

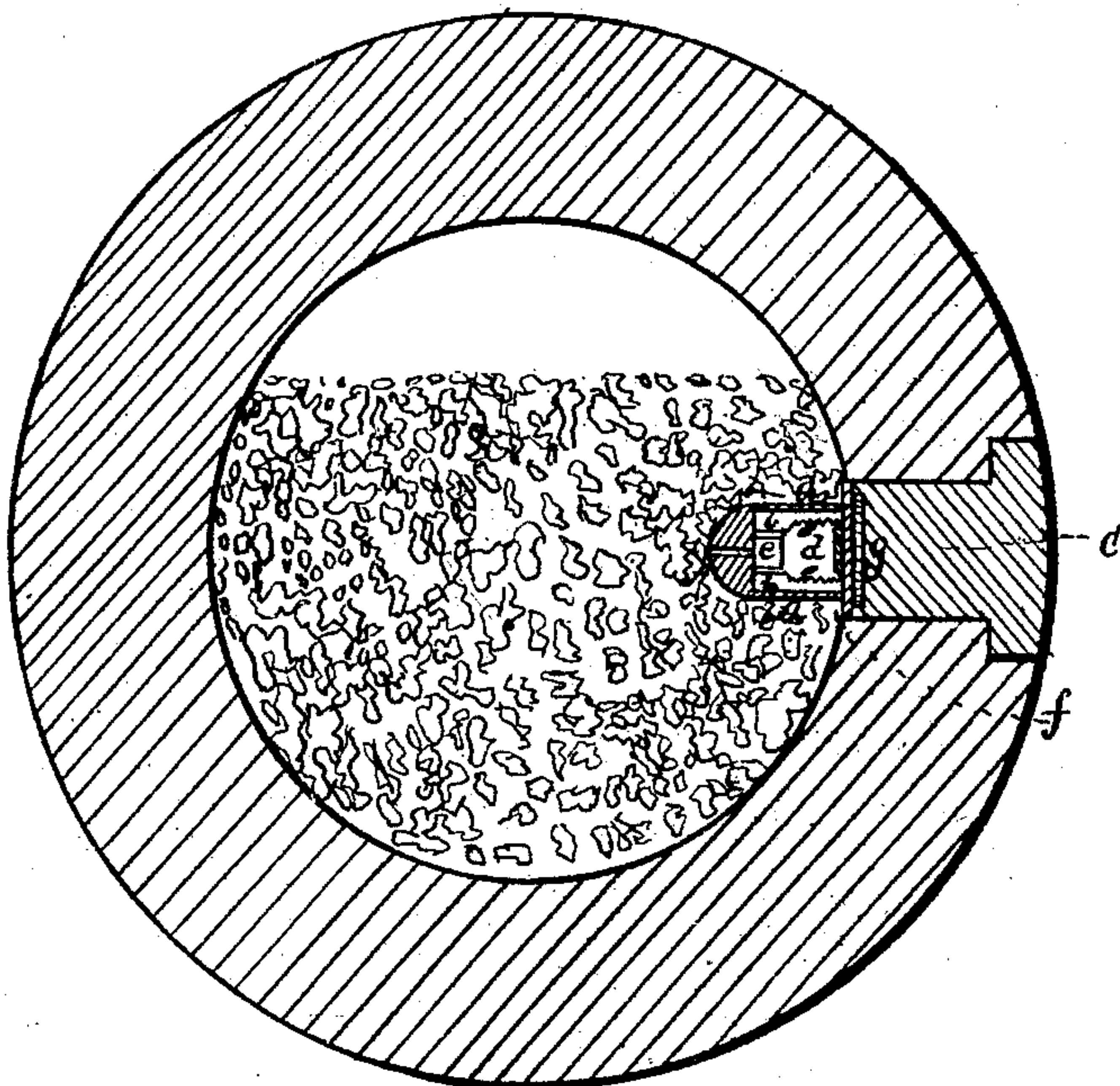
W. S. BEEBE.  
Shell Fuse.

2 Sheets—Sheet 1.

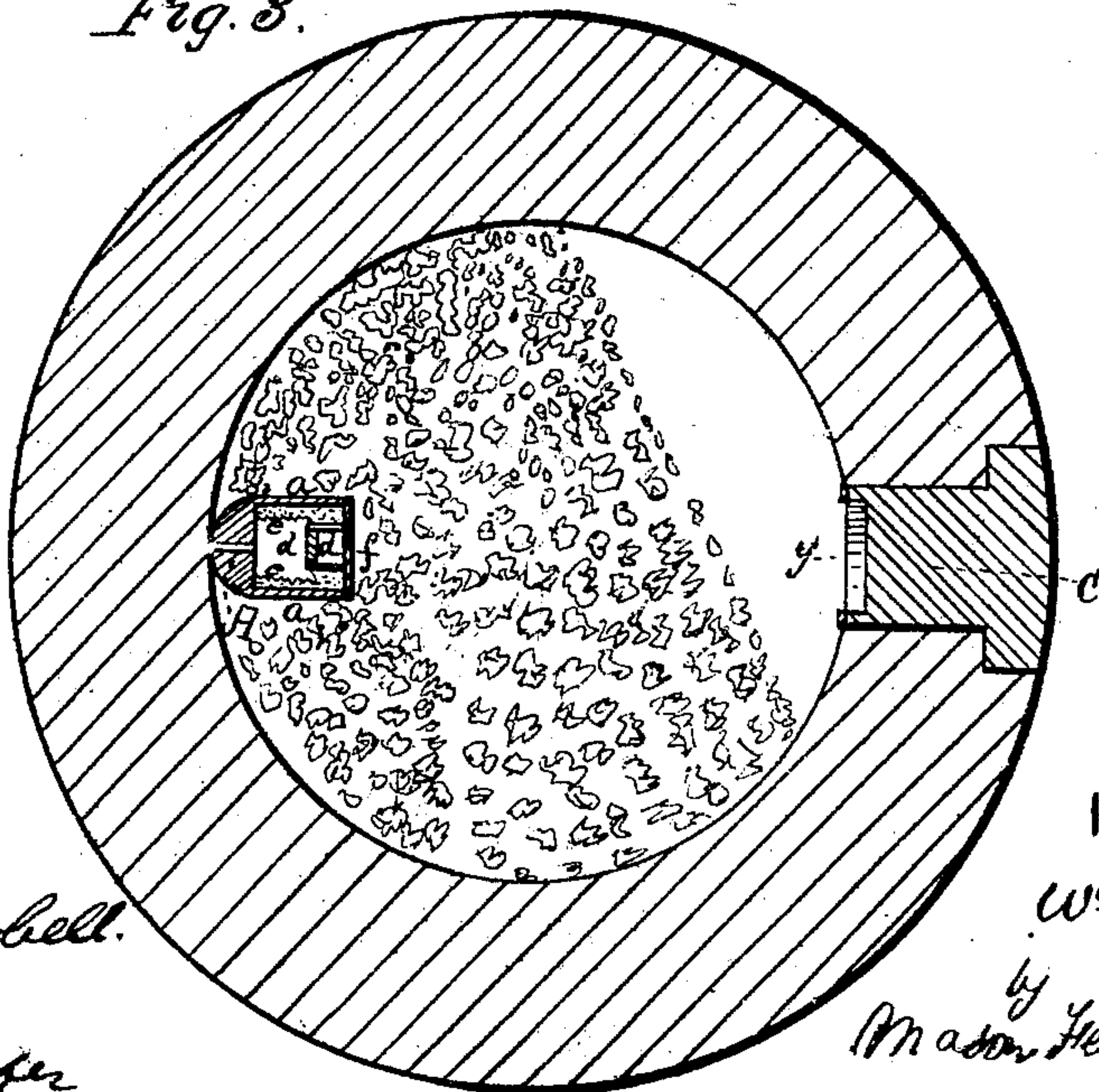
No. 63,834.

Patented April 16, 1867.

*Fig. 1.*



*Fig. 3.*



Witnesses

*R. G. Campbell.*  
*Edw. Schaper*


Inventor

*W. S. Beebe*  
by *Mason Hewitt & Lawrence*

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Fig. 2. 

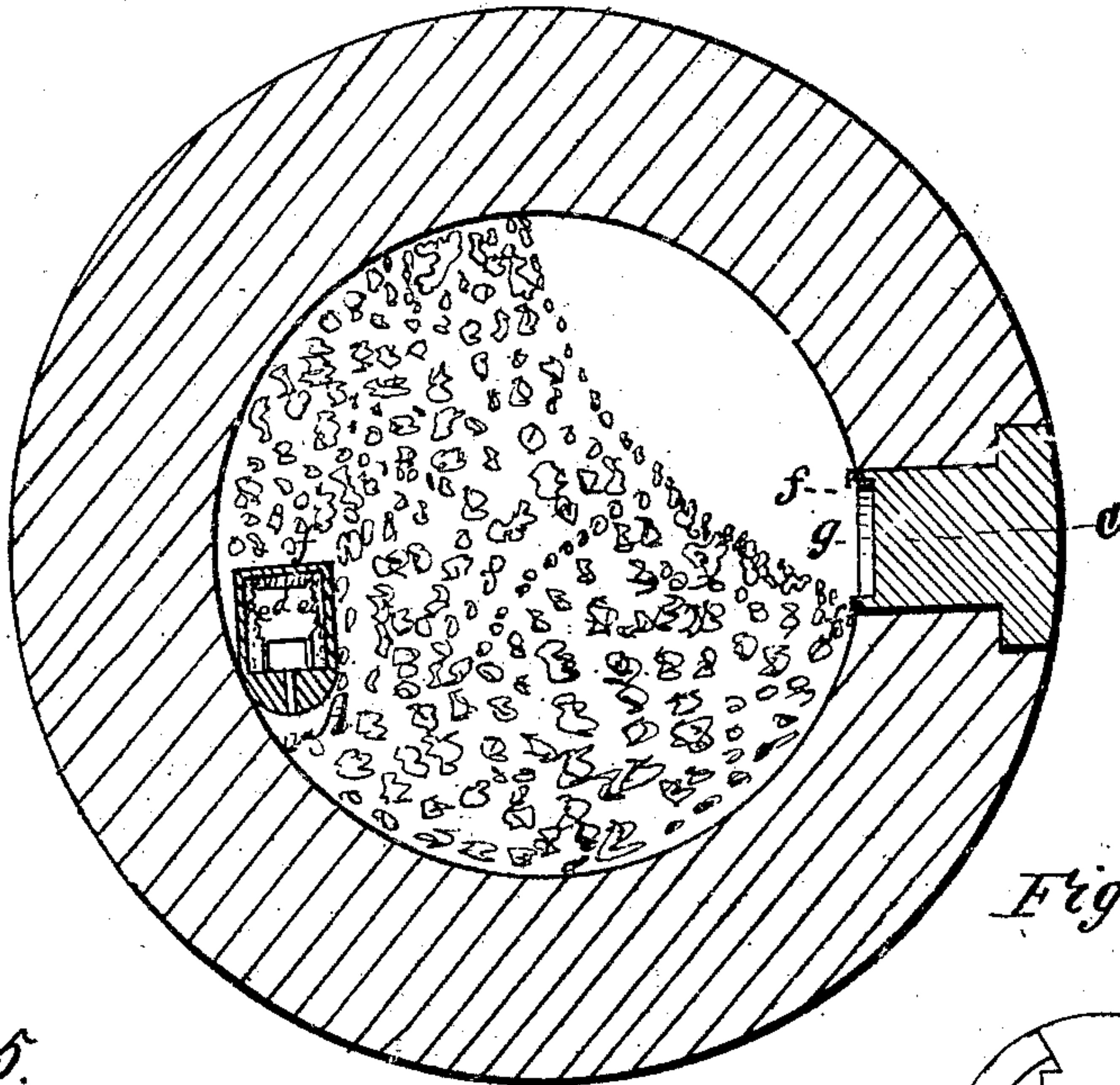


Fig. 7.

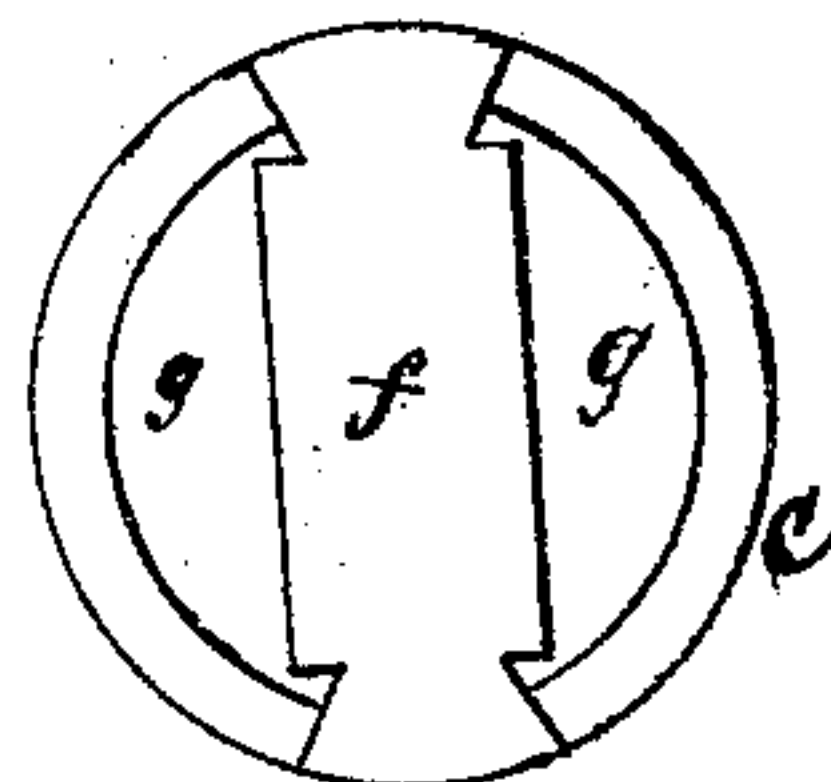


Fig. 5.

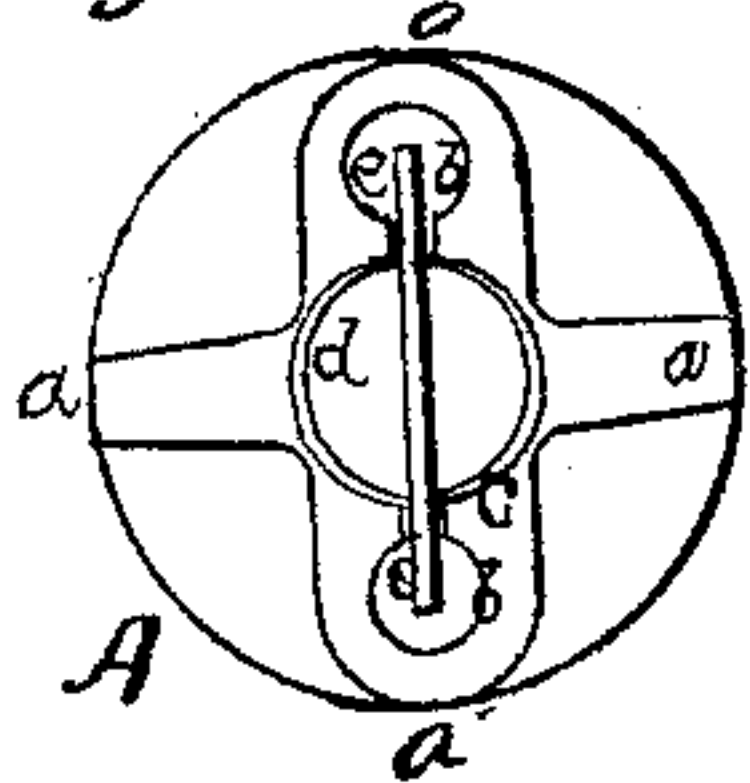


Fig. 4.

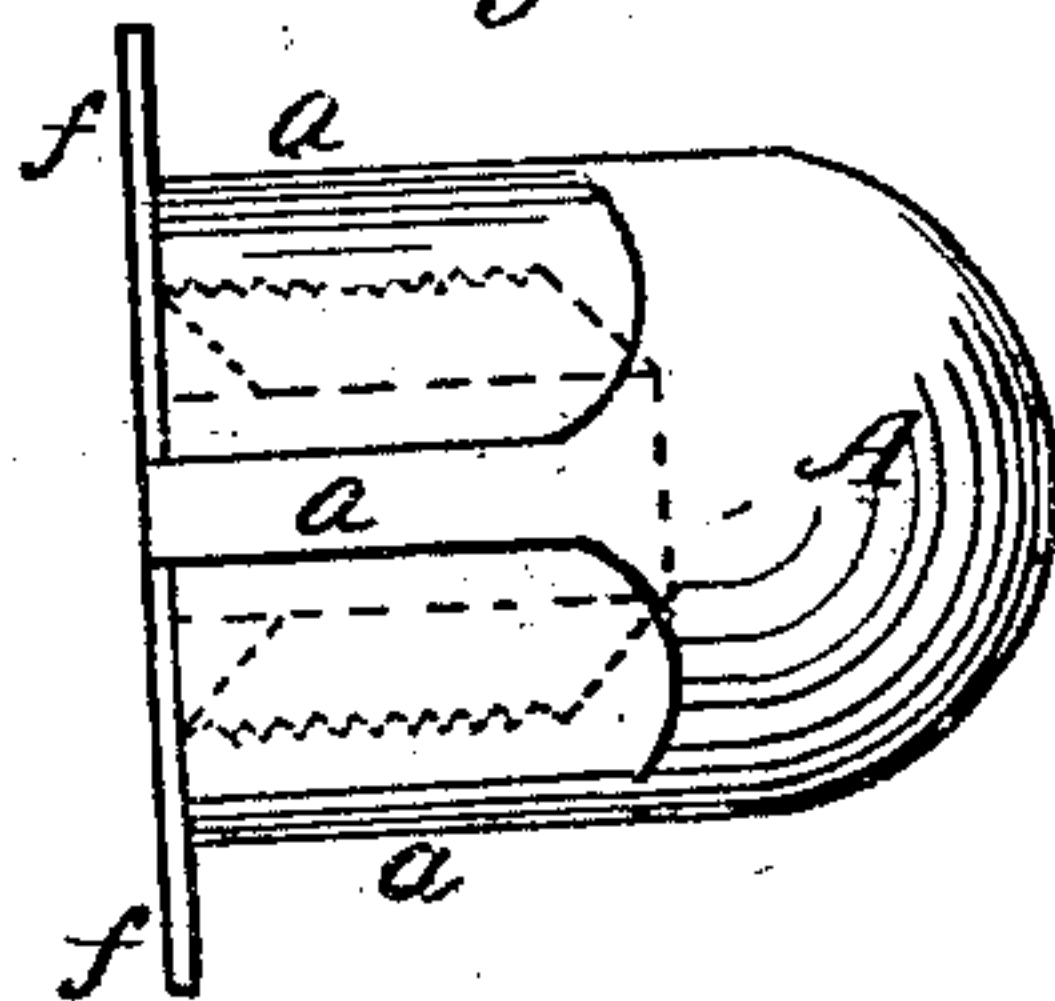
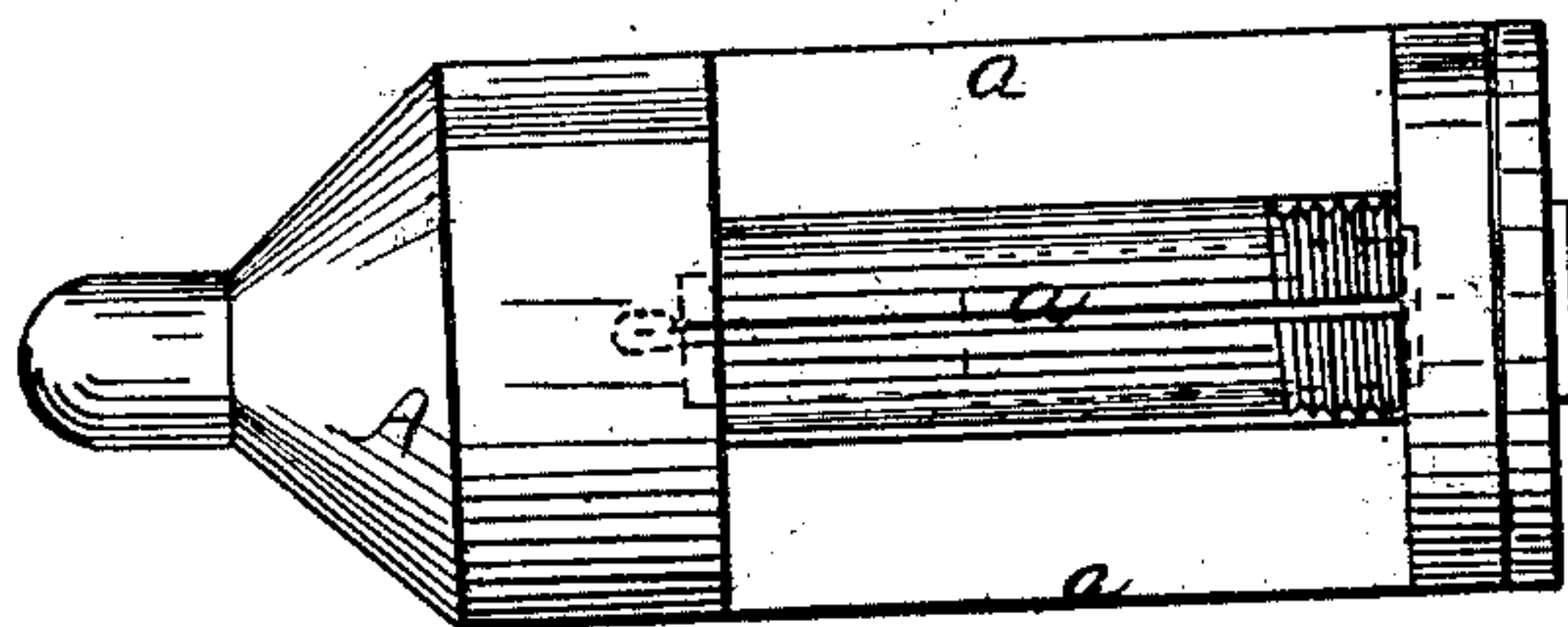


Fig. 6.



Witnesses

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# United States Patent Office

WILLIAM S. BEEBE, OF PHILADELPHIA, PENNSYLVANIA.

*Letters Patent No. 63,834, dated April 16, 1867.*

## IMPROVEMENT IN CONCUSSION FUSE FOR EXPLOSIVE SHELLS.

The Schedule referred to in these Letters Patent and making part of the same.

### TO ALL WHOM IT MAY CONCERN:

Be it known that I, WILLIAM S. BEEBE, of Philadelphia, in the county of Philadelphia, and State of Pennsylvania, have invented an improved Inertia Fuse for Shells; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 is a section through a spherical shell, showing the fuse attached to it, as it would appear before the first shock of discharge from a gun.

Figure 2 is a similar view of the same parts, showing the fuse lying loosely in the shell, which is supposed to be in its course through the air.

Figure 3 is a similar view of the same parts, showing the fuse in the act of igniting by striking point foremost against the wall of the shell.

Figure 4 is a side view of the fuse.

Figure 5 is a view of the rear end of the fuse with its bridge-plate detached.

Figure 6 is a side view showing a different form of fuse.

Figure 7 is an end-view of a shell-plug with a bridge-plate attached.

Similar letters of reference indicate corresponding parts in the several figures.

The object of this invention is to effect the exploding of spherical bomb-shells with certainty upon impact with any resisting object, notwithstanding the shells rotate or tumble in their flight through the air. It consists in the employment of fuses which are secured within the shells in such manner as to become detached therefrom and lie loosely in the powder therein upon receiving the first shock in the gun, and which are so constructed that when the shells strike an object the inertia of the fuses will cause them to strike point foremost and ignite the powder in the shells.

The following is a description of one practical mode of carrying out my invention.

The difficulty which is to be overcome in the application of percussion or friction fuses to spherical shells is that they rotate or tumble in their flight through the air, and consequently there can be no certainty of their striking upon any given point, like the elongated projectiles which are used with rifled guns. To overcome this difficulty I employ what I shall denominate an inertia fuse. This fuse is made with a rounded head, *A*, terminating in feathers or wings, *a a*, so that the head, which is considerably the heaviest part, shall by its inertia strike upon the wall of the shell, in whatever position the fuse may lie, upon the impact of the shell with a resisting object. The rear feathered portion of this fuse is constructed with three chambers, *b b* and *c*. The intermediate one receives loosely a plunger, *d*, having two wings, *e e*, in the edges of which teeth are made, as shown in the drawings. These toothed wings pass through slots and enter the chambers *b b*, in which any suitable fulminate which will ignite by friction is introduced. A thin steel plate or bridge, *f*, is secured firmly across the rear end of the fuse so as to cover the chambers *b b* and *c*, which plate is of such length that both ends project out beyond the sides of the fuse and are weakened by notching them, as shown in fig. 7. The fuse thus constructed is secured to the inner end of the plug *C* by soldering or otherwise attaching the weakened extremities of the plate or bridge *f* to a narrow flange on the end of said plug. This flange is produced by forming a recess, *g*, in the end of the plug *C*, as shown in figs. 1, 2, 3, and 7, and its object is to allow the fuse to be forcibly driven backward so as to break off the weakened ends of plate *f* at the first shock in the gun, thus detaching the fuse and allowing it to lie loosely in the shell with the powder, as shown in fig. 2. The fuse is secured to the plug *C* for safety in handling the shell, and also for preventing the first shock which it receives from producing an explosion in the gun. The plunger *d* with its serrated wings should be so applied within the fuse that it cannot, under any circumstances, ignite the fulminate by the shock of the gun, or the impact of the rear end of the fuse against the shell or plug; and while this is the case this igniter should be so constructed that it will act with certainty when the loaded or heaviest end of the fuse is caused to strike the interior surface of the shell by the impact of the latter with an object. In fig. 6 I have represented a fuse which differs slightly in form from that above described, but which operates upon the same principle. This fuse has the fulminate enclosed within in a tube and ignited by means of a serrated wire having a weight on one end. When this fuse strikes forcibly upon its point the said weight is moved forward, thus causing friction and consequent ignition of the fulminate.

The invention is not confined to the peculiar construction and form of the fuses herein shown and described, as other forms that are found to answer the purpose may be adopted. After the fuse becomes broken away from the plug C, and the shell leaves the gun, this fuse will lie loosely in the charge of powder and tumble with the shell during its flight through the air. Upon the impact of the shell with any resisting substance the inertia of the fuse will induce its heaviest end to fly foremost and strike the shell, thus causing the fulminate to be ignited and set fire to the charge of powder. It is evident that the fuse may be attached to the front portion of the shell by means of a plug inserted at that point, and so arranged that the fuse shall remain safely attached until the shock of the explosion of the gun shall break it loose from its connection, when it will lie loosely in the powder within the shell and be exploded as above described. The invention is more particularly designed for spherical shells, but it is also applicable to shells of various forms which are to be thrown from smooth-bore guns and which tumble in their course through the air.

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

1. So attaching an inertia fuse to the interior of a hollow projectile that, while it is secure against any ordinary shock, it will be broken loose by the discharge of the cannon or mortar from which it is fired when such fuse is so constructed and arranged that, lying loosely in the powder during the flight of the projectile, it will turn its loaded end against the wall of the cavity in the projectile and explode when the flight of such projectile is suddenly arrested or checked, substantially as above described.

2. A percussion or frictional fuse which is constructed with a loaded head, A, terminating in a feathered tail, a, and adapted for use in spherical and other tumbling shells, substantially as described.

WILLIAM S. BEEBE.