B. B. HOTCHKISS.

PROJECTILES.

No. 193,657. Patented July 31, 1877.

Fig: 1.

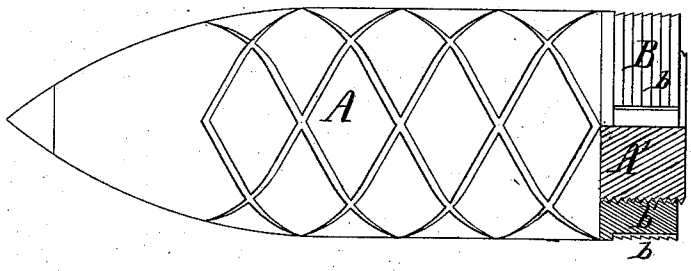


Fig: 2.

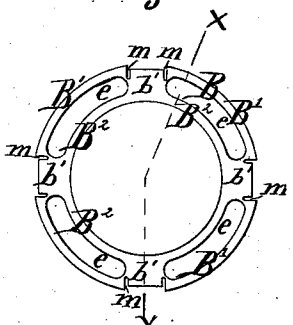


Fig: 3.

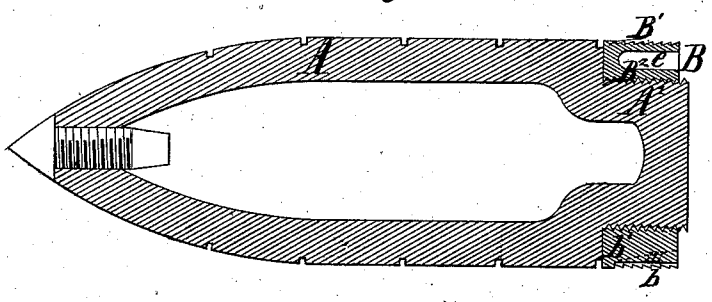


Fig: 3ª.

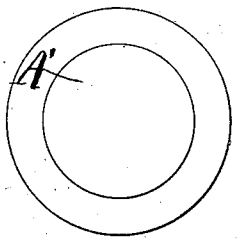


Fig: 4.

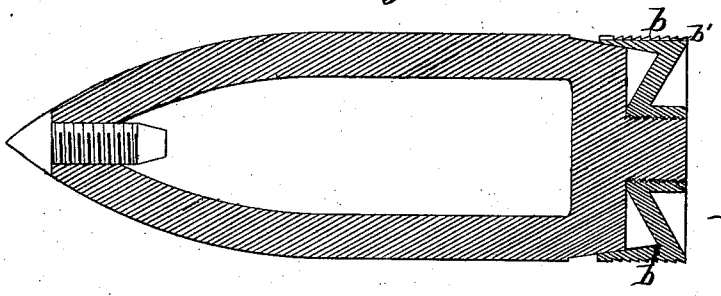
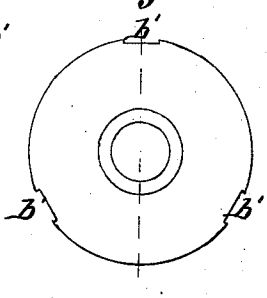


Fig: 5.



Witnesses:

Henry Gardner

Wm. C. Dey

Inventor:

B. B. Hotchkiss

By his attorney

Thomas L. Stetson.

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UNITED STATES PATENT OFFICE.

BENJAMIN B. HOTCHKISS, OF NEW YORK, N. Y.

IMPROVEMENT IN PROJECTILES.

Specification forming part of Letters Patent No. **193,657**, dated July 31, 1877; application filed January 11, 1877.

To all whom it may concern:

Be it known that I, BENJAMIN B. HOTCHKISS, of New York city, in the State of New York, temporarily residing in Paris, France, have invented certain Improvements in Projectiles for Rifled Ordnance, of which the following is a specification:

The invention relates to the construction and mounting of packing.

It is especially important for muzzle-loading guns; but it may be used with some benefit in breech-loaders.

The following is a description of what I consider the best means of carrying out the invention.

The accompanying drawings form a part of this specification.

Figure 1 is a side view, partly in section. Fig. 2 is a rear view. Fig. 3 is a central longitudinal section on the line *x x* in Fig. 2, and Fig. 3ª represents the rear end of the projectile before the packing is added.

Similar letters of reference indicate like parts in all the figures.

Any device which will relieve the strain on the gun is of very great importance. I have given the question much attention, and have arrived at the construction here represented as the result of years of experiment.

A is the body of the projectile, formed with an annular recess, A′. (See Fig. 3ª.) It is threaded to receive my peculiar sectional expansive ring.

This entire ring may be of soft brass, or other suitable material, and will be denoted, when necessary, by the single letter B, the several parts being represented by further marks or letters.

The interior of the packing is threaded, and screws tightly upon the part A′ of the body, as represented. It is formed with cells or deep cavities *e*, sunk in the rear face between the exterior rim B^1 and the interior rim B^2. The force of the discharge entering these cells drives portions of the outer wall, which may be termed a "lip," B^1, forcibly outward, and compels it to conform to the interior of the gun. The solid spaces *b′* between the cells remain unaffected.

Deep longitudinal grooves or scores *m* are produced by machinery or otherwise, in the positions represented. They nearly cut off the lip B^1 from the firm portions *b′*, so that when the force of the discharge is received it determines the line of fracture. The rear edge and main portion of each expansive lip B^1 is expanded against the inner wall of the gun, and caused to conform to the rifling thereof, while the front edge remains strongly secured to the other portions of the packing, so that it cannot be detached.

The solid portions *b′* give stability to the construction, and, by reason of their non-expansive quality, insure spaces for windage.

I prefer to form the packing with the exterior surface of the solid portion *b′* a little sunk, or of less diameter than the outer surface of the lips B^1. If they are not so made, they assume that relation on the expansion of the lips.

The outer surface of the lips B^1 is grooved circumferentially, as indicated by *b*. These fine grooves *b* on the surface of the expansive parts or sections, which I have termed "lips" B^1, insure the more easy expansion of the metal against the inner surface of the gun, and a more perfect matching to the rifling thereof. They serve to give a cushioning effect when the expansion takes place, and I am convinced they greatly relieve the gun from strain.

I do not consider the longitudinal grooves *m* absolutely essential; but their presence increases the perfection of the effect.

Fig. 4 is a longitudinal section, and Fig. 5 a rear view, of a different packing, which I esteem desirable for some situations. In this a packing-ring of soft brass or other suitable material is similarly screwed upon the main body, and is adapted to expand by being forced forward by the discharge. The inner portion remains immovable where it is threaded upon the body; but the outer portion and main surface moves forward bodily, and is expanded thereby, as will be readily understood.

Grooves *b*, corresponding to such grooves on the packing before described, are formed around the exterior of this packing in Figs. 4 and 5, and sunk longitudinal spaces *b′* tend to induce a less perfect expansion at those points, and thus allow for windage.

This form of packing, like that before described, is adapted to cushion or mold itself easily against the interior surface of the gun, and allow a sufficient escape of gas to effect all the useful functions of igniting the fuse and relieving the strain.

I claim as my invention—

1. In combination with a body, A, having an annular recess, A′, the sectional expansive packing described, having cells *e*, separated by firm parts *b′*, and adapted to allow the forcing outward of the expansive sections or lips B^1, and to provide spaces for windage over the parts *b′*, as specified.

2. In a projectile having cells, as described, in the packing B, the longitudinal scores *m*, partially separating the solid parts *b′* from the expansive parts B^1, in combination with the body A A′, and adapted to serve as herein specified.

In testimony whereof I have hereunto set my hand this 6th day of October, 1874, in the presence of two subscribing witnesses.

B. B. HOTCHKISS.

Witnesses:
WM. C. DEY,
E. VOLKMANN.