

TM 9-442

RESTRICTED

WAR DEPARTMENT

TECHNICAL MANUAL

**8-INCH SEACOAST MATERIEL
GUN MK. VI MOD. 3A2;
BARBETTE CARRIAGE M1**

APRIL 19, 1943

Section IX

AMMUNITION

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64. GENERAL.

a. Ammunition for the 8-inch Gun Mk. VI Mod. 3A2 (Navy) is of the separate-loading type. The loading of each complete round into the cannon requires 3 separate operations: loading the projectile; loading the propelling charge; loading the primer. These components are shipped separately. Armor-piercing and high-explosive projectiles for this gun are shipped fuzed.

65. NOMENCLATURE.

a. Standard nomenclature is used in this section in reference to specific items of issue. Its use is mandatory for all purposes of record.

66. FIRING TABLES.

a. For applicable firing tables, see section XV, entitled "References."

67. CLASSIFICATION.

a. The projectiles authorized for use in this gun are classified as armor-piercing, high-explosive, practice, and dummy.

b. The armor-piercing projectile is a thick-walled shell containing a relatively small quantity of high-explosive filler. It is used for penetrating armor plate.

c. The high-explosive projectile has relatively thin walls and contains a correspondingly larger quantity of high-explosive filler.

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d. The practice projectile is a cast-iron (C. I.) shot of the same size, shape, and weight as the armor-piercing projectile. It may have a tracer may be inert.

e. The dummy projectile, which is completely inert (contains no explosive), is provided for drill in loading and handling.

f. IDENTIFICATION.

a. **General.** Ammunition, including components, is completely identified by means of the painting and marking (including ammunition lot number). Other essential information is marked on the components, for example: on the projectile, its weight and kind of filler; on the propelling charge, weight of igniter, designation of each section, etc. See figures 102, 107, and the following subparagraphs b, c, d, and e. The muzzle velocity may be obtained from the firing table.

b. Mark Or Model.

(1) To identify a particular design, a model designation is assigned the time the design is classified as an adopted type. This model designation becomes an essential part of the standard nomenclature and is included in the marking on the item. The present system of model designation consists of the letter M followed by an Arabic numeral.

(2) 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 model designation was M1.

(3) Prior to July 1, 1925, it was the practice to assign mark numbers. The word "Mark," abbreviated "Mk.," was followed by a Roman numeral, for example: SHELL, H. E., Mk. I. The first modification of a model is indicated by the addition of MI to the mark number, the second by II, etc.

c. Ammunition Lot Number.

(1) When ammunition is manufactured, an ammunition lot number, which becomes an essential part of the marking, is assigned in accordance with pertinent specifications. In the case of separate-loading ammunition, such a lot number is assigned to, and marked on, each of the components—projectile, fuze, propelling charge, and primer—as well as all packing containers. It is required for all purposes of record.

(2) To provide for the most nearly uniform functioning, all of the components in any one lot are manufactured under as nearly identical conditions as practicable. For example, in the case of projectiles, any one lot consists of projectiles of one weight, made by one manufacturer and loaded by one manufacturer. Therefore, to obtain the greatest accuracy in firing separate-loading ammunition, successive rounds should consist of:

(a) Projectiles of one lot number (one type and one weight).

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- (b) Propelling charges of one lot number.
- (c) Fuzes of one lot number.
- (d) Primers of one lot number.

d. Painting And Marking.

(1) **PAINTING.** All projectiles are painted to prevent rust and to provide, by the color, a ready means of identification as to type. For the projectiles described herein, the color scheme is as follows:

High-explosive or armor-piercing	Olive-drab; marking in yellow. (Formerly painted yellow with marking in black.)
Practice	Black; marking in white.* (Projectiles may contain a tracer, or may be completely inert.)
Dummy or drill (inert)	Black; marking in white, except band at center of gravity which is red.

(2) **MARKING.** For purposes of identification, the following is marked on the components of separate-loading ammunition.

(a) On The Projectile.

Stamped in the metal:

- Lot number of metal parts assembly.
- Year of manufacture.
- Manufacturer's initials or symbol.
- Designation of shell.

Stenciled on the body:

- Weight (to the nearest pound).
- Caliber and type of cannon in which fired.
- Lot number of loaded projectile.
- Kind of filler, for example, "TNT."

(b) On The Propelling Charge Or Sections Thereof.

Designation of section, for example, "BASE CHG." on base section, and "INCR. CHG." on increment section.

Lot number (includes type of powder, the word "Lot," manufacturer's initials, serial number of the lot, and year of manufacture).

Caliber, type, and model of cannon for which authorized.

Weight of igniter charge.

On dummy propelling charges: "DUMMY BASE CHG." (on base section) and "DUMMY INCR. CHG." (on increment section), together with the caliber and model of gun in which it is used.

* It should be noted that the above color scheme is not wholly in agreement with the basic color scheme described in TM 9-1900, practice projectiles generally being painted blue.

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(c) On The Fuze (Stamped In The Metal).

Type and model of fuze.
Loader's initials.
Month and year loaded.
Loader's lot number.

(d) On The Primer (Stamped In The Metal).

Loader's initials.
Loader's lot number.
Year of loading.
Mark or model of primer.

e. **Weight Markings.** Because it is not practicable to manufacture all projectiles to exactly the weight required for the desired accuracy of fire, slight variations in weight are allowed. However, the actual weights to the nearest pound are stenciled on each projectile, and appropriate ballistic corrections are given in the firing tables for the variations.

69. CARE, HANDLING, AND PRESERVATION.

a. Ammunition components are packed to withstand conditions ordinarily encountered in the field. All projectiles for this gun are shipped with a grommet to protect the rotating band. Shells procured from the Navy may have a canvas cover on the band—in addition to the grommet.

b. The armor-piercing and practice projectiles are packed in crates, one per crate, and the high-explosive shell in boxes, one per box. Charges and primers are packed in moisture-resistant containers.

c. Since explosives are adversely affected by moisture and high temperature, the following precautions should be observed:

(1) Moisture-resistant seals should not be broken until the ammunition is to be used.

(2) Ammunition, particularly fuzes, primers, and propelling charges, should be protected from high temperatures and the direct rays of the sun. More nearly uniform firing is obtained if successive rounds are at the same temperature.

d. Do not attempt to disassemble any fuze.

e. Primers must always be stored in a dry place. Prolonged exposure to moisture or dampness may cause malfunctioning.

f. Explosives and ammunition must be handled with appropriate care at all times. The explosive elements in primers and fuzes are particularly sensitive to undue shock and high temperature.

g. Each of the components should be free of foreign matter—sand, mud, grease, etc.—before loading into the gun. If components get wet or dirty, they should be wiped off at once.

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h. Components of rounds prepared for firing but not fired will be returned to their original condition and packings, and appropriately marked. Fuzes will be inspected prior to repacking. Such components will be used first in subsequent firing, in order that stocks of opened packings may be kept at a minimum.

70. AUTHORIZED ROUNDS.

a. The ammunition authorized for the use in the 8-inch Gun Mk. VI Mod. 3A2 (Navy) is listed in Table I. No other ammunition will be used in this gun. The nomenclature (standard nomenclature) completely identifies the ammunition.

TABLE I
AMMUNITION FOR THE 8-INCH GUN MK. VI MOD. 3A2 (NAVY)

Nomenclature Of Fuzed Projectile	Fuze		Propelling Charge (Model Or Type)	Primer (Model)
	Type And Model	Action		
Service Ammunition				
SHELL, A.P., 260-lb. (Navy), Mk. XX, w/FUZE, B.C., Mk. X, 8-in. guns, M1888- 88MI-88MII and Mk. VI Mod. 3A2 (Navy)	B.D., Mk. X	Delay	Base and increment ¹	Mk. XV Mod. 1 (Navy) ²
SHELL, H.E., 240-lb., M103, w/FUZE, P.D., M51 Mod. 1, w/BOOST- ER, M21, or M51A1 Mod. 1, w/BOOSTER, M21A1, 8-in. guns, Mk. VI Mod. 3A2 (Navy), and M1.	P.D., M51A1 Mod. 1, or M51 Mod. 1	S.Q. and delay	Base and increment ¹	Mk. XV Mod. 1 (Navy) ²
Practice Ammunition				
SHELL, C.I., 260-lb., M109, 8-in. guns, M1888- 88MI-88MII and Mk. VI Mod. 3A2 (Navy)	none	—	Base and increment ¹	Mk. XV Mod. 1 (Navy) ²
SHELL, C.I., 260-lb., Mk. XVIII, 8-in. guns, M1888-88MI-88MII and Mk. VI Mod. 3A2 (Navy) ³	none	—	Base and increment ¹	Mk. XV Mod. 1 (Navy) ²
Dummy Ammunition				
PROJECTILE, dummy, 260-lb., T12, 8-in. gun, Mk. VI Mod. 3A2 (Navy)	—	—	Base and increment ⁴	Mk. XV Mod. 1 (Navy) ⁵

A.P.—Armor-piercing
H.E.—High explosive
C.I.—Can-Iron

B.D.—Base-detonating
P.D.—Point-detonating
S.Q.—Superquick

¹Service or practice charge is designated CHARGE, propelling, base and increment, NH powder, 8-in. guns, Mk. VI Mod. 3A2 (Navy), 240-lb. and 260-lb. projectile.

²Service or practice primer is designated PRIMER, combination, electric and percussion, Mk. XV Mod. 1 (Navy).

³May contain tracer.

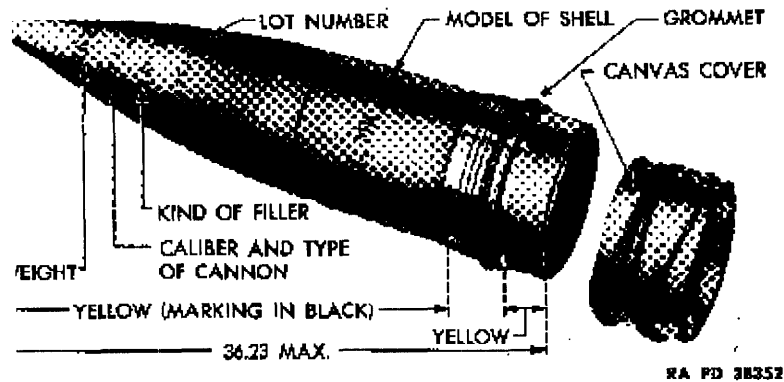
⁴Dummy charge is designated CHARGE, propelling, dummy (72-lb. base with 32-lb. increment), M5, 8-in. gun, Mk. VI Mod. 3A2 (Navy).

⁵A fired service primer is used with dummy ammunition for drill purposes.

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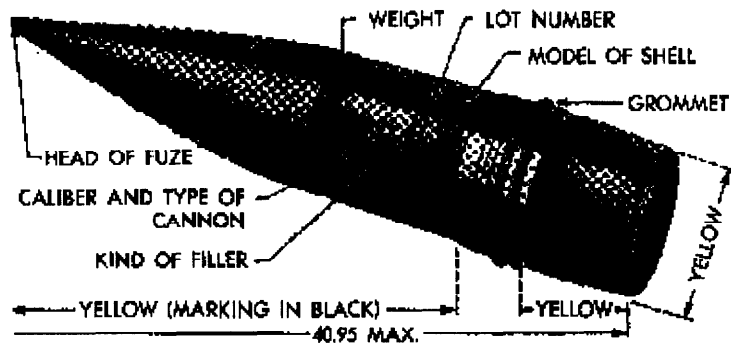


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Figure 102—SHELL, A.P., 260-Lb (Navy), Mk. XX, w/FUZE, B.D., Mk. VI, Mod. 3A2 (Navy)

PREPARATION FOR FIRING.

Aside from removal of the packing material (including the grommet and canvas cover—if any) which protects the rotating band, the armor-piercing and practice projectiles are ready for firing. This is also true of the high-explosive projectile when delay action is desired. When quick action of the high-explosive shell is required, the fuze head must be changed as described in paragraph 74 d. After removal from its storage case, the propelling charge is prepared for firing by removing the igniter protector caps (par. 73 b (2)).



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Figure 103—SHELL, H.E., 240-Lb (Navy), M103, w/FUZE, P.D., M1A1, Mod. 1, w/BOOSTER, M21A1, 8-In., Guns, Mk. VI, Mod. 3A2 (Navy) And M1

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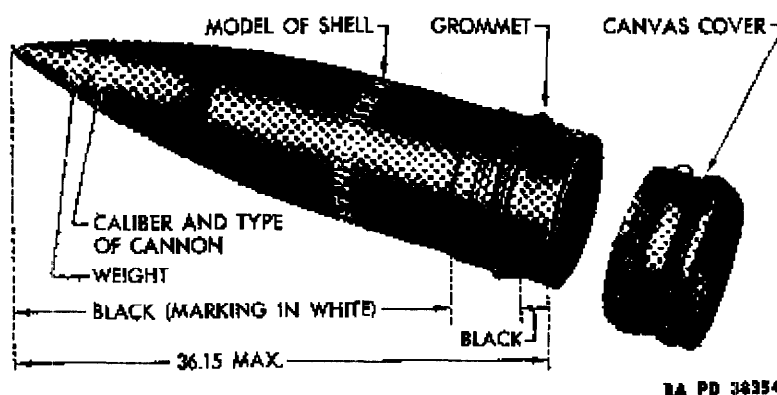


Figure 104—SHELL, C.I., 260-Lb, Mk. XVIII, 8-In., Guns, M1888-88MI-88MII and Mk. VI, Mod. 3A2 (Navy)

72. PROJECTILES.

a. General. The projectiles authorized for use in this gun comprise: an armor-piercing type (fig. 102) fitted with a base-detonating fuze; a high-explosive type (fig. 103) fitted with a point-detonating fuze; an inert practice projectile (fig. 104) which has no fuze; and a dummy type used for training in service of the piece. Packing of the projectiles is described in paragraph 76.

b. Service And Practice Projectiles.

(1) The service projectiles have a false ogive or windshield. In the case of the armor-piercing and the practice projectiles, the ogive of each has a radius of approximately $10\frac{1}{2}$ calibers, whereas the windshield of the high-explosive shell is a cone of approximately the same amount of taper.

(2) Bases of the armor-piercing and practice types are "square" (surface to the rear of the rotating band is cylindrical), but the high-explosive projectile is "boat-tailed" (surface to the rear of the rotating band is tapered). Because of their high-explosive fillers, the service projectiles are fitted with base covers to prevent the hot gases from the propelling charge from coming in contact with the bursting charge through possible flaws in the base. The weight of each projectile is included in the marking. See Table II for additional dimensions and details of the projectiles.

c. Dummy Projectile.

(1) The PROJECTILE, dummy, 260-lb., M10, 8-inch gun, Mk. VI Mod. 3A2, is designed for practice in loading and handling. It is of the type having a fully enclosed spring-cushioned plunger, which kicks the

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projectile loose from the forcing cone in the gun, on the rebound from ramming. It has a bronze cap, steel body, bronze front band, steel base, and steel rear ring with bronze rear band.

(2) The bronze cap is ogival in shape and is attached to the forward end of the body. The bronze front band simulates the bourrelet of a service projectile. The steel rear ring is mounted on the cylindrical portion of the base and can slide freely upon it. The bronze band mounted on this ring simulates the rotating band of a service projectile. Both front and rear bronze bands are replaceable.

(3) As this projectile is not fired, it must be removed from the gun by means of an extractor after each loading operation, as described in paragraph 84.

d. Dimensions and details of the projectiles are listed in Table II.

c. PROPELLING CHARGES.

a. General.

(1) The propelling charges used in this gun include a service and a dummy charge, both being of the base and increment type. The service charge consists of smokeless powder in 2 bags—the base section and the increment section. The base section of the service charge is fitted with a black powder igniter, described in the following subparagraph b. Igniter protector caps are placed on both ends of the base sections of the service charge, and the outer end of the increment section.

(2) The dummy (drill) charge simulates the service charge in size, weight, and general appearance; it is provided for training in handling and loading of the piece.

b. Charge, Propelling, Base And Increment, NH Powder, 8-Inch Gun, Mk. VI Mod. 3A2 (Navy), 240-Lb And 260-Lb Proj.

(1) DESCRIPTION.

a) This propelling charge (fig. 105) is composed of 2 sections—base and an increment section. Each section consists of unstacked grains nonhygroscopic (NH) smokeless powder packed in a laced cloth bag.

b) The base section is known as the normal charge; it is used for all guns up to the maximum obtainable with it. The full charge (base and increment) is known as the supercharge and is used only for extreme ranges; it is 9¼ inches in diameter and has a maximum over-all length (both sections) of approximately 57 inches, the base section being 40 inches long and the increment section, 17 inches long. This supercharge weighs approximately 104 pounds—72 pounds for the base section and 32 pounds for the increment section. The base and the increment sections are not attached.

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TABLE II
CHARACTERISTICS OF PROJECTILES FOR THE 8-INCH GUN MK. VI MOD. 3A2 (NAVY)

Fig. No.	Kind	Type	Model	Weight Loaded And Fuzed	Fuze		Material	Charge		Length (Inches)	Ogive (Radius In Calibers)	Rotating Band (Width In Inches)	Bourrelet	Shipped	
					Type And Model	Action		Kind	Weight						
SERVICE AMMUNITION															
(fig. 102)	Shell	A.P.	Mk.XX (Navy)	261.8	B.D.	Mk.X	Delay	Steel	Explosive "D"	3.40	36.23	10.50 (approx.)	3.31	Two-front and rear	1/crate
(fig. 103)	Shell	H.K.	M103	240.37	P.D.M51A1 Mod. 1, or M51 Mod. 1 delay	S. Q.		Steel	"TNT"	20.9	40.95	(cone)	3.31	Two-front and rear	1/box
PRACTICE AMMUNITION															
(fig. 104)	Shell	Practice	M109	260.	None			Cast Iron	None		36.15	10.42	3.31	Two-front and rear	1/crate
	Shell	Practice	Mk. XVIII* (Navy)	260.	None			Cast Iron	None		36.15	10.44	3.31	Two-front and rear	1/crate
	Proj.	Dummy	M.	260.				Steel, bronze						(Note 4) (Note 5)	

* This high-explosive projectile is fitted with FUZE, P.D., M51 Mod. 1, w/BOOSTER, M21. It has a windshield and two bourrelets. The front bourrelet is just to the rear of the windshield. The rear bourrelet is separated into two parts, one just in front of the rotating band, the other just to the rear.

* Limited standard, similar in essential respects to standard practice shell.

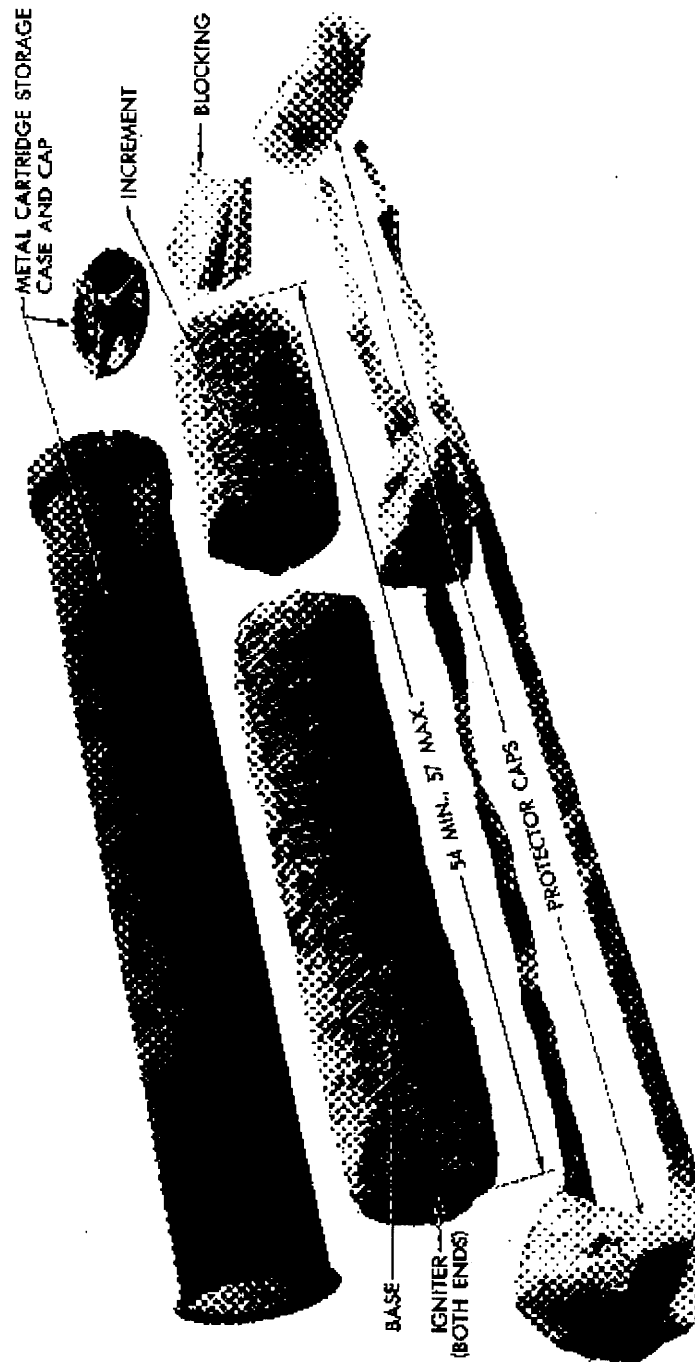
SHVLL, C. I., 240-lb., M109, 8-in. gun, M1888-89M1-89M2 and Mk. VI Mod. 3A2 (Navy).

* May contain tracer, assembly, Mk. VI (Navy), which weighs 0.47 lbs.

* Simulated by a bronze band mounted on a steel ring, at rear of projectile.

* Simulated by a bronze band on front of body.

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Figure 105—CHARGE, Propelling, Base And Increment, NH Powder, 8-In. Gun, Mk. VI Mod. 3A2 (Navy), 240-Lb And 260-Lb Proj.

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(c) The igniter comprises a core and 2 pads. The core extends through the axis of the base section, each end terminating in a pad sewed to the end of this section. The igniter charge consists of 17 ounces of black powder—5 ounces in each of the 2 pads and 7 ounces in the core. The cloth of the pads is dyed red to indicate the presence of black powder.

(d) For identification, the following are stenciled on the charge:

On The Base Section	
(Each End)	(Side)
5 OZ.	WT. BASE 72 LBS.
IGNITER	BASE CHG.
WITH 7 OZ. CORE	8-IN. GUN, MK. VI-MOD. 3A2
A-1 BLACK POWDER	NH XX LOT XXXX-XX
8-IN. GUN, MK. VI-MOD. 3A2	

On The Increment Section	
(Each End)	(Side)
Unmarked	WT. INCR. 32 LBS.
	INCR. CHG.
	8-IN. GUN, MK. VI-MOD. 3A2
	NH XX LOT XXXX-XX

(2) **PREPARATION FOR FIRING.** To prepare the charge for firing, it is only necessary to remove the igniter protector caps and the data tag, if attached. As the normal charge (base section) has an igniter pad at each end, it may be loaded into the gun, either end toward the breech.

CAUTION: When firing the supercharge (base and increment sections), the increment section will be loaded first, either end toward the breech. The base section will then be loaded, either end toward the breech. Should the base section be loaded first, the charge will not burn properly. This might result in a serious accident, should a hangfire occur.

c. **Charge, Propelling, Dummy (72-Lb Base With 32-Lb Increment) M5, 8-Inch Gun, Mk. VI Mod. 3A2 (Navy).**

(1) This dummy charge is used for drill purposes with the dummy projectile listed in Table I and described in paragraph 72 c. It is of the base and increment type simulating the service propelling charge described in the preceding subparagraph b.

(2) It consists of lead-weighted wood cylinders encased in cotton duck bags identical in size and shape to those of the service charge. However, there are no simulated igniter pads. A strap of cotton duck is sewed to one end of both the base and the increment sections for use in removing the charge from the chamber of the gun by the extractor described in paragraph 84.

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74. FUZES.

a. **General.** A fuze is a mechanical device used with a projectile to explode it at the time and under the circumstances desired. Fuzes are classified according to the manner of functioning as "time" or "impact." Impact fuzes function upon striking a resistant object. A further division, depending on the type of action after impact, is "superquick" and "delay."

b. **Boresafe Fuzes.** Certain fuzes are considered to be boresafe. A boresafe (detonator-safe fuze) is one in which the explosive train is so interrupted that, prior to firing and while the projectile is in the bore of the gun, premature detonation of the bursting charge of the projectile is prevented should any of the more sensitive explosive elements in the fuze, primer and/or detonator, malfunction.

NOTE: No attempt should be made to disassemble any fuze or part thereof. The only authorized assembling or disassembling operation is that of changing the fuze head in the case of the FUZE, P. D., M51A1 Mod. 1 or M51 Mod. 1, as described in the following subparagraph d, below.

c. **FUZE, B. D., Mk. X.** This base-detonating fuze is the standard delay fuze for major caliber armor-piercing projectiles. It is classified as a boresafe fuze. Being assembled in the base of the projectile and covered by the base cover, the fuze is not visible.

d. FUZE, P. D., M51A1 Mod. 1, w/BOOSTER, M21A1.

(1) GENERAL.

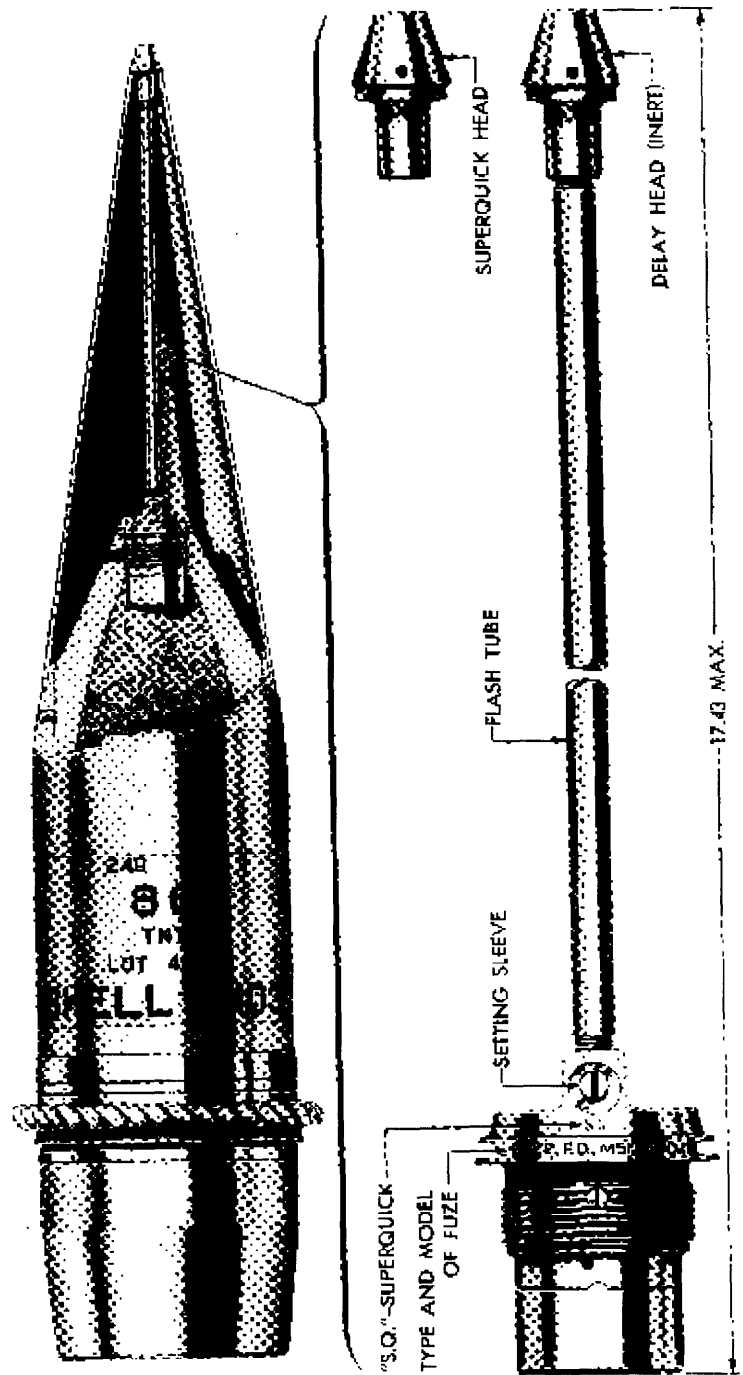
(a) This fuze, a boresafe type assembled to a cutaway shell, is shown in detail in figure 106. The fuze is so designed that it may be arranged for either delay or superquick action; to accomplish this, 2 heads are provided. One, the delay head (inert), is assembled to the shell as shipped; the other, the superquick head, which contains a firing pin and primer, is shipped in a separate container, but in the same packing box as the shell.

(b) The complete delay element and mechanism, including the delay firing pin, is housed in the body of the fuze; delay action requires that the inert delay head be used. Superquick action is obtained when the superquick head is used in place of the delay head.

(c) These 2 heads are distinguished by differences in the end: The delay head is solid brass, whereas the superquick head is closed with a disk of aluminum, crimped in place. The delay action is always operative; hence if the fuze is arranged for superquick action and this action should fail, the fuze will still function with delay action.

(d) As assembled and shipped, this fuze is covered by the windshield except that the delay head protrudes approximately $\frac{3}{4}$ inch.

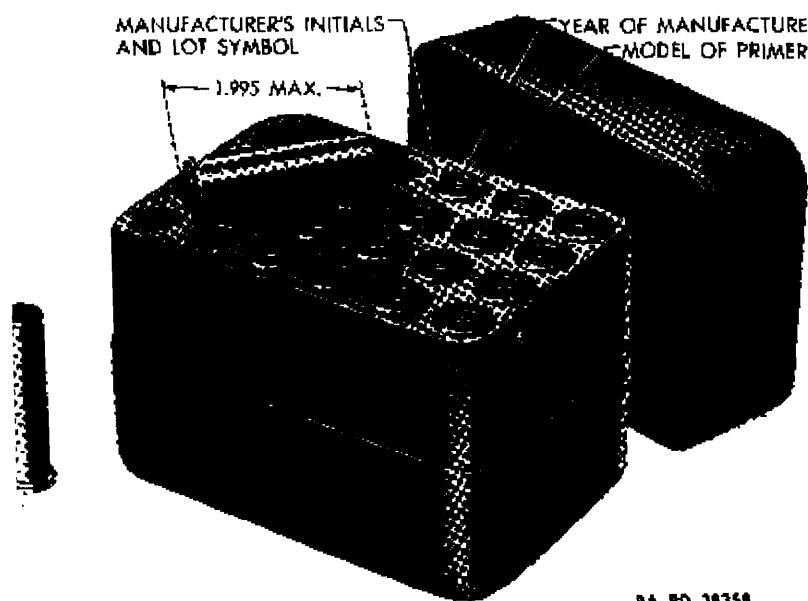
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Figure 106—FUZE, P. D., M51, Mod. 1, w/BOOSTER, M21, Showing Delay Head, Superquick Head, And Fuze Assembled In Cutaway Shell

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Figure 107—PRIMER, Combination Electric And Percussion, Mk. XV, Mod. 1, Showing Metal Container In Which 24 Primers Are Packed

(2) A retaining screw, packed in the box with high-explosive projectiles, is intended for use only with delay head of the FUZE, P. D., M51A1 Mod. 1, or M51 Mod. 1, should this fuze be replaced by a time fuze. Since a time fuze does not have an extended flash tube, this retaining screw is necessary to secure the delay head to the end of the windshield. This time fuze is not used with the 8-inch Gun Mk. VI Mod. 3A2 (Navy) but is used with the same shell in the 8-inch Gun M1.

(3) **PREPARATION FOR FIRING.** As shipped, the fuze of this projectile is arranged for delay action; hence when delay action is required, the projectile is ready for firing when packing materials are removed. To change the fuze for superquick action:

- a) Unscrew the delay head from the point of the projectile with the wrench provided for this purpose.
- b) Assemble superquick head in place of the delay head and tighten with the fuze wrench.

c) **FUZE, P. D., M51 Mod. 1, w/BOOSTER, M21.**

1) **GENERAL.** This fuze is similar to the FUZE, P.D., M51A1 Mod. 1, BOOSTER, M21A1, described in the preceding subparagraph d, except for minor internal details.

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(2) **PREPARATION FOR FIRING.** This is the same as described above for the FUZE, P.D., M51A1 Mod. 1, w/BOOSTER, M21A1.

75. PRIMER.

a. **General.** A primer used with rounds of separate-loading ammunition consists, in general, of a small quantity of sensitive explosive together with a larger quantity of black powder, encased in a metal container similar in shape to a blank cartridge. The function of the primer is to fire the igniter charge which is attached to the service propelling charge.

b. **Primer, Combination Electric And Percussion, Mk. XV Mod. 1.** This primer, shown in figure 107, is standard for all cannon using separate-loading ammunition which are equipped with the combination electric-percussion firing mechanism. The primer consists of a brass case which contains a primer charge of 30 grains of black powder and 2 initiating elements—one, electric; the other, percussion. Thus the primer may be fired by percussion should the electric circuit fail.

76. PACKING.

a. **General.** Complete packing data covering dimensions, volume and weight of the various components of the ammunition described herein are published in SNL P-1, P-7 and P-8.

b. **Data.** Although weights of individual projectiles vary somewhat, dependent on the type and model—propelling charges likewise, dependent on the particular powder lot—the following data are representative for estimating weight and volume requirements:

	Weight (pounds)	Volume (cubic feet)
8-inch projectiles as shipped:		
Armor-piercing and practice, one per crate	284	3.86
Over-all dimensions, 47 $\frac{1}{8}$ -in. x 11 $\frac{3}{8}$ -in. x 11 $\frac{3}{8}$ -in.		
High-explosive, one per box	286	3.89
Over-all dimensions, 46 $\frac{1}{2}$ -in. x 12-in. x 12-in.		
Propelling charges:		
Charge, without packing material	107	
As shipped, packed in individual metal cartridge storage case, one case (1 charge) per crate	171	5.81
Over-all dimensions of crate, 66 $\frac{1}{4}$ -in. x 12 $\frac{5}{16}$ -in. x 12 $\frac{5}{16}$ -in.		

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Primers:

	Weight (pounds)	Volume (cubic feet)
Packed 24 per metal container, 42 containers (1,008 primers) per box	126	2.00
Over-all dimensions of box, 24-in. x 12-in. x 12-in.		

c. Marking For Shipment. In general, packing containers for ammunition components are marked for shipment as follows:

- (1) Name and address of consignee (or code marking).
- (2) List and description of the contents.
- (3) Gross weight in pounds, displacement, or volume in cubic feet.
- (4) Number of the package.
- (5) The letters "U.S." to denote United States property.
- (6) Order number, contract number, or shipping number.
- (7) Ordnance insignium and escutcheon.
- (8) Name or designation of consignor, preceded by the word "From."
- (9) Lot number.
- (10) Month and year packed.
- (11) Inspector's stamp.

77. FIELD REPORT OF ACCIDENTS.

a. Any serious malfunction of ammunition must be promptly reported to the ordnance officer under whose supervision the materiel is maintained or issued (par. 7, AR 45-30).