(No Model.)

J. G. BUTLER.

PROJECTILE.

No. 290,970. Patented Dec. 25, 1883.

Fig. III.

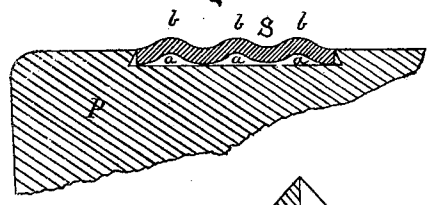


Fig. I.

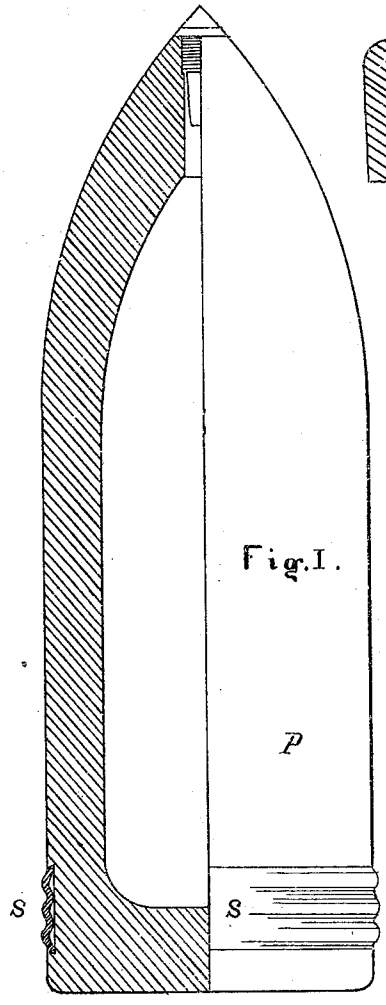
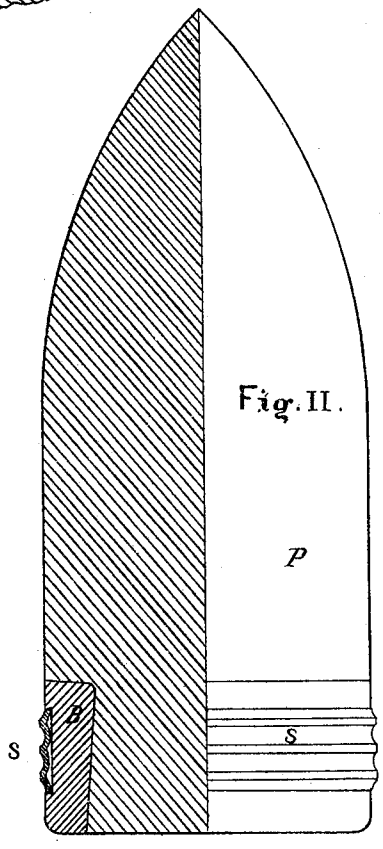


Fig. II.



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JOHN G. BUTLER, OF WATERTOWN, MASSACHUSETTS.

PROJECTILE.

SPECIFICATION forming part of Letters Patent No. 290,970, dated December 25, 1883.

Application filed February 12, 1883. (No model.)

To all whom it may concern:

Be it known that I, JOHN G. BUTLER, of Watertown, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Projectiles for Breech-Loading Rifled Guns, of which the following is a full and exact description, reference being had to the accompanying drawings, forming part of this specification.

My invention is confined to the device usually attached to an elongated projectile for the purpose of imparting to it the rotation due to the twist of the rifling.

Projectiles for breech-loading rifles usually consist of an iron or steel body circumscribed by one or two narrow bands of softer metal, which project above the cylindrical surface of the shot and exceed in diameter the rifled portion of the bore of the gun. When inserted in the chamber of the gun, the projecting band lodges against the rifling, and is afterward forced through the bore by the action of the discharge, and the band being cut into by the rifling the projectile is forced to follow the twist. These bands, though frequently grooved externally to diminish friction, are nevertheless solid and fill the space between the surface of the bore on the one hand and the hard, unyielding body of the shot on the other. They can yield only by the compression and flow of the metal itself, and the consequent "forcing" of the projectile is sometimes objectionably violent. Moreover, the attrition of the bore as the projectile passes through wears off some of the original impression of the rifling, and thus the band or rotating device which may have been too tight at the start of the projectile may become too loose for the best results by the time it reaches the muzzle.

It is the object of my invention to avoid both of these evils, and this I do by constructing and applying a band, which, while yielding more readily than the solid band to the forcing action of the charge, shall at the same time possess sufficient elasticity to maintain a close fit throughout the entire passage of the projectile in the bore.

Referring to the accompanying drawings, Figure I illustrates my invention as applied to a shell for a rifled gun, and in this drawing the form of the band is distinctly shown.

This band S is observed to be corrugated, and is shown on a larger scale in Fig. III, which gives part of the band and projectile in section. Furnished with such a band, the projectile, when driven through the rifling, meets with sufficient resistance to impress the rifling upon the band, which, however, is more yielding than solid metal would be, and opposes less resistance than the solid band during the initial progress of the projectile. The impressions of the rifling are taken upon the ridges *b b*, and the form of the band gives to it a limited but sufficient amount of elasticity caused by the corrugated or waved form of the band. Again, as each of these ridges has under it an air-space, *a*, the effect is not only to render compression somewhat easier, but to aid the elastic resistance of the band and keep it always distended sufficiently to insure a close fit or good mechanical bearing throughout the bore. The compression of the band tightens an already good fit in the under-cut of the projectile in which it is secured, and the escape of the confined air is not sufficiently rapid to affect any elastic effort it is capable of, and this action of the band is confined within narrow limits. In other words, it wants only sufficient elasticity to keep distended in the bore.

The annular under-cut channel may be cast or cut in the body of the projectile, and when the material is such as to render this difficult the corrugated band S may be applied to a band of softer material—like wrought-iron, cast-iron, or mild steel—which has previously been attached to the base of the projectile proper by casting or upsetting it upon the same. This latter plan is illustrated in Fig. II, where P represents the hard projectile, B, the softer part, and S the corrugated band in position.

The resistance which this projectile offers to forcing may be regulated by increasing the thickness or hardening the material of the corrugated band. Its elasticity may also be increased, while smaller grooves will increase the stiffness and diminish the elasticity of the band.

I am aware that projectiles have before been provided with corrugated bands, some supported upon flanges of the projectile, and others provided with openings, through which gas might enter the spaces beneath the corrugations or

air might escape therefrom, and I do not claim such as may invention.

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

A rifle-projectile having one or more circumferential grooves, in combination with one or more circumferentially-corrugated sheet-metal bands adapted to fit said grooves, the ridges of said corrugations forming air-spaces between the bands and the body of the projectile, as and for the purpose specified.

JOHN G. BUTLER.

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