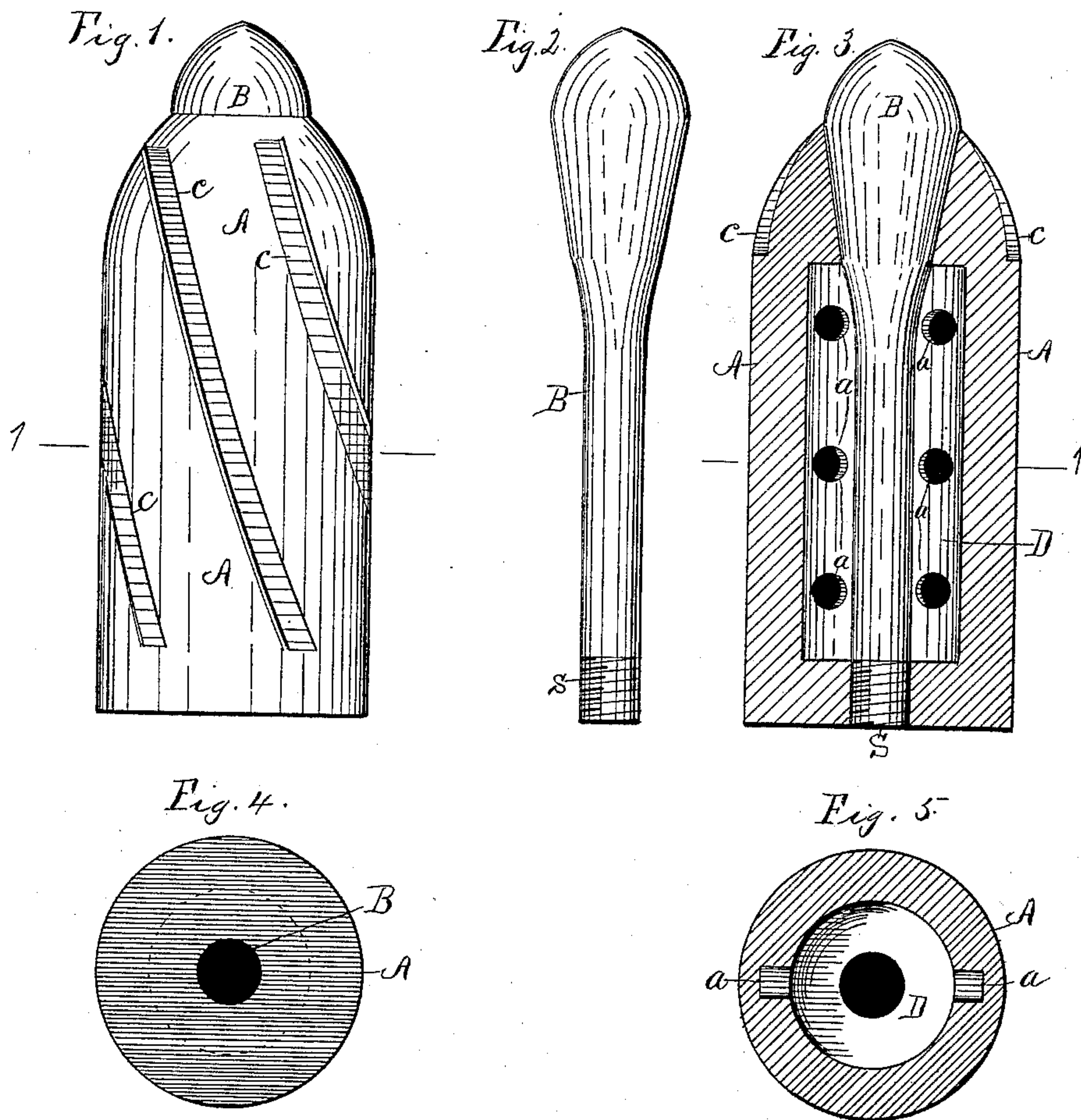


(No Model.)

C. TUNNICLIFF.  
PROJECTILE.

No. 451,088.

Patented Apr. 28, 1891.



Witnesses

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# UNITED STATES PATENT OFFICE.

CORNELIUS TUNNICLIFF, OF DENVER, COLORADO.

## PROJECTILE.

SPECIFICATION forming part of Letters Patent No. 451,088, dated April 28, 1891.

Application filed January 8, 1891. Serial No. 377,127. (No model.)

*To all whom it may concern:*

Be it known that I, CORNELIUS TUNNICLIFF, a citizen of the United States of America, residing at Denver, in the county of Arapahoe and State of Colorado, have invented certain new and useful Improvements in Projectiles, of which the following is a specification, reference being had therein to the accompanying drawings and the letters of reference thereon, forming a part of this specification, in which—

Figure 1 is a side view of the projectile complete as it would appear ready for use. Fig. 2 is a side view of the solid hardened steel bolt of the projectile detached from the shell. Fig. 3 is a longitudinal central section of the shell of the projectile and a side view of said bolt in its proper position within the shell. Fig. 4 is a view of the lower or rear end of the projectile; and Fig. 5 is a cross-section of Figs. 1 and 3, taken on line 1, looking down.

This invention relates to certain improvements in projectiles, which improvements are fully set forth and explained in the following specification and claims.

Referring to the drawings, A represents the shell of the projectile, having the central chamber D and the spiral grooves C arranged in its outer sides. Said shell is conoidal in form at its point, and is provided at that end with a central tapered aperture above the central chamber D for the reception of the tapered bolt B, having a conoidal point or head. The head of said bolt is tapered in its part within the said aperture of the shell, which aperture corresponds in form to that of said bolt. The lower or rear end of said bolt is screw-threaded, as shown at S, for the purpose of being screwed into that end of the shell to hold the bolt in place. The inner wall of the shell is provided with the chambers *a*, which are for the purpose of weakening the shell, so it can be the more readily split or broken in pieces by a concussion.

It is intended that the shell A is to be made of cast-iron, and the bolt B is to be made of hardened steel, so it will not break as readily

as the shell. No explosives are intended to be used within the shell.

In operation, when the projectile is fired from a gun the spiral grooves C cause it to have a rotary motion. When the bolt B strikes an object first and is arrested or partially arrested by the object struck, the momentum of the shell will be such as to cause it to be split into fragments by reason of the wedge-shaped head of the bolt B, and the rotary motion of the shell causes its fragments to be thrown radially from the bolt with the same force and effect as if the shell were exploded by means of explosives within its chamber. The force and character of the bolt is such that it will pass on into or through the object struck by it, while the shell is burst and flies in all directions. The screw-thread S on the end of the bolt is so small that it does not impede the progress of the shell forward when the bolt strikes an object. It is intended to have the exterior surface of the shell coated with lead or any other suitable softer substance to prevent injury to the gun from which it may be fired, and the projectile may be used as well in a smooth-bore gun as with one that is rifled. By this construction an explosive shell is obtained without the use of explosives contained within the shell, and the effectiveness of the bolt B is not lessened by the explosion or disintegration of the shell, but is rather improved when once separated from the shell.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is as follows, to wit:

1. The projectile shown and described, consisting of the combination of the shell A, having the chamber D and central tapered aperture at its point, and having the external spiral grooves C, and the bolt B, having the tapered head and a conoidal point and screw-threaded on its rear end S, substantially as and for the purpose set forth.

2. The combination of the shell A, having the chambers D and *a*, and a central tapered aperture extending from said chamber D through the point of the shell, and a screw-

threaded aperture in the shell at the opposite  
end of said chamber D, and the bolt B, hav-  
ing a conoidal point and formed to fit said  
tapered aperture, and having a screw-threaded  
5 rear end, substantially as and for the purpose  
set forth.

3. The combination of shell A, having the  
central longitudinal aperture and the screw-

threaded aperture in the base, and the bolt  
B, having a tapered head and conoidal point 10  
and screw-threaded rear end, substantially as  
and for the purpose set forth.

CORNELIUS TUNNICLIFF.

Witnesses:

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BERT O'BRIEN.