2 Sheets—Sheet 1.

E. BEACH.

Torpedo for Oil Wells.

No. 82,586. Patented Sept. 29, 1868.

Fig. 1.

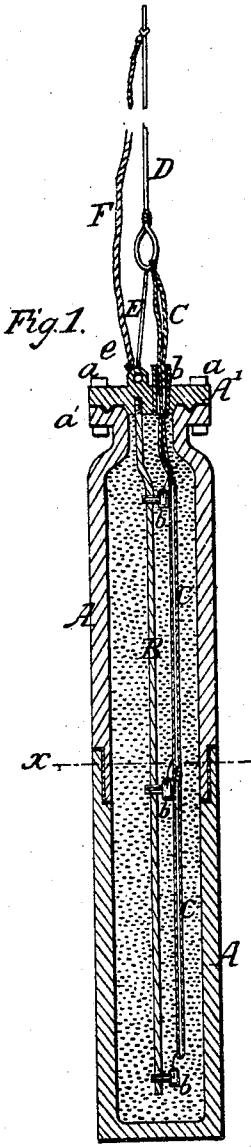


Fig. 3.

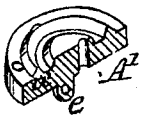
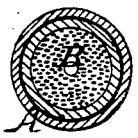


Fig. 2.



Witnesses.
Fredk Andre.
J. P. Theodore Lang.

Inventor.
Eliss Beach
by J. Prowden Bell
Atty

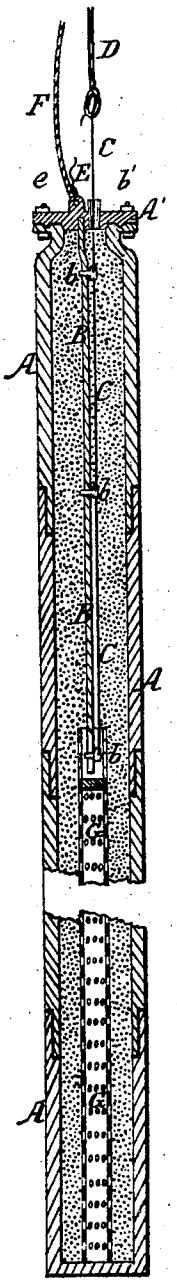
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E. BEACH.

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Fig. 4.



Witnesses:
Fredk. Andre
J. S. Thudore Lang.

Inventor
Elisa Beach
by J. Thornton Bell.
Atty

United States Patent Office.

ELIAS BEACH, OF TITUSVILLE, PENNSYLVANIA.

Letters Patent No. 82,586, *dated September* 29, 1868.

IMPROVEMENT IN TORPEDOES FOR OIL-WELLS.

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, ELIAS BEACH, of Titusville, in the county of Crawford, and State of Pennsylvania, have made certain new and useful Improvements in Torpedoes for Oil or other Wells, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, which make part of this specification, and in which—

Figure 1 represents a longitudinal section of my improved torpedo.

Figure 2, a transverse section of the same, at the line *x x* of fig. 1.

Figure 3, a perspective section of the cap, inverted; and

Figure 4 a similar section to fig. 1, showing another device for exploding the torpedo.

In operating oil-wells, it has been found that their productiveness may be greatly increased by the use of torpedoes of suitable construction, by the explosion of which in the well, its diameter is enlarged and communication opened with veins of oil in the surrounding rock.

The object of my invention is to provide a simple, safe, and efficient torpedo, which can be exploded with certainty at the moment desired, and in which the explosive material will be ignited in such manner as to give the full effect of the charge, and when exploded, the torpedo will be broken into such minute fragments as not to choke the well or to interfere with the pumping-machinery; to which ends my improvements consist—

First, in constructing the shell of the torpedo of glass, sulphur, cast iron, or other brittle substance, moulded in sections, and united by cementing or fusing, so as to be made of any required length, and impervious to water.

Second, in providing the cap of the torpedo with a circular projection, of angular or V-shape in cross-section, entering a corresponding groove in the top of the upper section of the shell, for the purpose of compressing the packing tightly, and preventing the entrance of water.

Third, in the use of friction-primers, placed at different points in the length of the torpedo, and connected and operated so as to be ignited at one and the same time, thus burning all the explosive material in the torpedo, and causing its full effect to be exerted.

Fourth, in a perforated tube, enclosing one or more of the friction-primers, and extending to or near the bottom of the torpedo, so as to communicate ignition to the explosive material below the lowest primer, in cases where the torpedo is made of such length that it might be difficult to explode the primers if continued through its whole extent.

Fifth, in the manner, hereinafter described, of causing the explosion, so as to obviate risk of the same occurring before the proper time.

In the accompanying drawings, which show a convenient arrangement of parts for carrying out the objects of my invention, A represents the shell of the torpedo, which is composed of glass, porcelain, sulphur, glue, cast iron, or other brittle substance, moulded in sections of as great a length as can be conveniently done, and united by some strong and water-proof cement, or by fusion.

By constructing the shell of a brittle material, it is broken into such minute fragments by the explosion as not to choke the well, or cause any derangement to the mechanism of the pump; and by making it in section, united in the manner described, I am enabled to use glass for a torpedo of any desired length, which could not otherwise be done, on account of the difficulty of moulding glass longer than about sixteen inches.

The torpedo is closed by a cap or cover, A′, secured to a flange on its upper section by bolts and nuts, *a*, having suitable packing interposed, to make a water-tight joint. The cap-bolts can rest in vertical slots formed in the periphery of the flange, if the latter cannot be conveniently drilled.

A circular projection, *a′*, of angular or V-shape in cross-section, is formed upon the bottom of the cap A′, and enters a corresponding groove in the flange or top of the upper section, and when the nuts are screwed up the packing is compressed into the groove and a perfectly tight joint insured.

A metallic rod, B, is screwed or otherwise firmly fastened to the bottom of the cap A′, and extends to the bottom of the torpedo, or nearly so, being perforated with holes at different points in its length, in which friction-

primers, *b*, of ordinary construction are inserted, and secured by tying or other suitable means. Any number of primers desired may be employed, depending upon the length of the torpedo. The wires by which the primers are discharged are connected to a cord, C, the tension of which is regulated so that they will all be discharged at one and the same time. By this means the explosive material is ignited at several points simultaneously, and entirely burned, thus exerting the full effect of the charge.

The cord C passes out through a pipe, *b'*, inserted in the cap A', and properly packed, to prevent the entrance of water, and is connected to the wire cable D, by which the torpedo is lowered. A safety-string, E, is attached to the cable D and to a lug, *e*, in the cap A', so as to bear the weight of the torpedo, the cord C being slack between the upper primer and the cable. A cord, F, is likewise attached to the lug *e*.

In cases where the torpedo is of so great a length as would make it difficult to operate the primers if carried through its whole length, I employ a thin metallic tube, G, perforated throughout its length with numerous small holes, and extending from the lowest primer to the bottom of the torpedo, or nearly so, the holes being made so small as not to allow the powder to pass through them. When the primers are discharged, the fire from the lowest primer is communicated along the tube G, by means of its perforations, to the explosive material below it, which will thus be burned with its full effect, however long the torpedo may be made.

The operation of my torpedo is as follows: The rod B being secured to the cap A', and the primers *b* and cord C being placed in position, as shown in fig. 1, the cap is then secured upon the torpedo, which is filled with powder, or other explosive compound, through the pipe *b'*, which is then properly packed to prevent the entrance of water. The torpedo is then lowered into the well by the cord F until it reaches the fluid, or for a sufficient distance to obviate risk to the operator, when the cord F is slackened and tied to the cable D. The weight of the torpedo being now supported by the cable D and safety-string E, it is lowered to the point where it is desired that the explosion shall take place, when the safety-string E being fractured by a sudden jerk, the weight of the torpedo comes upon the cord C, and the primers *b* are simultaneously discharged.

Fig. 4 shows the parts in the positions they occupy at this moment.

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

1. The perforated tube G, arranged and operating substantially as described, for the purpose of communicating ignition to the explosive material at the lower part of the torpedo, as set forth.

2. The primer-cord C, safety-string E, and cable D, in combination with the primers *b*, substantially as described.

3. The supplementary cord F, connected and operating as and for the purpose set forth.

4. The rod B, in combination with the primers *b* and cap A', as set forth.

ELIAS BEACH.

Witnesses:

J. SNOWDEN BELL,

FREDK. ANDRÉ.