

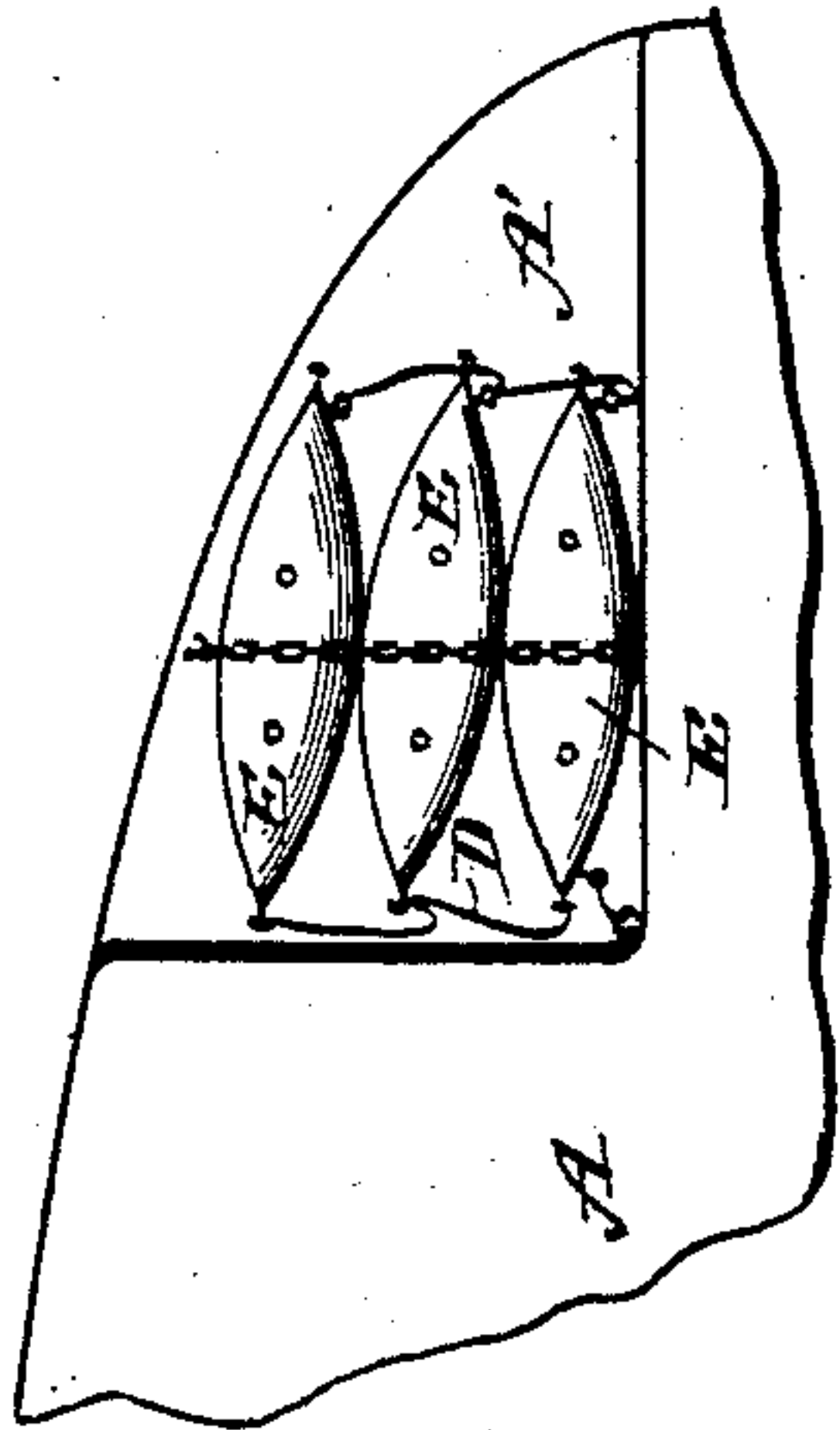
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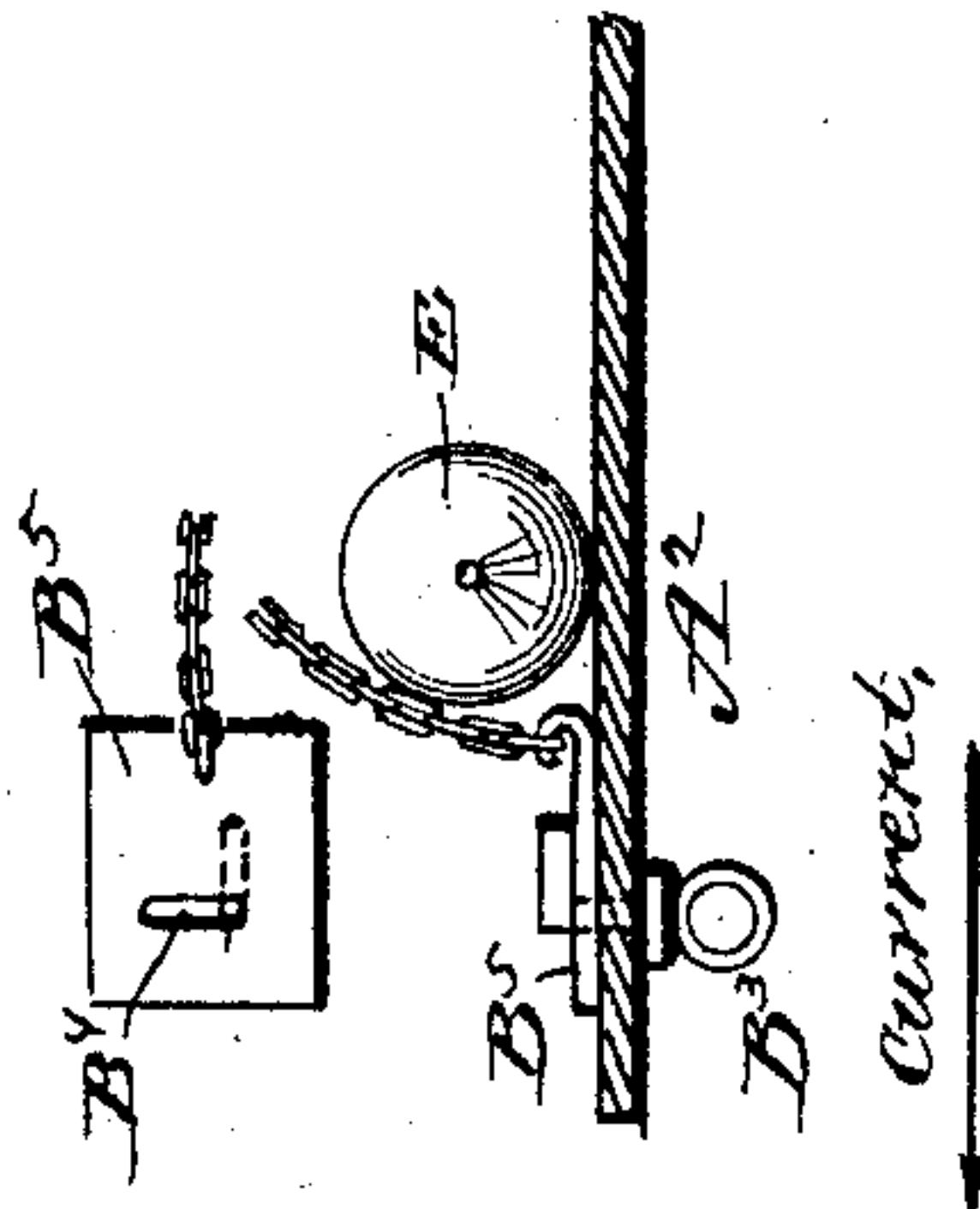
C. D. SHEPARD.
SUBMARINE TORPEDO VESSEL.

No. 379,991.

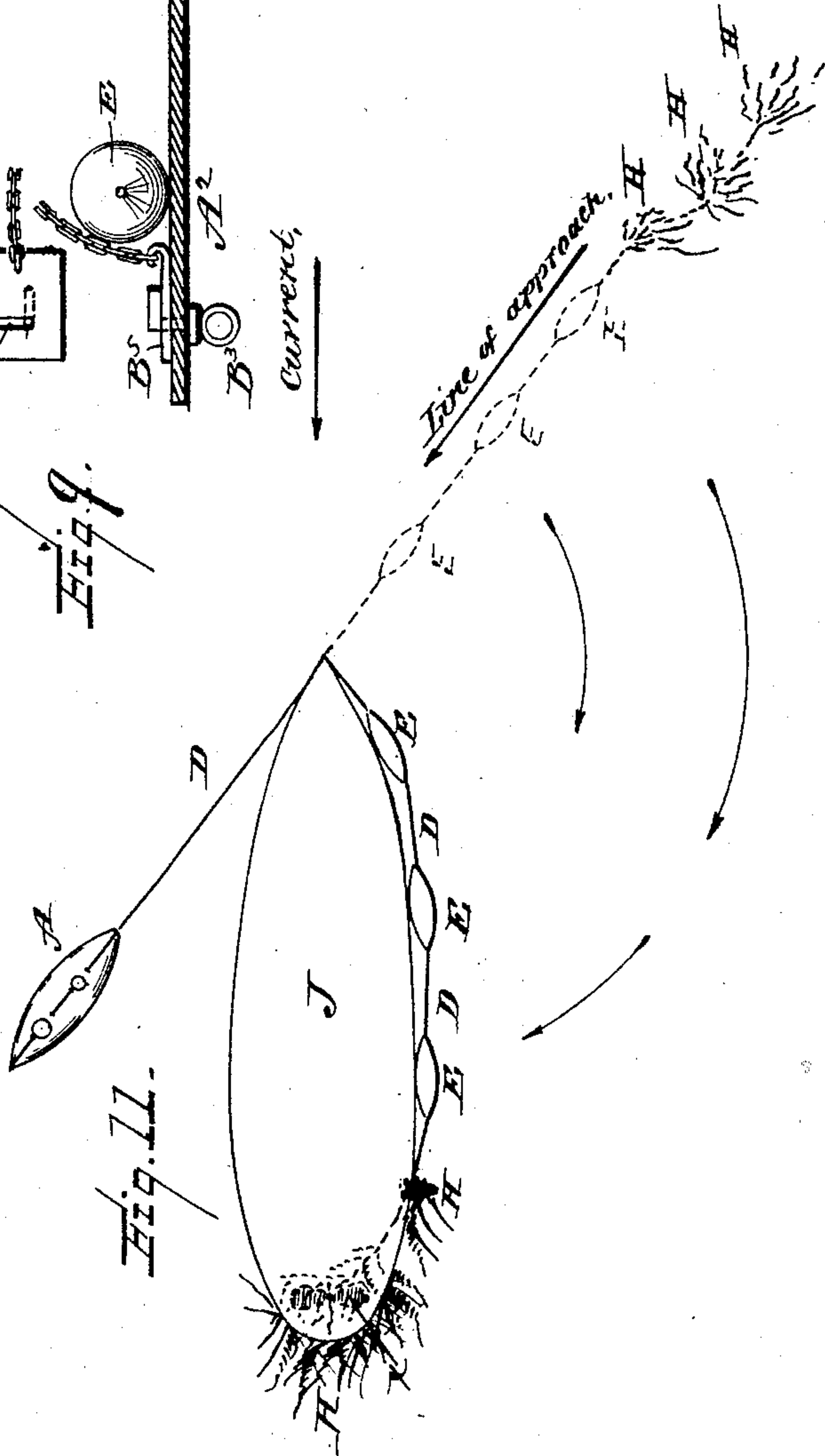
Patented Mar. 27, 1888.



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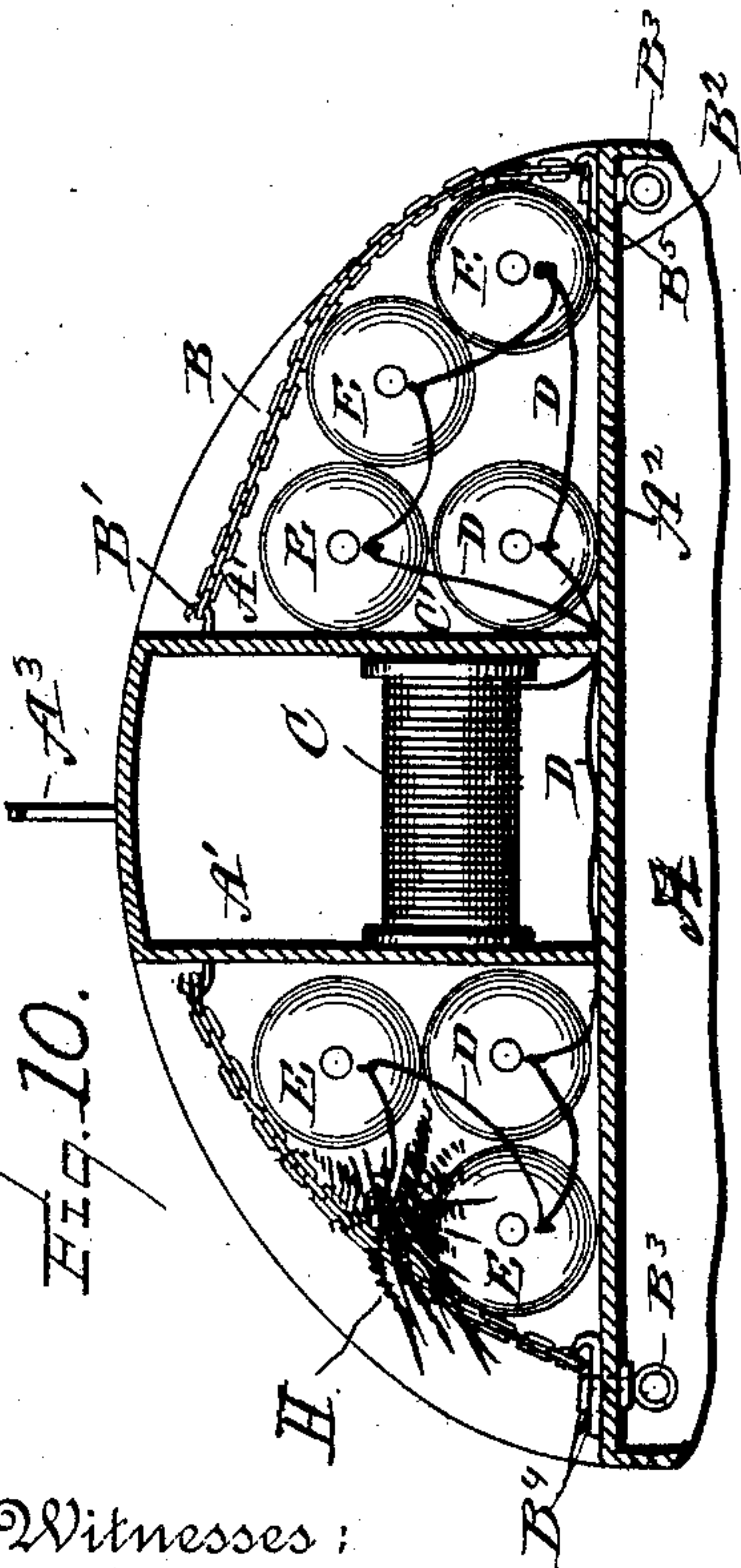


Fig. 10.

Witnesses :

S. C. Hills,
W. D. Swall

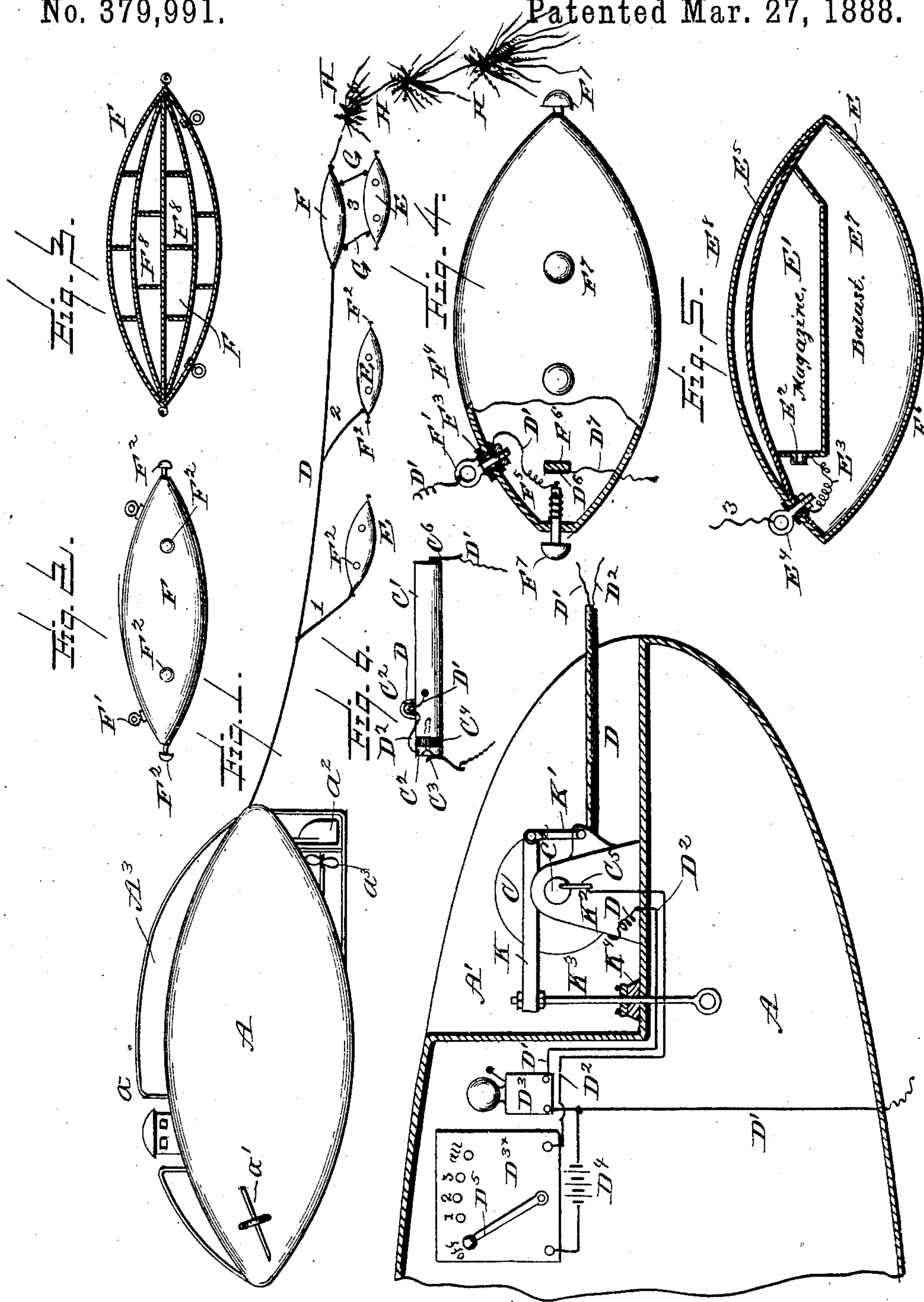
Inventor :

Charles D. Shepard,
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2 Sheets—Sheet 2.

No. 379,991.

Patented Mar. 27, 1888.



Witnesses.

S. B. Hills,
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Inventor,

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UNITED STATES PATENT OFFICE.

CHARLES D. SHEPARD, OF NEW YORK, N. Y.

SUBMARINE TORPEDO-VESSEL.

SPECIFICATION forming part of Letters Patent No. 379,991, dated March 27, 1888.

Application filed January 7, 1887. Serial No. 223,673. (No model.)

To all whom it may concern:

Be it known that I, CHARLES D. SHEPARD, a citizen of the United States, residing at New York, in the county of New York, State of New York, have invented certain new and useful Improvements in Submarine Vessels and Torpedo Systems for the Same, of which the following is a specification, reference being had therein to the accompanying drawings.

10 This invention has relation to submarine vessels and to a system of torpedoes adapted to be operated thereby.

Among the objects of the invention are to provide a system of torpedoes in connection 15 with a submarine vessel, or with a vessel adapted to ride upon the water, whereby the series of torpedoes may be disposed in contact with or about the hull of the vessel of the enemy, either at the surface or below the water-line, as desired, and to provide means where- 20 by any one or all of the torpedoes of the system may be exploded at will, and to embody in the system of torpedoes and the method of controlling the same a feature of self-protection to the 25 attacking party.

My invention has relation to that class of submarine vessels which are designed for and constructed with accommodations for a crew, which remains aboard the vessel while it is 30 submerged, as well as while it is navigated upon the surface of the water, and hence offensive appliances must be not only outside of the vessel, but the devices for controlling the same must be accessible to and governed from 35 the inside of the vessel.

Furthermore, as will hereinafter appear, my offensive devices, by which I mean my torpedoes, are so connected to the vessel and with its interior that the crew aboard the same 40 may manipulate the same at will, and as the sudden changes of circumstances in a conflict may dictate, either while on the surface or beneath the surface.

In torpedo systems as heretofore constructed 45 there are provided various arrangements of electrical devices operated from shore for controlling the torpedoes as to propulsion, direction of movement, and explosion; but certainty of results is more fully assured by accompany- 50 ing the offensive devices with a crew. My invention therefore provides improved means for the immediate control and disposition of

offensive devices by a crew present in the controlling member of the torpedo system.

Heretofore a system of torpedoes connected 55 to each other has been devised in which the forward torpedo of the system is propelled by mechanism controlled by electrical devices under the supervision of a person on shore; but this system necessitates the exposure of a 60 portion of the system to determine its locality, and such exposure gives the enemy the same information. This serious defect is remedied by my invention, as all operations may, when circumstances require, be wholly carried on 65 beneath the surface of the water. In fact, my system of torpedoes may be wound around and under an enemy's vessel without the appearance of any portion of the system on either the surface of the water or on land. 70

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

Referring to the drawings, Figure 1 is a side 75 elevation of a submarine vessel provided with a system of torpedoes and accessories in accordance with my invention. Fig. 2 is a side elevation, and Fig. 3 a vertical section, of a float which may be employed in connection 80 with my torpedoes. Fig. 4 is a side elevation, partly in section and detail, showing the electrical connections of my torpedo. Fig. 5 is a longitudinal vertical section of the torpedo. Fig. 6 is a detail showing the electrical con- 85 nections of the reel-shaft. Fig. 7 is a sectional view showing the apparatus arranged upon and within the boat. Fig. 8 is a side elevation of a portion of the boat and a torpedo-chamber. Fig. 9 is a sectional and plan de- 90 tail of the torpedo retaining and releasing devices. Fig. 10 is an end elevation, partly in section, showing two torpedo-chambers and an intermediate reel-chamber; and Fig. 11, a diagram illustrating one method of controlling 95 the disposition of the torpedoes and their accessories.

Like letters of reference indicate like parts in all the figures of the drawings.

A represents a submarine vessel, or, as 100 above indicated, it may represent a vessel adapted for propulsion upon the surface of the water and below the surface.

The hull A, Figs. 1, 7, 8, 10, and 11, is pro-

vided with a lookout, a , diving blades or rudders a' , steering-rudder a^2 , and a propeller, a^3 , and in size and arrangement of interior is designed for and adapted to the presence of a crew, which remains within the vessel to operate its propelling and guiding mechanisms and to manipulate the torpedo system connected therewith, as hereinafter described. At any desired part of the hull—as, for example, the stern, as illustrated in Figs. 7 and 9—I form a torpedo-transporting chamber, A' , by removing a portion of the shell and providing bottom, end, and side walls, so as to retain the feature of a water-excluding hull for the purpose of submarine propulsion. If desired, the chamber A' may be arranged at any portion of the hull, be it bow, stern, or midships, above or below the water-line.

For retaining the torpedoes within the chamber or chambers, as when being transported while traveling upon the surface of the water or beneath the same, and until it is desired to place the torpedoes for operation, I have in this instance shown a retaining-chain, B , which is secured to a wall or chamber, as at B' , and removably secured at an opposite wall of the chamber, in this instance the floor, as at B^2 , by means which will permit of the release of the chain from the inside of the vessel. In this instance the floor A^2 , which is practically the deck of the vessel, is perforated for the passage therethrough of a securing-key, B^3 , which passes through a slot, B^4 , of a lock-plate, B^5 , secured to the end of the chain B , whereby, after the plate is placed over the key, the same is turned at an angle to the slot B^4 thereof, so as to retain the plate and one end of the chain. When it is desired to release the torpedoes from the chamber, a simple turn of the key permits the plate to become detached and the torpedoes to float out of the chamber. At this time the electrical conductor is cut off from the battery to prevent accidental discharge of the torpedoes. When it is desired to explode the torpedoes, and after the cable is straightened and the torpedoes separated from each other, the conductor is connected with the battery. A reel, C , is also arranged in the chamber, or it may be in an adjacent chamber formed in the hull. In this instance the adjacent chamber is arranged between the two torpedo-chambers, and the reel is in a measure protected by the fin A^3 of the vessel. A cable, D , extends from the reel successively to each of the torpedoes of the system and from the torpedoes in one chamber to those in another, so that when released the entire system will naturally arrange themselves in rear of the vessel, and may be dragged or drawn by the cable D .

The cable D is provided in this instance with electrical conductors D' D^2 , the first of which has connection with an electrical alarm, D^3 , arranged within the vessel, and from thence the conductor extends to the water, as shown in Fig. 7, in order to complete the circuit thereof. The other conductor of the cable D

is connected with a switch-board, D^3 , and from thence it extends to a battery, D^4 , then to the ground-line D' of the circuit, or it may run from the battery to the water independently.

The switch-board is provided with the switch-lever D^5 , which is adapted to be placed in electrical connection with one of five anodes or terminals, (designated in Fig. 7 by the words and figures as follows: "Off," "1," "2," "3," "All.") Branches or conductors D^2 extend to each of the torpedoes of the system, as indicated by the numbers 1, 2, and 3 in Fig. 1, for a purpose hereinafter described.

E represents the torpedoes, which, by reference to Fig. 4, it will be seen, consist of a vessel provided with a magazine, E' , in which dynamite or any other desired explosive is stored or arranged. One wall of the magazine is provided with a fulminate or other explosive cap, E^2 , from which an electrical conductor, E^3 , extends to the draft or eye bolt E^4 of the torpedo. An inner shell, E^5 , of the torpedo covers the magazine and a chamber between it and the bottom E^6 of the torpedo, which chamber E^7 is for the purpose of receiving any suitable material to serve as a ballast for sinking the torpedo to a proper distance. In determining the individual ballast of the several torpedoes of the system it is desirable that the ballast of each be such as to sink it below the surface of the water-line to a predetermined depth, below or about to the keel of the boat to be attacked. As a matter of precaution, each of the torpedoes is provided with a double or additional roof, E^8 . The space between the two roofs may be filled with sand or other packing, so that should the outer one become injured by accident or a shot from the enemy the internal construction and contents are in a measure protected.

At the right of Fig. 3 I illustrate a float, F , to which is connected the last torpedo of the system. A side elevation of the float is shown in Fig. 2, and it is provided with a draft or eye bolt, F' , and with electrical push-knobs F^2 at different points of its surface, so that when the float strikes an object an open circuit may be closed and the alarm D^3 within the vessel sounded to indicate that fact. The eyebolt F' of the float, like the eyebolt E^4 of each of the torpedoes, is insulated, as at F^3 F^4 , from the shell of the float, through which it passes, and to which it is secured by a nut, F^5 .

A portion of the circuit D' is within the float and connected to the eyebolt, as shown in Fig. 4, and to the push-button F^7 , a cross-bar, F^6 , arranged within the float serving to support the terminal of a ground-section, D' , of the circuit, which is the conductor, extending to the water and serving the purpose of a ground-line. A push-button, F^7 , is spring-seated in the nose of the float, as are also all of the push-buttons thereof, and these are electrically connected with the conductor D' , so that whenever the push-button is forced inwardly by contact of the float with any object it (the push-button) is brought into contact

with the terminal D^6 of the ground-line D^7 of the float, thus completing the circuit D' with the alarm D^3 within the vessel. Similar push-buttons may be provided on all the torpedoes of the system to indicate when they strike the hull of a vessel or other object.

To the float F is connected the last torpedo E of the system by means of chains G , which are of a desired length to maintain the last torpedo at a desired depth below the surface of the water. This torpedo of the system is ballasted, preferably, to a greater extent than others of the system, in order to serve as a force to pull against in drawing the entire system through the water, and in order to permit of the utilization of the natural slack of the cable by slowing the progress of the submarine vessel drawing the same, so that a greater control is secured in the disposal of the torpedoes. For example, when proceeding at a normal rate of speed, the resistance of the last torpedo of the system serves to maintain a normal sag or sway of the cable. Now by slowing the speed of the submarine vessel it is apparent that the cable will sag more than normally, and thus the intermediate torpedoes may be allowed to sink deeper, so that, as hereinafter more fully described, said intermediate torpedoes may be disposed beneath the boat or near the keel, while the following float and one or more of the intermediate torpedoes may be beyond and at an opposite side of an enemy's boat.

At H , Fig. 1, I have illustrated a succession of fluffs connected with the cable which serves to draw the torpedoes. The fluffs are each a mass of cables, rope, or other material which will float and be carried under the stern of a vessel by the natural suction of the current of the water at that point toward and into the propeller thereof. It not only serves its well-known purpose of disabling the enemy's boat in this manner, but in disposing of the torpedoes it acts as a positive connection of the system with the vessel, and thus facilitates a further disposition of the same, as hereinafter described.

The cable D may be secured to the submarine vessel in any suitable manner; but in this instance I have shown a reel, C , by which the cable may be paid out as desired, so that the submarine vessel may be at a safe distance from the enemy's boat when the torpedoes are exploded. The reel C is mounted upon suitable standards, or, if desired, as shown in Fig. 9, in the walls A' of the torpedo-chambers. The shaft C' of the reel is of metal, (see Fig. 6,) which serves as an electrical conductor. In this instance a staple, C^2 , serves to secure the end of the cable D . One of the conductors, D' , is secured to the shaft C' , and the other of the conductors, D^2 , is secured to a metal disk, C^2 , secured by a screw or bolt, C^3 , to the end of the shaft, any suitable insulating material, C^4 , being inserted between the disk and shaft, so that the conductor D^2 is insulated from the shaft.

Referring, now, to Fig. 7, a spring, C^5 , is

mounted on the standard and bears upon the disk C^2 , and to the spring C^5 is fixed the conductor D^2 , which has connection with the switch-plate D^{3*} within the vessel. The conductor D' has electrical connection with the opposite end of the shaft of the reel by means of a similar spring, C^6 . (See Fig. 6.) Now it will be seen that the reel may be rotated in either direction without breaking the electrical connections with the alarm D^3 or with the switch D^{3*} .

The float F is made up of several shells, as illustrated in Fig. 3, suitably braced, as shown at F^8 , so that in case of accident or injury from any cause, as from a shot from the enemy's vessel, its buoyancy is still insured.

By referring to Fig. 11 the different methods of employing the submarine vessel with this system of torpedoes may be readily understood. Let J represent the enemy's vessel, either at anchor or in motion. If at anchor, it will naturally assume the position shown with reference to the direction of the current. If in motion, like effects will be produced as hereinafter described. Let A represent the submarine vessel going in the direction marked "Line of Approach," which is, as will be seen, across the bow of the vessel J and at an angle thereto. Supposing the cable D to be several hundred feet in length, the torpedoes E and float F , as well as the fluffs H , will naturally remain in line with the cable when not otherwise affected. When the cable D comes into contact with the bow of the vessel J , the current being present, as shown by the arrow, or the boat being in motion, with or without slowing the progress of the vessel A , the tendency of the torpedoes and fluffs is to swing toward the vessel J , as indicated by the curved arrows, and the latter—that is to say, the fluffs—when present in the system, will naturally be drawn into contact with the propeller, as shown by dotted lines X , and to be entangled therewith, so that the torpedoes are eventually disposed alongside of the enemy's vessel, while the submarine vessel itself has reached a position of protection, in that the enemy's vessel is between it and the torpedoes. As soon as a torpedo or the float of the system comes into contact with the hull of the vessel J , the push button or buttons thereof immediately announce this fact through the conductor D' by ringing the bell of the alarm D^3 within the submarine vessel, and at this time the switch-lever D^5 may be moved to explode, by means of the conductors D^2 , either one or all of the torpedoes, and this while the submarine vessel is at a safe distance from the enemy. Now, if it be desired to arrange the torpedoes of the system beneath the vessel of the enemy, this, it will be seen, can readily be done without the necessity of the submarine vessel passing beneath the enemy's keel, in that when or before the cable D strikes the bow of the enemy's vessel the speed of the submarine vessel may be slackened, so that intermediate torpedoes, being properly ballasted, will

sink deeper within the water until at or near the keel of the enemy's vessel, when the speed may be resumed and the torpedoes drawn upwardly against the bottom of the vessel, and when the alarm is given they may be exploded.

It is perfectly apparent that I may provide my cable with any desired number of torpedoes, one or more, and that when connected to the cable by branch cables, as shown in Fig. 1, the torpedoes employed may be independently ballasted for certain depths, and may or may not be provided with a float. Furthermore, I may provide the cable with fluffs under certain circumstances, or with torpedoes only.

Referring to Fig. 7, K represents a brake-lever, connected by a link, K', with the standard K² of the reel. A rod, K³, passes from the free end of the lever through stuffing-boxes K⁴ down into the interior of the vessel, where it is accessible for the purpose of controlling the paying out of the cable and the system of torpedoes connected therewith.

It is apparent that instead of using torpedoes which will be exploded only by the operation of the switch, I may employ torpedoes in this system and connected with my cable which are constructed in any well-known and usual manner and adapted to explode simply and solely by contact with an extraneous object.

I am aware that fluffs have been employed to disable vessels by setting them afloat where they may come into contact with the vessel's propeller, and I do not claim such devices, broadly, as of my invention.

Having described my invention and its mode of operation, what I claim is—

1. A vessel constructed for navigation at will upon and under the surface of the water by a crew within the same, and provided with an exterior cable and a series of torpedoes connected successively therewith, and cable and torpedo controlling devices accessible in the interior of the vessel, each torpedo having independent firing mechanism controlled from within the vessel, substantially as specified.

2. A vessel constructed for navigation at will upon and under the surface of the water by a crew within the same, and provided with an exterior cable and a series of torpedoes and cable and torpedo controlling devices accessible in the interior of the vessel, one of the torpedoes being connected to and suspended below a float to which the cable is attached, the remaining torpedoes being suspended from the said cable, substantially as specified.

3. A vessel constructed for navigation at will upon and under the surface of the water by a crew within the same, and provided with an exterior cable, a series of torpedoes, and a series of fluffs connected to the cable, and cable and torpedo controlling and firing

devices accessible in the interior of the vessel, substantially as specified.

4. A vessel of the class described provided with an electrical alarm and with a reel and a cable having electrical conductors therein, and a series of torpedoes having electrical conductors and devices for completing the circuit by contact of the torpedoes with extraneous objects, whereby notice is given to the crew within the vessel of such contact of the torpedo without exploding the same, substantially as specified.

5. A vessel of the class described provided with an electrical alarm and an electrical switch, a reel, and a cable, all having electrical conductors, in combination with a series of torpedoes having magazines, and electrical magazine-exploding devices, whereby an alarm is given to the crew within the vessel of the contact of the torpedo, and whereby said torpedo may be exploded at will by moving the switch, substantially as specified.

6. A vessel of the class described provided with an electrical switch, an electrical alarm, and electrical cable-connections with both, all arranged within the vessel and accessible to the crew thereof, in combination with an exterior portion of said cable having branches to separate torpedoes, each provided with separate electrical exploding devices and separate alarm devices, whereby any one or all of the torpedoes having contact with an object may be exploded, substantially as specified.

7. In a vessel of the class described, a reel for the electrical cable of a torpedo system, having at one end of its shaft a metallic disk and an interposed insulating-plate, in combination with springs arranged one at each end of the shaft to bear thereon and upon the disk, and connected with the electrical circuit to complete the same, substantially as specified.

8. In a vessel of the class described, an open exterior chamber for the reception of torpedoes, and a stay-chain for holding them therein removably secured at one end by a device extending through the wall of the vessel and accessible to the crew within the vessel, substantially as specified.

9. In a vessel of the class described, a reel mounted on the outside, a cable extending from the reel, a series of torpedoes arranged upon the outside of the vessel, and a detachable stay-chain passing over the torpedoes and secured by a device extending within the vessel and accessible to the crew therein, substantially as specified.

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

CHARLES D. SHEPARD.

Witnesses:

L. C. HILLS,

W. S. DUVALL.