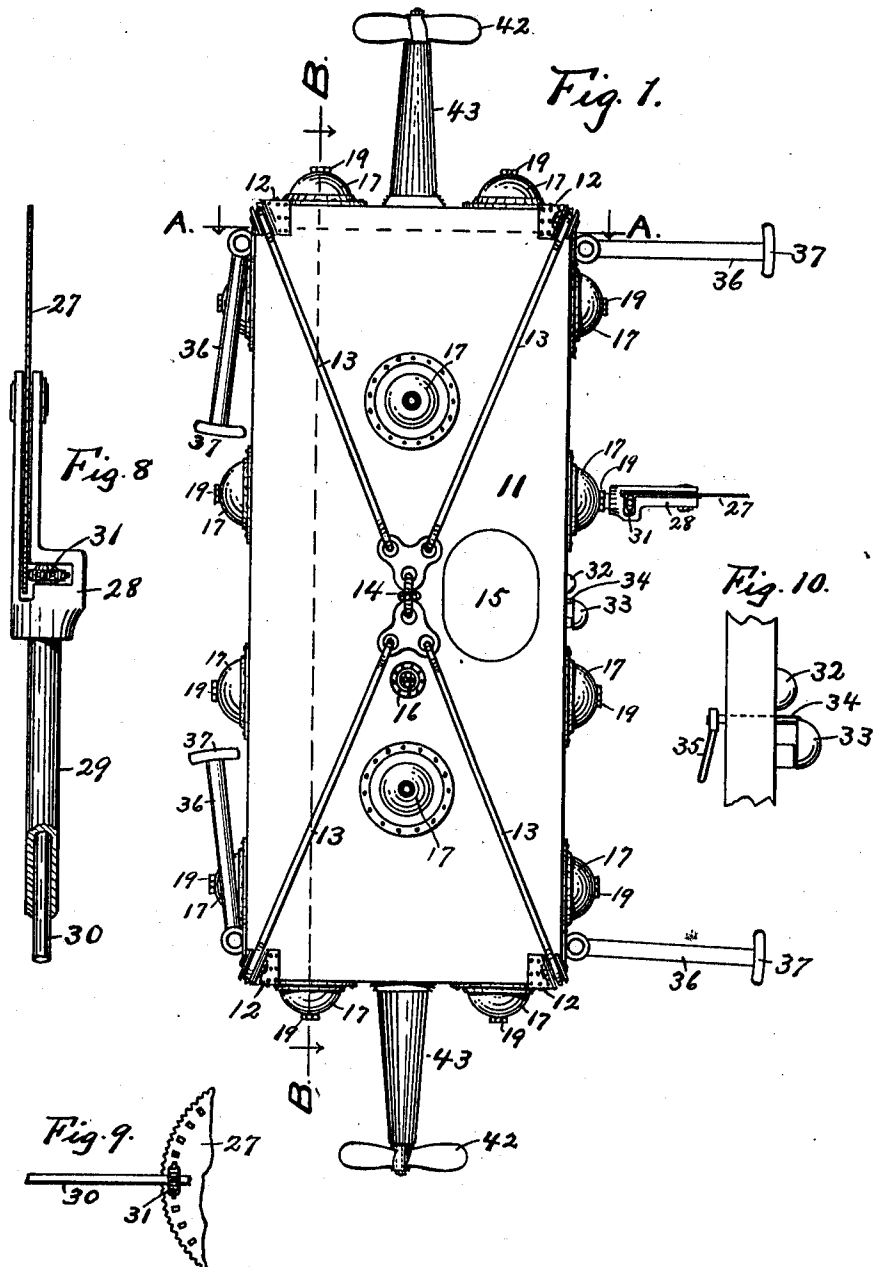


H. L. BOWDOIN.
SUBMARINE SALVAGE APPARATUS.
APPLICATION FILED AUG. 10, 1909.

1,004,552.

Patented Oct. 3, 1911.

4 SHEETS—SHEET 1.



WITNESSES:

K. H. Andrews.
G. D. Mosher.

INVENTOR.

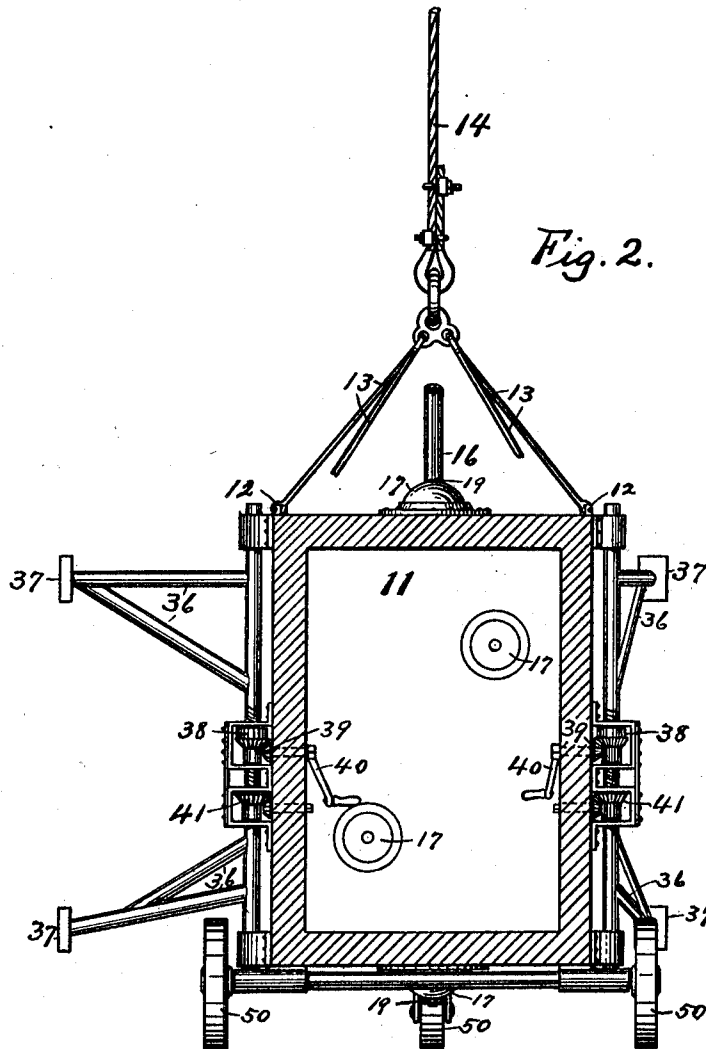
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WITNESSES:

L. H. Andrews.
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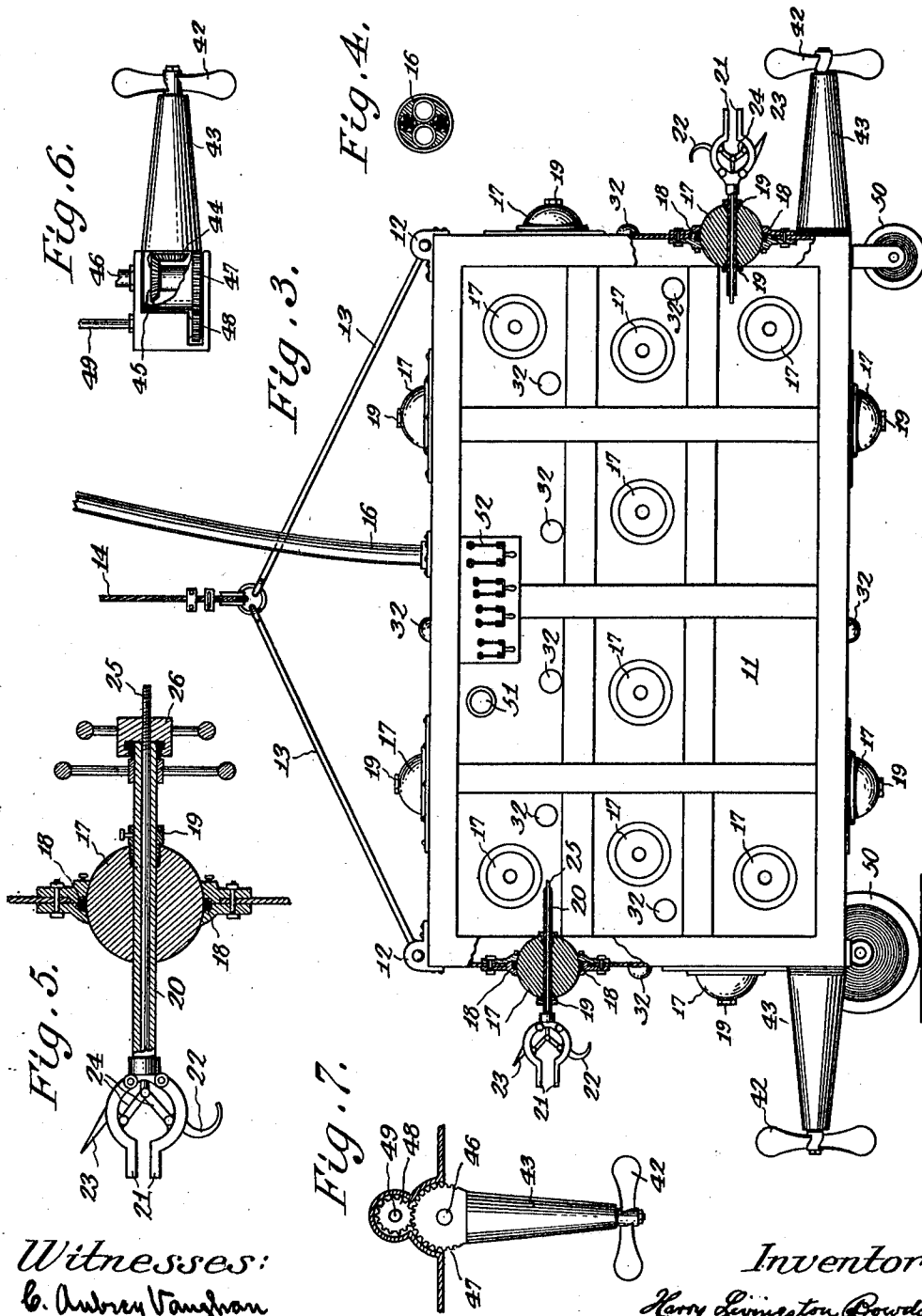
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4 SHEETS-SHEET 3.



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4 SHEETS-SHEET 4.

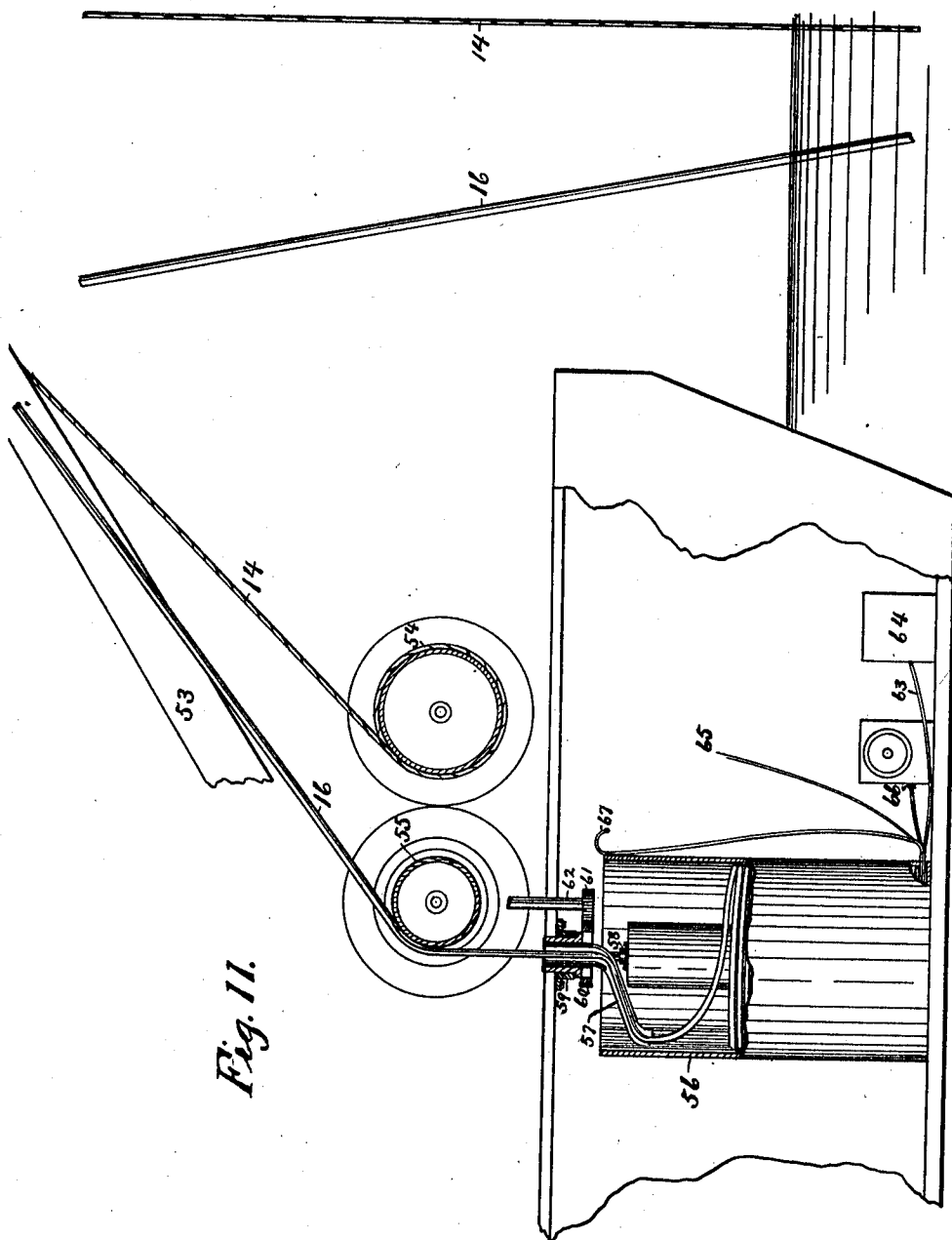


Fig. 11.

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UNITED STATES PATENT OFFICE.

HARRY LIVINGSTON BOWDOIN, OF NEW YORK, N. Y.

SUBMARINE SALVAGE APPARATUS.

1,004,552.

Specification of Letters Patent.

Patented Oct. 3, 1911.

Application filed August 10, 1909. Serial No. 512,214.

To all whom it may concern:

Be it known that I, HARRY LIVINGSTON BOWDOIN, a citizen of the United States, and a resident of New York city, in the county of New York and State of New York, have invented certain new and useful Improvements in Submarine Salvage Apparatus, of which the following is a specification.

The invention relates to improvements in submarine salvage apparatus, and consists in the novel features, arrangements and combinations of parts hereinafter described, and particularly pointed out in the claims.

The object of my invention is to provide an apparatus and mechanism by means of which two or more men may be lowered to any depth, and explore, wreck, salvage or hook on and float any vessel or valuable object.

Wrecking operations, up to the present time, so far as I am aware, have been confined to vessels sunk in not over 125 feet, (a diver's limit), so that all vessels sunk in greater depths remain untouched. As some of these still contain large amounts of gold and unperishable cargo a vast untouched field of great wealth may be opened up by means of this submarine salvage apparatus. By its use submarines may be quickly raised from any depth, saving life and property.

My invention also embraces novel constructions and features, all of which will be fully understood from the detailed description hereinafter presented, reference being had to the accompanying drawings, in which:

Figure 1 is a plan view of the submarine salvage apparatus. Fig. 2 is a cross section on lines A—A Fig. 1. Fig. 3 is a longitudinal section on lines B—B Fig. 1. Fig. 4 is a cross section of the made up cable. Fig. 5 is a longitudinal section of one of the tools. Fig. 6 is a vertical view of the propeller mechanism. Fig. 7 is a plan view of the propeller and means of steering. Fig. 8 (Sheet 1) is an enlarged view of a saw operated by sprocket. Fig. 9 is a side view of a fragmentary part of the saw and its driving mechanism. Fig. 10 is an enlarged view of a protecting cup. Fig. 11 is a view, (partly sectioned), of a scow, cables, means for taking in or letting out, means for coiling or uncoiling the cable in a receptacle

and a method of connecting the different units of the made up cable.

The apparatus consists of a strong steel chamber—11—built up of I beams, plate and bracing so as to withstand an enormous pressure on the walls of said chamber. On the upper corners of the chamber are fastened heavy bearing plates—12—in which are fastened suspension chains or rods—13—connected at their upper ends and suitably fastened to the end of a cable—14—by means of which the apparatus is raised or lowered. A manhole—15—(Fig. 1) for the entrance and exit of the men while on the surface, fastens on the inside, and is made watertight by a gasket. Leading from the surface, and entering the top of the chamber, and securely fastened thereto is a cable—16—made up of two hose pipes, electric power and light wires, and telephone wires. Mounted in the sides, ends, top and bottom of the chamber are ball and socket universal joints—17—having means for packing—18—and a hole fitted with stuffing boxes—19—through which are operated the saw, tools, etc., for working.

One style of tool, as shown, consists of a hollow rod—20—to the outer end of which is fastened a pair of jaws—21—one of which carries a hook—22—and the other a gig—23—. The jaws are manipulated by means of an elbow joint—24—connected to the rod—25—which is operated by the nut wheel—26—. Another tool is a metal cutting saw—27—(Sheet 1) mounted in a carrier—28—fastened on one end of a hollow rod—29—which passes through the stuffing boxes—19—and the ball and socket universal bearings—17—and is operated from the inside of the chamber by means of a motor acting on the shaft—30—and the sprocket—31—which engages slots in the saw.

Conveniently located around the apparatus are ports of heavy glass—32—which may be covered when not in use, or in case of damage by the cover cup—33—(Fig. 10) which is mounted on a rod—34—and swung over the port from the inside of the chamber by means of the handle—35—mounted on the inner end of the rod—34—.

On the sides of the apparatus near the ends are mounted movable arms—36—fitted at the ends with electro-magnets—37—. The arms may be moved vertically

by means of nut gears —38— (Fig. 2) engaging bevel pinions —39— mounted on shafts passing through stuffing boxes and the side walls of the apparatus, and operated by crank handles —40—. The arms may be moved horizontally in a circle by means of feather-key gears —41— operated by bevel pinions, shafts and crank handles from the inside. The arms are swung alongside when not in use.

At each end of the apparatus are mounted propellers —42—. The propeller shafts are carried in a casing —43— (Fig. 6), having bevel gears —44— on their inner ends. Meshing in the bevel are pinions —45— with feather-keys on the driving shafts —46—. The lower edge of the casings carry gears —47— which engage pinions —48— mounted on steering shafts —49— by operating which, the propeller casings and propellers may be oscillated from side to side for steering. The operating shafts may be withdrawn from the propeller casings, allowing the propellers and casings to slip out should same be caught in wreckage. Attached to the bottom of the apparatus are wheels —50— one of which may be used for steering when moving on the bottom. The apparatus contains suitably placed search lights —51— a switch board —52— (Fig. 3) and a telephone. The hoisting cable —14— is rove through suitable blocks on the boom, A-frame, etc., —53— on a hoister and attached to the drum of a hoisting engine —54—. The made up cable —16— passes through suitable blocks on the boom, A-frame, etc., —53— takes three or four turns around a hoisting drum —55— and is automatically coiled into a receptacle —56—, by means of a hollow guiding arm —57— held in position by, and moving in, bearings —58—59—. The guiding arm carries a gear —60— meshing into a pinion —61— on a shaft —62— which is connected by suitable gears with the shaft of the drum —55— and geared at a speed that will coil or uncoil the cable —16— in the receptacle —56— as the cable passes over the drum. The end of the cable —16— extends through the lower part of the receptacle —56— and the parts are separated and connected as follows: The light and power cables —63— to a dynamo —64—. The telephone cable —65— to a transmitter, and one hose to an air pump —66— the other hose open to the air —67— to obtain circulation.

To operate: Two or more men enter the chamber of the apparatus, fastening the manhole after them. The apparatus is lowered into the sea and the air pump and dynamo started. When it reaches the bottom, say in 250 feet, it is maneuvered around by means of its propellers and through telephone communication with the tender on the surface until it is landed near one end of

the sunken vessel—say a submarine—made visible by the search lights of the apparatus. A pontoon is then lowered and quickly fastened to that end of the submarine. When fastened, the pontoon is pulled upright, and enough air pumped in to hold it in position. By the same method a pontoon is fastened to the other end, and when done, (in a few hours' time), the apparatus is hauled to the surface and on board. Air is then forced into the pontoons, and when sufficient displacement has been created the pontoons will rise rapidly to the surface, bringing the submarine within a few feet of the surface. By hooking on to the pontoon chains, however, the submarine could be hoisted awash, and her crew released. After fastening her hatches she could be slacked back until held by the pontoons and towed to dry dock. When a vessel is to be raised, if of iron, the apparatus when alongside and in the desired position, swings out two arms, and the electro-magnets enable it to rigidly adhere to the side of the vessel. The pontoon is then lowered and fastened to a rib of the vessel. A sufficient number of pontoons are thus fastened to the sides of the vessel to lift her, and she is towed in to smooth water and the dry dock.

What I claim is:

1. A submarine salvage apparatus, consisting of a strongly built chamber, means for providing a circulation of air for breathing purposes in said chamber, means for raising and lowering the apparatus, ball and socket universal bearings in the walls of said chamber, tools operated through the bearings from the inside, a cable for supplying electric light and power within said chamber, magnetic arms attached to said chamber, and suitable means of propulsion through the water and on the bottom.

2. In a submarine salvage apparatus an air and water-tight metallic chamber with heavily built walls, a series of ball and socket universal bearings spaced around said walls, stuffing boxes in the holes of said ball and socket universal bearings, tools mounted in the universal bearings, arms carrying electric magnets mounted on the outside, and controlled from the inside, of said chamber, means for mechanically raising and lowering said chamber or apparatus, wheels on which the chamber may travel when landed, propellers and movable propeller casings for the propulsion and steering of the said chamber, ports for observation and for search lights, protection covers for the said ports, and a made up cable for furnishing electricity and air to said chamber of the submarine salvage apparatus.

3. In a submarine salvage apparatus a chamber, or vessel, to carry one or more people, a cable for raising or lowering said chamber, or vessel, in the water, saws, drills,

pincer jaws, hooks, gigs, or other tools, operated from the inside of said chamber, or vessel, and a tube for supplying air within said chamber, or vessel, for breathing purposes, a drum for handling the tube, and a guiding arm and mechanism for automatically coiling or uncoiling said tube.

Signed at New York city, in the county of New York and State of New York.

HARRY LIVINGSTON BOWDOIN.

Witnesses:

L. H. ANDREWS,
G. D. MOSHER.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."