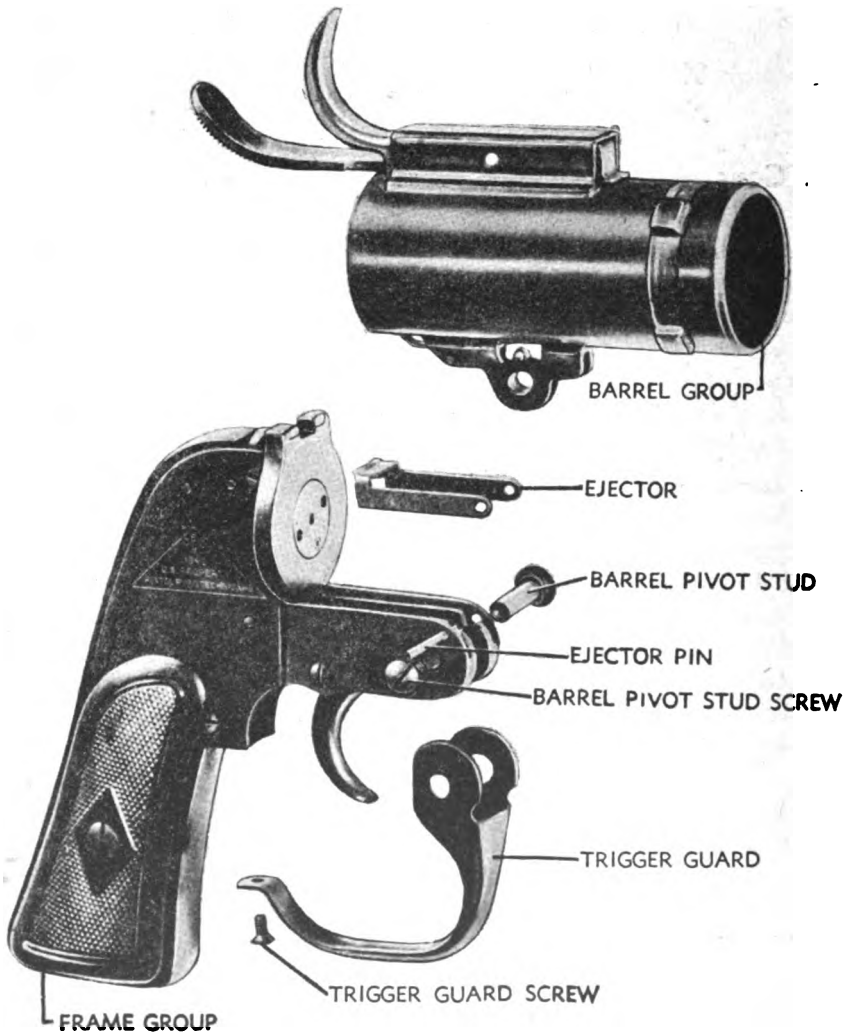
(2) Unscrew barrel pivot stud screw and force out barrel pivot stud.

(3) Pull trigger guard off frame.

(4) Drive out ejector pin and remove barrel group from frame group.

b. REPLACEMENT OF GROUPS (fig. 5). (1) Replace barrel group in frame. Line up ejector and ejector spring and insert ejector pin in position in frame.

(2) Replace trigger guard on frame.



RA PD 50911

Figure 5. Groups of pyrotechnic pistol AN-M8.

(3) Insert barrel pivot stud in position and screw in barrel pivot stud screw.

(4) Screw in trigger guard screw.

c. **DISASSEMBLY OF BARREL GROUP (fig. 6).** Do not disassemble unless necessary.

(1) Punch out breech lock pin with a drift.

(2) Grasp the mount latch and slide it out of the breech lock housing. The breech lock, breech lock spring, and the latch spring will also be withdrawn by this action.

(3) Do not remove ejector spring unless necessary. To remove, drive out ejector spring retaining pin.

d. **ASSEMBLY OF BARREL GROUP (fig. 6).** (1) Insert latch spring, breech lock, and breech lock spring into mount latch. Slide the assembly into the breech lock housing.

(2) Replace breech lock pin.

(3) If the ejector spring has been removed, replace and drive back ejector spring retaining pin and stake it in position.

e. **DISASSEMBLY OF FRAME GROUP (fig. 6).** (1) Unscrew grip screw and remove grip stud.

(2) Lift off left-hand and right-hand grips.

(3) Remove screws on cover plate, including trigger screw.

(4) Lift off cover plate.

(5) Unscrew barrel hinge spring screw and remove barrel hinge spring.

(6) Lift out hammer spring.

(7) Lift out hammer.

(8) Lift out pawl trip roller.

(9) Lift out safety lever and safety lever spring together. Do not remove safety lever unless necessary.

Note. All subsequent disassembly should be performed only when necessary.

(10) Slide out safety lever spring from safety lever.

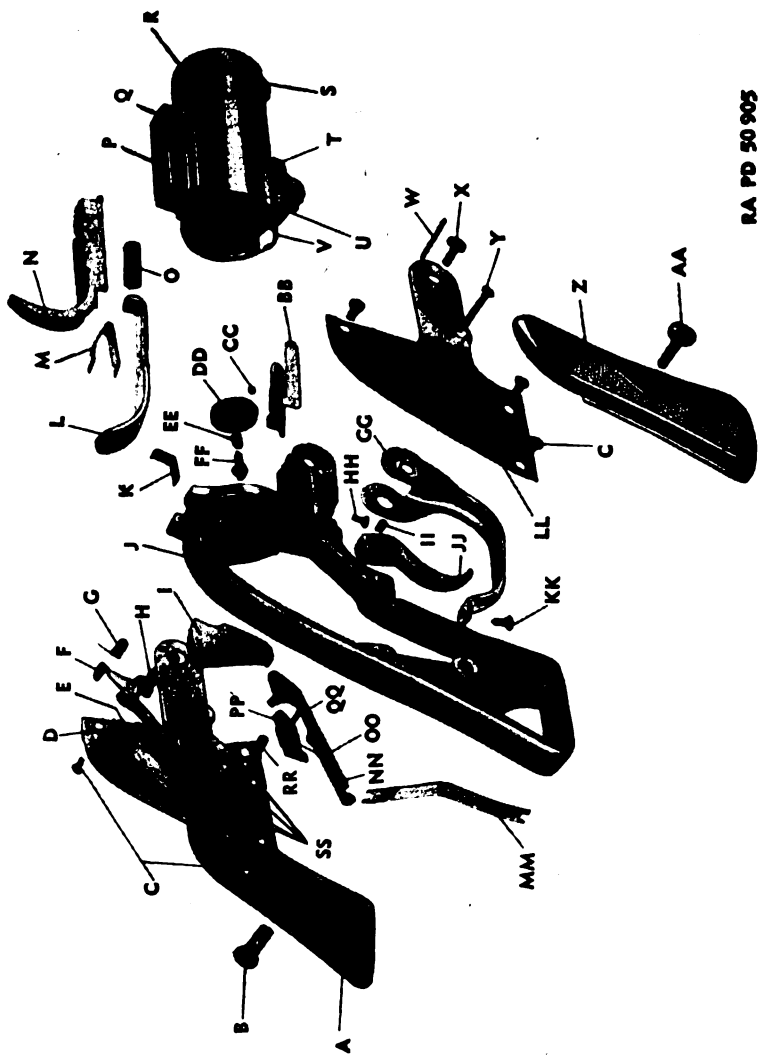
(11) Unscrew back plate screws and push out back plate assembly from frame.

(12) Force rear end of trigger slide upward to disengage from trigger spring. Remove trigger spring.

(13) Drive out trigger pawl pin and remove trigger pawl.

(14) Lift out trigger pawl spring.

(15) Pull rear end of trigger slide downward in frame. This action withdraws trigger partly into frame and exposes trigger slide pin. Lift out trigger slide pin. Remove trigger and trigger slide.



RA PD 50 905

Figure 6. Parts of pyrotechnic pistol AN-M8.

(16) Use a $\frac{1}{16}$ -inch hexagonal socket head setscrew wrench and unscrew bushing retainer set screw.

(17) Use a face spanner wrench, $\frac{5}{8}$ inch center to center, diameter of pin $\frac{1}{8}$ inch, and unscrew bushing retainer part way and press face of bushing retainer with thumb to dislodge firing pin bushing from frame. Complete unscrewing bushing retainer and extract firing pin bushing.

(18) Remove firing pin and firing pin spring from firing pin bushing.

f. ASSEMBLY OF FRAME GROUP (fig. 6). (1) Insert firing pin

A — L H GRIP	P — BREECH LOCK HOUSING	EE — FIRING PIN SPRING
B — GRIP STUD	Q — BREECH LOCK PIN	FF — FIRING PIN
C — COVER PLATE AND BACK PLATE SCREWS	R — BARREL	GG — TRIGGER GUARD
D — BACK PLATE ASSEMBLY	S — BARREL RECOIL LUG	HH — BARREL HINGE SPRING SCREW
E — HAMMER SPRING	T — BARREL HINGE	II — TRIGGER SLIDE PIN
F — SAFETY LEVER	U — EJECTOR SPRING RETAINING PIN	JJ — TRIGGER
G — SAFETY LEVER SPRING	V — EJECTOR SPRING	KK — TRIGGER GUARD SCREW
H — BARREL PIVOT STUD	W — EJECTOR PIN	LL — COVER PLATE
I — HAMMER	X — BARREL PIVOT STUD SCREW	MM — TRIGGER SPRING
J — FRAME	Y — TRIGGER SCREW	NN — TRIGGER SLIDE
K — BARREL HINGE SPRING	Z — R. H. GRIP	OO — TRIGGER PAWL SPRING
L — BREECH LOCK	AA — GRIP SCREW	PP — TRIGGER PAWL
M — BREECH LOCK SPRING	BB — EJECTOR	QQ — TRIGGER PAWL PIN
N — MOUNT LATCH	CC — BUSHING RETAINER SET SCREW	RR — PAWL TRIP ROLLER
O — LATCH SPRING	DD — BUSHING RETAINER	SS — PINS

Figure 6.—Continued.

bushing into place in frame. Replace firing pin spring on firing pin and insert the assembly into firing pin bushing.

(2) Replace and screw bushing retainer into frame, using spanner wrench.

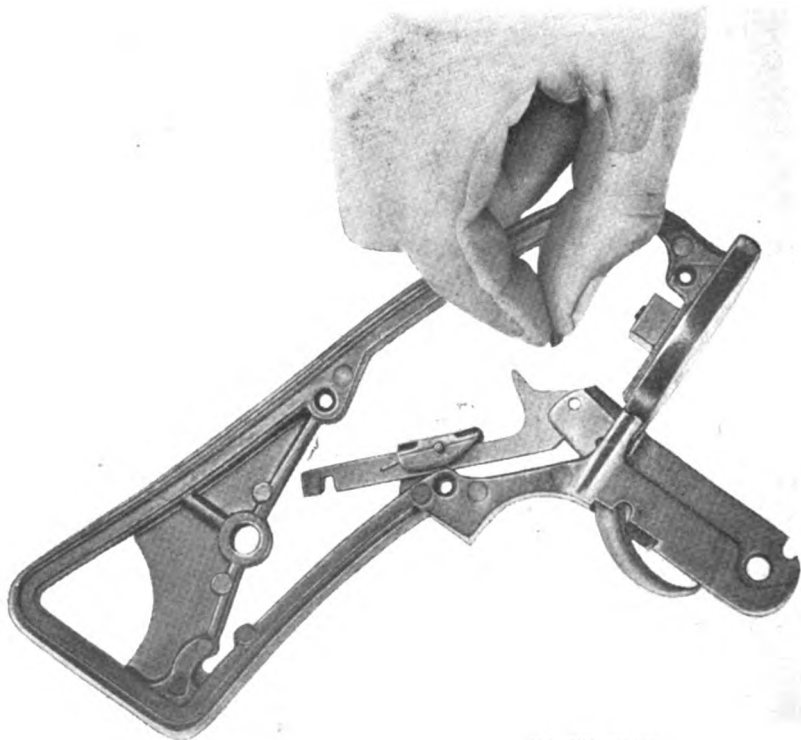
(3) Screw the bushing retainer setscrew into its recess in the bushing retainer. Use the $\frac{1}{16}$ -inch hexagonal socket head setscrew wrench for this operation.

(4) Replace the trigger slide in the frame and the trigger through its recess in the frame. Push the trigger into frame so that the hole receiving the trigger slide pin is visible. Position trigger slide so that its trigger slide pin hole is fair with that of the trigger (fig. 7) and insert trigger slide pin.

(5) Replace trigger pawl spring.

(6) Position trigger pawl over trigger slide and insert trigger pawl pin.

(7) Assemble trigger spring into position in frame. Care must be taken that the spring is inserted with the frame end facing forward as shown in figure 8. Force the trigger slide end of the



RA PD 50906

Figure 7.—Inserting trigger slide pin.



RA PD 50907

Figure 8. Frame group with grips and cover plate removed.

spring slightly forward and slip the trigger slide into position over trigger spring.

(8) Replace the back plate assembly on frame and screw in back plate screws.

(9) Slide safety lever spring into safety lever.

(10) Replace safety lever assembly into position in frame, compressing long arm of safety spring toward hammer end of safety lever and simultaneously forcing downward on safety lever pin.

(11) Replace pawl trip roller.

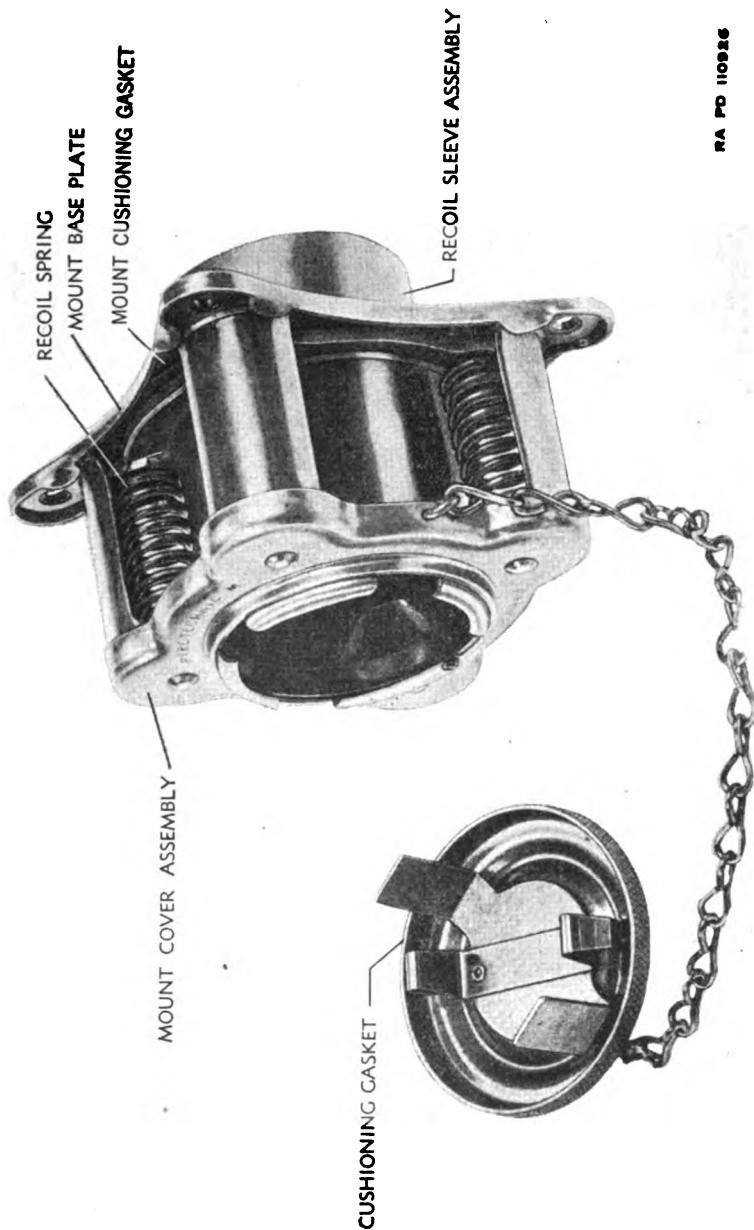
(12) Replace hammer.

(13) Replace hammer spring.

(14) Replace barrel hinge spring and screw in barrel hinge spring screw. Figure 8 shows relative position of component parts of frame group with grips and cover plate removed.

(15) Replace cover plate and insert cover plate screws.

(16) Position trigger so that trigger screw can be inserted.



PA PD 11086

Figure 9.—Pyrotechnic pistol mount M1.

(17) Replace left-hand and right-hand grips.

(18) Insert grip stud and replace grip screw.

g. DISASSEMBLY OF MOUNT M1 (fig. 9). The mount should be disassembled only when necessary.

(1) Remove mount from aircraft.

(2) Replace two mount base plate bolts and nuts on diagonally opposite holes on mount base plate. These bolts and nuts are not a part of the mount but are a part of the plane equipment.

(3) Pry up locking flaps of mount base plate.

(4) Unscrew mount base plate bolts carefully. This action will relieve the compression of the recoil springs. Slide off mount base plate.

(5) Slide off mount cover assembly and remove recoil springs.

(6) Slide off mount cushioning gasket from recoil sleeve assembly.

h. ASSEMBLY OF MOUNT M1 (fig. 9). (1) Slide mount cushioning gasket on recoil sleeve assembly.

(2) Fit recoil springs into position on recoil sleeve.

(3) Slide on mount cover assembly on recoil sleeve assembly. Make certain that the open end of recoil sleeve fits over rivet heads.

(4) Slide on mount base plate. Insert two mount base plate bolts through diagonally opposite holes on mount base plate and holes on mount cover assembly. Screw nuts on bolts and draw up evenly.

(5) Bend flaps of mount base plate over to lock the mount cover assembly to mount base plate. Remove mount base plate bolts and nuts.

(6) Attach mount to aircraft.

32. Maintenance

a. GENERAL. See paragraph 29a.

b. CLEANING AND OILING. See paragraph 29b for applicable instructions.

c. CARE OF BORE. See paragraph 29c for applicable instructions.

d. REPAIR AND REPLACEMENT. (1) See paragraph 29d for applicable instructions.

(2) Inspect firing pin for wear or broken point. If excessively worn or broken, notify ordnance maintenance personnel. Test firing pin for movement in bushing. If it binds or moves sluggishly, remove all burrs with crocus cloth.

(3) Check breech lock for wear and locking action. If worn and fails to lock the breech, notify ordnance maintenance personnel. Check lock for burrs on contacting face and remove with crocus cloth.

(4) Test action of mount latch. If it fails to lock the pistol to the mount, notify ordnance maintenance personnel.

(5) Test functioning and free action of trigger for hammer and trigger pawl. Examine trigger pawl and hammer for wear

and burs. Remove burs; if worn, notify ordnance maintenance personnel.

(6) Test rotation of pawl trip roller on pivot pin. If sluggish, remove burs from pivot pin.

(7) Check functioning of ejector and examine for wear. If it malfunctions or is excessively worn, notify ordnance maintenance personnel.

(8) Check functioning of safety lever and examine for deformation and burs. Remove burs; if lever malfunctions, notify ordnance maintenance personnel.

Section XV. HAND PYROTECHNIC PROJECTOR M9

33. General

The M9 projector consists of a short barrel with a hinged breech which houses the firing mechanism. The breech, in turn, is hinged to a latch, equipped with a spring actuated plunger, which serves to keep the breech closed. The signal is loaded through the breech end, the rim being engaged by an ejector near breech end of barrel. When the hand knob is hit by hand or by striking on a hard surface, it is forced inward against the action of the firing pin, allowing the firing pin on the knob to hit the primer. The firing pin (and knob) is returned to its original position by the recovery of the firing pin spring. As the breech is opened after firing, it pulls the ejector link which, in turn, forces the ejector backwards, thus extracting the case.

34. Disassembly and Assembly

a. **DISASSEMBLY.** (1) Unscrew the firing pin nut and remove the firing pin guide, breech plate, firing spring, and the firing pin assembly.

(2) Further disassembly of the projector by the using arm is prohibited.

b. **ASSEMBLY.** (1) Place the breech plate in position on back of breech so that groove on plate fits over the ejector link.

(2) Insert firing pin guide (threaded end leading) through front face of breech and breech plate.

(3) Place firing pin spring in firing pin assembly, place assembly on back of breech plate, and screw firing pin nut onto the firing pin guide.

35. Maintenance

a. **GENERAL.** See paragraph 29a.

b. CLEANING AND OILING. See paragraph 29*b* for applicable instructions.

c. CARE OF BORE. See paragraph 29*c* for applicable instructions.

d. REPAIR AND REPLACEMENT. (1) See paragraph 29*d* (1) and (2) for applicable instructions.

(2) Check action of firing pin spring. If it is broken or too weak to retract the firing pin, notify ordnance maintenance personnel.

(3) Examine condition of ejector. If deformed or broken, notify ordnance maintenance personnel.

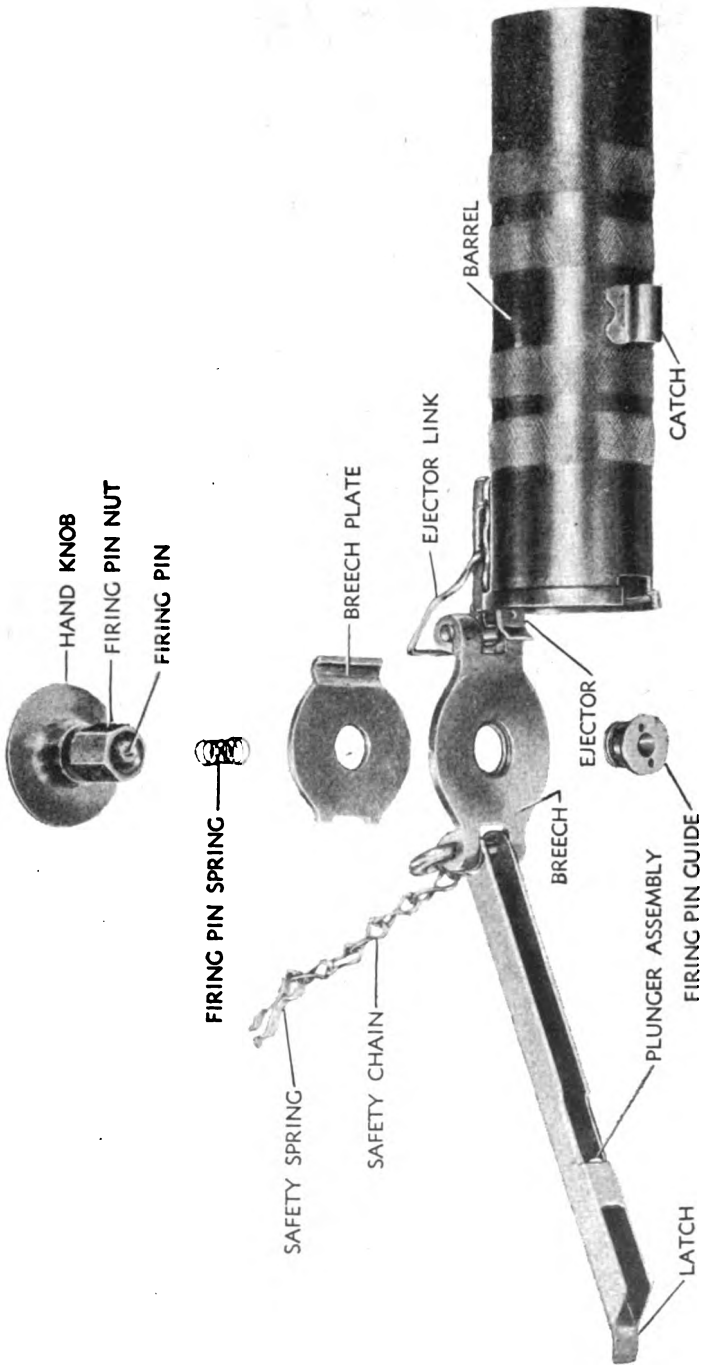


Figure 10. Parts of hand pyrotechnic projector M9.

PART FOUR AMMUNITION

Section XVI. GENERAL

36. Ammunition

Ammunition for pyrotechnic projectors is supplied in the form of fixed complete rounds, that is, all of the components necessary for proper function are assembled and the assembly is loaded into the pistol or projector as a unit.

37. Classification

According to use, pyrotechnics designed for use with the projectors described in this manual are classified as—

- a. GROUND SIGNALS. For use on the ground.
- b. AIRCRAFT SIGNALS. Originally designed for use from or by aircraft.

38. Identification

a. GENERAL. Ammunition is completely identified by painting and marking on original packing containers. For purposes of record, the standard nomenclature of the item, together with its lot number, completely identifies the ammunition. Once removed from its packing, ammunition may be identified by the painting and marking on the ammunition items. Further information on marking will be found in paragraphs describing the particular item.

b. MODEL. To identify a particular design, a model designation is assigned at the time the model is classified as an adopted type. This model designation becomes an essential part of the nomenclature and is included in the marking of the item. The present system of model designation consists of the letter "M" followed by an arabic numeral, for example, "M1." Modifications are indicated by adding the letter "A" and the appropriate arabic numeral. Thus, "M1A1" indicates the first modification of an item for which the original designation was "M1." Wherever a

"B" suffix appears in a model designation it indicates an item of alternative (or substitute) design, material, or manufacture. Certain items standardized for use by both Army and Navy are designated by an "AN" preceding the model designation, for example, AN-M37A1.

c. **AMMUNITION LOT NUMBER.** At the time of manufacture, every item of ammunition is assigned a lot number. This lot number is stamped or marked on all packing containers and on the item itself, unless the item is too small. It is required for all purposes of record involving the ammunition, such as reports on condition, functioning, or accidents in which the ammunition is involved.

d. **AMMUNITION DATA CARD.** A 5- by 8-inch card, containing all pertinent information concerning the ammunition, is furnished with the shipping ticket of each shipment of ammunition. Information on the cards includes lot number, date packed, assembling and firing instructions when required, and AIC symbols on lots of recent manufacture.

39. Care, Handling, and Preservation of Pyrotechnics

Pyrotechnics contain material of an intrinsically hazardous nature. Special precautions for certain pyrotechnics are prescribed in paragraphs describing the particular item. In general, the following regulations will be observed:

a. **MOISTURE.** The functioning of pyrotechnics is affected by moisture. Pyrotechnics are packed in moistureproof and hermetically sealed containers. The seals of such packings should not be broken until just before the item is to be used. If pyrotechnics are exposed to moisture, they should be segregated from all other material until an examination has been made to make sure that they are serviceable and not dangerous. Containers which show signs of dampness or moisture will be opened and if there is any evidence of moisture on the pyrotechnics, they will be destroyed by authorized and experienced personnel.

b. **HANDLING.** (1) Besides the hazardous pyrotechnic compositions, pyrotechnics contain sensitive elements, such as fuzes, friction compositions, and primers. Disassembly of pyrotechnics or components is prohibited. Pyrotechnics should be handled with care and protected against shock; boxes should not be dropped or thrown. Boxes containing signals which are discharged by percussion primers should be placed flat, with tops up. Protective or safety devices should not be removed until just before use. Care should be exercised to avoid damage to cases.

(2) Pyrotechnics, especially the types which are projected,

should be so handled as to avoid denting or deforming the barrel or case. Pyrotechnics which are seriously dented or deformed will not be used.

c. STORAGE. Pyrotechnics should be stored in a dry, well ventilated place, out of the direct rays of the sun, and protected against excessive or variable temperatures. Smoking will not be permitted, and matches and other flame or spark producing articles will not be carried in places where pyrotechnics are stored.

d. TOXICITY. Pyrotechnic material is poisonous to men and animals if taken internally.

e. BEFORE AND DURING FIRING. (1) Pyrotechnics should be inspected before firing to locate any defective units. Pyrotechnics should be kept clean. Any foreign substance, such as dirt, sand, mud, or grease, will be carefully removed before pyrotechnics are stored or used.

(2) Pyrotechnics that are to be fired should be stored in small quantities either to the right or the left, but not directly behind, the firing point. They should be placed so as to minimize the possibility of ignition or explosion in case of accident during firing. Smoking will be prohibited where pyrotechnics are piled and only approved lights will be used in their vicinity. When firing pyrotechnics, extreme care should be taken to fire them in such a manner that burning material or burned out signals will not fall on the firer or other personnel, or into boxes of pyrotechnics or other ammunition. Care should also be exercised when firing through trees or obstructions.

f. MISFIRE. In case of a misfire or hangfire of aircraft signals or flares, when using the pistol AN-M8, three attempts will be made to fire. If unsuccessful, the pistol may be unloaded after a wait of 30 seconds.

g. REPACKING AND STORAGE. Pyrotechnics will not ordinarily be on hand, except in sufficient quantities to meet immediate requirements. Any assembled complete rounds in excess of such requirements will be restored to their original packings and appropriately marked. Prior to repacking, components will be inspected and those which were originally sealed will be resealed. Such ammunition should be used first in subsequent firings, in order that the stock of opened packings may be kept at a minimum.

40. Packing

Pyrotechnics are packed in metal-lined or unlined, nailed or wire-bound wooden boxes. (See fig. 11.) Those in unlined boxes are placed in inner containers consisting of sealed corrugated board cartons, or fiber or metal containers. The cartons are dipped in

paraffin to protect the contents from moisture. Complete packing data covering dimensions, volume, and weight of the ammunition described herein are published in WD Supply Catalog ORD 11 SNL S-5. The data given in table I are considered representative for estimating weight and volume requirements.

Table I

Item	Inner container	Outer packing	Number of items contained	Over-all dimensions (in.)	Area (sq. ft.)	Volume (cu. ft.)	Weight (lb.)
Signal, high-burst ranging, M27.	2 per fiber container.	wooden box.	100	23% x 9% x 12%	1.6	1.7	70.7
Flare, aircraft parachute, M9A1.	1 per fiber container.	wooden box.	25	19% x 15% x 16%	2.1	2.8	100.0
Signal, flash and sound, M74.	10 per wax dipped carton.	wooden box.	100	23% x 11% x 11%	1.9	1.8	58.0
Signals, aircraft, single star, and double star, AN-M37A1 thru AN-M58A1.	12 per carton.	wooden box.	144	28% x 13% x 12%	2.6	2.8	93.0



NOTE A—TWO RED STRIPES TO INDICATE
RED-RED DOUBLE STAR SIGNAL

RA PD 104941A

Figure 11. Packing box for aircraft signals.

Section XVII. AMMUNITION FOR GROUND SIGNAL PROJECTOR M1A1 AND FOR AIRCRAFT TYPE PROJECTORS

41. Ammunition for Ground Signal Projector M1A1

a. GENERAL. The high-burst ranging ground signal M27 (fig. 12) produces a smoke puff at the top of its rise of approximately 550 feet. This signal is used to simulate the high burst of artillery shell. The over-all length is 3.82 inches maximum and the diameter is 1.628 inches maximum.

b. FUNCTIONING. The signal functions are described in the following steps:

(1) The firing pin strikes the primer which ignites the propelling charge.

(2) The propelling charge ignites the fuse and projects the signal assembly which rises to an altitude of approximately 550 feet.

(3) At this point the fuse burns through and ignites the charge which bursts the case.

c. CARE AND PRECAUTIONS IN HANDLING. In addition to the general precautions given in paragraph 39, the following special precautions will be observed:

(1) The primer will be carefully guarded against blows from a sharp instrument. Such blows may fire the propelling charge and ignite the signal.

(2) Signals with deformed, dented, or cracked cases will not be used.

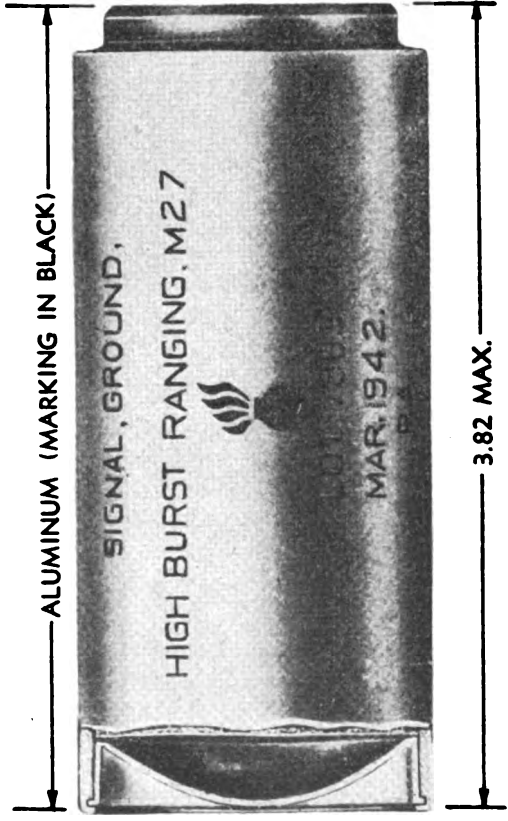
(3) Care will be exercised in firing the signal to keep all portions of the firer's body below the muzzle of the projector.

(4) Steel helmet or other adequate cover should be available to protect firer against fragments of the case.

42. Ammunition for Aircraft Type Projectors

a. GENERAL. Aircraft signals are assembled in two distinctive types of aluminum cases, one with a groove formed around the head and the other with a flange around the head. An earlier model of the flanged type is assembled in a paper and brass case resembling a shotgun shell. Both types are authorized for use in the pyrotechnic pistol AN-M8 and the hand pyrotechnic projector M9.

(1) *Parachute aircraft flare M9A1.* (a) This flare (fig. 13) is provided to meet the requirement for a reconnaissance flare. The complete round is supplied in cartridge form designed for projection from the pyrotechnic pistol AN-M8. When the flare is dis-



RA PD 2122

Figure 12. High-burst ranging ground signal M27.

charged, the fuse burns for 2.5 seconds before igniting the propelling charge which ignites the flare and expels the flare and parachute from the case. The flare burns with a white light of 60,000 candlepower for 1 minute while dropping at an average rate of 7 feet per second. The complete round is 15.05 inches in length, 2.00 inches in diameter for the greater part of its length,



RA PD 64447

Figure 13. Parachute aircraft flare M9A1.

and 1.56 inches in diameter at the base where it fits into the pistol. Although the pistol is designed for operation with the mount M1, the parachute aircraft flare M9A1 will not pass through this mount, hence must be fired freehand. The use of both hands is recommended because of the powerful recoil. The signals designed for use with this pistol may be discharged from a grounded plane but the parachute aircraft flare M9A1 should not be so used. The round weighs 2.1 pounds.

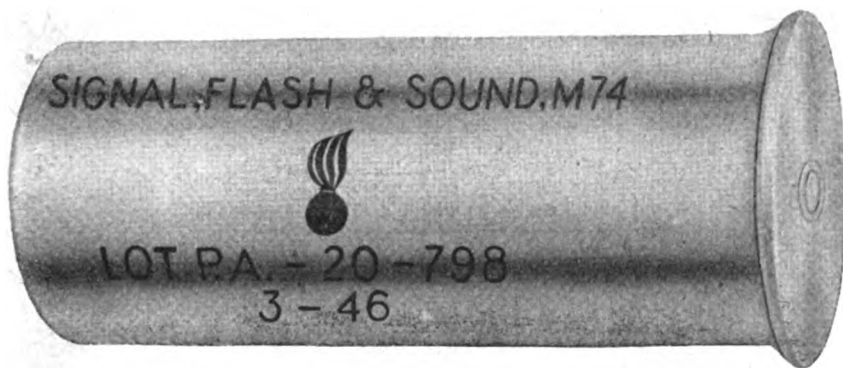
(b) *Care and precautions in handling.* In addition to the general precautions given in paragraph 39, parachute aircraft flares M9A1 will be examined on installation in planes. Those with dented, deformed, or cracked barrels, or with loose identification tops will not be used.

(2) *Flash and sound signal, M74.* (a) *General.* The flash and sound signal, M74 (fig. 14) is intended primarily for umpires to simulate air burst of artillery fire for training troops. This signal can be fired from the pyrotechnic pistol AN-M8 or the hand pyrotechnic projector M9. The signal consists of a one-piece outer case, similar to aircraft signals AN-M37A1 through AN-M58A1 in size and shape, a propelling charge, and an inner cylindrical case which contains a delay fuse and a bursting charge. A percussion primer, which is located in the base of the outer case, extends into the propelling charge which in turn contacts the delay fuse in the inner case. When fired, the primer ignites the propelling charge. This ignites the delay fuse and propels the inner case of bursting charge out of the outer case. After a delay of approximately $2\frac{1}{2}$ seconds, the fuse ignites the bursting charge which explodes and produces a bright flash and loud noise. The

fragments from the inner case lose velocity very quickly and are so small that they become harmless in a relatively short distance. The signal has an over-all length of 3.85 inches maximum and a body diameter of 1.568 inches maximum.

(b) *Care and precautions in handling.* In addition to the general precautions given in paragraph 39, the following special precautions will be observed:

1. When fired over the heads of personnel, the pistol or projector should be aimed at an elevation of not less than 45° to insure safe height of functioning. At this elevation, the height of burst is about 100 feet.
2. Personnel should not face toward the point of burst of the signal.
3. Standard equipment including helmet should be worn by personnel exposed to the detonation.



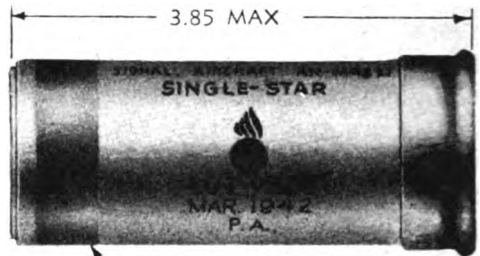
RA PD 108229

Figure 14. Flash and sound signal M74.

b. CARTRIDGE TYPE AIRCRAFT SIGNALS. (1) The original models of these signals are assembled in a shotgun type shell of cartridge paper with a brass head. The A1 modifications of the signals differ from the basic model in that the case is made of one piece of extruded aluminum. The signal cartridge is 3.85 inches in length by 1.568 inches in diameter. These signals are designed for use in the pyrotechnic pistol AN-M8 or hand pyrotechnic projector M9. Upon firing, the propelling charge ignites and projects one or two freely falling stars of the same or different colors which burn for 7 to 13 seconds. The colors and intensity of the stars are as follows:

(a) In double star signals:

Red.....	25,000 candlepower minimum
Yellow.....	20,000 candlepower minimum
Green.....	20,000 candlepower minimum



RED BAND

SIGNAL, AIRCRAFT, SINGLE-STAR, AN-M43AI



YELLOW BAND

GREEN BAND

SIGNAL, AIRCRAFT, DOUBLE-STAR, AN-M42AI



YELLOW BAND

RED BAND

YELLOW BAND

SIGNAL, AIRCRAFT, TRACER, DOUBLE-STAR, AN M53AI

RA PD 108190

Figure 15. Representative markings of aircraft signals.

(b) In single star signals :

Red.....	25,000 candlepower minimum
Yellow.....	25,000 candlepower minimum
Green.....	25,000 candlepower minimum

(c) In tracer signals :

Red tracer.....	48,000 candlepower minimum
Red star.....	30,000 candlepower minimum
Green tracer.....	25,000 candlepower minimum
Green star.....	20,000 candlepower minimum
Yellow tracer.....	30,000 candlepower minimum
Yellow star.....	36,000 candlepower minimum

(2) *Models.* The following signals are available :

- (a) Signal, aircraft, double star, red-red, AN-M37A1.
- (b) Signal, aircraft, double star, yellow-yellow, AN-M38A1.
- (c) Signal, aircraft, double star, green-green, AN-M39A1.
- (d) Signal, aircraft, double star, red-yellow, AN-M40A1.
- (e) Signal, aircraft, double star, red-green, AN-M41A1.
- (f) Signal, aircraft, double star, yellow-green, AN-M42A1.
- (g) Signal, aircraft, single star, red, AN-M43A1.
- (h) Signal, aircraft, single star, yellow, AN-M44A1.
- (i) Signal, aircraft, single star, green, AN-M45A1.
- (j) Signal, aircraft, AN-M53A1.
- (k) Signal, aircraft, AN-M54A1.
- (l) Signal, aircraft, AN-M55A1.
- (m) Signal, aircraft, AN-M56A1.
- (n) Signal, aircraft, AN-M57A1.
- (o) Signal, aircraft, AN-M58A1.

(3) *Marking* (fig. 15). The cartridge case is natural color marked in black with the type and model of signal, the ordnance insigne, lot number, manufacturer's symbol, and date of loading. Around the case of double star signals, two $\frac{1}{4}$ -inch bands are marked, each the color of one of the stars. The model designation is stenciled in black on the identification top. Single star signals are similarly marked, except that the single band around the case is $\frac{1}{2}$ inch wide.

APPENDIX I

STORAGE AND SHIPMENT

1. General

a. Preparation of the matériel for domestic shipment will be the same as that prescribed for limited storage (matériel temporarily out of use for periods up to 90 days).

b. Instructions for limited storage include receiving inspection; preferred storage; preparation of matériel for storage; necessary inspections and servicing to insure safe storage, and methods of removal from limited storage.

c. Instructions for domestic shipment include preparation of matériel for shipment; wrapping; packaging, boxing, and boxing data; and loading matériel in box cars.

d. Materials listed below and specified throughout this appendix required for preparation of matériel for storage and shipment, are in addition to those indicated in paragraph 20.

Barrier, waterproof (types E-2, H-1, H-2, L-2, or M).	Soap, issue.
Borax.	Tape, adhesive, nonhygroscopic, O.D.
Compound, cleaning, alkaline.	Triclorethylene, technical.
Compound, rust preventive, light.	Wrapping, greaseproof (type 1, grade A).

2. Instructions for Limited Storage

a. GENERAL. When matériel is out of use, it must be turned over to ordnance personnel, or placed in a limited storage status for periods not to exceed 90 days.

Note. Storage of matériel for periods in excess of 90 days will normally be handled by *ordnance personnel only*.

b. RECEIVING INSPECTION. Immediately upon receipt of matériel for storage, it must be inspected for missing or broken parts. If missing or broken parts cannot be replaced or repaired prior to placing the matériel in storage, a tag must be attached specifying

the repairs needed and a written report of these items must be made to the officer in charge of the matériel.

c. **PREFERRED STORAGE.** The preferred type of storage is in closed dry warehouses or sheds. When outdoor storage is necessary, the storage site must be selected and arranged as prescribed in SB 9-47.

d. **PREPARATION.**

Note. All matériel received processed for domestic or oversea shipment will not be processed for storage unless the inspections preparatory to or during storage reveal it necessary.

(1) *Cleaning. Caution:* Alkaline solutions deteriorate phosphate finishes rapidly, therefore are not to be used when degreasing matériel having a phosphate finish. Prior to cleaning, matériel will be disassembled. The bore, all parts of the mechanism, and the exterior parts must be thoroughly cleaned and made free of all foreign matter, using one of the following cleaning methods:

(a) *Dry cleaning solvent.* Dry cleaning solvent is preferred for removing rust preventative compound.

(b) *Rifle bore cleaner.* Maximum cleaning efficiency will be obtained when rifle bore cleaner is used undiluted. When necessary to conserve the supply, it may be diluted up to 50 percent with water provided prevailing temperatures are above +32° F.

(c) *Vapor degreasers.* Vapor degreasers using trichlorethylene are suitable for cleaning all matériel. Matériel cleaned in vapor degreasers must be immediately dipped in preservative lubricating oil (special) after the degreasing process. The natural dark color of phosphate finishes will be restored when oiled.

(d) *Hot water solutions.* The efficiency of hot water solutions is accelerated more by raising the temperatures of the solutions than by increasing the amount of materials. Maximum results are obtained with a temperature of +180° F. to +200° F.

Note. When hot water solutions are used, matériel must be thoroughly rinsed immediately in clear, hot water to remove all traces of the solution which may promote corrosion or deterioration of the finish, then dried, and immediately oiled.

1. For phosphate finishes, any one of the following materials may be used in the proportion shown, added to each gallon of water:

Borax.....6 to 10 oz.

Issue soap.....Not more than 2 oz.

2. For nonphosphate finishes, any one of the following materials may be used in the proportion shown, added to each gallon of water:

Borax..... $\frac{1}{2}$ to 1 lb.

Issue soap..... $\frac{1}{4}$ lb.

Alkaline cleaning compound..... $\frac{1}{3}$ lb.

(2) *Drying.* Dry all parts thoroughly with a lintless wiping cloth or dry compressed air, if available, and handle carefully to avoid contact with bare hands.

Caution: Unless special filters or moisture traps are used, compressed air will contain moisture and must not be used.

(3) *Application of preservative.* Immediately after cleaning and drying, apply preservative lubricating oil (medium). If matériel is to be issued immediately to using troops, apply preservative lubricating oil (special). Apply oil without heating, by dipping, spraying, fogging, brushing, or flooding on parts. Brushing is the least satisfactory of these methods. When dipping, hold the matériel at such angles that trapped air bubbles cannot keep portions of the interior surfaces from being coated with the oil. Drain all excess oil from matériel before wrapping.

(4) *Wrapping and packaging.* (a) Wrap matériel individually in a sheet of greaseproof wrapping (type I, grade A) or place in a bag made of this material. Cushion sharp edges of matériel with layers of greaseproof wrapping to prevent rupture of wrapper by the inclosed parts. Seal with O.D. nonhygroscopic adhesive tape.

(b) The wrapped matériel will then be placed into unit, intermediate, and shipping containers as prescribed in paragraph 3 of this appendix.

e. **INSPECTIONS.** A visual inspection must be made periodically to determine general condition. If corrosion is found on any part, remove the rust spots, clean, and treat with prescribed preservative.

f. **REMOVAL FROM LIMITED STORAGE.** (1) If the matériel is not shipped or issued upon expiration of the limited storage period, the matériel must be further treated for stand-by storage (matériel out of use for periods in excess of 90 days up to 3 years).

(2) Matériel to be shipped will not be deprocessed unless inspection reveals it necessary to reprocess the matériel for shipment.

(3) When it has been ascertained that matériel is to be placed into immediate service, any items noted on a tag attached to matériel as still needing repairs must be repaired and matériel then given a complete inspection. Any damage disclosed by this inspection will also be repaired. Matériel will be deprocessed as prescribed in *d*(1) above and the prescribed lubricant applied.

3. Instructions for Domestic Shipment

a. **GENERAL.** If matériel to be shipped will reach its destination within the scope of the limited storage period, it need not be

reprocessed upon removal from storage, unless inspection reveals it necessary.

b. PREPARATION. For the preparation of matériel for domestic shipment, refer to paragraph 2*d* of this appendix.

c. WRAPPING. Immediately after cleaning and preserving, the matériel will be wrapped as prescribed in paragraph 2*d* of this appendix.

d. PACKAGING, BOXING, AND BOXING DATA. (1) *Ground signal projector M1A1.* The shipping information required for this item is not available at the date of this publication.

(2) *Pyrotechnic pistol AN-M8 and pyrotechnic pistol mount M1.* (a) *Unit or issue box.* Place the individually wrapped pistol and mount into a unit box (4 by 7½ by 10 in.—W6 corrugated or solid fiber box). Apply dunnage to immobilize matériel and close box.

(b) *Intermediate or interior box.* Place ten unit boxes into an intermediate box (15½ by 10¼ by 20½ in.—W6 corrugated or solid fiber box). Close box and either wrap or place in a bag of type C-1 waterproof barrier. Seal with O.D. nonhygroscopic adhesive tape.

(c) *Shipping box.* The shipping box must have inside dimensions of 10½ by 20¾ by 31¼ inches. Construct box according to TM 9-2854. Line box with type E-2, H-1, H-2, L-2, or M waterproof barrier and insert two intermediate boxes. Close and mark the shipping box as prescribed in TM 9-2854.

(d) *Shipping data.*

Outside shipping box length.....	2 ft. 10 in.
Outside shipping box width.....	1 ft. 10 in.
Outside shipping box height.....	0 ft. 11 in.
Volume.....	4.8 eu. ft.
Gross weight.....	123 lb.
Ship tons.....	0.120

(3) *Hand pyrotechnic projector M9.* (a) *Unit or issue box.* Place one wrapped projector into a two-part slide carton with an outer and inner sleeve (2- by 2⅞- by 7½⅙-in. corrugated box). Apply dunnage to immobilize matériel and seal box.

(b) *Intermediate or interior box.* Place ten unit boxes into an intermediate box (11¾- by 6⅞- by 8⅜-in. corrugated fiber box). Seal box and either wrap or place in a bag of type C or L-2 waterproof barrier. Seal with O.D. nonhygroscopic adhesive tape.

(c) *Shipping box.* The shipping box must have inside dimensions of 25¼ by 14¾ by 17¾ inches. Construct box according to TM 9-2854. Place eight wrapped intermediate boxes into the shipping container. Close and mark as prescribed in TM 9-2854.

(d) *Shipping data.*

Outside shipping box length.....	1 ft. 8 in.
Outside shipping box width.....	1 ft. 5 in.
Outside shipping box height.....	2 ft. 3 in.
Volume.....	5.4 cu. ft.
Gross weight.....	165 lb.
Ship tons.....	0.135

e. **LOADING MATÉRIEL IN BOXCARS.** For the methods used in loading and bracing boxed items for rail shipment, see TM 9-2854.

APPENDIX II

REFERENCES

1. Publications Indexes

The following publications indexes should be consulted frequently for latest changes or revisions of references given in this section and for new publications relating to matériel covered in this manual:

- a. Ordnance Supply Catalog Index
(index to SNL's).....WD Supply Cat. ORD 2
- b. Ordnance Major Items and Combinations, and
Pertinent Publications..... SB 9-1
- c. List and Index of War Department Publications
(listing CCBP's, FM's, FT's, MTP's, TB's,
TM's, TR's, and LO's)..... FM 21-6
- d. List of War Department Films, Film Strips and
Recognition Film Slides FM 21-7
- e. Military Training Aids (listing graphic training
aids, models, devices, and displays)..... FM 21-8

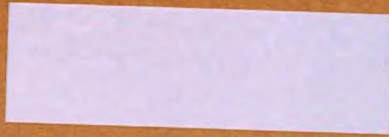
2. War Department Supply Catalogs

- a. Pyrotechnics, military, all types..... ORD 11 SNL S-5
- b. Obsolete and nonstandard bombs, gre-
nades, pyrotechnics, and rockets..... ORD 11 SNL S-10
- c. Cleaning, preserving and lubricating
materials; recoil fluids, special oils,
and miscellaneous related items..... ORD 3 SNL K-1
- d. Tools, maintenance, for repair of small
and hand arms, and pyrotechnic
projectors ORD 6 SNL B-20
- e. Pistol, pyrotechnic, AN-M8, with
mount, pyrotechnic pistol, M1..... ORD 9 SNL B-33
- f. Projector, pyrotechnic, hand, M9..... ORD 9 SNL B-38
- g. Projector, signal ground, M1A1..... ORD 9 SNL B-40

3. Explanatory Publications

- a.* **AMMUNITION.**
Ammunition, General..... TM 9-1900
Ammunition Inspection Guide TM 9-1904
Military Pyrotechnics..... TM 9-1981
- b.* **CARE AND PRESERVATION.**
Basic Maintenance Manual TM 38-650
Cleaning, Preserving, Sealing, Lubricating
and Related Materials Issued for Ord-
nance Matériel TM 9-850
Decontamination TM 3-220
Defense Against Chemical Attack..... FM 21-40
Military Chemistry and Chemical Agents..... TM 3-215
- c.* **Dictionary of United States Army Terms..... TM 20-205**
- d.* **Inspection of Ordnance Matériel..... TM 9-1100**
Protection of Ordnance Matériel in Open
Storage SB 9-47
- e.* **Qualifications in Arms and Ammunition
Training Allowances AR 775-10**
- f.* **Range Regulations for Firing Ammunition
for Training and Target Practice..... AR 750-10**
- g.* **STORAGE AND SHIPMENT.**
Instruction Guide: Ordnance Packaging
and Shipping (Posts, Camps, and Sta-
tions) TM 9-2854

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