W. H. SMITH.

Projectile.

No. 44,669. Patented Oct. 11, 1864.

Fig. 1

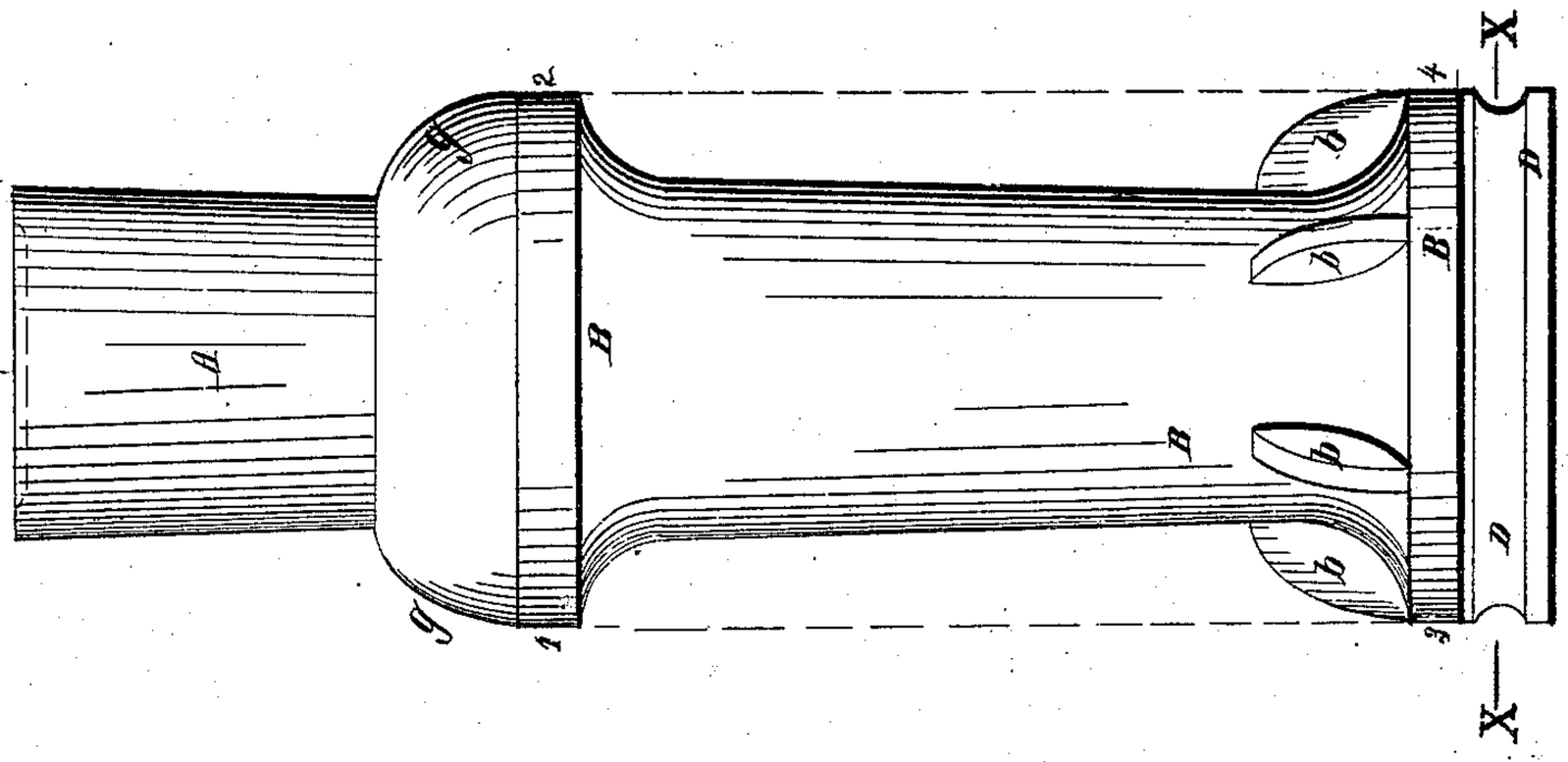


Fig. 2

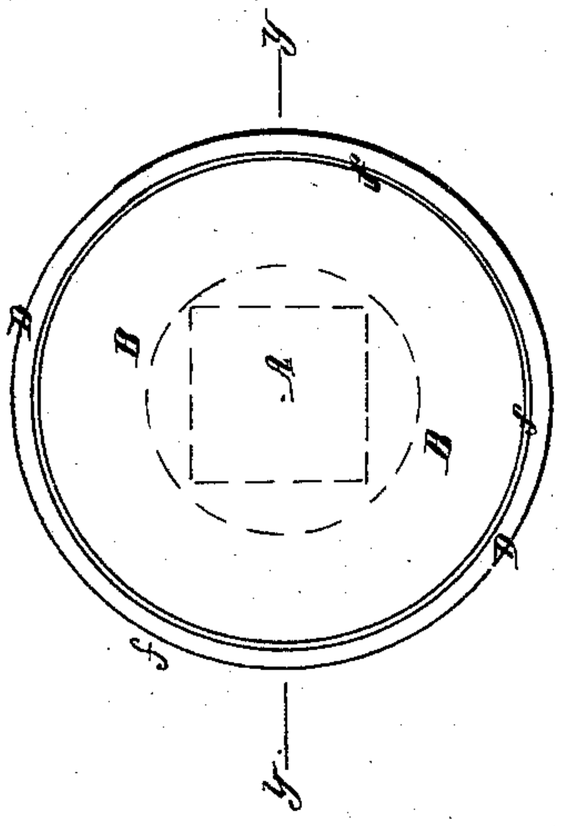


Fig. 4

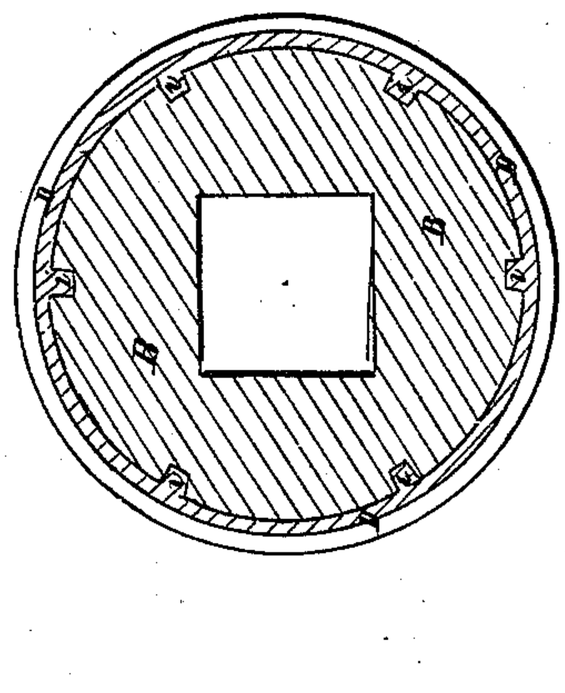
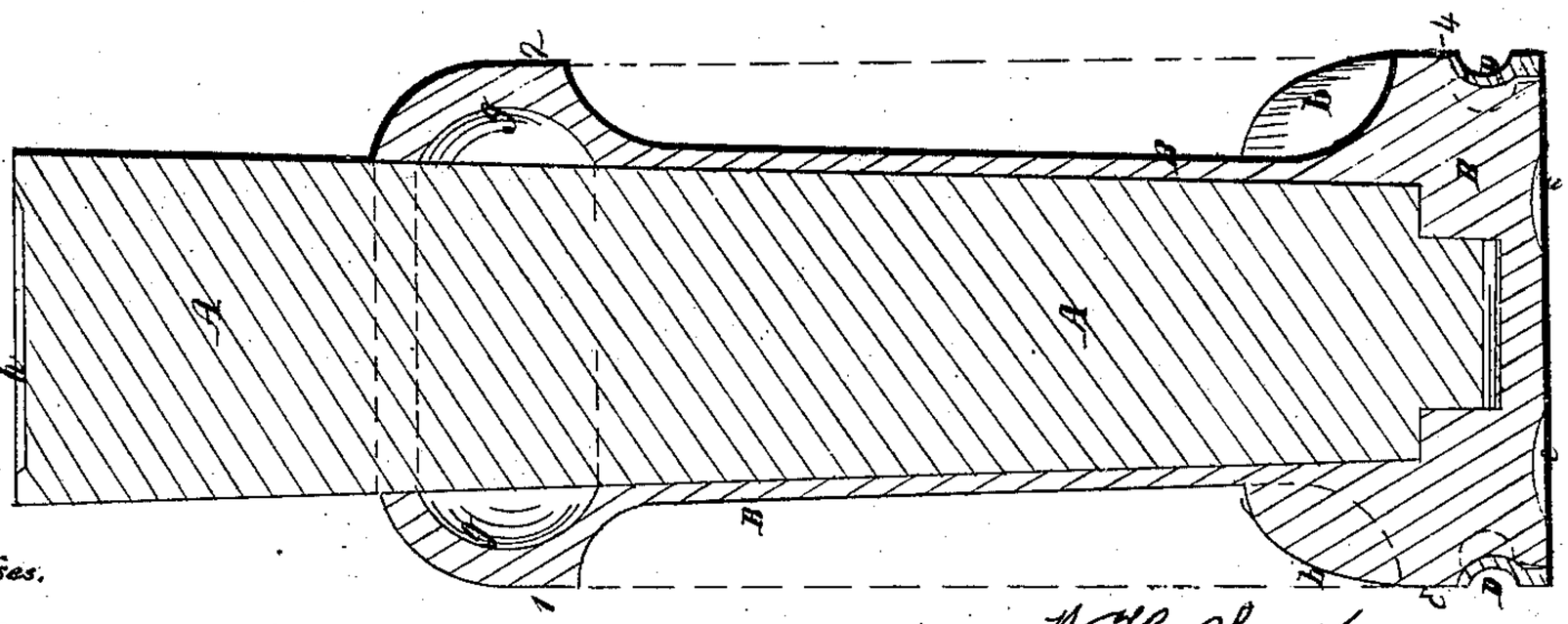


Fig. 3



Witnesses.

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UNITED STATES PATENT OFFICE.

W. H. SMITH, OF BIRMINGHAM, CONNECTICUT.

IMPROVEMENT IN PACKING PROJECTILES FOR RIFLED ORDNANCE.

Specification forming part of Letters Patent No. **44,669,** dated October 11, 1864.

To all whom it may concern:

Be it known that I, W. H. SMITH, of Birmingham, of New Haven county, in the State of Connecticut, have invented certain new and useful Improvements in Projectiles for Ordnance; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, making part of this application.

My present invention relates to a new method of applying the expansible packing (or sabot) to projectiles, which is employed to cut off windage and effect the rotation of the shot in rifled guns.

Previous to my invention various forms of sabot and different kinds of expansible packing-rings have been suggested and applied to projectiles for rifled guns, among which the simplest and most economical is that kind of packing-ring which consists of a simple brass (or other suitable metal or alloy) band cast onto the perimeter or circumference of the projectile at its base or rear end, and intended to be expanded by the force of the explosive gases in the rear of projectile entering the joint formed between the internal circumference of said band and the exterior and adjacent circumference of the shot, and forcing the said band outward (radially) against the base of the gun and into its grooves, the said band being so connected in casting onto the shot as to rotate it by the action of the grooves on the band itself. Practical application and thorough test of this kind of packing-ring thus applied have demonstrated that the explosive gases will not enter quickly and thoroughly enough the joint between the packing-band and the shot (which, by the shrinkage of the brass band when cast on, is a very close joint) to effectually expand said band and cause it to perfectly fill the bore and grooves of the gun and successfully rotate the shot and prevent windage. Experiment with the Parrott shot has shown that if a projectile thus made has its packing-ring forced away from the surface of the shot at several places by driving in a chisel between the band and the shot before firing it, it will work much more successfully and satisfactorily, and experiment with this kind of projectile and packing has also shown that if one of them, after having been fired, (whereby the joint is started between the shot and its packing-band,) and which failed to take the grooves and "tumbled," be reloaded into the same gun and fired a second time, it will then take the grooves thoroughly and be fired most successfully, showing clearly that the cause of the failure to operate successfully at first should be attributed solely to the failure of the explosive gases to get in between the band and the shot.

It is well known that a "seam blast"—that is, the operation of the explosive gases in a crack or seam between two surfaces—is the most effectual and successful means of forcing such surfaces apart, and it is also well-known that in a practical point of view a successfully-working packing device (for projectiles for rifled guns) consisting of a simple metallic band cast onto the base of the shot would be a most desirable thing. Now, my invention has for its object to render this kind of packing-ring capable of operating in the most desirable manner, and successfully rotating the shot perfectly, thus inducing to the combination of the simplest form of packing and the most successful operation; and to this end my invention consists in having a space (sufficient for the ready access of the gases) between the adjacent surfaces of the shot and that portion of the packing-band which is to be forced out against the bore of the gun, whereby the ready and instantaneous action of the gases between the shot and its packing-band is admitted of, and the packing-band made to perfectly fill the bore and grooves of the gun.

To enable those skilled in the art to make and use my invention, I will proceed to describe the same, referring by letters to the accompanying drawings, forming part of this application, and in which—

Figure 1 is a longitudinal elevation of a "sub-caliber" projectile having my invention embodied in it. Fig. 2 is a botton (or base end) view of same. Fig. 3 is a longitudinal central section of the same, and Fig. 4 is a cross-section at the line X X, Fig. 1.

In the several figures the same parts are indicated by the same letters of reference.

As I have before mentioned, the drawings represent a sub-caliber shot; but since my invention is applied in precisely the same way to other kinds of projectiles for rifled guns, a description of it in connection with this particular kind of projectiles will answer every purpose.

A represents the bolt or body, and B the centering jacket or case, of a sub-caliber shot. The jacket B is so formed as to fit the bolt A during the middle greater portion of said jacket, and with its base or rear end enlarged to fit the bore of the gun, (loosely,) as is also its forward end, as seen at *g*. The jacket B may be formed or cast with ribs *b b b*, and may be covered between its base and enlargement *g* with a casing or cover of papier-maché or other light material, as illustrated by the red lines at Figs. 1 and 3, and the bolt A should have its forward end slightly dished out, as shown at *h*, Fig. 3; but since my present invention relates only to the mode of packing the projectile, I need not allude more particularly to any of the other features of the projectile shown.

D is the expansible packing-ring or sabot, which I propose to make of brass, of about the shape shown, and which is cast onto the base of the shot in the relative position, with the latter clearly shown in the drawings. The rear end of the projectile is cast or formed of a proper shape to receive the band D, and with numerous cavities or depressions to receive the spots or lugs *i i* of said band, the object of which lugs *i*, fitting into the shot, is to prevent the band D from turning thereon when actuated by the rifles of the gun. Between the rim portion of the packing-band D—that is, the extreme rear portion beyond where the lugs *i* are—and the exterior of the shot (the circumference at this point) is an annular space or crevice, *f*, (see Figs. 2 and 3,) which on a one-hundred-pound shot I should have about a sixteenth of an inch or more wide. This crevice *f* may be formed in the manufacture of the shot, either by cutting it in a lathe after the band D is cast on or in another manner, which I deem the best, which I propose to adopt and will presently explain.

In the construction of my improved projectile I propose to apply the packing-band D and form the crevice *f* in the following manner, viz: When the projectile or shot is ready to receive the packing-ring D, I take it and immerse its rear end (to a depth equal to the depth I propose to give the crevice *f*) into a thick solution of "blackwash," which is composed of charcoal-dust, "clay-wash," and molasses, and coat it with this wash, which is allowed to dry on it. If one coating is not sufficiently thick to suit my purpose, I put on in the same manner another coat or stratum of this compound. I then place the projectile (having its rear end thus coated) into a suitable mold and cast on the band D. When the band D has become solid, (and coated,) the layer of compound between it and the circumference of shot will be easily crumbled away and shaken out, leaving the annular crevice *f*, as seen in the drawings. The operation of a projectile thus made is briefly explained: When the explosion takes place, the explosive gases, operating in the crevice or space *f* between the band D and the body of the shot, produce by a seam-blast the instantaneous and thorough distention of the lower rim portion of band D against the bore of the gun and into the grooves or rifles, and the shot is projected in a most successful manner, that portion where the projections *i i* extend into the shot holding onto it and causing it to rotate with the band D.

It will be understood that the peculiar shape shown of the band D is not essential to my invention so long as the crevice *f* is formed and the band so combined or connected at its forward portion to the shot as to turn the latter as it (the band) is turned by the rifles of the gun. It is obvious that numerous modifications in the mode of applying my invention may be adopted without departing from its spirit, which lies in the idea of so constructing the projectile as to have a palpable space, *f*, between the band and the body of the projectile for the ready and effective operation of the gases, as explained.

What I claim, therefore, as new, and desire to secure by Letters Patent, is—

The combination of the expansible packing-band with the projectile, when constructed and arranged to operate in the manner substantially as described, for the purpose set forth.

In testimony whereof I have hereunto set my hand and seal this 7th day of June, 1864.

W. H. SMITH. [L. S.]

In presence of—

J. N. McINTIRE,

AUGUSTUS O. BOURN.