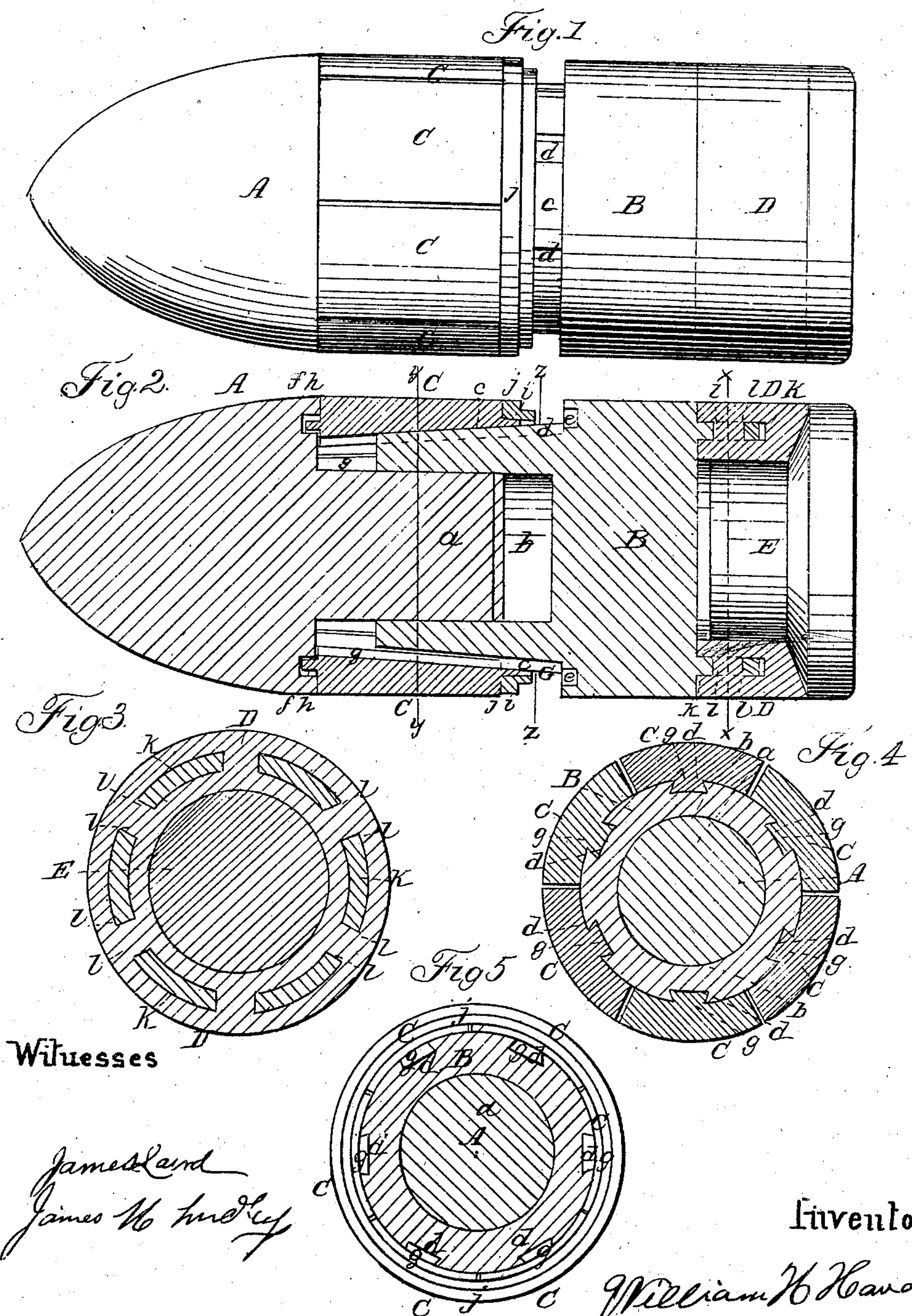


W. H. HAVENS.

Projectile.

No. 34,493.

Patented Feb. 25, 1862.





# UNITED STATES PATENT OFFICE.

WM. H. HAVENS, OF PATERSON, NEW JERSEY.

## IMPROVEMENT IN PROJECTILES FOR RIFLED ORDNANCE.

Specification forming part of Letters Patent No. 34,493, dated February 25, 1832.

*To all whom it may concern:*

Be it known that I, WILLIAM H. HAVENS, of Paterson, in the county of Passaic and State of New Jersey, have invented certain new and useful Improvements in Projectiles for Rifled Ordnance; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a longitudinal outside view of an elongated shot with my improvements. Fig. 2 is a central longitudinal section of the same. Fig. 3 is a transverse section of the same in the line *x x*, marked on Fig. 2; Fig. 4, a transverse section in the line *y y*, and Fig. 5 a transverse section in the line *z z*.

Similar letters of reference indicate corresponding parts in the several figures.

To enable others skilled in the art to make and use my invention, I will proceed to describe its construction and operation.

A and B are the two pieces of cast-iron composing the body of the shot, the front piece, A, being made with a pin, *a*, at its rear, to enter a cavity, *b*, in the rear piece, B. The front portion of the rear portion, B, is made of conical form, as shown at *c c*, and with a number of equidistant dovetail grooves, *d d*, running lengthwise of it for the reception of dovetail tongues *g*, formed upon the expanding segments. In rear of the conical portion *c c* there is a shoulder formed on the piece B, and a groove, *e*, is provided in the face of the said shoulder, and a similar groove, *f*, is provided in the face of the shoulder that is formed on the front piece, A, in front of the pin *a*.

C C are the expanding segments, of which there may be any desired number, made of brass or other moderately-hard metal or alloy. These segments are of such form that when arranged close together their exteriors combine to form a cylinder of the same circumference as the cylindrical portion of the exterior of the body of the shot, and their interiors fit the front portion of the conical portion *c c* of the body, and each is furnished on its interior with a dovetail tongue, *g*, to fit one of the dovetail grooves *d d*, which correspond in number with the segments. On the front ends of the segments there are formed tongues *h h* to enter the groove *f*, and on their rear ends

there are formed tongues *i i*, to enter a ring, *j*, of lead or other soft metal or alloy, a portion of which is made to fit the groove *e*. The external portion of the ring *j* is of a circumference equal to that of the cylindrical portion of the body of the shot. For a projectile to be used in a gun having a small number of large rifle-grooves, the segments may be made with projecting ribs or fins to partly enter the grooves when the projectile is first placed in the gun; but for a projectile with a large number of fine grooves the exterior surfaces of the segments may be made plain. When the projectile is inserted in the gun, the portion A is drawn out from B some distance, as shown in Fig. 2, and the segments are arranged on the forward and smaller portion of the cone *c c*, close to the shoulder of A, and so contracted or drawn together to permit them to pass easily through the bore of the gun. In ramming home the projectile the portion A is driven back into B, and the segments are driven back along the cone *c c*, and so expanded till they fit tightly to the lands of the bore. When the charge is fired, the impact upon the rear portion of the projectile drives it forward before the front part, A, or the segments start, and the cone passing forward into the segments expands them and causes them to fill the grooves, and the shoulder of B is driven forward against the soft-metal ring *j*, which is thus compressed between the said shoulder and the rear ends of the segments, and so expands radially against the walls of the gun and made to prevent windage. The tongues *g g* insure the rotary motion of the segments derived from the rifle-grooves being imparted to the projectile, and when the projectile has left the gun the segments are locked to the body not only by the dovetail tongues *g g*, but by the tongues *h i* and grooves *f e*, and so effectually prevented from flying off.

D is a soft-metal band applied to the rear of a projectile, and E a cast-iron follower, to be driven forward against the said band for the purpose of expanding it. On the rear portion of the cast-iron body of the projectile there is formed a concentric annular projection, *k k*, having provided in it a number of holes, *l l*. The follower E is made with a conical head, and with a shank in front smaller than the inside of the annular projection *k*,



and the band D is cast on the projectile by placing the body of the projectile and the follower E in a suitable mold. The metal of this band covers the projection *k* both inside and outside, and fills the holes *l l*, and so attaches itself firmly to the projectile.

These improvements are applicable to hollow as well as to solid projectiles. The cavity for the powder in a shell or hollow projectile will extend into both parts A and B of the body, and, in order to prevent the powder from getting around the pin *a*, I propose to form a continuation between the two parts of the chamber in A and B by means of a tube made of tin-plate or other light metal.

I do not claim expanding the packing of projectiles by means of a cone driven forward into it; but

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

The combination, with the conical portion of the part B and the part A, of the independent sliding packing-segments *c c*, all arranged and operating as herein described.

WILLIAM H. HAVENS.

Witnesses:

JAMES LAIRD,  
RICHARDSON PAWLEY.