2 Sheets—Sheet 1.

J. LIPPINCOTT.

Shell-Fuse.

No. 14,460

Patented Mar. 18, 1856.

Fig. 2

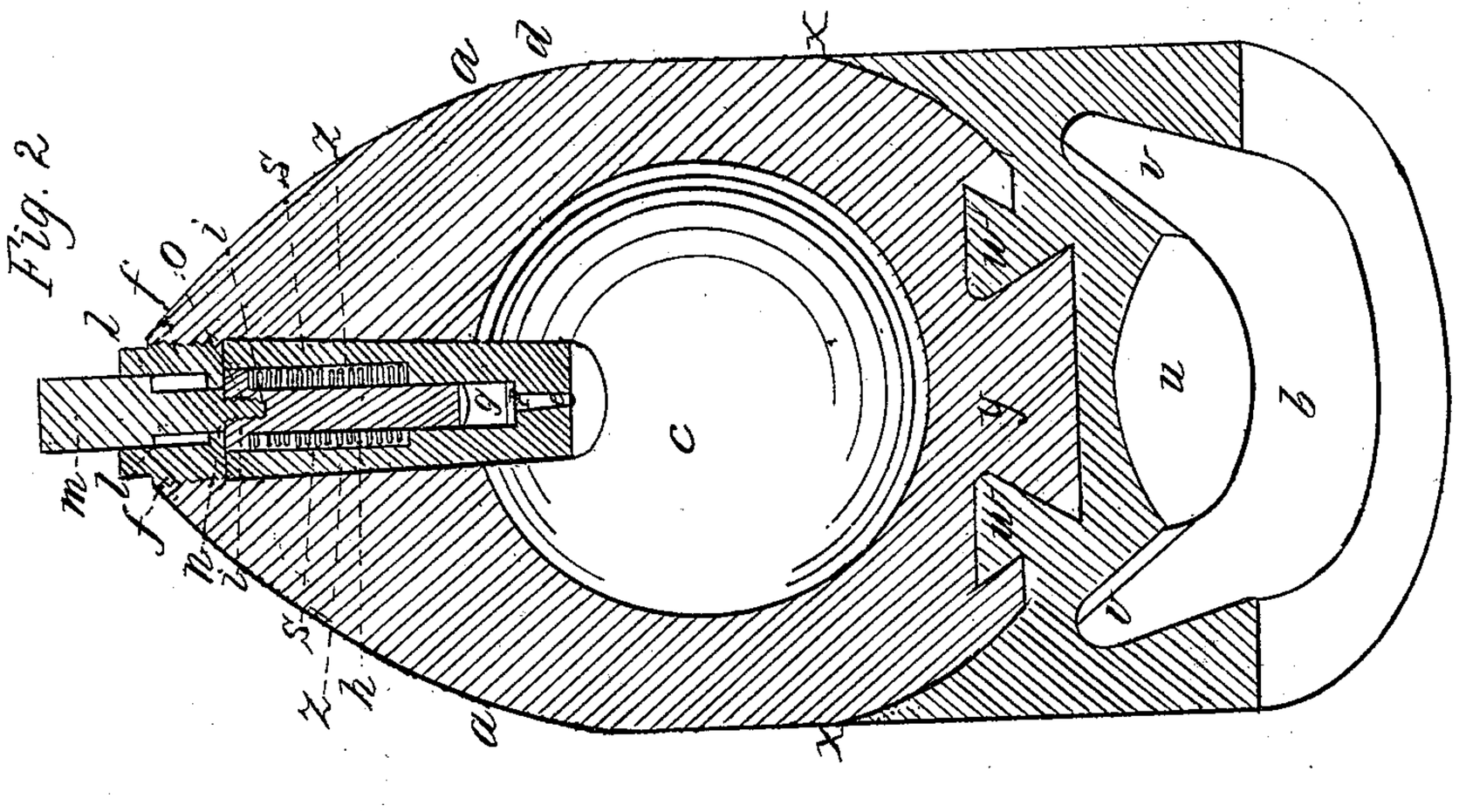
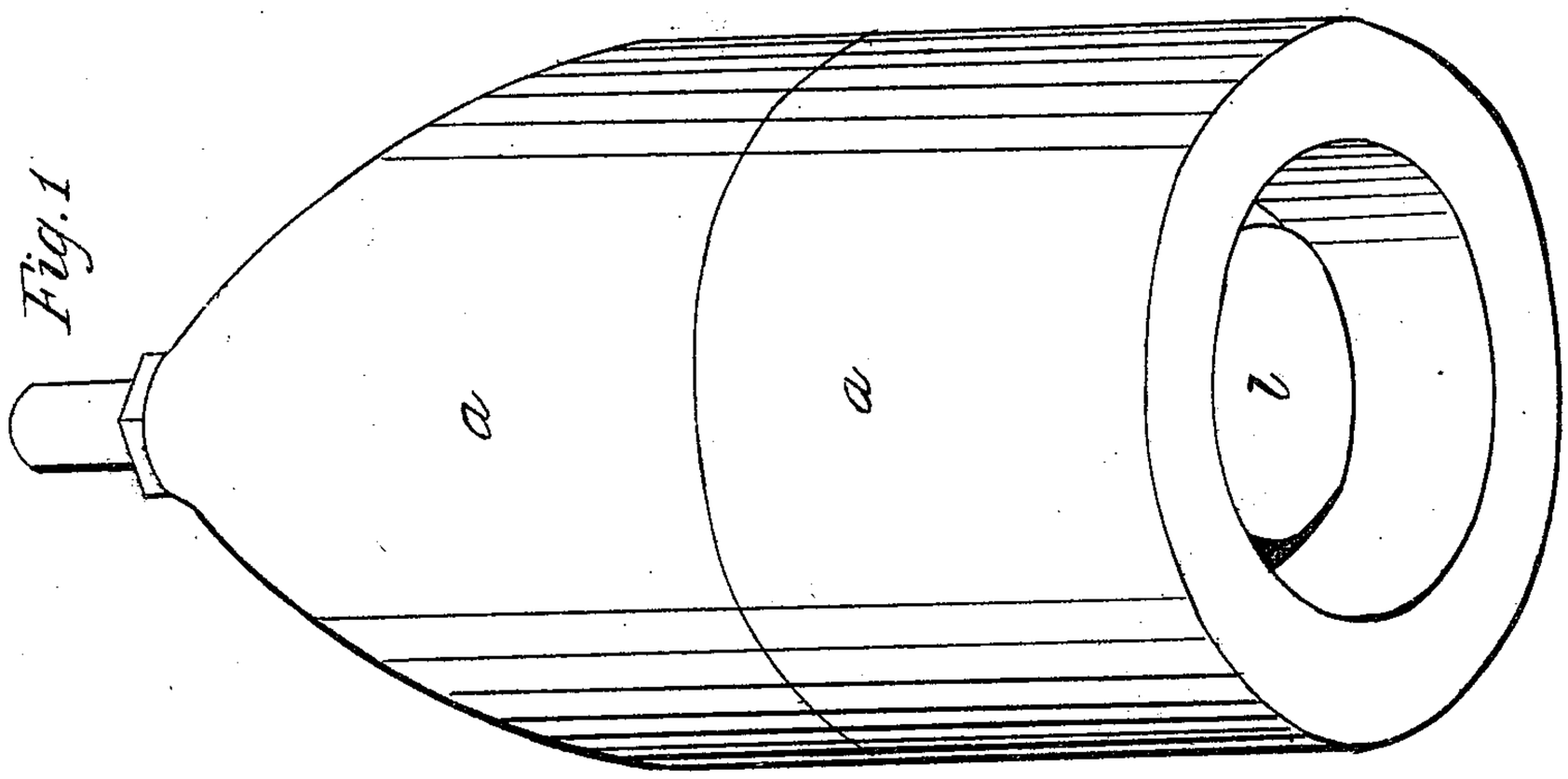


Fig. 1



Witnesses
Wm A Howard
Josiah Ellis

Inventor
John Lippincott

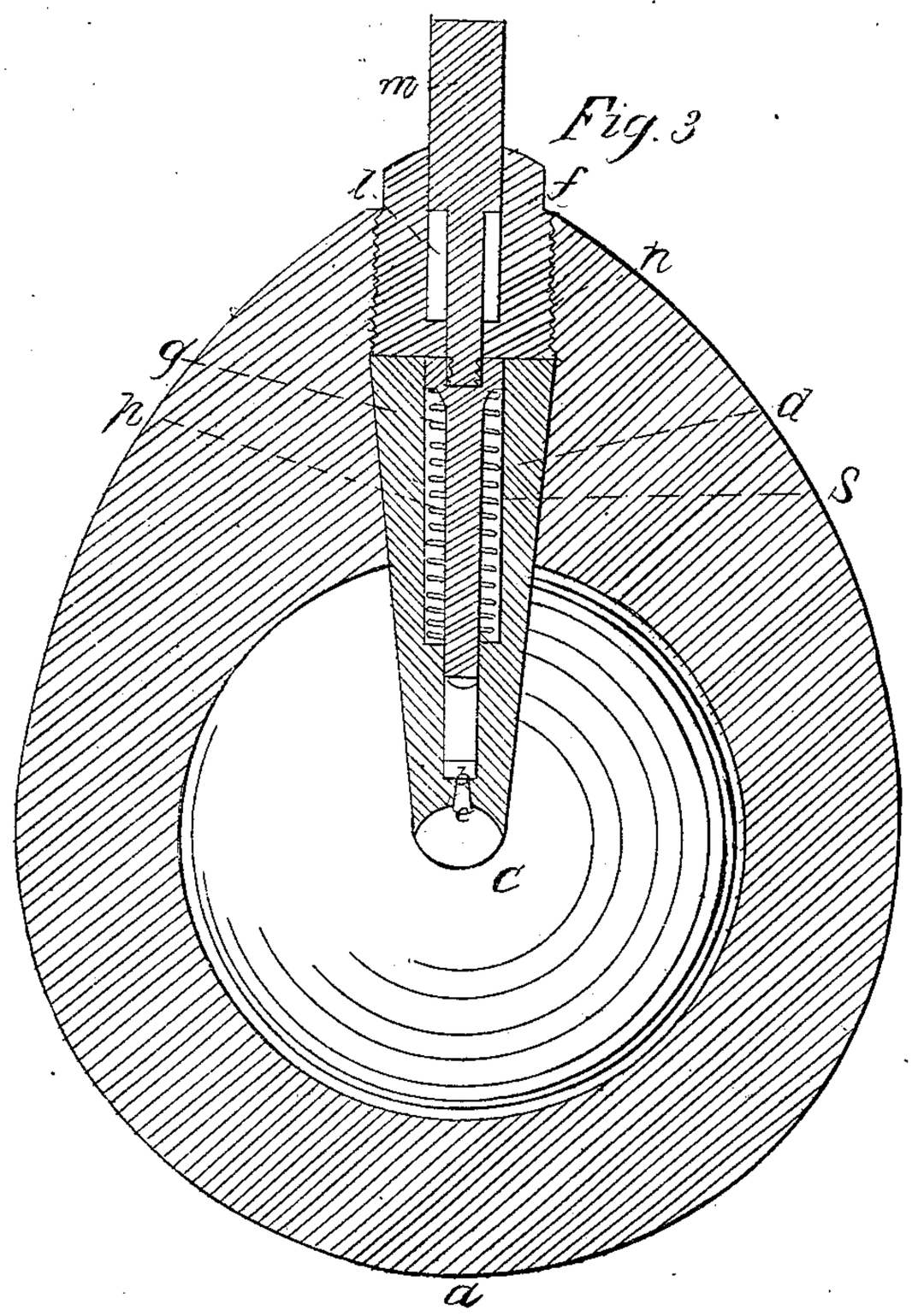
2 Sheets—Sheet 2.

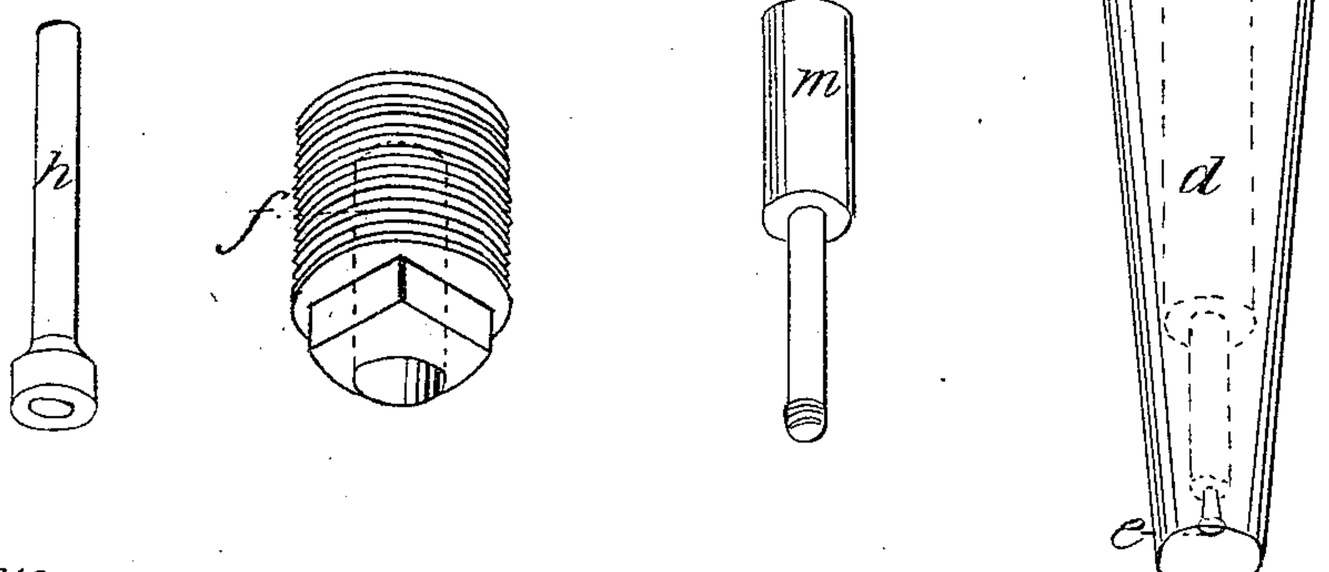
J. LIPPINCOTT.

Shell-Fuse.

No. 14,460.

Patented Mar. 18, 1856.





Witnesses
Wm. A. Howard
Josiah Ellis

Inventor
John Lippincott

UNITED STATES PATENT OFFICE.

JOHN LIPPINCOTT, OF PITTSBURG, PENNSYLVANIA.

IMPROVEMENT IN PERCUSSION PROJECTILES.

Specification forming part of Letters Patent No. **14,460,** dated March 18, 1856.

To all whom it may concern:

Be it known that I, JOHN LIPPINCOTT, of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented new and useful Improvements in Bomb-Shells; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the annexed drawings, forming part of this specification, in which—

Figure 1 is an exterior view of one of my improved bomb-shells. Fig. 2 is a section through the center thereof.

In the several figures like letters of reference refer to similar parts.

To enable others skilled in the art to make and use my improved bomb-shell, I will proceed to describe its construction and operation.

In the drawings, (see Fig. 2,) *a* is my bomb-shell, which in its general outline is of conical shape, which will enable it to pass more readily through the air and give it greater range. *b* is a sabot of lead, the shape of which is shown in Figs. 1 and 2, and the advantages of which I will explain hereinafter. *c* is the powder-chamber of the shell, which may be of spherical or other convenient shape. This powder-chamber is placed as near as safely may be to the base or sabot end of the bomb, for the purpose of making the point or apex of the bomb the heavier end, so that where the bomb is fired to a great distance it may fall with its apex or point downward, or toward the object it is intended to strike. From the point of a bomb a circular hole enters the powder-chamber *c*, which hole tapers gradually from the point toward the powder-chamber *c*. The percussion-cylinder *d*, which is also tapering, fits closely into the circular hole leading into the powder-chamber *c*. It projects into the powder-chamber far enough to secure its coming in contact with the powder in the chamber, and the entrance of the powder for priming through the touch-hole *e*. The top of this percussion-cylinder *d* sinks into the hole about an inch below the point of the bomb-shell, and a screw cap or nut, *f*, is screwed over it into the hole until the lower surface of the nut *f* comes in contact with the upper surface of the cylinder *d*, forcing it closely home into the hole. The percussion-cylinder is perforate throughout its length. From its base upward the touch-hole *e* opens into a cylindrical bore, *g*, of considerably larger diameter than the touch-hole *e*, and of the same diameter for about one-third of the length of the percussion-cylinder from this point to the top of the cylinder *d* the bore is of still increased diameter, as at *k*, but perfectly cylindrical. The hammer or piston *h* is of the same diameter as the bore *g*, excepting at its upper extremity, which is furnished with a flange or head, *i*, of the same diameter as the larger cylindrical cavity *k*. The piston *h* is made as light as is consistent with strength and safety, to prevent any recoil of the piston when the bomb-shell is fired from a cannon or mortar, and it is so long that when the head or flange *i* is even with the top of the percussion-cylinder *d* its lower extremity extends about half-way down into the bore *g*. A strong spiral spring, *s*, surrounds the piston *h* in the cylindrical cavity *k*, pressing at one end against the base of the cavity *k*, and at the other against the under surface of the flange *i*. This spiral spring *s* sustains the piston *h*, preventing it from sinking farther into the cylindrical bore *g*, and pressing its head or flange *i* firmly against the under surface of the screw-nut *f*. The cap or nut *f* has a cylindrical bore, *l*, extending from the top to the head of the piston *h*. This bore *l* is contracted at its lower end by a flange, *n*. A nose-piece, *m*, fitting into the bore *l* in the nut *f*, is furnished with a screw, *o*, which screws into the head of the piston *h*. The lower half of the nose-piece *m* is smaller than the upper half, so as to pass through the flange *n* at the base of the screw cap or nut *f*, while its upper half is of the same-diameter as the bore *l* in the screw-cap *f*. The upper part of the nose-piece *m* projects outside of the screw-nut *f* at the point of the bomb-shell, the projecting part being longer than the distance from the bottom of the piston *h* to the bottom of the bore *g* in the percussion-cylinder. The screw-nut *f* also projects slightly beyond the point of the bomb-shell, and the projecting part is squared, so that it may be inserted or, if necessary, removed with a wrench. A percussion-wafer, *p*, composed of explosive powder between two thin plates of copper, or other explosive preparation, is placed at the bottom of the bore *g*, in the percussion-cylinder *d*, over the touch-hole *e*.

In order to insure the successful operation

of my improved bomb-shell, it is at least desirable to give the shell, when fired from a cannon, a rapid spiral motion on its axis, in order to secure its hitting the mark and to insure its striking its object on its point. This I accomplish by attaching to the base of the bomb-shell a sabot, of lead or other suitable material, of a peculiar shape. I am aware that the use of a hollow sabot to expand by the explosive force of the gunpowder is not new, that being the principle of the well-known Minié rifle-ball; but I consider the peculiar shape of sabot I am about to describe and the mode of attaching it are admirably adapted to secure the desired end. Toward the base of my bomb-shell I give it a rapid curve in, as shown at *x x*, Fig. 2, and in the base I cast an annular cuneiform groove, *w*, the central piece, *y*, projecting beyond the surface outside the groove, so that the points of the projecting central piece extend nearly over the outer edge of the annular groove. Over this annular groove *w* and projecting central piece, *y*, I cast my sabot *b*, of lead, the sides of which extend over the contracted edge of the base of the bomb-shell at *x x*, Fig. 2, so as to continue the diameter of the bomb-shell the same from a point midway from either end to the base of the sabot. In the center of the sabot I cast a shallow basin, *u*, and around this basin, near the edge of the sabot, an annular channel, *v*, the inclination of which is outward, and which sinks somewhat deeper than the basin *u*.

Having thus described the construction of the several parts of my bomb-shell, I will proceed to explain its mode of operation.

The bomb-shell is placed into a rifle-bored cannon, into which it fits easily, with its point toward the mouth and the sabot toward the breech. When the cannon is fired, the powder in the annular chamber *v*, by its explosive force, not only forces out the edges of the sabot into the grooves of the rifled cannon, but presses the lead down over the curved sides of the base of the bomb-shell at *x x*, thus completely filling up the space around the bomb, and the grooves preventing windage and effectually securing the spinning motion of the shell on its long axis. The spring *s*, around the piston *h* in the percussion-chamber, is strong enough to prevent any recoil of the piston *h*, which might cause the premature explosion of the shell. If the shell is fired directly at an object within its range, the spinning motion, which cannot be secured if it were fired from a mortar instead of a cannon, will prevent the shell from turning over on its transverse axis, and will secure it hitting whatever it may strike on its point. The concussion will immediately drive the nose-piece *m* down, and with it the piston *h*, which will strike the percussion-wafer or explosive powder *g*, and, communicating with the powder in the touch-hole *e*, at once explode the shell.

A bomb-shell with my improved percussion apparatus may be constructed without the sabot when it is to be fired from a mortar, and not directly at the object to be struck, in which case the percussion apparatus is similarly constructed and arranged and inserted into the heavy end of the shell, while the other end is rounded, as shown in Fig. 3.

The spiral spring *s* is made strong enough to prevent any accident from careless handling of the shell, or recoil of the piston *h* at the time of firing; and in order to secure safety of transportation and handling, the nose-piece *m* is easily removable, it being designed to have it removed for transportation and its place filled by a cork or plug, to prevent the admission of water or dirt. The nose-piece may easily be screwed into place when the shell is to be used.

The several pieces of my percussion apparatus fit so tightly in their places as to prevent any liability of the admission of water into the powder-chamber *c*.

What I claim as my invention, and desire to secure by Letters Patent, is—

The combination of the cylindrical chamber, piston, spiral spring, cap, and nose-piece, constructed and arranged as described, forming an improved percussion apparatus, to be inserted into the powder-chamber of bomb-shells, either in combination with or without a shallow sabot of lead of the shape described, the whole being constructed and arranged substantially in the manner and for the purposes hereinbefore set forth.

In testimony whereof I have hereunto set my hand this 14th day of January, A. D. 1856.

JOHN LIPPINCOTT.

Witnesses:
WM. N. HOWARD,
JOSIAH ELLS.