W. H. SMITH.

Projectile.

No. 47,754. Patented May 16, 1865.

Fig: 5.

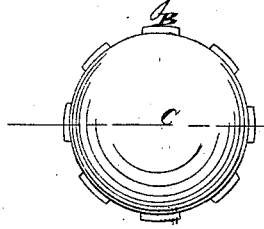


Fig: 4.

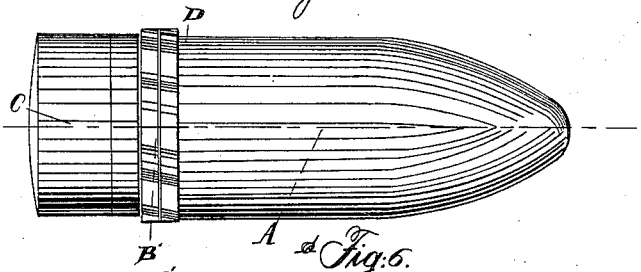


Fig: 6.

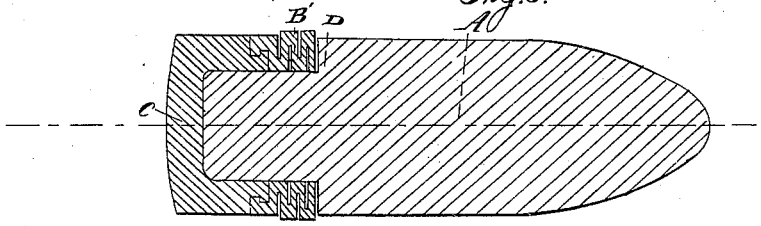


Fig: 3.

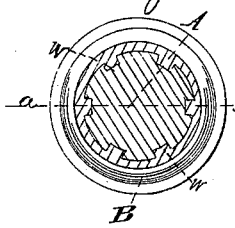


Fig: 1.

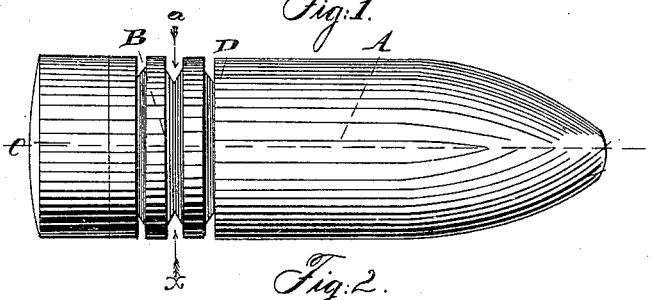
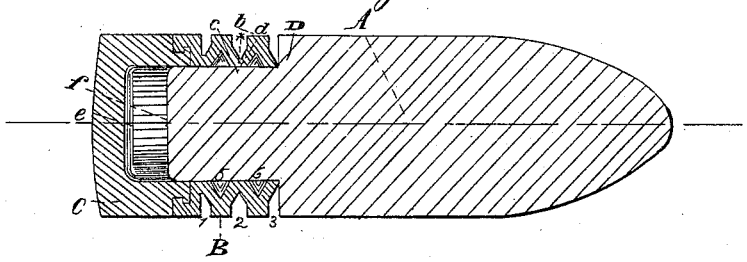


Fig: 2.



Witnesses

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UNITED STATES PATENT OFFICE.

WILSON H. SMITH, OF BIRMINGHAM, CONNECTICUT.

IMPROVEMENT IN PACKING PROJECTILES FOR RIFLED ORDNANCE.

Specification forming part of Letters Patent No. **47,754**, dated May 16, 1865.

To all whom it may concern:

Be it known that I, WILSON H. SMITH, of Birmingham, in the county of New Haven and State of Connecticut, have invented a new and useful Improvement in Projectiles for Rifled Ordnance; 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, forming part of this specification.

My invention relates to that class of projectiles in which the body of the shot or shell is provided with an expansible packing ring, which is forced outward or against the lands of the gun and into the grooves by the action of a longitudinally-sliding base-piece, fitted over and around a tail-piece of the body of the shot; and my invention has for its object to regulate or control the extent of expansion or distension of the packing-ring, so that the latter may not be forced outward against the lands of the gun to any greater extent than is sufficient to cause it to perfectly fill the bore and grooves (and properly rotate the shot) and thereby avoid all unnecessary and detrimental wedging or forcing of the packing-ring against the walls of the bore; and to these ends my invention consists in the employment of a corrugated or grooved packing-ring, in combination with a sliding base-piece or follower, said packing-ring and follower being arranged upon the body of the shot in such a manner that the extent of motion of the follower is limited, as hereinafter more fully explained.

To enable others skilled in the art to fully understand my invention, I will proceed to describe it with reference to the drawings.

Figure 1 is an elevation of my improved projectile. Fig. 2 is a longitudinal central section of the same, and Fig. 3 is a cross-section at the lines *a x*, Fig. 1. Figs. 4, 5, and 6 are, respectively, an elevation, a back view, and a longitudinal section of my improvement, representing its appearance after the packing-ring has been distended or expanded.

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

A is the body of the shot or shell, and is cylindro-conoidal in form, and is contracted near its base, forming the shoulder D, and is then continued to its rear end in a cylinder of smaller diameter, concentric with the body A. Upon this smaller cylinder is fitted a corrugated or grooved packing-ring, B, (having its forward edge resting against the shoulder D,) extending nearly to the rear end of A, having the follower C attached to it, which forms the base of the projectile. The packing-ring is made by casting it in a metal mold of proper form, and is united to the follower at the same time. The follower being set in the mold, the molten metal is poured in and runs around and into the groove, (shown on the edge of the follower,) thereby uniting them permanently.

The portion of the body A on which the packing-ring B is put is formed with ribs or depressions W, running longitudinally, upon which the packing-ring fits, to prevent the latter from turning on the shot; or said body A may be octagonal, or any other desired shape, to prevent the slipping or twisting around (by the power exerted to follow the grooves) of the packing-ring. The packing-ring and follower being fitted upon the body A, they are all turned off together to such a size that they will fit easily within the lands of the gun.

The angle of corrugation or the angle of the sides of the grooves of the packing-ring may be made such that upon being forced into a straight line, perpendicular to the axis of the body A, the circumference will be expanded sufficiently to fill the grooves of the gun, and no more, thus relieving the gun from the powerful wedge-like action that an ulimited expansion would allow.

In the small (triangle) figure, indicated by dotted lines in Fig. 2 and the small letters *c d b*, it will be seen that by swinging the line *c d* from the center point, *c*, until it coincides with *c b* the expansion will be denoted by the difference between the two distances *c b* and *c a*, (*c a* being the perpendicular distance from *c* to the surface of the projectile,) which is the distance *a b*. This distance should be equal to the depth of the grooves in the gun, with an allowance made for windage or the difference between the diameter of the shot and the bore of the gun. The sum of the spaces 1 2 3 and 5 6 are equal, and the space from *c* to *f*, between the follower and body the A, is also equal to 1 2 3. Therefore, when the follower C is forced against the body A the spaces will all be closed, and the packing ring will be expanded, as shown in Figs. 4 and 6, and forced

into the grooves and against the lands of the gun, thereby imparting a gyratory motion to the projectile, corresponding to the spiral of the grooves of the gun, which keeps the axis of the projectile parallel with the trajectory throughout its flight, causing the shot or shell to strike on its point or forward end, instead of its side, as an imperfect packing-ring would do.

It will be seen that since the corrugated packing-ring is forced together or has its grooves closed by the forward motion of the follower, and that since said follower is limited in its extent of motion, the packing-ring cannot be forced outward or expanded any more than is necessary.

I do not claim, broadly, the follower when combined with a packing-ring, for this is old; but

What I do claim as my invention, and desire to secure by Letters Patent, is—

The employment, in combination with the projectile, of a corrugated or grooved packing and a follower or tail-piece, the whole arranged to operate in the manner and for the purpose substantially as set forth.

WILSON H. SMITH.

Witnesses:

THOMAS B. DE FOREST,

FITCH SMITH.