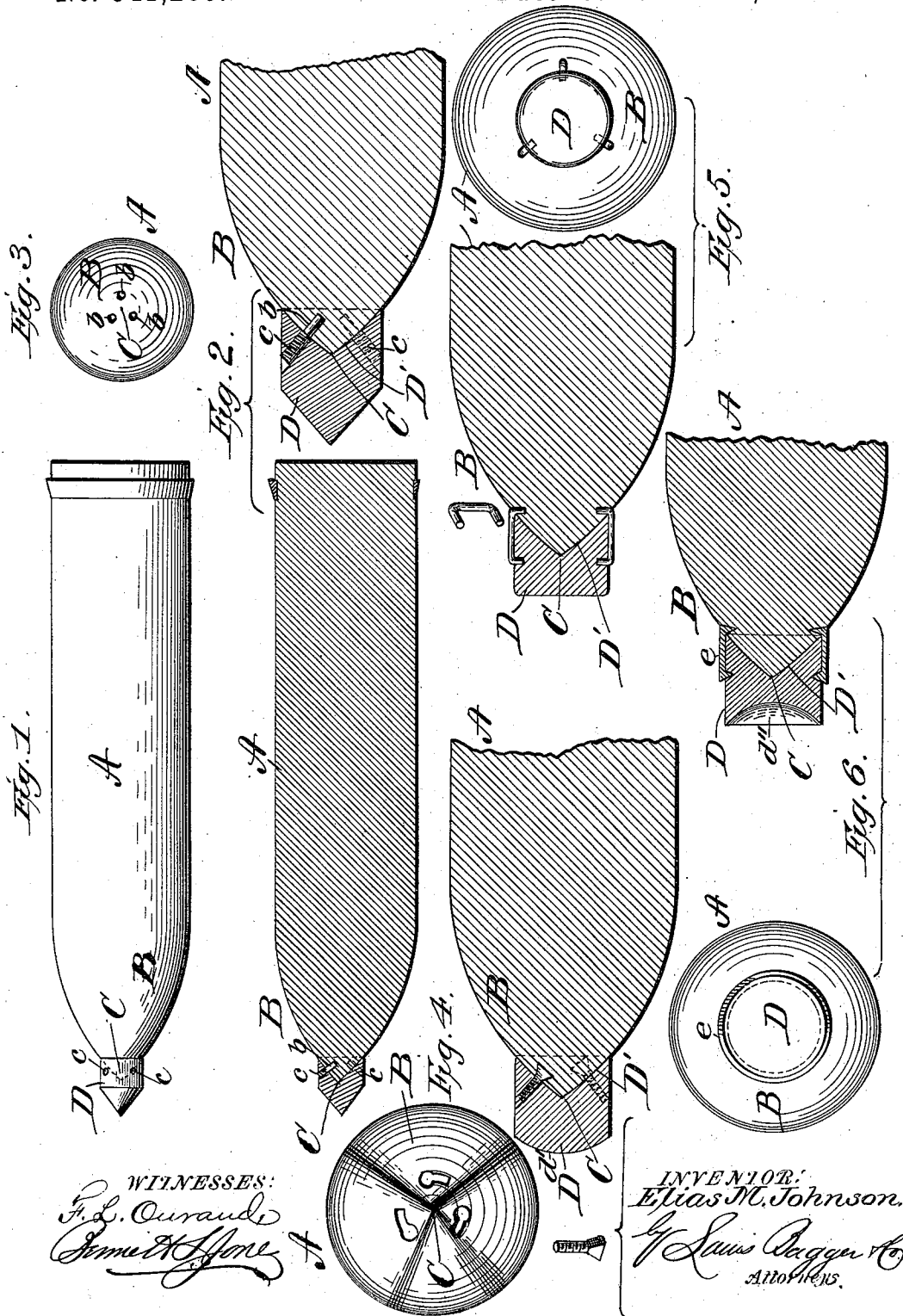


(No Model.)

E. M. JOHNSON.
PROJECTILE WITH DETACHABLE SOFT CAP.

No. 541,280.

Patented June 18, 1895.



WITNESSES:

F. L. Ouraud,
James H. Hone

INVENTOR:
Elias M. Johnson.
G. Louis Baggett
ATTORNEYS.

UNITED STATES PATENT OFFICE.

ELIAS M. JOHNSON, OF NEW YORK, N. Y.

PROJECTILE WITH DETACHABLE SOFT CAP.

SPECIFICATION forming part of Letters Patent No. 541,280, dated June 18, 1895.

Application filed March 30, 1894. Serial No. 505,750. (No model.)

To all whom it may concern:

Be it known that I, ELIAS M. JOHNSON, a citizen of the United States, and a resident of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Projectiles; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification, and in which—

Figure 1 is a side elevation of a projectile of my improved construction. Fig. 2 is a longitudinal sectional view through the axis of the same. Fig. 3 is a top view of the projectile with the cap removed, and Figs. 4, 5, and 6 are detail views illustrating various modifications in the shape of the cap and the manner of attaching it to the projectile.

Like letters of reference designate corresponding parts in all the figures.

My invention relates to projectiles for rifled ordnance, and while not limited in its application to, yet is more especially intended for, armor-piercing projectiles; that is to say: conoidal projectiles adapted to penetrate the armor-plates of ships of war, floating batteries, and fortifications protected by armor-plates of modern construction.

As is well known, modern armor-plates of the more approved patterns as now produced in Europe and in the United States, are hardened on the exterior surface, to a depth of from half an inch to one inch and a half (more or less) by various processes, among which may be mentioned the so-called "Harveyizing" process, the "Campbell" (or Sheffield) process, and several other processes, both patented and secret, which appear to have met with some degree of success in being able to resist penetration by special armor-piercing projectiles, fired from heavy-power guns, specially constructed for the purpose by permitting the use of heavy charges of high explosives. An examination of the projectiles, after firing, seems to show that the resisting power of these modern plates is due to the fact, that

as the hard point of the projectile strikes the hardened surface of the plate against which it is fired, the point of the projectile becomes "upset" by the blow at the moment of impact, and thus loses, in a great measure, its power of penetrating the softer metal underlying the hardened exterior surface of the plate. Now, if this "upsetting" of the hard point at the moment of impact with the hardened surface of the armor-plate can be prevented, and the shape of the point sustained and kept intact while the hardened surface of the plate is being pierced, then the projectile would have no difficulty in penetrating the underlying softer metal and completely piercing the plate, so that the projectile, if of explosive character, would have reached the point where it can do most effectual damage prior to bursting or explosion, instead of exploding practically exteriorly to the armor-protected sides of the vessel and thus doing comparatively little execution. My invention is based upon this theory, and experiments have demonstrated that it is correct.

My improvement therefore consists broadly in the combination with a pointed projectile (having a hard point) of a detachable supporting and sustaining cap, recessed on its under side so as to overlap and cover the point of the projectile and adapted to sustain and support said point at the moment of impact with the hardened surface of the armor plate against which the projectile is fired, so that the point cannot fly off or become "upset" by the blow of impact with the plate, but will be supported and its shape sustained while the hardened surface of the plate is being pierced.

On the accompanying drawings, the reference-letter A denotes the cylindrical body of a projectile (either solid or hollow); B, the conoidal head, and C the hard point or apex, which, on firing the projectile against a modern armor-plate, first strikes the hardened surface of the plate. Upon this hard point C, I place a cap D, of any suitable metal or grade of metal, and of any desired shape exteriorly; but recessed on its under side, as shown at D', so that it will overlap and fit

upon the point C. To prevent this cap D from becoming detached during the flight of the projectile through the air (or water), it can be fastened to the head of the projectile around the point in various ways, as shown for example, in Figs. 1, 2, and 3, in which I have shown the supporting cap D attached to the conoidal head B of the projectile by means of short metal bolts *c* (preferably three in number, although there may be more or less), which are fastened obliquely into the sides of the cap D, so as to project with their inner ends into the recess D' and into apertures *b* in the conoidal head B, around and below the point; but the method or means of fastening the supporting cap D upon the projectile, as well as the shape of the cap, may be varied or modified in many ways without departing from the spirit of my invention. Thus, in Figs. 1 and 2, I have shown, as examples, the sustaining-cap D with a pointed head *d*; while in Fig. 4, I have shown cap D with a rounded or semispherical head *d'*. In Fig. 5, the cap D is flat; and in Fig. 6, I have shown cap D with a concave or recessed head *d''*. Again, instead of the bolts *c* for attaching the supporting-cap D to the projectile, as illustrated in Figs. 1, 2, and 3, dovetailed bolts or keys may be used, as shown in Fig. 4, fitting into dovetailed recesses in the conoidal head of the projectile below the point C; or hook-shaped fastenings may be used, as illustrated in Fig. 5; or a band or hoop *e* may be used for connecting cap D to the conoidal head B of the projectile, as illustrated in Fig. 6. In other words, I desire it to be distinctly understood, that I do not confine or limit myself to any particular exterior shape or configuration of the supporting cap D, nor to any particular means for or method of fastening said cap detachably upon the head of the projectile. Experiments have demonstrated that this recessed supporting cap D will effectually support and sustain the hard impact-point C of the projectile, so that this cannot fly off, "flow," or become "upset" at the moment of impact with the hardened surface of the plate.

It would appear that, at the moment of impact, the fastenings by which cap D is attached to the projectile break or become disrupted, thus severing the connection between the cap and the projectile, and spreading or enlarging the cap laterally, so as to form, so to speak, a supporting ring or circular sleeve around the projectile through which this enters and pierces the plate. It has been demonstrated that the metal of the cap D, acting in this manner will effectually support the point C and sustain its shape by such support, not only at the moment of actual impact, but while the point penetrates the comparatively thin hardened outer surface or hard skin of the plate, after the piercing of

which the softer metal of the plate which underlies its hardened surface will of itself support the point and prevent it from "flowing" or "upsetting" during the penetration of this softer metal which forms the body of the plate.

I am aware that so-called "compound" projectiles (that is to say, projectiles composed or built up of several separate and separable sections adapted to break apart and scatter after the projectile leaves the muzzle of the gun and during its flight toward the point aimed at) for small arms have been made before, in which the several separable parts or sections are held together either by soldering, or by a small cap which overlaps and is fastened to the front end of the sectional bullet; but both the construction and the result of such a device differ very essentially from my invention, which has relation to an altogether different class or type of projectiles, quite the reverse of "separable," namely: projectiles which shall remain solid and in one piece not only during their flight through the air, but even after actual impact and until penetration has been effected. Not until then is it desirable that a projectile of the "armor-piercing" type, to which mine belongs, should break and scatter. This is a fundamental difference, and distinguishes the modern "armor-piercing" projectile from all others.

I am also aware of the patents to William H. Brown, No. 376,728, dated January 24, 1888; and George R. Wilson, Jr., No. 465,230, dated December 15, 1891; the former showing a cylindrical body with a conical point incased throughout its entire length in a jacket or envelope of soft metal, substantially like the so-called "Lorentz" jacketed picket, and many other bullets of that type; while the patent to Wilson specifically describes and claims a projectile with a stepped or shouldered point covered by a hollow (*i. e.*, not solid) or chambered frangible cap; the frangibility or brittleness of the cap, so that it may be instantly shattered on impact, being an important and absolutely necessary feature. I claim neither of these constructions, combinations or arrangements, which could under no circumstances be applied to, or form an equivalent for, my invention, which is as follows, to wit:

1. The combination with an armor-piercing projectile, having a hard solid point, of a detachable solid cap recessed to fit and overlap the point of the projectile and adapted to support and sustain the same at the moment of impact with the plate against which the projectile is fired; substantially as and for the purpose set forth.

2. The combination with an armor-piercing projectile, having a hard solid point, of a solid supporting and sustaining cap, recessed on its under side to fit and overlap the point of the projectile, and attached detachably to the co-

noid below the point by fastenings adapted to break or rupture by the blow of impact; substantially as and for the purpose set forth.

5 3. The combination with a conoidal projectile of a supporting and sustaining cap, recessed on its under side to fit and overlap the point of the projectile, and attached detachably to the head of the projectile below the point of the same by fastenings entering apertures or recesses in the head of the projectile
10

and adapted to become broken or ruptured by the blow of impact; substantially as and for the purpose shown and set forth.

In testimony that I claim the foregoing as my own I have hereunto affixed my signature 15 in presence of two witnesses.

ELIAS M. JOHNSON.

Witnesses:

BENNETT S. JONES,
AUGUST PETERSON.