(No Model.)

W. H. BROWN.

PROJECTILE.

No. 376,728. Patented Jan. 24, 1888.

Fig. 1.

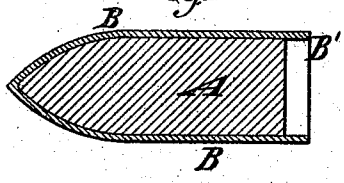


Fig. 2.

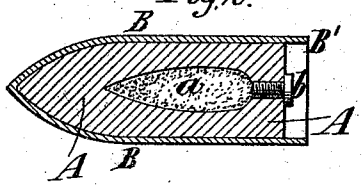


Fig. 3.

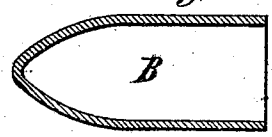
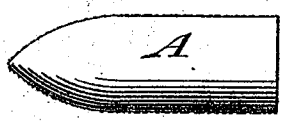


Fig. 4.



Witnesses.
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by his attys
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UNITED STATES PATENT OFFICE.

WILLIAM HENRY BROWN, OF JERSEY CITY, NEW JERSEY, ASSIGNOR TO THE BROWN'S SEAMLESS METAL COMPANY, OF SAME PLACE.

PROJECTILE.

SPECIFICATION forming part of Letters Patent No. 376,728, dated January 24, 1888.

Application filed June 30, 1885. Renewed June 23, 1887. Serial No. 242,275. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM HENRY BROWN, of Jersey City, in the State of New Jersey, have invented a new and useful Improvement in Projectiles, of which the following is a specification.

My invention relates both to shot projectiles and shells; and the object is to provide a shot or shell which will be capable of great penetration, and yet will readily take the rifle-grooves of a piece of ordnance and not injure the same.

The invention consists in the combination, in a projectile, of a conical hard metal body and a conical covering-shell of seamless drawn metal enveloping the body from its point rearward, the body portion of the shell being extended in a direct line rearward beyond the adjacent portion of the body and left open at the rear end to form a gas-ring and expansion-chamber.

In the accompanying drawings, Figure 1 represents an axial section of a solid shot embodying my invention. Fig. 2 is a similar section of an explosive shell, also embodying the invention. Fig. 3 is an axial section of the envelope or covering-shell alone, and Fig. 4 is a side view of the hard-metal body.

Similar letters of reference designate corresponding parts in all the figures.

In both examples of my invention, A designates the hard-metal body or center of the projectile, and B designates the envelope or covering-shell of softer metal.

The body A will consist, usually, of a hard-metal casting of tungsten steel or other metal; or it may, if desired, be a forged or hammered and hardened piece of metal. It may be a solid body of metal, or have an internal chamber, *a*, for explosive, which is to be fired by a primer, *b*, as shown in Fig. 2. It may, and preferably will, have a rough surface, as indicated by the broken line around it, as shown in Fig. 4.

The envelope or covering-shell B is to be of mild steel or other metal somewhat softer than the body, and is cupped into proper shape by means of suitable dies and mandrels.

It is now my intention to perform the drawing operations necessary to bring the envelope or covering shell to the form shown in Fig. 3 while the metal is in a hot state, and to form the shell of such size that it will receive easily within it the body or center A. At this stage of the manufacture the metal of the shell B will be thicker than it is designed to be when finished, and the shell will be of less length than when finished.

The body may be placed in the envelope covering shell B while the latter is in a hot state, and the latter is then subjected to a further drawing operation to compress and contract the envelope or covering-shell upon the body, the envelope or shell becoming firmly secured upon the body by its shrinkage as it cools and being reduced in thickness and elongated. The projectile may be afterward subjected, in a cold state, to a further drawing operation, in order to condense and compress the envelope or covering-shell and produce its firmer union with the body, and also to relieve any excess of tension which the envelope or covering-shell may have by shrinking it on the body. It may be desirable to coat the exterior of the projectile with a stanniferous alloy to prevent oxidation and to serve as a lubricator in the cold-drawing operations.

The envelope or covering-shell B is somewhat longer than the body A, and is open at the rear, thereby forming a gas or expansion ring, B', and a powder-chamber at the rear of the projectile, and on firing the said ring portion B' will be expanded into the rifling of the gun, so as to strongly engage therewith without danger of injury to the rifling.

I am aware that it is not new to provide a projectile with a soft-metal covering which will more readily take the grooves of a gun and will enable the projectile to more closely fit the bore without danger of wedging therein, and I do not therefore claim, broadly, such a covering as of my invention.

I am also aware of English Patent No. 1,972 of 1883, which shows a soft-lead bullet enveloped in a shell of copper, which is closed or folded inward over the end of the bullet. I do not seek to include such a projectile in my invention, and my projectile differs from such a bullet in that my body A is of a harder metal than the shell, and because the shell is pro-

longed rearward in a direct line beyond the adjacent portion of the body and is left open at the rear end. The projecting portion of the shell serves as a gas-ring and expansion-chamber, and the rear end of the shell being open, the force of the explosion has the effect of driving the body A still farther and more closely into the covering-shell B.

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

The combination, in a projectile, of a conical hard-metal body, A, and a conical covering-shell, B, of seamless drawn metal enveloping the body from its point rearward, the body portion of the shell B being extended in a direct line rearward beyond the adjacent portion of the body A and left open at the rear end to form a gas-ring and expansion-chamber, substantially as herein described.

WM. HENRY BROWN.

Witnesses:
T. B. CLATWORTHY,
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