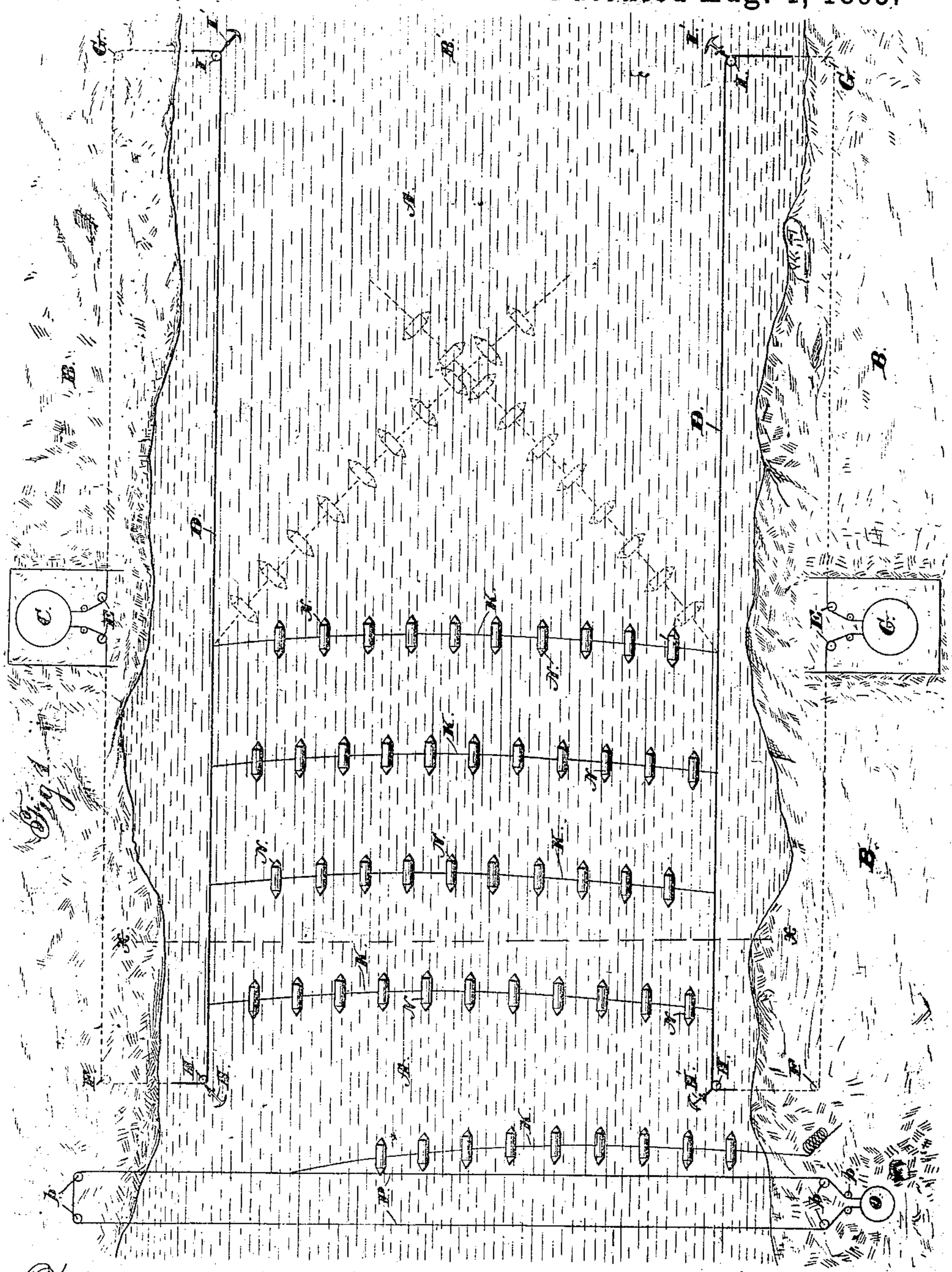
(No Model.)

2 Sheets—Sheet 1.

J. W. GRAYDON.

SUBMARINE TORPEDO.

No. 502,294. Patented Aug. 1, 1893.



Witnesses:
Jas. E. Hutchinson
Henry C. Hazard.

Inventor.
James W. Graydon, by
Crindle and Russell, his Attys

(No Model.) 2 Sheets—Sheet 2.

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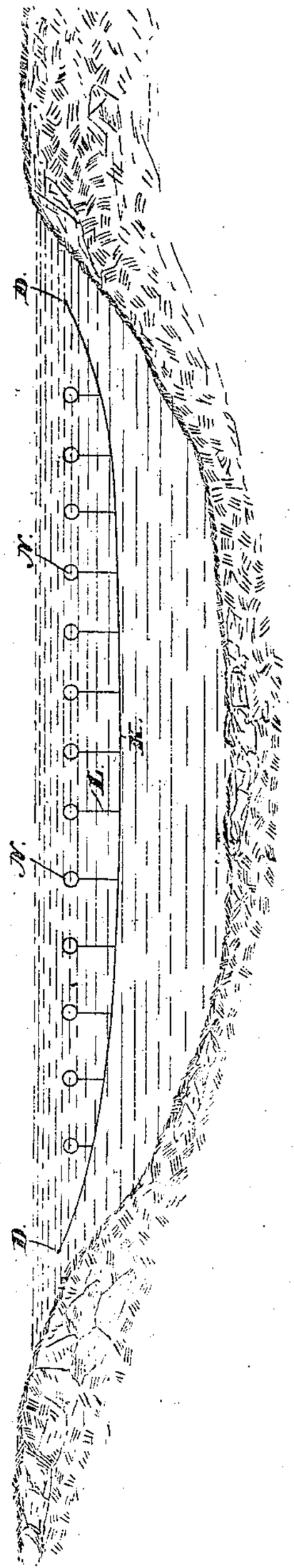
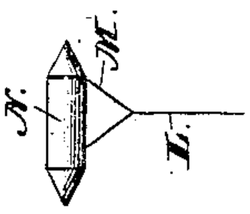
Fig. 2.





Witnesses:
Jas. E. Hutchinson.
Henry C. Hazard.

Inventor:
James W. Graydon, by
Lindley and Russell, his attys.

UNITED STATES PATENT OFFICE.

JAMES W. GRAYDON, OF WASHINGTON, DISTRICT OF COLUMBIA, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE GRAYDON DYNAMITE PROJECTILE CARTRIDGE AND HIGH EXPLOSIVE COMPANY, OF SAME PLACE.

SUBMARINE TORPEDO.

SPECIFICATION forming part of Letters Patent No. 502,294, dated August 1, 1893.

Application filed May 7, 1887. Renewed December 19, 1891. Serial No. 415,570. (No model.)

To all whom it may concern:

Be it known that I, JAMES W. GRAYDON, of Washington, in the District of Columbia, have invented certain new and useful Improvements in Submarine Torpedoes; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, in which—

Figure 1 shows a plan view of a river as provided with my torpedo system, and Fig. 2 a transverse sectional view on line *x x* of Fig. 1.

Letters of like name and kind refer to like parts in each of the figures.

The object of my invention is to provide an improved torpedo system for the defense of rivers and narrow harbors, and to this end it consists in the system and parts thereof as hereinafter described and more specifically pointed out in the claims.

In the drawings A is a river or harbor having the banks B B.

B′ in the drawings designates the lower portion of the river or harbor toward its mouth.

The torpedo system is shown in the drawings as adapted to keep vessels from coming from the direction of the point B′. On each bank is an engine C which can be of any form desired and which is to be provided with any preferred form of drum or winding mechanism adapted to cause the cable D to move in either direction.

From the winding drum the cable which is preferably of wire well protected with a water proof coating, passes outward in either direction over the pulleys E E. From these pulleys the cable extends up and down the bank below the surface thereof, over pulleys F and G up and down the river respectively, and then out under the water around pulleys H, I, held in place by anchors or moorings H′, I′. The cable then extends directly down the river from pulley H to I. With this construction and arrangement, by causing the winding drum to turn in one direction or the other, the cable between pulleys H and I may be made to move up or down the river.

The engines C C are preferably to be below the surface of the ground out of the way of the enemy's shots, or protected by forts.

To the cables D D are attached the ends of cross or sweeping cables K K of which there can be any desired number. To each of these cross cables are attached or connected by means of the lines L L, and slings M M, the torpedoes N N. Each sling M is attached to a torpedo near one end thereof so that the torpedo will always float end on to the current and so will offer the least resistence thereto.

To get the cables K K across the river or harbor from one side to the other, so that they can be attached to cables D D, I provide at O an engine with a winding drum similar to those already described, which serves to cause the endless cable P which stretches across the river or harbor to travel in the desired direction over the pulleys *p*, *p*, *p*, *p*. With this construction an end of one of the cables K K with its torpedoes is attached to the cable P and, as indicated in Fig. 1, is carried across the river where it can be attached to the cable D on that side. Its other end is then attached to the cable D on the side from which cable K was carried out. Thus a ready means is afforded for getting the sweep lines or cables across the river, so that any number of them can be attached to cables D D and carried down the river or harbor by the movement of the latter. The engine O can like the other engines be protected, but such protection is hardly necessary.

The engines C C instead of being placed opposite the middle point of the system, can obviously be placed higher up at any convenient or safe point.

With my system as arranged and constructed, a series consisting of any number of torpedoes carrying sweep cables can be moved down the river to sweep the whole distance from pulleys H H to pulleys I I. The torpedoes can be attached to the sweep lines so closely together that it would be impossible for any vessel coming up the river to escape. The torpedoes are attached to one line so as to stand in line with the spaces between the torpedoes on the lines before and behind it.

If the enemy should grapple the forward line with its torpedoes and pull it loose at either end from the main cables the line would sweep around, as indicated by dotted lines in

Fig. 1, and some of the torpedoes thereon would strike the boat from which the grappling was done, and blow it up.

If desired the sweeping lines can be easily arranged to be detached at will at one end or the other from one of the cables, so that the line with its torpedoes will, as described above, swing around and sweep across the river or harbor.

The torpedoes are preferably to be of the percussion kind so as to explode upon contact with any object, but they can, if desired, be arranged to be fired by electricity at the right time, as the positions of the sweep lines and the torpedoes attached to them can be determined and known from the shore and by the cables the lines can be moved up or down into the desired position.

Having thus fully set forth the nature of my invention, what I claim is—

1. In a torpedo system for rivers and harbors in combination with the two submerged cables extending along the shore one on each side of the harbor or river, a line fastened to such cables extending across from one to the other and having attached to it a series of torpedoes and means for moving the cables to carry the sweep line along, substantially as and for the purpose described.

2. In a torpedo system for the defense of rivers and harbors, in combination with the two parallel submerged cables one on each side of the harbor or river, a sweep line extending from one cable to the other, a series of torpedoes attached to the line by suitable lead or float lines, and means for moving the cables to carry the sweep line up or down the river or harbor as desired, substantially as and for the purpose described.

3. In a torpedo system for river and harbor defense, the two submerged cables each extending up and down the river or harbor on each side of the channel, the series of sweep lines extending from cable to cable and each having attached to it by suitable lead or float lines a series of torpedoes, and means for causing the cables to travel up or down the river or harbor as desired, substantially as and for the purpose described.

4. In a torpedo system for river and harbor defense a submerged cable extending along each side of the river or harbor passing over suitable submerged pulleys or blocks, and from these to suitably protected means for causing it to move up or down the harbor or river as desired, and one or more sweep lines attached at each end to one of the cables and carrying series of torpedoes, all combined substantially as and for the purpose described.

5. In a torpedo system for the protection of rivers and harbors, in combination with the submerged cables extending along the sides of the river or harbor provided with means for moving them as desired, and adapted to carry sweep lines with torpedoes attached up or down the river or harbor as desired, the means for getting the torpedo sweep lines across the harbor or river so that they can be attached to both cables, which consists in the endless cable passing across the river or harbor and adapted to carry across the end of the sweep line attached to it, and means for moving the cable, substantially as and for the purpose described.

In testimony that I claim the foregoing I have hereunto set my hand this 3d day of May, 1887.

JAMES W. GRAYDON.

Witnesses:
GEO. S. PRINDLE,
PHILIP G. RUSSELL.