W. H. KEEN.

ARMOR PIERCING PROJECTILE.

APPLICATION FILED MAR. 16, 1914.

1,102,758. Patented July 7, 1914.

Fig. 1.

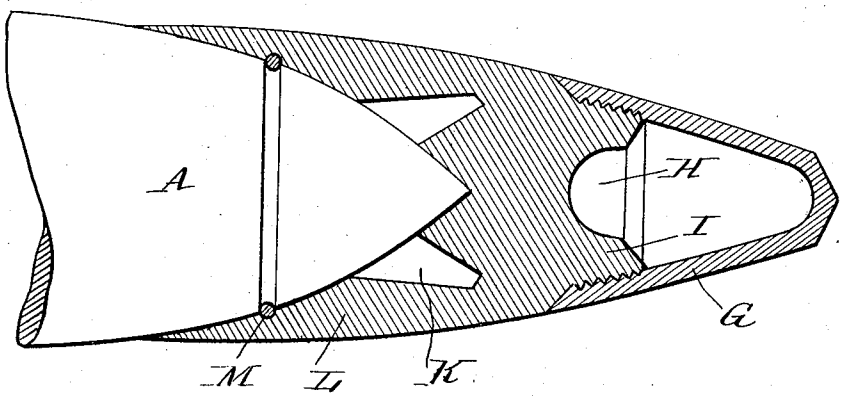


Fig. 2.

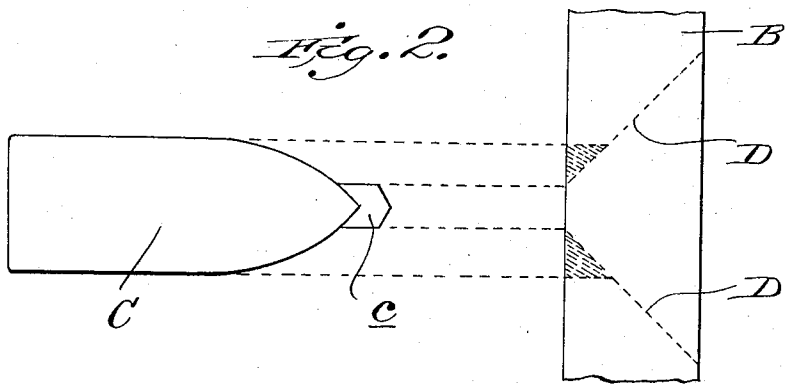
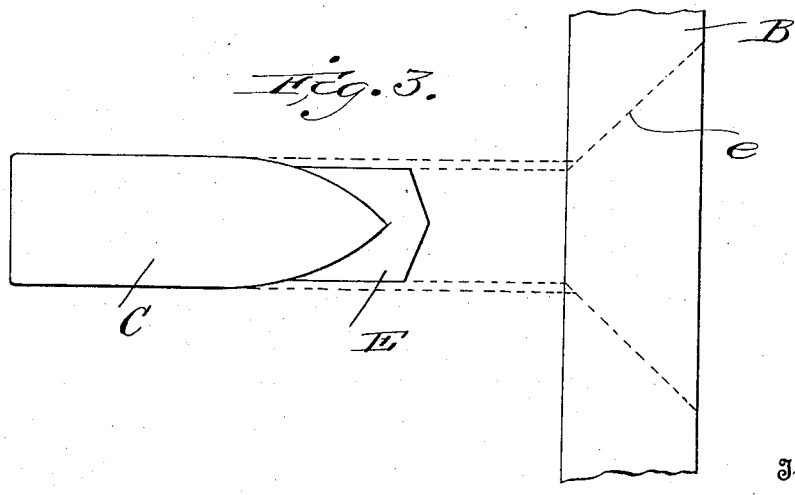


Fig. 3.



Inventor

William Herbert Keen

By Church Thomas

his Attorneys

Witnesses

Halbert P. Brown,

Francis E Ruth.

UNITED STATES PATENT OFFICE.

WILLIAM HERBERT KEEN, OF WASHINGTON, DISTRICT OF COLUMBIA, ASSIGNOR TO WASHINGTON STEEL & ORDNANCE COMPANY, OF WASHINGTON, DISTRICT OF COLUMBIA, A CORPORATION OF WEST VIRGINIA.

ARMOR-PIERCING PROJECTILE.

1,102,758. Specification of Letters Patent. Patented July 7, 1914.

Application filed March 16, 1914. Serial No. 824,997.

To all whom it may concern:

Be it known that I, WILLIAM HERBERT KEEN, a citizen of the United States, residing at Washington, in the District of Columbia, have invented certain new and useful Improvements in Armor-Piercing Projectiles; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, and to the figures and letters of reference marked thereon.

The object of the present invention is to provide an armor piercing projectile which will be more efficient than those heretofore provided at either normal or oblique impact.

The invention consists in certain novel details of construction with relation to the cap of the projectile, all as will be hereinafter described and pointed out particularly in the appended claims.

Referring to the accompanying drawings,—Figure 1 is a sectional elevation of a conventional form of armor piercing projectile having a cap thereon constructed in accordance with the present invention. Figs. 2 and 3 are diagrammatic views showing the action of armor piercing projectiles on armor with which they come in contact.

Like letters of reference in the several figures indicate the same parts.

The body A of the projectile is of the usual form and material best adapting it for penetration and the cap affixed to its forward end has the contour which is considered best for exterior ballistics, it being understood that the superficial contour lines may be secured by providing thin walls forming extensions of the true cap which walls will be destroyed or dissipated on impact without influencing materially the action of the body of the cap in its effect on the armor piercing qualities of the projectile.

In accordance with the present invention the effective portion of the cap which assists the penetration has a broad leading end of annular form, the major mass of metal being forward of the point of the projectile, whereby the area of the surface of the armor plate embraced within the contacting end of the cap will be large and will set up in the plate vibration along lines of cleavage which correspond to the lines of cleavage in forming an opening through which the body of the projectile will pass. Furtheremore, the area of contact is immediately increased by the flattening out of the mass of metal in front of the point of the body, both when the impact is normal and when oblique, to set up vibration in the armor plate along the lines of cleavage around an area of a size to permit the passage of the body of the projectile. The action is assisted by the provision of an annular cavity in the cap in rear of the point of the projectile body into which cavity the metal may flow back over the ogive of the body during the initial contact and spreading of the mass of the cap forward of the point.

The effect of setting up vibration in the plate to be penetrated will be best understood by reference to Figs. 2 and 3. The plate is indicated at B and the projectile at C, while *c* is a small cap on the point of the projectile. The contact of the cap with the plate sets up vibration along the shearing or cleavage lines D at 45° to the surface, but these lines inclose too small an area for the passage of the body of the projectile, with the result that the body of the projectile must remove or displace a large section of metal around the shearing line in which vibration has been established. In Fig. 3 on the other hand, a cap E is shown which will inclose a large area during initial contact and vibration will be set up in the plate B along shearing lines *e* to form an opening of such size as to permit the passage of the body of the shell with the displacement of a very small percentage of metal at the entering edge of the aperture.

With the above explanation it is believed the construction and operation of the present invention will be readily understood from the illustration in Fig. 1, wherein it will be seen that back of the contour extension G which has no appreciable influence on the penetration, the end of the cap is broad and provided with a central concavity H in the axial line of the projectile, giving the end of the cap an annular formation at I, which is of large diameter well forward of the point of the body of the projectile. The major mass of the metal of the cap is forward of the point of the body and an annu-

lar cavity K is formed in the cap around the body in rear of the said point into which cavity the metal of the cap will flow over the ogive by pressure, due to impact and during the spreading of the cap forward of the point.

The skirt L of the cap serves to give the proper contour to the base of the cap and the usual securing means may be introduced between the skirt and the body of the shell, as shown at M.

The annular cavity K is shown as extending forwardly and outwardly from the interior wall of the cap which is the preferred construction, but it is obvious that its particular shape and location is not essential and save when specified in the claims, it is not desired to restrict the invention thereto.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent of the United States, is:

1. An armor piercing projectile embodying a pointed body, a broad-ended cap on the pointed end of the body having a concavity in its outer portion in line with the axis of the projectile, and a massive body of metal forward of said point and around said concavity, said cap having an annular cavity in rear of said massive body of metal, whereby the impact area of the cap will be increased and impact will cause the cap to spread forward of the point of the body and rearwardly into said annular cavity.

2. An armor piercing projectile, embodying a pointed body, a broad-ended cap on the pointed end of the body and having a massive body of metal forward of said point, said cap having an annular cavity in its inner portion around the body of the projectile adjacent the point into which the metal of the cap will flow under the pressure due to impact.

3. An armor piercing projectile embodying a pointed body, a broad-ended cap on the pointed end of the body, having a massive body of metal beyond said point, said cap having an annular cavity in its inner portion adjacent to and extending entirely around the body of the projectile in rear of the point and into which cavity the metal of the cap will flow under the pressure due to impact.

4. An armor piercing projectile embodying a pointed armor piercing body and a contour cap affixed to the pointed end of the body and having a massive body of metal located forward of the point with its leading portion for first contact of annular form around the axis of the projectile, and an annular cavity in the cap around the body in rear of the point into which cavity the metal of the cap will flow under the pressure of impact.

5. An armor piercing projectile embodying a pointed armor piercing body and a contour cap affixed to the pointed end of the body with a massive body of metal forward of the said point, there being a rearwardly extending concavity in the said body of metal whereby the leading portion of the cap metal is of annular form and there also being an annular cavity in the interior of the base of the cap extending around the body of the projectile in rear of its point.

WILLIAM HERBERT KEEN.

Witnesses:
J. E. WILLIAMS,
H. W. DAVIS.