

(No Model.)

E. PIERCE.
BOMB LANCE.

No. 345,803.

Patented July 20, 1886.

Fig. 1.

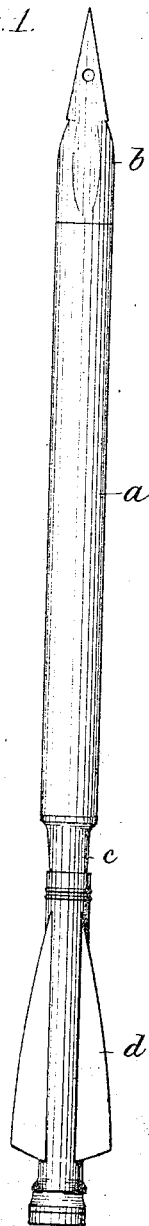


Fig. 3.

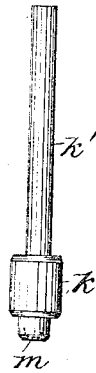


Fig. 2.

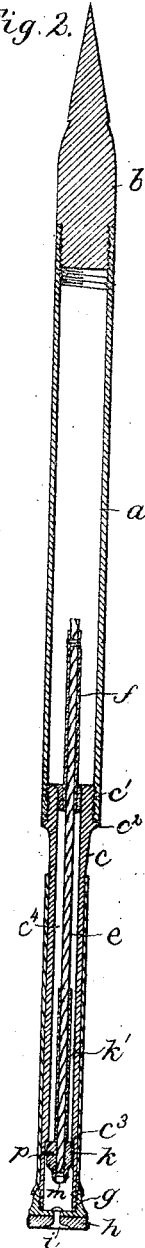
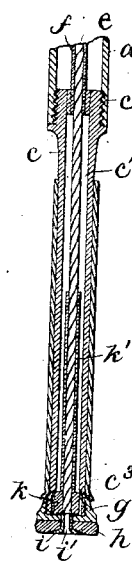


Fig. 4.



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UNITED STATES PATENT OFFICE.

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BOMB-LANCE.

SPECIFICATION forming part of Letters Patent No. 345,803, dated July 20, 1886.

Application filed July 18, 1885. Serial No. 171,923. (No model.)

To all whom it may concern:

Be it known that I, EBENEZER PIERCE, of New Bedford, county of Bristol, State of Massachusetts, have invented an Improvement in Bomb-Lances, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

The object of my invention, which relates to bomb-lances—such as are used for killing whales—is to insure the proper ignition and burning of the fuse, so that the lance will be exploded with certainty at the end of the proper interval of time after leaving the gun, this time being determined by the length of the fuse.

In bomb-lances as heretofore constructed the explosion of the lance sometimes takes place prematurely, either owing to the ignition of the fuse along its sides at some distance from its end, so that instead of burning progressively from end to end it begins to burn at some intermediate point, and the fire reaches the powder before the time required for the proper progressive burning of the entire length of the fuse, or on account of the movement or forcing of the entire fuse bodily forward through the fuse-tube into the magazine of the lance, owing to the pressure of the gases on the end of the fuse.

Bomb-lances as heretofore made sometimes fail to explode on account of improper construction of the means for igniting the fuse. These causes of premature discharge or failure to explode are removed by the present invention, which consists, mainly, in the novel construction of the fuse containing and igniting devices, and their relation to the other parts of the lance.

Figure 1 is a side elevation of a bomb-lance embodying this invention; Fig. 2, a longitudinal section of a lance, showing the invention as applied to a lance in which the fuse is ignited by percussion; Fig. 3, a detail showing the hammer or igniting device on a larger scale, and Fig. 4 a partial sectional detail showing the invention as applied to a lance in which the fuse is ignited from the charge of the gun by which the lance is thrown.

The main portion of the lance, comprising the magazine *a* for the powder, by which the lance is exploded, the point-section *b*, screwed

into or otherwise attached to the said magazine, and the tail-section *c*, screwed into or otherwise attached to the other end of the magazine, and provided with wings or feathers *d*, (shown in this instance as of soft rubber,) may be of any suitable or usual construction. The tail-section *c*, which may be of cast-iron, and is of smaller diameter than the main portion of the lance and the bore of the gun from which it is thrown, is enlarged at its forward end, and provided with threads (shown at *e'*) and a shoulder, *e''*, which engages the end of the magazine-tube when the threaded portion *e'* is screwed therein, thus tightly fastening the tail-section to the magazine-tube.

The tail-section *c* is provided with a chamber, *e'*, throughout its entire length, of a diameter somewhat larger than that of the fuse *e*, and has fastened to it at its forward end a fuse tube, *f*, which is stationary with relation to the other parts of the lance, and extends forward any desired distance into the magazine, so that the charge of powder from the latter is ignited near the middle, in the usual manner. The base or end of the tail-piece *c* remote from the magazine is provided with a cap, *g*, having attached to it a wad or yielding washer, *h*, which fits tightly the bore of the gun from which the lance is thrown, and which may be of leather attached to the cap *g* by a rivet, *i*. The tail-piece *c* is counterbored for a short distance from the cap *g*, forming an internal shoulder, *e''*, which engages the igniting device, and prevents it from entering too far into the chamber of the tail-piece.

The igniting device consists of a metallic head or plug, *k*, which fits loosely in the counterbored portion of the tail-piece, and a tube, *k'*, which fits closely upon the fuse *e*, extending along the said fuse for a distance of two or three inches, or, preferably, about one-half the length of the fuse-chamber *e'* in the tail-piece. When the fuse is to be ignited by percussion, the igniting device *k k'* is provided with a suitable percussion cap or primer, *m*, and the tail-piece is counterbored a sufficient distance, as shown in Fig. 2, to permit the said igniting device to have a slight longitudinal movement between the shoulder *e''* and the cap *g*, so that when the lance is projected from the gun the igniting device will have a relative backward movement, causing the cap or

primer to be struck by the end of the rivet *i* and exploded, thus igniting the end of the fuse. The tube *k* confines the fire of the percussion cap or primer, so as to insure the proper ignition of the fuse, but at the same time prevents the fire from extending any considerable distance along the side of the fuse, so that the latter burns progressively from its end, instead of being ignited at an intermediate point, and thus igniting the powder prematurely. The hammer or igniting device may be held a short distance in advance of the cap *g*, as shown in Fig. 2, by an easily breakable pin, *p*, which is broken by the shock of shooting the lance, and permits the percussion cap or primer to be struck by the inner portion of the cap *g* or rivet connected therewith. The fuse-chamber *c'* in the tail-piece *c* is of sufficient size to accommodate the expansion of the gases from the percussion cap or primer and fuse, so that the latter, which is fastened at its forward end to the tube *f*, in the usual manner, cannot be forced bodily lengthwise through the said tube so as to ignite the powder before substantially its whole length is burned; and, even if it should be forced forward through the tube *k*, it would merely buckle or bend in the chamber *c'*, between the tubes *k* and *f*, and would still burn progressively from end to end in the fuse-chamber *c'*. When the fuse is to be ignited directly from the charge by which the lance is thrown, the igniting device *kk'*, (see Fig. 4,) which is the same as that already described, except that it has no percussion cap or primer, may be confined closely between the shoulder *c'* and the cap *g*, and the latter provided with a passage, *i*, shown as made in the rivet *i*, through which the fire from the charge passes to the end of the fuse *e*.

The construction of the fuse-controlling devices, comprising an igniting device having a tube fitting closely upon the fuse for a considerable portion of its length, an enlarged chamber surrounding the said tube and an intermediate part of the fuse, and a tube fitting closely to the fuse and extending from the enlarged fuse-chamber into the magazine, insures the proper ignition and progressive burning of the fuse from end to end, and prevents the fuse from being moved bodily into the magazine by affording sufficient space for the expansion of the gases generated by the burning of the fuse, without, however, in the construction in which the fuse is ignited by percussion, affording a vent to the external air, and consequently without diminishing the effect of the explosion in the magazine, as is the case when a vent is provided.

When the fuse is ignited by the charge of the gun, as in the construction shown in Fig. 4, the tube *k* of the igniting device confines

the fire of the fuse and protects it, so that it cannot become readily extinguished, as sometimes happens in lances heretofore made not having such protection to the fuse, when thrown into the water or after penetrating the body of the whale, as when the fuse merely burns in an open chamber there is danger of water or blood from the whale entering the chamber and extinguishing the fuse—an accident which cannot happen when the fuse is protected by a tube, as in the present invention.

By having the fuse and its igniting device contained within the tail-piece of the lance the forward or point end may be made solid, affording greater strength than when chambered to contain an igniting device, and the entire body of the lance may be employed as a magazine to contain a large and effective charge of explosive material.

I claim—

1. In a bomb-lance, the combination of the magazine and tail-piece connected therewith, having a longitudinal fuse-chamber, with an igniting device comprising a tube fitting closely upon the fuse for a considerable distance from its end where ignition takes place, and a fuse-tube extending from the said chamber into the magazine, a portion of the fuse being uncovered between the said fuse-tube and the tube of the igniting device, substantially as and for the purpose described.

2. The combination of a magazine of a bomb-lance with a tail-piece having a fuse-chamber of larger diameter than the fuse, provided with an internal shoulder, and an igniting device consisting of a plug engaged by the said shoulder, and a tube fitting the fuse closely for a portion of the length of the chamber in the tail-piece, substantially as described.

3. The combination of a magazine of a bomb-lance with a tail-piece having a fuse-chamber of larger diameter than the fuse and a wad and rivet securing the same to the end of the said fuse-chamber, with an igniting device consisting of a tube fitting closely on the fuse from its end where ignition takes place, and having a longitudinal movement in the fuse-chamber, provided with a percussion cap or primer that strikes the rivet which secures the wad in the longitudinal movement of the igniting device relative to the lance, which takes place when the latter is fired, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

EBEN. PIERCE.

Witnesses:

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