

(No Model.)

W. H. BELL.
PROJECTILE.

No. 579,035

Patented Mar. 16, 1897.

FIG. 1.

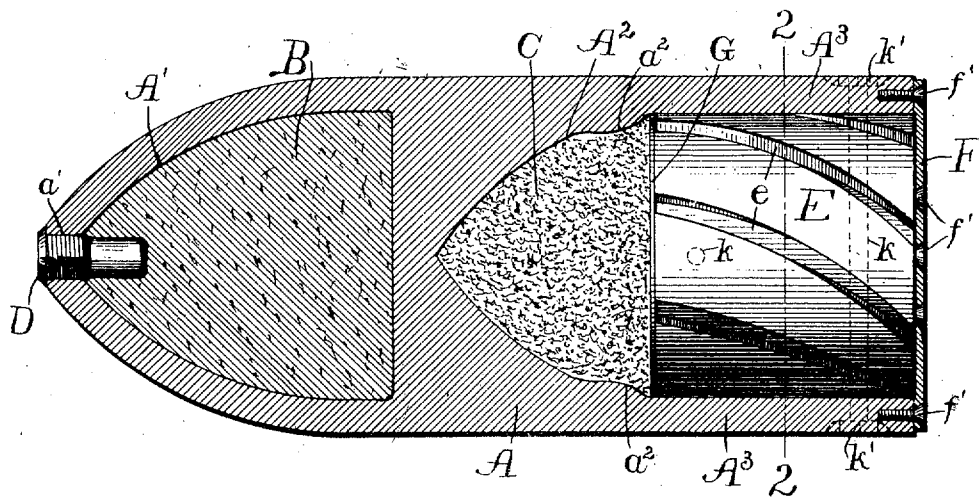


FIG. 2.

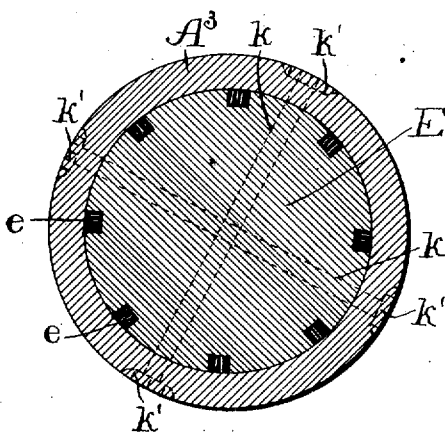
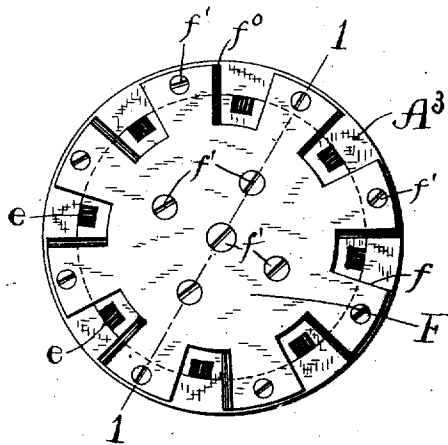


FIG. 3.



Witnesses
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UNITED STATES PATENT OFFICE.

WILLIAM H. BELL, OF THE UNITED STATES ARMY.

PROJECTILE.

SPECIFICATION forming part of Letters Patent No. 579,035, dated March 16, 1897.

Application filed June 11, 1896. Serial No. 595,182. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM H. BELL, lieutenant-colonel, assistant commissary-general of subsistence, United States Army, a citizen of the United States, stationed at San Francisco, in the county of San Francisco and State of California, have invented certain new and useful Improvements in Projectiles; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in projectiles; and it consists in providing an elongated projectile adapted to be fired from a smooth-bore gun and certain means for imparting a rotary motion to the said projectile whereby it may be kept steady on its axis during its flight and prevented from those errors due to what is technically known as "tumbling" and whereby its motion may be accelerated after leaving the gun.

The said invention consists of certain novel features hereinafter described and claimed.

Reference is had to the accompanying drawings, in which the same parts are indicated by the same letters throughout the several views.

Figure 1 represents a central vertical section through the axis of the projectile and showing the plug in the breech thereof in elevation. Fig. 2 represents a section along the line 2 2 of Fig. 1, and Fig. 3 represents a rear view of the projectile as seen from the right of Fig. 1.

A represents the body of the projectile, which is provided with two chambers A^1 and A^2 , separated from each by a wall of metal of sufficient thickness. In the front chamber A^1 the bursting charge B, made of powder or other suitable explosive, is placed, which powder is exploded with the fuse D, of any ordinary or suitable construction, screwed either into the screw-thread a^1 at the front end of the projectile or into a bushing provided for the purpose, as may be preferred.

The rear chamber A^2 is preferably made ogival in shape, as shown in Fig. 1, with the shoulder a^2 provided at the front end of the plug E. The rear end of this chamber A^2 is surrounded by the hollow cylindrical portion A^3 of the projectile. The plug E fits in this

portion A^3 , and the front end bears against the shoulder a^2 . The chamber A^2 in front of the face of this plug E is filled with rocket-powder or other slow-burning powder C.

The plug E is provided with spiral grooves e , which grooves may be either cut on the outside of the plug or bored in through the body of the same, as may be preferred. These grooves may be either of a uniform or increasing twist, as desired. Over the front face of the plug and covering over these grooves and preventing the powder C from passing through the grooves in handling the projectile I provide a disk G, of paper or any other suitable material pervious to the fire for the explosion of the cartridge in the gun.

The plug E may be held in place in any convenient way—such, for instance, as the plate F, which is slotted radially around its periphery to permit the passage through the grooves e . The sides of these radial slots are preferably cut away at an angle, as shown at f^0 , so that the escaping gases may continue out through the grooves unimpeded. This plate F is secured to the projectile and to the plug by means of the screws f^1 . The said plate should preferably be made of low steel having sufficient resiliency to stand the shock of discharge; or instead of the plate F, constructed as shown, bolts k may be passed through the plug and through the walls A^3 , inclosing the same, having their heads k^1 countersunk, as shown in dotted lines in Figs. 1 and 2, in which case the plate F may be omitted, or the said plate may be used in combination with one or more of the said bolts.

In the operation of the device when the gun is fired the gases from the charging in the gun blow through the grooves e and burst the plate or paper G and ignite the slow-burning powder C, the gases from which immediately begin to escape through the grooves e , imparting a gradually-increasing rotary motion to the projectile. The escape of these gases also reacts upon the atmosphere in the rear of the projectile, accelerating the velocity of the projectile, while at the same time the projectile is impeded by the resistance of the air in front of the same. Thus it will be seen that the slow-burning powder C gives not only a rotary motion to the projectile and thus insures the stability of flight acquired

by the ordinary rifling, but also causes the projectile to act more or less like a rocket and in a measure to compensate for the loss of the velocity due to the resistance of the air in front of the projectile, and even in some instances gives the projectile an accelerated motion after it leaves the gun.

The effect on the projectile of this slow-burning explosive C will depend in a measure upon the nature and the quantity of the explosive and the rapidity with which it burns. It will be obvious that this explosive should not be of such a character as to detonate in the gun or that the pressure would be of such a force as to burst the shell. Thus it will be seen that I provide a projectile adapted for use in smooth-bore guns which may be fired from the said guns with far greater stability of flight than has hitherto been obtained under similar conditions.

Smooth-bore guns are obviously much cheaper in construction, and since they are devoid of angles on the interior thereof are less liable to erosion and less likely to burst under the same conditions than are rifled guns. Moreover, by having the projectile accelerated after it leaves the gun the pressure of the powder in the gun may be less for the same ultimate speed of the projectile, or with the same pressure of the powder in the gun a higher speed in the flight of the projectile may be obtained.

It will be obvious that various modifications of the herein-described invention may be made which can be used without departing from the spirit of my invention.

Having thus described my invention, what I claim, and desire to secure by Letters Patent of the United States, is—

1. In an elongated projectile, the combination with a shell provided with separate front and rear powder-chambers, the rear powder-chamber opening to the rear, of a plug provided with curved grooves therein, partly closing the rear powder-chamber, a frangible

disk secured to one end of said plug and normally closing the end of said grooves, and means for holding said plug in the shell, substantially as described.

2. In an elongated projectile, the combination with a shell provided with separate front and rear powder-chambers, the rear powder-chamber opening to the rear, of a plug provided with curved grooves therein, partly closing the rear powder-chamber, a frangible disk secured to one end of said plug and normally closing the end of said grooves, and a slotted disk secured to the base of said shell, and to said plug, substantially as described.

3. An elongated projectile provided with a powder-chamber in the rear portion thereof and opening to the rear, a plug closing the rear end of said powder-chamber, and provided with curved grooves, similar to the grooves in rifling, opening from the front of the plug to the rear thereof, and serving as passages for the gases from said powder-chamber, with means for holding said plug against revolution in said projectile, substantially as described.

4. An elongated projectile provided with a powder-chamber for the bursting charge, and with a second powder-chamber in rear of the first and separated therefrom by a wall of metal, a plug closing the rear end of said second powder-chamber, and provided with curved grooves, similar to the grooves in rifling, opening from the front of the plug to the rear thereof, and serving as passages for the gases from said powder-chamber, with means for holding said plug against revolution in said projectile, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM H. BELL.

Witnesses:

T. E. WATERS,
ANDREW G. RYER.