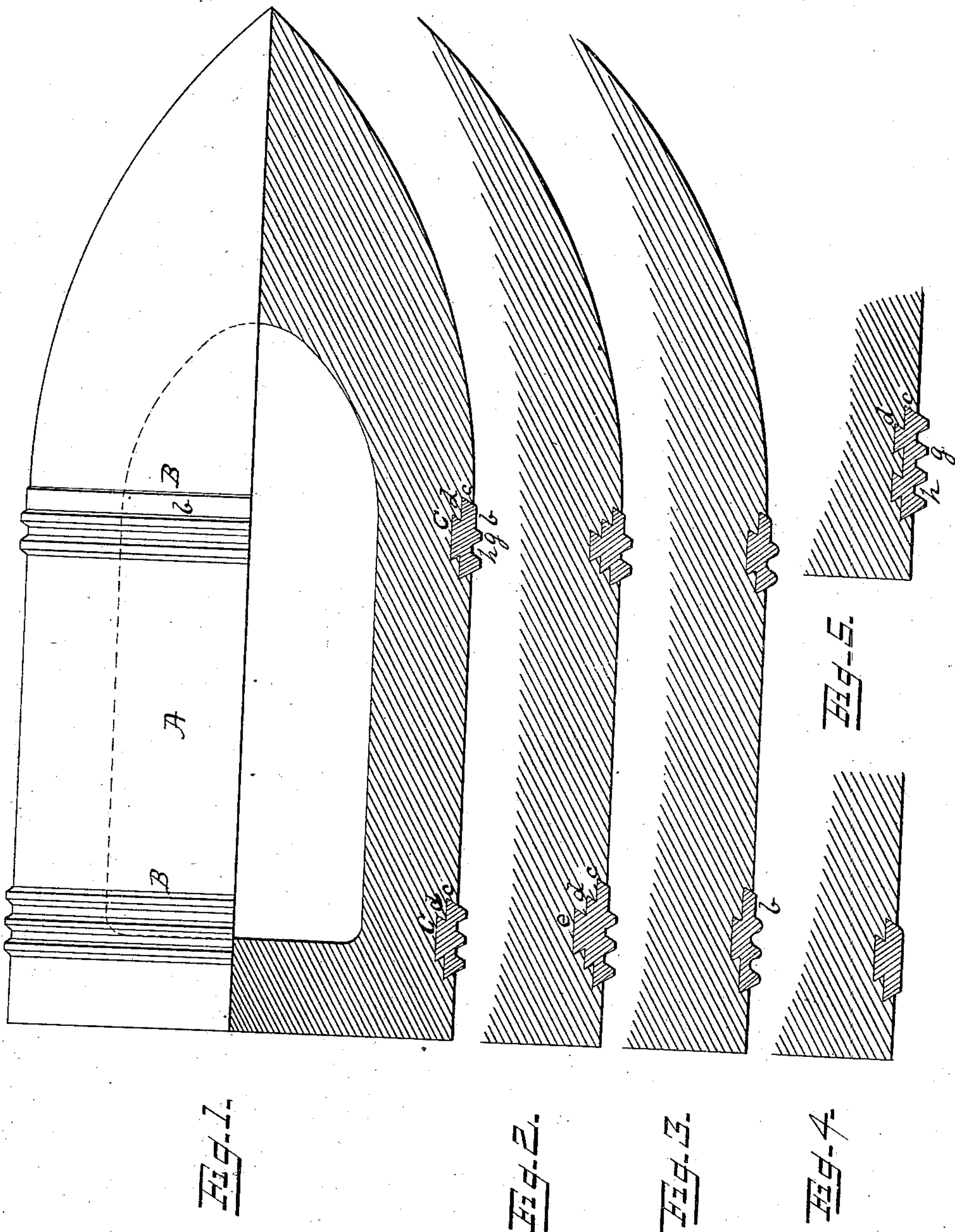


(No Model.)

H. F. MANN.  
PROJECTILE.

No. 293,337.

Patented Feb. 12, 1884.



WITNESSES  
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# UNITED STATES PATENT OFFICE.

HENRY F. MANN, OF PITTSBURG, PENNSYLVANIA.

## PROJECTILE.

SPECIFICATION forming part of Letters Patent No. 293,337, dated February 12, 1884.

Application filed December 20, 1883. (No model.)

*To all whom it may concern:*

Be it known that I, HENRY F. MANN, a citizen of the United States, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Projectiles for Ordnance; and I hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, in which—

Figure 1 is an elevation, partly in section, of a shell illustrating my invention. Figs. 2, 3, 4, and 5 are detail sectional views of modifications thereof.

Like letters refer to like parts wherever they occur.

My invention relates to the form and manner of securing soft-metal packing rings or bands of shot, shell, and other projectiles for ordnance, and has for its object not only to insure against the stripping of the ring or band, but also to secure a sufficient body or thickness of the soft metal to perfectly fill the rifling without needlessly weakening or cutting away the body of the shot or shell.

To this end the first part of the invention consists in the construction of the ring or band recess or seat with dovetailed groove or grooves and a sub or second dovetailed groove or grooves in the bottom of the outer groove, whereby the body of metal in the band or ring may be increased and the force applied to the band will drive or compact the soft metal in the sub-groove, and thus prevent the stripping of the band or ring.

The second part of the invention consists in the formation of the leading part of the forward band, so that its external diameter corresponds with the interior diameter of the bore of the gun at the top of the lands, whereby the shot or shell shall be centered in the bore of the gun.

There are also other novel features of minor importance, which will hereinafter more fully appear.

I will now proceed to describe my invention more fully, so that others skilled in the art to which it appertains may apply the same.

A indicates the body of the shell, shot, or like projectile; B, the soft-metal bands or packing-rings, and C the band-grooves. The band-

grooves may be formed either at the time of casting by means of cores, or by subsequently turning, or in any of the methods practiced in the art. These band-grooves are composed of an outer or peripheral dovetailed groove, *c*, and one or more sub-grooves, *d*, of like dovetail form, and which are formed in the bottom of the main or outer groove, usually centrally, as shown in Fig. 1, where a single sub-groove is all that is desired, or equidistant, as in Fig. 5, where two or more sub-grooves in the same plane are required. In some instances a third sub-groove, *e*, may be formed in the bottom of the first sub-groove, *d*; but the same will seldom, if ever, be found necessary. The bottom of the groove or grooves may be roughened by a milling or knurling tool or other known means, which will afford additional protection against any tendency of the ring to slip peripherally in the grooves, while giving the necessary rotation to the projectile, due to the twist of the grooves of the rifling in the bore of the gun. The soft-metal bands B, which may be of any suitable metal or alloy, may be cast in suitable molds, or they may be forced into the grooves by compression, and their outer surfaces be afterward finished as desired, plain-faced, as shown in Fig. 4, or have a series of ribs and grooves, as shown in Figs. 1 and 5, or may have a leading plain face followed by ribs and grooves, as shown in the other figures of the drawings, which latter embody the second feature of my present invention, and are of the preferred form for the forward band. The forward band, B, I form with a leading portion, *b*, the external diameter of which, when on the shell, shall correspond with the diameter of the bore of the gun at the top of the lands, so that said portion, being placed at or near the center of gravity of the shot, shall engage with the lands and insure the true central position of the shot or shell in firing.

Back of the leading portion or ring *b* are one or more ribs, *g*, which correspond in external diameter with the diameter of the bore to the bottom of the grooves of the rifling, and between said ribs are the grooves *h*, which are of less diameter from bottom to bottom than the diameter at *b*, or may correspond with the windage given to the shell. The form and at-



tachment of the bands to the projectile being of the general character hereinbefore described, when the shell is fired from the gun the pressure, instead of tending to strip and lift the forward edge of the band from the outer or peripheral groove, will compact the soft metal, driving it down diagonally on the center of the sub-groove and increasing its hold in the dovetails thereof, while the leading ring *b*, which moves on the lands, will not only tend to center the shell, but bind down the leading edge of the band and aid in the prevention of the stripping or displacement thereof.

The main advantages of my invention are that any desired width of soft metal in the band can be used without unnecessarily weakening or deeply grooving the projectile, while the body of soft metal will be massed at the desired point near the center of the band, and where the applied force will tend to compact it into the sub-groove and increase the hold of the band on the projectile.

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

1. A projectile having a band-groove composed of a peripheral dovetail groove or grooves and a sub-groove of similar form made in the bottom thereof, substantially as and for the purposes specified.

2. The combination, with a projectile having a peripheral dovetailed groove and a sub-groove of like form in the bottom of the main

groove, of a soft-metal band, substantially as and for the purposes specified.

3. The combination, with a projectile having a dovetailed band-groove, of a soft-metal band having one or more ribs and groove and a leading ring which corresponds in external diameter with the internal diameter of the bore of the gun at the top of the lands, substantially as and for the purposes specified.

4. The combination, with a projectile having a dovetail band-groove, of a soft-metal band having two or more ribs, interposed grooves which correspond with or are less than the windage given to the shell, and a leading part which corresponds in diameter with the diameter of the bore of the gun at the top of the lands, substantially as and for the purposes specified.

5. The combination, with a projectile having a band-groove composed of a peripheral dovetailed band-groove and a sub-groove of like form in the main groove, of a soft-metal band having one or more ribs and interposed grooves and a leading part whose diameter corresponds with the diameter of the bore at the top of the lands, substantially as and for the purposes specified.

In testimony whereof I affix my signature in presence of two witnesses this 19th day of December, 1883.

HENRY F. MANN.

Witnesses:

F. W. RITTER, Jr.,

C. A. NEALE.