

Ammunition

PAGES FROM THE ORIGINAL MANUAL

TM 9-1900, Ammunition, General (War Department, 1945)

WHAT'S INSIDE

Chapter 2, Sections I-III: small-arms cartridges (.30 rifle, .30 carbine, .45), their markings and packing, hand and rifle grenades, and mortar ammunition.

40 pages from the original follow: the manual's cover, then the section about this weapon. Original US Government publication (public domain). Scans courtesy of the Internet Archive and Wikimedia Commons.

WAR DEPARTMENT TECHNICAL MANUAL

TM 9-1900

This Technical Manual supercedes TM 9-1900, dated 3 July 1942, and Changes No. 1, dated August 1943; OST 9-18, Vols. 1 to 5, incl., dated October 1942; OFSTB 1900-11, dated 13 January 1943; OFSTD 1900-13, dated 22 April 1943; WDTB 9 1900-13, dated 22 April 1943; OFSTR 1900-16, dated 11 June 1943; OFSTB 1900-17, dated 30 September 1943; WDTB 9-1900-19, dated 5 August 1944; and WDTB ORD 51, dated 5 March 1943. This Technical Manual supercedes portions of WDTB ORD 194 (a reprint of OFSTB 1900-18), dated 6 November 1943; WDTB ORD 214, dated 28 October 1944; and WDTB ORD 249, dated 1 February 1945.

AMMUNITION, GENERAL



WAR DEPARTMENT

JUNE 1945

RESTRICTED. DISSEMINATION OF RESTRICTED MATTER.

No person is entitled solely by virtue of his grade or position to knowledge or possession of classified matter. Such matter is entrusted only to those individuals whose official duties require such knowledge or possession.

(See also paragraph 23b, AR 380-5, 15 March 1944.)

CHAPTER 2 CLASSES OF AMMUNITION

Section 1

SMALL-ARMS AMMUNITION

59. GENERAL.

a. Ammunition used in weapons whose bore is 0.60 inch or less (rifles, carbines, pistols, revolvers, and machine guns) and in shotguns is classed as small-arms ammunition.

b. Many types of cartridges are manufactured to the same profile. Consequently, cartridges of the same caliber although of different model may be very similar in appearance. Each type, and sometimes each model, as in the case of some tracer cartridges, has a characteristic colored bullet tip. Cartridges may be identified as to type, model, and caliber by marking on packing boxes and cartons.

c. The colors used on bullet tips to identify the type of cartridge are shown in figure 1 and described in paragraph 7 a (3).

60. CARTRIDGES.

a. General. A round of small-arms ammunition is known as a cartridge. In general, it consists of a bullet, a propelling charge, a primer, and a cartridge case, all assembled into a unit assembly (figs. 24, 25, and 26).

b. Bullet. Bullets for service use have a metal core or slug which is covered with a gilding metal, or gilding-metal-clad steel jacket. In the case of caliber .45 bullets, copper-plated steel may be used instead of gilding metal for the jacket. Ball and tracer bullets have a lead alloy or common steel core or slug, whereas armor-piercing bullets have a hardened steel alloy core. Bullets have a flat or tapered base. A bullet having a tapered base is said to be "boat-tailed." A cannelure, or annular knurl, is rolled or cut into the jacket to provide a recess into which the cartridge case is crimped (figs. 27, 28, 29, and 30).

c. Propelling charge. There are two types of small-arms propellants generally used, the single-base nitrocellulose type and the double-base type. The double-base type is a mixture of nitrocellulose and nitroglycerin which burns more rapidly than the single-base type; it is used in shotgun shells, some caliber .45 rounds, and carbine ammunition. The weight of the charge and granulation of the powder are in accordance with specification requirements for velocity and pressure. The charge is assembled loosely in the cartridge case.

Classes of Ammunition

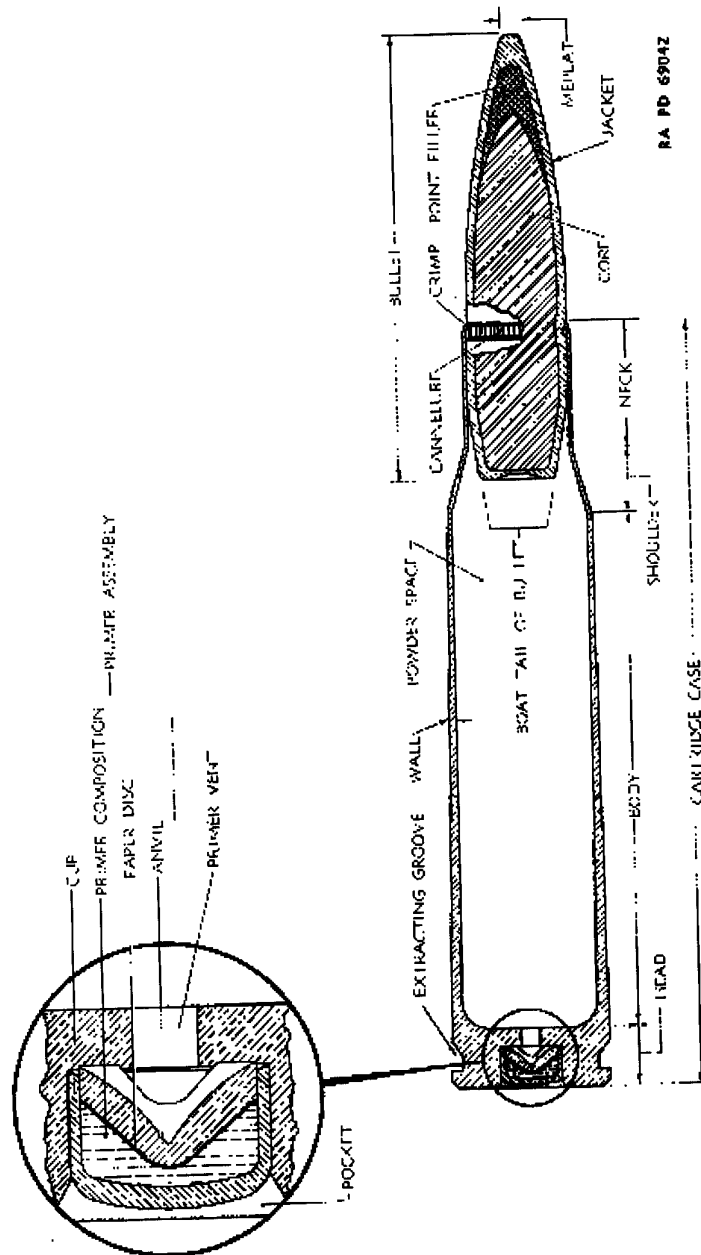
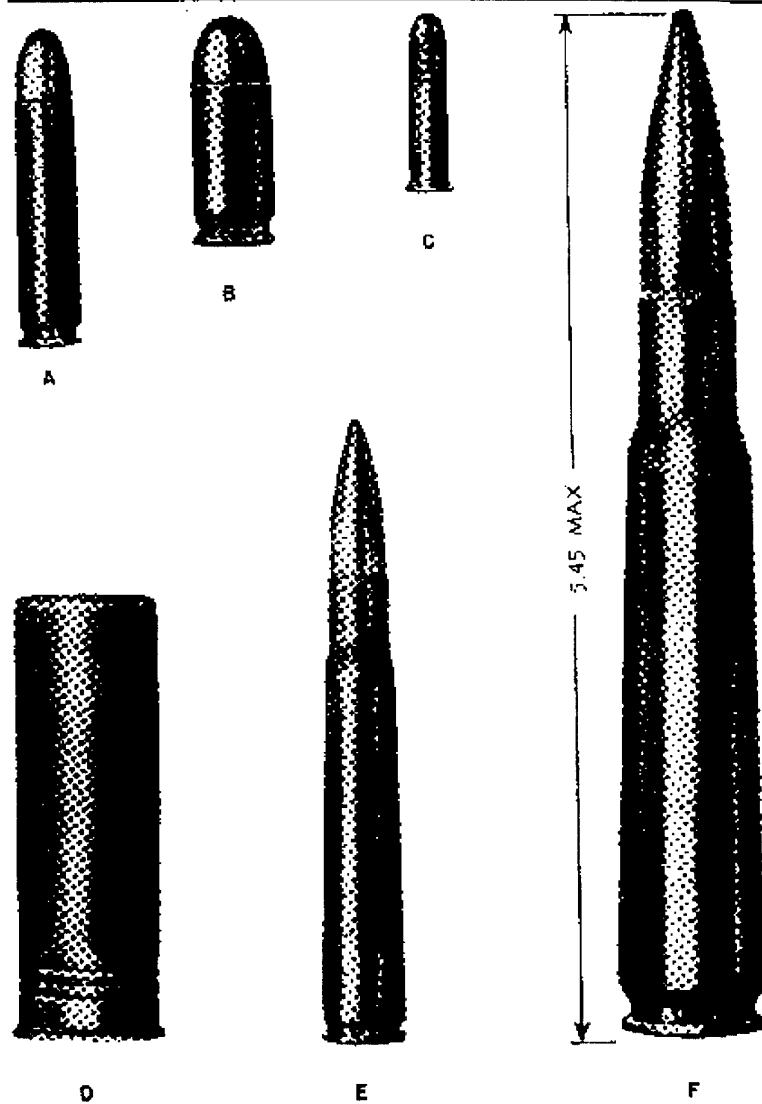


Figure 24 — Cartridge Terminology

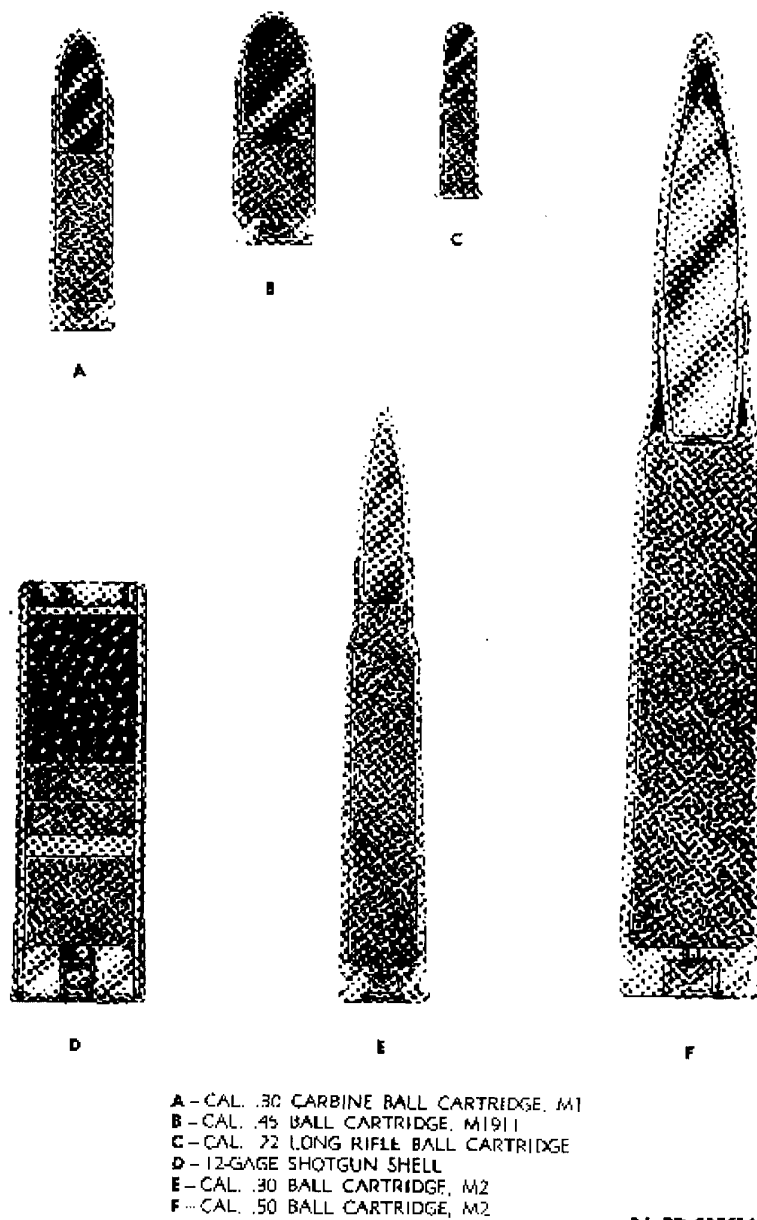
Classes of Ammunition



- A — CAL. .30 CARBINE BALL CARTRIDGE, M1
 B — CAL. .45 BALL CARTRIDGE, M1911
 C — CAL. .22 LONG RIFLE BALL CARTRIDGE
 D — 12-GAGE SHOTGUN SHELL
 E — CAL. .30 BALL CARTRIDGE, M2
 F — CAL. .50 BALL CARTRIDGE, M2

NA PD 45078

Figure 25 — Types of Small-arms Ammunition

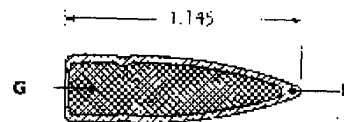
Classes of Ammunition

RA PD 89561A

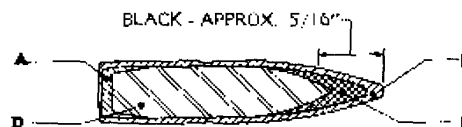
Fig. 26 — Types of Small-arms Ammunition — Cross Section

Classes of Ammunition

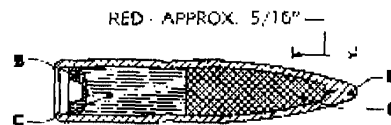
- A — BASE, FILLER-GILDING METAL
- B — COMPOSITION, IGNITER
- C — COMPOSITION, TRACER
- D — CORE-TUNGSTEN CHROME STEEL
- E — JACKET GILDING METAL OR GILDING METAL CLAD STEEL
- F — POINT FILLER-LEAD "T" SHOT
- G — SLUG-LEAD WITH ANTIMONY
- H — BODY PLUG-LEAD SHOT
- I — INCENDIARY COMPOSITION
- J — STEEL BODY



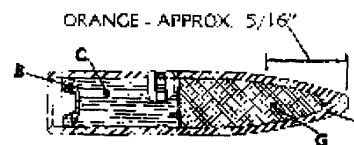
CAL. 30 BALL BULLET, M2



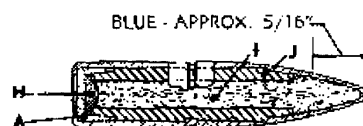
CAL. 30 ARMOR-PIERCING BULLET, M2



CAL. 30 TRACER BULLET, M1



CAL. 30 TRACER BULLET, T10



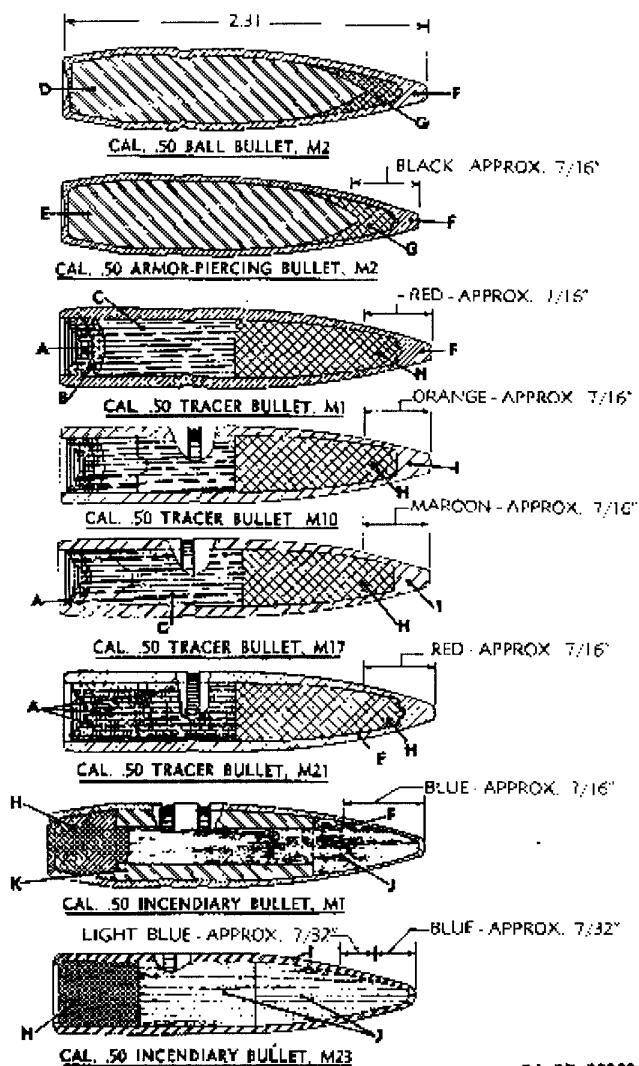
CAL. 30 INCENDIARY BULLET, M1

RA PD 4511C

Figure 27 — Caliber .30 Bullets — Cross Section

Classes of Ammunition

- | | |
|--------------------------------|-------------------------------------|
| A — COMPOSITION, IGNITER | G — POINT FILLER-LEAD WITH ANTIMONY |
| B — COMPOSITION, SUB-IGNITER | H — SLUG, LEAD WITH ANTIMONY |
| C — COMPOSITION, TRACER | I — JACKET-GILDING METAL CLAD STEEL |
| D — CORE-STEEL | J — INCENDIARY MIXTURE |
| E — CORE-TUNGSTEN CHROME STEEL | K — STEEL BODY |
| F — JACKET GILDING METAL | |



KA PD 89328A

Figure 28 — Caliber .50 Bullets — Cross Section

Classes of Ammunition

d. **Primer.** The primer consists of a brass or gilding-metal cup which contains a primer-composition pellet of sensitive explosive, a paper disk, and a brass anvil. A blow from the firing pin on the primer cup compresses the primer composition between the cup and the anvil, and causes the composition to explode. The holes or vents in the anvil allow the flame to pass through the primer vent in the cartridge case and ignite the propellant.

e. **Cartridge case.** The cartridge case is made of drawn brass or steel. It serves as a means whereby the other components—primer, propelling charge, and bullet—are assembled into a unit, the cartridge. Another of its functions is to expand and seal the chamber against the escape of gases to the rear when the cartridge is fired. This action is known as obturation. To make the cartridge waterproof and to keep the propelling charge dry, the primer is sealed in the primer seat and the bullet is sealed in the neck of the cartridge case by a thin film of lacquer or varnish at the time of manufacture. An extractor groove, turned in the head of the cartridge case, provides a means of removing the case from the chamber of the weapon.

61. **TYPES.** Small-arms cartridges are classified according to type as follows:

Bell	Dummy
Armor-piercing	High-pressure test
Armor-piercing-incendiary	Gallery practice
Armor-piercing-incendiary-tracer	Guard
Incendiary	Subcaliber
Tracer	Grenade
Blank	Shot
	Shotgun shells

62. **BALL.** This type of cartridge, intended for use against personnel and light materiel targets, is the oldest service type. It is being replaced for combat purposes, however, by armor-piercing and other types. The term "ball," although no longer accurately describing the shape of the modern bullet, has been continued in use to designate that type of bullet and ammunition used for the same purposes as ammunition of very early design, the bullet of which was actually a ball (figs. 25 to 30). A special high grade of ball ammunition is manufactured each year for the National Matches of that year. The following year it may be used in preliminary firing for such matches. The second year, and thereafter, it is considered as standard service ammunition. The head of each of these cartridges is stamped "N.M." and with the year of manufacture.

63. **ARMOR-PIERCING.** This type of cartridge is intended for use against armored aircraft and vehicles, concrete shelters, and similar built-resisting targets. The bullet has a hardened steel alloy core. In addition, it may have a base filler and a point filler of a softer metal, such as gilding metal (figs. 27 and 28).

Classes of Ammunition

- A—SLUG-LEAD ALLOY
 B—JACKET-GILDING METAL
 C—JACKET-COPPER-PLATED STEEL
 D—IGNITER
 E—TRACER COMPOSITION

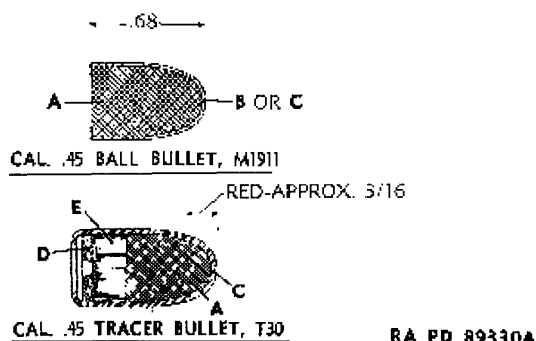


Figure 29 — Caliber .45 Bullets — Cross Section

64. **ARMOR-PIERCING-INCENDIARY.** This type of cartridge is used in caliber .30 and caliber .50 weapons in lieu of using both armor-piercing and incendiary cartridges.

65. **ARMOR-PIERCING-INCENDIARY-TRACER.** This type of cartridge combines the features of armor-piercing, of incendiary, and of tracer cartridges and is intended to replace these cartridges.

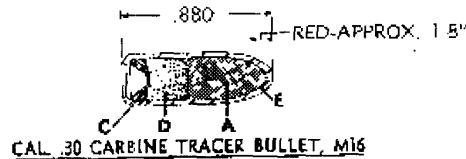
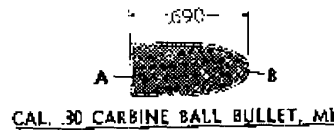
66. **INCENDIARY.** This type of cartridge is similar to ball or armor-piercing ammunition in outward appearance. It is used for incendiary purposes against aircraft. It contains an incendiary composition, as a central bullet core, which ignites on impact with the target (figs. 27 and 28).

67. **TRACER.** This type of cartridge is intended for use with other types to show the gunner, by its trace, the path of the bullets, thus assisting in correcting aim. It may also be used for incendiary purposes. The tracer element consists of a pressed inflammable material in the base of the bullet; this composition is ignited by the propelling charge when the cartridge is fired (figs. 27 through 30). For identification, the nose of the bullet is painted red, orange, or maroon.

68. **BLANK.** This type of cartridge (fig. 31) is distinguished by the absence of a bullet. It is used for simulated fire, training cavalry mounts, and firing salutes. It is also used in machine guns equipped

Classes of Ammunition

- A-SLUG-LEAD ALLOY
- B-JACKET-GILDING METAL
- C-IGNITER
- D-TRACER COMPOSITION
- E-JACKET-GILDING METAL CLAD STEEL



RA PD 89332A

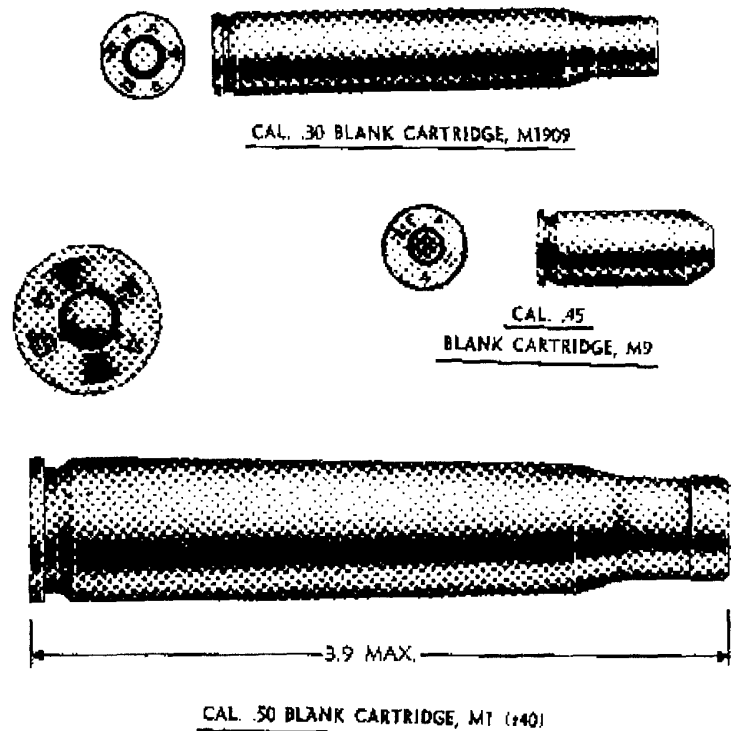
Figure 30 — Carbine Caliber .30 Bullets — Cross Section

with blank-firing attachments in order to operate these weapons for instructional purposes. EC blank powder is used to produce the noise.

69. DUMMY. This type of cartridge (fig. 32) is used for practice in loading weapons, to detect flinching in firing weapons, and to simulate firing. The cartridge case of older lots of dummy ammunition is tin-coated. However, the present means of identification of dummy cartridges is by means of holes drilled through the side of the case and by the empty primer hole. The cartridges are completely inert but simulate service rounds in most details.

70. HIGH-PRESSURE TEST. This type of cartridge (fig. 33) is manufactured for use in proof firing of small arms. Since the propelling charge of this ammunition develops high pressures, these cartridges should never be used for any other purpose. When used for the purpose intended, all personnel should be protected by adequate cover. This ammunition is distinguished from other types by the tin coating of the cartridge case. In some older lots, the word "TEST" is stamped on the head of the case.

71. GALLERY PRACTICE. The present standard for gallery practice is the caliber .22 long rifle cartridge (figs. 25 and 26), a rim-fire cartridge of commercial manufacture. In the past a gallery practice cartridge, caliber .30 M1919 was used, but any available lots of this cartridge are reserved for guard purposes.

Classes of Ammunition

RA PD 89334A

Figure 31 - Blank Cartridges

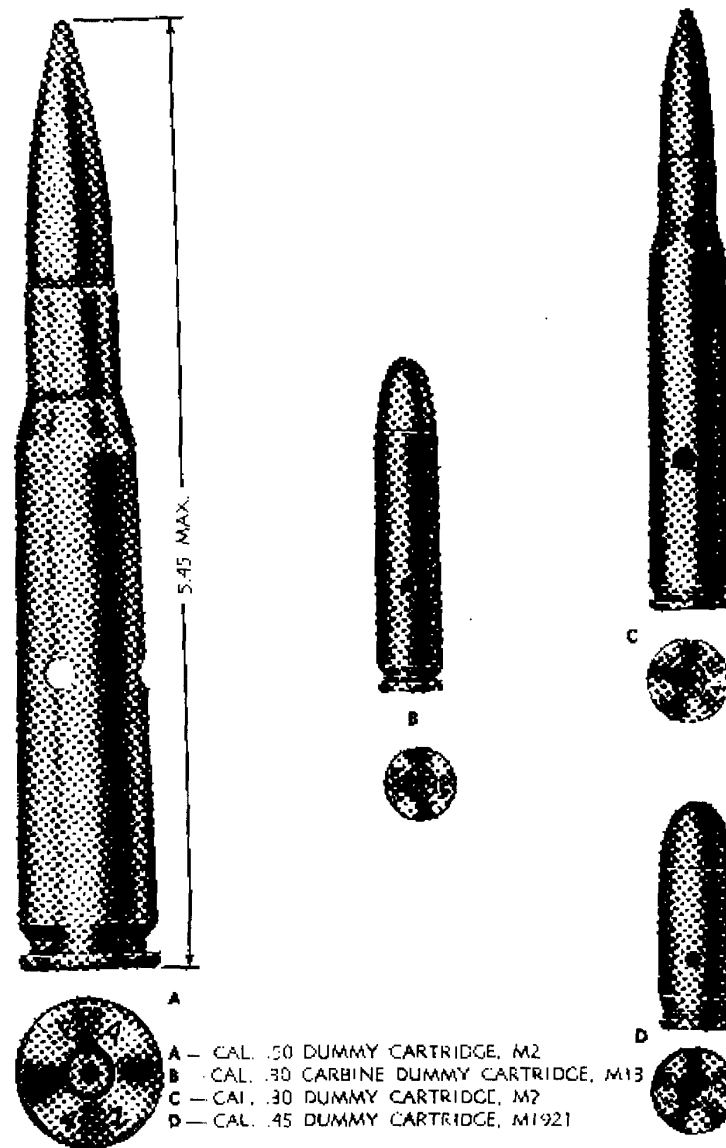
72. GUARD. Guard cartridges consisted of a low-velocity charge and a round-nose lead bullet together with the cartridge case and primer. The guard cartridge M1 was formerly known as the gallery practice cartridge M1919 (par. 71). As in the case of the gallery practice cartridge, the use of the guard cartridge is being discontinued.

73. SUBCALIBER.

a. This type of cartridge (fig. 34) is fired from subcaliber tubes inserted in larger weapons. The subcaliber cartridge, caliber .30, M1925 is fired from a "Krag" type of subcaliber tube in 3-inch sea-coast guns. This cartridge is identified by the extracting rim on the head of the case instead of the usual groove.

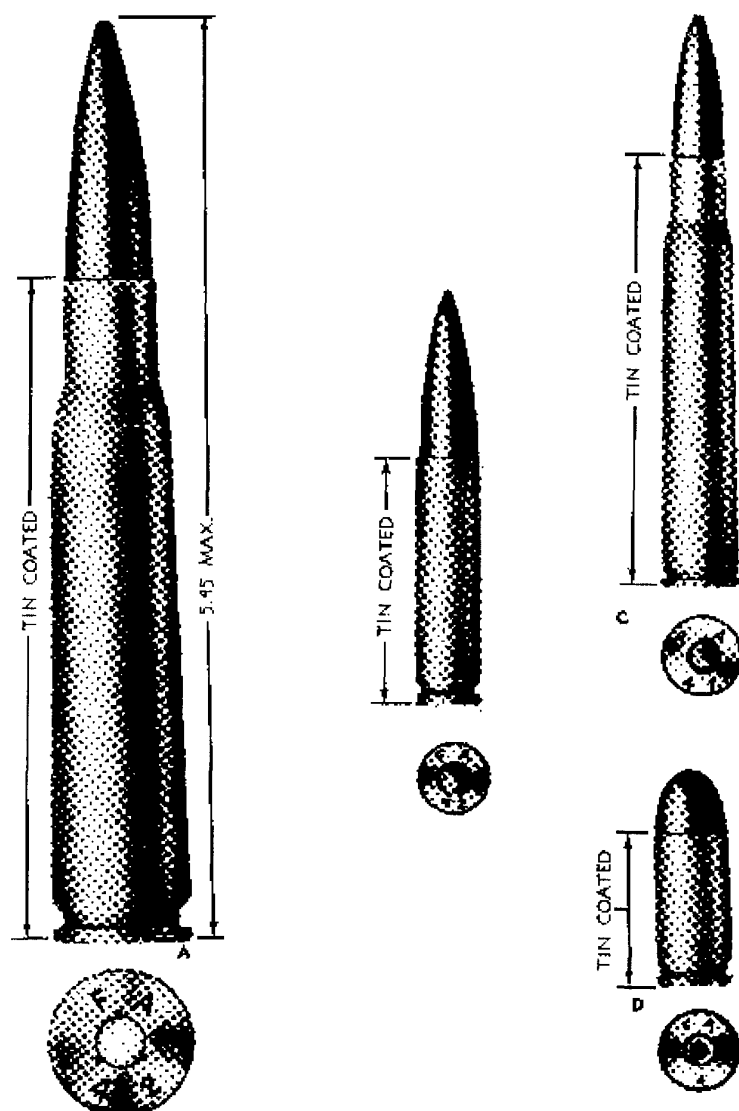
b. Other cartridges, specifically the standard caliber .22, caliber .30, and caliber .50 ball cartridges, are fired from subcaliber tubes in field, tank, and antitank weapons.

Classes of Ammunition



RA PD 89344A

Figure 32 - Dummy Cartridges

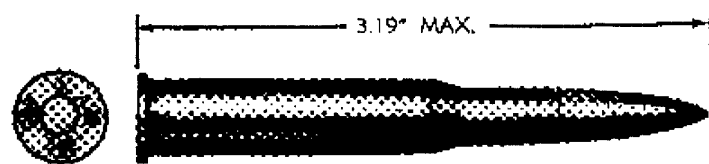
Classes of Ammunition

- A. CAL. .50 HIGH-PRESSURE TEST CARTRIDGE, M1
 B. CAL. .30 CARBINE HIGH PRESSURE TEST CARTRIDGE, M18
 C. CAL. .30 HIGH-PRESSURE TEST CARTRIDGE, M1
 D. CAL. .45 HIGH-PRESSURE TEST CARTRIDGE, M1

RA 7D 89346A

Figure 33 — High-pressure Test Cartridges

Classes of Ammunition

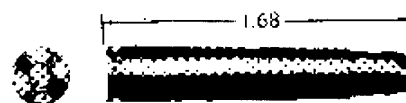


RA PD 23078A

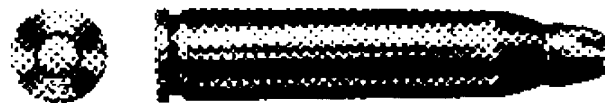
Figure 34 — Caliber .30 Subcaliber Cartridge M1925



AUXILIARY GRENADE CARTRIDGE, M7



CAL. .30 CARBINE GRENADE CARTRIDGE, M6



CAL. .30 RIFLE GRENADE CARTRIDGE, M3

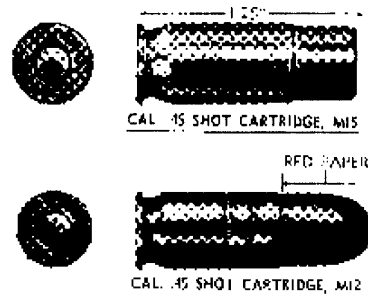
RA PD 68318B

Figure 35 — Grenade Cartridges

74. GRENADE. Grenade cartridges (fig. 35) are special blank cartridges for use in propelling grenades from launchers attached to rifles or carbines. The rifle grenade and carbine grenade cartridges are distinguished by a rose-petal crimp at the mouth of the case. The auxiliary grenade cartridge M7 which contains a propellant but no primer is sometimes used in conjunction with the rifle or carbine grenade cartridge to give additional range.

75. SHOT. Shot cartridges of caliber .45 (fig. 36) are for use in pistols for hunting small game. Instead of a solid bullet, they contain No. 7½ chilled shot, which is also used in shotgun shell loadings. These cartridges are intended primarily for use by air force personnel as an aid in obtaining food.

76. SHOTGUN SHELLS. Shotgun shells (shot shells) of appropriate loads are procured commercially for use in 12-gage sporting-type and riot-type shotguns (fig. 37).

Classes of Ammunition

RA PD 89562A

Figure 36 — Caliber .45 Shot Cartridges**77. GRADES.**

a. Current grades of existing lots of small-arms ammunition are established by the Chief of Ordnance in accordance with acceptance and surveillance tests, and are published in WD SE 9-AMM 4. Grade 3 indicates unserviceable ammunition, which will not be issued or used.

b. Small-arms ammunition which has been graded "For Training Use Only" will not be used in demonstrations or on training courses requiring this ammunition to be fired over the heads of participating troops.

78. CARE AND PRECAUTIONS IN HANDLING.

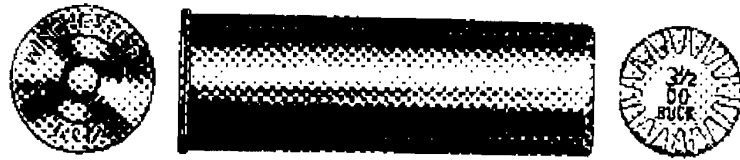
a. Small-arms ammunition is comparatively safe to handle. However, care must be taken to prevent ammunition boxes from becoming broken or damaged. Broken boxes must be repaired immediately, and careful attention given to the transfer of all markings to the new parts of the box. Metal liners should be air-tested and sealed if equipment for this work is available.

b. Ammunition boxes will not be opened until the ammunition is required for use. Ammunition removed from airtight containers, particularly in damp climates, may corrode and become unserviceable.

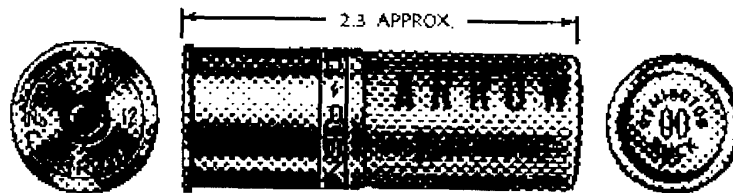
c. When cartridges are taken from their original packings for loading into clips or machine gun belts, the clips or belts should be tagged or marked so as to preserve the ammunition lot number, thereby preventing the ammunition from falling into grade 3 through loss of lot number (identity).

d. Ammunition should be carefully protected from mud, sand, dirt, and water. If it gets wet or dirty, it should be wiped off at once.

Classes of Ammunition



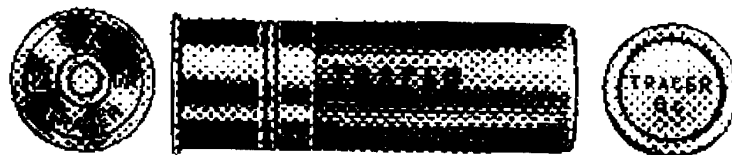
ALL BRASS NO. 00 BUCK 12-GAGE SHOTGUN SHELL, M19



PAPER #00 BUCKSHOT 12-GAGE SHOTGUN SHELL



PAPER #7-1/2 CHILLED SHOT 12-GAGE SHOTGUN SHELL



PAPER #8 CHILLED SHOT AND TRACER 12-GAGE SHOTGUN SHELL

RA PD 23080A

Figure 37 — Shotgun Shells, 12-gage

Classes of Ammunition

If light corrosion or verdigris forms on cartridges, it should be wiped off. However, cartridges should not be polished merely to make them look brighter or better.

e. Ammunition should not be exposed to the direct rays of the sun for any considerable length of time. This is likely to affect its firing qualities.

f. The use of oil or grease on cartridges is dangerous and is prohibited.

g. Cartridges that are dented, have loose bullets, or are otherwise defective should not be fired.

79. PRECAUTIONS IN FIRING.

a. Because a misfire cannot immediately be distinguished from a hangfire, it is unsafe to open the bolt of a rifle for at least 10 to 15 seconds after a misfire occurs. When the rifle M1 fails to fire, it should be recocked by means of the trigger guard and refired before the bolt is opened. When the rifle M1903 fails to fire, it should be recocked by drawing back the cocking piece and should be refired before the bolt is opened. The rifle M1917 cannot be recocked without opening the bolt; in case of misfire, wait a full minute before the bolt is opened. When the caliber .30 carbine fails to fire, pull the operating slide to the rear and release the operating rod. If the operating slide goes fully home, aim and fire. To avoid injury in case of hangfire, hold the hand so that no part of the palm or wrist can be struck by the operating slide in its rapid rearward movement.

b. Before firing, be sure that the bore of the weapon is free of any foreign matter such as cleaning patches, mud, sand, snow, etc. Firing a weapon with any obstruction in the bore will result in damage to the weapon and may result in injury to the firer.

c. No small-arms ammunition will be fired until it has been identified positively by ammunition lot number and grade, as published in the latest revision of WD SB 9-AMM 4.

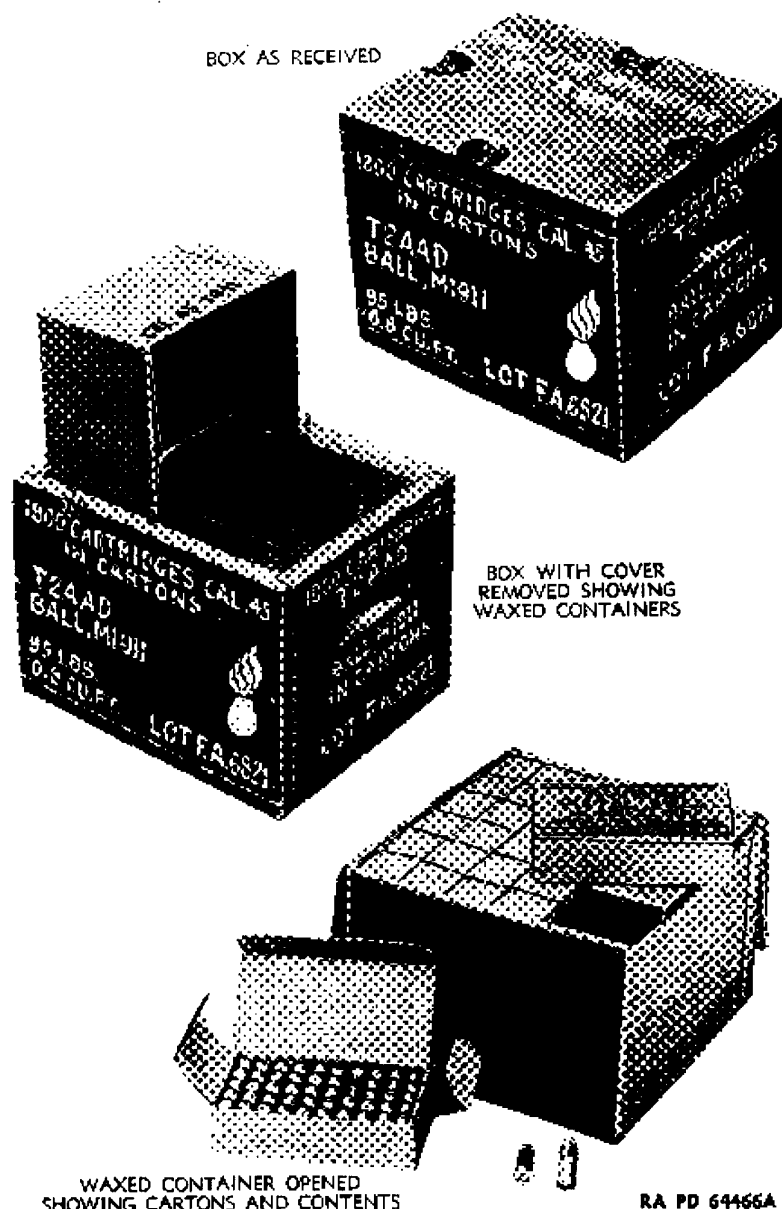
d. For precautions in firing blank ammunition, see TM 9-1990.

e. Any serious malfunction of ammunition must be reported promptly to the ordnance officer under whose supervision the material is maintained and issued. As provided in AR 750-10, the ordnance officer will report such malfunction to the Chief of Ordnance. It is important, therefore, that all evidence be preserved. This includes the cartridge case, other cartridges from the same box, the weapon concerned, and all recoverable pieces—in short, everything that might determine the cause of the malfunction.

80. PACKING AND MARKING.

a. *Packing.* Dependent on its intended use, small-arms ammunition is packed in link and web belts, clips, or cartons (figs. 38

Classes of Ammunition



RA PD 64466A

**Figure 38 — Boxes Containing Carton-packed Ammunition
in Waxed Containers**

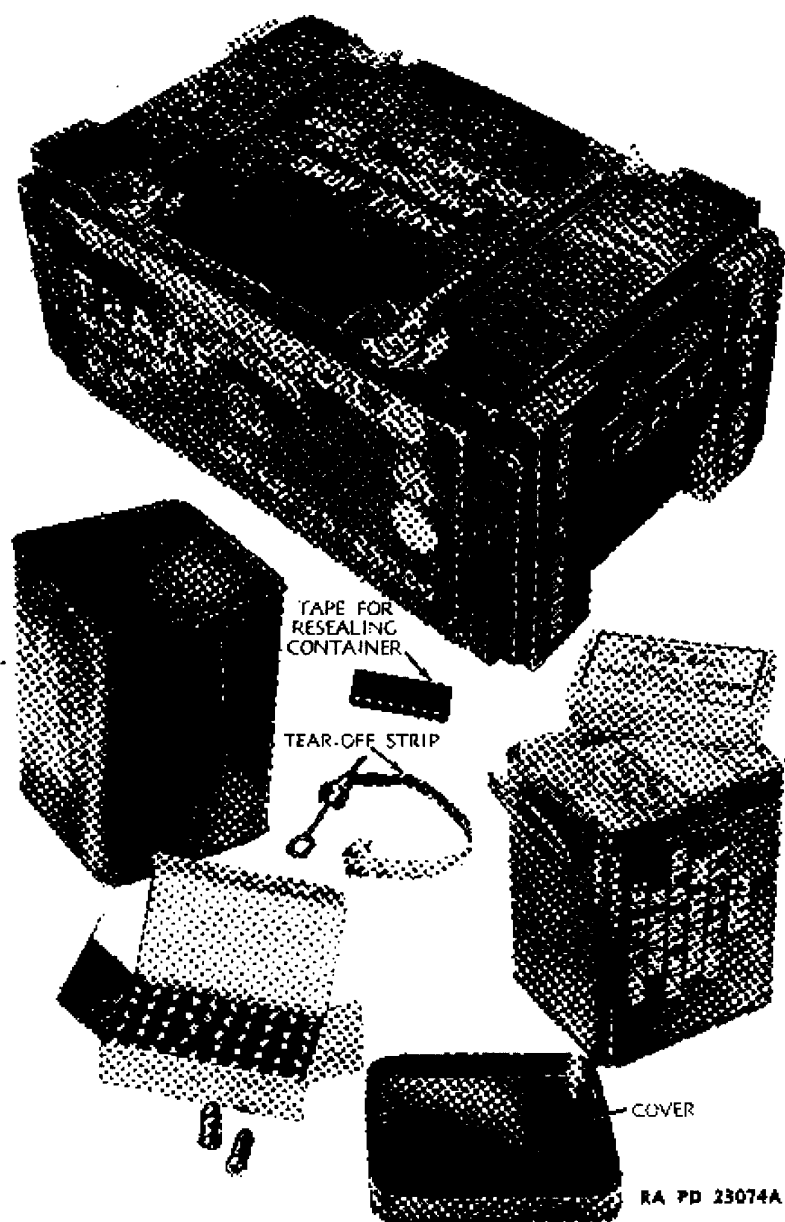
Classes of Ammunition

Figure 39 — Boxes Containing Carton-packed Ammunition in Metal Cans

Classes of Ammunition

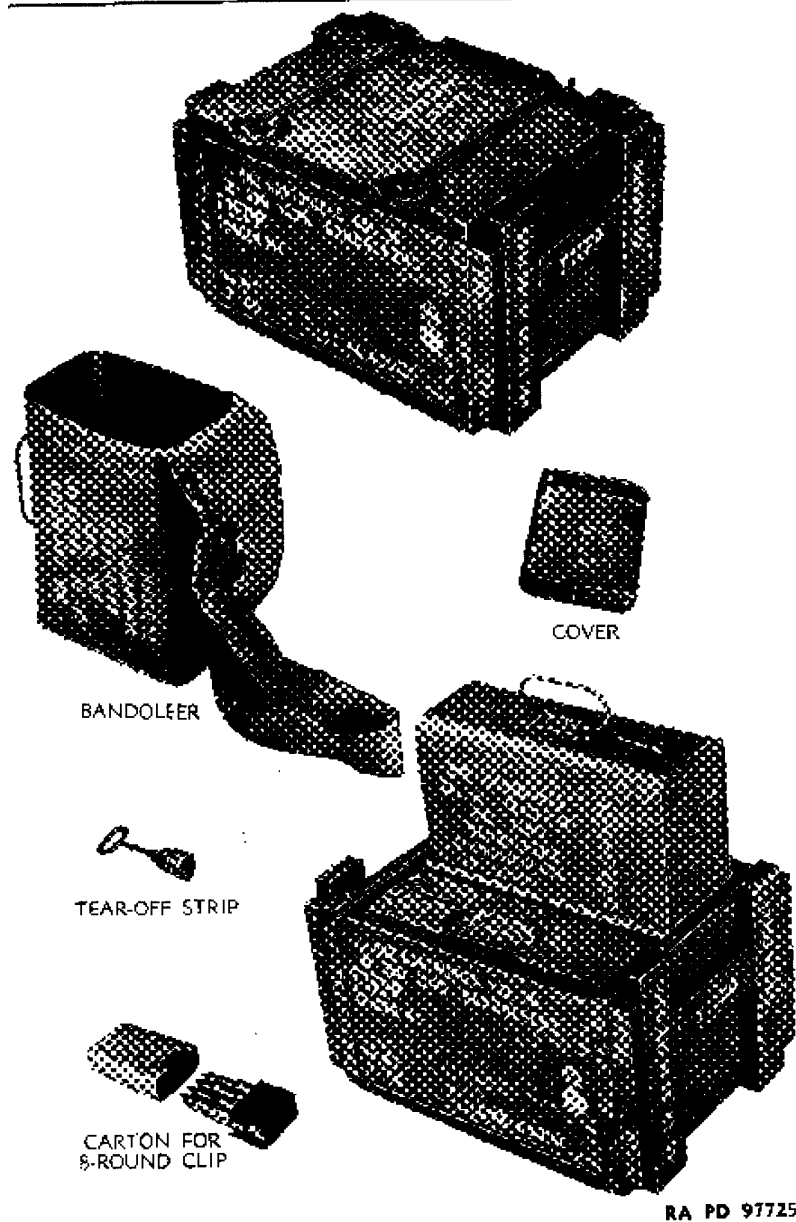
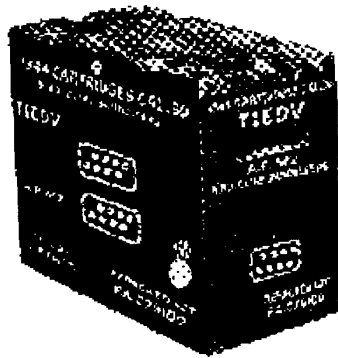
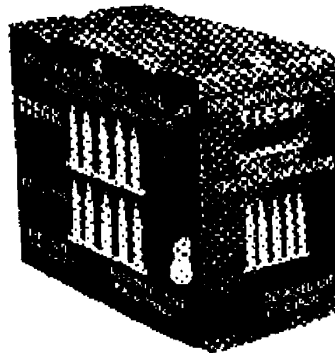
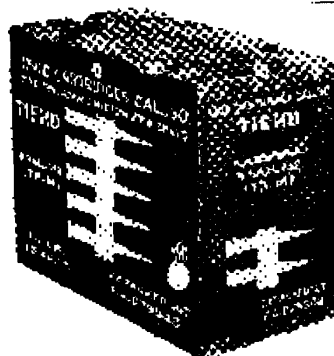
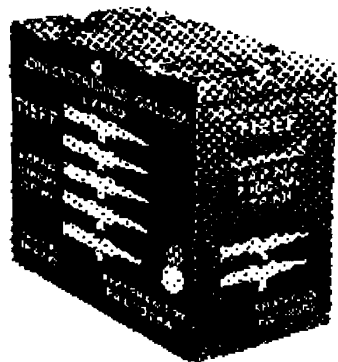
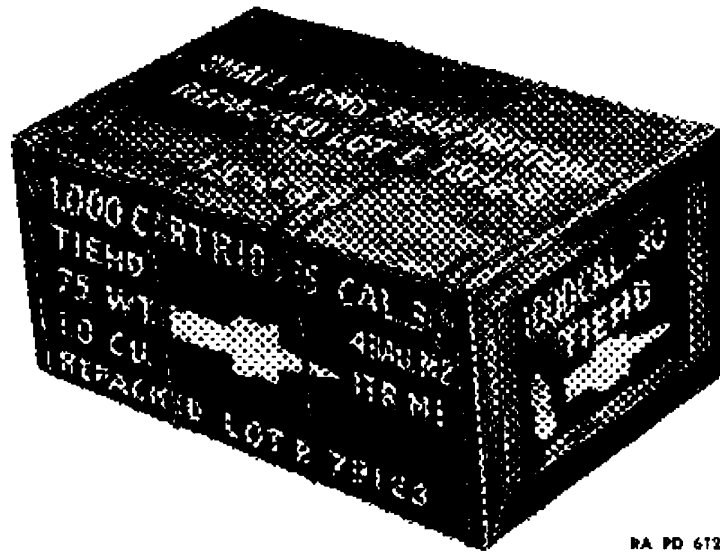


Figure 40 — Boxes Containing 8-round Clipped Ammunition in Bandoleers in Metal Cans

Classes of Ammunition8-RD. CLIPPED5-RD. CLIPPEDCAL. 30 BELTEDCAL. 30 LINKEDCAL. 50 LINKED

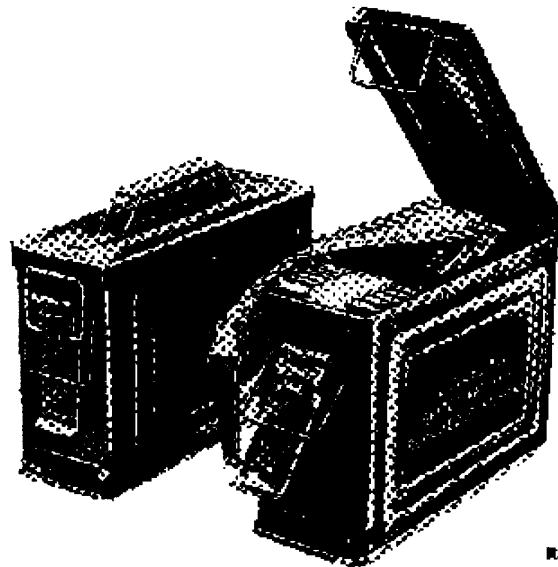
RA PD 15193B

Figure 41 — Packing Symbols on Small-arms Ammunition Boxes



RA PD 672108

Figure 42 — Wire-bound Crate for Four Ammunition Boxes, Cal. .30, M1



RA PD 483198

Figure 43 — Ammunition Box, Cal. .30, M1 (Steel)

Classes of Ammunition

through 43). For example, ammunition intended for use in the rifle M1 is packed in 8-round clips. For a detailed description of packing, see ORD 11 SNL's of the T group.

k. Marking.

(1) Small-arms packing boxes may be either stained brown with marking in yellow, or unstained with marking in black. Markings for shipment are covered in chapter 3, section IV, and in TM 9-1990.

(2) Instead of the lot number, a repacked lot number may be stenciled on packing boxes containing web belts and metallic link belts; the serial number of the repacked lot number is preceded by the letter "B" for belted ammunition, and "L" for linked cartridges.

(3) To provide a further means of quickly identifying type of packing, stenciled figure silhouettes are used on boxes and crates containing clipped, belted, and linked cartridges. These symbols indicate whether the ammunition is packed in rifle clips, web belts, or linked belts. The silhouettes are vertical for caliber .30 cartridges, and diagonal for caliber .50 cartridges (fig. 41). The absence of stenciled figure silhouettes on boxes indicates carton-packed ammunition (figs. 38 and 39).

(4) The expendable metal ammunition boxes are painted olive-drab with marking in yellow (fig. 43).

Section II

GRENADES

81. GENERAL DESCRIPTION.

a. **Definition.** Grenades are small explosive or chemical missiles intended for use against an enemy at relatively short ranges.

b. **Basic types.** There are two basic types of grenades—those intended to be thrown by hand (figs. 11 and 44) and those intended to be projected from rifles or carbines equipped with suitable grenade launchers (figs. 12 and 45). By attaching a suitable adapter, some of the hand grenades may also be fired from rifles and carbines (figs. 46 and 47). Hand grenades provide the soldier with an auxiliary weapon, similar to a shell or bomb, to supplement his basic weapons. Rifle grenades are valuable not only for specialized use, such as against tanks, but also for covering the ranges between the maximum for hand grenades and the minimum for mortar shell. Special blank cartridges (fig. 35), packed with the rifle grenades, must be used in the weapon for projecting these grenades.

c. **General types.** Both hand and rifle grenades can be classified into three general types, namely: explosive, chemical, and practice or training.

Classes of Ammunition

(1) Explosive grenades are used primarily for antipersonnel (fragmentation or blast) or antitank effect. They may also be used as demolition agents.

(2) Chemical grenades are used for casualty, harassing, incendiary, screening, and signaling purposes. Some of them may also be used for training purposes and destruction.

(3) Practice and training grenades are used in training troops for combat.

d. **Fuzing.** Grenades thrown by hand are normally fitted with a delay-action fuze. For explosive hand grenades and the chemical M15 (bursting type) WP smoke hand grenade, this delay is set for approximately 4.5 seconds. Burning-type chemical hand grenades use a fuze with a delay of approximately 2 seconds. Rifle grenades are usually fitted with a base fuze that functions on impact.

82. EXPLOSIVE HAND GRENADES.

a. **Fragmentation type.** The Mk 2 is a typical fragmentation hand grenade (fig. 11 and A, fig. 44). This grenade is made of cast iron varying in thickness from $\frac{1}{8}$ to $\frac{1}{4}$ inch. The body is lemon-shaped, approximately $2\frac{1}{4}$ inches in diameter and $3\frac{1}{2}$ inches in length without the fuze. It contains an explosive charge which, upon detonation, breaks up the body of the grenade and fuze and projects the fragments outwards in all directions at high velocity. The body is grooved both horizontally and vertically. The fuze for this grenade has a primer, a combustible time-delay train, and a detonator. Attached to the fuze body is a safety lever held in place against the action of the striker spring by means of a safety pin. Just prior to throwing, the safety pin is removed. When the grenade is thrown, the safety lever is pushed off by the striker, allowing the striker to impact against the primer. The primer ignites the time-delay train and, after 4 or 5 seconds, this delay train causes the detonator to explode. This, in turn, causes the explosive filler in the grenade to detonate, thereby fragmenting the grenade. Fragments may fly over 200 yards.

b. **Offensive type.** The offensive grenade (fig. 11 and C, fig. 44) is intended to have an antipersonnel effect over a small area. It contains more explosive than the fragmentation-type grenade, approximately $\frac{1}{2}$ pound of pressed TNT, and, therefore, is more useful as a demolition agent. No fragmentation effect is obtained.

83. CHEMICAL HAND GRENADES.

a. **Burning type.** The standard container for this type of grenade (fig. 11 and D, fig. 44) is a cylindrical steel can $2\frac{3}{4}$ inches in diameter and $4\frac{3}{4}$ inches high. The fuze for these grenades is similar to the fuze used in the Mk 2 fragmentation grenade, except that it

Classes of Ammunition

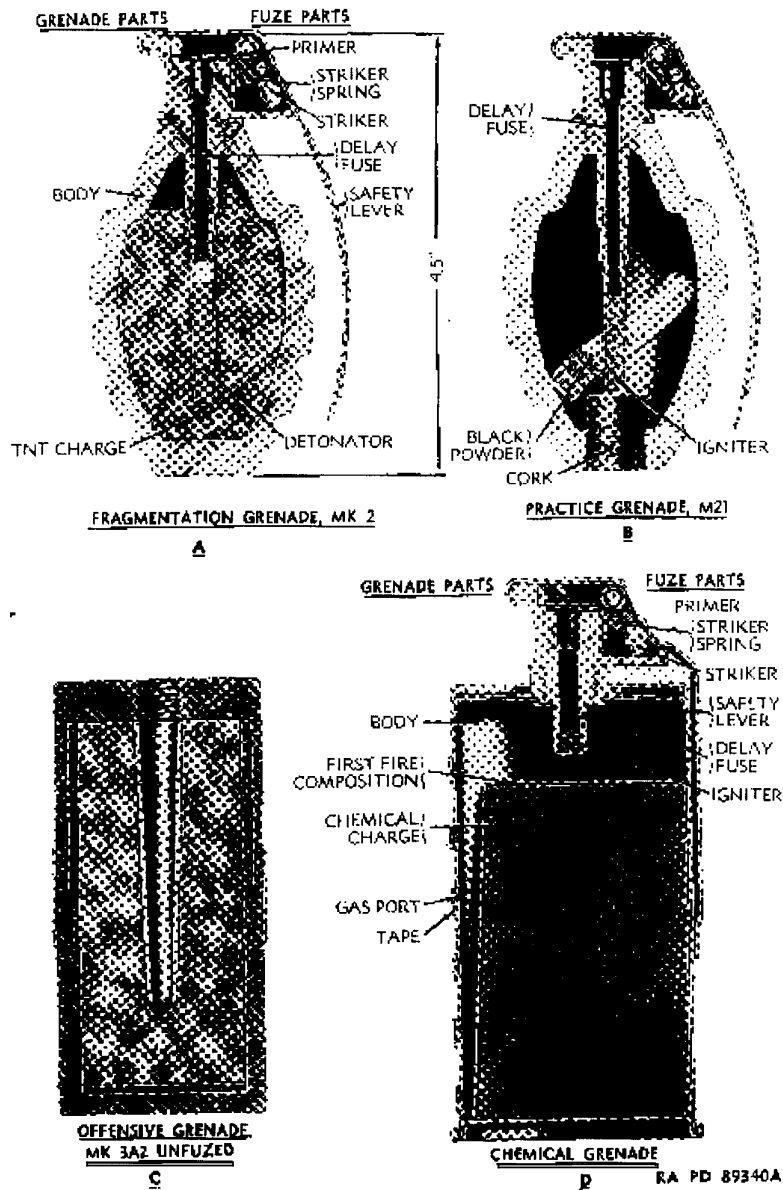


Figure 44 - Hand Grenades - Cross Section

Classes of Ammunition

has an igniter instead of a detonator, and has a short delay time of 2 seconds. Grenades of this type have waterproof, adhesive-tape covered, smoke emission holes in the top, sides, or bottom. These grenades are described briefly as follows:

(1) **CN-DM IRRITANT HAND GRENADE.** The products of combustion of the filler in this grenade have a harassing effect. Its principal use is in the control of civil disturbances. The burning time is 20 to 60 seconds. The filler is a composition of tear gas, vomit gas, and smokeless powder.

(2) **CN TEAR HAND GRENADE.** This grenade is identical with the CN-DM grenade except that it has a tear gas filler. Principal uses are in control of civil disturbances, and training in use of the gas mask.

(3) **HC SMOKE GRENADE.** This is an Army-Navy standard white smoke grenade, used for signaling and screening purposes. The container is standard except that there are no emission holes in the side. The burning time is 2 to 2½ minutes.

(4) **TH INCENDIARY GRENADE.** This is an Army-Navy standard munition for setting fire to enemy materiel. The container is standard except that there are no emission holes in the side. Clamps of steel strapping, which fit around the body of the grenade, may be used to nail the grenade against an object to be burned. The filling is thermate, which burns at approximately 4,330° F for 30 to 35 seconds.

(5) **COLORED SMOKE GRENADE M16.** This grenade, used for ground-air and ground-ground signaling purposes is made in the following colors: green, yellow, red, and violet. It is of standard construction and burns for approximately 2 minutes.

(6) **COLORED SMOKE GRENADE M18.** This grenade, available in red, green, yellow, and violet, is also used for signaling purposes. The container has emission holes in the top, and a single hole at the bottom. A tapered hole extends through the center of the grenade from the bottom emission hole to the fuze. The starter mixture lines the tapered cavity. The grenade produces a heavy smoke for approximately 1 minute.

(7) **RED SMOKE GRENADE AN-M3.** This grenade is an Army-Navy air forces official distress signal. It is the standard metal grenade except that the fuze lever is shortened and the body is covered with a metal jacket to which are attached three metal strips which may be bent out from the jacket to keep the grenade from sinking into snow or soft ground. Burning time is 2 to 2½ minutes.

b. **Bursting type.** There is only one standard chemical grenade of this type and it is known as the WP smoke grenade M15. This grenade has a drawn-steel cylindrical body similar in size to the burning-type chemical hand grenades, and is filled with white phos-

Classes of Ammunition

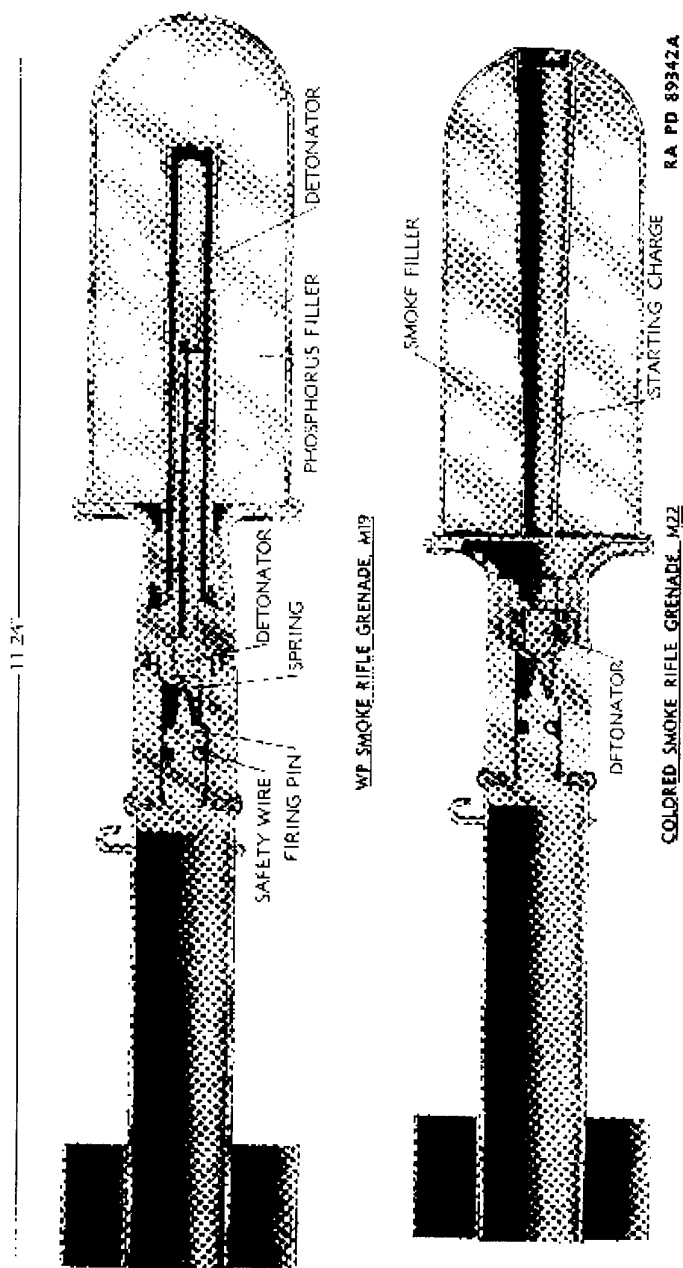


Figure 45 — Smoke Rifle Grenades — Cross Section

Classes of Ammunition

phorus. The detonating fuze used in this grenade causes it to split open and project burning particles of phosphorus over a radius of about 15 yards. This produces a dense white smoke screen and will cause casualties by burning.

84. PRACTICE AND TRAINING HAND GRENADES. This type of grenade (fig. 11 and B, fig. 44) is used in training. They may be inert (training), or loaded with a charge of black powder contained in a cloth tube (practice). In this case the charge is inserted into the filling hole, which is closed with a cork.

85. EXPLOSIVE RIFLE GRENADES. Antitank type: A typical antitank rifle grenade, the M9A1 (fig. 12) consists of a sheet-steel body, cone, and ogive assembly to which is attached a simple base-detonating fuze and a stabilizer and fin assembly. The head of the grenade contains a 4-ounce cast-pentolite, shaped charge for blasting holes in the target. At the same time detonation of the main charge causes fragmentation of the body in a lateral direction. The grenade is intended primarily for use against armored vehicles. It has been found to be most effective against enemy personnel when it is fired at a high angle of elevation (45°).

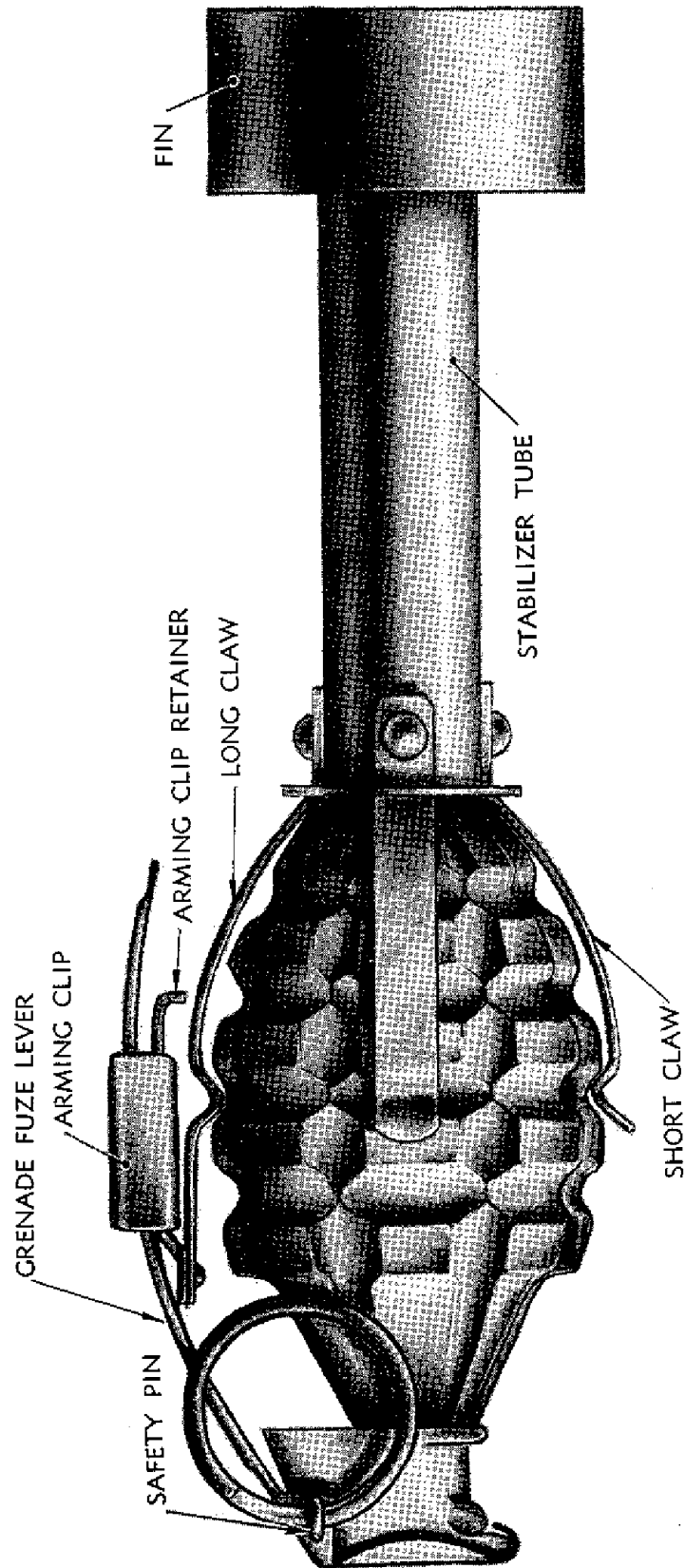
86. CHEMICAL RIFLE GRENADES.

a. **Burning type.** These grenades consist of a deep-drawn, thin-walled steel body with hemispherical ogive and body union assembly to which is attached a simple base fuze and a stabilizer and fin assembly (B, fig. 30). This type of grenade is available with approximately 10¾ ounces of HC white smoke or 6½ ounces of standard colored smoke fillings. Both HC and colored smoke grenades have five sealed smoke emission holes in the body union. The colored smoke grenades also have a smoke emission hole in the ogive. Both of these types of chemical rifle grenades commence burning upon impact, due to the action of the base initiating type of fuze. The HC grenade is intended primarily for screening purposes and the colored smoke grenades for signaling.

b. **Bursting type.** This grenade is the counterpart of the WP smoke hand grenade M15. The WP smoke rifle grenade M19 (A, fig. 45) has a stabilizer and fin assembly identical to that used in the antitank grenade M9A1. It contains approximately 8.5 ounces of white phosphorus and is equipped with a burster actuated by a base-detonating fuze. The spontaneously combustible WP grenade is scattered upon impact.

87. PRACTICE AND TRAINING RIFLE GRENADE. There is at present only one standard practice rifle grenade, the M11A3 (fig. 12). This grenade is used only in training and simulates the flight and

Classes of Ammunition



RA PD 68355

Figure 46 — Fragmentation Grenade Projection Adapter M1

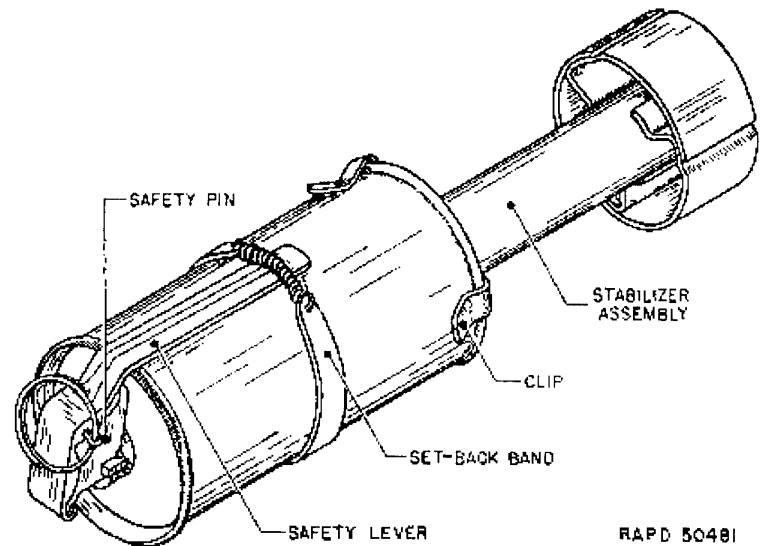


Figure 47 — Chemical Grenade Projection Adapter M2

action of the AT grenade M9A1. Being completely inert, this grenade is painted black. For repeated use, it is issued with additional replacement fins and ogives.

88. GRENADE PROJECTION ADAPTERS.

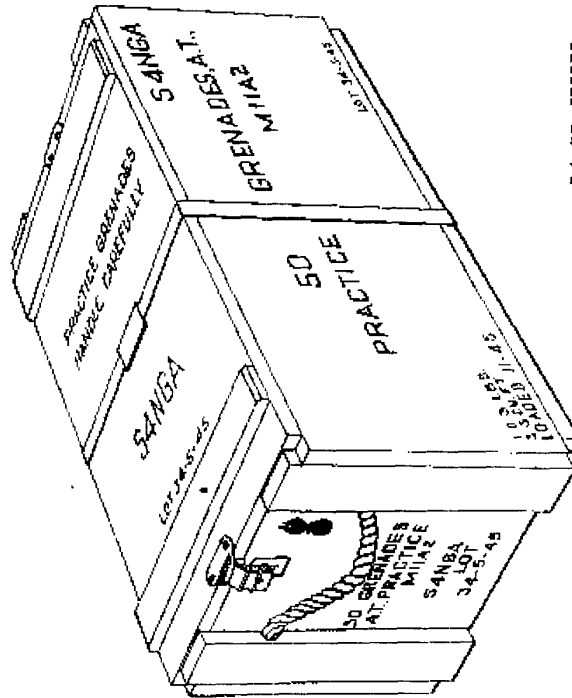
a. The grenade projection adapter (fig. 46) assembled to a fragmentation hand grenade Mk 2 permits this hand grenade to be used as a rifle grenade. After removal of the grenade safety pin before firing, the safety lever is held in position by the arming clip. Upon firing the grenade from a launcher-equipped rifle or carbine, the arming clip frees itself from the arming clip retainer, thereby releasing the grenade safety lever and initiating the 5-second fuze. Grenade cartridges are packed in each adapter packing box.

b. The chemical grenade-projection adapter (fig. 47) is intended for use with the chemical hand grenades. It consists of a stabilizer tube, which has a base plate and a three-pronged clip on one end and on the other end, a standard fin similar to that on the grenade M9A1, and a metal setback band which fits around the grenade, over the safety lever. Upon firing the grenade from a launcher-equipped rifle or carbine, the setback band moves to the rear, thereby releasing the grenade safety lever and initiating the 2-second fuze. Grenade cartridges are packed in each adapter cartridge packing box.



Figure 48 — Typical Packing of Hand Grenades

Classes of Ammunition



RA PD 68335B

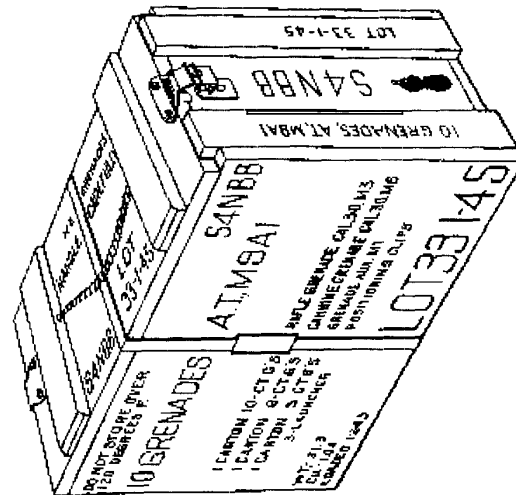


Figure 49 - Typical Packing of Rifle Grenades

Classes of Ammunition

89. CARE AND PRECAUTIONS IN HANDLING.

a. **Care.** Information concerning the care to be exercised in handling grenades will be found in chapter 3 of this manual and pertinent Field Manuals.

b. **Precautions.** The following additional safety precautions for handling ammunition will also be observed:

(1) Since fragments may be projected over 200 yards, fragmentation grenades will not be used in training without adequate cover.

(2) The safety pin will be removed just before throwing or launching and at no other time.

(3) Occasionally, chemical grenades may flash. Hence, when used in maneuvers, they will be so thrown as to function not less than 30 feet from personnel.

(4) Duds will be disposed of in accordance with the provisions in chapter 4.

(5) *Rifle grenades must never be launched with a cartridge other than the special grenade cartridges provided for that purpose.*

(6) The fuze furnished with the grenade Mk 2 is noiseless, smokeless, and sparkless. Under no condition, therefore, will the thrower consider the grenade a dud because no noise, smoke, or sparks are observed upon release of the safety lever.

90. IDENTIFICATION. High-explosive grenades are painted olive-drab with yellow bands around the top of the grenade body. Training hand grenades (inert) are painted black; practice grenades containing a simulated charge are painted blue. Practice rifle grenades are painted black with white stenciling. Chemical grenades are painted blue-gray with identification band and marking in the appropriate color as indicated in chapter 1, section II and in figures 11 and 12. The stabilizer assembly of all rifle grenades is painted olive-drab.

91. PACKING.

a. Grenades are usually packed as fuze complete rounds, each in an individual fiber container.

b. Fragmentation grenades are packed 15 or 25 containers per wooden box.

c. The offensive hand grenades are packed 50 per wooden box (fig. 48), and the training grenades are packed 24 per box.

d. The standard packing for rifle grenades is 10 containers per box (fig. 49), with a supply of cartridges for launching from any appropriate weapon. Jungle packing is waterproofed to withstand hot humid climates.

e. Grenade-projection adapters are packed 48 per box, with sufficient number of various grenade cartridges and positioning clips.

Section III

MORTAR AMMUNITION

92. DESCRIPTION.

a. To obtain maximum accuracy and range, projectiles for smooth-bore mortars are stabilized by means of fins assembled to a shaft which is secured to the base end of the projectile; when the fins are omitted, the projectile tends to tumble and be erratic in flight.

b. In general, the ammunition has an adjustable propelling charge, consisting of a number of propellant increments, usually sealed in individual cellophane bags, and an ignition cartridge, to permit firing various ranges or zones of fire. The propellant increments are attached to the fin shaft or within the fin blades; the ignition cartridge is inserted in base end of the fin shaft.

c. The primer and ignition cartridge are separate elements. The primer is screwed into the shaft after the ignition cartridge has been inserted. The assembly of the ignition cartridge and the propellant increments make up the required propelling charge; or the ignition cartridges alone may be used for very short range in the 60-mm mortar and with the light-weight round (M43A1) in the 81-mm mortar.

d. Because the complete round (figs. 50 and 51) is loaded into the mortar as a unit and provision is made for adjusting the propelling charge, ammunition of this type comes within the classification of semifixed ammunition.

93. CLASSIFICATION.

a. According to the purpose for which it is intended, mortar ammunition is classified as high-explosive, smoke, illuminating, practice, or training.

b. High-explosive mortar shell are used for fragmentation or demolition effect, according to the action of the fuze and design of shell.

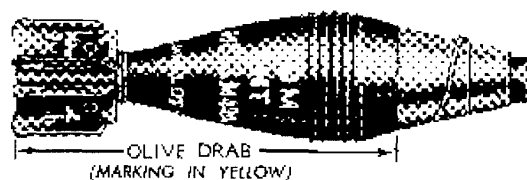
c. Smoke shell contain chemical fillers.

d. Illuminating shell are intended for signaling and illuminating purposes.

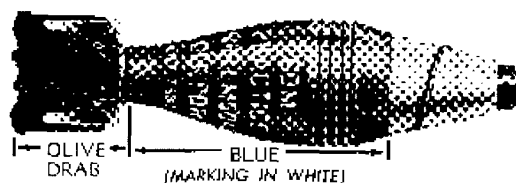
e. Practice shell may have a spotting charge or may be inert.

f. Training projectiles are provided for training and practice. They are inert and may be fired more than once. Several propelling charges and fins are supplied for each projectile.

Classes of Ammunition



HE SHELL, M49A2, W: PD FUZE, M52



PRACTICE SHELL, M50A2, W PD FUZE, M52



WP SMOKE SHELL, M302, W: PD FUZE, M82



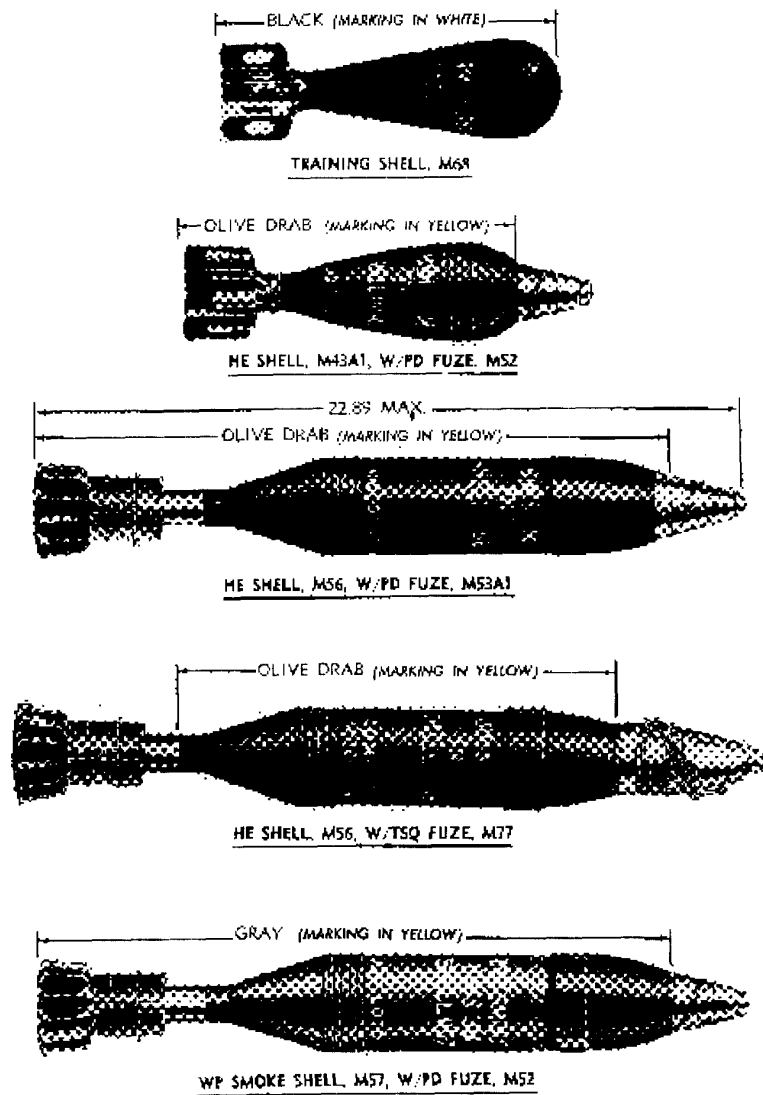
ILLUMINATING SHELL, M83A1, W TIME FUZE, M65



TRAINING SHELL, M69

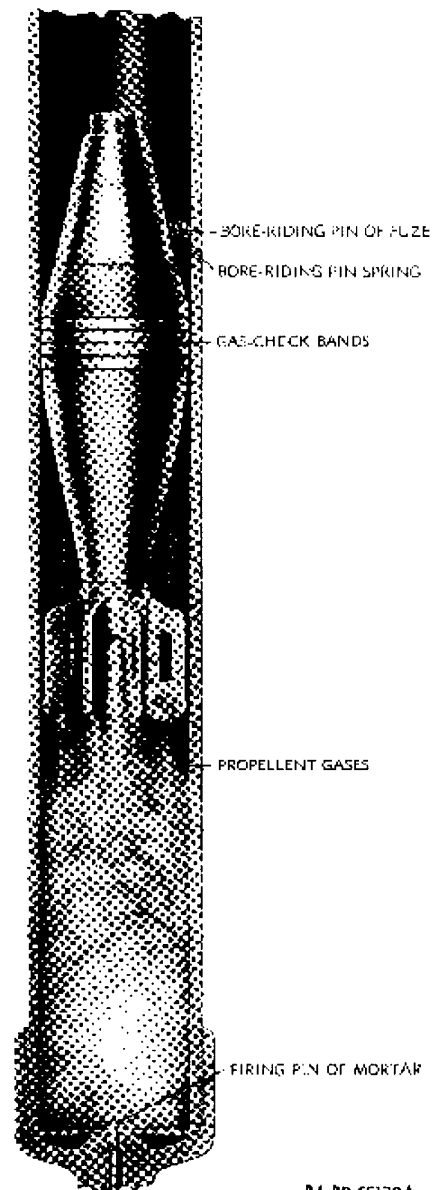
RA PD 64448B

Figure 50 — 60-mm Mortar Ammunition



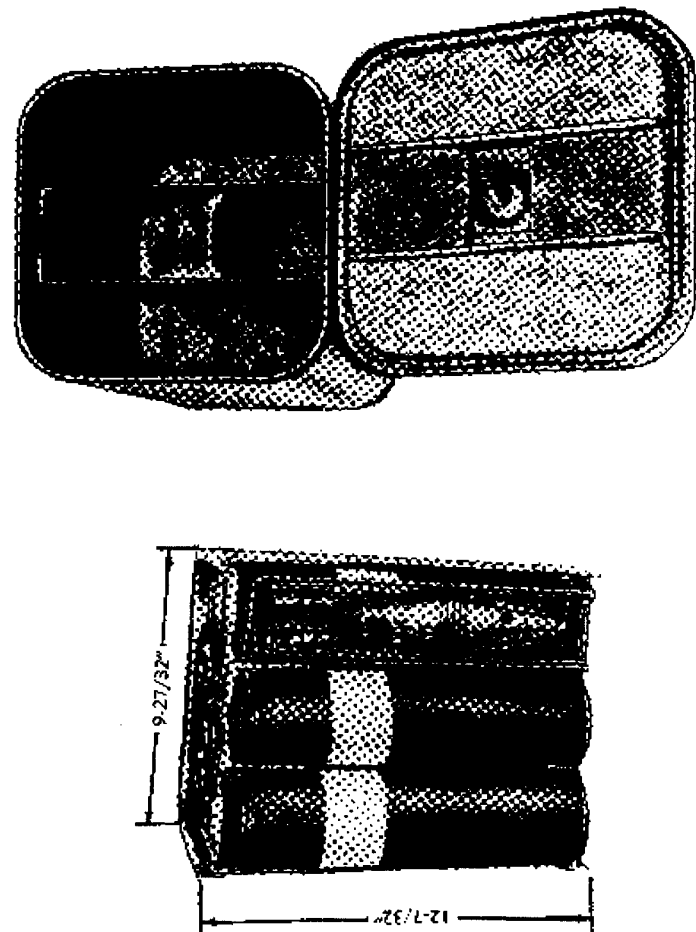
RA PD 6449A

Figure 51 — 81-mm Mortar Ammunition



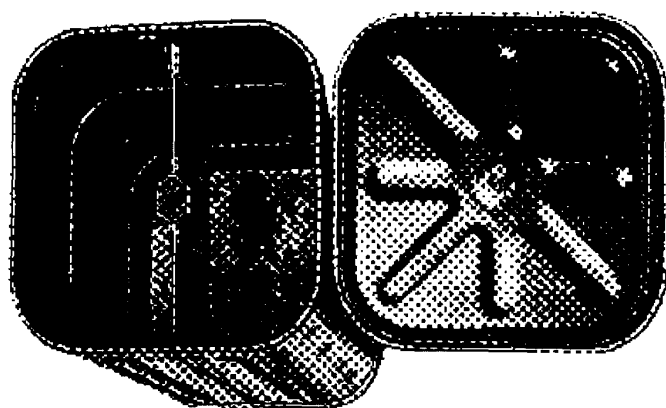
RA PD 65179A

Figure 52 — 60-mm Mortar Shell Being Fired



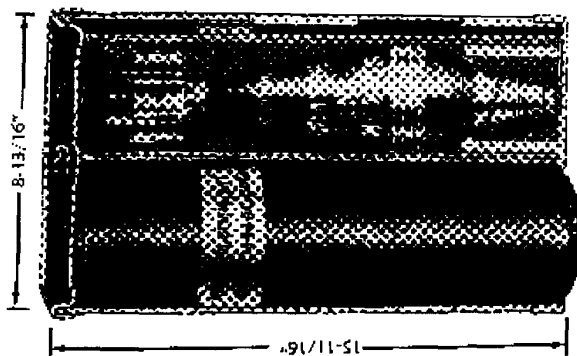
IA PD 97687A

Figure 53 — Metal Container M199A1 for 60-mm Mortar Ammunition



RA PD 97686

Figure 54 — Metal Container M140A1 for 81-mm Mortar Ammunition



Classes of Ammunition

94. METHOD OF PROJECTION. The round is dropped into the mortar tube and upon reaching the bottom of the mortar, the round's primer impinges upon the firing pin of the mortar. This impact sets off the ignition cartridge and propelling charge, and the gas produced forces the round from the mortar (fig. 52). The bourrelet, or gas-check band, prevents practically all the gas from escaping past the shell, and provides a bearing surface for the round in its travel through the bore. A bore-riding pin in the fuze of the shell prevents the fuze from becoming armed until after it leaves the bore of the weapon.

95. PRECAUTIONS IN HANDLING.

a. Complete rounds, particularly rounds with fuzes, will be handled with care at all times. Explosive elements in fuzes and primers are particularly sensitive to shock and high temperature.

b. Do not break the moisture-resistant seal on the fiber container until ammunition is to be used.

c. The safety wire will be withdrawn from the fuze only just before firing and at no other time. Be certain the bore-riding pin is in place in the fuze at the time the shell is dropped in the mortar.

d. When loading muzzle-fed mortars, the round is inserted into the mortar, cartridge end first. When the shell is released to slide down the barrel, the hands should be promptly removed from the muzzle.

e. Duds should not be handled or moved. Because their fuzes are armed, they should be destroyed in place as described in chapter 4 of this manual.

96. PACKING AND MARKING.

a. **Packing.** Except training ammunition, which may be requisitioned by components, mortar ammunition in the smaller calibers is packed as assembled complete rounds. Each round is packed in an individual fiber container, and then in suitable outer packing. In the case of 60-mm and 81-mm mortar ammunition, clover-leaf bundles, wooden box, or metal containers have been in use. The metal container (figs. 53 and 54) is now the standard packing for this ammunition, but is reserved for shipment to certain theaters.

b. **Marking.** In addition to the painting which identifies the ammunition as to type, the following information is stenciled on the projectiles:

Caliber and type of mortar
in which fired
Kind of filler
Model of shell
Ammunition lot number