2 Sheets—Sheet 1.

C. E. BALL.

PROJECTILE.

No. 187,746. Patented Feb. 27, 1877.

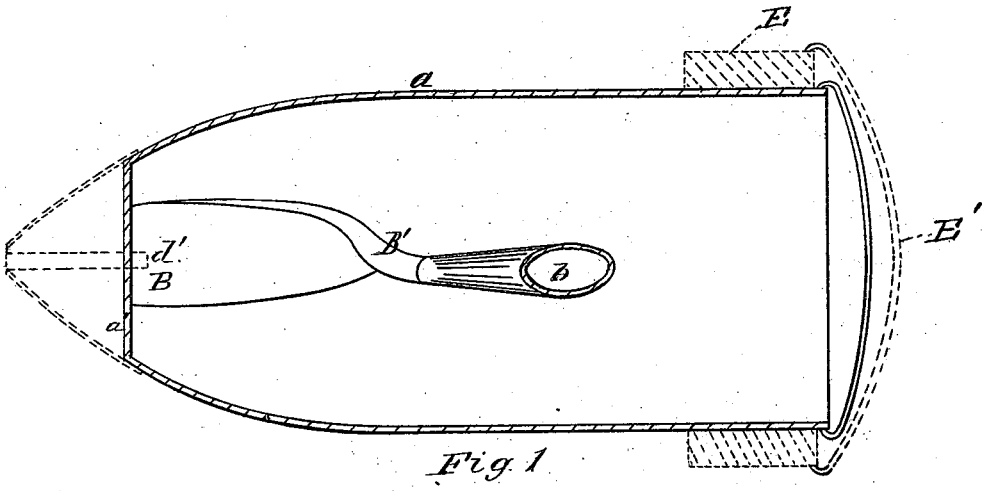

Fig. 1

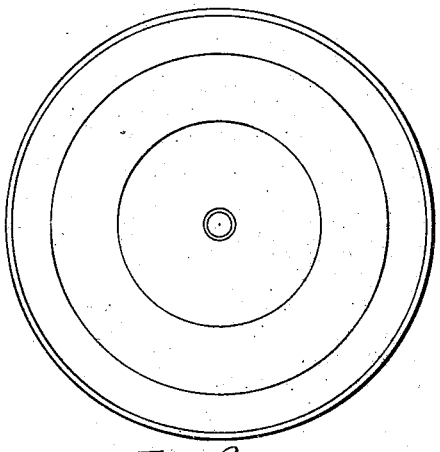

Fig 2.

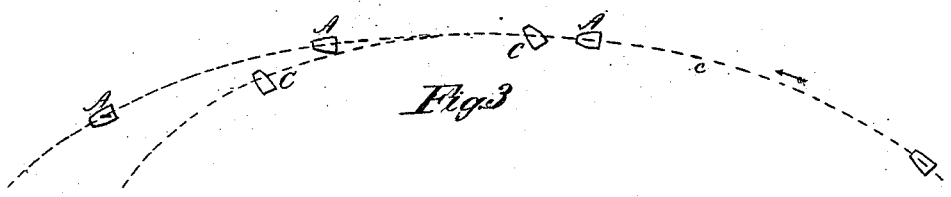

Fig 3

Witnesses

F. Frank Hartman

Jos. P. Connolly

Inventor

By Chas E. Ball

Connolly Bros. Attorneys

2 Sheets—Sheet 2.

C. E. BALL.

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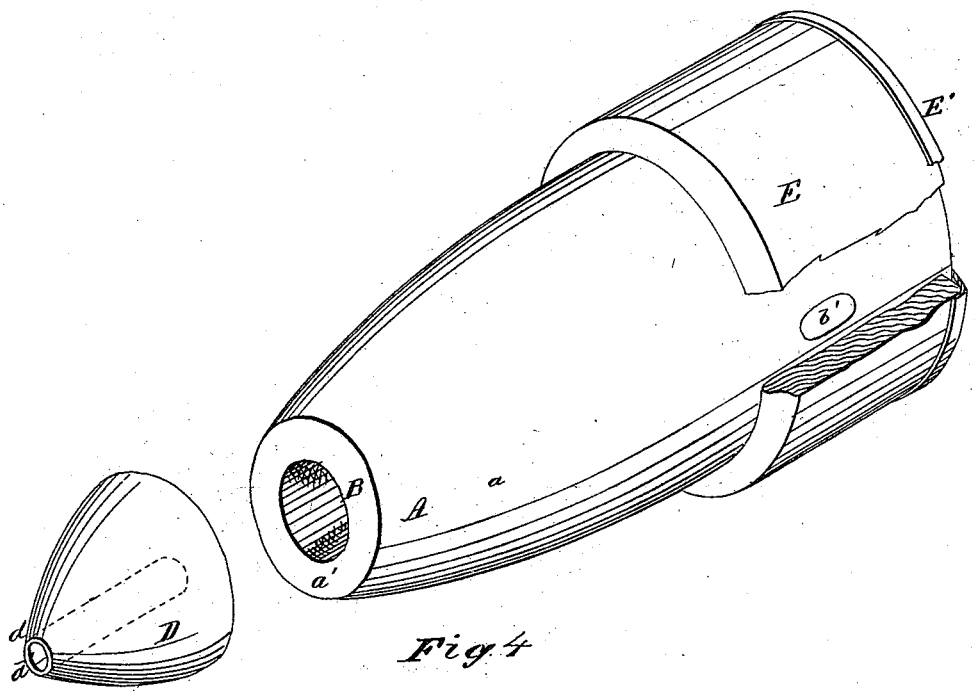

Fig 4

Witnesses
Jos. P. Connolly
A. Fischer

By Chas E. Ball
Connolly Bros

Inventor

Attorneys

UNITED STATES PATENT OFFICE.

CHARLES E. BALL, OF PHILADELPHIA, PENNSYLVANIA.

IMPROVEMENT IN PROJECTILES.

Specification forming part of Letters Patent No. **187,746**, dated February 27, 1877; application filed November 7, 1874.

To all whom it may concern:

Be it known that I, CHARLES E. BALL, of Philadelphia, in the county of Philadelphia, and State of Pennsylvania, have invented certain new and useful Improvement in Projectiles; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use it, reference being had to the accompanying drawings, which form part of this specification, in which—

Figure 1 is a central longitudinal section of my invention. Fig. 2 is a front end view. Fig. 3 is a diagram, showing comparative movements of projectiles; and Fig. 4 is a perspective view of projectile with frusto-conical cap displaced.

My invention consists of a projectile having a flat face, in which is formed a recess for the reception of grease or other suitable lubricant. This recess is continued in the form of a twisted or spiral channel, diverging into two straight tubes, which pass out of the projectile at the sides near the rear end, said channel and tubes being for the purpose of allowing the lubricant and air-currents to pass therethrough, so as to grease the bore and give the necessary rotary motion to the projectile.

My invention also consists in the provision of a conical cap or end adapted to fit over the flat or square face of the projectile, and to be used when it is desired to ricochet.

My invention further consists in the combination, with a projectile having air-channels terminating in the sides, as described, of an encircling band or collar of wood secured to the rear of the projectile, and provided, if desired, with a suitable base or wall, said band being of diameter equal to the bore of the piece from which it is shot. This band is intended to adhere to the projectile only till the latter leaves the mouth of the weapon by which it is discharged, at which moment, it being shattered by concussion, the air-currents passing through the channel and tubes already described will cause it to fly to pieces, allowing the projectile to proceed alone on its course.

Referring to the accompanying drawing, A shows a projectile having a smooth surface, *a*, and a flattened or square face, *a'*. B is a central opening or recess in the face *a'* continued to form a twisted or spiral channel, B', which diverges into two straight tubes, *b b*, terminating in openings *b' b'* in the side *a*. When a projectile of this construction is shot from a piece of ordnance it meets obviously with a certain amount of resistance from the atmosphere amounting to a positive impact on the face *a'*. This resistance is utilized by the improved construction shown, which causes the air to pass through the channel B' and tubes *b b*, giving a rotary or rifled motion to the projectile, and serving at the same time to keep its longitudinal axis parallel to, or in a line with, its trajectory from the beginning to the end of its flight.

In Fig. 3 I have illustrated the positions which a projectile of this construction will assume, as distinguished from ordinary rifled projectiles. A represents my improved projectile, and C a projectile of the ordinary construction. D represents a frusto-conical cap to be applied to the face of the projectile A, when it is desired to ricochet with the latter.

This cap has an opening at its point *d* continuing in the form of a channel or tube, *d'*, until it meets and registers with the recess B entering said recess for a short distance, as shown plainly in the drawing. The air enters through the opening *d*, and is conducted through the tube *d'* into the recess B, passing thence through the spiral channel B', and finding its exit through tubes *b b*, whereby the rotary or rifling motion of the projectile is secured and wabbling prevented, as already described. E is a wooden collar or band applied to the rear end of the projectile. This band is simply driven on the projectile without being secured by pins or other equivalent devices, so that when the projectile leaves the mouth of the cannon or other shooting-arm said band being shivered to pieces by the shock, concussion, or friction, and being forced off by the air-currents issuing from the opening *b' b'*, will leave the projectile, permitting the latter to proceed on its flight alone.

What I claim as my invention is—

1. The combination, with a projectile having the spiral diverging air and grease channels B', beginning at its flat end and terminating at its sides, of the wooden sabot E covering

the rear end-openings of said channels, so as to be shattered by the issuing currents when the shot is discharged, substantially as described.

2. The separable projectile point B, having a central longitudinal aperture, d', for the admission of air to the air-channels of the projectile, substantially as shown and described.

In testimony that I claim the foregoing I have hereunto set my hand this 26th day of October, 1874.

CHARLES E. BALL.

Witnesses:
JNO. A BELL,
M. DANL. CONNOLLY.