No. 627,611. Patented June 27, 1899.

F. BURGER.

EXPLOSIVE PROJECTILE.

(Application filed Apr. 5, 1898.)

(No Model.)

Fig. 1.

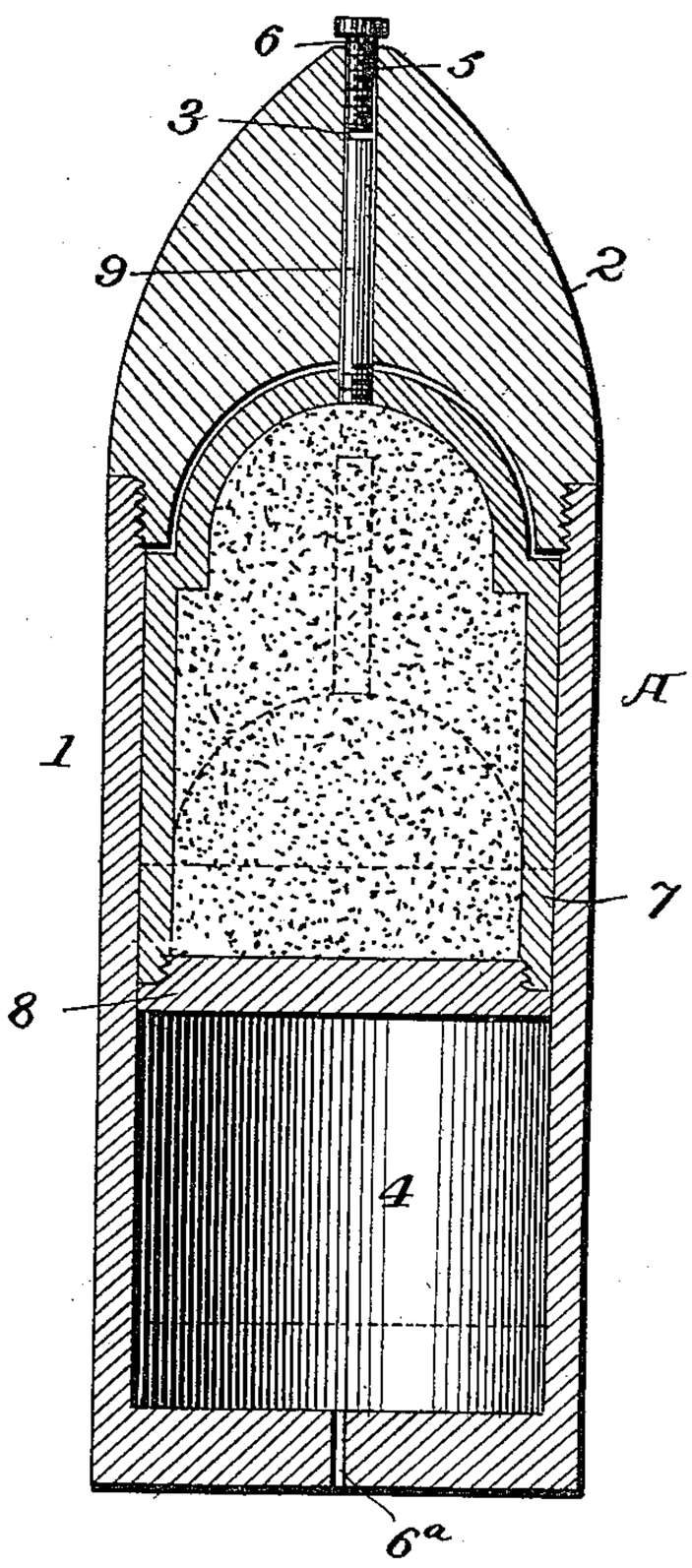


Fig. 2.

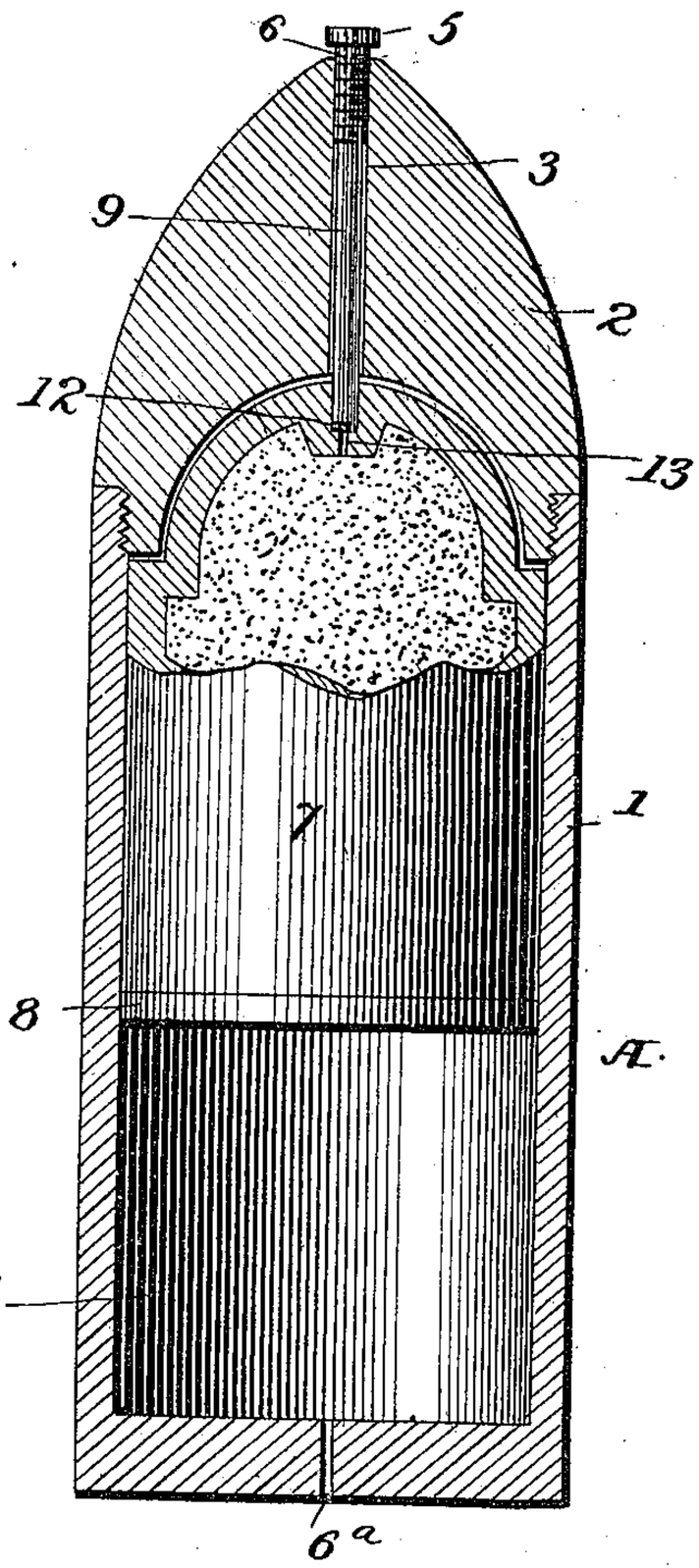
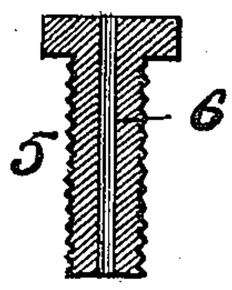


Fig 3.



Witnesses
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UNITED STATES PATENT OFFICE.

FRANZ BURGER, OF FORT WAYNE, INDIANA, ASSIGNOR OF THREE-FOURTHS TO HENRY M. WILLIAMS, OF SAME PLACE.

EXPLOSIVE PROJECTILE.

SPECIFICATION forming part of Letters Patent No. 627,611, dated June 27, 1899.

Application filed April 5, 1898. Serial No. 676,548. (No model.)

To all whom it may concern:

Be it known that I, FRANZ BURGER, a citizen of the United States, residing at Fort Wayne, in the county of Allen and State of Indiana, have invented certain new and useful Improvements in Explosive Projectiles, of which the following is a specification.

This invention relates to certain new and useful improvements in projectiles for containing dynamite or other high-explosive compounds or mixtures, having for its object to provide a projectile which may be impelled from a gun at a high velocity without danger of exploding the compound or mixture in the projectile before it reaches its point of destination; and with this object in view the invention consists in the novel construction, combination, and arrangement of the parts hereinafter more particularly described.

In the accompanying drawings, Figure 1 represents a vertical sectional view of a projectile embodying the invention, and Fig. 2 is a similar view of a modification. Fig. 3 is a detail sectional view of the plug adapted to the end of the projectile.

Referring more particularly to the drawings, A designates the outer casing or shell of the projectile, which may be formed of any suitable material or combination of materials and made in two or more pieces. Preferably, however, the shell is formed of steel and consists of a body 1 and a separable pointed end or cap 2, provided centrally with a circular passage 3. The passage 3 communicates with a chamber 4, formed in the body of the shell, and in its outer end it is preferably provided with a plug 5, having a contracted opening 6 extending longitudinally through it. The plug 5 is provided with external threads and is adapted to be screwed into and to be adjusted in the passage 3. The purpose of this will presently appear.

Within the chamber 4 of the shell is a hollow piston 7, in which is contained the explosive compound. This piston may be formed in one, two, or more pieces. As shown, it is formed with a removable end 8, screwed into the main body thereof and adapted to be removed to facilitate the introduction of the explosive into the chamber of the piston.

The piston 7 is of less length than the chamber of the shell within which it is adapted to move, there being normally a space upon opposite ends of the piston, and said piston fits into the chamber tightly enough to prevent air escaping from one end thereof to the other as it shifts its position in the chamber. In the rear end of the body of the shell is formed a small opening 6^a, extending wholly through said end and communicating with the chamber 4 of the shell upon one side of the piston 7.

Carried upon the front end of the piston in line with the passage 3 is a rod or plunger 9, which under certain conditions is adapted to enter and close or partially close said passage, and while said rod may be formed integral with the piston it is preferred to form it separate therefrom and screw it into a threaded opening in the end of the said piston.

Assuming now the projectile to be placed within a gun with the piston 7 and its rod in the position indicated in full lines in the drawings, immediately the gun is fired the sudden impulse imparted to the shell or casing causes the piston to shift its position within the chamber 4, compressing the air in the rear end thereof and assuming the position indicated by the dotted lines. The air in this end of the cylinder not only acts as a cushion to relieve the piston of the sudden shock caused by the explosion of the charge of the gun, but also serves to prevent its making contact with the rear wall of the shell. The opening in the rear end of the shell is of course too small to permit any considerable volume of the gases generated by the explosion within the gun to enter the chamber 4, as this would cause the piston to be forced forward and bring the end of the rod 9 into contact with the plug 5, resulting in the premature explosion of the compound or mixture within the piston. The opening is, however, sufficiently large to permit a sufficient quantity of gases to enter the chamber to prevent the cylinder from making contact with the rear wall thereof. In shifting its position toward the rear end of the chamber 4 the rod 9 of the piston is withdrawn from the passage 3 and air is drawn into the front end of the chamber, and if by any chance after leaving the bore of the gun the expansion of the air in the rear end of the chamber should be so violent and sud-

den as to force the piston toward the front of the shell the rod 9 will be caused to reënter the passage 3 and trap or partially trap the air in the front end of the shell, which air will be compressed by the further forward movement of the piston and serves to resist said movement, the air in the rear end of the shell in the meantime being allowed to escape through the opening 6^a until the pressure upon both sides of the piston becomes equalized.

There are certain explosives which will explode by the violent impact of their retaining-receptacle with an object and others which can only be exploded by means of a percussion-cap, fulminate, or a detonator. When the former class of explosive compounds is employed in the improved projectile, the plug 5 may be dispensed with and the rod 9 may fit closely the passage 3 to prevent either the ingress or egress of air to or from the front end of the chamber 4, as the impact of the projectile against an object will be sufficient to explode the charge in the piston notwithstanding the presence of air in front of the piston. When, however, the latter class of explosives are to be used, the rod 9 is adapted to move with the piston 7 as well as to move relative thereto, a fulminate 12 being interposed between the inner end of the rod and a bearing 13, formed in the end of the piston. The rod, too, in this construction is slightly less in diameter than the passage 3, and while the rapid escape of air from the front end is not permitted when the projectile strikes an object all of the air in front of the piston will be forced from in front of the piston by the violence of the impact, causing the end of the rod to be brought into forcible contact with the inner end of the plug, which will result in the ignition of the fulminate and the consequent explosion of the compound within the piston.

From the foregoing it will be manifest that a simple and efficient projectile is provided adapted to contain the most powerful and sensitive explosive compounds and one which may be fired from a gun with perfect safety and without danger of premature explosion.

Without limiting myself to the precise construction and arrangement of the parts shown and described, what I claim is—

1. In an explosive projectile, the combination of a shell provided with a chamber and having openings in or adjacent to its front and rear ends, and a hollow piston or receptacle adapted to move longitudinally in the chamber of the shell, said piston being provided with a chamber for containing an explosive compound or mixture, substantially as described.

2. In an explosive projectile, the combination of a shell provided with a chamber and having a passage in its front end, a piston or receptacle freely movable longitudinally in the chamber in opposite directions, said piston being provided with a chamber for containing an explosive compound or mixture, and a rod or plunger adapted to enter the passage of the shell, substantially as described.

3. In an explosive projectile, the combination of a shell provided with a chamber and having a passage in its front end, an adjustable plug in said passage having a longitudinal opening, a piston or receptacle longitudinally movable in the chamber of the shell, said piston being provided with a chamber for containing an explosive compound or mixture and having a rod or plunger adapted to enter the passage of the shell and make contact with the end of the plug therein, substantially as described.

4. In an explosive projectile, the combination of a shell provided with a chamber, and having openings in its front and rear ends, and a piston or receptacle movable longitudinally in the chamber, said piston being provided with a chamber for containing an explosive compound or mixture, substantially as described.

5. In an explosive projectile, the combination of a shell provided with a chamber and having an opening at or near its front end, a piston or receptacle freely movable longitudinally in the chamber in opposite directions, said piston being provided with a chamber for containing an explosive compound or mixture, and means for throttling the opening of the shell to retard the forward movement of the piston when it reaches a predetermined point, substantially as described.

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

FRANZ BURGER.

Witnesses:

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HENRY W. J. AIKINS.