

No. 611,636.

Patented Oct. 4, 1898.

S. LAKE.

APPARATUS FOR FLOATING STRANDED VESSELS.

(Application filed June 7, 1897.)

(No Model.)

2 Sheets—Sheet 1.

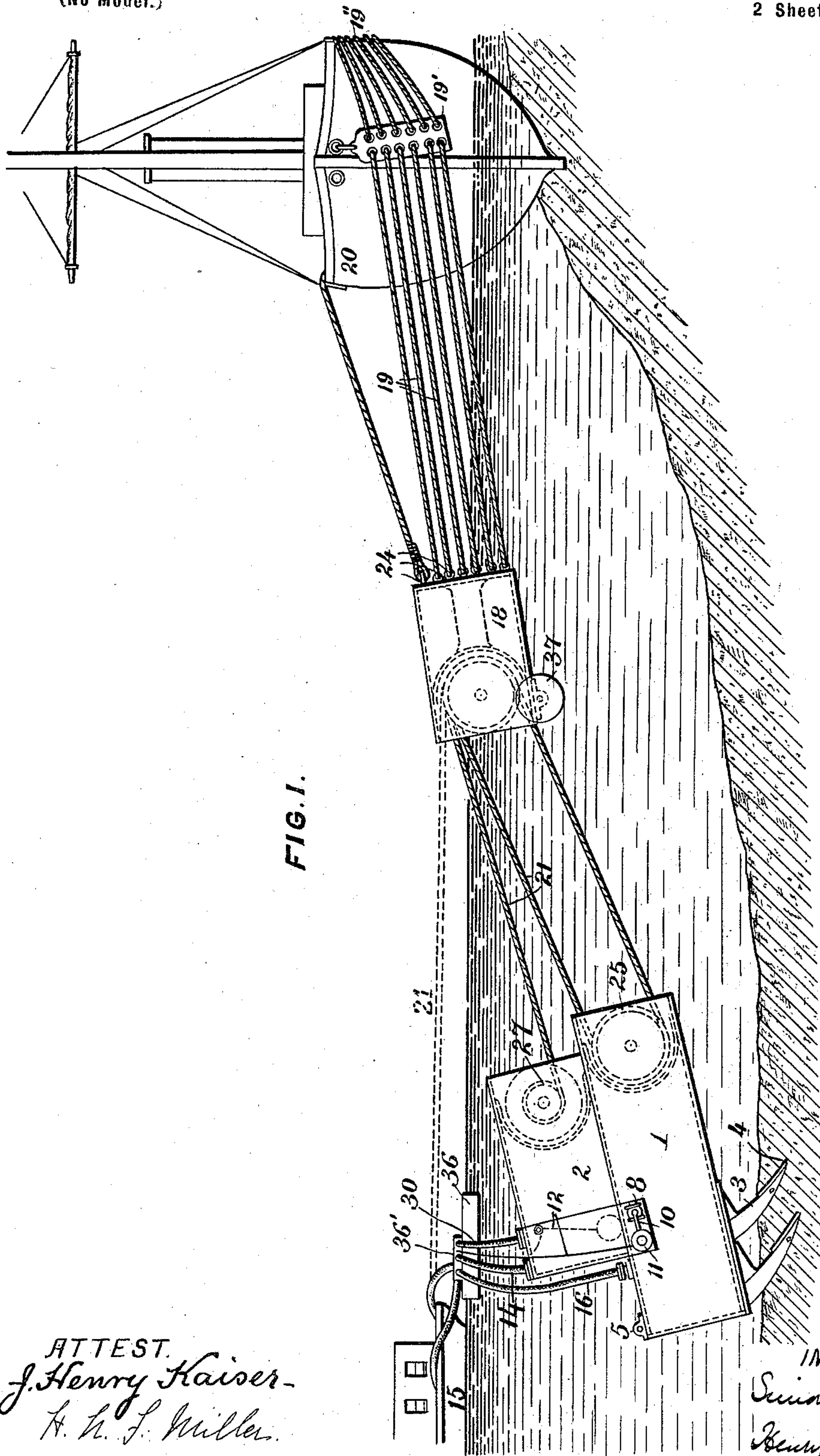


FIG. 1.

ATTEST.
J. Henry Kaiser.
A. L. L. Miller.

INVENTOR.
Simon Lake, per
Henry J. Miller
Atty.

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2 Sheets—Sheet 2.

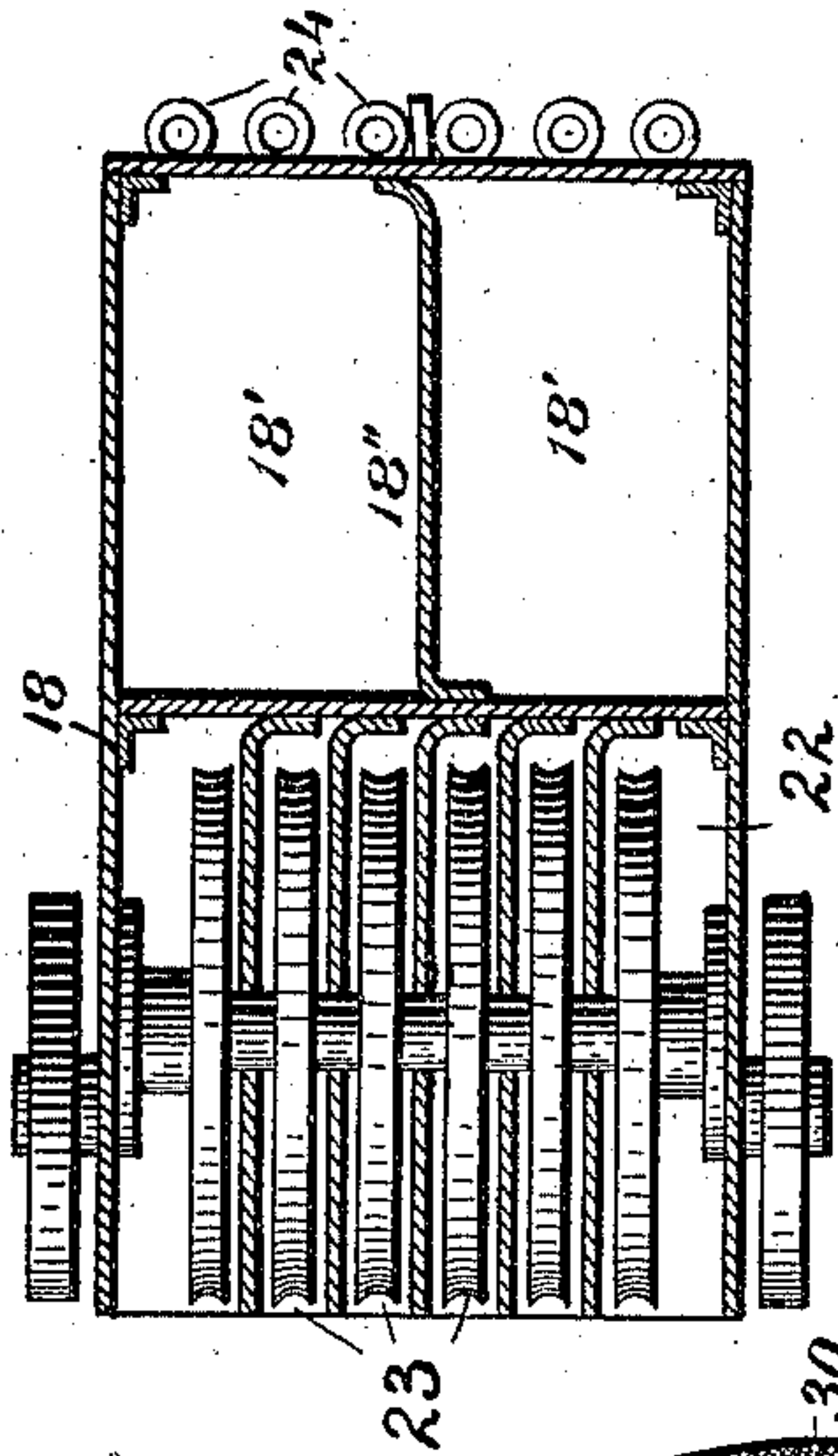


FIG. 5.

FIG. 2.

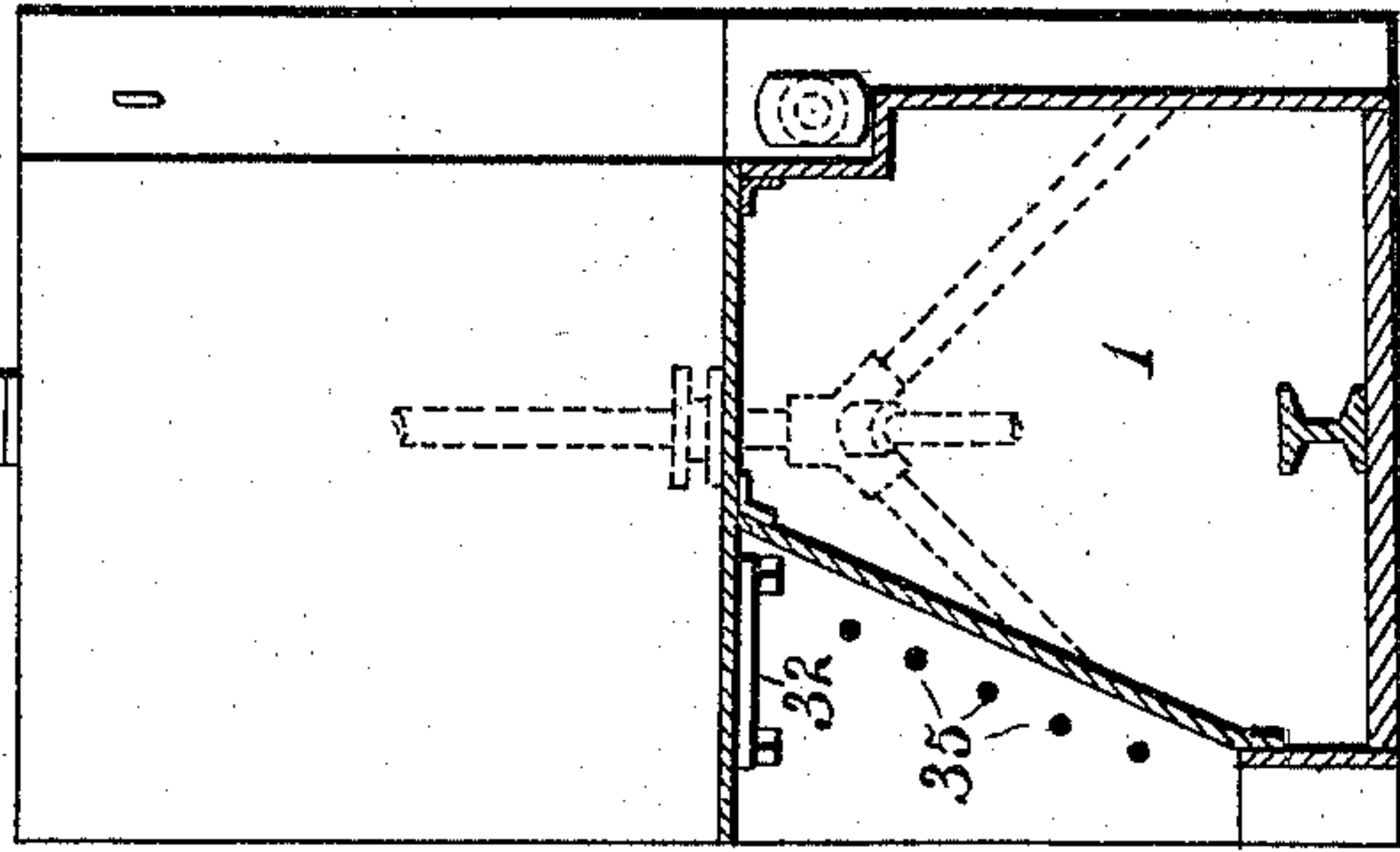
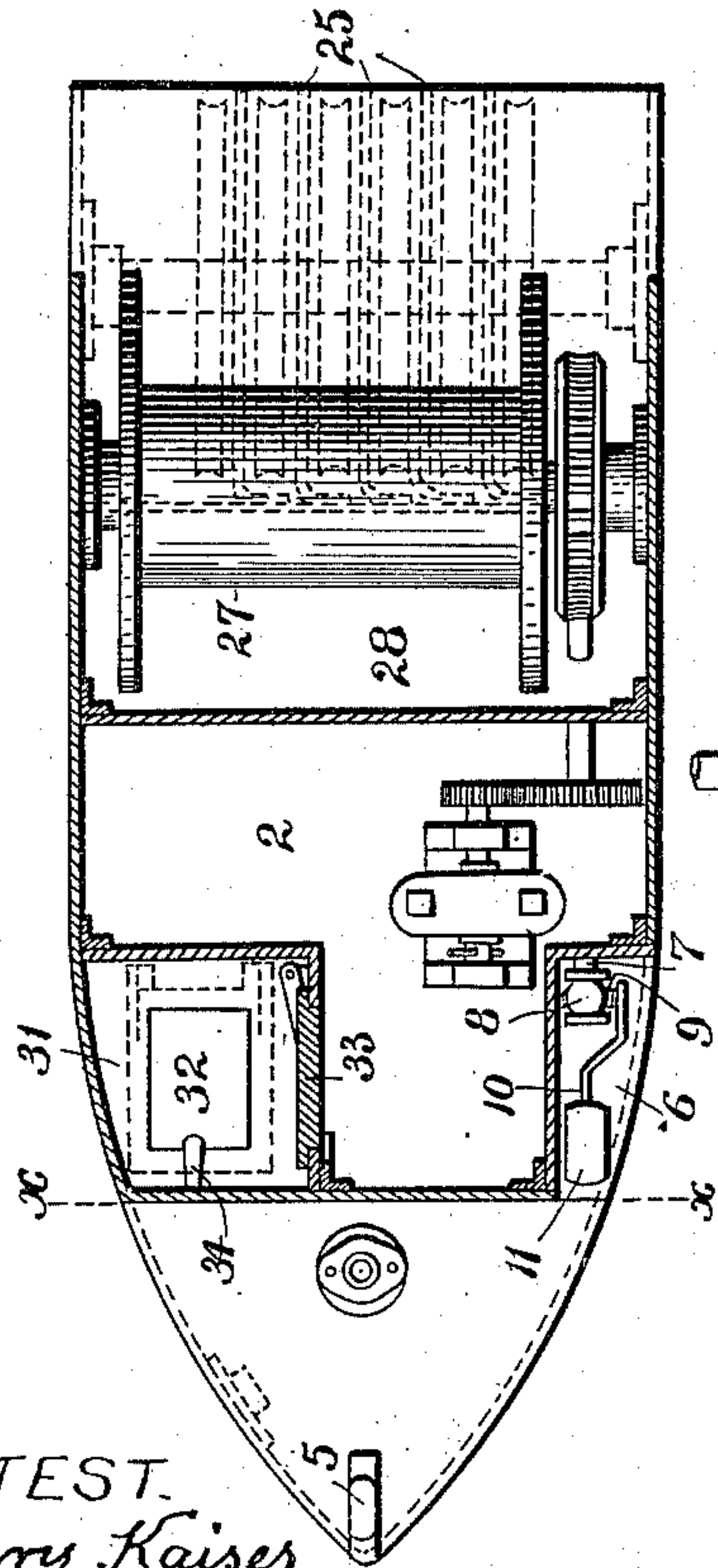


FIG. 4.

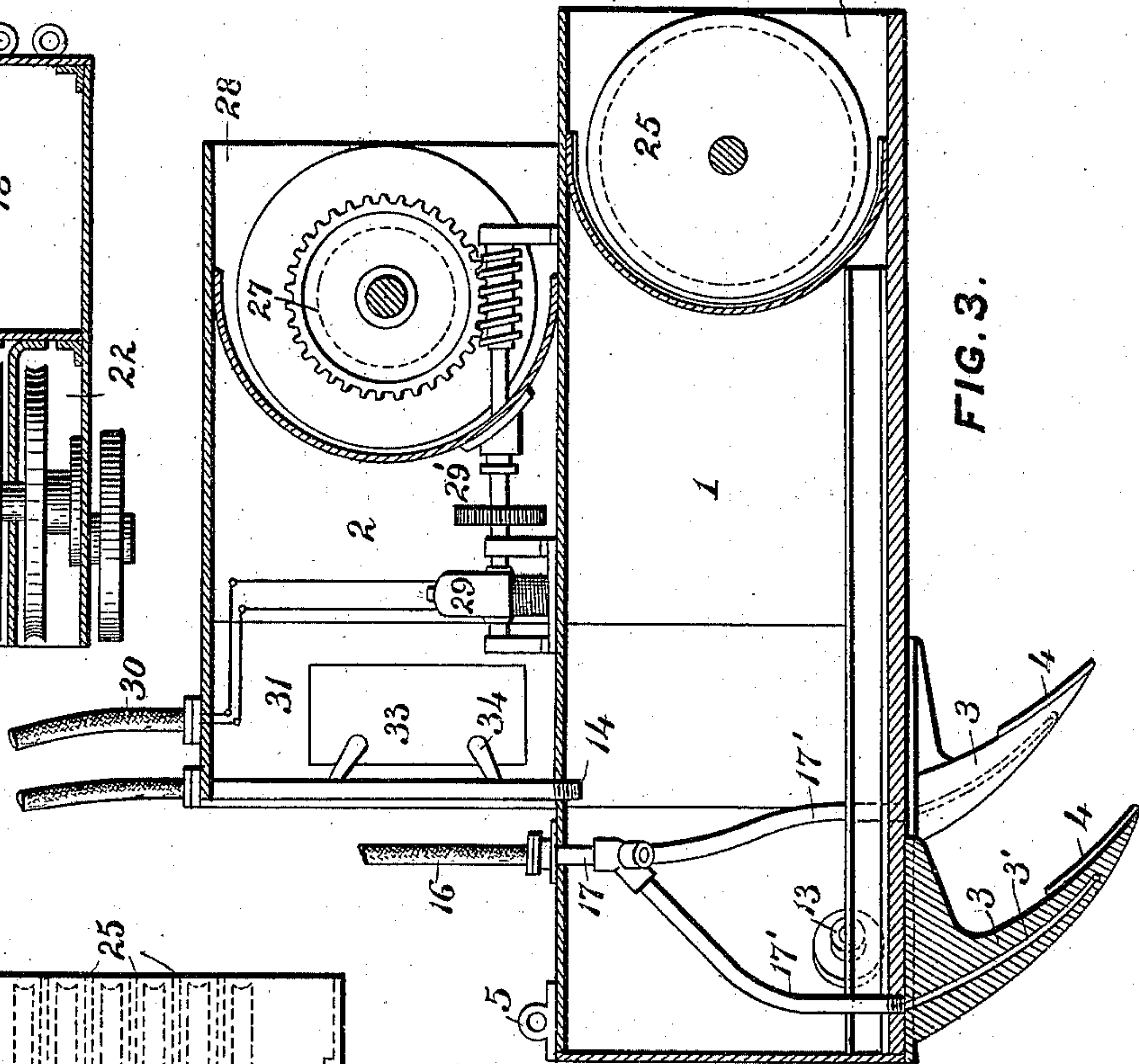


FIG. 3.

ATTEST.
J. Henry Kaiser.
H. H. Miller.

INVENTOR.
Simon Lake, per
Henry J. Miller
Atty

UNITED STATES PATENT OFFICE.

SIMON LAKE, OF BALTIMORE, MARYLAND.

APPARATUS FOR FLOATING STRANDED VESSELS.

SPECIFICATION forming part of Letters Patent No. 611,636, dated October 4, 1898.

Application filed June 7, 1897. Serial No. 639,703. (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 Baltimore city, in the State of Maryland, have invented certain new and useful Improvements in Apparatus for Floating Stranded Vessels, of which the following is a specification.

This invention has for its object to provide an apparatus adapted for use in hauling stranded vessels off the shores or out of shoal waters, into which they may have been driven by storms or by other means, into deep water.

It has been common heretofore to effect this object, where practicable, by the employment of towing vessels, to which the stranded vessels have been attached by suitable hawsers; but owing to the excessive power required in such operation and the comparatively small force to be derived from the means of propulsion of the towing vessel the operation is exceedingly difficult and liable to failure, under the effects of the elements during the time usually expended in waiting for favorable tides and conditions of the weather. The comparatively small amount of power available for such work will be evident when it is realized that the forward impulse of a large transatlantic steamer—such, for instance, as the *St. Paul* of the American line, developing twenty-thousand-horse power—is only about eighty-five tons—i. e., would exert a pull of eighty-five tons upon a tow-line attached thereto—while that of one of the larger steam tug-boats is not more than three or four tons. Although the power developed by the engines of these vessels is ample for performing the object of the present invention, a means of applying such power effectively has heretofore been lacking, the mere resistance of the water against the propeller-wheels being insufficient. The employment of anchors of the ordinary type, from which lines have been led to winches on the stranded steamer, has also proved ineffective, as they have necessarily been made of such size as to be readily handled, in which case their grasp upon the sea-bed has failed to offer sufficient resistance to the strain upon the line leading from the stranded vessel. To obviate these objections and to furnish an abutment of sufficient rigidity to resist the pull of the line made fast to the vessel for dislodg-

ing the same is the immediate object of the present invention, which consists, primarily, in a normally buoyant anchor adapted to be towed to the vicinity of the stranded vessel and provided with means for then destroying its buoyancy to enable it to sink to the seabed, where its weight operates in embedding its arms deeply in the bottom to secure a firm hold. A line fixed to the anchor under such conditions may be subjected to the severest strain without starting the same from its position. The work of dislodging the stranded vessel having been effected, the restoration of the buoyancy of the anchor enables the latter to again rise to the surface for being towed to some other locality where its similar use is required.

By providing the anchor with a water-tight chamber capable of excluding the water when normally floating upon the surface the device may be made of any suitable size for the use for which it is designed, its bulk and weight not appreciably affecting its adaptability for transportation. The body of the anchor is preferably shaped somewhat like a boat, pointed at one or both ends in order that it may be readily drawn by a tow-boat or a wrecking-steamer provided with such supplemental apparatus as may be found useful for operation in connection with the anchor in the process of moving the vessel.

While the largest anchors at present in use weigh from three to four tons only and cannot be made larger in practice because of the difficulty of handling the same from the deck of the ordinary wrecking-steamer, anchors made according to my present invention may be of fifty or seventy-five tons weight, and thus capable of resisting a pull of five hundred to six hundred tons from lines attached to the stranded vessel, and still be capable of easy manipulation, as they require on no account to be lifted from the water in connection with the performance of their proper functions.

My present invention further includes a winch mounted in an external recess in the body of the anchor and driven by a motor within a water-tight chamber therein, and thus adapted to apply directly to the line the power for moving the stranded vessel.

The invention includes also a floating pul-

ley-block with pulleys for use in connection with the winch in the anchor and a line leading therefrom, such pulley-block being connected by other lines to a head-block attached to the vessel. The latter arrangement enables me to employ a series of hempen ropes between the head-block and the floating pulley-block to give the requisite elasticity to the tackle, while employing a steel cable having the advantage of small bulk for a given degree of strength for connecting the pulley-block with the anchor. By this construction the cable may be normally wound up so as to draw the pulley-block up against the end of the anchor to serve as the stern of a boat, which they together produce, of convenient form for being towed from place to place.

From the foregoing description it will be observed that one of the important advantages of the present improvement is that the apparatus may be attached to the stranded vessel immediately upon arriving in its vicinity and without waiting for favorable tides and weather in which to effect the dislodgment of the vessel, so that in case of stormy weather during such time the vessel may not be liable to be driven farther ashore. It is equally evident that by connecting the hauling-line to a winch directly upon the stranded vessel the work of floating the vessel may be effected even in stormy weather under conditions in which a wrecking-boat would be unadapted to operate, thus preventing the vessel's being dashed to pieces while awaiting assistance.

Having thus stated the essential features of the improvement and believing that I am the first to provide an anchor adapted to be floated to the location in which it is designed to operate, then lowered to the water-bed to perform its normal function, and its buoyancy afterward restored to enable it to rise to the surface for removal from such location, I wish it to be understood that I do not limit myself to the particular form or construction of the device or its various parts shown and described herein, as the same may obviously be greatly varied without departure from the spirit of the present invention.

In the annexed drawings, Figure 1 is a diagrammatic representation of the apparatus in the operation of dislodging a stranded vessel from its position upon the water-bed in shoal water. Fig. 2 is a plan of the anchor with the top portion removed to expose the construction and arrangement of the parts below, and Fig. 3 is a vertical section of the same. Fig. 4 is an end elevation, partly in section, on line *xx* in Fig. 2. Fig. 5 is a sectional plan, similar to Fig. 2, of the floating pulley-block.

The buoyant anchor embodying the essential part of the apparatus is constructed with a primary water-tight chamber 1 and a smaller superposed independent water-tight chamber 2 together constituting the body portion of

the anchor, from the bottom of which are projected, near the forward end, the downwardly and rearwardly extending grappling-arms 3, having the flukes 4 of the usual form and arrangement. The forward portion of the lower chamber is shown extended forward of the upper chamber and wedge-shaped like the bow of a boat, its forward extremity having an eye 5 or other suitable means for fastening a line for use in towing the apparatus to the place of operation.

An external recess 6 is shown formed at one side of the lower or primary chamber 1, the wall of which is pierced by the water-inlet pipe 7, having the valve 8, with stem 9, provided with the actuating-lever 10, carrying a weight 11 upon its outer end. The valve being normally closed, with its actuating-lever in a substantially horizontal position to exclude the water from the chamber 1, as indicated in full lines in Fig. 1, the weighted end of the lever may be raised into the position indicated in dotted lines in Fig. 1 by means of a cord 12, when the inflow of water through the inlet-pipe 7 will destroy the buoyancy of the anchor and permit it to sink to the water-bed, in which the anchoring-arms 3 will firmly embed themselves under the then effective weight of the anchor.

When it is desired to raise the anchor to the surface after performing its function while embedded in the water-bed, its buoyancy may be restored by the displacement of the water in the chamber 1 through a check-valve 13 at the bottom by means of compressed air forced into the chamber through the air-supply pipe 14, leading into the top of the same from the tug-boat or wrecking vessel 15 upon the surface.

In case the inlet-valve is disposed near the bottom of the chamber it is obvious that it may serve additionally as an exit-passage when opened by means of the cord 12 during the admission of compressed air from the pipe 14, which is of course suitably valved, and that the additional check-valve 13 is not therefore essential to the effective working of the apparatus.

It is obviously immaterial whether the inlet and outlet valve for the chamber employed for ballast be connected directly therewith, as shown in the drawings, or indirectly by arrangement in a pipe leading thereto, or whether such valve be employed directly for the passage of water to and from such chamber, as with the use of a force-pump for expelling and excluding the water, or for compressed air employed in varying the volume of water therein so long as the chamber is valved, whereby it is adapted for the manipulation of the water admitted to and expelled from the chamber. It is obvious that by providing an open aperture or passage in the lower portion of the chamber for the free entrance and exit of water to and from the same the quantity of water therein may be readily governed by compressed air supplied through

a suitably-valved pipe connected with the upper portion of the chamber.

While the external pressure of the water will be found in most cases sufficient to compress the contained air to the required extent for the admission of the necessary volume of water in overcoming the buoyancy of the anchor, it is evident that the top of the chamber may be provided with an air-valve to permit the displacement of the air wholly by the inflowing water, or such confined air may be led away through the pipe 14.

The anchoring-arms 3 are provided each with a passage 3', leading from its upper end downwardly to a point in its surface near the lower or outer extremity, through which passages jets of water may be forced from a pipe 17, having branches 17' connected therewith and with the flexible hose 16 from a hydraulic pump upon the vessel 15, whereby the water-bed surrounding such arms may be softened preparatory to disengaging the same when the water is expelled from the chamber 1 to restore the buoyancy of the anchor. In most cases, however, the employment of this device will be found unnecessary, as the restored buoyancy of the anchor will exert a sufficient upward impulse to effect the withdrawal of the arms 3.

A floating pulley-block 18 is preferably provided for connecting the lines 19, leading from the head-block 19', attached to the stranded vessel 20, to a hoisting-line 21, connected with the anchor. This pulley-block I preferably form with a water-tight chamber 18', which may be subdivided by one or more partitions 18'' and provided in one end with an external recess 22, in which are sustained the sheaves 23, mounted in suitable bearings. The pulley-block is provided upon the opposite end with a series of eyes 24 for the attachment of the lines 19 and is constructed of similar cross-section to the rear end of the anchor, to which it is attached by means of the steel cable 21, passing over sheaves 25, sustained in bearings in the external recess 26 adjacent to the chamber 1 and connected to a winch 27 in a similar recess 28 adjacent to the secondary water-tight chamber 2. This winch is shown connected by means of suitable spur and worm gearing with an electric motor 29 within the chamber 2, the shaft 29' of the train of gearing being surrounded by a stuffing-box where it pierces the wall of the chamber.

While the winch 27 is for obvious reasons preferably housed in the recess 28 exterior to both the chambers 1 and 2, forming the body of the anchor, as illustrated herein, it is to be understood that such arrangement is not essential to the present improvement, as the winch may obviously be mounted in bearings secured directly to the external wall of either of such chambers; nor is the motor-chamber 2 an essential part of the structure, as the selection of some other type of motor from that shown in the accompanying draw-

ings for actuating the winch may render such inclosing chamber unnecessary.

The metallic conductors for supplying electrical energy to the motor are led upward from the interior of the motor-chamber 2 through a flexible hose 30 to the wrecking-boat 15, which is provided with means for supplying electric current to the motor and means for regulating or governing its movement. While the means for driving the winch is shown herein as an electric motor, it is to be understood that any other suitable form of motor may be employed for the purpose, the employment of a hydraulic motor exhausting directly into the surrounding water, rendering the provision of a motor-chamber 2 unnecessary.

In order to provide access to the motor-chamber in case the motor requires attention when the anchor is sunk to its operative position, I provide a third air-lock chamber 31 at one side of the anchor adjacent to the motor-chamber 2 and provide it with an outer trap-door 32, opening outward or downward from the bottom, and an inner door 33, opening outward with reference to the motor-chamber, each of said doors being provided with suitable fastenings 34, as indicated in the drawings. By means of this air-lock chamber a diver upon the water-bed may ascend the ladder 35, open the trap-door 32 into the chamber 31, the latter having been previously supplied with compressed air at the pressure of the surrounding water by suitable means, (as by a branch from the air-supply pipe 14,) and enter the chamber 31. Upon closing the trap-door communication may be established with the interior of the motor-chamber in the customary manner under such circumstances. The mode of communication between the interior and exterior of a chamber or compartment under different pressures by means of air-locks being at present well known, I have not shown herein all the specific apparatus required in practice for such purpose, the same forming no part of my present invention.

In order to provide a buoy for locating the position of the anchor when the wrecking-boat is compelled to leave the vicinity of the anchor on account of rough weather or for other reasons, a floating block 36 is provided, which latter carries, preferably, a guide-block 36' with holes in which are secured the ends of the several flexible pipes for manipulating the submerged anchor. This block 36 not only determines the position of the anchor, but affords a means of support for the ends of the hose for their detachable connection with pipes leading from the apparatus upon the attending wrecking-boat employed in the operation of the anchor.

In the operation of the apparatus the winch is first actuated to wind the line 21 upon its drum, so as to bring the pulley-block 18 into abutment against the rear end of the anchor

to form the stern portion of a boat of which the normally buoyant anchor constitutes the middle and forward portions. As thus arranged the device is readily towed to the vicinity of the stranded vessel to be operated upon. Water is next admitted to the chamber 1 through the valved inlet-pipe 7 and the buoyancy of the anchor destroyed to fix the latter firmly in the water-bed, after which the head-block 19' at the free end of the ropes 19 is attached to lines 19'', made fast to suitable portions of the vessel 20, when the apparatus is ready for operation in hauling the stranded vessel into deep water, in which the anchor has been sunk. The several pipes leading from the anchor having been properly connected with their respective apparatus upon the attending wrecking-boat, the motor may now be started to slowly wind in the line 21, the latter having previously been run out to free the pulley-block from the anchor a suitable distance. When the vessel is hauled off the bottom by this device, the tackle is disconnected therefrom and the anchor caused to rise to the surface, as before explained, after which the pulley-block 18 is drawn up to its initial position astern of the anchor, and the float 36, head-block 19' and ropes 19, and the flexible pipes 14, 16, and 30 having been piled thereupon the apparatus may be towed away in readiness for the repetition of the operation in some other locality.

While the character of the connection between the pulley-block and the stranded vessel is not an essential of the present improvement, I prefer to employ hempen ropes for the lines marked 19 in the drawings in order to confer elasticity to the connection with the anchor, for reasons which will be readily understood by those conversant with the class of work for which the present improvement is designed.

It will be obvious that instead of providing the anchor with the motor the line 21 may be led to a winch directly upon the wrecking-boat 15, as indicated in dotted lines in Fig. 1, and it is also evident that the means of manipulating the anchor and of drawing upon the line 21 may be supplied by the stranded vessel itself; but the plan specifically described and illustrated herein is considered preferable, as such supplemental apparatus is thereby more conveniently accessible and renders the apparatus better adapted for operating upon all classes of vessels alike regardless of the apparatus with which they may be provided for coöperating with the anchor.

In cases wherein a compressed-air reservoir is employed in connection with the anchor to supply means for expelling the water from the chamber 1 the anchor may obviously be sunk and raised from the water-bed merely by the manipulation of suitable valves without the necessity of connecting it with an attending vessel, as described above.

It sometimes happens that a vessel is

stranded upon a gradually-sloping beach or sand-bar, and the anchor is thus required to be submerged at a considerable distance therefrom, in which case the floating pulley-block is drawn down to the bottom in the operation of dislodging such vessel. In order to adapt the pulley-block to ride over the water-bed readily in such case, I provide the same preferably with a pair of rollers 37, which are adapted to roll upon the bottom and sustain the body of the block out of contact therewith, so as to prevent its dragging thereon.

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

1. An anchor adapted for submergence wholly beneath the surface of the water and provided with a valved chamber and means for the admission and expulsion of water to and from said chamber, whereby said anchor may be caused to descend below the surface and rest upon the water-bed and to thereafter rise to the surface for the purposes described.

2. The combination, with an anchor adapted for submergence wholly beneath the surface of the water and provided with a valved chamber and with rigid downwardly-projecting grappling-arms, of means for the admission and expulsion of water to and from said chamber, whereby said anchor may be caused to descend below the surface and by its own weight force its grappling-arms into engagement with the water-bed and to thereafter rise to the surface and thus withdraw said arms from the water-bed.

3. The combination with an anchor adapted for submergence wholly beneath the surface of the water and constructed with a chamber for the reception interchangeably of water and air, of means whereby the contents of said chamber may be changed for either increasing or reducing the weight of said anchor in relation to that of the displaced bulk of surrounding water.

4. An anchor adapted to be submerged wholly beneath the surface of the water and provided with a water-tight chamber, an inlet-valve for admitting water thereto, and a pipe connection for the introduction of compressed air to the interior of said chamber for expelling the water therefrom.

5. An anchor adapted to be submerged wholly beneath the surface of the water and provided with a water-tight chamber, a check-valve at the bottom of said chamber, and a pipe connection for the introduction of compressed air to the interior of said chamber for expelling the water through said check-valve.

6. An anchor provided with a water-tight chamber, an inlet-valve for admitting water thereto, a weighted actuating-lever fixed to the stem of said valve, means for retaining said lever in its upright position to maintain the valve in its open position and for releasing said lever to effect the closing of said valve, and a pipe connection for the intro-

duction of compressed air to the interior of said chamber for expelling the water therefrom.

7. An anchor provided with a water-tight chamber, an inlet-valve for admitting water thereto, a pipe connection for the introduction of compressed air to the interior of said chamber for expelling the water therefrom, anchoring-arms projected downwardly from the body of said anchor and formed with passages leading to the extremities of said arms, and pipe connections with said passages for supplying water thereto, as and for the purpose set forth.

8. A normally buoyant submergeable anchor provided with a water-chamber and means for the admission and expulsion of water to and from the same for the purpose described, a winch mounted in bearings external to said chamber, and means for actuating said winch.

9. A normally buoyant submergeable anchor provided with a water-chamber and means for the admission and expulsion of water to and from the same for the purpose described, a secondary air-tight chamber, a winch mounted in bearings external to said chambers, and means within said secondary chamber for actuating said winch.

10. An anchor provided with a primary water-tight chamber and means for the admission and expulsion of water to and from the same, a secondary water-tight chamber, a winch mounted in bearings external to said chambers, a motor within said secondary chamber and means for supplying the same with power, and a connection from said motor to said winch for actuating the latter.

11. An anchor provided with a primary water-tight chamber, a secondary water-tight chamber, an air-lock chamber provided with an external door and a door for communication with the interior of said secondary chamber, a winch mounted in bearings external to said chambers, a motor within said secondary chamber and means for supplying the same with power, and a connection from said motor to said winch for actuating the latter.

12. An anchor provided with a primary water-tight chamber and means for the admission and expulsion of water to and from the same, a secondary water-tight chamber, exterior recesses at the adjacent ends of each of said chambers, a motor within the secondary chamber, a winch mounted in bearings within the adjacent external recess and connected with said motor for deriving mo-

tion therefrom, sheave-pulleys mounted in the recess exterior to said primary chamber, and means for supplying power to said motor. 60

13. The combination with a normally buoyant submergeable anchor constructed with a water-chamber, and means for the admission and expulsion of water to and from the same for the purpose described, of an independent float, and a flexible conductor suitable for the transmission of power for manipulating said anchor and having one end connected with the interior of the same and the other end attached to and supported by said float. 70

14. The combination, with a normally buoyant anchor provided with means whereby its buoyancy may be destroyed and restored at will, and carrying suitable sheave-pulleys, of a floating pulley-block, and lines connecting the pulleys of said anchor and floating block, as and for the purpose set forth. 75

15. The combination, with a normally buoyant anchor provided with means whereby its buoyancy may be destroyed and restored at will, and carrying suitable sheave-pulleys, of a floating pulley-block having antifriction-wheels projected below its bottom, and lines connecting the pulleys of said anchor and floating block, as and for the purpose set forth. 85

16. The combination, with a normally buoyant anchor provided with means whereby its buoyancy may be destroyed and restored at will, of a floating pulley-block fitted to and abutting against one end of the same, and means for detachably securing said anchor and pulley-block together, as and for the purpose set forth. 90

17. The combination, with a normally buoyant anchor pointed at one end and blunt at the opposite end and formed with a recess therein containing suitable sheave-pulleys, and provided with means whereby its buoyancy may be destroyed and restored at will, of a floating pulley-block having one end fitted to the blunt end of said anchor and provided with pulleys adjacent thereto and a line running over said pulleys operating to secure said pulley-block to the anchor, as and for the purpose set forth. 105

Signed at Baltimore city, in the State of Maryland, this 25th day of May, A. D. 1897.

SIMON LAKE.

Witnesses:

ELBERT THOMSON,
J. C. LAKE,
FELIX R. SULLIVAN.