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CIVIL WAR EXPLOSIVE ORDNANCE

Revised 10 November 1960

U. S. NAVAL SCHOOL, EXPLOSIVE ORDNANCE DISPOSAL

U. S. NAVAL PROPELLANT PLANT

Indian Head, Maryland

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U. S. NAVAL SCHOOL, EXPLOSIVE ORDNANCE DISPOSAL

A REPORT ON
CIVIL WAR EXPLOSIVE ORDNANCE

by

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U. S. NAVAL PROPELLANT PLANT
Indian Head, Maryland

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PREFACE

The purpose of this pamphlet is to provide an identification text for Explosive Ordnance Disposal use in the field. No attempt has been made to outline inerting, rendering safe, or disposal procedures in this publication.

Only the more common types of Civil War explosive ordnance are covered. It should be noted that, since standardization at the time of the Civil War was not as we know it today, it is quite common to find ordnance with slight modifications from type to type.

Civil War artillery pieces are of two general types: smooth bore and rifled bore. Most were muzzle-loaded, although a few imported pieces were breech loaded. Smooth bore weapons normally fired a spherical projectile, which was frequently attached by bands to a wooden sabot in order to gain better obturation. Muzzle-loaded, rifled artillery normally fired projectiles fitted with expanding rotating bands (sabots), the expansion caused by propellant pressure at the moment of firing.

The explosive filler used in shell and case shot was black-powder, with the balls in the case shot held in place by a matrix usually made of sulphur or some similar material. Fuzes were normally loaded with granulated black powder for powder trains and fitted with fulminate caps, should a impact function be desired.

If further study of Civil War Ammunition is required, refer to Notes on Ammunition of the American Civil War 1861-1865, authored by Colonel B. R. Lewis, and published by the American Ordnance Association.

EXPLANATION OF CIVIL WAR ORDNANCE NOMENCLATURE

- CASE SHOT Projectile with thin side walls and filled with lead or iron balls and black powder bursting charge.
- COMBINATION FUZE A fuze which gives either air-burst or impact functioning.
- CONCUSSION FUZE A fuze which functions at the shock of discharge or shock of impact with the target.
- PERCUSSION FUZE A fuze designed to give impact functioning.
- SABOT Band of material which engages rifling of gun tube and imparts rotation to projectile. A sabot usually refers to an expanding type of band used on muzzle loaded, rifled projectiles (also used on smooth bore projectiles when assembled as fixed ammunition). After discharge of the piece, propellant gas pressure expands sabot into rifled tube. Before firing, sabot is flush with projectile base to facilitate muzzle loading of round.
- SHELL Projectile with medium to thick side wall construction and filled with black powder bursting charge.

CIVIL WAR EXPLOSIVE ORDNANCE

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Without the cooperation, furnishing of data, and examples of projectiles and fuzes by the following, this report could not have been written: Mr. S. C. Kerksis, SP6 Norman H. Lier, Jr. LTJG J. R. Long USNR, Mr. J. R. Schneid, AOCS Louis S. Treadwell, LTJG M. E. Waggoner USNR, Mr. Jac Weller, The West Point Museum, and the Civil War Branch of the National Archives.

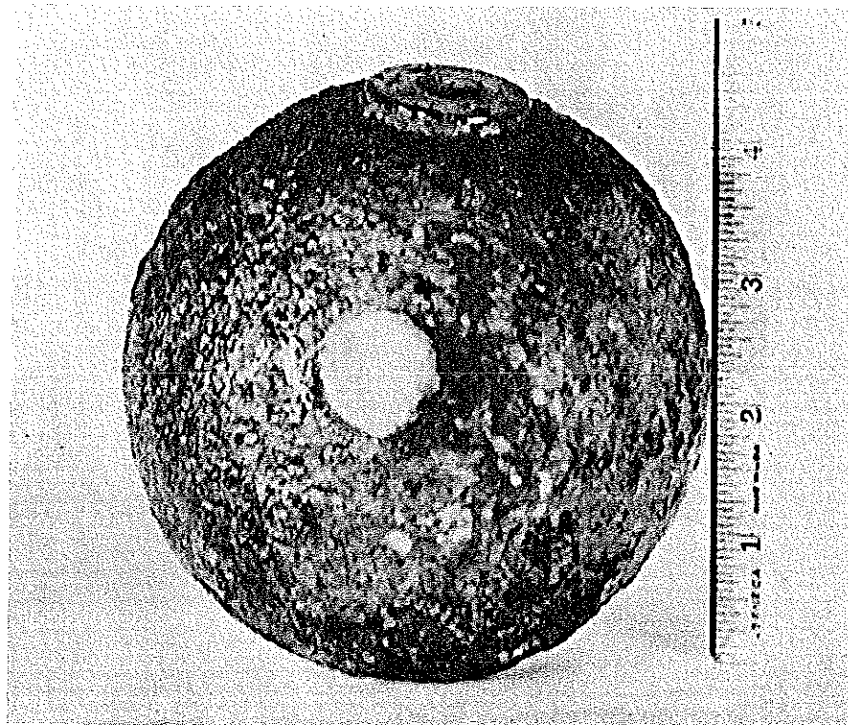
Unfortunately space considerations prevent acknowledgment of all persons who have contributed, but their help and guidance are appreciated.

PART 1

SMOOTH BORE ARTILLERY PROJECTILES

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TYPE: CONFEDERATE FIELD CASE SHOT



IDENTIFICATION: Spherical shape and usually fitted with copper time fuze adapter.

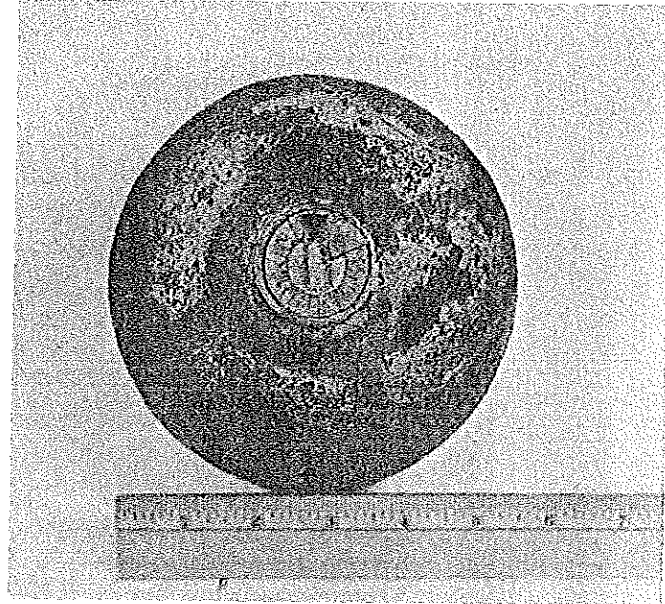
FUZE: Time (driven or in copper adapter).

FILLER: Black powder bursting charge and lead or iron balls embedded in a matrix.

SIZES: Generally same sizes as U. S. ordnance.

REMARKS: In some cases, these Confederate projectiles were fitted with a screw-in filler plug near fuze cavity (see illustration). Confederates also issued this type of projectile in solid shot and shell.

TYPE: U.S. FIELD AND SIEGE CASE SHOT



IDENTIFICATION: Spherical shape, Bormann or paper time fuze normally employed.

FUZE: Normally Bormann or paper time. Also occasionally found with Tice concussion fuze.

FILLER: Black powder bursting charge with lead balls embedded in matrix.

SIZES: See chart on page 6.

REMARKS: Also issued in solid shot and shell. Round illustrated is the 12 Pdr and is fitted with a Bormann time fuze.

TYPE: MORTAR AND SEACOAST SHELLS



IDENTIFICATION: Spherical shape and tapered fuze cavity; in most cases, provided with handling recesses (ears) on each side of fuze cavity.

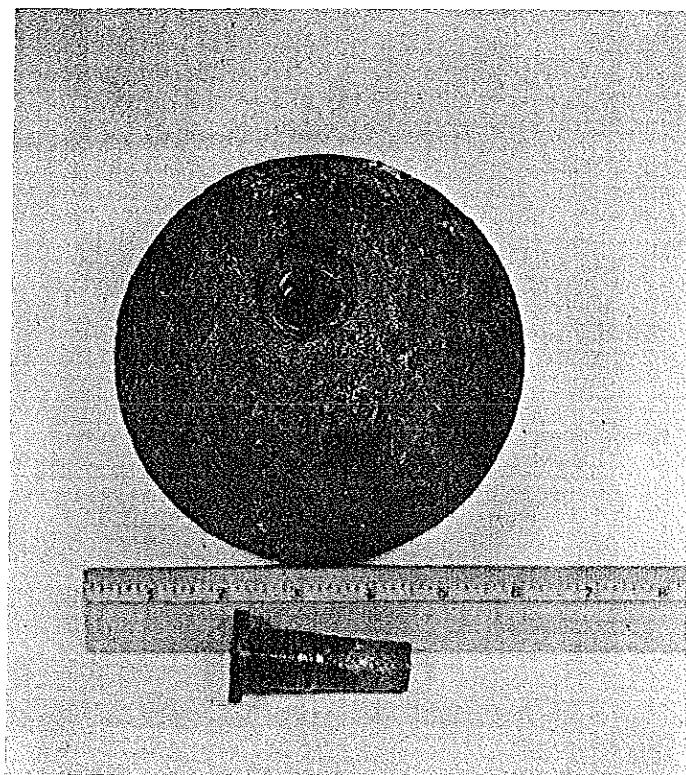
FUZE: Normally driven time (unthreaded).

FILLER: Black powder bursting charge.

SIZES: See chart on page 6.

REMARKS: The small Coehorn mortar projectile of U.S. manufacture normally did not have handling ears. Round illustrated is probably of Confederate manufacture and is fitted with a driven time fuze. Mortar shells also exist in solid shot and case shot.

TYPE: U.S. NAVAL SHELL



IDENTIFICATION: Spherical shape and normally fuze with water-cap time fuze.

FUZE: Usually water-cap time fuze, threaded and driven types of metal cases (adapters) have been noted.

FILLER: Black powder bursting charge.

SIZES: See chart on page 6.

REMARKS: Also issued in solid shot and case shot. Illustration shows projectile with water-cap time fuze removed showing fuze cavity and configuration of fuze case. Round in photo is the 24 Pdr size.

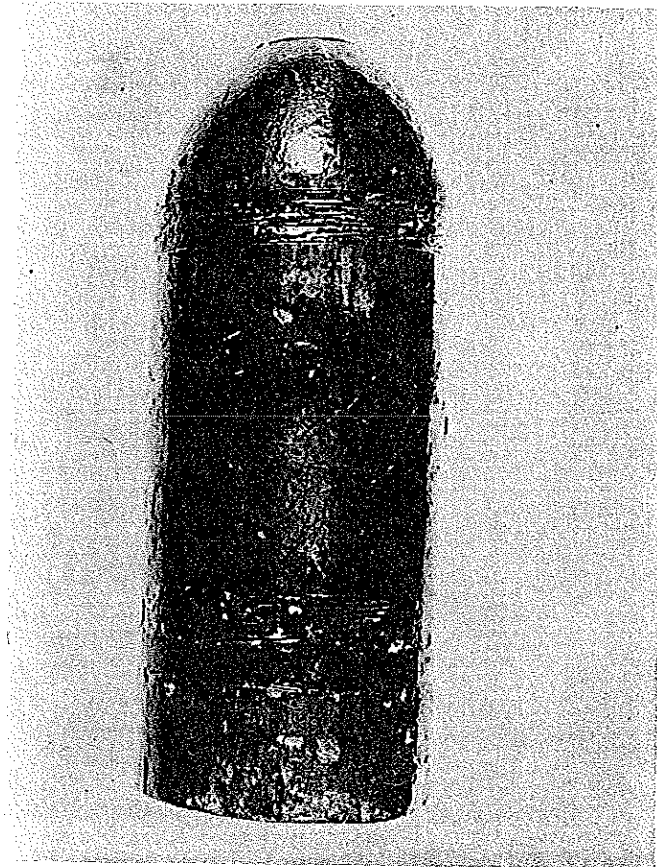
SMOOTH BORE PROJECTILE SIZES

<u>Designation</u>	<u>Diameter (in.)</u>	<u>Weight (Shell) (lb)</u>
<u>Mortar and Seacoast Projectiles</u>		
Coehorn (12 Pdr)	4.5	8.5
Coehorn (24 Pdr)	5.8	17.5
8 Inch	7.85	44.5
10 Inch	9.85	87.5
13 Inch	12.85	197
15 Inch	14.9	350
20 Inch	19.85	1000 (Solid)
<u>U.S. Naval Projectiles</u>		
12 Pdr	4.6	8.4
24 Pdr	5.75	17
32 Pdr	6.25	26.5
64 Pdr (8 Inch)	7.85	52.7
9 Inch	8.85	73.5
10 Inch	9.85	101.5
11 Inch	10.85	135.5
15 Inch	14.8	352
<u>U.S. Field and Siege Projectiles</u>		
6 Pdr	3.6	3.3
12 Pdr	4.5	8.4
18 Pdr	5.2	13.4
24 Pdr	5.7	17
32 Pdr	6.3	22.5
42 Pdr	6.8	31

PART 2

RIFLED BORE ARTILLERY PROJECTILES

TYPE: U.S. ABSTERDAM SHELL (EARLY TYPE)



IDENTIFICATION: Elongated iron projectile with lead sabot and two lead bearing surfaces. May also have saw cuts on edge of sabot and marked with Absterdam patent date.

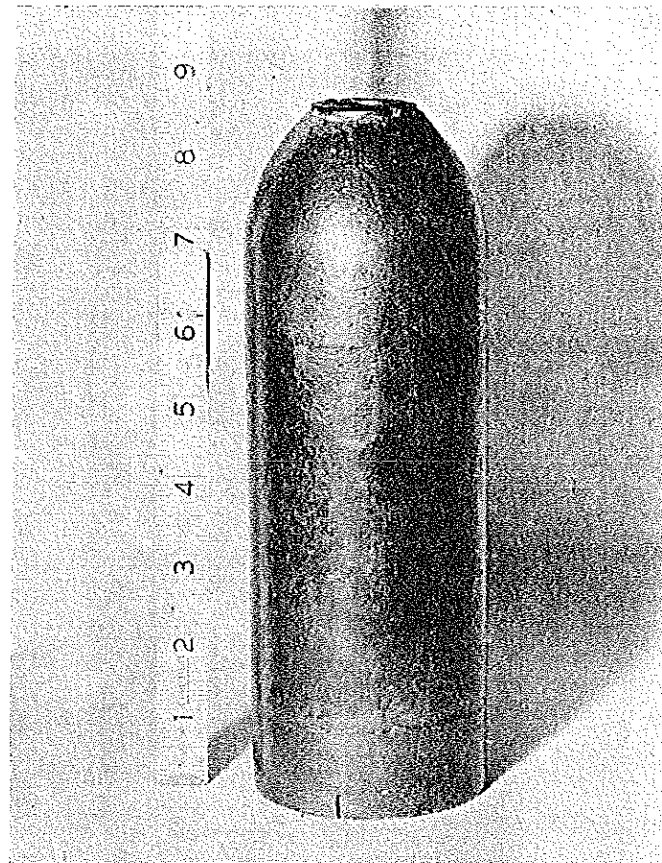
FUZE: Percussion and time.

FILLER: Black powder bursting charge.

SIZES: Vary from 3-inch to 4.5-inch caliber.

REMARKS: This is probably the early version of the Absterdam and is rarely encountered. This round was also said to be made in case shot and solid shot. Although the projectile was patented in 1864 some have been found stamped 1863 indicating an earlier patent.

TYPE: U.S. ABSTERDAM SHELL (LATE MODEL)



IDENTIFICATION: Elongated iron projectile fitted with brass sabot (rotating band); band has six saw cuts on base.

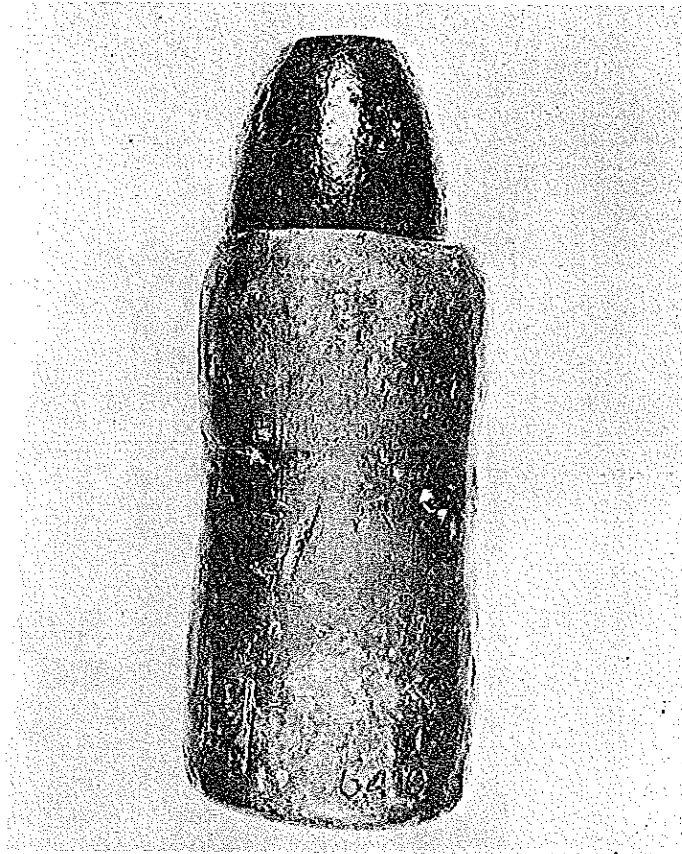
FUZE: Brass adapter for time fuze.

FILLER: Unknown (specimen examined filled with lead).

SIZES: Only 3-inch caliber noted.

REMARKS: This is probably the later type shell made without lead bands. Base of sabot is marked: ABSTERDAM PAT. FEB 23, 1864. There is a good chance that this projectile never saw extended field use; this is based on lack of field recoveries and late patent date. The Absterdam was also made in solid shot and case shot.

TYPE: ENGLISH ARMSTRONG SHELL



IDENTIFICATION: Long, lead sabot covering most of projectile. Shell body itself is grooved to hold sabot.

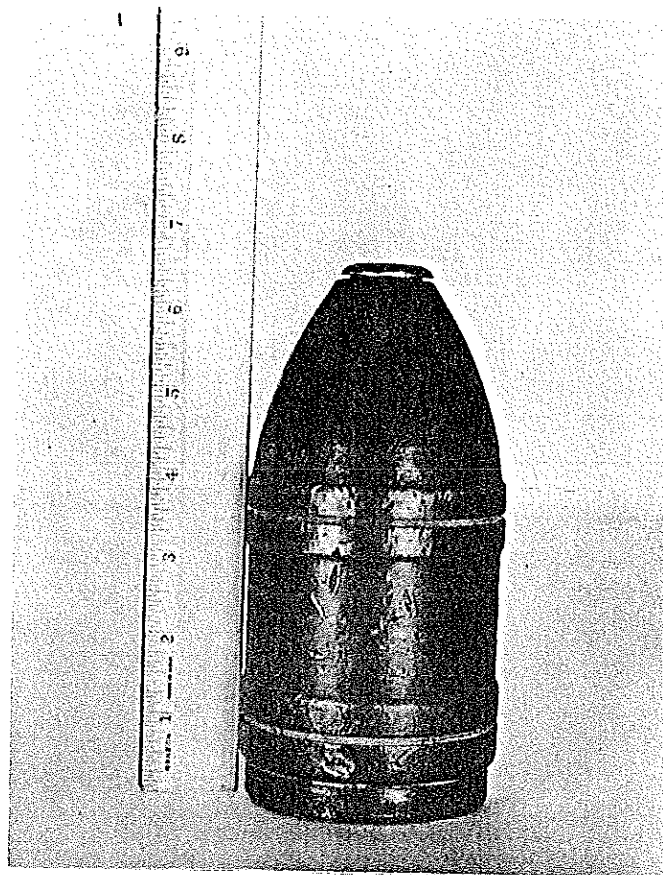
FUZE: Probably percussion.

FILLER: Black powder bursting charge.

SIZES: Only the 3-inch caliber has been noted.

REMARKS: Another example of an English made projectile, imported and used by the Confederates during the Civil War. Rarely encountered today even in museums. Only the Shell type illustrated is known. Not only does the grooved shell body hold the sabot but it also probably aids in controlling fragmentation.

TYPE: ENGLISH ARMSTRONG SHELL



IDENTIFICATION: Brass percussion fuze in nose and wide lead expanding band fitted with two raised bearing surfaces.

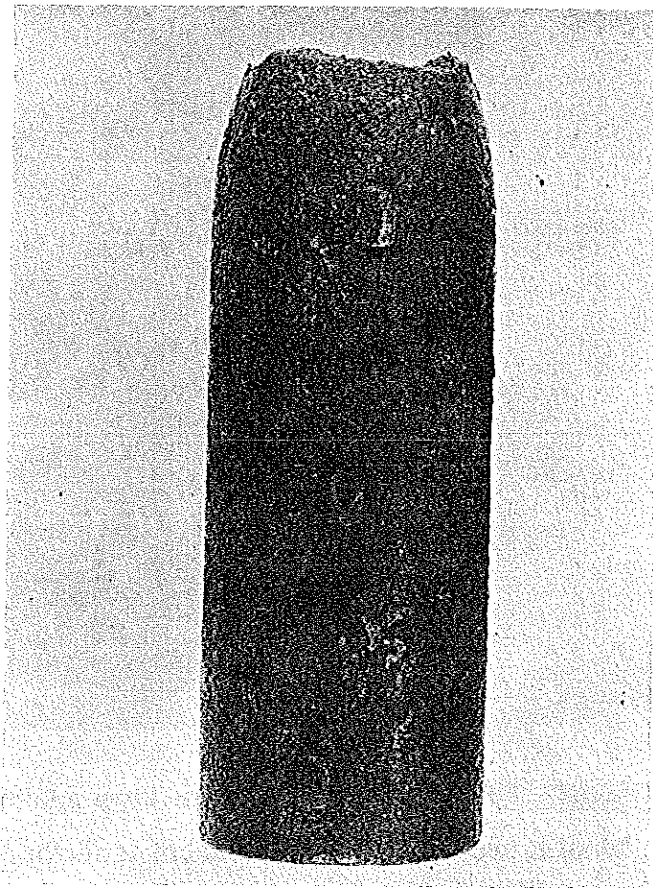
FUZE: Percussion (English design).

FILLER: Black powder bursting charge and internal preformed fragments positioned around the bursting charge.

SIZES: Only 3-inch caliber has been noted.

REMARKS: There is some question that this type of projectile was actually used during the Civil War. It is, however, typical of the well made Armstrong series of rounds sold to the Confederates by the English.

TYPE: CONFEDERATE ARMSTRONG SHELL



IDENTIFICATION: Another projectile of the shunt (stud) type. Projectile can be identified by the three rows of brass or copper-alloy studs and the threaded fuze cavity.

FUZE: Time (some noted with Bormann time).

FILLER: Black powder bursting charge.

SIZES: Only the 3-inch diameter size has been noted.

REMARKS: This projectile may be of English manufacture like the rest of the Armstrong types. Round illustrated has nose chipped off to enlarge fuze cavity so that a Bormann time fuze might be thus inserted.

TYPE: CONFEDERATE BROOKE SHELL



IDENTIFICATION: Ratchet-type base holding copper sabot (rotating band) to base of projectile. Sabot is further secured by one center bolt similar to the Mullane.

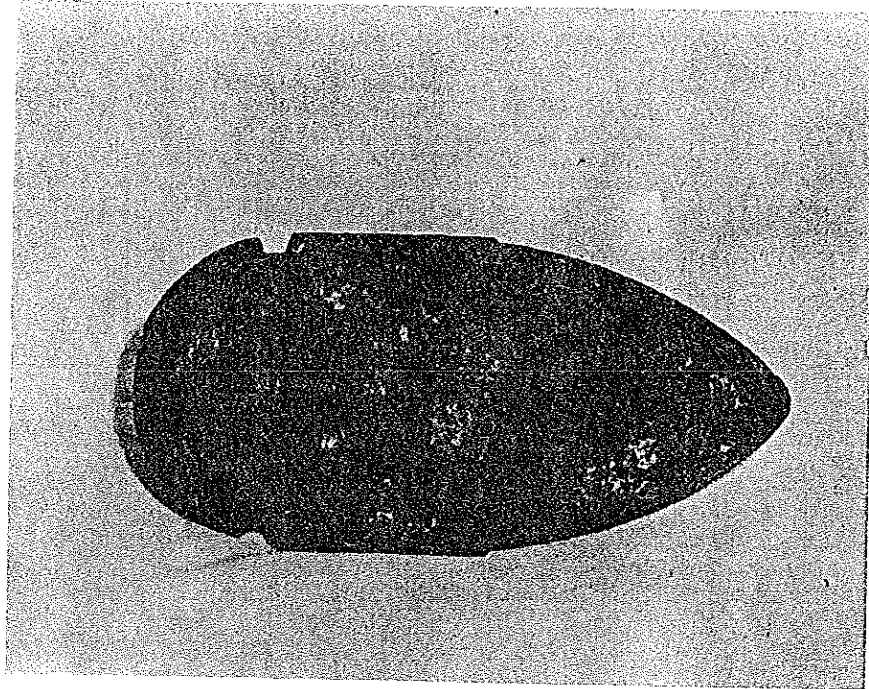
FUZE: Both percussion and time have been noted.

FILLER: Black powder bursting charge.

SIZES: Vary from 3-inch to 7-inch caliber.

REMARKS: This projectile can be found with or without raised bourrelets and bears resemblance to both the Confederate Reed and Mullane. This round is seldom encountered in the smaller calibers; it seems to have been more popular in the larger naval and siege calibers. The Brooke was invented by Commander John M. Brooke of the Confederate Navy and is sometimes called the "Ratchet Sabot" projectile.

TYPE: DAHLGREN PROJECTILE



IDENTIFICATION: Lead sabot (round illustrated has sabot missing) and raised ribs on side of projectile body.

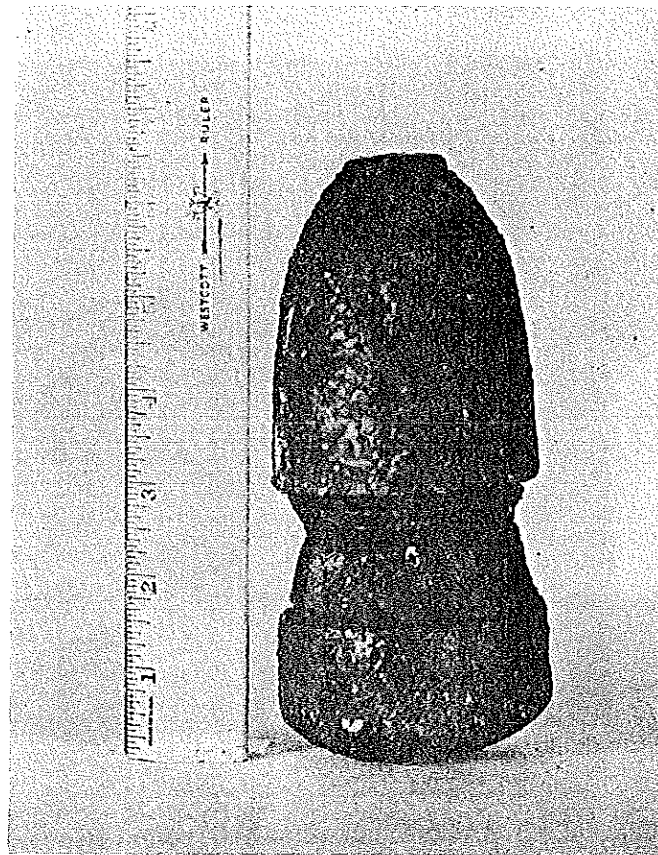
FUZE: Unknown (types examined fitted with solid brass fuze plug).

FILLER: Unknown (types examined inert filled).

SIZES: Projectile illustrated has a diameter of 4-7/8 inches; field calibers have also been noted.

REMARKS: Round illustrated is probably Confederate, although Federal Naval versions are known to exist. The Dahlgren is rarely encountered today.

TYPE: U.S. HOTCHKISS SHELL



IDENTIFICATION: Expanding lead band near base of projectile.
(Note: Band on round illustrated is missing.) Hotchkiss projectile has moveable base which, under propellant gas pressure, moves forward and expands lead band into rifling. Projectile is frequently recovered without lead band or base piece. Case shot version usually has grooves cut long ways on outside of projectile body to allow gas to pass thus igniting time fuze.

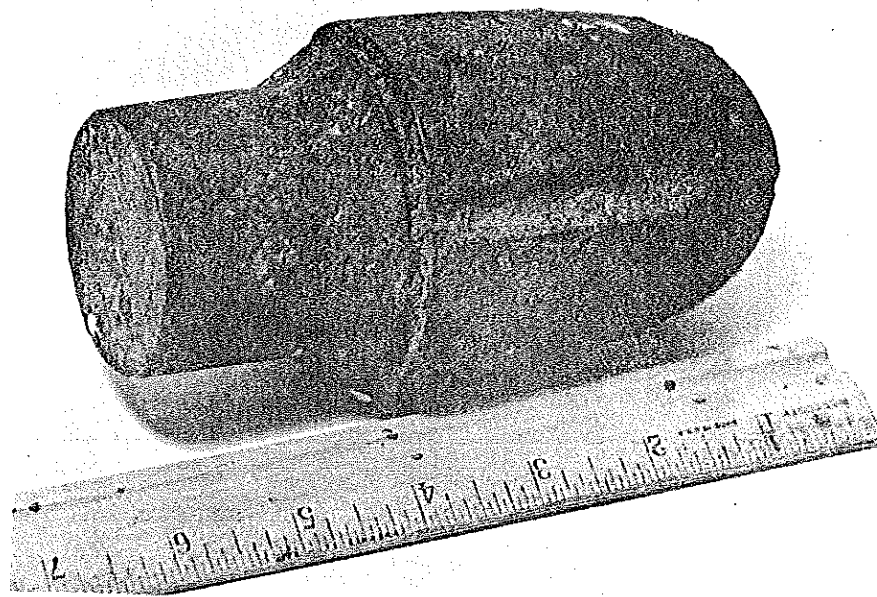
FUZE: Percussion or time.

FILLER: Black powder bursting charge.

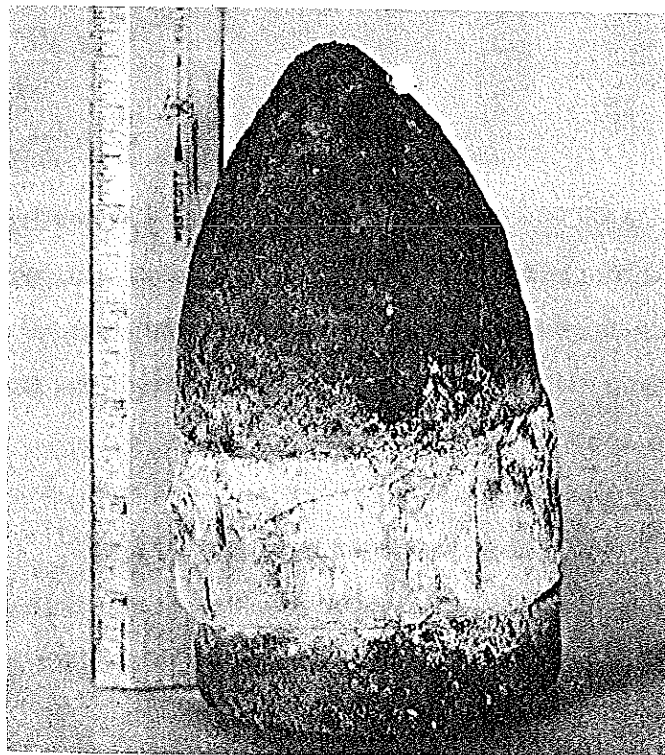
SIZES: Vary from 2.6-inch to 4.5-inch caliber.

REMARKS: Also made in case shot and solid shot; the Hotchkiss was one of the most popular projectiles of the Civil War.

TYPE: ADDITIONAL HOTCHKISS PROJECTILE ILLUSTRATIONS

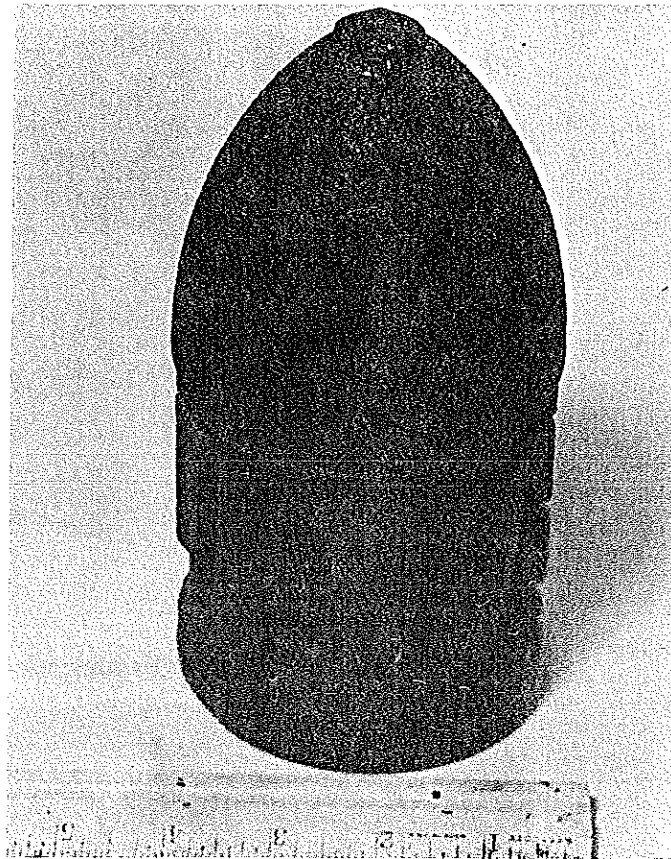


Forward piece of 3-Inch Hotchkiss Case Shot



Complete 3.67-Inch Hotchkiss Solid Shot

TYPE: U.S. JAMES SHELL



IDENTIFICATION: Semipointed nose; wheel type base; expanding sabot of canvas covered lead; all are main recognition features. Upon firing, expanding propellant gases enter open base and force sabot out into rifling. Round is seldom encountered in fired condition with sabot in place.

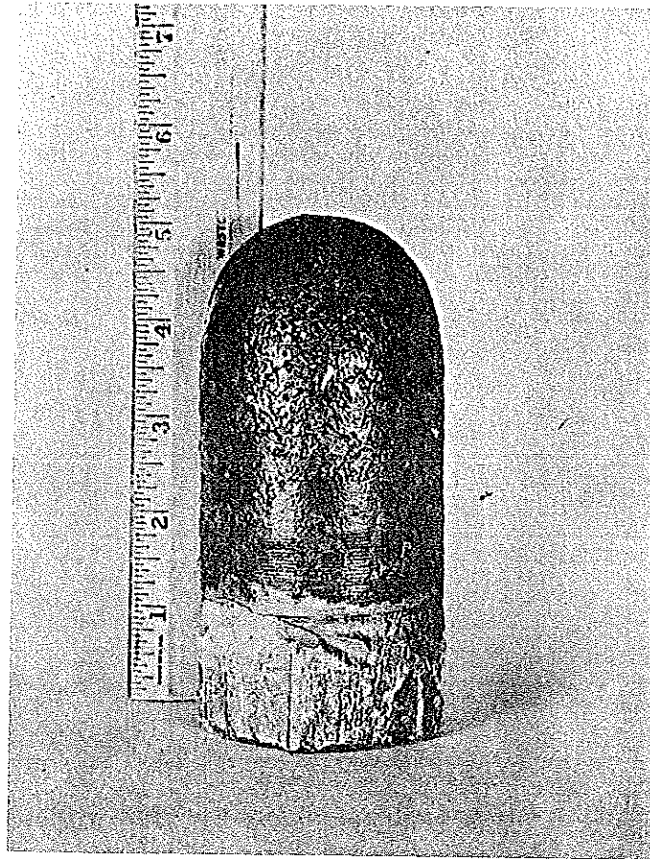
FUZE: Percussion.

FILLER: Black powder bursting charge.

SIZES: Vary from 3.6-inch (6 Pdr) to 6.8-inch (42 Pdr) caliber.

REMARKS: Also made in solid shot; projectile illustrated is the 6 Pdr size and is shown without sabot.

TYPE: CONFEDERATE LEAD SABOT PROJECTILE



IDENTIFICATION: Lead sabot normally slightly recessed on base to aid expansion. There are many types of this projectile including the Burton, Archer, Britton, etc, differing in such details as means of attaching sabot to projectile, length of projectile, etc.

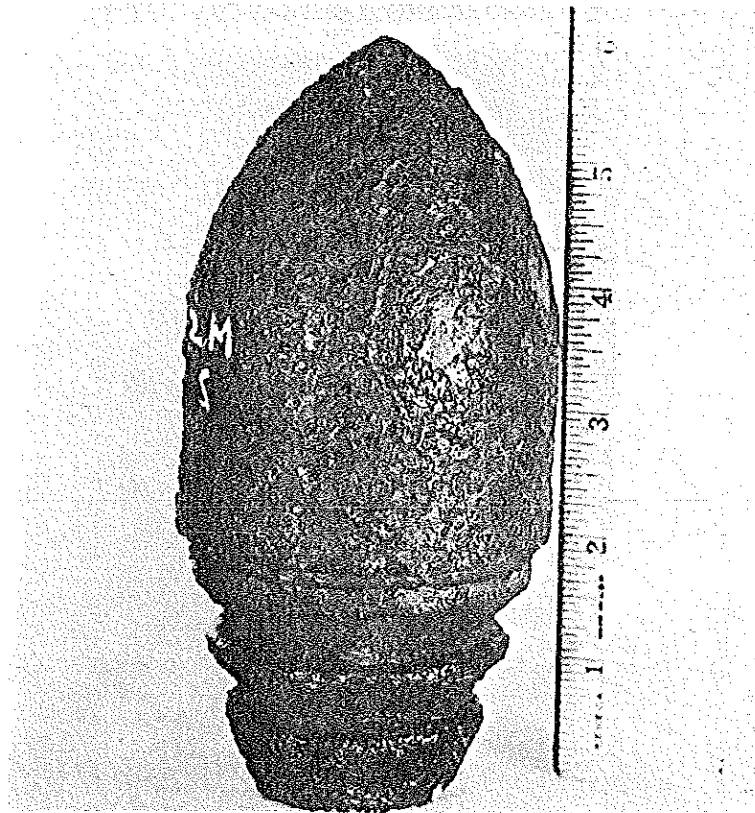
FUZE: Time and percussion types have been noted.

FILLER: Black powder bursting charge (shell only).

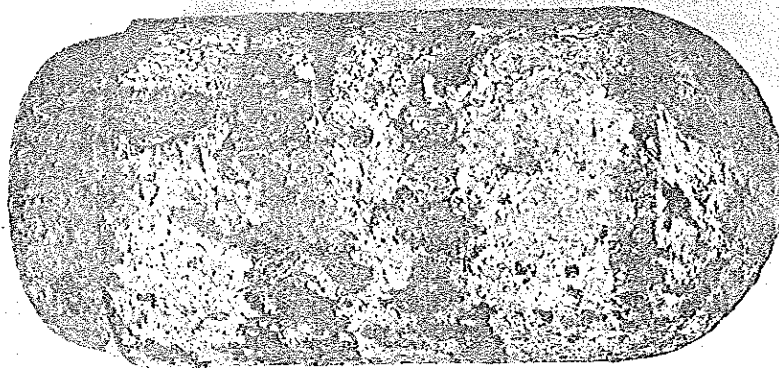
SIZES: 2.5-Inch to 7-inch caliber noted.

REMARKS: Projectile illustrated is solid shot type complete with lead sabot (most are recovered with sabot missing). This type of projectile is very similar to the Federal Dyer, which also took a lead sabot.

TYPE: ADDITIONAL LEAD SABOT PROJECTILE ILLUSTRATIONS

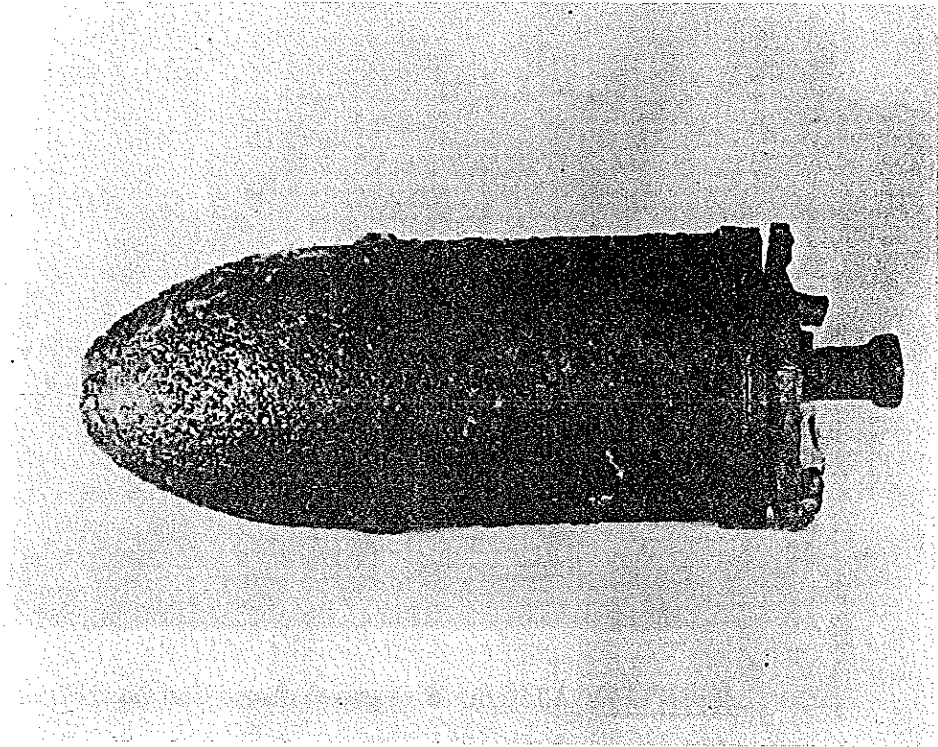


Confederate 3-Inch Solid Shot without lead sabot



Confederate 3-Inch Shell without lead sabot

TYPE: CONFEDERATE MULLANE SHELL



IDENTIFICATION: Copper sabot held to the projectile by a center bolt and three studs or dowels. Projectile is sometimes referred to as "Dowel Base."

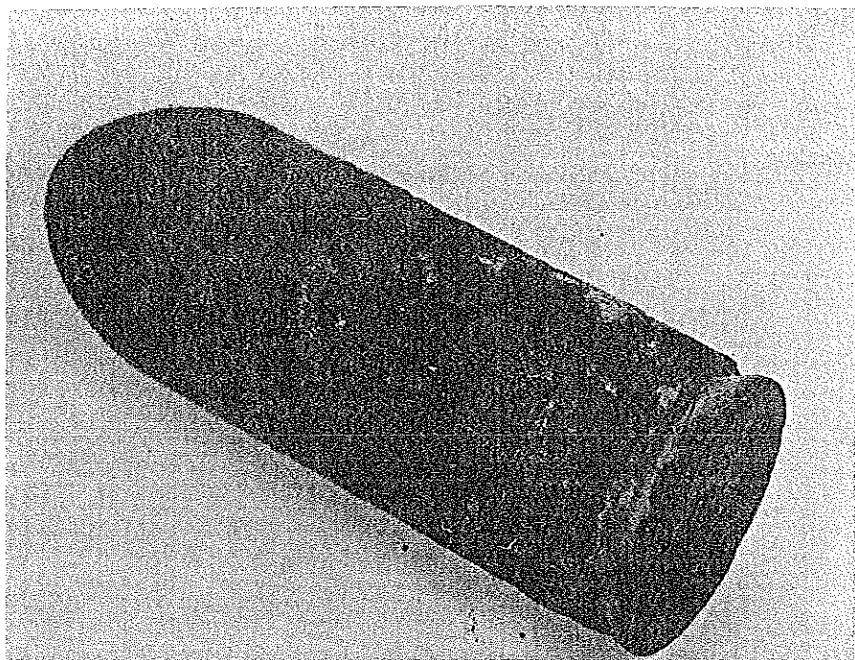
FUZE: Time and percussion have been noted.

FILLER: Black powder bursting charge.

SIZES: Range from 2.2-inch caliber and up.

REMARKS: Also found in solid shot and case shot. Projectile is frequently recovered with sabot and dowels missing, apparently thrown off upon firing or upon impact. A modification of the Mullane is the "Ratchet Sabot" sometimes called the Brooke's. This type uses only the one center bolt to hold the expanding sabot, plus the ratchet base which prevents the sabot from stripping.

TYPE: U.S. PARROTT SHELL



IDENTIFICATION: Elongated shape and narrow expanding band (sabot) normally made from iron or brass. Base of projectile is normally slightly recessed because of sabot overlap.

FUZE: Percussion or time.

FILLER: Black powder bursting charge.

SIZES: Vary from 3-inch (10 Pdr) to 10-inch (300 Pdr) caliber.

REMARKS: Undoubtedly, one of the most popular artillery projectiles of the Civil War. Also made in solid shot and case shot. Both the Federals and the Confederates manufactured the Parrott with many minor modifications.

TYPE: CONFEDERATE PRESTON SHELL



IDENTIFICATION: Projectile has angled slines formed from the body and a tapered (boat-tail) base.

FUZE: Unknown (possibly time).

FILLER: Black powder bursting charge.

SIZES: Only two calibers have been noted; they are: 3.75-inch and 4.2-inch (diameter of projectile across slines).

REMARKS: Also found in solid shot. This type of projectile is rarely encountered and is distinct in that, like the Whitworth, it has no soft metal expanding band, the body being formed to fit the rifling. The larger (4.2-inch) version is also equipped with three lugs or projections on the forward ogive as illustrated above.

TYPE: CONFEDERATE REED SHELL



IDENTIFICATION: Very similar to the Federal Parrott. Confederate projectiles normally have either an iron or copper band (sabot). Some (see photo) have dual, raised bearing surfaces above the sabot on projectile body.

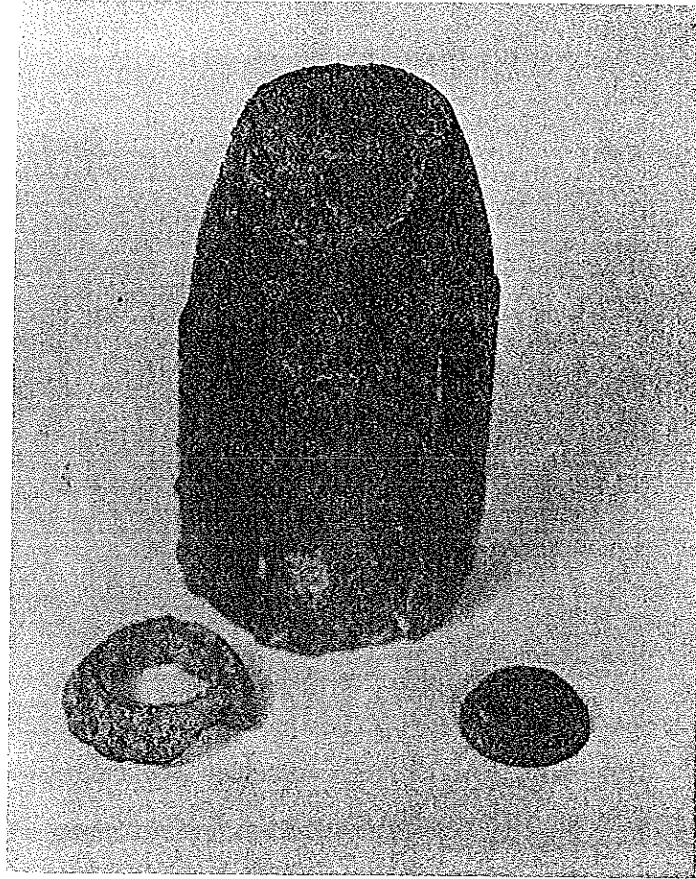
FUZE: Percussion or time.

FILLER: Black powder bursting charge.

SIZES: 2.5-Inch to 6.4-inch calibers noted.

REMARKS: Also found in solid shot and case shot. Projectile in original form was actually the forerunner of the Federal Parrott round. The Reed (also found spelled Read) was probably one of the most common Confederate rifled bore projectiles.

TYPE: U.S. SAWYER SHELL



IDENTIFICATION: Lead covered projectile body with nose percussion fuze. In some cases patent date (Nov 10, 1855) will be stamped on base of projectile in lead outer covering.

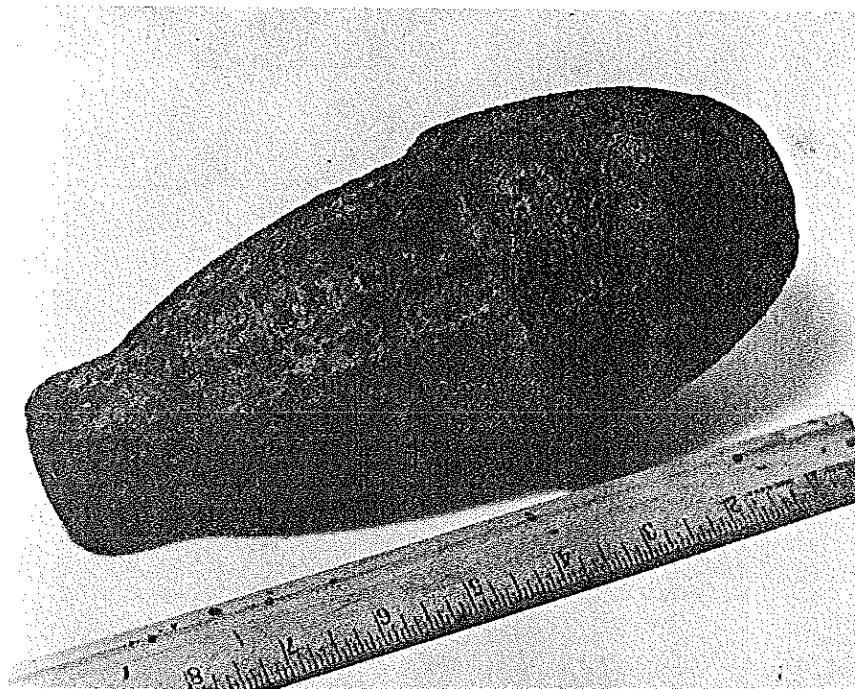
FUZE: Sawyer percussion fuze.

FILLER: Black powder bursting charge.

SIZES: Vary from 3-inch to 6.25-inch (24 Pdr) caliber.

REMARKS: Illustration shows shell with nose piece and top fuze cover removed. Some models of the Sawyer have pre-engraved rifling on lead outer cover. Round was also made in case shot and solid shot. A rare projectile seldom encountered in field recoveries.

TYPE: U.S. SCHENKL SHELL



IDENTIFICATION: Bottle-like configuration with after body ribbed for attachment of papier-mache sabot; (note: sabot missing from projectile in illustration). Expanding propellant gases force papier-mache sabot upward on rear cone, expanding and forcing it into the rifling.

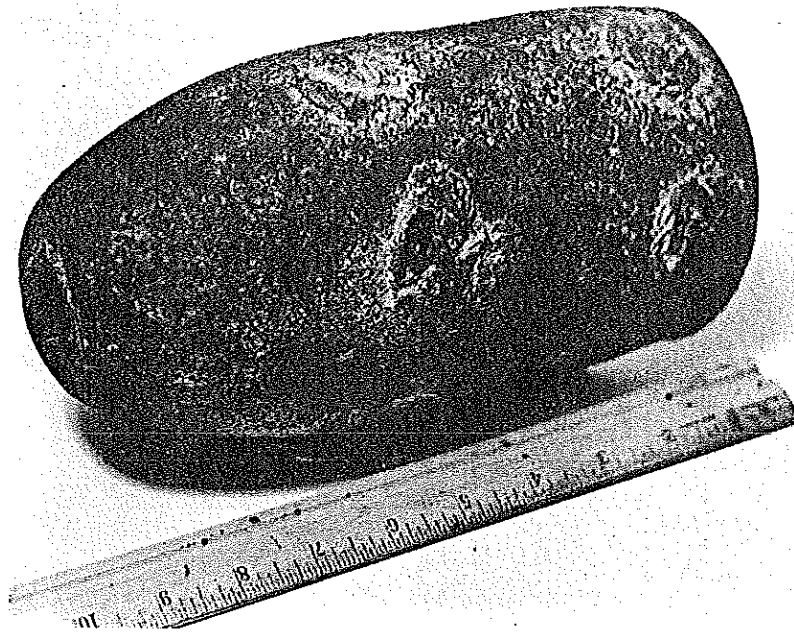
FUZE: Percussion, combination and time have been noted.

FILLER: Black powder bursting charge.

SIZES: Vary from 3-inch to 4.62-inch caliber.

REMARKS: Schenkl also issued in case shot and solid shot. One of the most popular projectiles of the war.

TYPE: CONFEDERATE SHUNT OR STUDDED SHELL



IDENTIFICATION: Iron projectile with two rows of lead studs which fit the rifling of the weapon. The projectile illustrated may be of English manufacture.

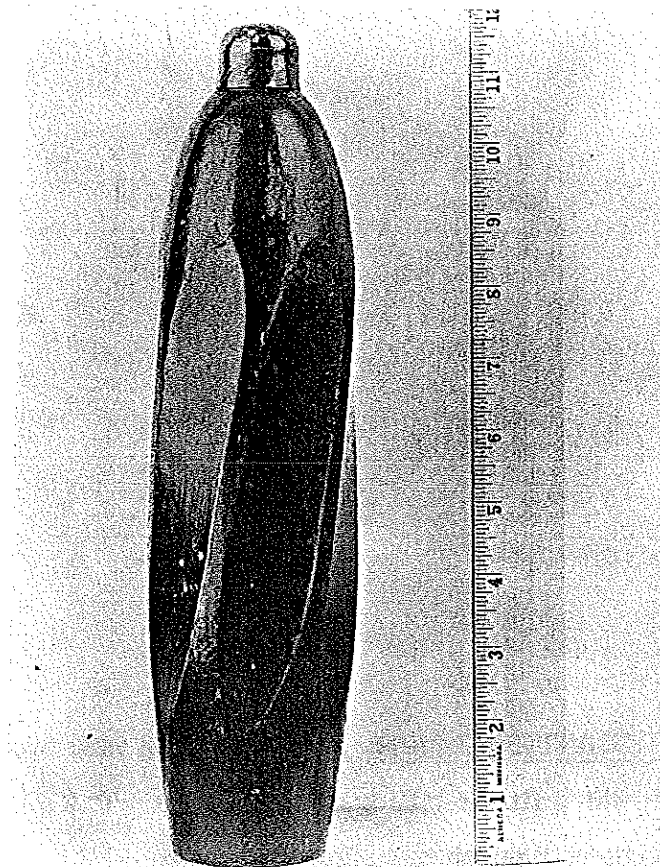
FUZE: Time (percussion is also said to exist).

FILLER: Black powder bursting charge.

SIZES: Only one noted has a diameter of 3.5 inches.

REMARKS: Seldom encountered in field recoveries. Sometimes referred to as the Blakely projectile, although this designation has not been proved. Both English made and Confederate types are said to exist.

TYPE: ENGLISH WHITWORTH SHELL



IDENTIFICATION: Elongated construction with a multi-flat-sided projectile body.

FUZE: Brass adapter (also copper) for time fuze and English percussion have been noted.

FILLER: Black powder bursting charge (shell).

SIZES: Vary from 1.5-inch to 5-inch caliber.

REMARKS: Issued in solid shot (bolt) and shell, the 12 Pdr (caliber 2.71 inch) is illustrated. Used primarily by the Confederates although some were used by the Federals. Both English and Confederate made projectiles have been noted.

PART 3

MISCELLANEOUS

TYPE: CANISTER



IDENTIFICATION: Solid lead or iron balls normally contained in a sheet-metal container. Construction of Civil War Canister projectiles is much the same as present artillery canister ammunition.

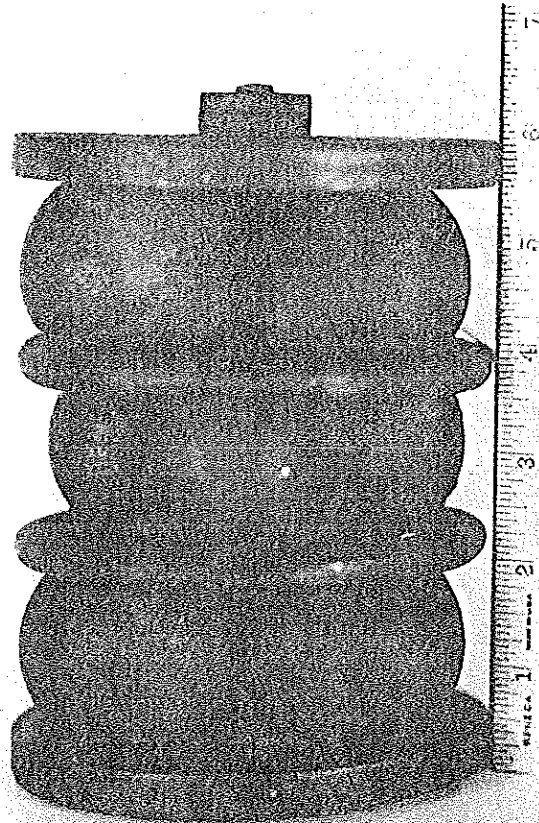
FUZE: None

FILLER: Normally sawdust and lead or iron balls.

SIZES: Made in most field and siege gun sizes.

REMARKS: Made for both rifled and smooth bore weapons. Issued by both Federal and Confederate Ordnance Departments. Round illustrated is for the 12 Pdr smooth bore and is of Federal manufacture.

TYPE: GRAPE SHOT



IDENTIFICATION: Metal stand holding a number of smaller solid balls.

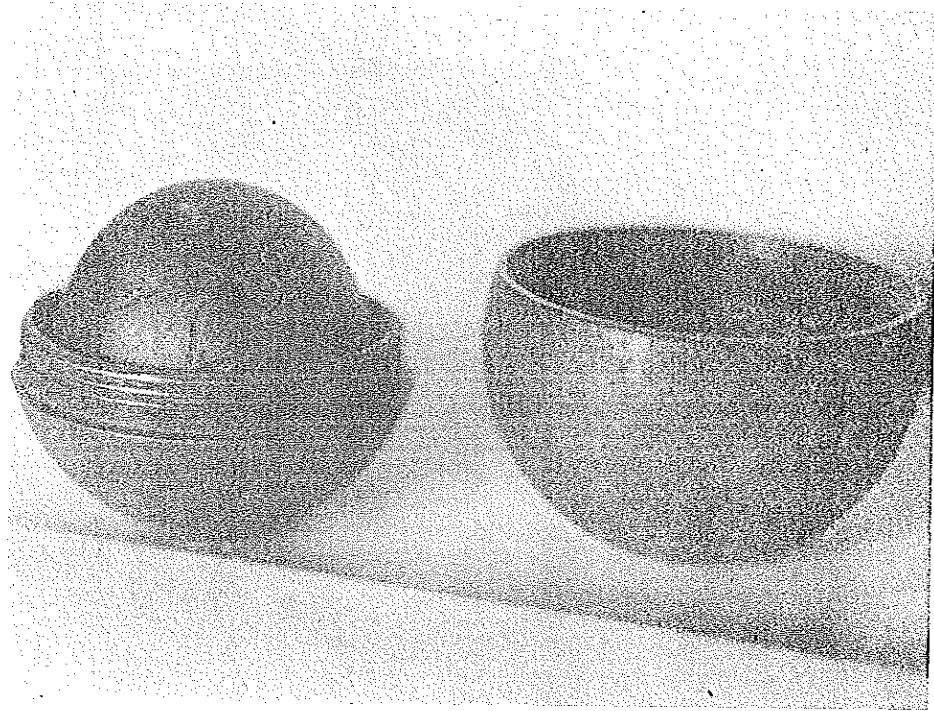
FUZE: None

FILLER: None

SIZES: Vary from 4.5-inch (12 Pdr) to 8-inch caliber.

REMARKS: In field caliber sizes used very infrequently during the Civil War. Stand of Grape Shot is completely inert and was normally fired from smooth bore weapons. Size illustrated is for 12 Pdr smooth bore. One Confederate type was constructed with a wood post surrounded by balls held to this center post by a cloth cover tied with wire.

TYPE: U.S. HANES GRENADE



IDENTIFICATION: Outer and inner case construction with break in outer body when assembled. Inner container fitted with percussion caps and nipples and contains the bursting charge.

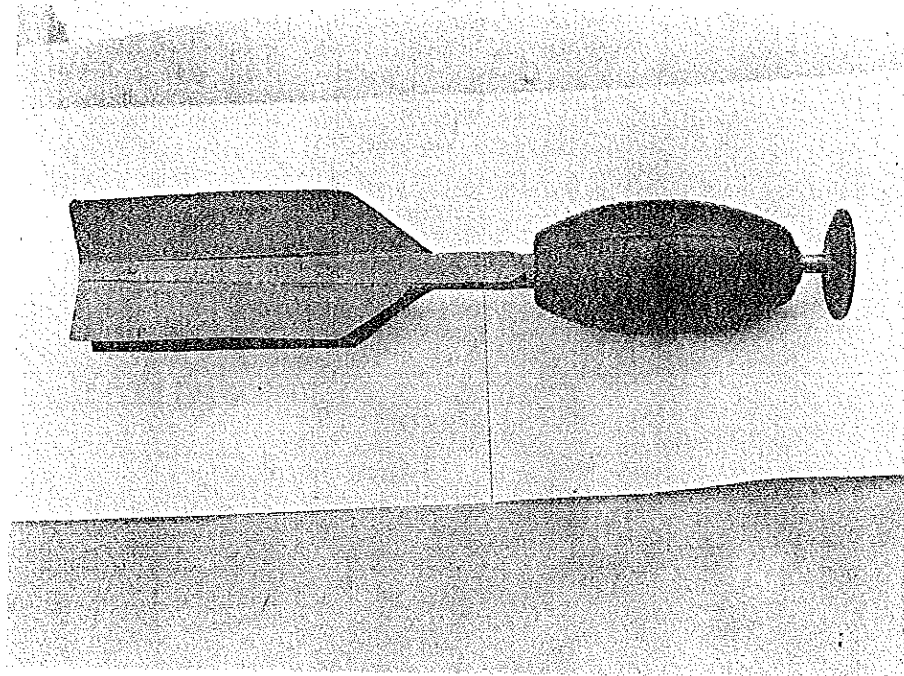
FUZE: Impact (from 14 to 16 nipples on inner case).

FILLER: Black powder bursting charge contained in inner case.

SIZES: Only one has been noted with outer case diameter of 3-5/8 inches and inner case diameter of 2-5/8 inches.

REMARKS: Also called the "Excelsior" or Haynes Grenade. This item is rarely encountered today, and its use in combat during the Civil War is questionable.

TYPE: U.S. KETCHUM GRENADE



IDENTIFICATION: Dart shape with iron body and wood and cardboard tail assembly.

FUZE: Percussion

FILLER: Black powder bursting charge.

SIZES: 1 Pdr (body diameter 1-5/8 inches), 3 Pdr (body diameter 2-7/16 inches), and the 5 Pdr (body diameter 2-15/16 inches).

REMARKS: Probably the most common Civil War hand grenade which was actually used in combat. The patent date, August 20, 1861, is usually found marked on one of the cardboard fins. Another U.S. Grenade was the Adam's, which was constructed from a modified smooth bore projectile (usually a 6 Pdr), and fitted with a pull friction ignited fuze actuated upon throwing.

TYPE: CONFEDERATE TORPEDO (LAND MINE)



IDENTIFICATION: Spherical shape with large brass fuze and filler plug.

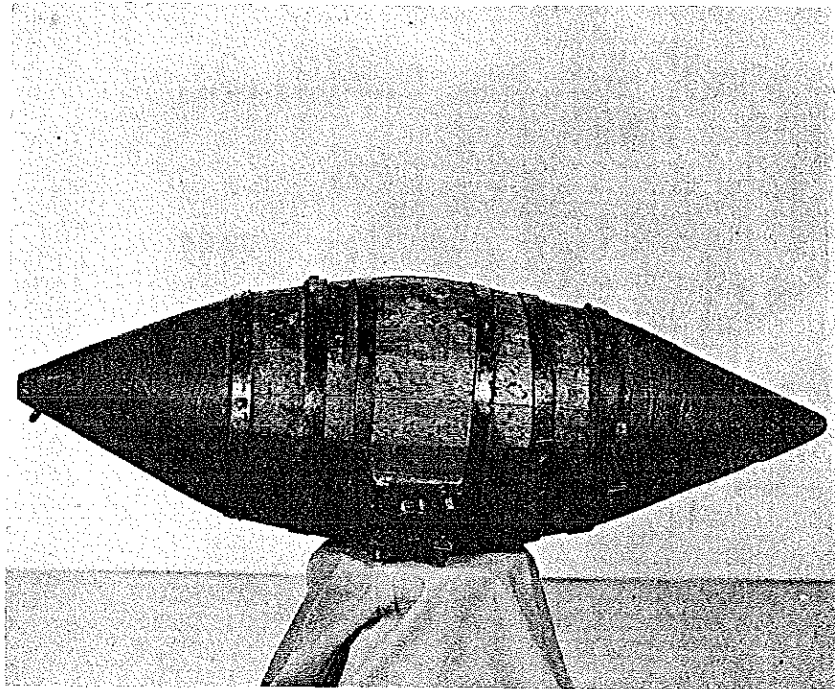
FUZE: Pressure actuated.

FILLER: Black powder bursting charge.

SIZES: Converted 24 Pdr, 32 Pdr, and 10-inch Shells have been noted.

REMARKS: Made from converted smooth bore artillery projectile (shell) fitted with special pressure fuze and filler plug. A similar fuze is also said to be used on a Confederate underwater torpedo (mine).

TYPE: CONFEDERATE TORPEDO (UNDERWATER MINE)



IDENTIFICATION: Large wood body fitted with metal fuze pockets.

This was the floating and moored type fitted with contact fuzes.

FUZE: Contact chemical (same general type as used on Confederate Land Mine, see page 32) and Percussion have been noted.

FILLER: Black Powder

SIZES: Only the size above has been noted which measures 42 inches long, 14 inches in diameter and contains approximately 65 pounds of black powder.

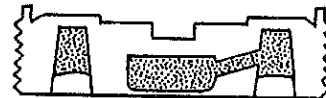
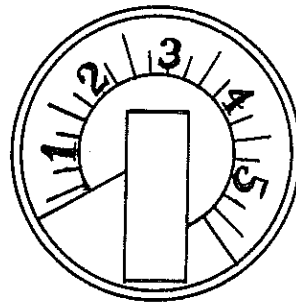
REMARKS: The Confederates made great use of Mines during the Civil-War and the one illustrated is one of the many types they issued. These included floating, both moored and free, and fixed contact types. Some were electrically initiated as controlled mines.

PART 4

FUZES

FUZE TYPE: BORMANN TIME

Top



IDENTIFICATION: Lead alloy body with numbered time graduations. Fuze is normally used with smooth bore ordnance.

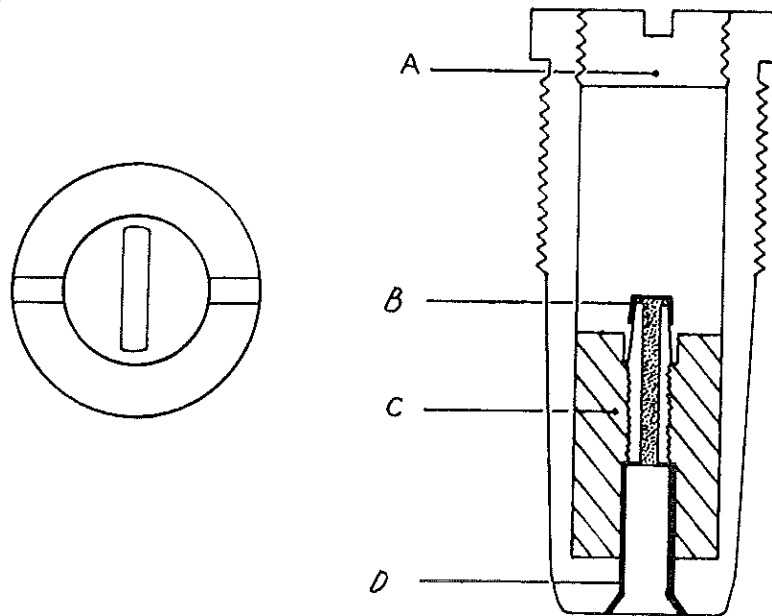
DIAMETER: 1-5/8 inches.

LENGTH: Fuze is approximately 7/16-inches thick.

OPERATION: Prior to use, top of fuze case (over powder ring) is cut or pierced at desired time setting. Upon firing, propellant gases enter this cut and start black powder burning around time ring; after preset time, powder burns into central booster charge which in turn transmits the flame to the main charge.

REMARKS: One of the most popular smooth bore projectile fuzes in use during the Civil War. Used both by the Federals and Confederates. Later in the war the Confederates replaced the Bormann with the paper time fuze fitted into their copper fuze adapter.

FUZE TYPE: U. S. Absterdam Percussion



IDENTIFICATION: Body is made from a zinc casting. Fuze is usually encountered without markings. In outer configuration this fuze is similar to the Hotchkiss Percussion.

DIAMETER: 1-3/16 inches (top)

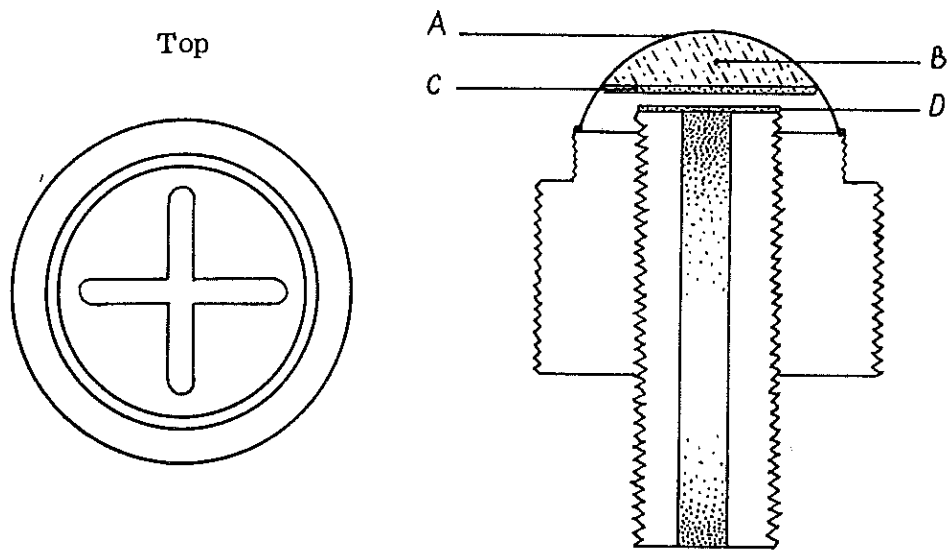
LENGTH: 2-11/16 inches (overall)

OPERATION: Upon firing, the weight (C) remains to the rear due to setback; upon impact with the target, impact inertia breaks the hollow lead retainer (D), and the weight (C) with percussion cap (B) attached moves forward striking the cap (B) against the plug (A).

This fires the cap which flashes through the weight and rear of the fuze into the bursting charge. During storage and shipment the only safety device is the lead retainer which holds the weight to the rear.

REMARKS: This fuze is seldom encountered in actual field recoveries. It has been found in both Absterdam and Parrott rifled projectiles.

FUZE TYPE: CONFEDERATE LAND MINE FUZE



IDENTIFICATION: Large brass fuze body covered on top with brass or copper alloy foil cover.

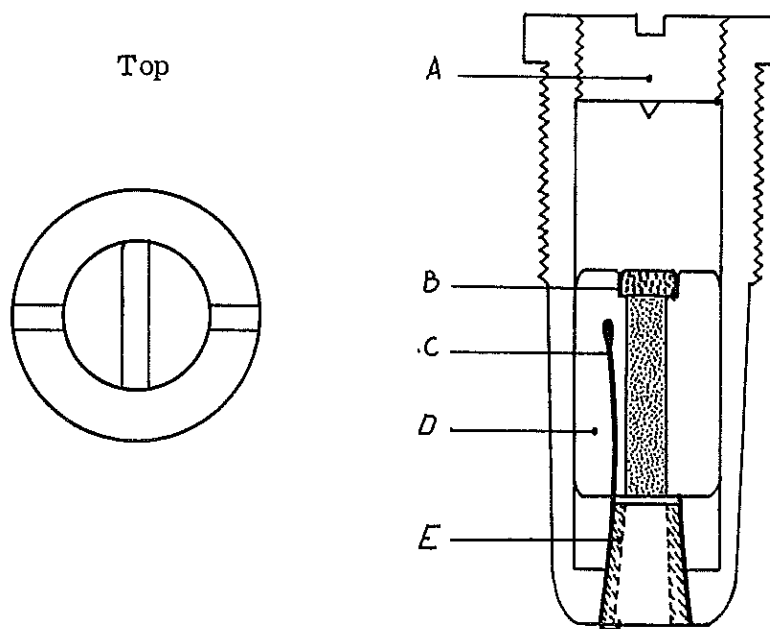
DIAMETER: 1-3/4 inches (maximum).

LENGTH: Approximately 2-1/4 inches (overall).

OPERATION: Pressure applied on top of foil cover (A) will crush cover and force top wood piece (B) fitted with chemically saturated paper (C) down onto bottom piece also fitted with saturated paper (D). Chemical reaction of two joined pieces of paper will cause flame which is transmitted to bursting charge through channel in rear fitting. Bottom piece is threaded and apparently is used to adjust sensitivity to pressure.

REMARKS: No written reference has been found describing this item; all information comes from disassembled field recoveries.

FUZE TYPE: U.S. HOTCHKISS PERCUSSION



IDENTIFICATION: Brass body, normally found without markings. Otherwise very similar in appearance to Schenkl percussion fuze. Normally found in the Hotchkiss shell.

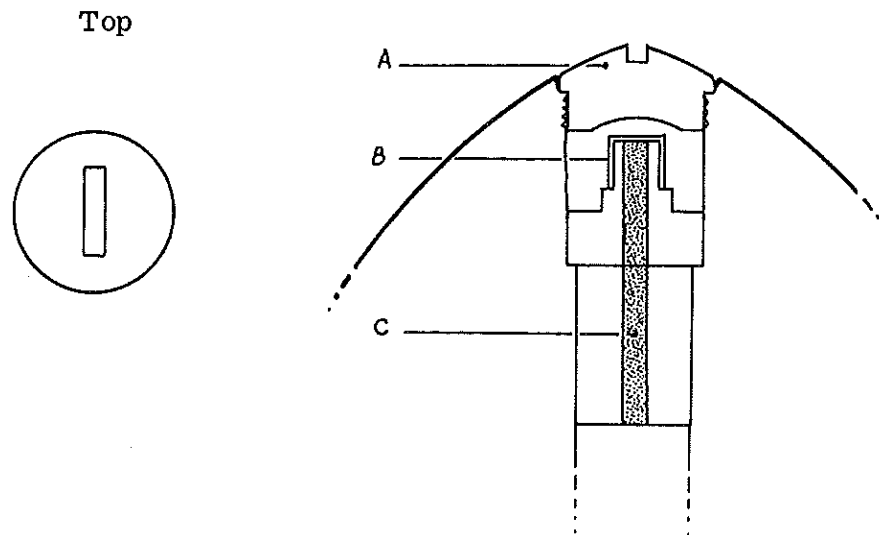
DIAMETER: 1-1/4 inches (top).

LENGTH: Approximately 2-3/8 inches (overall).

OPERATION: Prior to use, wire (C) holds plunger (D) inside of fuze body (wire is in turn anchored to a lead safety plug); upon firing, the lead safety plug (E) moves to the rear into the projectile freeing the plunger (D). Upon impact with the target the force of impact drives the plunger with percussion cap (B) attached forward and strikes the plug (A), firing cap (B).

REMARKS: The Hotchkiss fuze is very similar in construction to the Absterdam percussion fuze, which is rarely encountered.

FUZE TYPE: U.S. JAMES PERCUSSION



IDENTIFICATION: Brass or iron threaded cap with screwdriver slot on tip. Fuze is used in the James projectile.

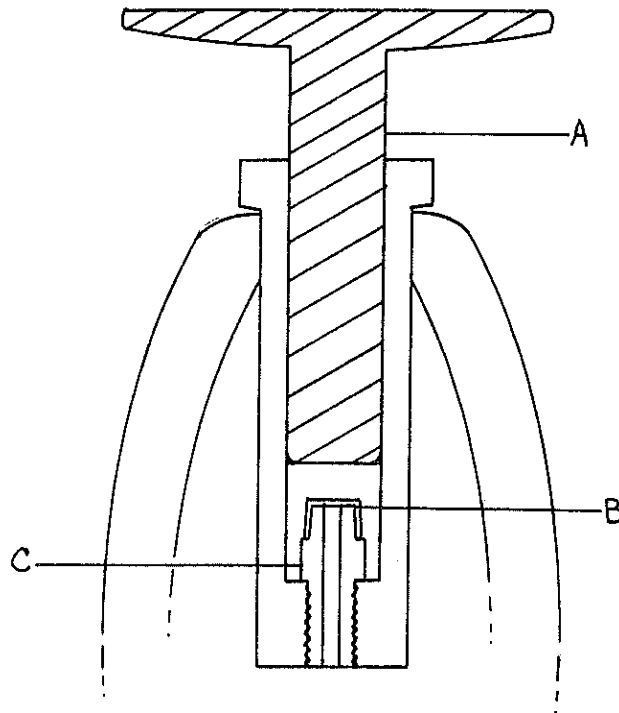
DIAMETER: 13/16 inch (top).

LENGTH: Vary

OPERATION: Upon impact with the target, the nose cap (A) crushes, or the force of impact inertia carries the cap and nipple assembly forward firing the percussion cap (B) which transmits the flame through the black powder filled nipple and rear fitting (C) to the bursting charge in the shell.

REMARKS: Fuze is also found in a modified form in the early Hotchkiss projectile. This type of fuze is probably a copy of the Bourbon Percussion Fuze which was invented well before the Civil War. In a slightly modified form this fuze has also been found in Confederate field artillery projectiles.

FUZE TYPE: U.S. KETCHUM GRENADE FUZE



IDENTIFICATION: Large mushroom type striker head inserted into nose of grenade body.

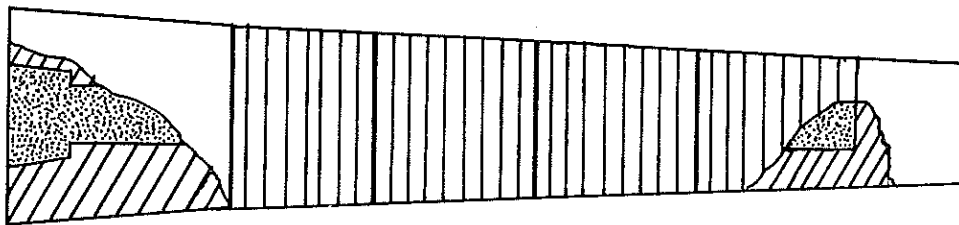
DIAMETER: 2 inches (head)

LENGTH: Vary

OPERATION: Prior to use, plunger (complete with mushroom head) is partially inserted into fuze cavity in nose of grenade body (plunger is held in cavity by protruding leaf). Grenade is thrown, and, upon impact with target, plunger (A) is driven down against percussion cap (B) mounted on nipple (C) in the bottom of fuze cavity, the resulting flash igniting bursting charge.

REMARKS: Fuze is used in the Ketchum hand grenade.

FUZE TYPE: MORTAR TIME



IDENTIFICATION: Wood case with powder train time element through center of case.

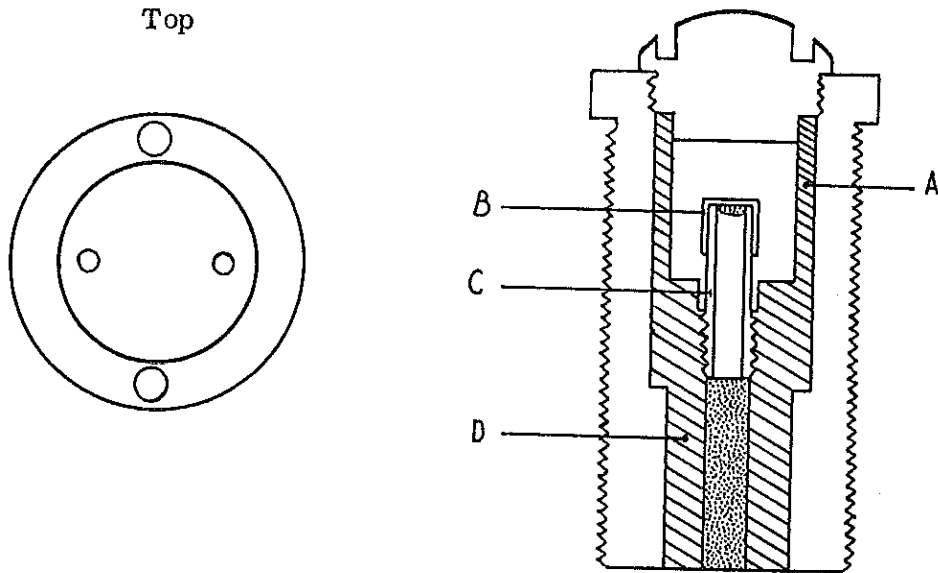
DIAMETER: Vary

LENGTH: Vary

OPERATION: Prior to use, fuze is cut to desired burning time and driven into smooth bore mortar projectile fuze cavity. Upon firing, propellant gases ignite end of time fuze, starting time action for airburst functioning.

REMARKS: Wood fuze case is normally graduated on outside for indication of burning time. Wood case time fuzes were also used on other types of rounds, including field and siege smooth bore and rifled bore projectiles. Used by both the Federals and Confederates during the Civil War.

FUZE TYPE: U.S. PARROTT PERCUSSION (FIRST TYPE)



IDENTIFICATION: Twin spanner holes in top of metallic fuze body with inner plug slightly domed shaped. Due to corrosive action, fuze is rarely found in good condition.

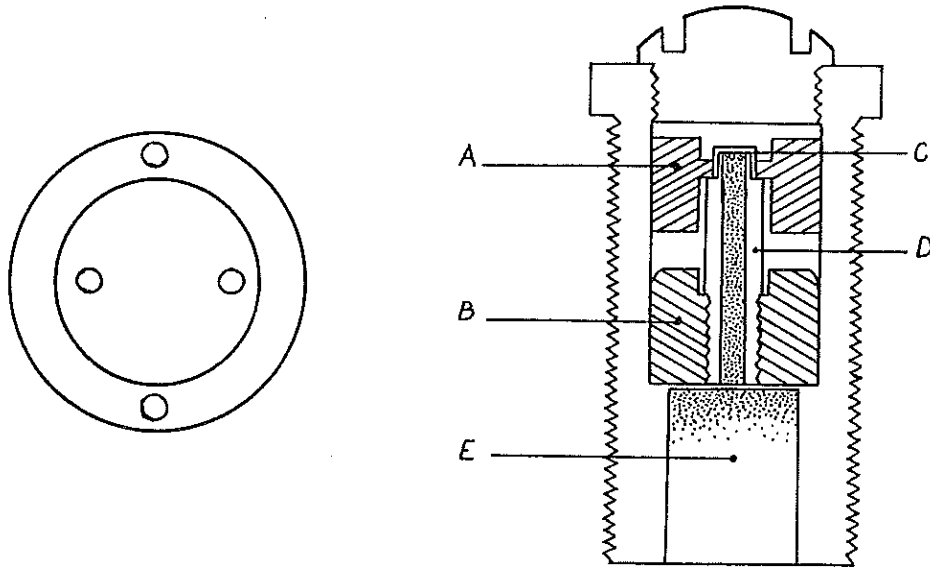
DIAMETER: 1-3/8 inches (top).

LENGTH: 2-5/8 inches (overall).

OPERATION: Upon being fired down the rifled gun tube, the force of setback resulting from angular acceleration causes the two leaves (A) to bend down out of their recesses (leaves are made of thin strips of metal), freeing the plunger assembly (D). Upon impact with the target, the force of impact inertia carries the plunger forward, thus crushing the percussion cap (B) against the forward fuze cap. The resulting flash is transmitted through the nipple (C) to the bursting charge.

REMARKS: This is the original patent type.

FUZE TYPE: U.S. PARROTT PERCUSSION (SECOND TYPE)



IDENTIFICATION: Same recognition features as the early Parrott Percussion fuze. (see page 37)

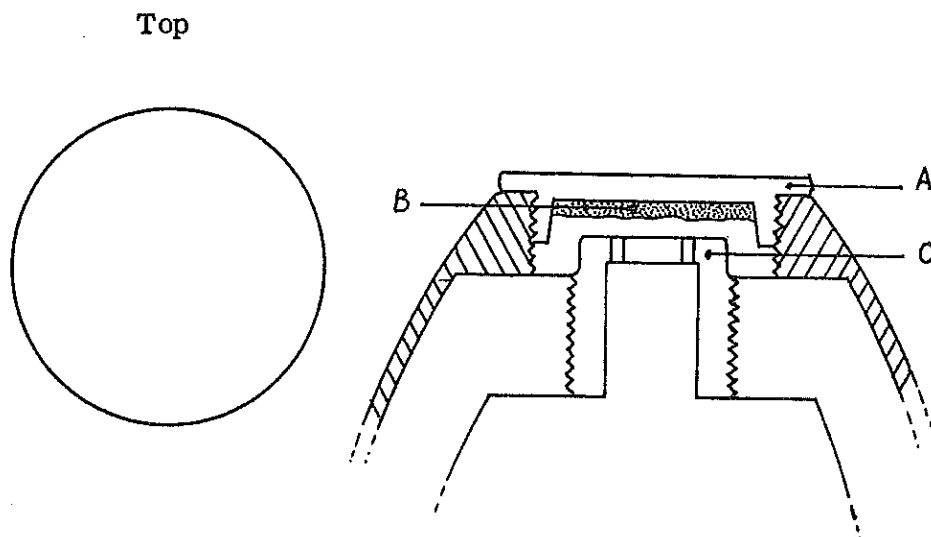
DIAMETER: 1-3/8 inches (top).

LENGTH: 2-5/8 inches (overall).

OPERATION: Two projections on a cylinder (A) above the plunger (B & D) hold it in place before firing. Upon impact with the target, the force of inertia carries the plunger forward, breaking the projections (A) and allowing the plunger to pass through the cylinder and crush the percussion cap (C) against the top screw cap. The resulting flash is transmitted through the nipple (D) to the channel in the plunger and from there to the booster (E).

REMARKS: This late type Parrott fuze is the most common and is frequently encountered in field recoveries.

FUZE TYPE: U.S. SAWYER PERCUSSION



IDENTIFICATION: Large diameter brass fuze cover with knurled edge, used in lead-covered Sawyer projectile.

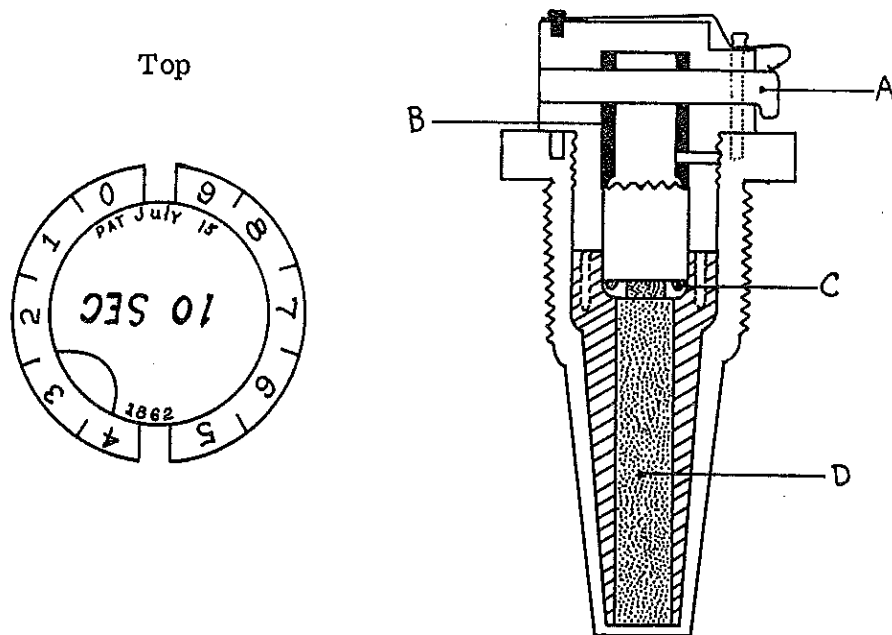
DIAMETER: Approximately 1-5/8 inches (diameter of top cap).

LENGTH: Unknown

OPERATION: Inside of top fuze cover (A) is loaded with layer of fulminate (B). Upon impact with target, fuze cover is crushed over post (C) which causes fulminate to flash through holes in post, causing ignition of bursting charge.

REMARKS: Fuze is used on Sawyer projectile.

FUZE TYPE: U.S. SCHENKL COMBINATION



IDENTIFICATION: Metallic fuze body marked with time graduations and patent date.

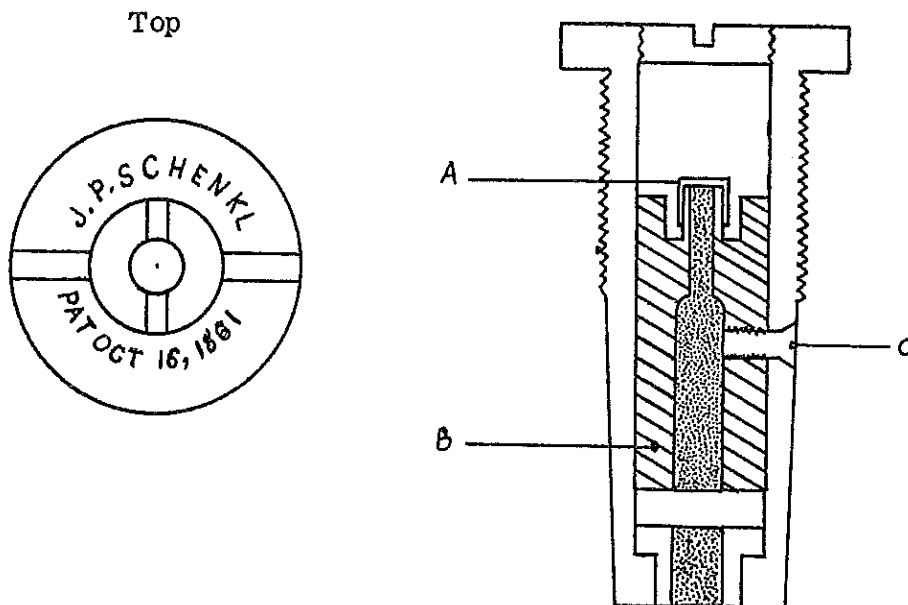
DIAMETER: 1-5/8 inches (maximum).

LENGTH: 2-13/16 inches (overall).

OPERATION: Safety pin (A) is removed prior to use. Upon firing, the plunger (B) moves to the rear (shearing the shear wire) and fires the percussion cap (C) igniting the time composition (D). Turning the top cap varies the time of functioning by aligning a series of holes with the internal time element. If the projectile should hit a target prior to fuze setting time, the internal fuze parts will normally rotate or rupture, transmitting the flame of the burning time element to the bursting charge.

REMARKS: Fuze designed to be used in the Schenkl projectile.

FUZE TYPE: U.S. SCHENKL PERCUSSION



IDENTIFICATION: Large brass body, normally stamped with Schenkl patent date.

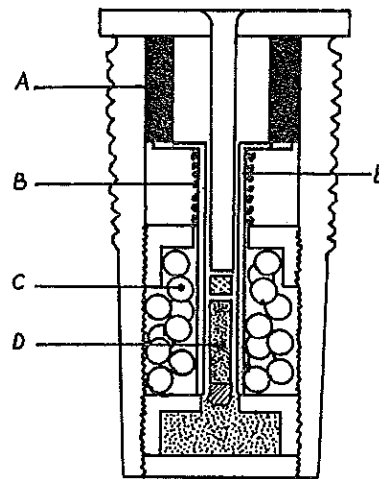
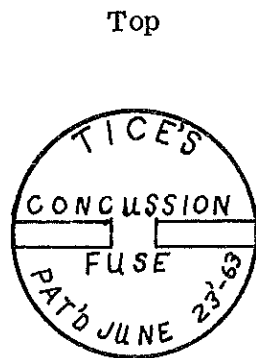
DIAMETER: 1-1/4 inches (top).

LENGTH: Approximately 2-1/2 inches (overall).

OPERATION: Upon firing, the force of setback drives the plunger (B) to the rear, breaking the shear screw (C). Upon impact with the target, the force of impact inertia drives the plunger forward, crushing the percussion cap (A) against top of fuze, firing the cap, which flashes through plunger and bottom of fuze body, igniting bursting charge.

REMARKS: For rifled projectiles, usually found in the Schenkl case shot or shell. Various sizes of Schenkl fuzes have been noted in addition to the size listed.

FUZE TYPE: U.S. TICE CONCUSSION



IDENTIFICATION: Brass fuze body marked on top with Tice patent date.

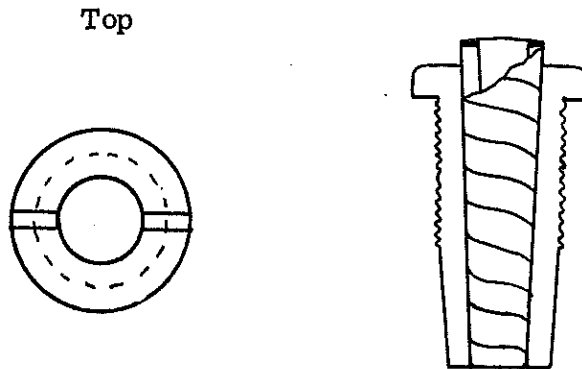
DIAMETER: 1-5/16 inches (top).

LENGTH: 2-15/16 inches (overall).

OPERATION: Upon firing, the set back collar (A) moves to the rear bending the top of the safety tube (E) back; upon leaving the weapon, the safety tube spring (B) forces the safety tube forward, exposing a glass vial of fulminate (D) to the lead pellets (C). When impact with the target occurs, the lead pellets crush the glass vial, causing the fulminate to flash through to the bursting charge.

REMARKS: Fuze has been recovered in both smooth bore and rifled bore projectiles. The Tice is probably one of the most dangerous Civil War impact fuzes.

FUZE TYPE: TIME



IDENTIFICATION: Brass, copper, or zinc alloy case (adapter) which threads into projectile; case contains black powder time fuze in paper container. Type illustrated is U.S.; Confederate versions were usually made of copper and had two spanner holes in top flange of case.

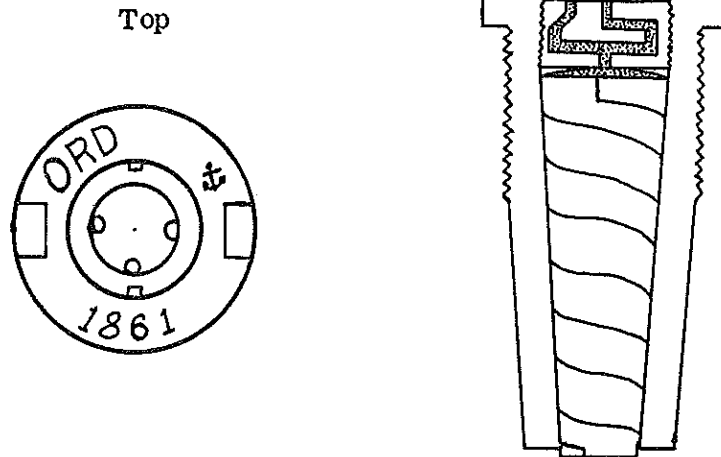
DIAMETER: 1 inch (approximately).

LENGTH: 1-5/8 inches (approximately).

OPERATION: Paper time fuze is precut to desired length prior to firing; upon discharge of weapon, propellant gases ignite end of exposed time fuze, causing projectile to function at preset time

REMARKS: Used in rifled and smooth bore projectiles (especially popular in Hotchkiss Case Shot).

FUZE TYPE: U.S. WATER CAP TIME



IDENTIFICATION: Brass body fitted with inner plug having channels to transmit flame to inner paper time fuze. Top of fuze is frequently marked with date and anchor.

DIAMETER: 1-1/4 inches (top).

LENGTH: 2-7/16 inches (overall).

OPERATION: Consists of a water-tight adapter to hold standard paper time fuze. Upon firing, propellant gases ignite powder in channels of water cap. Flame from the burning powder is transmitted to the internal time fuze; the burning of which, in turn, sets off the main bursting charge. Should the projectile enter the water prior to bursting, water entry into the fuze will be hindered both by the angled channels and also by the gases of the ignited time fuze.

REMARKS: Also found without threads, for use in tapered fuze cavity. Fuze is normally used in smooth bore ordnance, although some have been recovered in rifled projectiles.

