

BARTLESON'S
Illustrated Civil War Ordnance Guide

John D. Bartleson Jr.

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John D. Bartleson III
Piney Flats, Tennessee

Design at 31bBY5.com

JOHN BARTLESON JR. passed away October 16, 2016 from multiple health complications with his adult children and several grandchildren by his side.

More than an acknowledged historian, civil war ordnance collector, author, and illustrator, he was an Eagle Scout, Scout Master, and served a thirty year distinguished career in the U.S. Navy Explosive Ordnance Disposal (EOD) program, rising from the top enlisted rank to retire as Chief Warrant Officer (CWO) 4 with the following distinctions:

- First Navy EOD Officer competitively selected to serve as Exchange Officer to the UK Defense EOD School (1973-75).
- Plank Owner NEOD Training & Evaluation Unit 2, Ft. Story, VA (1980-84)
- Held esteemed title, "Navy EOD Master Blaster" (a distinction reserved for the active duty service person having longest consecutive service time in the Navy's EOD program.)

As a subject matter expert and historian, he is acknowledged in many Civil War Ordnance publications both in the U.S. and the U.K., including some non-fiction books, and has been featured several times in *Artilleryman Magazine*.

In his retirement, he served as the first Navy EOD Historian (eleven years), researching and writing the History of U.S. Navy EOD creation to 1992, also writing several articles for the *Disposaleer*, a publication of the non-profit Naval EOD Association.

On behalf of my sisters, Ann and Pat, and brother Mike, and as his eldest son and fellow retired Air Force EOD Superintendent, we dedicate this guide on behalf of our father, a true renaissance man, so others may benefit from his work and dedicated life of community and public service.

—John D. Bartleson III

Table of Contents

About the Illustrator: John . Bartleson Jr. 1

Glossary 3

Spherical Projectiles 5

Rifled Projectiles 25

Sabots 165

Torpedoes, Rockets, and Assorted Ordnance 179

U.S. Fuzes 189

C.S. Fuzes 253

British Fuzes 273

Patents 340

About the Illustrator

John D. Bartleson Jr., CWO 4, USN (1936–2016)



The 775 digital illustrations of Civil War projectiles and fuzes presented in this field guide were produced by John D. Bartleson Jr. between 2012–2014 from hand drawings and specification plates obtained from multiple sources to include the Royal Laboratories (circa 1865).

These detailed illustrations were produced by John for the intended purpose of providing current and future collectors, historians, students, construction workers, law enforcement, Explosive Ordnance Disposal (EOD) technicians and artillerymen an additional reference to consult to positively identify these relics' using multiple sources. As with the original 1972 "*Civil War Explosive Ordnance 1861–1865*" publication authored by John, this illustrative guide, its publisher, technical writer, and other contributors disclaim any responsibility for the safety of anyone who might attempt hazardous work on explosive ordnance using this document as a guide. The detailed sectional drawings presented are to inform readers of ordnance type-by-function and internal fuze functioning design.

John a.k.a. "Bart" enlisted in the U.S. Navy in 1954 and retired in December 1984 as the outgoing EOD Master Blaster with 27 continuous years service in EOD. Having enlisted in the Navy as a Mineman in 1954 he graduated Underwater Swim School in 1956 before graduating EOD School in 1957. From John's incomplete autobiography we know that his first EOD duty assignment was with EOD Unit 2 in Charleston S.C., where his first EOD operation was performing sub-surface range clearance duties at Saddle Bunch Keys, FL. No doubt this is where John mastered the use of early metal/ordnance detection equipment that would later benefit his lifelong hobby of collecting Civil War Ordnance. His autobiography also states, "... life around the unit was fairly active with local ordnance pick-ups consisting mainly of Civil War projectiles." Thus his initial research was not only of a personal nature but as a matter of survival at a time when there were few to no publications available for EOD technicians on Civil War Ordnance. During John's distinguished thirty-year naval career he also served:

- EOD Technical Center, Indian Head, MD. (1960–1963)*
- EOD Unit 2, Charleston S.C. (1964–1967)
- EOD Exchange Officer to Defense EOD School, UK (1973–1975)
- Assistant Training Officer, Naval EOD School (1975–1978)
- Training Officer, Command EOD Group Two (1978–1980)
- EOD Training & Evaluation Unit 2, Ft. Story VA. (1980–1984)

Following his retirement John voluntarily served as the Naval EOD Historian (1984–1994). In this capacity he published the "*History* [creation] *of U.S. Navy Bomb Disposal* [EOD]," in 1992 and the "*History of U.S. Navy Mine Disposal*" in 1995. His digital illustrations have been featured in the *Artilleryman Magazine* and with permission by fellow authors of other Civil War Ordnance publications. Before his passing John was a regular contributor to several websites including bulletandshell.com and artillerymanmagazine.com.

John is survived by his children Ann, Pat, John III, Mike, and Lori as well as many family members. John's friend, Jack W. Melton, as well as Tom Crawford and Chuck Veit, have graciously contributed their time and many talents producing this publication so that future generations may benefit from John's experience and many hours of meticulous drawing that reveal details that might otherwise be unobserved.

*Years not specifically mentioned reflect duty time aboard surface vessels.

Glossary

Anvil *(abutting plug, safety cap, cover)*
That portion of a percussion fuze that provides forward closure of the fuze and a hard surface for the percussion cap to strike.

Cap *(top hat)*
A musket percussion cap used in artillery percussion fuzes and containing fulminate of mercury comparable in intensity to a modern shot gun primer.

Case Shot
A projectile with thin walls, containing lead or iron balls cast in a matrix of sulphur or pitch, and having a small black powder bursting charge, centrally located.

Combination Fuze
A combination fuze functions by either impact with the target or by time giving an aerial burst. The time element will be initiated at discharge from the gun.

Concussion Fuze
A concussion fuze functions by shock of gun discharge or by the shock of impact. Applicable to spherical projectiles.

Nipple
A mounting teat for the percussion cap. Usually screwed or molded into the striker.

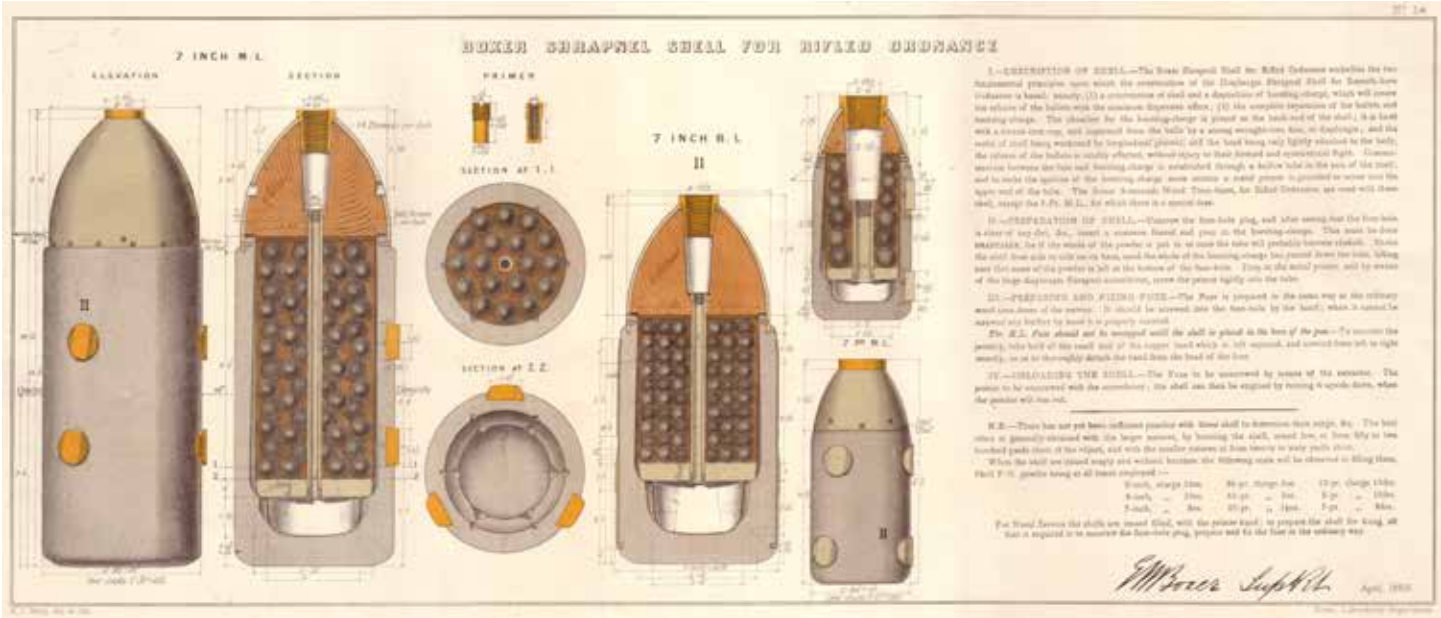
Percussion Fuze
A percussion fuze functions by the striking of some particular point of the projectile, normally' the nose, against an object, as in rifled projectiles.

Shell
A projectile with medium to thick wall construction and filled with black powder. Did not contain fragments as in the case shot.

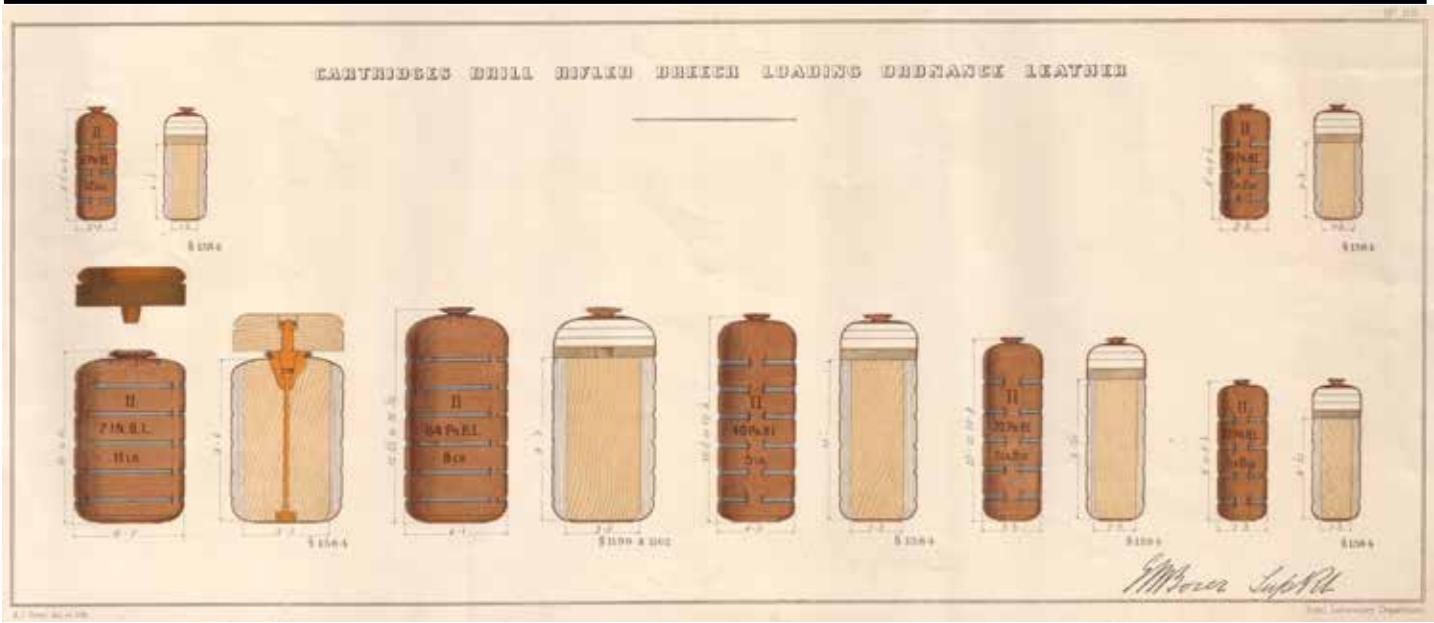
Sabot *(rotating band, obturator)*
A band of material which engages rifling of gun tube and imparts rotation to the projectile and provides obturation for the propellant gases. Can be found made of lead, copper, brass, soft iron, papier-mâché, tin and greased canvas combination, or even greased rope.

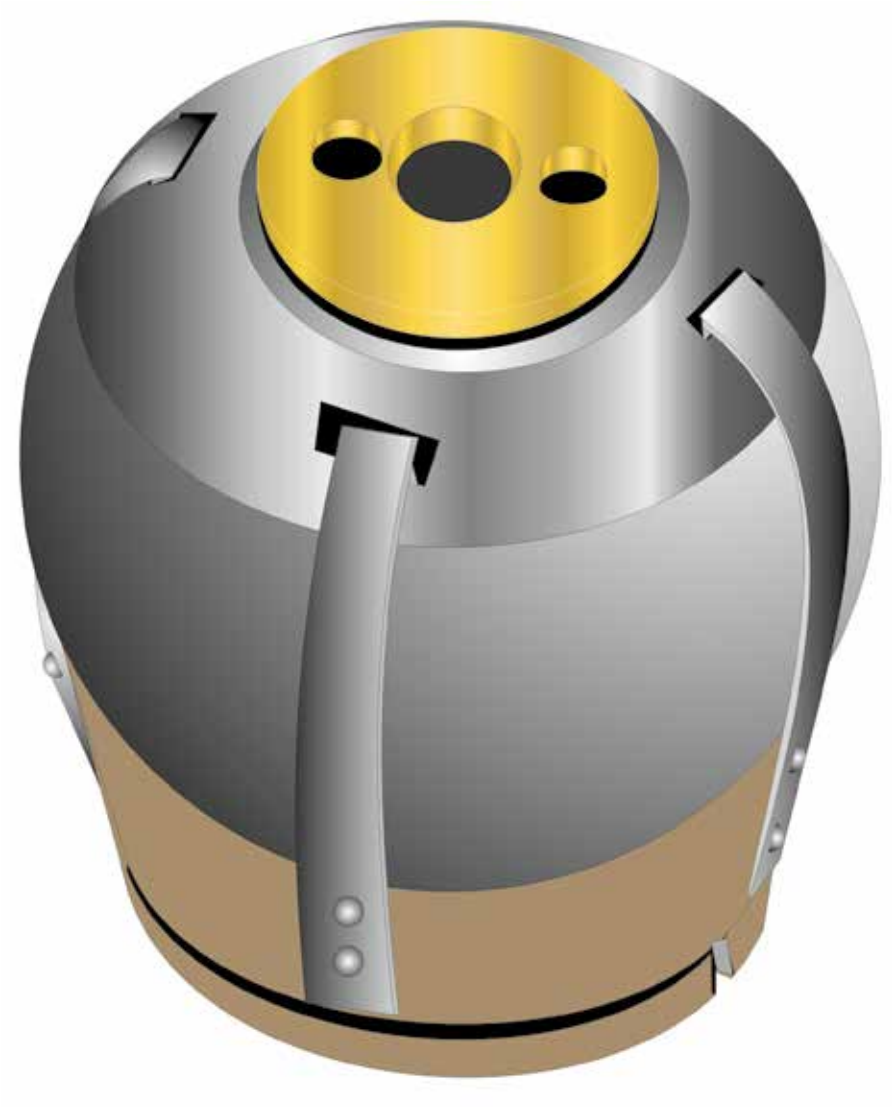
Striker *(nipple carrier, plunger)*
The movable weight found in percussion fuzes that utilizes the force of impact inertia to strike the percussion cap against the anvil. Usually made of steel, lead, or lead with a brass jacket. The striker contains a minute amount of rifle powder to communicate the flash from the percussion cap to the main filler of the projectile.

Solid Shot
A smoothbore or rifled projectile cast of solid steel and containing no explosives.

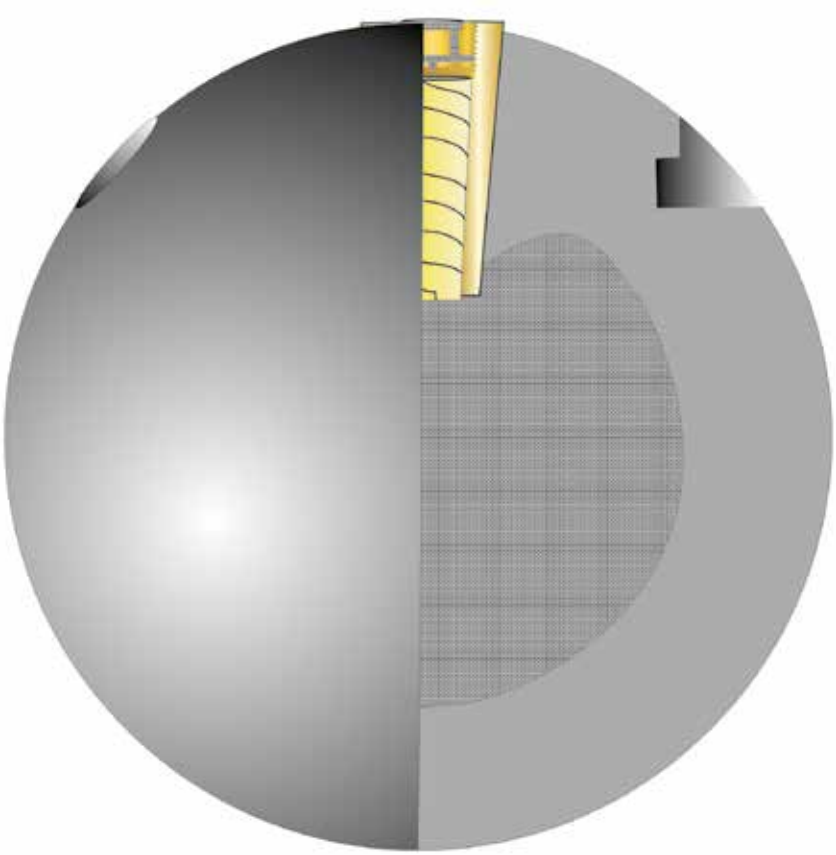


Spherical Projectiles

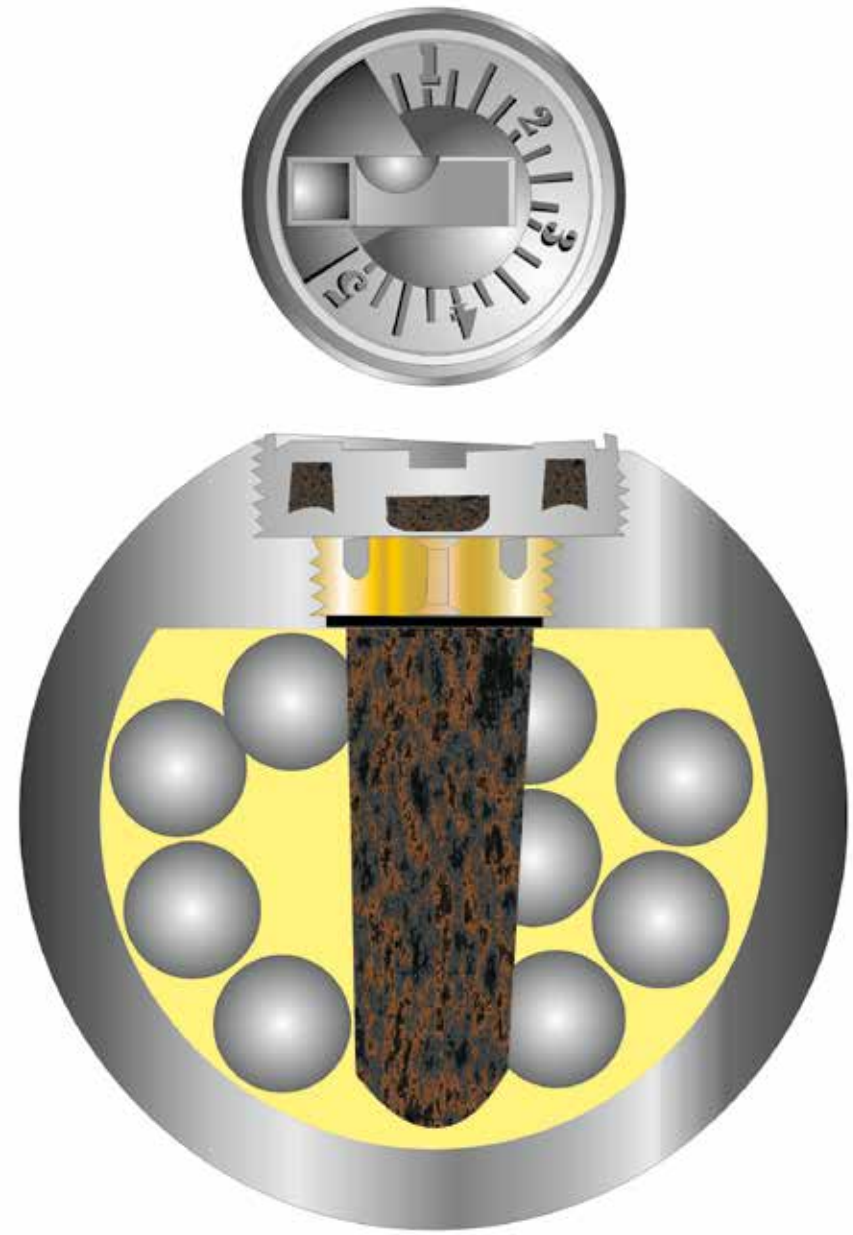




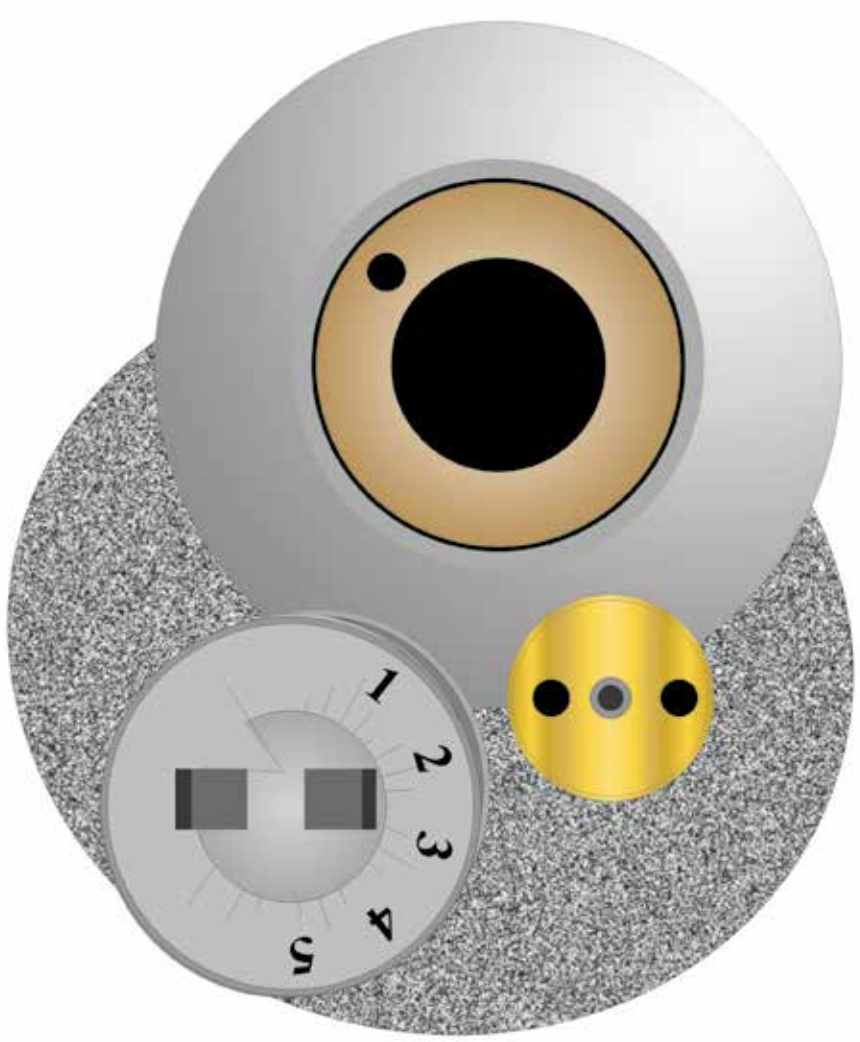
12 pdr Spherical Shell on Sabot,
powder time fuze adapter



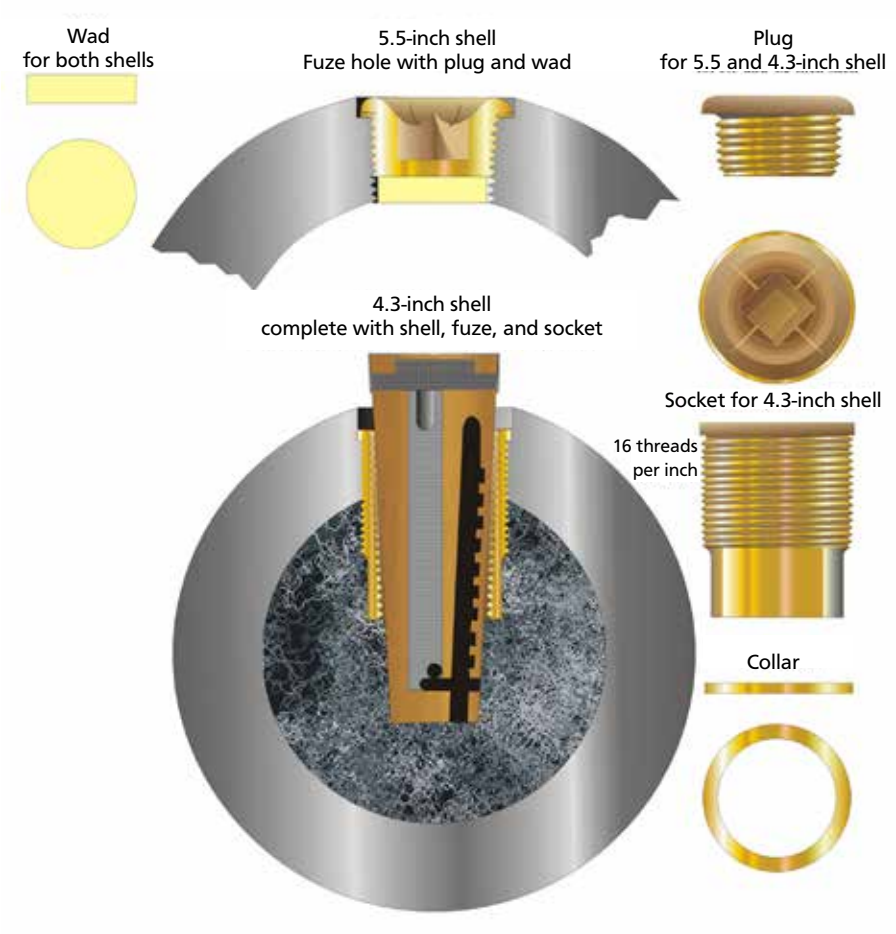
U.S. 8-inch Mortar Shell,
Alger Seacoast, water cap time fuze adapter



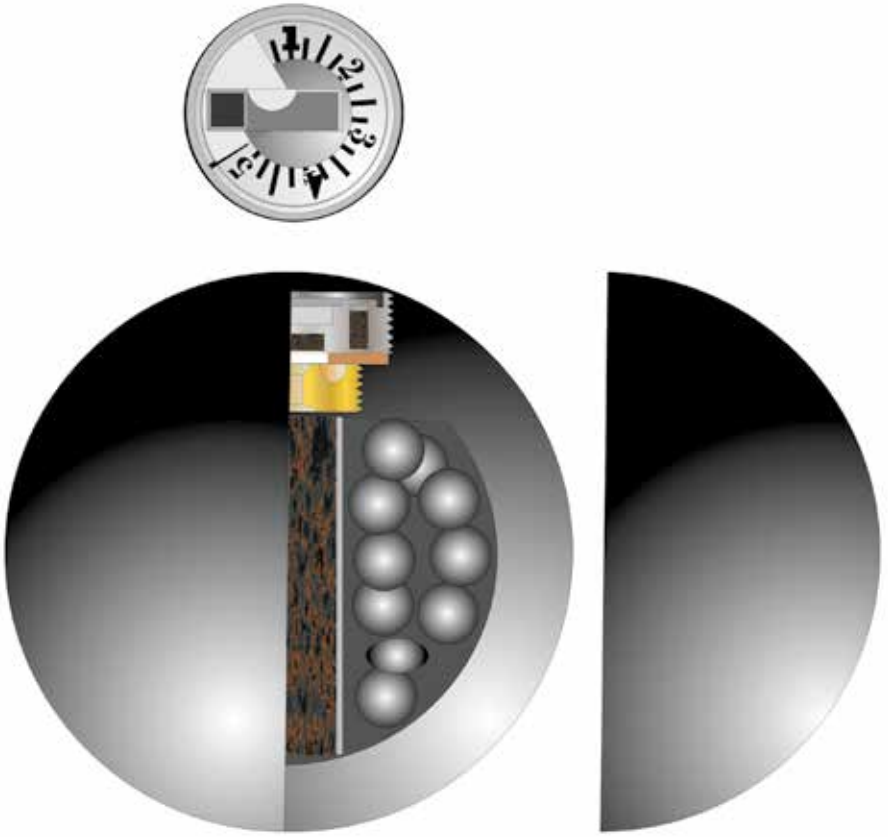
**3.58-inch (6 pdr) Case shot,
Bormann time fuze**



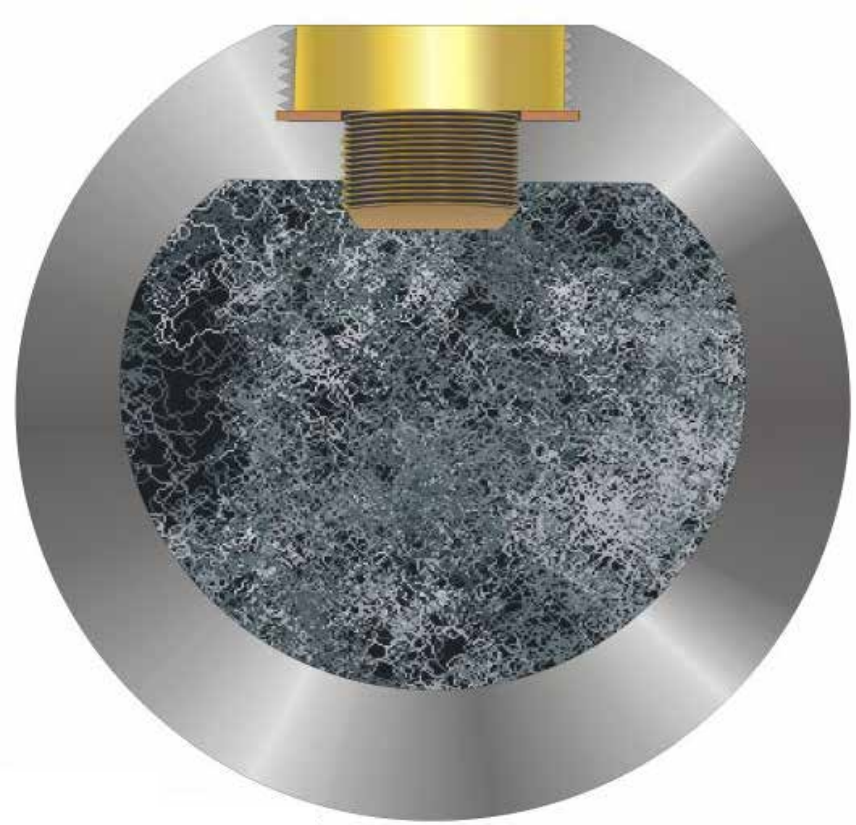
**6 pdr Spherical case shot,
Bormann fuzed**



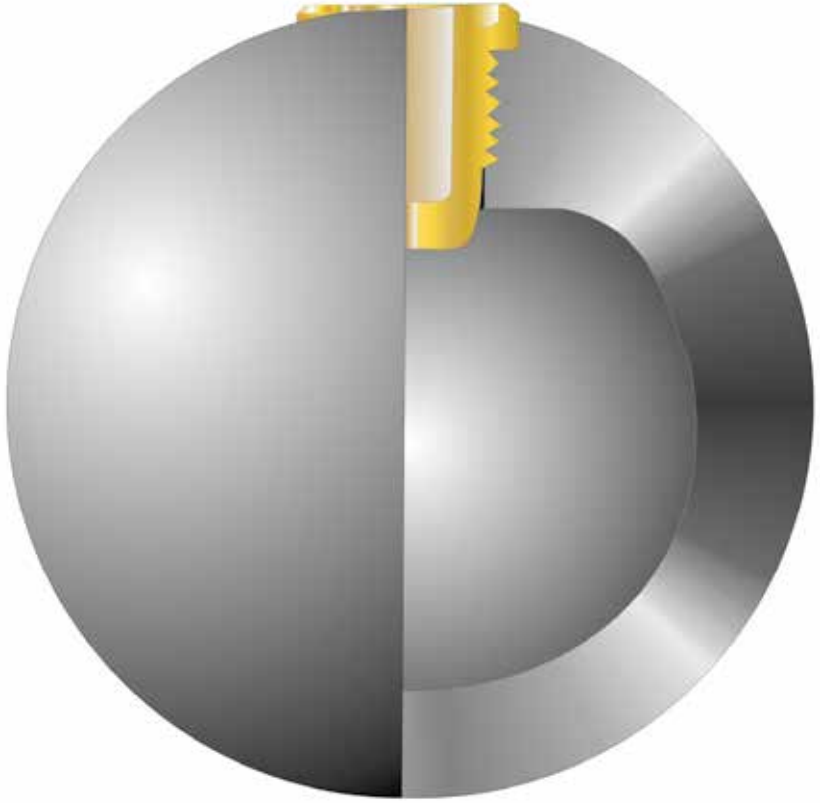
4.25-inch British mortar shell



12 pdr Spherical case shot,
tin tube burster



C.S. 12 pdr with
substitute Bormann fuze



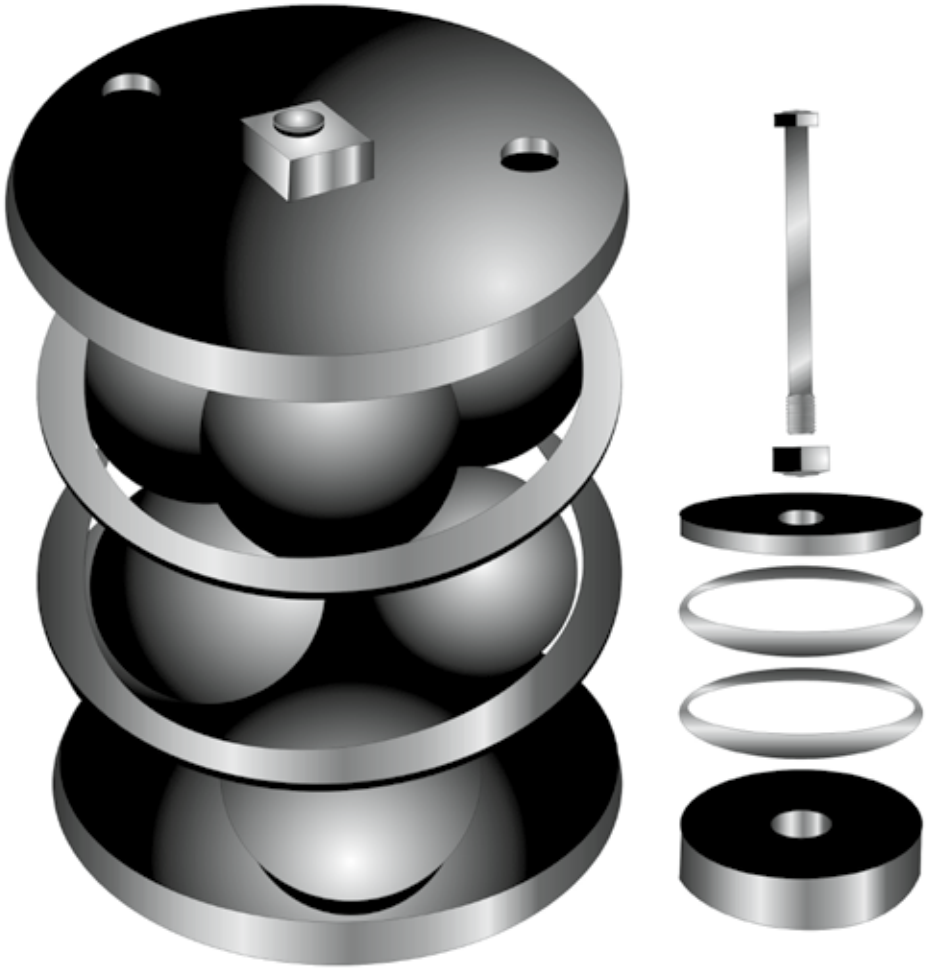
C.S. 12 pdr shell,
time fuzed



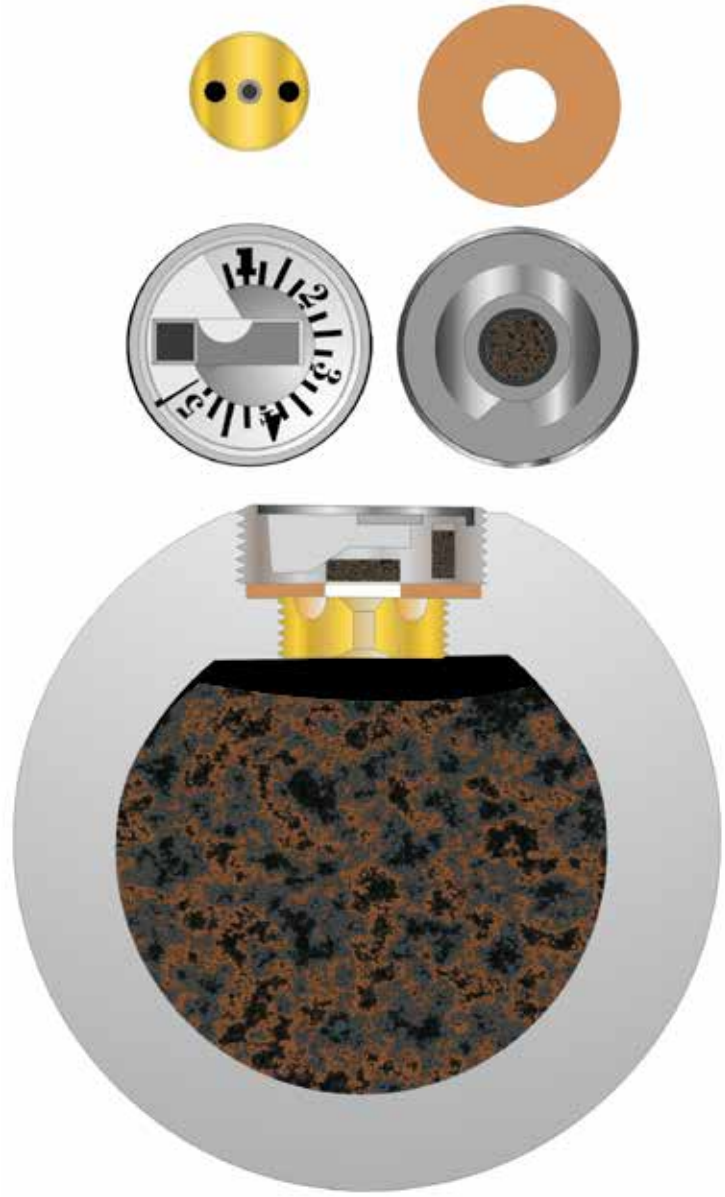




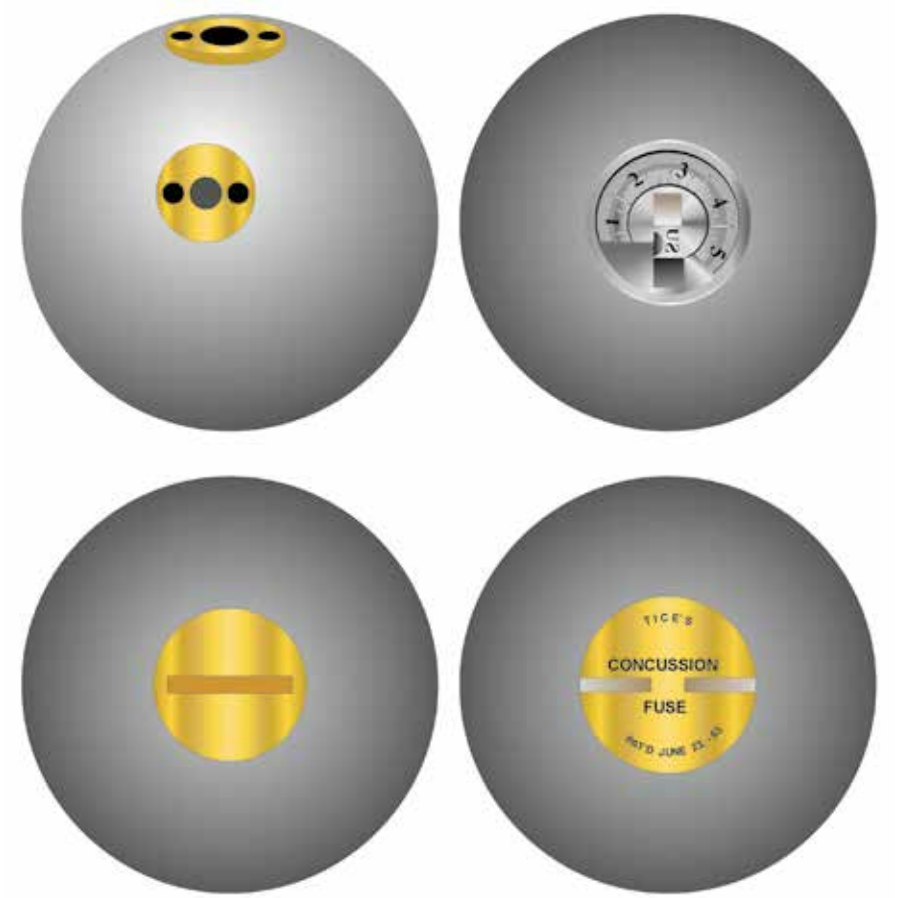
**12 pdr Spherical shell on sabot,
powder time fuze adapter**



12 pdr Stand of grape



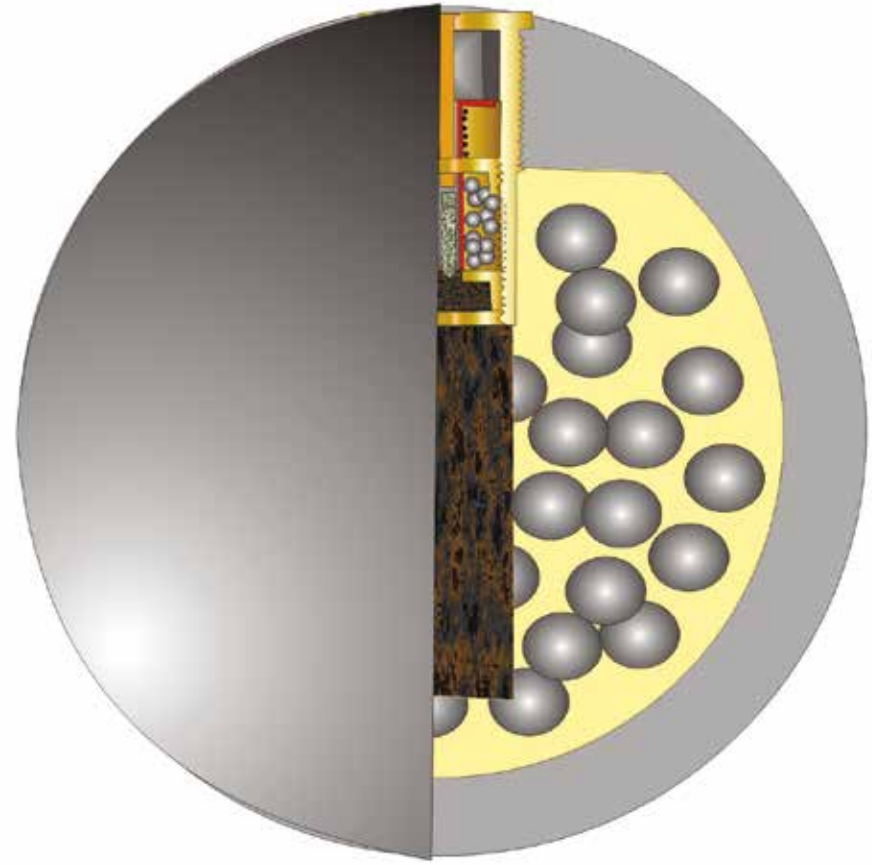
C.S. 12 pd12 pdr Spherical shell,
Bormann time fuze



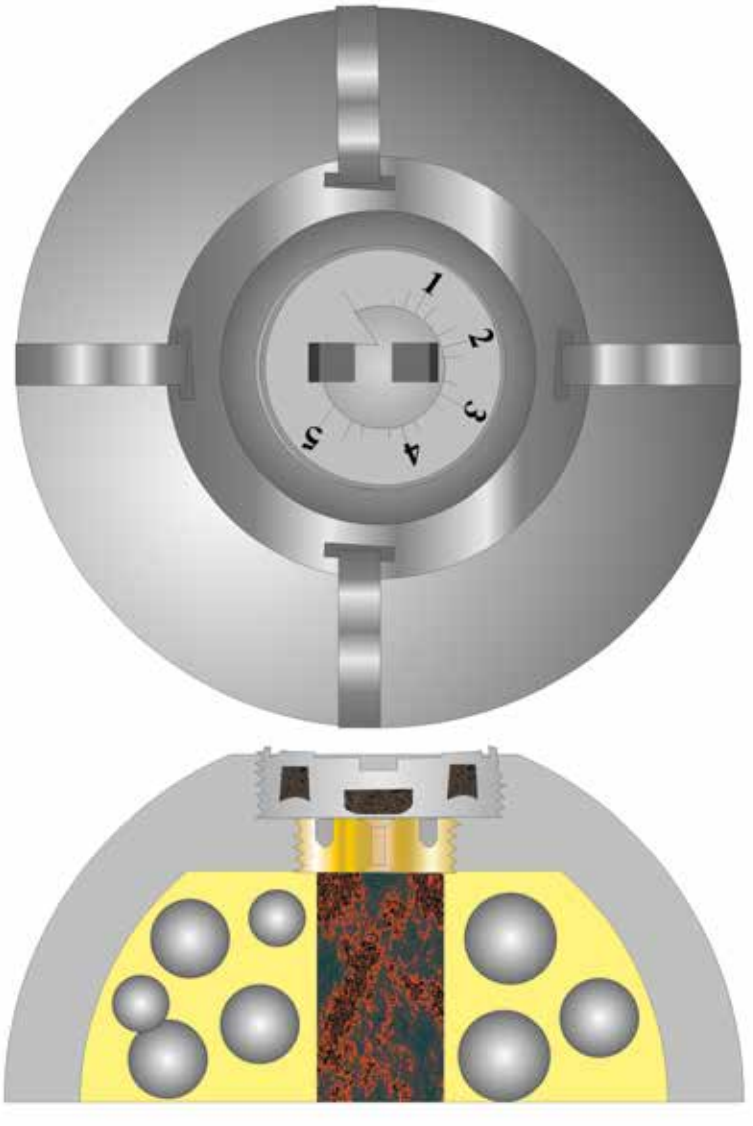
12 pdr Spherical ammunition,
fuze adapter, Bormann, Broun, Tice



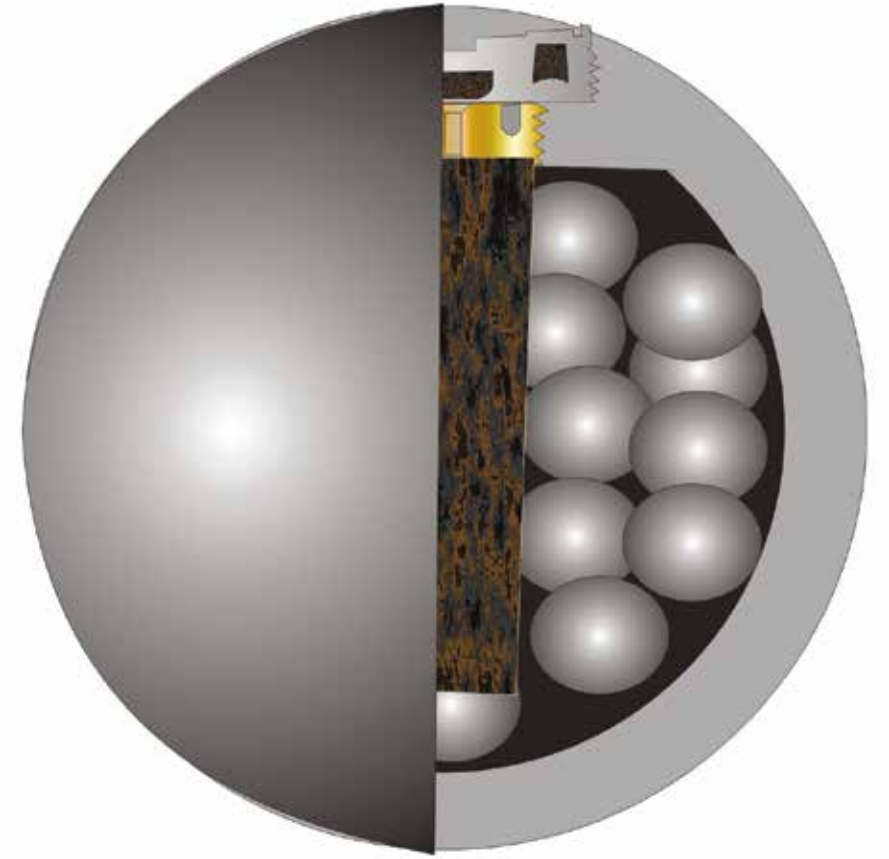
12 pdr Spherical case shot,
Bormann time fuze



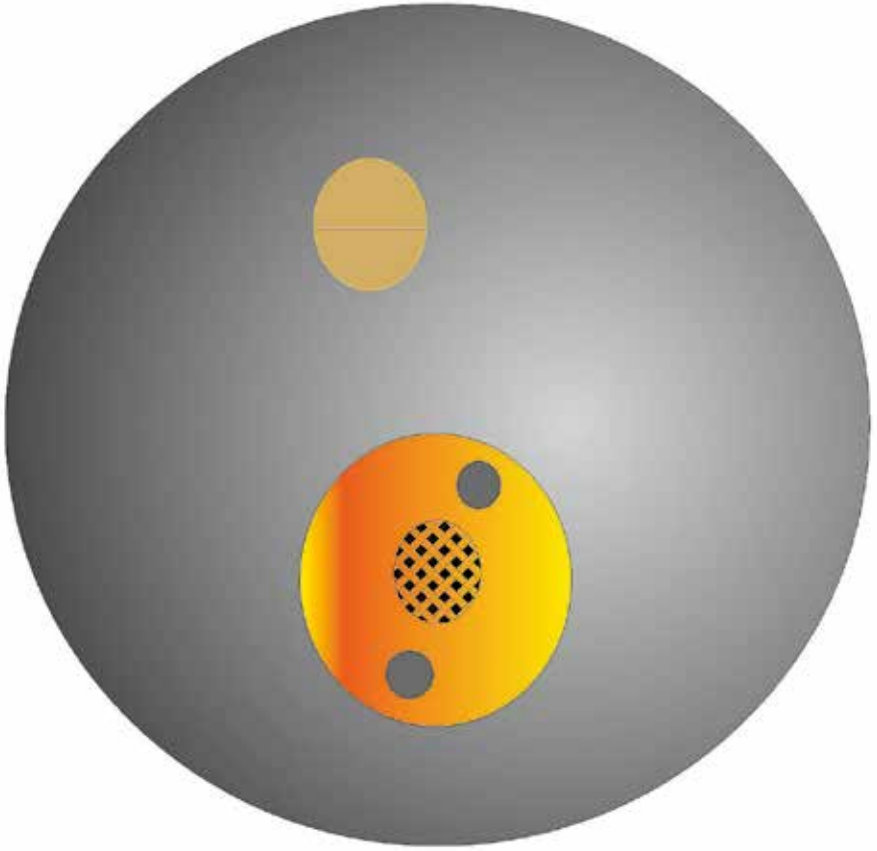
12 pdr Spherical case shot,
Tice concussion fuze



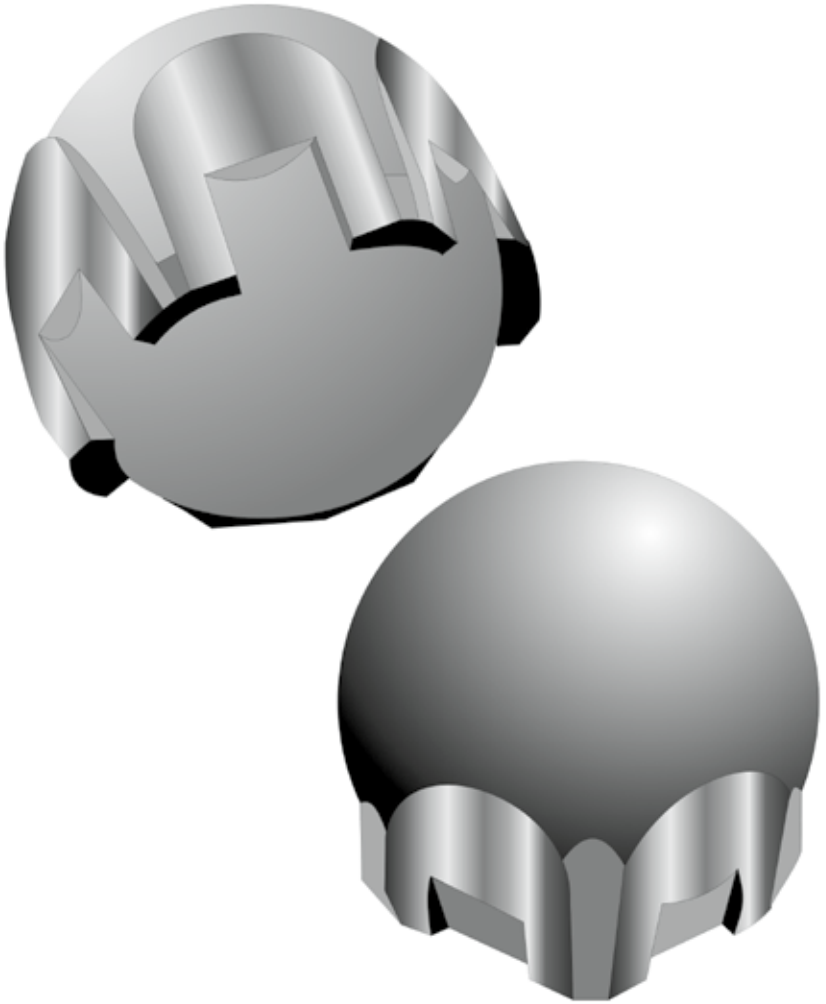
12 pdr Spherical case shot,
Bormann time fuze



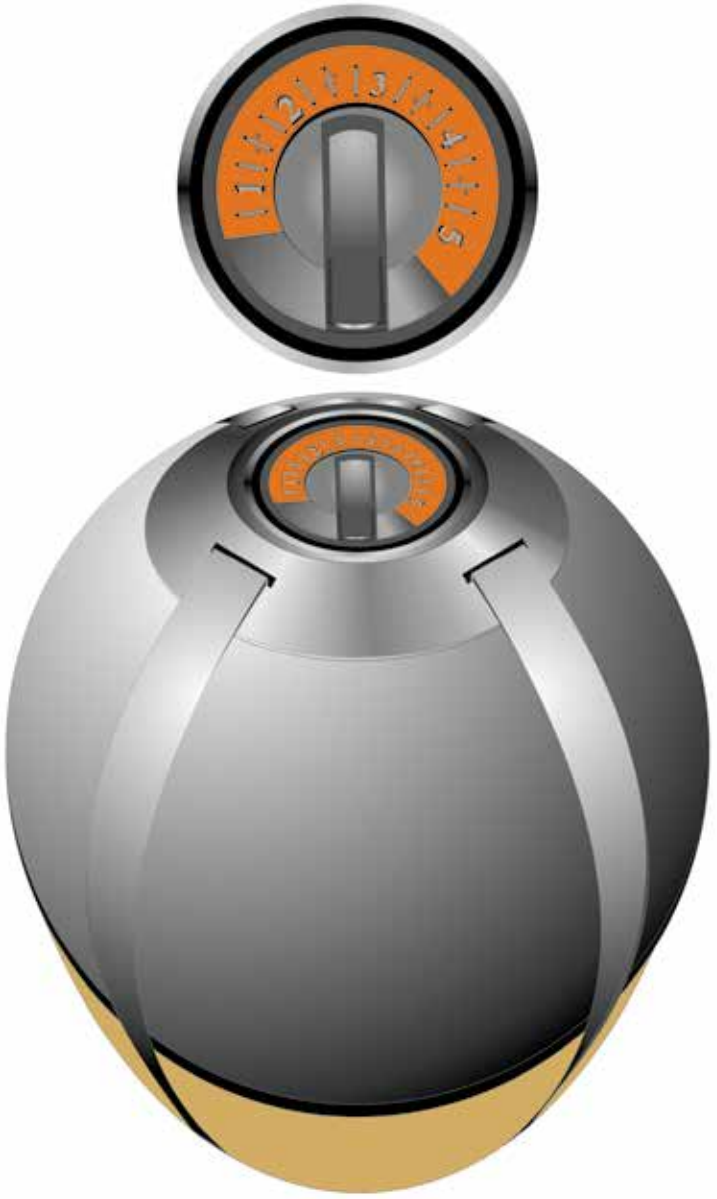
12 pdr Case shot,
Bormann time fuze



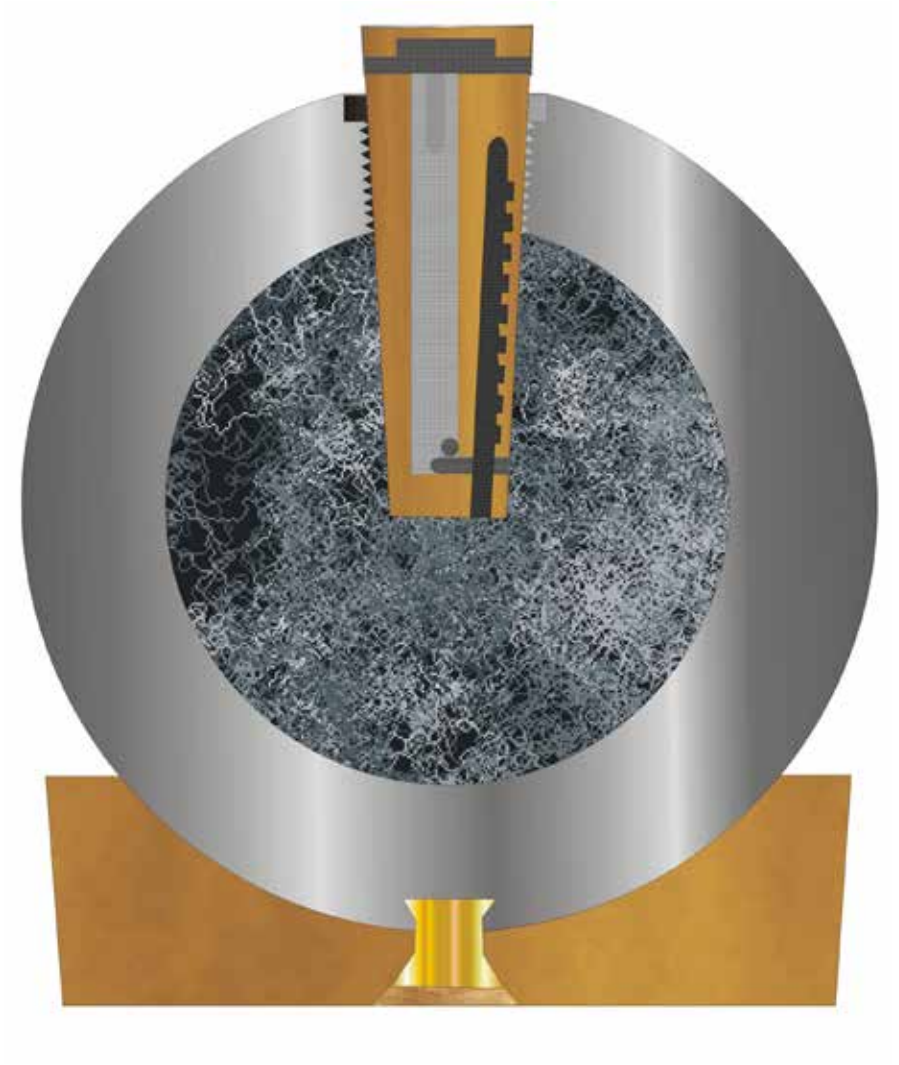
C. S. 12 pdr Case shot



4.62-inch
Whitworth spherical bolt



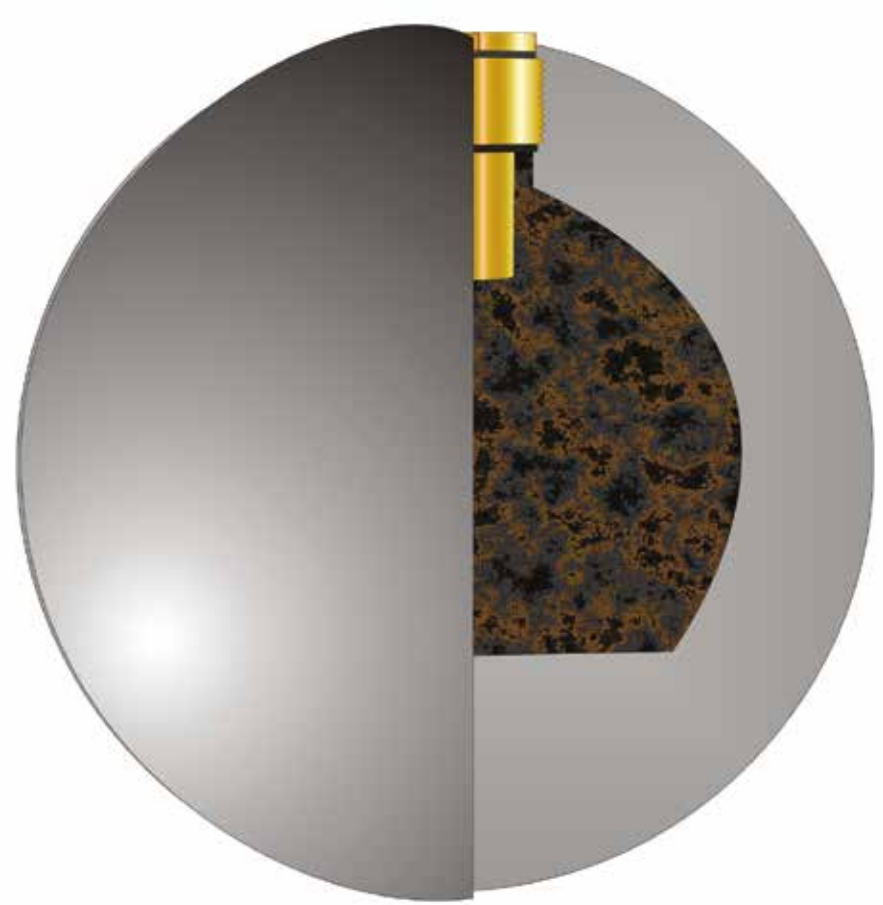
Spherical shell with
Bormann fuze



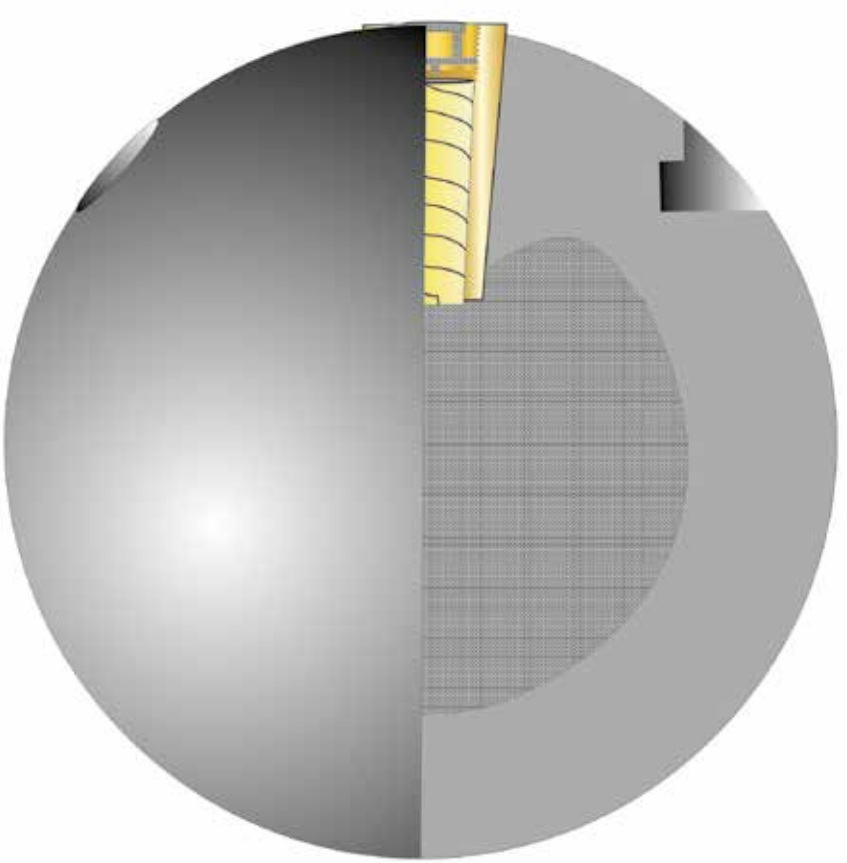
British 18 pdr
common shell



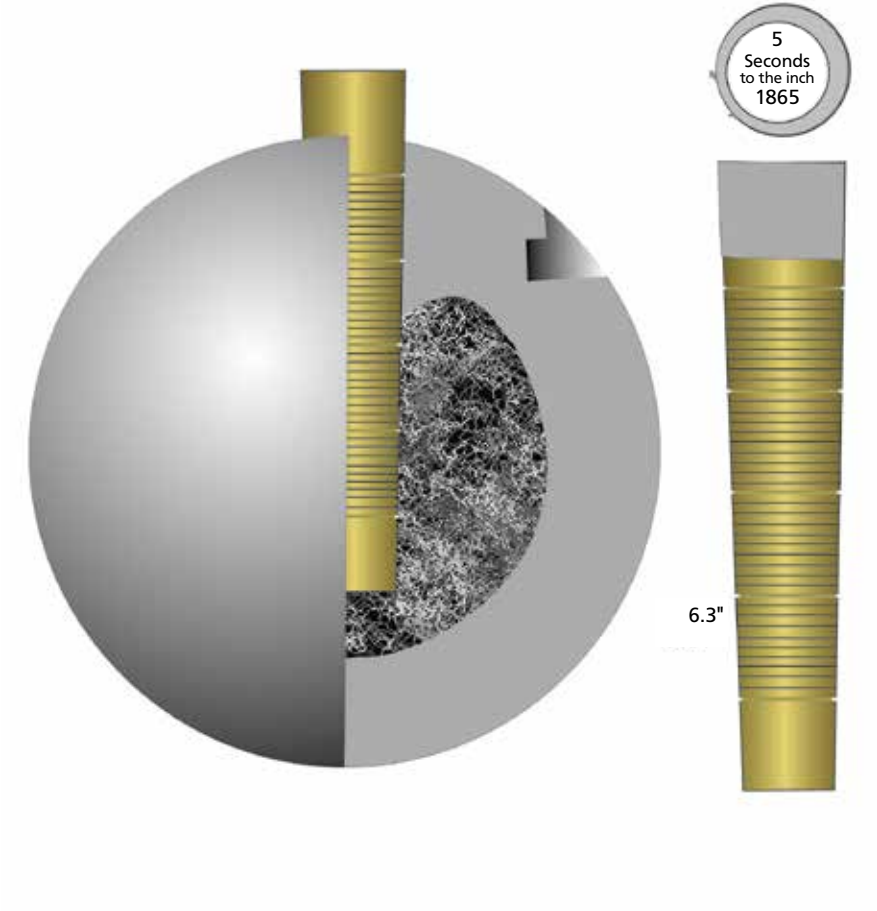
U.S. 24 pdr spherical case shot,
Bormann time fuze removed



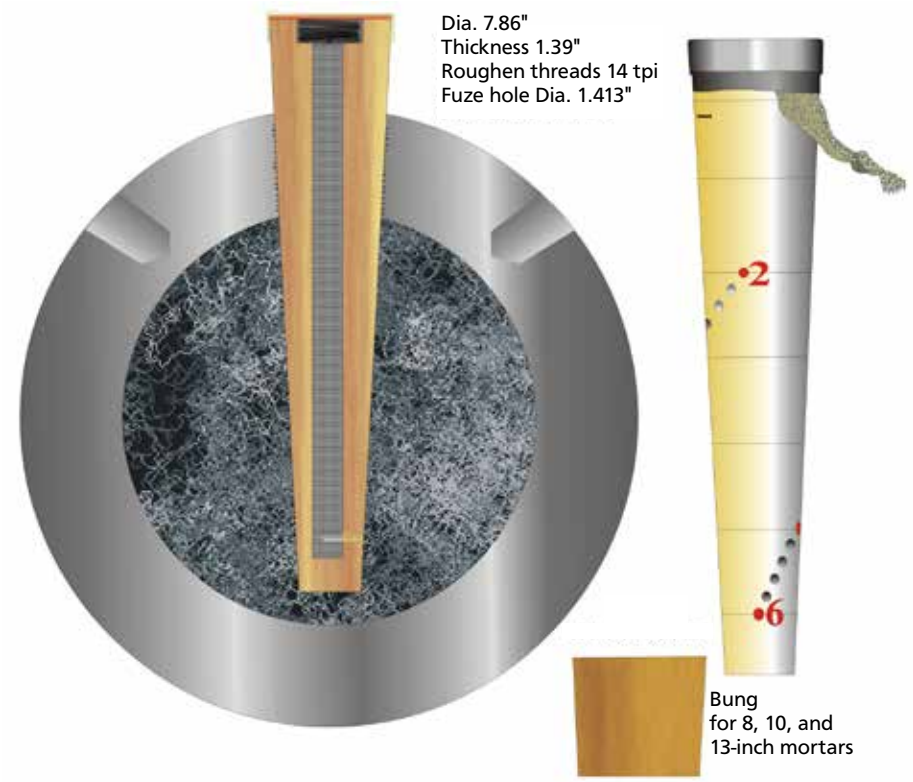
8-inch Spherical shell, "Cullotte," naval water cap fuze



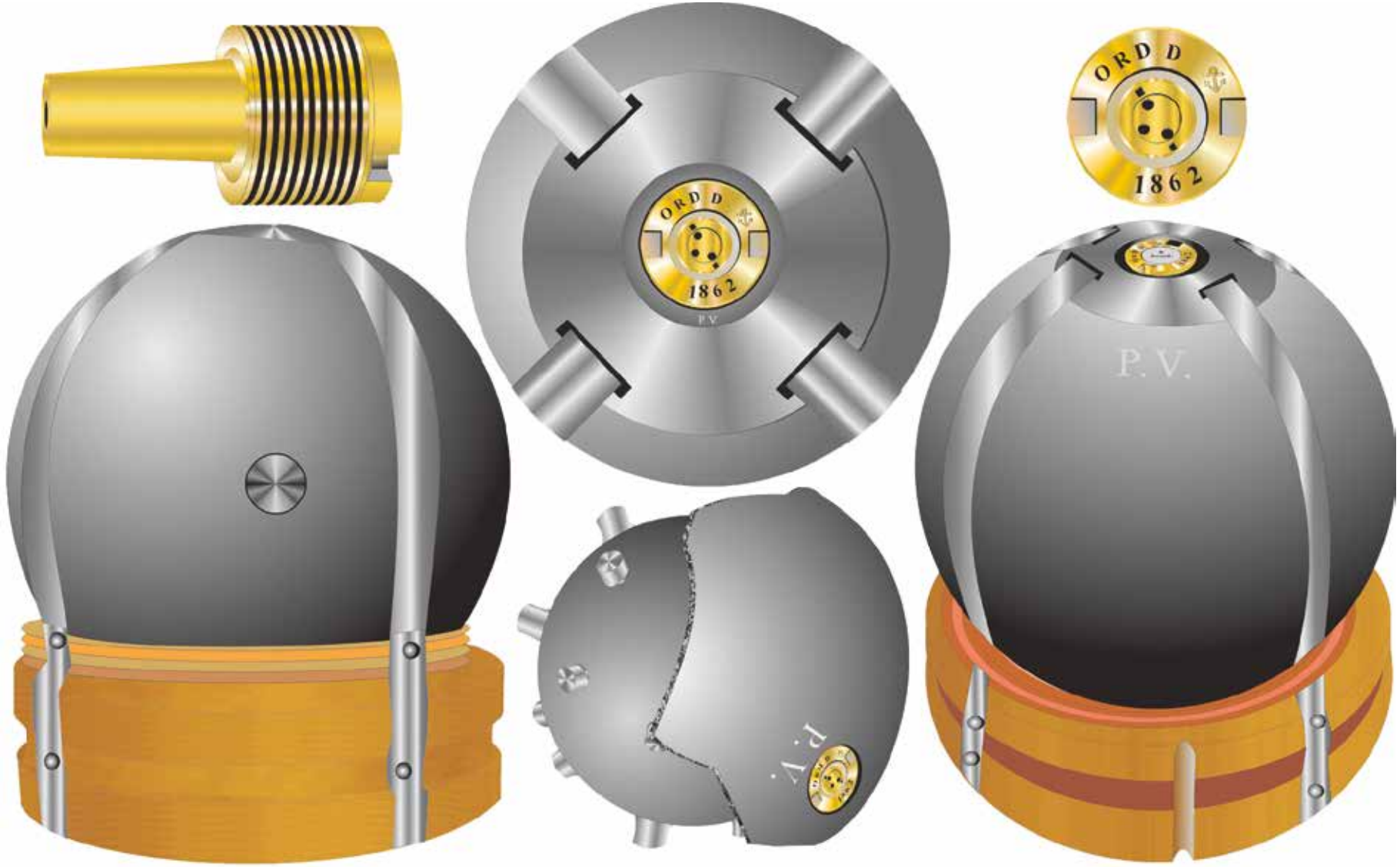
U.S. 8-inch mortar shell, Alger seacoast, water cap time fuze adapter



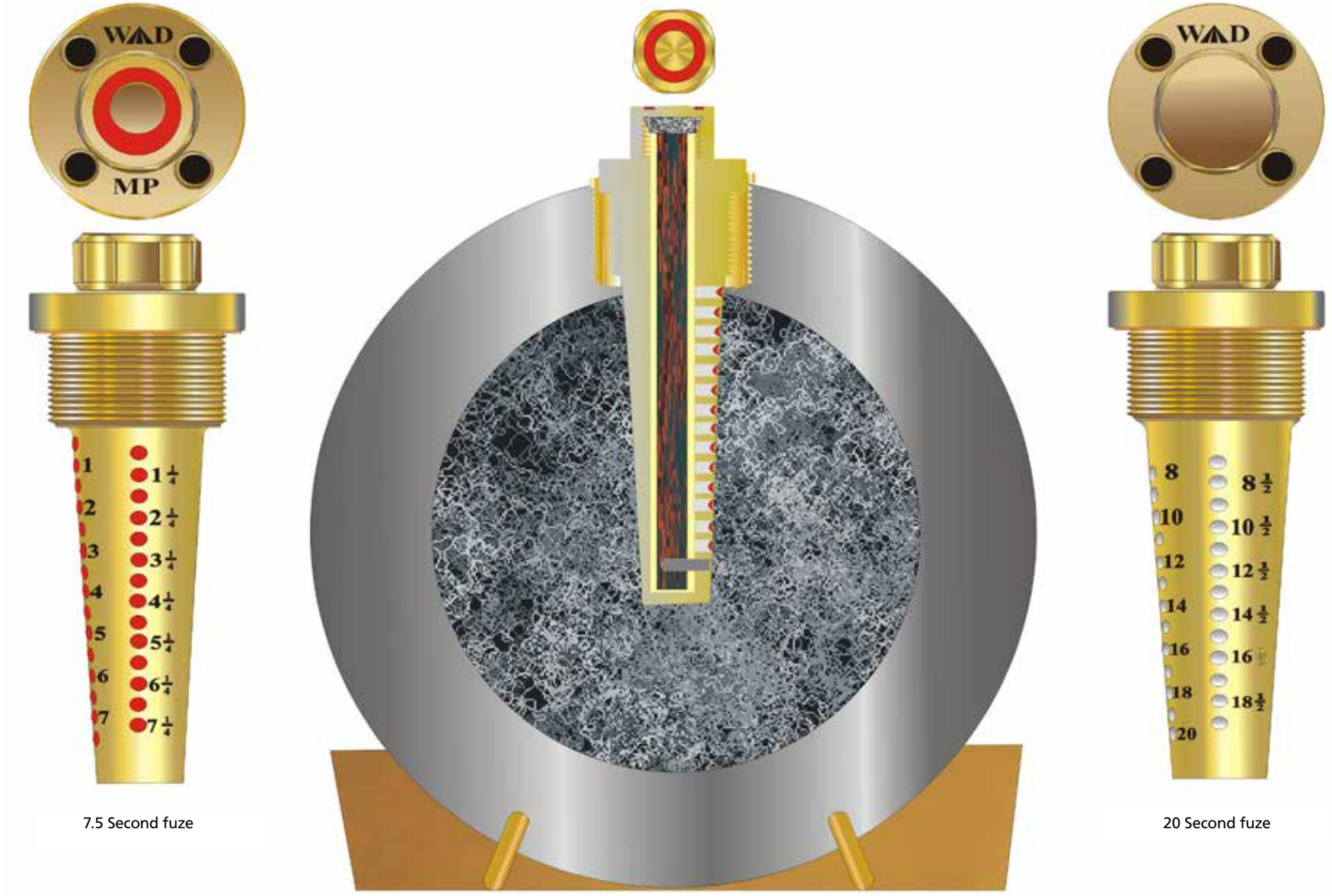
U.S. 8-inch mortar shell



British 8-inch mortar shell



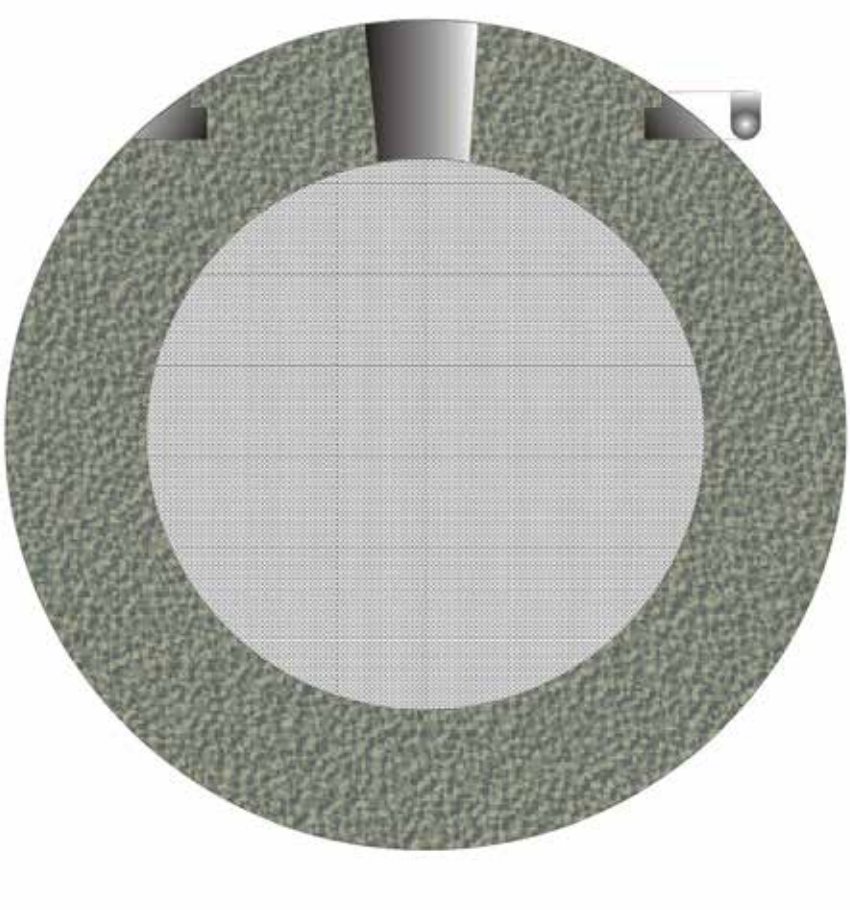
9-inch Pevey shell on sabot,
U.S. naval water cap fuze, fragment



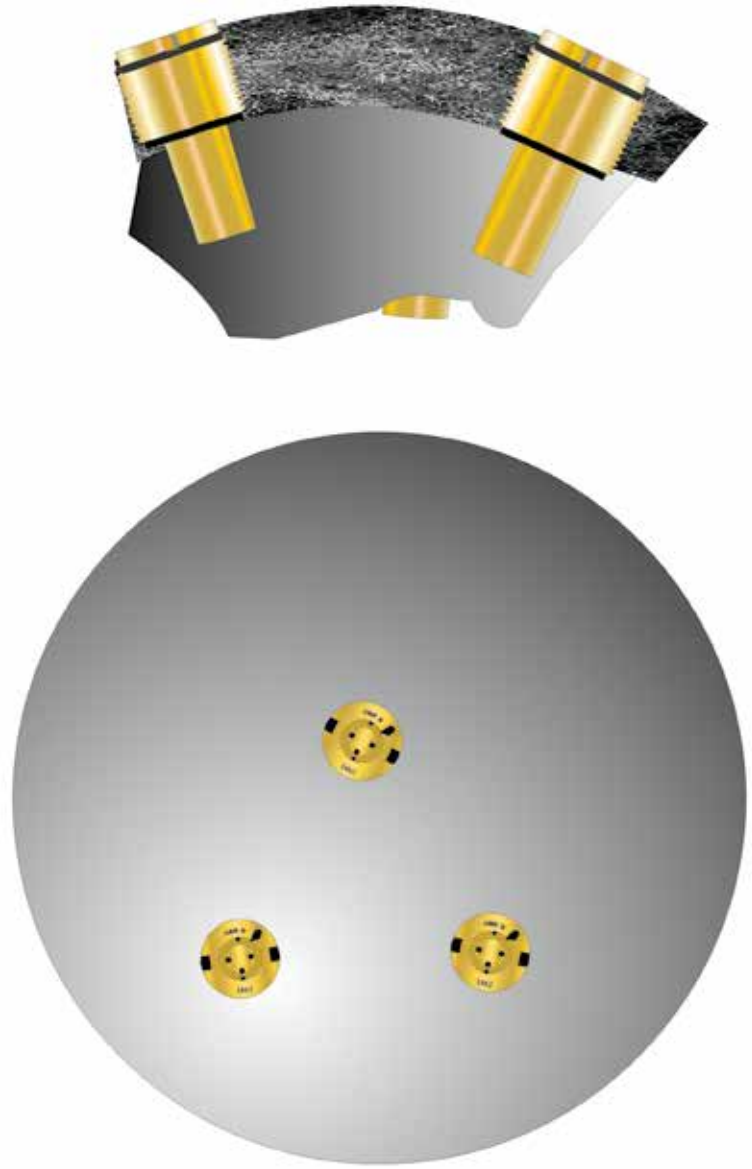
7.5 Second fuze

20 Second fuze

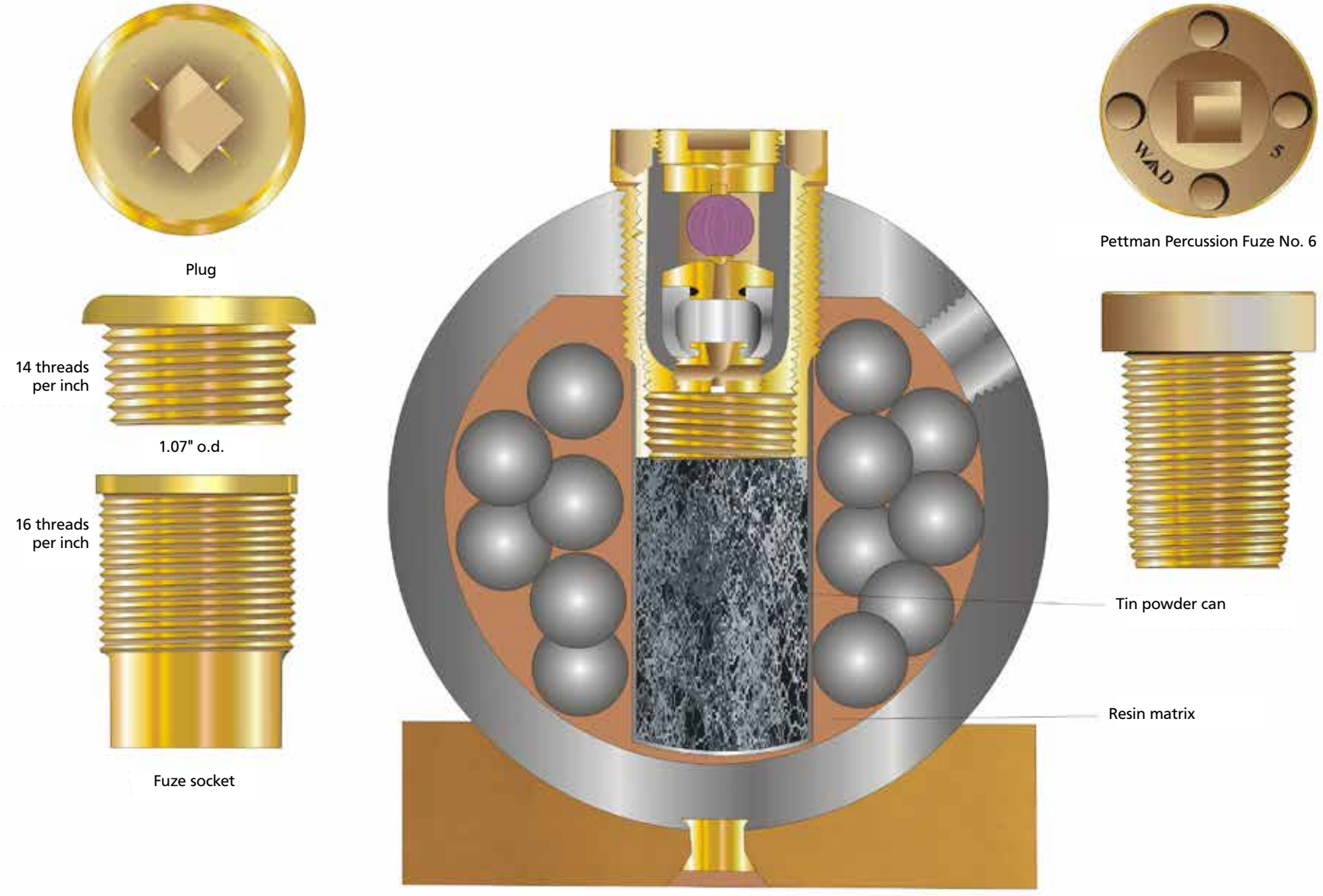
**British 10-inch naval shell,
Boxer metal time fuze**



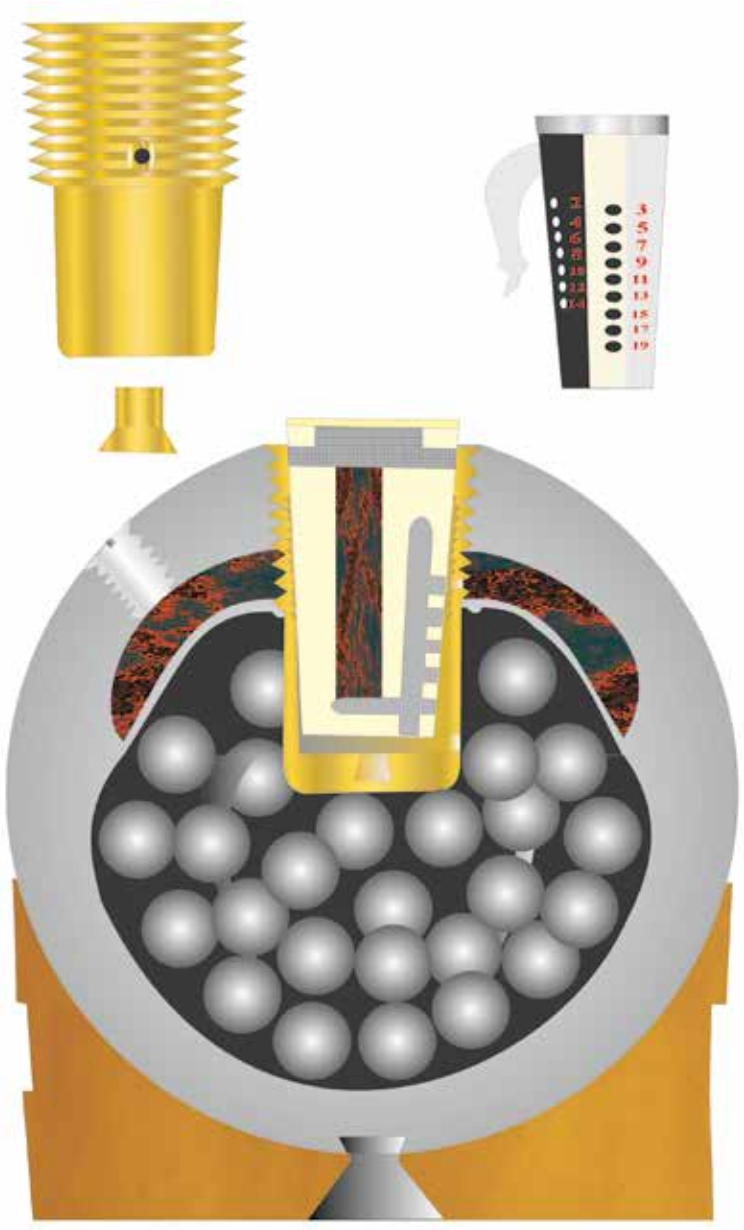
U.S. 11 inch mortar shell



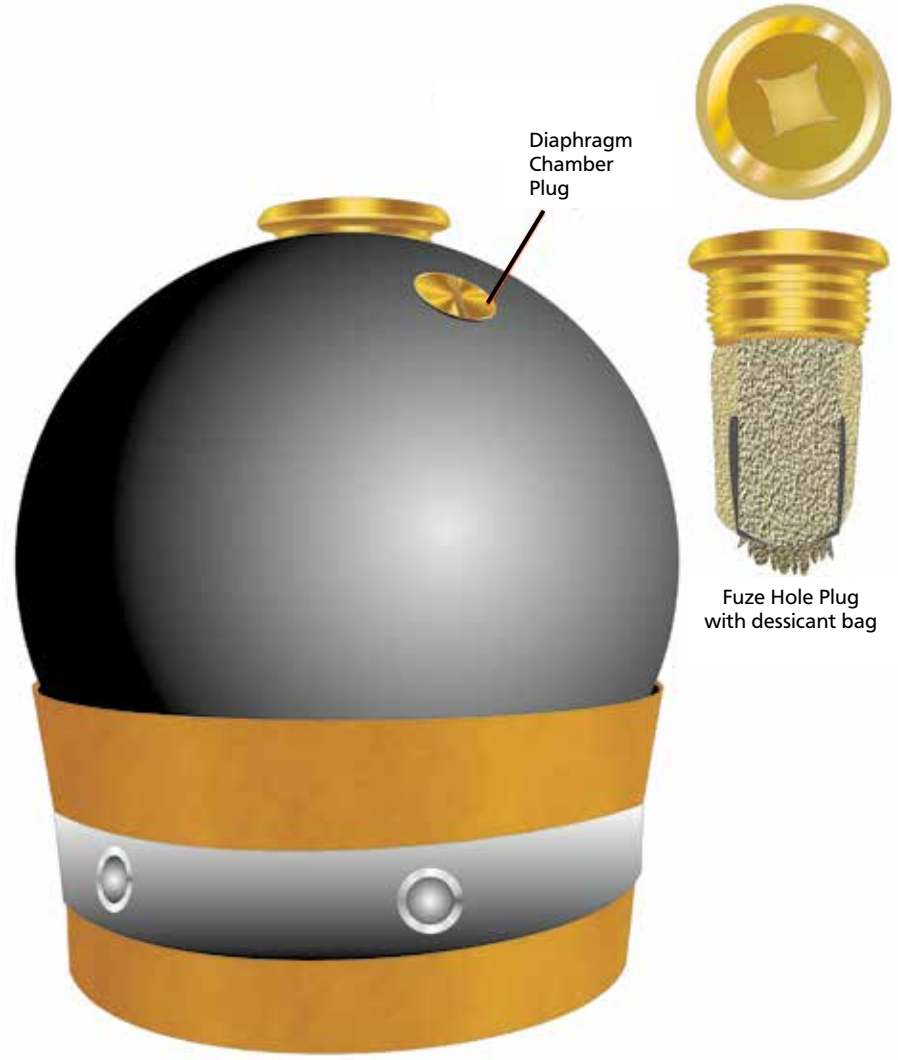
15-inch Triple fuzed shell



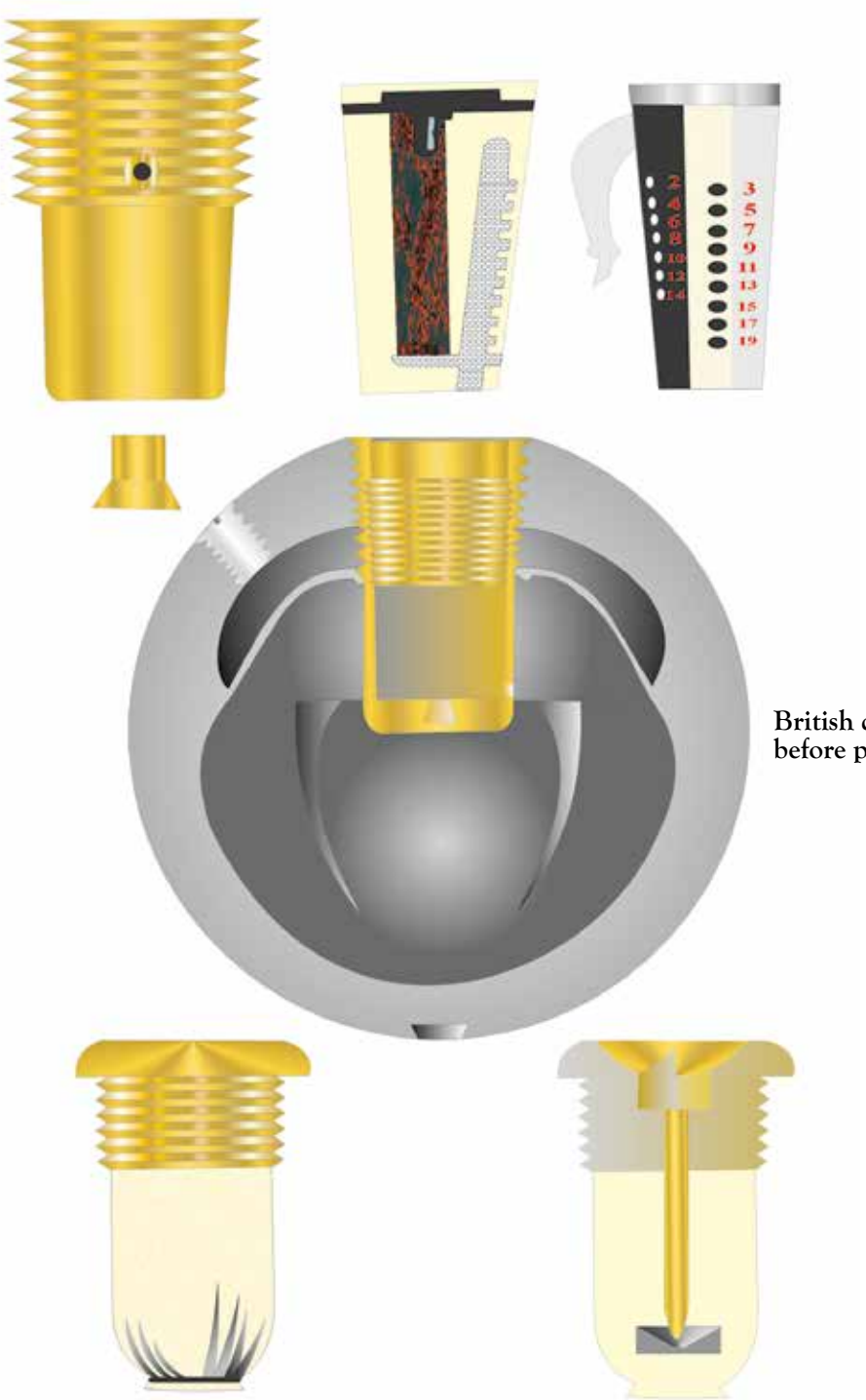
British 8-inch improved shrapnel shell, 6, 9, 12, 18, 24, 32, 42, 56, Boxer time fuze or Pettman L. S.



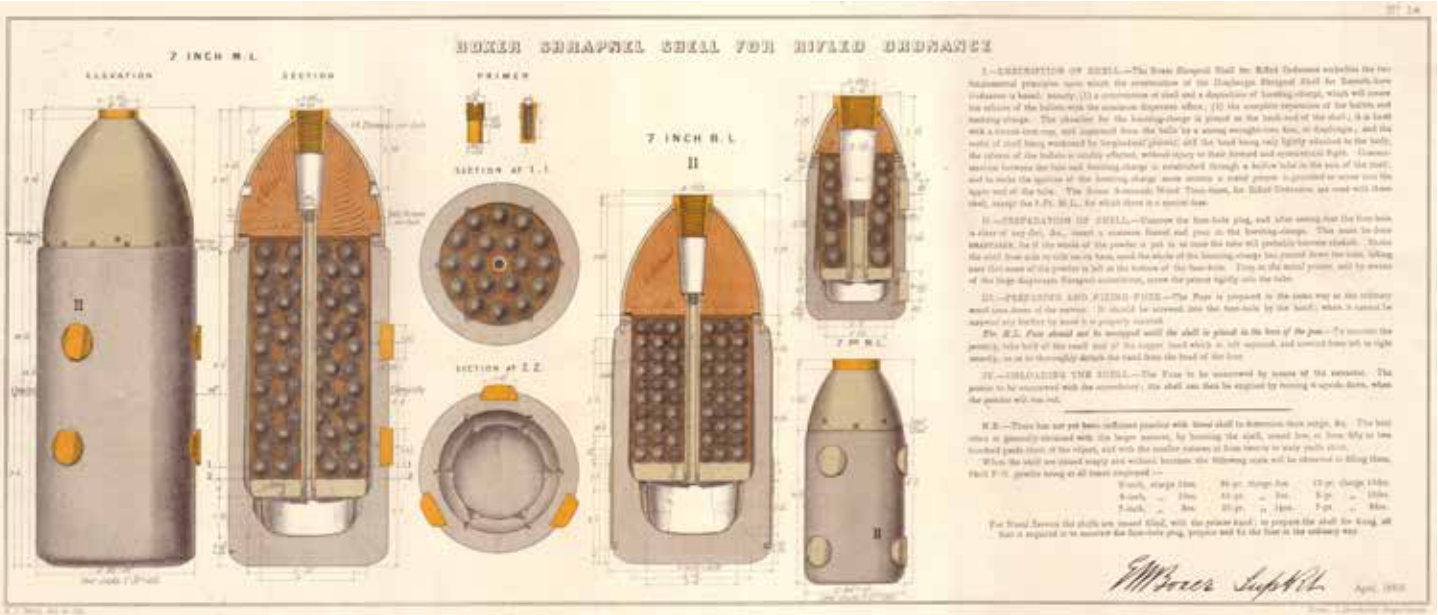
British diaphragm shrapnel shell,
Boxer time fuze



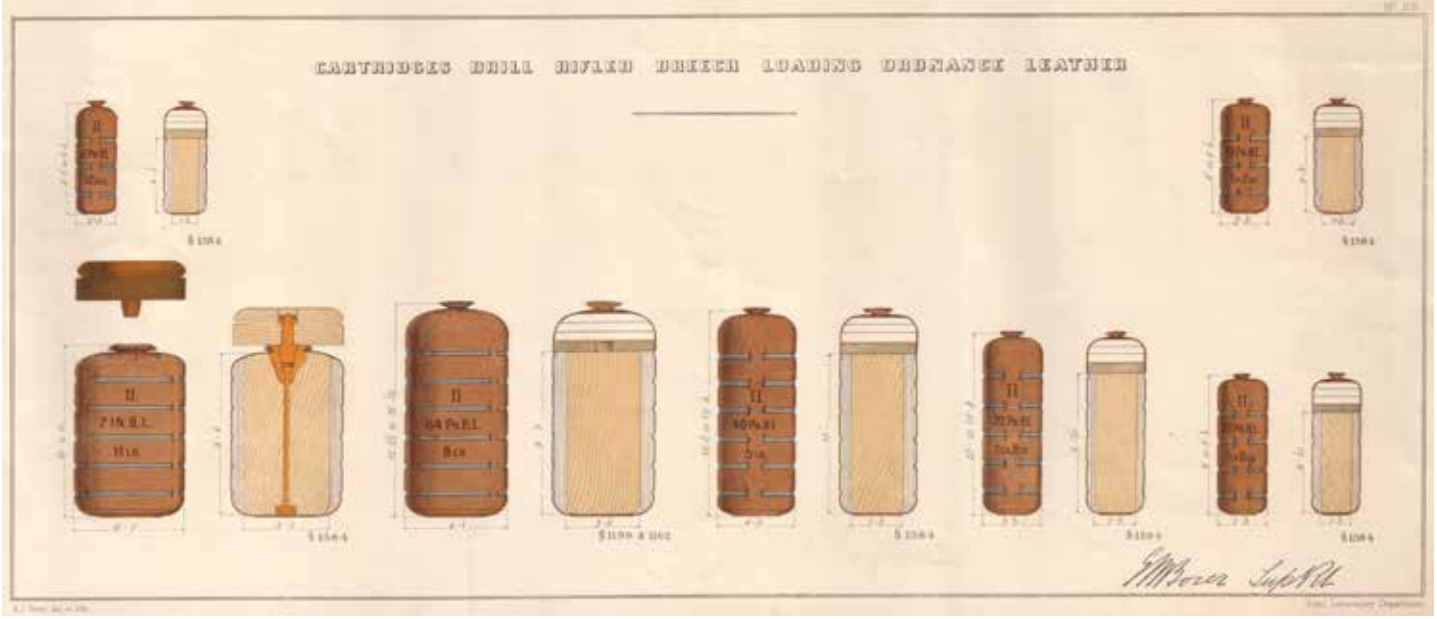
British Boxer shrapnel shell



British diaphragm shrapnel shell before powder is added

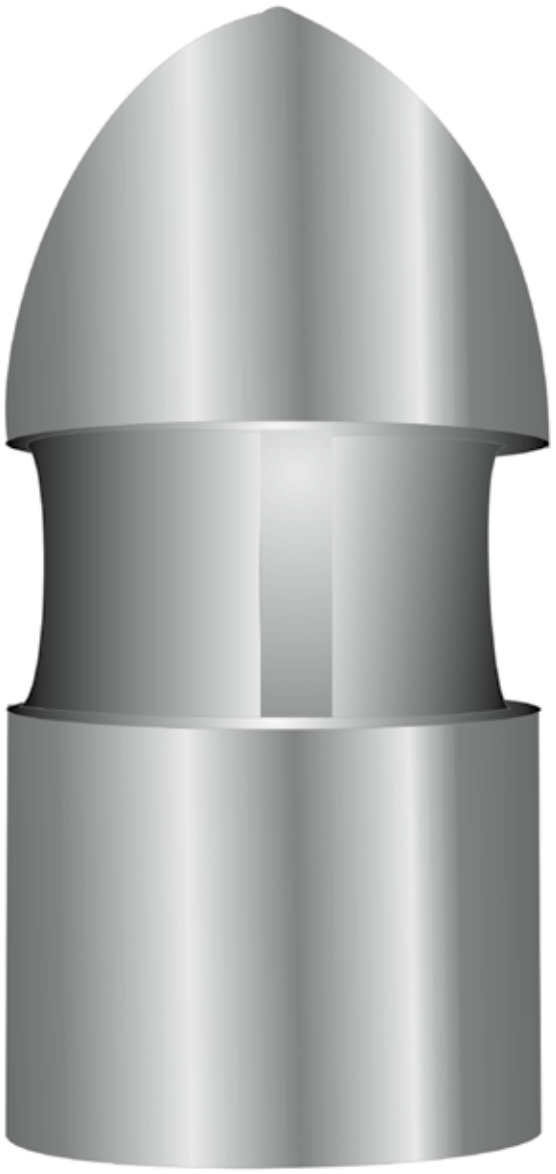


Rifled Projectiles

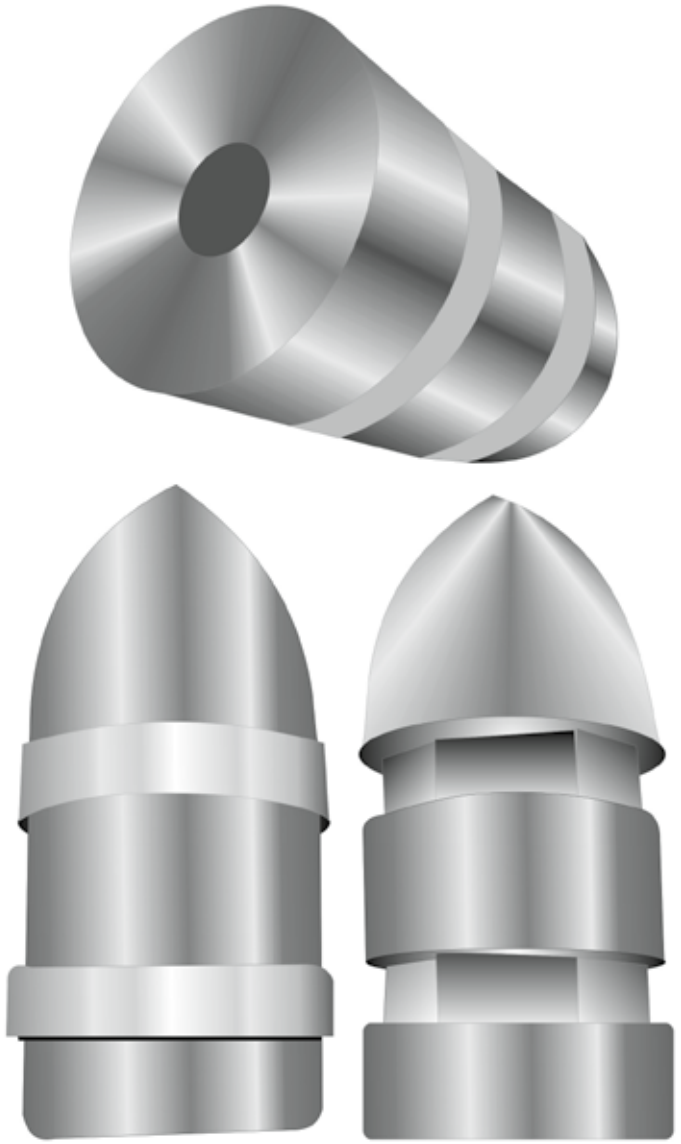




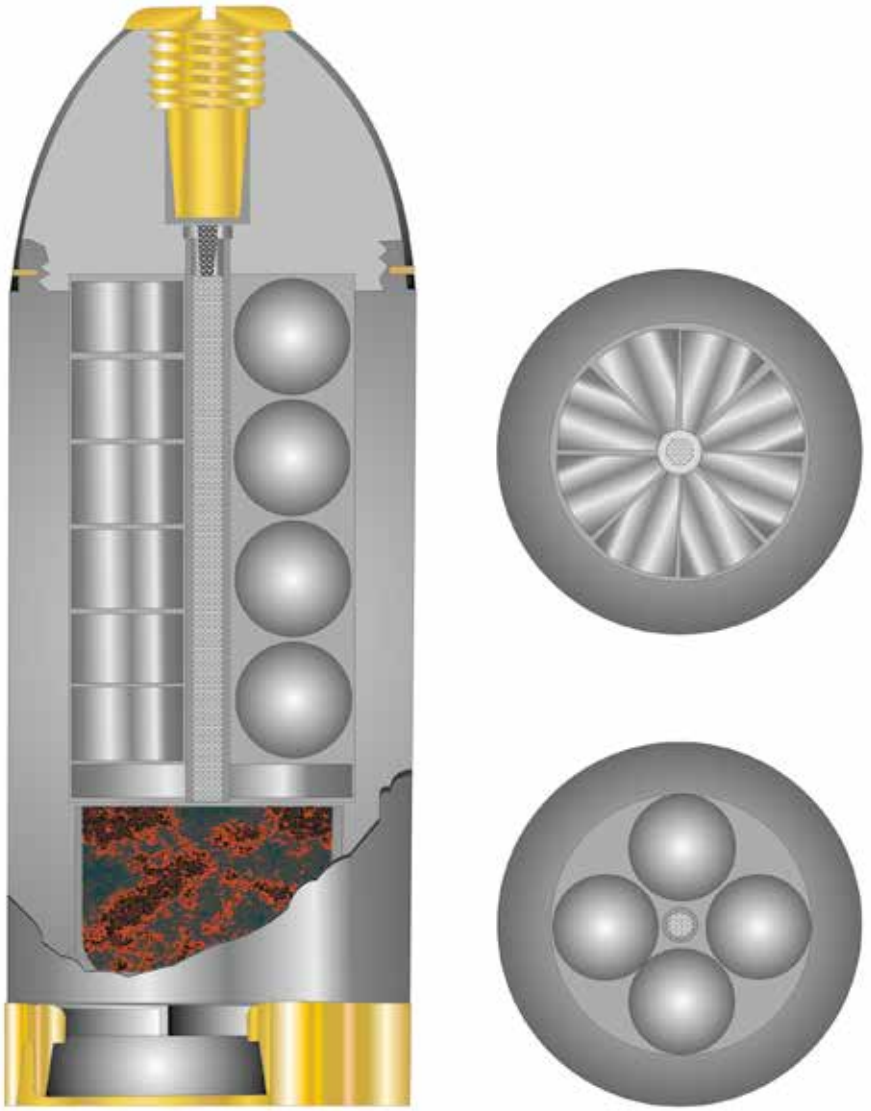
2.15-inch Whitworth shell



C. S. 2.25-inch
Oconee River bolt, variation



C. S. 2.25-inch Oconee River Bolt,
Sumner oscillating rifle



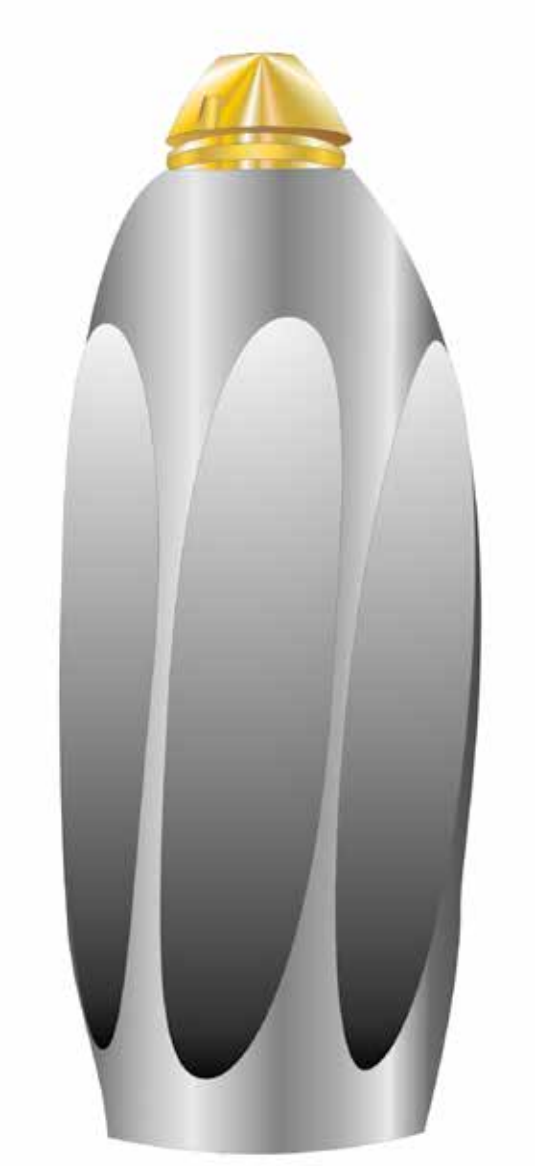
2.5-inch Butler case shot,
1875



C. S. 2.75-inch Harding shell



C. S. 2.75-inch Mullane shell



British 3 pdr Whitworth shell
with fuze



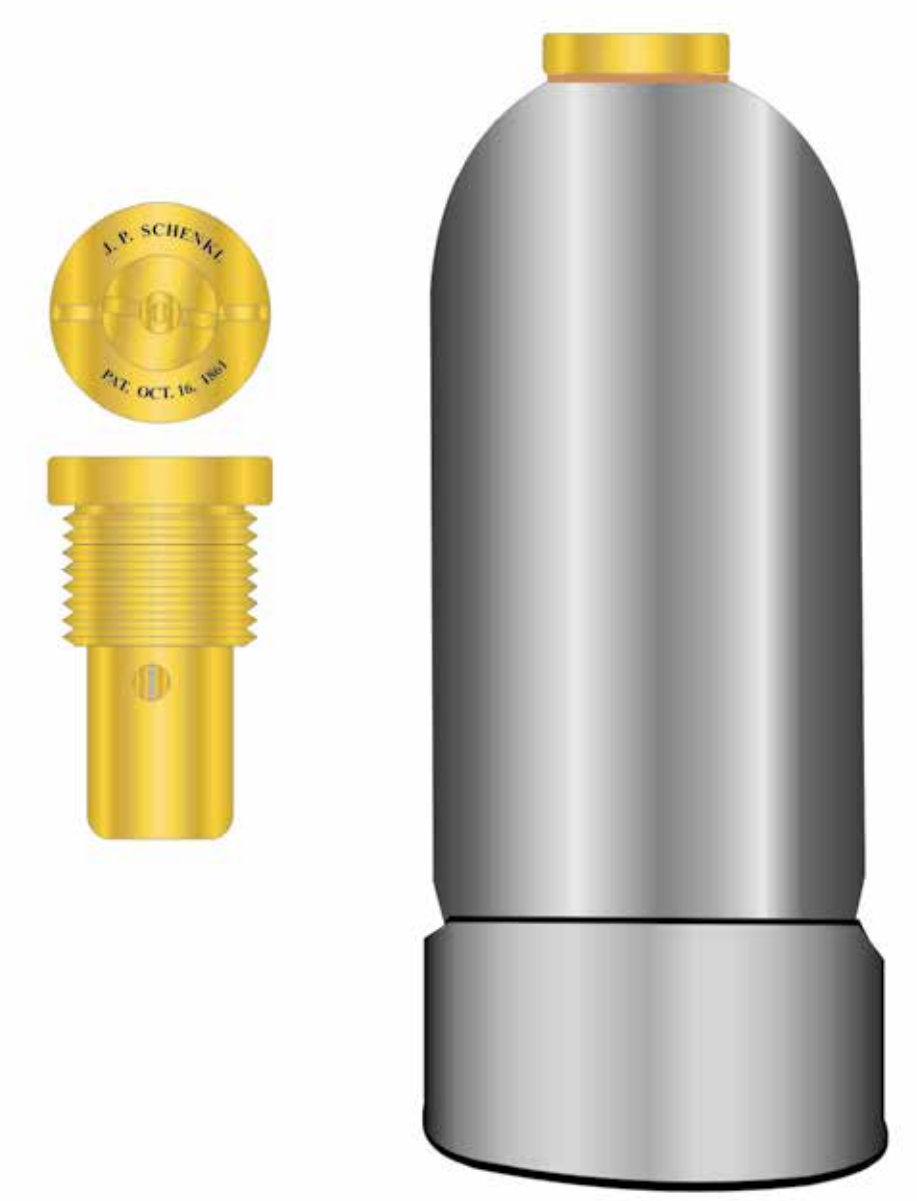
3 pdr Whitworth shell



British 2.9-inch Britten shell,
Vavaseur percussion fuze



2.94-inch Mullane shell,
C. S. brass time fuze adapter



2.96-inch Post-war Dyer, 3.15-inch sabot,
Schenkl percussion fuze



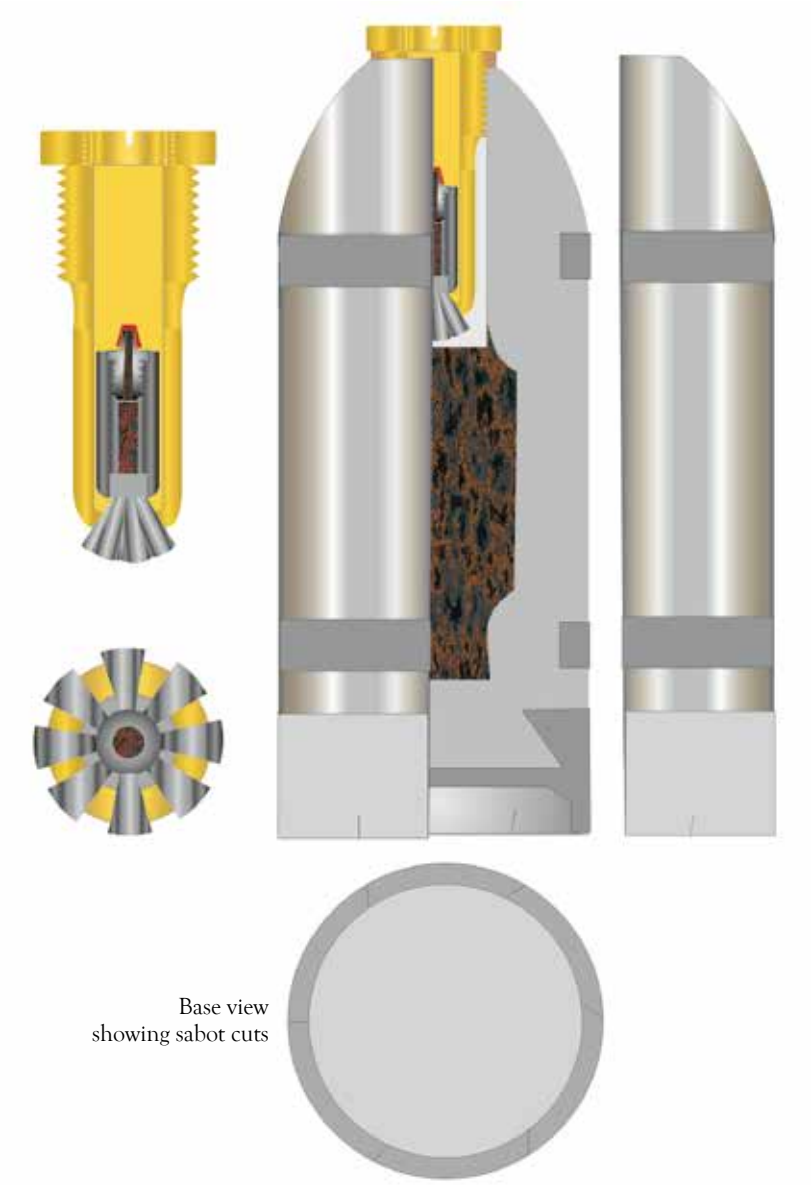
Absterdam shell and percussion fuze,
patented 23 February 1864



3-inch Absterdam shell,
lead sabot



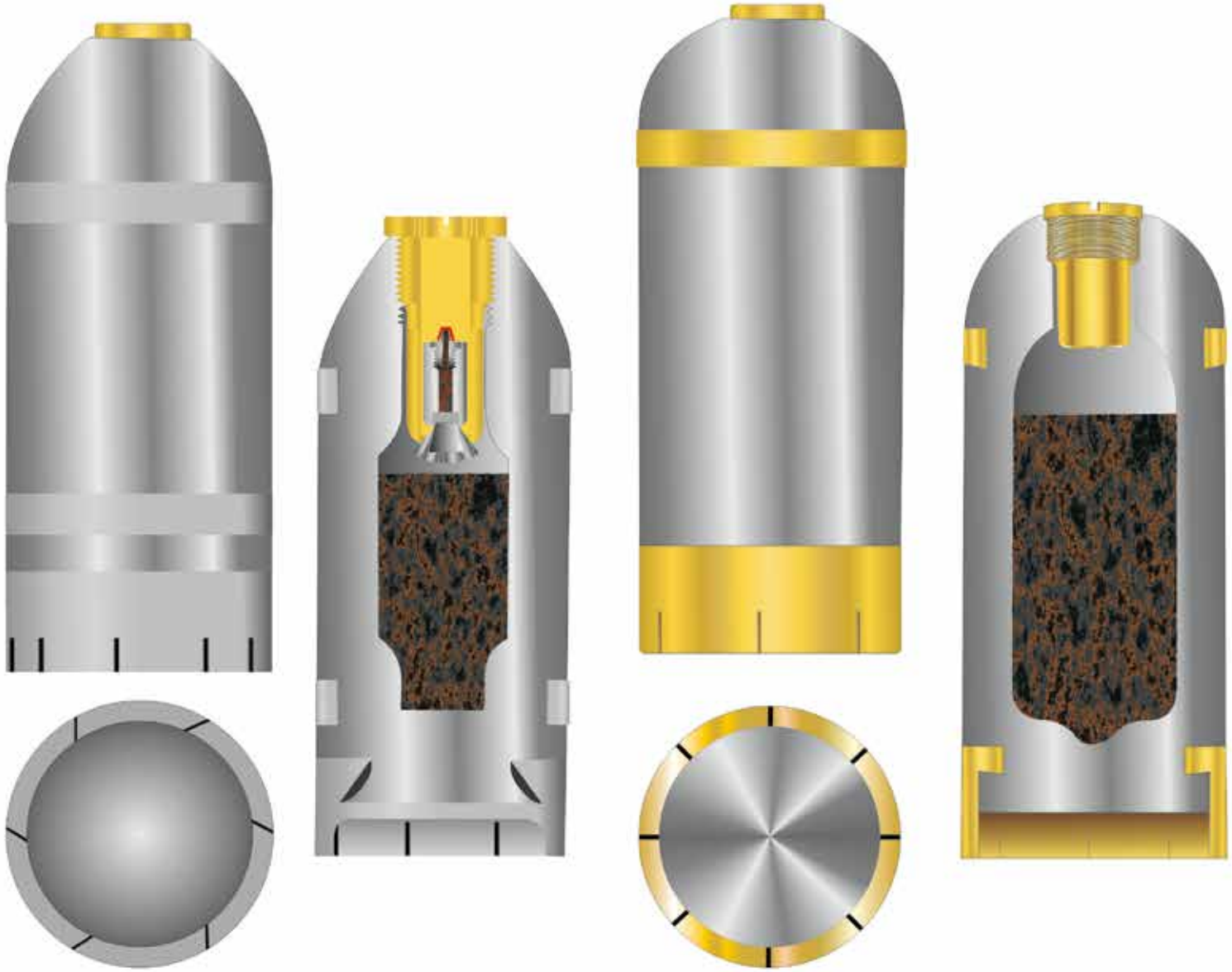
3-inch Absterdam shell,
brass sabot



3-inch Absterdam shell and percussion fuze



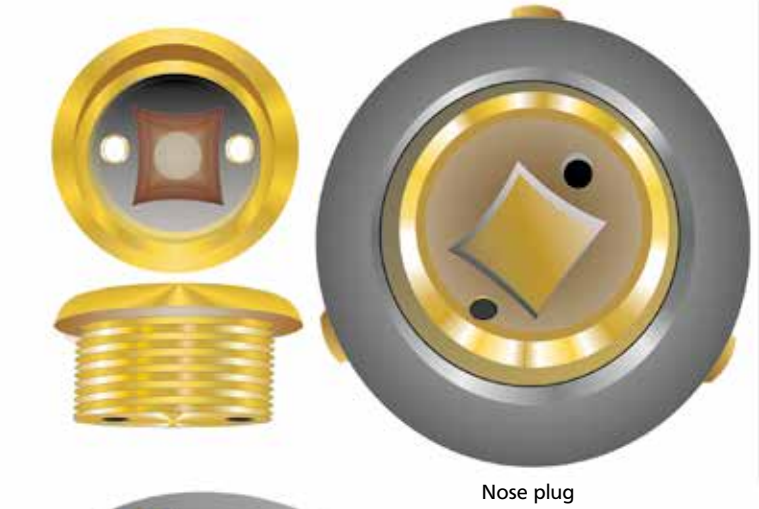
3-inch Absterdam shell and fuze adapter



U. S. Absterdam shell and fuze,
patent #41,668, 23 February 1864 and patent #50,783, 7 November 1865



3-inch Archer bolts and shells



Nose plug

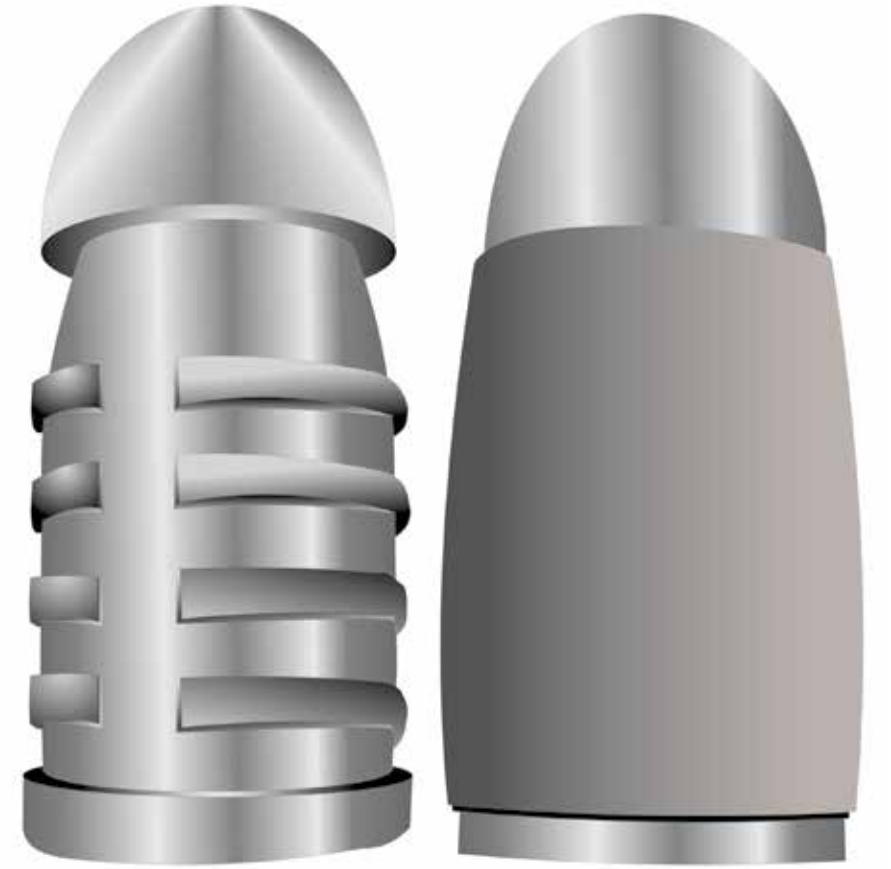


British 3-inch Armstrong Studded Shell,
Elswick Ordnance Company





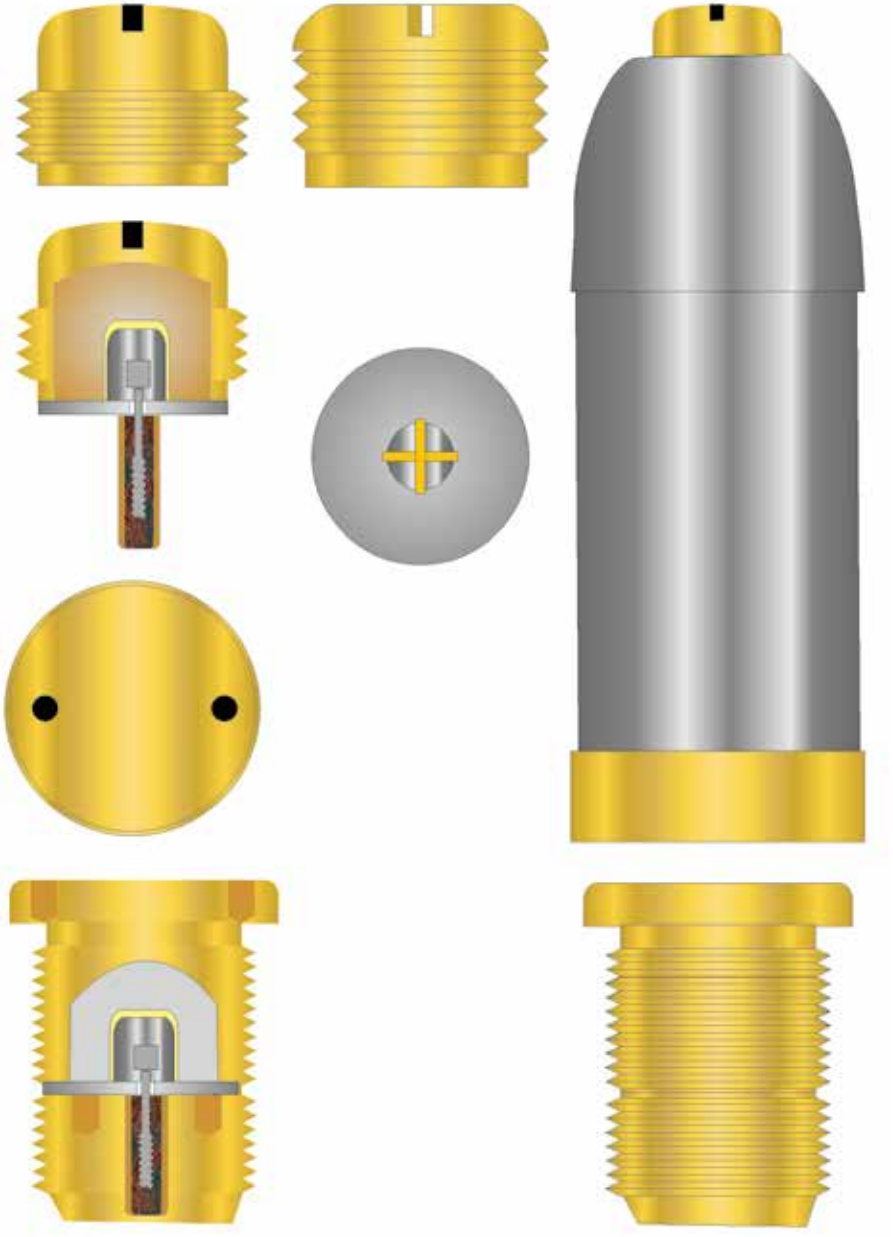
British 3-inch Armstrong Studded Shell,
Elswick Ordnance Company



3-inch Armstrong shell,
external ribbed



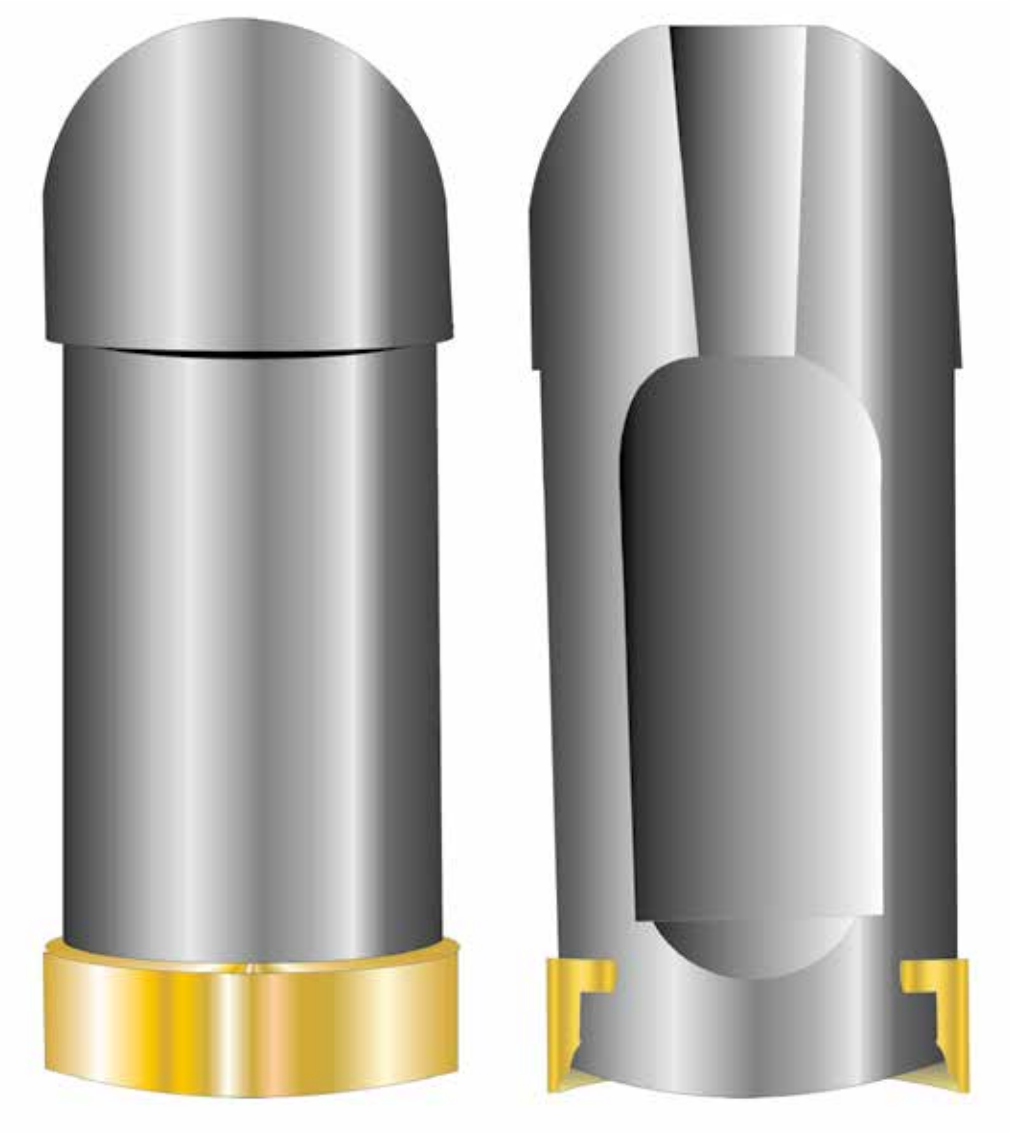
3-inch Armstrong shell,
half sabot



3-inch Braun shell
and concussion fuze



3-inch Braun shell



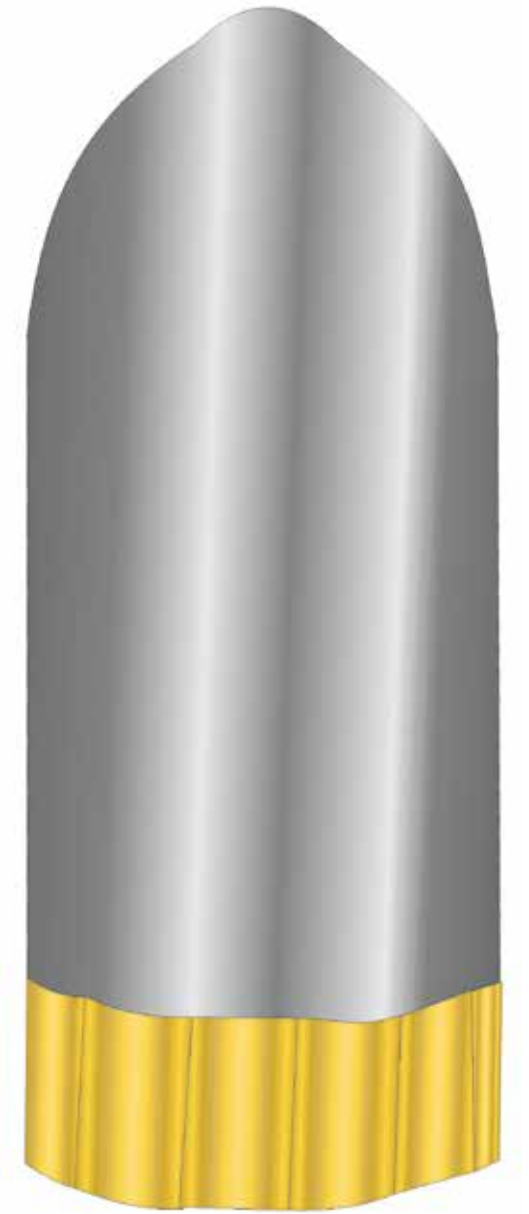
C. S. 3-inch Braun shell



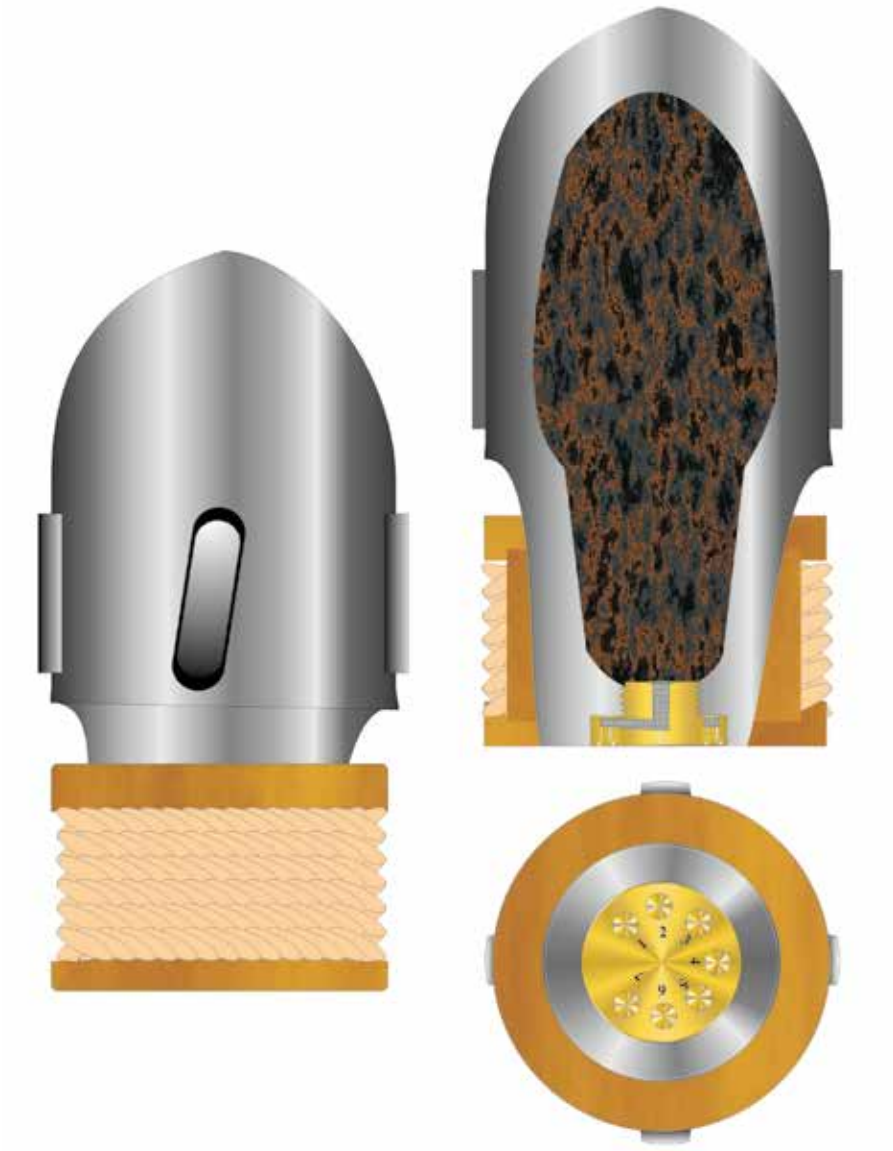
3-inch Braun shell, sectioned



3-inch Brooke shell,
time fuzed



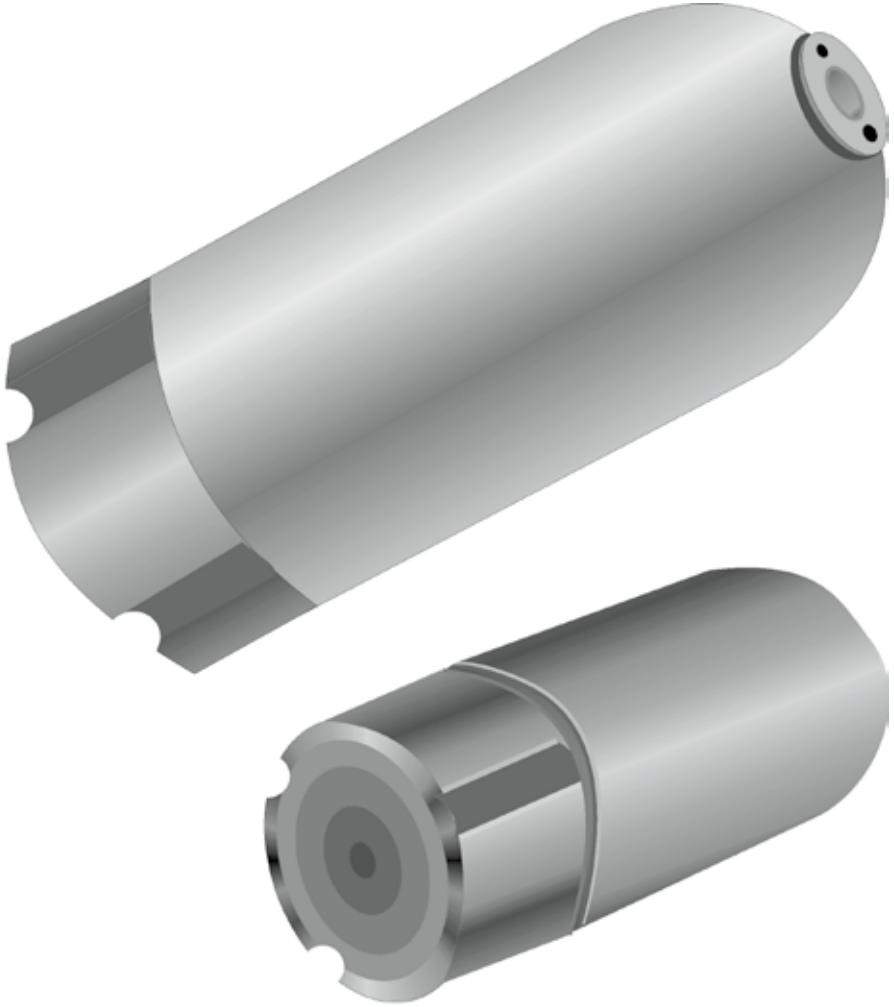
3-inch Burton bolt,
copper sabot, long



Burton-Archer original shell design



3-inch Butler case shot, 1875



3-inch Dyer case shot, modified



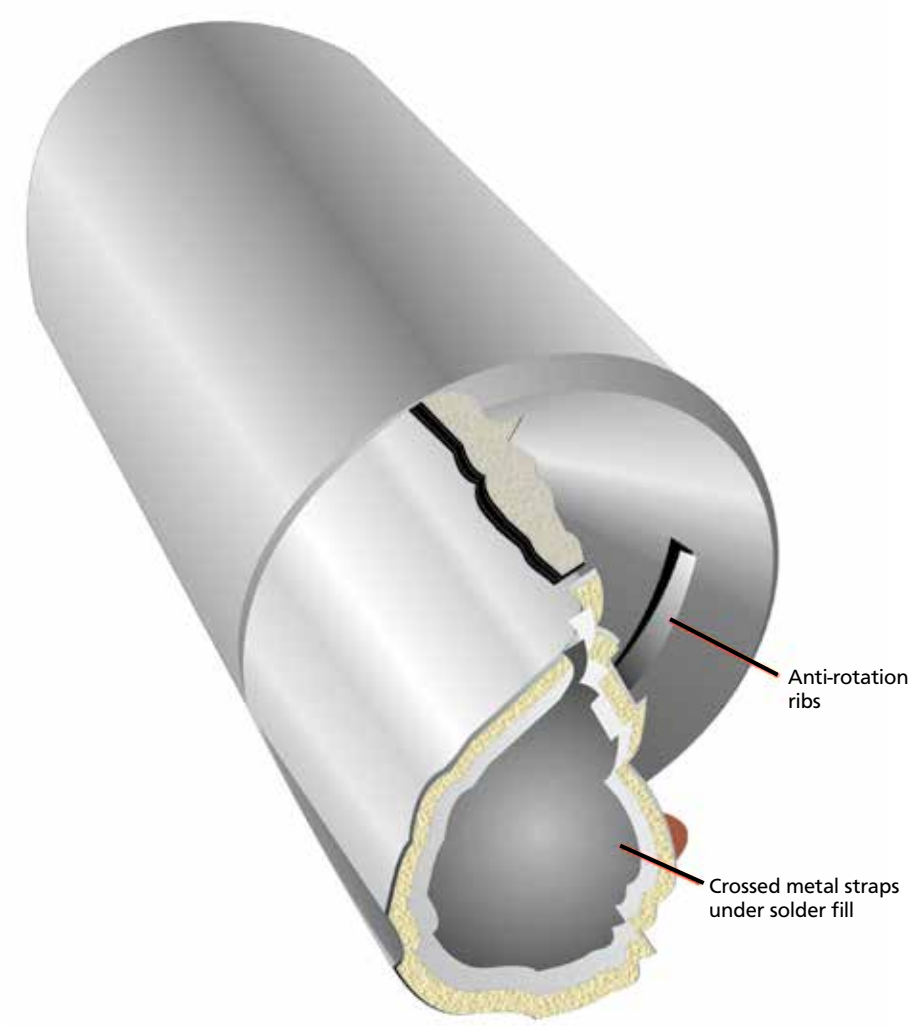
3-inch Dyer shell
and case shot comparison



3-inch Dyer shell,
Schenkl percussion fuzed



3-inch Dyer shell,
time fuze



3-inch Dyer shell,
broken sabot



3-inch Dyer shell with
Taylor fuze adapter and hood

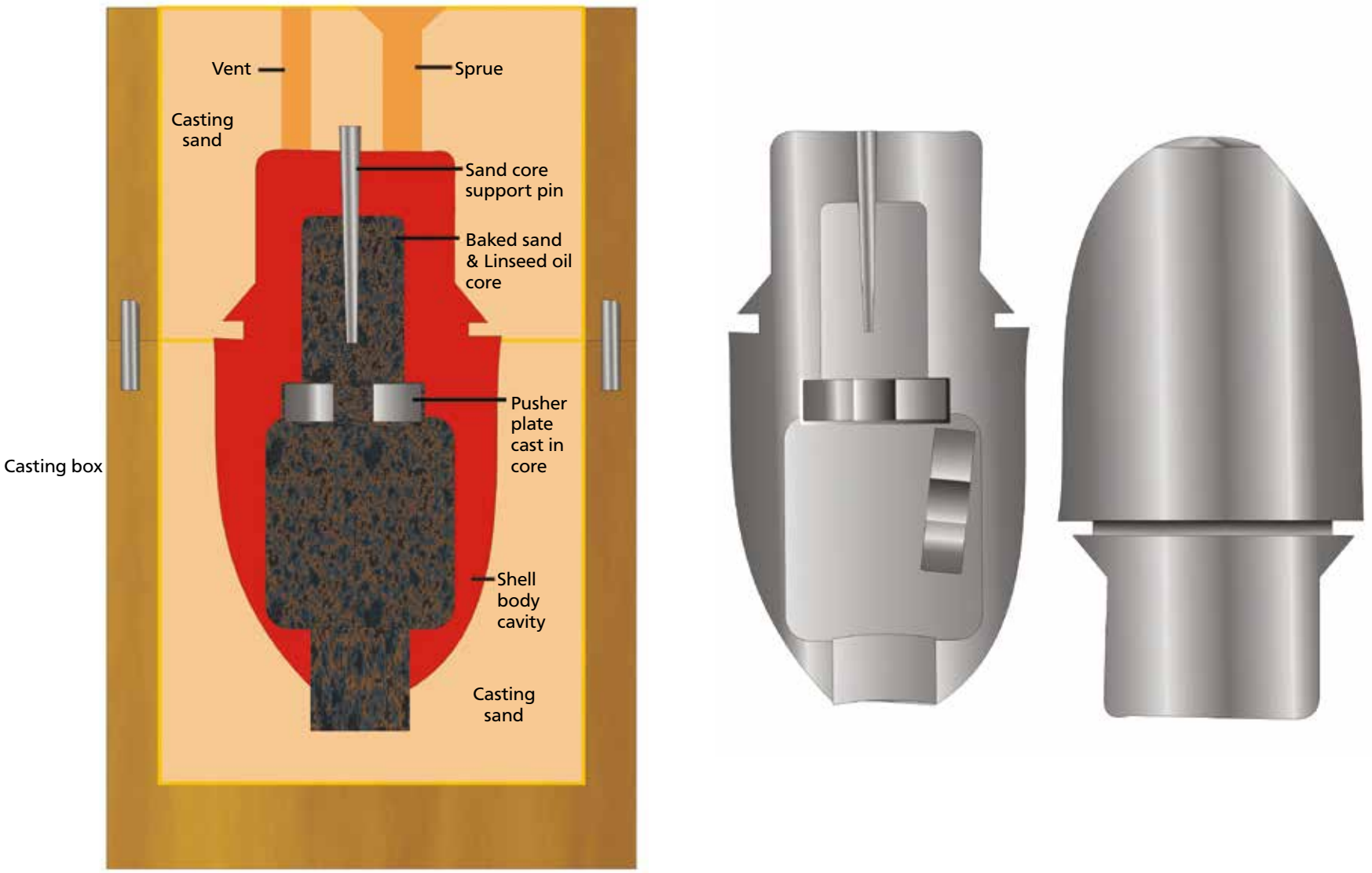


3-inch Eureka (Arrick) shell,
productionn model, 1864

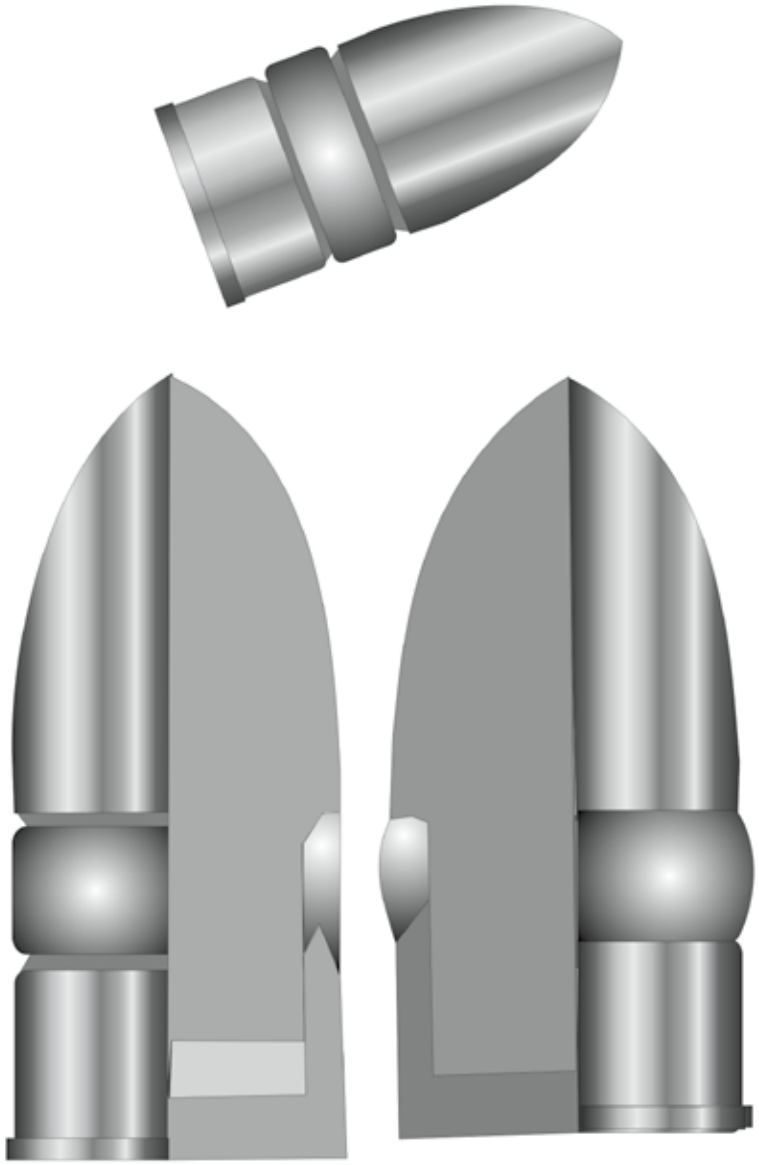


Eureka shell sabot, 1875,
Clifford Arrick

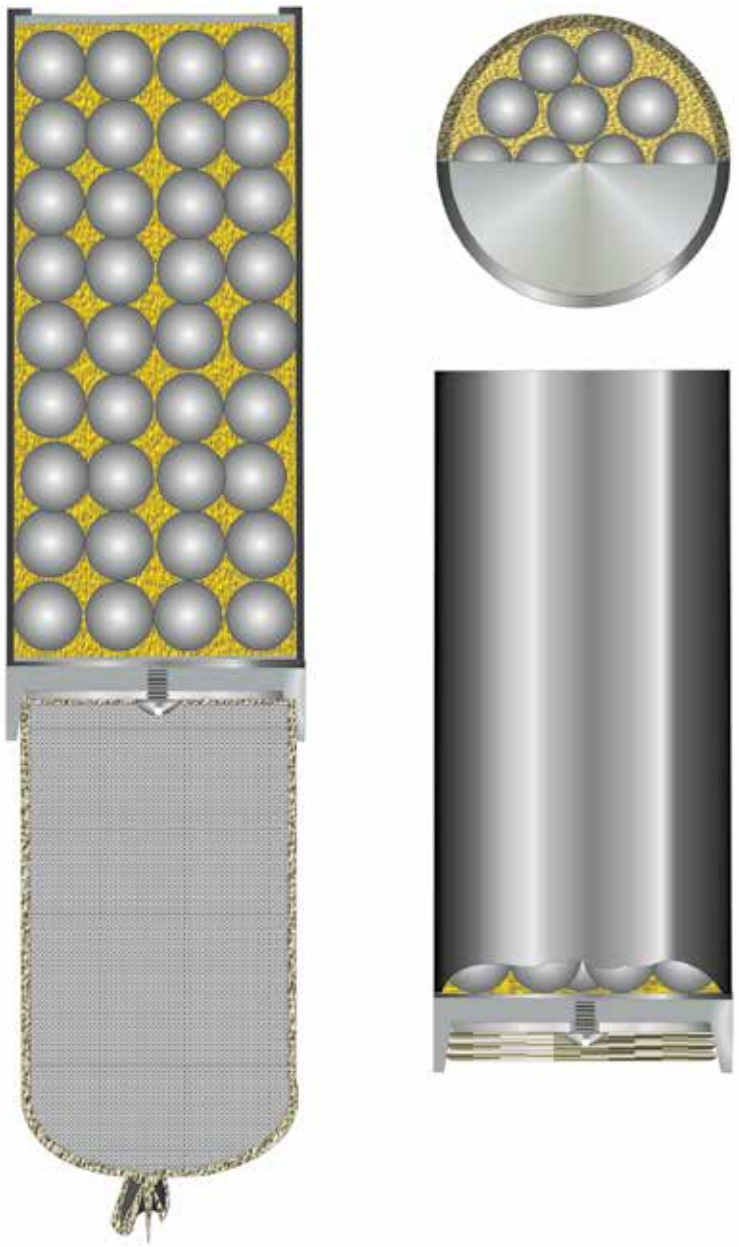
3-inch Eureka (Arrick) shell,
with paper time fuze



Sand casting the Hotchkiss case shot body



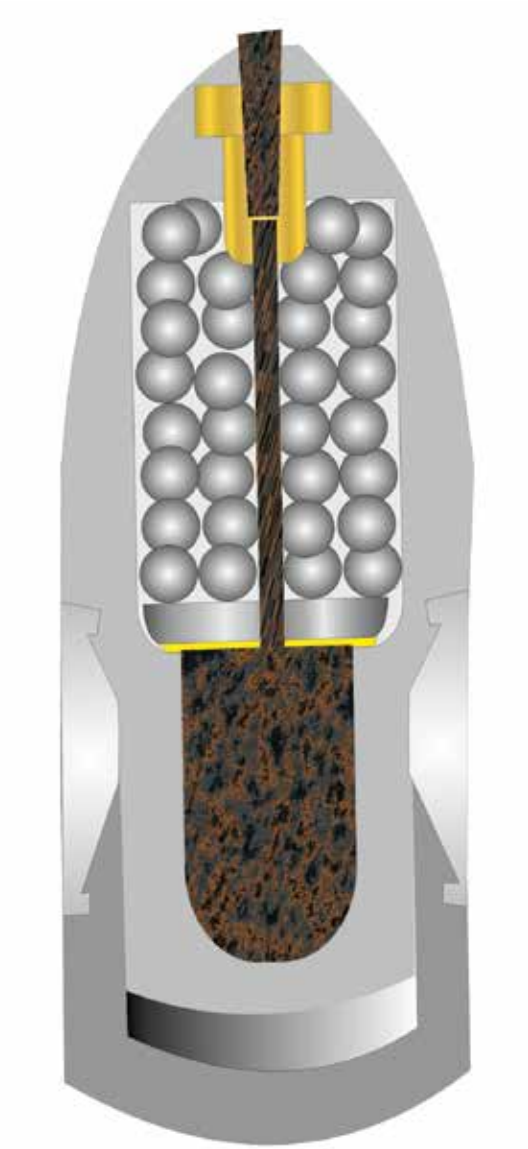
Hotchkiss bolt, flat base,
patent model 32,293



3-inch Hotchkiss canister,
patent drawing 34,058, 2 January 1862



U. S. 3-inch Hitchkiss case shot



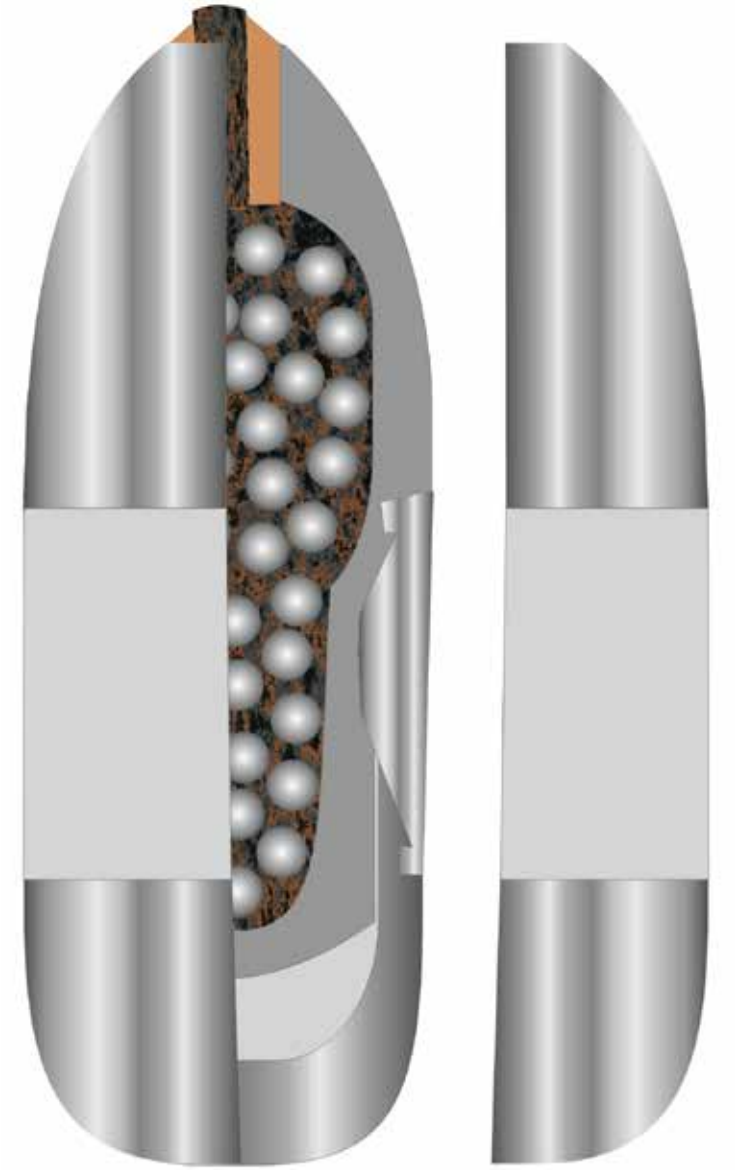
Patent drawing 38,359 of 28 April 1863
C. W. Smith, G. H. Babcock, B. B. Hotchkiss, and C. A. Hotchkiss



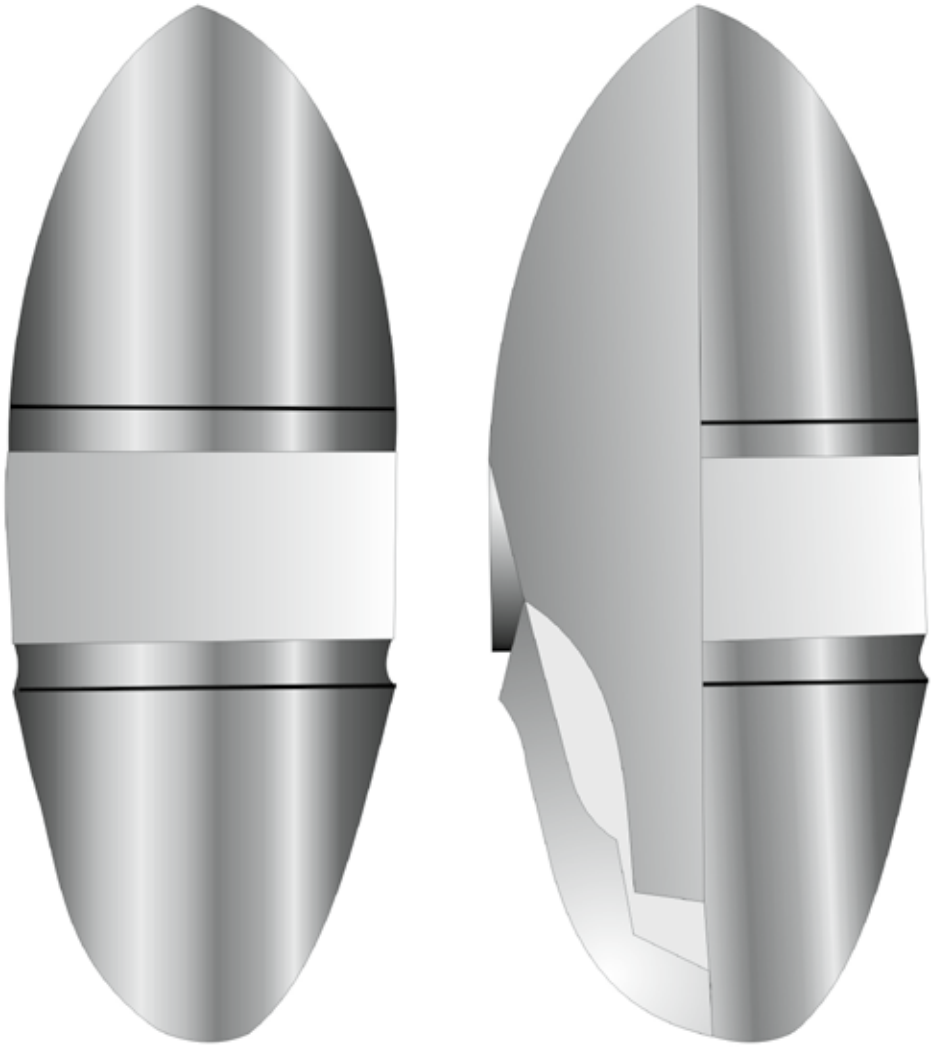
3-inch Hotchkiss flat nose case shot, time fuze adapter



Hotchkiss case shot, sectioned



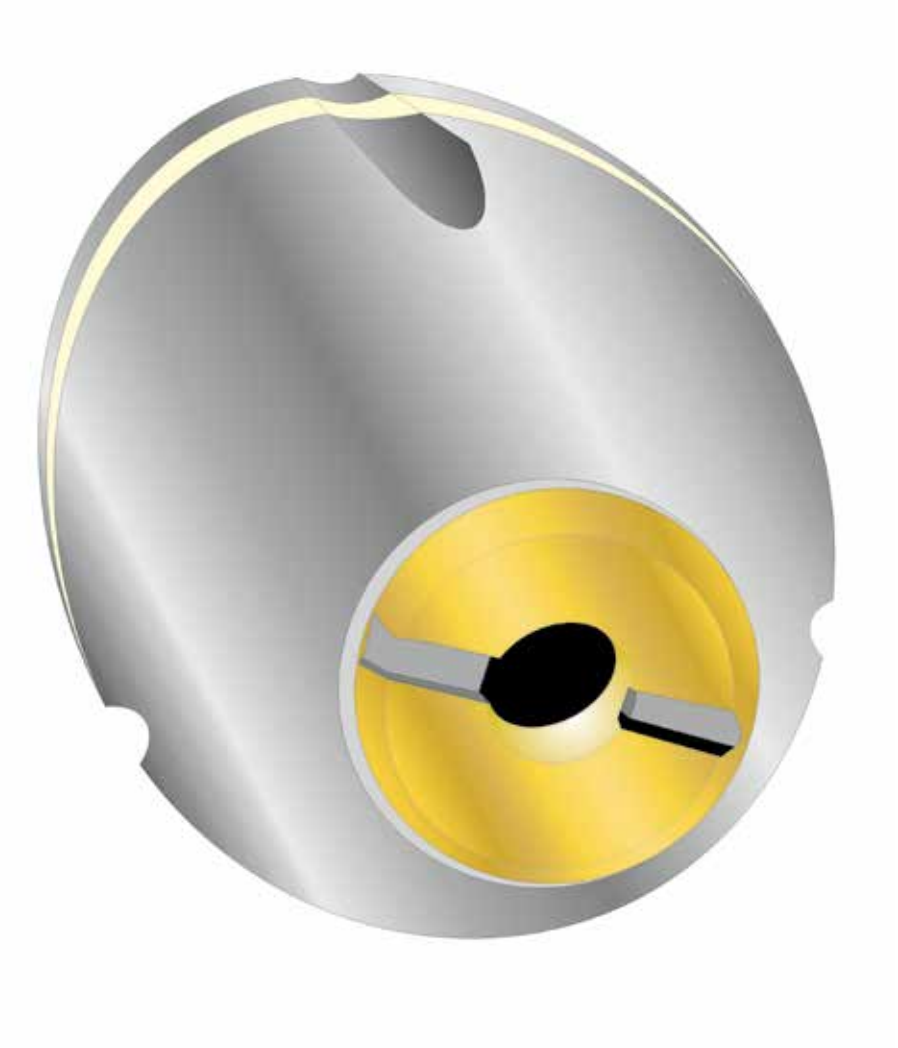
Hotchkiss case shot patent image,
number 35,153 dated 6 May 1863



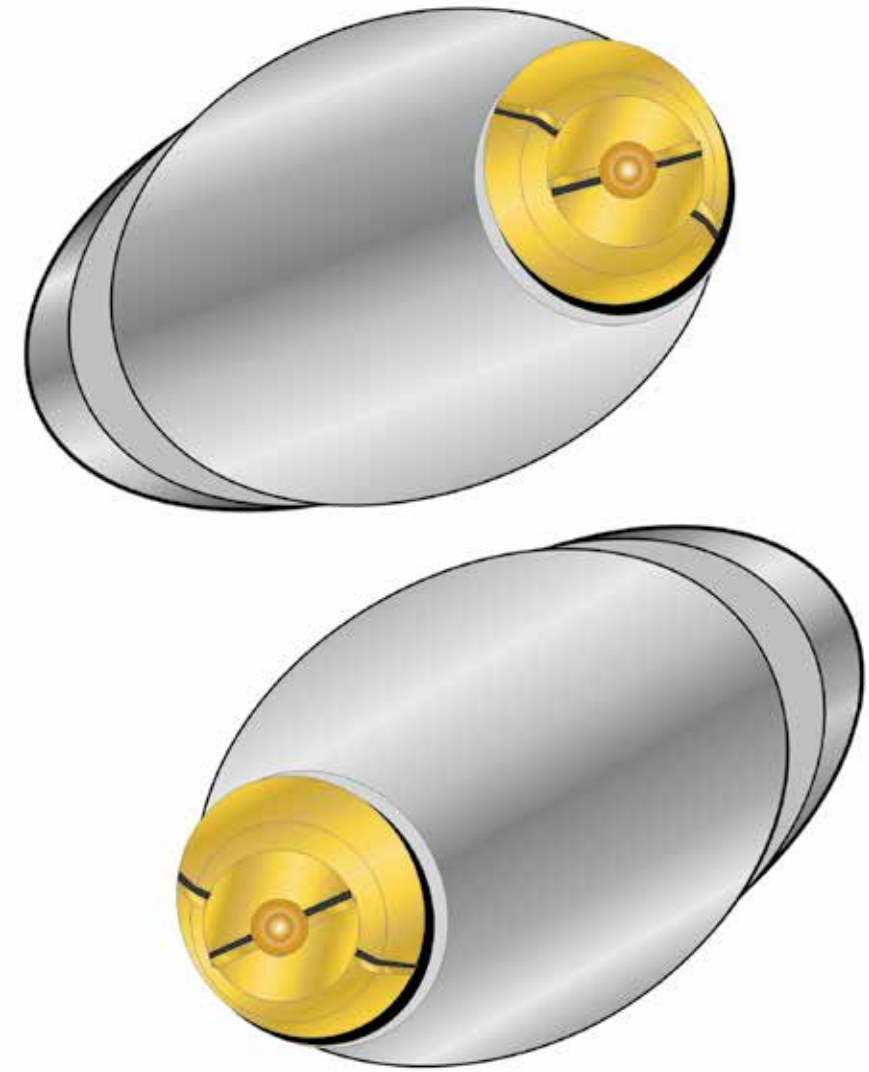
A. A. Hotchkiss original patent mode
13,679, 1855



3-inch Hotchkiss shell, combination fuze



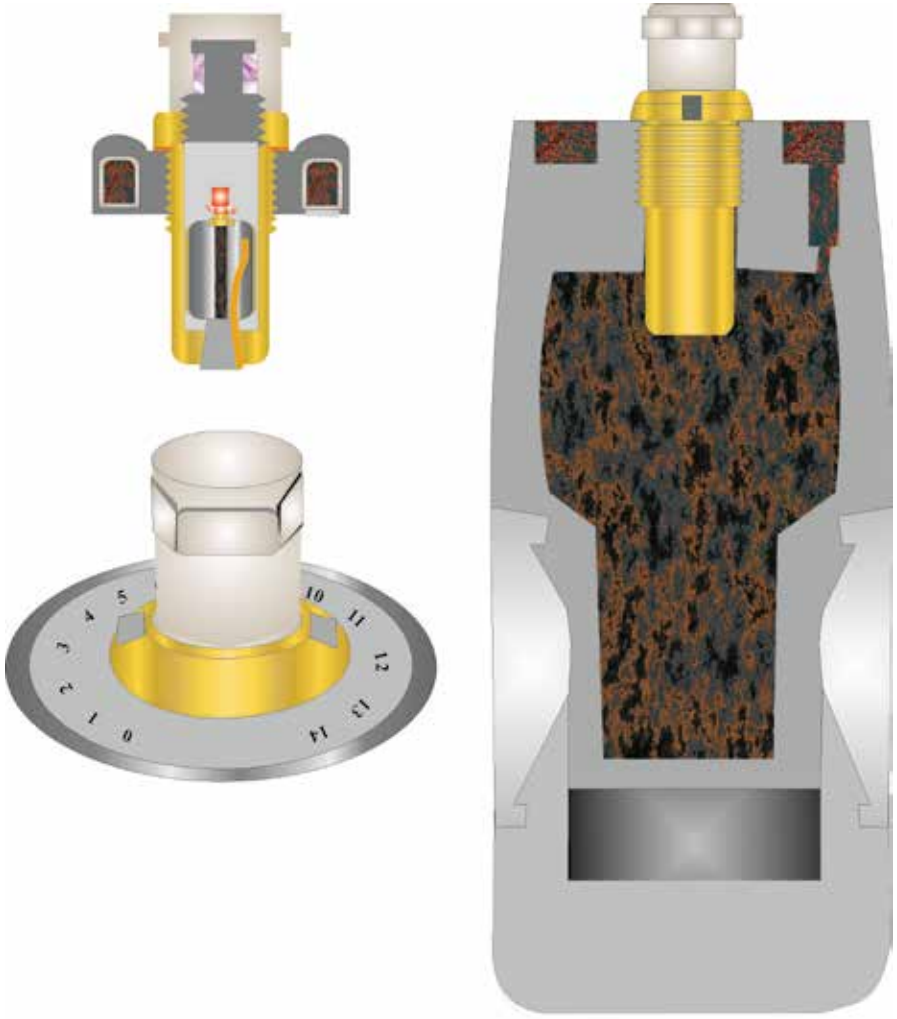
3-inch Hotchkiss shell



3-inch Hotchkiss shell,
percussion shell



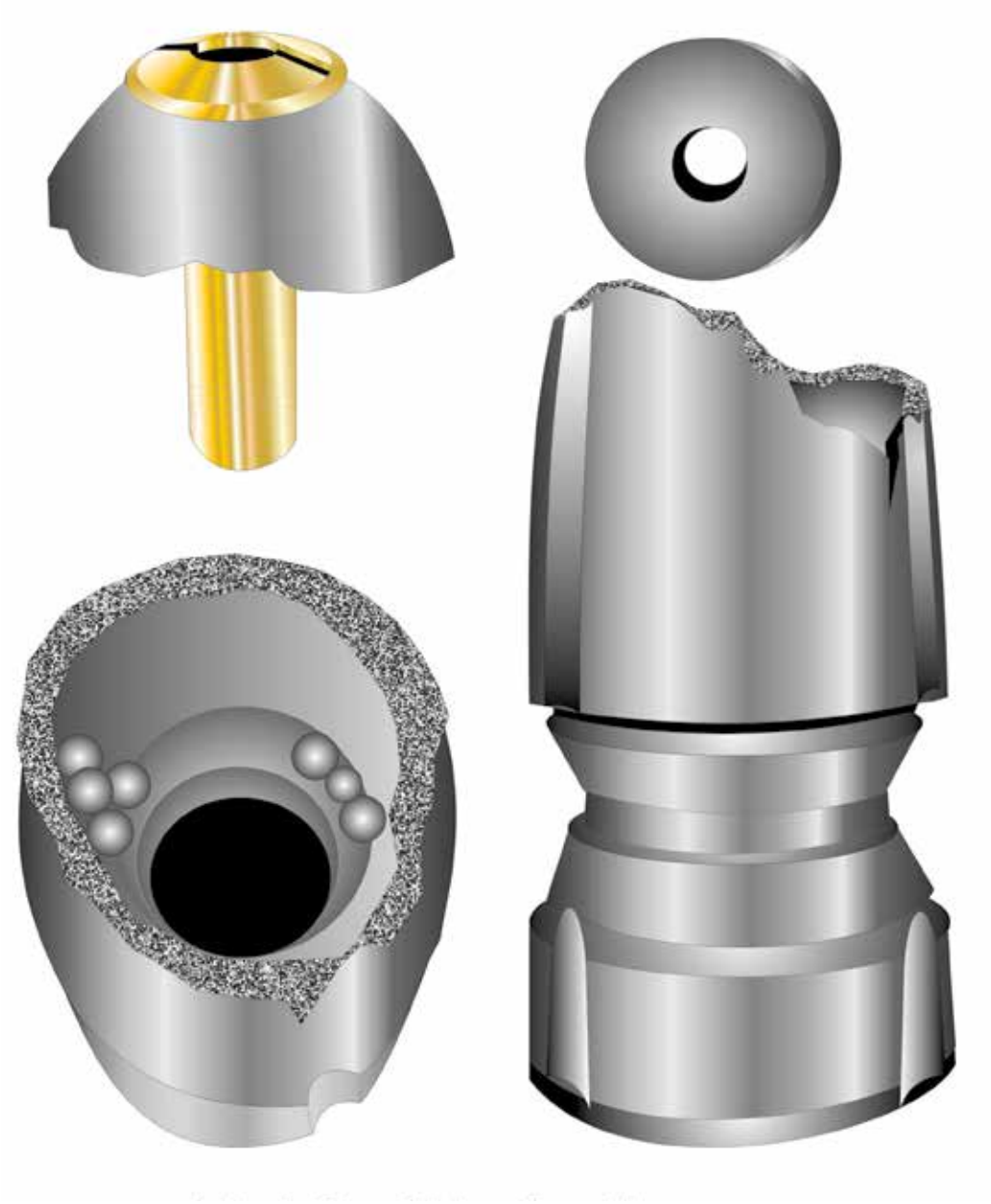
3-inch Hotchkiss shell,
cap plunger and anvil



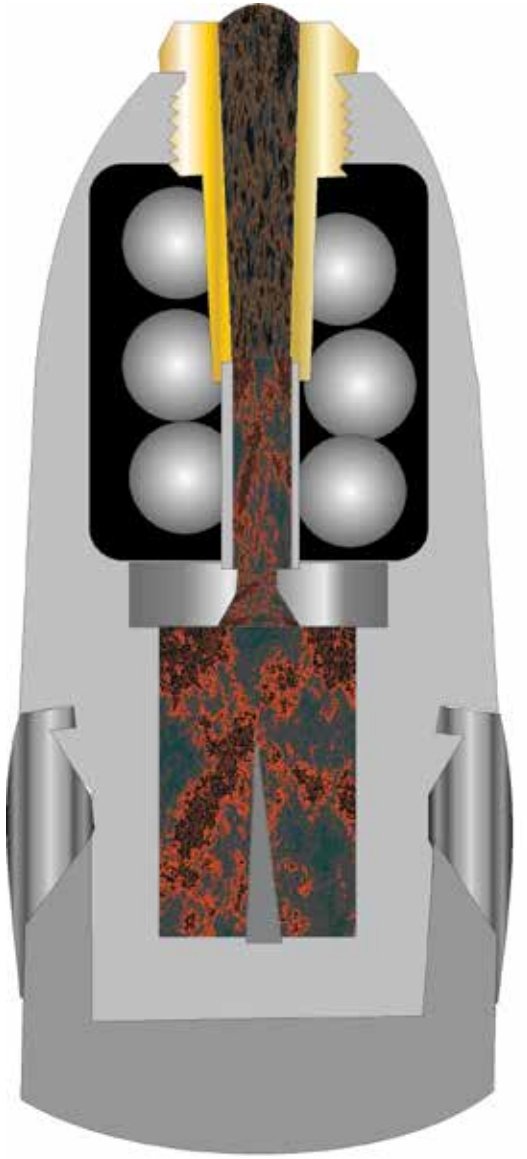
3-inch Hotchkiss shell,
flat topped, sectioned, with combination fuze



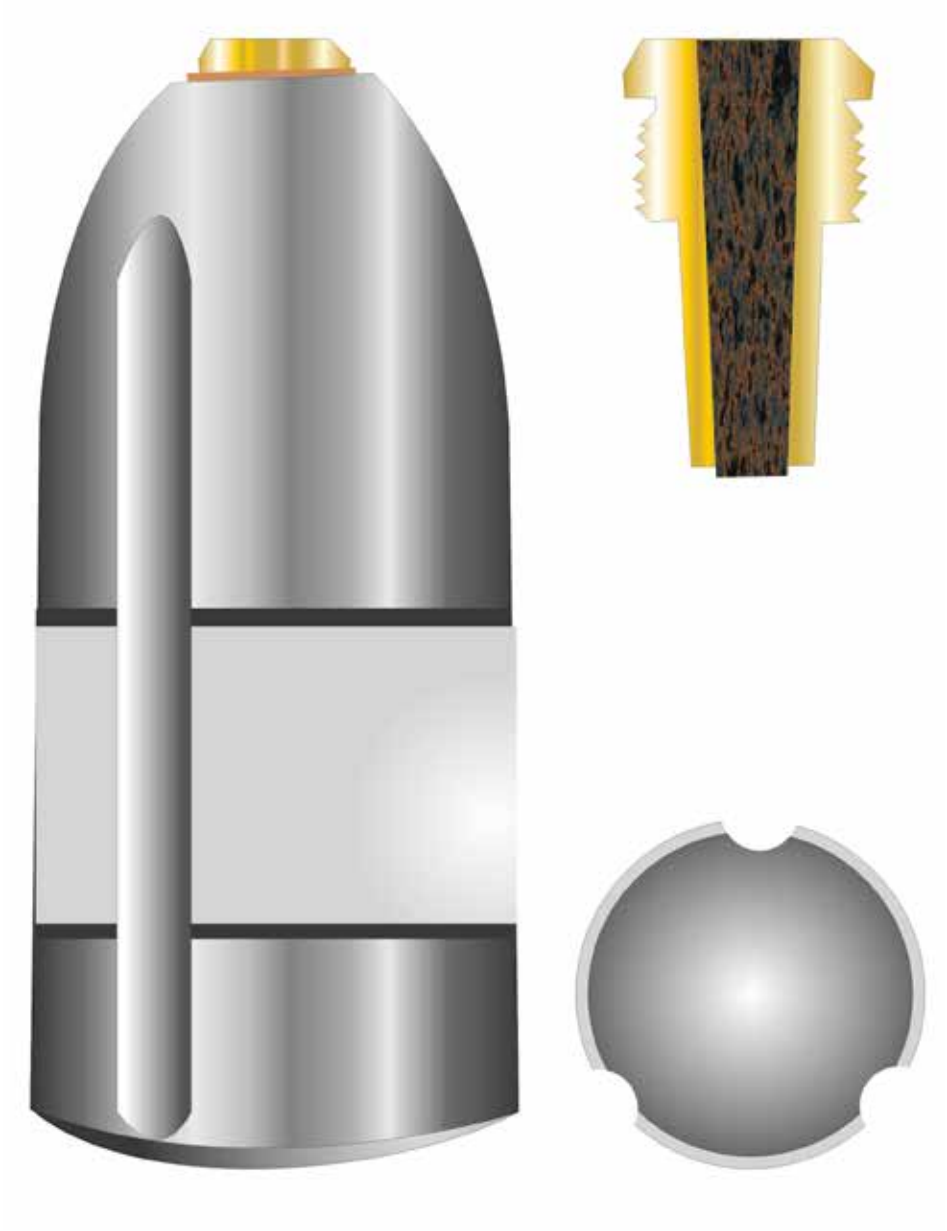
3-inch Hotchkiss bolt,
exploded view



3-inch Hotchkiss case shot, time fuze ddapter



3-inch Hotchkiss case shot, time fuzed, sectioned



3-inch Hotchkiss case shot,
fuze adapter



3-inch Hotchkiss case shot,
flat nosed, combo fuze



3-inch Hotchkiss case shot,
flat nosed, combo fuze

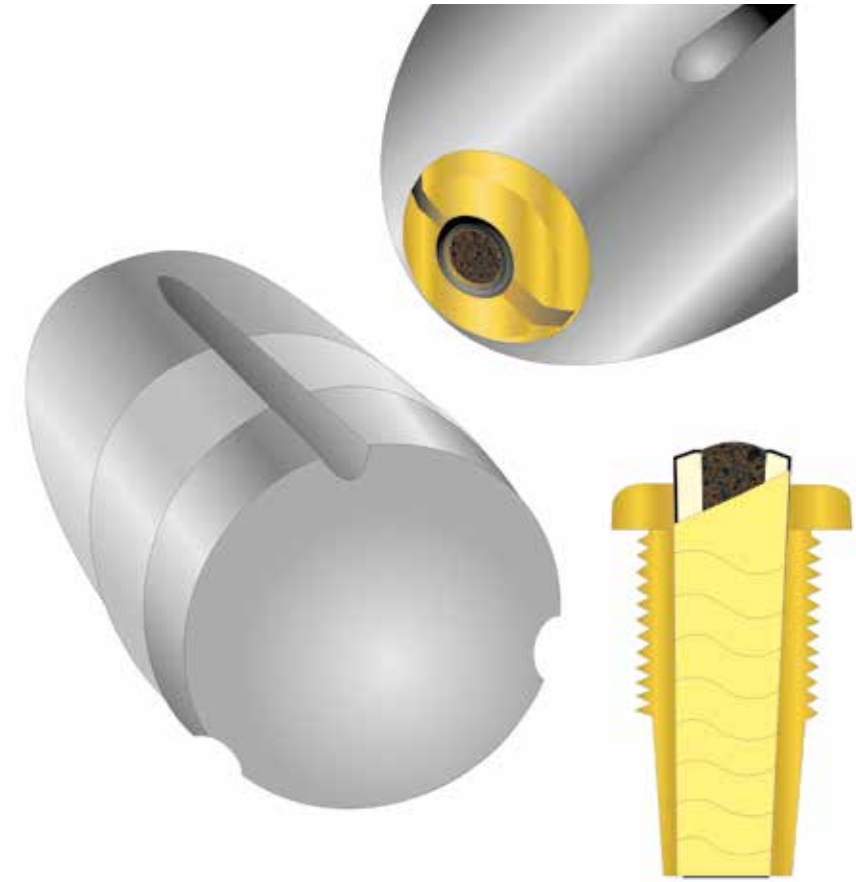


Hotchkiss 14-second
time fuze

3-inch Hotchkiss case shot,
flat nose, Wright fuze



3-inch Hotchkiss case shot,
combination fuzes



Brass adapter and
paper time fuze

3-inch Hotchkiss case shot,
nose fuze



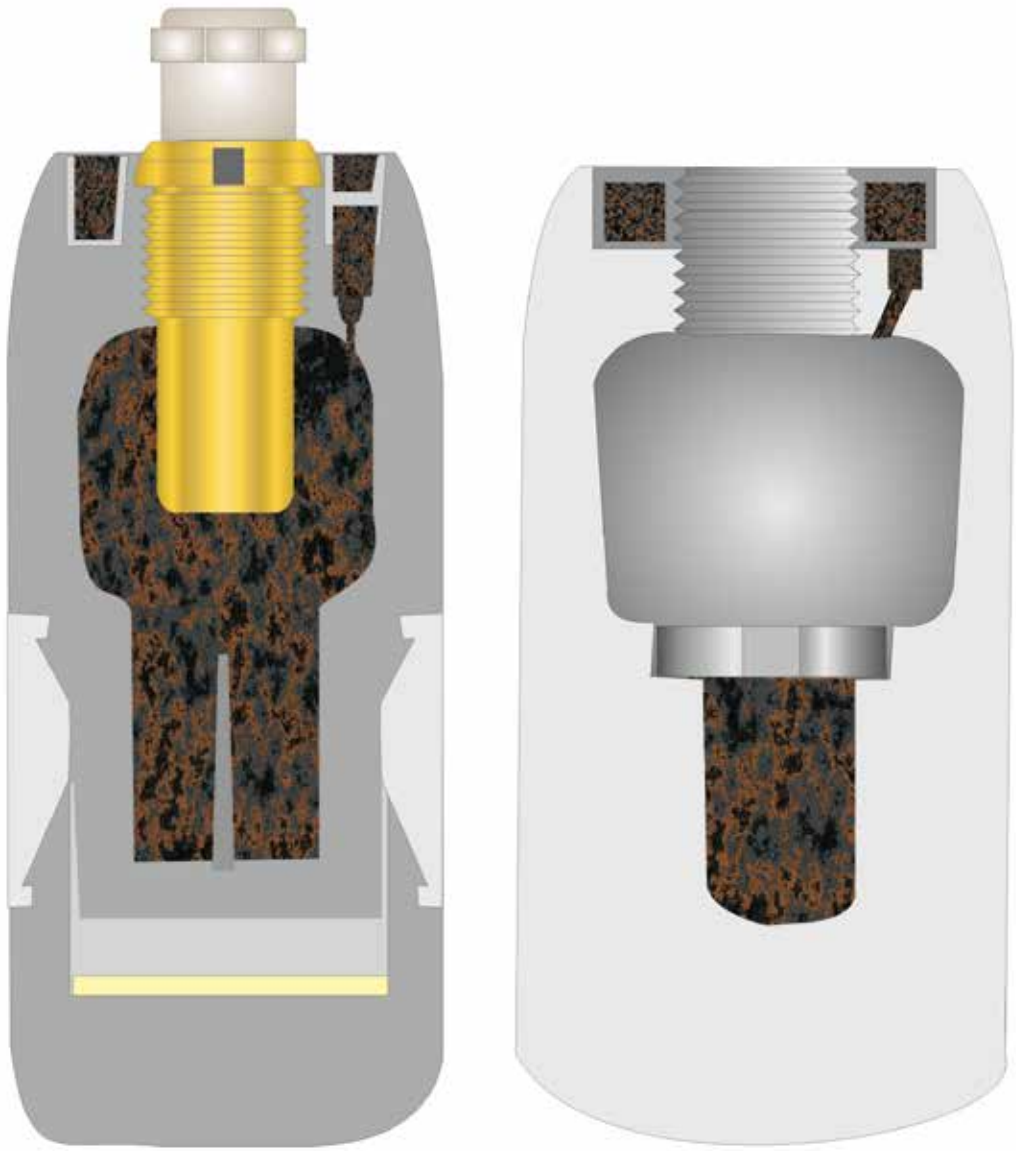
3-inch Hotchkiss case shot, body and base cup



3-inch Hotchkiss case shot, fragment and fuze



3-inch James shell, Type II,
James percussion fuze



Melton's flat nose Hotchkiss shell



3-inch Mullane shell, time fuze



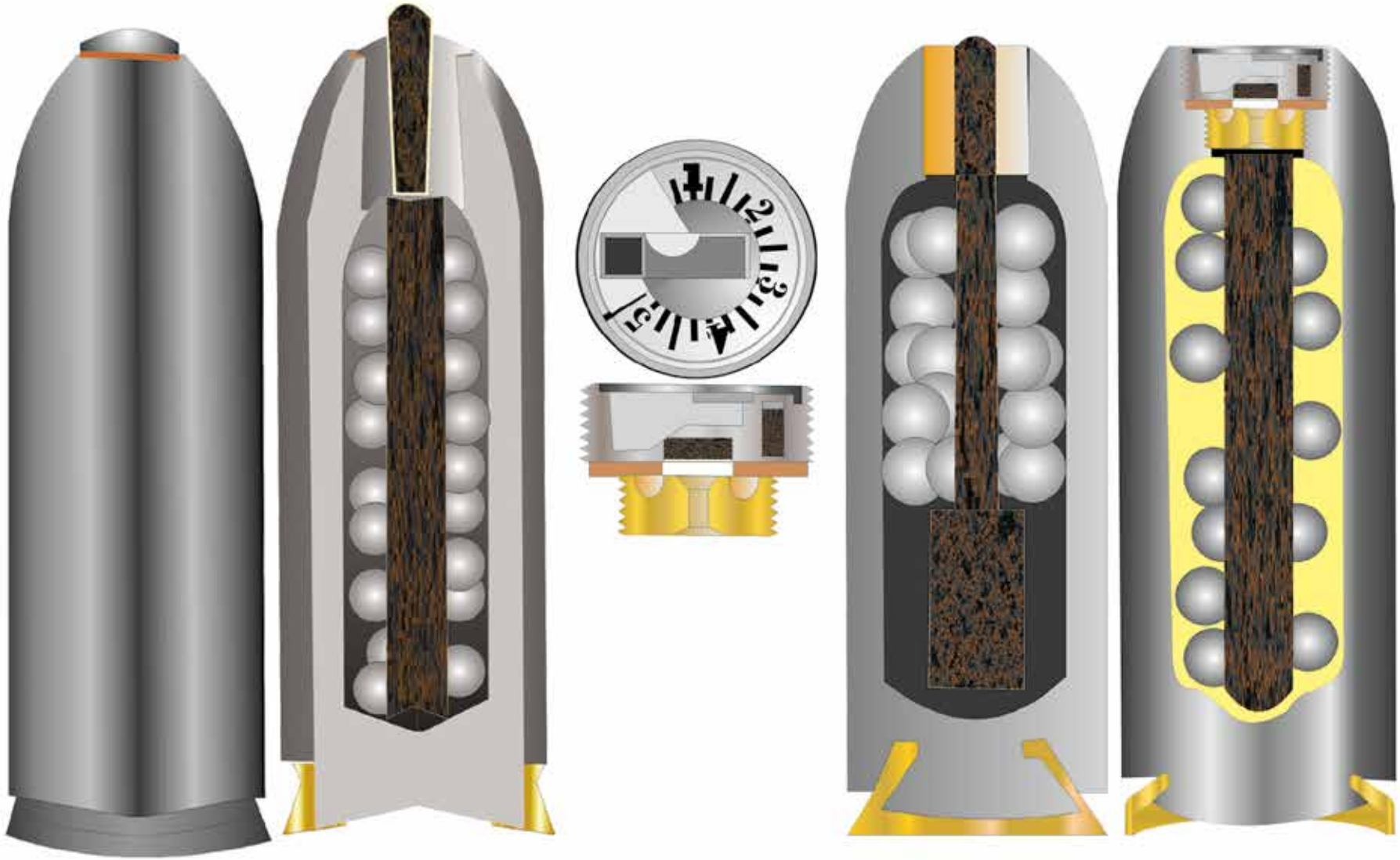
3-inch Mullane case shot



U.S. 3-inch Parrott shell,
brass adapter



U.S. 3-inch Parrott case shot,
canned burster



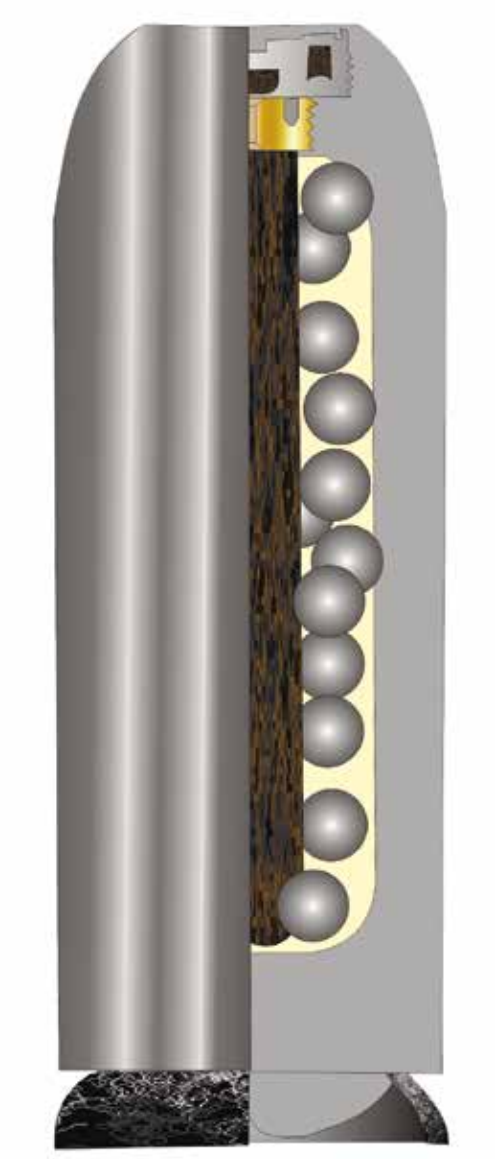
3-inch Parrott case shot; quarter view; Bormann time fuze; canned burster; with Bormann fuze inserted



3-inch Reed shell,
wrought iron sabot, sectioned



3-inch Reed case shot



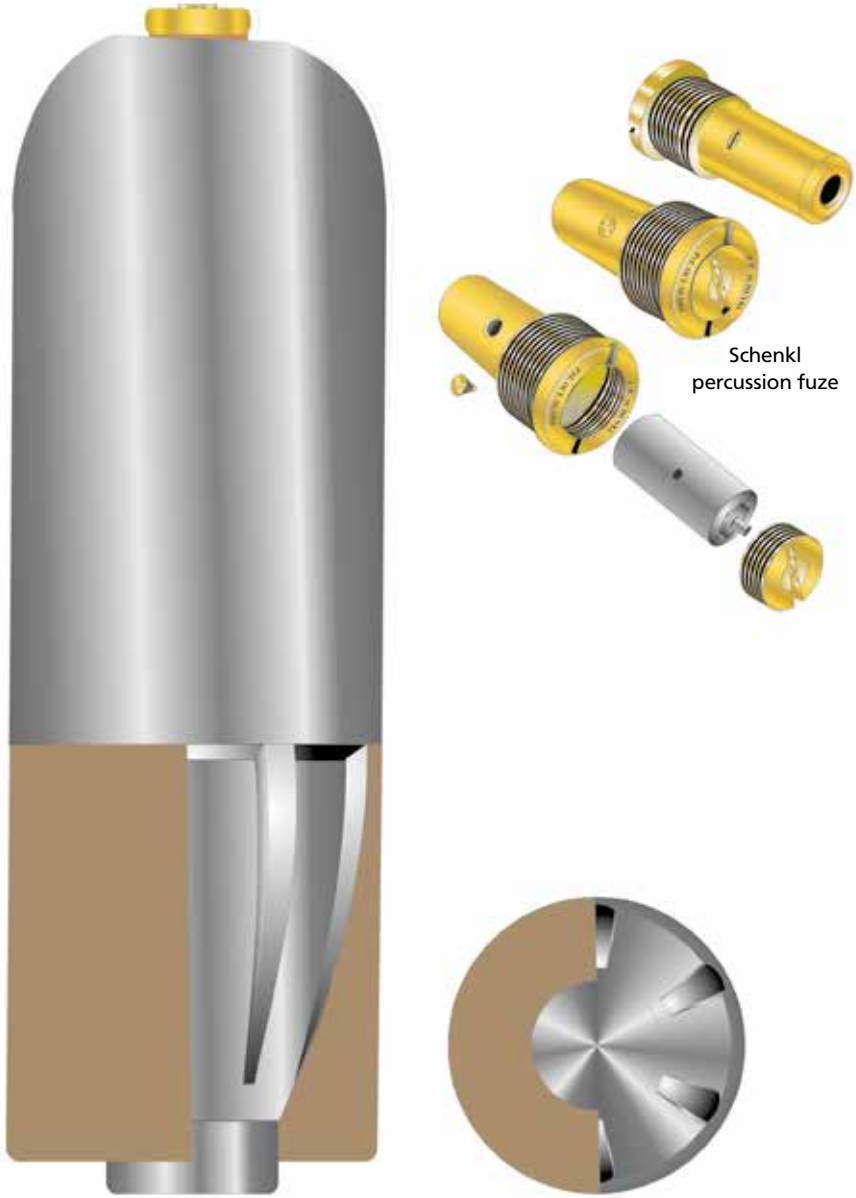
3-inch Reed case shot,
Bormann time fuze



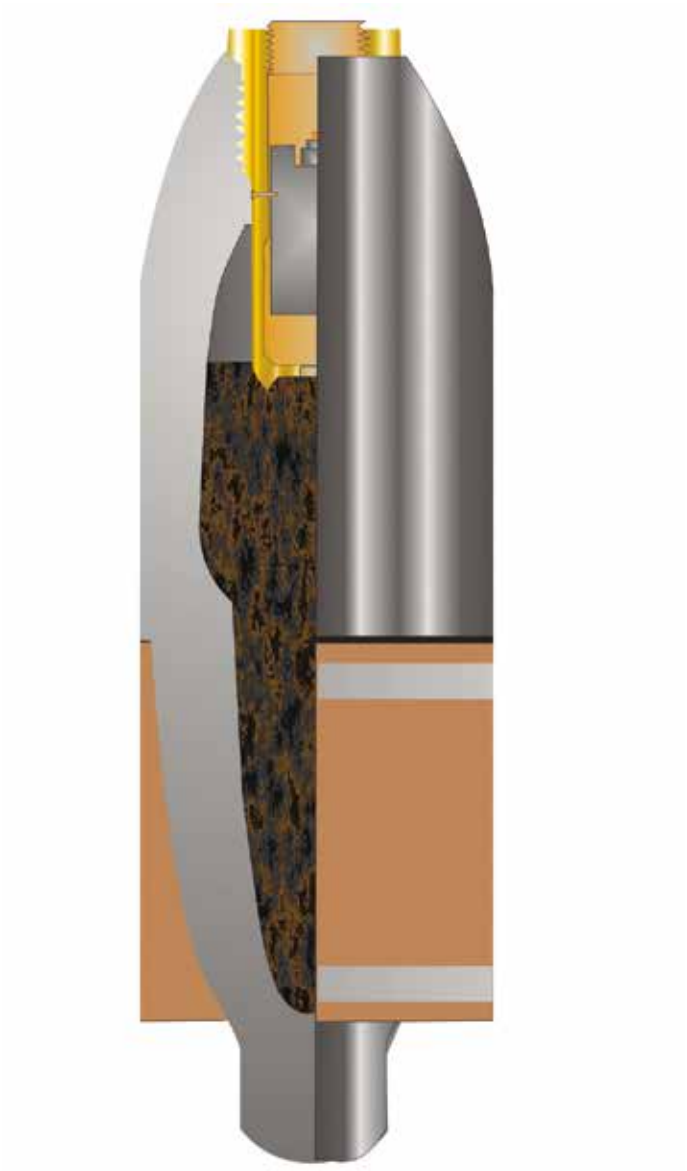
3-inch Reed shell,
brass fuze adapter



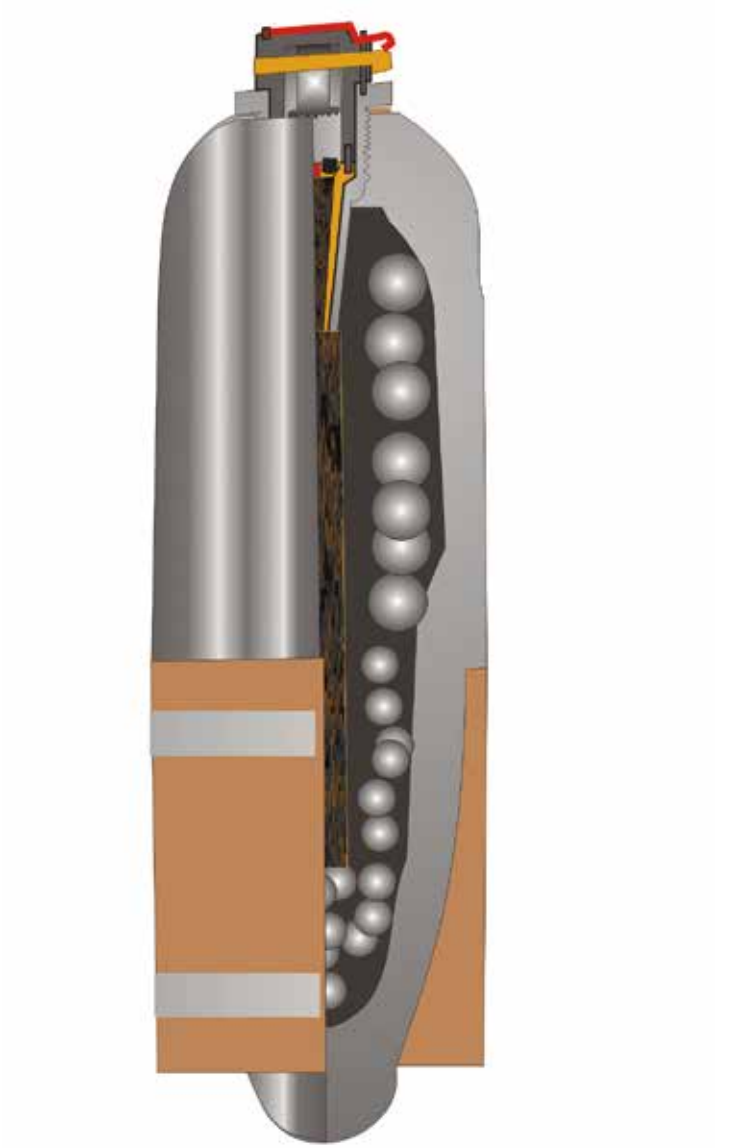
3-inch Schenkl shell,
Schenkl percussion fuze



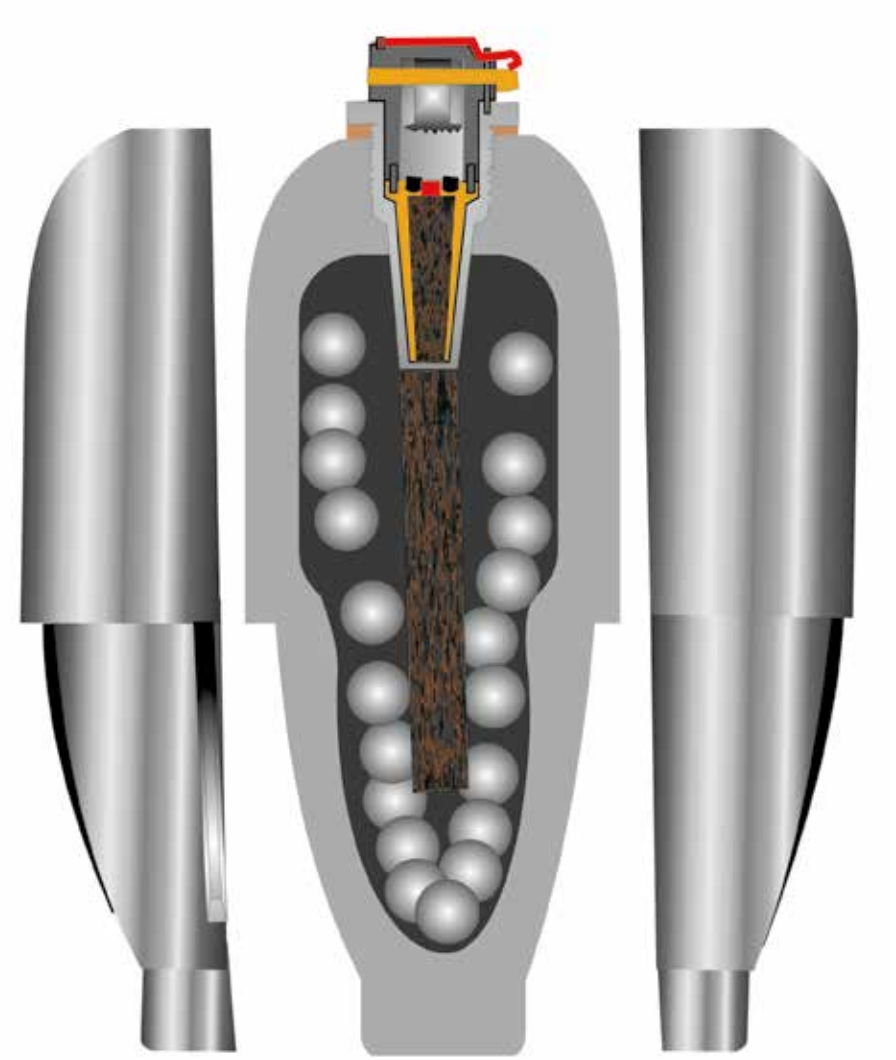
3-inch Schenkl shell,
percussion fuze



3-inch Schenkl shell,
sectioned, percussion fuze



3-inch Schenkl case shot,
sectioned, combination fuze



3-inch Schenkl case shot, combination fuze

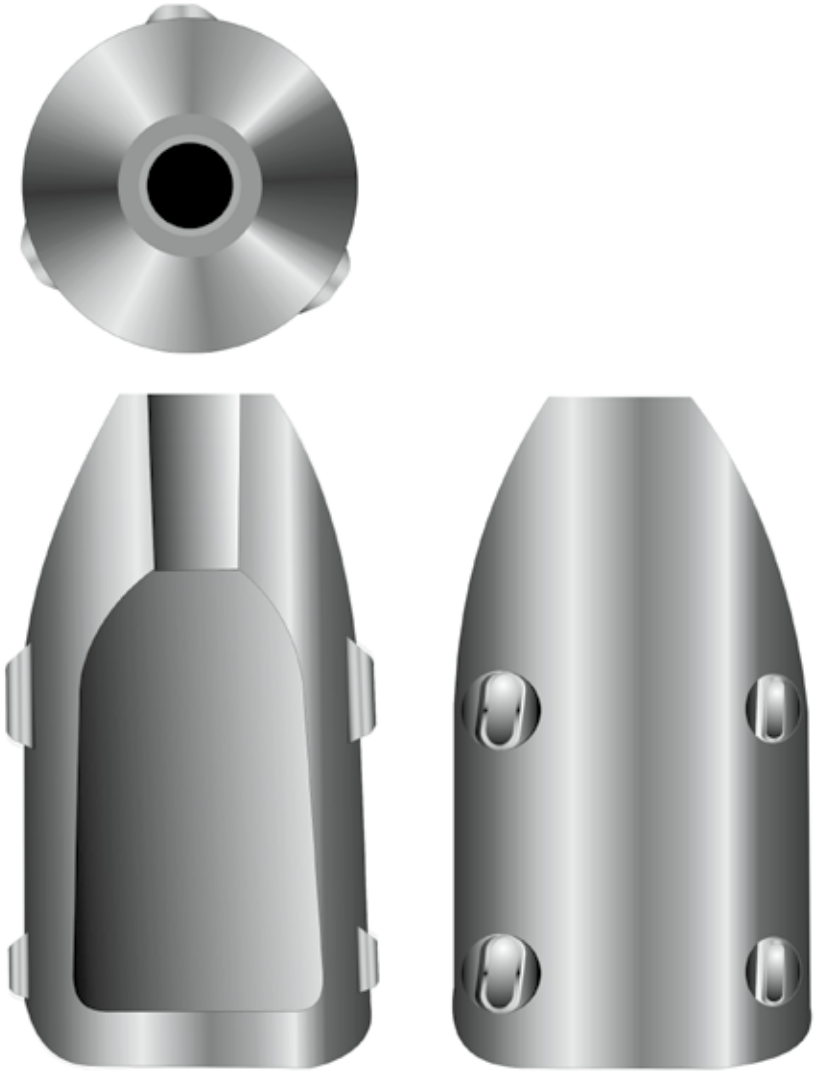


Eureka shell sabot, 1875, Clifford Arrick

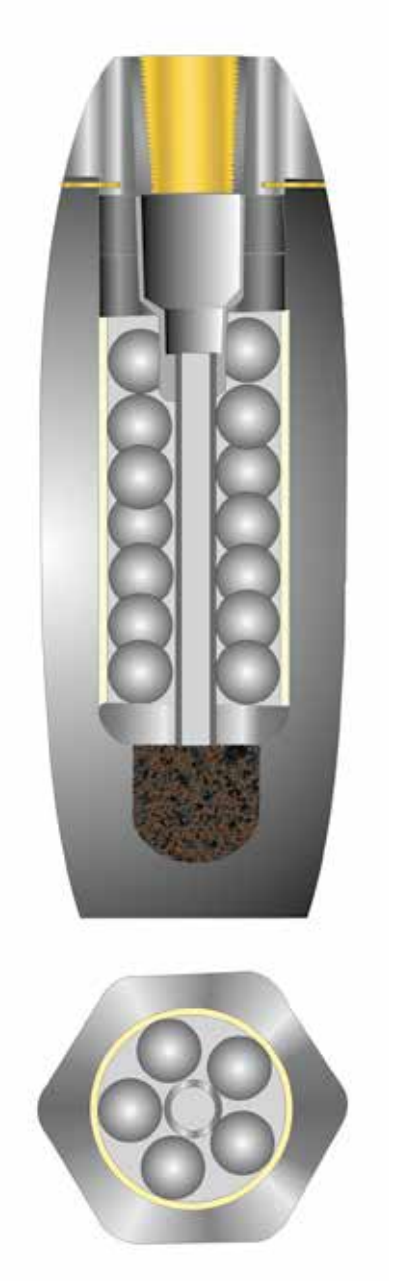
3-inch Eureka (Arrick) shell



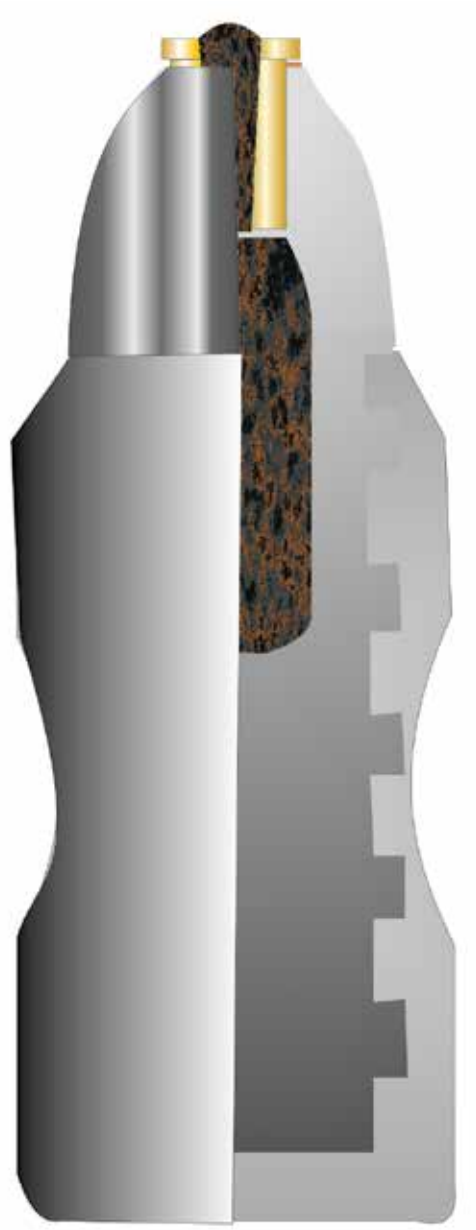
3-inch Eureka (Arrick) shell,
production model, 1864



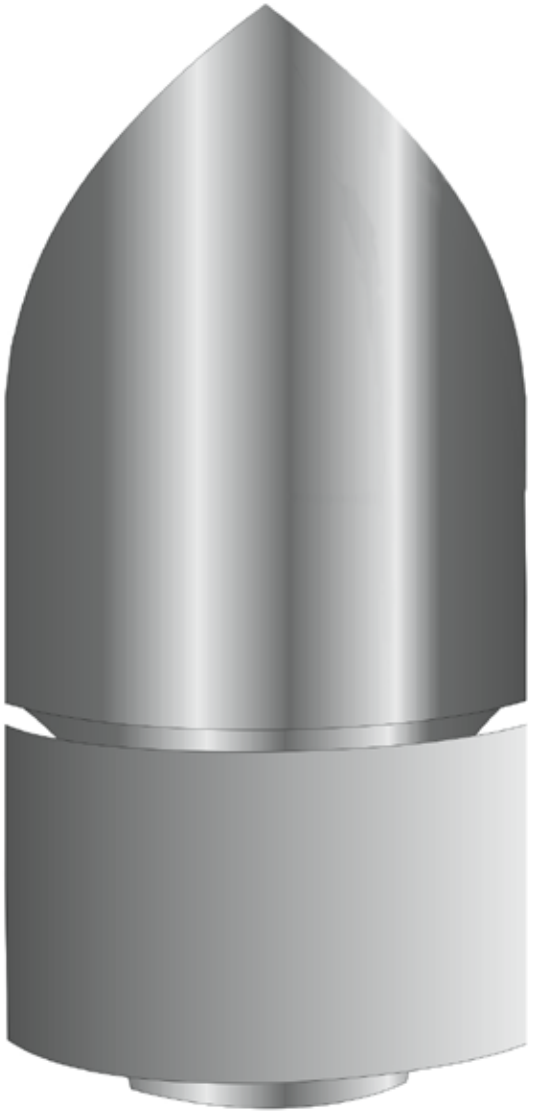
3-inch lead studded shell



British 3-inch Whitworth case shot



3.12-inch Armstrong shell



3.22-inch Archer bolt, wide sabot



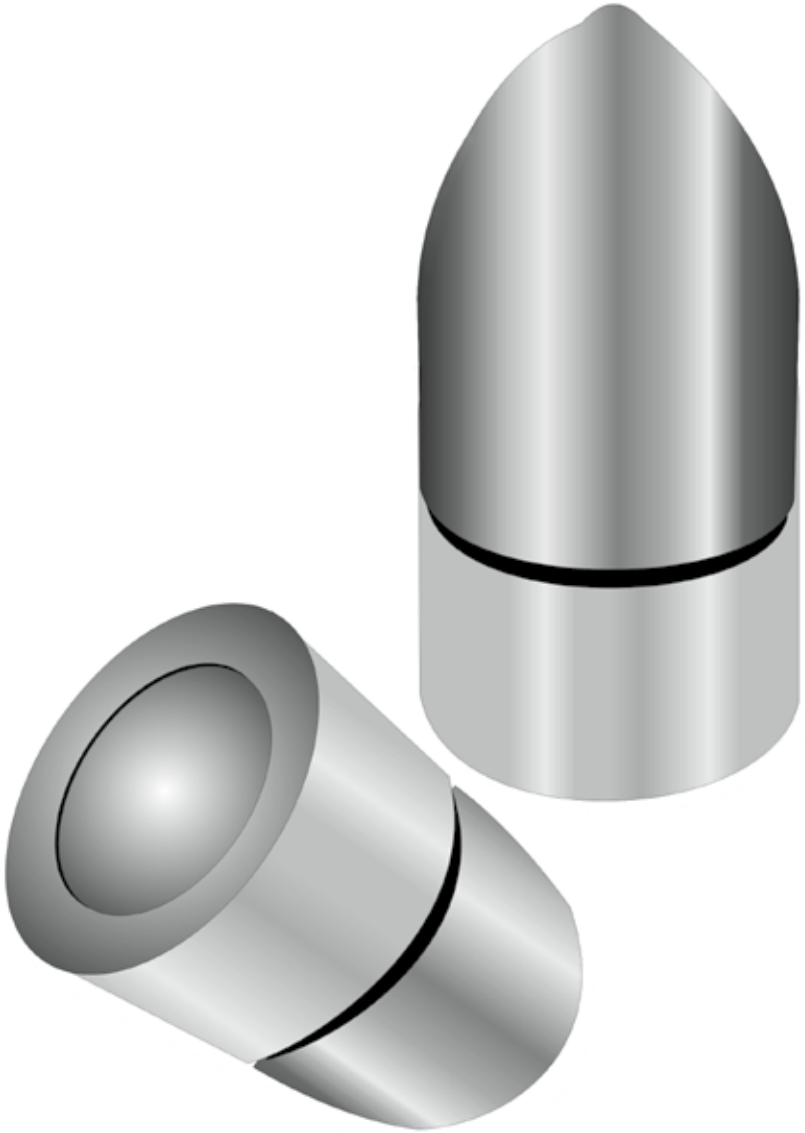
3.23-inch Reed shell



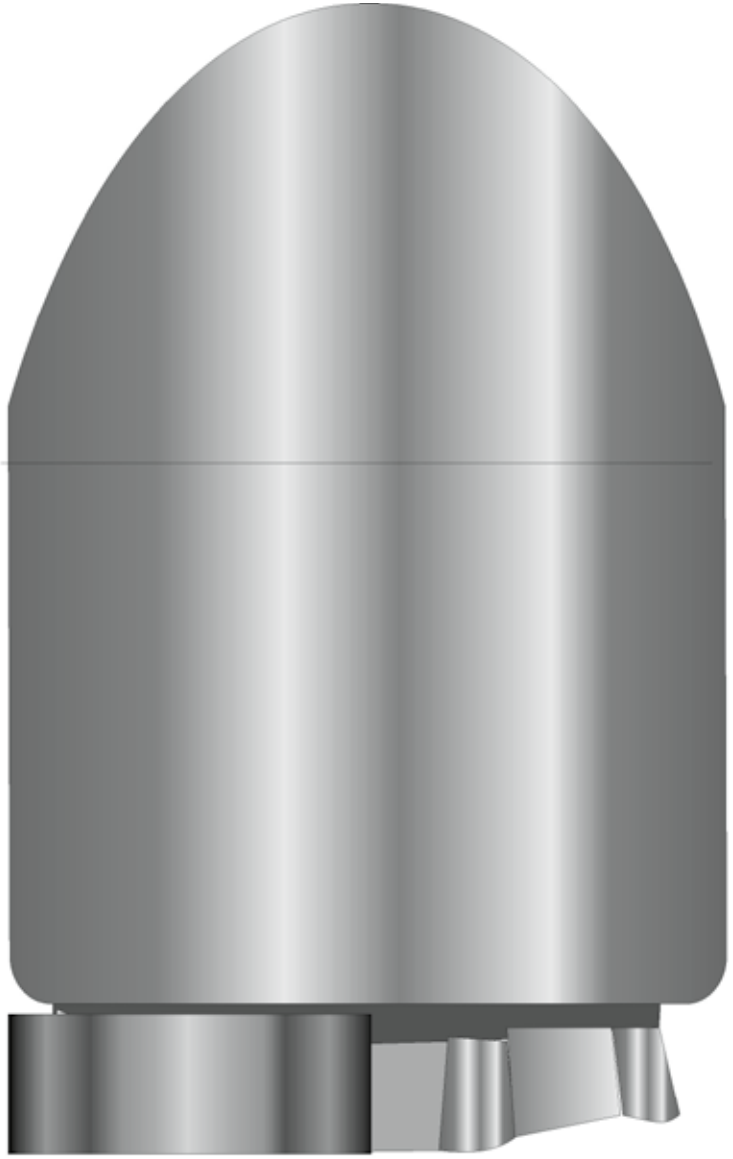
C.S. 3.23-inch Read shell,
sectioned



C.S. 3.23-inch Read shell,
fuze adapter



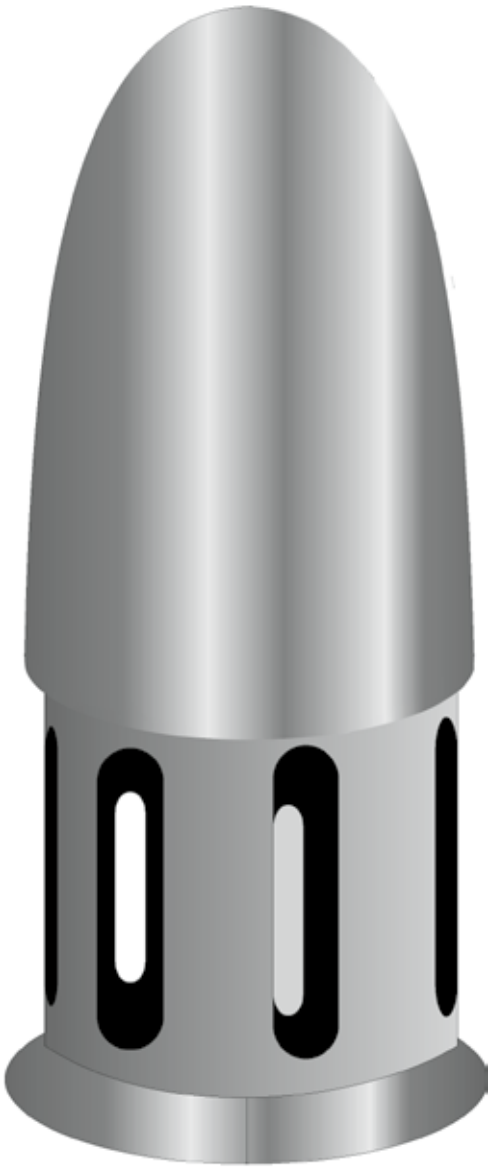
3.3-inch Archer bolt



3.3-inch Burton bolt,
lead sabot, sectioned



3.3-inch Navy Schenkl shell



3.3-inch James bolt

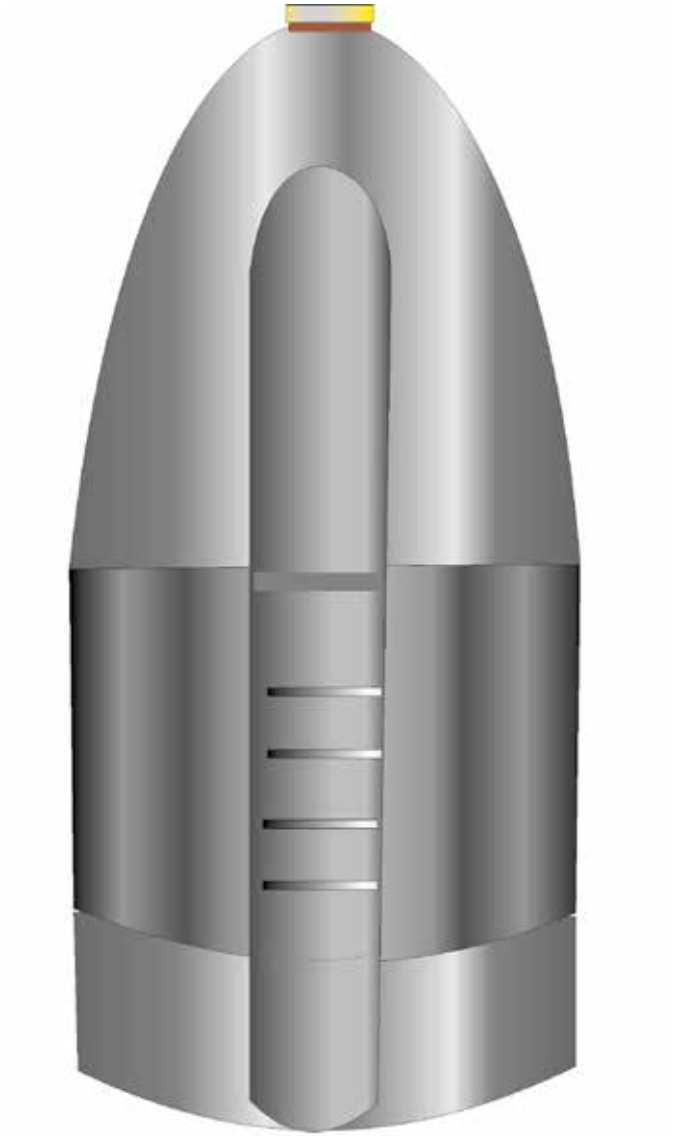


3.3-inch Reed shell,
fuze adapter, sectioned



Length: 6.33 inches
Diameter: 3.32-inches
Weight (empty): 7.8 lbs.

British 3.32-inch zinc studded shell,
Elswick Ordnance Company, UK



3.4-inch Hotchkiss case shot, wire wrapped



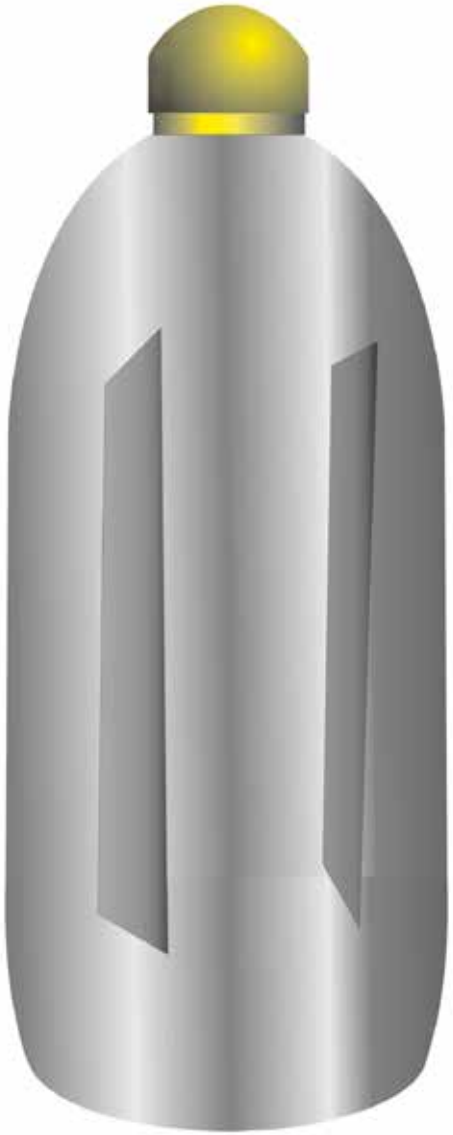
3.4-inch Burton shell, lead sabot



3.4-inch Schenkl shell with sabot



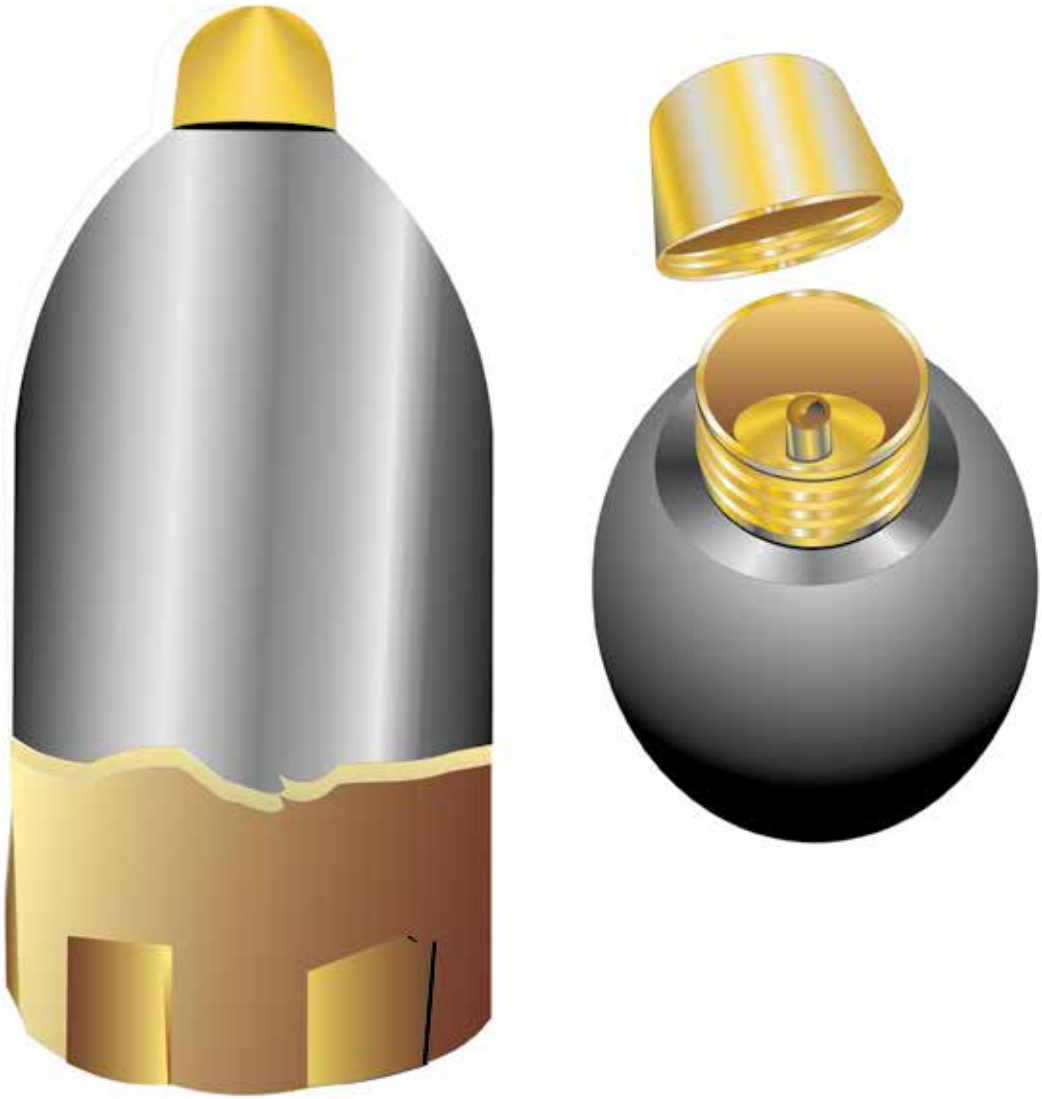
3.4-inch Schenkl shell, for boat howitzer



3.5-inch British Blakely shell



3.5-inch Britten shell,
with angled views



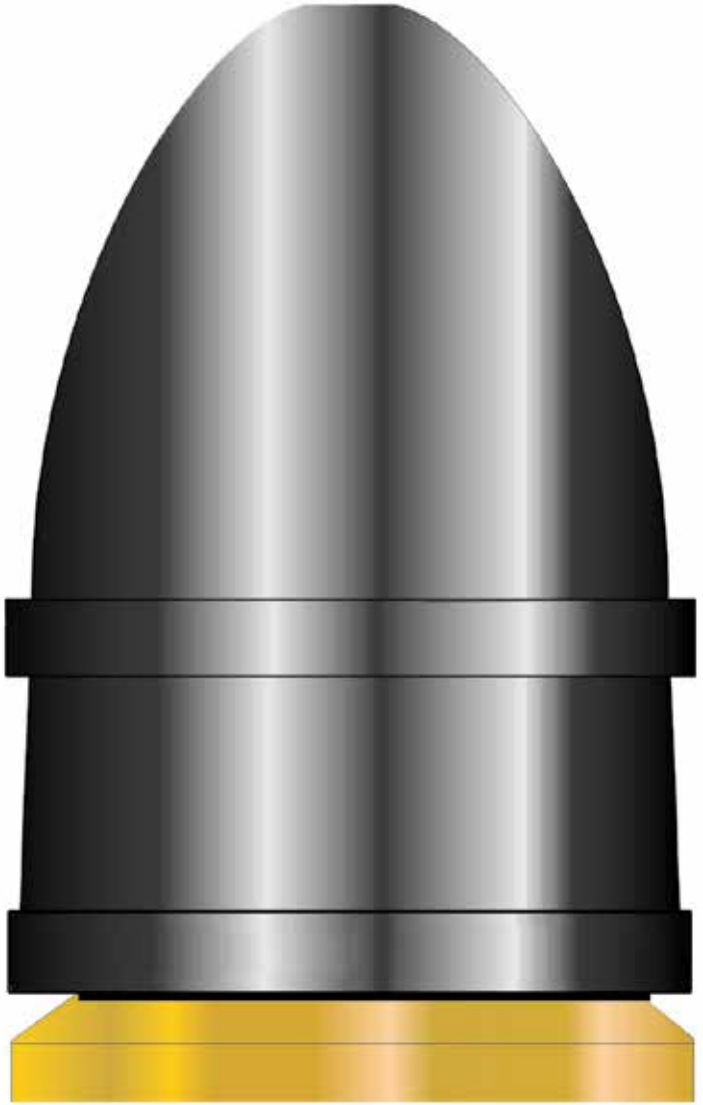
3.5-inch Britten-Blakely shell



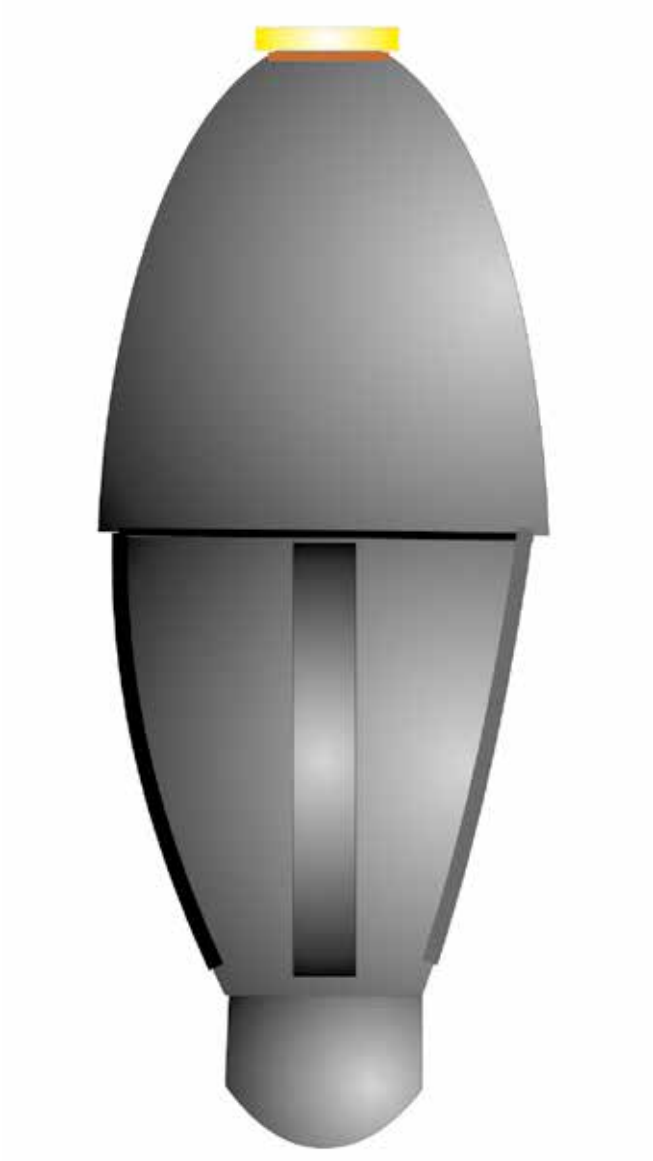
3.5-inch Blakely bolt



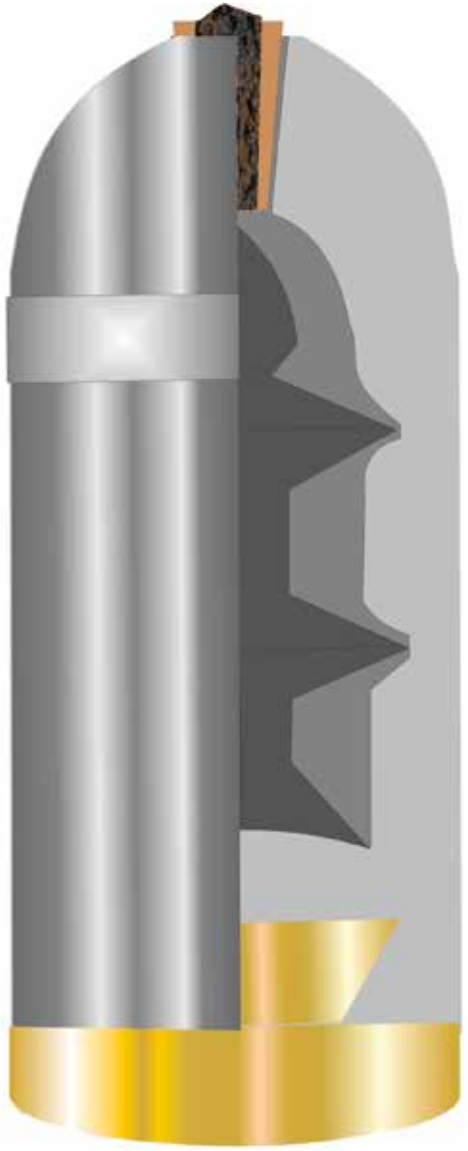
3.6-inch Britten shell and time fuze adapter, pointed nose "Georgiana," 1860



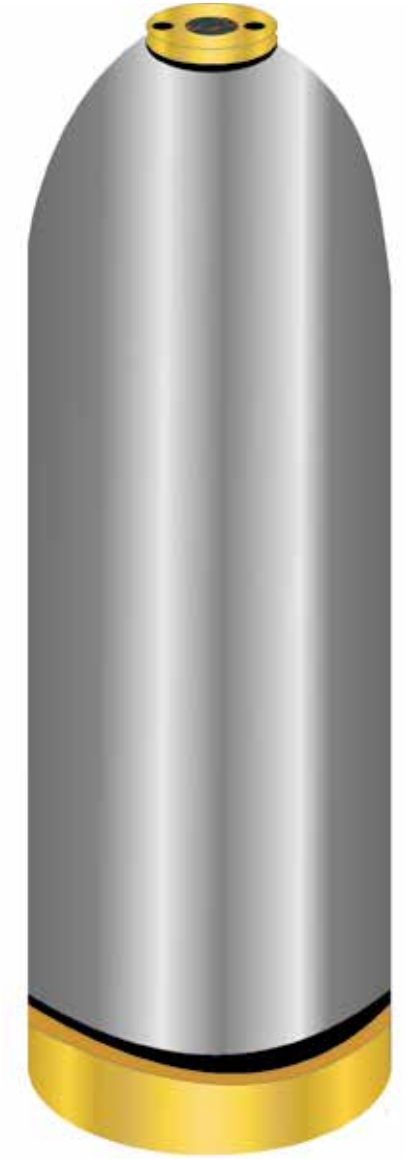
3.6-inch Selma bolt



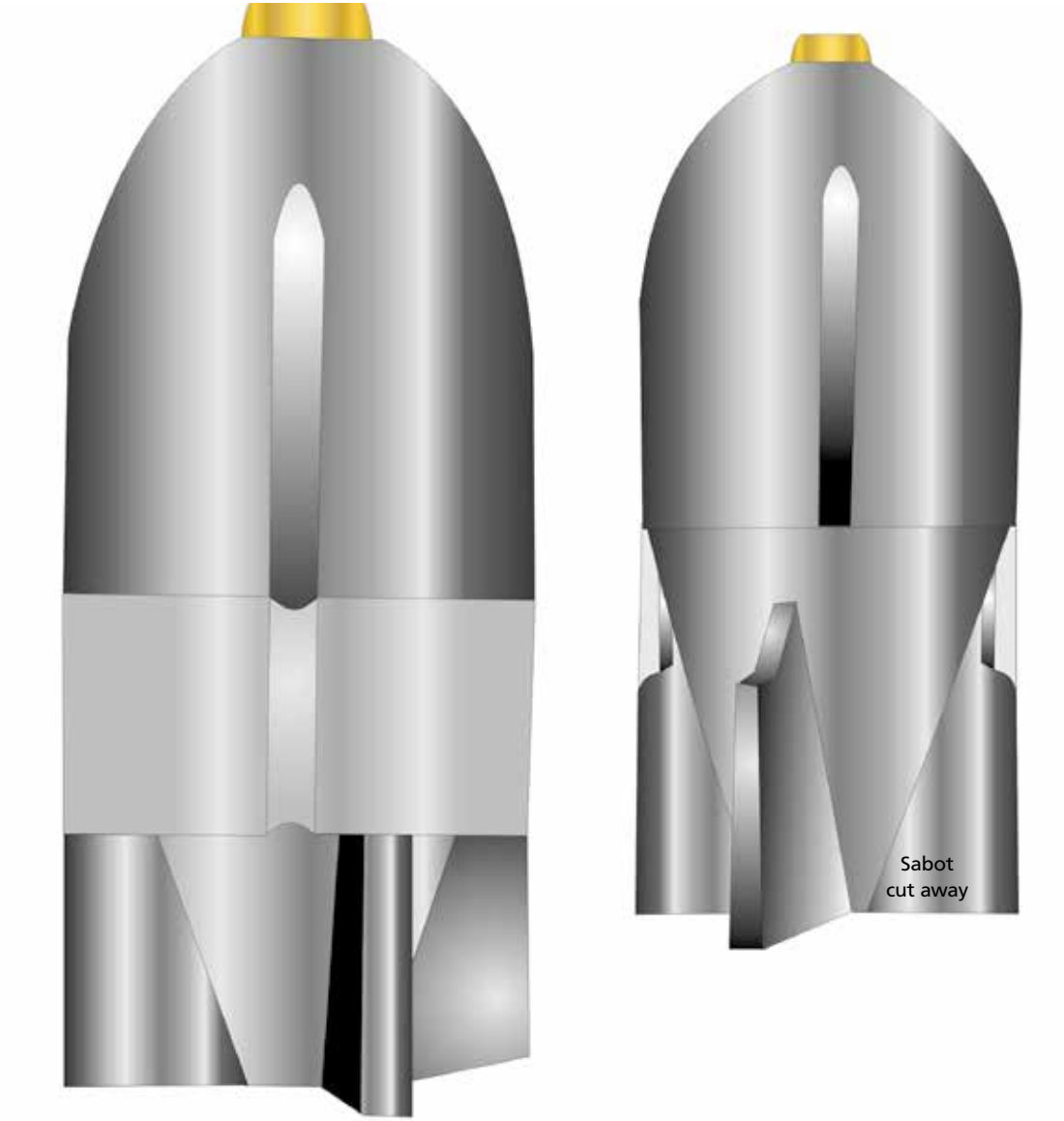
3.62-inch Schenkl shell



3.62-inch Selma segmented shell



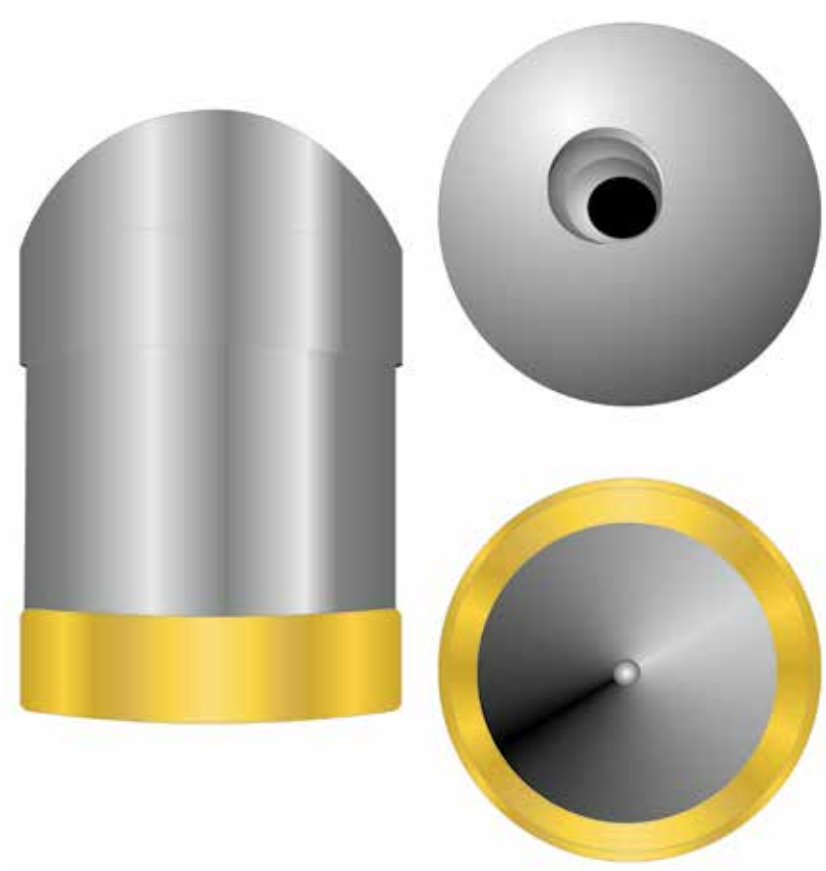
3.65-inch Reed shell,
paper time fuze



C.S. 3.67-inch finned Archer shell,
time fuze adapter



3.67-inch Braun shell



3.67-inch Braun shell, segmented wooden time fuze adapter



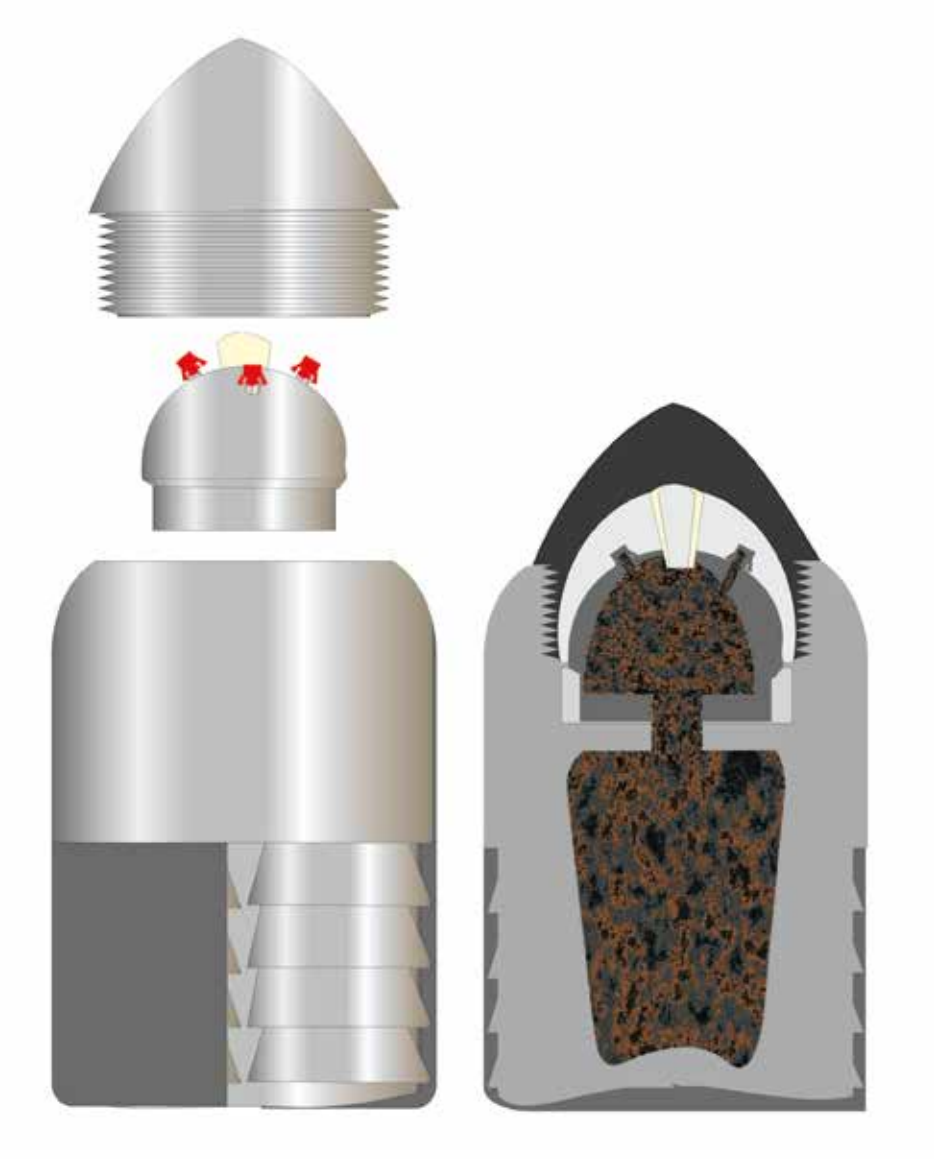
3.67-inch Cochran bolt



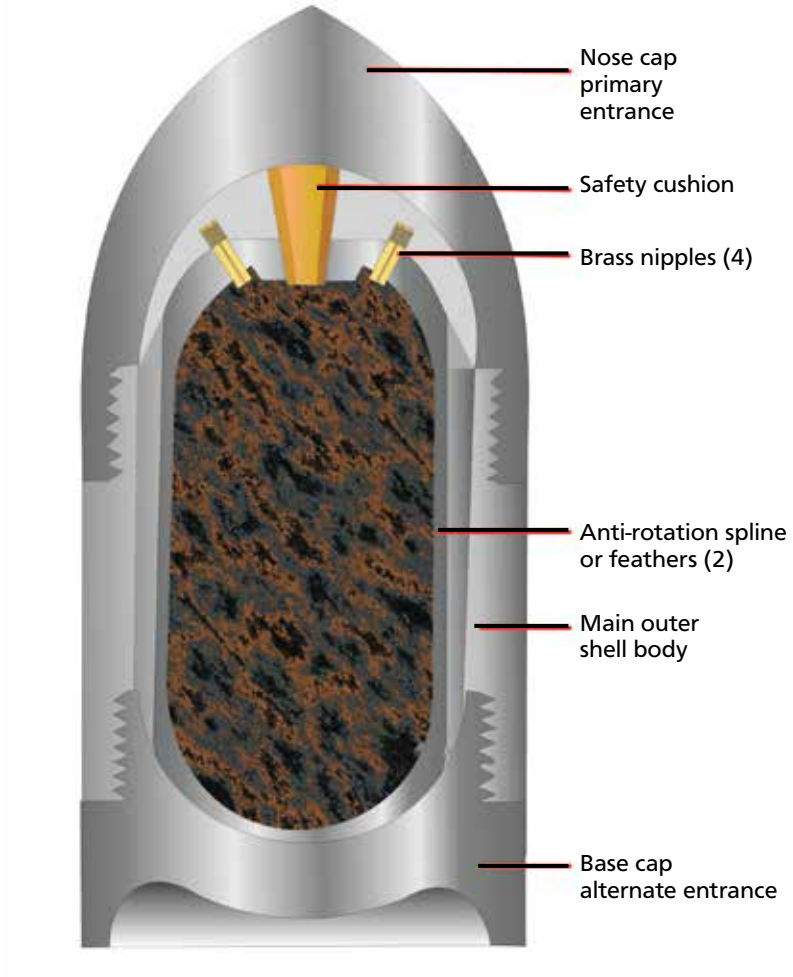
Federal James shell



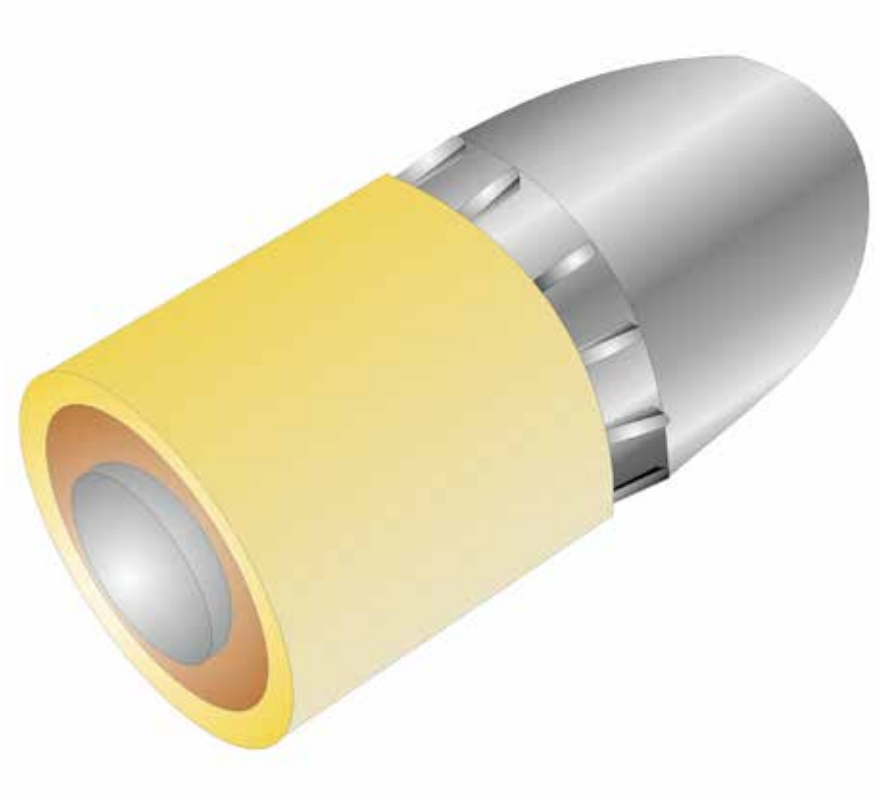
Federal James shell, sabot vew



3.67-inch Hanes percussion shell, sectioned



Hanes percussion shell,
patent 36,295, 26 August 1862



C.S. 3.67-inch Schenkl bolt



C.S. 3.67-inch Schenkl shell



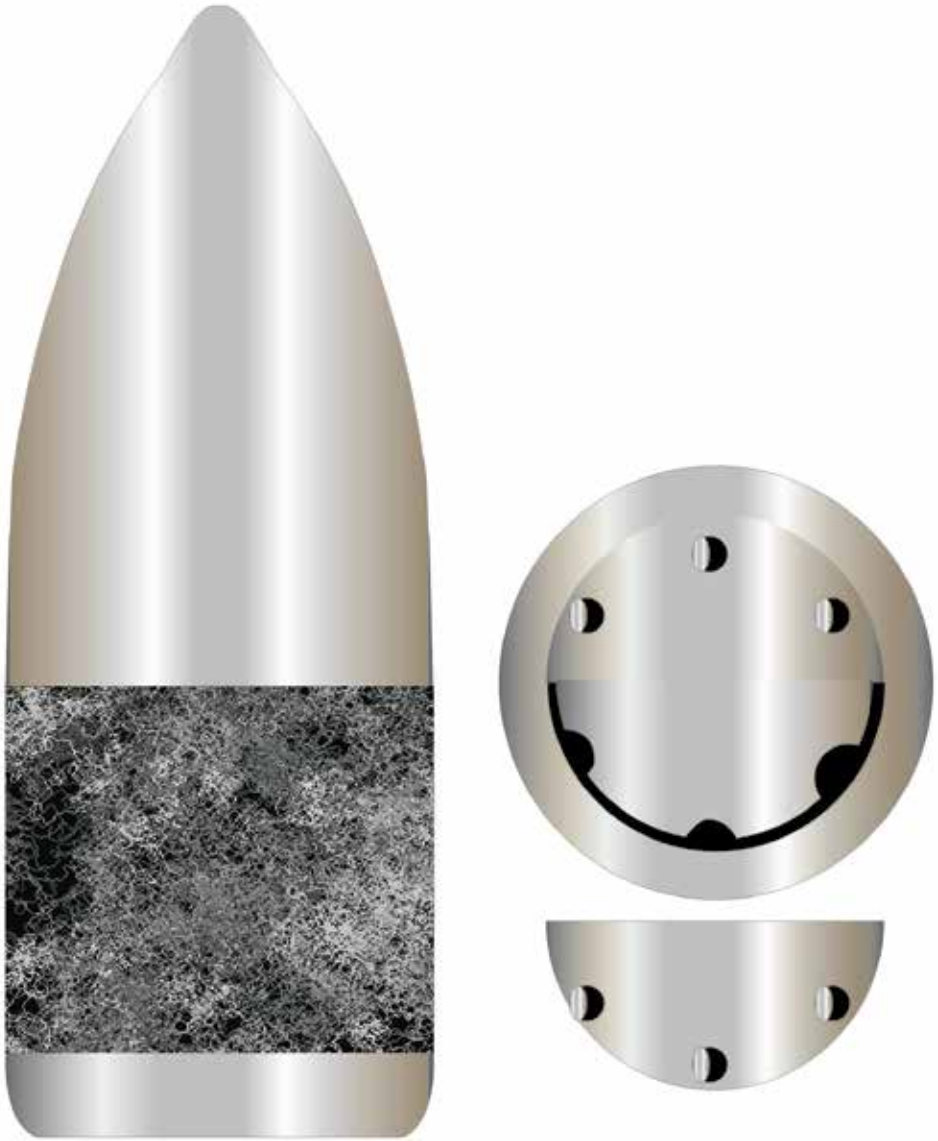
U.S. 3.67-inch Schenkl shell,
with base view and Schenkl percussion fuze



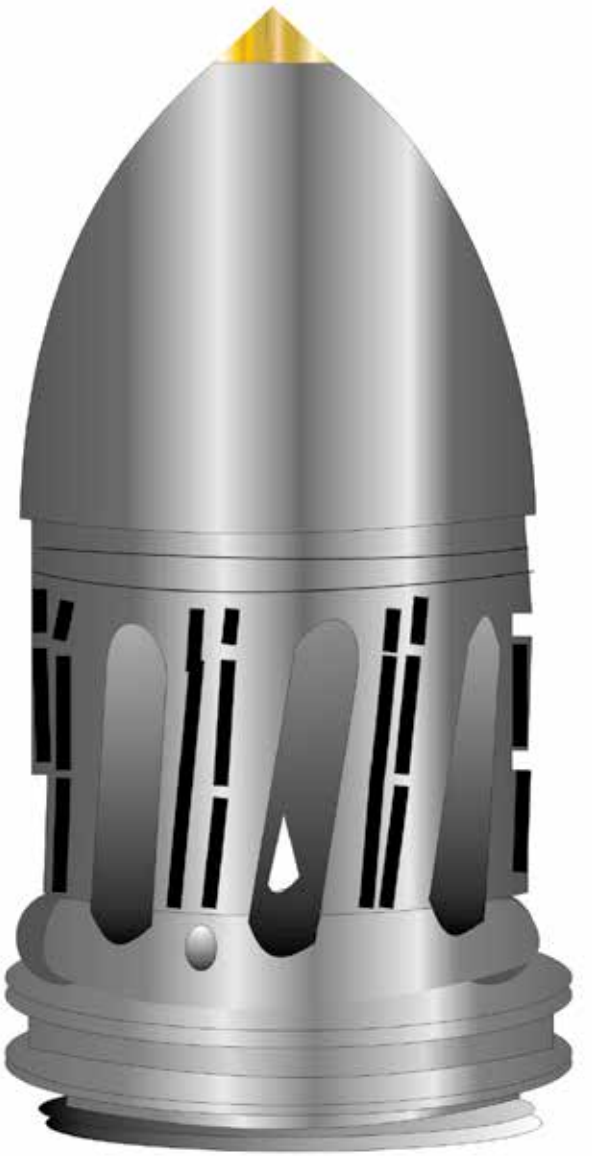
3.67-inch Mullane bolt



3.67-inch Parrott shell, sectioned view



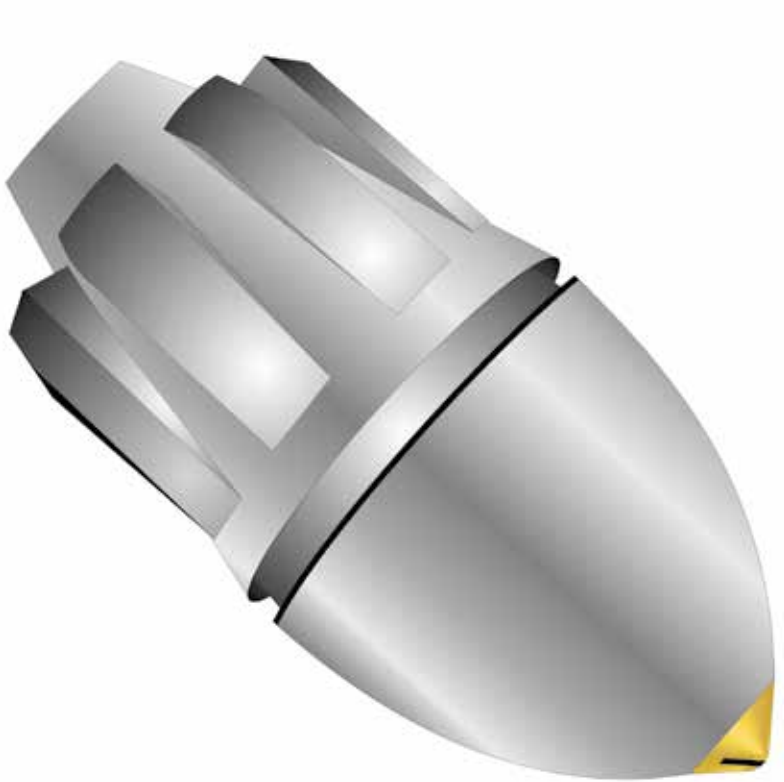
3.67-inch Read shell (blind)



3.69-inch James shell, type I



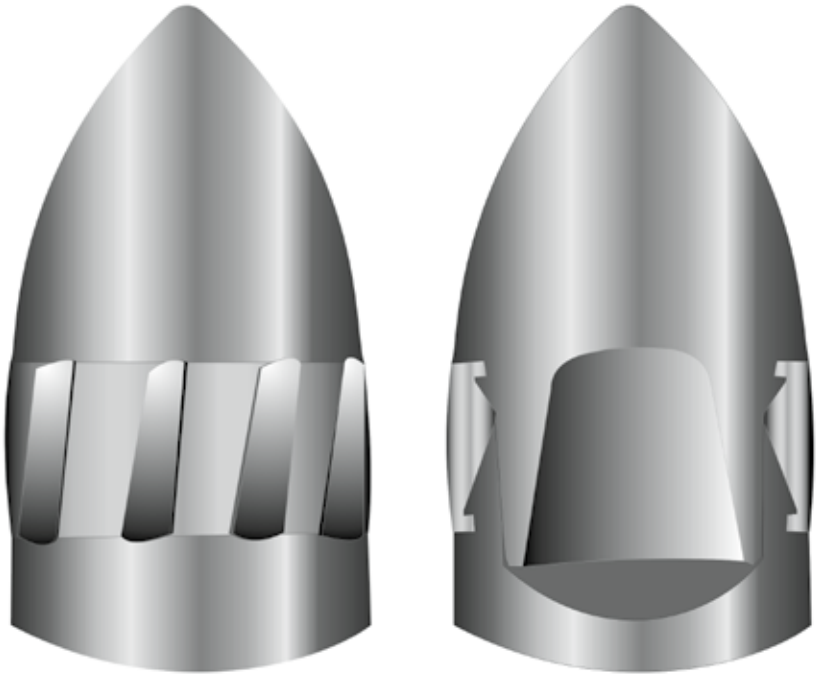
British Boxer 7 pounder M. L. shrapnel shell



3.73-inch James shell, Type II



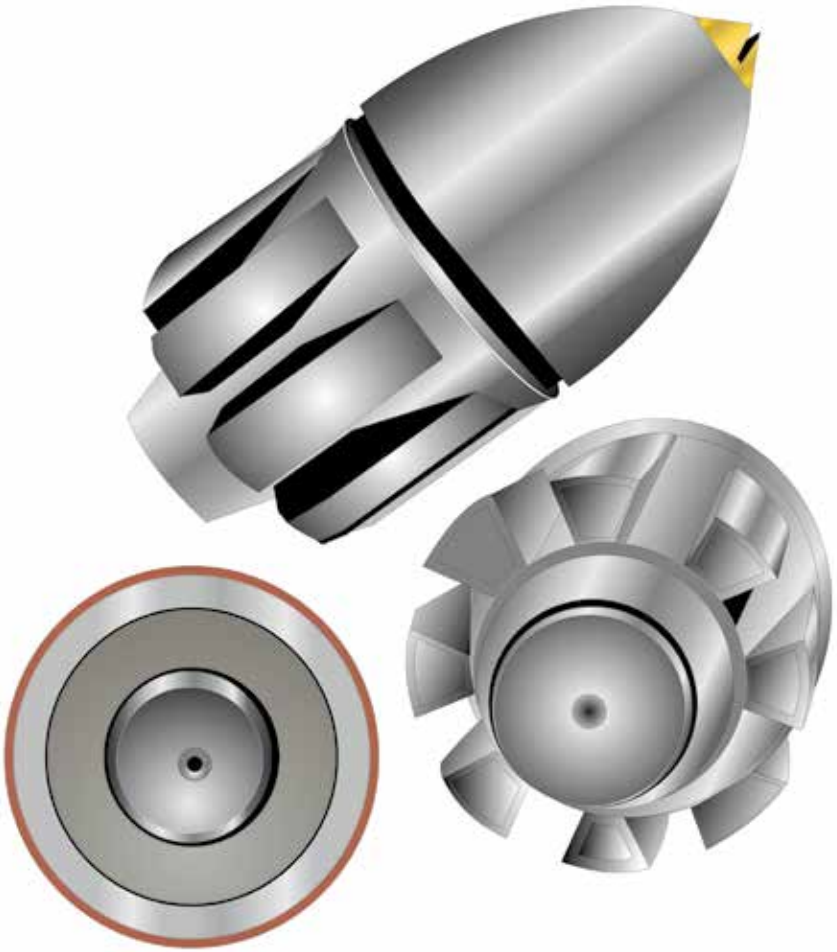
3.73-inch James shell, Type II, sectioned



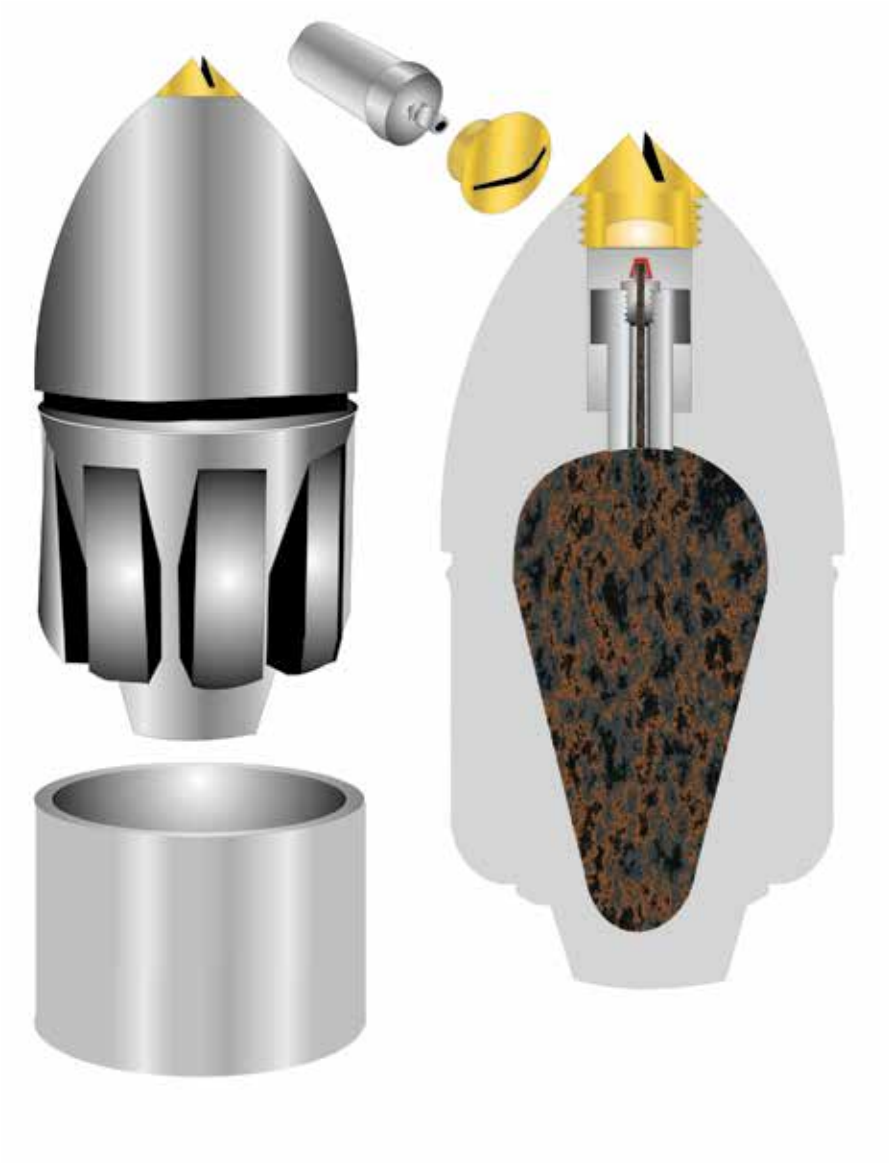
U.S. 3.8-inch Hotchkiss bolt, cavity in body



3.8-inch Hotchkiss case shot,
removable nose



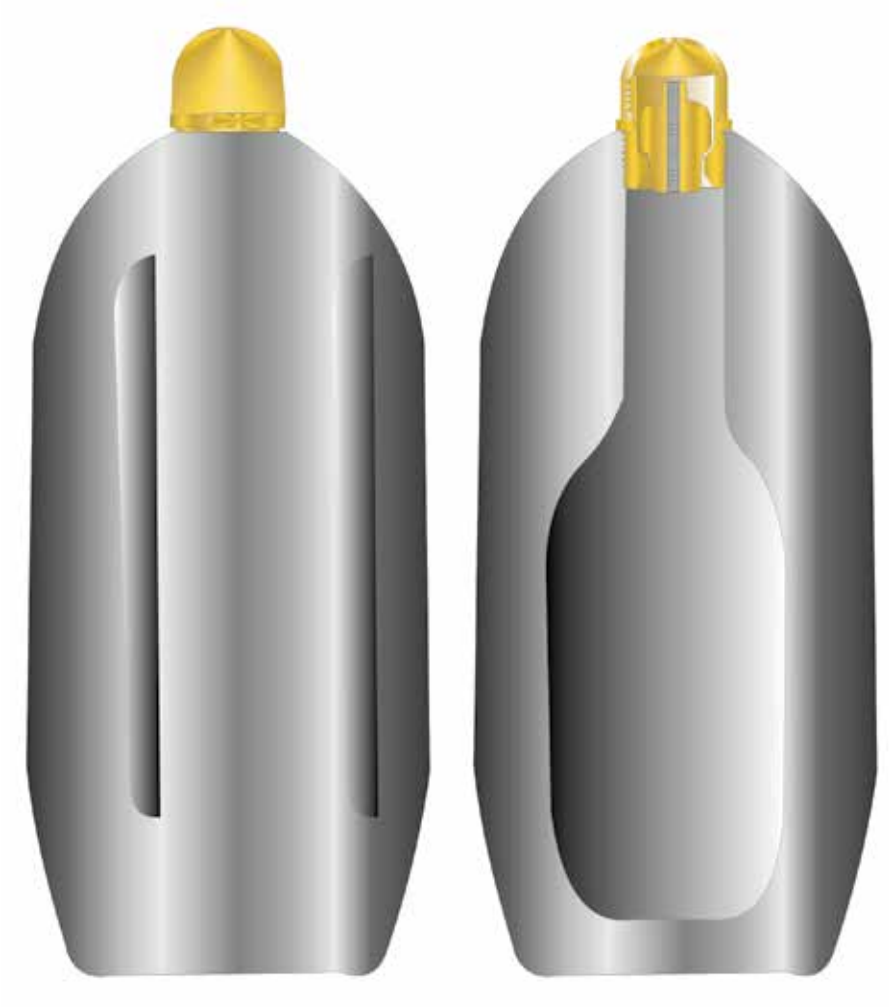
3.8-inch James shell, Type II,
base view



3.8-inch James shell, Type II



3.86-inch (10 pdr) Parrott shell,
wrought iron sabot



British 4-inch Blakely shell



4-inch Dahlgren shell,
threaded for fuze



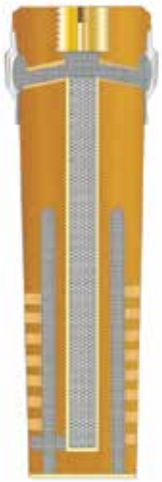
4-inch Dahlgren blind shell



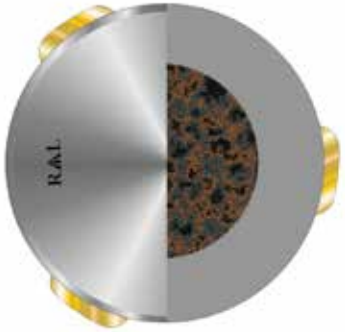
U.S. 4-inch Schenkl shell,
percussion fuze







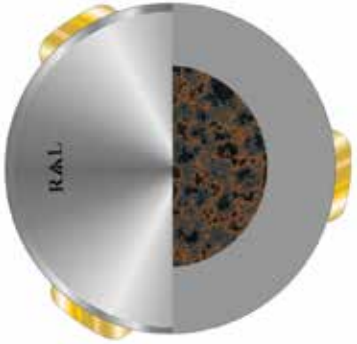
British wood, fuze, time,
No. 40, Mk !





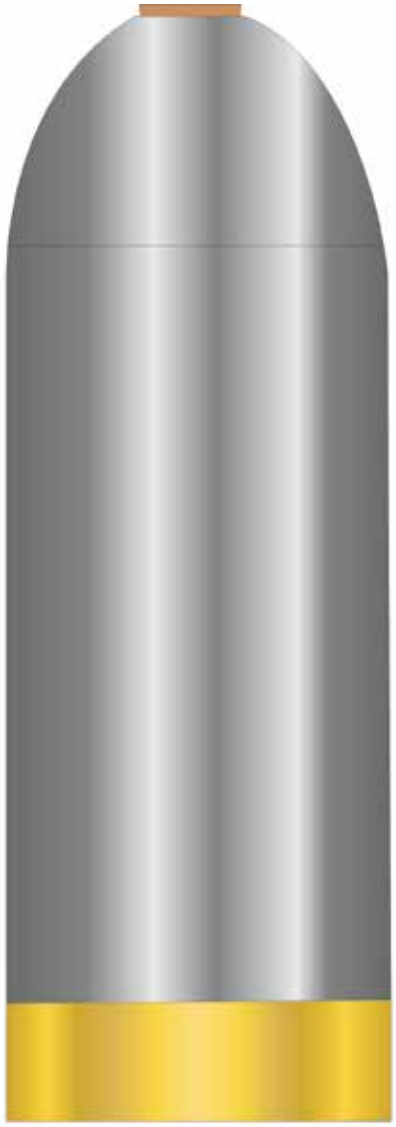


British No. 7 percussion fuze,
Mark IV, 1872-1911

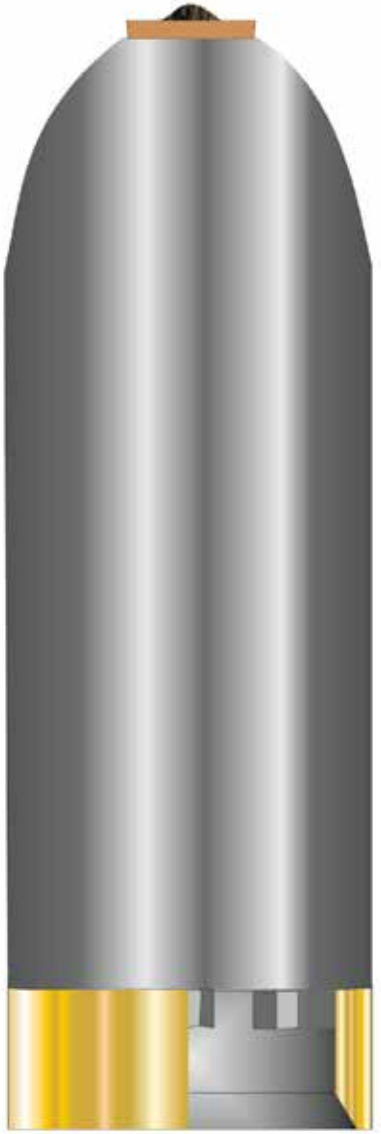


British 9 pounder shell
Woolwich System

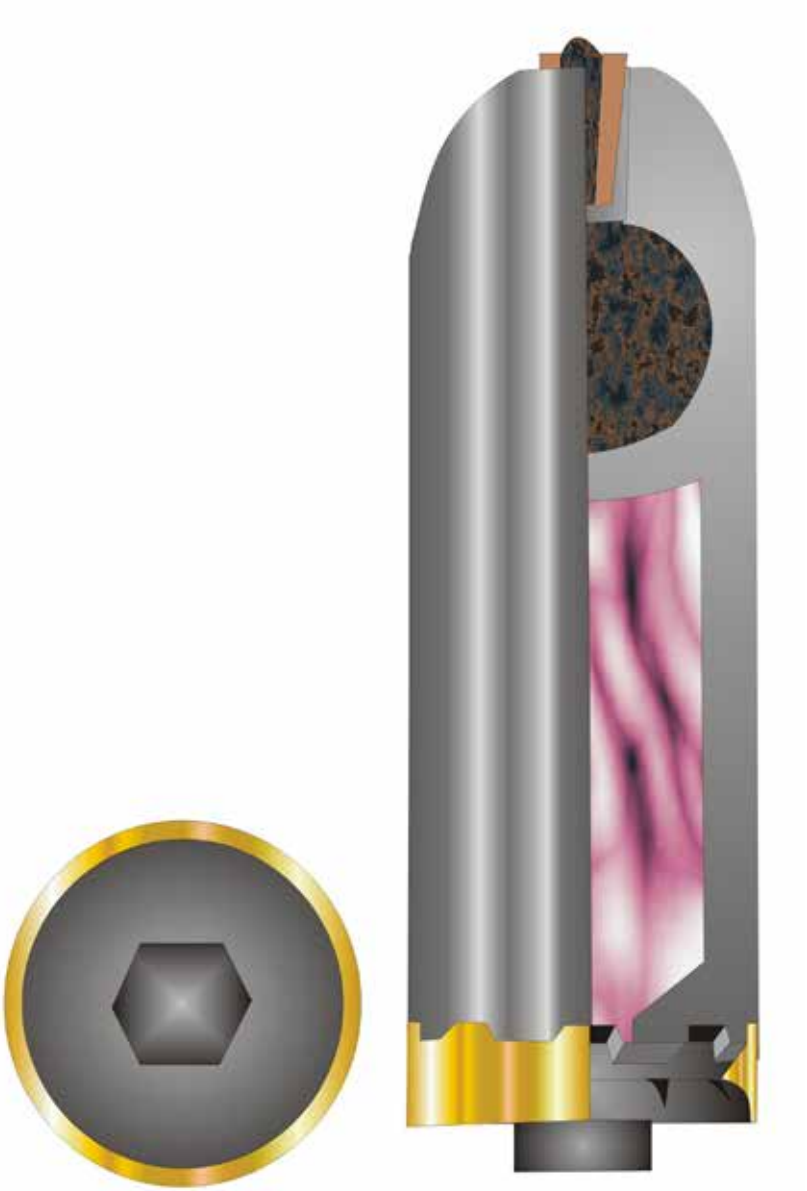
British 9 pounder
Woolwich System shell, No. 7 fuze



**4.2-inch Braun shell,
wooden time fuze adapter**



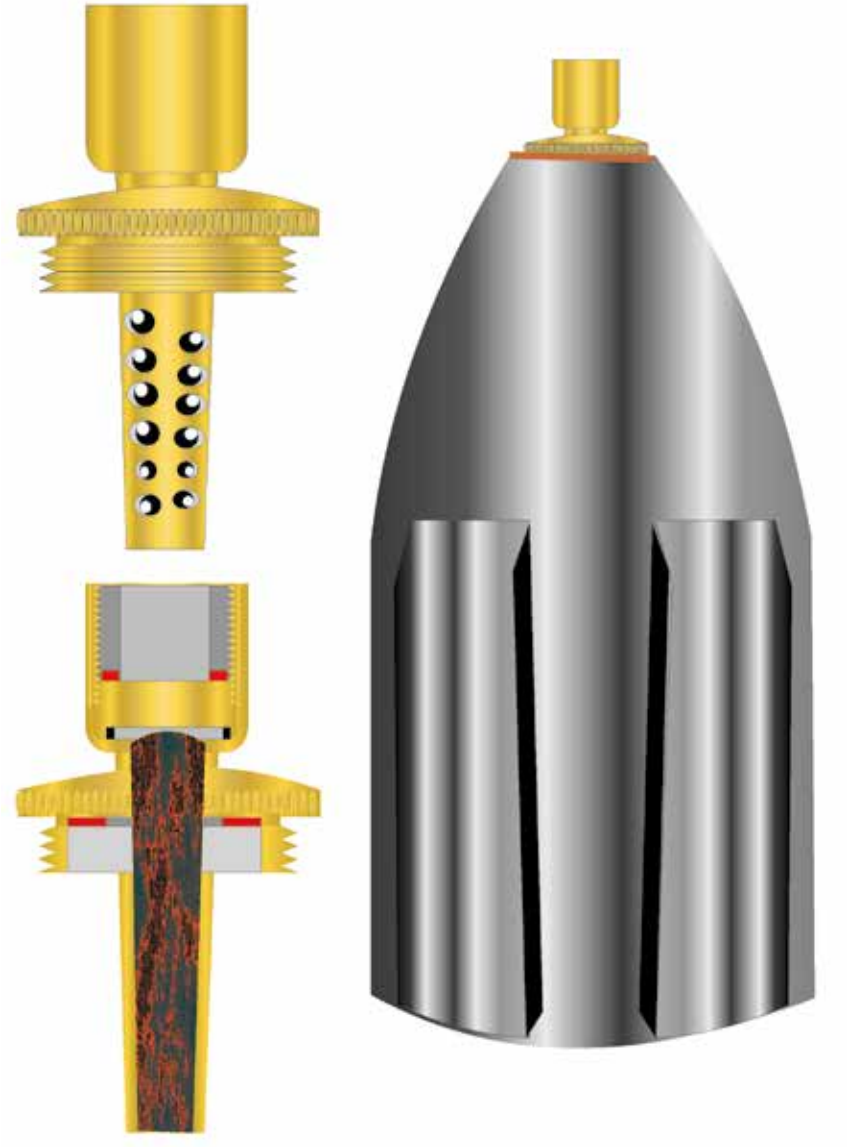
**4.2-inch Parrott shell,
castellated sabot**



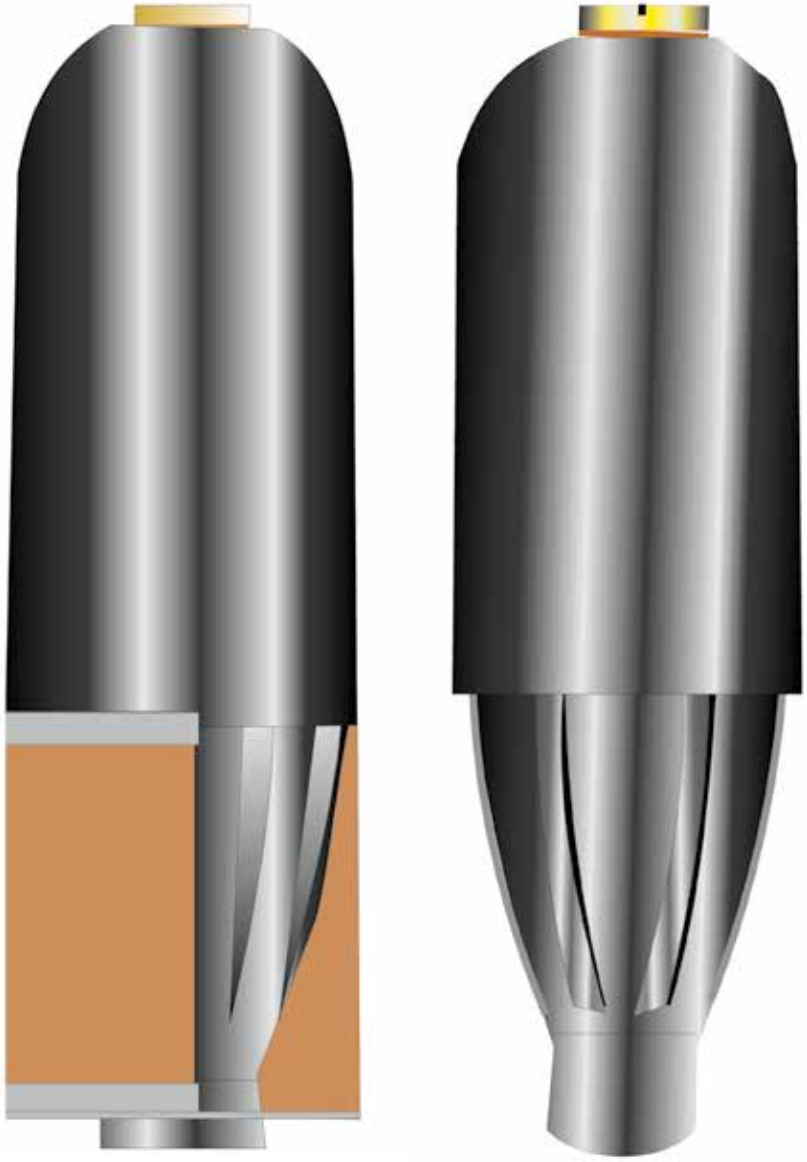
4.2-inch Parrott incendiary shell, sectioned



4.2-inch Reed shell, wrought iron sabot, sectioned



4.2-inch Sawyer shell
with fuze



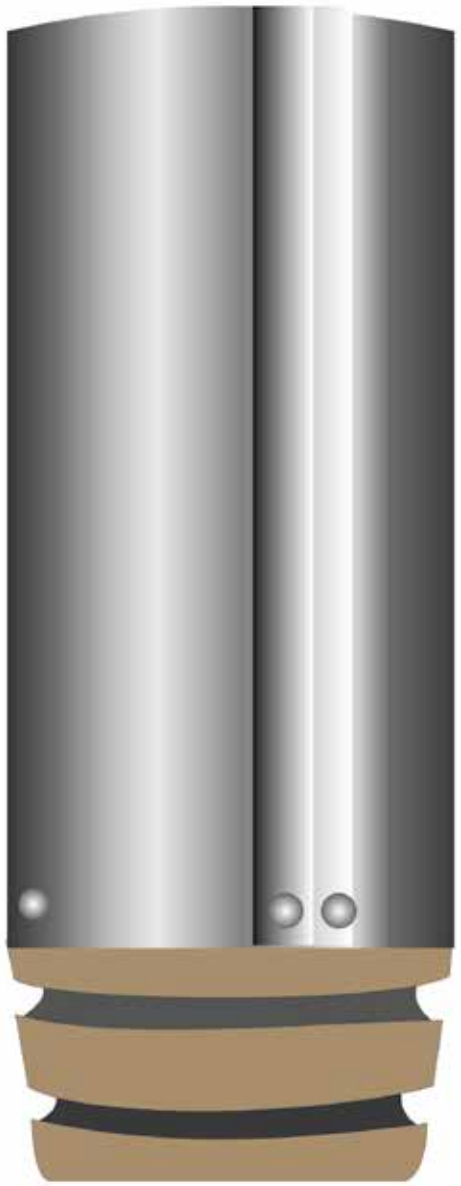
4.2-inch Schenkl shell, percussion fuzed,
with and without sabot



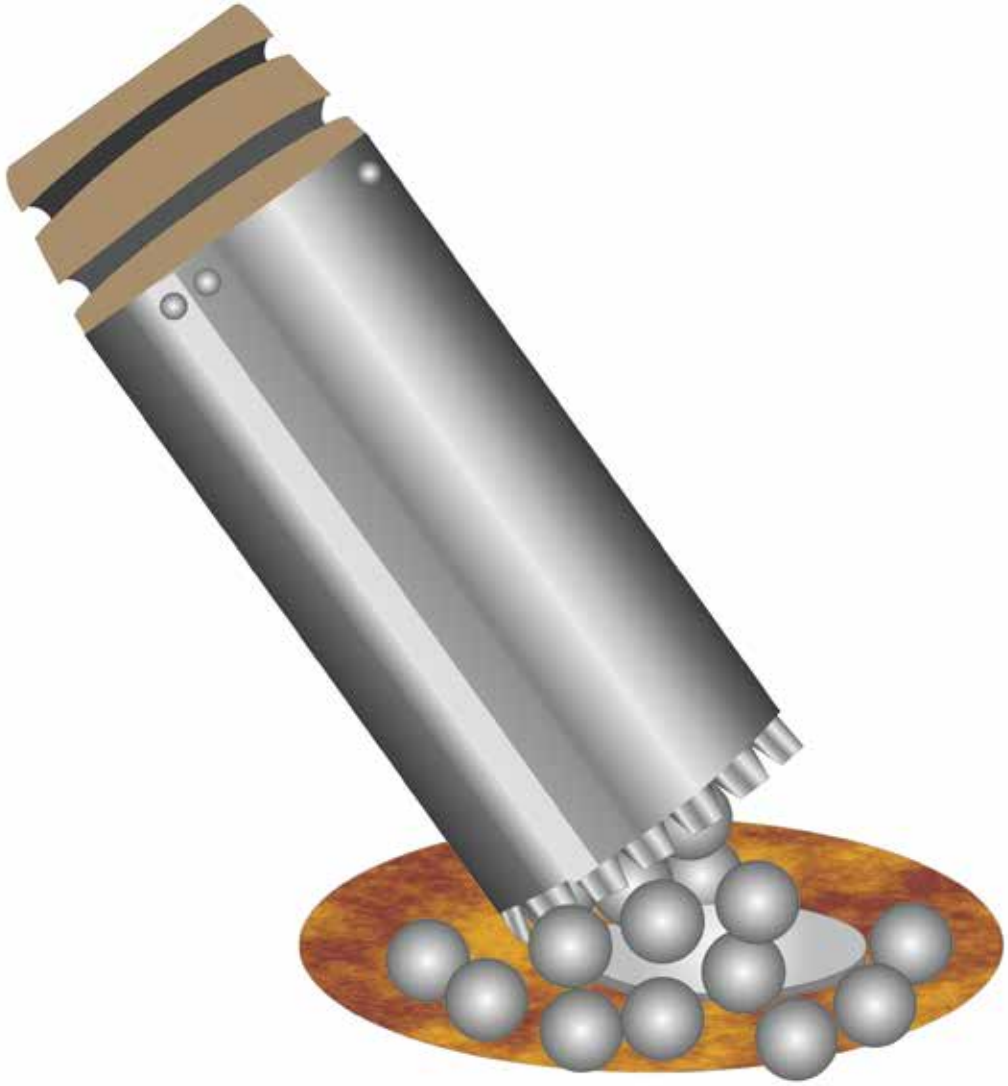
Schenkl bolt



3-inch Schenkl case shot
with sabot



10 pounder Parrott canister



10 pounder Parrott canister
with shot removed



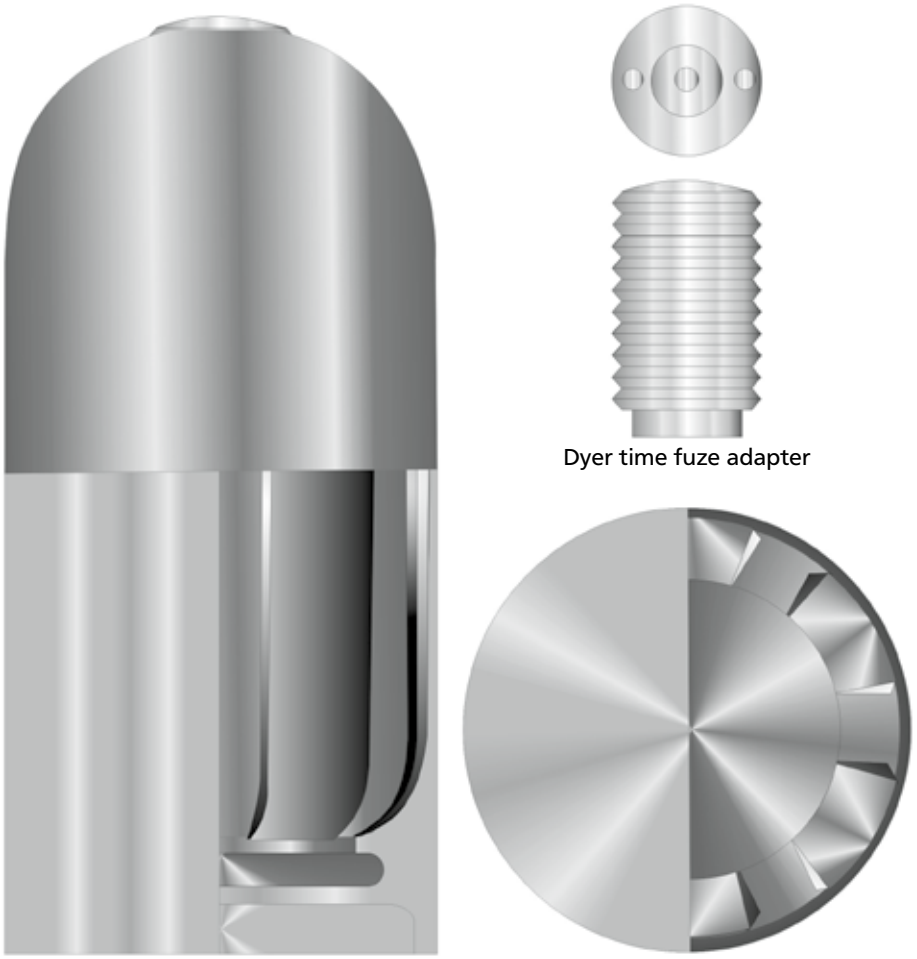
4.4-inch Dahlgren blind shell



U.S. 4.5-inch Absterdam shell



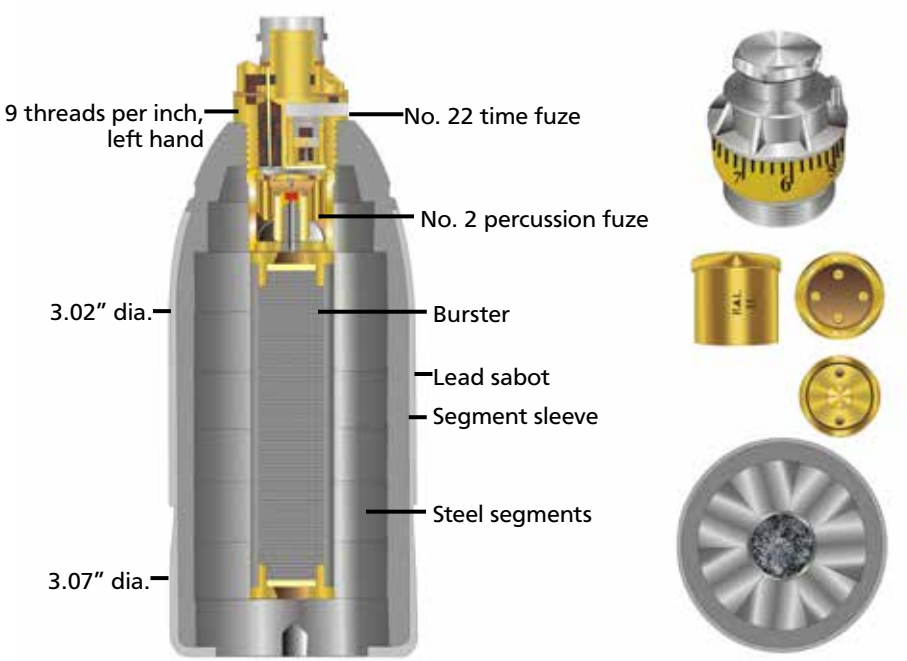
U.S. 4.5-inch Absterdam shell, cutaway with fuze



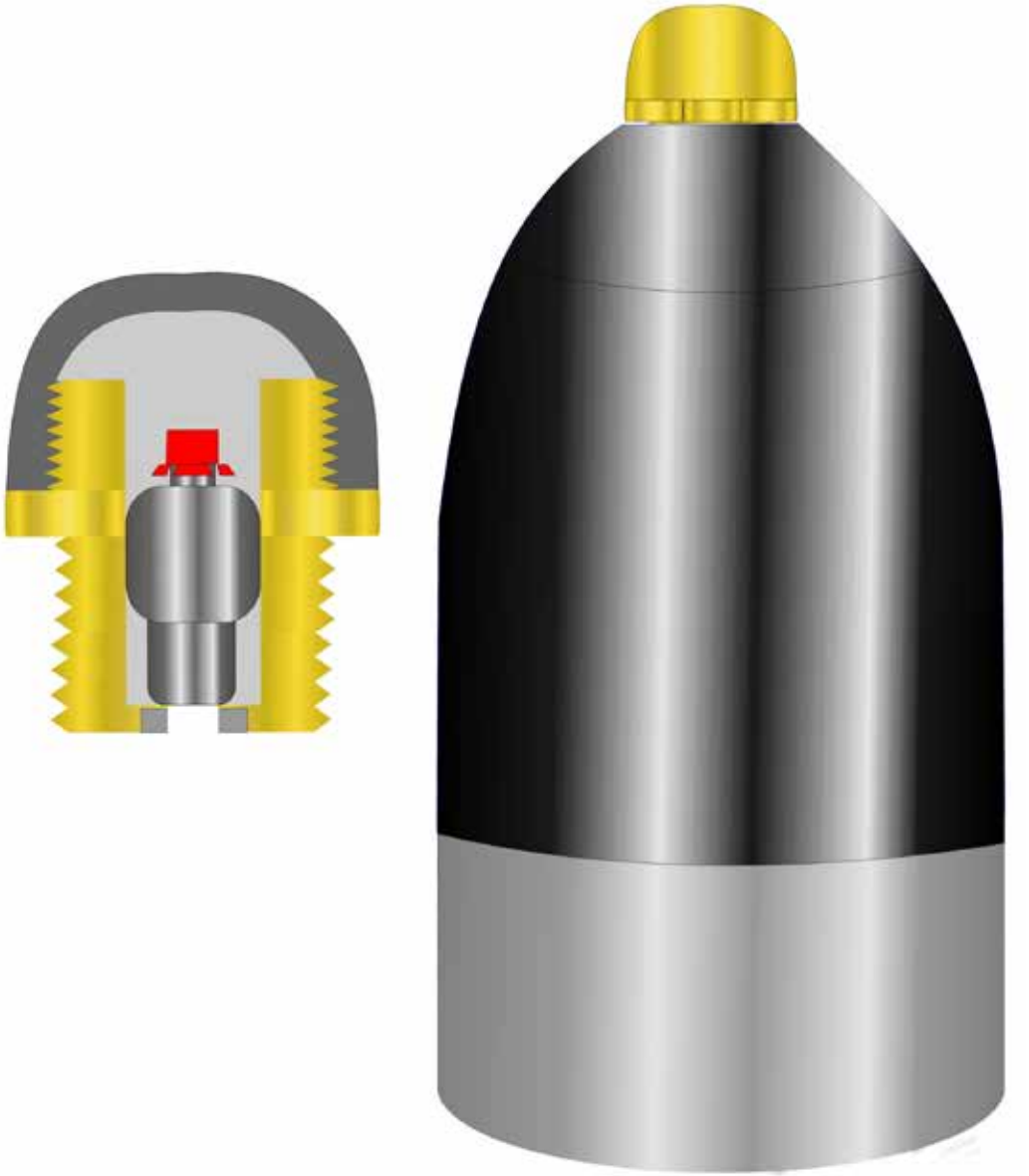
U.S. 4.5-inch Dyer shell



U.S. 4.5-inch Dyer case shot



British 12 pounder Armstrong segment shell



12 pounder Britten shell,
percussion fuzed, internally segmented



12 pounder Mullane shell,
Archer's safety pin fuze



R.B.L. plain percussion fuze, R.L. III



British 12 pounder R.B.L. case shot



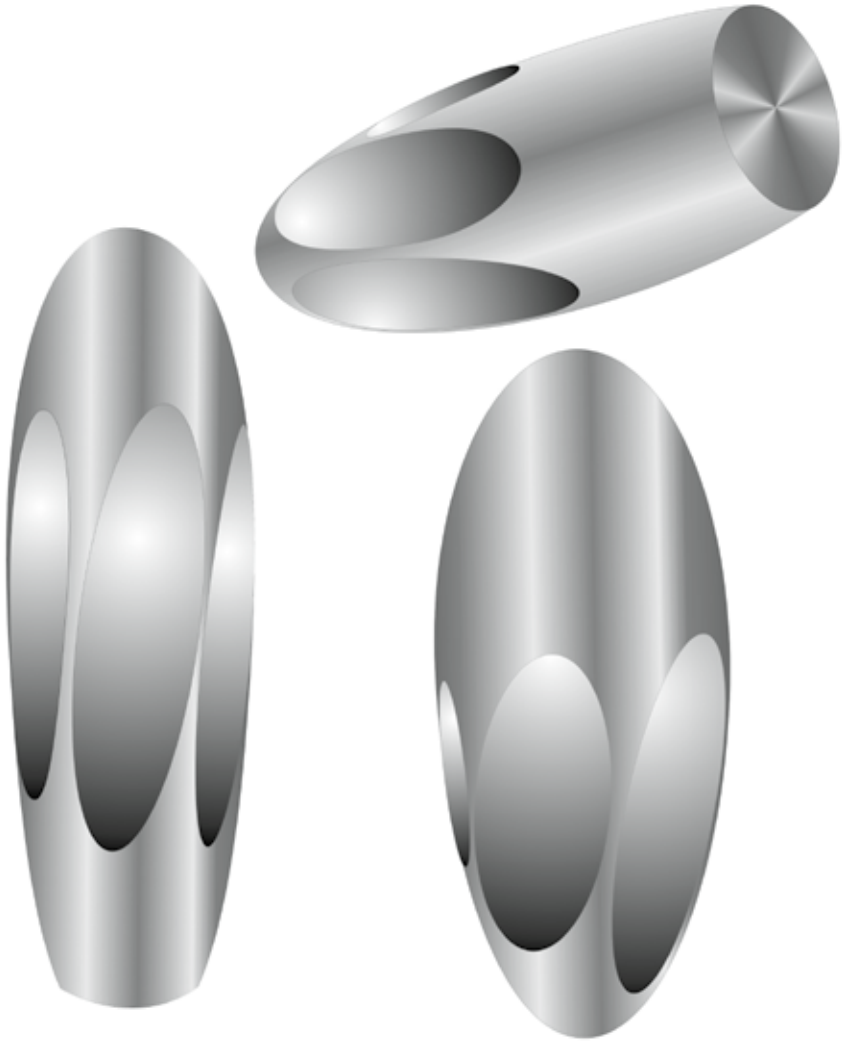
British Armstrong time fuze



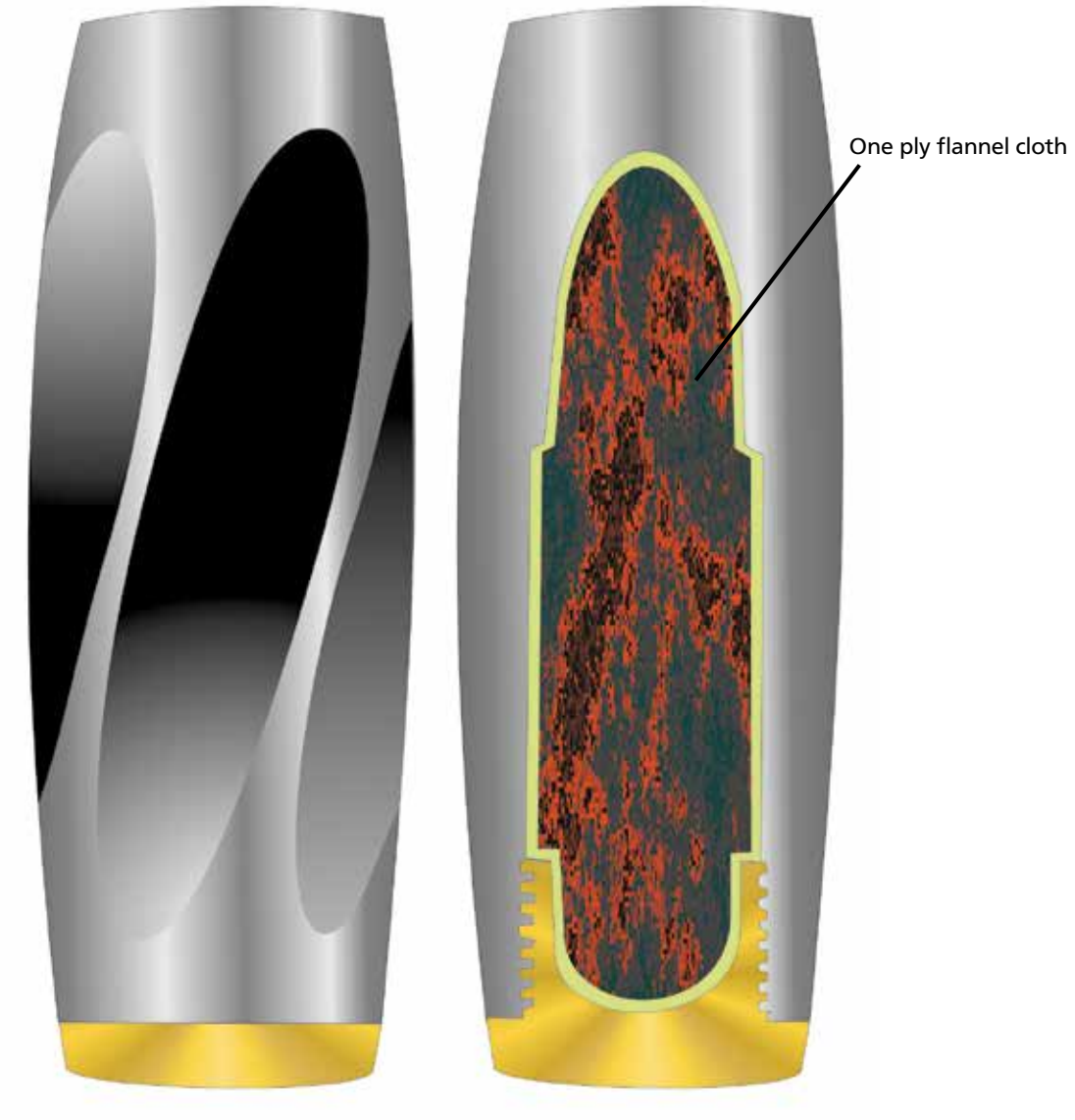
British 12 pounder R.B.L shell, combination percussion-time fuze



12 pounder Read bolt,
Oconee River



British 12 pounder Whitworth bolt,
three views



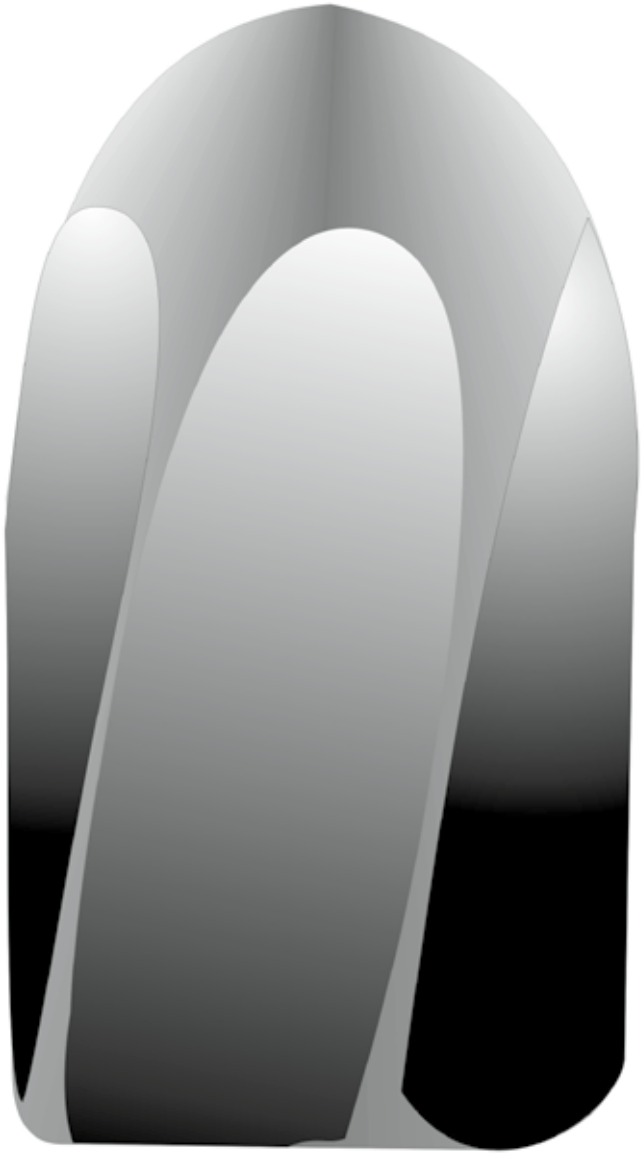
British 12 pounder Whitworth shell,
fired by penetration heat



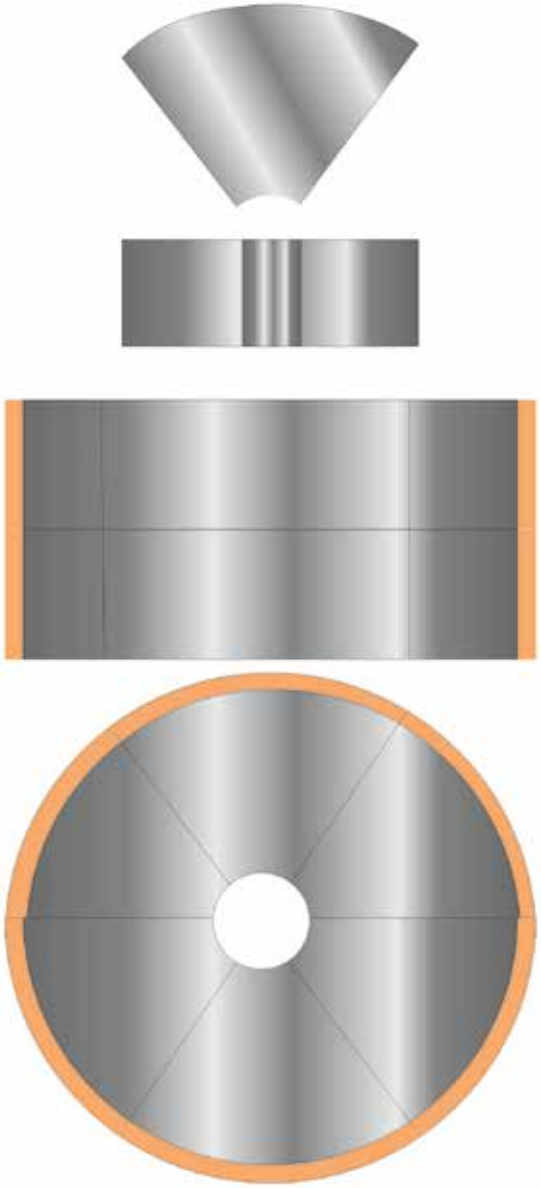
12 pounder Whitworth shell



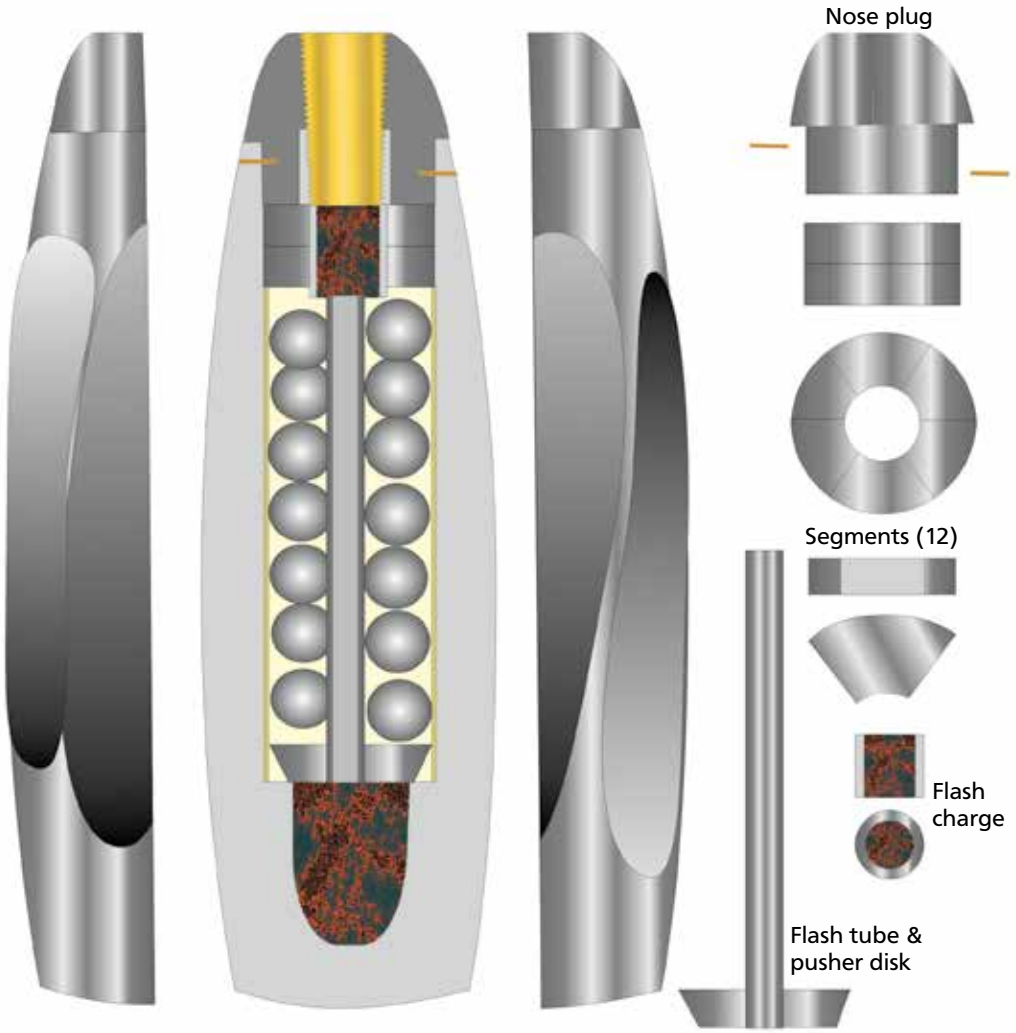
12 pounder Whitworth bolt



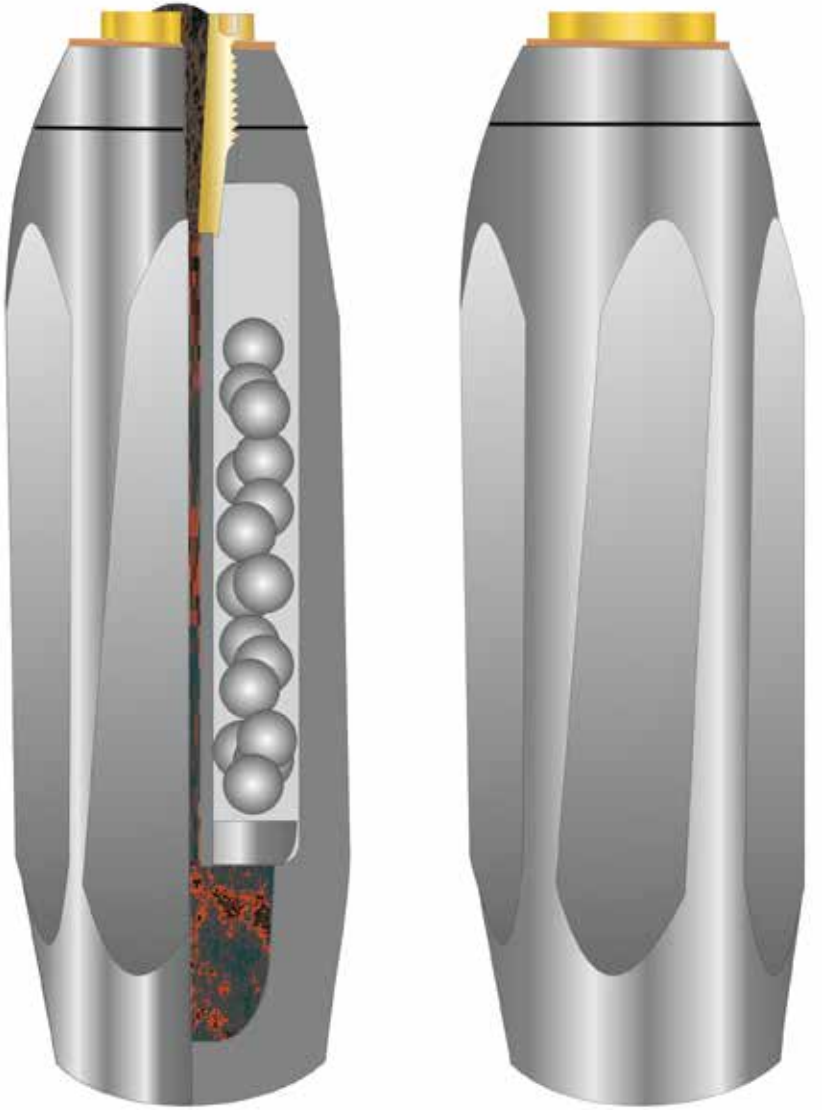
12 pounder Whitworth bolt, short



12 pounder Whitworth case shot, upper segments



12 pounder Whitworth case shot parts
(data on projectile parts courtesy of Jack Wells)



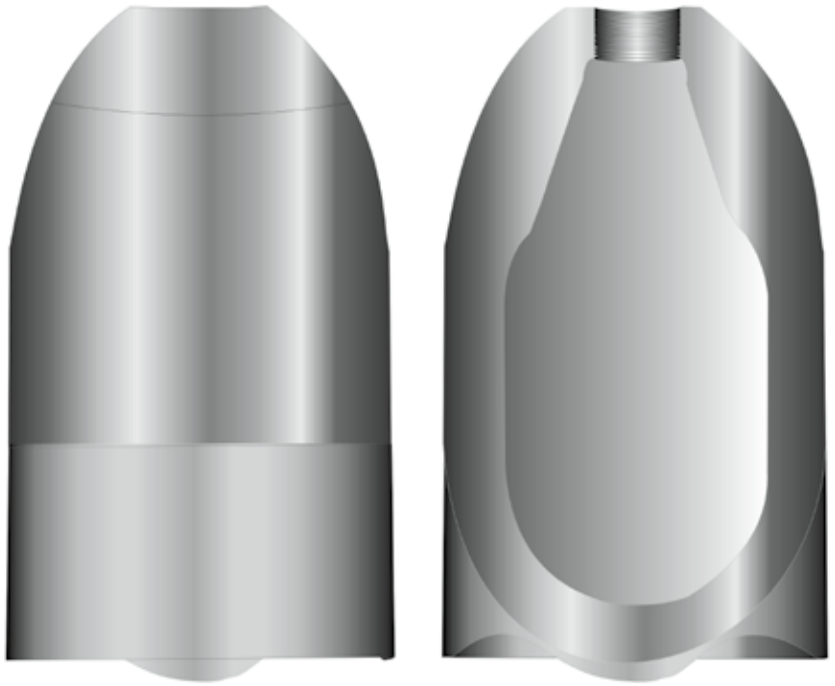
12 pounder Whitworth case shot,
sectioned



12 pounder Whitworth case shot,
X-ray of interior



British Woolwich 12 pounder common shell,
brass fuze adapter



British 4.62-inch Britten shell



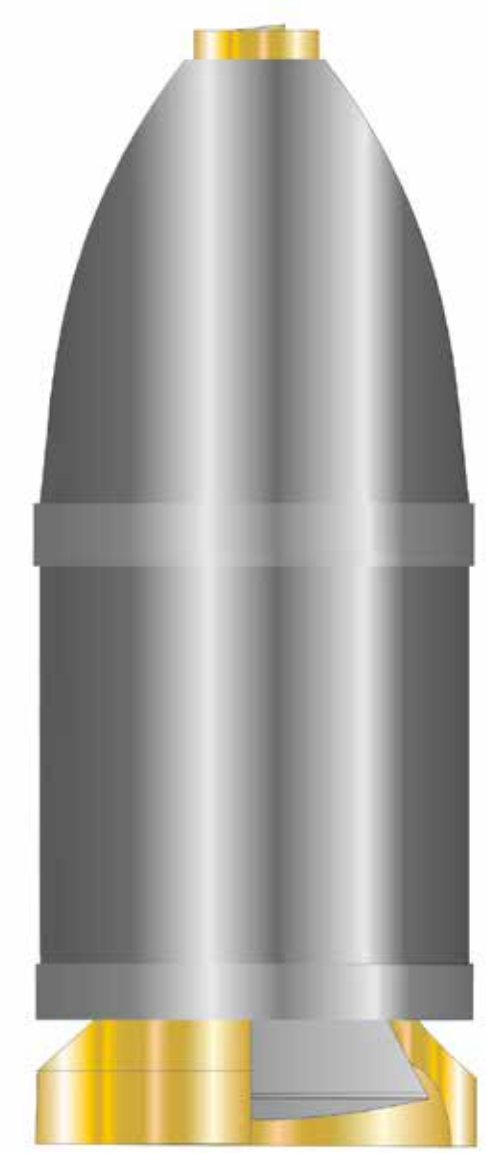
4.62-inch Harding shell



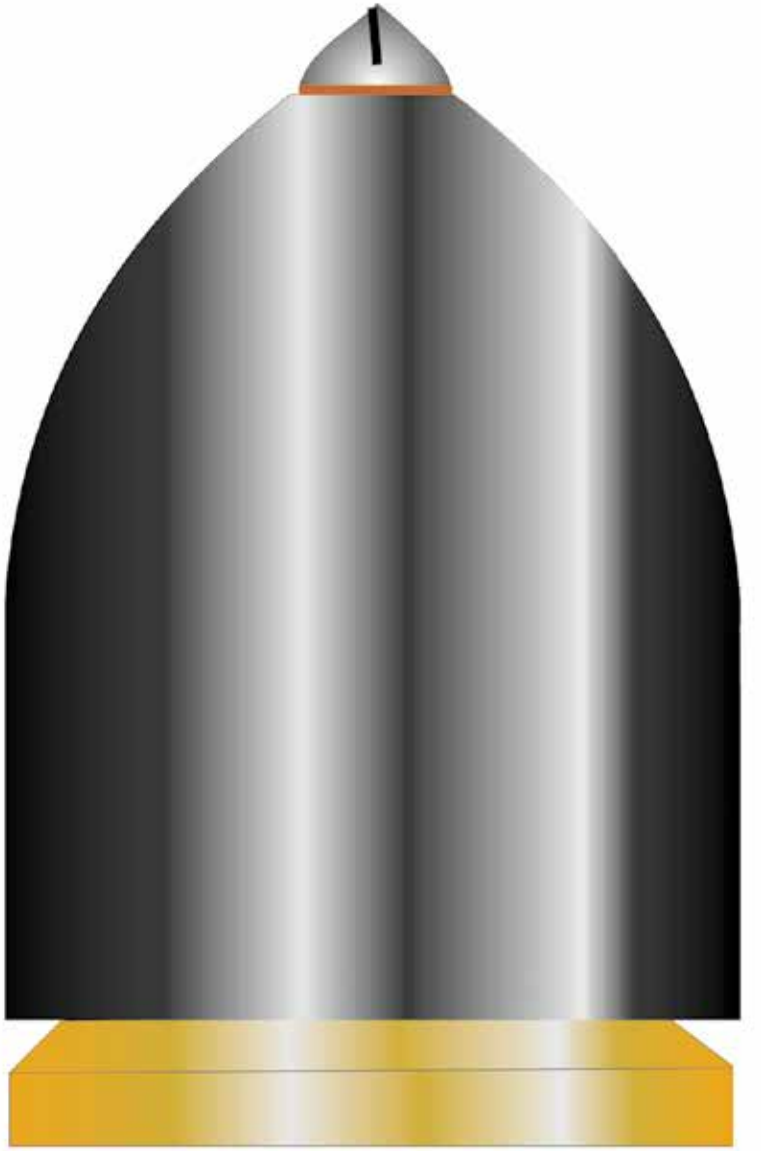
4.62-inch Mullane shell, Type II, long; copper sabot missing



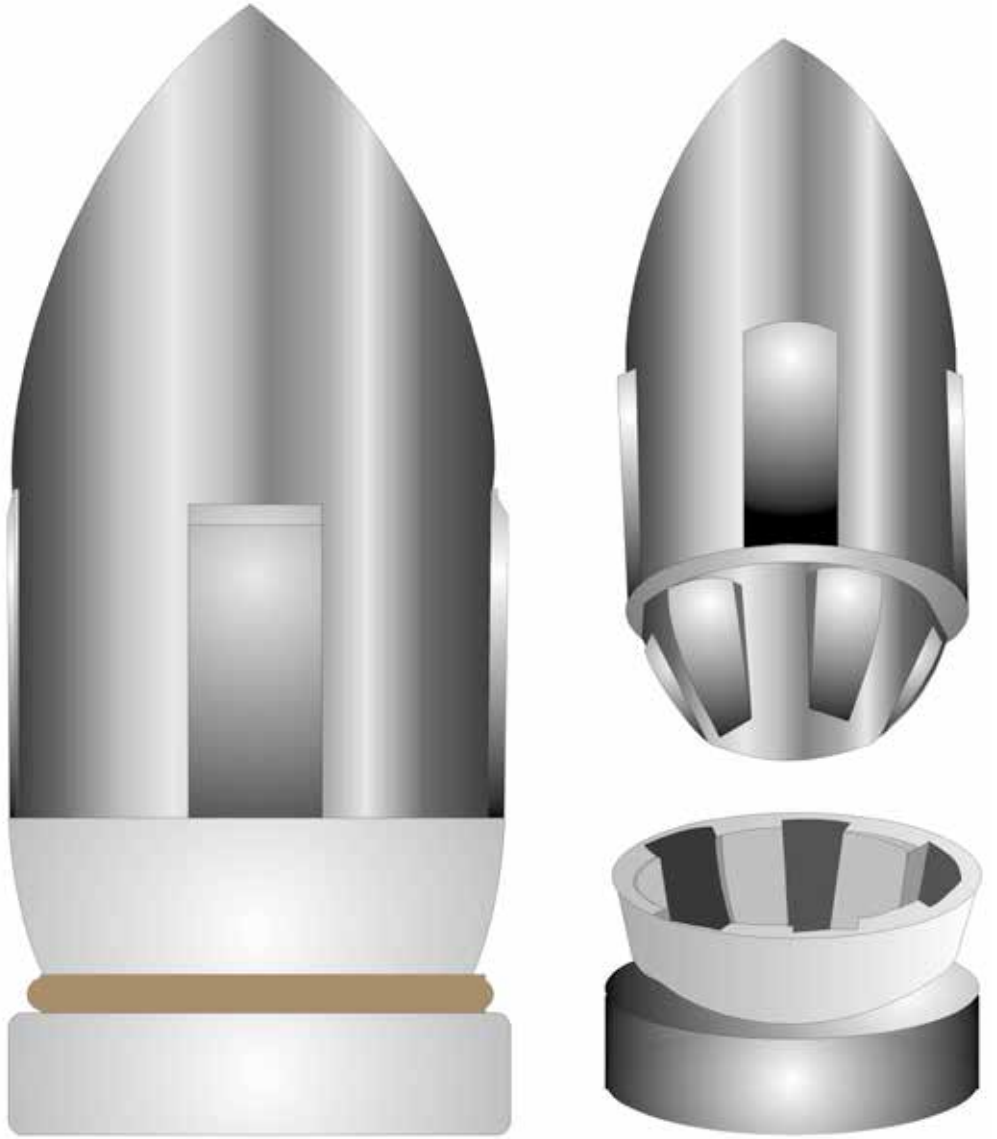
C.S. 4.62-inch Read shell,
Oconee River



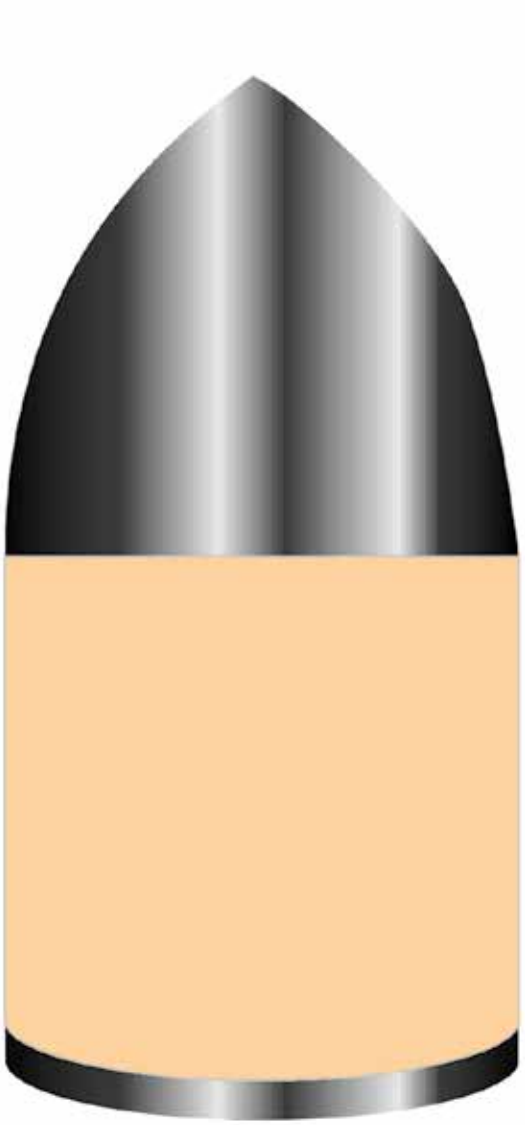
4.62-inch Reed shell, sectioned,
percussion fuze



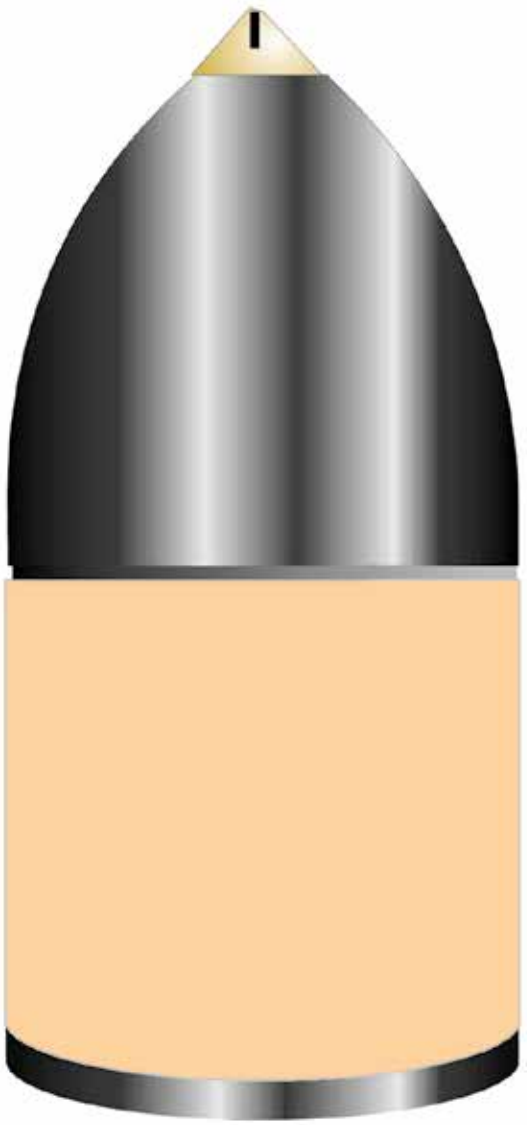
4.62-inch Reed shell



Dahlgren blind shell,
patent model 32,986 dated 6 August 1861

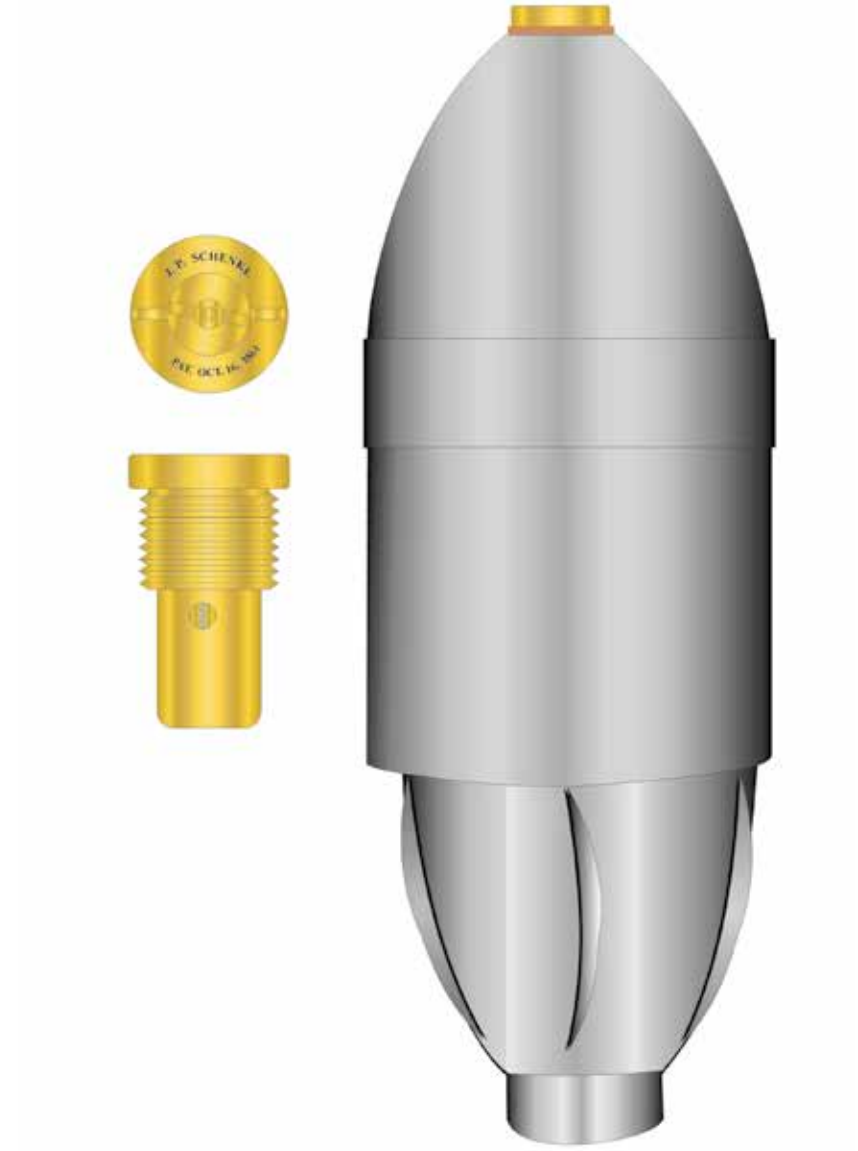


14 pounder James bolt and shell

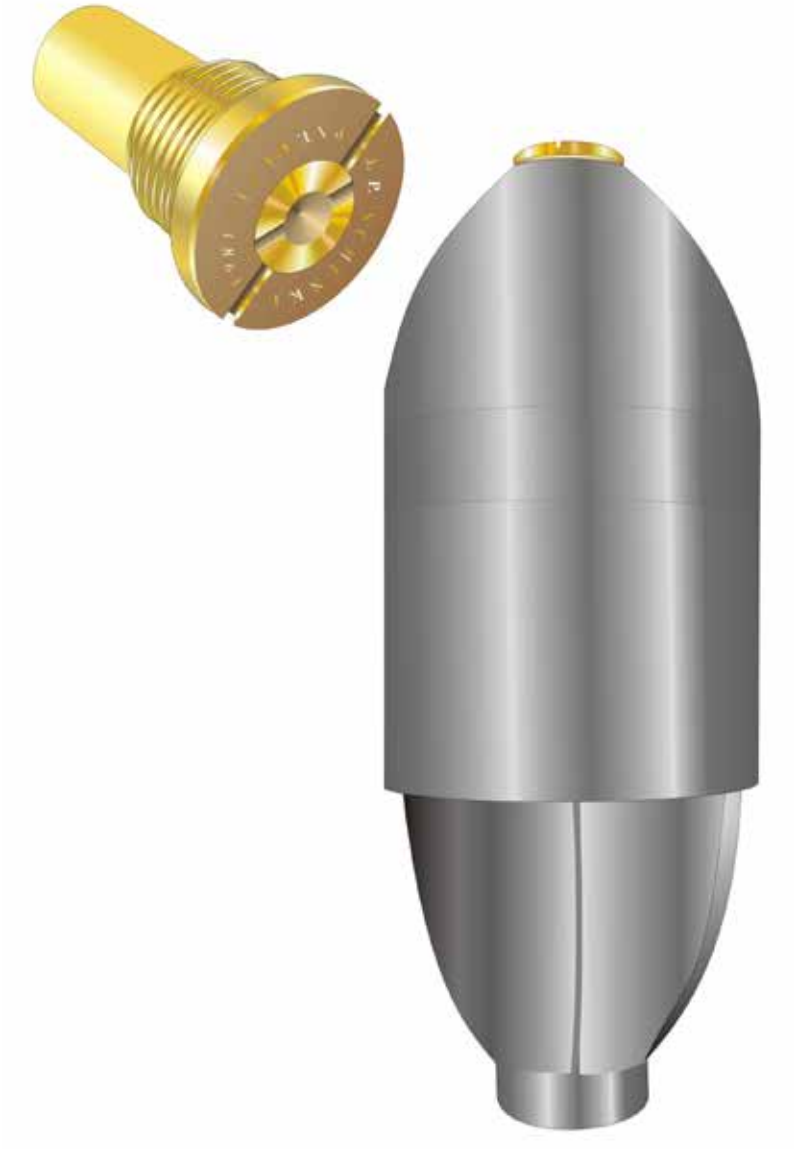




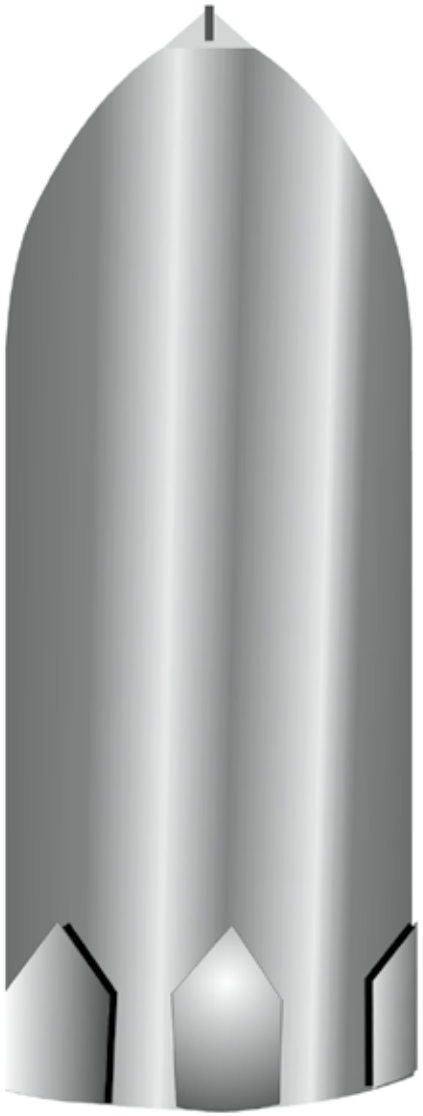
5-inch Whitworth shell



5.03-inch Federal Navy Schenkl shell



U.S. 5.1 inch Navy Schenkl shell



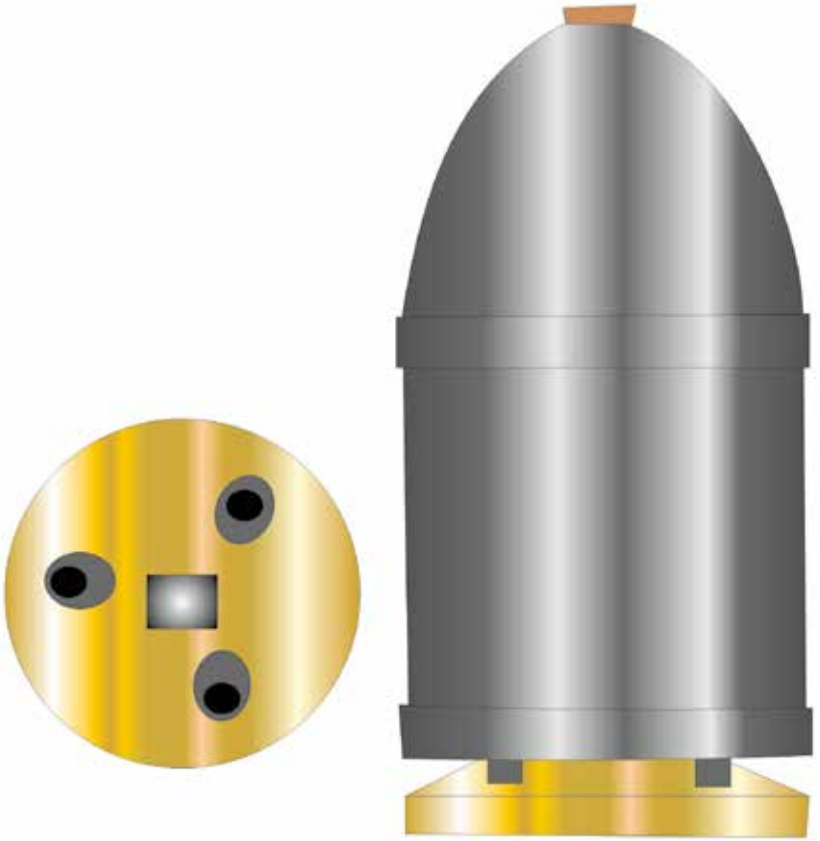
20 pounder Delafield shell



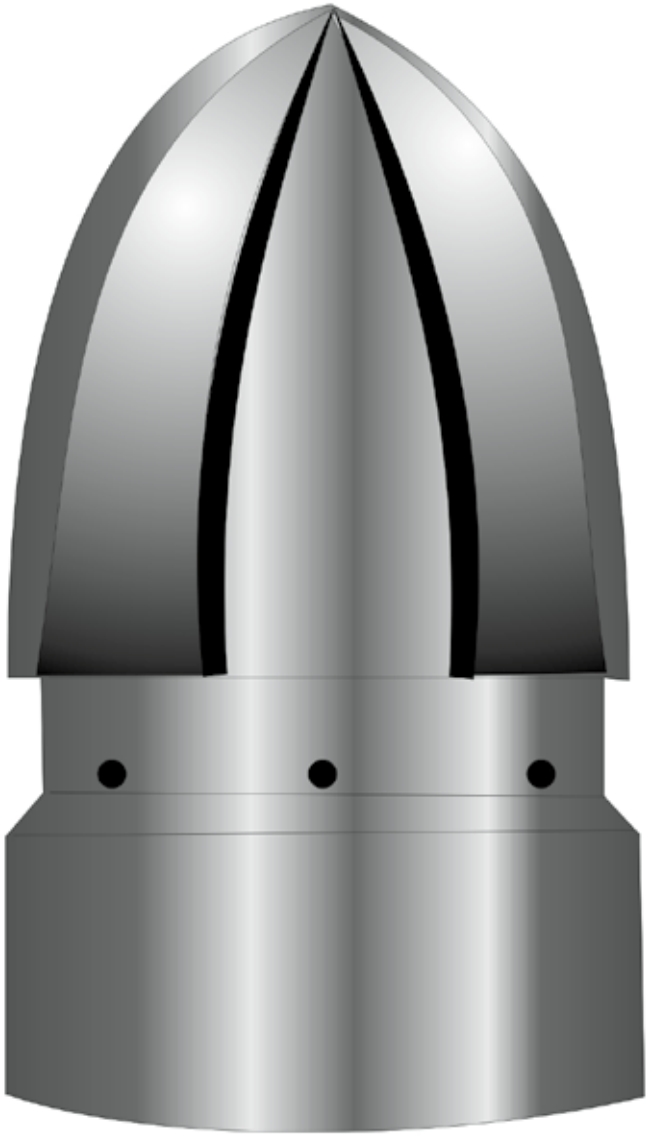
20 pounder Parrott shell and fuze



20 pounder Reed shell



5.3-inch Mullane shell, Type I



5.82-inch Abbot bolt



5.82-inch Reed shell, long



6-inch Cochran shell



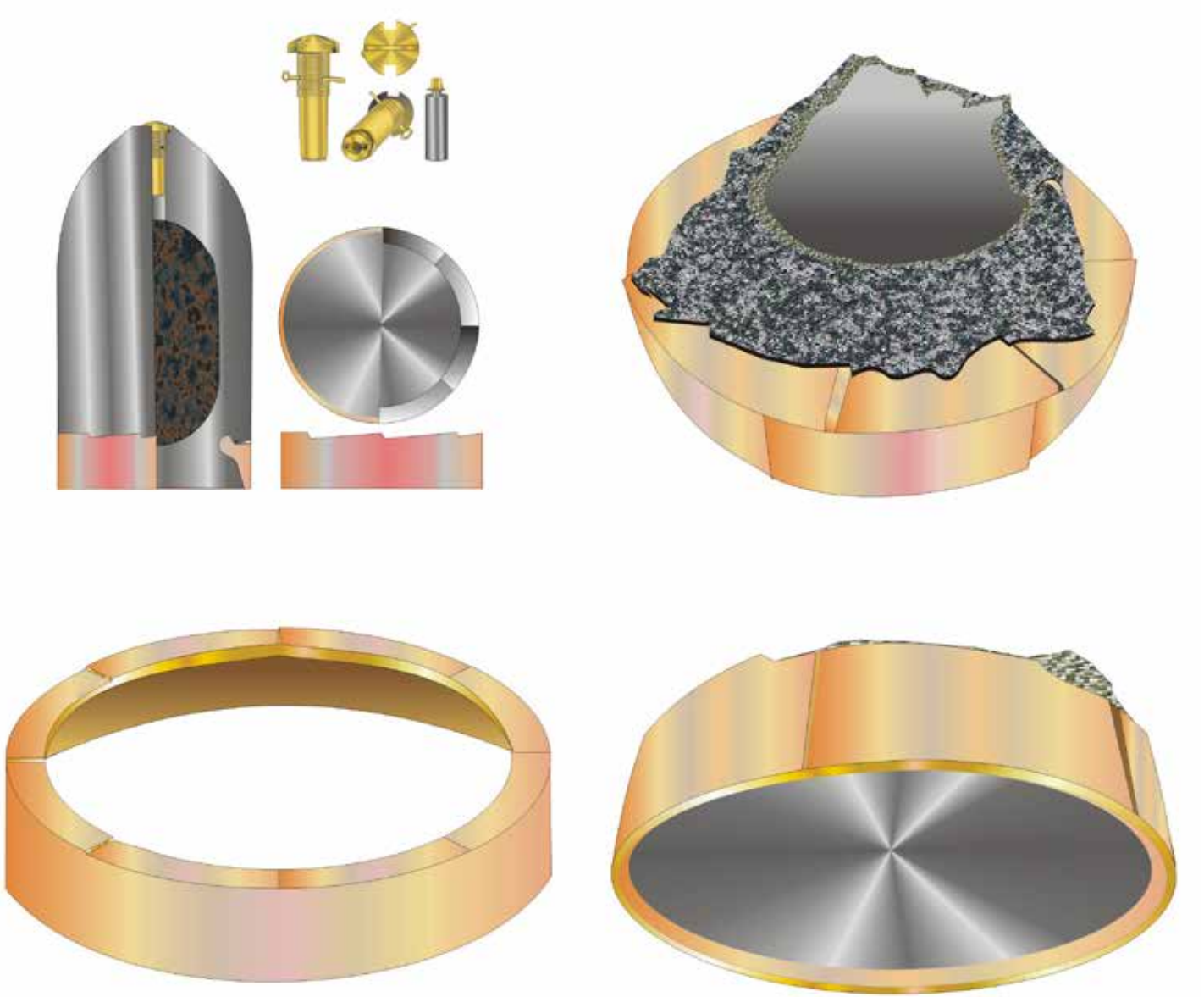
32 pounder Harding shell



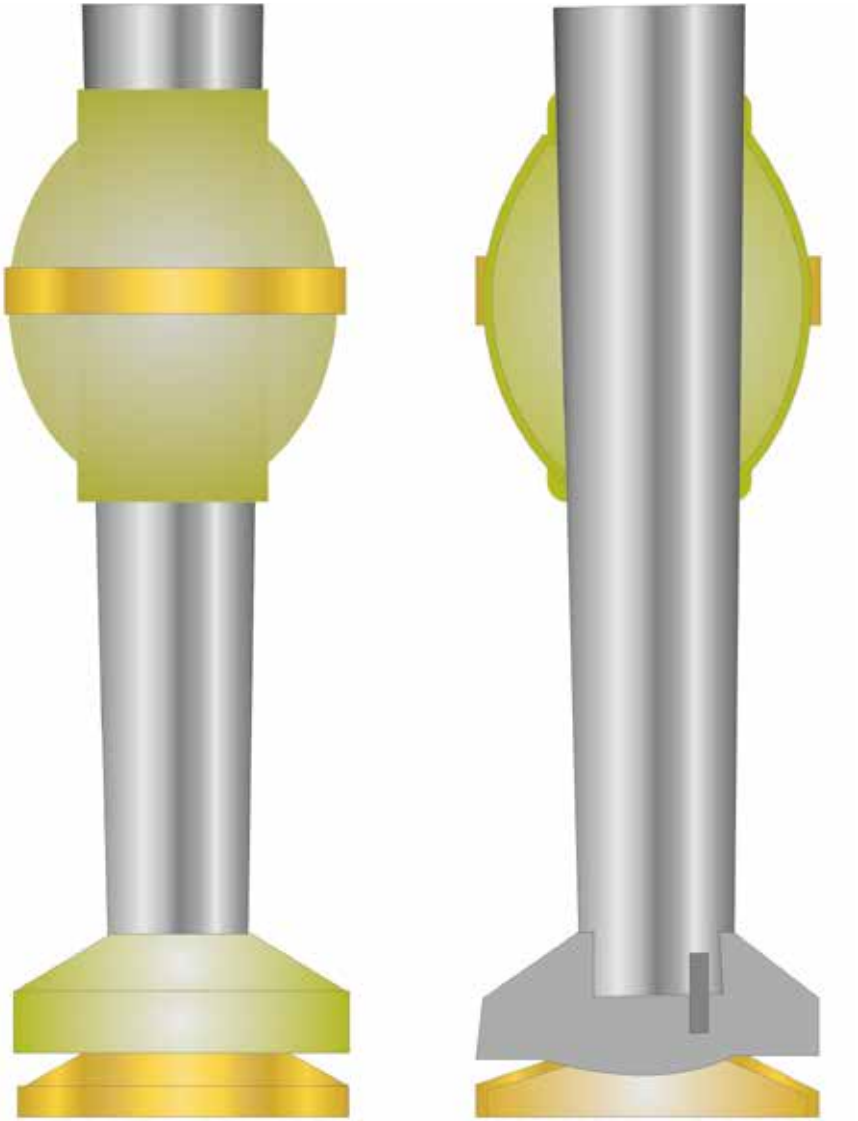
32 pounder Mullane shell



32 pounder Parrott bolt,
chilled nose



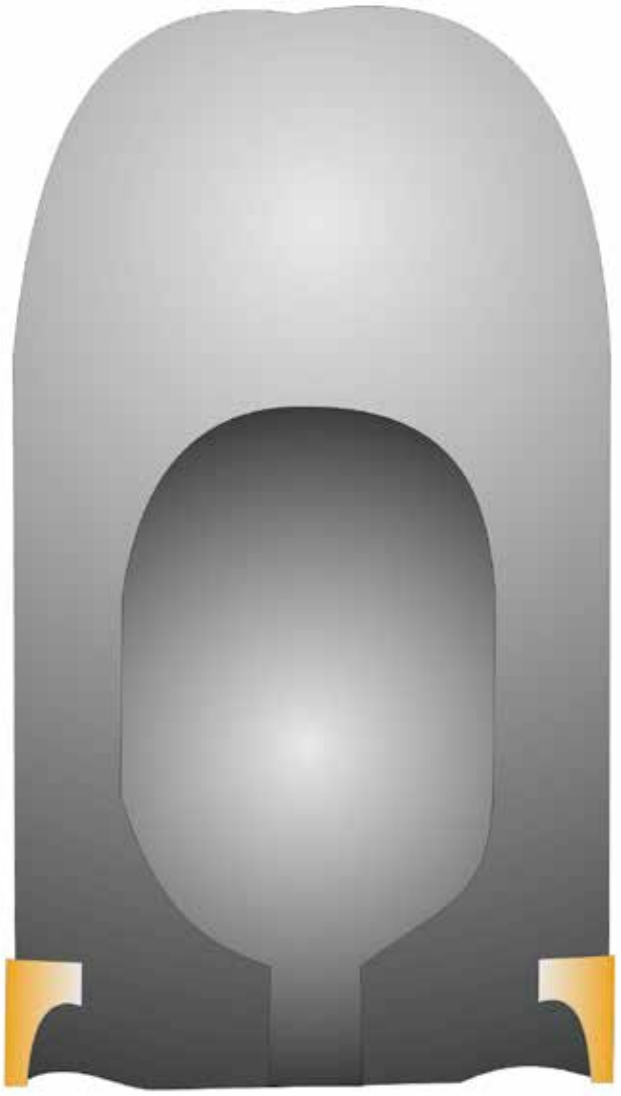
**C.S. 6.4-inch Brooke ratchet ring sabot shell,
approved November 1863, with Archer safety pin percussion fuze, long**



6.38-inch Stafford sub-caliber bolt, patent 39,180, dated 7 July 1863



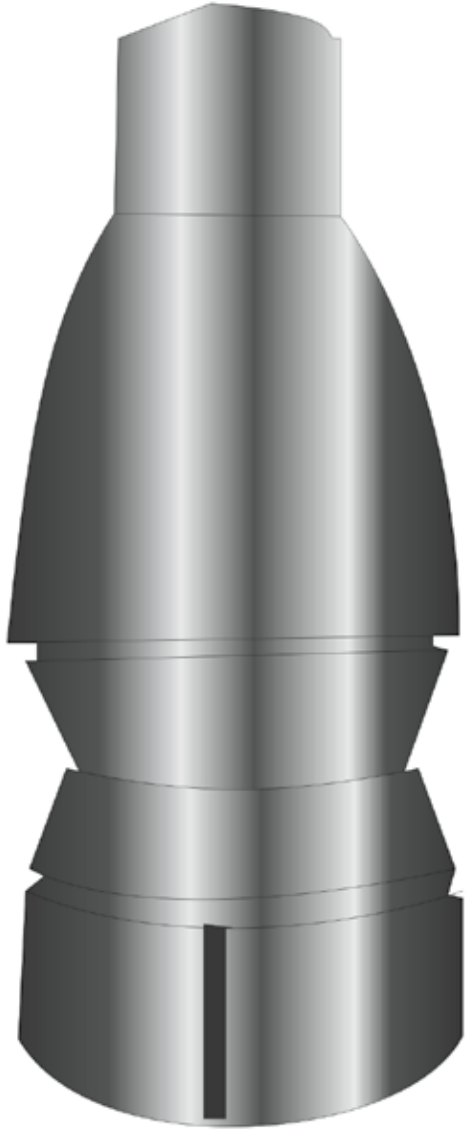
Stafford sub-caliber projectile, patent 40,198, dated 6 October 1863



6.4-inch Harding shell, hollow shot



6.4-inch Harding shell, hollow shot, exterior



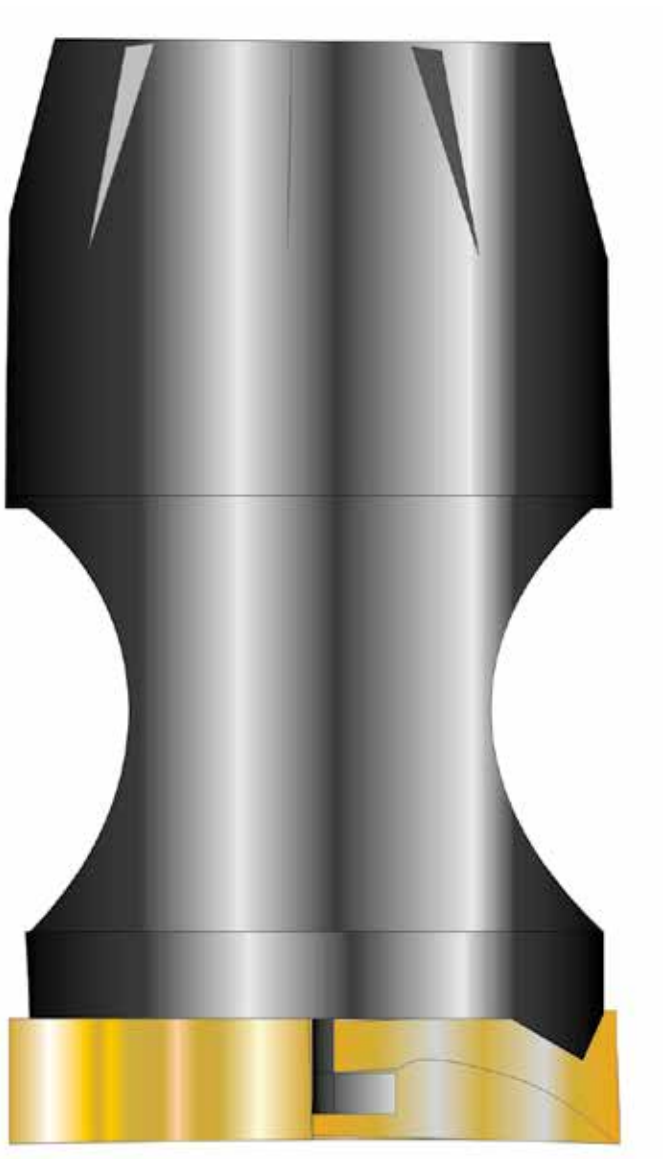
6.4-inch Hotchkiss bolt



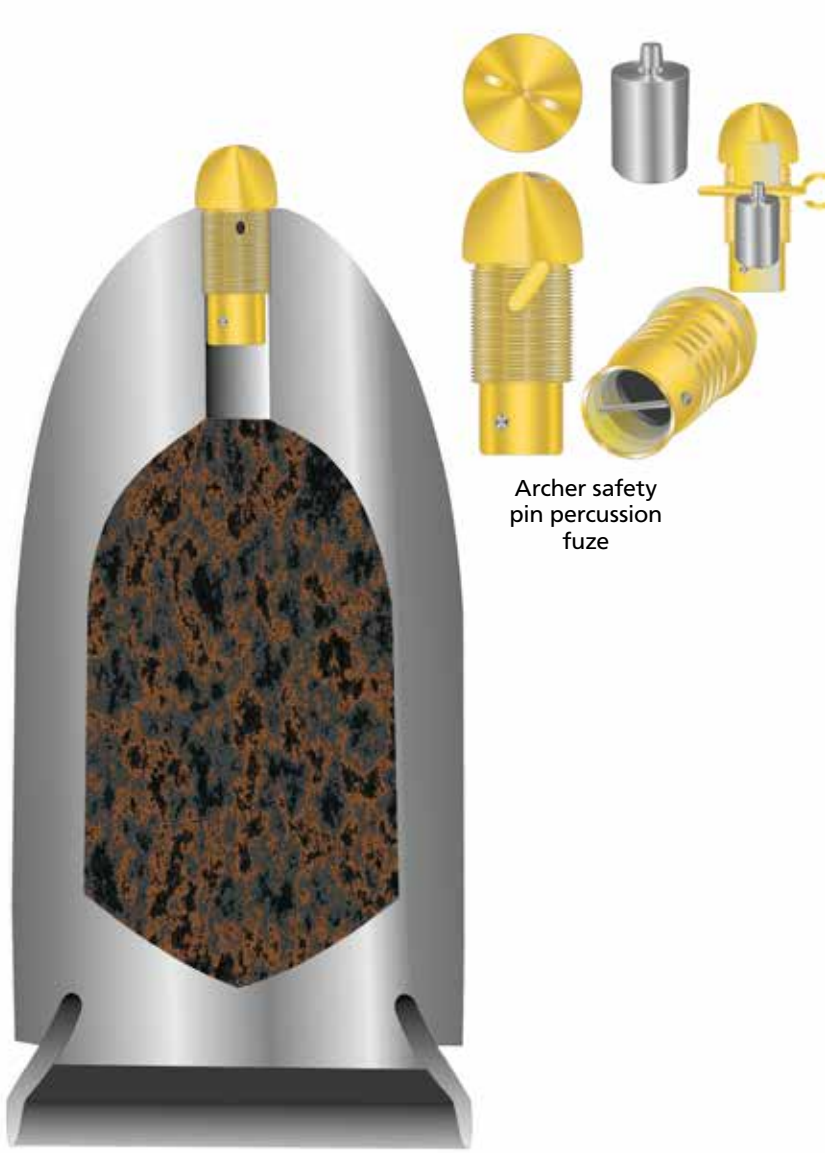
6.4-inch Armstrong bolt



C.S. 6.4-inch shell, sabot sectioned



6.4-inch curved bolt



C.S. 6.4-inch Brooke shell,
wrought iron sabot



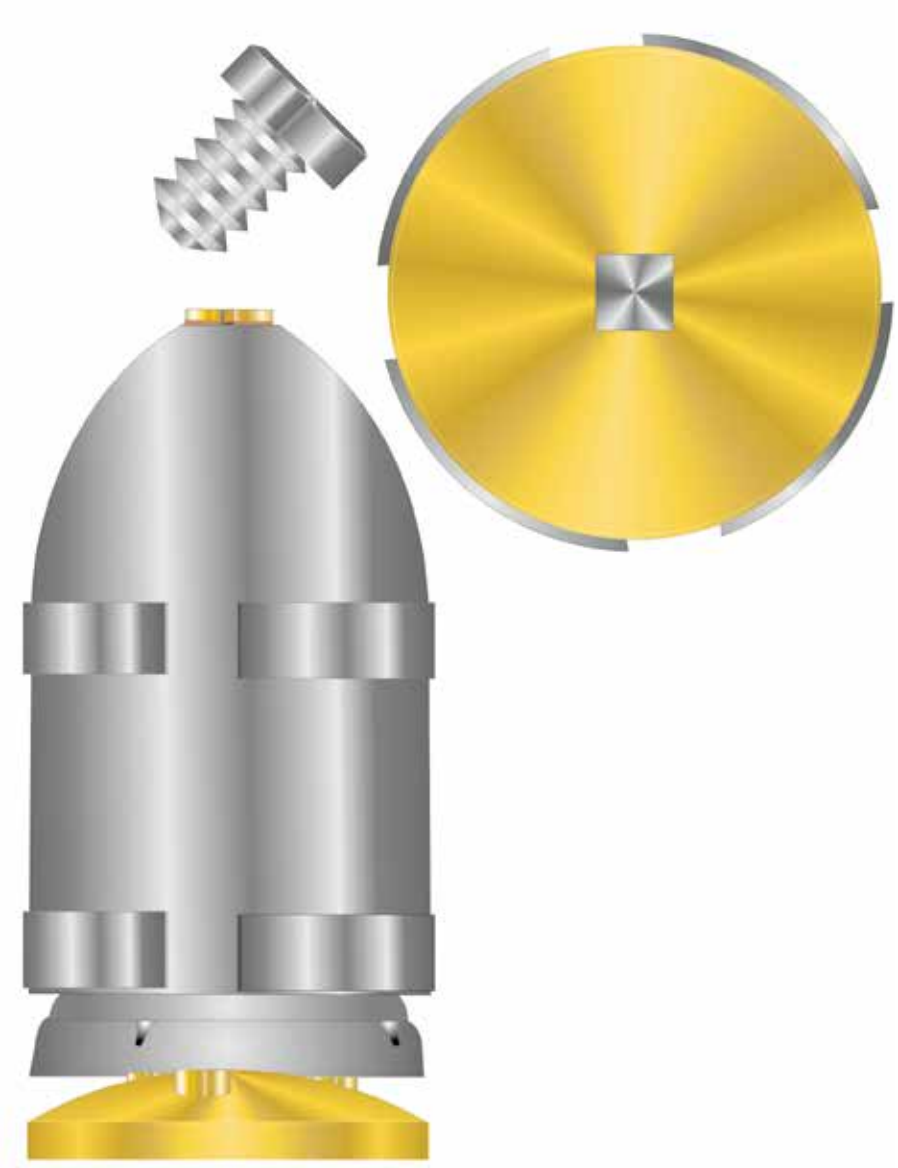
C.S. 6.4-inch Brooke milled base bolt



6.4-inch Mullane shell, fuzed



6.4-inch Mullane shell, percussion fuzed



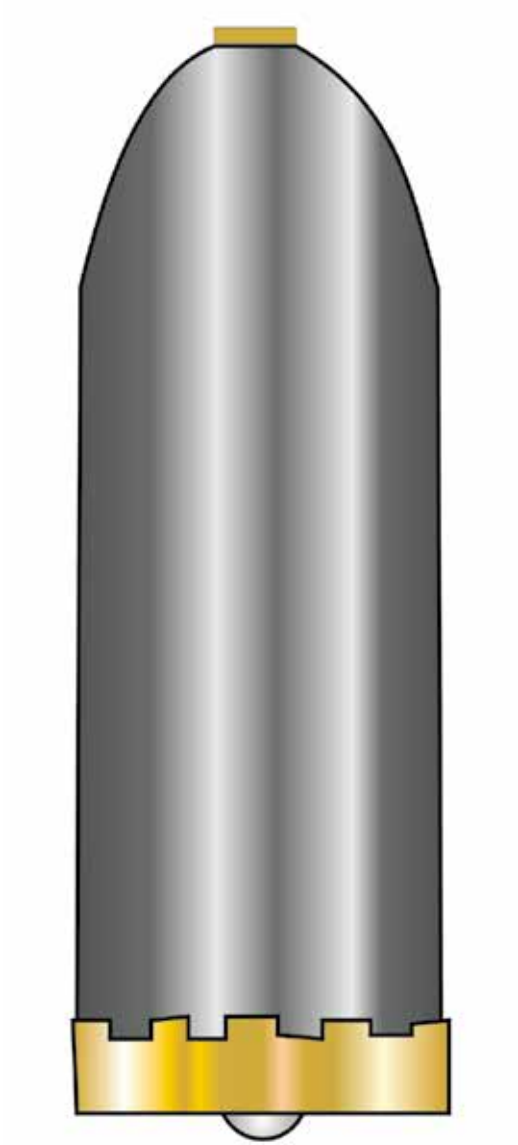
C.S. 6.4-inch Mullane shell, resaboted



6.4-inch Mullane bolt



6.4-inch Parrott incendiary shell



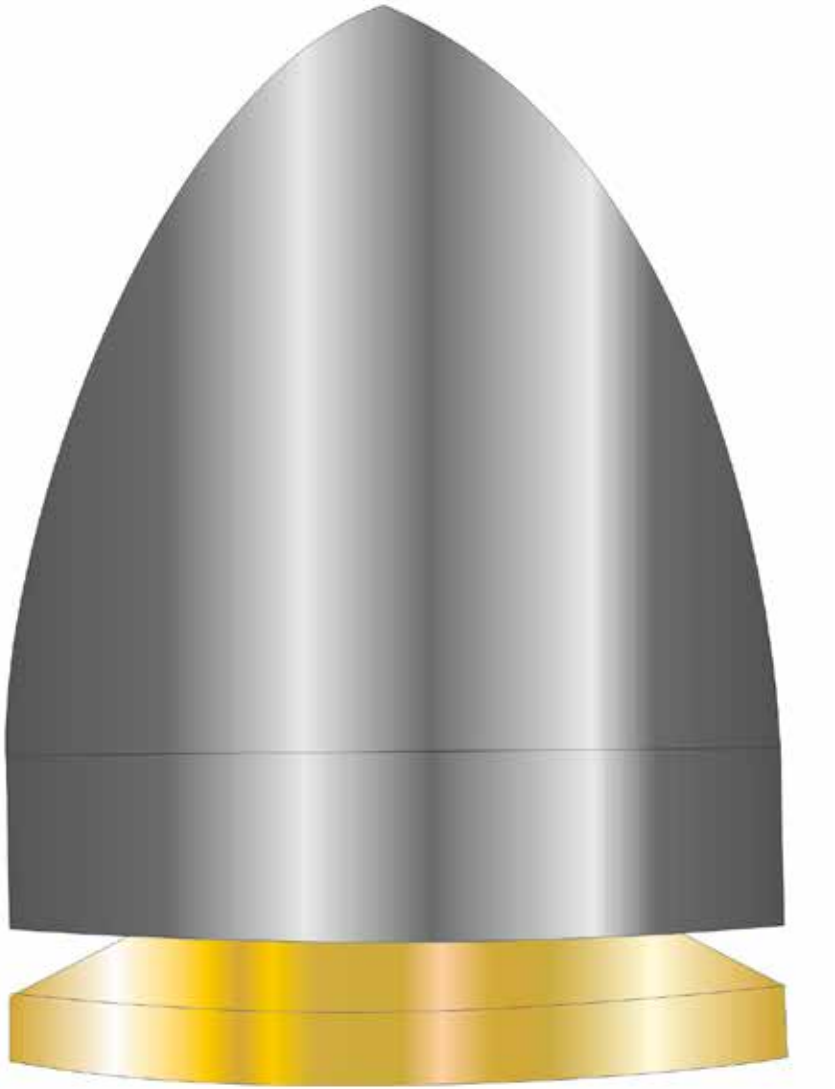
6.4-inch Parrott shell, Type II, rivet base



U.S. 6.4-inch Parrott shell, knob base



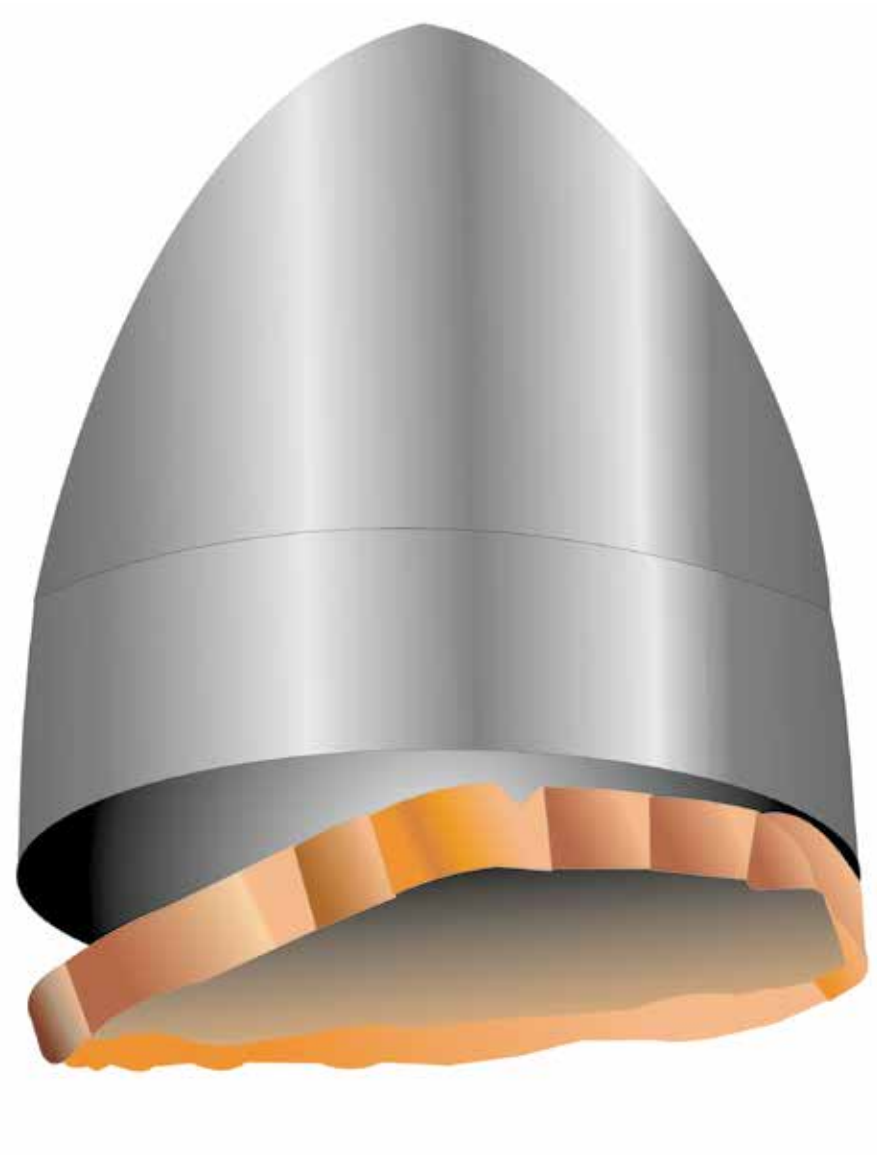
U.S. 6.4-inch Parrott, Type II,
flat top, hollow bolt



6.4-inch Reed bolt, teardrop



6.4-inch Schenkl shell



C.S. 6.4-inch Selma bolt, teardrop



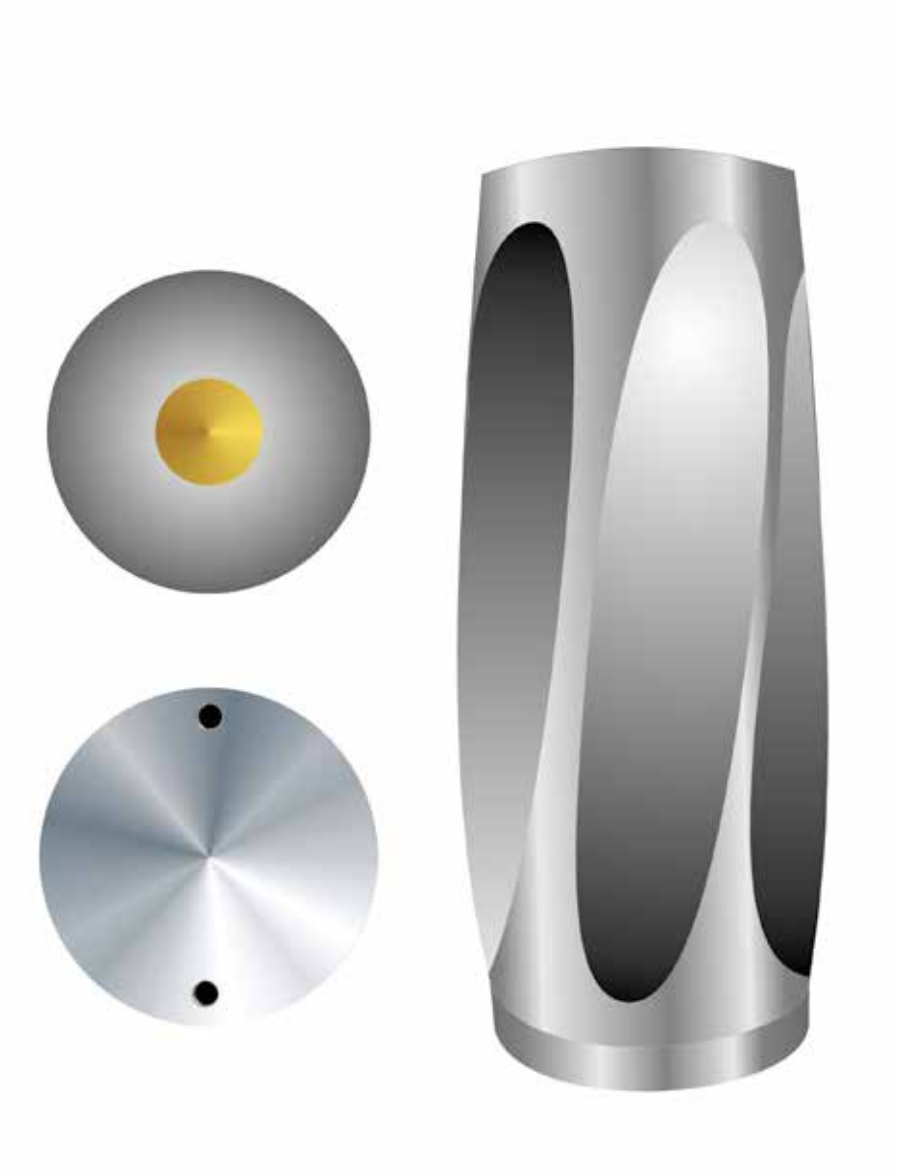
6.4-inch Stafford bolt



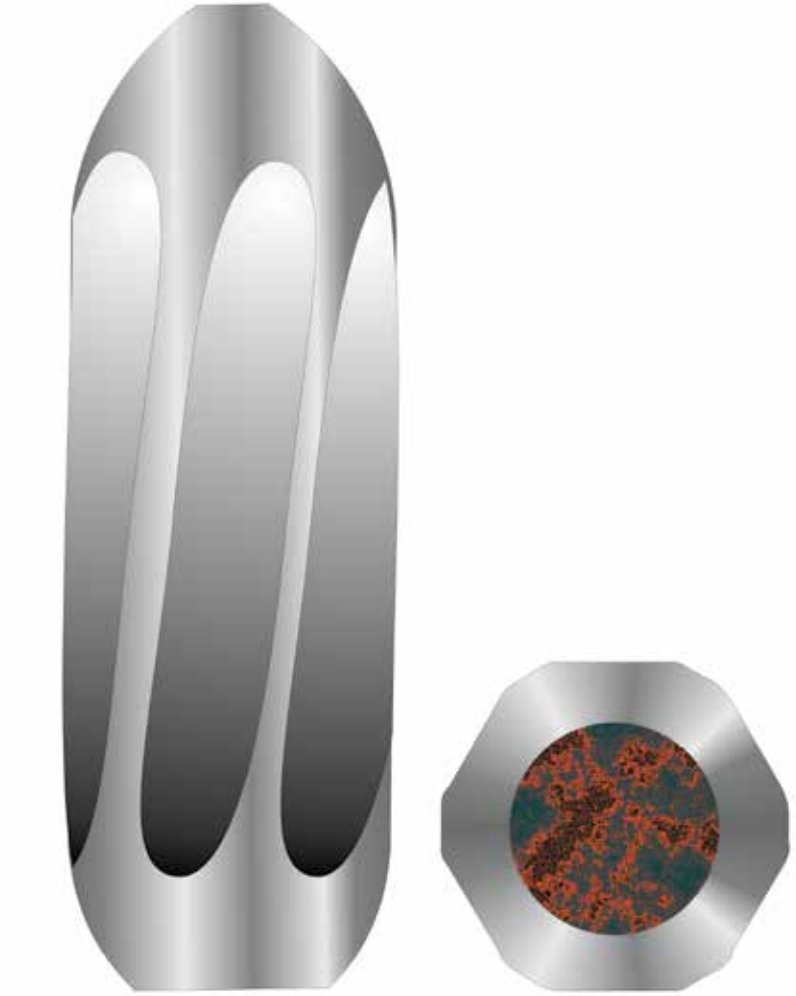
6.4-inch Tredegar bolt



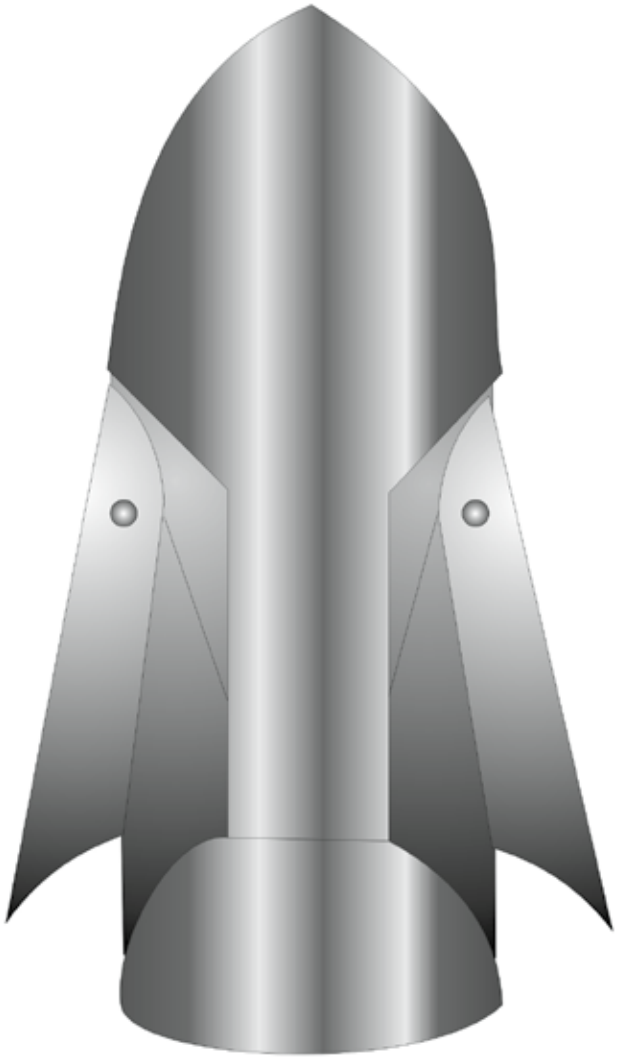
6.4-inch Whitworth shell



British 6.4-inch Whitworth blind shell



British 6.4-inch Whitworth shell



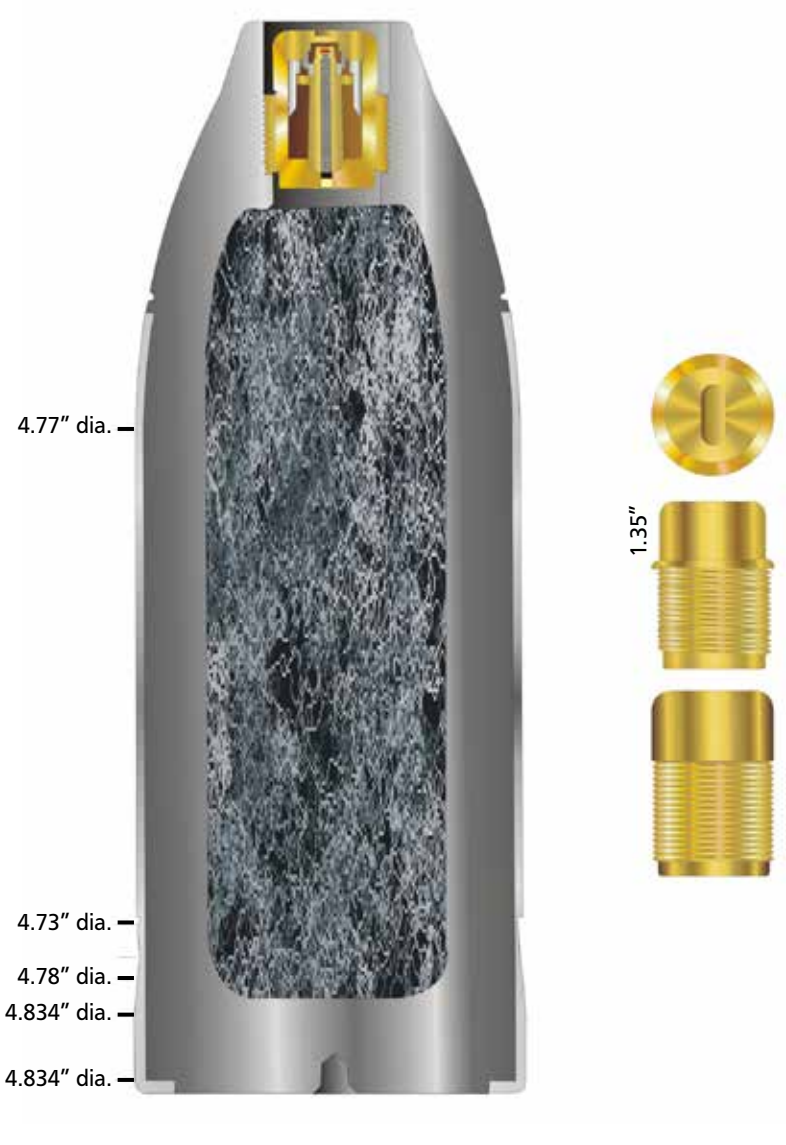
6.4-inch winged bolt



British 40 pounder Armstrong segment shell, time fuzed



British 40 pounder B.L. shrapnel shell,
Armstrong Elswicj Ordnance Company



British 40 pounder common shell
with Armstrong pillar fuze



42 pounder James bolt



50 pounder Schenkl shell



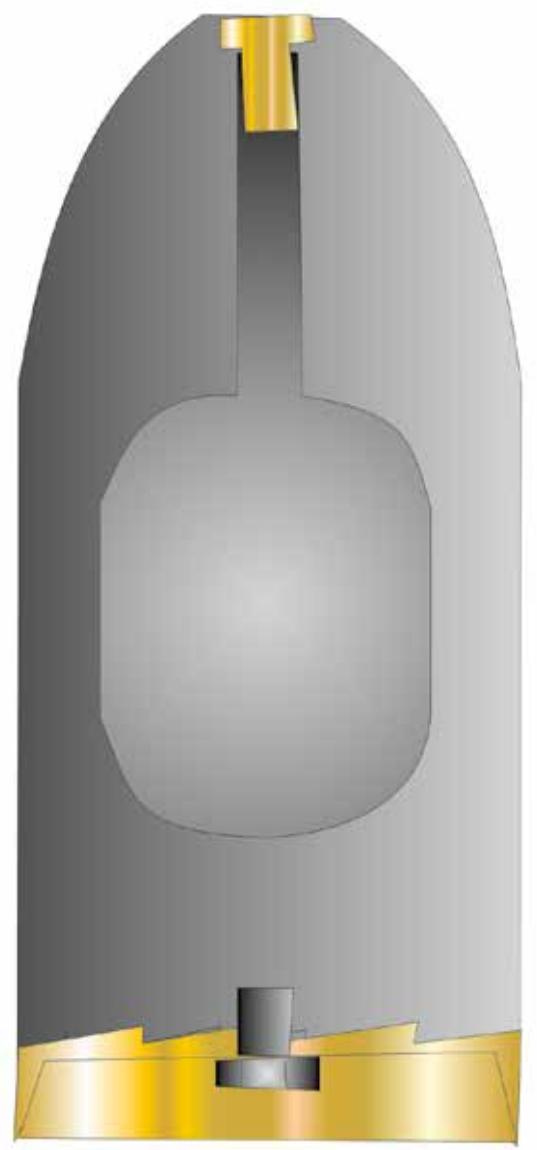
6.8-inch Navy Schenkl shell



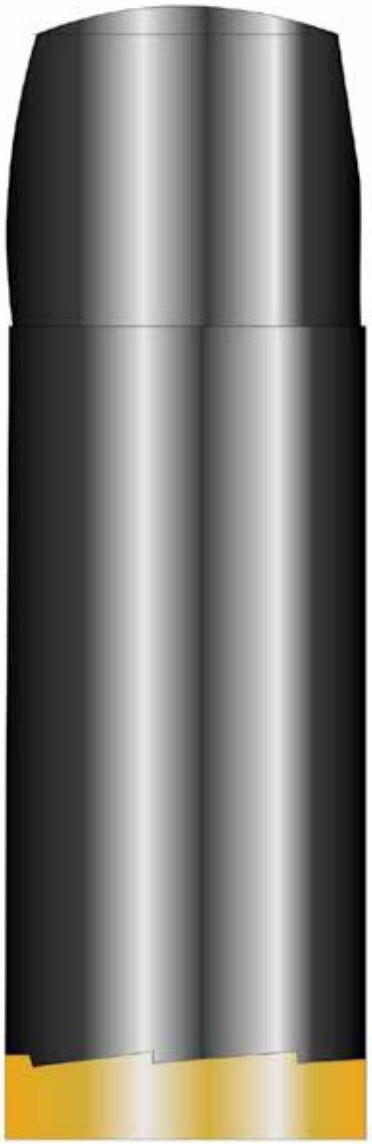
7-inch Boxer rifled muzzle loading shrapnel



C.S. 7-inch Brooke shell, percussion fuze



7-inch Brooke shell, sectioned



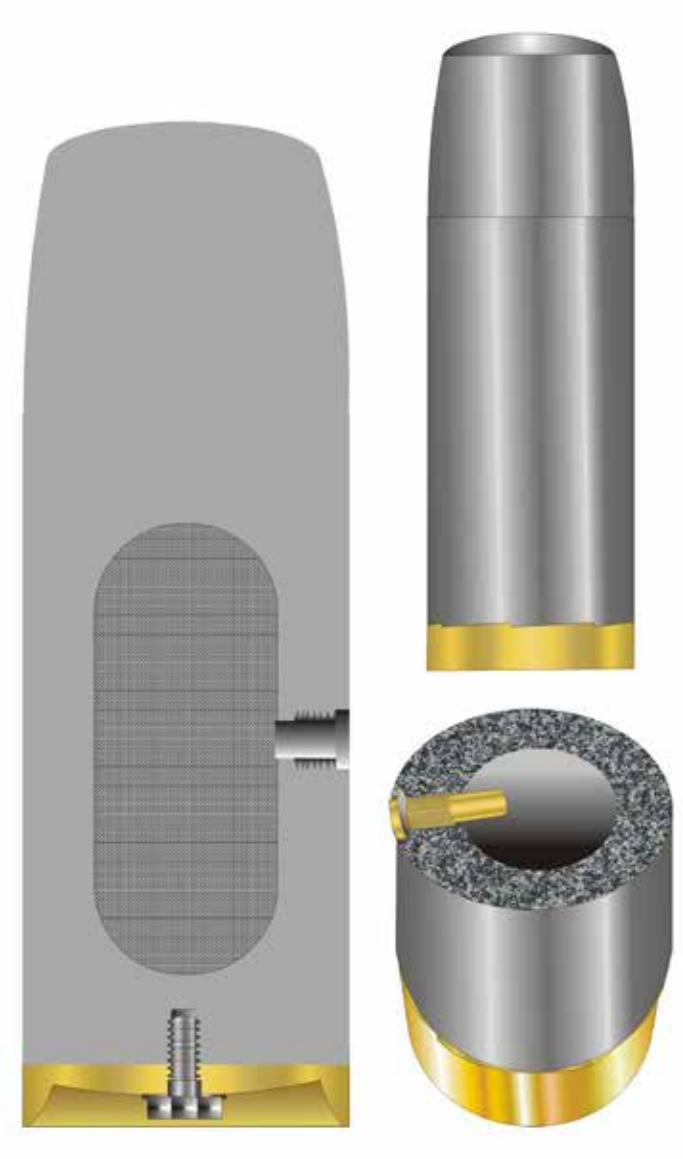
7-inch Brooke shell, side fuzed



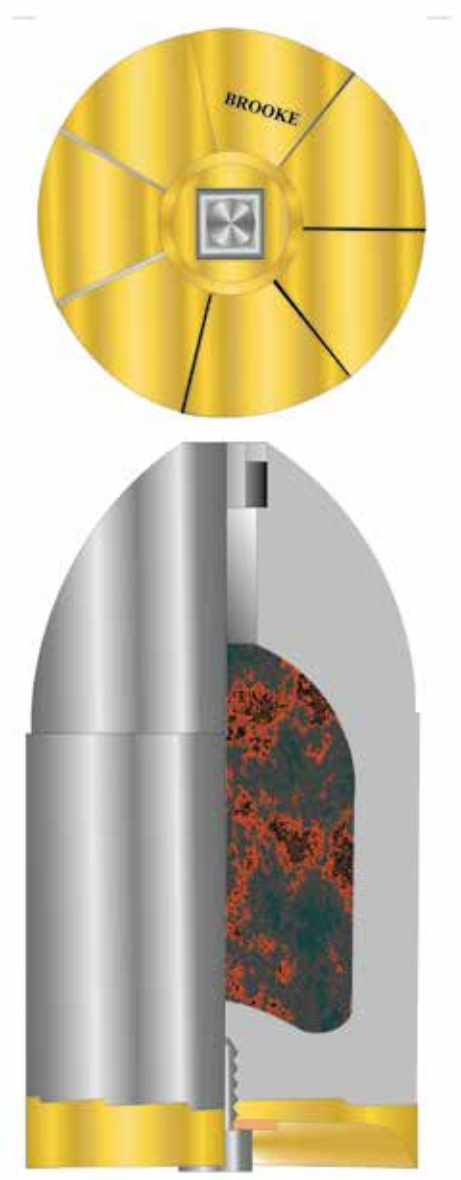
7-inch Brooke shell, side fuzed, sectioned



C.S. 7-inch Brooke concussion shell



C.S. 7-inch Brooke shell, armor piercing, water cap fuze



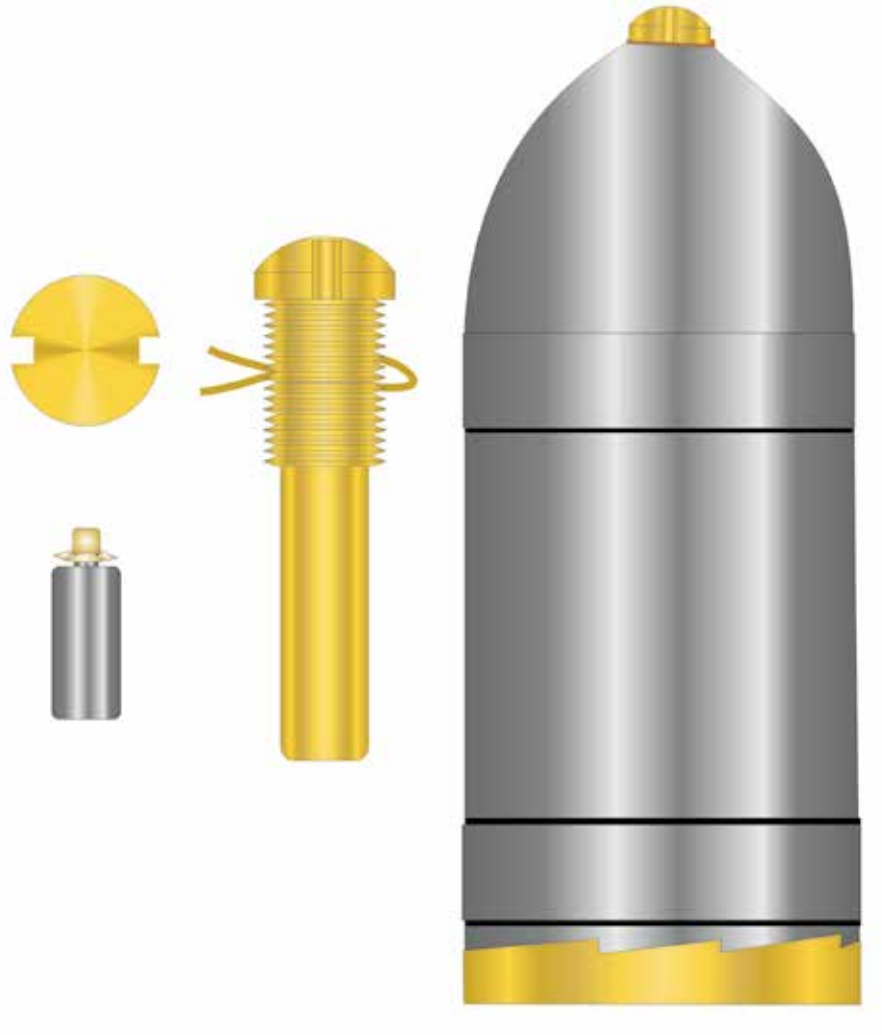
C.S. 7-inch Brooke shell



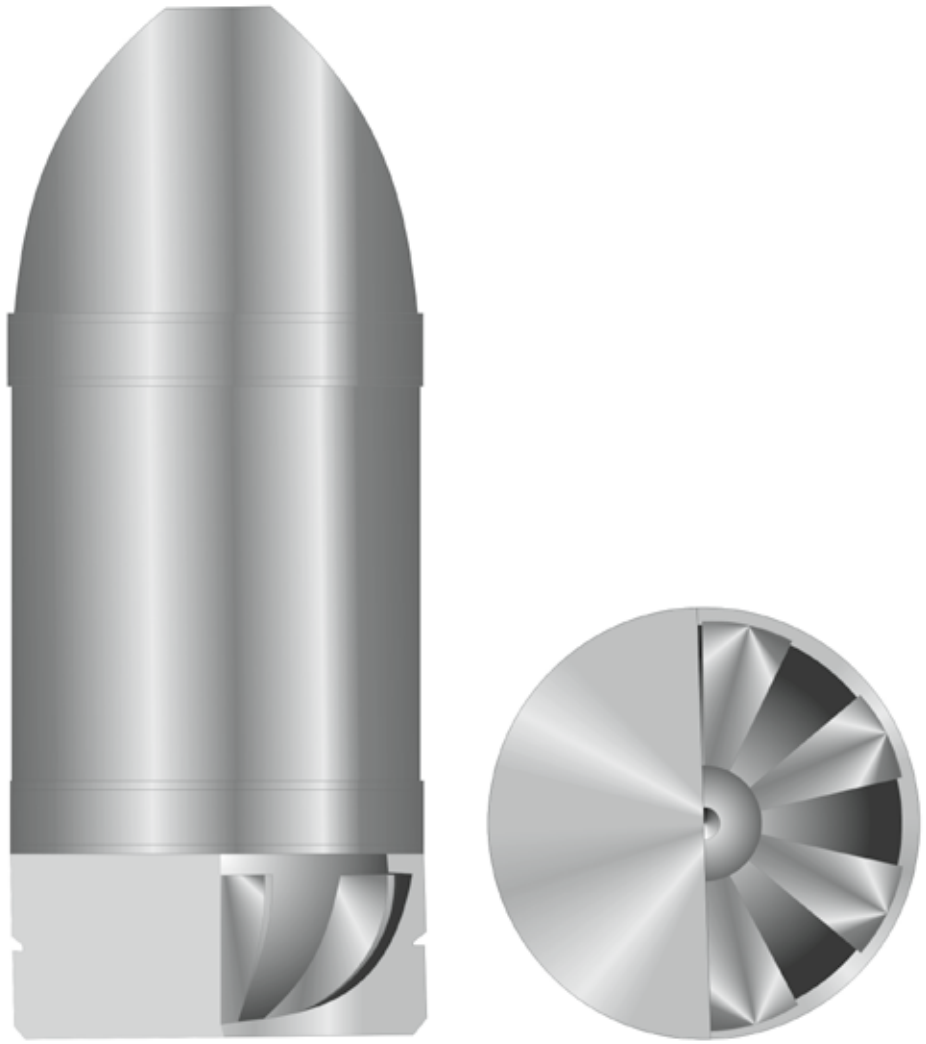
C.S. 7-inch Brooke bolt



7-inch Brooke bolt, flat top



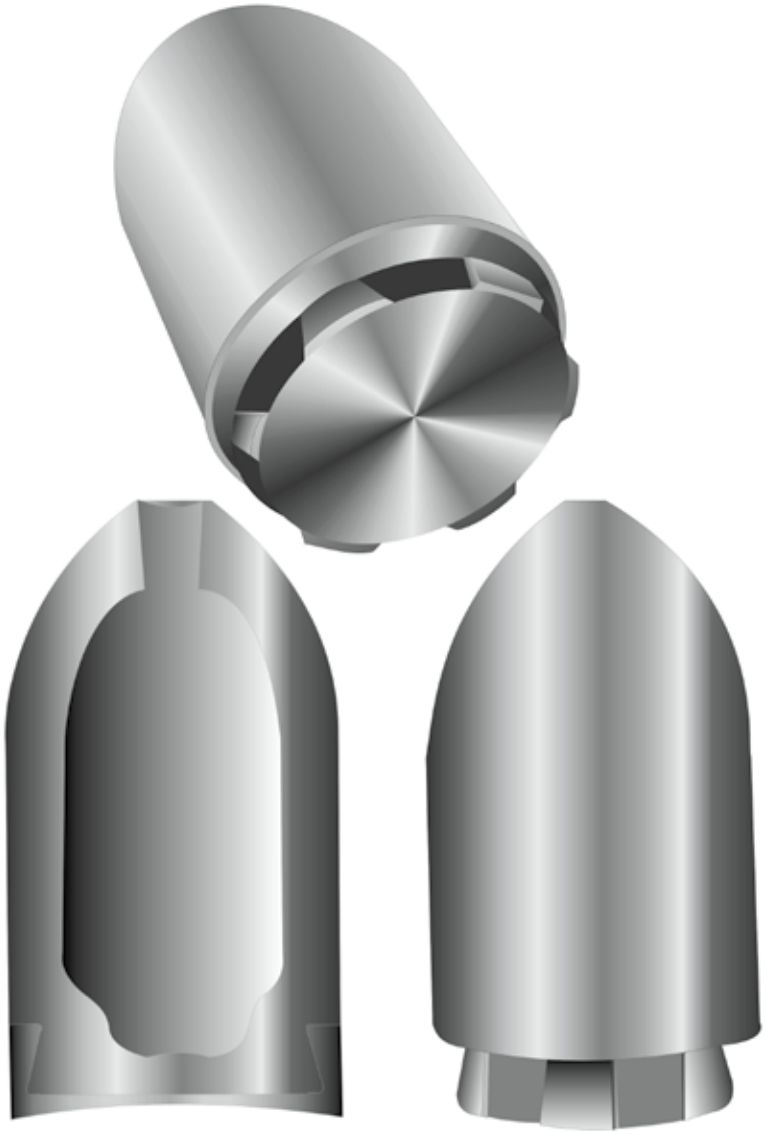
7-inch Brooke
with Archer safety pin fuze



C.S. 7-inch Dahlgren shell



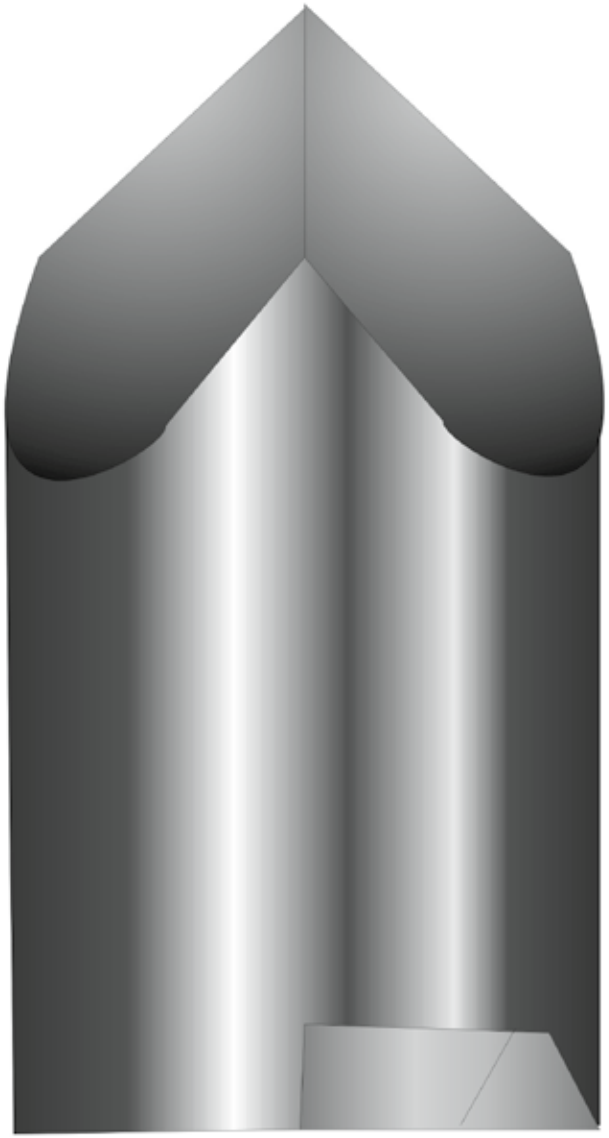
7-inch Dimick shell



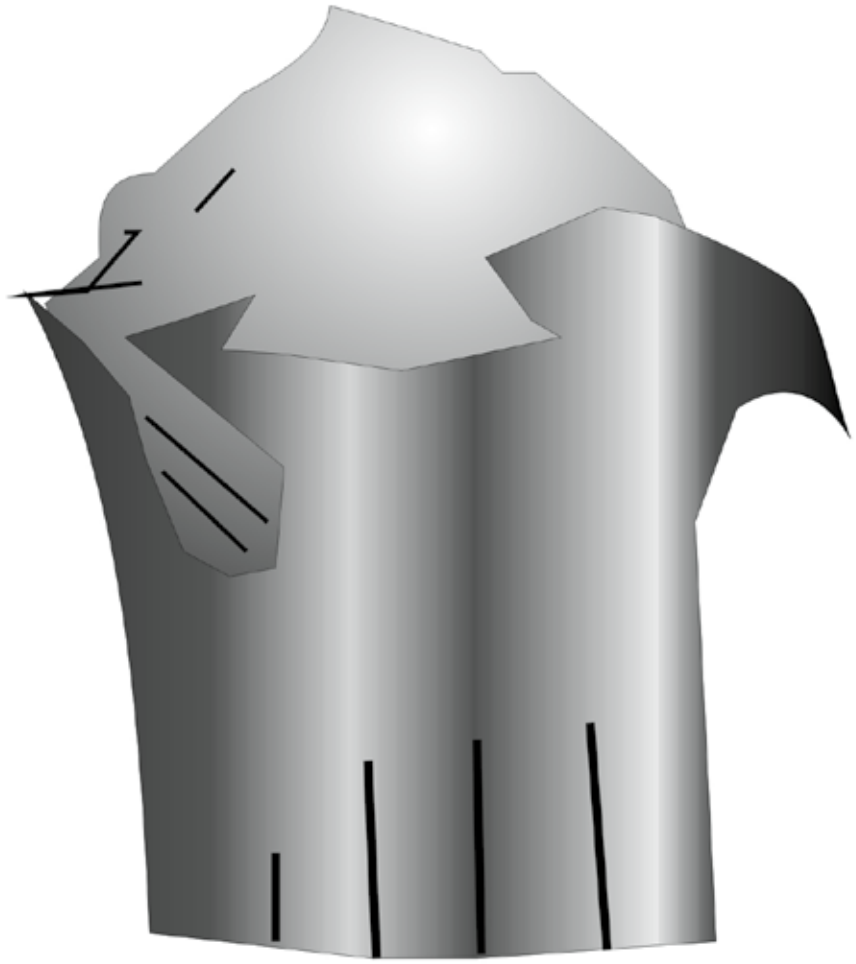
U.S. 7-inch Dyer shell



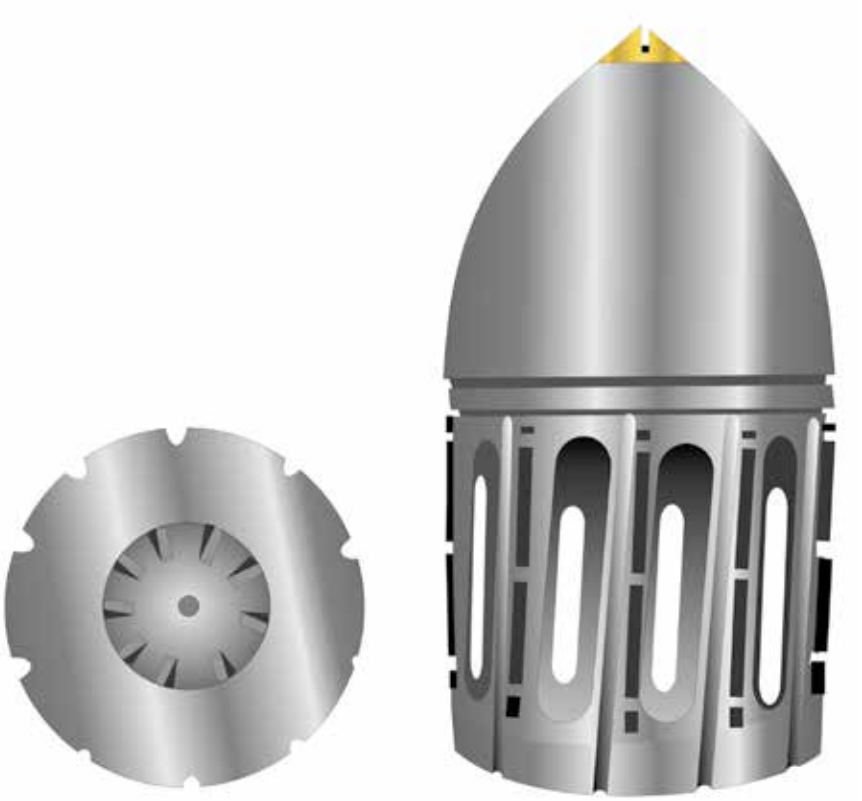
British 7-inch hollow shot



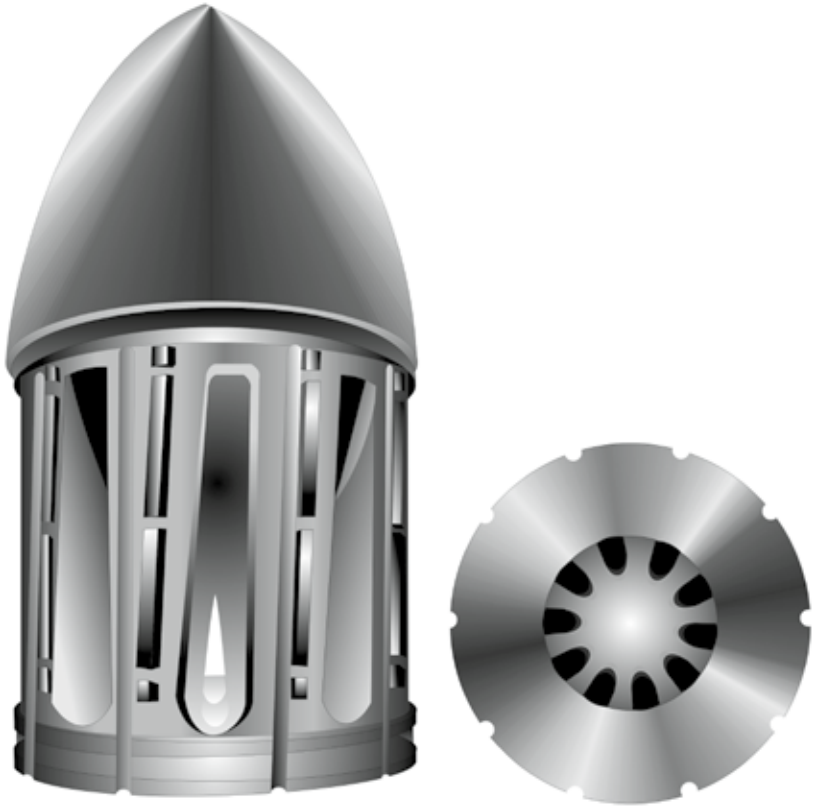
**7-inch Hopson-Brooke bolt,
milled base sabot**



**7-inch Hopson-Brooke bolt
after impact**



7 inch James shell,
James percussion fuze



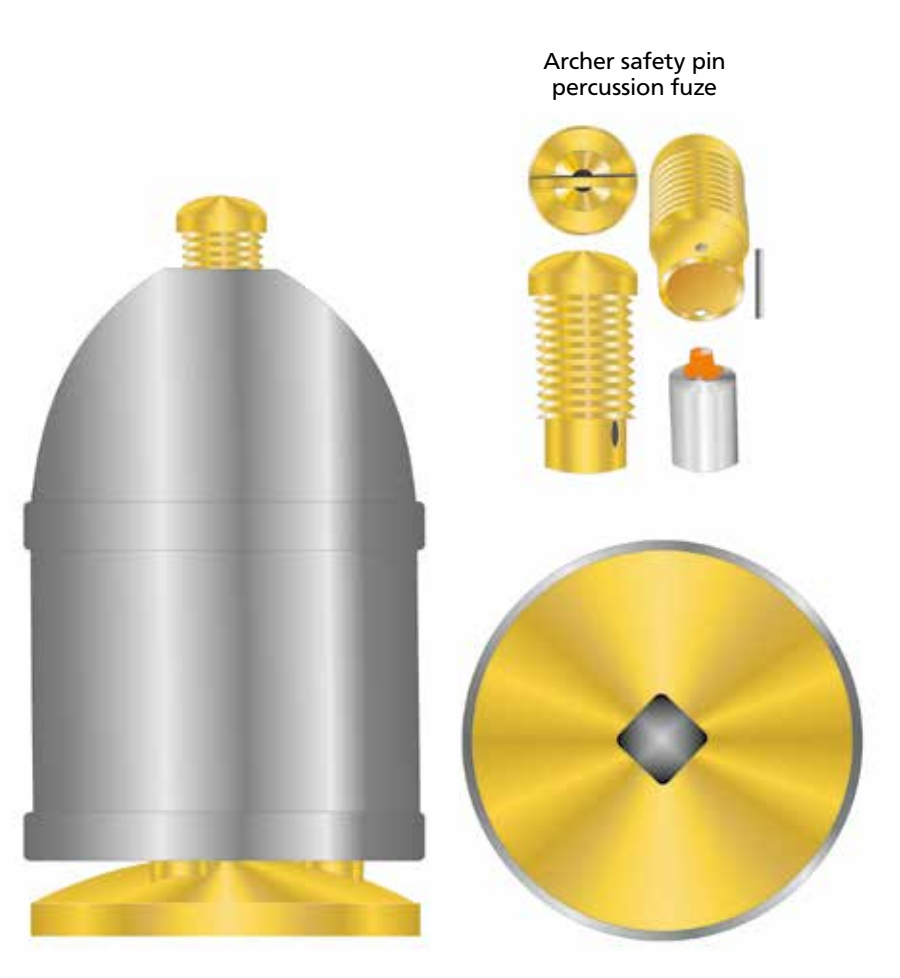
7-inch James bolt



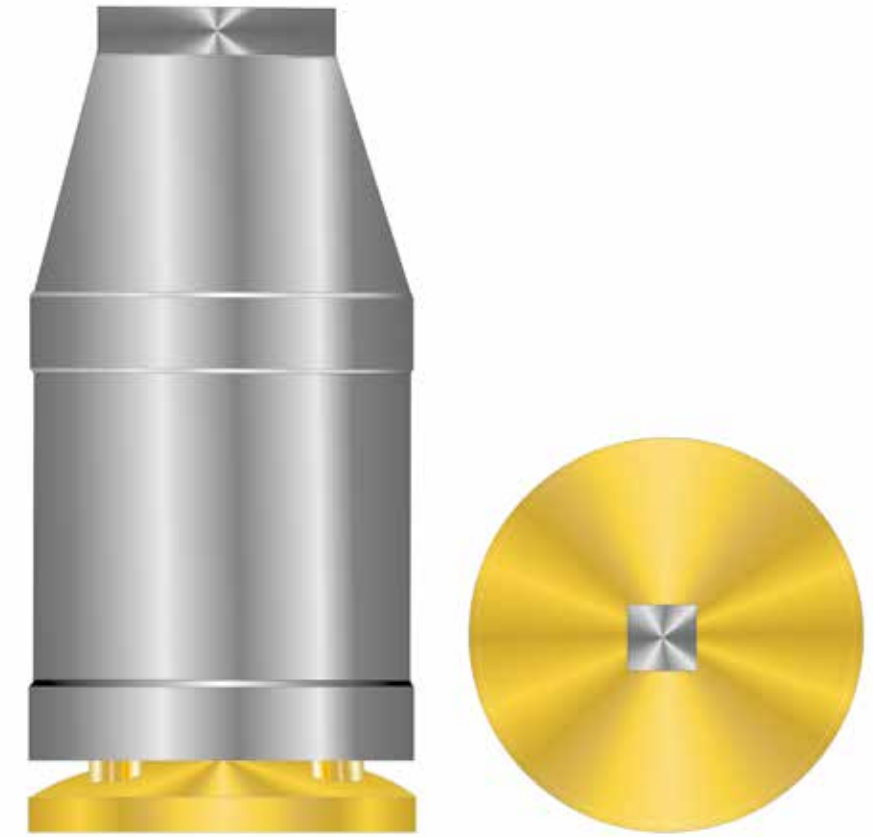
7-inch Mullane bolt



7-inch Mullane bolt, flat top



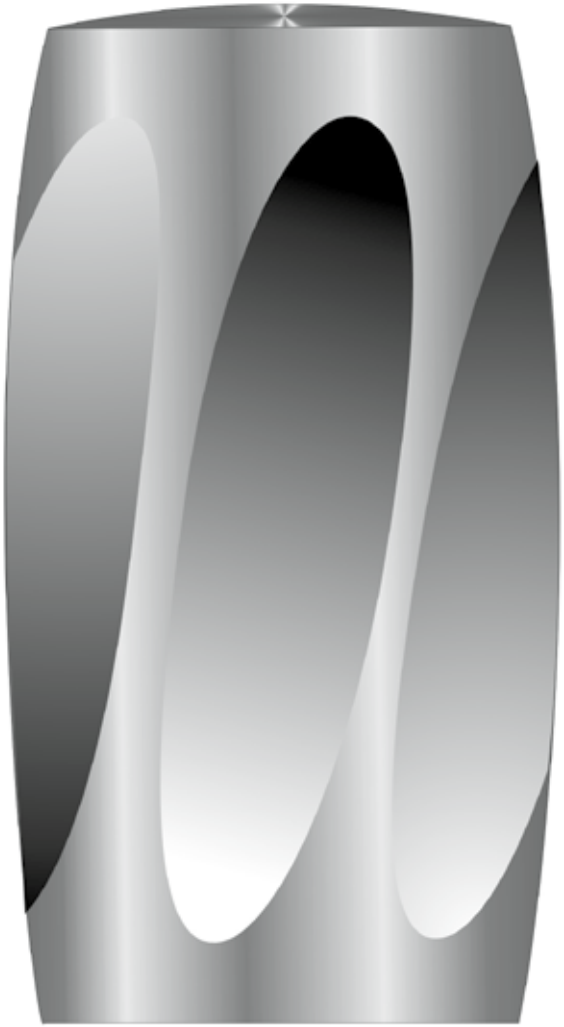
C.S. 7-inch Mullane shell



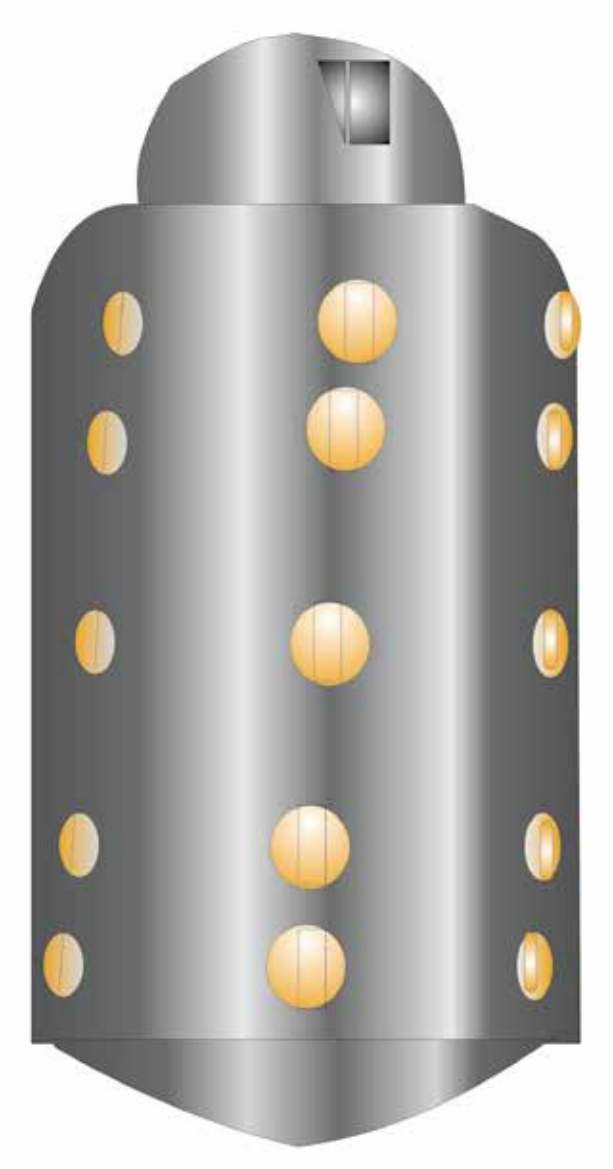
C.S. 7-inch Mullane bolt,
armor punching



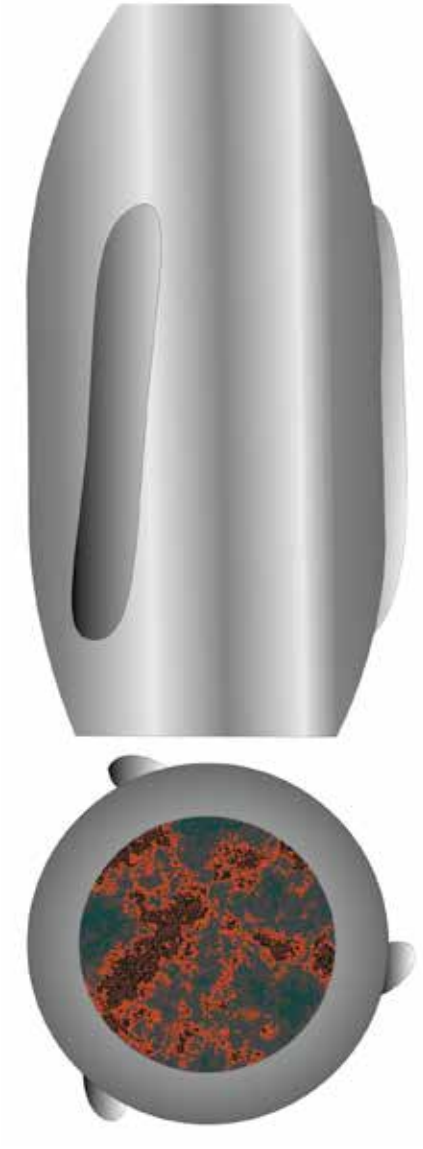
7-inch Parrott shell, Type III



British 7-inch Whitworth bolt,
tested at Woolwich in September 1862



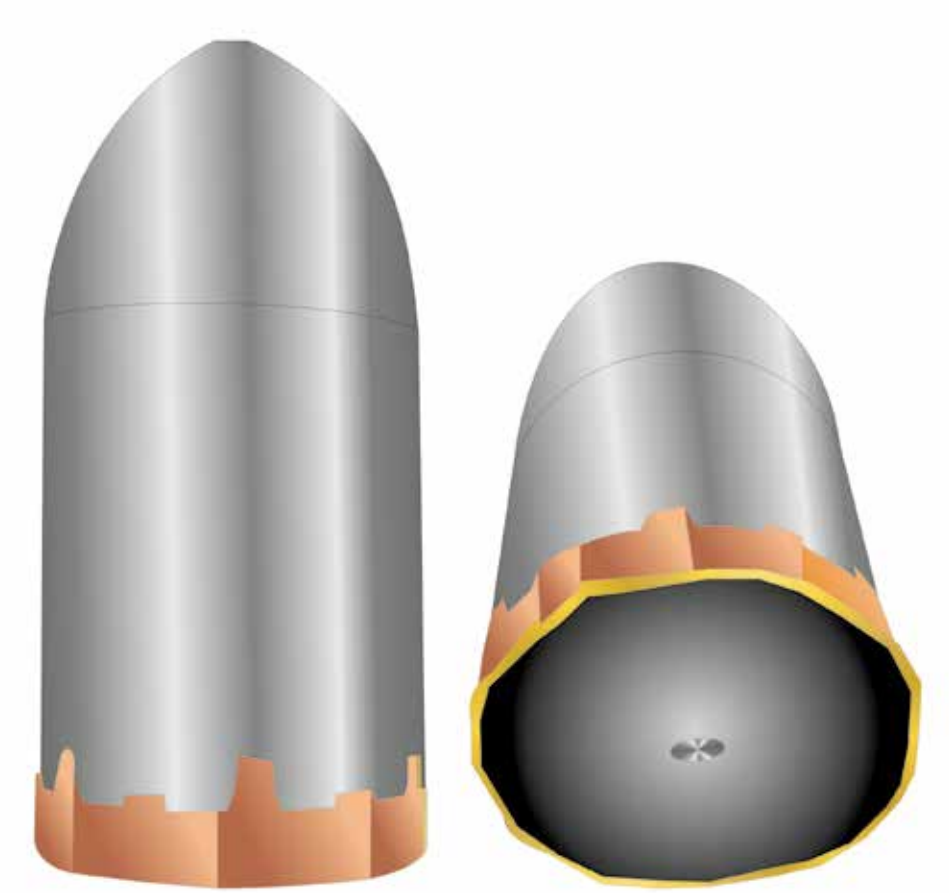
8-inch Armstrong studded shunt shell



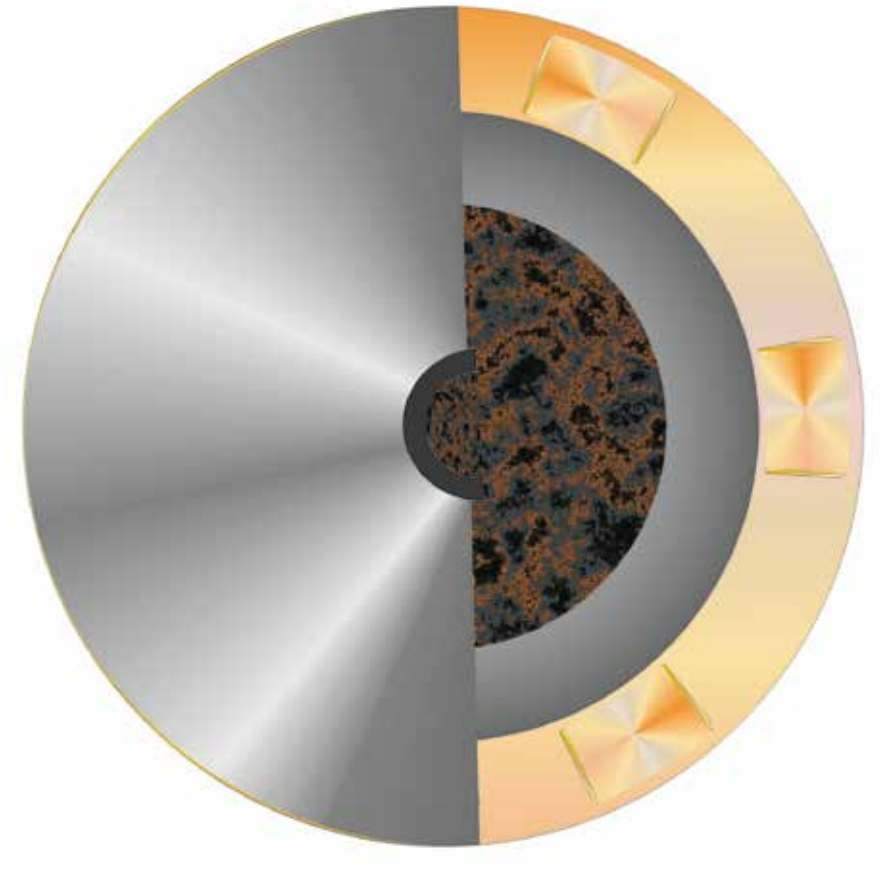
British 8-inch Blakely flanged shell



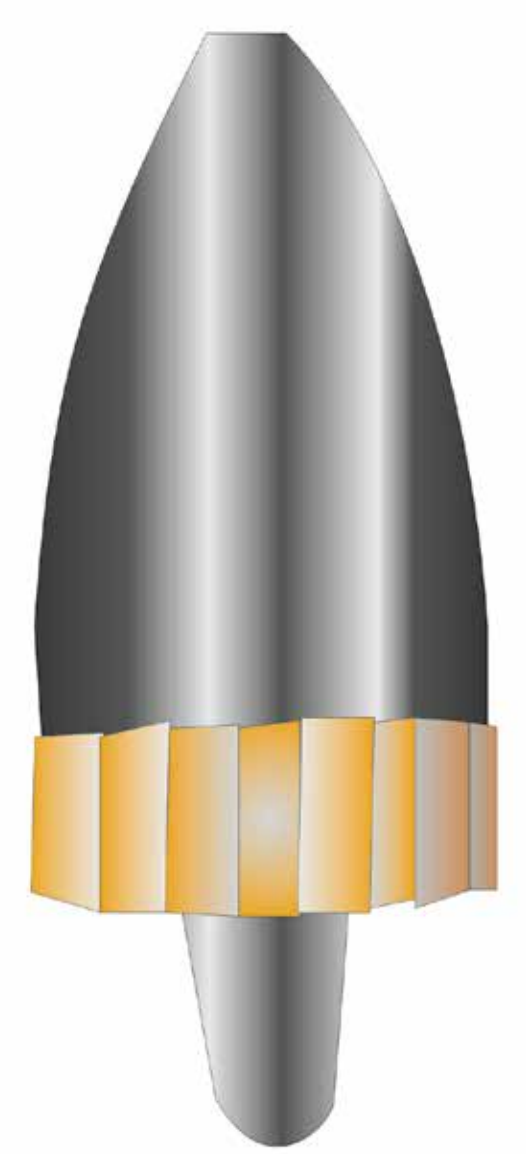
8-inch Confederate shell



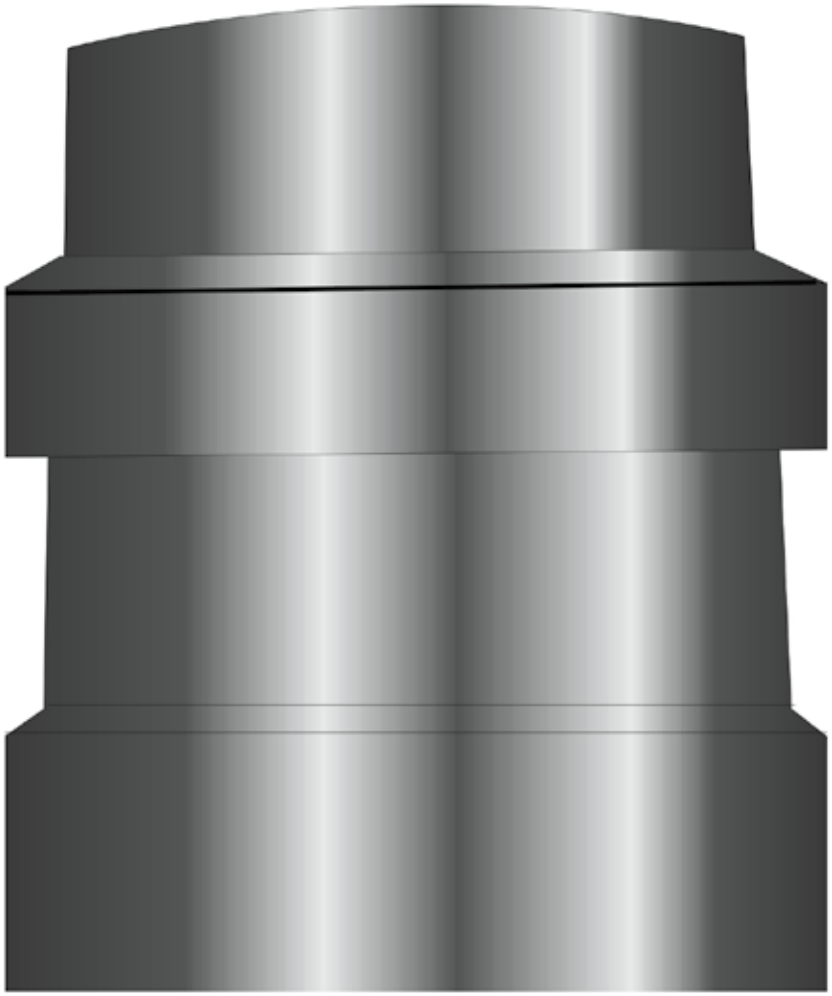
C.S. 8-inch Harding shell



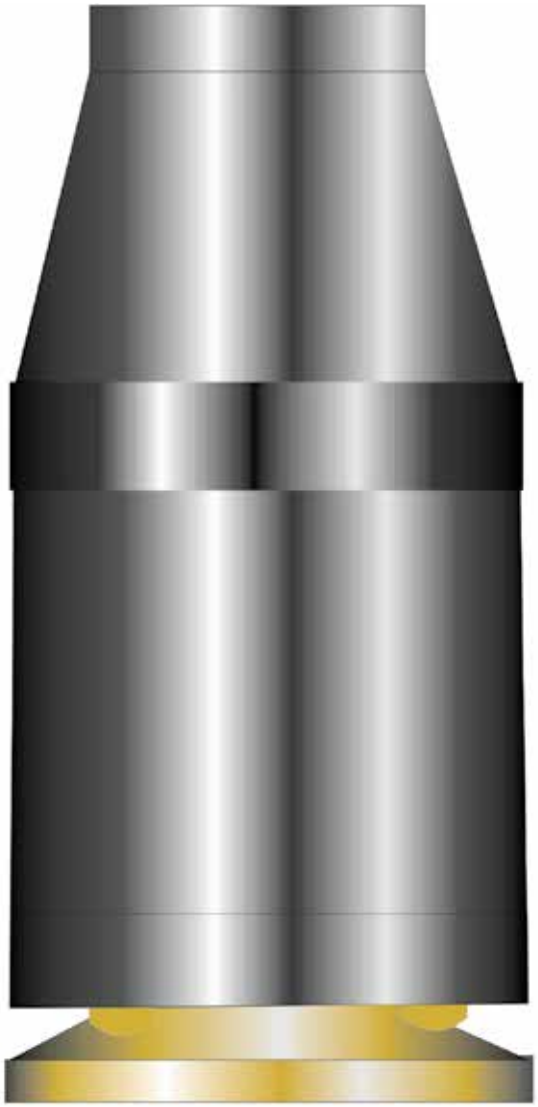
C.S. 8-inch Harding shell,
nose view



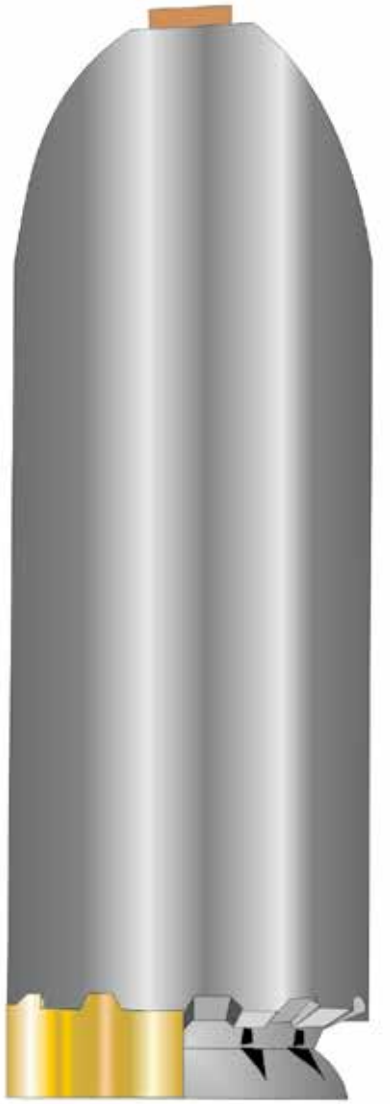
8-inch Harding shell, pointed



8-inch Maury bolt



8-inch Mullane bolt



8-inch 200 pounder Parrott shell



C.S. 8-inch Parrott, Type II shell



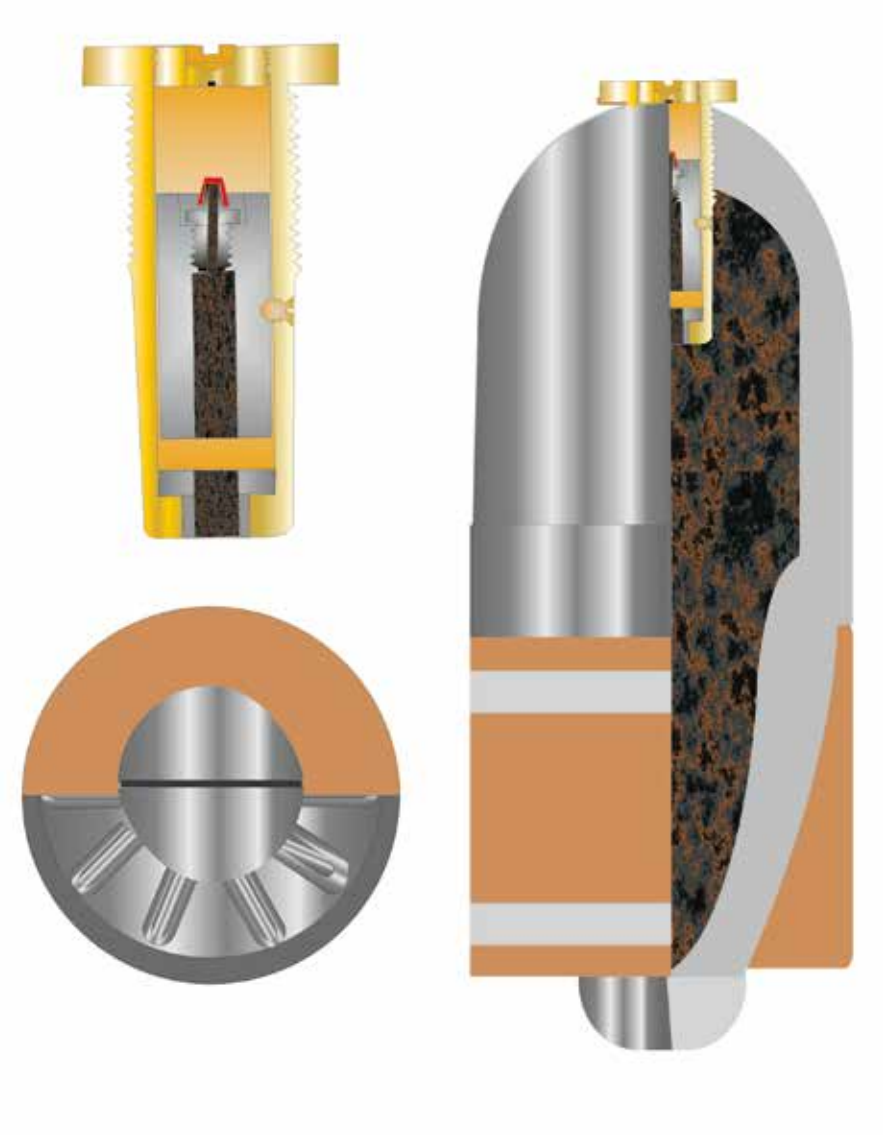
8-inch Parrott bolt



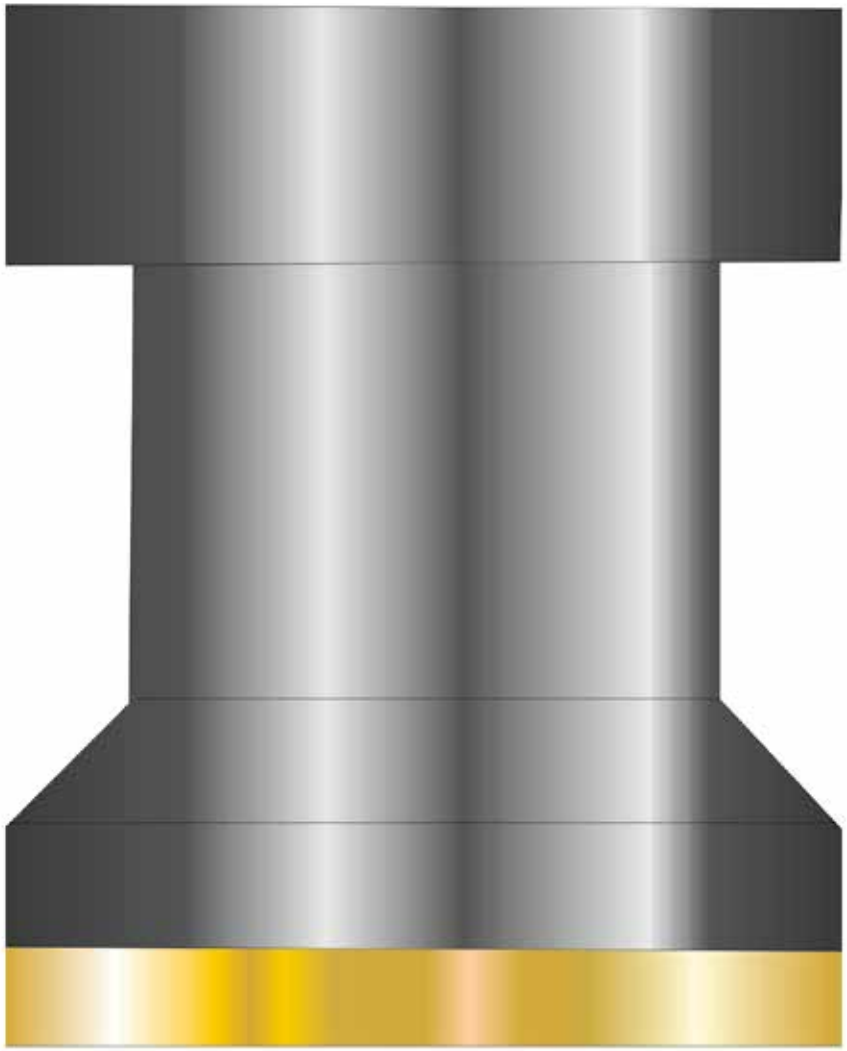
8-inch Parrott bolt,
sectioned sabot



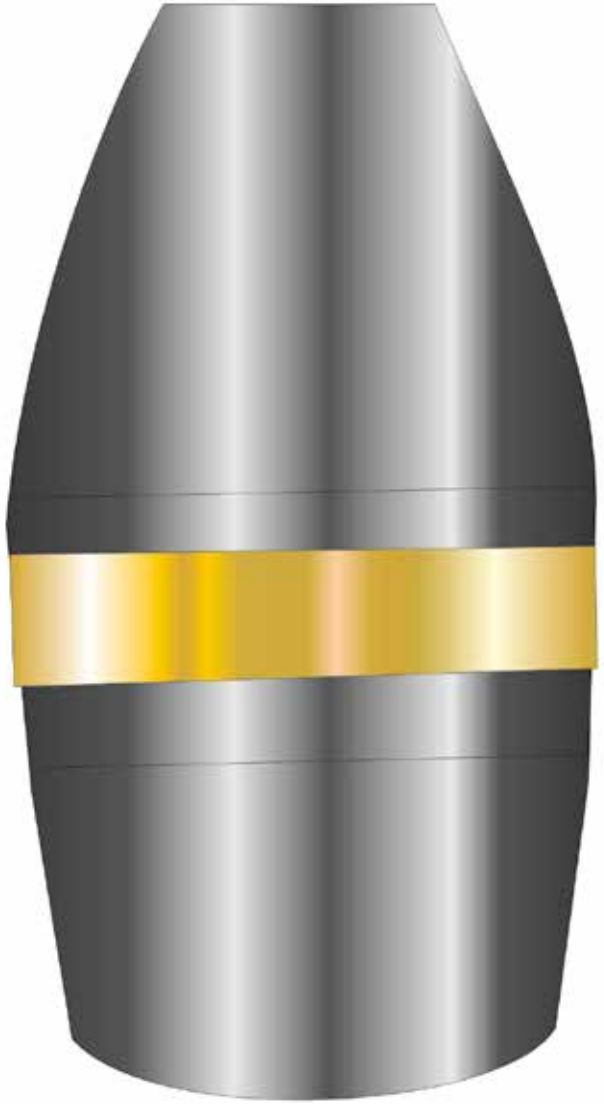
8-inch Parrott bolt, Type II



8-inch Schenkl, sectioned,
Schenkl percussion fuze



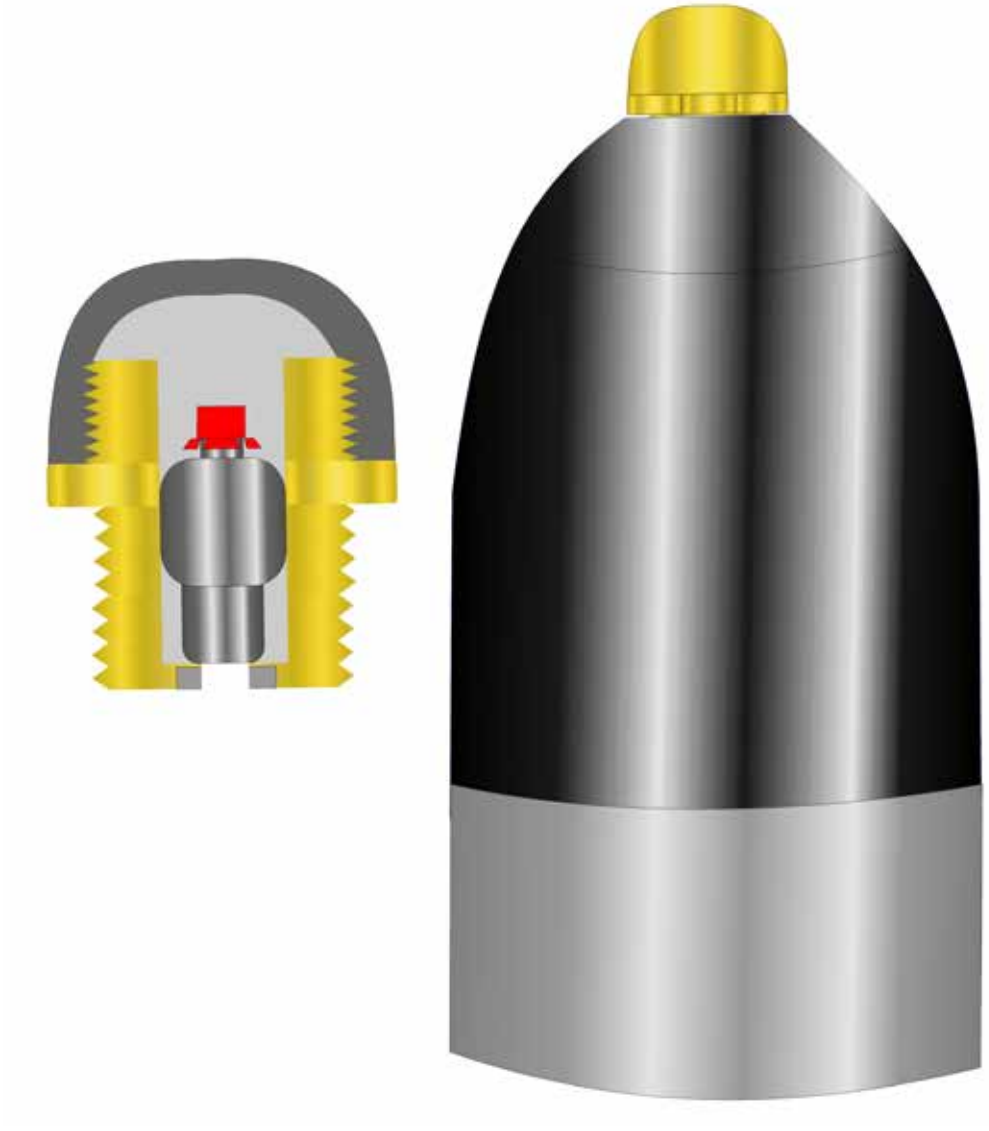
10-inch Harding dumbbell bolt



10-inch Harding tapered bolt



10-inch Parrott shell, Type II



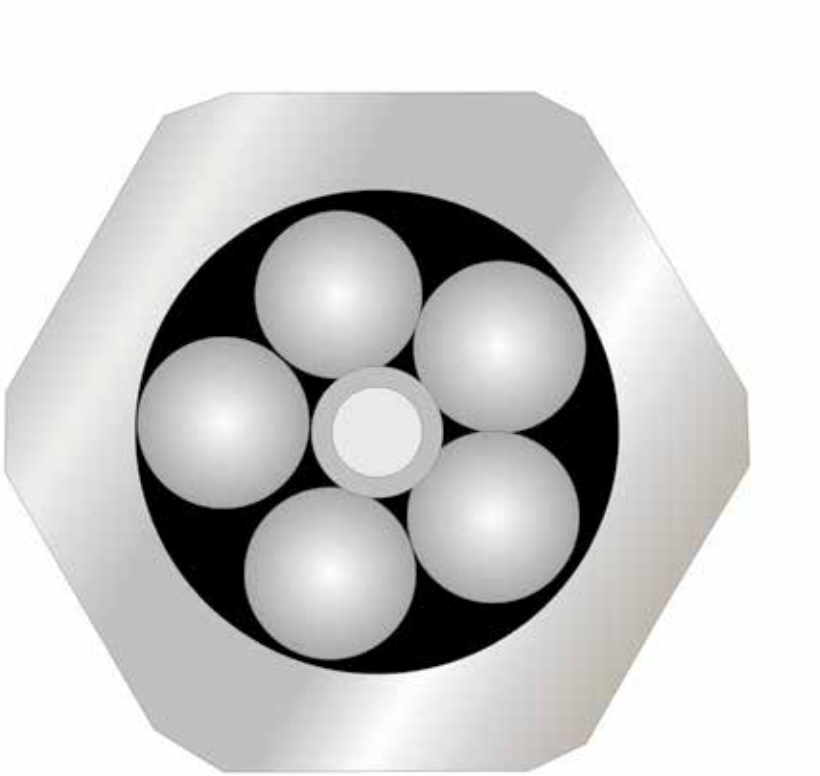
12 pounder Britten shell,
percussion fuzed



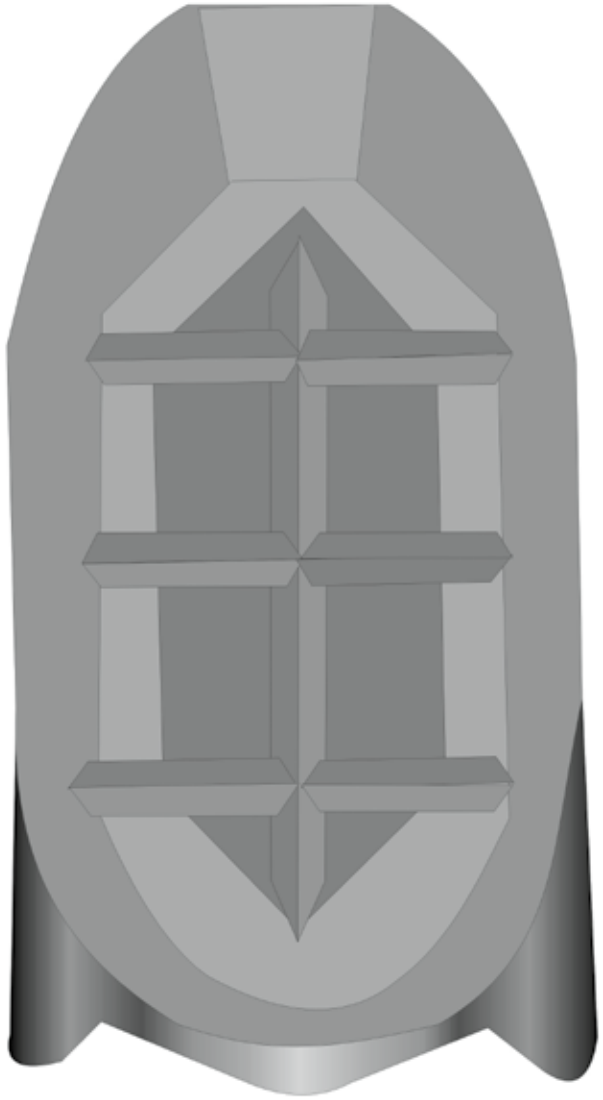
Reed shell,
sectioned, copper time fuze adapter



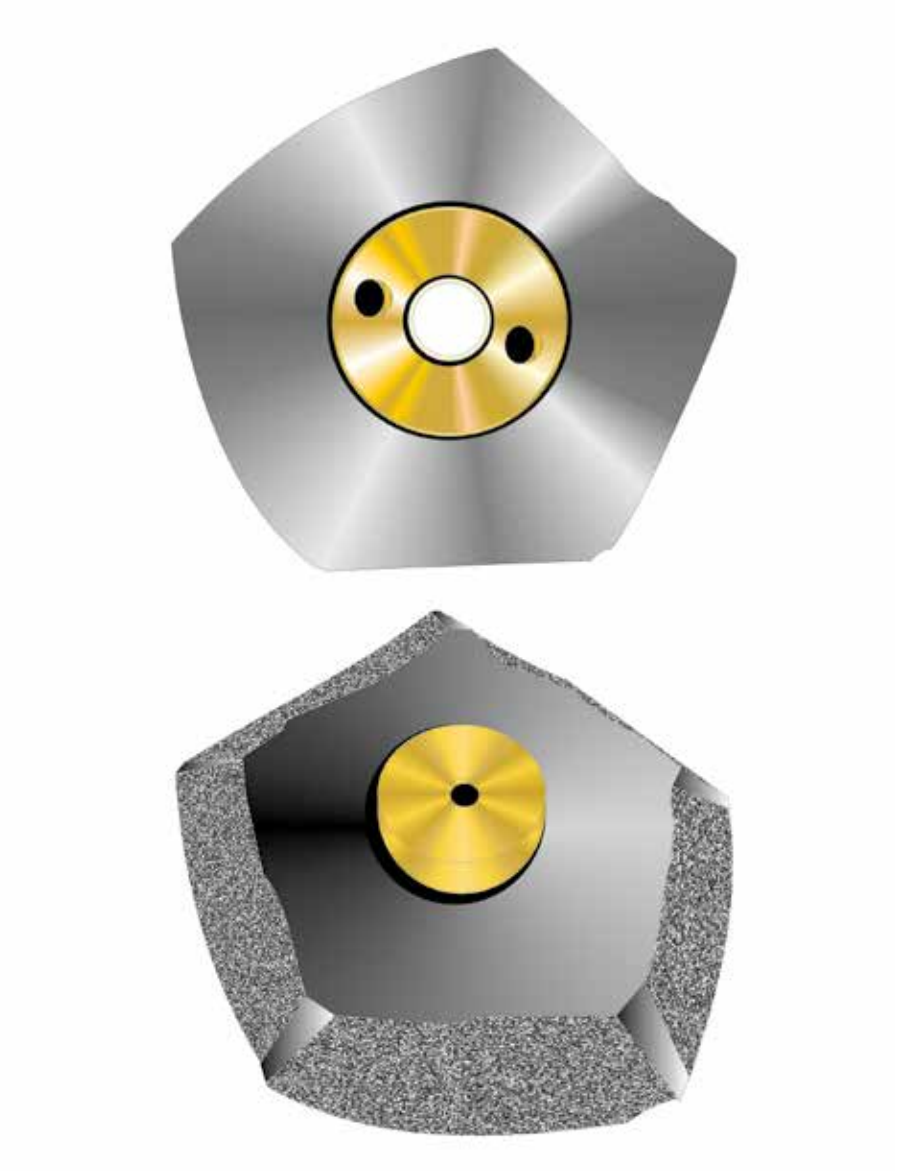
British lead-coated shell
by Woolwich



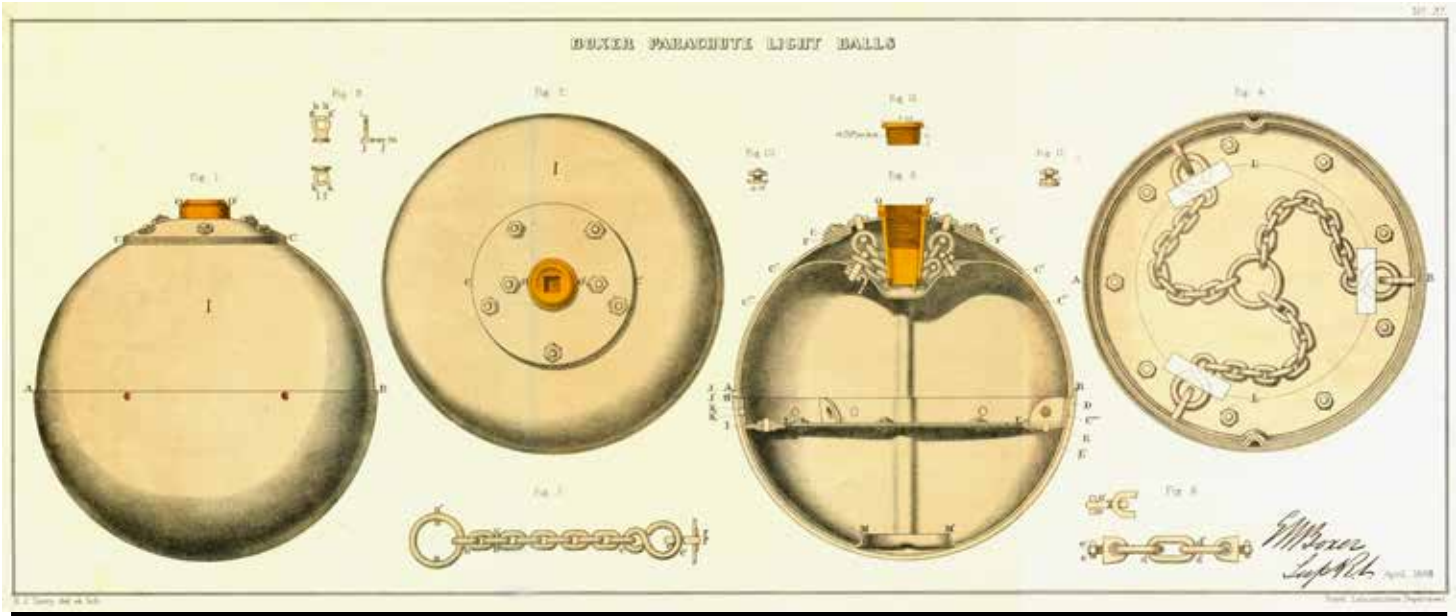
12 pounder Whitworth
case shot cross section



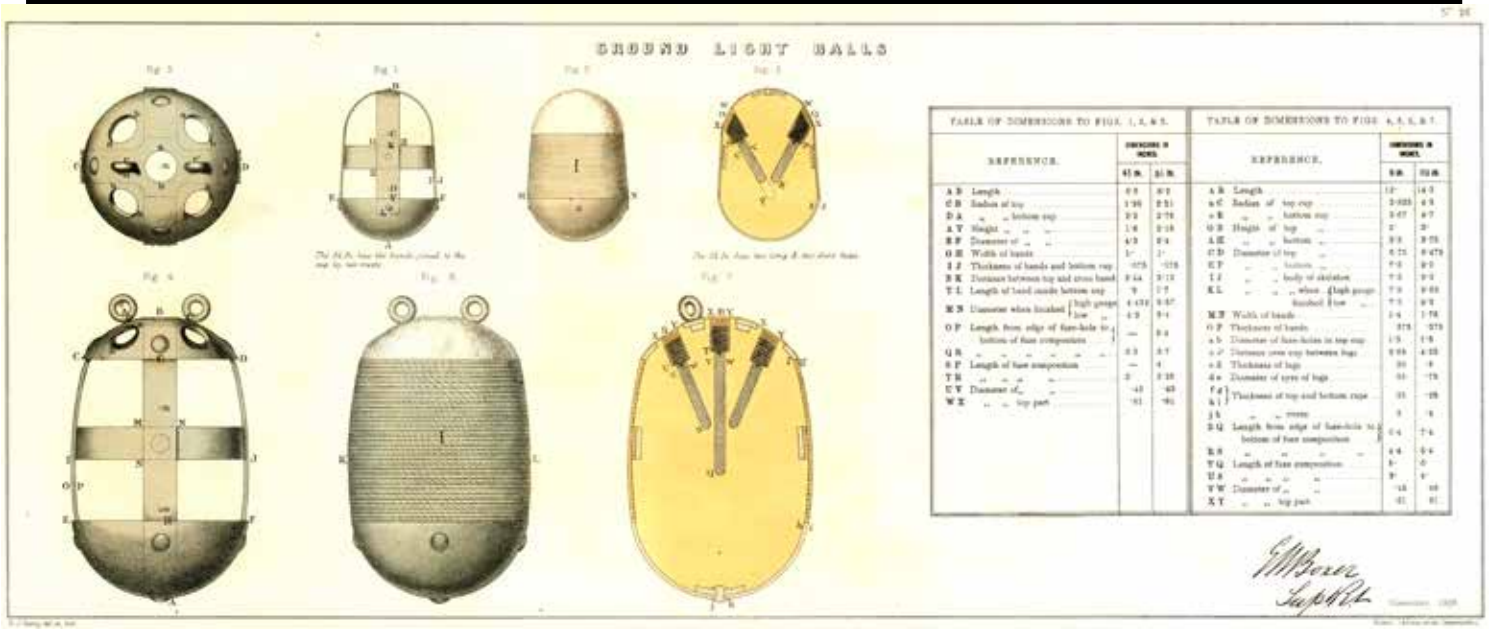
Britten segmented shell, sectioned

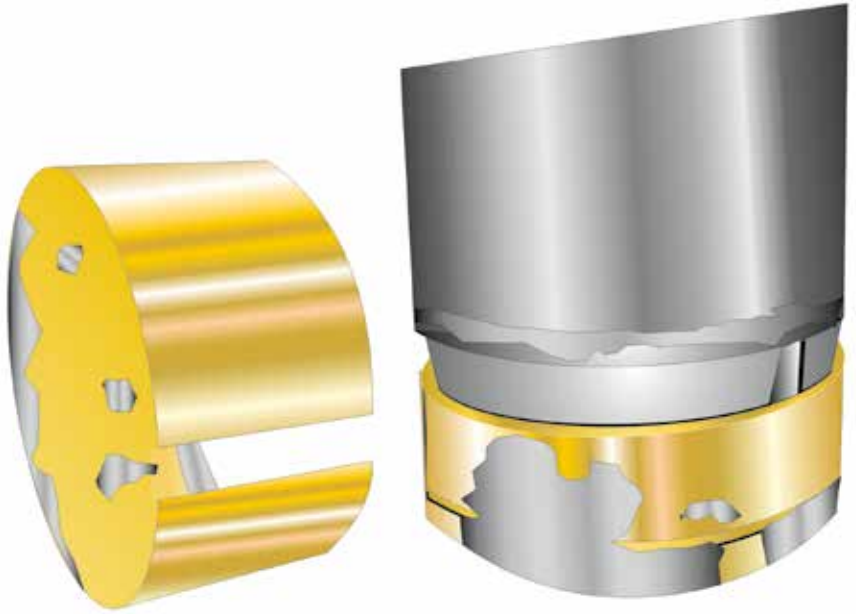


Polygonal cavity shell fragment with suse adapter

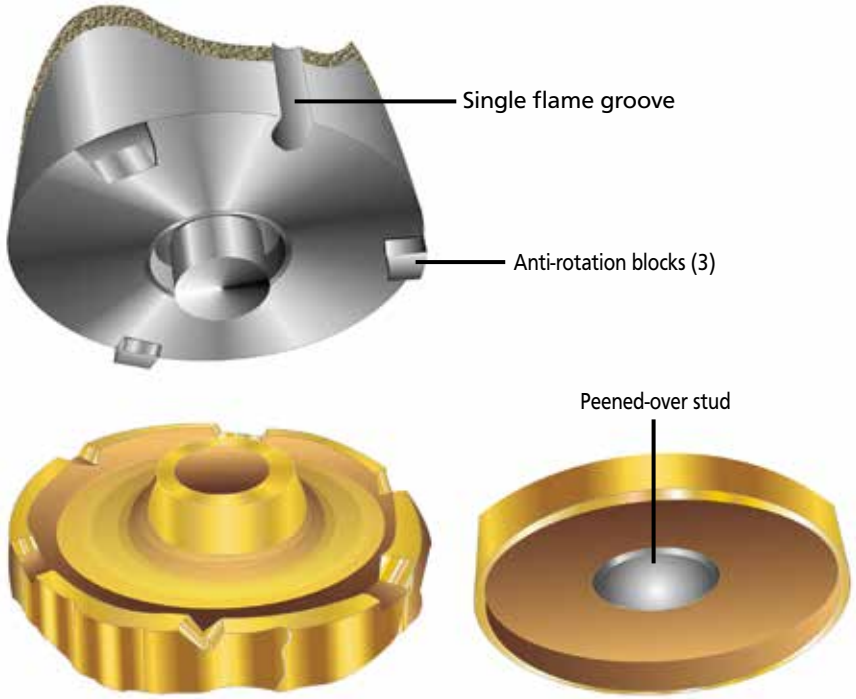

BOXER PARACHUTE LIGHT BALLS

Sabots

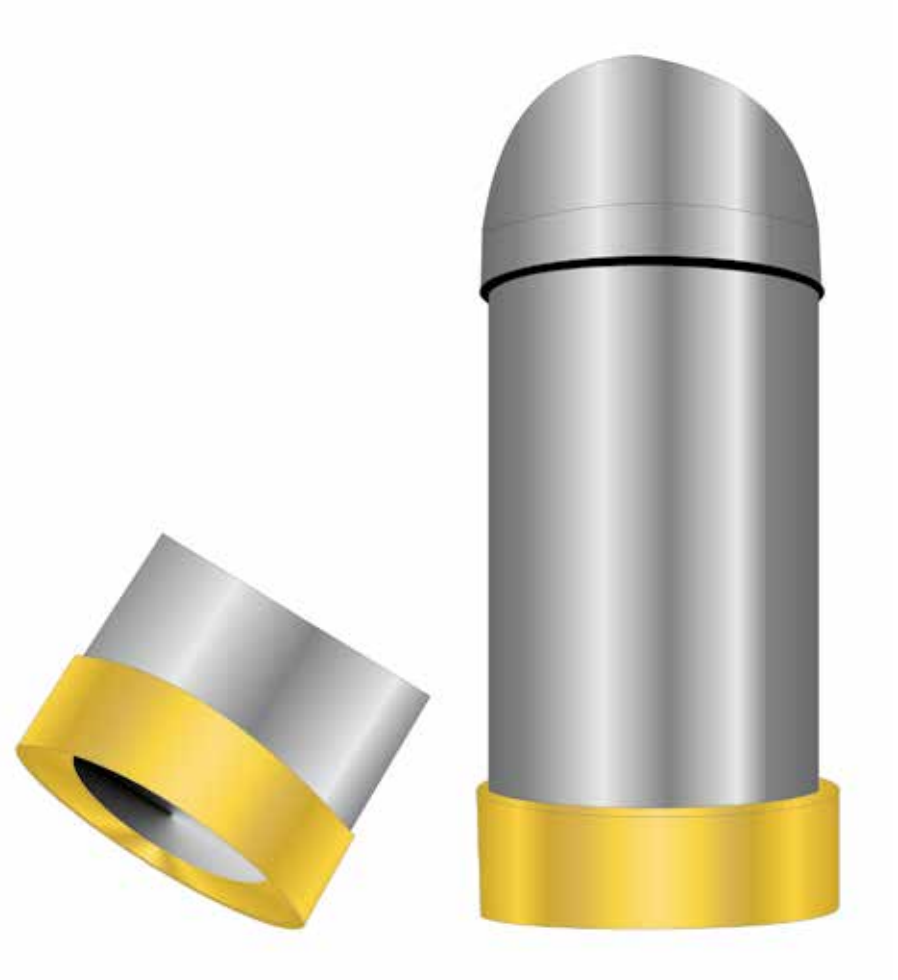

GROUND LIGHT BALLS
TABLE OF DIMENSIONS TO FIGS. 1, 2, & 3.
REFERENCE.
TABLE OF DIMENSIONS TO FIGS. 4, 5, 6, & 7.
REFERENCE.



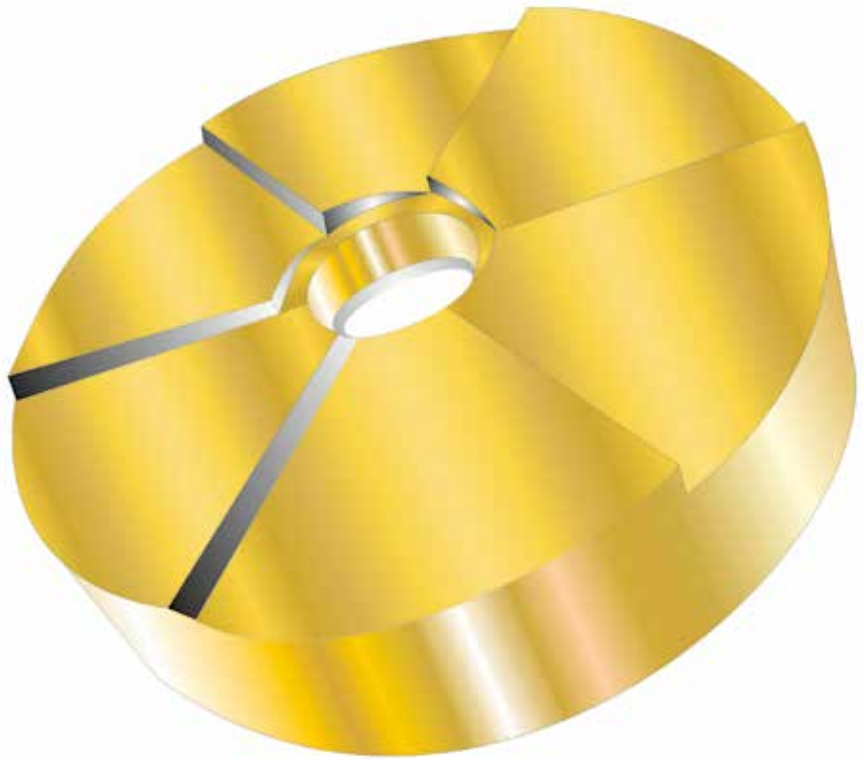
3.1 inch Arrick (Eureka) shell modified with copper cleeve soldered to sabot and body



Arrick early sabot design for Eureka



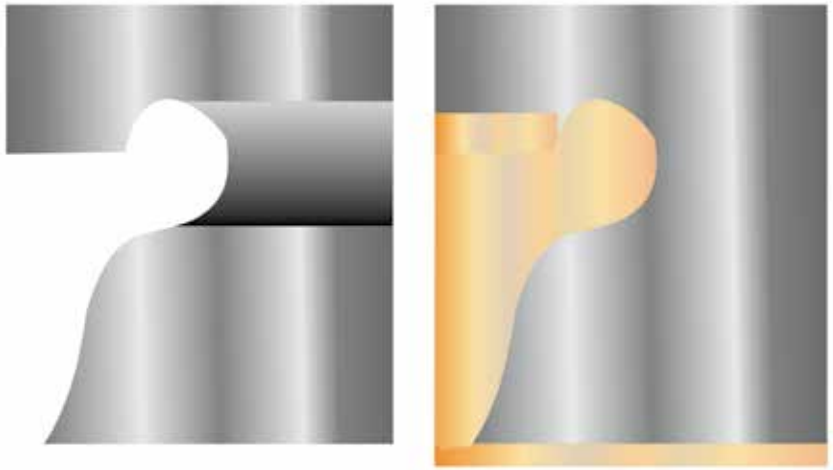
C.S. Braun shell, sabot insert



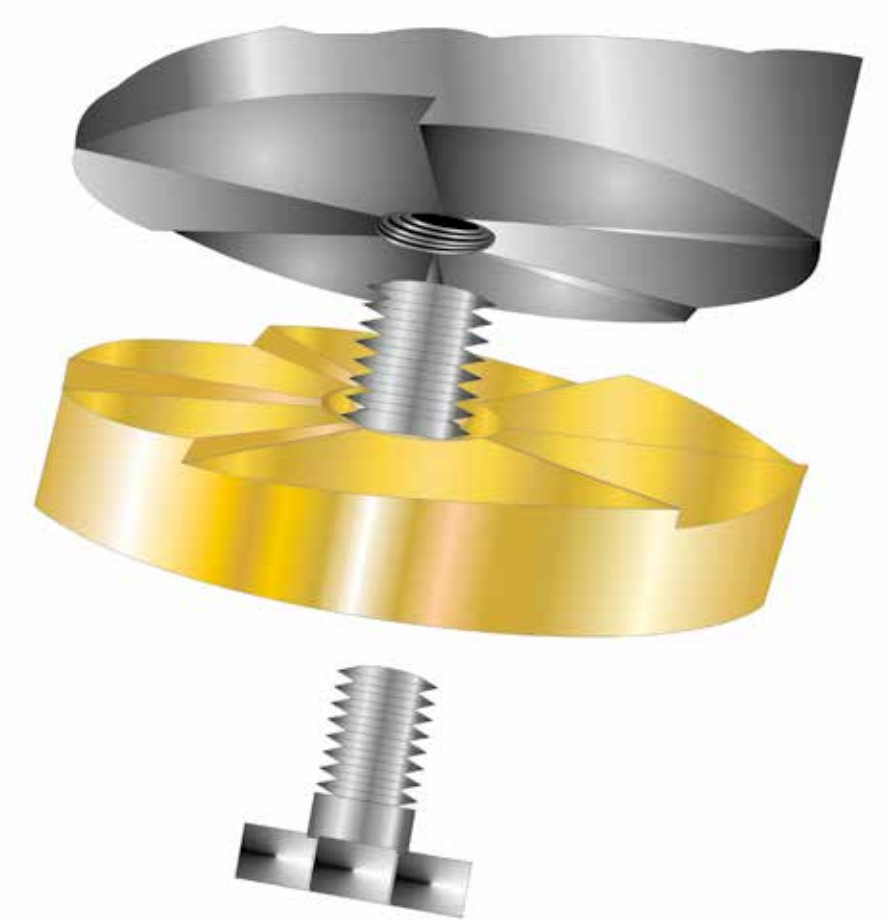
4.2-inch Brooke sabot



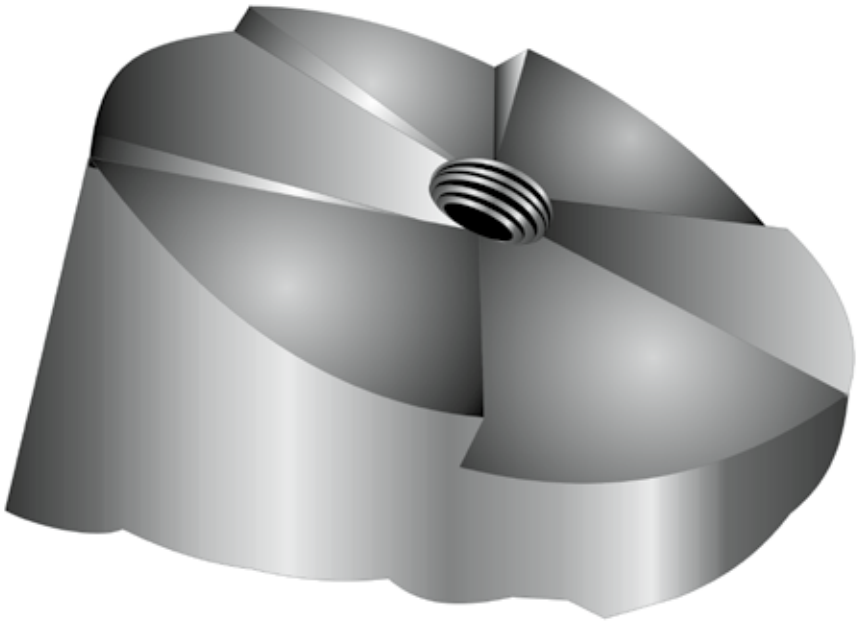
Brooke ratchet sabot design



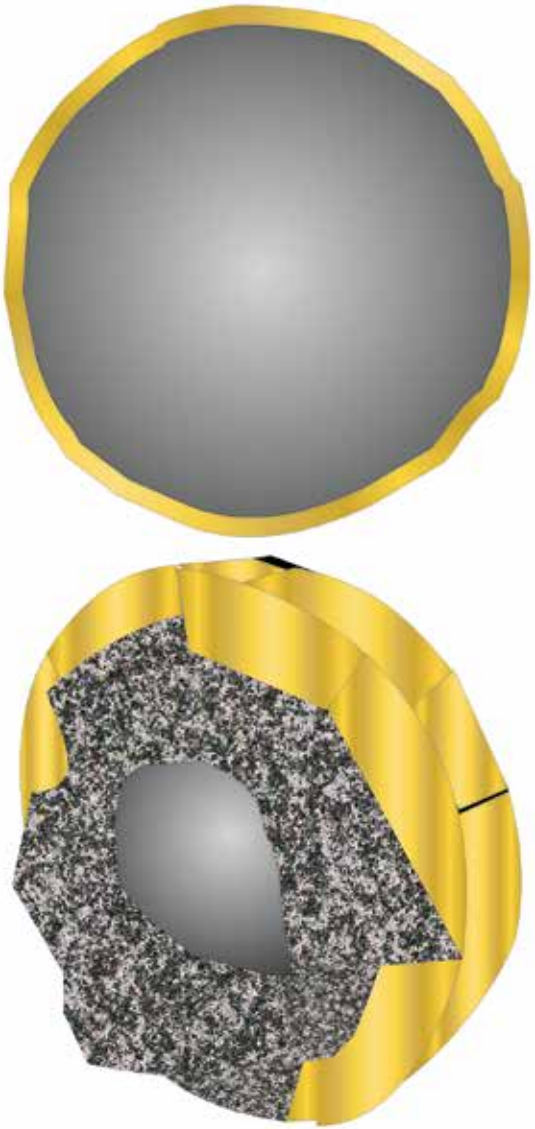
Brooke ring ratchet design



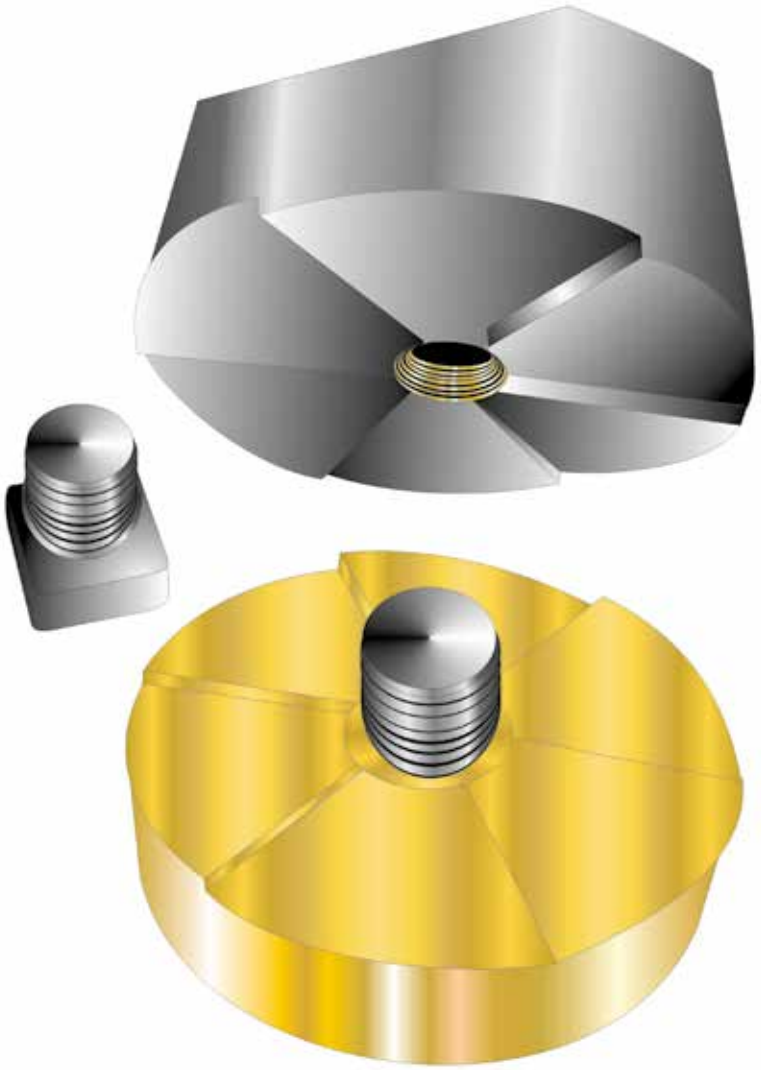
Brooke rachet shell base and sabot



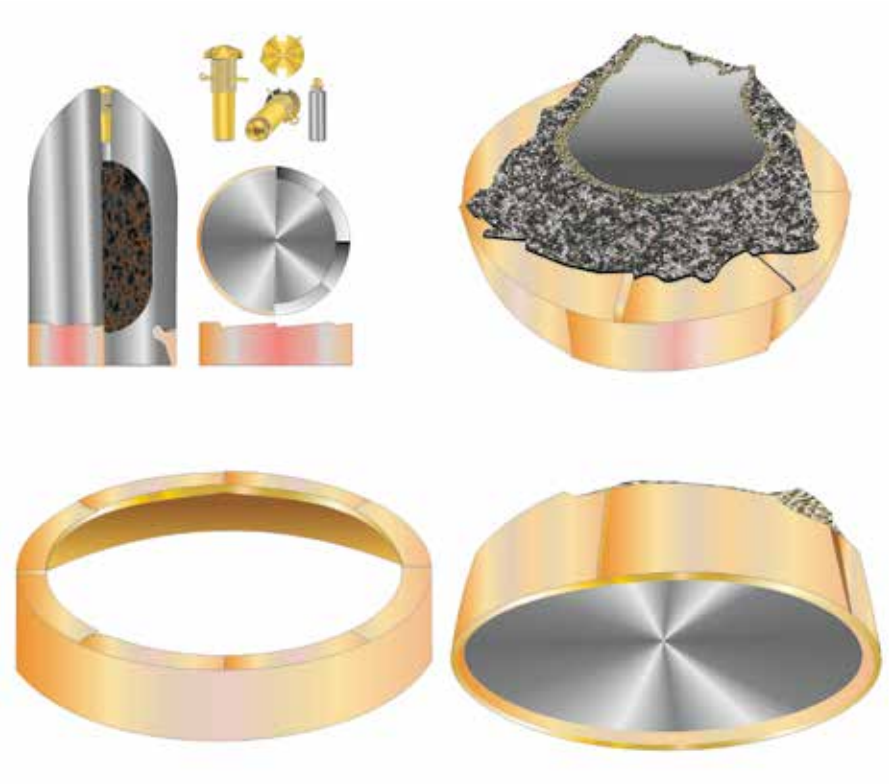
Brooke rachet shell base



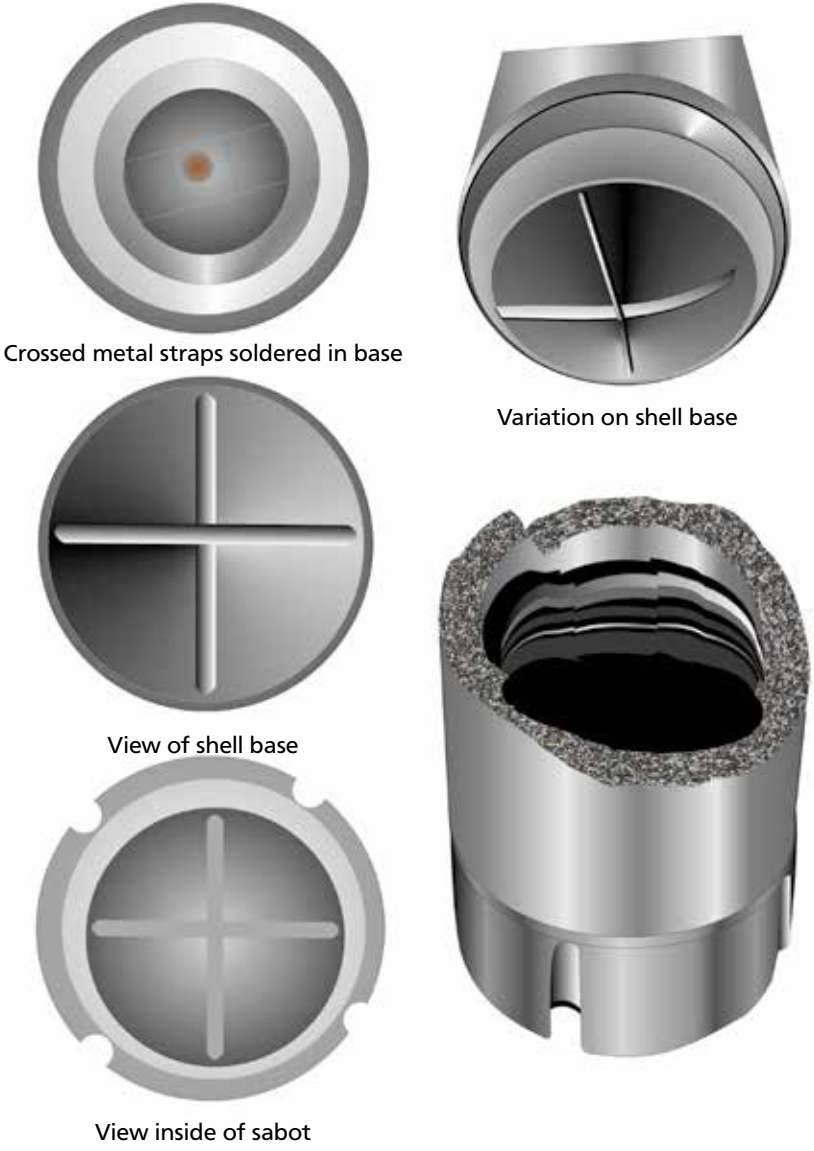
7-inch Brooke ring sabot



C.S. Brooke sabot design



C.S. Brooke 7-inch ring ratchet sabot



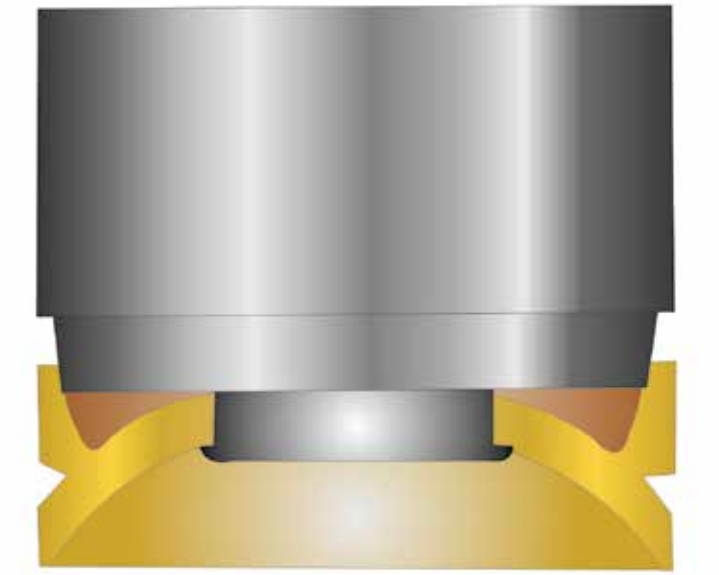
3-inch Dyer sabot system



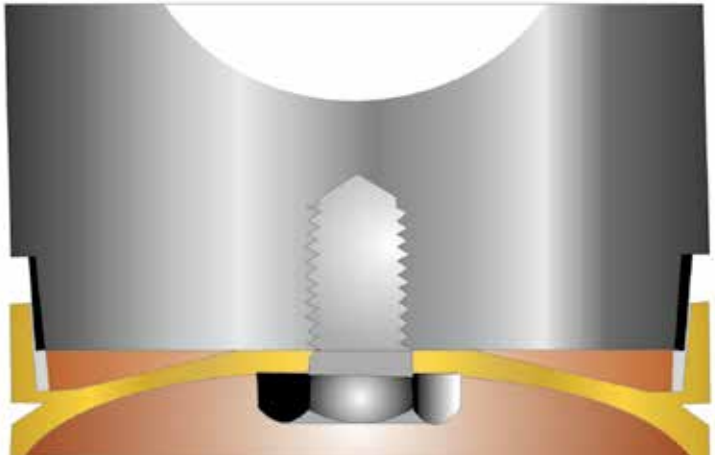
3-inch Arrick (Eureka)
patent sabot and bolt



Eureka brass sabot, patent 1865,
test model from Petersburg



1865

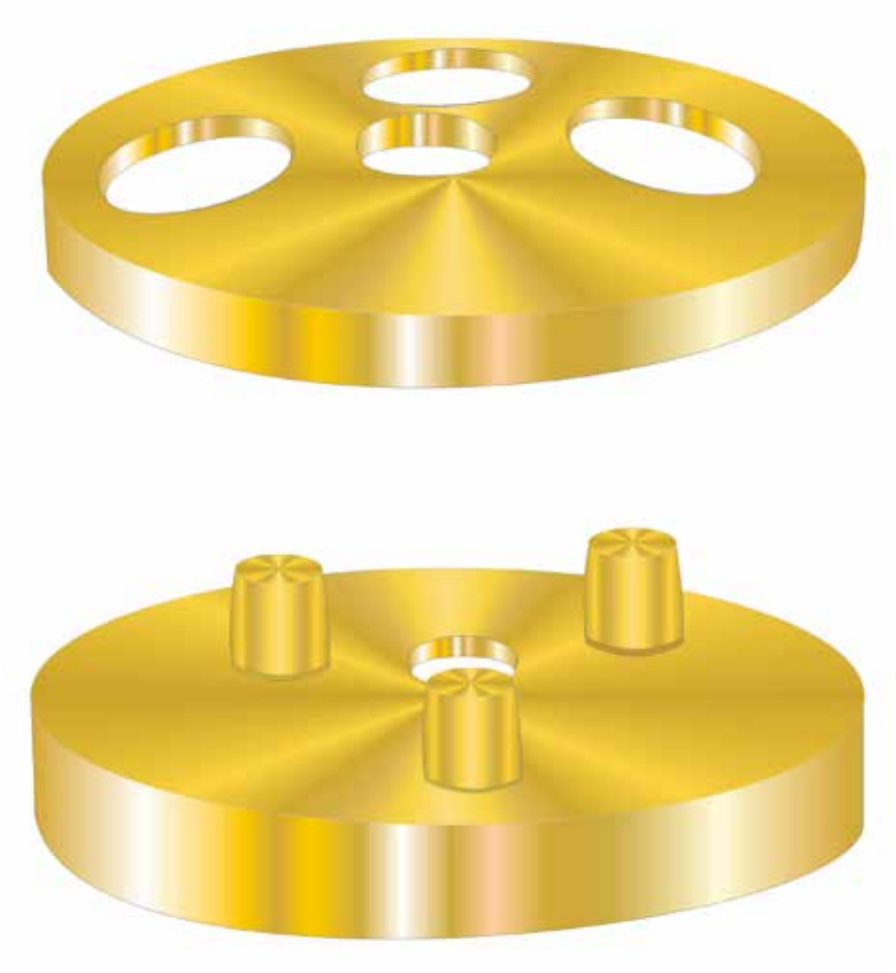


1875

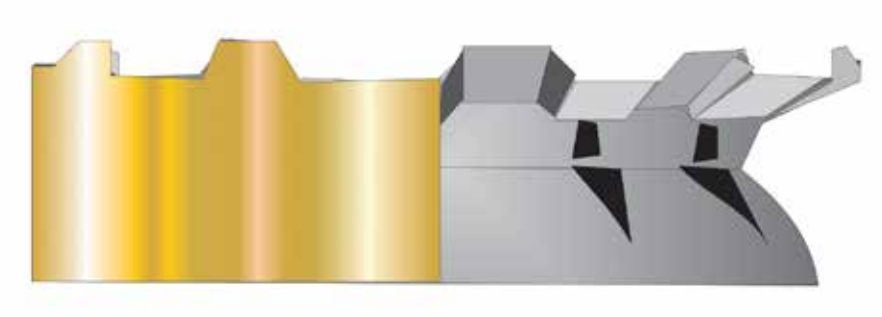
Eureka shell sabot, 1865 and 1875,
CLifford Arrick



Mullane Type II sabot system



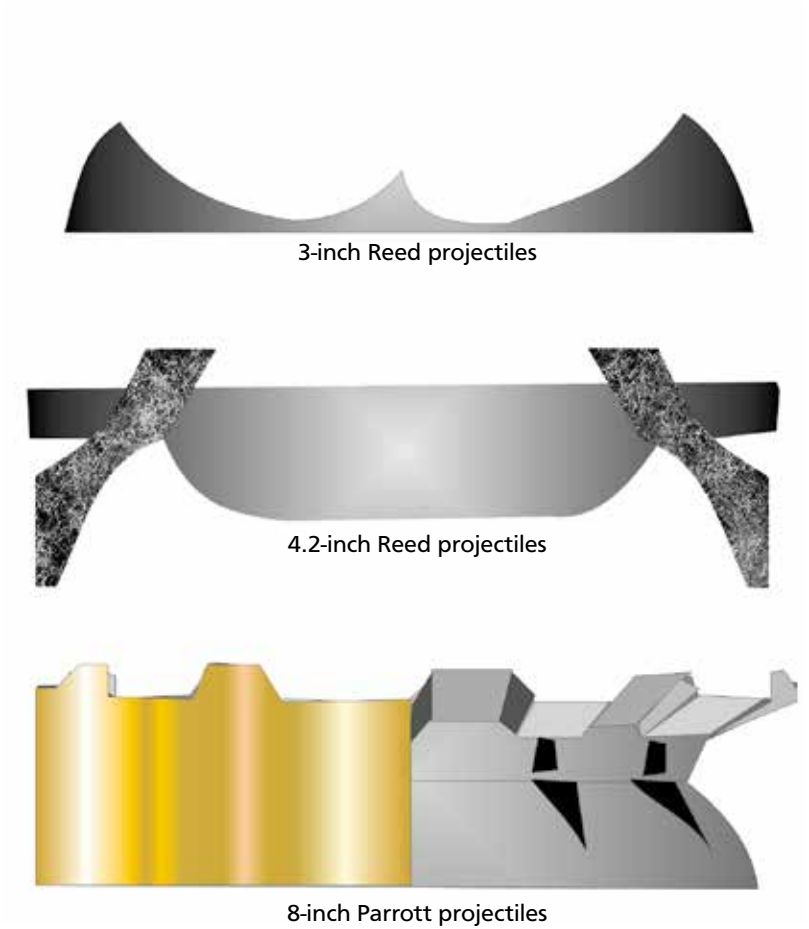
Mullane sabot systems,
Type I (top) and Type II



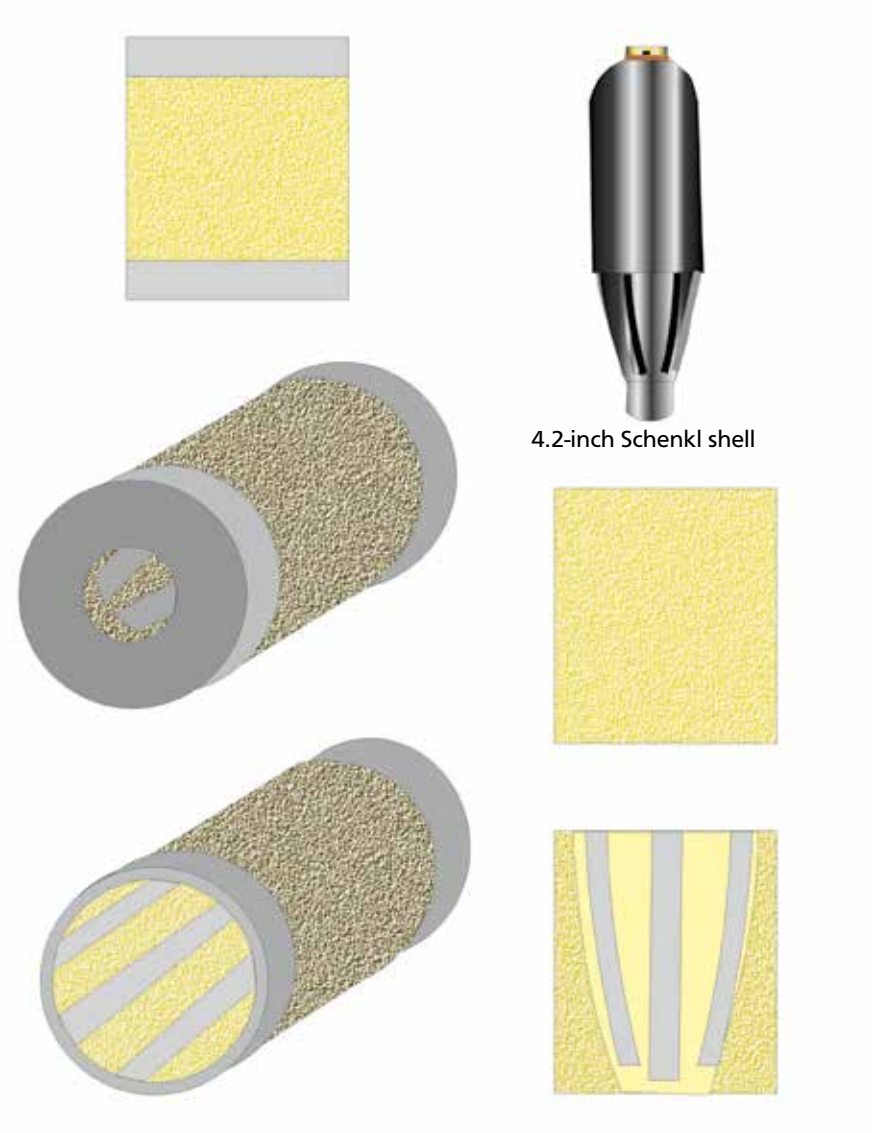
Parrott sabot



7-inch Brooke bolt and Brooke rachet sabot



Reed and Parrott projectile sabots



4.2-inch Schenkl shell

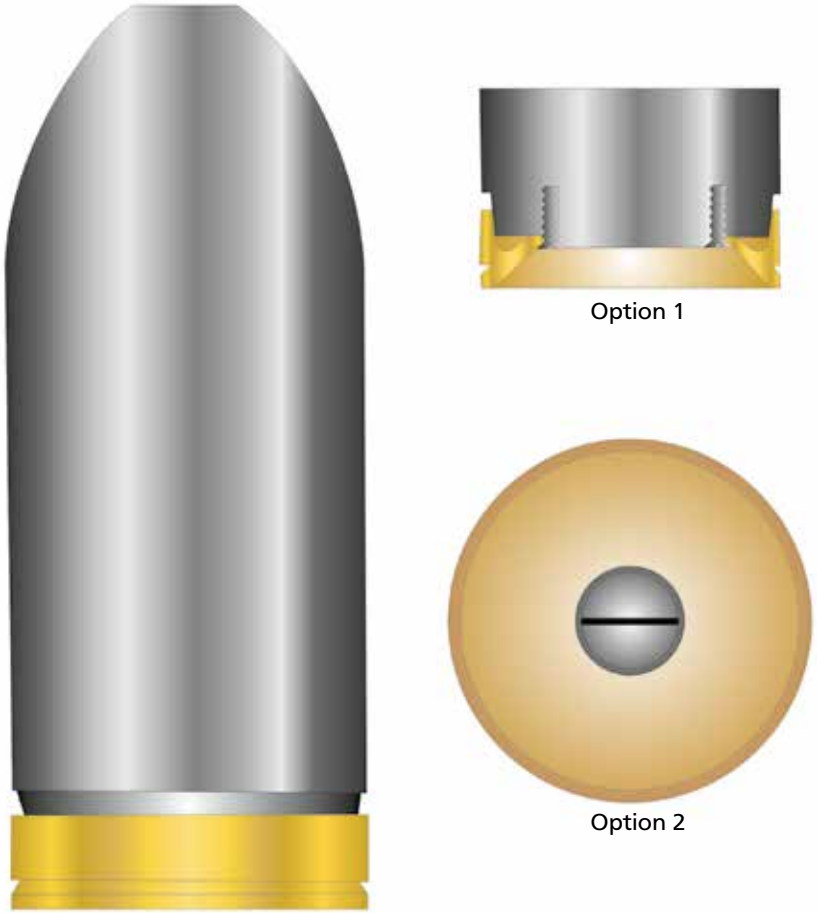
Schenkl Pappier mache sabot



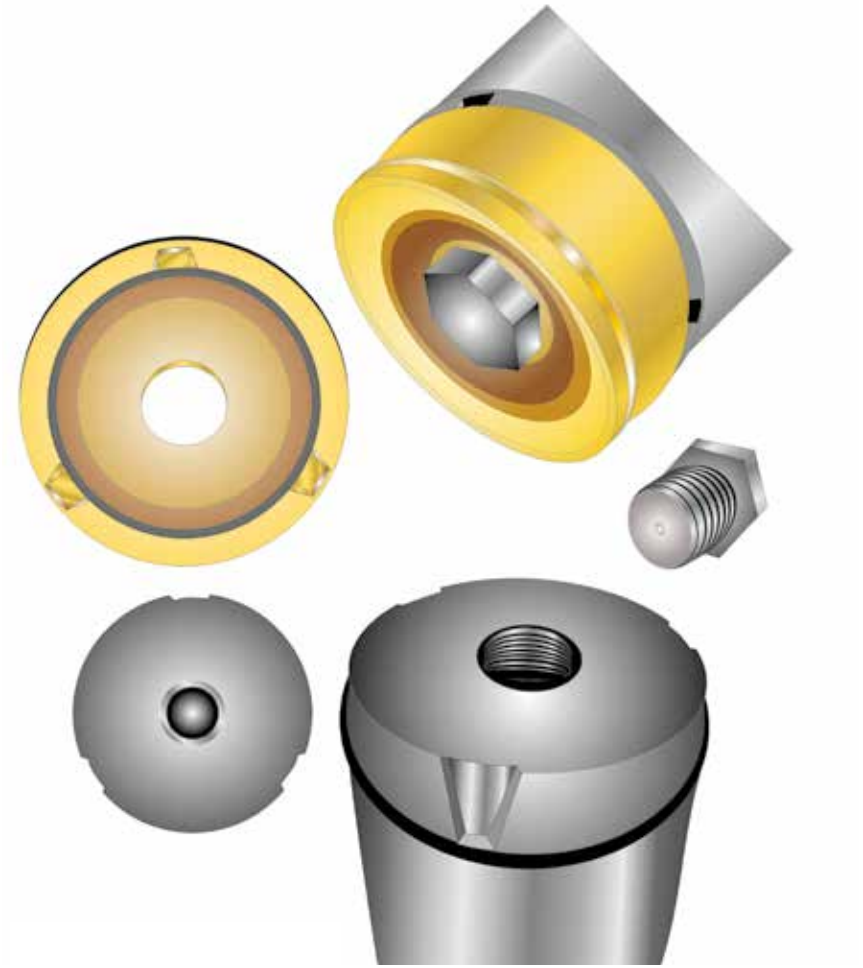
Selma sabot, base view



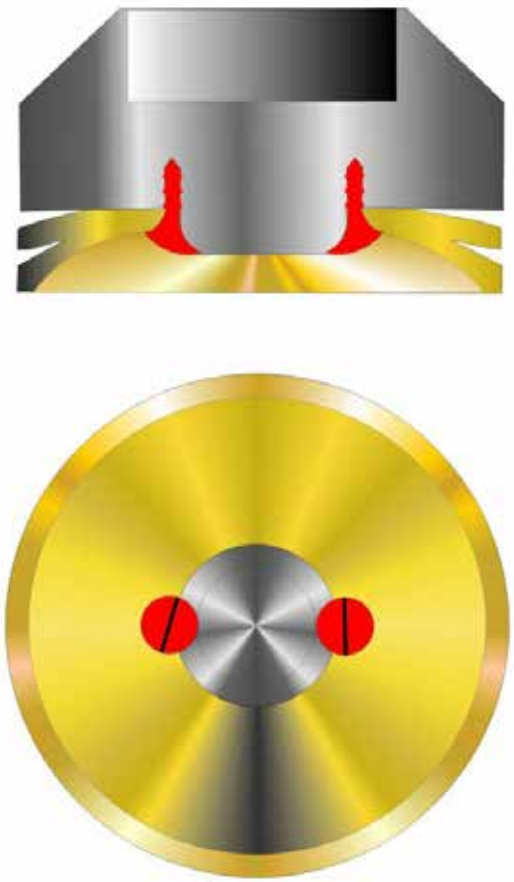
Selma Arsenal sabot system



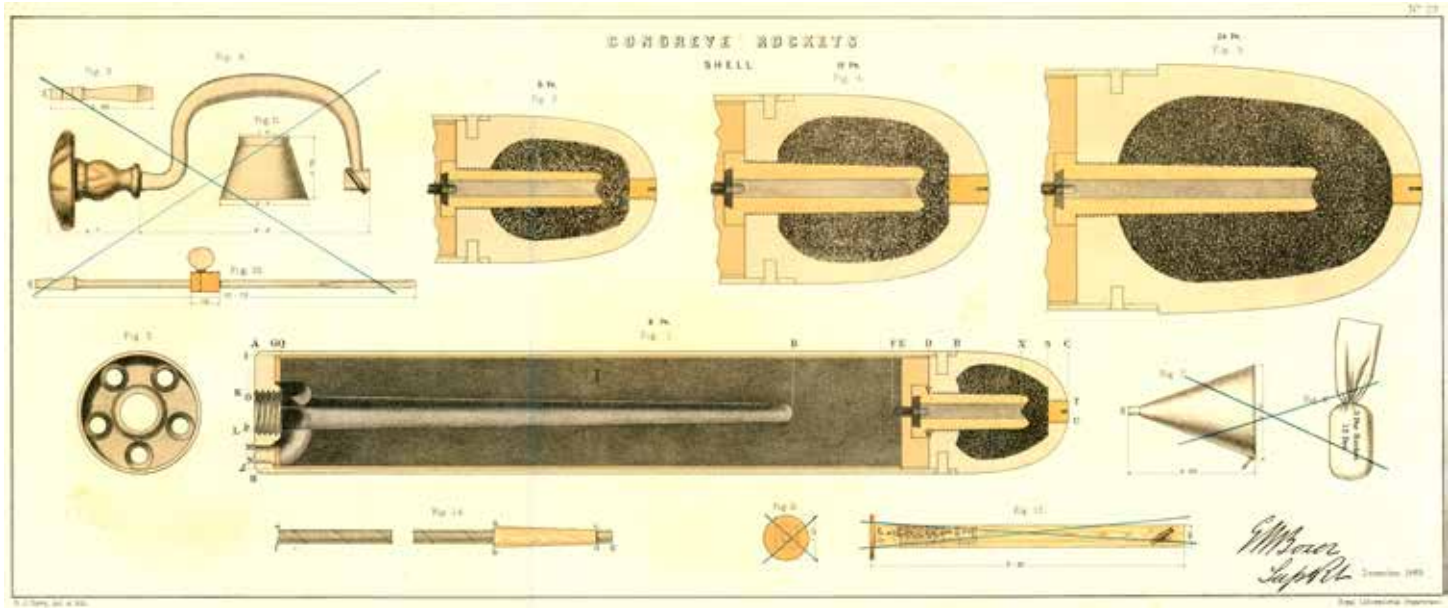
Stafford sabot, patented 1864,
options 1 and 2



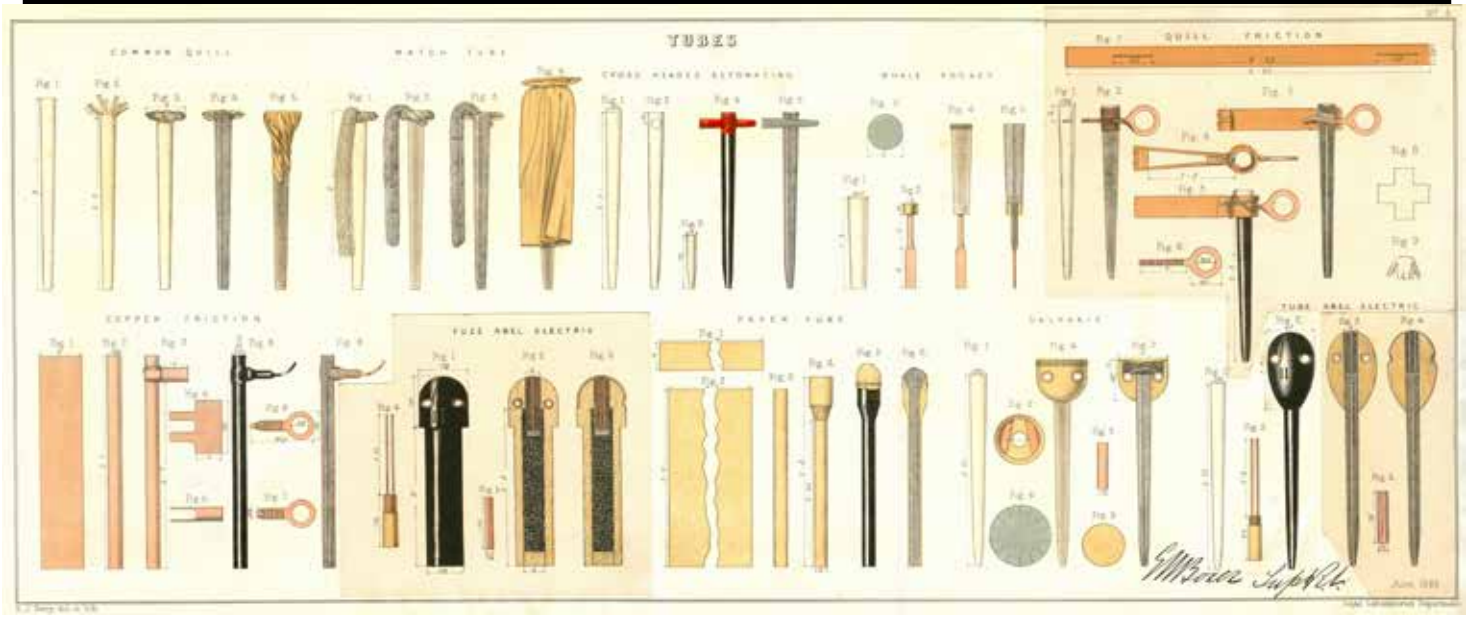
3-inch Stafford shell sabot attachment

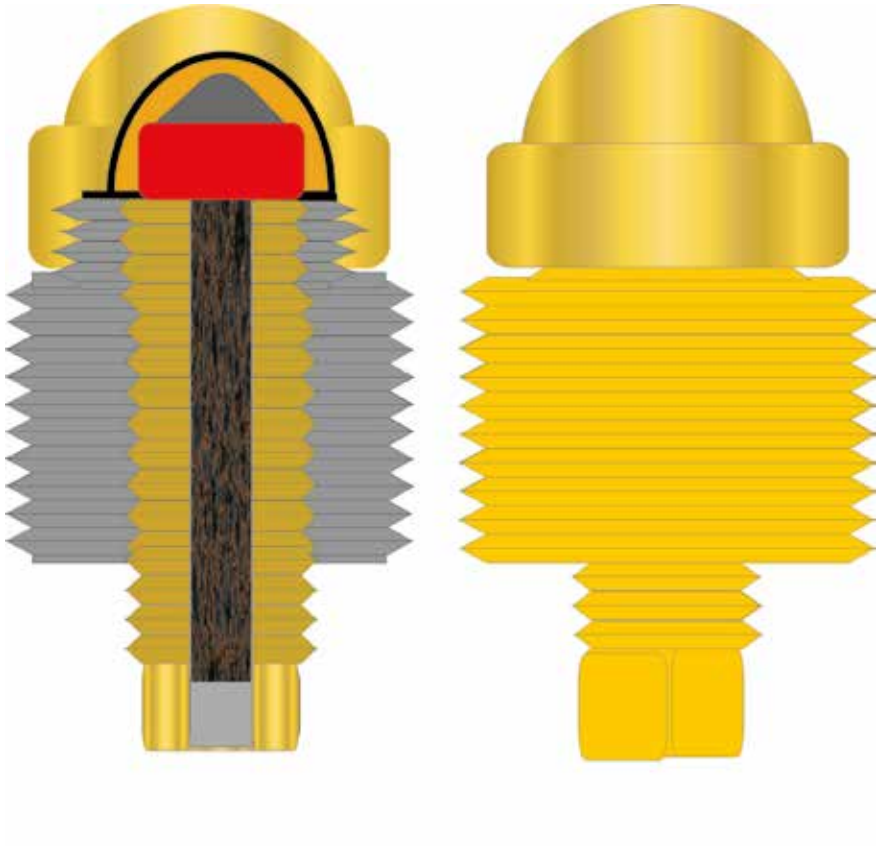


C. W. Stafford's sabot patent 39,427



Torpedoes, Rockets, and Assorted Ordnance





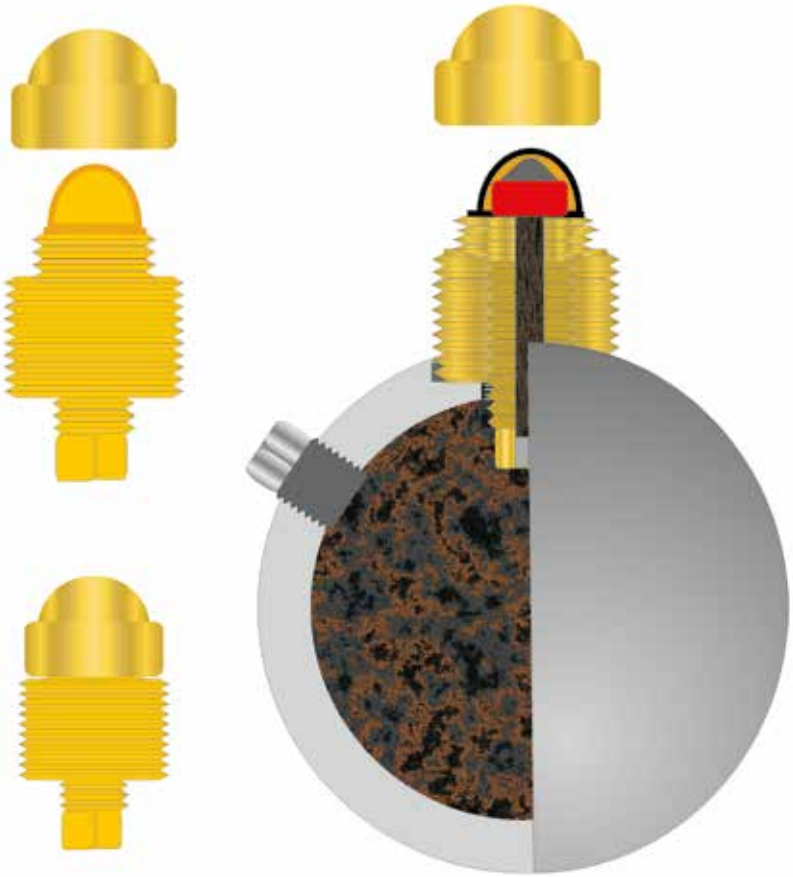
Rain's land mine fuze



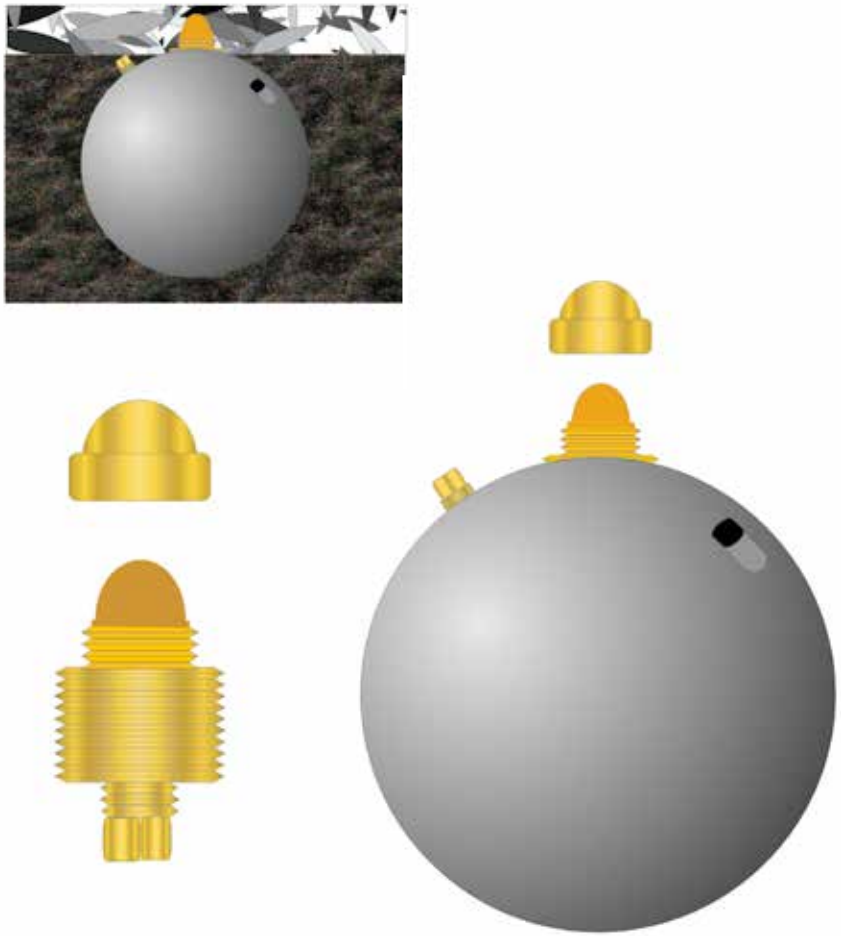
C.S. Rains land mine fuze body



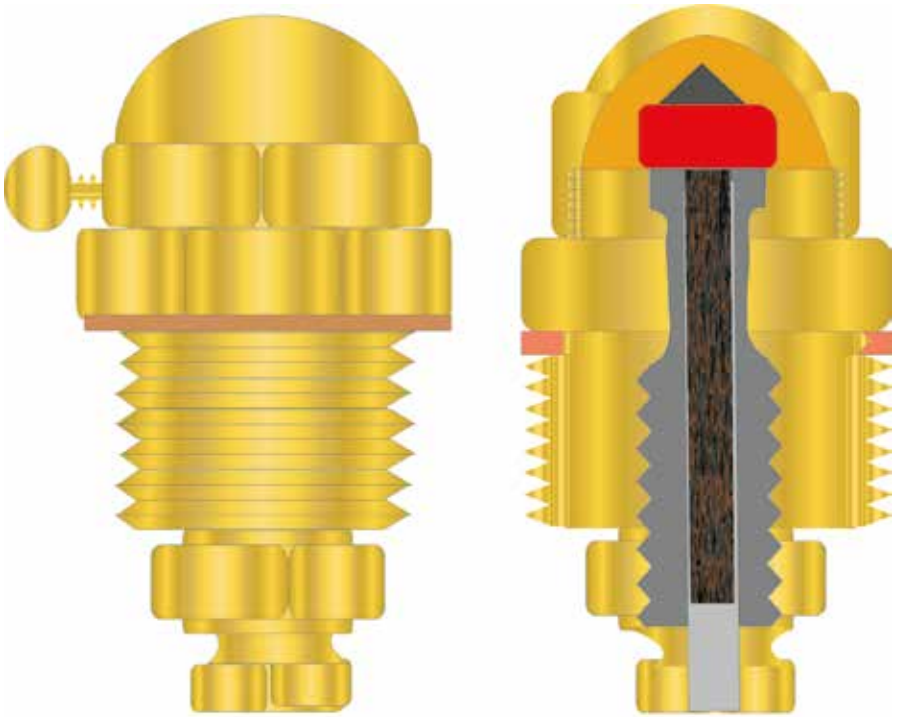
Rains land mine and fuze:
converted 24 pounder shell



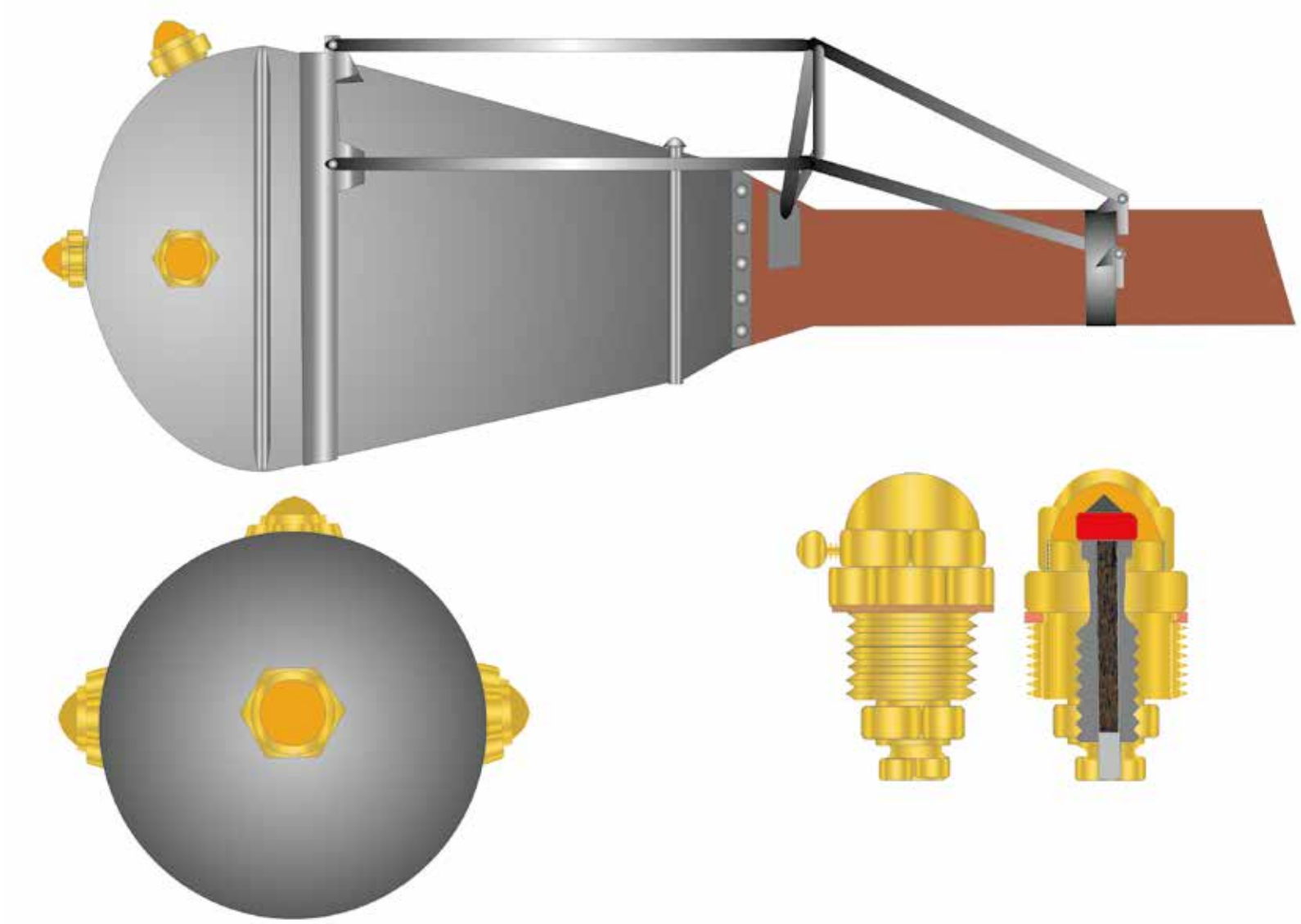
Rains land mine and fuze:
converted 24 pounder shell, sectioned



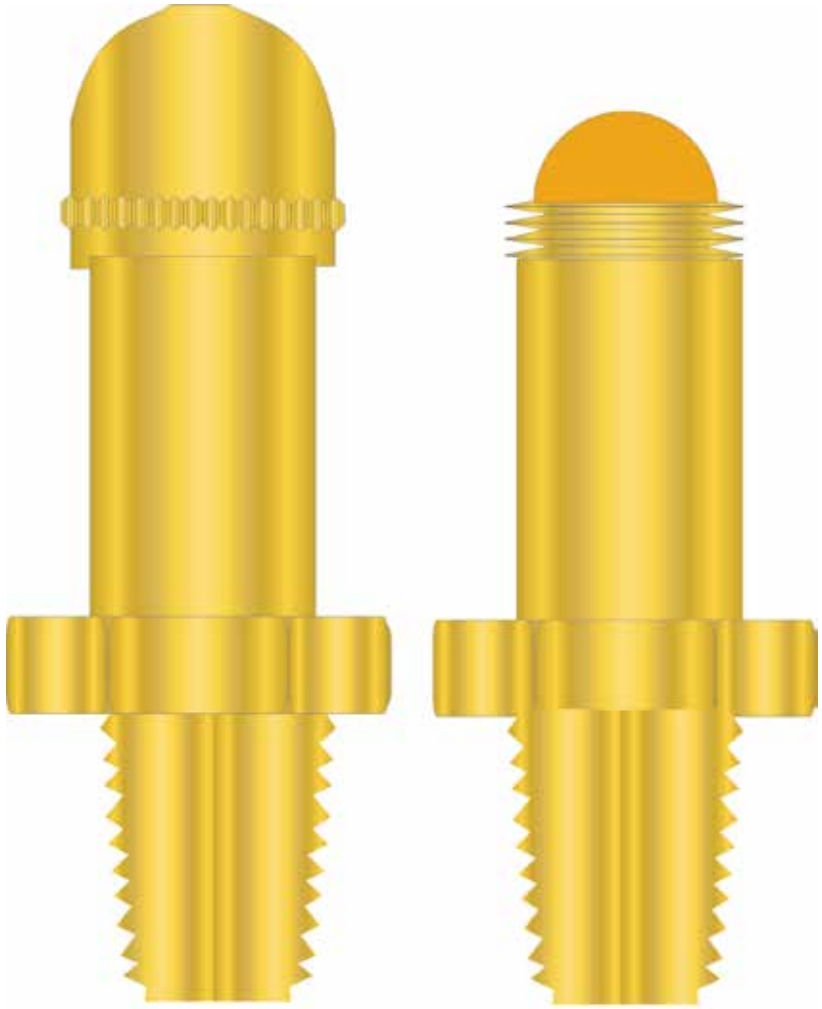
10-inch mortar shell, land mine



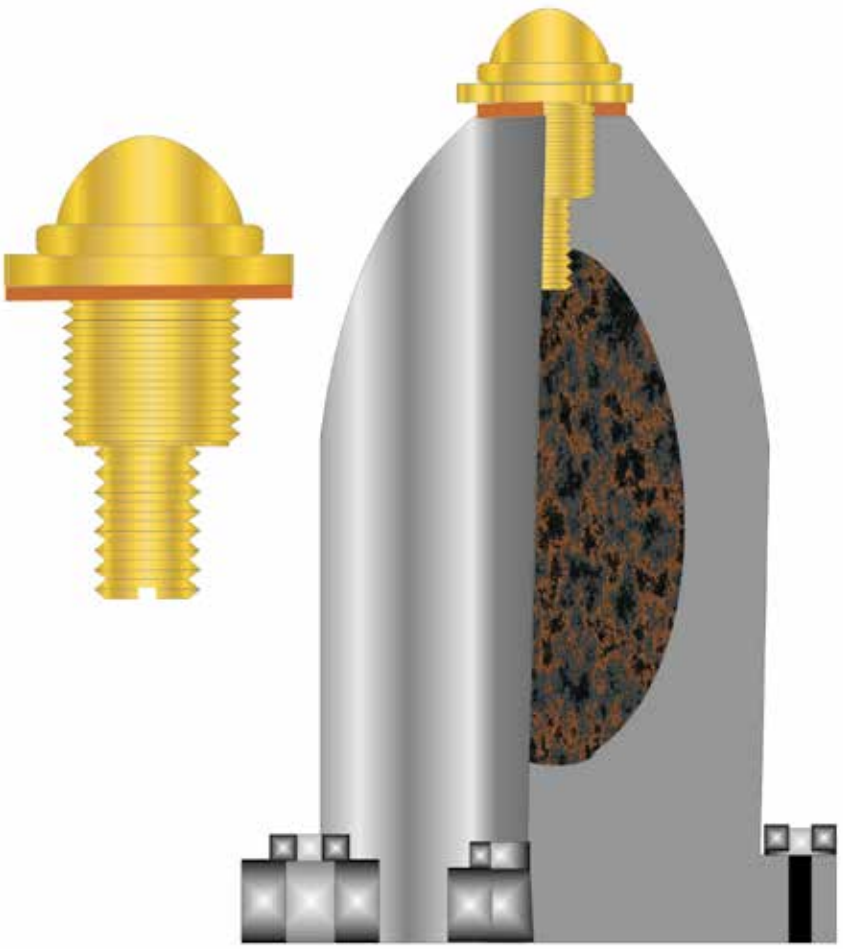
C.S. Spar torpedo fuze



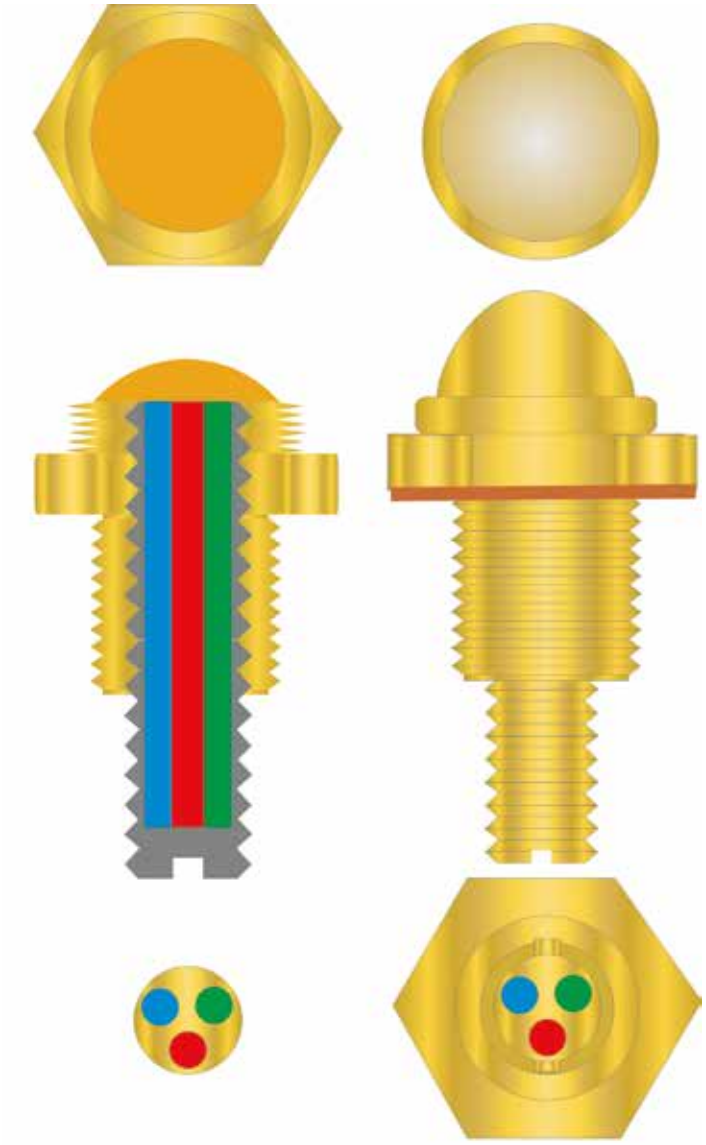
C.S. spar torpedo with fuzes



Rains barrel torpedo fuze



C.S. shell torpedo, Rains fuze



C.S. shell torpedo fuze parts

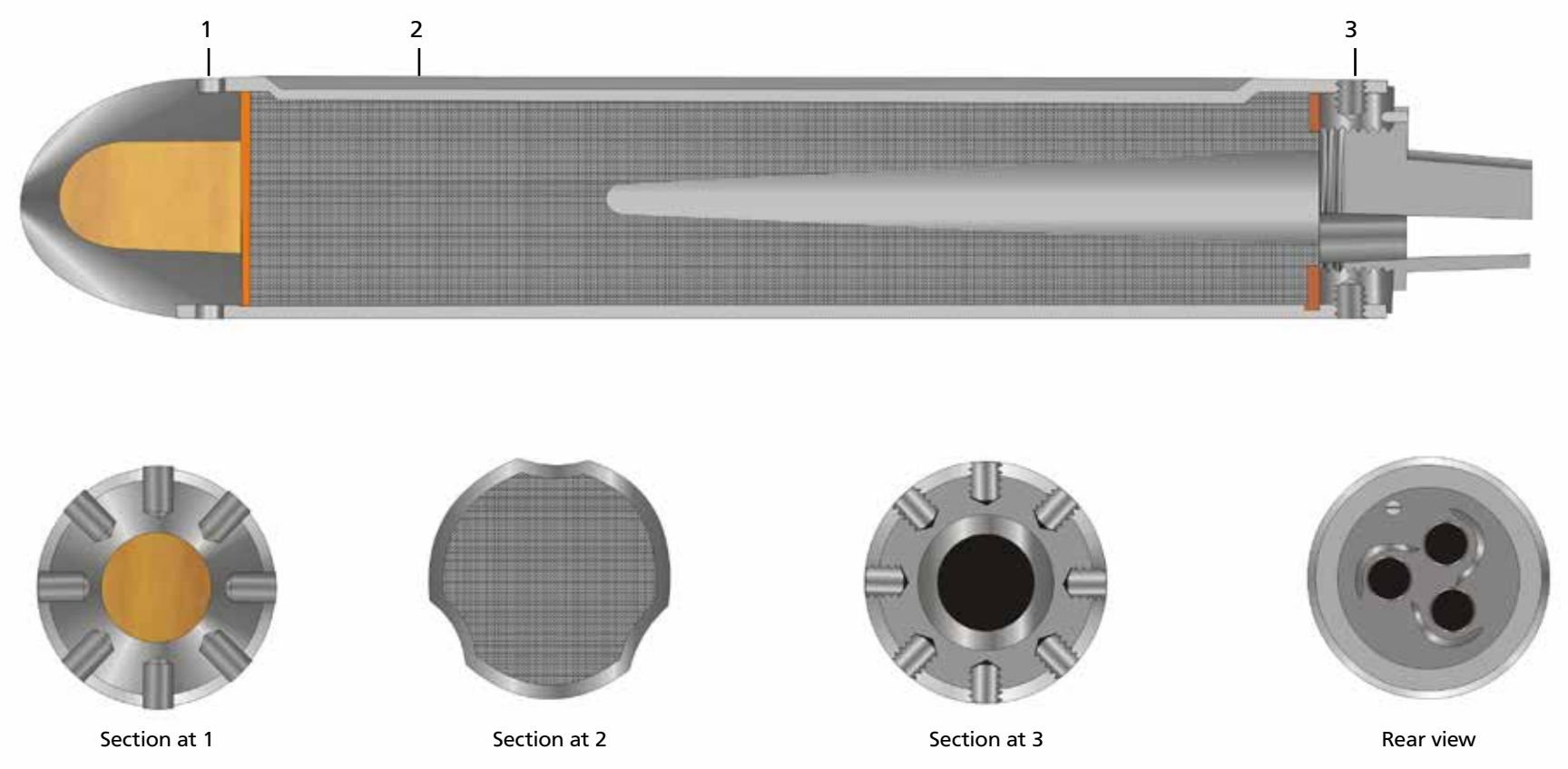


3 lb. Ketcham grenade

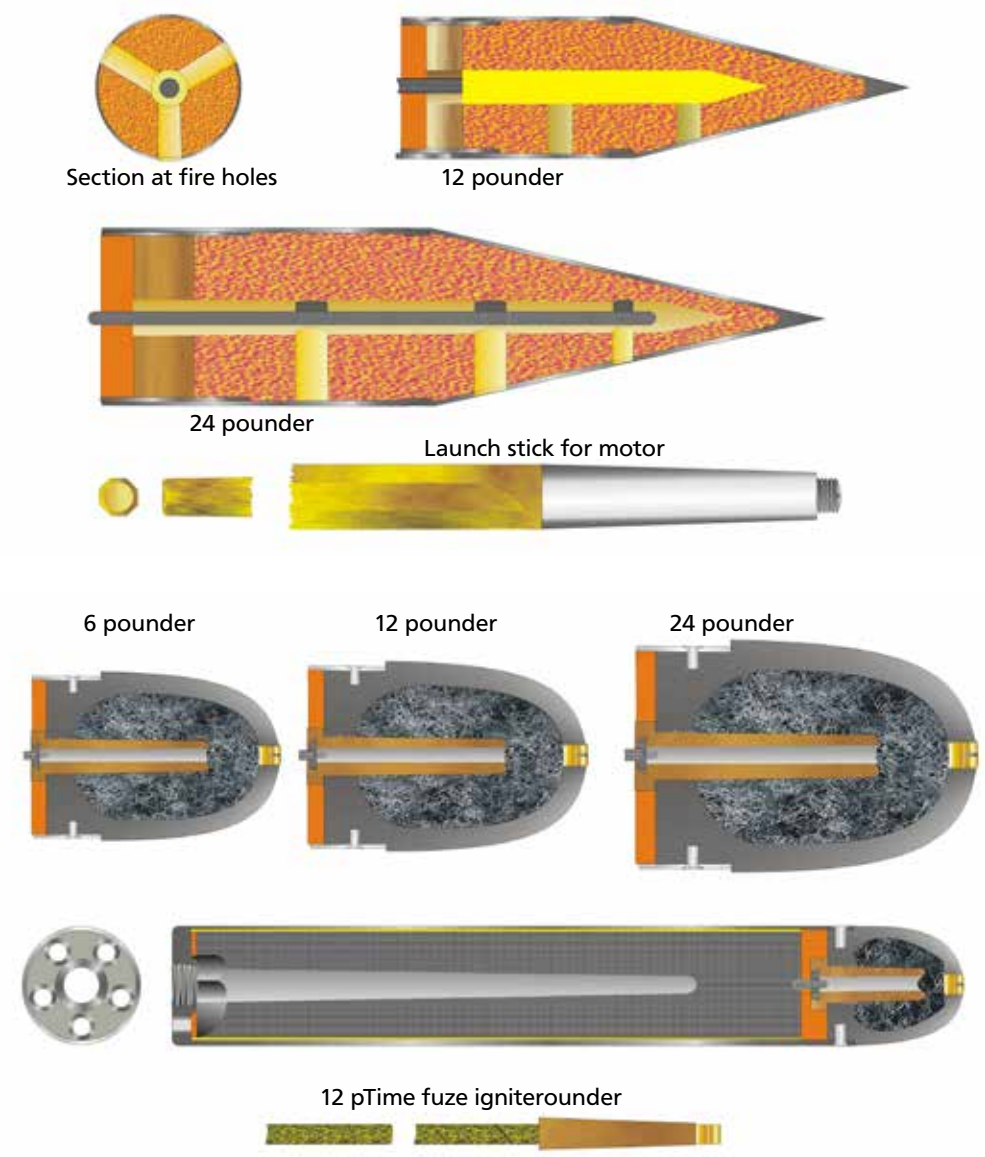




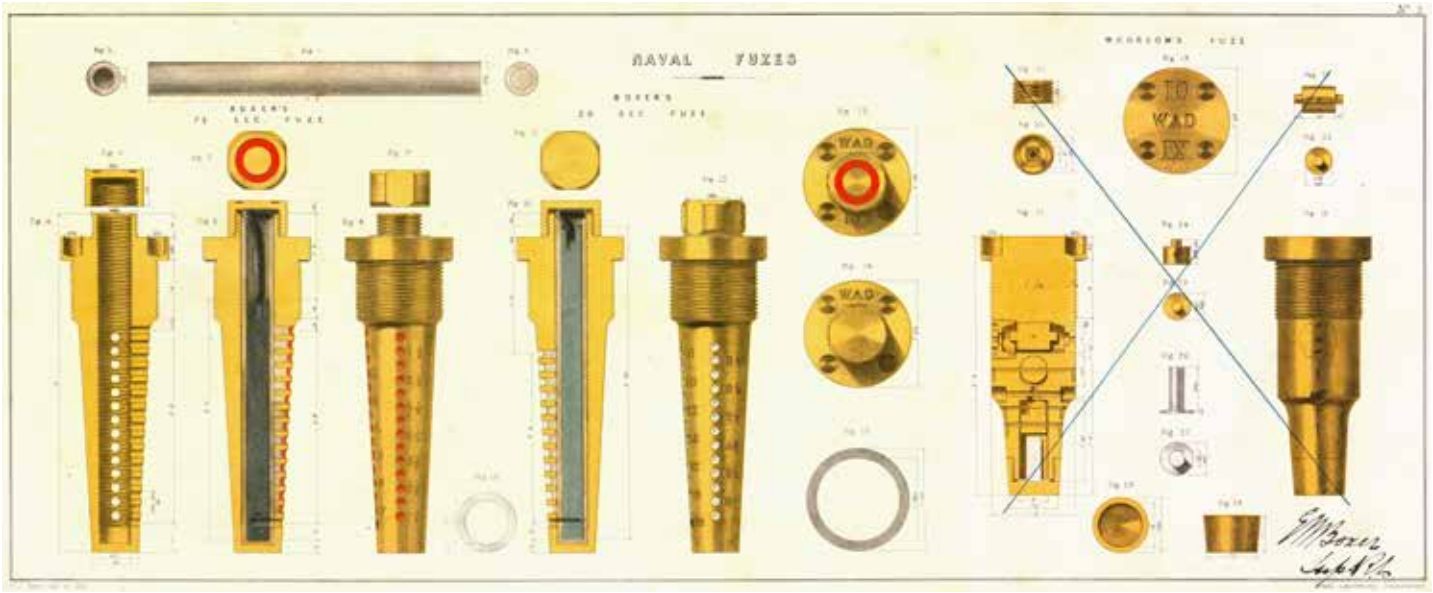
Hanes hand grenade



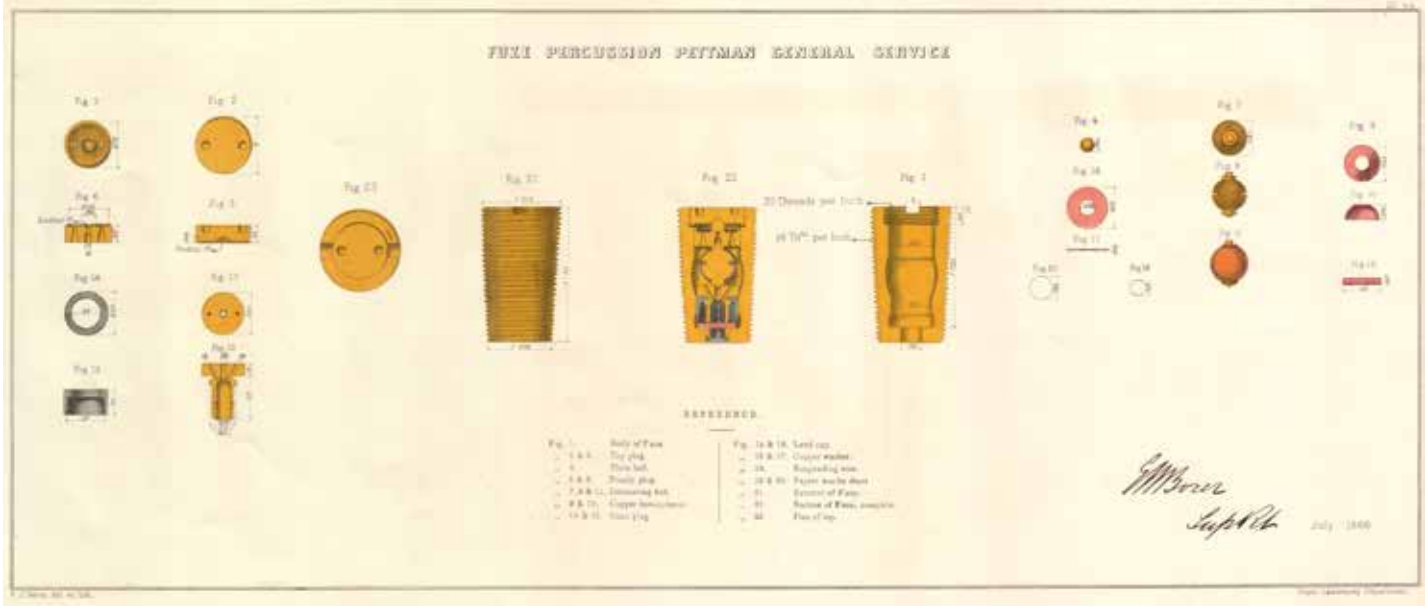
Rocket, War, Hale



British Congreve rocket, carcass heads (top) and shell (lower)


NAVAL FUZES
WADDING FUZE
WAD
WAD
IO
WAD
IX

U.S. Fuzes


FUZE PERCUSSION PETTMAN GENERAL SERVICE



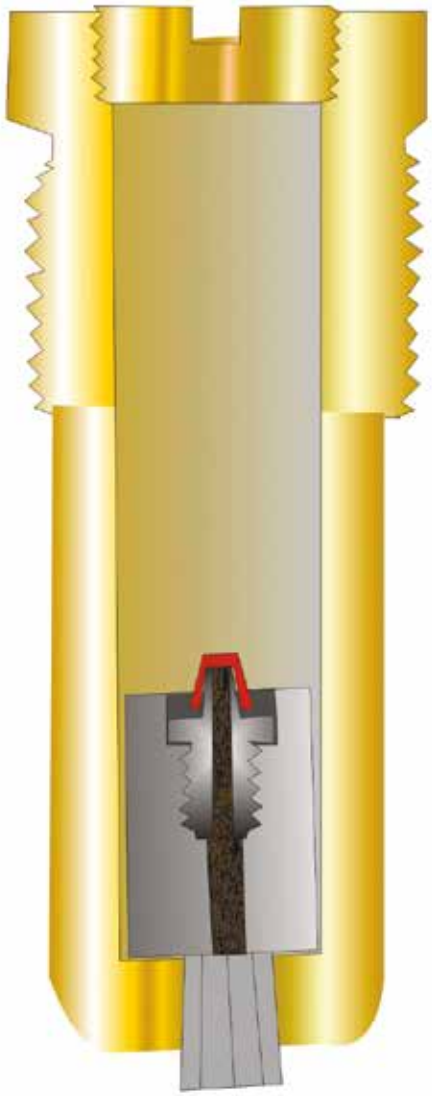
Absterdam time fuze adapter, patent 41,668



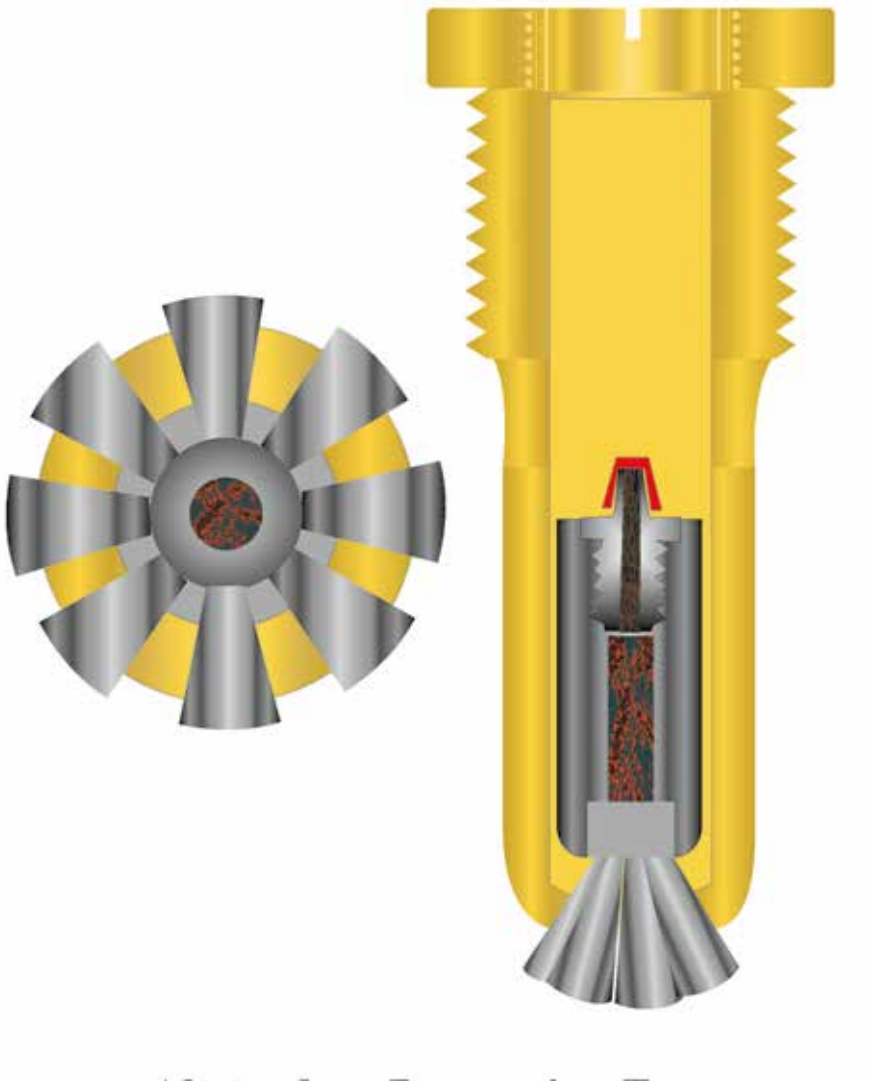
Absterdam time fuze adapter



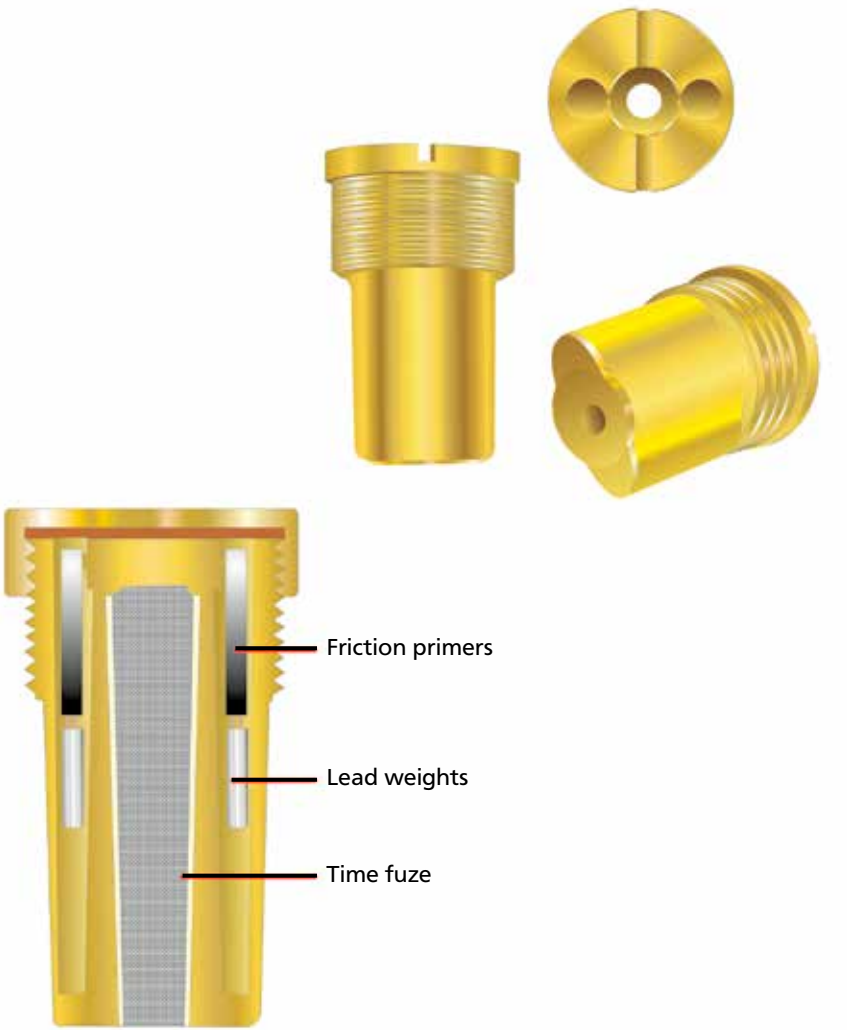
Absterdam time fuze adapter,
designed after Taylor fuze



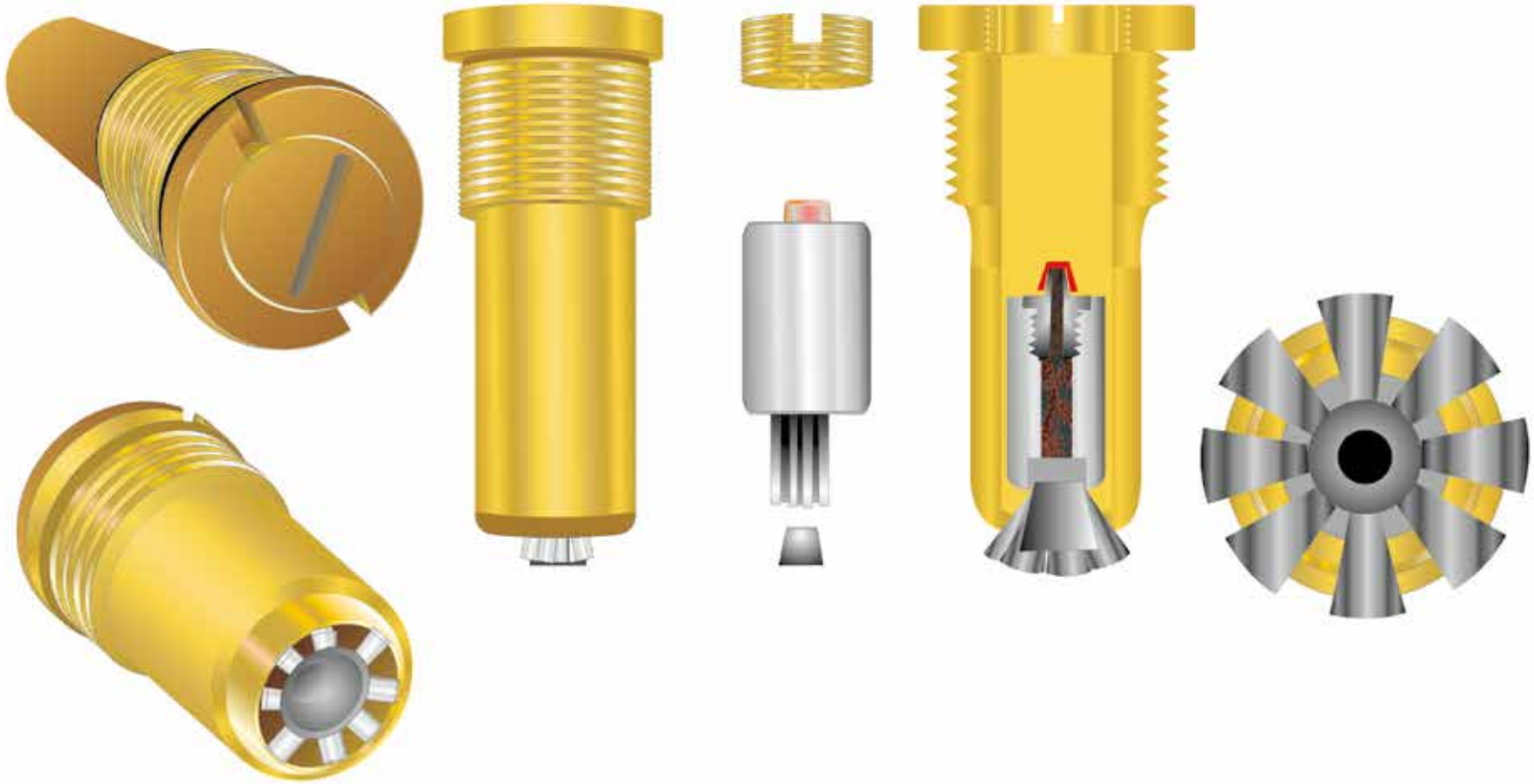
Absterdam percussion fuze



Absterdam percussion fuze,
detail of plunger retaining safety



U.S. Absterdam time fuze adapter,
external and internal views, patent 41,668



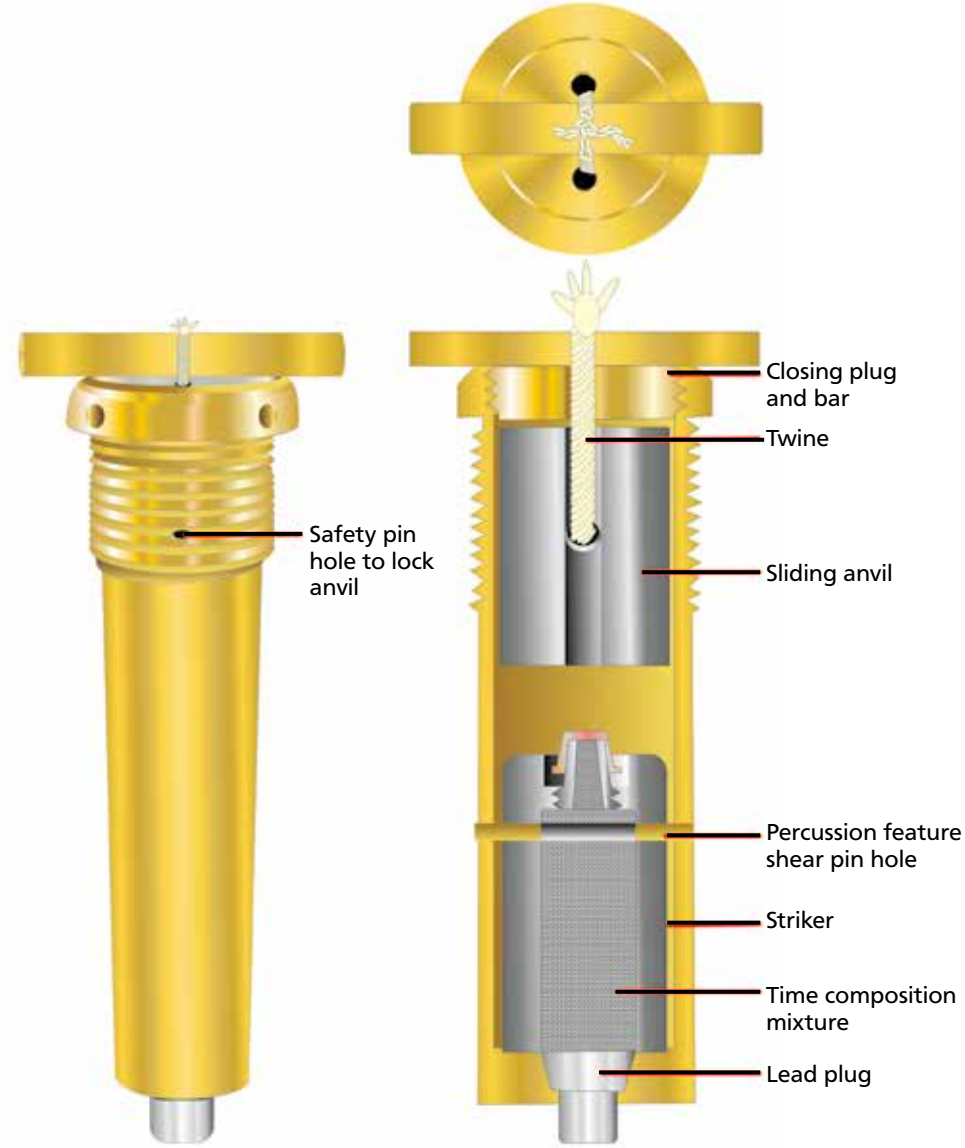
U.S. Absterdam percussion fuze, detail of plunger retaining safety



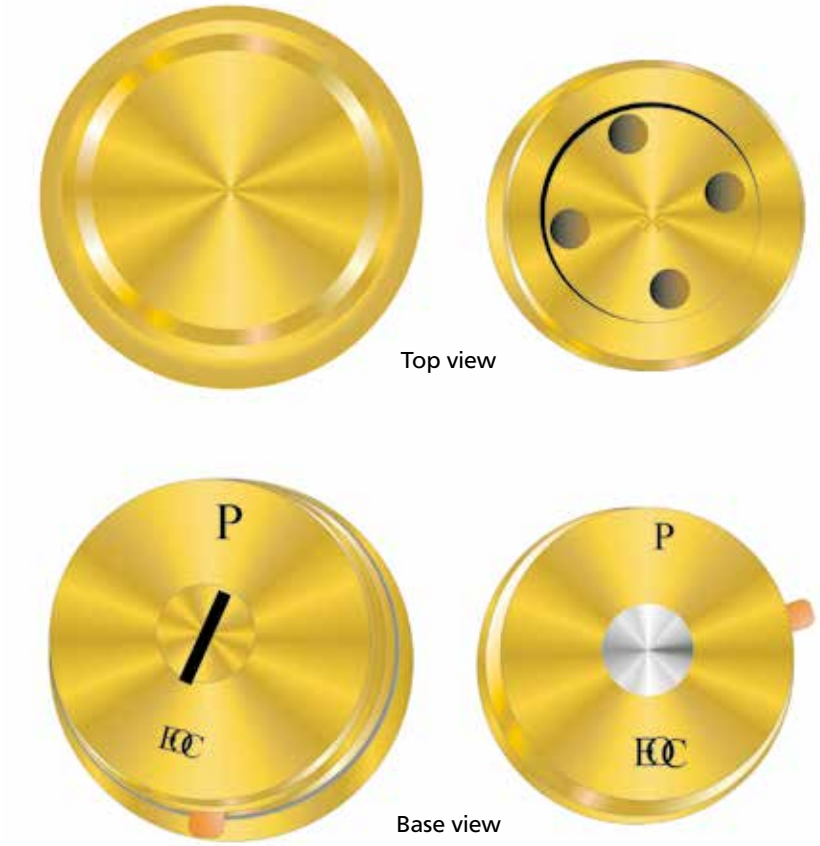
U.S. Alger seacoast water cap fuze adapter



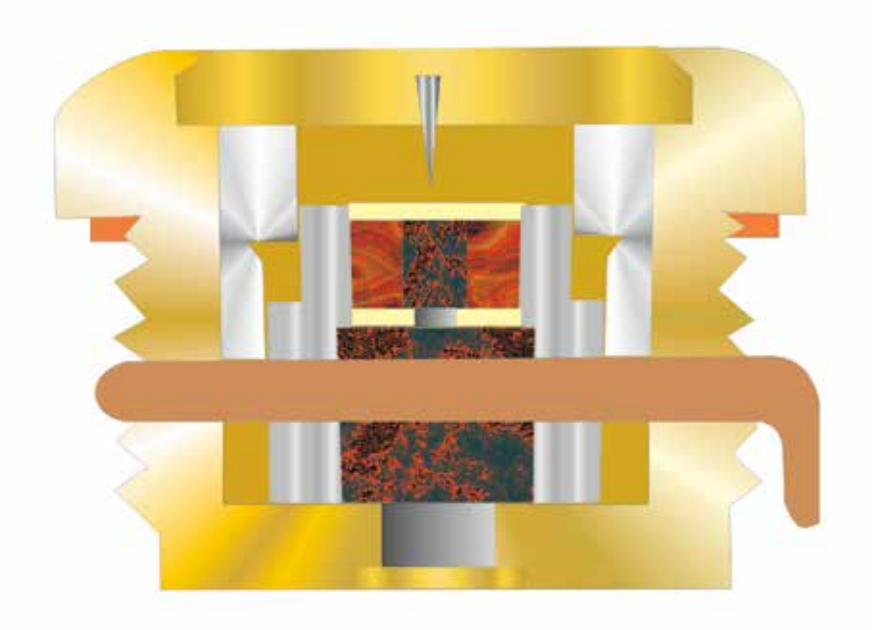
Alger fuze parts



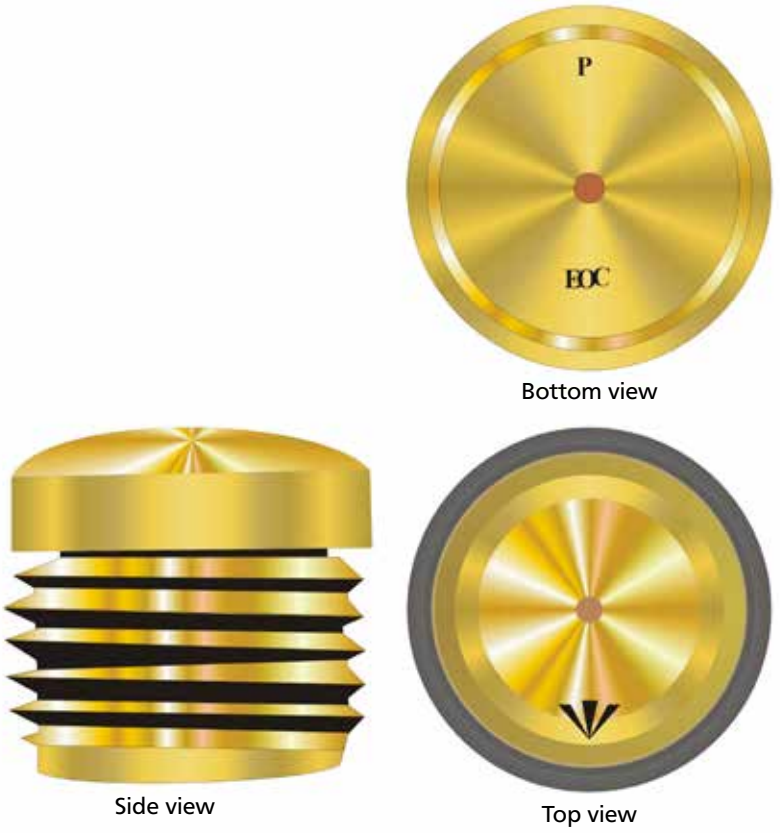
Alger concussion fuze, patent model 1861



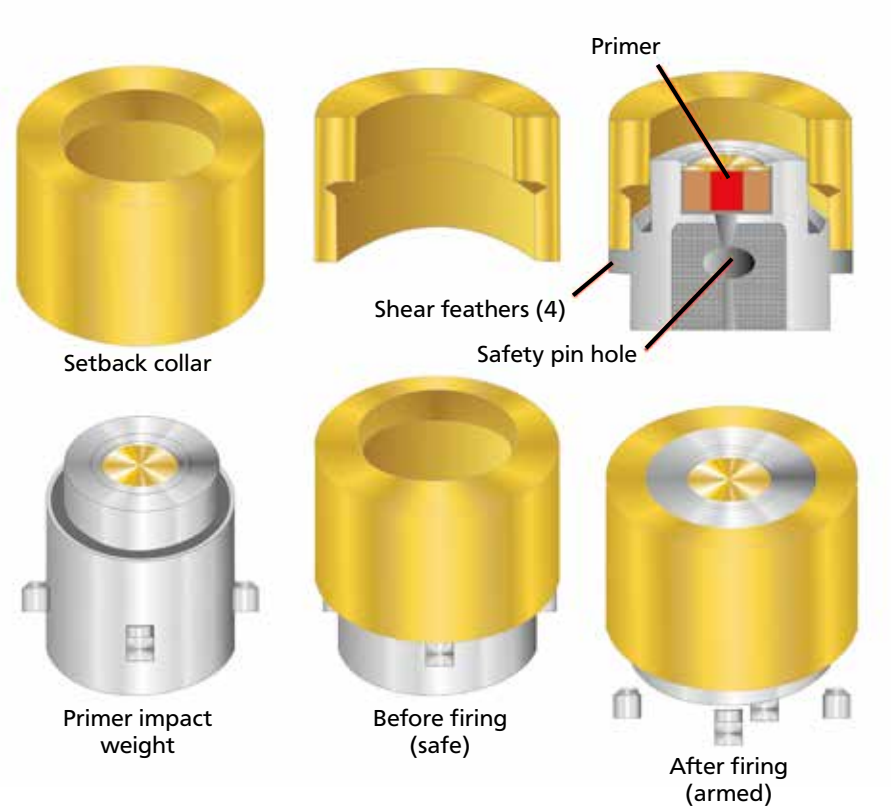
Armstrong Percussion Fuzes



Armstrong percussion fuze, sectioned



Armstrong percussion fuze, EOC



Fuze parts, Armstrong percussion fuze No. 3



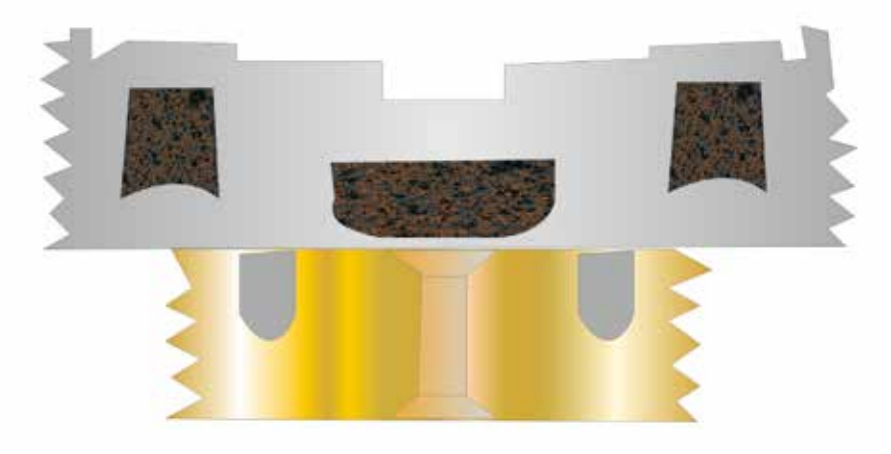
Bormann Washington Navy Yard fuze, Sept. 1875, Montgomery Sicard, inspector



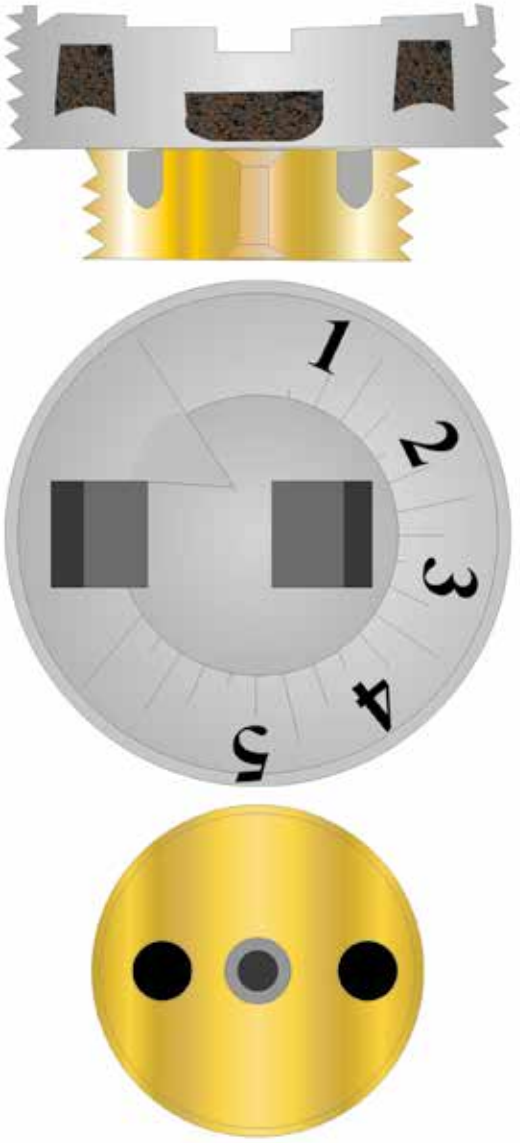
Navy ten second Bormann fuze



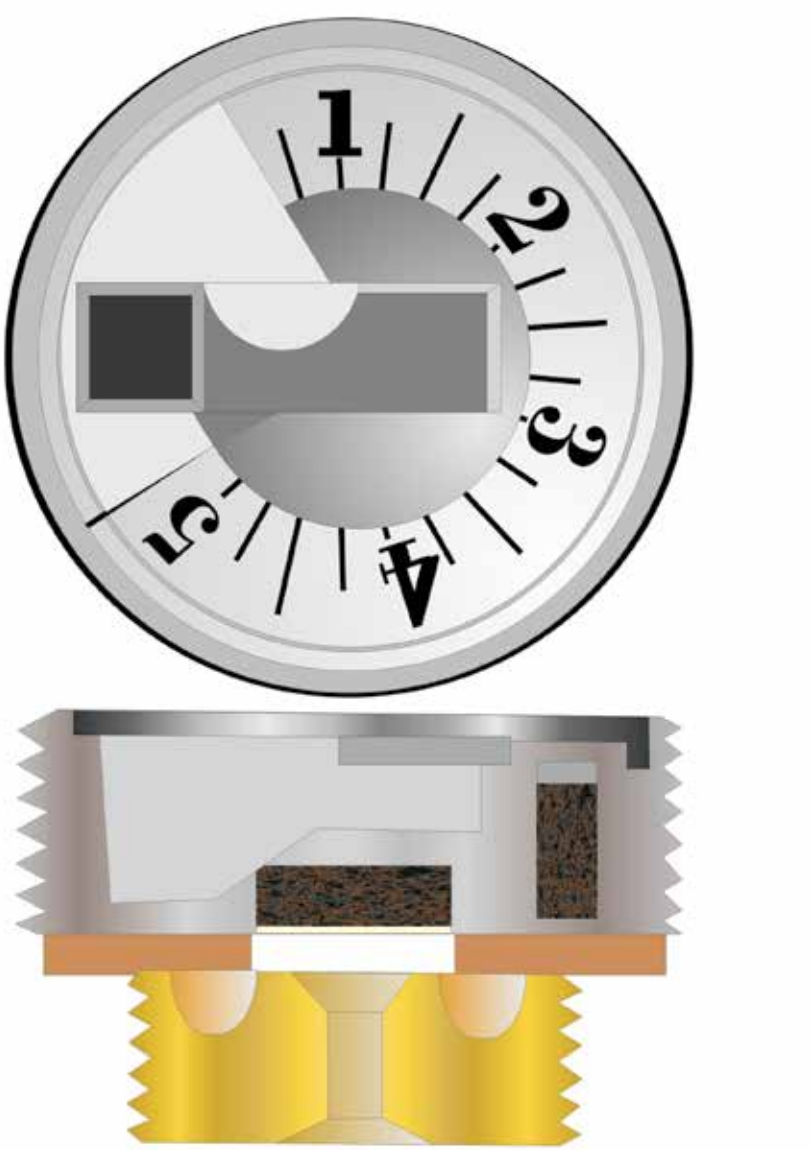
Belgium Bormann Fuze



Borman time fuze support disk



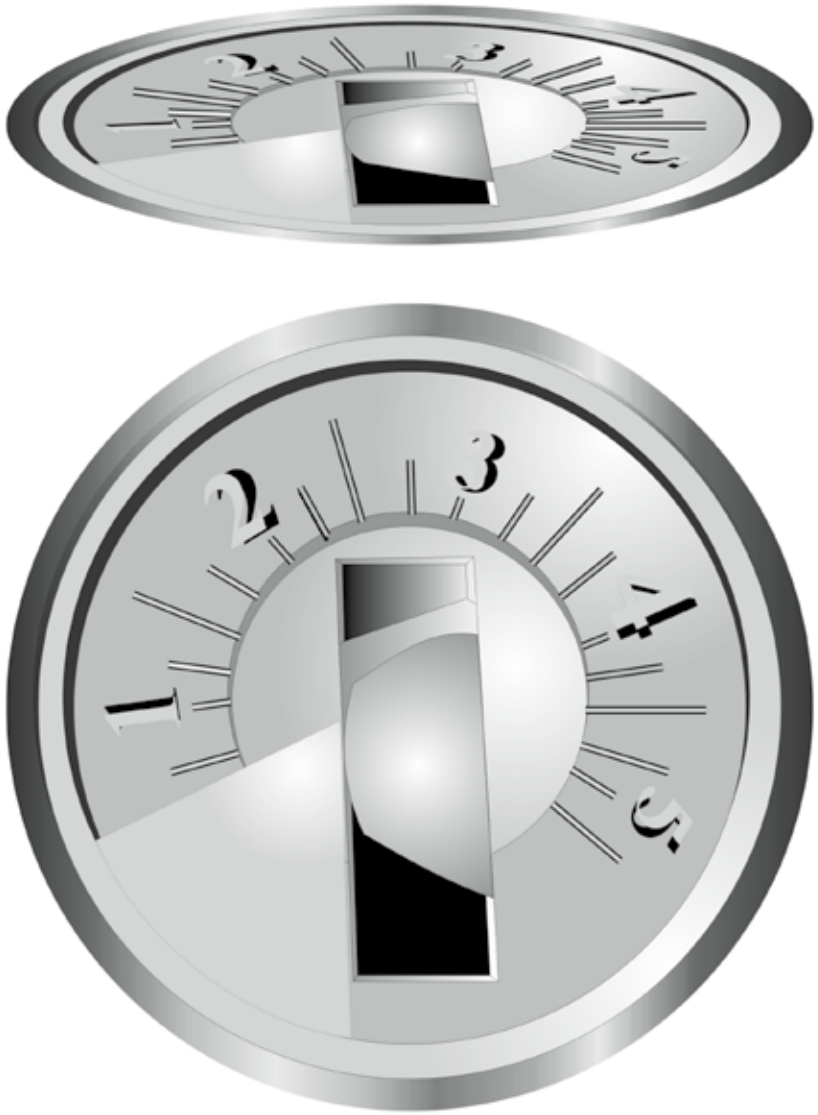
Borman time fuze & support disk



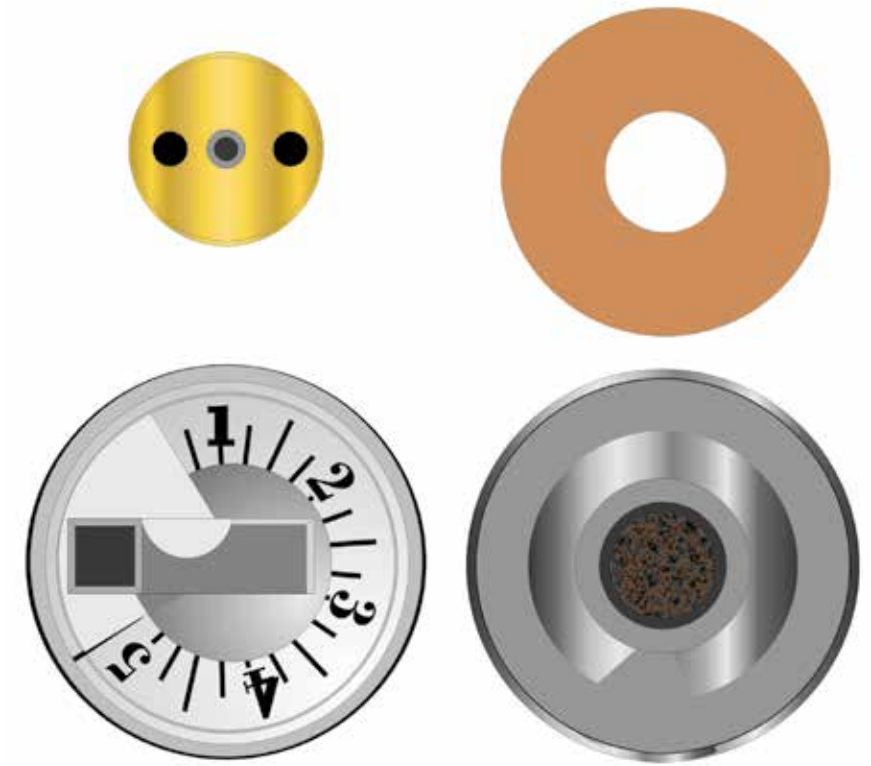
Bormann fuze with sectioned view



Bormann powder train time fuze, detailed



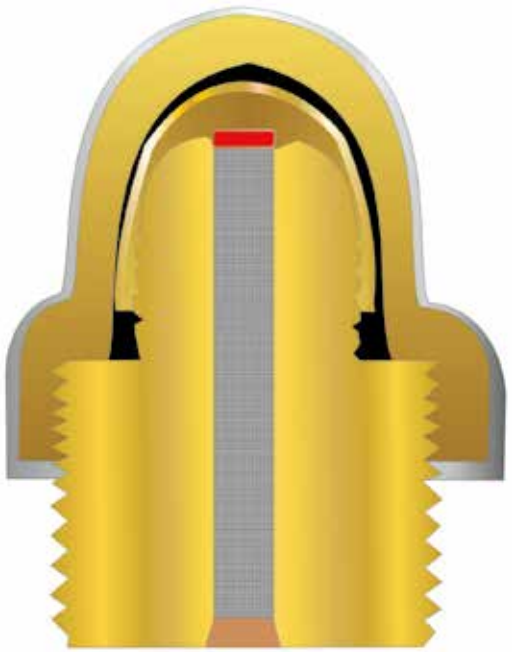
Bormann powder train time fuze,
oblique view



Bormann powder train time fuze,
top & bottom



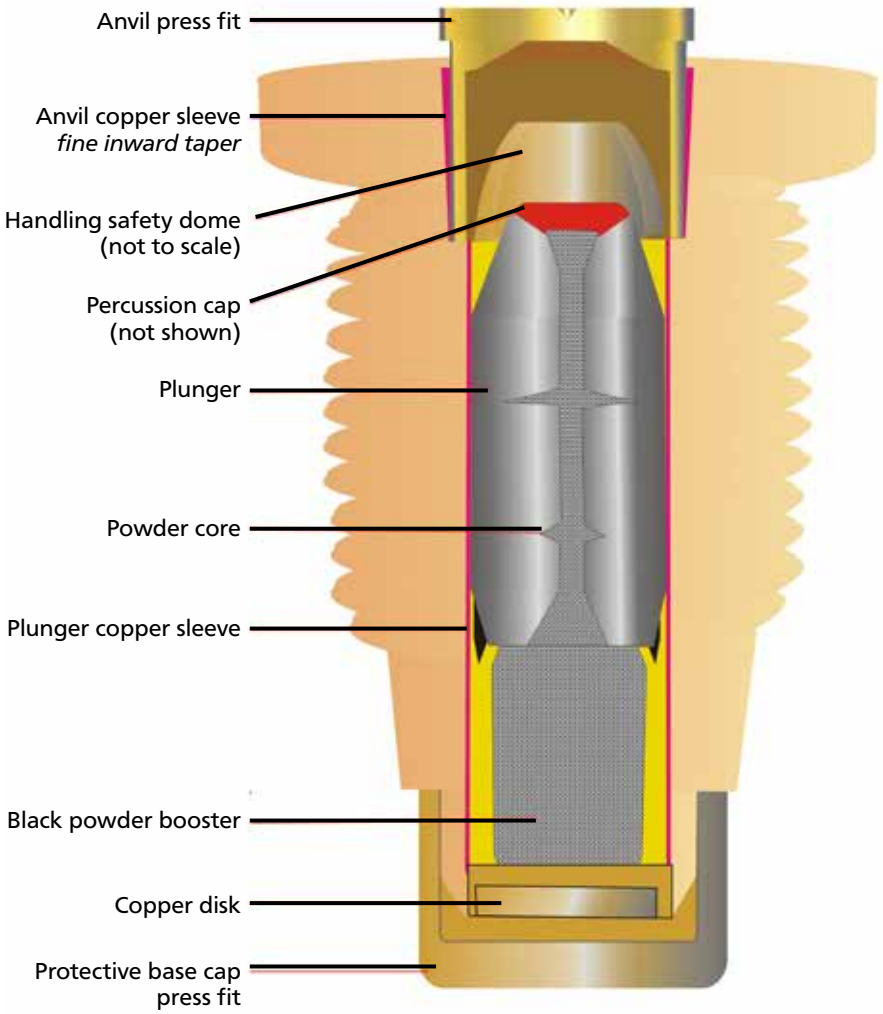
U.S. 12 pounder case shot,
Bormann fuze



Eaurb's Vase,
the Bourbon percussion fuze



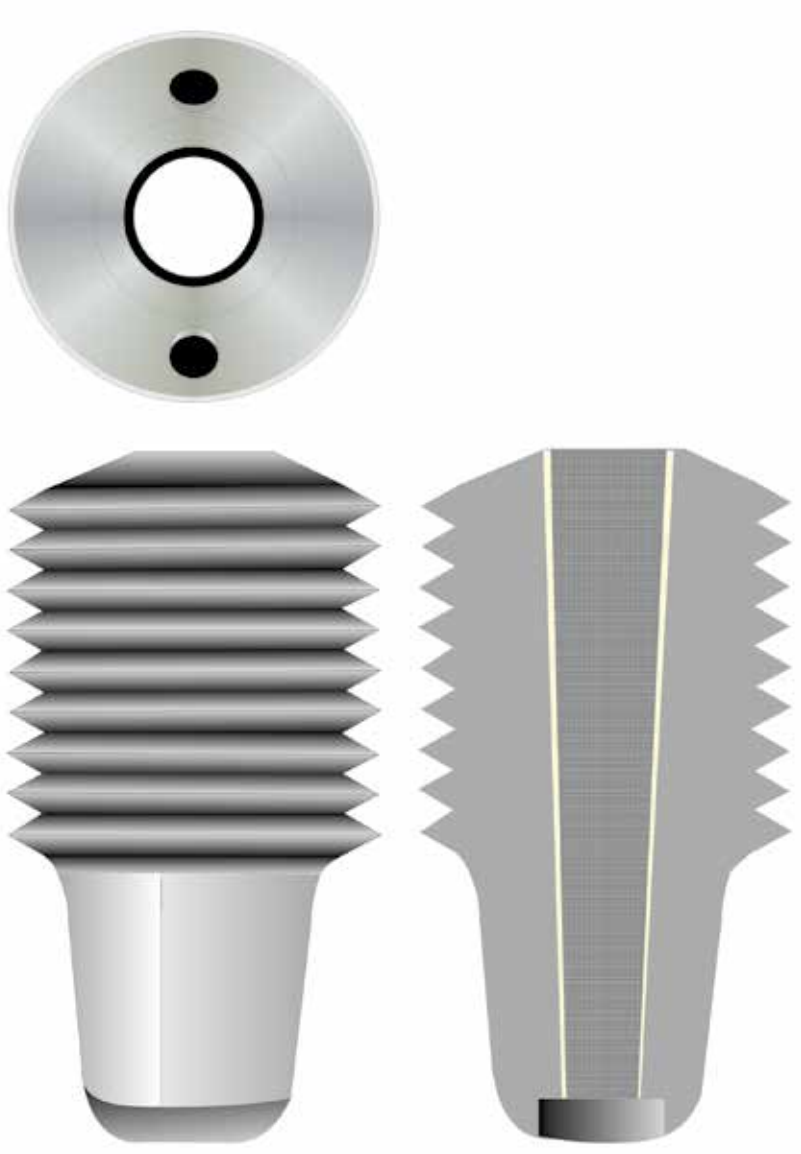
Boxer percussion fuze,
side view and top view



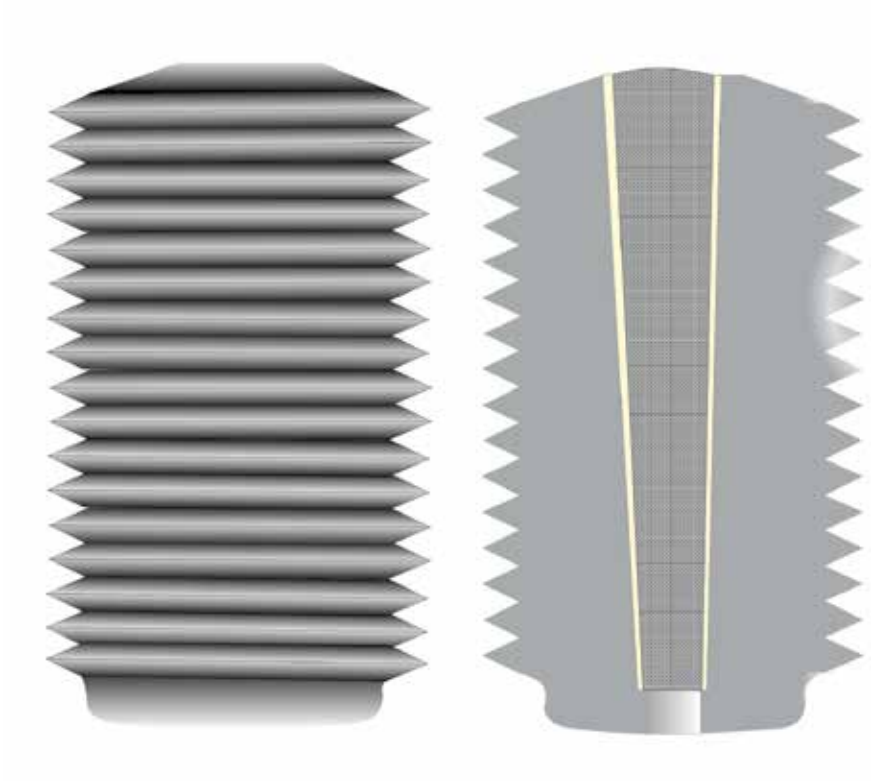
Dahlgren percussion fuze, sectioned view
(drawn from fuze radiograph)



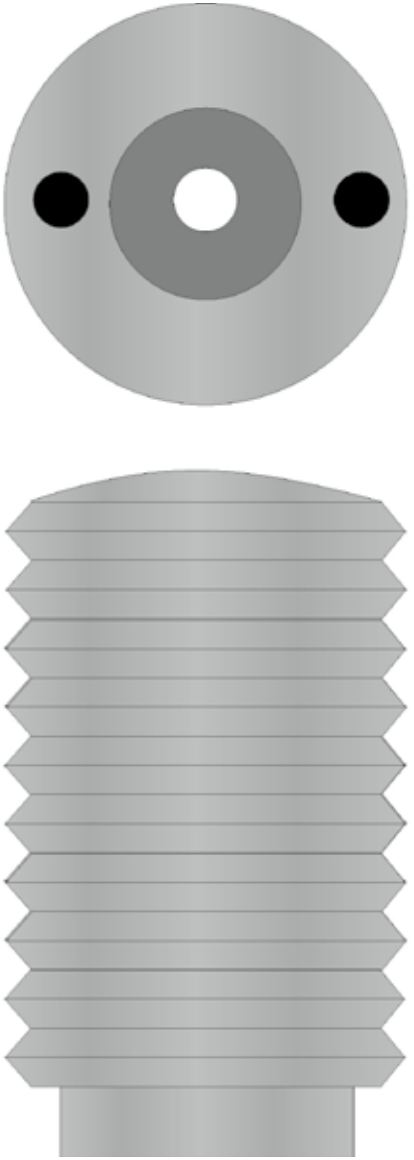
Dahlgren percussion fuze



Dyer time fuze adapter for shells



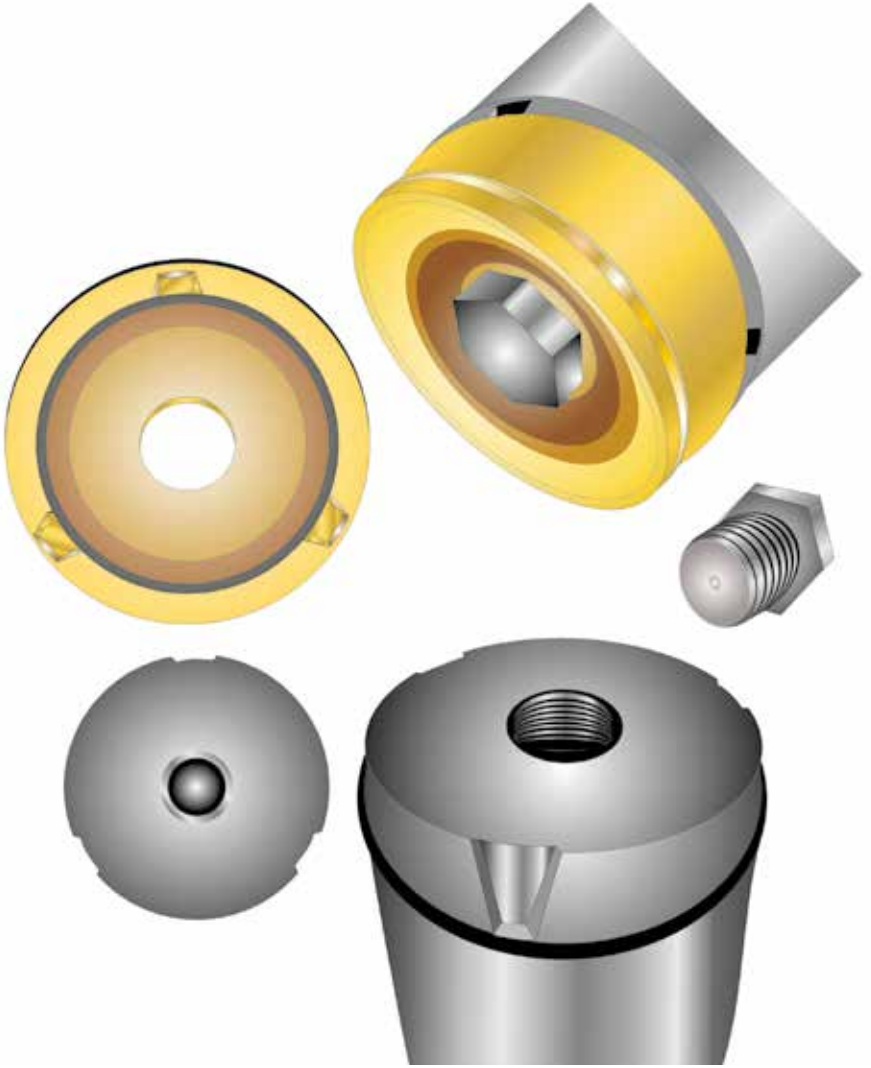
Dyer time fuze adapter for case shot



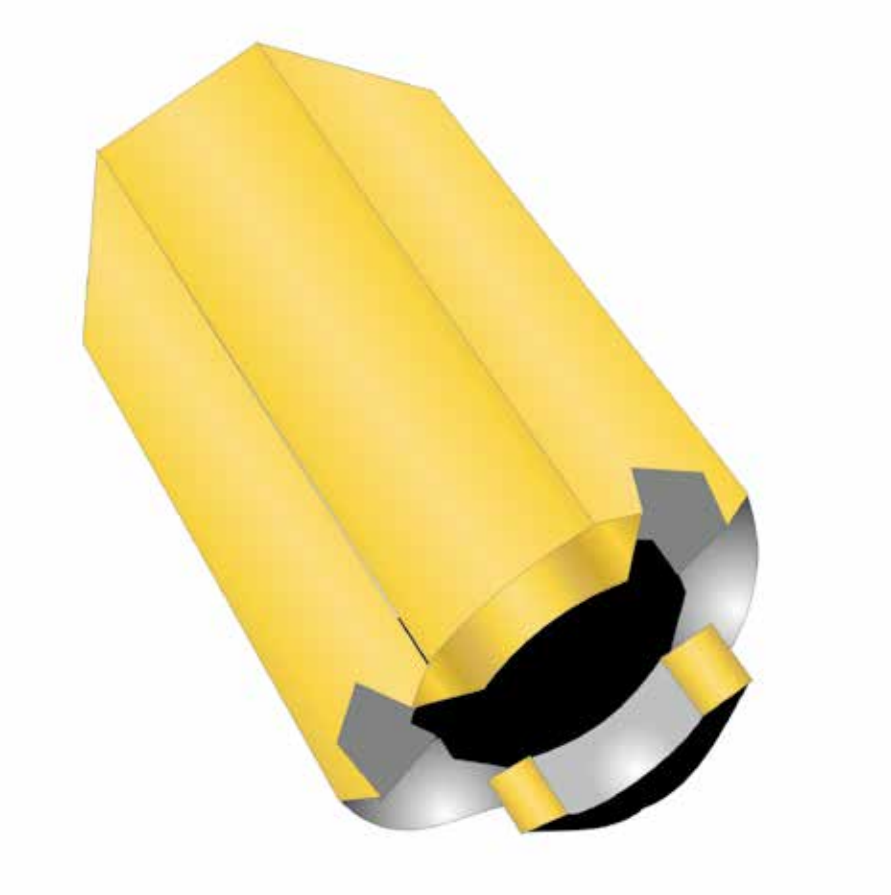
Dyer time fuze adapter



Eureka (Arrick) shell fuze striker,
Frankfort Arsenal ring resistance system



3-inch Eureka (Arrick) shell sabot attachment



Eureka (Arrick) shell plunger housing



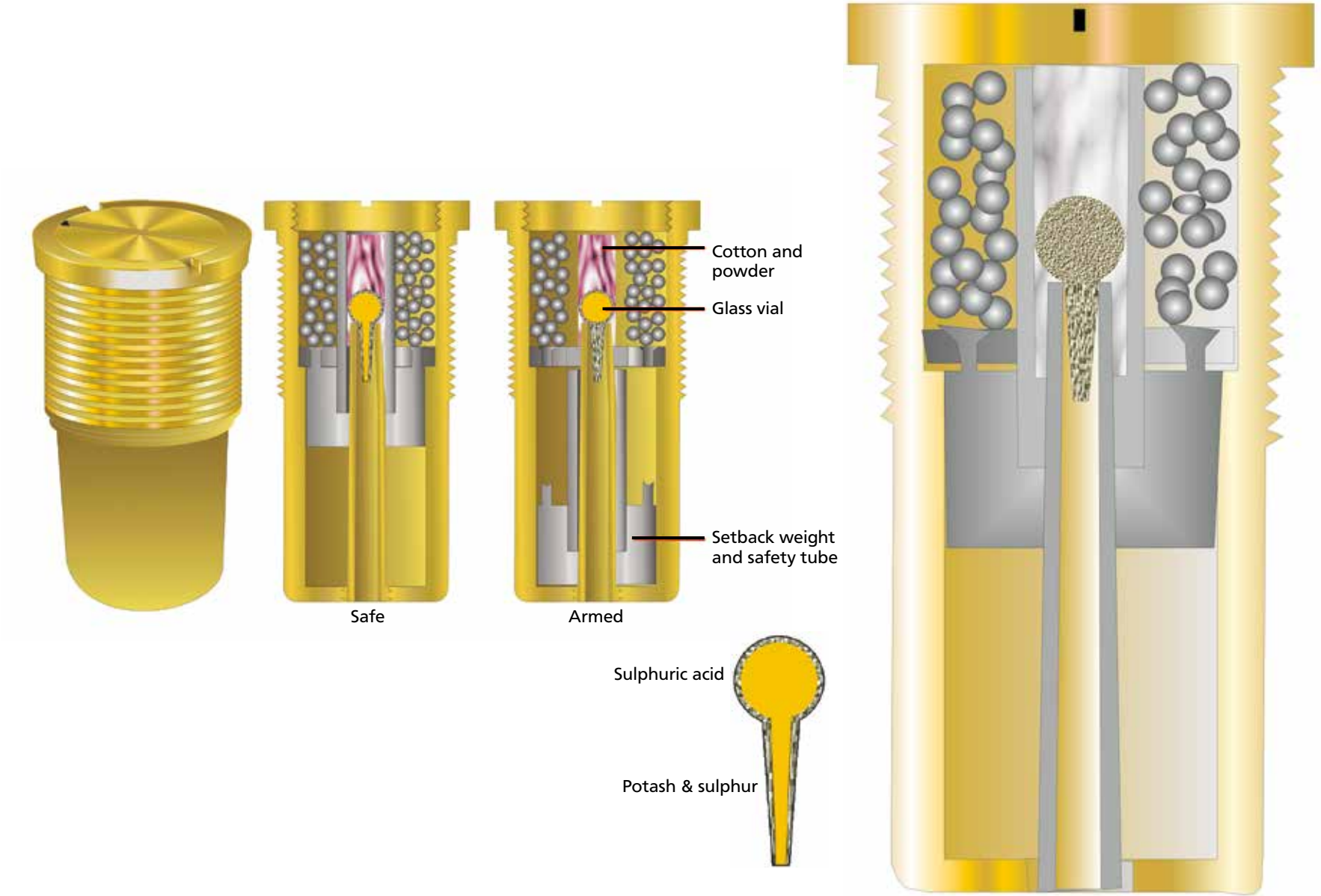
3-inch Eureka (Arrick) fuze parts



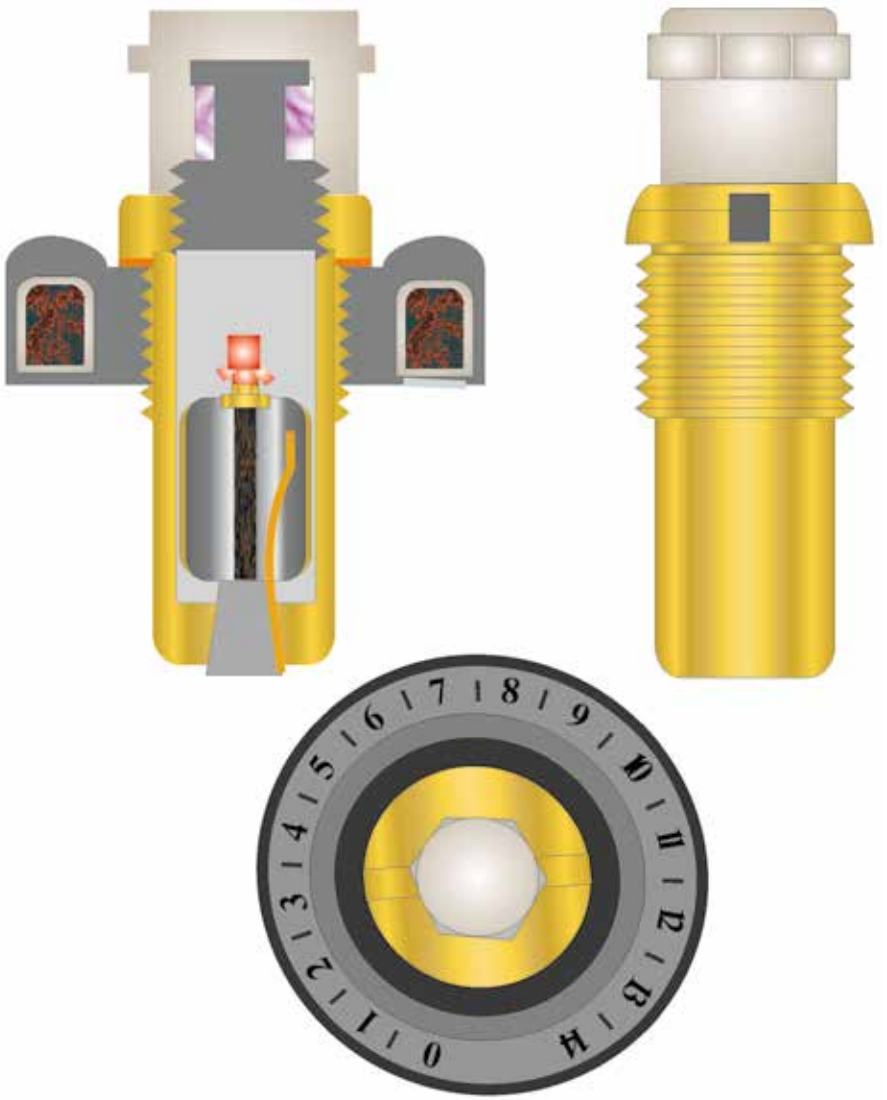
Eureka (Arrick) shell with
Absterdam time fuze adapter



Frankford "N" percussion fuze,
Model 1894



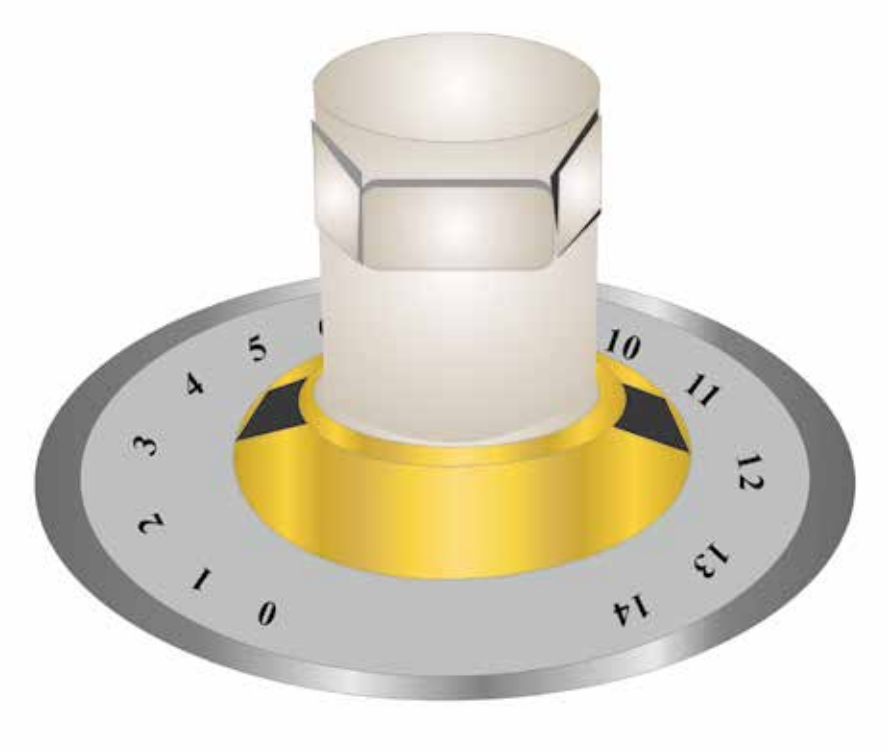
U.S. Ganster concussion fuze,
5 April 1864



Hotchkiss combination fuze, percussion and time



Hotchkiss combination fuze



Hotchkiss combination fuze,
top perspective view



Hotchkiss combination fuze,
time ring dial



U.S. Hotchkiss percussion fuze,
quarter view



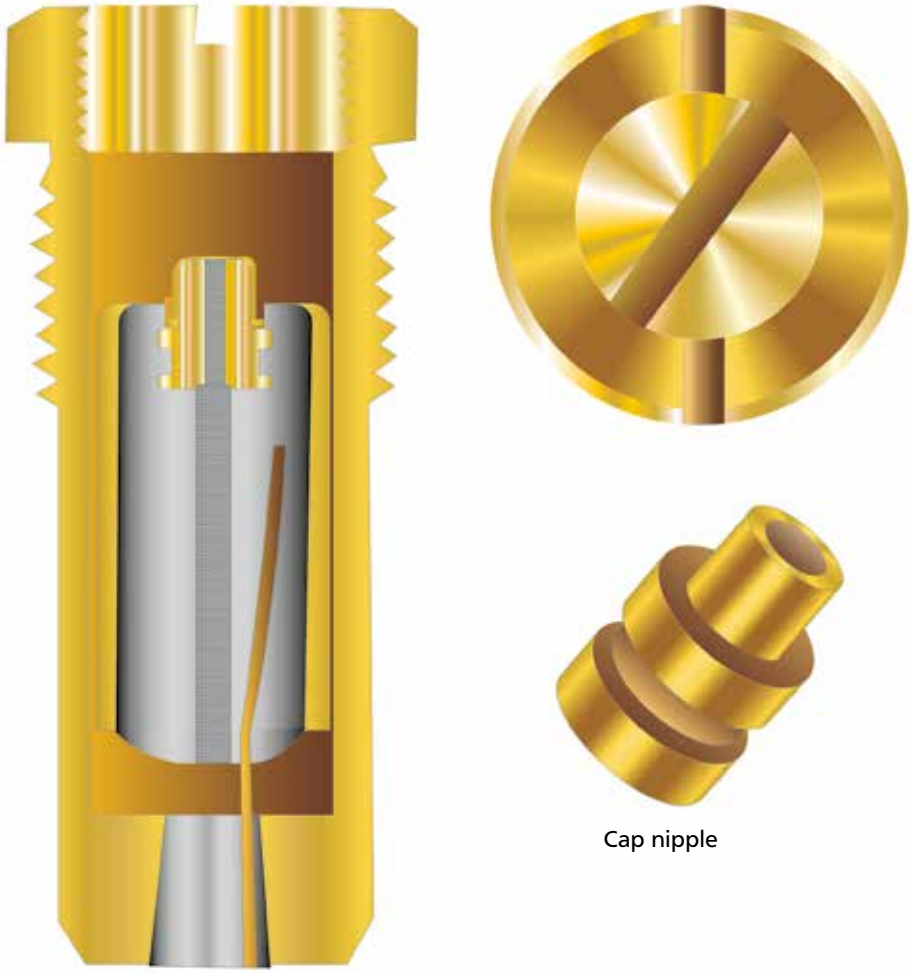
U.S. Hotchkiss percussion fuze,
head stamps



U.S. Hotchkiss percussion fuze cap nipple

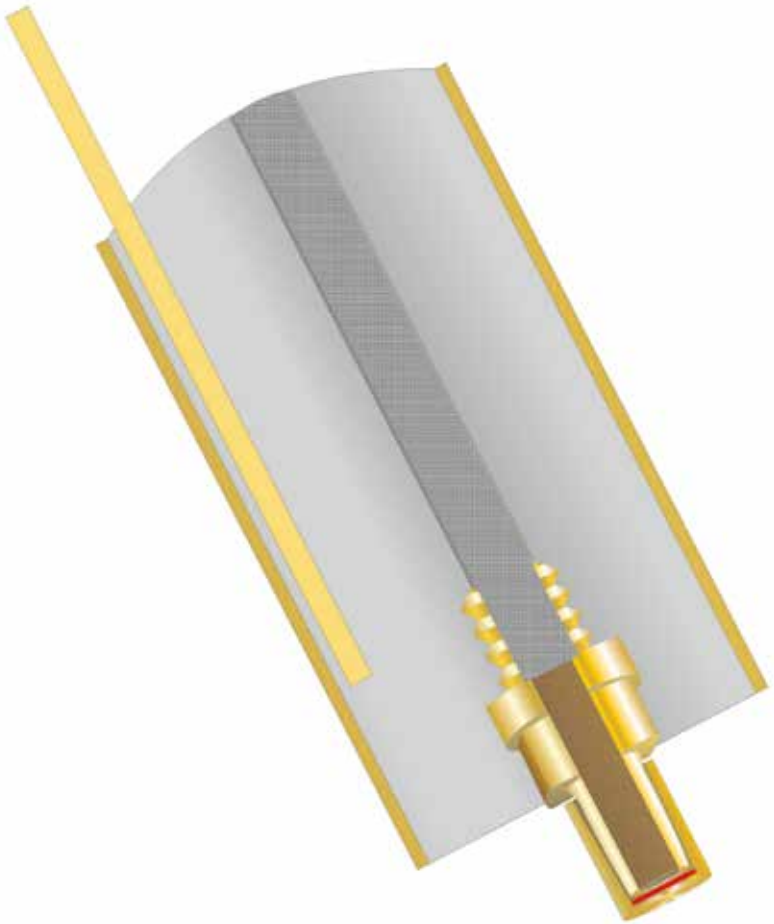


Navy Hotchkiss percussion fuze

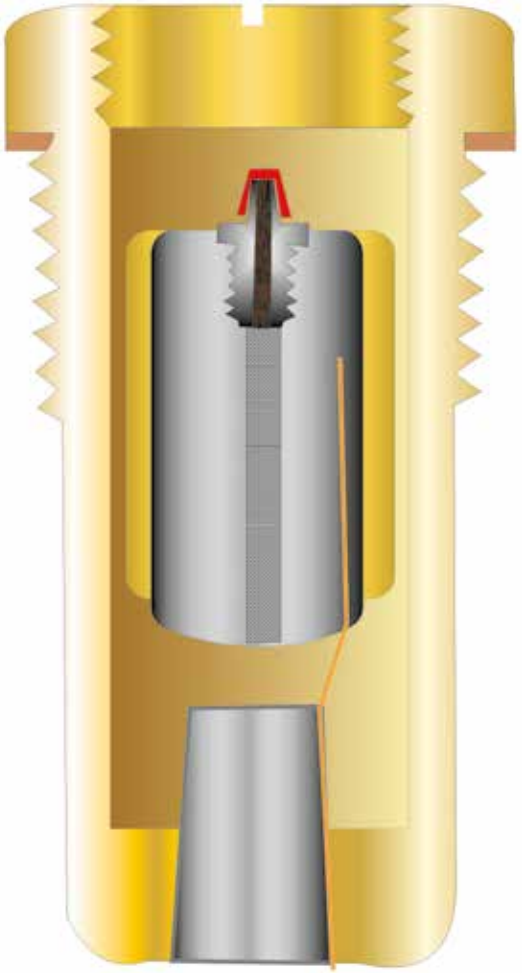


Cap nipple

U.S> Hotchkiss percussion fuze, sectioned



Hotchkiss percussion fuze plunger



Hotchkiss percussion fuze, sectioned



Hotchkiss percussion fuze



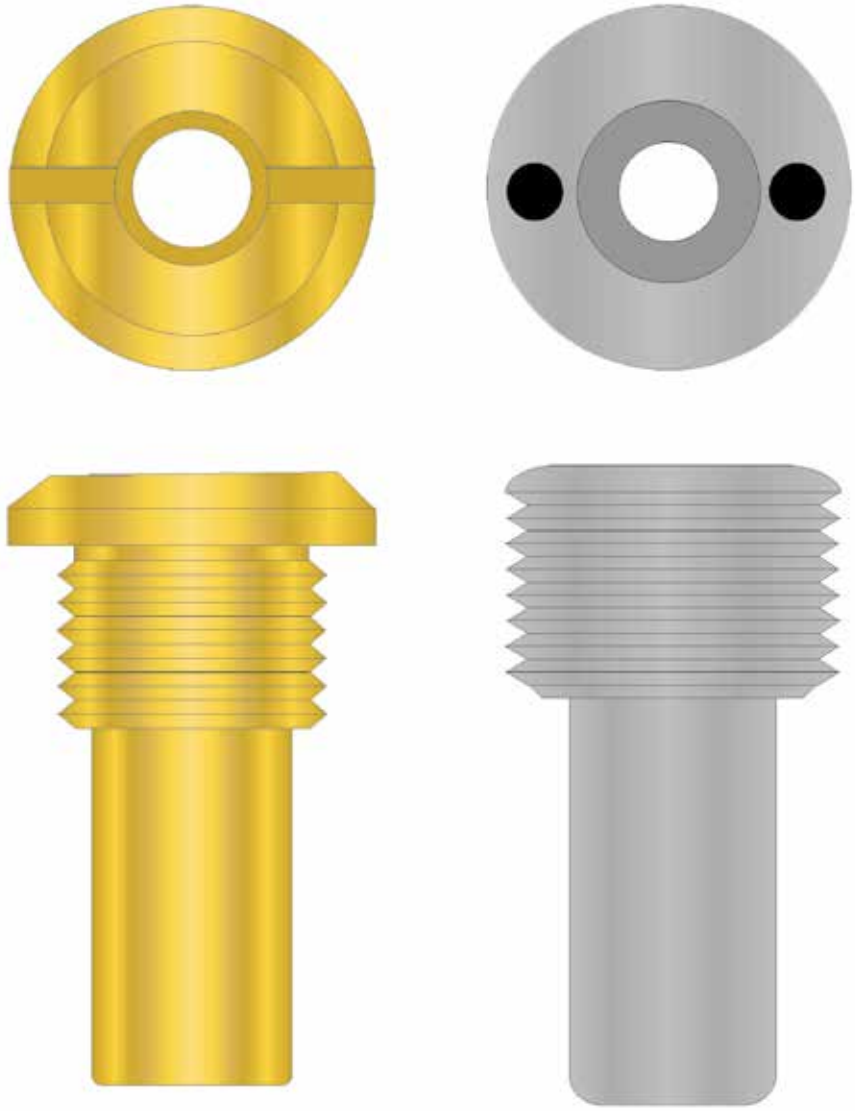
Hotchkiss percussion fuze



Hotchkiss percussion fuze, three views



U.S. Hotchkiss time-percussion fuze,
Model 1864



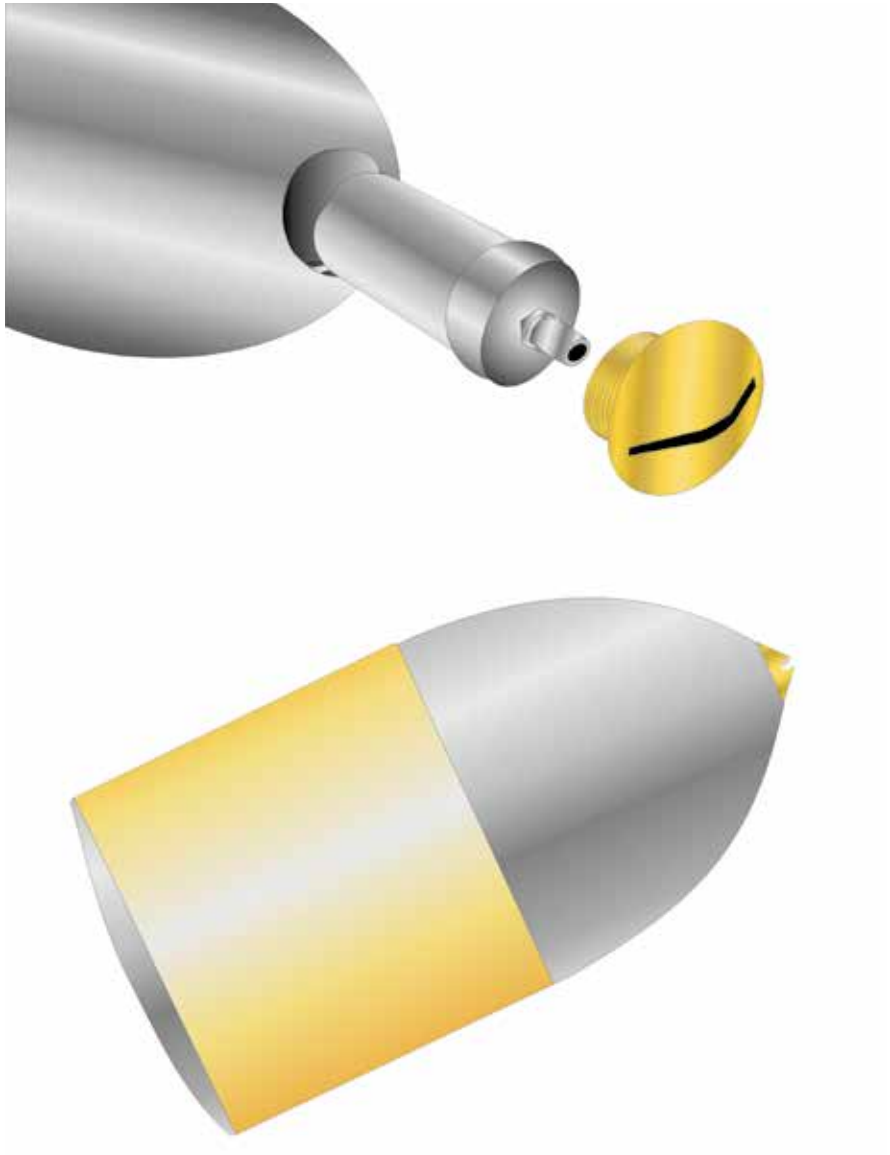
Hotchkiss t[i]me Fuze adapters



Hotchkiss time fuze adapter



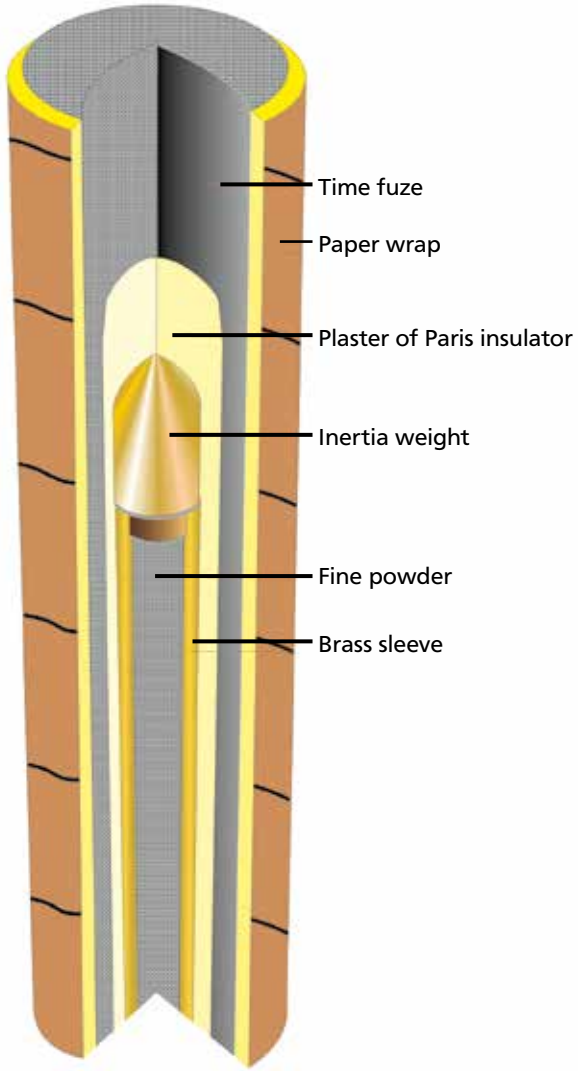
Hotchkiss time fuze adapter
for case shot



James shell,
plunger and anvil removed



James percussion fuze



McIntyre concussion fuze,
patent 44,581 of 4 October 1861



U.S. naval water cap fuze, 1862 R



U.S. naval water cap fuze, 1862 R



U.S. naval water cap fuze,
exploded view



U.S. naval water cap fuze, sectioned



U.S. naval water cap fuze, quarter section



U.S. naval water cap fuze, 1862,
with and without adapter bushing



Seacoast water cap fuze



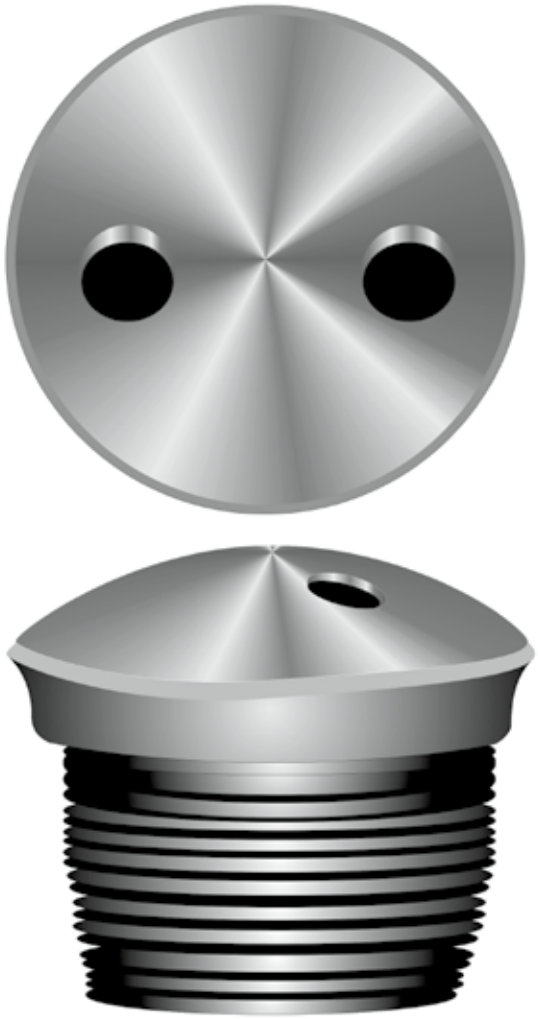
3-inch Parrott canned burster components



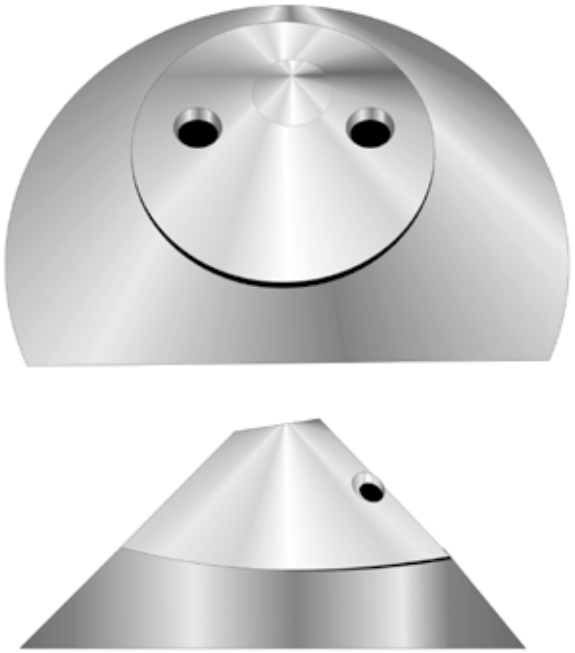
Brass Parrott percussion fuze,
brass anvil (also found with zinc anvil)



Parrott percussion fuze, sleeve safety



Parrott percussion fuze anvil, West Point,
1.4-inch head diameter





Parrott percussion
fuze anvil
1.4-inch head Dia.

6.4-inch Parrott shell fuze



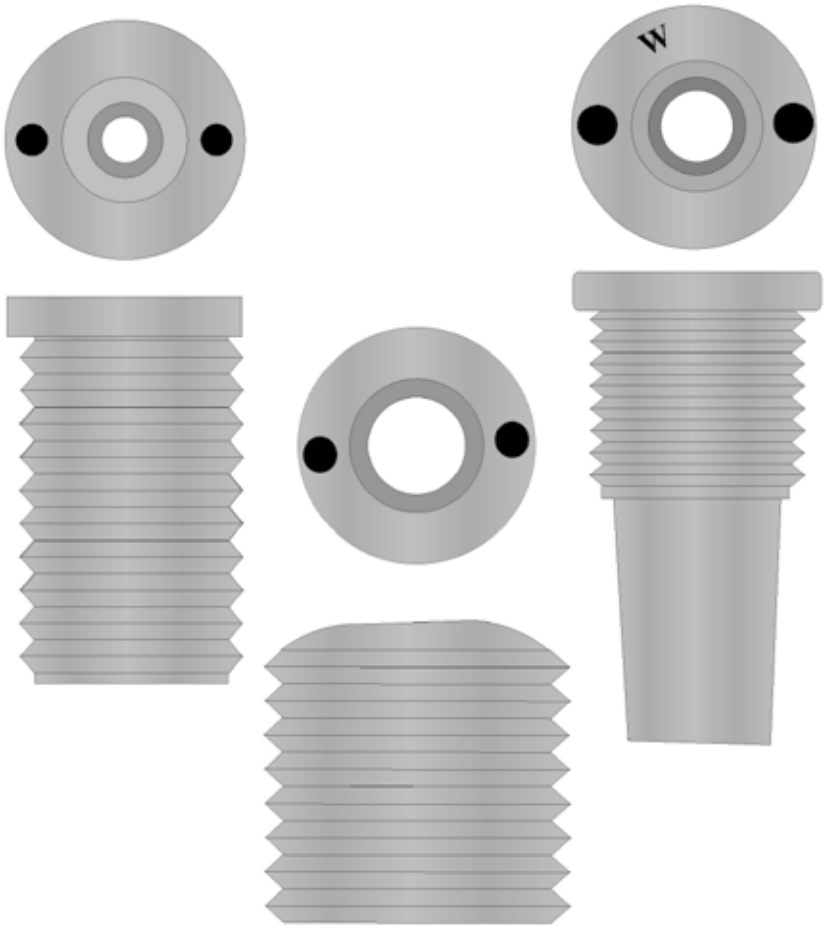
U.S. Parrott percussion fuze



U.S. Parrott percussion fuze,
long striker



U.S. Parrott percussion fuze,
brass



Parrott time fuze adapters



Parrott time fuze adapter, zinc, "W"



Parrott time fuze adapter, zinc

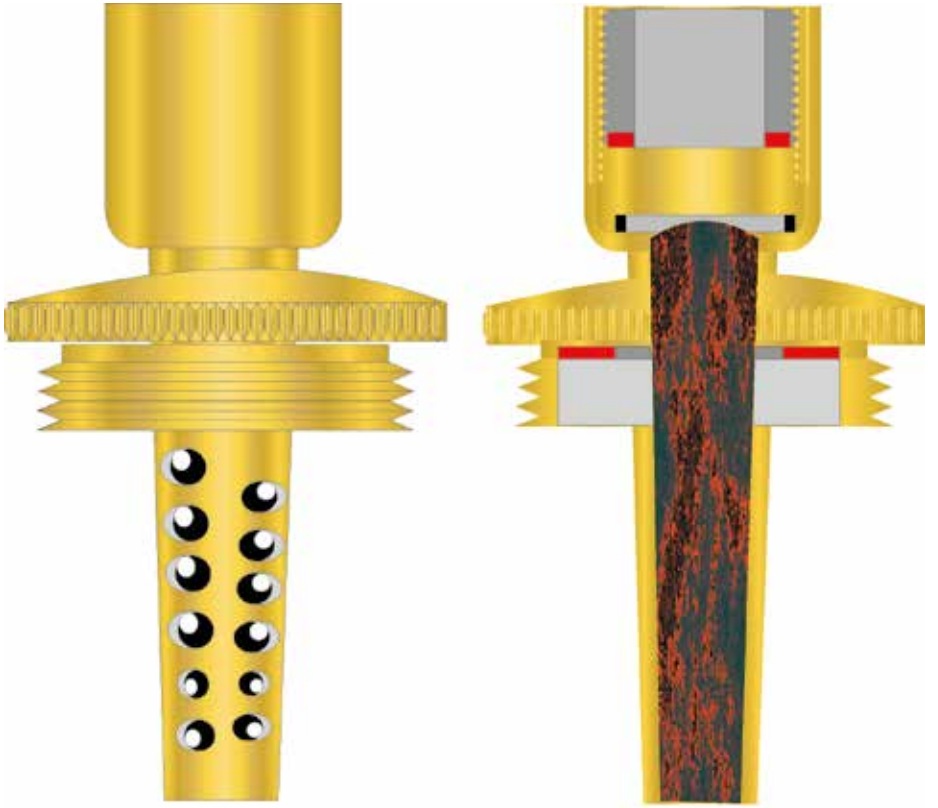


Parrott time fuze adapters and time fuze

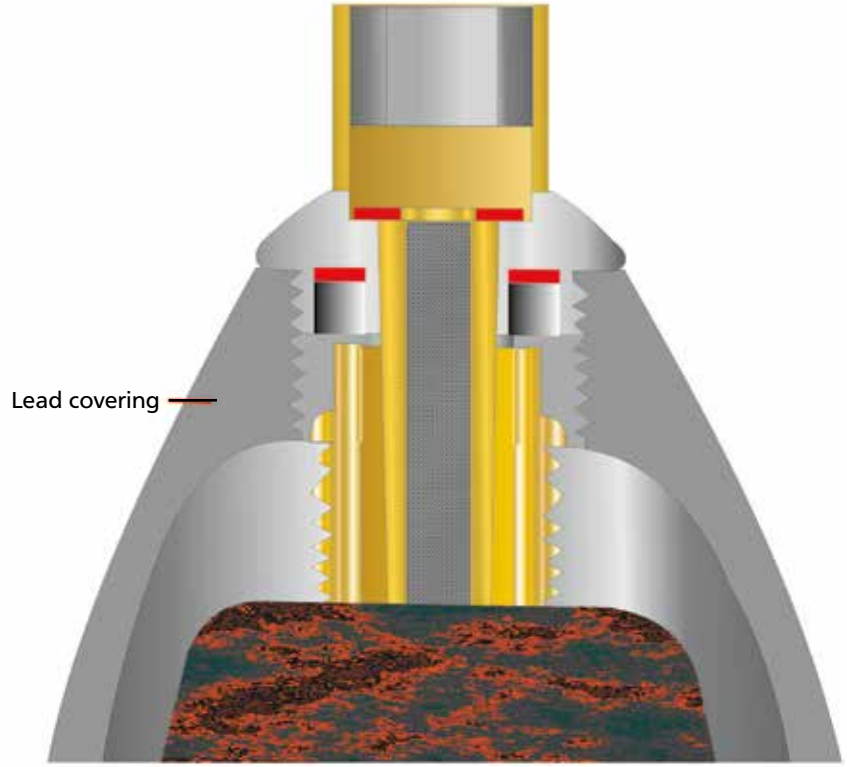


Head diameter 1.85-inches
Thread diameter 1.5-inches
TPI 12
Length 2.36-inches
Weight 13.12 ounces
White metal material

U.S. Parrott time fuze adapter, 60 pounder Parrott shell



Sawyer combination fuze



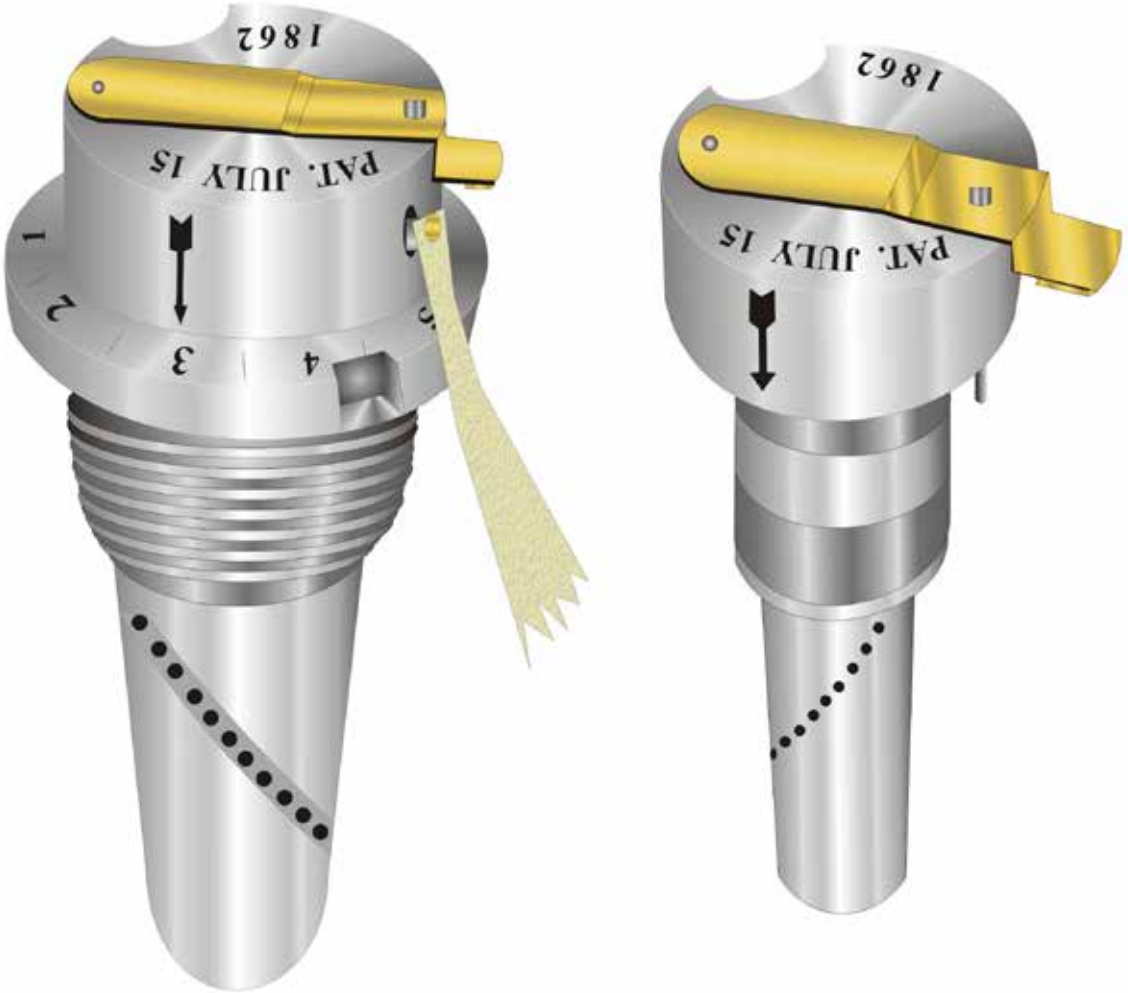
Sawyer combination fuze,
patent drawing 38,699, 26 May 1863



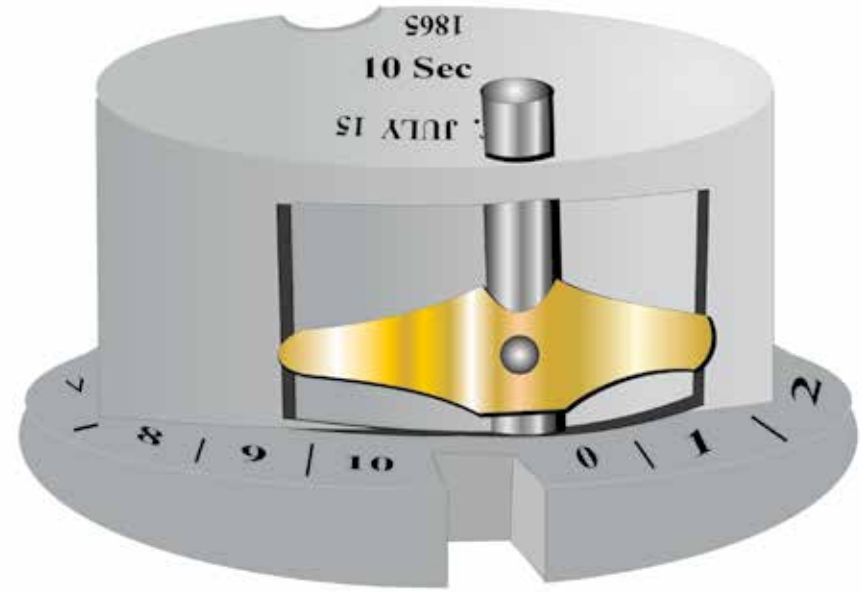
Naval Schenkl fuze, large



Schenkl combination fuze, exterior



Schenkl combination fuze



Schenkl combination fuze,
time selector knob



Schenkl combination fuze, parts



Schenkl combination fuze,
early model, top



Schenkl combination fuze rotor cap,
1st model



Schenkl combination fuze, 2nd model



Schenkl combination fuze, sectioned



Schenkl case shot with
10 second combination fuze, top view



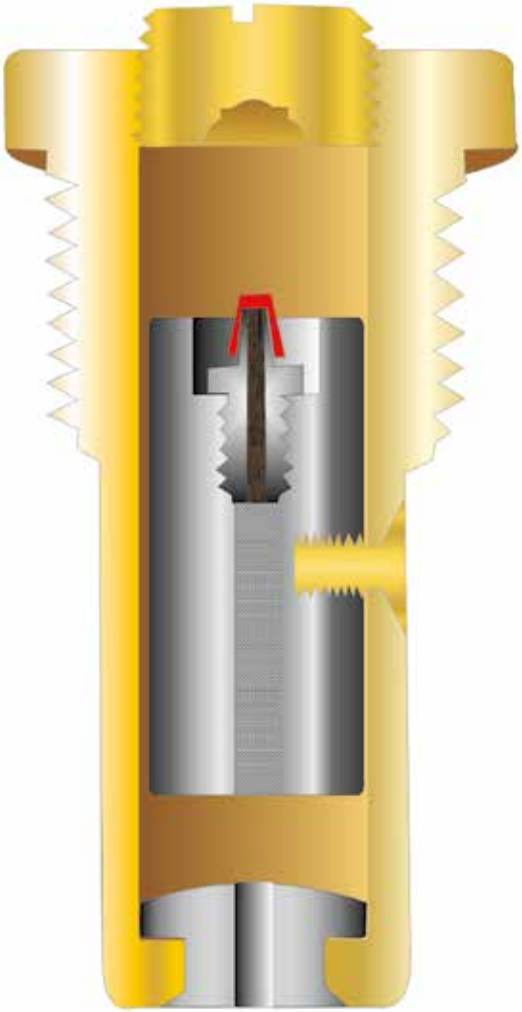
U.S. Schenkl percussion fuze



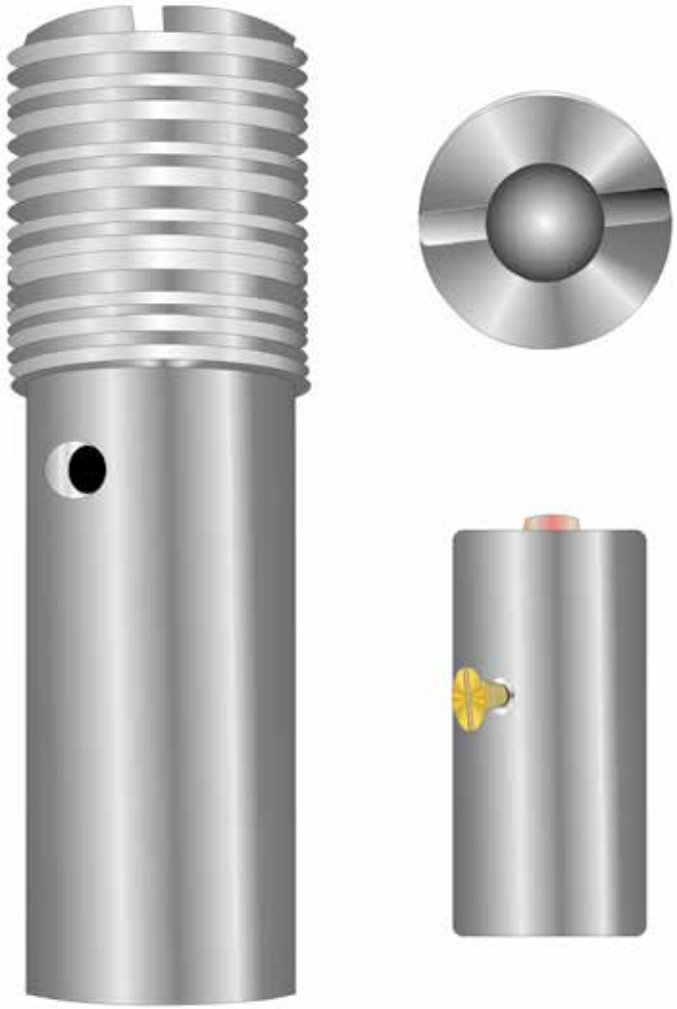
U.S. Schenkl percussion fuze,
unmarked



U.S. Schenkl percussion fuze,
large



U.S. Schenkl percussion fuze,
sectioned



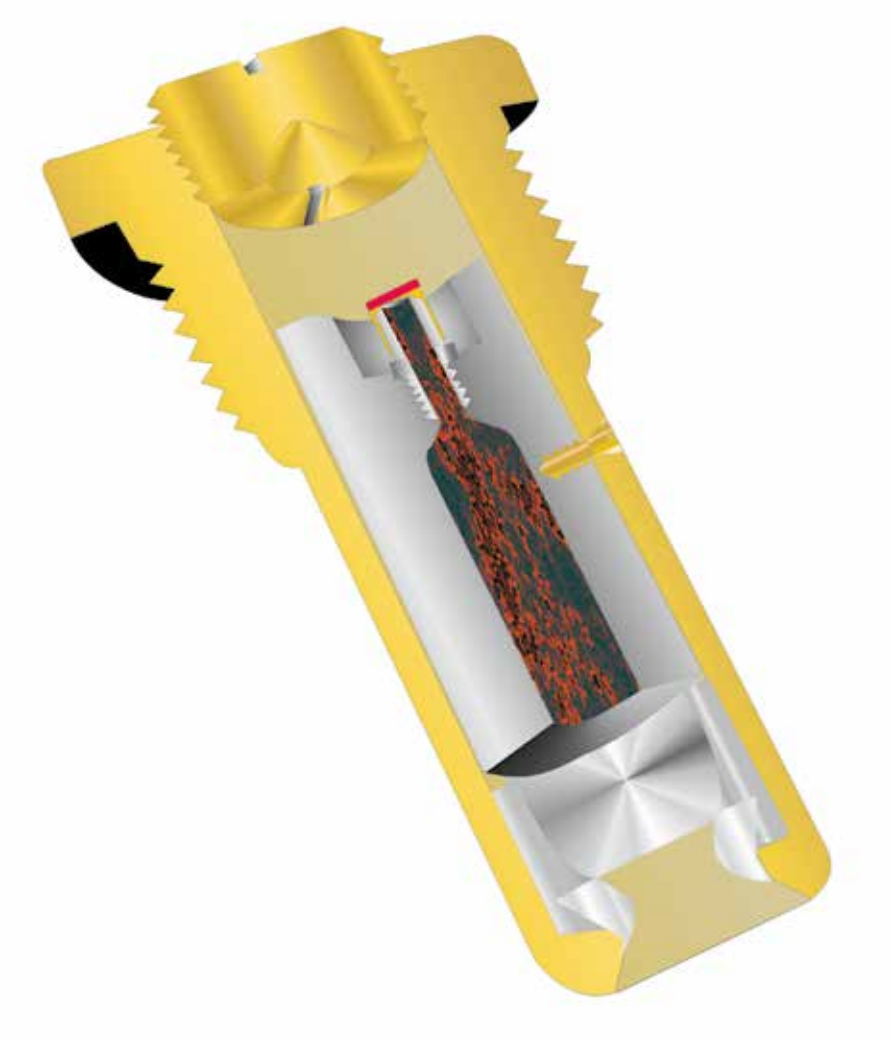
Schenkl percussion fuze,
patent model #33,495, 1861



Schenkl percussion fuze,
two views



Schenkl percussion fuze



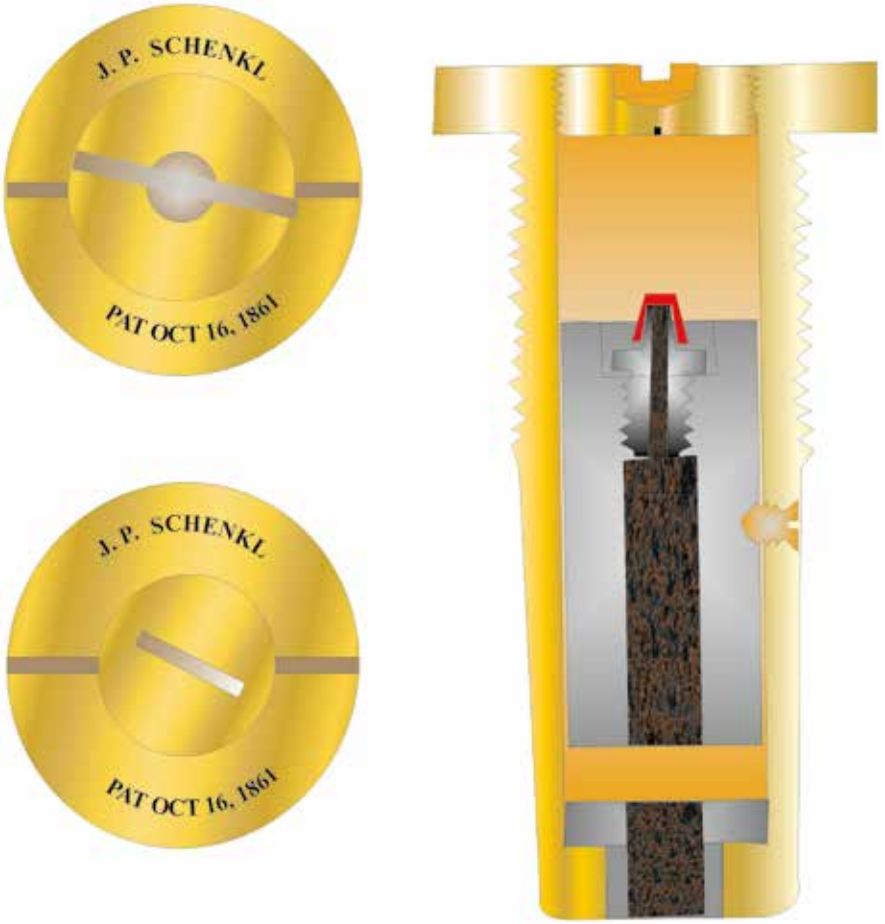
Schenkl percussion fuze,
sectioned



Schenkl percussion fuze
for Dyer shells



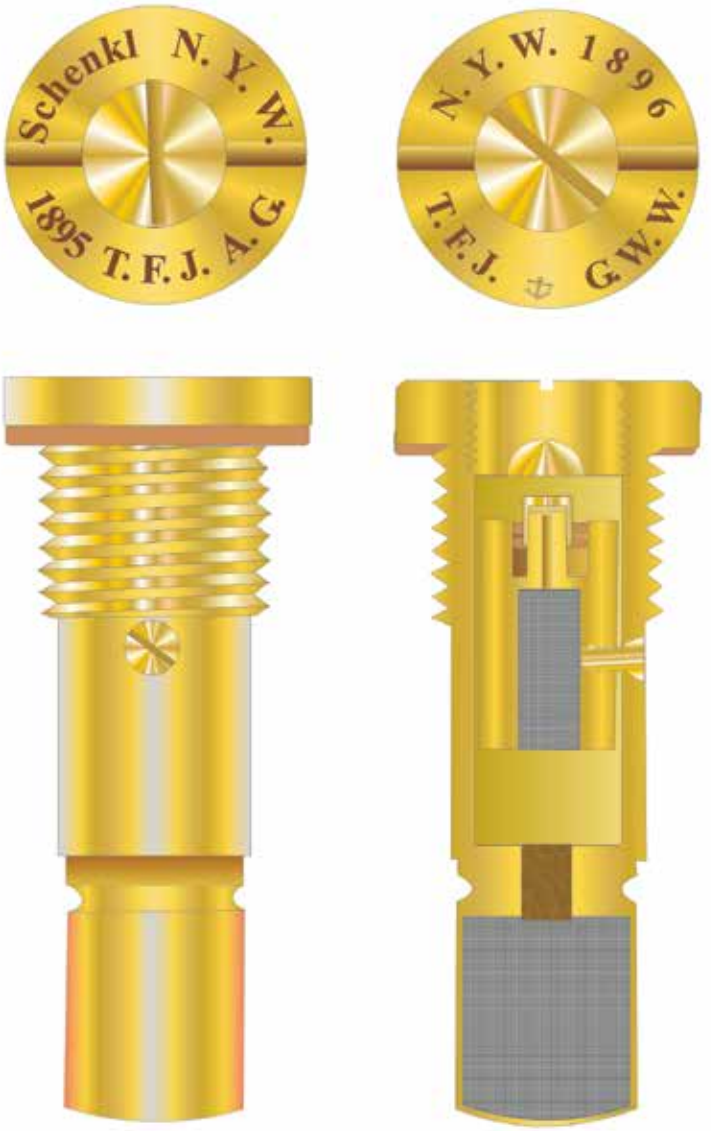
Schenkl percussion fuze, exploded view
(safe view, left; armed view, right)



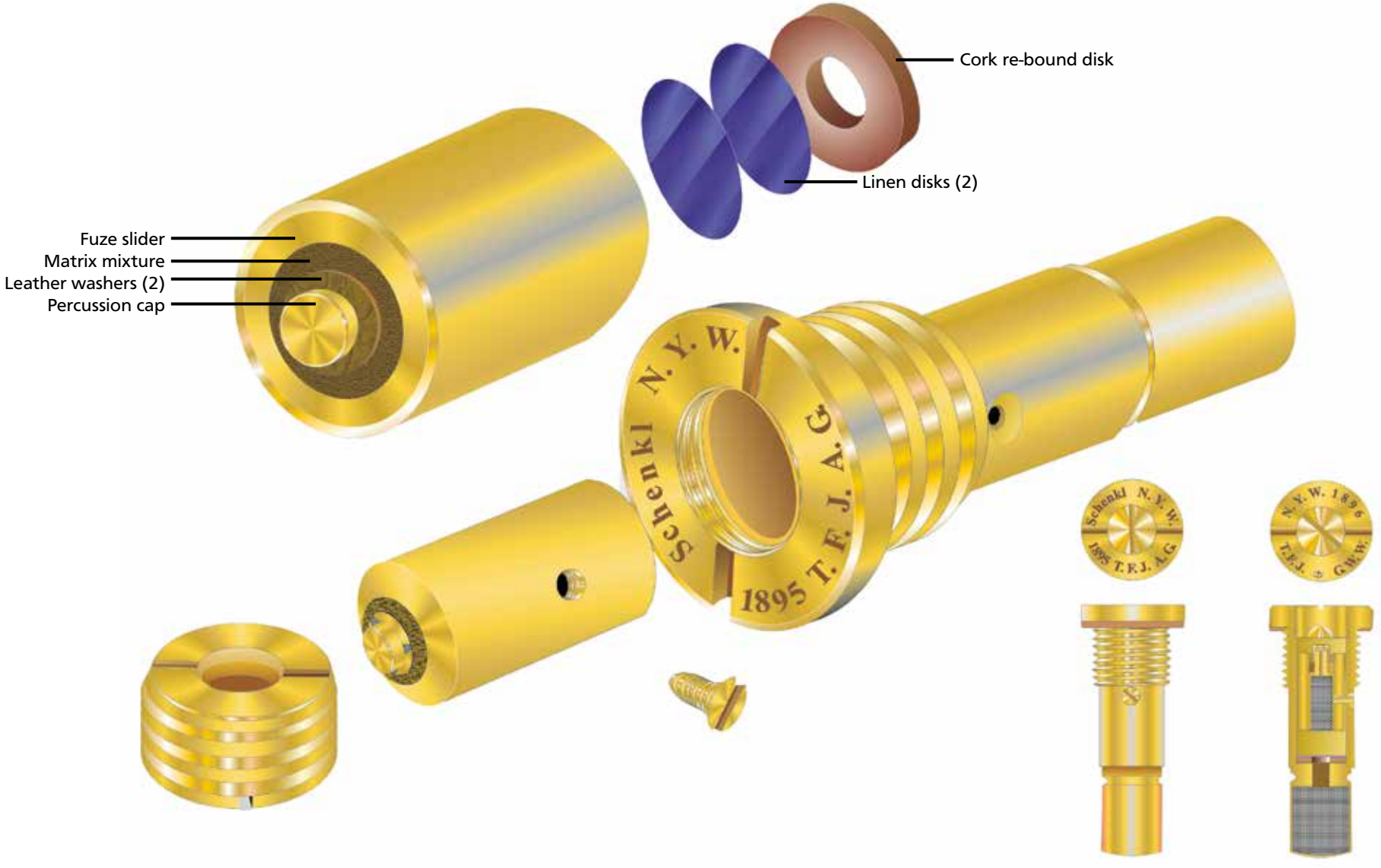
Schenkl fuze,
armed (top) and safe (bottom) conditions



U.S. 1895 Schenkl percussion fuze



U.S. 1890s era Schenkl percussion fuze,
75 grain black powder booster charge



U.S. 1890 era Schenkl percussion fuze, disassembled



U.S. naval water cap fuze,
two views



U.S. naval water cap fuze,
underside view



U.S. naval water cap; fuze



U.S. seacoast water cap fuze, details



U.S. naval water cap fuzes, used in tri- fuzed spherical shells



Naval water cap fuze,
without bushing



U.S. naval water cap fuze adapter
with flame deflector



Stafford shell fuze striker



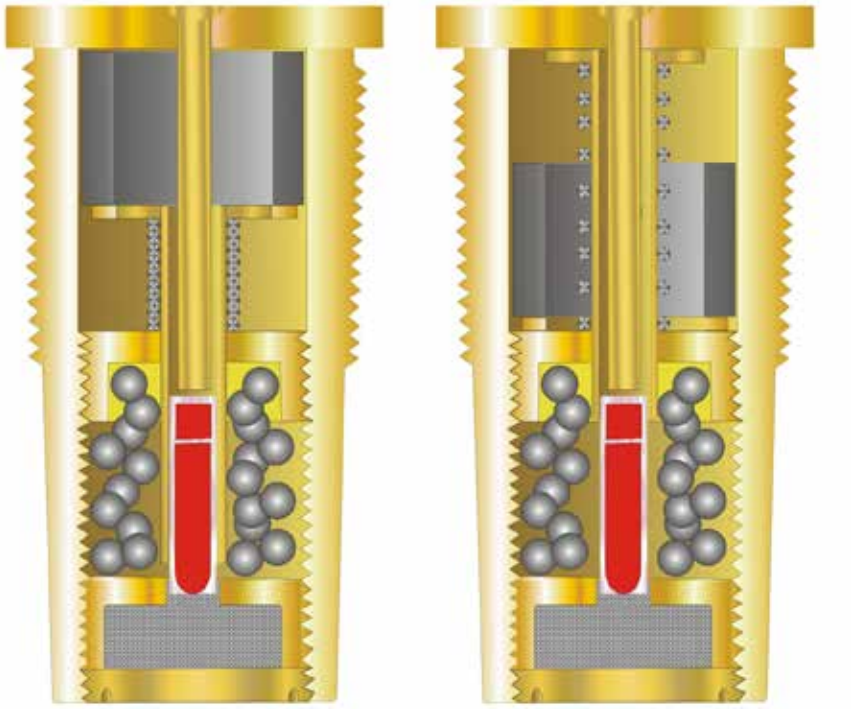
Stafford fuze plug, primer, and primer housing



Taylor time fuze adapter
with flame director



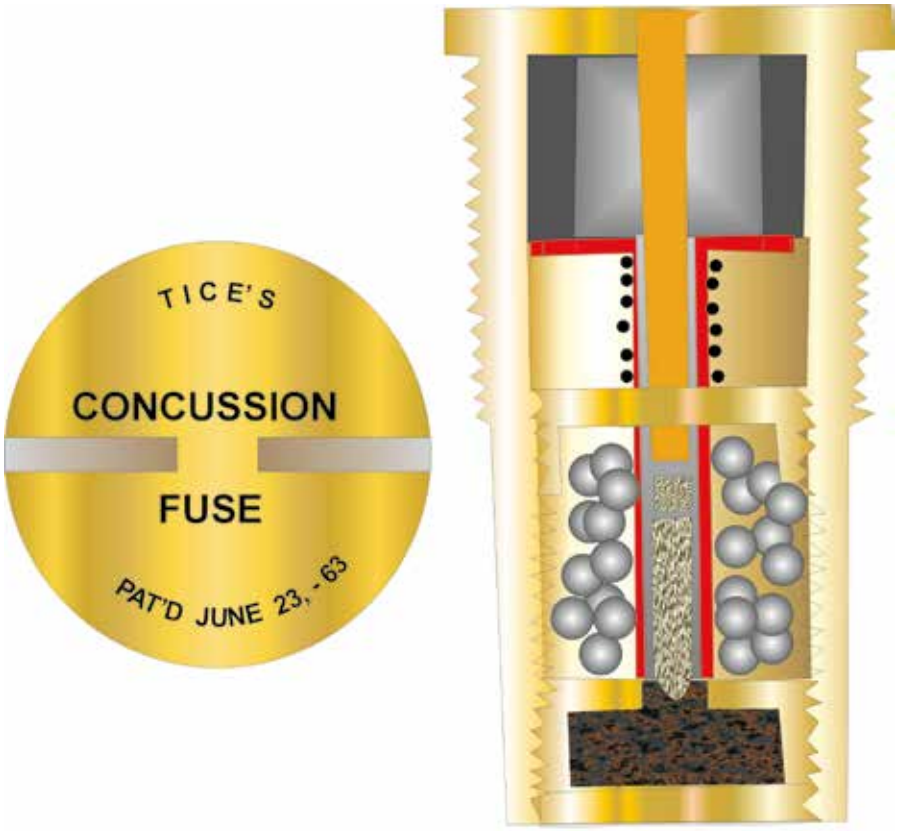
Taylor time fuze adapter, 1865



U.S. Tice concussion fuze, sectioned view
(safe, left; armed, right)



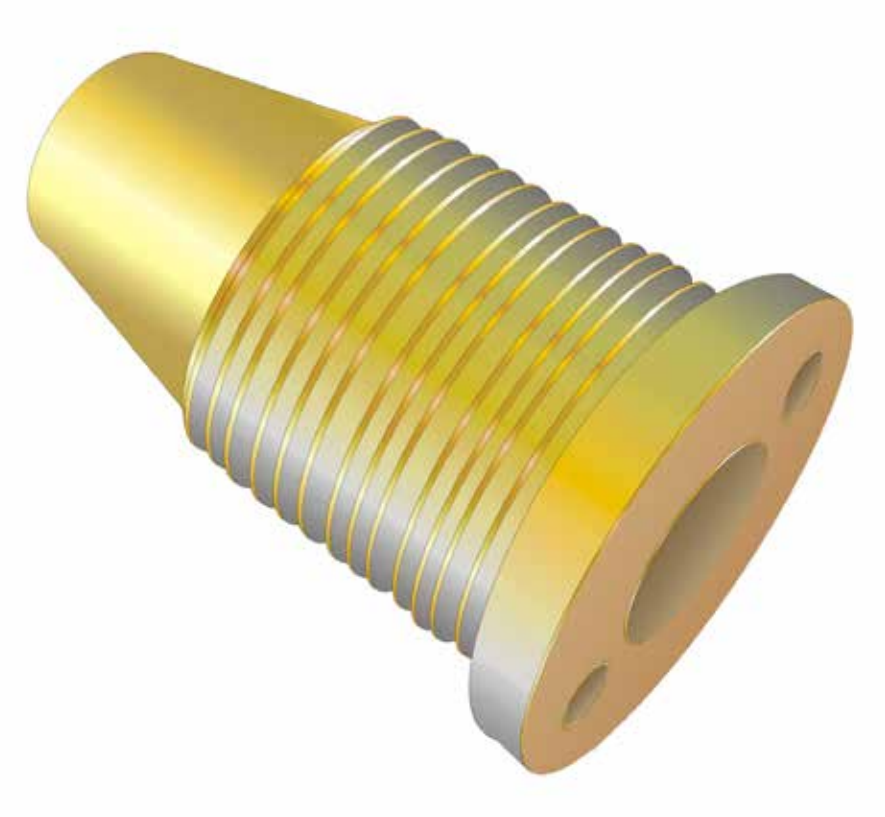
U.S. Tice concussion fuze,
patented 23 June 1863



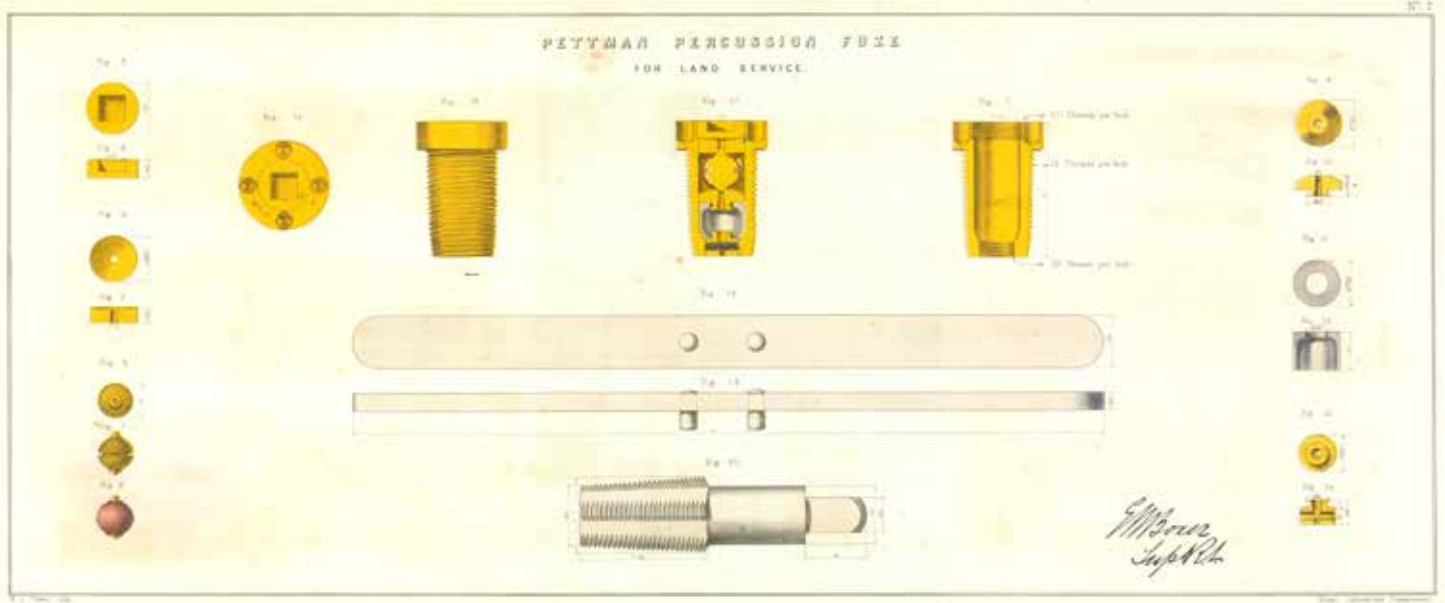
Tice concussion fuze



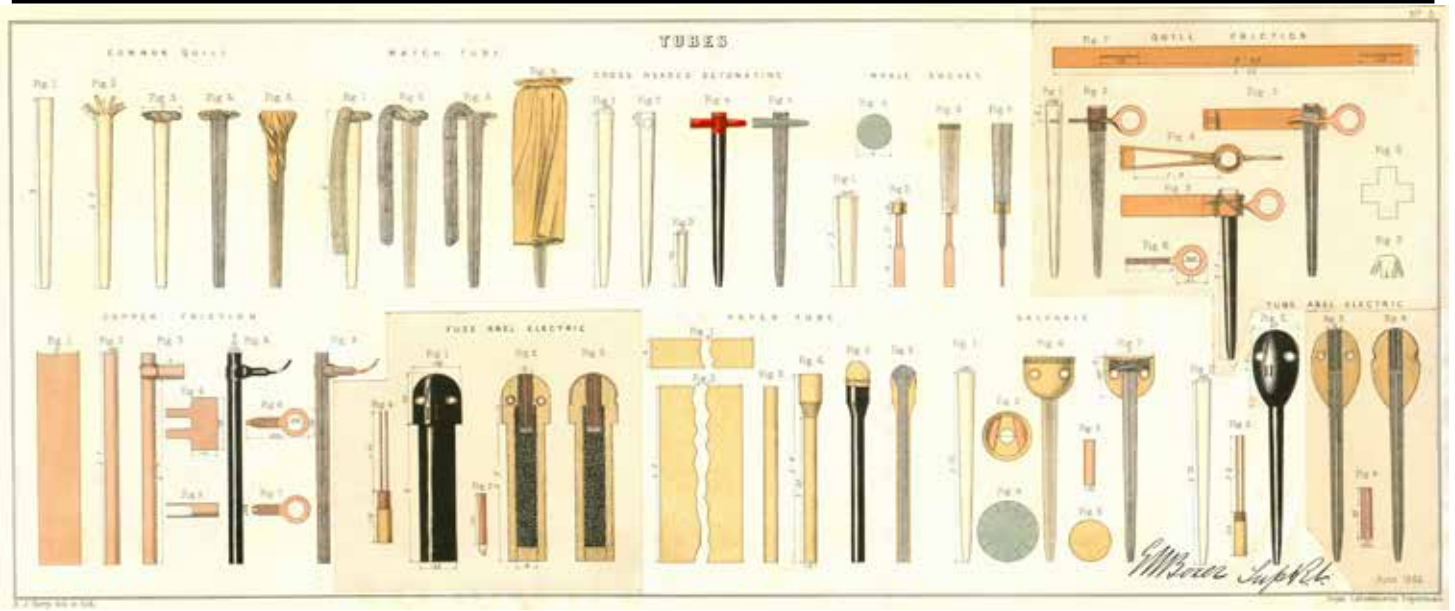
West Point fuze patent for
Hotchkiss shell, 1862



U.S. time fuze adapter



C.S. Fuzes





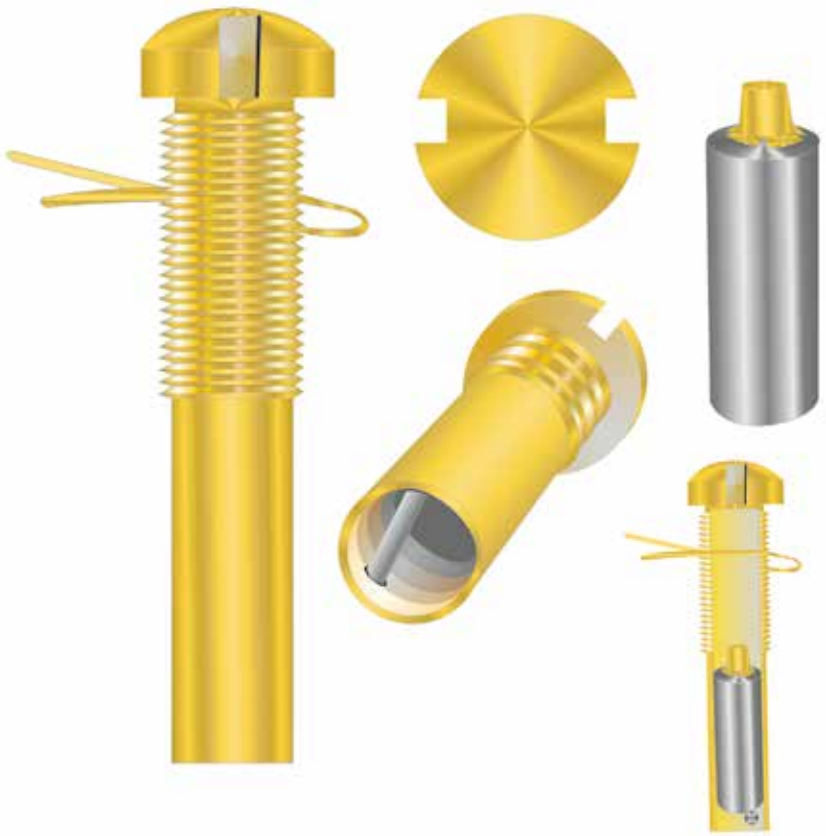
C.S. Archer safety pin percussion fuze



C.S. Archer safety pin percussion fuze, pin base



C.S. Archer safety pin percussion fuze,
long body



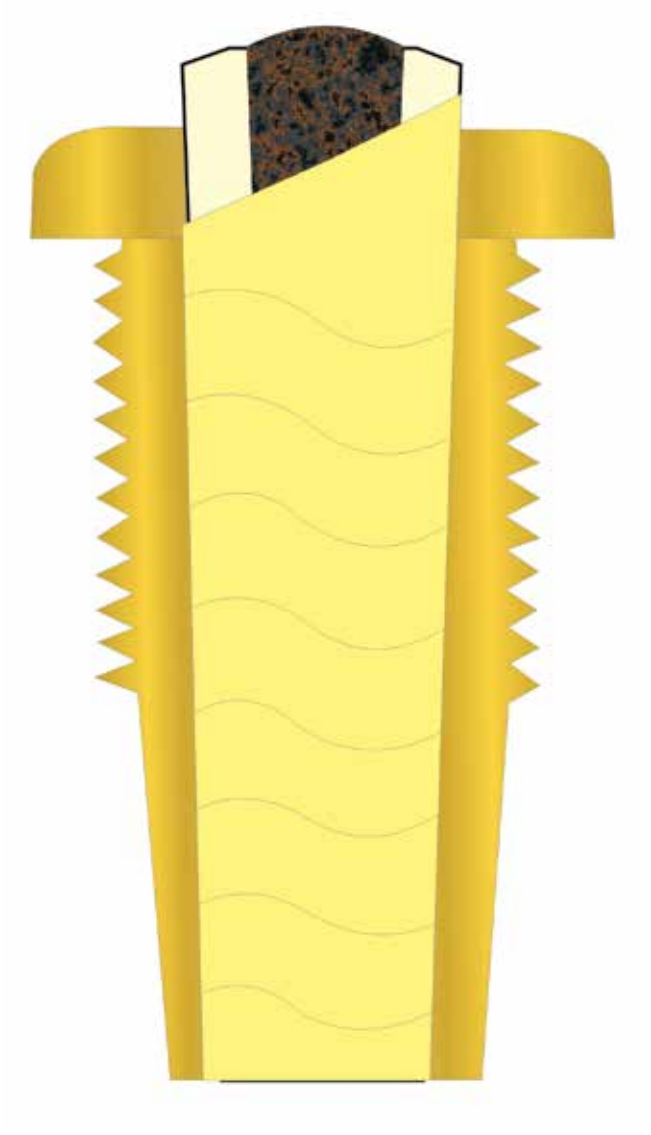
C.S. Archer safety pin percussion fuze,
extra long shank



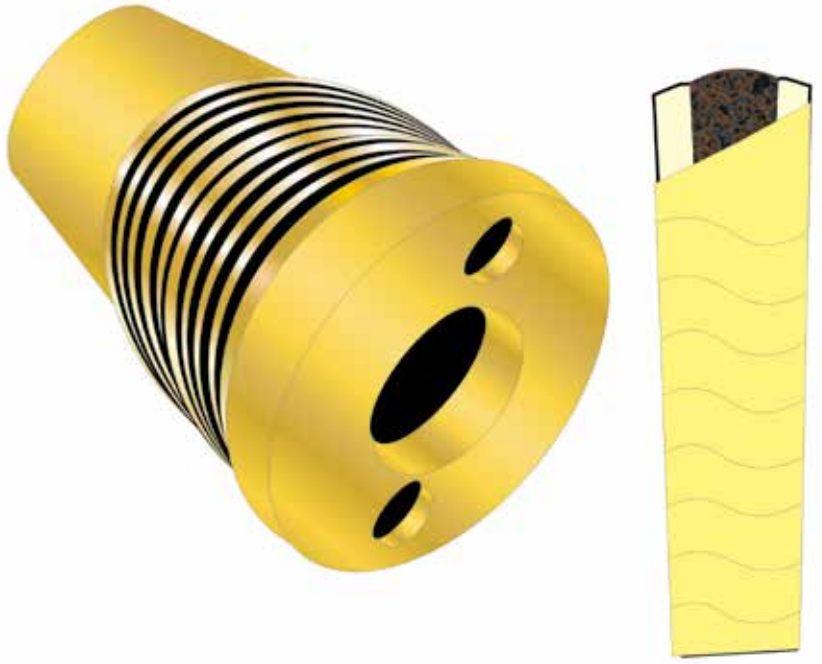
C.S. Archer safety pin percussion fuze



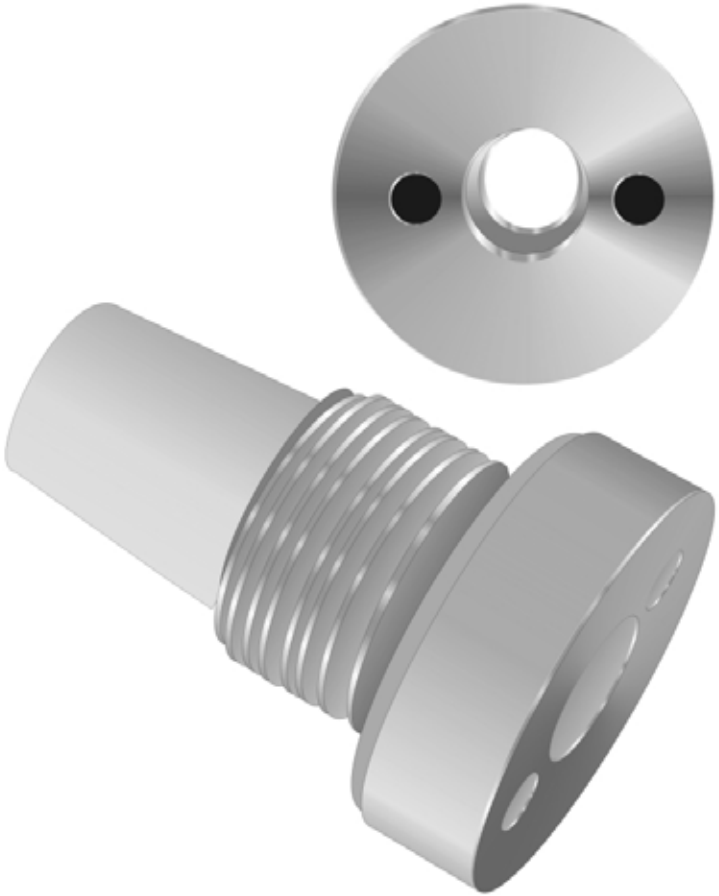
C.S. Archer safety pin percussion fuze



Brass adapter and paper time fuze



C.S. metal time fuze adapter,
Selma shell



C.S. Bormann substitute fuze adapter



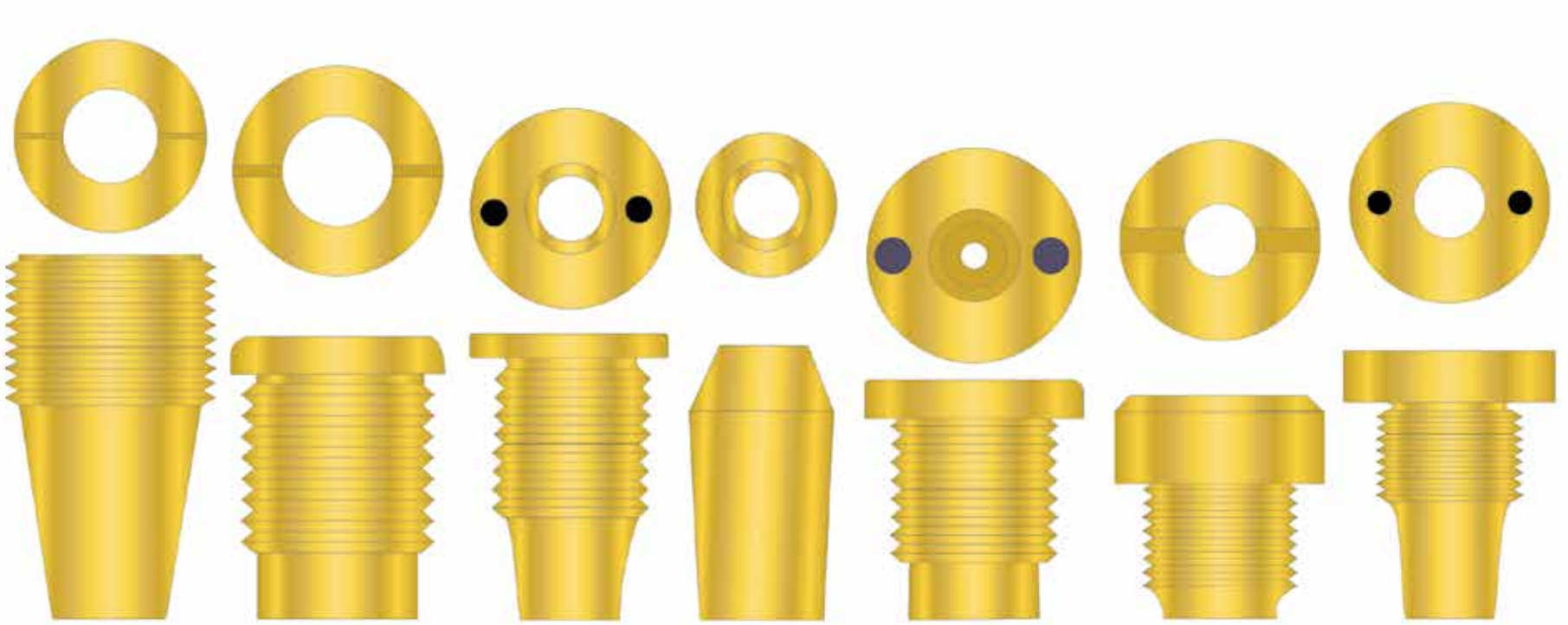
C.S. time fuze adapter



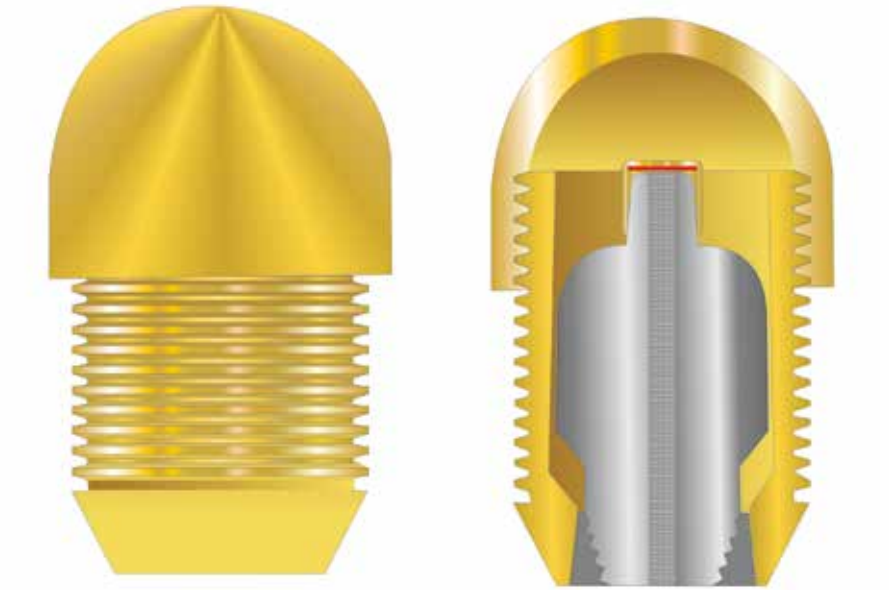
C.S. time fuze adapter



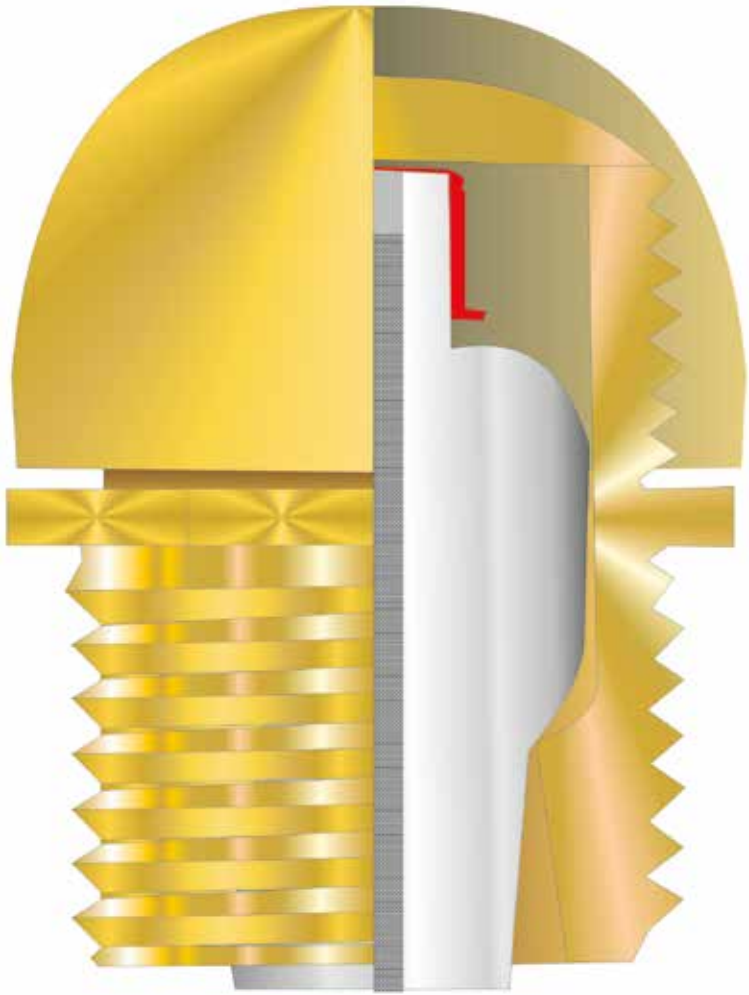
C.S. 8-inch incendiary shell fuze,
adapter & fuze



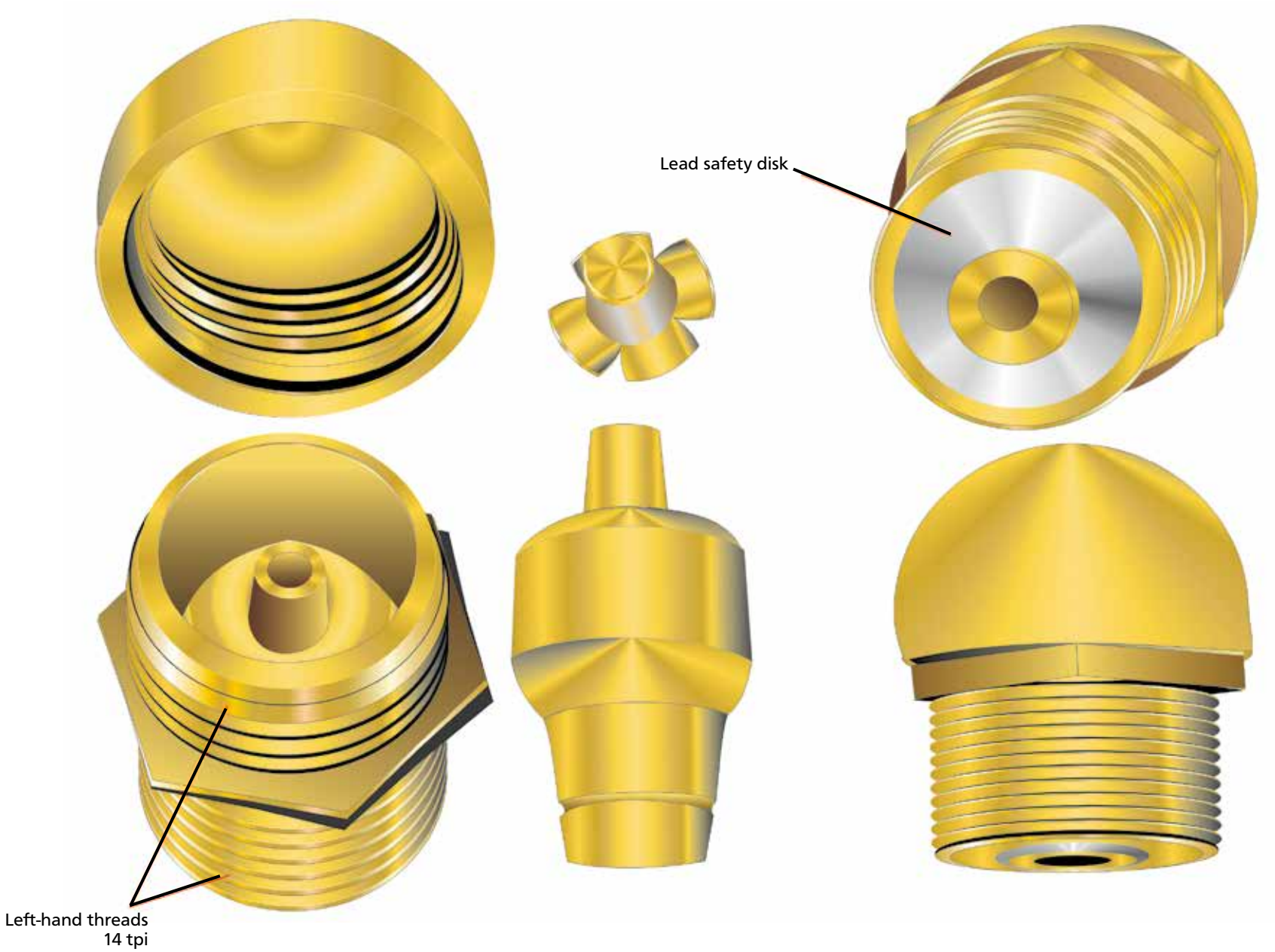
C.S. time fuze adapters



Bashley Britten percussion fuze,
patent 585, 8 March 1861



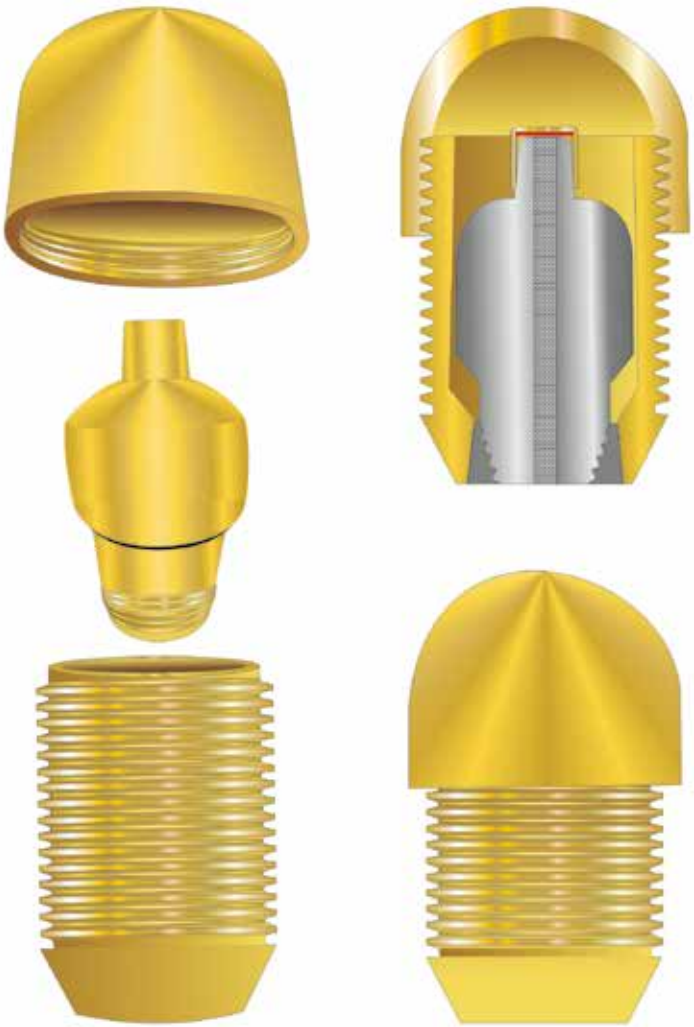
Bashley Britten percussion fuze,
sectioned



Bashley Britten percussion fuze



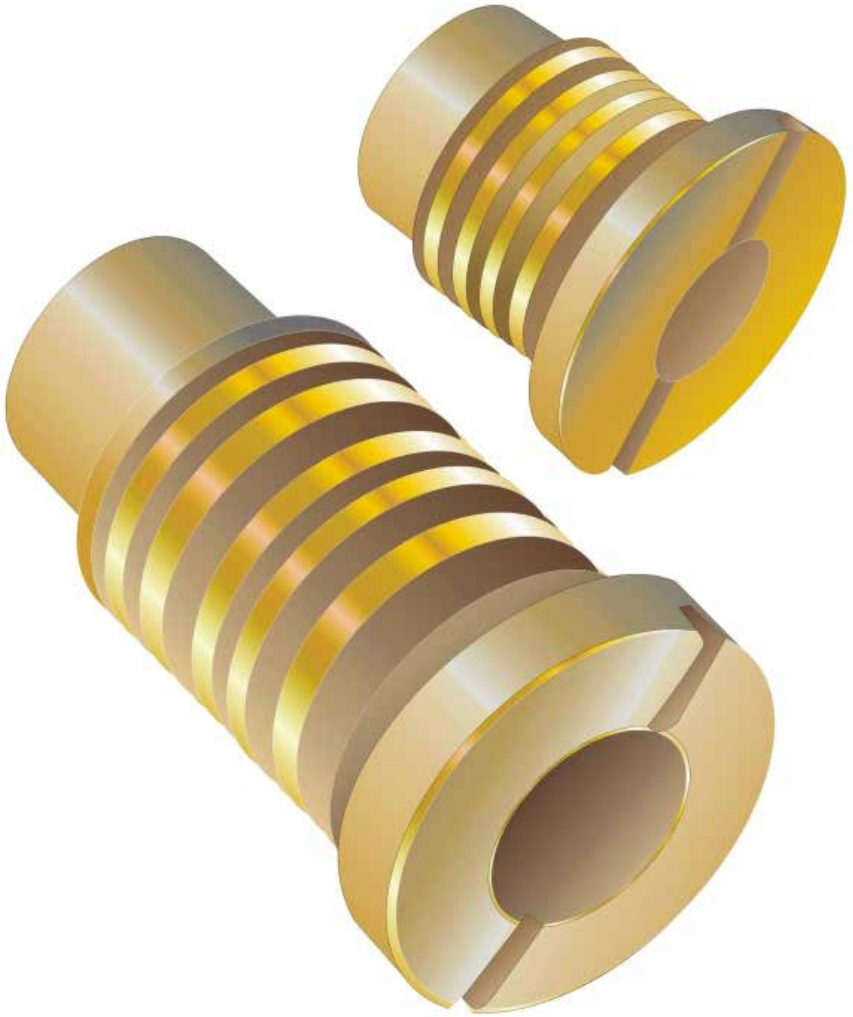
British Britten shrapnel shell, percussion fuze



British Britten percussion fuze, disassembled



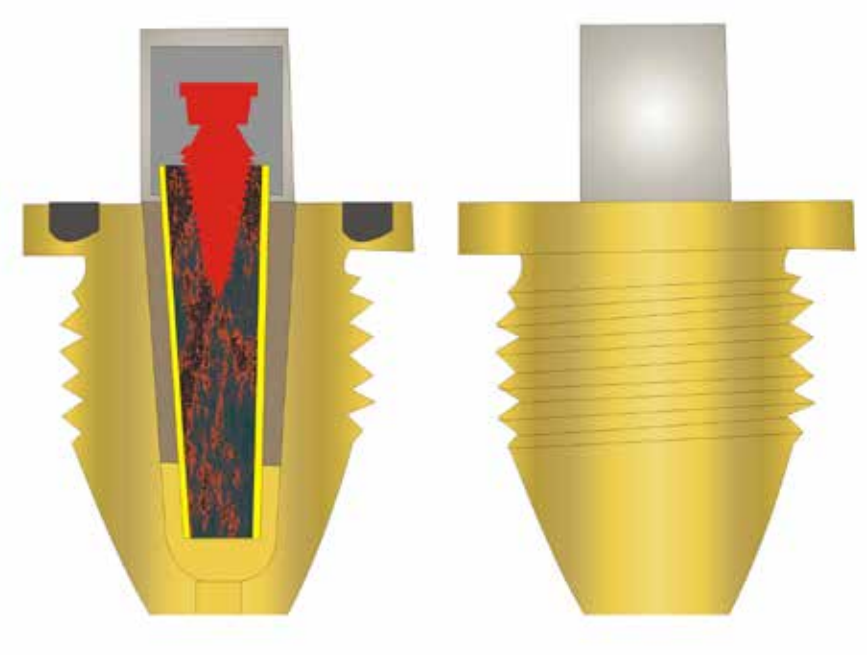
Britten time fuze adapter



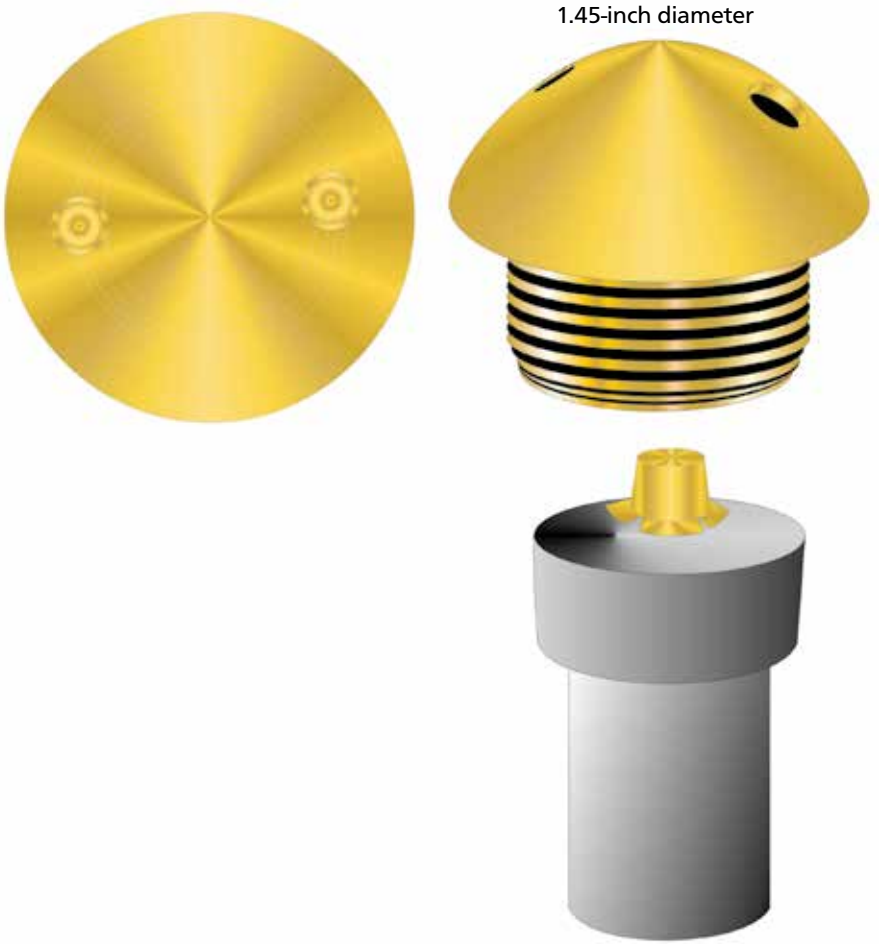
C.S. Brooke time fuze adapters



C.S. time fuze adapter,
1.4-inch head diameter



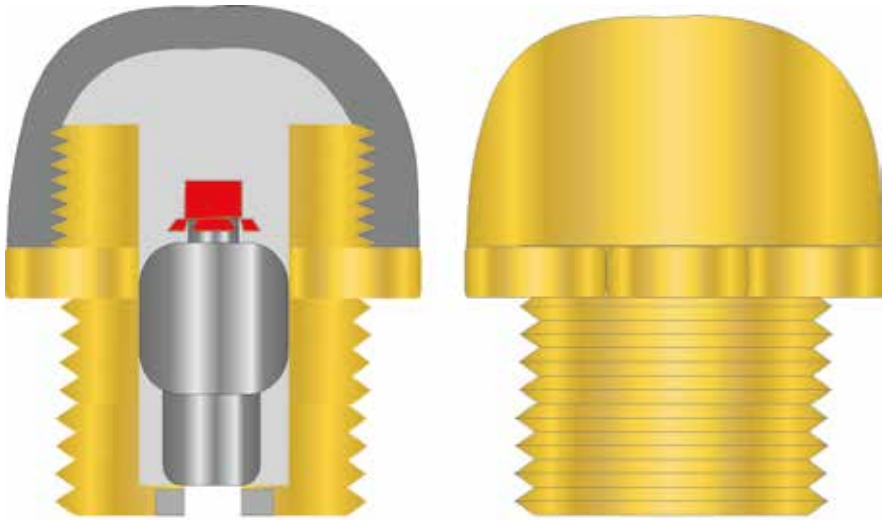
Girardey percussion fuze



C.S. version of James anvil and slider



McEvoy fuze igniter



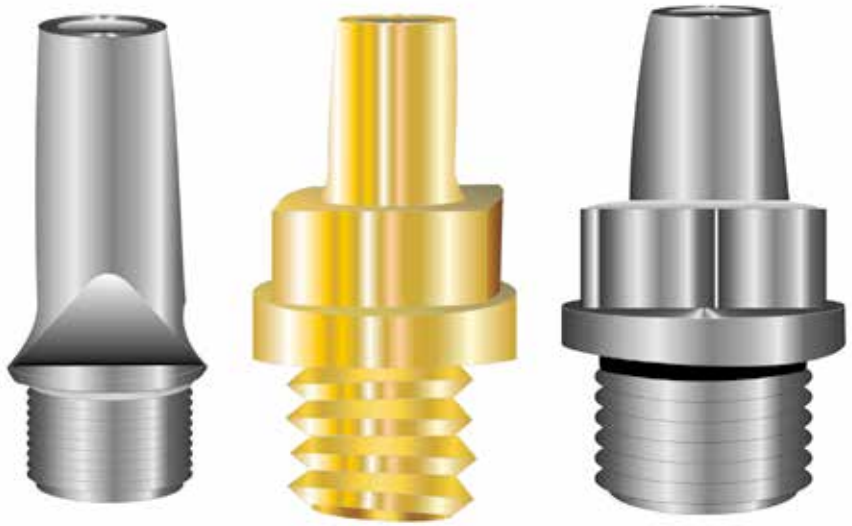
Preston-Britten percussion fuze



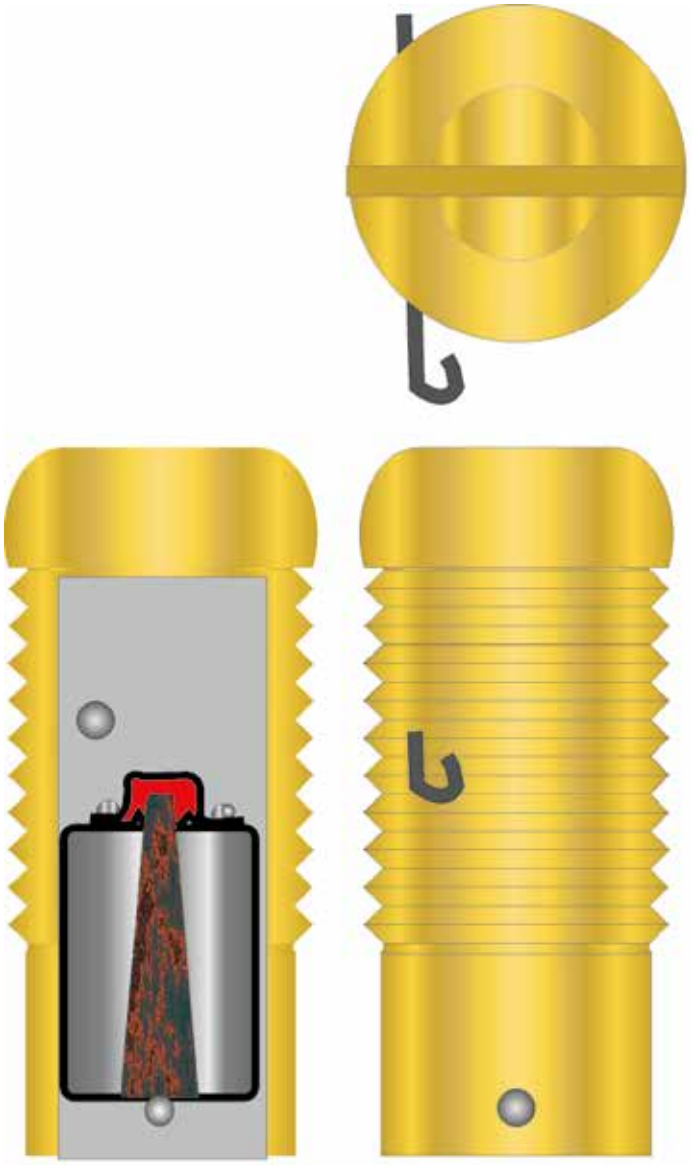
Metal Time Fuze adapter for
French la Hitte studded shell



Tin of top hat percussion cap



Fuze plunger percussion nipples



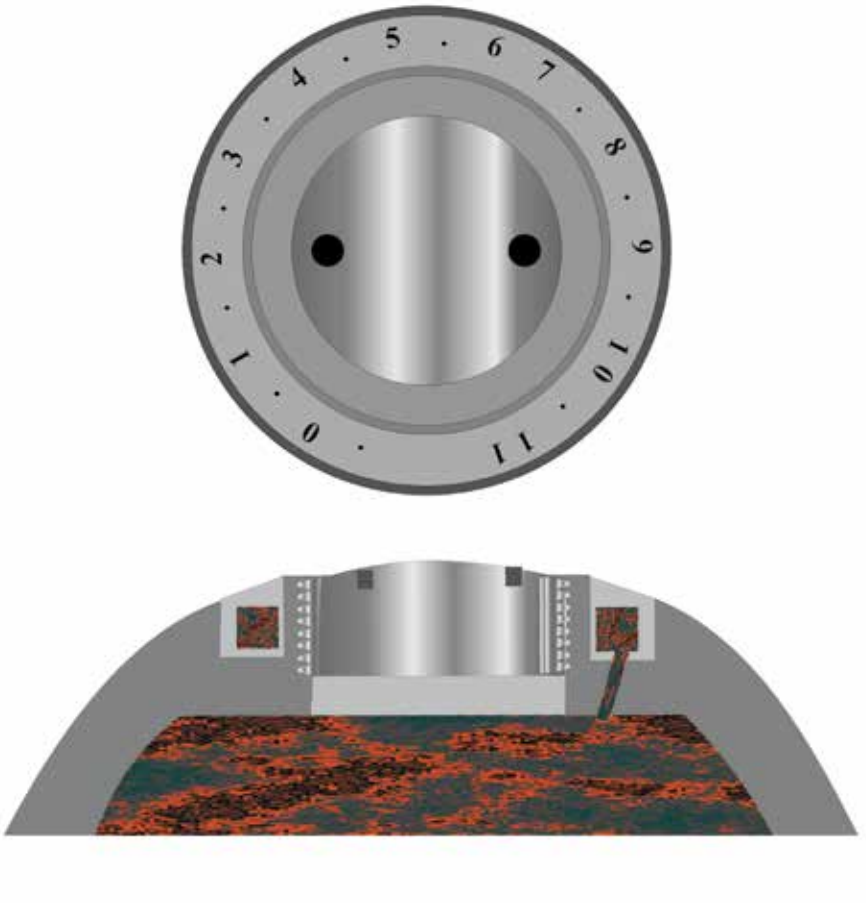
C.S. percussion fuze



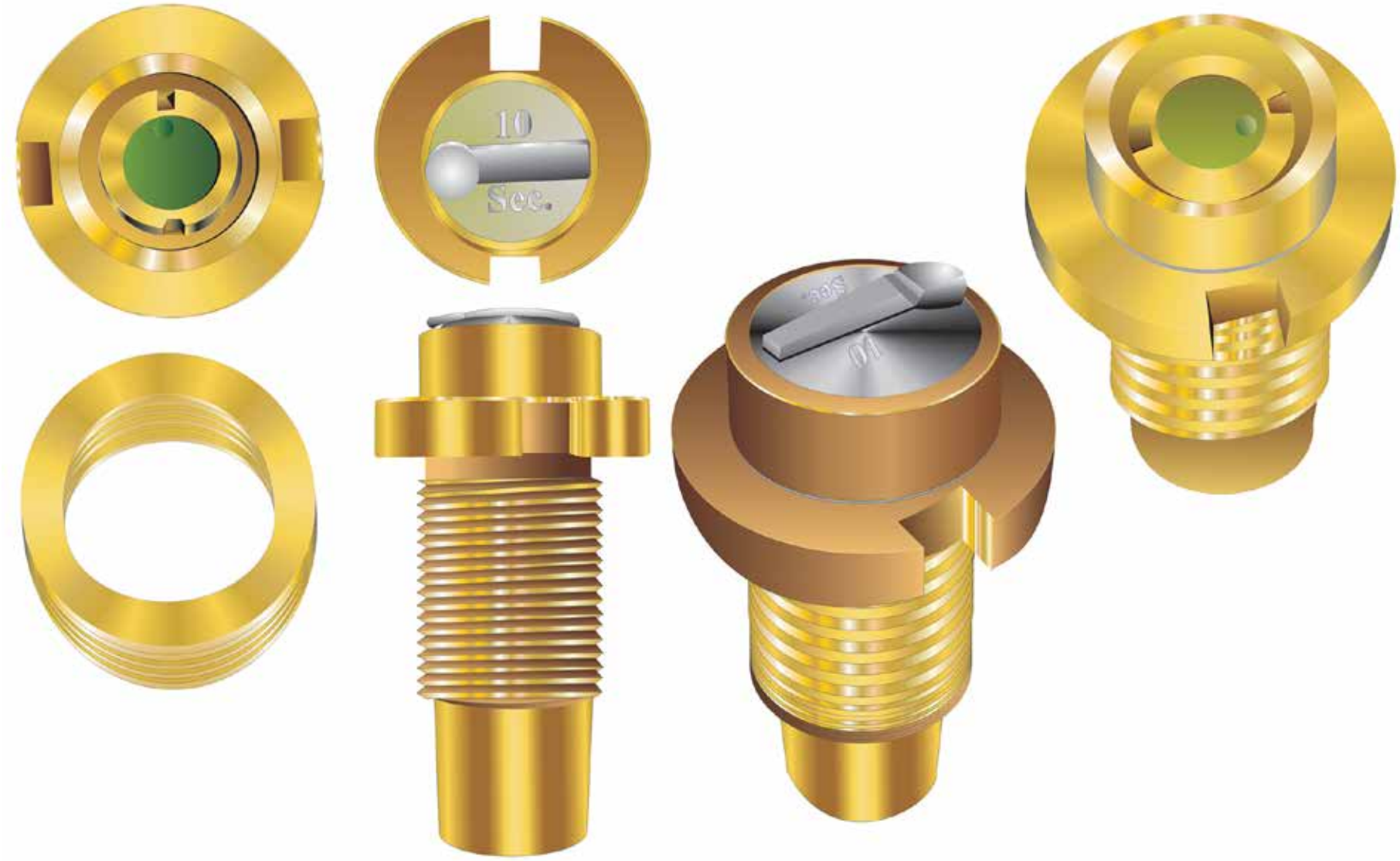
C.S. percussion fuze



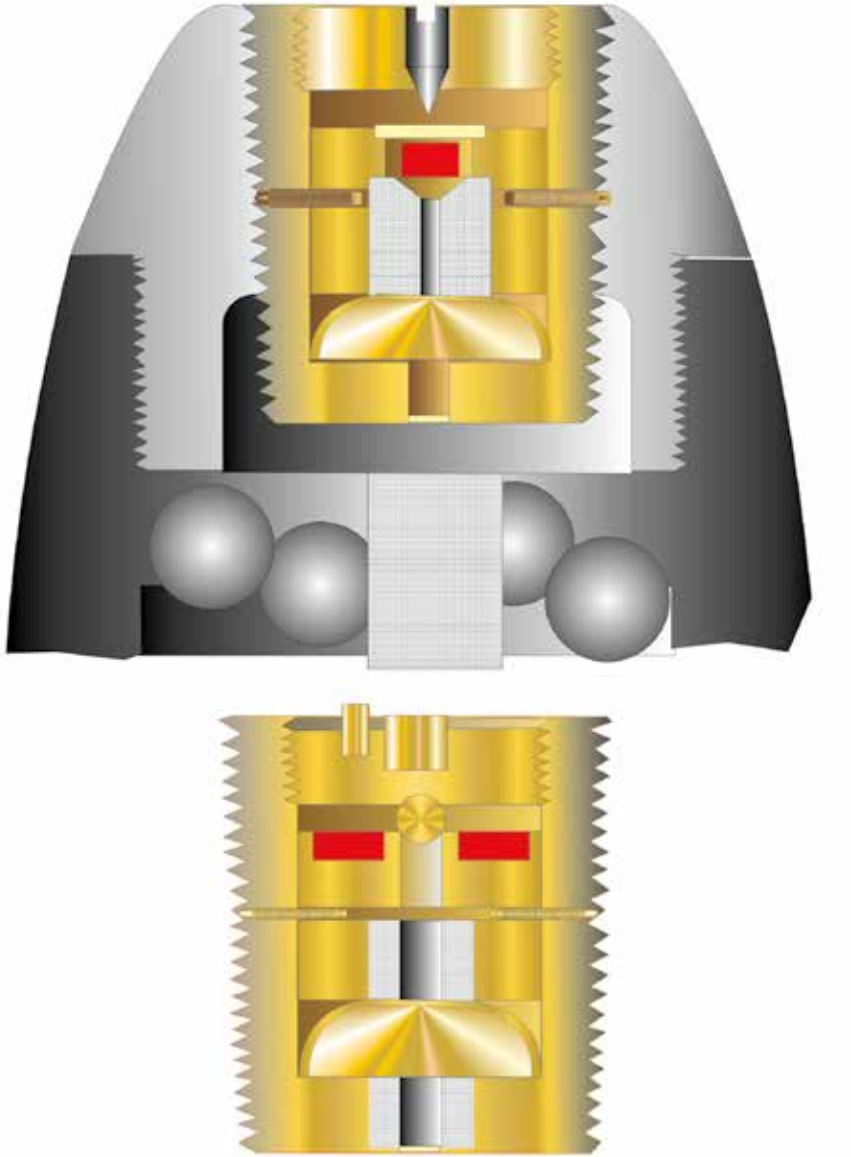
Two spherical shell time fuze adapters



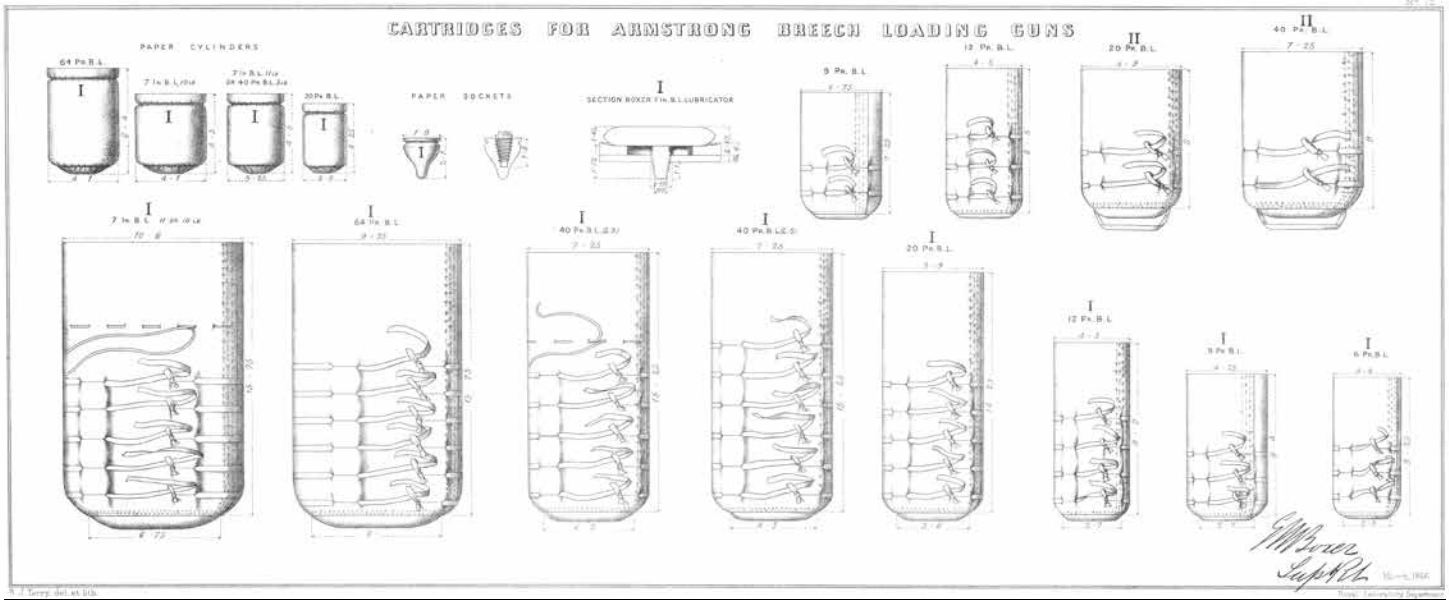
Wright time fuze



C.S. water cap time fuze adapter

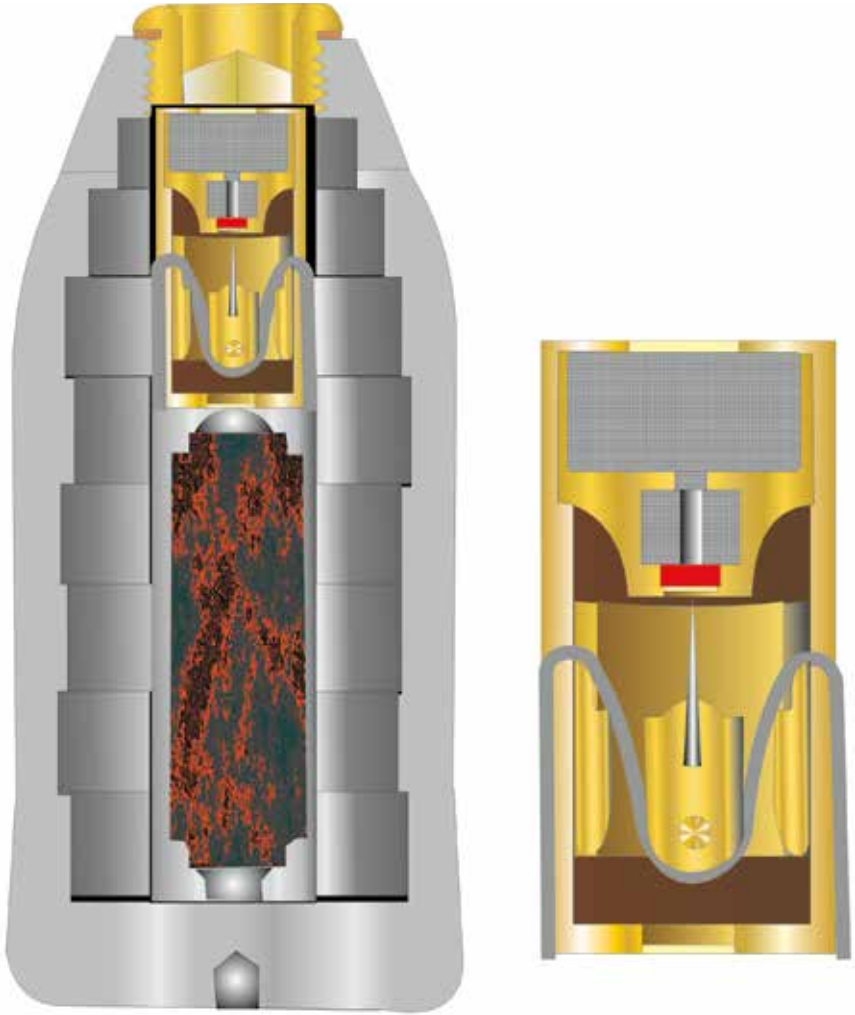


British Whitworth percussion fuzes



British Fuzes





Armstrong concussion fuze



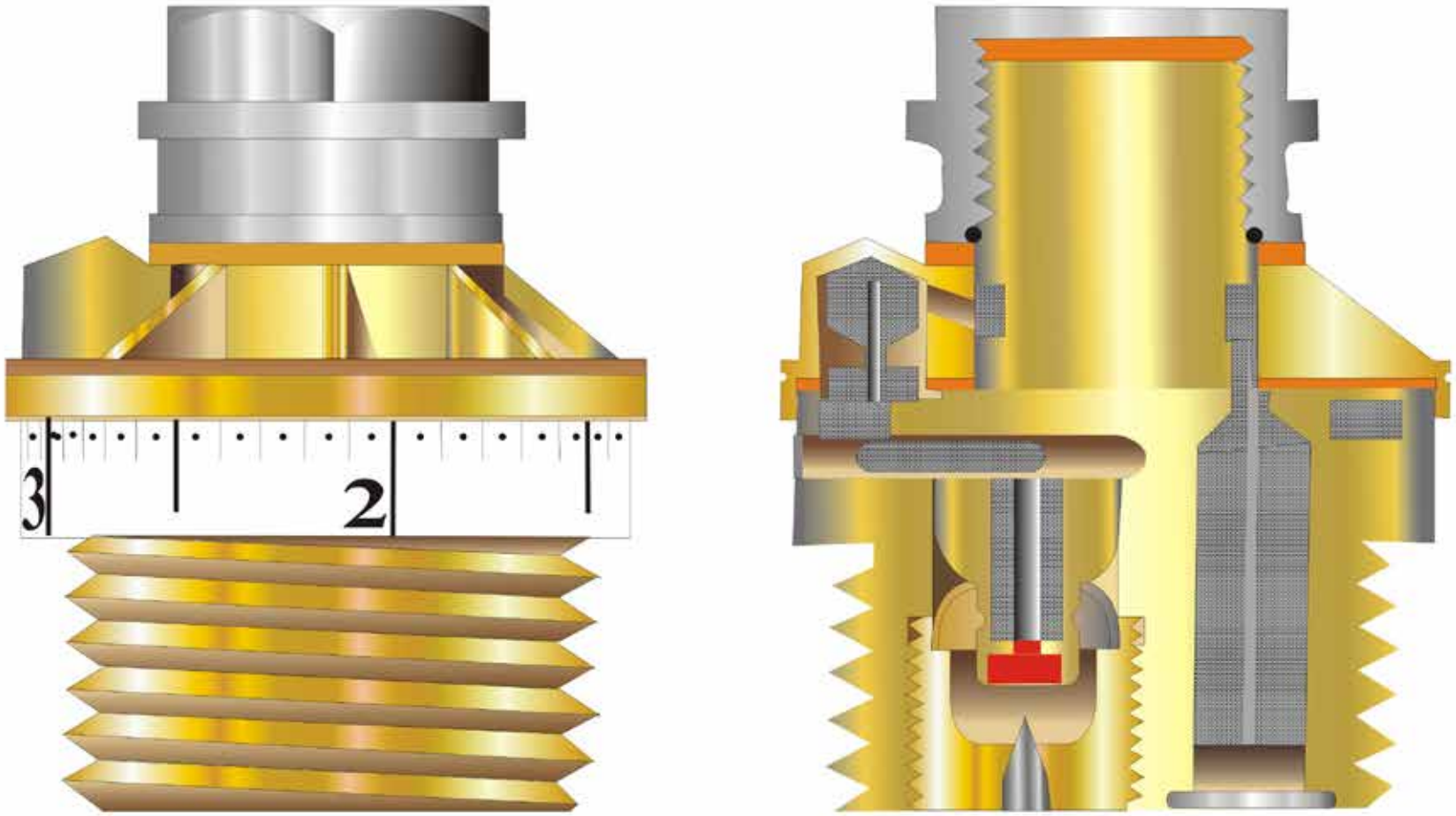
Armstrong time fuze E, CAP III, components



Early Armstrong metal time fuze



Armstrong time fuze, E, CAP III



**Armstrong metal time fuze E, No. 22,
Freeth's modification**



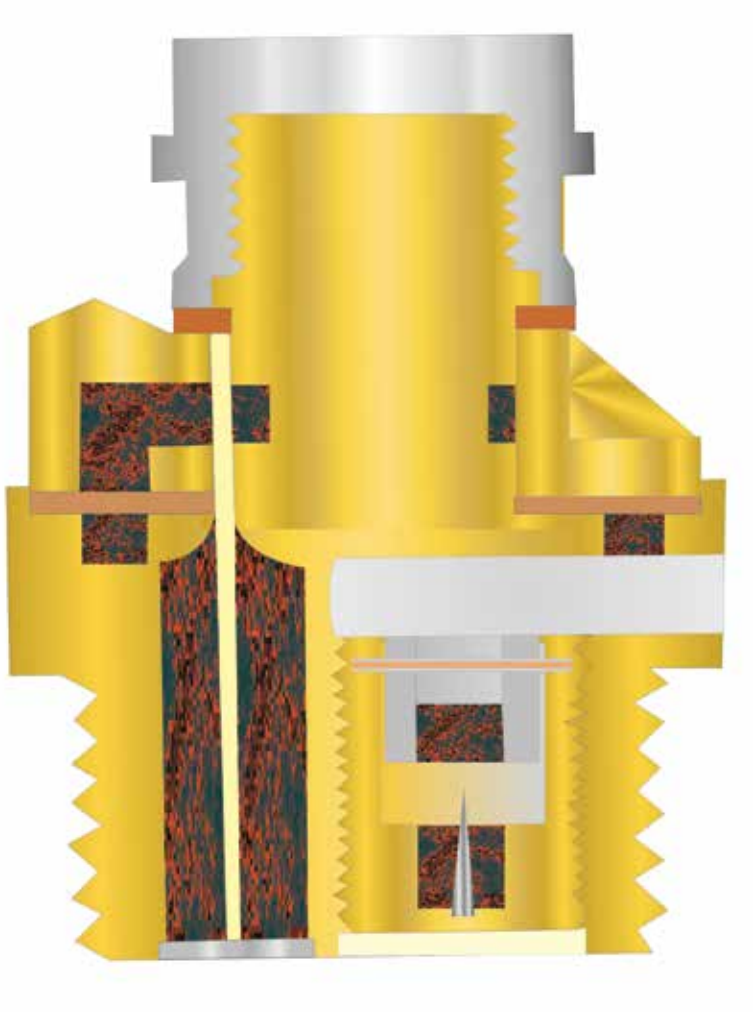
Armstrong time fuze



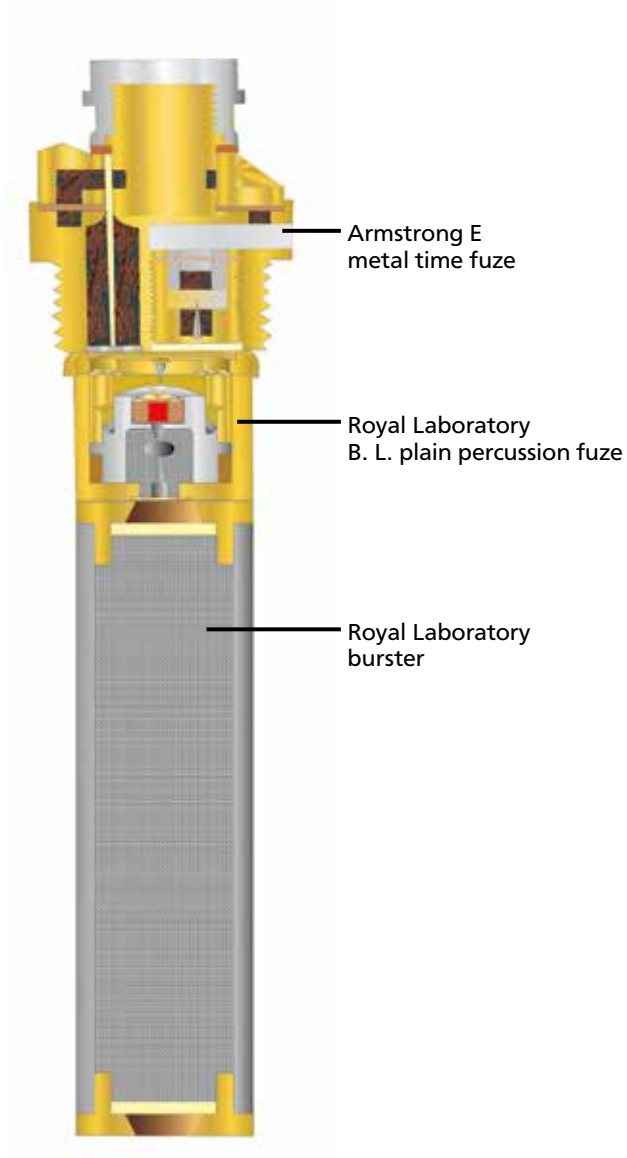
Armstrong time fuze setting ring



Armstrong time fuze,
external view



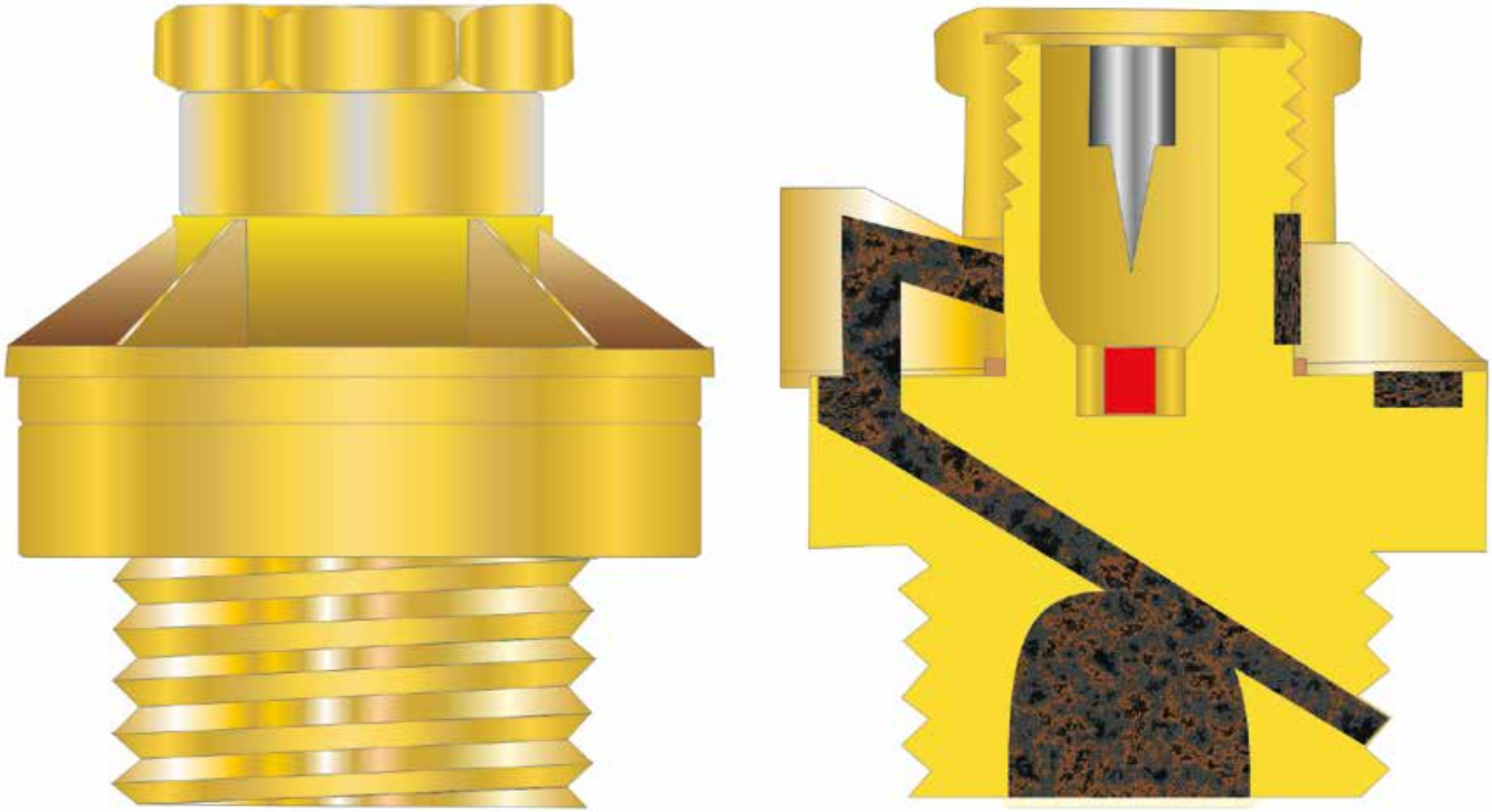
Armstrong time fuze,
sectioned



Fuzing and burster assembly
for segmented Armstrong shell



Early Armstrong B.L. percussion fuze



Early Armstrong metal time fuze



Armstrong pillar percussion fuze, both models



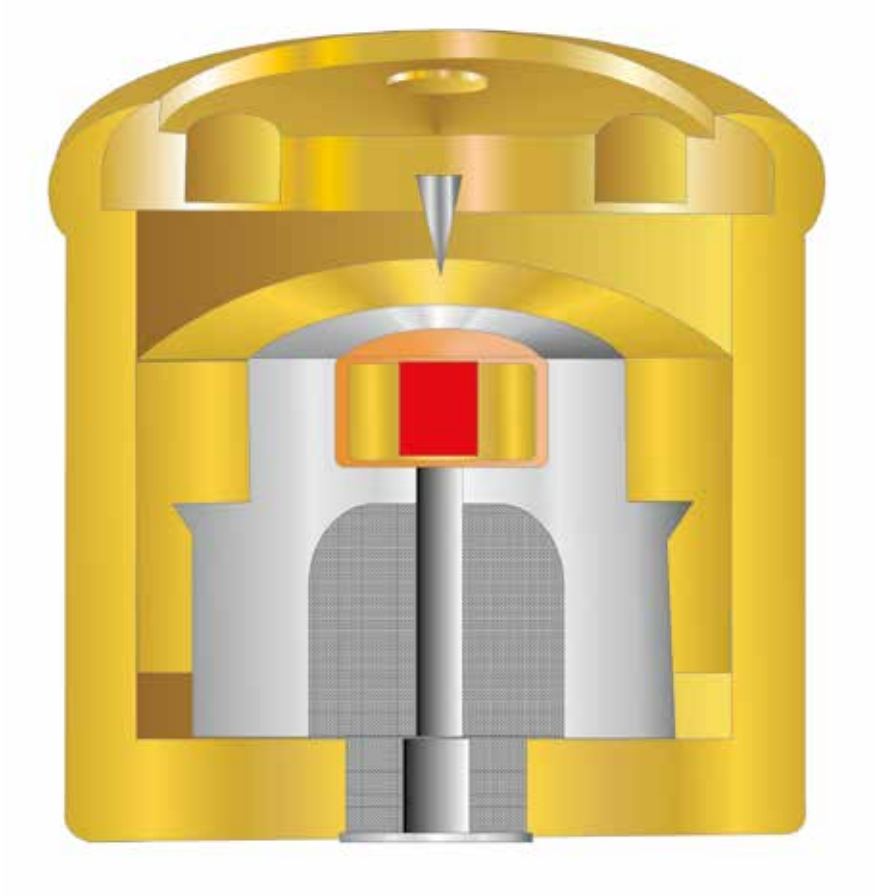
Armstrong pillar percussion fuze



Modified Armstrong time fuze



Armstrong Percussion Fuze,
recovered at San Lorenzo Island, Peru



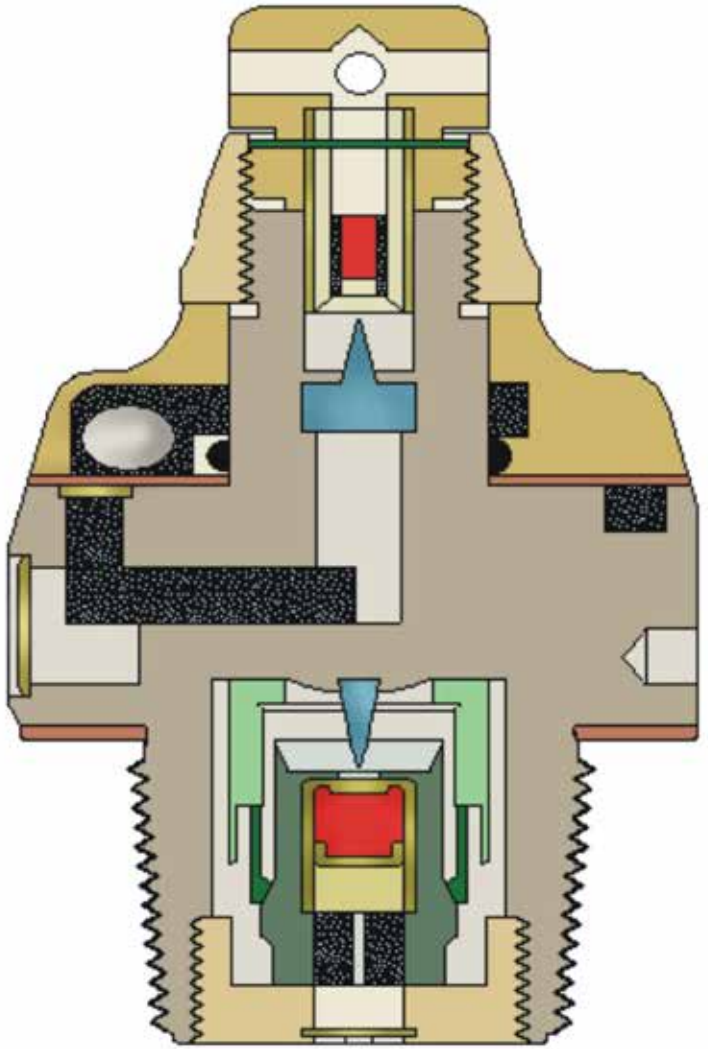
Armstrong percussion fuze 2,
armed condition



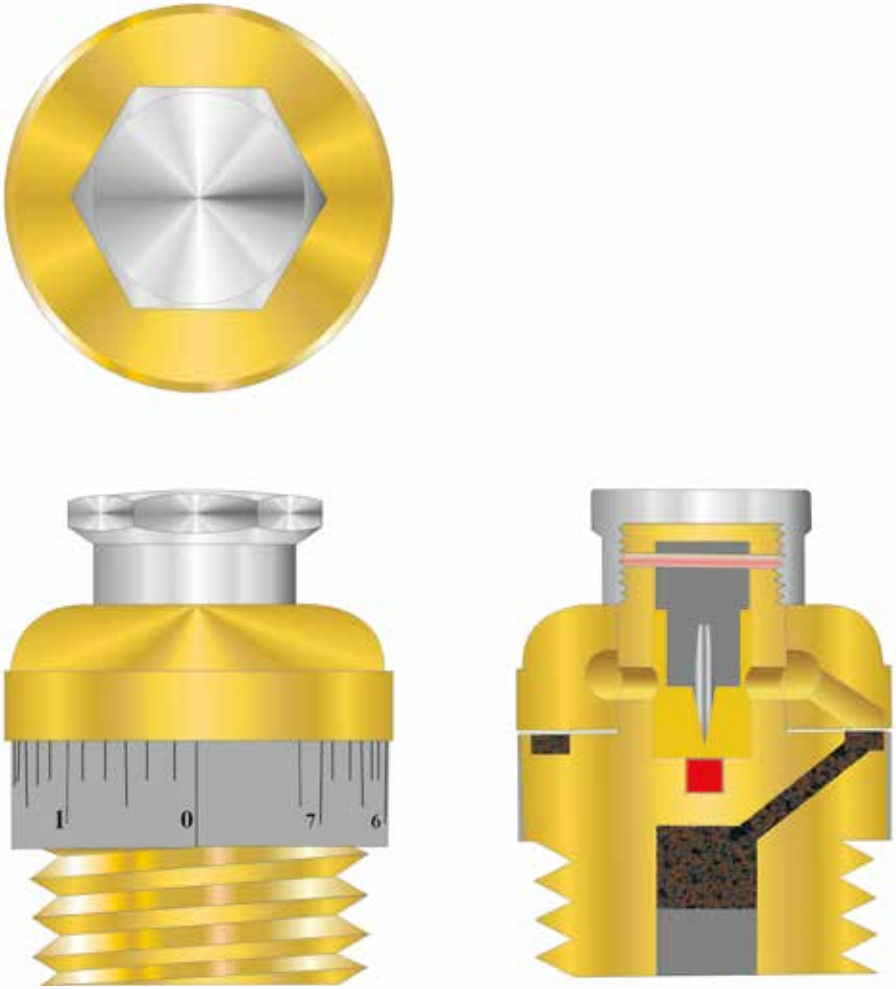
Armstrong percussion fuze
for naval use, 1859



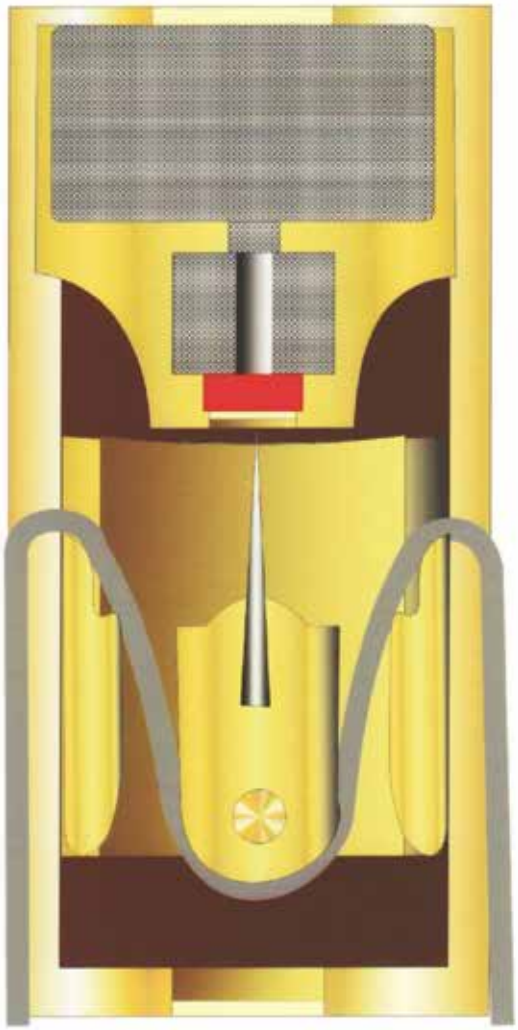
Armstrong percussion - time fuze



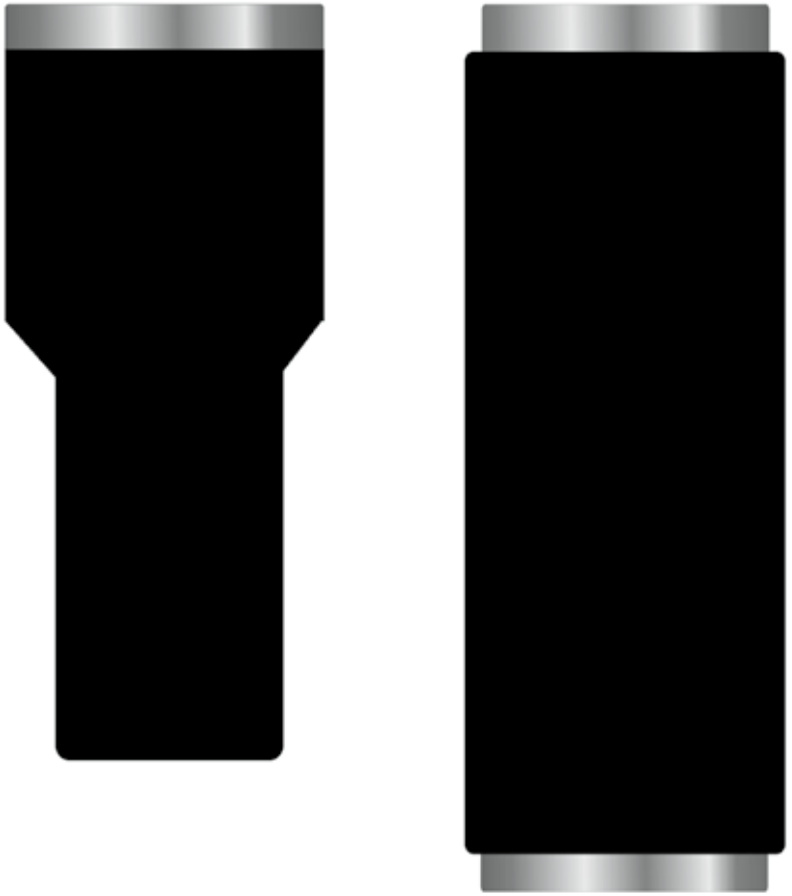
Armstrong time and percussion fuze
No. 52, Mark II



Armstrong patent 779, 1858,
metal time fuze



Armstrong concussion fuze, early model



Ignitors (bursters)
for 6 and 12 pounder Armstrong projectiles



Fuze hole plugs
for 12 pounder Armstrong shells



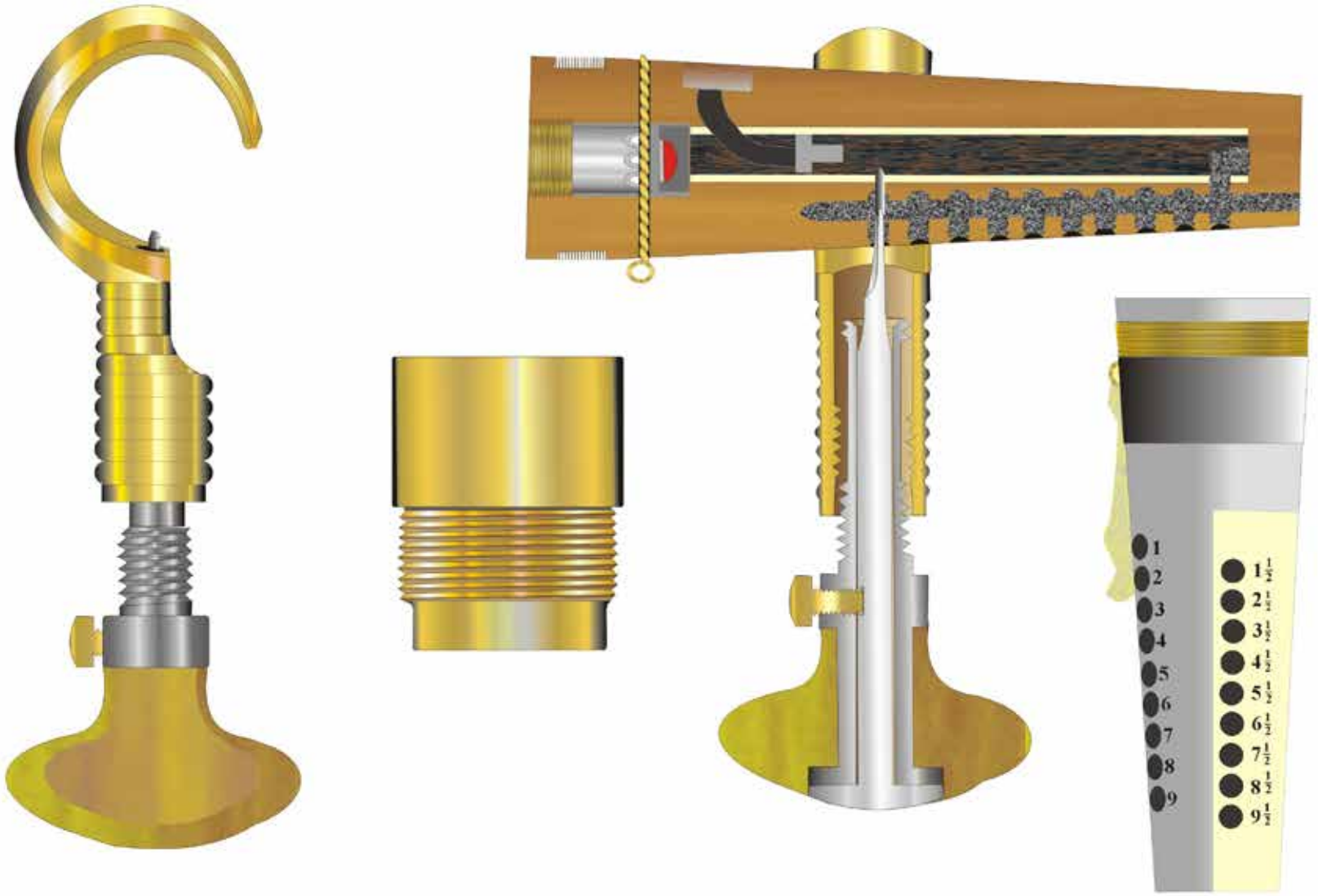
7-inch hollow shot

40 pounder common shell with Armstrong pillar fuze

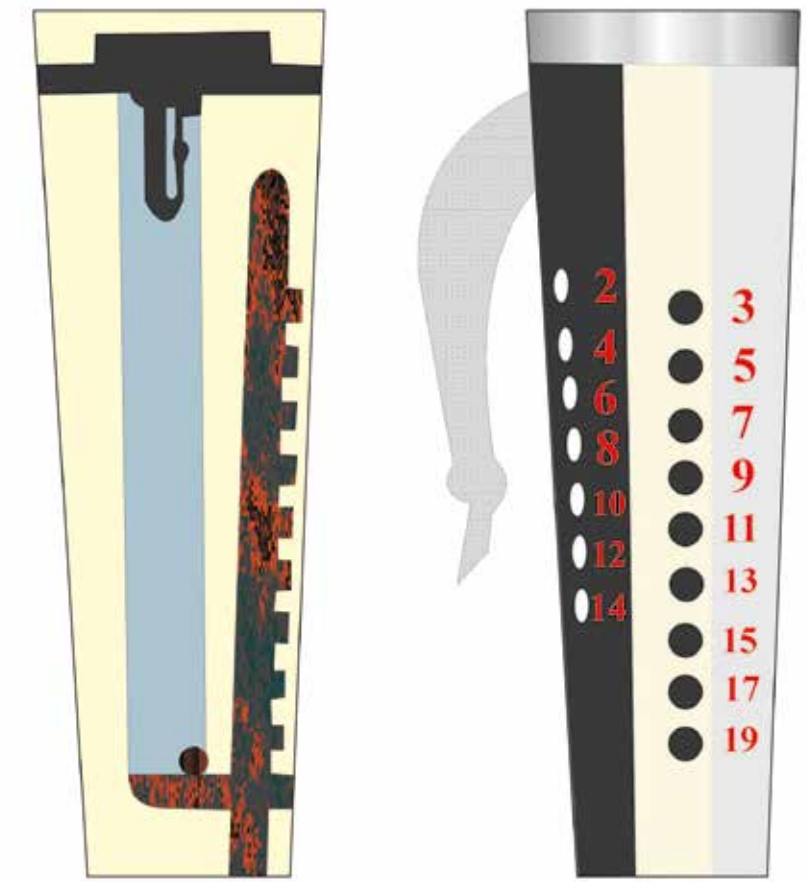
40 pounder B.L. shrapnel shell, Armstrong Elswick Ordnance Company (EOC)

12 pounder Armstrong segment shell

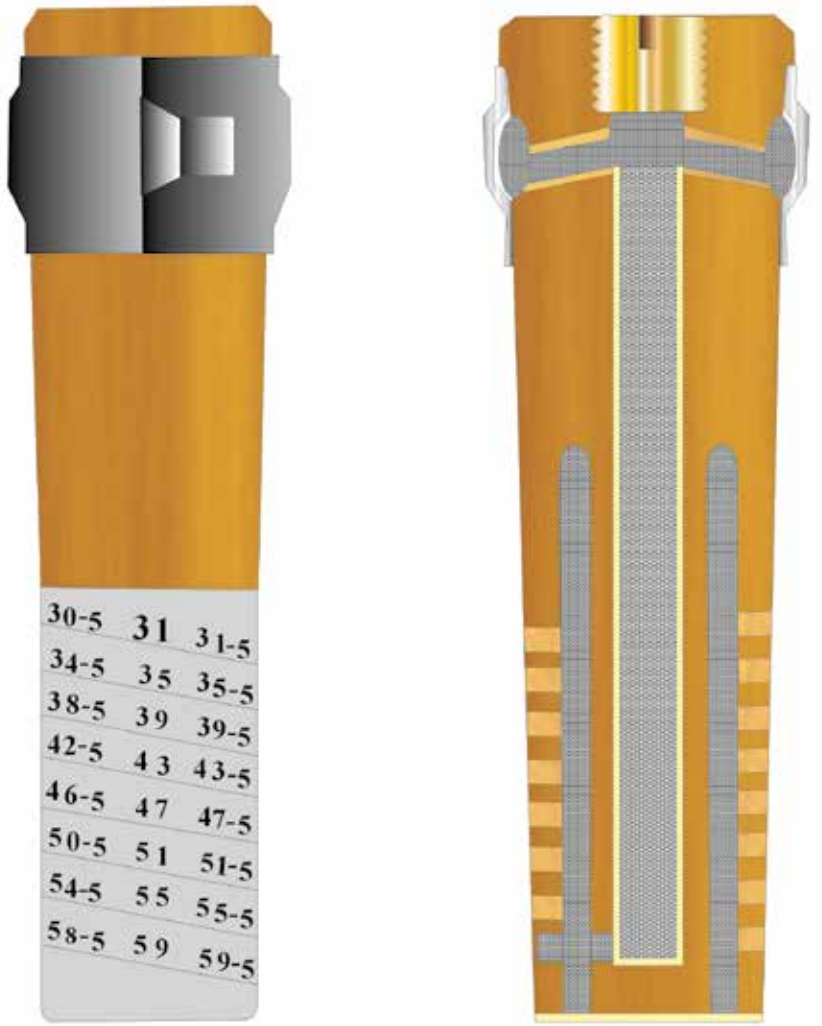
Royal Laboratory Color Plate No 43



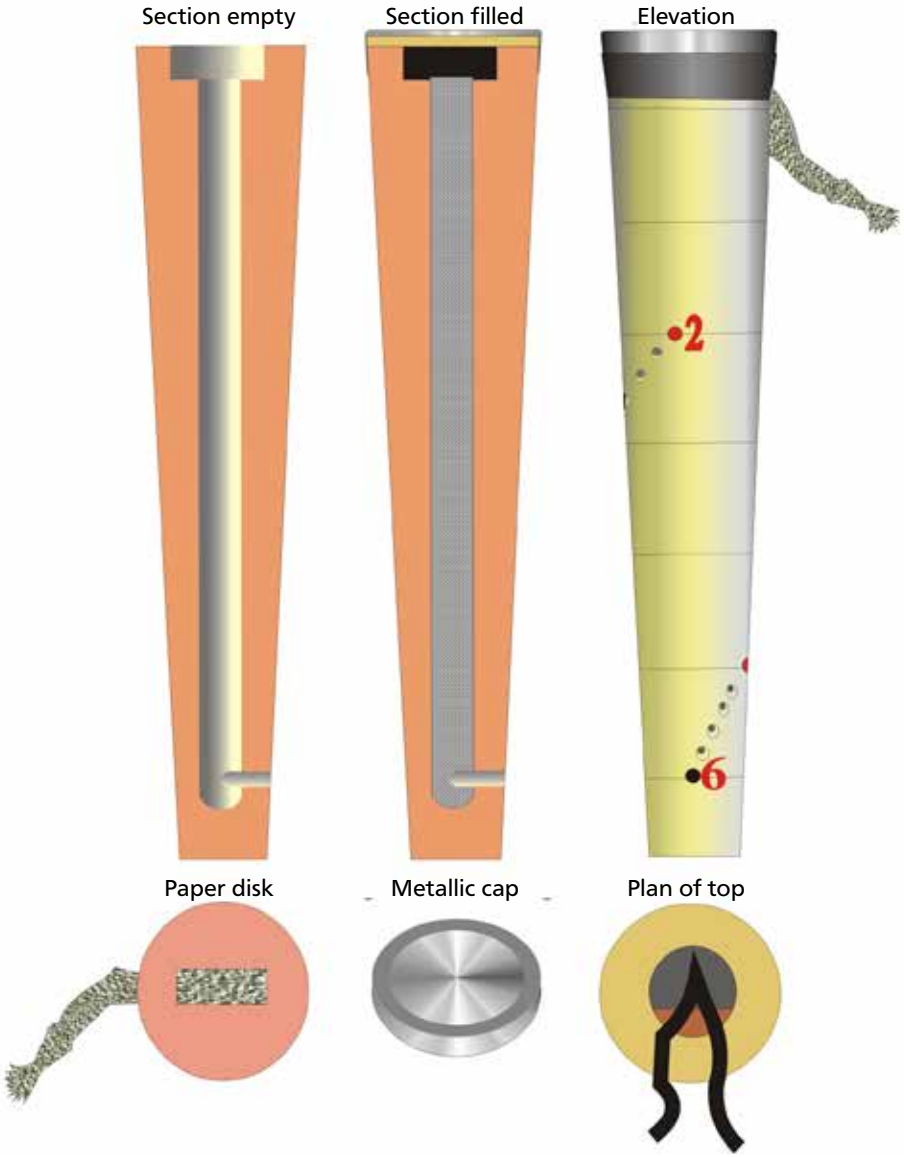
Boxer's time fuze for rifled projectiles



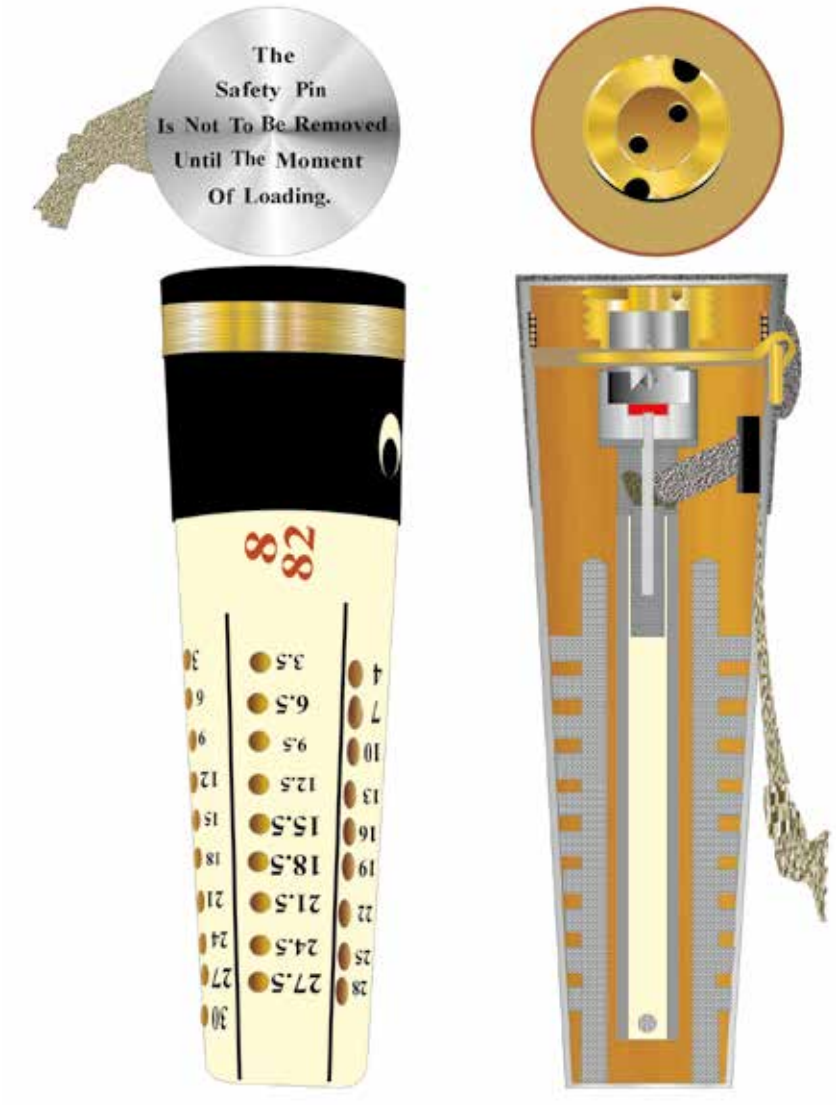
Boxer wooden time fuze



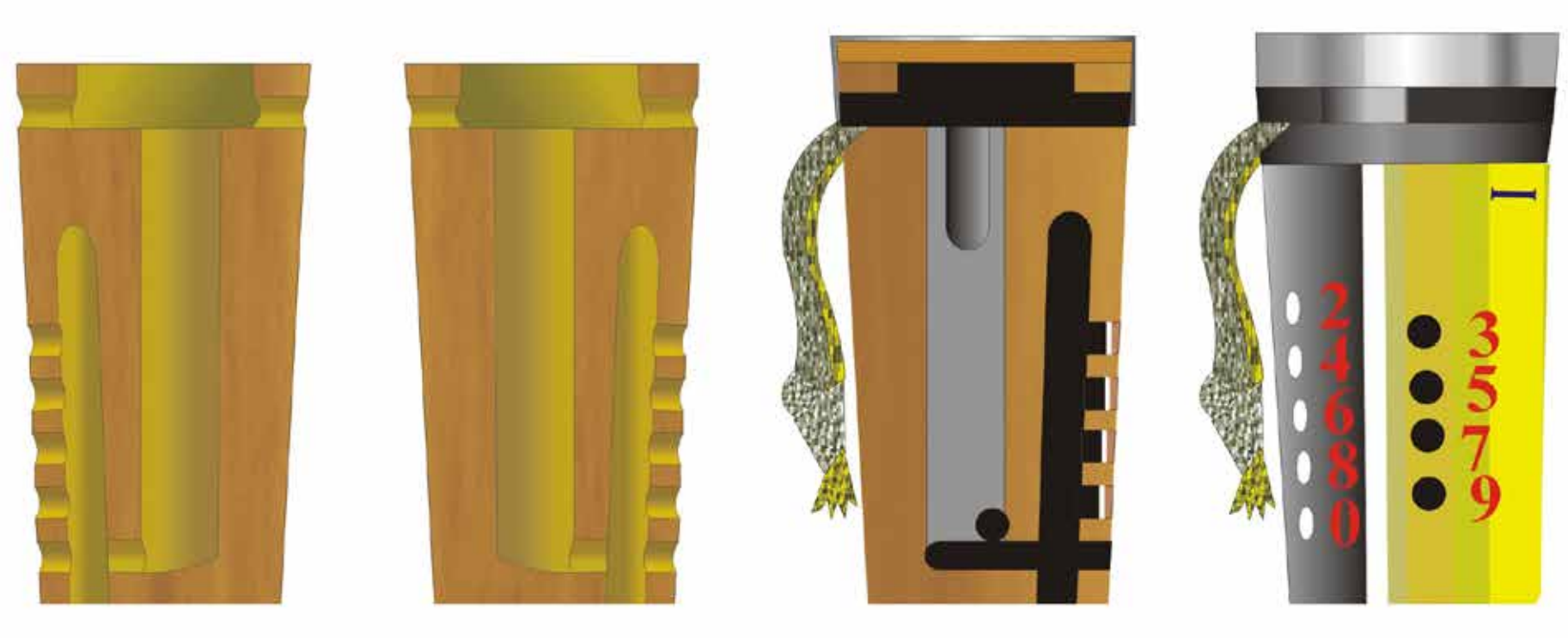
British wooden time fuze, No 40, Mk. I



Boxer time fuze
for 8, 10 and 13-inch Mortar Shells



Boxer 30-second wooden time fuze
for RML projectiles



Boxer wooden time fuze
for diaphragm shrapnel shell



Boxer 3-second metal time fuze



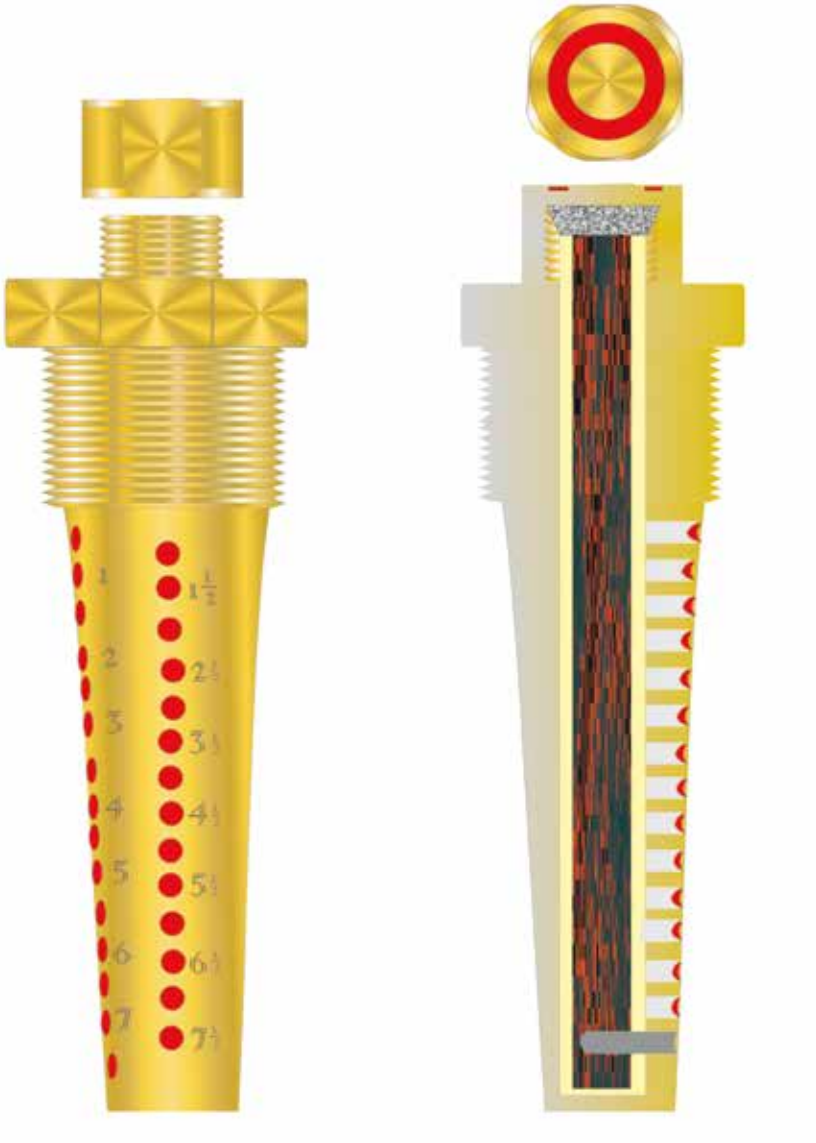
Boxer 3-second metal time fuze



Boxer metal time fuze,
cap removed



Boxer metal time fuze,
cut and fired



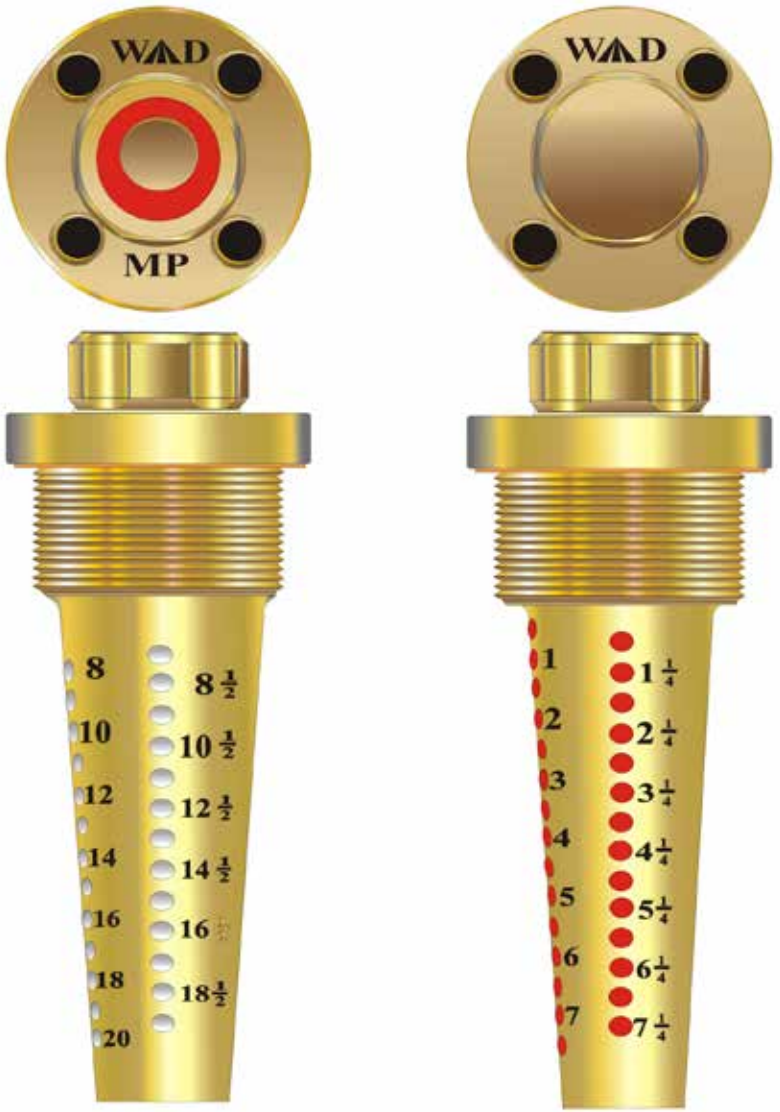
Boxer 7½-second metal time fuze



Boxer 7½-second metal time fuze
for naval use



Boxer 7½-second metal time fuze



Boxer metal time fuzes,
20-second (left) and 7½-second (right)



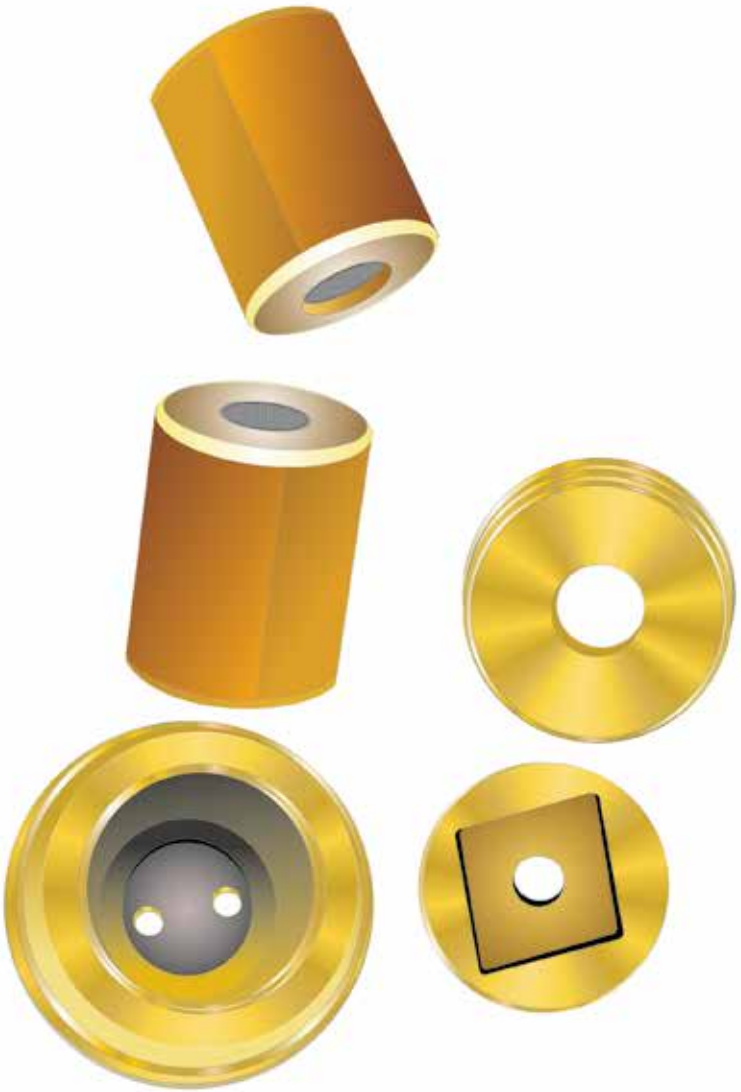
Boxer 20-second metal time fuze



Boxer 20-second metal time fuze



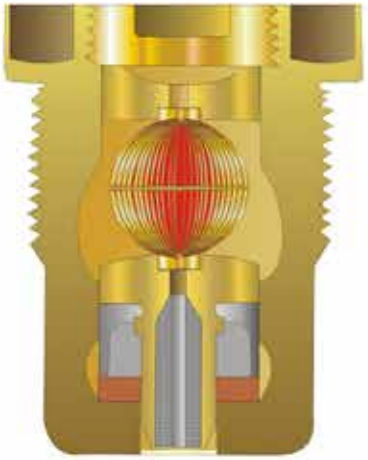
Boxer diaphragm shell,
diaphragm and fuze adapter



Boxer percusson fuze, bottom view,
paper powder container and plug



Naval Moorsom percussion fuze, invented by Capt. William Moorsom, RN, 1850



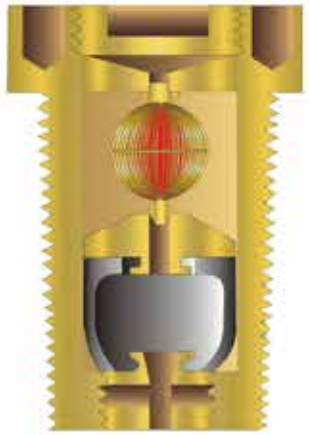
Pettman sea service percussion fuze



No. 11 B. L. plain percussion fuze



No. 5 percussion fuze, Pettman G. S.



No. 6 percussion fuze, Pettman L. S.

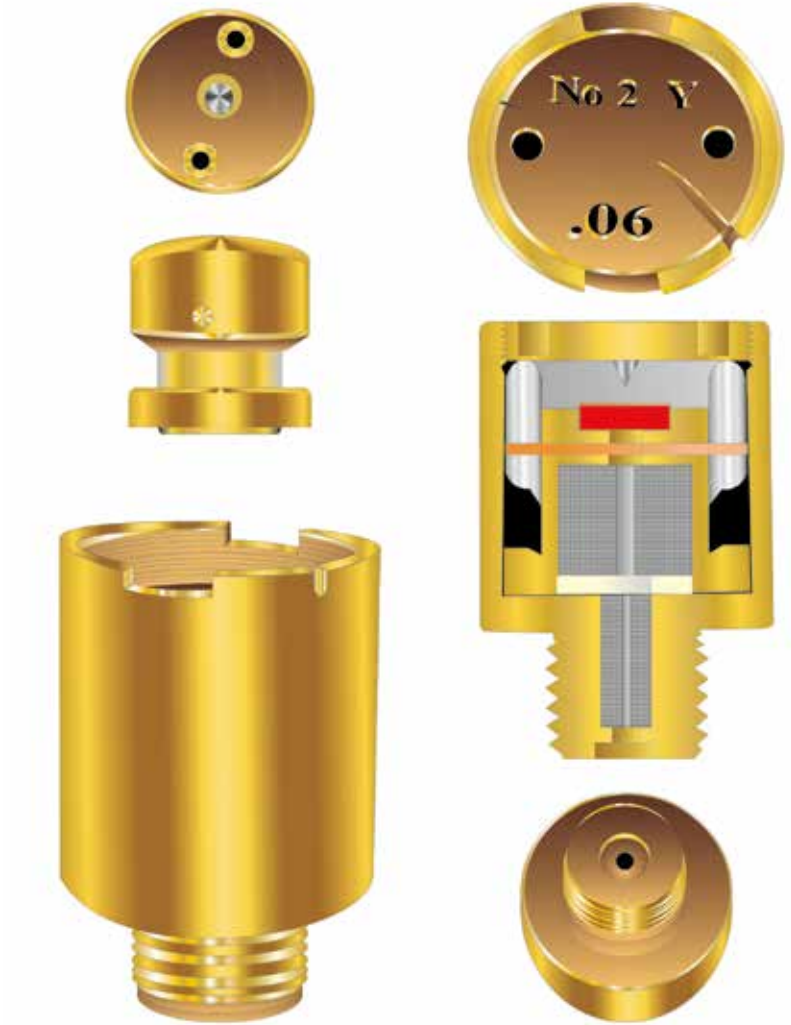


Armstrong pillar percussion fuze

Early British percussion Fuzes



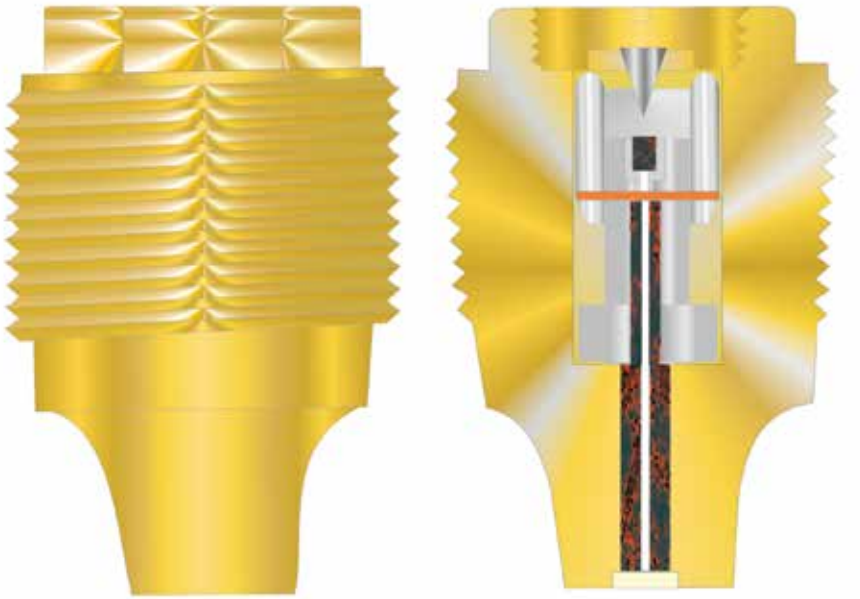
Boxer percussion fuze, unidentified



Boxer percussion fuze, No. 2Y



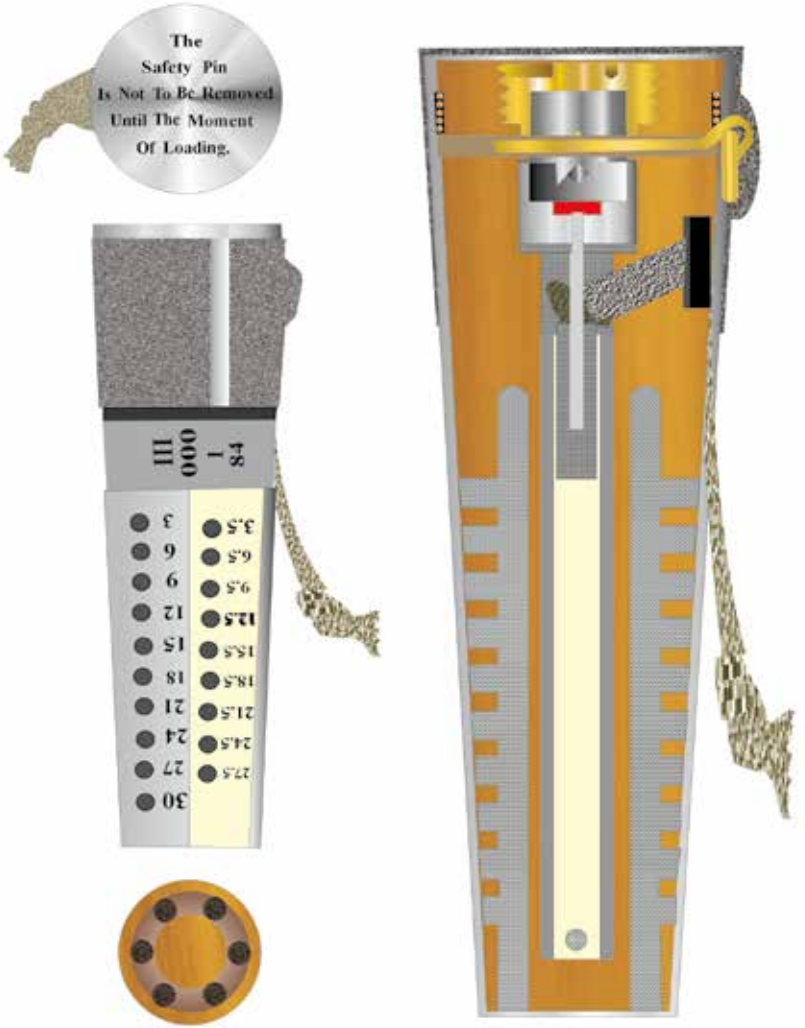
Boxer percussion fuze,
external view



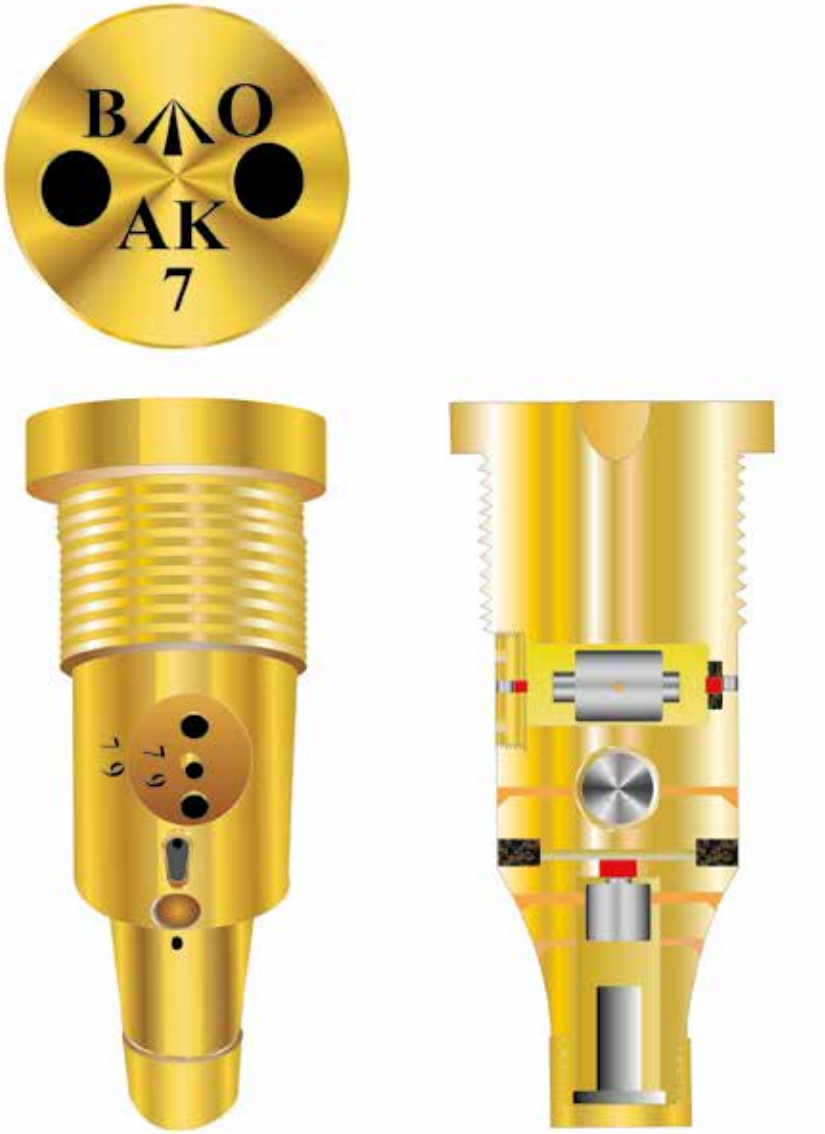
Percussion fuze, LtCol Edward Mounier Boxer,
Royal Arsenal, Woolwich, Kent



Boxer percussion fuze



Wooden time fuze, with
detonator No.43 Mark III

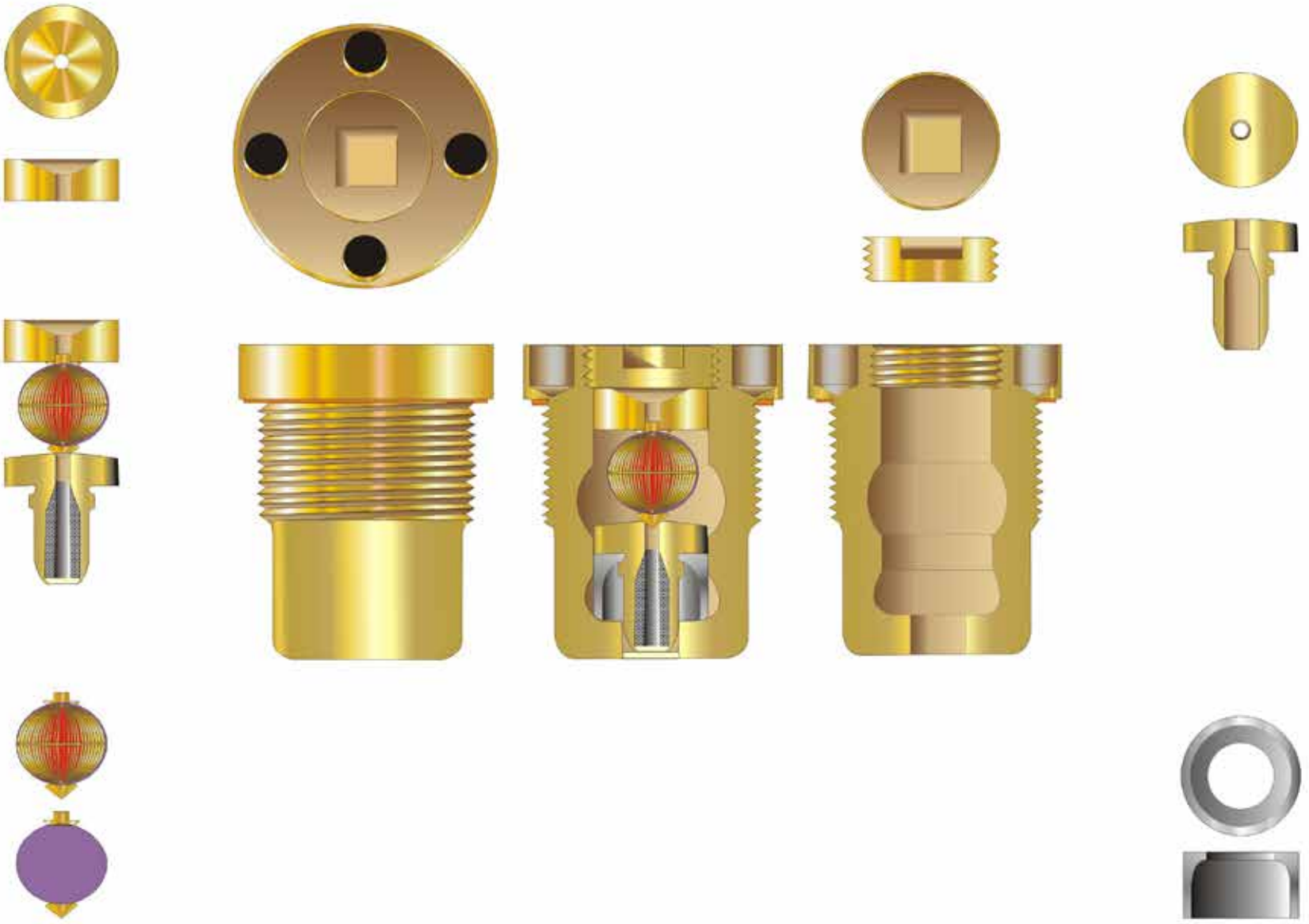


Naval Moorsom percussion fuze, 1850

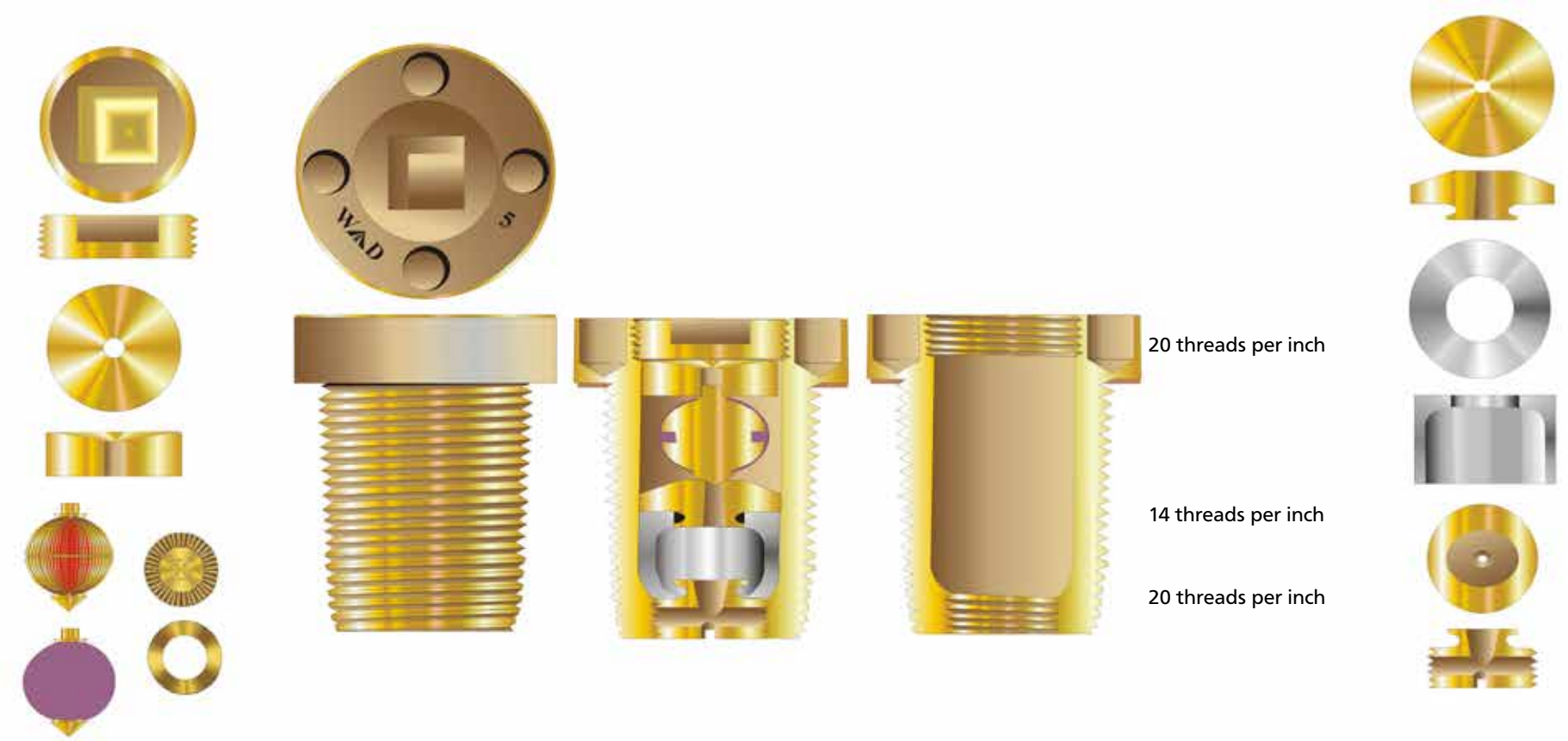


Reverse side

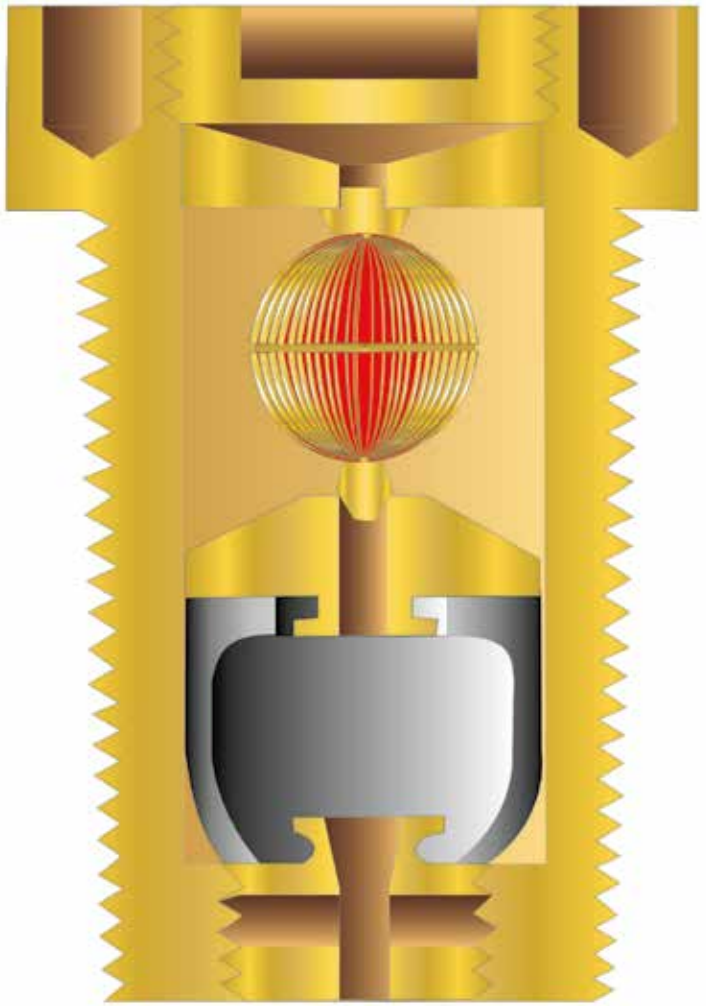
WD Pettman percussion fuze, P-7



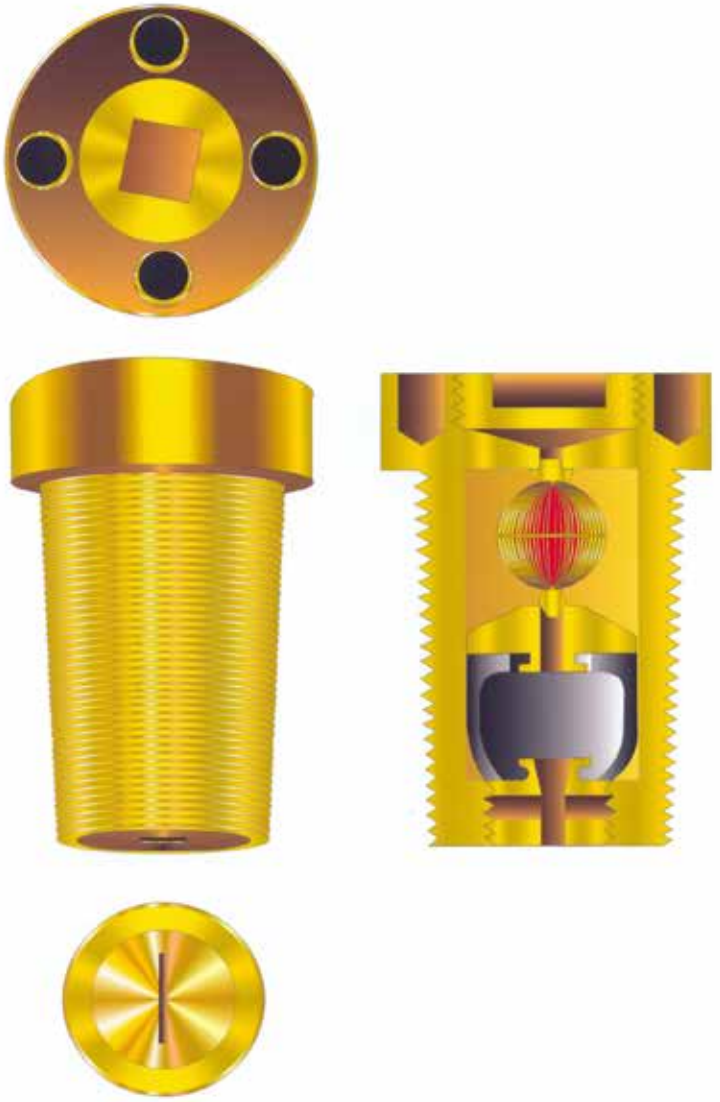
Sea service Pettman percussion fuze



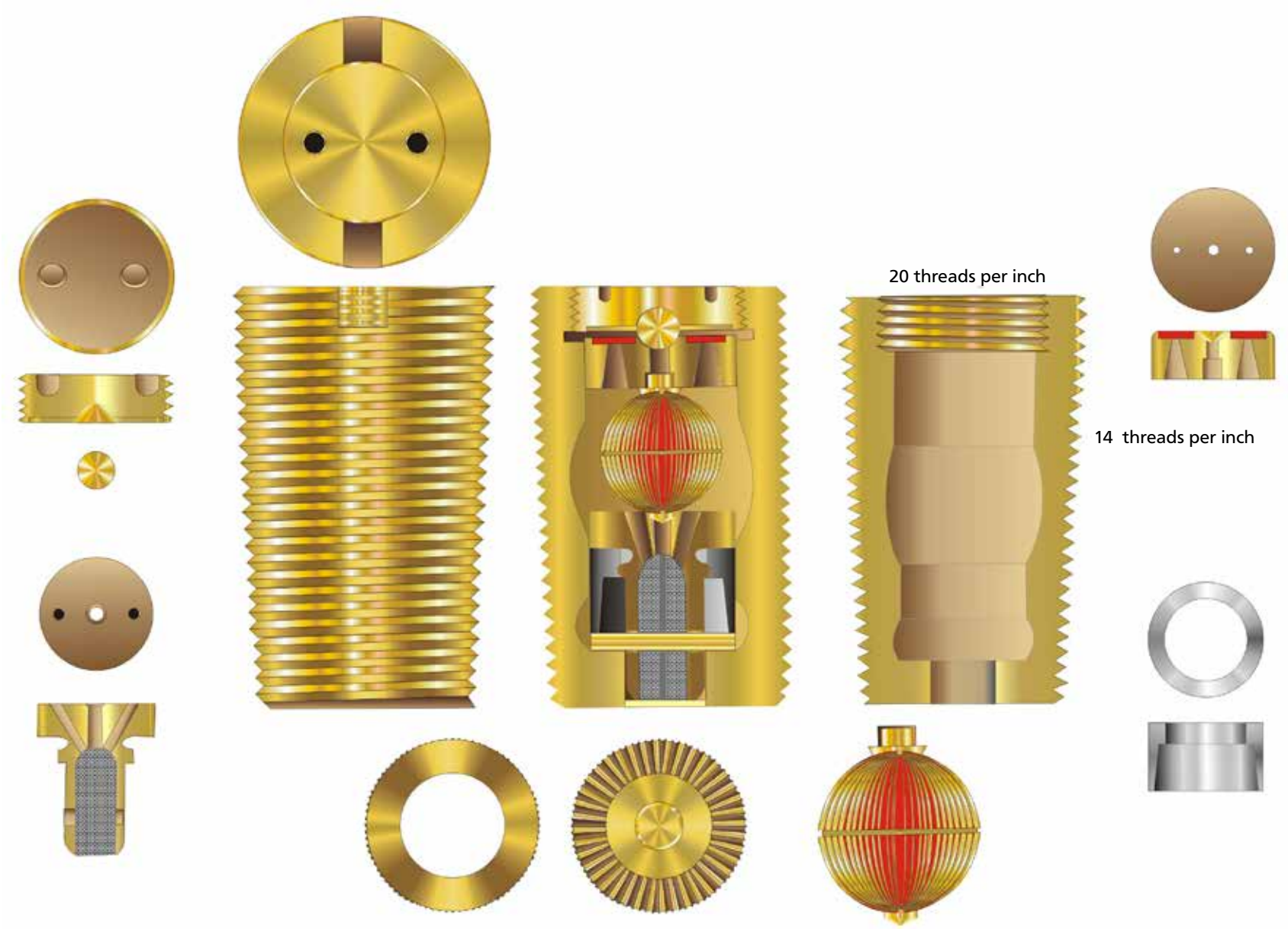
Land service Pettman percussion fuze No. 6 - Large



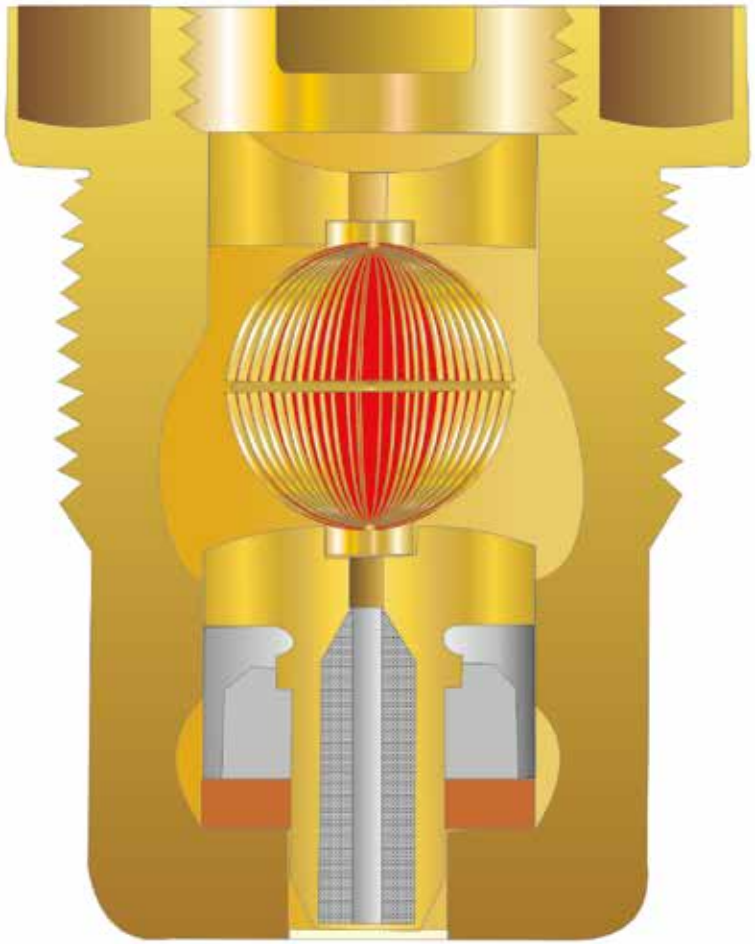
Percussion fuze No. 6, Pettman LS



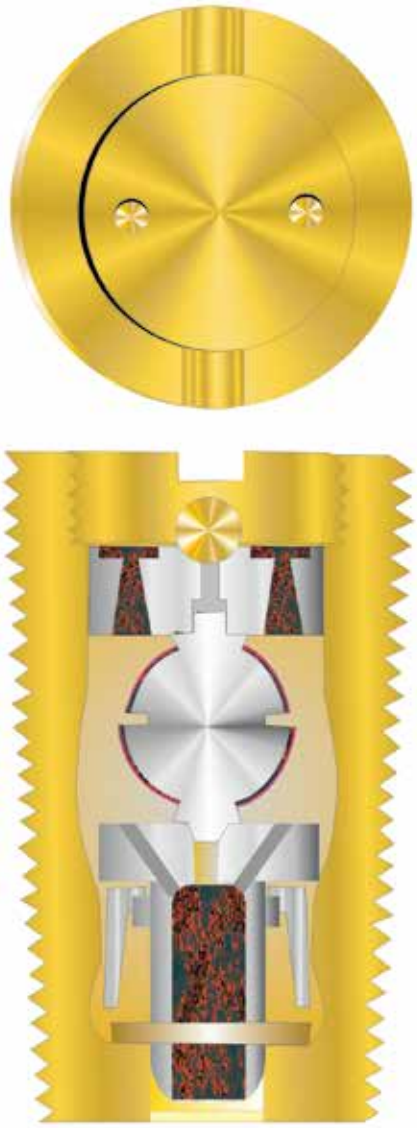
Percussion fuze No. 6 Pettman L.S.



General service Pettman percussion fuze No. 5



Pettman sea service percussion fuze



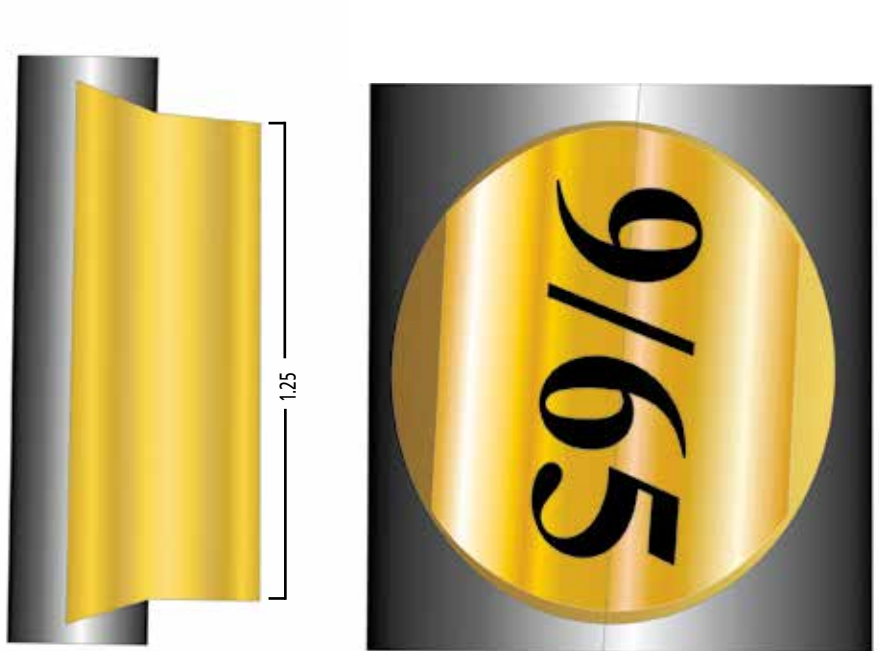
Pettman percussion fuze, G. S.



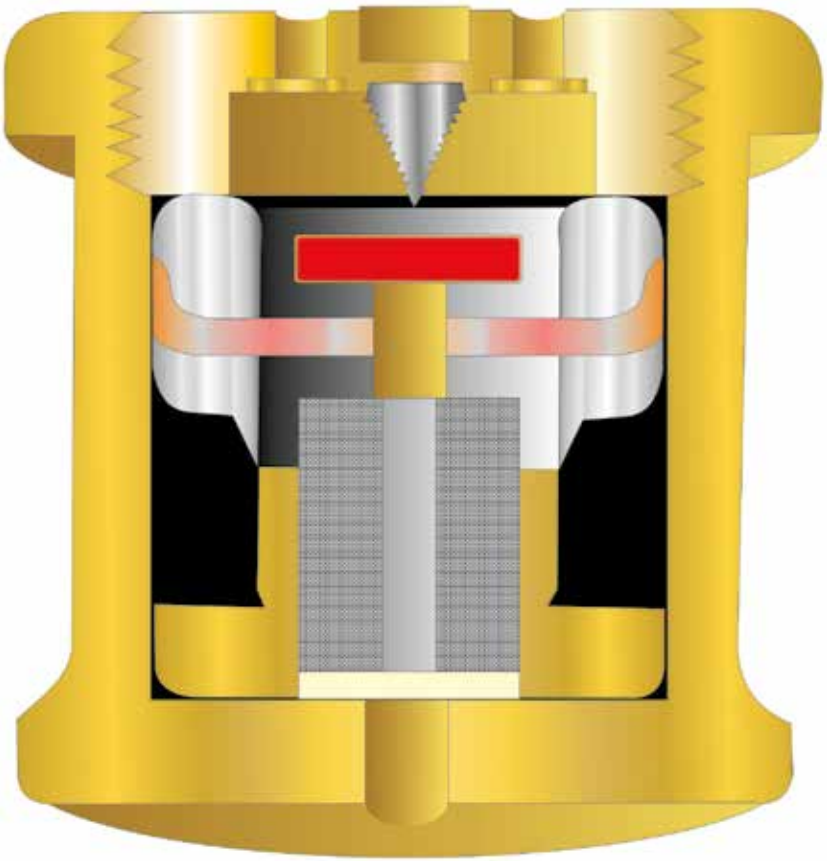
No. 5 percussion fuze, Pettman G. S.



Vavaseur percussion fuze, 1871,
for Blakely shell



Woolwich system of rifling



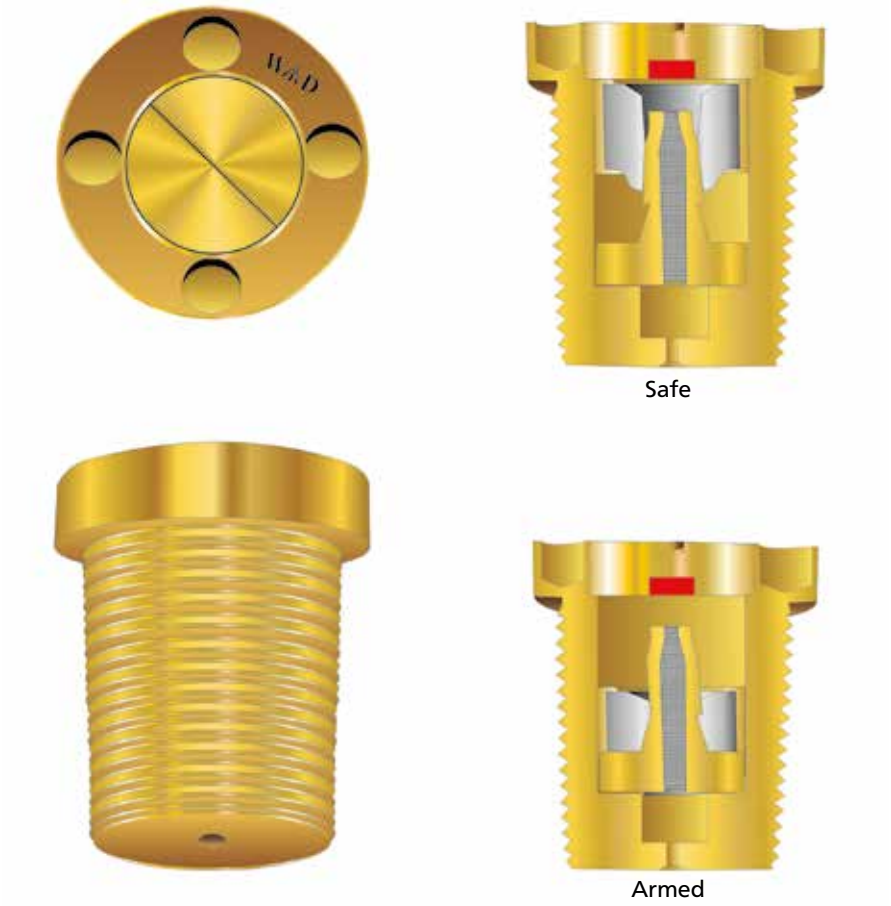
W-D percussion fuze 1034



War Department base percussion fuze



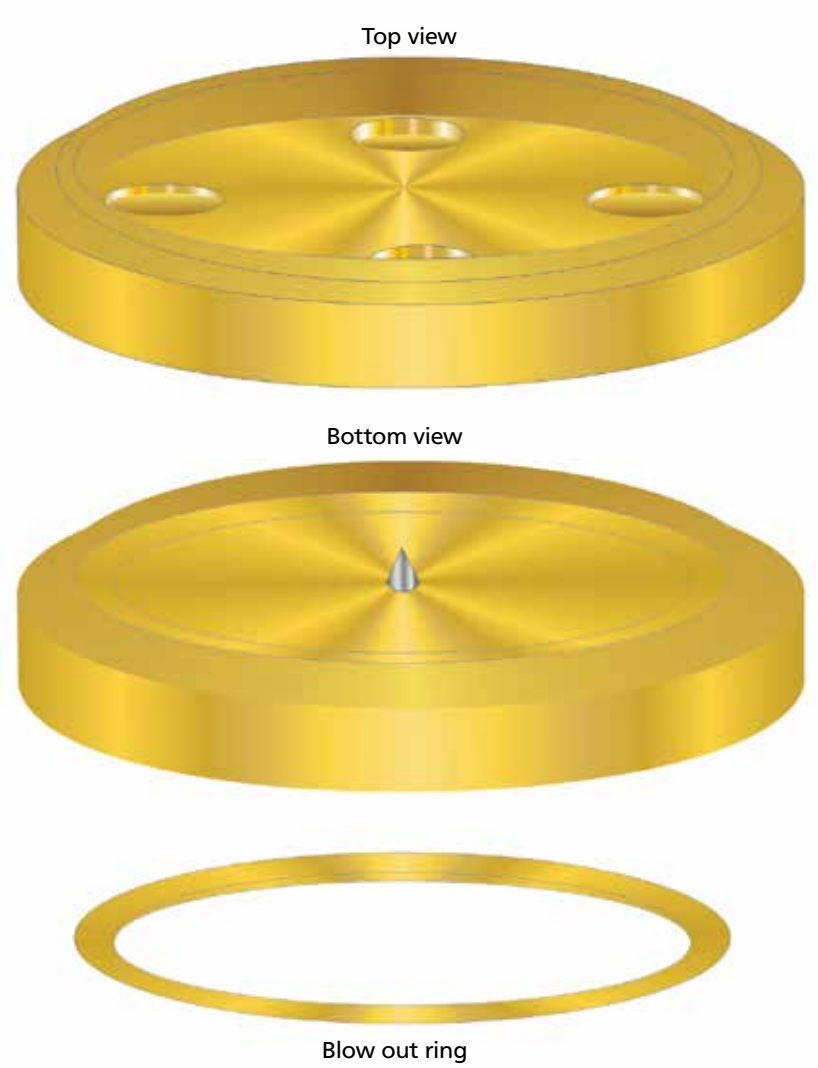
Powder train time fuze, unidentified



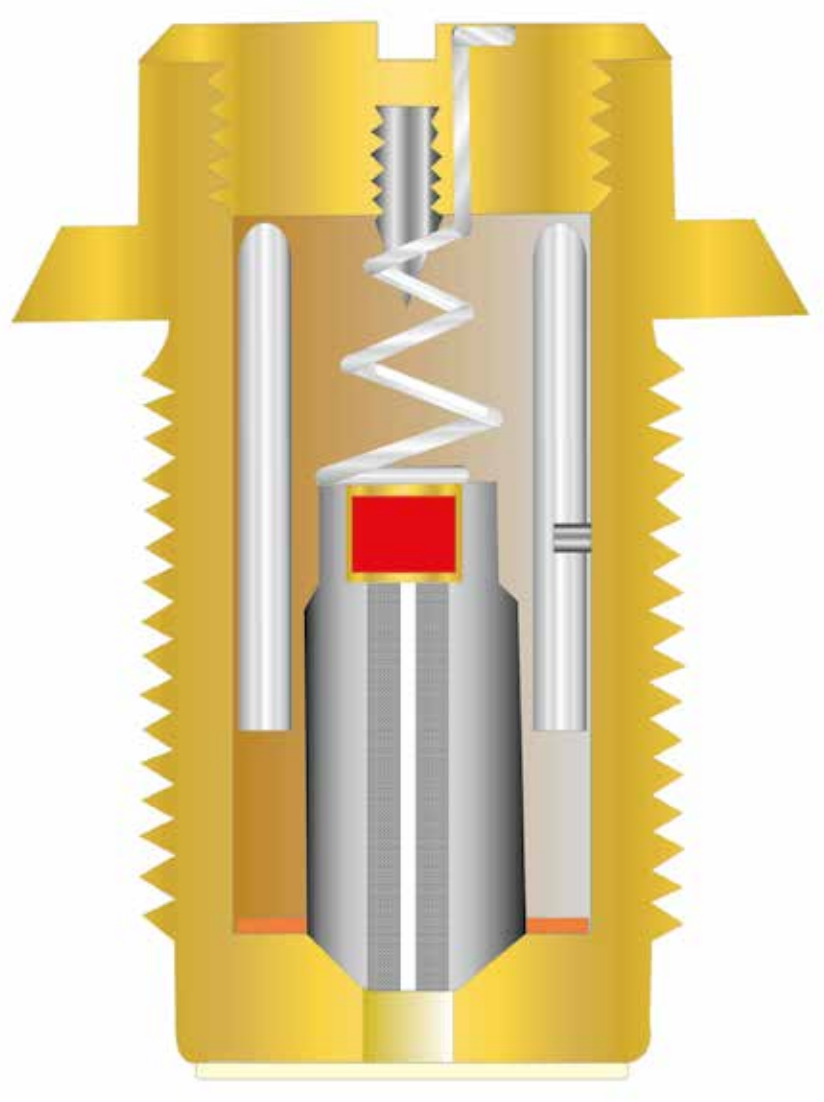
Unidentified percussion fuze, pillar action



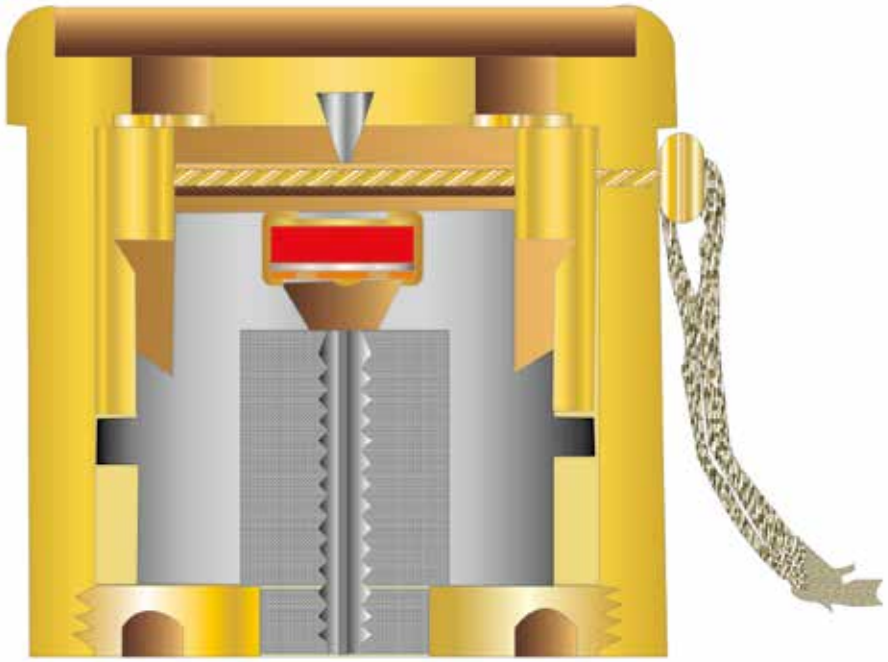
Sensitive percussion fuze, Mark I

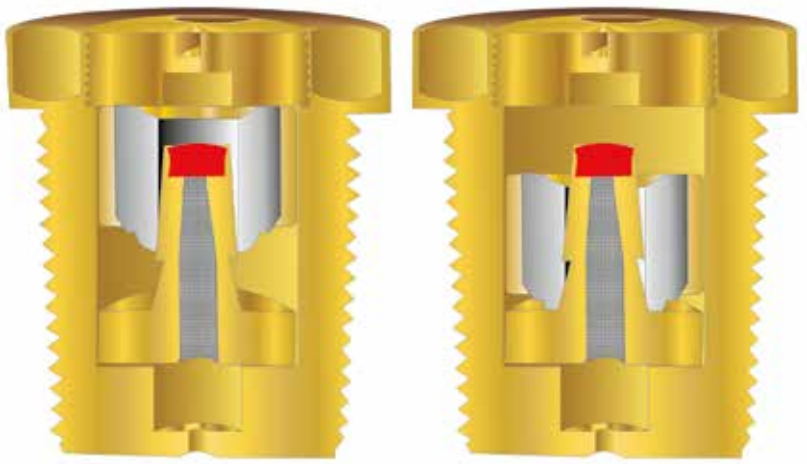


Percussion fuze: Top disk and ring



Percussion fuze, Q. F., one pounder



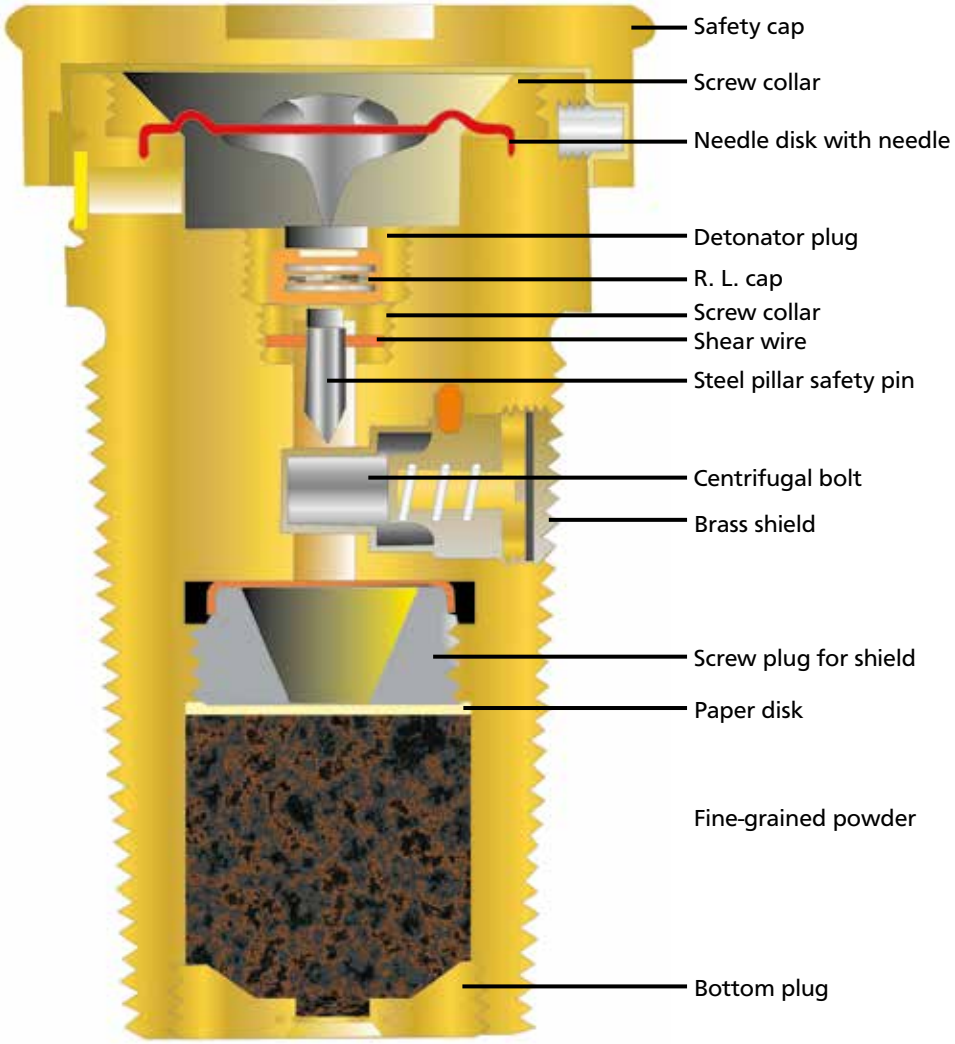


Safe

Armed

Percussion fuze, No 2, Mk IV, B. L. plain

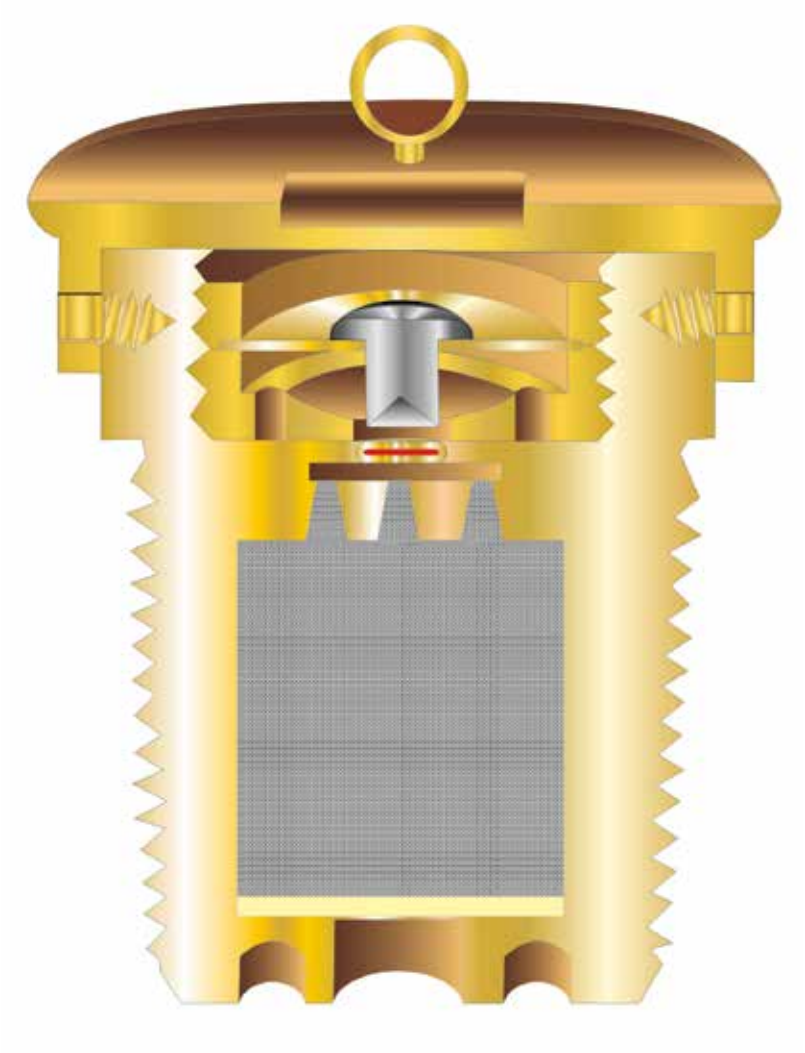
Unidentified percussion fuze, early pillar design



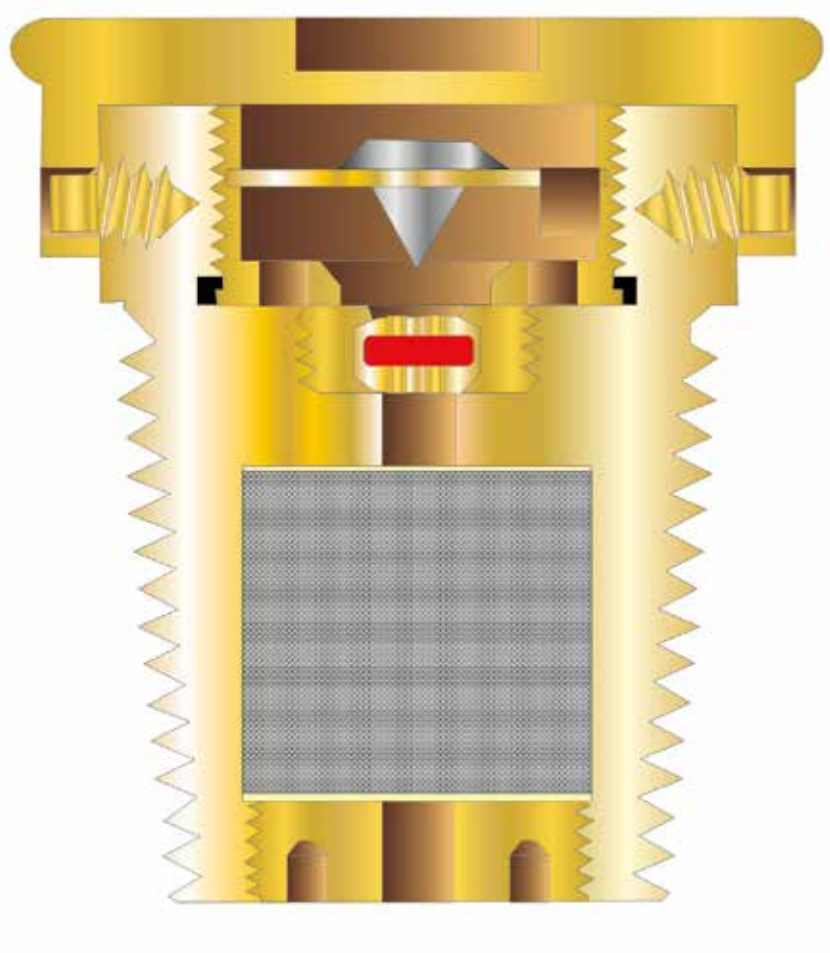
Percussion fuze, D.A.
with cap number 17, Mark III, 1909-1924



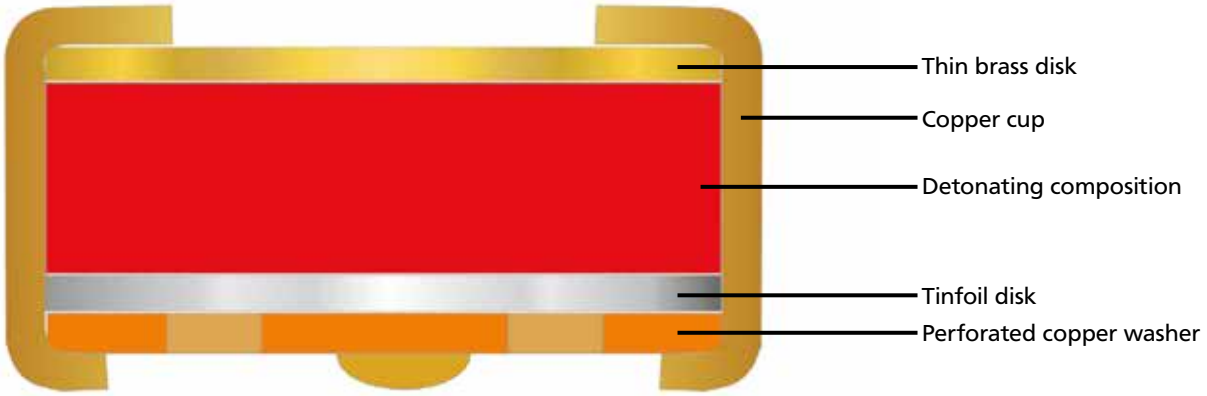
Percussion fuze No. 17 Mark III



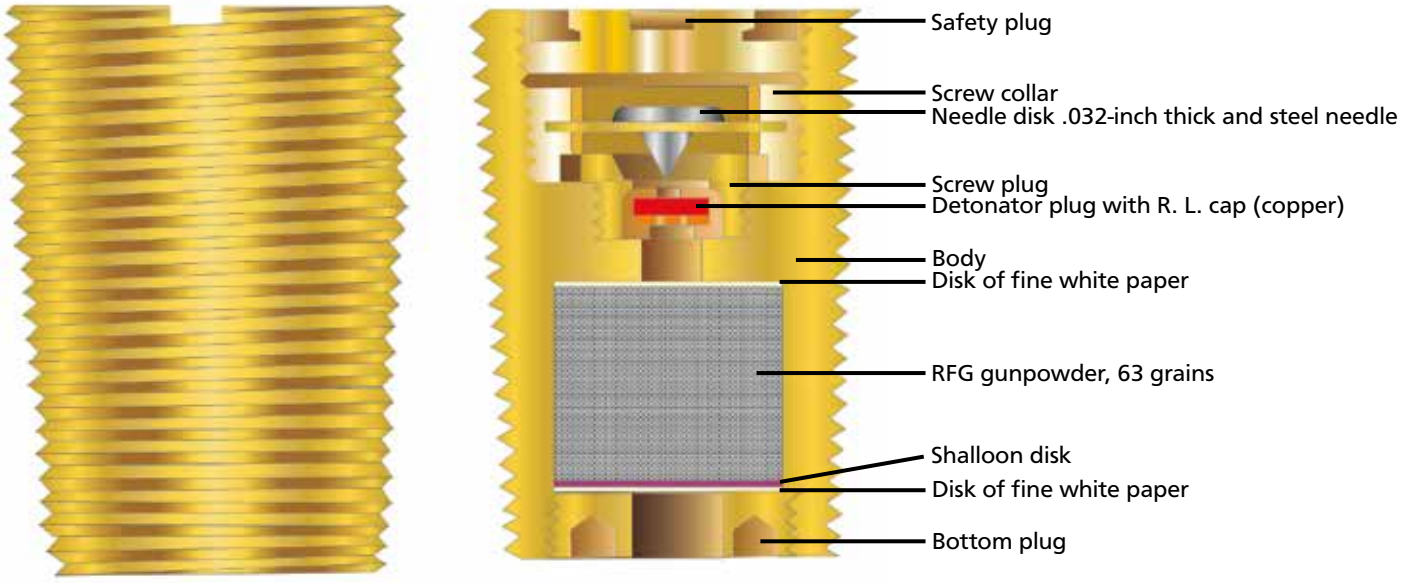
Percussion fuze No. 1, direct action



Percussion fuze No. 1, MK. 1, direct action



R. L. Cap



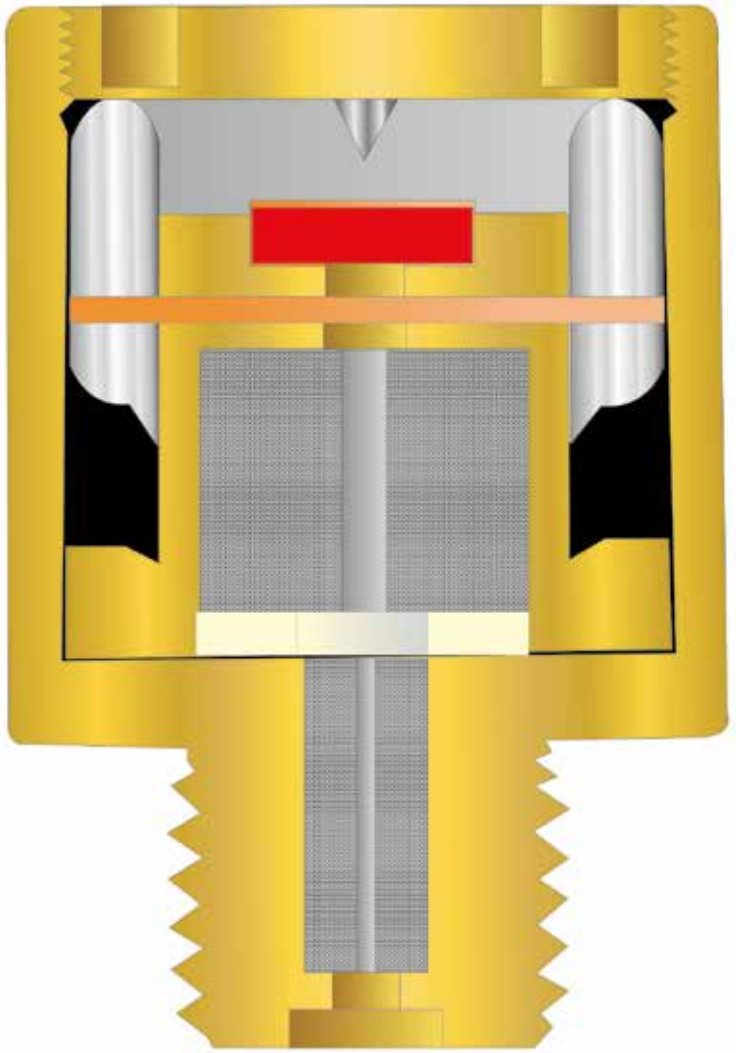
Percussion fuze D.A No. 3, Mark IV



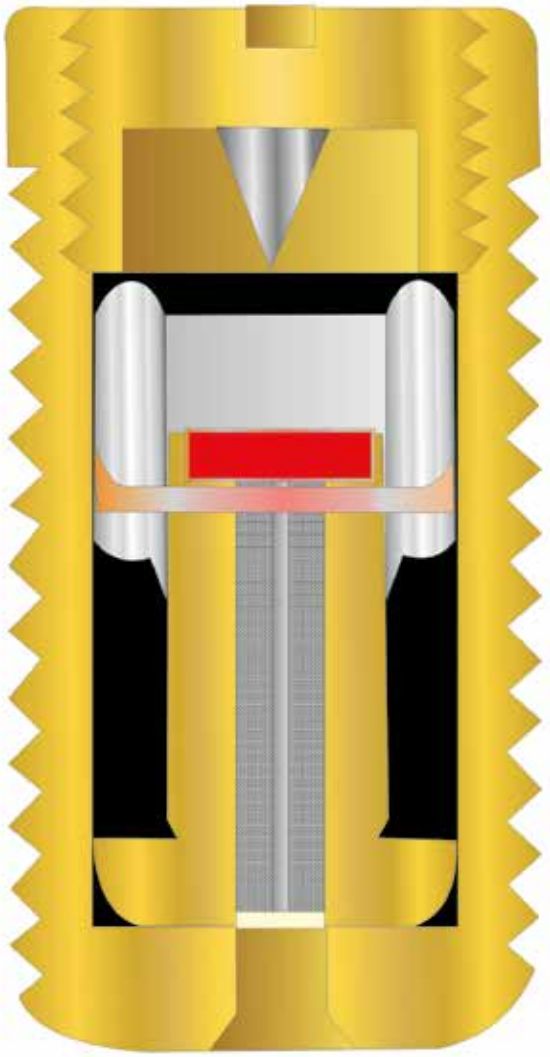
Percussion fuze Mark III asterisk, Model 1891



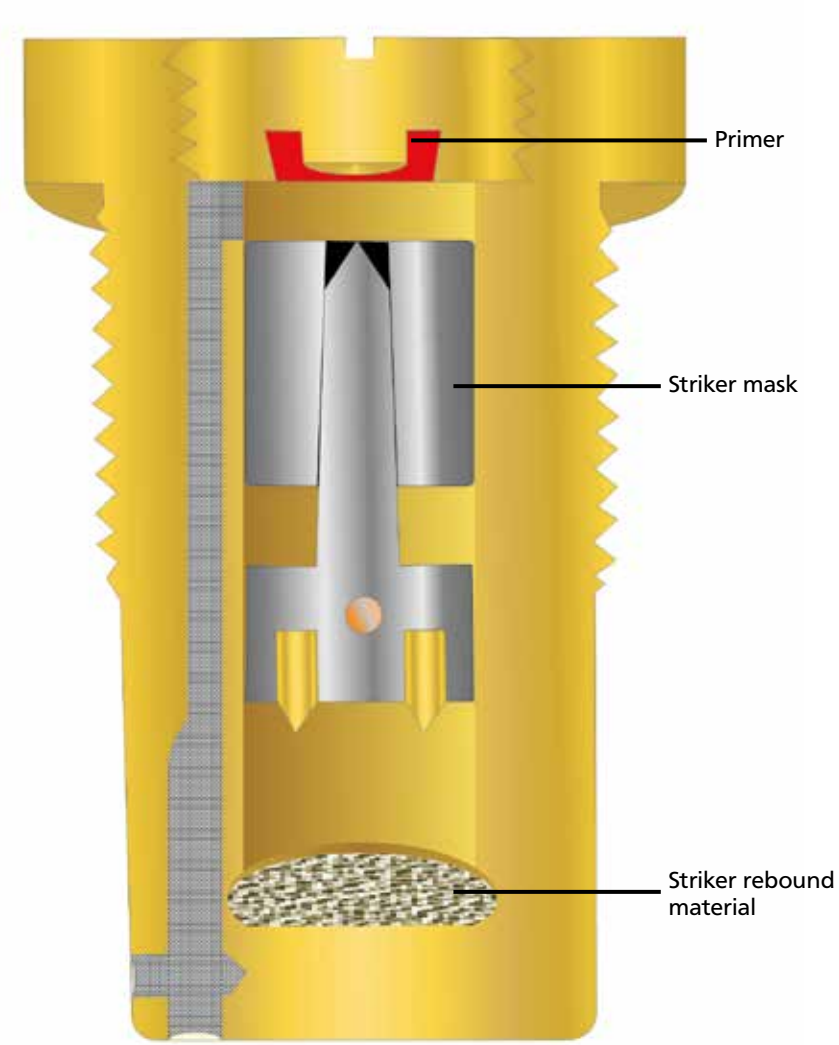
Percussion fuze D. A. impact No 18, Mark II



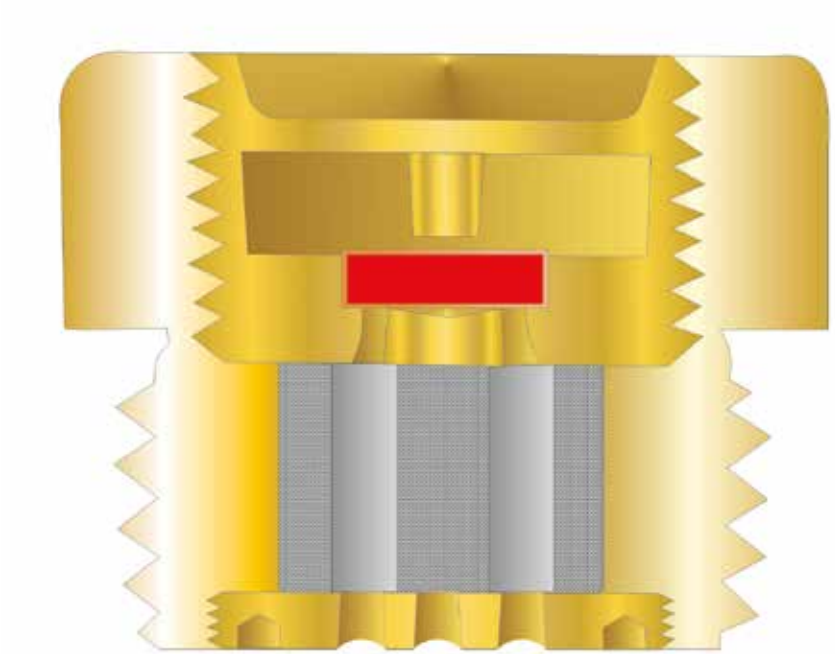
Percussion fuze 1059



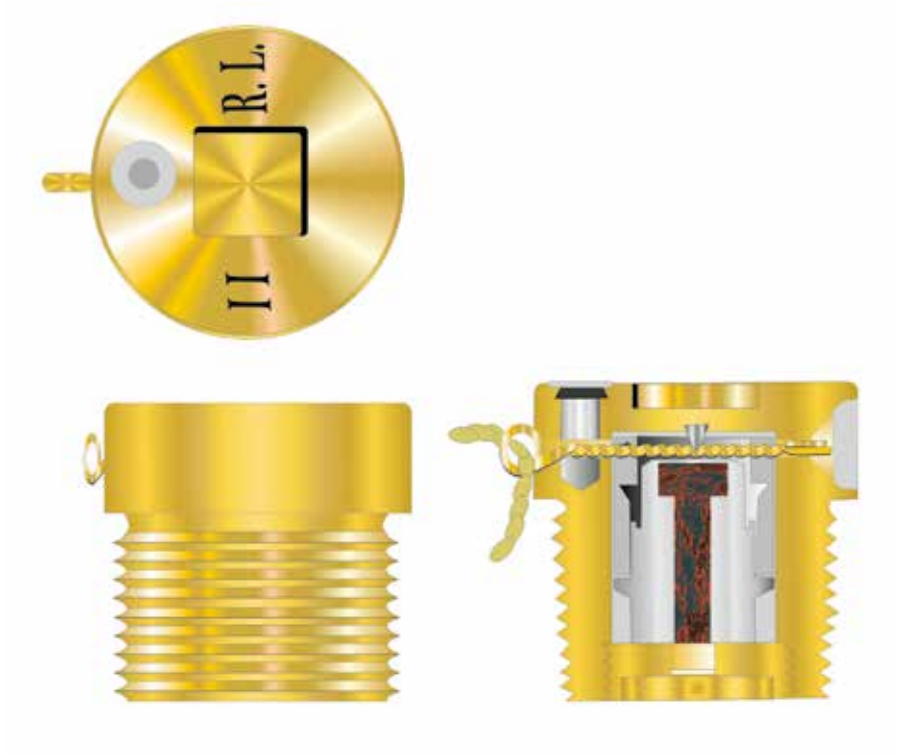
Percussion fuze 1069



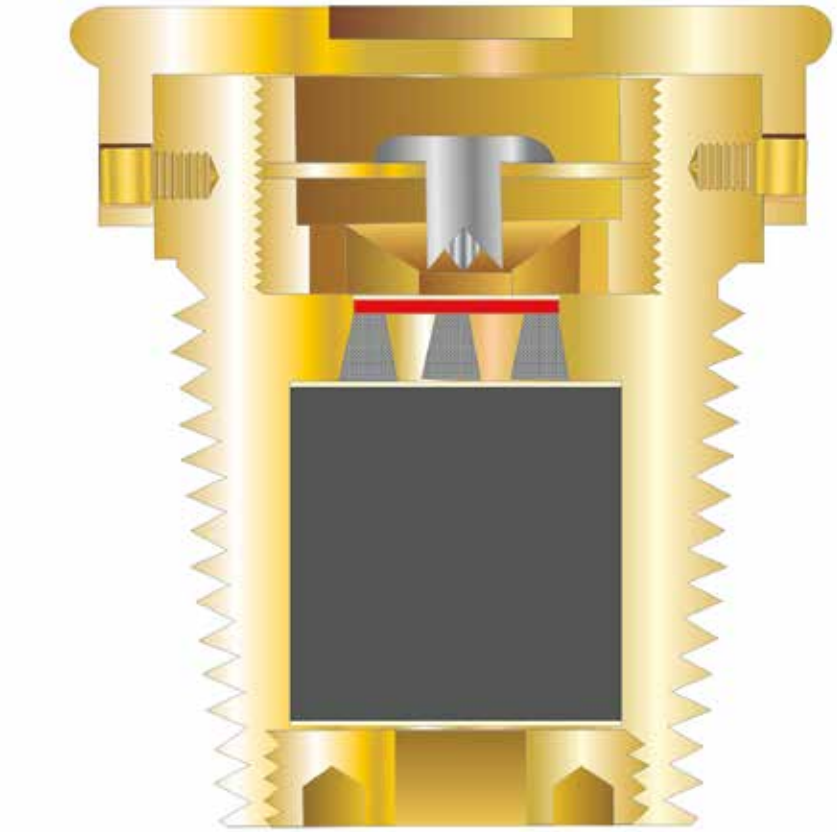
Percussion fuze 1042



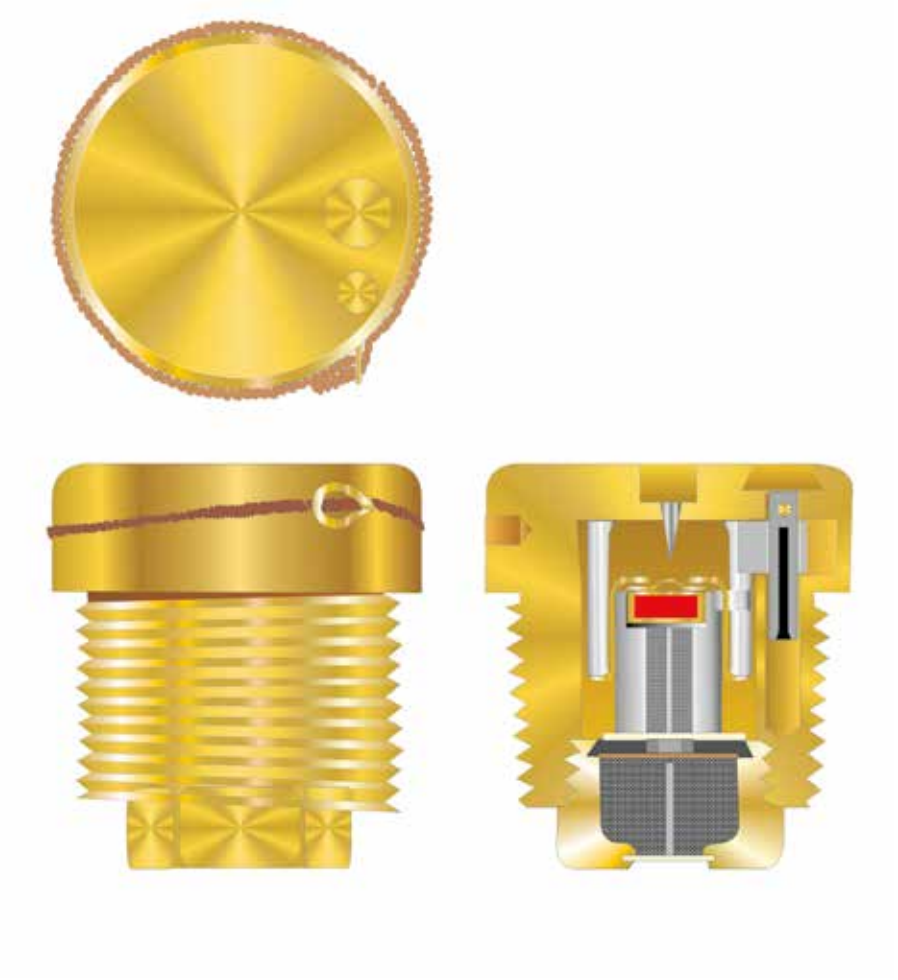
Percussion fuze 1037



Percussion Fuze, R. L., II



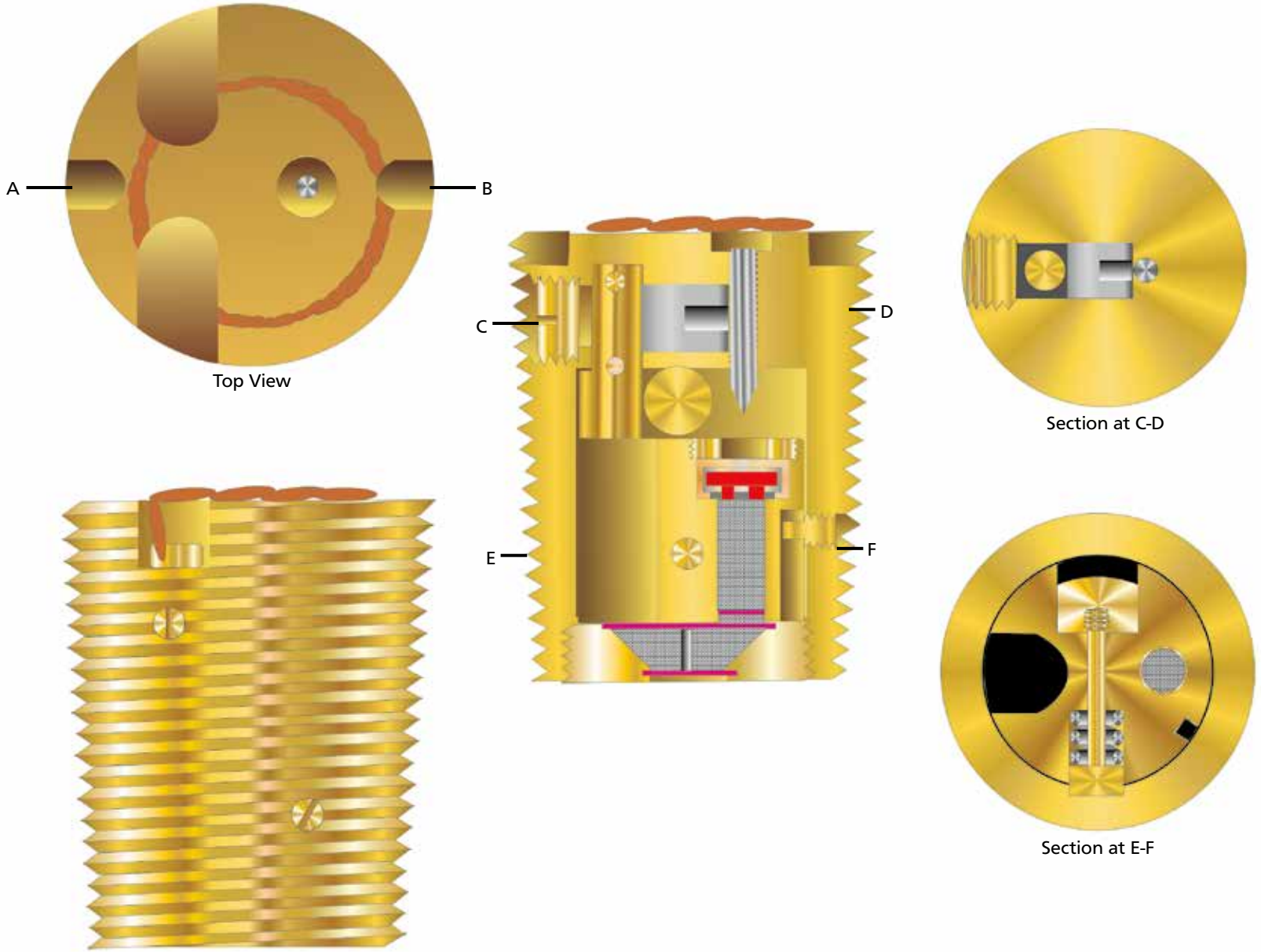
Percussion D.A. Impact Fuze No. 3



Percussion Fuze, Bolt No. 1, Mark I-2



No 7 Percussion Fuze,
Mark IV, 1872-1911



Percussion fuze, Small Mark I.
Later marks became No. 8 percusion fuze



Shell fuze adapter



Time fuze and fuze adapter



British Royal Laboratory fuzes



British Royal Laboratory fuze hole plug
for Woolwich system shell



British Royal Laboratory
percussion fuze II



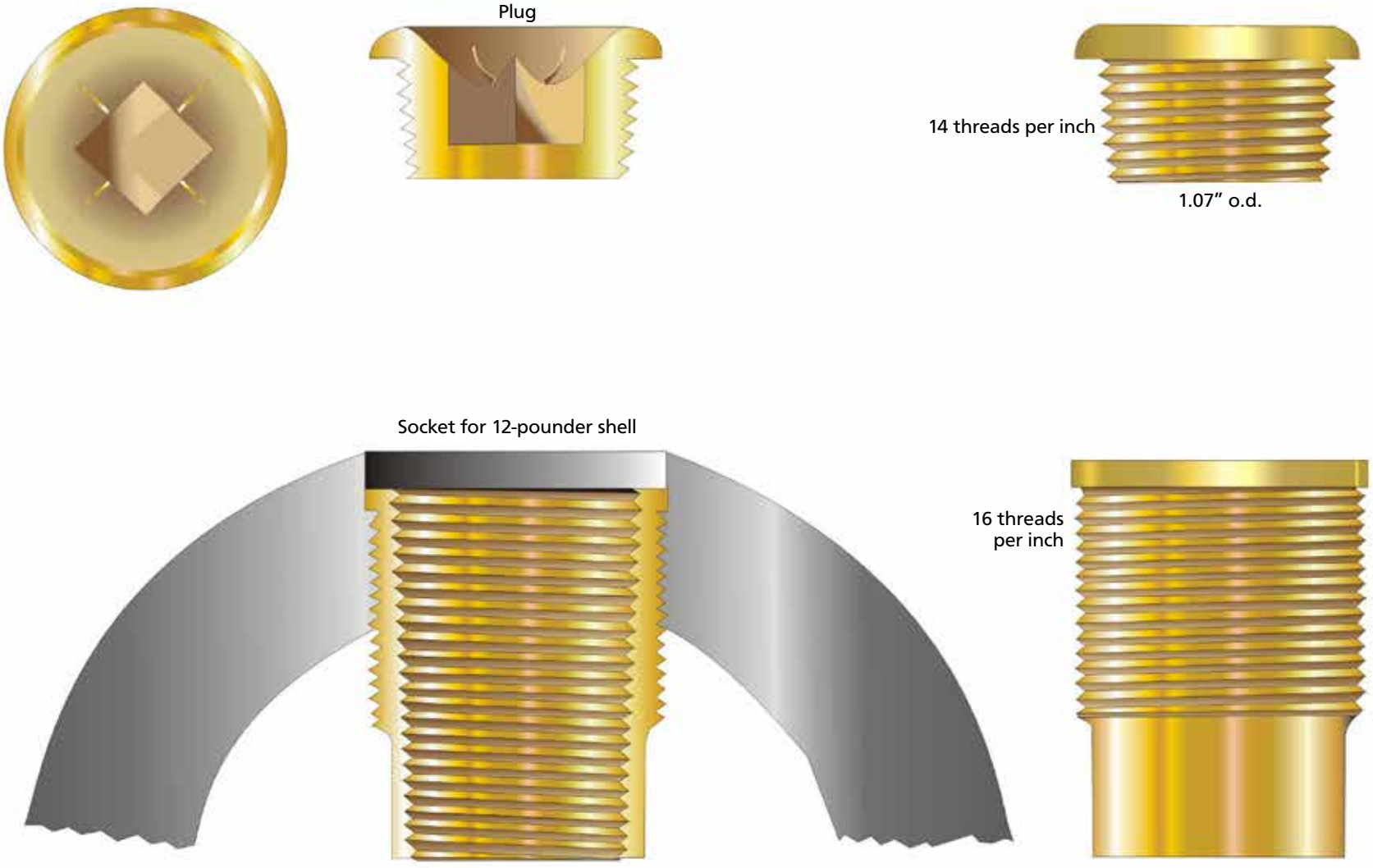
British Royal Laboratory percussion fuze,
Model III, 1880



Projectile fuze well plug



Unidentified percussion fuze



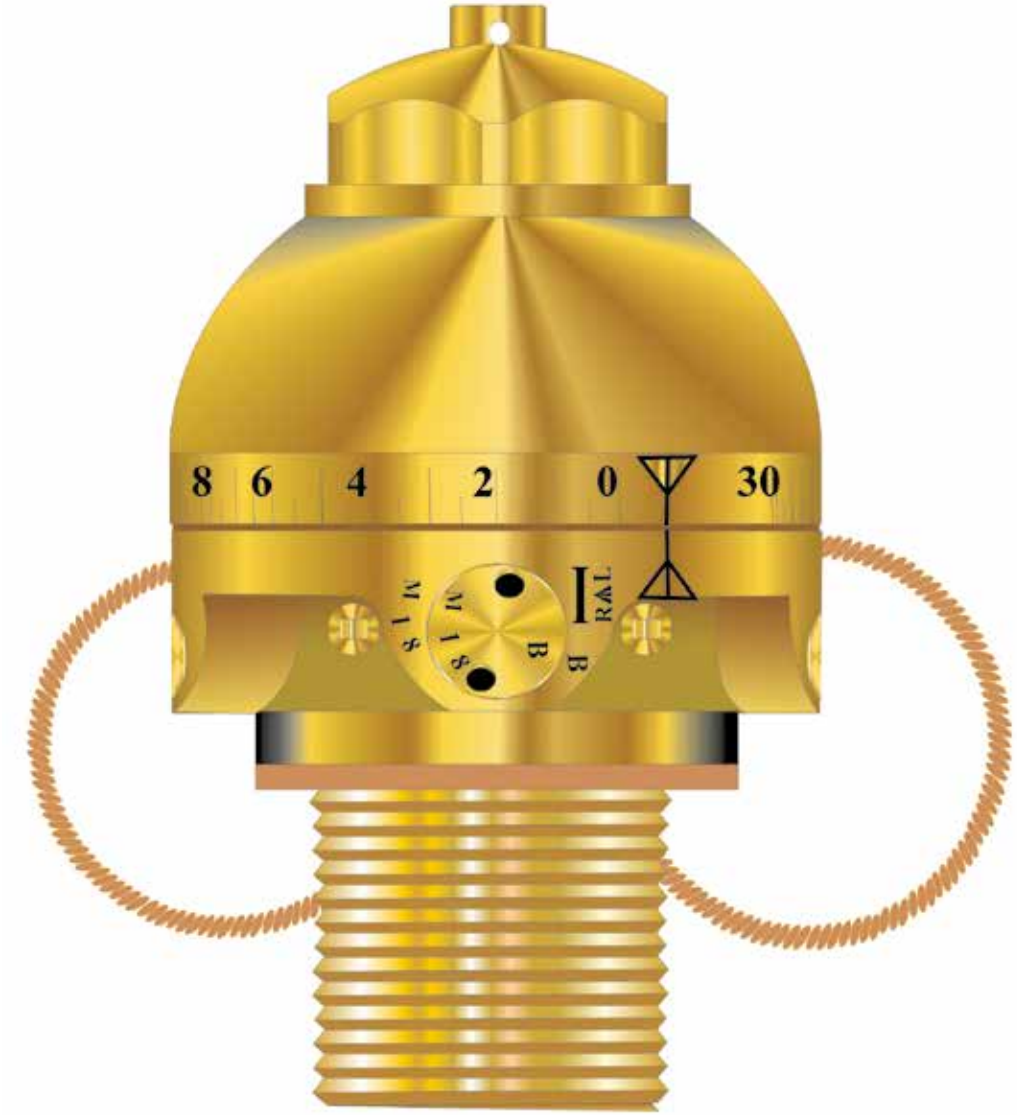
Plug and socket for 12-pounder shell



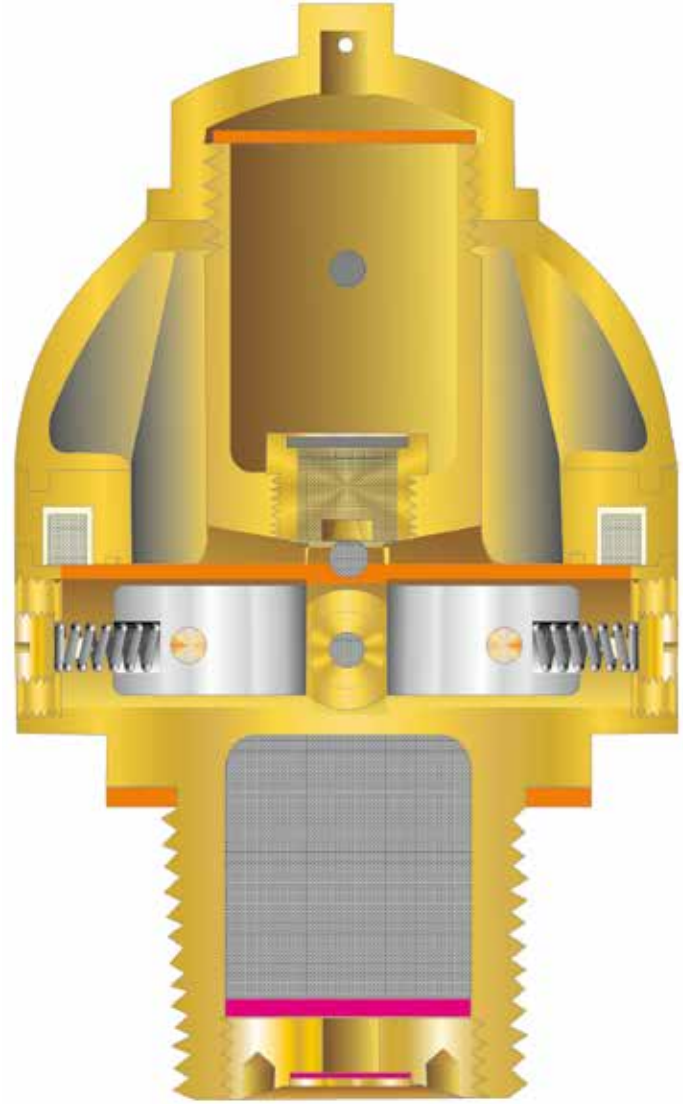
Fuze hole plug for projectiles



Fuze hole plug for
9-12-pounder studded shell



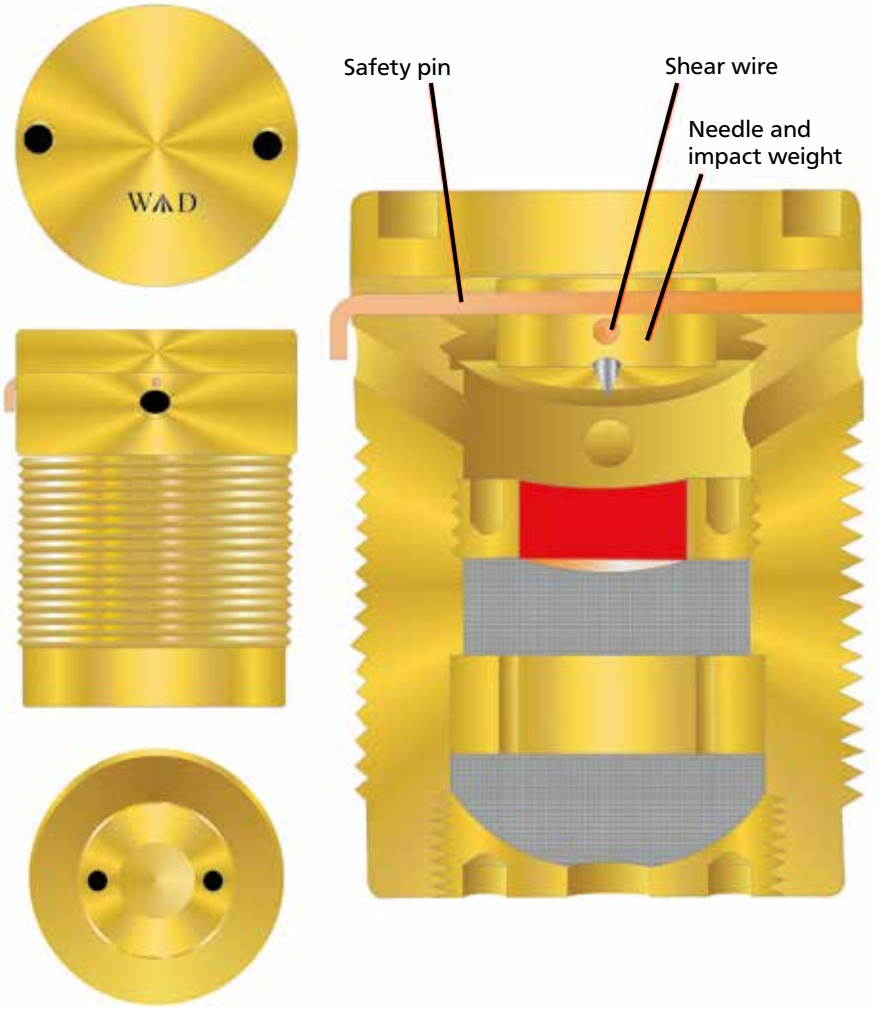
Time-sensitive medium fuze No. 24,
Mark I, 1887-1920



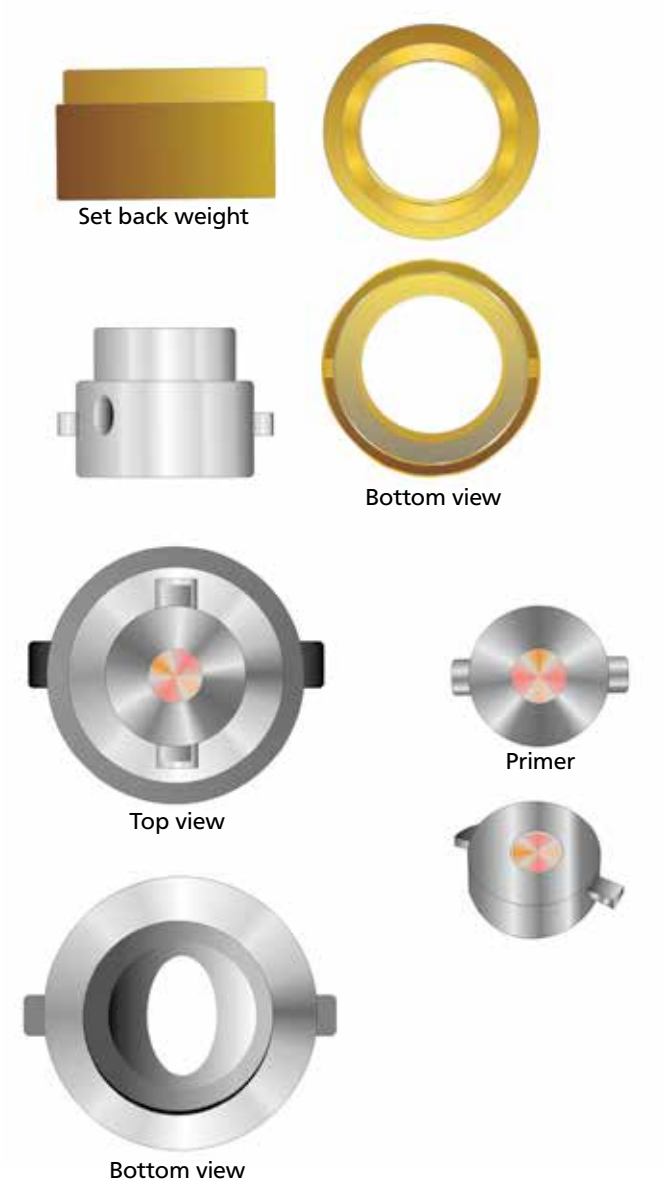
Cutaway of time-sensitive medium fuze No. 24,
Mark I, 1887-1920



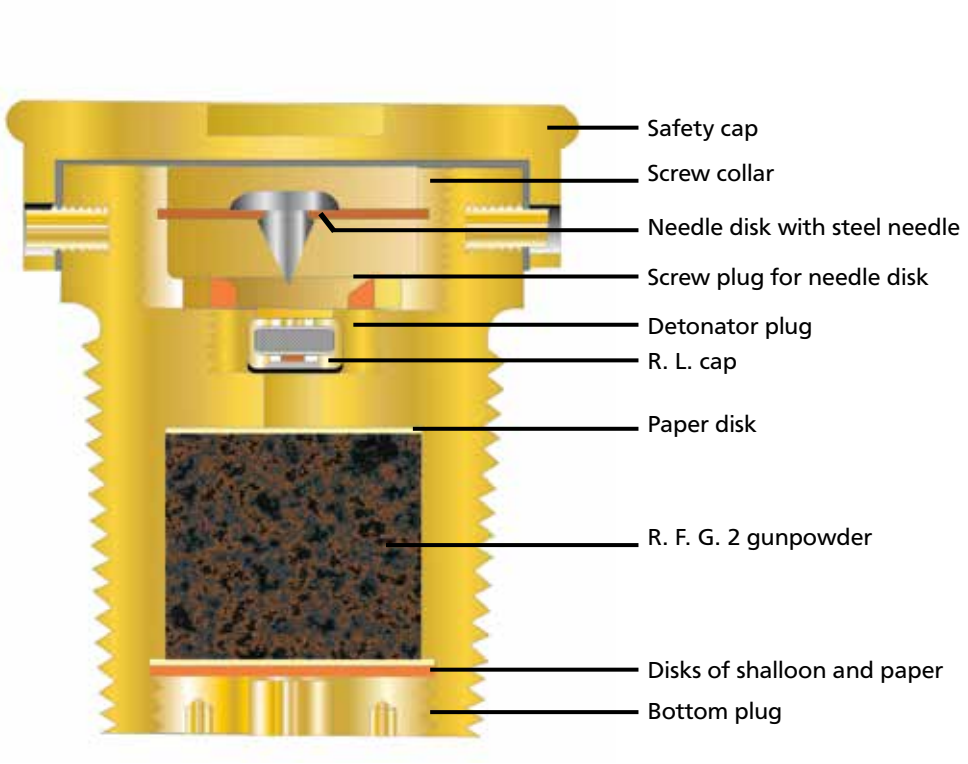
Combination time and percussion fuze, No.54, Mark III



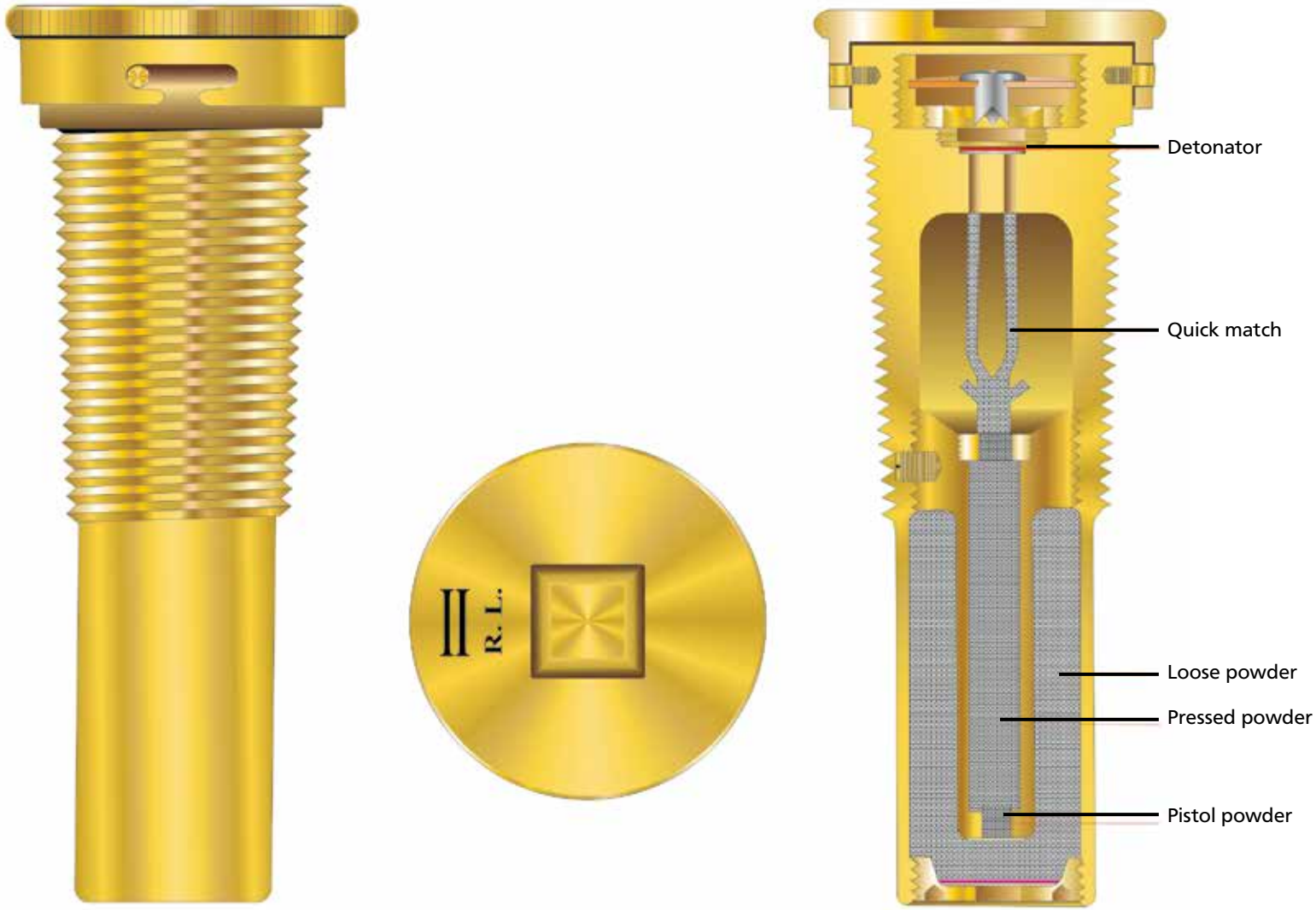
Base concussion fuze 1043



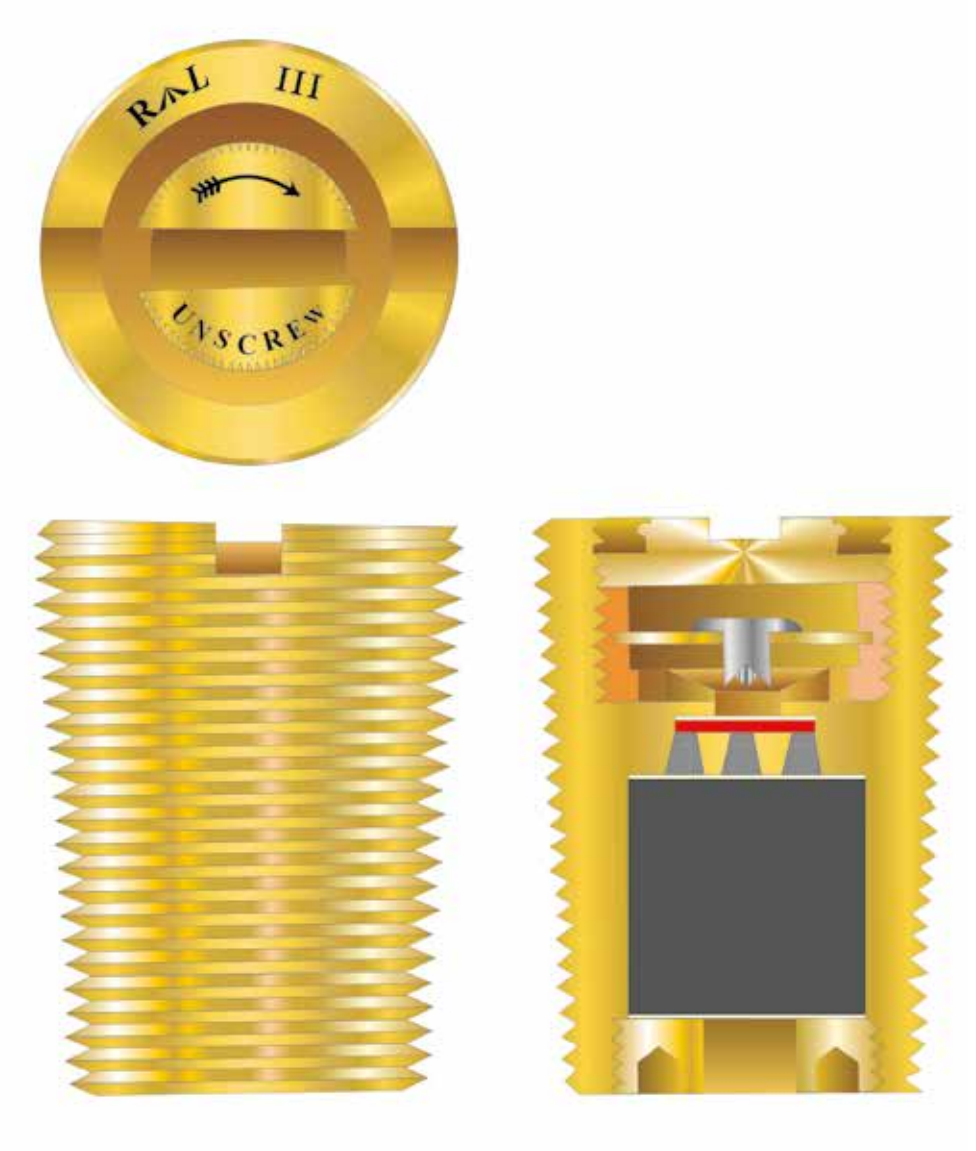
Early B. L. percussion fuze parts,
set back weight and primer assembly



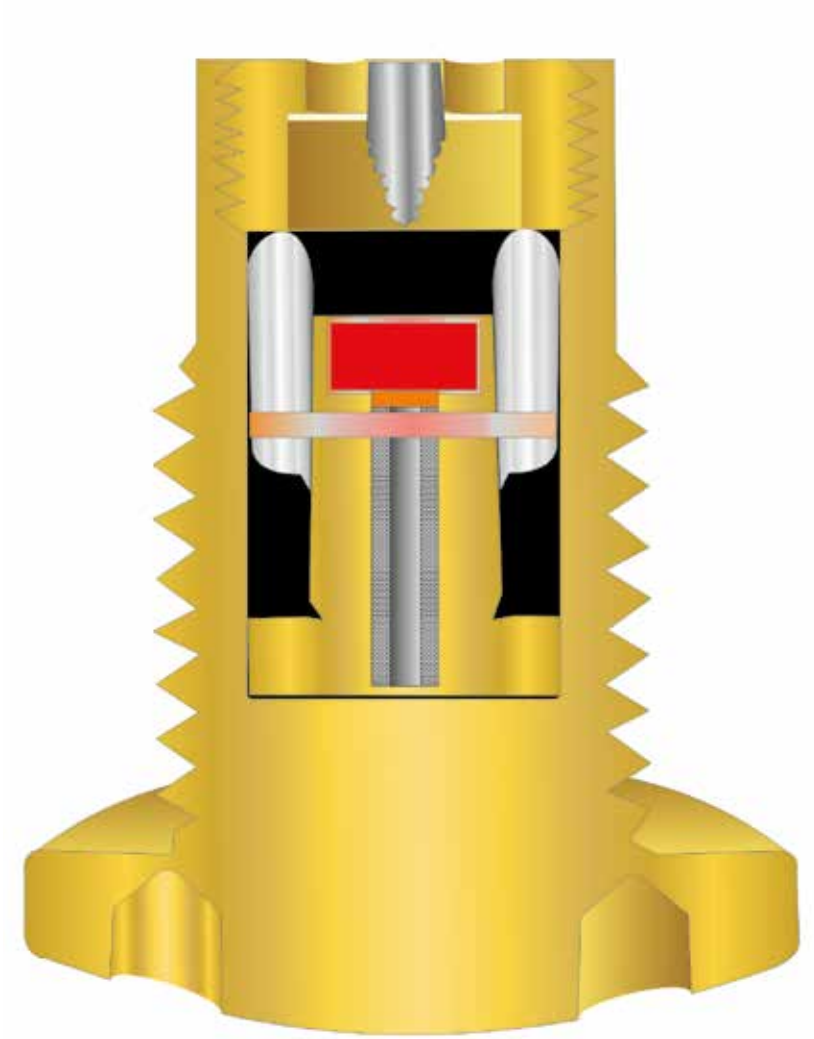
Fuze, percussion direct action,
No. 1 with cap, Mark III



Percussion fuze, direct action, No.10 Mark II L

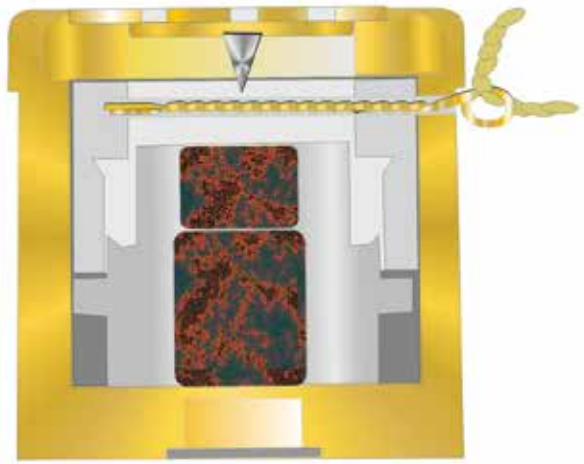


Percussion fuze, direct action, No. 3 Mark III



Base Percussion Fuze, 1067

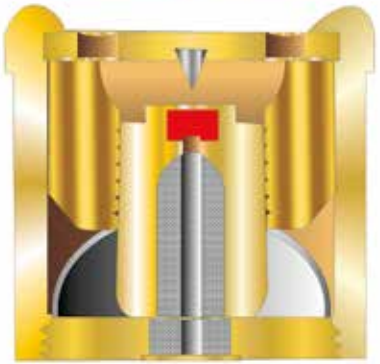




B. L. Plain percussion fuze, R. L. III

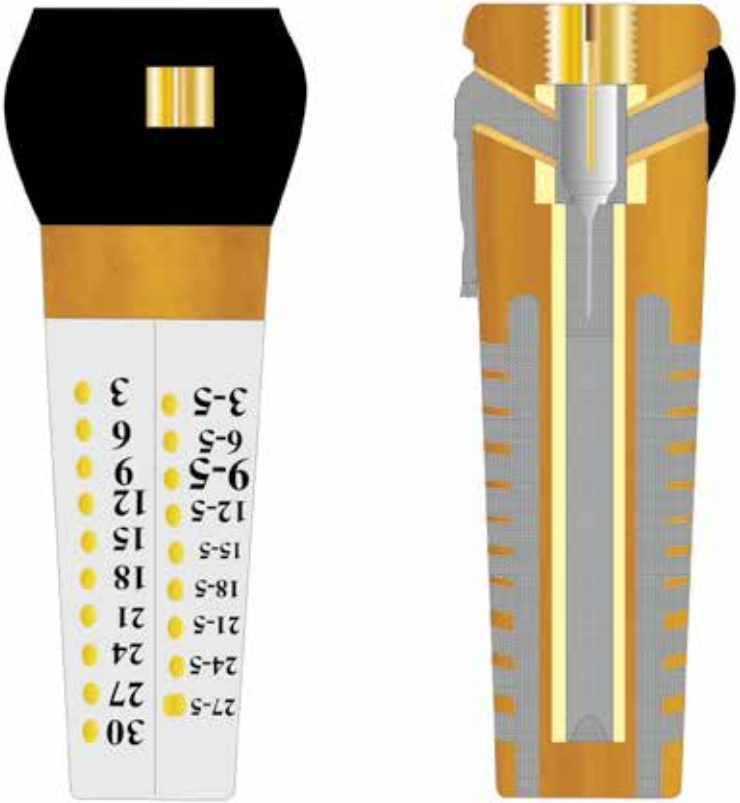




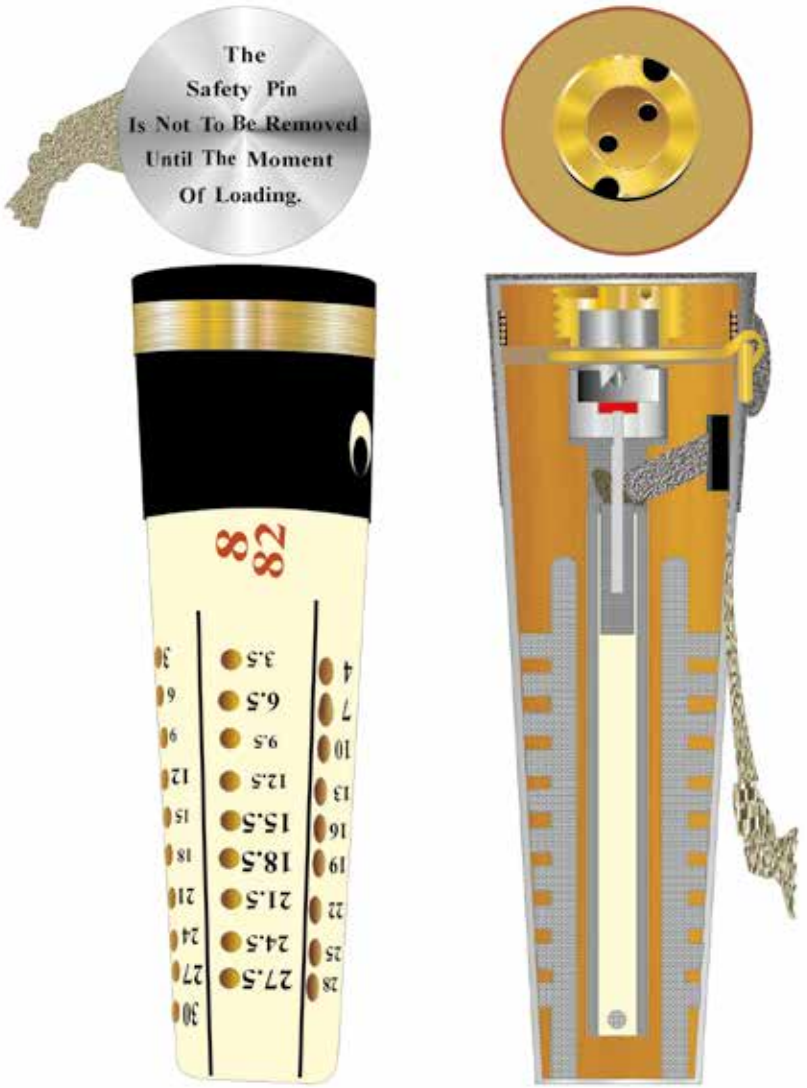




B. L. Plain percussion fuze No. 11



Wood, Fuze, Time No 41 Mark. II



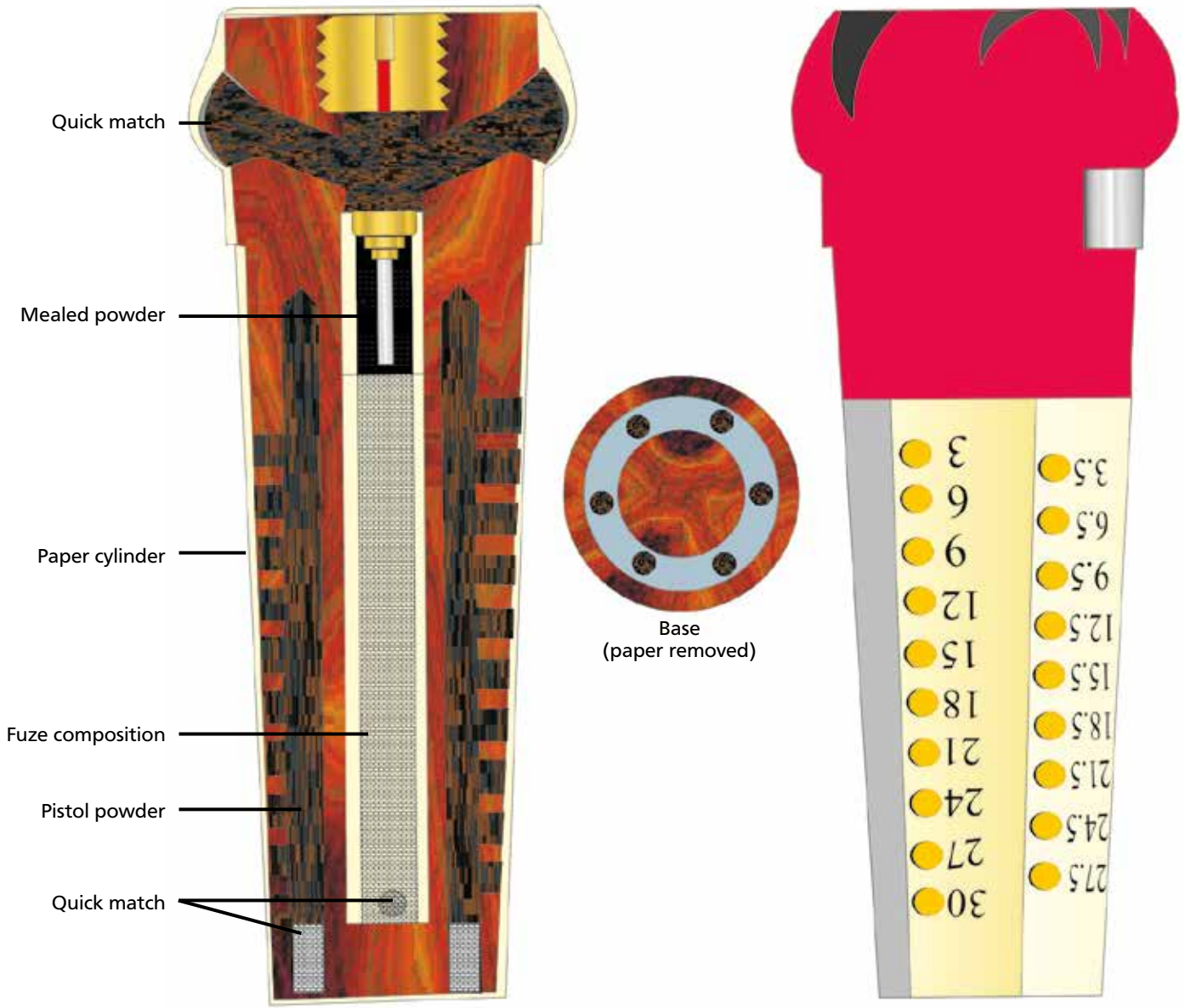
Wood, Time, Fuze No. 43,
for RML projectiles



Percussion fuze, long shank



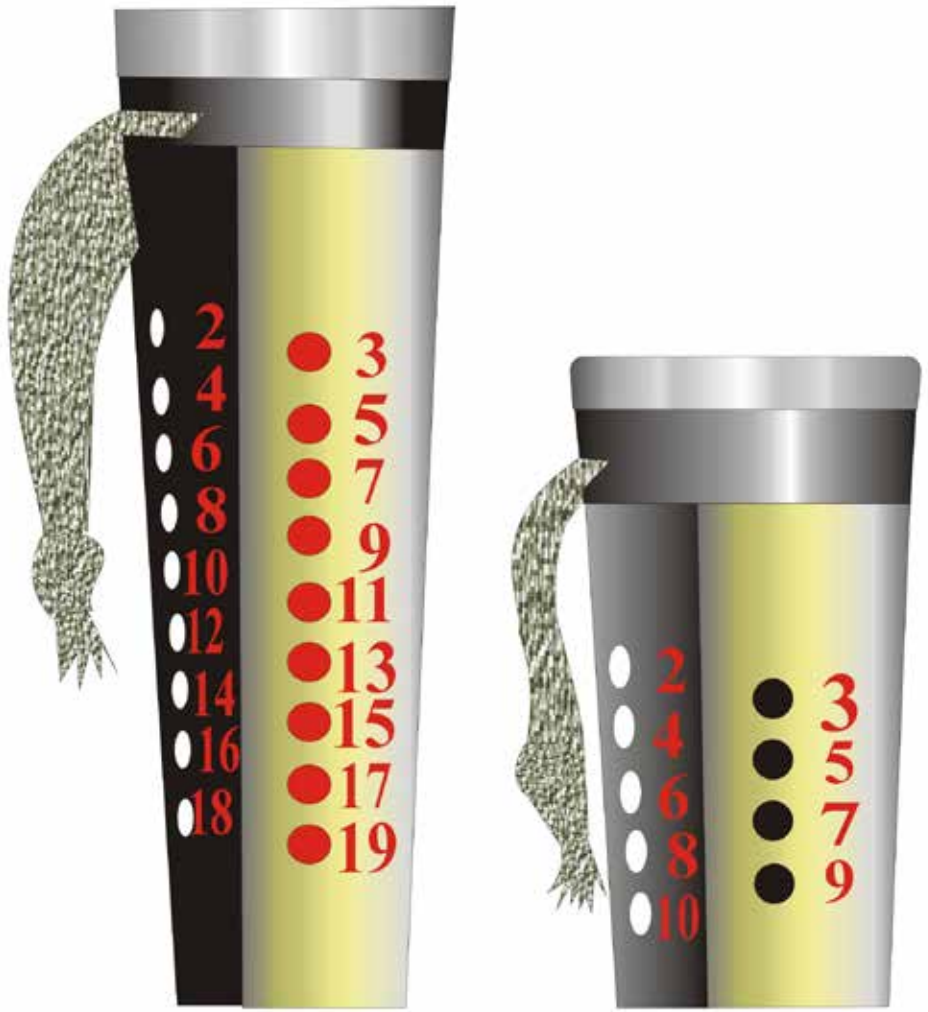
M.L. Rifle wooden time fuze



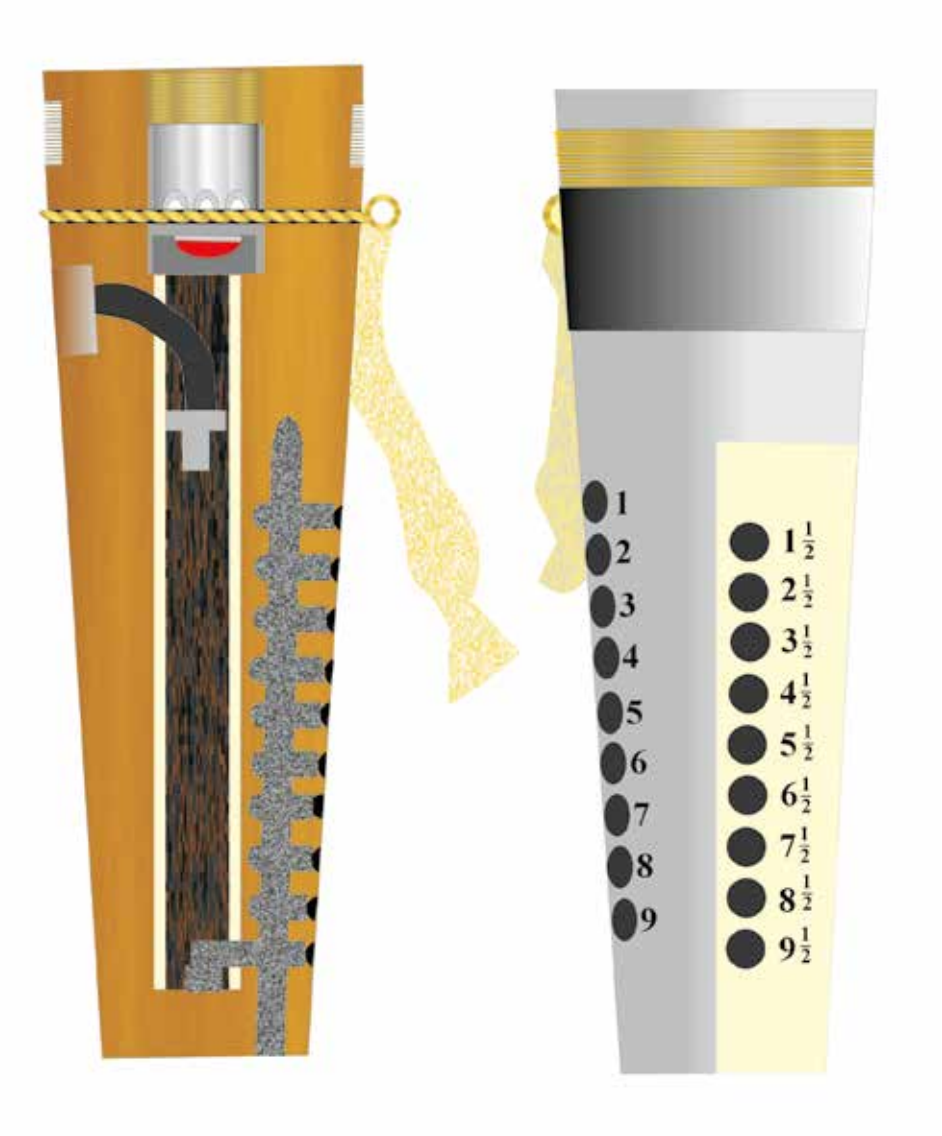
15 Second M. L. time fuze, special priming No.42



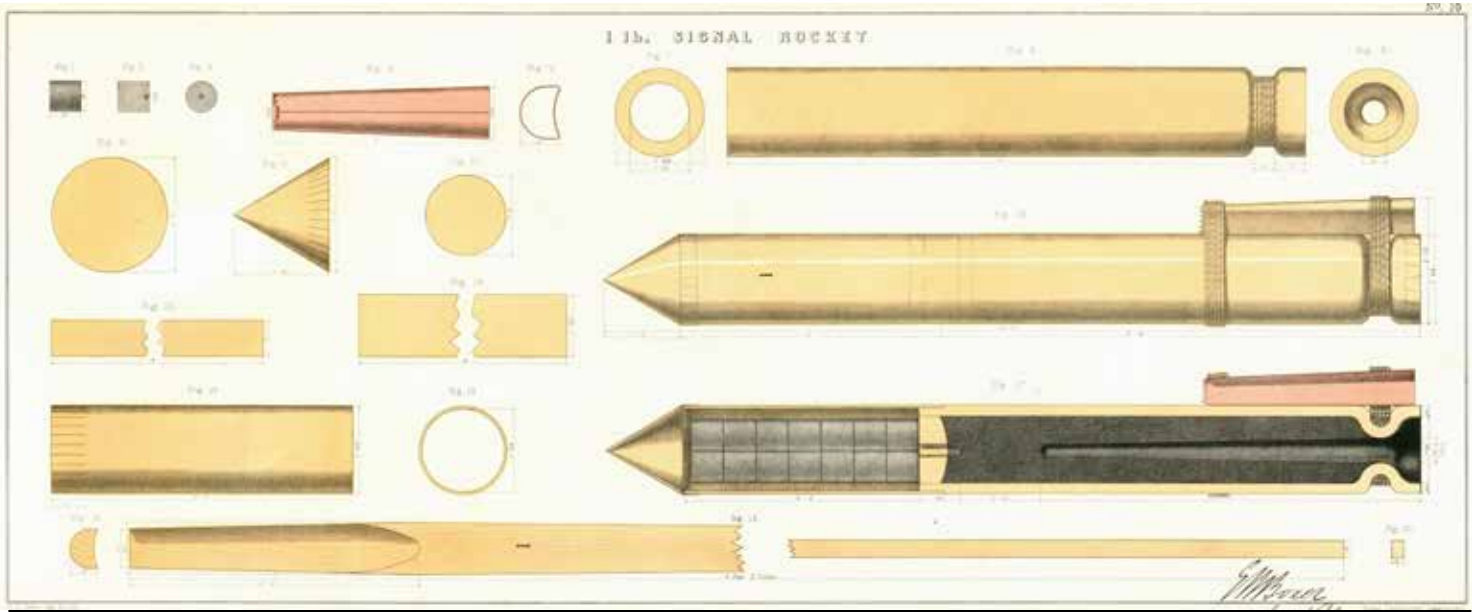
Wooden time fuze No 42 Mk. I



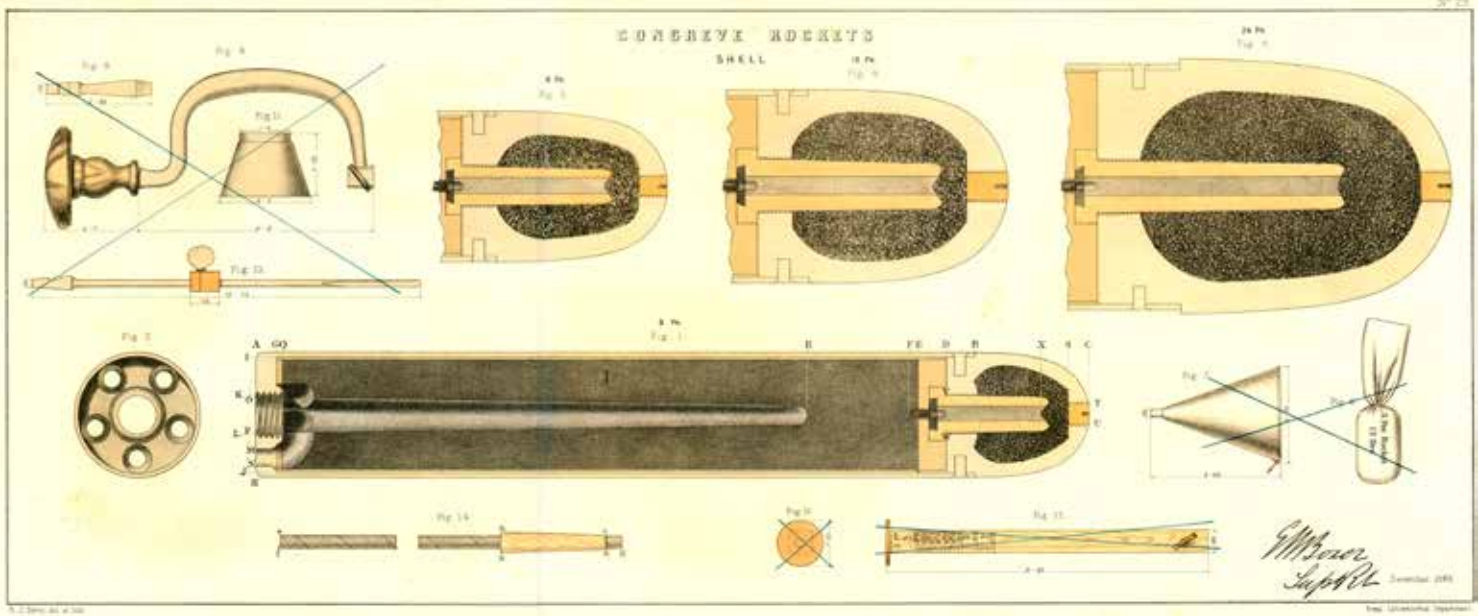
Wooden time fuzes for common (left) and diaphragm (right) shells



M. L. rifle wooden time fuze No. 43

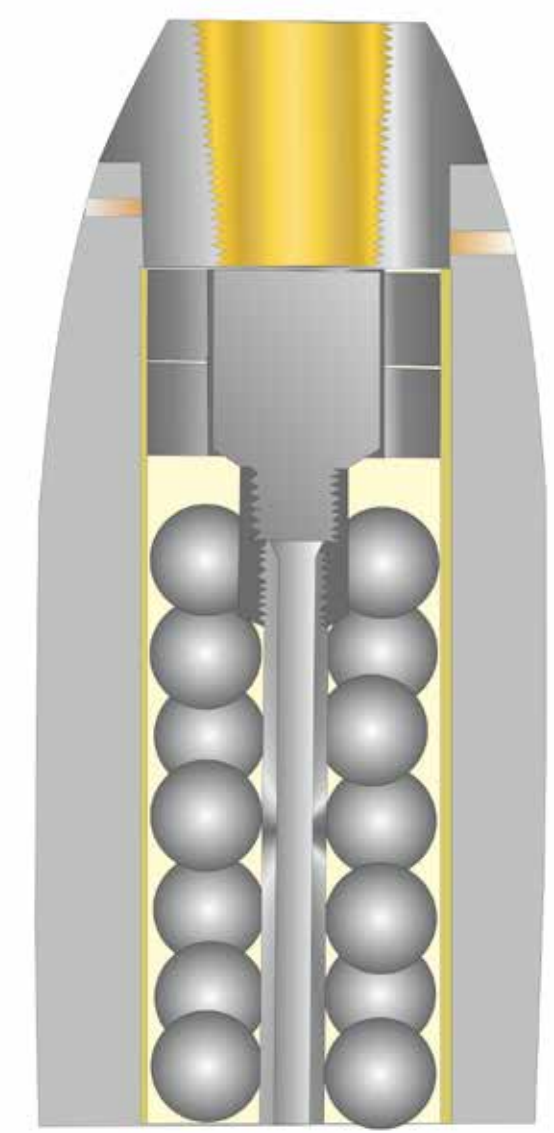


Patents

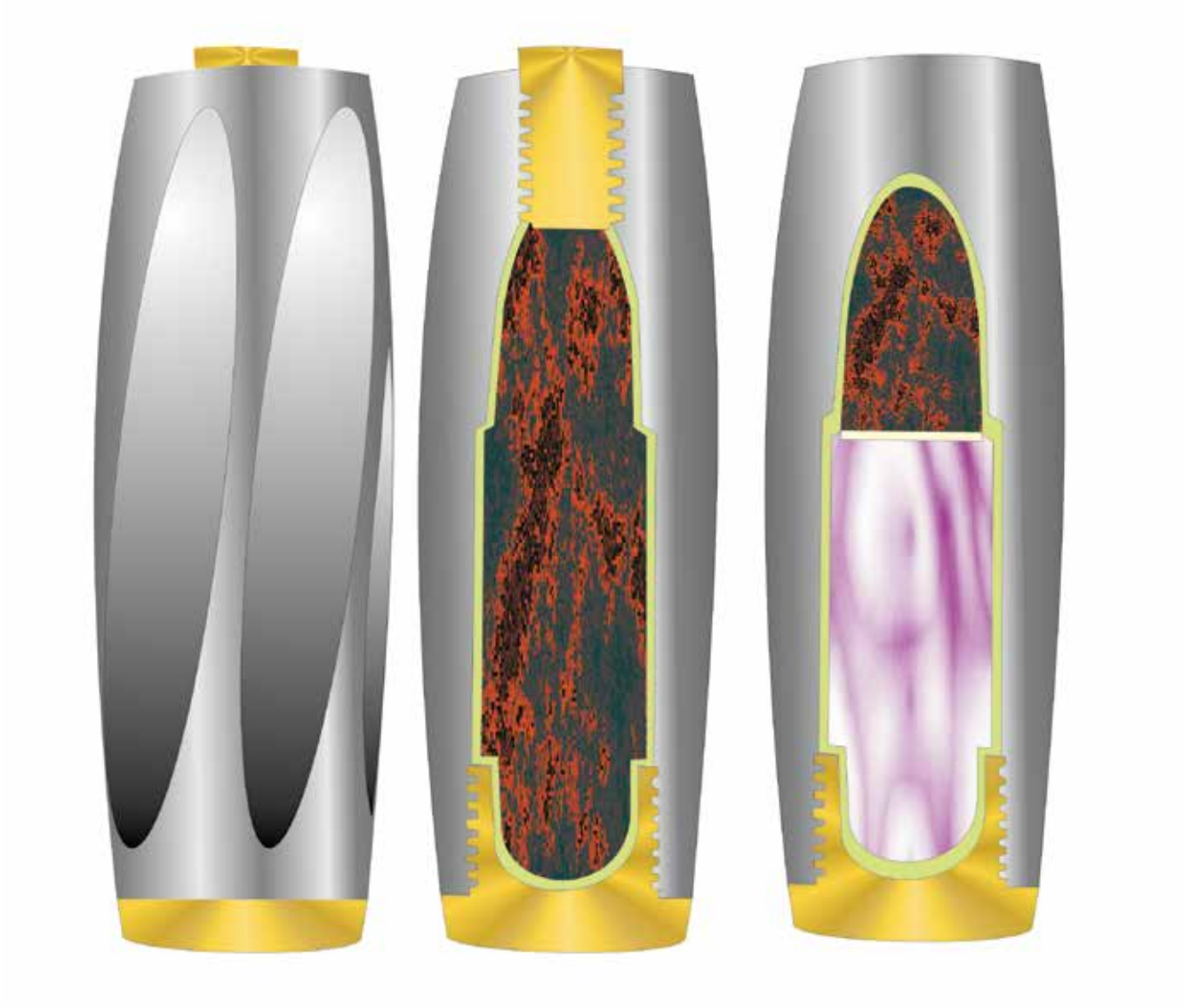




Blakely patent No 3087 projectile
9-inch bolt of 1864



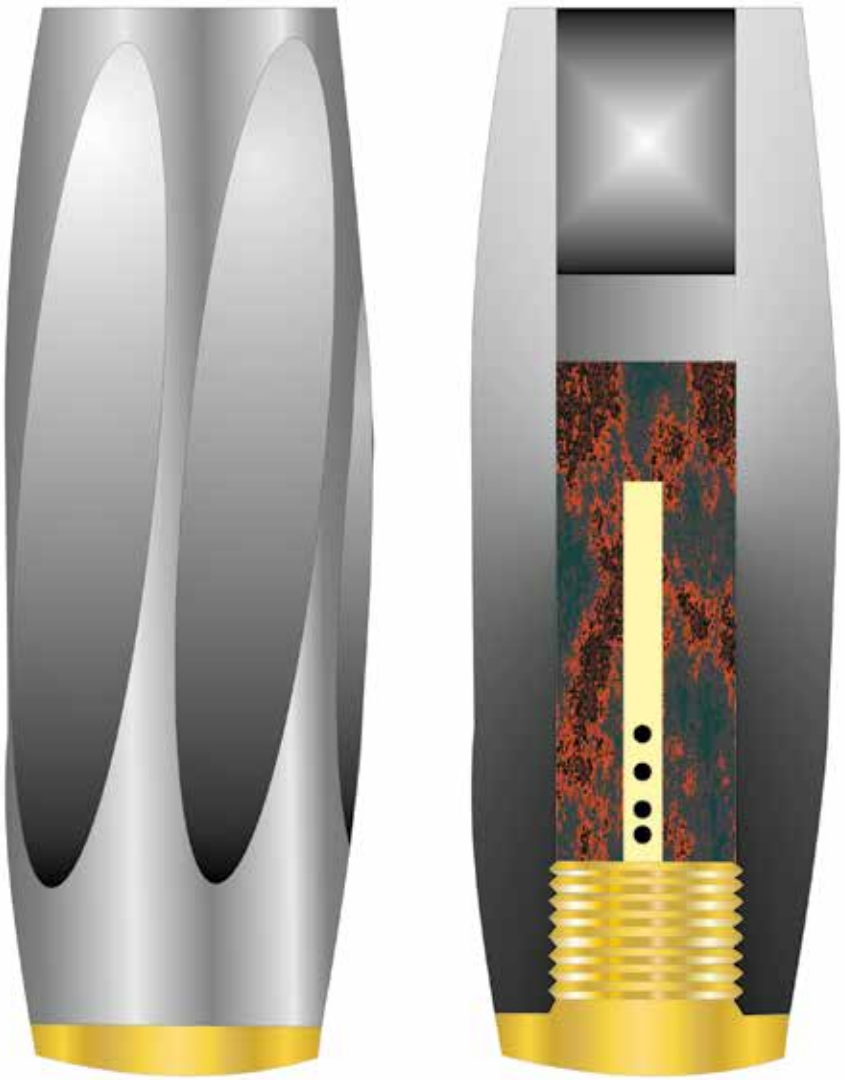
Boxer patent for Whitworth projectiles #1517



British Whitworth patent #1663



British Whitworth patent #1859



British Whitworth patent #261

Bartleson's Illustrated Civil War Ordnance Guide

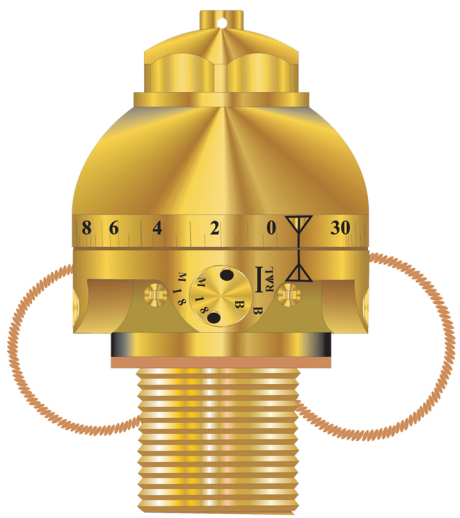
Provides readers 775 illustrations and sectional cutaways of ordnance items and fuzes used during the 1861–1865 United States Civil War.

All illustrations were meticulously and accurately drawn by John D. Bartleson Jr., a retired USN Explosive Ordnance Disposal (EOD) technician and Naval Officer, author and illustrator of the 1972 field guide for Explosive Ordnance Disposal (EOD) personnel entitled *Civil War Ordnance 1861–1865*.

Illustrations and sectional cutaways drawn from multiple sources, including radiographs, Bartleson's original 1972 publication, hand drawings, and specifications plates from the Royal Laboratories (circa 1865).

A visual compilation of Spherical Projectiles • Rifled Projectiles •Sabots • Torpedoes, Rockets, and Assorted Ordnance • U.S., Confederate States (C.S.), and British Fuzes • Patents

This work is intended to provide detailed sectional/cutaway drawings to inform readers of ordnance type-by-function and internal fuse functioning design. Potential users include current and future collectors, historians and academics, students, construction workers, law enforcement, Explosive Ordnance Disposal (EOD) technicians and artillerymen as an additional reference to consult to positively identify these hazardous relics using multiple sources.



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