

No. 639,214.

Patented Dec. 19, 1899.

C. COLEMAN.
EXPLOSIVE PROJECTILE.

(Application filed Jan. 3, 1899.)

(No Model.)

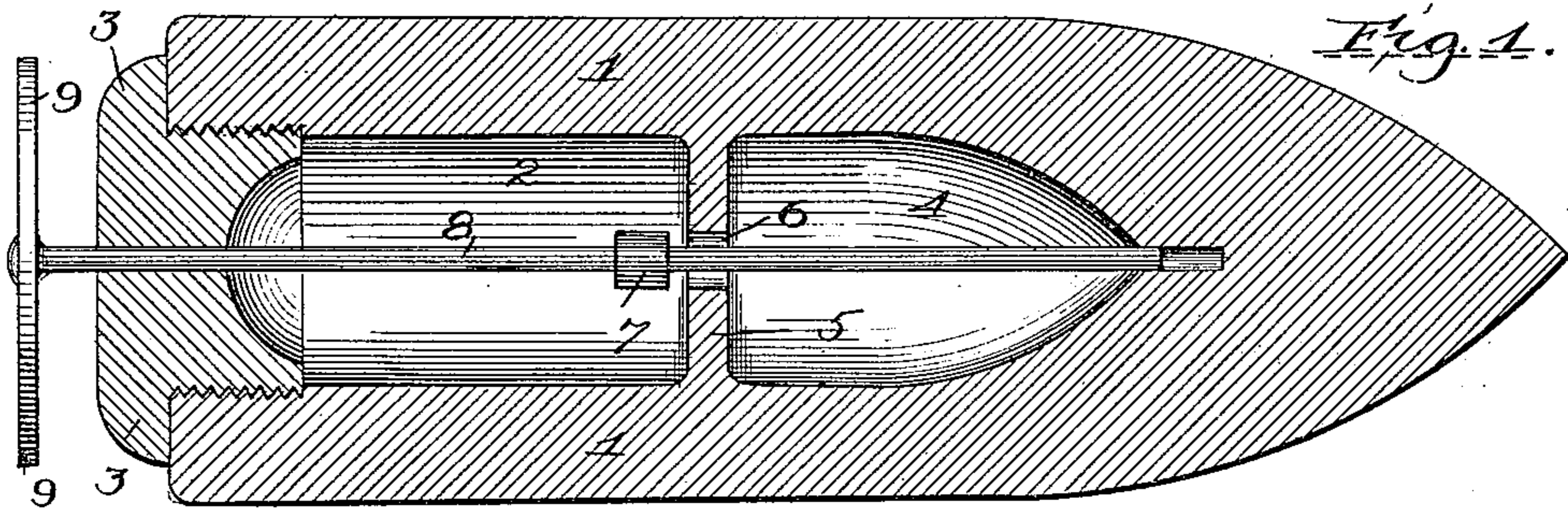


Fig. 1.

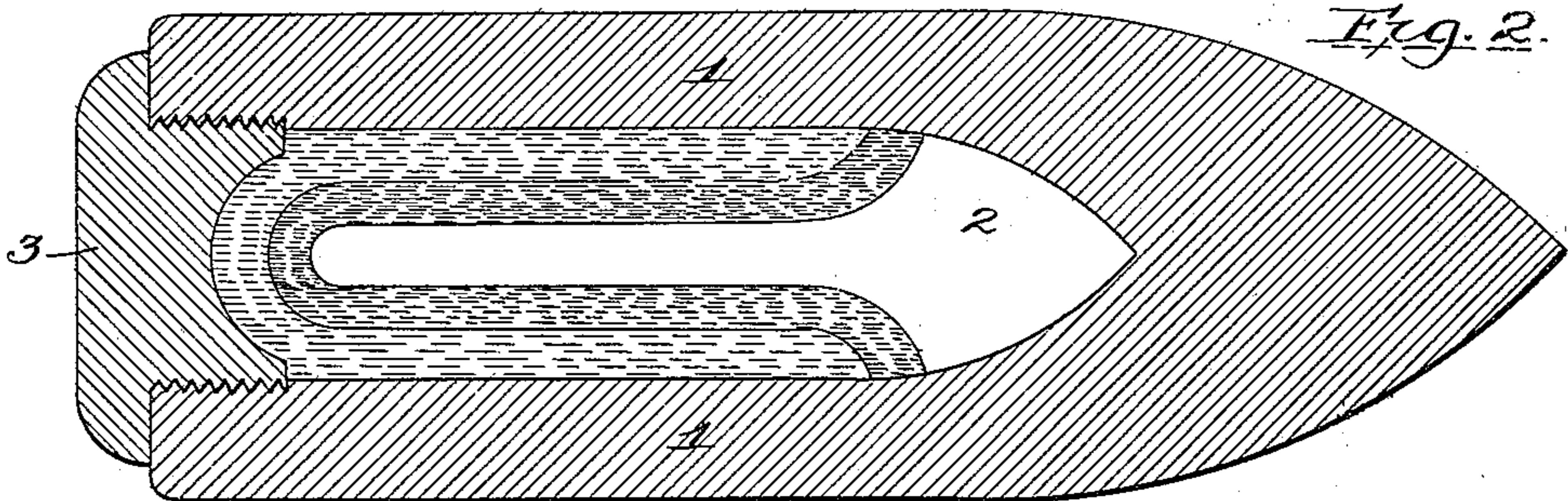


Fig. 2.

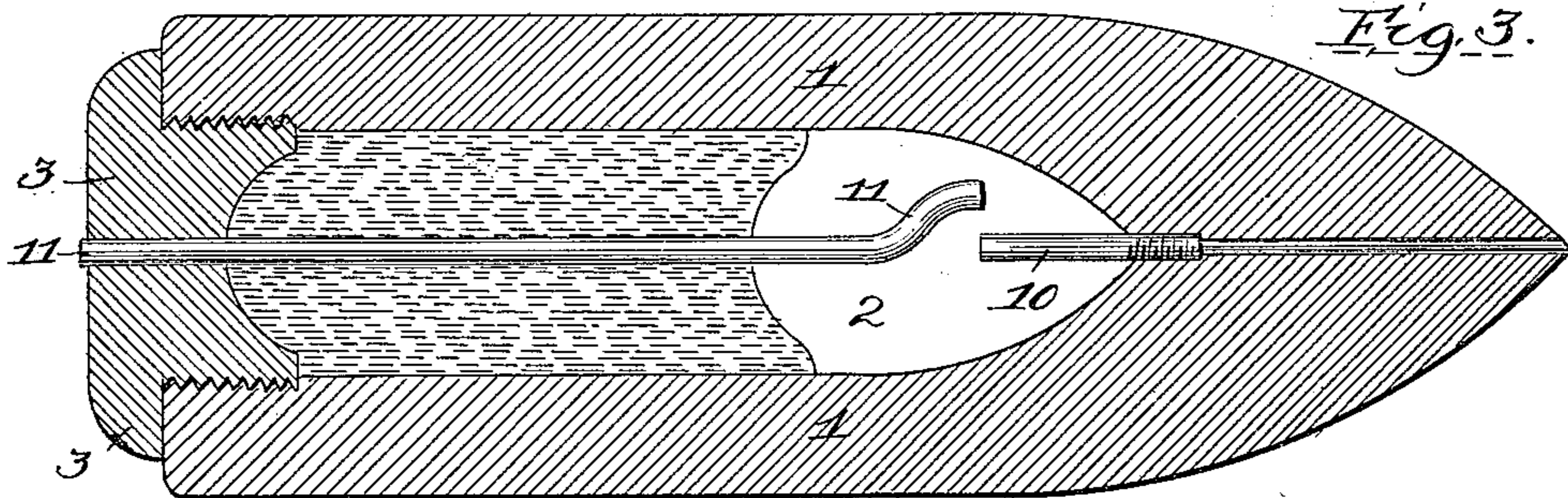


Fig. 3.

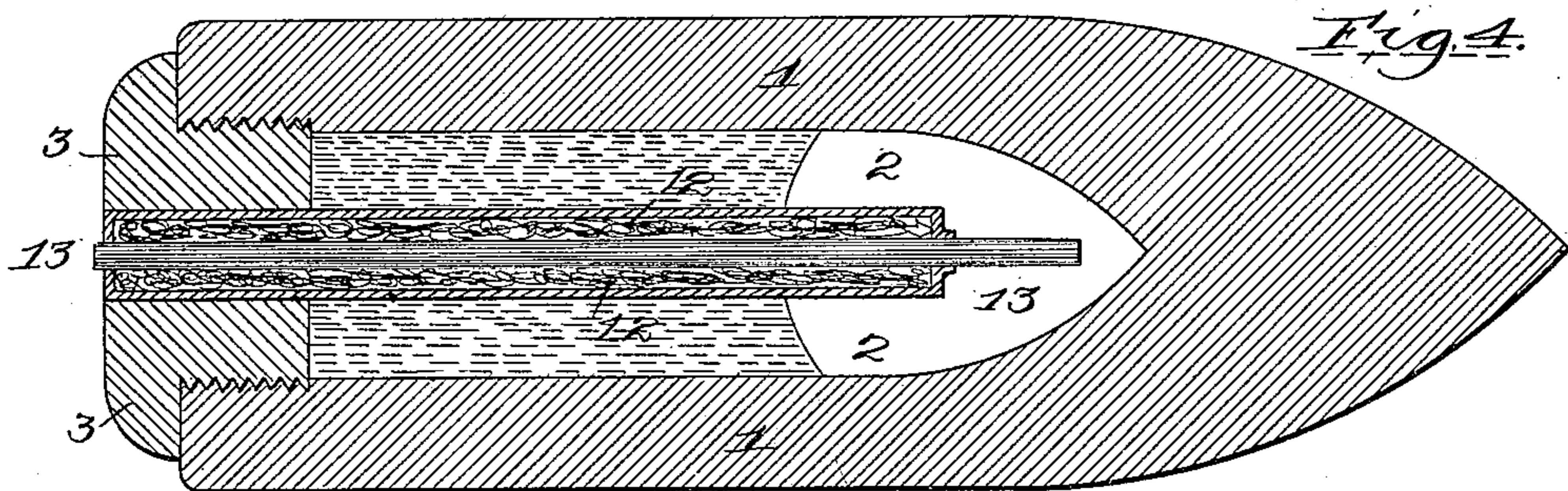


Fig. 4.

Attest.

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CLYDE COLEMAN, OF CHICAGO, ILLINOIS, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, TO THE CHICAGO DEVELOPMENT COMPANY, OF NEW JERSEY.

EXPLOSIVE PROJECTILE.

SPECIFICATION forming part of Letters Patent No. 639,214, dated December 19, 1899.

Application filed January 3, 1899. Serial No. 701,038. (No model.)

To all whom it may concern:

Be it known that I, CLYDE COLEMAN, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Explosive Projectiles; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification.

The present invention relates to an explosive projectile in which high explosives may be fired with safety, and more especially to that type of such projectiles which are designed to explode upon striking an object.

The object of the present improvement is to provide a simple and effective method and means for carrying out the same, whereby a shell or other projectile charged with nitroglycerin or other like high explosive can be handled and fired with safety and the same rendered explosive after leaving the gun.

The principle of the present invention is based upon the well-known fact that nitroglycerin, fulminates, and other analogous high explosives are rendered non-explosive by mixture with a proper diluent and that by a subsequent physical separation of such high-explosive substances from their diluents their original high-explosive nature is restored.

In the present invention and according to the above-stated principle a projectile or bomb filled with a high explosive, such as nitroglycerin, and a diluent, such as alcohol, may be fired from a gun without danger, the novel and material feature of the present improvement consisting in the gradual yet rapid restoration of its high-explosive properties to the nitroglycerin by physical action, which is in turn controlled by the rapid movement of the projectile.

In carrying out my present invention I have found a suitable compound for producing the high-explosive action in the manner above described to be a mixture of ninety per cent. of nitroglycerin and ten per cent. of alcohol. With such mixture the explosive property of the nitroglycerin is dormant and remains so until in the present process the subsequent physical separation and restored activity are

effected by physical agency, which in turn is dependent upon a rapid movement of the projectile, and my present invention comprehends the use of centrifugal force to cause a separation of the high explosive from its diluent; the admixture under a high-velocity stress of a body of liquid, such as water, to absorb the diluent and set free the nitroglycerin, and the use of heat aided by a high-velocity stress to expel the diluent, as well as the evaporation and expulsion of such diluent under the stress of high velocity.

In the accompanying drawings, illustrating various types of my present invention, Figure 1 is a central longitudinal section of a projectile embodying that type of the present invention in which the diluent is separated from the high-explosive substance by the introduction of a body of water to absorb such diluent and set free the high-explosive substance; Fig. 2, a similar view of another type of the present invention, in which such separation of the diluent is effected by centrifugal action, such type of the present invention being especially adapted to rifled guns; Fig. 3, a similar view of another type of the present invention, in which the diluent is separated and removed from the high-explosive substance by a forced circulation of air through the chamber of the projectile; and Fig. 4, a similar view of still another type of the present invention, in which such separation and removal of the diluent are effected by heat.

Similar numerals of reference indicate like parts in the several views.

As illustrated in the drawings, the projectile will be of the usual form, closed at both ends, and formed with an internal chamber 2 for containing the charge of high explosive, the closure of the rear end being preferably attained by means of a screw-plug 3 for convenience in introducing the charge of high explosive, &c.

In the type of the present invention illustrated in Fig. 1 a secondary chamber 4 is formed in the interior of the projectile forward of the main chamber 2 and separated therefrom by a partition 5, communication being had between the two chambers by a central orifice or passage 6 in said partition.

7 is a plug-valve fitting said orifice or passage 6 and normally closing communication between the two chambers 2 and 4. 8 is the valve-stem, suitably guided in the projectile and provided at its rear end with a circular or suitably-shaped disk or vane 9 exterior to the rear end of the projectile, as shown. With such construction the forward chamber 4 will contain the charge of high explosive mixed with its liquid diluent and the rear chamber will contain a body of water that is adapted to absorb the aforesaid diluent to set free and render active the high-explosive substance. With the discharge of a projectile so constructed from a gun as the projectile leaves the mouth of the said gun the atmospheric resistance will retard the disk or vane 9 to move the same rearwardly with relation to the projectile, and in so doing will open the valve 7 to permit the high explosive and its diluent in the forward chamber to pass into the rearward chamber, and by the action of the water therein the high explosive will be set free, so that by the time an object is struck the high-explosive substance will be in an active condition ready to explode by the impact of the projectile against such object.

In the type of the present invention illustrated in Fig. 2 a single chamber 2 is used for containing the charge of high explosive mixed with its liquid diluent. In this construction high velocity alone or combined with centrifugal action are the forces upon which dependence is placed to effect a separation of the high explosive from its diluent through the different specific gravities of the two.

In the type of the present invention illustrated in Fig. 3 a single chamber 2 is also provided for containing the charge of high explosive mixed with its diluent. In this construction 10 is an air-induction pipe or passage from the forward end of the projectile to the forward end of said chamber, and 11 an eduction pipe or passage from near the forward end of said chamber to the rear end of the projectile. With this construction in a rapid movement of the projectile air is forced into the chamber 2 through the induction-passage 10 to absorb the diluent, and the air so charged with the diluent passes out from the chamber through the eduction-passage 11, and in this manner the diluent is gradually yet quickly removed and the high-explosive substance rendered active, so as to explode upon the projectile striking an object.

In the type of the present invention illustrated in Fig. 4 a single chamber 2 is also provided for containing the charge of high

explosive mixed with its diluent. In this construction 12 is a centrally-arranged hollow casing within the main chamber 2 and adapted to contain a slow-burning fuse or other like body, and by the combustion of which heat will be generated and imparted to the charge to vaporize and separate the diluent from the high-explosive substance, such vapor escaping from the chamber 2 through the eduction pipe or passage 13.

From the foregoing description of my present invention it is obvious that it is essential to the practical success thereof that the physical change of the contained charge in the projectile should be in progress from the moment the projectile is fired and that such change should be completed before the projectile strikes the desired object in order to obtain the most efficient action of the high explosive used.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The herein-described method of firing high-explosive projectiles, the same consisting in charging a projectile with a high-explosive substance mixed with a diluent to render the same dormant, and separating subsequent to firing the diluent to restore the high-explosive substance to an active state while still contained within the projectile, substantially as set forth.

2. The combination with a projectile filled with a high explosive and a diluent to render the same dormant, of means actuated by the movement of the shell for separating the diluent and rendering the high explosive active while still contained within the projectile, substantially as set forth.

3. The combination with a projectile filled with nitroglycerin and a diluent to render the same dormant, of means actuated by the movement of the shell for separating the diluent and rendering the high explosive active while still contained within the projectile, substantially as set forth.

4. The combination with a projectile filled with nitroglycerin and an alcohol diluent to render the same dormant, of means substantially as described for separating the diluent and rendering the high explosive active while still contained within the projectile, substantially as set forth.

In testimony whereof witness my hand this 20th day of December, 1898.

CLYDE COLEMAN.

In presence of—

ROBERT BURNS,
JAMES LAVALLIN.