

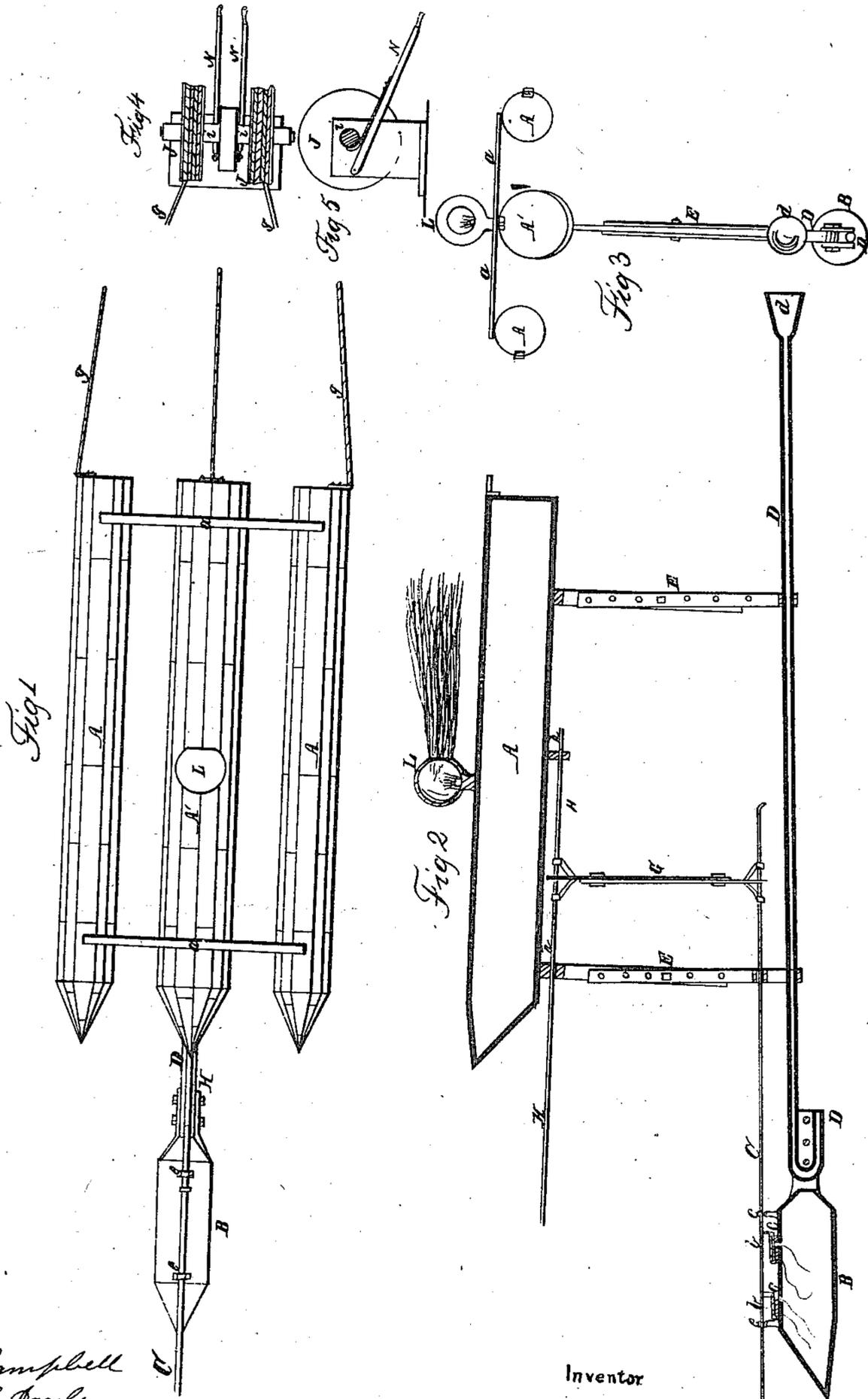
J. D. WILLOUGHBY.

2 Sheets—Sheet 1.

Marine Torpedo.

No. 41,112.

Patented Jan. 5, 1864.



Witnesses

R. Campbell  
John F. Jacobs

Inventor

J. D. Willoughby  
by his attys  
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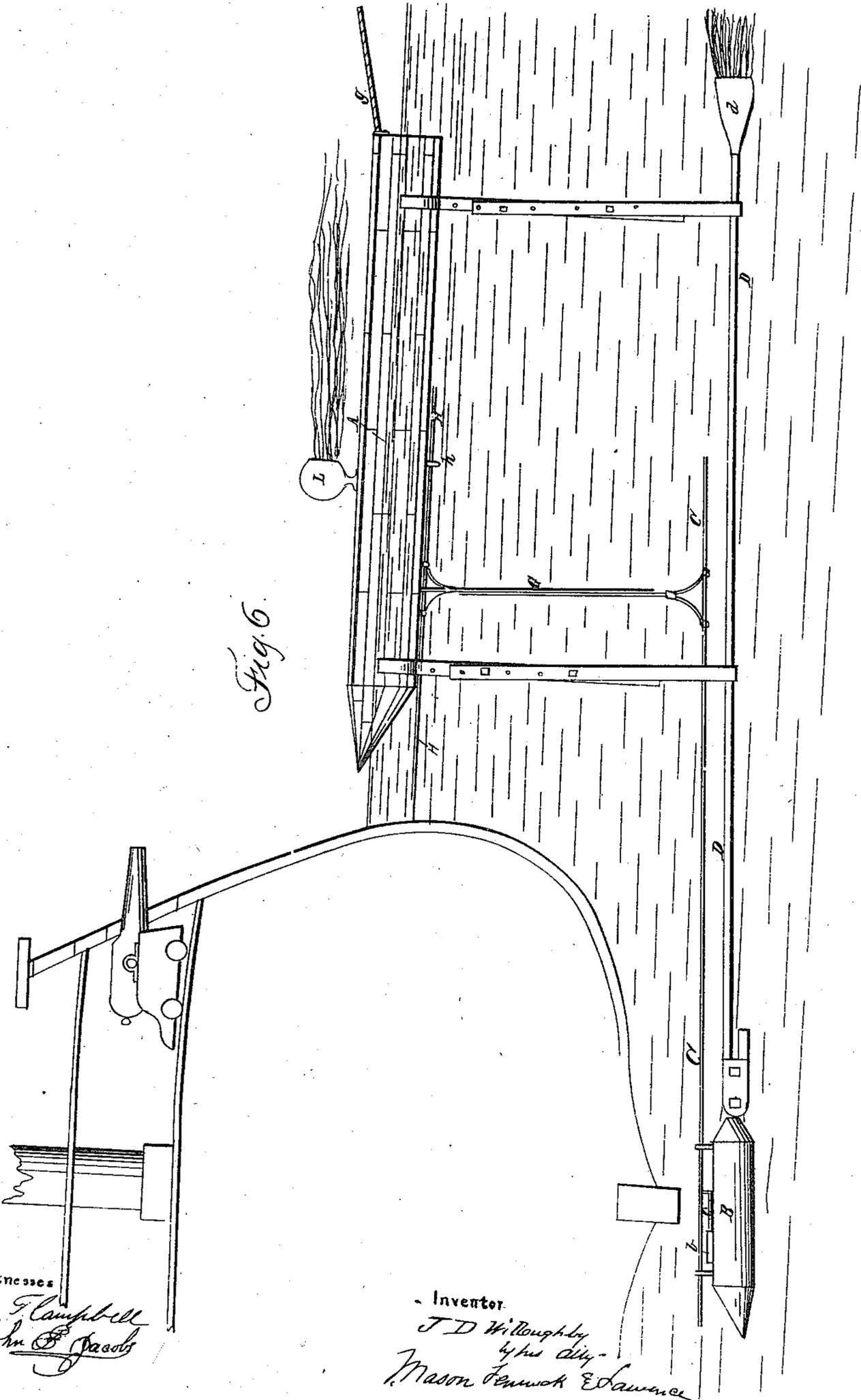


Fig. 6.

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Mason Fenwick & Lawrence

# UNITED STATES PATENT OFFICE.

JAMES D. WILLOUGHBY, OF WASHINGTON, DISTRICT OF COLUMBIA.

## IMPROVEMENT IN SUBMARINE EXPLOSIVE PROJECTILES.

Specification forming part of Letters Patent No. 41,112, dated January 5, 1864.

*To all whom it may concern:*

Be it known that I, JAMES D. WILLOUGHBY, of Washington city, in the county of Washington and District of Columbia, have invented a new Traveling Torpedo; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 is a top view of the buoy and torpedo. Fig. 2 is a longitudinal section through Fig. 1, taken in the plane indicated by the red line *xx* thereon. Fig. 3 is a rear end elevation of Fig. 2. Fig. 4 is a top view of the paying-out apparatus, and Fig. 5 is a vertical section through the same. Fig. 6, Sheet 2, illustrates the operation of my invention.

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

This invention relates to certain novel improvements in destroying vessels at sea, in harbors, &c., where such vessels are inaccessible, or where it would be deemed unsafe and impracticable to attack them with the ordinary means.

The nature of my invention consists in the employment of traveling torpedoes, which are suspended beneath buoys or suitable floats, and propelled through the water by means of rockets of a novel construction, which are applied to the floating torpedoes, or to the buoys supporting them, in such a manner that they can be guided and directed in their course to a vessel which it is desired to destroy, and then exploded directly under this vessel at the moment of contact with it, all as will be hereinafter described.

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

In Fig. 1, Sheet 1, of the annexed drawings I have represented three floats or buoys, A A' A; but in practice it may not be found necessary to employ more than two, and in some instances one buoy will be found sufficient. These buoys may be made of boiler-iron and formed of the shape of a cylinder, hollow inside, flat at the stern, and conical or tapering upward at the bow, and they should possess sufficient floating capacity to sustain two or three hundred pounds in the water. Fig. 2 represents about the shape I desire to

make the forward ends of the floats—*i. e.*, inclining downward and backward—so that the force of the waves, acting at this point, will tend to keep these ends upward, for reasons hereinafter to be explained. When three floats, A A' A, are used, they are connected together at suitable distances apart by means of brace-rods *a a*, and the magazine or torpedo is suspended beneath the central buoy, A'.

The torpedo B may be made of the same shape as the buoy A'; but instead of the forward end inclining downward and backward, as in the buoy, the forward end of the torpedo inclines downward and forward, as shown in Figs. 2 and 6. The tendency of the water upon the torpedo will be to keep it down, which being counteracted by the upward tendency of the bow of the buoy, the machine will glide through the water smoothly, and the torpedo will not in any case be tossed out of the water.

This torpedo may be constructed of boiler-iron, the size being controlled by the destructiveness desired of it, and it is filled with powder or any explosive compound which will give the best results, and communicating with the powder in this torpedo are several friction-fuses, which are shown in Fig. 2, consisting of tubes *b b*, which are charged with the fulminate of mercury, or any other one of the fulminates, and projecting into these tubes are short rods *c c*, which are connected to a draw-rod, C. The fuse-rods *c c* may be serrated, so that when they are moved backward very slightly they will ignite and explode the torpedo. One or more of such fuses may be used, and they should be so confined as not to be exposed to the water. This can be done by packing the fuse-rods *c c* in their tubes.

The torpedo B is secured at its rear end to a long metal tube, D, which is flaring at its rear end, as shown at *d*, Figs. 2 and 6, and which is curved at its forward end, as shown in Fig. 2. Both ends of this tube may be left open, or one end may be closed. The tube extends back in rear of the torpedo in a straight line, and it should be made of sufficient size to support the torpedo. This tube D is filled with "rocket-powder" of such character as not to burn too rapidly nor too slowly, and such as will burn under water and, by its re-

action upon the water, will propel the machine forward.

The tube or rocket D, carrying on its forward end the torpedo, is supported in the water at a suitable distance below its surface by the buoys A A' A above described, and this rocket-tube is connected to the buoys by means of adjustable extension-rods E E, which are made adjustable for the purpose of raising or lowering the torpedo and rocket with reference to the buoy, according to the size and draft of the ship to be destroyed, and also for setting the rocket-tube at any desired point of inclination.

The draw-rod C, to which the right-angular fuse-rods c c are connected, has its bearings in two pillow-blocks, e e, projecting up from the torpedo shell, and, extending back behind the forward extension-rods E, this rod C is connected to the extension-rods G, which project upward, and are again connected to another draw-rod, H, which is supported in bearings h h under the buoy A', as shown in Figs. 2 and 6 of the drawings.

The two rods C and H are in the same vertical plane, and both being connected they move together, which movement ignites the fuses and explodes the torpedo. It is not intended that the lower draw-rod, C, shall come in contact with the side of a vessel to be blown up unless by some accident the torpedo is not low enough to pass under the keel of the vessel, in which case the explosion will take place before the rod H strikes the vessel, and a great deal of the force of the explosion may be lost; but it is intended that the magazine shall be so far below the surface of the water, and at such a distance beyond the bow of the buoy, that it will be brought directly under the keel of the vessel before the forward end of the rod H strikes the side of the vessel. Then when this rod H strikes it will be forced back, carrying with it the rod C and fuse-rods c c. and exploding the torpedo.

The vertical adjustments of the torpedo and rocket are effected by means of the extension-rods E E and extension rods G, and this adjustment regulates the depth of the torpedo with respect to the draft of the vessel it is desired to destroy. If it is required to adjust the torpedo with respect to the width of the vessel to be destroyed, this can be done by using set-screws on the lower bearing ends of the extension-rods E E for fixing the tube D at any desired point to which it may be adjusted.

The rocket-tube D being open at both ends, and having its forward end bent backward, it will be seen that the rocket may be ignited at either or both ends if found desirable. It may be found best to ignite the rocket at its forward end, in order that the force of the expelled gases may react upon the water directly in rear of the torpedo and as near to it as possible. In this event the forward end of the tube D will be made flaring instead of the rear end of this tube. The object of flaring

the end of this rocket-tube is to increase the superficial area of the resisting medium against which the gaseous matter resulting from the combustion of the "rocket-powder" impinges, thus increasing the impelling force of the rocket.

Now, in order to give direction to the buoy and rocket, and to be able to direct the machine with some degree of precision to any desired object, I employ a paying-out machine, to which the buoy is connected by means of two or more guide-ropes, g g. These ropes are connected to the buoy at its rear end, and wound upon the drums or reels J J of the paying-out machine, (represented in Figs. 4 and 5 of the drawings,) and this machine being established in some convenient position on the deck of a vessel, the buoy can be guided in its passage through the water by means of the friction-brake arms N N, which, on being applied to the hubs i i of the reels J J, will regulate the speed of these reels and tighten or slacken either one or the other of the guide-ropes g g.

It is intended to use these traveling torpedoes at night, and the darker the night, so long as the position of the enemy be known, the better for success, as the approaching object will not be seen by the enemy, while it may be seen by those directing its course by means of a dark-lantern, L, which is arranged on top of the buoy and protected from the water, and in guiding the machine to its destination it is only necessary to keep this light in a line with the object to be destroyed.

The distance to which the machines may be impelled through the water will depend upon the capacity of the rocket-tube for containing powder and the length of time required to consume this powder, together with the distance to which a given amount of powder will impel the machine. This being determined, the length of guide-ropes and the distance necessary to approach the foe is known.

Before sending these machines off it will be necessary to know with some degree of certainty the size of the enemies' vessel, and to regulate the depth of the torpedo below the surface of the water, so that it will pass under the keel of the vessel and allow the rod on the buoy to strike the side thereof. These adjustments being made and the machine all ready, it is lowered into the water by means of "davits" or other suitable contrivances. When the guide-ropes are properly connected to the paying-out apparatus, and the rocket ignited by means of a string fuse suitably applied to it, the machine starts on its errand of destruction, guided and controlled in its course through the water by a person having hold of the brake-levers N N. The torpedo passes under the vessel first, and then the rod H strikes the vessel's side with such force as to instantly ignite the fuse and cause the explosion of the torpedo.

The rod H might be casually pushed back so as to cause a premature discharge, should it come in contact with any light floating ob-

ject, and to prevent this a spring may be applied to this rod in such a manner as to keep it in place until it strikes the desired object.

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

1. The combination of buoys or floats A A' A with a torpedo or magazine of powder suspended beneath the same, and operating substantially as and for the purposes herein described.

2. In combination with a floating torpedo, a rocket constructed and applied substantially as described.

3. The means, substantially as described, applied to the buoy and torpedo for exploding the latter automatically.

4. The adjustable extension-rods E E, or their equivalents, for supporting the torpedo and rocket and allowing the same to be raised or depressed, substantially as described.

5. The combination of a traveling torpedo with a paying-out apparatus constructed for guiding the torpedo in its course through the water without the interposition of a rudder, substantially as described.

6. The combination of a dark-lantern, L, with a traveling torpedo, substantially as and for the purposes described.

7. Arranging and supporting the torpedo beneath the buoy, substantially as described, in such a relation therewith that the torpedo can be brought under the keel of a vessel and there exploded, substantially as described.

8. A rocket-torpedo consisting of the magazine B, fuse or fuses *c c*, and rocket D, constructed substantially as described.

J. D. WILLOUGHBY,

Witnesses:

R. T. CAMPBELL,  
JOHN P. JACOBS.