W. DALTON.

ARMOR PIERCING PROJECTILE.

APPLICATION FILED DEC. 22, 1917.

1,301,822.

Patented Apr. 29, 1919.

2 SHEETS—SHEET 1.

Fig. 1.

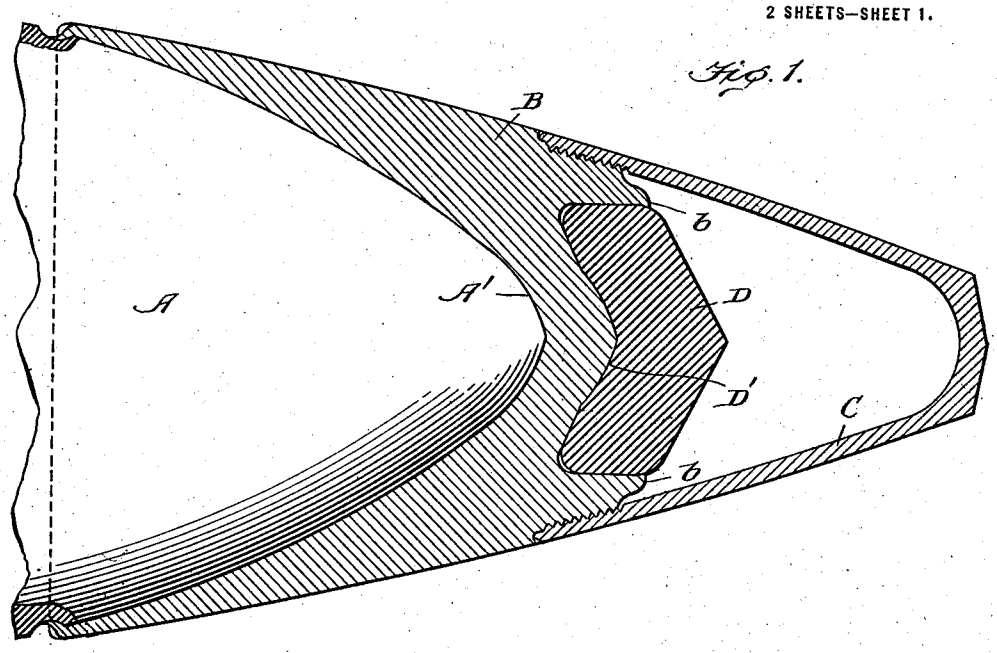
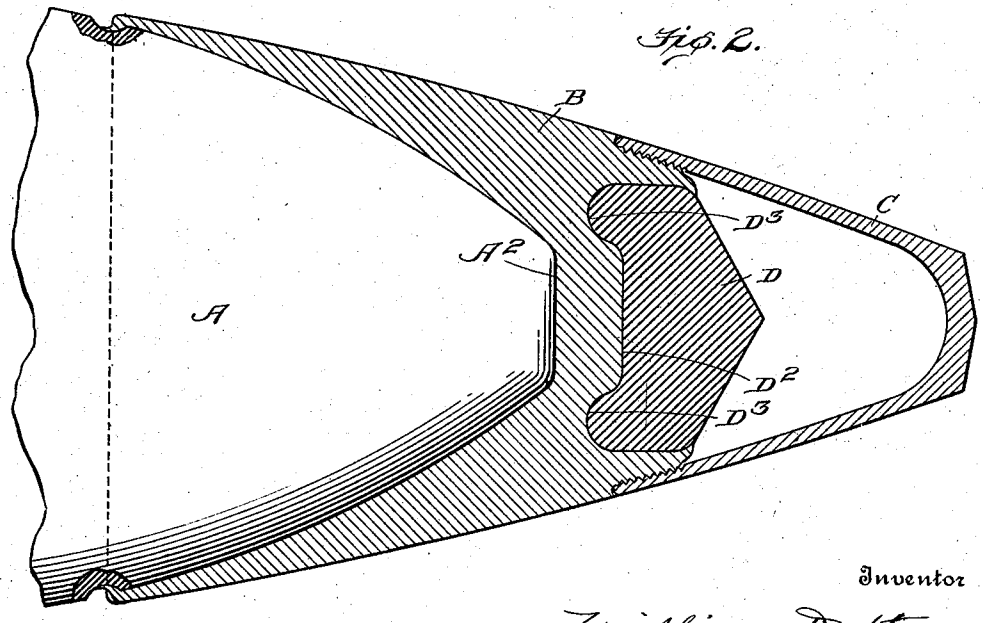


Fig. 2.



Inventor

William Dalton

By Church & Church

his Attorney

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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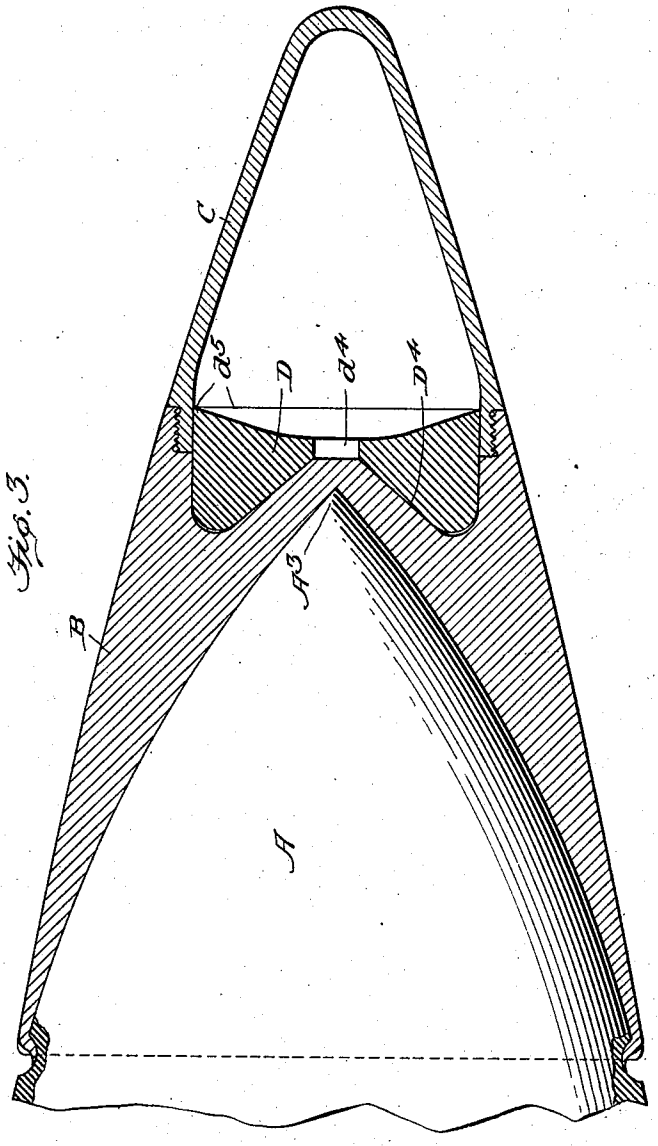


Fig. 3.

Inventor

William Dalton

By Church & Church

his Attorney

UNITED STATES PATENT OFFICE.

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

ARMOR-PIERCING PROJECTILE.

1,301,822. Specification of Letters Patent. Patented Apr. 29, 1919.

Application filed December 22, 1917. Serial No. 208,474.

To all whom it may concern:

Be it known that I, WILLIAM DALTON, 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.

This invention relates to projectiles of the armor piercing type and has to do specifically with that part of such projectiles commonly designated as the cap. Caps of the type herein contemplated serve to facilitate the passage of the body of the projectile through resistant protective armor and are commonly made of metal which is tough but soft or ductile, as compared with the projectile itself, or the point or nose portion of the projectile. In a contemporaneous application filed by Alexander G. McKenna and William Dalton, Serial No. 185,163, there is disclosed a cap for armor piercing projectiles in which cap there is incorporated a very hard striking portion which is held in the cap in a position in advance of the point or nose of the projectile body, and experience has shown that a cap embodying this construction is more efficient than where a soft metal cap is employed and is equally as efficient and as a manufacturing proposition much more practical than where the cap is an integral structure having a hardened external striking portion.

The object of the present invention is to improve upon the structure disclosed in said contemporaneous application Serial No. 185,163, filed Aug. 8, 1917 and allowed Nov. 6, 1917, in such wise that the tendency of the point of the projectile body to be shattered will be measurably overcome, and the efficiency, in so far as armor piercing and punishing capacity is concerned, correspondingly increased.

In carrying the invention into practice the hardened metal striking portion of the cap is so formed and positioned with relation to the point or nose of the projectile body that the hardened metal striking portion will form in effect a seat for the nose of the projectile body when the soft metal of the cap normally separating the two is displaced by the impact against the target. The seat so formed extends over a considerable area, and consequently the strains and stresses transmitted through the hard metal striking portion to the point or nose of the projectile are distributed, thereby avoiding a concentration of the strains or stresses at a single point, or in a small area at the extreme point or nose of the projectile.

The fundamental invention may be carried into practice in a variety of ways and while ideal conditions would indicate that the rear face of the hard metal striking portion of the cap should be made to conform to the nose or point of the projectile body throughout a considerable area, a considerable latitude in this respect may be indulged in, sometimes with beneficial results, owing to the fact that the relatively soft metal of the cap which must be displaced by the forward progress of the projectile body upon impact against the target, will flow laterally and will form an effective packing material, as it were, between the rear face of the hardened striking portion and nose of the projectile. As the distance between the two decreases, and the volume of relatively soft metal decreases in this area, the resistance to displacement correspondingly increases and the ultimate result is that the nose of the projectile body finds an effective seat against the rear face of the hardened striking portion which extends over a very considerable area, or an area sufficiently great to overcome the tendency of the nose of the projectile body to shatter or split off.

Referring to the accompanying drawings,—

Figure 1 is a sectional elevation of the nose or point of a projectile with a cap embodying the present improvements mounted thereon.

Fig. 2 is a similar view showing a variation in the conformation of the nose of the cap and rear face of the hardened striking portion.

Fig. 3 is a similar view showing the preferred adaptation of the invention to a so-called deck-piercing projectile or a projectile which is designed more especially for penetration of the target when the impact is at an acute angle to the face of the target.

Referring to the drawings, A, indicates the nose portion of the projectile in Fig. 1, and as shown in this figure the point or extreme end of the nose portion is varied somewhat from the ordinary ogival form by being made relatively blunt as at A'. B indicates the body of the soft metal cap which is seated on the nose portion of the projectile and held by approved means, for example, by having its rear edge peened into a recess in the projectile. The body of the soft metal cap B, in so far as the portion thereof which surrounds and supports the nose of the projectile and in so far as the windshield C when employed are concerned, may be of the usual or preferred construction. The soft metal cap carries or has incorporated in it a separately formed striking portion D, which is of a metal made exceedingly hard and tough. As a convenient construction the striking portion is seated in a suitable chamber in the forward portion of the body of the soft metal cap and is held therein by having the edges of the seat or chamber peened over a portion of the striking portion as at *b*. In accordance with the present invention the rear face or that face of the striking portion with which the nose portion of the projectile coöperates upon impact, is preferably shaped to substantially conform to the shape of the extremity of the nose portion throughout a considerable area. As shown in Fig. 1 the rear face of the striking portion at D' conforms to the shape of the nose of the projectile with a sufficient degree of accuracy to insure a firm seating of one against the other when the intermediate soft metal of the cap is displaced, or in any event the shock of impact is distributed throughout a very considerable area of the extremity of the nose portion and consequently the tendency to shatter or split off from a concentration of the strains and stresses at a single point is largely overcome.

In Fig. 2 a construction is shown in which the extreme point or end of the projectile nose at A^2 is cut away or flattened at D^2. In this construction a surrounding annular bead-like formation as at D^3 may be formed on the hard striking portion which will afford additional support for the nose of the projectile at the moment of impact.

Obviously the rear face of the hard striking portion of the cap may be so shaped as to distribute the strains and stresses throughout a considerable area of the point of the projectile without changing the shape of the latter from that of ordinary or approved practice, and one such formation is illustrated in Fig. 3.

In Fig. 3 the structure is particularly designed for use as a so-called deck-piercing projectile, and in this construction the point of the projectile body is pointed as at A^3 and the hardened striking portion D of the cap is formed with a conically recessed or chambered rear face as at D^4, the angle of the conical face being slightly wider than the angle of the surface of the point of the projectile. In this instance also the centering of the hardened striking portion is perforated at d^4 and its front is dished to form a sharp annular edge at d^5, designed to bite into the surface of the target when the impact is at an acute angle to that surface.

In all forms of the invention illustrated, the soft metal intermediate the point of the projectile and the hard striking portion is probably displaced laterally when impact occurs, a sufficient quantity of the metal remaining, however, regardless of the pressure, to form an effective seat for the nose of the projectile and to distribute the strains and stresses over the front end of the projectile, throughout a considerable area.

What is claimed is:

1. A striking member of an armor piercing projectile of the type in which the striking member is of relatively hard metal and is placed on the forward portion of the soft metal nose which surrounds the hardened nose of the projectile, characterized by having its rear face shaped to substantially conform to the shape of and provide a bearing for a considerable area of the surface of the hardened nose of the projectile when the latter is brought into contact with the striking member upon impact.

2. The combination with a soft metal cap for an armor piercing projectile, said cap having a rear face surrounding the nose of the projectile, of a relatively hard striking member having a rear surface shaped to substantially conform to the shape of and provide a supporting bearing over an extended area of the surface of the nose of the projectile when the latter has driven the soft metal from between it and the striking member.

3. A cap for armor piercing projectiles having a body portion of relatively soft metal adapted to surround and support the hardened point of the projectile and a striking part of hard metal carried by the cap in front of and spaced from said point by the intermediate relatively soft metal of the cap, the rear face of the hard striking portion being shaped to substantially conform to the point of the projectile and take a support-

ing bearing in an extended area thereon when the intermediate soft metal of the cap is displaced.

4. A cap for armor piercing projectiles comprising a body portion of relatively soft metal formed to inclose the hardened point of the projectile and having incorporated therein at its forward end a separately formed striking portion of hard metal, the rear face of said striking portion being recessed to substantially conform to the contour of the point of the projectile whereby an extended bearing is afforded between the projectile and striking portion when the relatively soft metal of the cap is displaced.

WILLIAM DALTON.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."