No. 676,820. Patented June 18, 1901.

S. LAKE.

APPARATUS FOR LOCATING SUNKEN VESSELS.

(Application filed Apr. 25, 1900. Renewed Jan. 9, 1901.)

(No Model.) 2 Sheets—Sheet 1.

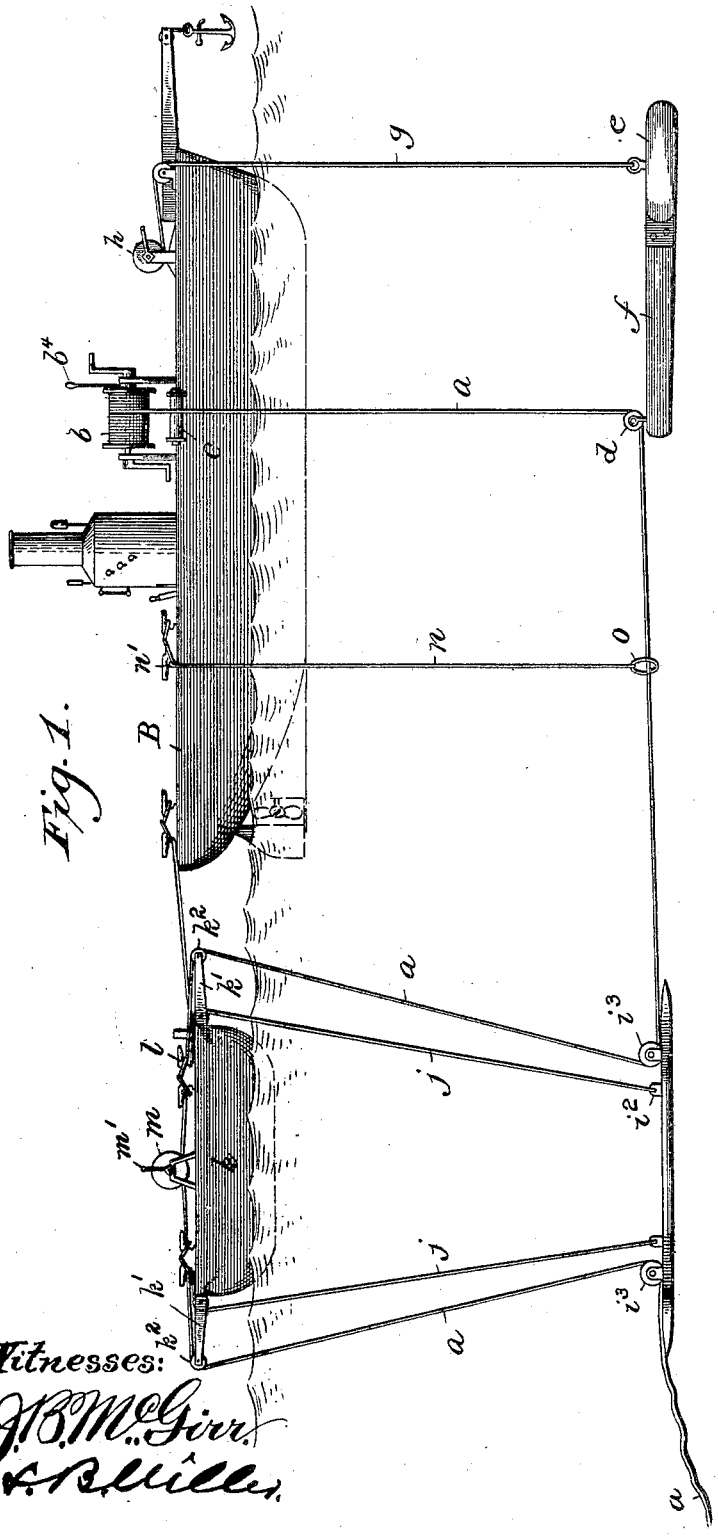

Fig. 1.

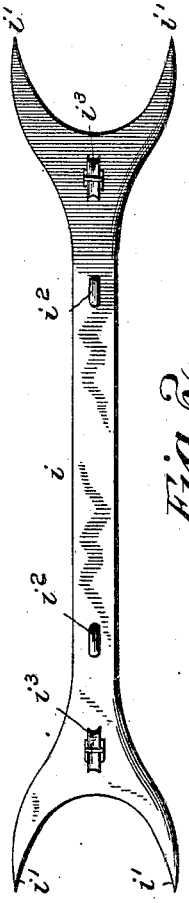

Fig. 2.

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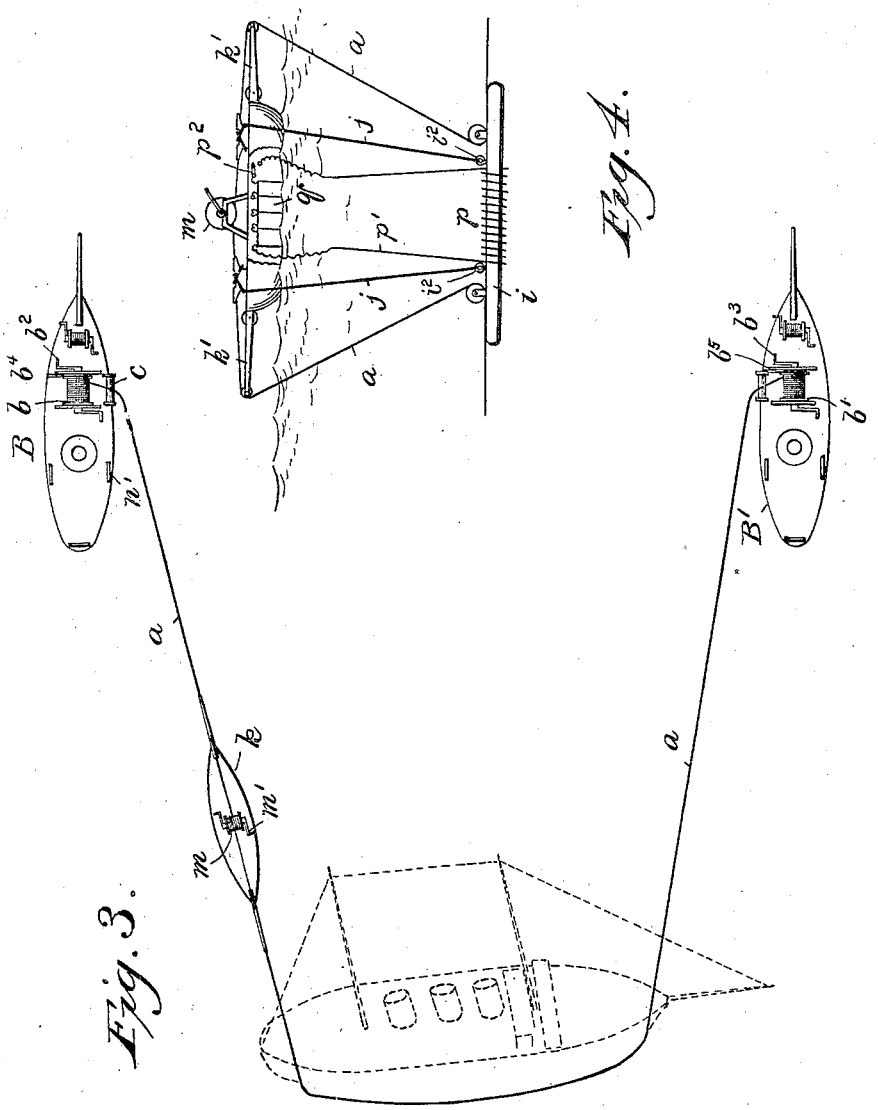

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UNITED STATES PATENT OFFICE.

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APPARATUS FOR LOCATING SUNKEN VESSELS.

SPECIFICATION forming part of Letters Patent No. 676,820, dated June 18, 1901.

Application filed April 25, 1900. Renewed January 9, 1901. Serial No. 42,658. (No model.)

To all whom it may concern:

Be it known that I, SIMON LAKE, a citizen of the United States, and a resident of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Devices for Locating Sunken Vessels and other Submerged Objects, of which the following is a specification.

This invention relates to a device for locating sunken vessels or other submerged objects which are hidden beneath the surface of the water. Heretofore searches for such purpose have been conducted by means of two separated boats moving in parallel courses and connected by a sweep-line having a weight or sinker attached thereto near each boat to maintain said line in contact with the water-bed. With such apparatus the weights have necessarily been made light, so that their contact with and consequent drag upon the water-bed would not constitute them anchors and impose excessive resistance to the movement of the boats, for which reason the advance of the latter has required to be exceedingly slow in order that the resistance of the intermediate length or operative portion of sweep-line should not be sufficient to lift the weights from the water-bed, thus rendering the apparatus partially or wholly ineffective by causing it to pass over objects which it was designed to engage in its progress over the water-bed. Even at ordinarily suitable speeds of advance the temporary arrest of the sweep-line at a considerable distance from either of the weights would operate to straighten the line between such point and the boats by lifting the weights, and thus render it liable to pass over the submerged object sought. Furthermore, the dragging of the line upon the water-bed causes it to catch every small natural obstruction in its path—such, for instance, as small stones—thereby operating to unnecessarily impede the movement of the boats, and hence the progress of the search.

The present invention has for its object to increase both the speed and the certainty of action of this class of apparatus; and with this end in view the improvement is designed, partly, to provide means whereby the ends of the effective or operative portion of the sweep-line may be sustained with sufficient rigidity for its maintenance at a fixed level slightly above the water-bed, so that its encounter with the smaller natural objects upon the water-bed may be avoided, partly to provide means for relieving the strain upon the sweep-line when engaged by a submerged wreck or other obstruction while the boat to which said line is attached and which is propelled at substantially normal speed is coming to rest, and partly to provide means for conveniently locating an object engaged by the sweep-line for examination and without disarranging the apparatus for further progress when desired in the same course.

The invention consists, primarily, in a boat from which depends a rope-guide of suitable character held at a fixed distance below the surface of the water and slightly above the water-bed and a separate line extending from said guide to a distant object, which latter may be a guide depending similarly from a second boat arranged and adapted to move in a direction parallel with that of the first boat, or may be a buoy anchored at a distant point around which the primary boat, with its depending guide, traverses a circular course. It is not, however, essential that the rope-guide should be attached to a submerged weight suspended by a cable from the boat nor that the sweep-line should actually pass through the guide with which it is connected, any suitable connection with the latter being sufficient to sustain it and determine its position. The rope-guide is preferably applied in the form of a pulley to a heavy weight having a guiding or steering vane and suspended from the boat by a sufficiently heavy cable, so that not only the weight may follow closely the direction of movement of the boat, but the cable may remain substantially upright, and thus sustain the weight at a uniform distance from the surface and the water-bed when the boat is propelled at substantially its normal rate of speed. By employing a comparatively light or thin sweep-line passing through the guide-eye or pulley carried by the weight, but independent of the drag of the weight, the operative portion of such line may be held taut, even when extended outward from the boat a considerable dis-

tance, with comparatively little resistance and the boat propelled at a fair rate of speed without disturbing the relation of the several parts of the apparatus.

In order that the sweep-line may be protected from breakage by an excessive strain due to its encounter with a sunken object under the motion of the boat, such line is preferably extended upwardly from the guide-eye to a winding-drum or other suitable holding device provided with some kind of releasing means, so that a sufficient reserve length of line may be paid out during the stoppage of the boat to relieve the strain upon the line. In order that the course of the search may be maintained should the object encountered by the sweep-line not be the one sought, the boat is anchored as soon as its motion can be arrested and a device which I term a "wreck-finder," applied to the sweep-line just beyond the guide-eye through which it passes, is run outward from the boat along the sweep-line until the obstruction is reached, when the nature of the object will serve to determine whether or not the search is to be continued, the line being disengaged for the farther advance of the boat. This wreck-finder consists of a traveler whose guide eyes or pulleys embrace the sweep-line, which is suspended by suitable lines or cables from a tender upon the surface, adapted to be rowed or otherwise propelled in the direction in which the sweep-line extends under the guidance of the traveler until the latter, whose ends may be forked and sharpened for the purpose, engages the obstruction, the sweep-line maintaining throughout the entire operation of the apparatus its initial depth below the surface, and having therefore no tendency to slip off the object it engages, even on the approach of the tender, which exerts no upward pull at such time, as would be the case in the former method before referred to.

The invention will be more fully understood by reference to the annexed drawings, in which—

Figure 1 is an elevation showing a boat and its tender provided with the present improvement, and Fig. 2 a plan upon a larger scale of the wreck-finder detached. Fig. 3 is a diagrammatic view illustrating the method of using the apparatus and showing in plan view two boats between which the sweep-line extends, which is indicated as engaging a submerged wreck, the tender being on its way along the sweep-line to locate the wreck. Fig. 4 is a view of the wreck-finder and the tender from which it is suspended, with the body of the finder adapted to be temporarily converted into an electromagnet by suitable means.

The sweep-line a is shown with one end attached to a winding drum or winch b upon the deck of the primary boat B, and the other end similarly connected to the winding-drum b' upon the second boat B', the said drums being provided each with cranks b^2 and b^3, respectively, for turning it by hand. The line a passes from the drum b over a roller c at the side of the boat, downwardly under a guide-pulley d, attached to the weight or sinker e, with rearwardly-extending guiding or steering vane f, suspended by a rope or cable g, attached to a winch h upon the boat B, thence around a similar guide-pulley upon a weight similarly depending from the second boat and upward over a corresponding antifriction-roller at the side to the drum b'. In practice the sinker e is made of two or three hundred pounds weight and its supporting-cable of corresponding size or strength, so that their combined resistance in the water under a moderate speed of the boat which carries them will be counteracted to a considerable extent by the gravity of the sinker, and thus tend to maintain the suspending-cable in an upright position and the sinker at a uniform distance from the surface and the water-bed.

Each of the winding-drums b b', respectively, is shown provided with a release-lever b^4 b^5 for operating a brake device adapted to enable the drum to hold the line only under a normal strain thereon, but permitting it to pay out an extra reserve length while the motion of the boat is being arrested when an obstacle to the further advance of the sweep-line is encountered. The sweep-line is of course required to be kept taut during the entire operation of making the search, for which reason it is at times necessary for the operators to wind in any slack caused by variation in the courses of the boats.

It will be observed that the nature of the release devices employed, as also of the holding devices for the ends of the sweep-line, is not an important part of the present improvement, any device being suitable for the purpose which will hold the sweep-line yieldingly, so as to relieve any undue strain imposed thereon by its encounter of a barrier in its path.

The wreck-finder consists of a traveler, preferably of iron, whose body i is forked at both ends, with sharpened extremities i' and provided with eyes i^2, to which are attached at one end the suspending-cables j, having their opposite ends secured to cleats l upon the tender k. The wreck-finder is shown provided with two rope-guides in the form of pulleys i^3, arranged in alinement with each other, the sweep-line being led around one of said pulleys upwardly to a guide-pulley k^2 upon a bowsprit k', projecting from the boat k, thence around a winding-drum m, with actuating-cranks m' upon the tender k, to a second guide-pulley k^2, journaled in the end of a bowsprit k', and downwardly around the second guide-pulley i^3. By this means the winding of the drum m by the occupants of the tender upon the arrest of the sweep-line

by a submerged barrier serves to draw the said tender along the sweep-line until the prongs i' of the finder engage the obstruction, which may then be examined by a diver and buoyed for further work upon the same by the employment of suitable apparatus.

It will be observed that both the traveler and its supporting-tender are double-pointed, and thus adapted to act equally well when moving in either direction along the sweep-line. By this means the wreck-finder may remain moored to either of the boats B or B', the nearest to which it was last in operation, while traversing a given course and may be propelled along the sweep-line when required from either of such boats to the other.

It will further be seen by reference to Fig. 1 that a second traveler is applied to the sweep-line between the primary finder i and the weight e, which consists merely of a ring o, embracing the line a, to which is attached a leader-line n, normally made fast to a cleat n' upon the boat B, but which may also be used in locating a wreck near such boat in case the wreck-finder is at the other end of the sweep-line, the line n being held by an occupant of a small boat, which is thereby guided along the sweep-line in the direction of the obstruction. The traveler o thus embodies in a simple form the essential feature of the wreck-finder previously described.

In order to determine to some extent the character of an obstruction to the advance of the sweep-line when operating in deep water, where it is inconvenient to send a diver to make an examination without some previous knowledge of the object encountered by the finder, the latter may be made in the form of a magnet, which when in contact with the hull of an iron vessel will offer an increased resistance over that of its normal weight to an upward pull upon its supporting-lines by the occupants of the tender, the difference in the resistance when free and in contact with iron or non-metallic objects determining whether or not the submerged obstruction is the hull of an iron vessel. Fig. 4 shows the finder so constituted, having a coil p of wire encircling the same intermediate the eyes i^2, with conductor-lines p' connecting the ends or terminals thereof though the intermediate switch p^2 with the source of electric current, which is indicated in the figure as a series of storage batteries q, carried by the tender. Any other means of energizing the magnet-coils would, however, be suitable for temporarily converting the finder into an electromagnet.

By the present invention it is made possible to employ a heavy supporting-weight sustained above the water-bed by a suitable cable in conjunction with a light sweep-line, the comparatively small resistance of which through the water and the avoidance of the drag of the apparatus upon the water-bed insures a greater speed, accuracy, and convenience of operation than in the apparatus heretofore in common use.

It is to be understood that the present invention is not limited to the specific constructive features herein shown and described, as the details and the arrangement of the various parts may be widely varied without departure from the spirit of the invention.

Having thus set forth the nature of the invention, what I claim herein, and desire to secure by Letters Patent, is—

1. The combination with a boat and means for propelling the same, of a cable depending from said boat and sustaining above the water-bed a weight of sufficient size to maintain said cable in a substantially upright position while the boat is in motion, and a sweep-line extending from said weight to a distant object.

2. The combination with a boat and means for propelling the same, of a cable depending from said boat and sustaining above the water-bed a rope-guide and also a weight of sufficient size to maintain said cable in a substantially upright position while the boat is in motion, and a sweep-line yieldingly attached to said boat and passing downwardly through said rope-guide and connected to a distant object.

3. The combination with a boat, of a suspending line or cable attached thereto at one end and having at its other end a weight provided with a rope-guide, and a sweep-line passing through said rope-guide and attached yieldingly at one end to said boat and connected at the other end with a distant object.

4. The combination with two separated boats arranged and adapted to traverse parallel courses, of rope-guides suspended therefrom and maintained each at a uniform distance beneath the surface of the water and slightly above the water-bed, and a sweep-line passing through said guides and having each end attached yieldingly to one of said boats.

5. The combination with a boat having a rope-guide suspended therefrom and maintained at a substantially uniform distance beneath the surface and slightly above the water-bed, of a sweep-line passing through said guide and attached yieldingly at one end to said boat and connected at the other end to a distant object.

6. The combination with a boat, of a cable depending therefrom and supporting beneath the surface of the water a weight having a steering-vane, and a sweep-line extending from said weight to a distant object.

7. The combination with a boat, of a cable depending therefrom and supporting beneath the surface of the water a weight having a steering-vane and a guide-eye, and a sweep-line connected with said boat and extending through said guide-eye to a distant object.

8. The combination with a boat, of a rope-guide and means for maintaining it at a uni-

form distance beneath the surface of the water, a sweep-line passing through said guide and having one end extended to a distant object, and a winding-drum upon the boat to which the other end of said sweep-line is attached.

9. The combination with a boat, of a rope-guide and means for maintaining it below the surface of the water, a sweep-line passing through said guide and having one end extended to a distant object, a winding-drum upon the boat to which the other end of said sweep-line is attached, and means upon said winding-drum for releasing the line under excessive strains thereupon.

10. The combination with a boat, of a weighted line extending from the same to a distant object, a winding-drum upon said boat to which an end of said line is attached, and means provided on said drum for releasing said line under excessive strains thereupon produced by the encounter of said line with an obstruction while the boat is in motion.

11. The combination with a boat, of a sweep-line extending from the same to a distant object, a weight applied to said line near the boat for maintaining it beneath the surface of the water, a traveler upon said line intermediate said weight and said distant object, and a line extending upwardly from said traveler.

12. The combination with a boat, of a sweep-line extending from the same to a distant object, a weight applied to said line near the boat for maintaining it beneath the surface of the water, a traveler having two pulleys embracing said line intermediate said weight and said distant object, and a line extending upwardly from said traveler.

13. The combination with a boat, of a sweep-line extending from the same to a distant object, a weight applied to said line near the boat for maintaining it below the surface of the water, a traveler having pulleys embracing said line beyond said weight and constructed with one or both of its ends forked and sharpened to engage obstructions opposed to the free advance of said sweep-line, and a line extending upwardly from said traveler.

14. The combination with a boat, of a sweep-line extending from the same to a distant object, a weight applied to said line near the boat for maintaining it below the surface of the water, a traveler upon said line beyond said weight, and a tender upon the surface from which said traveler is suspended having rope-guides through which the sweep-line is led from the traveler beneath.

15. The combination with a boat, of a sweep-line extending from the same to a distant object, a weight applied to said line near the boat for maintaining it below the surface of the water, a traveler upon said line beyond said weight, and a tender upon the surface from which said traveler is suspended, said tender having rope-guides and a winding-drum intermediate thereto, and the sweep-line being led upwardly from the traveler through one of said guides, around said winding-drum and onward through the other guide.

16. The combination with a boat, of a sweep-line extending from the same to a distant object, a weight applied to said line near the boat for maintaining it below the surface of the water, a traveler upon said line beyond said weight having two spaced grooved pulleys arranged in alinement with each other, and a tender upon the surface from which said traveler is suspended, said tender having rope-guides and an intermediate winding-drum, and the sweep-line being led around one traveler-pulley, upwardly through one of said rope-guides, thence around said winding-drum and through the other rope-guide, and finally around the other traveler-pulley toward the boat.

17. The combination with a boat, of a sweep-line attached thereto at one end and having its other end extended to a distant object, and a weight applied to and supported independently of said line near said boat.

18. The combination with a boat, of a sweep-line extending therefrom to a distant object, a weight applied to said line near the boat for maintaining its normal position beneath the surface of the water, a traveler in the form of a magnet upon said line intermediate said weight and said distant object, and a line extending upwardly from said traveler.

19. The combination with a boat, of a sweep-line extending therefrom to a distant object, a weight applied to said line near the boat for maintaining its normal position beneath the surface of the water, a traveler upon said line intermediate said weight and said distant object and surrounded with electromagnetic coils whose terminals have connections with a source of electric current above the surface, and a line extending upwardly from said traveler.

20. The combination with a boat, of a sweep-line extending therefrom to a distant object, a weight applied to said line near the boat for maintaining its normal position beneath the surface of the water, a traveler upon said line intermediate said weight and said distant object and surrounded with electromagnetic coils, a tender upon the surface from which said traveler is suspended, means for supplying electric current carried by said tender, and connections between the same and the terminals of said magnet-coils.

21. The combination with a boat, of a sweep-line extending therefrom to a distant object, a weight applied to said line near the boat for maintaining its normal position beneath the surface of the water, a traveler upon said line intermediate said weight and said distant object and surrounded with electromagnetic

coils, a tender upon the surface from which said traveler is suspended, means for supplying electric current carried by said tender, and connections between the same and the terminals of said magnet-coils, and an electric switch for temporarily closing the circuit between said source of current and magnet-coils.

Signed at Elizabeth, in the county of Union and State of New Jersey, this 17th day of April, A. D. 1900.

SIMON LAKE.

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