No. 55,796.

Sam. H. Haycock.

Patented June 19, 1866

Projectile.

Fig. 1.

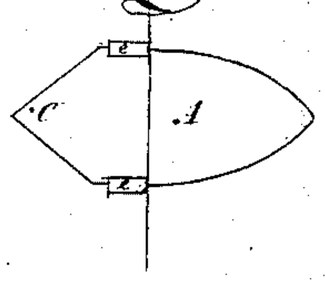
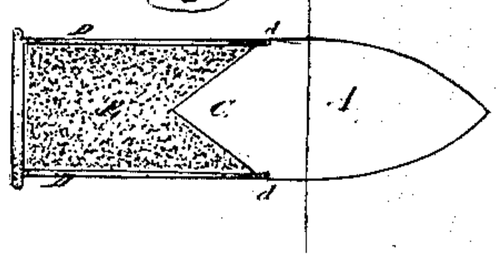


Fig. 2.



Witnesses
Edward H. Knight
C. Winton Haywood

Sam. H. Haycock

UNITED STATES PATENT OFFICE.

SAMUEL H. HAYCOCK, OF OTTAWA, CANADA WEST.

IMPROVEMENT IN PROJECTILES.

Specification forming part of Letters Patent No. **55,796**, dated June 19, 1866.

To all whom it may concern:

Be it known that I, SAMUEL HATT HAYCOCK, of Ottawa, in the county of Carlton, Canada West, have made new and useful Improvements in Projectiles; and I do hereby declare the following to be a full, clear, and exact description of the nature and construction of the same, sufficient to enable one skilled in the art to which it is allied to construct and use the same, reference being had to the accompanying drawings, which is made part of this specification, and in which—

Figure 1 is a sectional view of a projectile with a band upon it. Fig. 2 is a sectional view of a projectile in connection with a metallic capsule.

The invention consists of a bullet having a conical base or rear end, combined with a cylindrical portion and an elongated point, the center of gravity being in advance of the said cylindrical portion.

I am aware that the bases of projectiles have been rounded, forming a semi-spherical rear to the projectile, or some other rounded shape, and also that a round-faced projectile has been made with a conical rear or base; but I have found that such balls do not fly truly, but are apt to upset in their flight or at the moment of penetration, and this I ascribe to the faulty construction involving a misplacement of the center of gravity.

In balls with a flat or concave base great impediment to the flight of the ball is believed to be caused by the partial vacuum behind it. The air, being violently displaced by the forward end of the projectile, forms an eddy behind it without filling the space in its rear, somewhat analogous to the motion of the water in the wake of a moving boat of a parabolic horizontal water-section.

Inasmuch as it has been found necessary to give a taper to the ran of a vessel under the counter at the place where the water closes in again behind the vessel, so have I provided a conical rear end to the ball, so that the air closes in behind it more directly and with less disturbance, instead of leaving it flat or so rounded as to produce a partial vacuum in the rear of the ball.

I am not able to demonstrate to a certainty that the air closes in behind and hugs the surface of the rear end of the ball when it is made conical, as I propose; but I know that it flies better, and believe that there is less tendency in the ball when of that shape to produce a partial vacuum behind it; and, further, inasmuch as the air cannot be credibly claimed to occupy, at its ordinary pressure, the space in the rear of a flat or concave-based projectile when in rapid motion, I believe that to fill this space with a cone of lead will add to the weight without increasing the displacement or adding to the frictional surface of the ball in the bore of the piece. This benefit I believe to inure to my conical-based projectile, as well as the concomitant advantage of preventing or diminishing the partial vacuum presumed to be formed in the rear of projectiles of ordinary character.

The cylindrical portion, which fits against the lands of the bore, is expanded at its rear end by the force of the explosion exerted against the shoulder *d d*, Fig. 2, so as to occupy the grooves in the bore; or when a belt, *e*, Fig. 1, is used the rear edge of the same is similarly expanded for the same purpose.

In the drawings, A is the ball. In Fig. 1 a groove is formed around it for the attachment of a band of lead or other suitable material, the ball proper being made of cast-iron. The projectile represented in this figure may thus be adapted for ordnance. The conical rear is indicated by C, and the center of gravity is in advance of the said cylindrical portion, which extends forward to the red line.

In Fig. 2 the lead ball is shown in connection with a capsule or copper cartridge-case, D, the powder E, and flange on the capsule for priming and withdrawal, as commonly seen. A shoulder, *d*, is formed upon the ball, on which the end of the capsule fits, and this shoulder affords quite a sufficient surface for expansion by the force of the explosion to enable the ball to occupy the bore and utilize the result of the deflagration of the powder.

I am aware that bullets have been made of a conical shape with a flat base, or a slightly rounded base, or with a hemispherical base; and I am also aware that a bullet has been made whose hemispherical face and conical base have been united by a cylindrical portio : but in this case the center of gravity of th bullet has been within or in the rear of th said cylindrical portion, which is fatal to per

fect accuracy in the flight and impact of the projectile.

In my bullet the rounded face is so prolonged as to make a comparatively sharp point, and it embraces so large a portion of the metal of the projectile that the center of gravity is thrown forward of the cylindrical portion, which is a necessary feature where accuracy of motion is to be secured.

Having described my invention, what I claim therein as new, and desire to secure by Letters Patent, is—

An elongated pointed projectile, with a cylindrical portion to fit the lands of bore and a conical rear, the center of gravity being in advance of the cylindrical portion.

To the above specification of improvement in projectiles I have signed my hand this 4th day of June, 1866.

SAML. HATT HAYCOCK.

Witnesses:
W. F. HALL,
C. BURTON HAYCOCK.