



# UNITED STATES PATENT OFFICE.

W. H. SMITH, OF BIRMINGHAM, CONNECTICUT.

## IMPROVEMENT IN JACKETS FOR SUB-CALIBER PROJECTILES.

Specification forming part of Letters Patent No. 44,670, dated October 11, 1861.

*To all whom it may concern:*

Be it known that I, W. H. SMITH, of Birmingham, of the county of New Haven, 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 that kind of projectile which is designated "sub-caliber." Previous to my invention this kind of projectile has had its centering case or jacket made to fit to the body or bolt of the shot near its forward and rear ends, and about equal in diameter throughout its entire length to the bore of the gun—as, for instance, as shown in Letters Patent granted to me on the 23d day of December, 1862; but with the centering holder case or jacket thus made the large diameter of the latter induced to so much weight as to make it very objectionable, since it is necessary to produce a successful sub-caliber projectile that a certain proportion of weights should exist between the bolt or body and its surrounding case or centering-jacket, and it was impracticable to attain this proportion with the jacket of so great diameter, and at the same time have the latter sufficiently strong. These objections were overcome by making the jacket of another form, in which the greater portion of it corresponded in diameter (internal) to the diameter of the bolt, only a small enlarged portion at its front end corresponding to the diameter of the bore of the gun, and by combining with a jacket so shaped a washer or band arranged on its rear end, which also filled the bore of the gun, as fully shown and described in Letters Patent granted to me on the 5th day of January, 1864; but this mode of constructing a sub-caliber shot, though possessing some advantages over methods previously known and being very good, still embodies some practical objections, among which may be mentioned the expense and labor of construction, and the liability of the small rear band to be upset or deranged by the excess of pressure on the upper surface of the projectile as it lay in the bore when the explosion of the charge takes place.

My invention has for its objects to avoid

these objections, and to produce a sub-caliber projectile which will be more desirable in every respect than any heretofore made; and to these ends my present invention consists in making the centering jacket or case with both its forward and rear ends large enough to fill the bore of the gun, (of equal diameter,) and the portion intervening between the enlarged ends small enough to fit closely to the body or bolt therein inclosed, whereby the centering case or jacket is made capable of effectually holding the bolt or body centrally in the bore of the gun, both at rear and front end of the former, and at the same time have the greater portion of its length so small in diameter as to involve little weight.

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

Figure 1 is a longitudinal elevation of one of my improved projectiles. Fig. 2 is a bottom view of the same. Fig. 3 is a longitudinal central section, and Fig. 4 is a cross-section at the line XX, Fig. 1.

In the several figures the same part is designated by the same letter of reference.

A is the body or bolt of the projectile, which I propose to make of steel, (or iron tipped with steel,) of a tapering form, as clearly shown, (being largest at its extreme forward portion,) with its forward end dished out slightly, as seen at *h*, Fig. 3.

B is the centering holder case or jacket, by which the body A is held and guided during its flight through the bore of the gun, and by which it is also rotated on its axis, the said jacket B being rotated by means of a sabot, D, (taking into the rifles of the gun,) and being so interlocked (or dogged) by means of a depression in its rear end and a correspondingly-shaped projection on the rear end of bolt A as to cause the latter to always turn with it. The sabot D is composed of a simple brass band cast onto the base of the jacket B in such a manner as to be expanded or distended radially by the action of the gases entering into the space or crevice *f*. This peculiar combination and arrangement of packing-ring D is made the subject of another appli-

cation filed simultaneously with this, where it will be found fully described. The jacket B, it will be seen by reference to the drawings, is formed with its extreme forward and rear portion of a diameter adapted to fill the bore of the gun, while the intermediate and greater portion of it is made small enough to just fit over the body A, which is turned to fit into the finished interior of said jacket. If the metal of which B is formed is sufficiently strong, the forward enlarged end may be cast hollow, as seen at *g*, to lighten it. The enlarged portions are turned to fit the bore of the gun, as shown at 1 2 3 4, and the intermediate portion may be covered over with a filling of some light material, such as papier-maché, or any other suitably light and tenacious material, as illustrated by the red lines coming out flush with the perimeters of the enlarged front and rear ends of jacket B, and presenting, in connection with them, a smooth cylindrical exterior.

*b b* are corner braces or webs, which may be found desirable for affording greater strength to the enlarged base of jacket B, which carries the sabot, receives the shock of the explosion, and has imparted to it the twist of the rifles.

The operation of this improved projectile in receiving the force of the explosion and in its flight is pretty much the same as that of my other sub-caliber projectiles. The explosive gases expand the packing-ring D into the grooves of the gun, and the shot is projected in a successful manner, the case or jacket B traveling with the bolt A until the latter meets with a resisting medium too dense for the case B to penetrate, when the latter is stripped or broken off.

My improved shot, like most sub-caliber projectiles, is particularly intended for heavy ordnance and operating against iron armors where accuracy of range, great force of impact, and penetration are the main requisites.

It will be seen that by making the centering-case B with both its rear and forward ends of a diameter equal to that of the bore of the gun a permanent and reliable support is afforded at the rear as well as at the forward end of the body A, to hold and guide it cen-

trally in the bore independently of the sabot, while at the same time the jacket is of such form as to involve very little weight, and to induce to economy in the manufacture of the shot, and in these combined advantages it will be seen that my present form of jacket, B, is more desirable than any heretofore made or suggested.

Experiment and practice have shown that in consequence of the greater opportunity afforded to the explosive gases to escape around the upper portion of the shot as it lay in the bore, (for the shot cannot fit the bore closely, and when at rest in the bore will of course leave a larger crevice between its upper portion and the bore than between the bore and its lower surface,) they will exert so much more pressure at this point than at any other as to cause the projectile to be forced downward onto the bore of the gun considerably before the packing has expanded and the force becomes equalized. Where the base of the shot is sustained only by a sabot or by a washer, this objectionable depression of the shot occurs to a much greater extent than it can with my improved form of jacket B, with which, it will be seen, the solid stock of the jacket helps to sustain the body or bolt A centrally in the bore against this action of the gases.

I deem the form and proportions of the jacket B shown to be about the best, but do not of course limit myself to the precise shape or proportions shown, so long as the characteristic features of formation are embodied.

Having fully explained the construction and operation of my improved sub-caliber projectile, what I claim therein as new, and desire to secure by Letters Patent, is—

Making the metallic holder-case or centering-jacket to fill the bore of the gun at both its rear and forward ends, and its intermediate portion to fit to the bolt or body of the shot, substantially as and for the purposes 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,  
ANDREW I. TODD.