

(No Model.)

J. CLARK.

3 Sheets—Sheet 1.

MEANS FOR CONDUCTING, POSITIONING, AND EXPLODING TORPEDOES.

No. 513,983.

Patented Feb. 6, 1894.

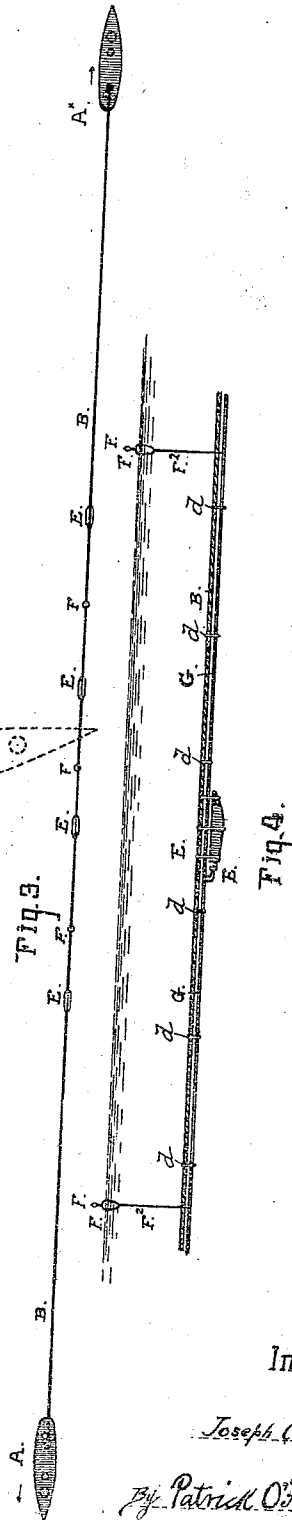
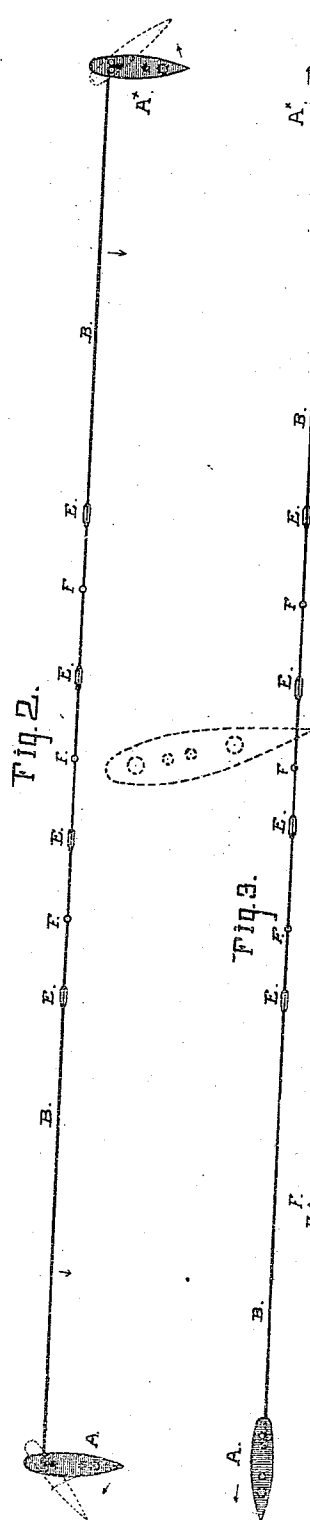
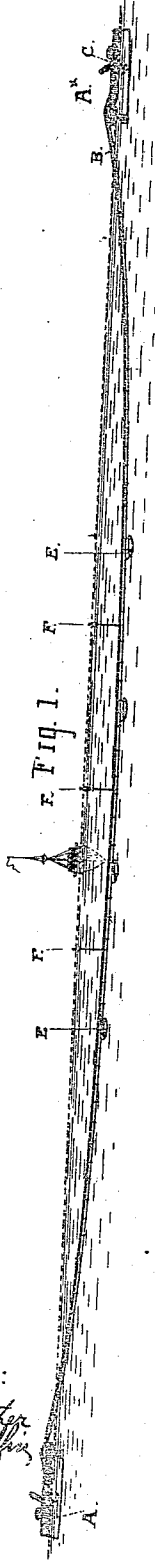


Fig. 4.

Witnesses:

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William C. Griffin

Inventor:

Joseph Clark

By Patrick O'Tamell

his atty.

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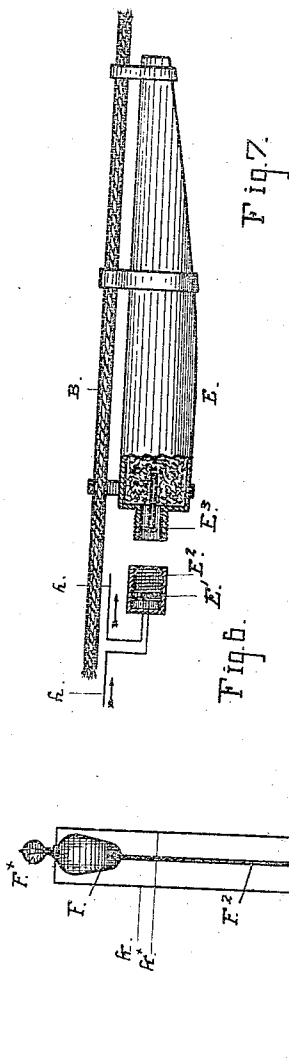
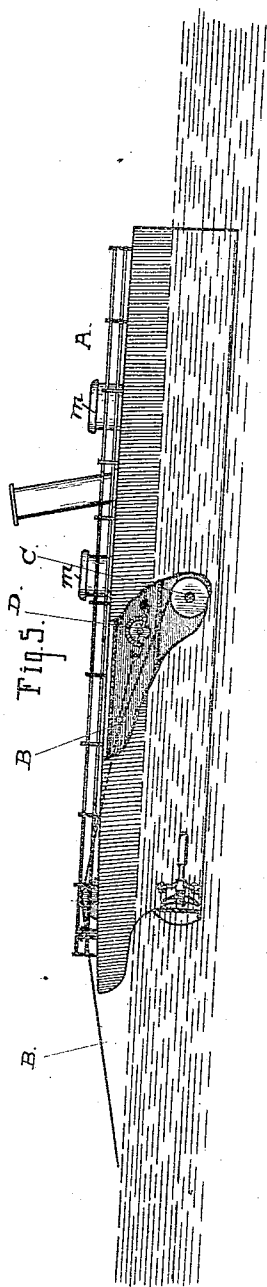
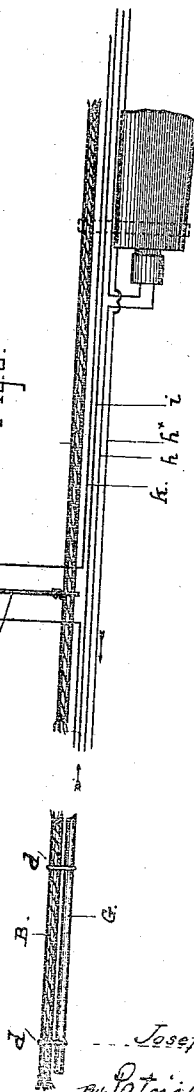


Fig. 7.

Fig. 6.



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(No Model.)

3 Sheets—Sheet 3.

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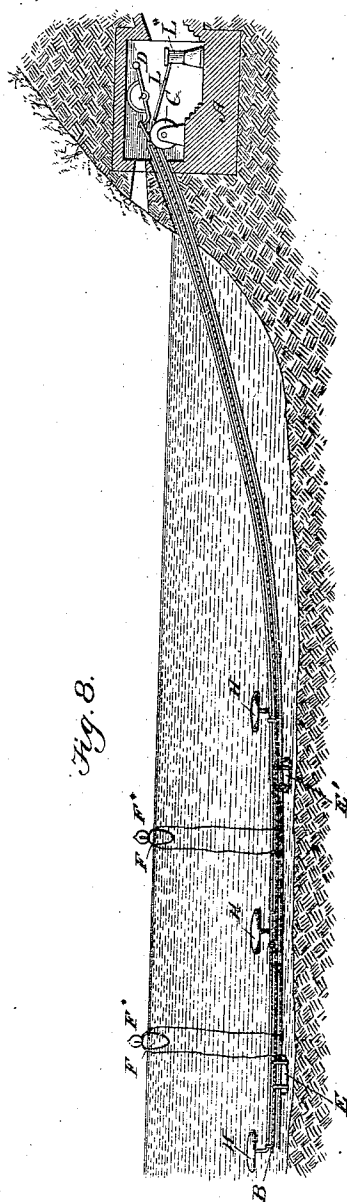


Fig. 8.

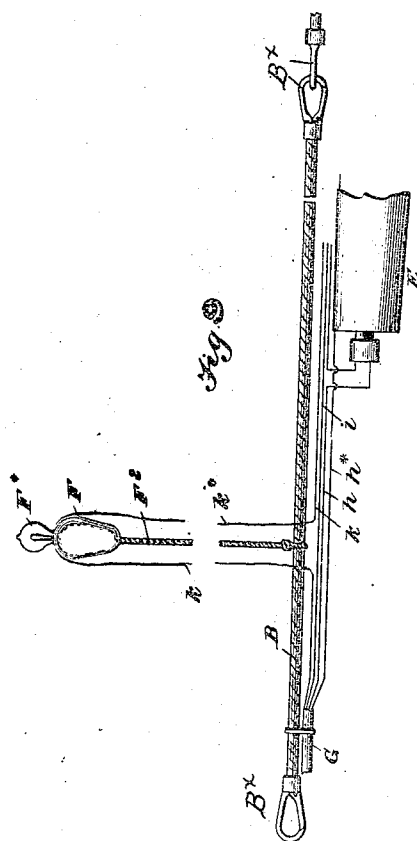
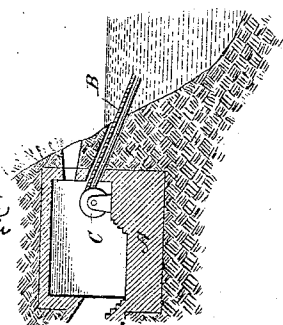


Fig. 9.

Witnesses
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Inventor
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UNITED STATES PATENT OFFICE.

JOSEPH CLARK, OF SAN FRANCISCO, CALIFORNIA.

MEANS FOR CONDUCTING, POSITIONING, AND EXPLODING TORPEDOES.

SPECIFICATION forming part of Letters Patent No. 513,983, dated February 6, 1894.

Application filed November 10, 1891. Serial No. 411,432. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH CLARK, a citizen of the United States of America, residing at San Francisco, in the county of San Francisco and State of California, have invented certain new and useful Improvements in Conducting, Positioning, and Exploding Torpedoes, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention relates to improvements in means for conducting and positioning torpedoes and exploding the same in proximity to, or in contact with a vessel or other object of attack.

The objects and advantages of the invention will hereinafter appear and the novel features thereof will be particularly pointed out in the appended claims.

The invention is clearly illustrated in the accompanying drawings, in which—

Figure 1 is a front elevation representing two boats or floating stations with a connecting cable provided with torpedoes showing how the cable and torpedoes can be brought beneath and against the vessel to be attacked. Fig. 2 is a plan view illustrating the maneuvering of the boats in positioning the torpedoes and operating them to strike the vessel at a proper depth when making an attack. Fig. 3 illustrates the two boats straining the cable to bring the torpedoes up against the vessel after they have been positioned under it. Fig. 4 represents an enlarged view of the torpedo section of the cable, and a portion of the electric cable connecting with the lights on the buoys. Fig. 5 represents a side elevation of a boat, a portion of the side being broken away showing the cable, winding and connecting apparatus and dynamometer. Fig. 6 is a diagram representing the several electric conductors communicating with the torpedo firing mechanism, the electric lights and for telegraphically connecting the stations. Fig. 7 represents an enlarged view of one of the torpedoes shown partly in section. Fig. 8 represents two fixed or land stations with a cable connecting them across an intervening channel, the stations being shown in section exposing the apparatus for actuating the cable to position the torpedoes. Fig. 9 is an enlarged detail of the torpedo carry-

ing cable with a floating electric light and a torpedo connected therewith and with the various electrical conductors.

It will be observed that in carrying out my invention I may use either the fixed or movable stations, as circumstances may require, and while the objects in view and the principles employed are the same in both instances, nevertheless, it is believed that the details can be better understood by describing the two systems in the order in which they are illustrated in the drawings; referring therefore to the system as operated from movable or floating stations or boats, A A' indicate two boats connected by a cable B, the ends of which are attached to reels or winding drums C, (as in Fig. 5.) E E are torpedoes attached to the cable B or to a shorter cable which may form the middle or torpedo section of said cable. The torpedo sections are each provided with suitable couplings B*, Fig. 9, whereby upon the explosion of a torpedo the remaining portions or sections of the cable may be saved from injury or destruction upon the explosion of a torpedo in any one of the sections. F F are buoys attached to the torpedo section of the main cable B by means of short cables F², (as in Fig. 6.) These buoys carry incandescent or other electrically operated lights which may be operated from one or both of the stations, and serve as signal lights to those manning the boats or stations. G indicates a cable carrying insulated electric wires or conductors, the wire *k* for operating the electric lights, *h* for discharging the torpedoes, and *i* for keeping up telegraphic communication between the boats or stations. The cable carrying these wires or conductors may be attached to the main cable B by cringles *d* or in any other suitable manner.

For convenience in disconnecting the torpedoes from their firing devices without disturbing them, and removing the torpedoes from the carrying cable, the exploder E' is fixed in a removable cap or top E² fitted to a screw threaded neck E³ on the end of the torpedoes, and having the ends of the electric firing wires set into their heads, as illustrated in Fig. 7. The torpedoes are disconnected by unscrewing the caps E² and drawing the torpedoes away from the screw threaded necks,

and at such time both parts are protected by covering their open ends with screw caps fitted to each part. The cable carrying the electric conductors may be separated from the main cable B before passing round the winding drum C, and the electric cable may be taken up by a separate reel or drum provided for it.

To indicate the depth of submergence of the cable B, I provide a dynamometer D, (as in Fig. 5,) which will not only indicate the depth of submergence of the cable, but, will also indicate when it has been brought into contact with a vessel or other object by the sudden increase of pressure indicated by the dynamometer. It will thus be seen that in connecting by a cable two boats adapted by their construction for the purpose of this invention, having capacity for high speed and for being rapidly handled and maneuvered, and also adapted for being wholly or partially submerged, and being run noiselessly, and having in addition to the engine or motor for propelling the boats, power for operating reels, cables, winding drums, electric generating apparatus, pumps, and other necessary machinery, and providing the cable with torpedoes of any desired power and with electric connections for exploding the same at pleasure, and by establishing between the boats electric communication by telegraph, telephone, or electric signals, a formidable system of defense is provided for coast, harbor, rivers, and for the high seas.

In making an attack upon a vessel the cable will be paid out until a sufficient length is obtained to permit the boats to separate to the required distance, when the cable will be attached to a dynamometer and the reel or drum turned to throw the strain upon it. The length of the cable connecting the boats will not be changed during the attack; and observations can be made from the lookouts *m m*, and no lights will be observable upon the boats during the attack.

In making an attack upon a vessel at anchor and protected by torpedo nettings the two boats moving abreast at a sufficient distance apart are caused to travel at equal rates of speed with the cable slack, and submerged at a sufficient depth below the surface to pass entirely under the nettings and beneath the vessel, and then by changing the course of the boats simultaneously to produce greater tension on the cable, the torpedo section with the torpedoes will be raised into contact with the vessel when the torpedoes will be exploded. The dynamometer at all times while the cable is attached to it will indicate the tension of the cable and the depth of its submergence, and the floating lights need not be used for determining the submergence. The tension of the cable when affected only by the resistance of the water through which it passes will be very uniform, but, at the moment the cable and torpedoes come in contact with the vessel or object of attack the resistance caused thereby will be so much

greater than that of the water that the dynamometer will instantly show it. The degree of submergence may, however, be determined in other ways, as by noting by reason of the pressure of the water the increase or decrease of the resistance offered to the electric current in the conductors arranged on the cable, by the use of a galvanometer, or by arranging the signal lights so that at one point of submergence only a white light will be observed above the surface of the water; and at another depth a blue or red light will appear, &c.; each light F having a different length of attaching cable with the main cable B, see dotted lines Fig. 4, with or without a separate electric wire. The electric lights may also be used as search lights, and they may be exposed to view from one or both boats. The cable B with the torpedoes attached may be maintained at the required depth by maneuvering the boats to slacken or strain the cable as the indicating apparatus may suggest, and when it is desired to raise the torpedoes quickly in making an attack so as to bring them against a vessel, the boats are steered in opposite directions or as nearly so as may be necessary, and to give the cable a greater submergence, the course or movement of the boats would be reversed.

When found necessary I provide a series of inflatable and collapsing buoys H, Fig. 8 and dotted lines Fig. 4, which may be attached at convenient points to the cable B, and when it is desired to raise or assist in raising the cable, these buoys may be inflated by means of an air compressor on one or both of the boats or in the stations, which will communicate with said buoys by means of a flexible tube, but, as this part of my invention is also applicable to the system when operated from fixed or land stations I will not describe it more fully here, the principle being the same in both cases.

My improved system as operated from fixed or land stations, is shown in Fig. 8, and it differs from the system as operated from boats or floating stations in the following respects: As these stations are fixed the cable will have little or no lateral movement, and the vertical and longitudinal movement will be imparted to it by means of the winding mechanism, or the winding mechanism and the buoys. The latter it is believed will be of great assistance, especially where the cable is of considerable length. The fixed stations are also capable of being communicated with by telegraph, not only from different points along the coast or shore, and, the wires connecting them for this purpose may be carried round at any desired distance so as not to be disturbed when the torpedoes are exploded. In the drawings the wires or electric conductors are shown as being contained in a single cable until they are brought to the point of divergence, where each is carried to the light or the firing mechanism which it is intended to operate, and then returned to the cable.

The lights may all be operated from a single wire or a separate wire may be provided for each light, and the torpedoes may all be discharged by one wire, or a separate wire may be provided for each.

In describing my system as operated from fixed stations, I have used the same letters to indicate corresponding parts as are used in describing the same when operated from movable stations or boats; A A' indicating the two stations on the opposite shores; B the cable connecting the stations; G the electric cable connecting with the cable B by means of the cringles *d* or in any suitable manner; C C are reels or drums for taking up and paying out the cable, to move it longitudinally in either direction; and D the dynamometer for indicating the submergence of the cable and the tension to which it is subjected; E E indicating the torpedoes attached to the torpedo section of the cable B. The middle portion of the cable B carrying the torpedoes which I have herein termed the "torpedo section," of the cable can be a separable length or section of cable connected at the end portions or sections that with the torpedo section make the whole length of the cable, by means of any suitable couplings, as in Fig. 9, so that the torpedo section can be detached for adjusting and setting the torpedoes and their firing devices in working relation, and for conveniently separating the boats from each other. F F are buoys provided with electric lights and which are connected by short cables with the main cable B, and electrically connected with the cable G. The short or connecting cables may be of the same or of varying lengths, so that all the lights may be afloat at the same time, or one or more may be above the surface of the water and the rest be submerged, or vice versa, and they may be used as search lights, signals, or indicators, to determine the submergence of the cable and to indicate the position of the torpedoes. They may be all of one color or the colors may vary as may be found desirable and convenient in the several uses to which they are put. H H indicate the inflatable and collapsing buoys which assist in raising the cable when the compressed air is turned on from the compressor L^x, the compressor communicating with the buoys by means of the flexible tube L. *k* indicates the electric conductor leading from the cable G to the lights F. This conductor may pass through the connecting cable F², if found desirable; the conductor *i* is the telegraphic circuit by which communication is maintained between the stations, but, this wire may be disconnected from the cable G and be carried far enough out of the line of the cable B and the torpedoes, as not to be affected by the explosion of the latter. *h* indicates the conductor leading from the cable G to the torpedoes for discharging the same. When the buoys H are not inflated the pressure of the water will expel the air and collapse them.

When the system is operated from boats of suitable dimensions, they with the machinery and apparatus can be transported upon the decks of vessels of war or other suitable vessels to any place where it is desired to employ them, or they may be towed by such vessels.

I have not entered into a detailed description of the several mechanisms used in carrying out my invention as it consists in the system of conducting, positioning, and operating torpedoes, by means of a cable, and the other improvements hereinbefore described.

Any person, or persons skilled in the art or arts to which my improvements appertain can construct and operate the same.

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

1. A system of torpedo defense comprising boats connected by a cable carrying a torpedo and provided with means for exploding the same, substantially as specified.
2. A system of torpedo defense comprising boats connected by a cable carrying torpedoes and provided with means for paying out and drawing in said cable and with a dynamometer, substantially as specified.
3. A system of torpedo defense comprising boats connected by a cable carrying torpedoes and provided with means for putting the cable under tension, a dynamometer and means for connecting a cable therewith, substantially as specified.
4. A system of torpedo defense consisting of a cable conducted by boats, a series of torpedoes attached to said cable, means for raising and lowering said cable, and means for exploding the torpedoes substantially as described.
5. In a system of torpedo defense, navigable stations connected by a torpedo carrying cable, and an electric conducting cable, with means for electrically exploding the torpedoes substantially as described.
6. In a system of torpedo defense, navigable stations, a connecting torpedo carrying cable, and electric conducting cable, and means for paying out and taking up said cables, substantially as described.
7. In a system of torpedo defense, navigable stations, a connecting torpedo carrying cable, and means for indicating at a station the submergence of said cable substantially as described.
8. In a system of torpedo defense, a connecting torpedo carrying cable, navigable stations, a connecting cable between the stations and means for attaching the torpedo carrying cable to the station connecting cable substantially as described.
9. In a system of torpedo defense the combination of boats, a torpedo carrying cable, reels or drums mounted on said boats, a torpedo section in the length of said cable, electric firing devices, and an electric conductor for maintaining telegraphic communication

between said stations substantially as described.

10. In a system of positioning and exploding torpedoes, the combination of boats or navigable stations, connected by a torpedo
5 carrying cable, electric firing devices, electric conductors, means for operating said cable and said electric conductors, by which the torpedoes are positioned and exploded and

communication maintained between the stations substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

JOSEPH CLARK.

Witnesses:

M. E. BAYLISS,

RUDOLPH B. SCHWICKARDI.