

(No Model.)

C. T. CAYLEY & R. S. COURTMAN.
SHELL.

No. 447,229.

Patented Feb. 24, 1891.

Fig. 1.

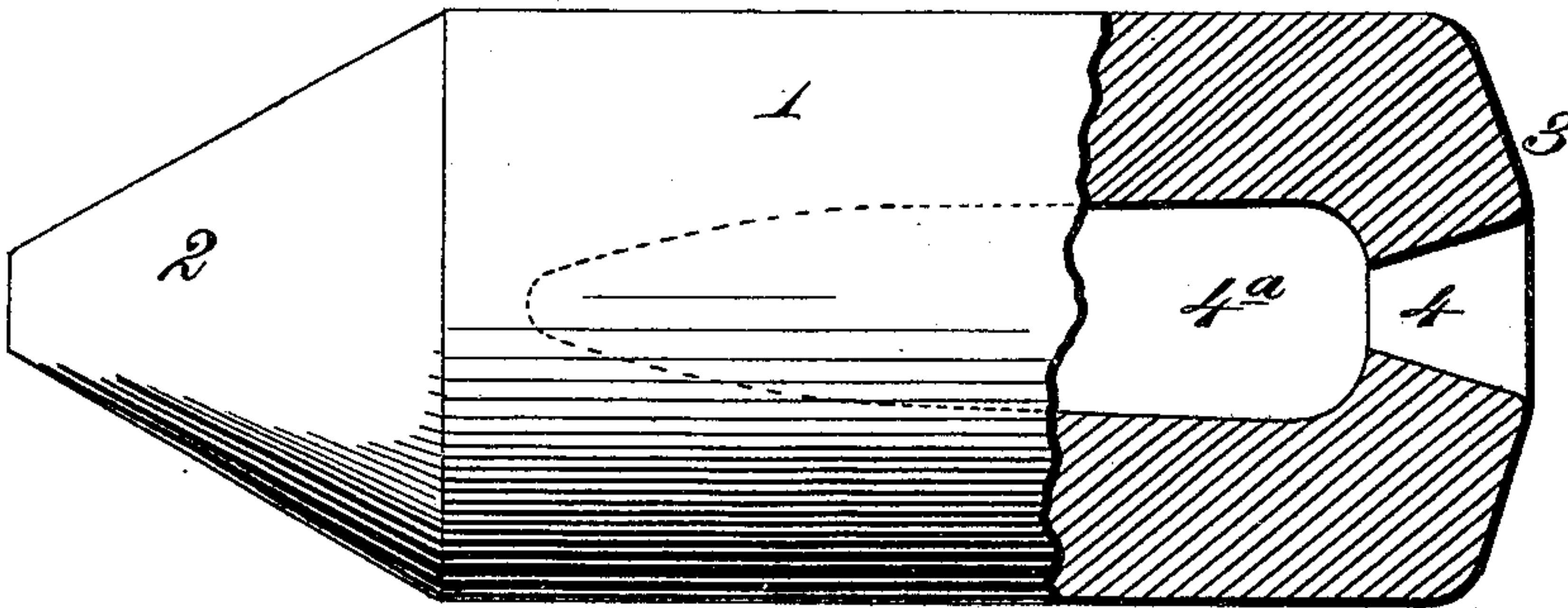


Fig. 2.

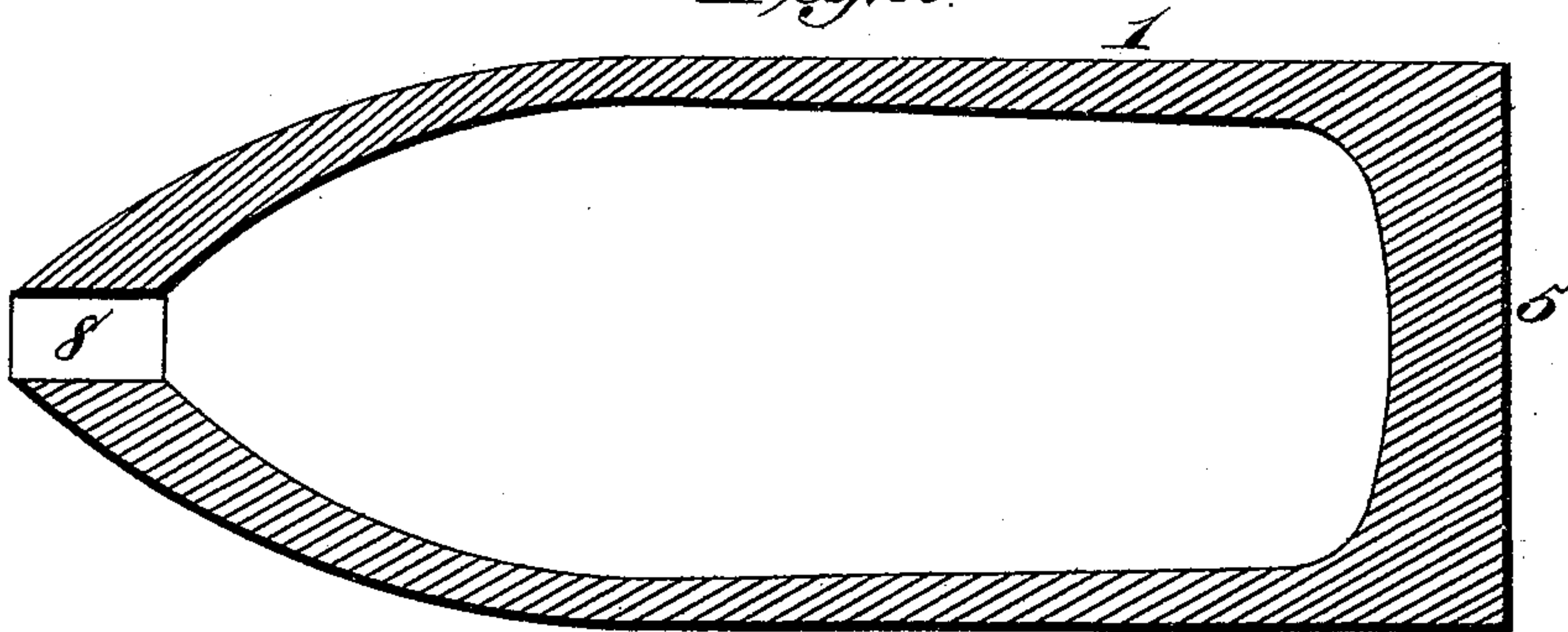
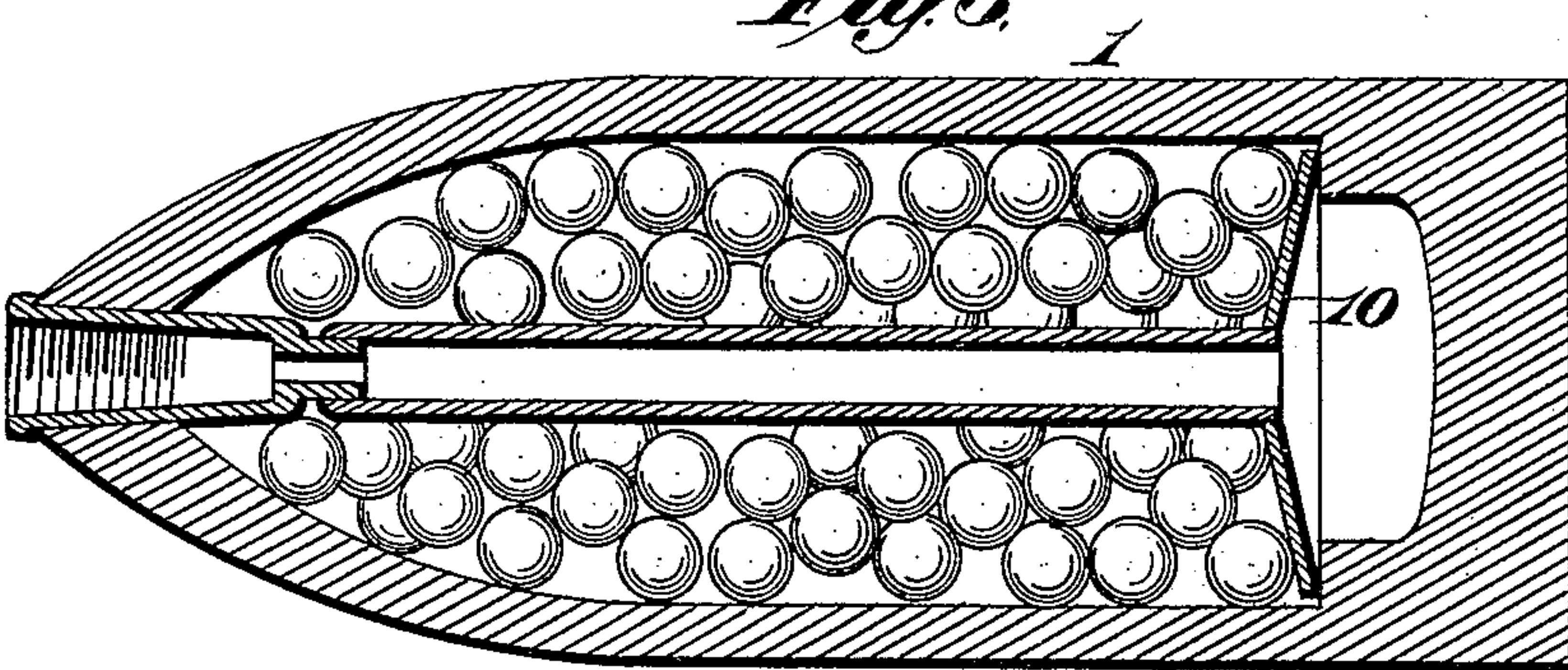


Fig. 3.



Witnesses.
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UNITED STATES PATENT OFFICE.

CLAUD THORNTON CAYLEY AND REUBEN SAMUEL COURTMAN, OF LONDON, ENGLAND, ASSIGNORS, BY DIRECT AND MESNE ASSIGNMENTS, TO THE E. W. BLISS COMPANY, LIMITED, OF BROOKLYN, NEW YORK.

SHELL.

SPECIFICATION forming part of Letters Patent No. 447,229, dated February 24, 1891.

Application filed November 10, 1887. Serial No. 254,805. (No model.)

To all whom it may concern:

Be it known that we, CLAUD THORNTON CAYLEY and REUBEN SAMUEL COURTMAN, subjects of the Queen of Great Britain, residing at London, England, have invented new and useful Improvements in Projectiles and Shells, of which the following is a specification.

The present invention relates to hollow projectiles and shells for ordnance which are forged from a solid piece of iron or steel in contradistinction to being hollowed out by means of boring-tools.

The object of this invention is to provide a peculiar projectile or shell with no joint or seam and possessing walls of substantially uniform thickness of great tenacity and strength; and to such ends the invention consists in a punch-forged hollow projectile or shell made of a single block of metal having a conoidal point and a longitudinally-drawn and punched-out cylindrical portion formed with a lustrous external surface having parallel thread-like marks or lines extending longitudinally thereupon, whereby the article is distinguished from its kind now in the market.

We have in an application for patent filed February 12, 1887, Serial No. 227,419, fully described the process of manufacturing shells and projectiles from solid blocks of metal, and have also included or shown in said application the special forms of projectiles and shells claimed in the present application, which as articles of manufacture or products are not claimed therein.

In the accompanying drawings, Figure 1 is a face view, partly in section, of a hollow armor-piercing projectile having a dense head. Fig. 2 is a longitudinal sectional view of a hollow shell having a fuse-opening at the point and provided with a solid or closed base. Fig. 3 is a longitudinal sectional view showing a shrapnel-shell charged with shot.

Referring to Fig. 1, the reference-numeral 1 designates the body portion of a projectile having a solid conoidal or conical point 2, which is made very dense or hard, so as to facilitate or insure the penetration of the projectile into solid armor-plates. The base 3 of the projectile is shaped so as to leave a small

central opening 4, that is closed by a screw-plug or by any other suitable means. A chamber or cavity 4^a is formed within the body of the projectile for the purpose of throwing the center of gravity nearer the forward end than it would be if the projectile were solid.

The entire projectile defined by the foregoing description is made of a solid piece of steel or iron and has no seams or joints whatever.

The process of manufacture is fully set forth in the application filed February 12, 1887, and, briefly stated, it may be said to consist in subjecting a solid block of metal to the action of punches, mandrels, and dies, so as to cause the metal to flow endwise and form a chamber or cavity of any desired size or configuration. The open base of the projectile is then by other dies turned down so as to close it, with the exception of the small central opening 4. It should be observed that by the process of manufacture set forth we can manufacture very large and heavy shells or projectiles of one piece of steel or iron without the necessity of using boring-tools. Furthermore, the successive action of punches and dies will improve the quality of the metal, produce walls of uniform thickness and great tenacity, and give great strength to the projectile, whether made with an open or closed bore. When the point or head is solid and closed, the metal will be very dense and hard, for the object already stated.

In Fig. 2 we have shown a common shell which has a closed base 5, a body with parallel walls of uniform thickness, and a point formed by forcing the metal of said walls inward, so as to produce a conical or tapering head or apex, which has a central opening 8 for the reception of a closing-plug. The shell shown in Fig. 2 is made in the same manner as the armor-piercing projectile, only in this instance there is a fuse-opening in the point. The shrapnel-shell shown in Fig. 3 is also forged from a single piece of steel, and before the open end or apex of the shell is closed we insert the diaphragm 10, which covers the chamber of the bursting-charge. The aperture at the apex of the shell is made large enough to permit the introduction of the bullets or shot into the said shell after its end has been closed

by the action of the dies, with the exception of said aperture. We prefer to fill the conical or conoidal part as well as the cylindrical part of the chamber or cavity in the shell. We then introduce the bursting-charge and insert the fuse. In this manner we produce a forged shrapnel-shell containing a larger number of bullets than a forged shrapnel-shell of the same dimensions as heretofore manufactured, and we are enabled, if desired, to use steel instead of lead bullets, the larger number employed making up for the difference in the weight of the two metals. Moreover, we can by our improved method manufacture shrapnel-shells more cheaply than is practicable by the well-known method of making them in two parts and uniting the said parts by riveting, screwing, or otherwise.

In addition to the projectile or shell having the characteristics of walls of substantially uniform thickness and great density, tenacity, and strength our improved punch-forged projectile or shell possesses other characteristics by which it is distinguishable as an article of manufacture from prior projectiles or shells of its kind in that it possesses the characteristic features of a longitudinally-drawn and punched-out cylindrical portion formed with

a lustrous external surface having parallel thread-like marks or lines extending longitudinally thereupon, which are produced during the process of punching by the action of the die or mold and punches or mandrels and the lengthwise flowing of the metal.

We disclaim a hollow projectile rolled into shape with the metal condensed and hardened at one operation, as such is not our invention, and is disclosed by Letters Patent No. 348,788 to G. F. Simonds, dated September 7, 1886.

What we claim as our invention is—

As a new article of manufacture, a punch-forged hollow projectile or shell having a conoidal point and a longitudinally-drawn and punched-out cylindrical portion formed with a lustrous external surface having parallel thread-like marks or lines extending longitudinally thereupon, substantially as herein set forth.

In testimony whereof we affix our signatures in presence of two witnesses.

CLAUD THORNTON CAYLEY.

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Witnesses:

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