(No Model.)

C. C. PALMER.

EXPLOSIVE PROJECTILE.

No. 375,190. Patented Dec. 20, 1887.

Fig. 1.

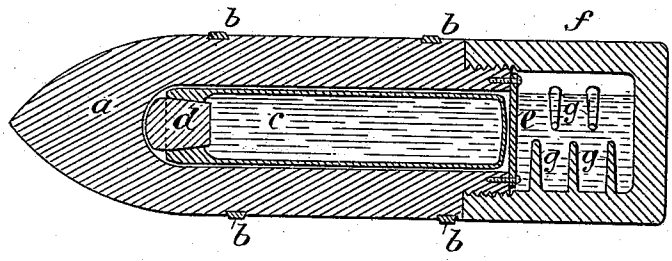


Fig. 2.

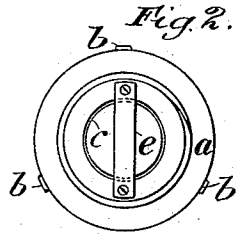


Fig. 3.

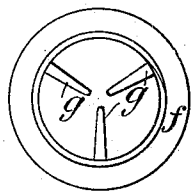


Fig. 4.

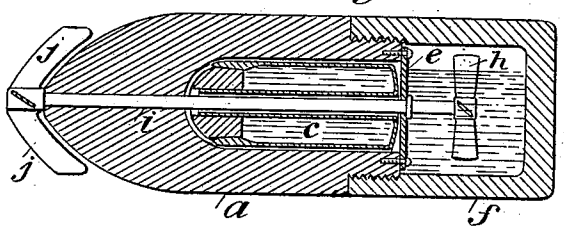
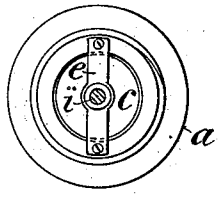


Fig. 5.



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UNITED STATES PATENT OFFICE.

CASSIUS C. PALMER, OF PAINESVILLE, OHIO.

EXPLOSIVE PROJECTILE.

SPECIFICATION forming part of Letters Patent No. 375,190, dated December 20, 1887.

Application filed May 16, 1887. Serial No. 238,320. (No model.)

To all whom it may concern:

Be it known that I, CASSIUS CLAY PALMER, a citizen of the United States, residing at Painesville, county of Lake, State of Ohio, have invented a new and useful Improvement in Explosive Projectiles, of which the following is a specification.

The object of my improvement is to produce a projectile which can be fired without risk, but which will explode upon striking any object; and it consists in arranging within a projectile two or more separately non-explosive ingredients which form a powerful explosive upon being combined, and which are separated by a fragile partition, to be shattered by the concussion of firing. Provision is also made for mixing the two ingredients thoroughly together.

In the drawings, Figure 1 is a longitudinal section of a projectile adapted for a rifled bore. Fig. 2 is an end view of the shell of the same detached from the cap. Fig. 3 is an end view of the cap of the same detached from the shell. Fig. 4 is a longitudinal section of a projectile adapted for a smooth bore, and Fig. 5 is an end view of the smooth-bore shell detached.

I will first describe Figs. 1, 2, and 3. *a* is the shell, containing an internal cavity, as shown, and provided on its exterior with the projections *b b*, which fit into the rifling of the bore. *c* is a vial of some fragile material, preferably glass, adapted to hold one of the ingredients of the explosive. This vial is constructed so as to be inserted in a cavity of the shell from the rear and to fit snugly therein. It may have its opening at *d*, which may be closed by a cork. It is held in place, after being inserted, by a cross-piece, *e*, which is secured to the rear end of the shell across the opening of the cavity, and against which the bottom of the vial rests. A screw-thread is formed on the shell at its rear, as shown, and a cap, *f*, is thereby secured to the shell. This cap is hollow, and is provided on its interior with projections *g*, in the form shown, or any other form which is calculated to agitate the liquid contents of the cap as the shell and cap rotate in consequence of the rifling of the bore.

The form of projectile shown in Fig. 4 for a smooth bore is similar to that already described, excepting that a different means is provided for agitating the liquid contents of the cap. This means consists of an agitator, *h*, arranged upon the end of a spindle, *i*, which extends longitudinally through the vial *c*, which is provided with a central opening for that purpose, and thence forward through the shell, from the point of which it projects. Upon this spindle, at the point of the shell, are arranged wings *j*, which are so constructed as to rotate the spindle *i* under the action of the air, and thus produce a mixing of the liquid contents of the cap *f* by the action of the mixer *h*. In charging this projectile the cap *f* is unscrewed from the shell *a*, the piece *e* is detached, and the vial *c* removed. The vial *c* is then filled with the proper proportions of sulphuric and nitric acids used in making nitro-glycerine. The vial and piece *e* are then replaced in the position shown. The cap is charged with glycerine in adequate proportions for the proper production of nitro-glycerine when mixed with the contents of the vial. The cap is then screwed upon the shell, and the projectile, being thus completely charged, is placed within the gun. The force of the discharge will fracture the vial, so as to bring together the glycerine and the acids.

While the projectile is in course of its flight it is desirable that the glycerine and the acids should be thoroughly mixed. In the case of the projectile shown in Fig. 1, which will be continually revolving in consequence of the rifled bore, this is provided for by the mixers *g g*, &c. In the case of the smooth-bore projectile, (shown in Fig. 4,) the same function is performed by the mixer *h*. The result is that when the projectile reaches its destination the contents of it will be a high explosive, which is discharged by the concussion of striking.

It is plain that the projectile above described, while being inexplosive by reason of the separation of its contents at the time of firing, becomes by the mixing of its contents in the course of its flight a high explosive when it reaches its point of destination, thus producing all of the conditions which are essential for making it possible to employ such a high explosive as nitro-glycerine in a projectile.

While I have specified the use of the ingredients of nitro-glycerine in the projectile, I do not desire to limit myself to that explosive, since it is obvious that any other explosive

may be employed which is made up of non-explosive ingredients and which is discharged by concussion.

It will be observed that in the above-described explosive I have arranged the glycerine in the cap so as to be at the rear of the receptacle containing the acids, and this arrangement I deem to be preferable for the purpose of facilitating the thorough mixing of the ingredients. I have also described what I at present conceive to be the preferable form of receptacle and stirrers and other parts for embodying my invention; but I do not desire to limit myself to the form of such parts, as I am aware that they may be varied indefinitely without departing from the principle of my invention.

I have shown a projectile in which there are only two separate receptacles for the ingredients of the compound; but it is obvious that in case of a compound containing a greater number of ingredients the number of receptacles may be multiplied on the same principle.

I claim—

An explosive projectile composed of two parts, *a* and *f*, provided with a screw-connection, the chamber within the forward part, *a*, containing the vial *e*, of fragile material, retained therein by piece *e*, and being of less diameter than the chamber within the rearward part, *f*, and the chamber within the rearward part being substantially concentric with and communicating with the forward chamber, and being provided with stirrers, all substantially as described.

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