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H. B. STRANGE.

ARMOR PIERCING PROJECTILE.

APPLICATION FILED JULY 1, 1914.

1,153,460.

Patented Sept. 14, 1915.

2 SHEETS—SHEET 1.

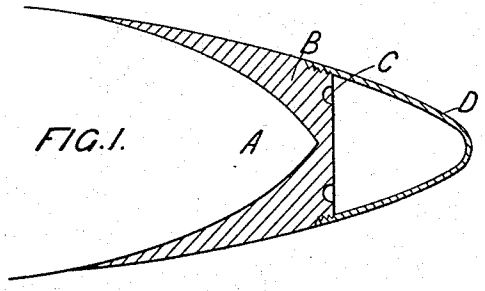


FIG. 1.

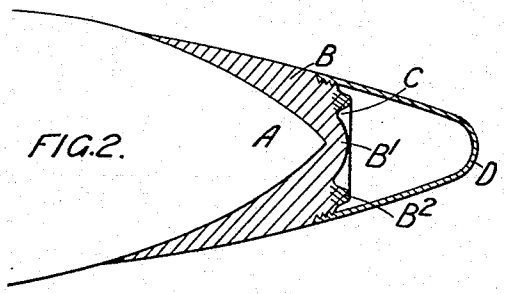


FIG. 2.

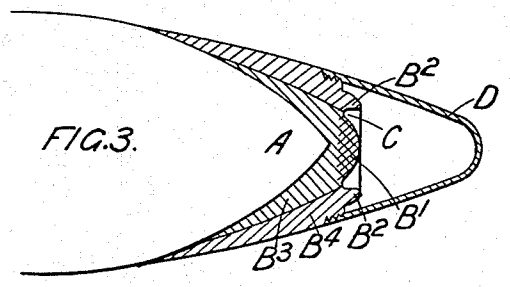


FIG. 3.

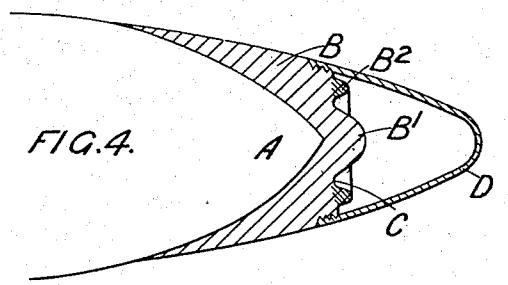


FIG. 4.

WITNESSES.

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2 SHEETS—SHEET 2.

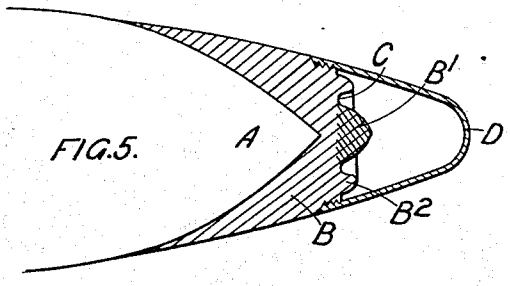


FIG.5.

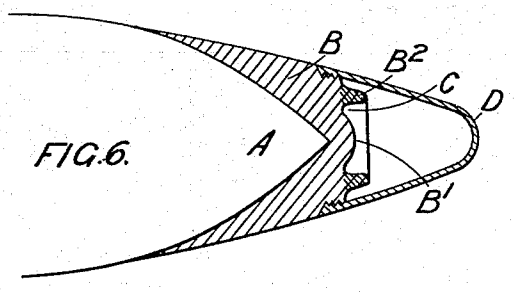


FIG.6.

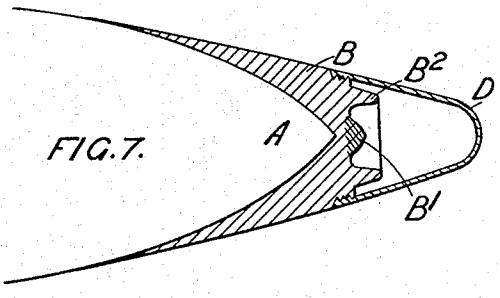


FIG.7.

WITNESSES.

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UNITED STATES PATENT OFFICE.

HARRY BLAND STRANGE, OF BLACKHEATH, ENGLAND, ASSIGNOR TO MESSRS. THOS. FIRTH AND SONS, LIMITED, OF SHEFFIELD, ENGLAND.

ARMOR-PIERCING PROJECTILE.

1,153,460. Specification of Letters Patent. Patented Sept. 14, 1915.

Application filed July 1, 1914. Serial No. 848,445.

To all whom it may concern:

Be it known that I, HARRY BLAND STRANGE, subject of the King of England, residing at Blackheath, Kent, in England, have invented certain new and useful Improvements in Armor-Piercing Projectiles, of which the following is a specification.

This invention relates to capped armor-piercing projectiles and has for its object so to construct and form the cap as to cause it effectively to support the point of the projectile when the plate is struck by the projectile obliquely to the plate surface, and also at the same time not to minimize the action of the cap when the projectile strikes normally to the plate surface. These two functions, with ordinary caps are mutually antagonistic.

According to this invention the cap has an annular groove or recess formed in its front face. The dimensions of this groove and its position are such as to divide up the front face of the cap into a central protrusion and a separate and distinct annular protrusion. The central protrusion or the annular protrusion may both be soft or either may be hardened, or both may be hardened. They may also protrude relatively the one beyond the other.

The external contour, cross-sectional area and general proportions and shape of each protrusion, may vary as required, as also the cross-section and dimensions of the groove. Preferably however that protrusion which is hardened is so positioned that it will strike the face of the plate, at oblique impact, usually slightly before or in any case not later than the soft protrusion. Thus for example if the annular protrusion is hardened, it may be so formed that if the projectile strikes a plate obliquely to its surface, contact will first take place between the hardened annular protrusion and the plate. On the other hand if the central protrusion is hardened this protrusion may be so formed that it will project to a greater extent than the unhardened annular protrusion so that on striking a plate normal to its surface or with slight obliquity of impact contact will take place initially between the central protrusion and the plate. In some cases however where the annular protrusion is hardened it is desirable to form the unhardened central protrusion so that it will project more than the hardened ring, the relative extents to which these protrusions project however being conveniently such that while with normal or approximately normal impact contact will first take place between the central unhardened protrusion and the plate surface, on appreciable oblique impact the hardened ring will first come into contact with the plate surface.

As already mentioned the dimensions of the central protrusion may vary but where this protrusion is unhardened it is preferable to give it such a contour that the point of the projectile will have an approximately equal thickness of metal in any direction forward of and over it and such that the surplus metal displaced may fill or tend to fill the groove.

The annular groove permits of the central protrusion being compressed or crushed into it on normal impact and on oblique impact it permits the annular protrusion to be displaced sidewise into the annular groove and the central protrusion likewise whether both or either are hard or soft. The annular groove also serves the important function of making possible local hardening of the face of the cap a highly important consideration in the manufacture of caps for armor-piercing projectiles.

The groove may be so placed that the annular protrusion may be positioned at or near or actually constitute the perimeter of the front face of the cap. It is desirable however to so form the perimeter of the front face particularly where the annular protrusion is hardened so that the whole face of the cap can be covered or inclosed by a hollow casing such as is customarily employed with these caps. The hardened ring must therefore be formed and disposed so as to allow of the attachment of the hollow casing by screwing or otherwise.

In the case of caps for large projectiles the improved cap for convenience of construction may be composed of inner or outer concentric portions. Thus for example the annular groove in the front face of the cap may be positioned at the juncture between the inner and outer members which make up the complete cap so that the protruding ring is formed on and carried by the outer part while the central protrusion is formed on the inner part of the cap. Such a construction facilitates the treatment of that pro-

trusion which is to be hardened. In other cases both protrusions may be formed on the inner portion of the cap the outer part having a flat or otherwise formed front face which constitutes a recess or cut away portion outside the annular protrusion. This outer member may have a flange formed on its face for the attachment by screwing or otherwise of the hollow casing or the perimeter of this outer member may be otherwise formed for the attachment of this casing.

It will be understood that except where the protrusions are hardened the cap as a whole is made of relatively soft metal.

In the accompanying drawings,—Figures 1 to 7, are longitudinal central sections through the front portions of projectiles having caps constructed according to the present invention.

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

In Fig. 1 the pointed ogival nose A of the projectile proper is provided with a cap B having an annular groove C formed in its front face. A hollow casing or false nose D is secured to the cap B.

In all the other figures the front face of the cap is so shaped that the annular groove or recess C forms a central protrusion B′ and an annular protrusion B^2.

Figs. 2 and 3 show constructions in which the central portion B′ and the annular part B^2 protrude to an equal extent, the annular protrusion B^2 being hardened in the form shown in Fig. 2 as indicated by the cross-hatching whereas in Fig. 3 the central protrusion B′ is hardened. The cap illustrated in Fig. 3 differs from the other forms by being made in two portions an inner part B^3 and an outer concentric member B^4. In this construction the groove C is made conveniently at the point of junction of the two portions.

Figs. 4 and 5 illustrate two caps in which the central portion B′ protrudes to a greater extent than the annular part B^2 the central protrusion B′ being soft in the form shown in Fig. 4 and the annular protrusion hardened whereas in Fig. 5 the central protrusion is hardened and the annular protrusion left soft.

In the caps shown in Figs. 6 and 7 it is the annular protrusion B^2 which projects beyond the central portion B′ the annular protrusion being hardened in the case of Fig. 6 and left soft in Fig. 7 where the central protrusion is hardened.

From the figures it will be appreciated that the shape of the central protrusion may vary, for instance it may be rounded as in Figs. 2, 3, 4 and 6, or may be formed with an ogival point as in Figs. 5 and 7.

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

1. A cap for an armor piercing projectile having an annular groove or recess formed formed in its front face that the metal on each side of the groove will be cut by a plane normal to the axis of the projectile cutting the groove.

2. A cap for an armor piercing projectile having an annular groove or recess formed in its front face with the metal on each side of the groove extending forwardly to such an extent that a plane normal to the axis of the projectile cutting the groove will cut also the metal on each side of the groove.

3. A cap for an armor piercing projectile having an annular groove or recess so formed in its front face that a plane normal to the axis of the projectile cutting the groove will also cut the metal on each side of the groove, the metal on one side of the groove being hardened and that on the other side left relatively soft.

4. A cap for an armor piercing projectile having an annular groove or recess formed in its front face so positioned and of such dimensions as to divide the front face into distinct central and annular protrusions, and permit one of said protrusions to be crushed or compressed into the groove on impact of the projectile.

5. In a cap for an armor piercing projectile, the combination with a central protrusion on the face of the projectile, of an annular protrusion also formed on the face of the cap, one of the protrusions being hardened and the other left comparatively soft.

6. In a cap for an armor piercing projectile, the combination with a central protrusion on the front face of the cap, of an annular protrusion also formed on its face, one of the protrusions being hardened and the other left comparatively soft, said protrusions protruding relatively the one beyond the other.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

HARRY BLAND STRANGE.

Witnesses:

RAYMOND WILLIAM BILLINGHURST,
ALFRED HORACE PACKHAM.

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