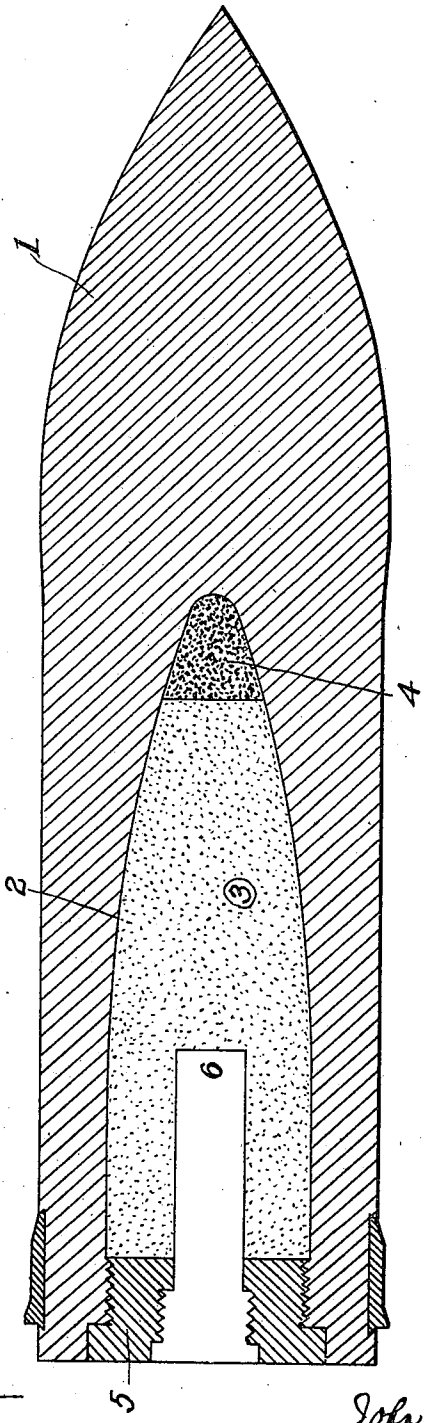
J. B. SEMPLE.

EXPLOSIVE PROJECTILE.

APPLICATION FILED JAN. 14, 1914.

1,105,849.

Patented Aug. 4, 1914.



WITNESSES:

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UNITED STATES PATENT OFFICE.

JOHN B. SEMPLE, OF SEWICKLEY, PENNSYLVANIA.

EXPLOSIVE PROJECTILE.

1,105,849. Specification of Letters Patent. Patented Aug. 4, 1914.

Application filed January 14, 1914. Serial No. 811,969.

To all whom it may concern:

Be it known that I, JOHN B. SEMPLE, residing at Sewickley, in the county of Allegheny and State of Pennsylvania, a citizen of the United States, have invented or discovered certain new and useful Improvements in Explosive Projectiles, of which improvements the following is a specification.

My invention relates to explosive projectiles and consists in the composition and arrangement of the burster charge.

The invention is illustrated in the accompanying drawing which shows in central longitudinal section an armor-piercing projectile in which my invention is employed.

Within an armor-piercing projectile the shape of the cavity for containing the burster charge is standardized and conforms in a general way to the external contour of the shell, but is so shaped that the thickness of metal is greatest toward the point. This is shown in the drawing.

Of late years certain explosives have come into use, because of their relatively great explosive power, which at the same time are relatively sensitive to shock; such explosives are trinitrotoluene (commonly written for convenience, though not according to accepted chemical notation, T N T) and tetranitroanilin (T N A) and picric acid, and others. These substances are so sensitive that, when used to fill the tapering chamber of a projectile, the shock of impact, when the flying projectile strikes heavy armor-plate, is apt to cause premature explosion—anticipating the operation of the delay-acting fuse-mechanism provided to effect detonation.

When a flying projectile strikes and its speed is checked, the body of explosive material within is caused to set forward and there is a consequent sudden enormous compression of the burster charge. The stresses of compression are concentrated at the tip of the forwardly tapering chamber; and it is at this point that premature explosion originates.

It has been proposed to fit into the peak, that is, the anterior end of the cavity which receives the burster charge, a conical block of wood. By resorting to this expedient, the shape of the shell is not altered and the disposition of metal is the same, but the body of burster charge, instead of being attenuated to a point, is blunt in front and abuts upon an extended flat surface. With such a block of wood present the strains consequent upon striking armor-plate are not concentrated in the peak of the cavity and the danger of premature ignition is removed. But the body of wood is inert and occupies space which should be occupied by explosive, the efficiency of the burster charge is accordingly impaired, and the advantages which might otherwise be enjoyed in using such high explosives as have been mentioned are thus wholly or to a large extent offset by this disadvantage.

My invention consists in filling the cavity for the burster charge in the main with these high-power and desirable explosives but with this qualification: Before introducing the body of sensitive explosive, I fill the peak of the cavity with a body (ordinarily compressed) of relatively insensitive explosive—as, for example, the United States Government explosive known as explosive D, or an "ammonal" explosive, of the class made by using ammonium nitrate. By resorting to this expedient, which constitutes my invention, the burster charge taken as a whole is not materially less, in its explosive power, than if it were wholly made up of the high-power explosives named; the cavity is entirely filled with explosive, and the normal effect of detonation is not appreciably diminished; and at the same time the stress of compression incident to striking is concentrated, not in a body so sensitive as to be in danger of exploding prematurely, but in a relatively insensitive body, capable of enduring the stress.

In the accompanying drawing, the projectile is indicated at 1, the cavity for the burster charge at 2. The contours shown are approximately those now standardized. Within the cavity is the body of explosive. The greater portion 3 of this body of explosive is of relatively high power and is relatively sensitive to shock, but at the anterior end of the cavity and filling the peak thereof is the smaller portion 4 of somewhat inferior power but of appreciably less sensitiveness to shock. The cavity is closed posteriorly with the base plug 5, which carries the detonating fuse 6, indicated in outline.

I claim as my invention:

1. The combination within the forwardly tapered cavity of a projectile, of a body of relatively insensitive explosive capable of sustaining without explosion the stress of impact occupying the anterior end of the cavity

and a body of a relatively sensitive high-power explosive filling the major portion of the cavity, to rearward of the body of explosive first mentioned substantially as described.

2. The combination, within the forwardly tapered cavity of a projectile, of a body of relatively sensitive high-power explosive, and a body of relatively insensitive explosive capable of sustaining without explosion the stress of impact occupying the tapered end of said cavity, substantially as described.

In testimony whereof I have hereunto set my hand.

JOHN B. SEMPLE.

Witnesses:
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