S. H. HAYCOCK.

Projectiles.

No. 137,442. Patented April 1, 1873.

FIG. 1.

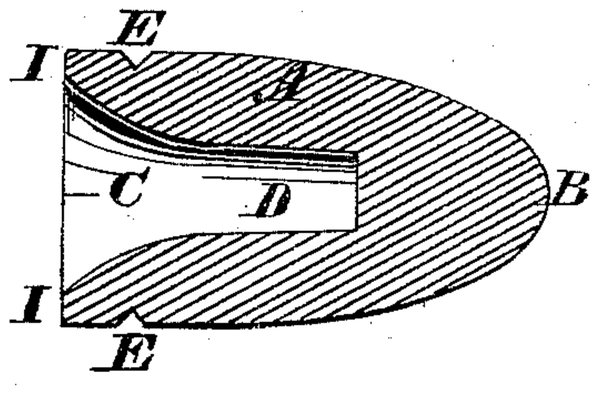
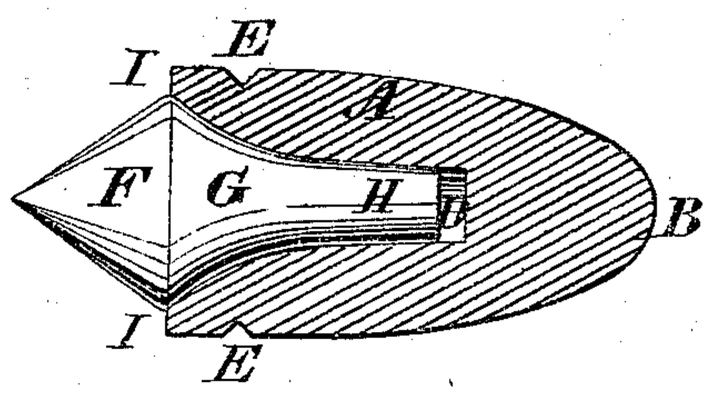


FIG. 2.



WITNESSES:

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UNITED STATES PATENT OFFICE.

SAMUEL HATT HAYCOCK, OF OTTAWA, CANADA.

IMPROVEMENT IN PROJECTILES.

Specification forming part of Letters Patent No. **137,442**, dated April 1, 1873; application filed January 6, 1873.

To all whom it may concern:

Be it known that I, SAMUEL HATT HAYCOCK, of Ottawa, in the county of Carleton, in the Province of Ontario, and Dominion of Canada, civil engineer, have invented a new and useful Projectile, of which the following is a specification:

Nature and Objects of the Invention.

This is an improved form of those leaden or other material projectiles or bullets (for use with rifled guns or ordnance) which have a conical or conoidal advancing end and a hollow cylindrical body occupied by a "tige" or plug of lighter material, which operates, in firing, to expand the rear portion of the bullet into the bore and rifles of the gun, and assists in guiding the projectile steadily in its flight.

General Description.

Figure 1 is an axial section of the bullet proper of a projectile embodying my invention. Fig. 2 represents such projectile complete, the bullet proper being shown in axial section, and the tige being represented *in situ* within the said bullet.

The bullet proper is of lead or other suitable metal, and is cylindrical, A, from its rear extremity to about its mid-length, whence it tapers to a point, B, preferably of the represented conoidal form. The rear extremity I of the bullet is rectangular with respect to its sides, and has, coincident with its axis, a cavity, C, which, converging conically inward nearly to the center of the bullet, gradually merges into a cylindrical or approximately cylindrical termination, D. The bullet has, near its rear extremity, a circumferential groove, E, for attachment of the cartridge-capsule. The cavity C D is nearly filled by the forward part of a plug or tige, preferably of wood, having at rear the form of an entire cone, F, to which is joined, base to base, a truncated cone or frustum, G, from whose inner extremity projects a cylindrical nose or extension, H. When put together, the conical portion of the cavity is occupied by the frustum G, and the cylindrical portion of said cavity is partly occupied by the cylindrical termination H, so as to leave a small unoccupied chamber or cavity in front of the tige within the bullet. The conical portion F of the plug extends axially in rear and wholly outside of the bullet. The projecting portion F of the plug should be sufficient to entirely fill the vacuum-space at the heels of the projectile caused by the displacement of the atmosphere during its flight. Were this vacuum not thus filled, "atmospheric motion" at the rear would ensue, causing obstruction of the projectile, and the still more serious evil of gyrating eddies of air tending to divert it from its true course. In consequence of the rear-projecting cone F, the flight of the projectile will not be entrammeled by atmospheric currents of its own creation, and speed and penetrating power will thereby be secured. By proper proportion and angle of the cavity C D, it is easy to secure the several objects of advanced center of gravity, secure retention of the plug, effective spread of its butt, and sufficient area of the annular surface I of the butt to utilize the propulsive force of the explodent. To insure steadiness, I give to the hollow bullet and its plug such relative forms and proportions as to place the center of gravity in front of the center of bulk.

Operation.

A suitably-charged cartridge shell or capsule being attached to the rear of the bullet by means of the groove E, and the projectile being placed in the breech and the piece fired, the concussion of the discharge operates to drive the plug forward so as to nearly or quite fill the cavity D, and by so doing to expand the rear portion of the bullet, and thus to fill the bore of the gun and to crowd the metal of the bullet into the rifle-grooves. This operates to completely "chamber the charge," and to conserve its entire energy for expulsion of the projectile, and it at the same time insures an effective rotation of the projectile in its passage along the bore. The parabolic conoidal form of head reduces to a minimum the atmospheric resistance, and thus conserves the initial energy, and secures the greatest force and accuracy of impact. The cylindrical form of the body is useful in holding the bullet to true coincidence with its trajectory, and that with the least possible atmospheric friction. The rear termination F of the plug discharges

the functions of a rudder or guiding-tail, which co-operates with the pointed and preponderating head to hold the projectile in its trajectory, while the conical form of said rear termination becomes effectual in reducing to a minimum the atmospheric suction which in the ordinary "blunt-tailed" bullet is so serious a drawback to its velocity.

It is believed that the above-described projectile can be made to reach a given object with a less elevated trajectory and correspondingly smaller charge of powder or other explodent, and with greater force and accuracy than one not so constructed. The cylindrical nose or front termination H of the plug F G H, tightly fitting the bore of the corresponding chamber D of the cavity C D, is of vital importance, serving as it does to hold the plug firmly and accurately in line, and so tightly as to insure its retention within the bullet, and it is also of the greatest value when driven inward by the explosion of the charge, as already explained, in guiding and holding the plug to a truly axial path within the bullet.

Claims.

I claim as my invention—

1. The projectile herein described, composed of an elongated body, A B, and a plug, F G, of lighter material, formed with a conical or tapering rear end.

2. The construction of the plug F G with a cylindrical forward end, H, fitting a corresponding cavity in the projectile A B, so as to hold the parts more securely together before use, and permit more free movement of the plug.

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Witnesses:
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