J. ERICSSON.

Submarine Torpedo and Means for Propelling the Same.

No. 203,435. Patented May 7, 1878.

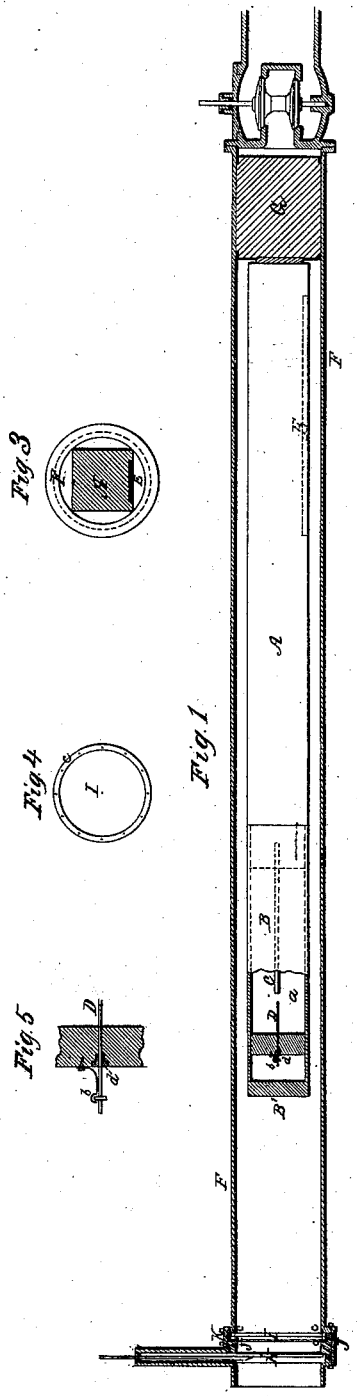

Fig. 1

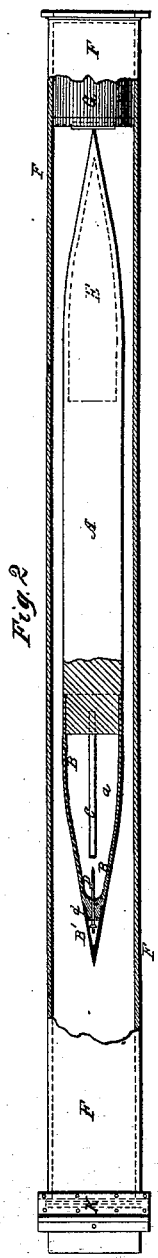

Fig. 2

Fig. 3

Fig. 4

Fig. 5

Witnesses
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JOHN ERICSSON, OF NEW YORK, N. Y.

IMPROVEMENT IN SUBMARINE TORPEDOES AND MEANS OF PROPELLING THE SAME.

Specification forming part of Letters Patent No. **203,435**, dated May 7, 1878; application filed November 17, 1877.

To all whom it may concern:

Be it known that I, JOHN ERICSSON, of the city, county, and State of New York, have invented certain new and useful Improvements in Submarine Torpedoes and Means of Propelling the same; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification.

One part of the invention relates to the external form of the submarine torpedo; and consists in a submarine torpedo having its transverse section square or rectangular, its top and bottom flat and parallel with each other, its sides vertical throughout their length, and its ends sharp.

Another part of the invention relates to the construction of the forward part or head of the torpedo for the reception of the explosive charge, and to the provision for igniting and exploding the charge. The forward part or head, in which there is a cavity of sufficient capacity for the charge, and the end of which is made sharp enough to cut netting or other impediments which may surround or be otherwise applied to or near the ship or other body to be assailed, consists of a hollow shell of iron or steel of sufficient strength to resist the impact necessary for such cutting, but may yet be capable of being crushed or split by striking against the body assailed. In the front part of this head there is a fulminate-priming, and a steel rod applied to operate like the firing-needle of a needle-gun. This rod is locked by a spring-guard in such a position that it cannot reach the fulminate-priming until the shell of the head, or that portion of the latter which covers the forward end of the steel firing-rod, is crushed or split by striking the ship or body assailed, when, by such crushing or splitting, the point of the steel rod and the priming are permitted to be brought sharply into contact with each other, and by the consequent ignition of the priming the charge is exploded.

The front extremity of the head may be composed of a separate cap of hardened steel, and applied to cover the end of the steel firing-rod, and made capable of cutting a way for the torpedo through netting, and yet of being crushed or broken to permit or produce the operation of the firing-rod, without necessitating the crushing or splitting of that part of the head which contains the exploding-charge.

That part of my invention which relates to the propulsion of the torpedo consists, principally, in a cylindrical guide-tube applied under water, and through which the square torpedo is pushed by means of a detached piston, which fits said tube, and is actuated by the pressure of steam, air, or any other elastic medium of high tension, but which, though being projected from the guide-tube behind the projectile, is retarded and stopped by the resistance of the water after leaving the guide-tube, while the torpedo continues its onward course.

The guide-tube may have an internal diameter equal to the angular distance between opposite corners of the square torpedo, in which case the square torpedo will be guided by its corners working in contact with the internal circumference of the guide-tube; but the guide-tube and its detached piston may be made of a diameter much larger than the said angular distance, in which case it will be necessary to attach longitudinal guide-pieces to the torpedo to fit the guide-tube, in order to insure its ejection in a line coinciding with the axis of the guide-tube. This method of pushing out the torpedo by a detached piston admits of imparting to it an indefinite amount of energy, irrespective of the tension of the actuating medium, since the guide-tube and its piston may be of many times greater area than that of the torpedo.

The guide-tube may be applied in various ways. It may be applied in connection with stationary water-batteries for defending harbors. It may be suspended by the side of a vessel or between twin boats; or it may be applied under the bottom of a ship, or within the same, protruding through a suitable opening in the side or stem thereof.

Being applied under the surface of the water, the guide-tube must be provided with means

of preventing the entrance of the water into the end from which the torpedo is to be ejected. This may be done by an ordinary sliding sluice-valve; but such valve cannot be opened instantaneously at the moment when the forward point of the torpedo reaches it, and, of course, the end of the guide-tube must not be opened before that moment; otherwise water would enter the guide-tube and seriously retard the ejection of the torpedo.

To overcome this difficulty, one feature of this invention consists in a stationary valve composed of a disk of some water-tight textile fabric, held in position by two metallic rings, and inserted within the guide-tube inside of the sluice-valve. This disk-valve admits of opening the sluice-valve before commencing to push out the torpedo, which latter, on reaching the stationary disk-valve, perforates the same and passes through it during its onward course. On closing the slide-valve after the piston has pushed out the torpedo, another disk-valve may be introduced through an opening provided in the top or side of the guide-tube, the said opening being furnished with a water-tight cover, which has to be removed for the insertion of the disk-valve.

Figure 1 in the drawing exhibits a side view, partly in vertical section, of the torpedo, and a central longitudinal section of the guide-tube containing the torpedo. Fig. 2 is a top view corresponding with Fig. 1, showing parts of the guide-tube and torpedo in horizontal section. Fig. 3 is a transverse section of the torpedo and guide-tube. Fig. 4 is a face view of the disk of water-proof textile fabrics, and Fig. 5 exhibits in detail, on a larger scale than the other figures, the device for locking the firing-pin out of contact with the fulminate-priming.

A is the body of the torpedo, which may be of wood or other material. B is the hollow head, of iron or steel, in which is the cavity *a* for the exploding-charge. B′ is a hollow steel cap, forming the forward extremity of the head. A heavy weight, E, is inserted into the bottom of the body near the after end, in order to balance the explosive charge in the head and to keep the body in a vertical and horizontal position. C is a fixed tube, containing fulminate-priming. D is the firing-rod, arranged opposite the priming, and fitted to slide in a guide, *d*, provided in the head. This rod is made with a collar, to engage with spring-locking guard *b*, which is firmly secured within the head, and which holds the rod out of contact with the fulminate-priming until the head or the cap B′ is crushed or split, and thereby insures the prevention of premature explosions.

F is the guide-tube, and G is the detached piston fitted to said tube. H is a sliding sluice-valve, applied to the end of the tube from which the torpedo is to be ejected. I is the disk-valve, of water-proof textile fabric, for closing the tube inside of the valve H, and *c c* are two metallic rings, between which the said disk is clamped by suitable screws, and by which it is kept extended. The said disk and wings are represented as inserted into a water-tight box, J, which is attached to the mouth of the guide-tube, and which is provided with an opening in the top, and has a removable cover, K, applied to said opening, to permit the introduction of the disk and rings and the removal of the rings after the disk has been perforated by the passage of the torpedo through it.

At the other end of the guide-tube any suitable valve may be provided, for the admission into the said tube behind the piston of the compressed air, steam, or other elastic medium which is to be employed for the propulsion of the torpedo, and which may be supplied by a pipe from any suitable reservoir, generator, or compressing apparatus.

The torpedo may be inserted into the guide-tube from either end, and, if any water has been allowed to enter the guide-tube during the act of insertion, such water must, after closing the sluice-valve H and inserting the disk I, be removed by suitable means. Previous to opening the valve by which the propelling medium is admitted behind the piston, the sluice-valve H is opened. When the propelling medium enters the guide-tube behind the piston, the latter is pushed forward, and propels the torpedo before it through the guide-tube, and through the disk I, and through the water outside, with great velocity, until the forward end of the torpedo strikes the ship or body assailed, when the hollow shell-like head B or cap B′ is crushed or broken. The spring locking-guard *b* is broken or bent, and the rod D and fulminate-priming are brought sharply into contact with each other, the priming is ignited, and the explosion of the charge takes place. The piston follows the torpedo through the mouth of the tube, cutting out the perforated disk I from the interior of the rings *c c* in its passage; but it is instantly left behind by the torpedo, and floats or sinks, according to the material of which it is made.

I claim—

1. A submarine torpedo having its transverse section square or rectangular, its top and bottom flat and parallel, its sides vertical throughout their length, and its ends sharp, substantially as herein described.

2. In a submarine torpedo having inclosed within it a firing-pin for igniting fulminate priming to produce the explosion of the charge, a hollow head or cap having a sharp cutting end, and capable of being broken or split by striking the vessel or body assailed.

3. The combination, with the firing-rod D and the head B or cap B′, of the spring locking-guard *b*, for locking the firing-pin, substantially as herein described.

4. The guide-tube having an internal trans-

verse sectional area larger than the transverse sectional area of the torpedo, in combination with the torpedo and detached piston, substantially as described.

5. The combination, with the guide-tube and an outer valve for closing the end of the same, of an inner stationary valve composed of a disk of water-proof textile fabric held between two metallic rings, substantially as and for the purpose herein described.

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