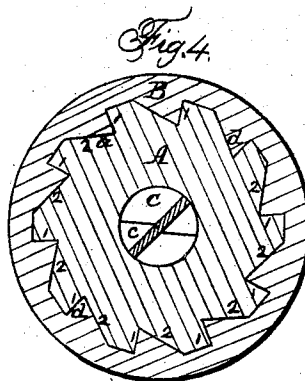
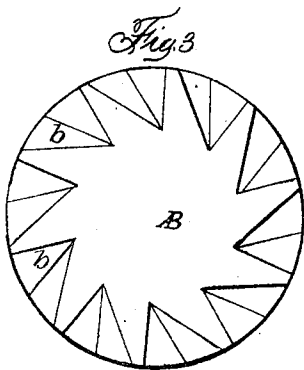
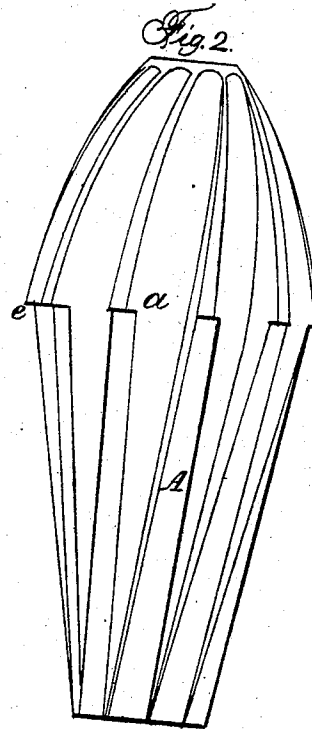
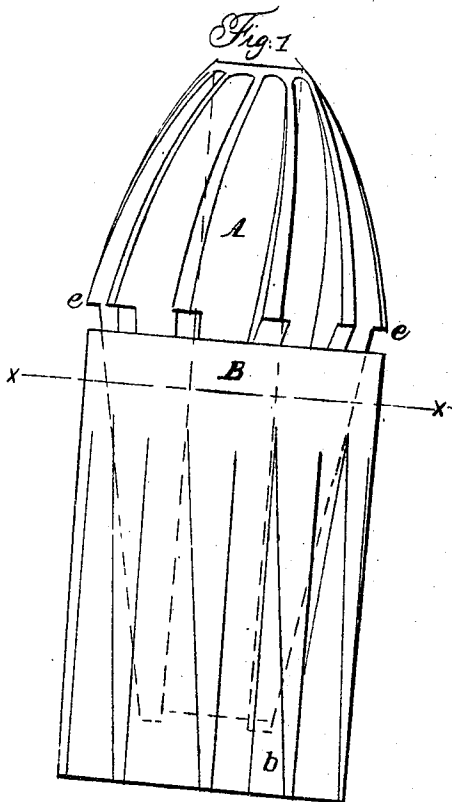


J. A. WOODBURY.

Projectile.

No. { 2,859, }  
 { 33,863. }

Patented Dec. 3, 1861.



*Witnesses*  
*Oscarus Wright*  
*Edw. J. Smith*

*Inventor*  
*J. A. Woodbury*  
*attg*

# UNITED STATES PATENT OFFICE.

JAMES A. WOODBURY, OF BOSTON, MASSACHUSETTS.

## IMPROVEMENT IN PROJECTILES FOR SMOOTH-BORED ORDNANCE.

Specification forming part of Letters Patent No. 33,863, dated December 3, 1861.

*To all whom it may concern:*

Be it known that I, JAMES A. WOODBURY, of Boston, in the county of Suffolk and State of Massachusetts, have invented a new and useful Improvement in Projectiles; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 is a plan of my improved projectile complete. Fig. 2 is a similar view with the sabot removed. Fig. 3 is a rear elevation of the sabot. Fig. 4 is a transverse section at *x*, Fig. 1.

Similar letters of reference indicate corresponding parts in the several figures.

The nature of my invention consists, first, in forming the external oblique channels by which rotation is imparted to the shot of greatest depth at the greatest diameter of the shot, and decreasing gradually in depth toward the front and rear, in order to present the smallest possible area of resistance to the passage of the shot through the air, apply the greatest lateral pressure of the air at the point where it can exert the greatest rotative force, and provide for the easiest possible reception, passage, and delivery of the current; second, in the use of a sabot spirally or obliquely winged or grooved, so as to receive rotation by the action of the escaping gases in the act of firing, in combination with a projectile winged or grooved in the opposite direction, so as to receive rotation by the action of the atmosphere during the flight of the shot, as hereinafter explained.

To enable others skilled in the art to make and use my invention, I will proceed to describe its construction and operation.

A is the projectile proper, and B the sabot. The external form of the front part of the projectile is conoidal or spheroidal, converging forward. The rear part (being, say, three-fifths of the whole length) is in the form of a conic frustum converging backward.

*a a a* represent a series of oblique or spiral grooves or channels, commencing at or near the front end of the projectile, increasing in depth until reaching the greatest diameter of the shot, and thence decreasing backward to the rear end. The increase in the depth of the channels is not, however, so great as the

increase in the diameter of the shot toward its center. Consequently the bottoms of the channels as well as the outer surface of the shot approach the axis toward each end.

C is a cylindrical aperture extending completely through the shot from end to end.

*c* is a screw-flange extending completely across the said aperture and as far endwise as may be desired, which flange is intended to cooperate with the channels *a* in causing the rotation of the shot by the action of the atmosphere during its flight. The office of the sabot B is to give direction to the shot in its passage through the bore, close the windage so far as may be desirable, and protect the channels *a* from the disadvantageous action of the gases escaping in the act of firing. The sabot is accordingly formed to fit over the rear of the shot, and approaches on its exterior to a cylindrical form, but it is further provided with a series of oblique or spiral channels, *b*, beginning at the distance of, say, one inch from the front of the sabot and increasing rapidly in depth to the rear end. The office of the said channels is to inaugurate, by the action of the escaping gases, a rotation which will be kept up and perhaps increased by the action of the atmosphere upon the faces *l* of the channels *a*. The obliquity of the channels *b* is accordingly opposite in direction to that of the channels *a*, in order that both may operate in the same direction upon the shot. To secure the communication to the shot of any rotation imparted to the sabot by the escaping gases, the sabot is provided in its interior with projections *d*, fitting within the channels *a*, as clearly shown in Fig. 4. In the illustration here given the shot passes into the sabot until arrested by its increasing size. If preferred, they may fit more loosely, the sabot extending forward to shoulders *e* upon the shot, in order to prevent any danger of locking together so tightly in firing as to prevent the shot from disengaging itself from the sabot.

In using this invention the purpose is to leave sufficient windage between the front part of the sabot and the bore as to permit some escape of gas, in order to enable it to act upon the channels *b*. This imparts a rotary motion to the shot before leaving the gun, which motion is continued in the same direction by the action of the atmosphere in the channels *a*. The instant the sabot is relieved

of pressure from behind the resistance of the atmosphere against its forward end causes the shot to pass out of it—an effect which is promoted by the action of the air upon the channels *b* tending to arrest the rotation of the sabot. The shot thus released passes through the air with but slight resistance, the atmosphere rushing freely through the channels *a* and acting throughout the whole length of the shot upon the faces *1*, thus continuing and increasing the rotation which has been begun.

I am aware that spirally-winged bolts have previously existed, and do not desire to be understood as claiming any device consisting of wings projecting from a mere shaft or spindle of small diameter.

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

1. Channeling or grooving, in the manner explained, the surface of an elongated projectile tapering toward both ends, for the purpose of producing the greatest rotative force with the least possible atmospheric resistance.

2. The use of a sabot spirally or obliquely winged or grooved, so as to receive rotation by the action of the gases escaping in the act of firing in the described combination with a projectile spirally winged or grooved in the opposite direction, so as to receive a corresponding rotation by the action of the atmosphere during its flight.

JAMES A. WOODBURY.

Witnesses:

OCTAVIUS KNIGHT,  
L. W. BENDRÉ.