Sept. 20, 1927. 1,643,247

W. LA GRANGE

APPARATUS FOR RAISING SUNKEN SHIPS

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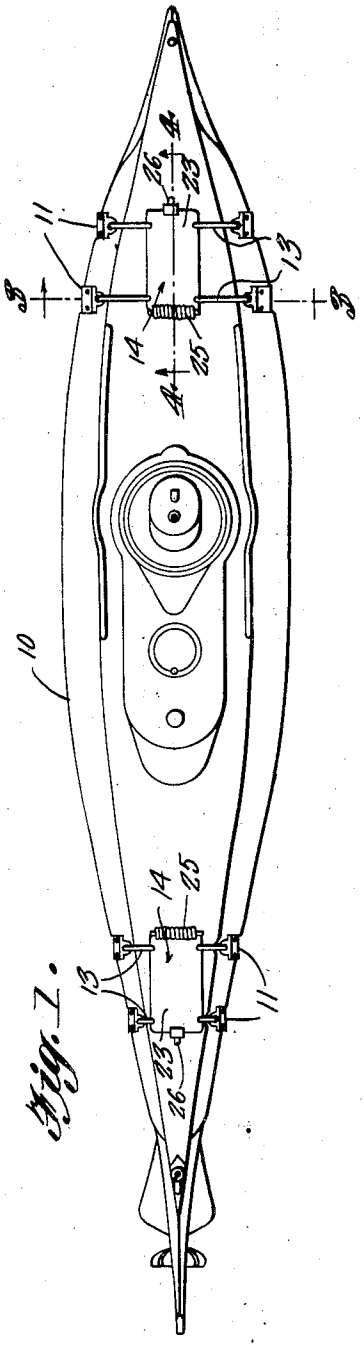


Fig. 1.

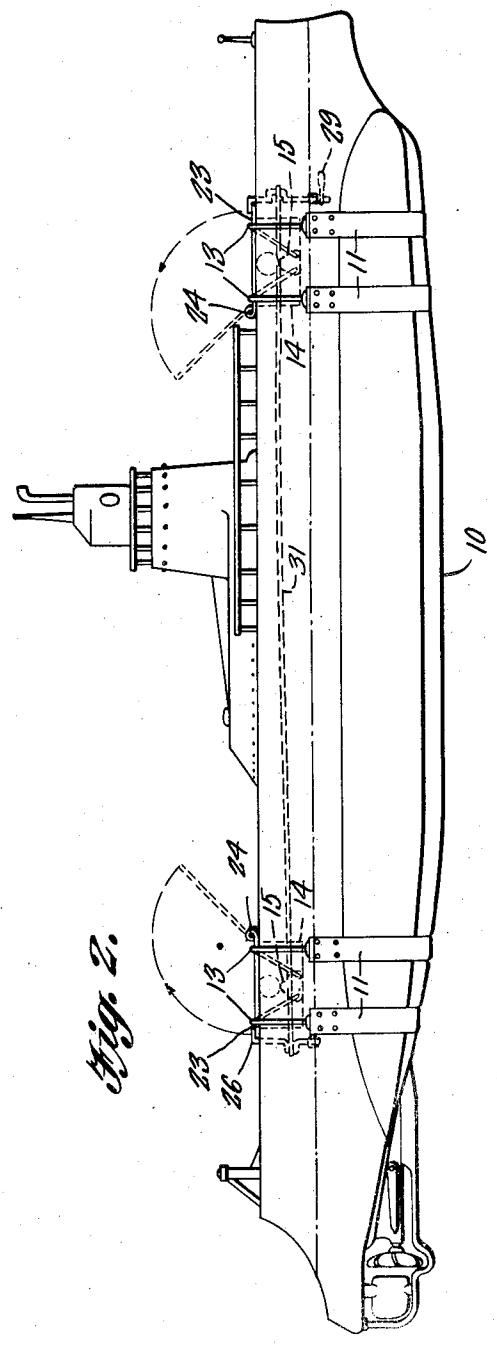


Fig. 2.

William La Grange
INVENTOR

BY Victor J. Evans
ATTORNEY

Lynn Bradton
WITNESS:

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W. LA GRANGE

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Fig. 3.

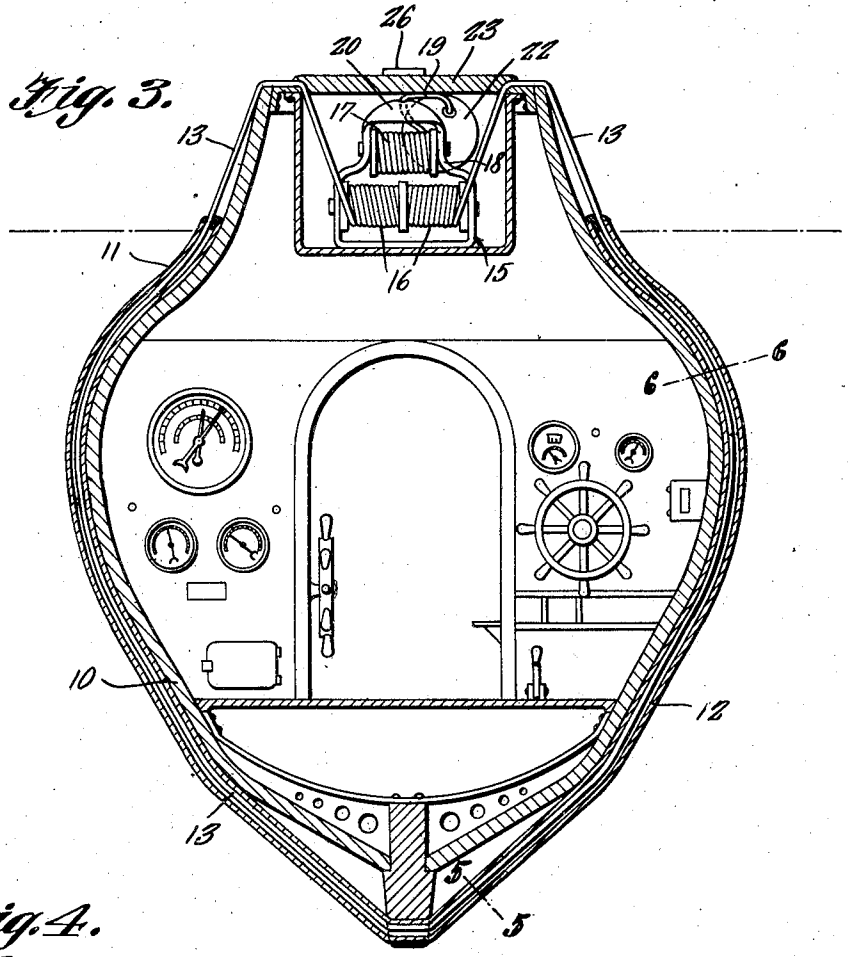


Fig. 4.

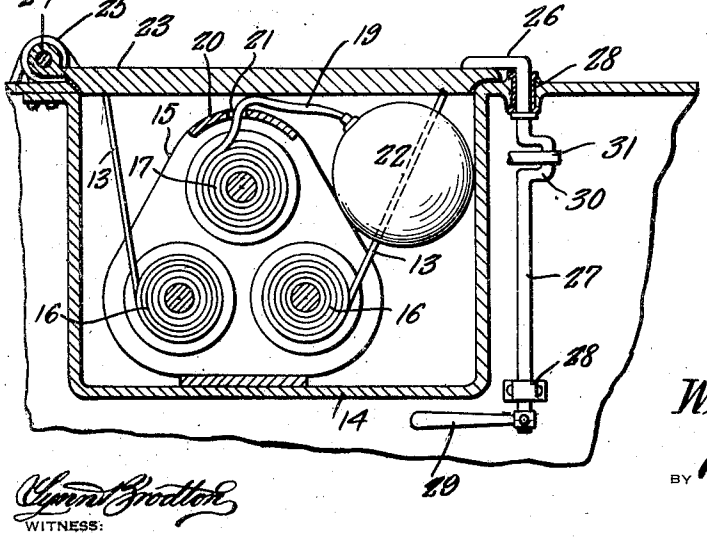
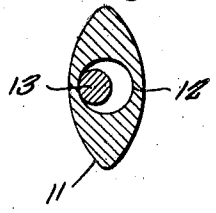


Fig. 5.



William LaGrange
INVENTOR

BY Victor J. Evans
ATTORNEY

WITNESS:

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W. LA GRANGE

APPARATUS FOR RAISING SUNKEN SHIPS

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Fig. 6.

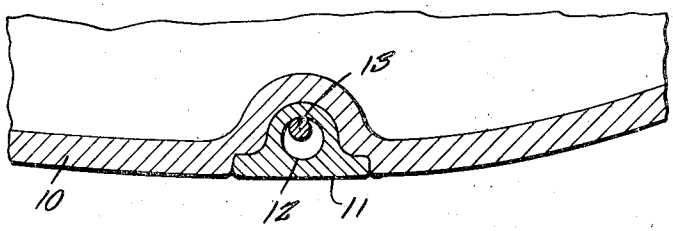


Fig. 8.

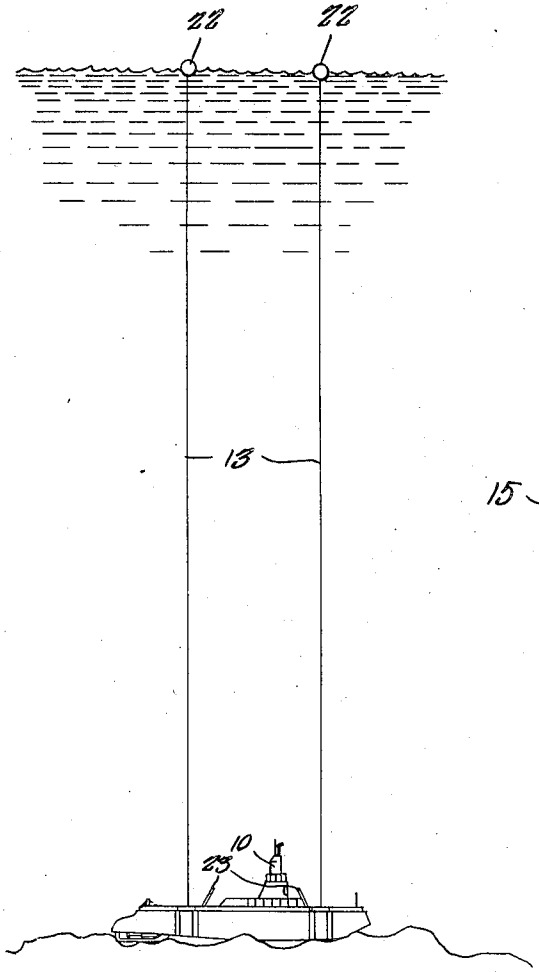
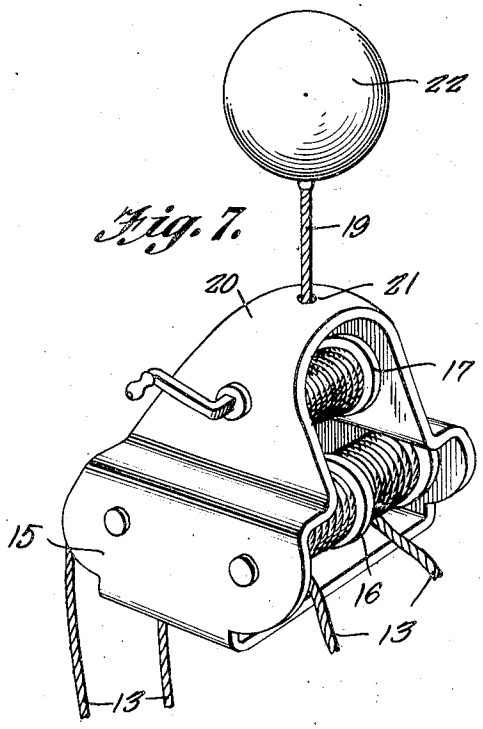


Fig. 7.



WITNESS:

William La Grange
INVENTOR

BY Victor J. Evans
ATTORNEY

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W. LA GRANGE

APPARATUS FOR RAISING SUNKEN SHIPS

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Fig. 9.

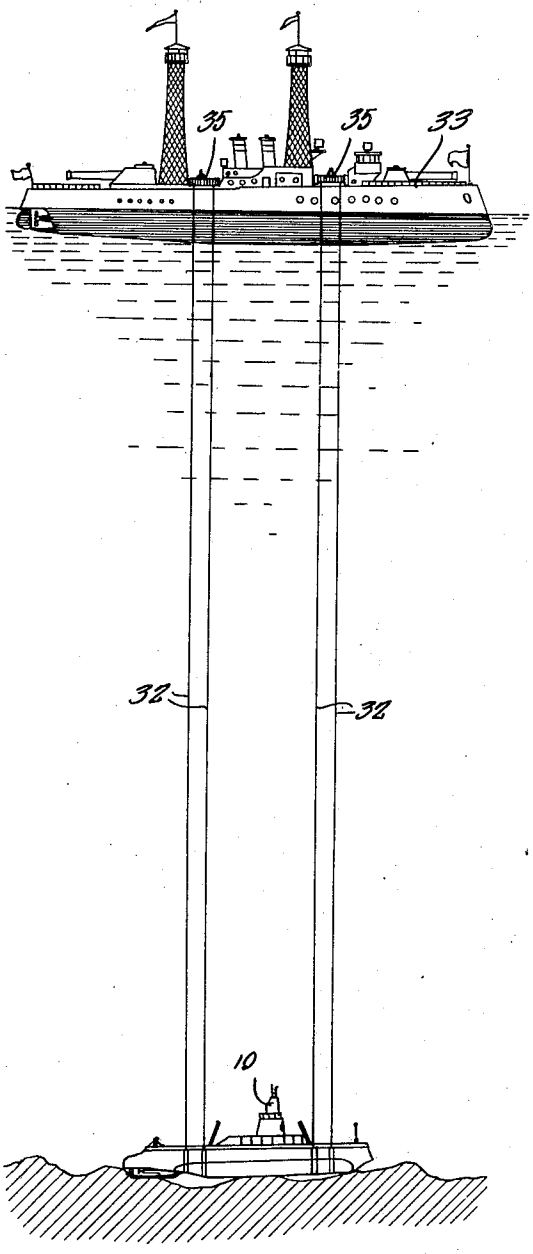
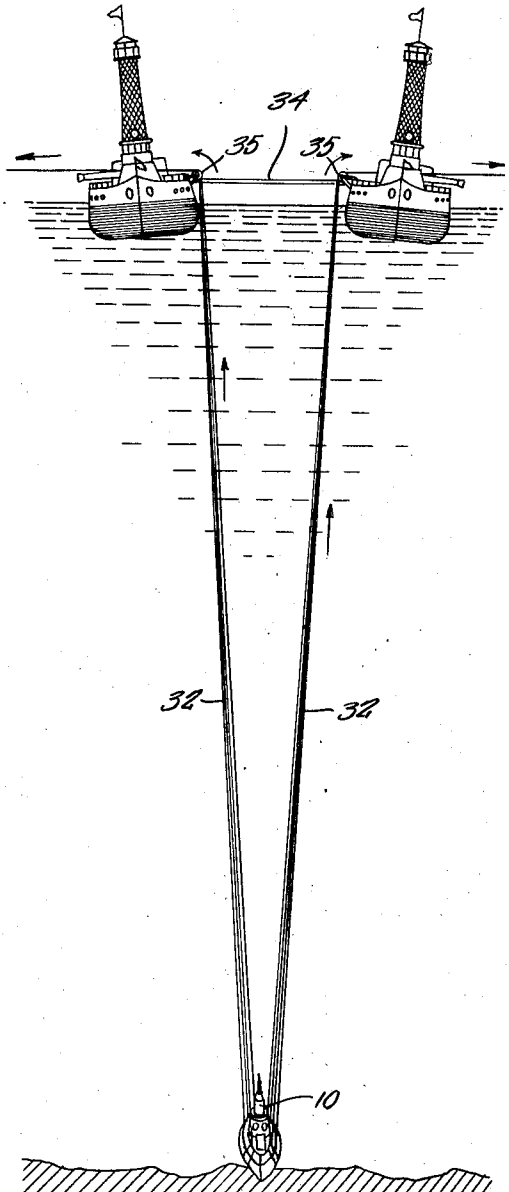


Fig. 10.



William La Grange
INVENTOR

BY Victor J. Evans
ATTORNEY

Lynn Bodton
WITNESS:

Sept. 20, 1927. 1,643,247

W. LA GRANGE

APPARATUS FOR RAISING SUNKEN SHIPS

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Fig. 11.

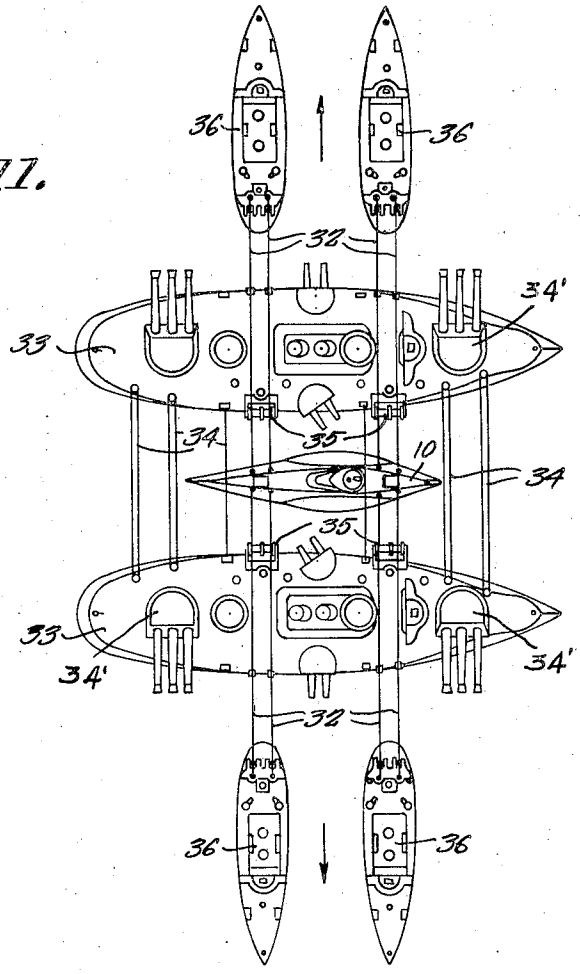
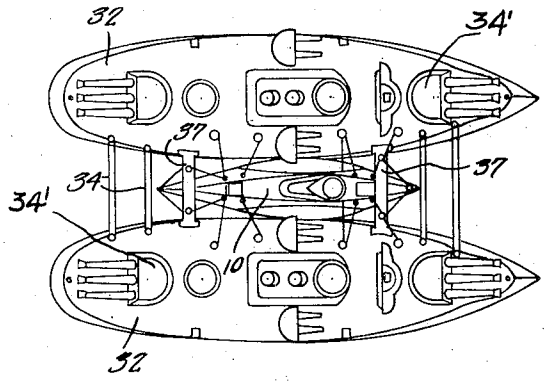


Fig. 12.



William La Grange
INVENTOR

BY Victor J. Evans
ATTORNEY

Lyman Bradton
WITNESS

Patented Sept. 20, 1927. 1,643,247

UNITED STATES PATENT OFFICE.

WILLIAM LA GRANGE, OF BROOKLYN, NEW YORK.

APPARATUS FOR RAISING SUNKEN SHIPS.

Application filed August 23, 1926. Serial No. 131,000.

This invention relates to improvements in apparatus for raising sunken ships and is especially adapted for salvaging sunken submarines.

The primary object of the invention resides in a means for applying hoisting cables about the hull of a sunken submarine without necessitating divers going to the bottom of a body of water to make the cables fast thereto.

Another object is to provide buoys normally concealed within hatches provided in the deck of a ship and which buoys may be released by a member of the crew in case of accidental sinking of the ship, the buoys when released, automatically rising to the suface of the water to indicate the position of the sunken ship to any salvage or rescuing ships.

Another object of the invention is the provision of a means for raising a sunken submarine by applying cables about the hull of the same, the ends of which cables pass over rollers provided on the decks of a pair of salvage ships of relatively heavy tonnage and on which cables a pull is exerted by securing the ends of the cables to tow boats which are adapted to pull in opposite directions, whereby the sunken ship is lifted to a position between the salvage ships, and when raised to the surface of the water, suitable strong backs are placed between the salvage ships for spanning the space therebetween, the submarines being lashed thereto, whereby the salvage ships may proceed to port with the salvaged submarine suspended therebetween.

With these and other objects in view, the invention resides in certain novel construction and combination and arrangement of parts, the essential features of which are hereinafter fully described, are particularly pointed out in the appended claims, and are illustrated in the accompanying drawing, in which:—

Figure 1 is a top plan view of a submarine provided with my improved salvage apparatus.

Figure 2 is a side elevation of the same.

Figure 3 is a vertical transverse sectional view on the line 3—3 of Figure 1.

Figure 4 is a vertical sectional view on the line 4—4 of Figure 1.

Figure 5 is a detail cross sectional view on the line 5—5 of Figure 3.

Figure 6 is a similar view on the line 6—6 of Figure 3.

Figure 7 is a perspective view of one of the cable hoisting devices.

Figure 8 is a side elevational view of a sunken submarine just after the buoys have been released.

Figure 9 is a similar view showing the salvage ships in position ready for the hoisting operation.

Figure 10 is a front view of the same.

Figure 11 is a top plan view showing the tow boats at the ends of the cables.

Figure 12 is a similar view of the submarine in a raised position and lashed between two salvage ships.

Referring more particularly to the drawings, the reference numeral 10 designates a ship which in the present instance is shown as a submarine of the usual well-known construction and to the hull of which sets of steel straps 11, 11 are mounted, the straps being counter-sunk in the sides of the hull and passing beneath the keel from the water line on one side to the water line on the opposite side. By making the straps flush with the sides of the hull, the straps in no way act as a resistance to the submarine when travelling in the water. That portion of the straps which pass beneath the keel, are elliptical in cross section as shown in Figure 5, the narrow portion of the strap pointed fore and aft so as to reduce after resistance of the exposed portions of the straps. There are two straps in each set, the same being disposed in spaced relation, one set of which is forward of the ship while the other set is aft as clearly shown in Figures 1 and 2 of the drawings. Each strap 11 is provided with a continuous conduit 12, through which a normally thin cable 13 passes, the ends of the cables extend into the respective hatches 14 provided in the top deck of the submarine. There are two hatches 14 shown in the drawings, one for each of the sets of cables and which hatches are identical in construction, so that a description of one will suffice for the other.

Stored in each hatch or compartment 14, is a cable raising device 15 which comprises two double winding reels 16 to which the ends of two cables 13 are normally wound. A single reel 17 is disposed above the reels 16 while all of said reels are journalled for rotation on a suitable frame 18. A cable

19 has one of its ends fixedly connected to the reel 17, and the same is normally wound thereon. The frame 18 has a bridge piece 20 which is rounded so as not to catch in the rigging of the ship when being lifted to the surface of the water in a manner presently to be explained. The bridge 20 is provided with an opening 21 for the passage of the cable 19, the walls of the opening serving as a guide for the cable during the paying out of the same. The free end of the cable 19 carries a float buoy 22 which is also normally housed within the respective hatch, while the cable 19 is wound on the reel 17 as shown in Figures 3 and 4 of the drawings.

The hatches are normally closed by doors 23, which are hinged as at 24, the said hinges having springs 25 therein for swinging the doors 23 to an open position upon the release of the door locking mechanism 26. The springs 25, are of course of relatively great strength as to overcome the pressure of the water from the outside of the door when the submarine is submerged at a great depth.

The door locking mechanism 26 comprises a vertical shaft 27 for each hatch door and which shaft is journalled in suitable bearings 28, the top of said shaft extending through the top of the submarine and having an angularly disposed lip for overlying the top of the door to hold the same down against the action of the spring 25. The other end of the shaft 27 is provided with a manipulating handle 29 for imparting a turning movement to the shaft 27 to release said lip from engagement with the door. For operating both hatch doors simultaneously, I provide each shaft 27 with a crank 30 to which the ends of a connecting rod 31 are operatively connected. It will be seen that in an emergency, a member of the crew of the sunken ship may actuate one of the handles 29, and by so doing, cause the simultaneous opening of the doors for releasing the buoys 22. The operation and purpose of the apparatus already described is as follows:— We shall presume that the submarine has been rammed by another ship and sunk, or has met with some accident which has caused the submarine to sink to the bottom of a body of water and in which case the submarine is unable to rise to the surface. In such event, a member of the crew of the sunken ship turns the handle 29, thereby releasing the hatch doors 23, at which time the springs 25 automatically raise the doors, permitting the buoys 22 to float to the surface of the water as shown in Figure 8 of the drawings. As the buoys rise, the cables 19 which are wound on the reels 17 disposed in the respective hatches begin to pay out. The buoys upon reaching the surface of the water serve to mark the position of the sunken ship, while the cables 19 establish a connection to the hoisting gear 15 which still remains in the hatches. The salvage operation is now ready to begin. The cable 19 is next pulled up by members of the salvaging crew and by reason of their connection with the reels 17, the gear 15 in the respective hatches is lifted to the surface, at which time the cables 13 unwind from the reels 16. After the hoisting gear has been lifted from the water onto one of the salvage ships, the cables 13 are completely unwound from their reels 16 to permit of the attachment of relatively heavy cables 32 to one end thereof. The cables 32 are capable of withstanding the weight of the submarine during the lifting operation presently to be described. After the heavy cables 32 have been connected to one of the ends of the cables 13, the same are passed about the hull of the submarine by pulling upon the free ends of the cables 13, thus causing the heavy cables 32 to pass through the conduits 12 in the straps 11 until the same replace the former cables 13 to provide a cradle or sling for the sunken ship. The cables 13 are next unfastened from the ends of the cable 32 for they are no longer required and the lifting operation is begun.

Two pontoons or battle ships 33 take up a position on the surface of the water parallel to the lie of the sunken ship. The two ships 33 are lashed together by ropes or cables 34 so as to remain at a spaced distance from each other as clearly shown in Figures 10 and 11 of the drawings to limit the lateral movement of the ships 33 when the tow boats hereinafter mentioned are pulling upon the cables 32. It might be well to mention why battle ships are employed in the salvaging operation in preference to other types of ships. It will be appreciated that battle ships are of a relatively heavy tonnage capable of supporting the weight of a submarine and are equipped with heavy gun turrets 34' as a part of their equipment, which turrets are turned to one side of the ship to counter-balance the weight of the lifting force during the raising operation.

Mounted on the decks of the battle ships are steel rollers 35 over which the cables 32 pass, the free ends of said cables being attached to towing ships 36 which are adapted to pull upon the cables when moving in a direction at right angle to the longitudinal axis of the battle ship. There are four towing ships 36 shown in the drawings, to each of which two cables 32 are connected, however, a tow boat may be used for each cable should the weight of the submarine be too great for the pulling force of the four tow boats. The tow boats are now propelled forward at an even rate of speed so that the cables 32 are drawn up together. The horizontal pulling force will impart a lifting

force beneath the submarine due to the cables passing therebeneath. The tow boats continue pulling upon the cables until the submarine reaches the surface of the water, same appearing at the surface between the spaced battle ships. When raised, steel strong backs 37 are placed across the space between the battle ships to bridge the same and the submarine lashed thereto. The gap between the battle ships is closed up after the raising of the submarine by pulling in upon the cables 34 so that the submarine snugly fits therebetween. The cables 32 are made fast to the decks of the battle ships as shown in Figure 12 and the turrets returned to normal position. The battle ships may now proceed to port with the salvaged submarine suspended therebetween.

The rollers 35 and strong backs 37 are made portable to permit the same to be stored upon the battle ships as part of their equipment, whereby to lend aid in such an emergency as has been mentioned.

From the foregoing description, it will be seen that by providing a means for passing cables about the hulls of sunken ships, it is possible to quickly raise the same to the surface of the water without sending divers to the bottom to attach the cables, as all work is performed on the surface of the water.

While I have described what I deem to be the most desirable embodiment of my invention, it is obvious that many of the details may be varied without in any way departing from the spirit of my invention, and I therefore do not limit myself to the exact details of construction herein set forth nor to anything less than the whole of my invention limited only by the appended claims.

What is claimed as new is:—

1. In an apparatus of the class described, the combination of a ship having a compartment in the deck thereof, a cable normally encircling the hull of said ship and having its ends extending into said compartment and wound about said reel, a second reel journalled in the same support as said first reel, a cable having one end fixedly connected to said second reel, a buoy carried by the other end of said last cable and disposed within said compartment, a door normally closing said compartment, and manual control means for operating said door below the surface of a body of water to release said buoy from said compartment to permit the same to automatically float to the surface of a body of water to indicate the position of a submerged ship, and for facilitating the lifting of said reel to the surface of the water.

2. In an apparatus for raising sunken ships, a ship having compartments forward and aft thereof, cables passing about the hull of said ship and having their free ends extending into said compartments, doors normally closing said compartments, door opening mechanism for simultaneously opening said doors against the pressure of water thereagainst when said ship is submerged, and means releasable from said compartments upon the opening of said doors for effecting the raising of the ends of said cables to the surface of a body of water when said ship is submerged therein.

3. In an apparatus for raising sunken ships, a ship having compartments therein, conduits provided in the hull of said ship and extending transversely therearound, compartments provided in the deck of said ship, a frame provided in each of said compartments, a reel journalled in said frame, a cable passing through each of said conduits and having its ends normally wound about said reel, a second reel journalled in said frame, a cable having one of its ends normally wound about said second reel and having one end fixedly connected thereto, a float buoy carried by the other end of said last cable and normally disposed within said compartment, spring actuated doors normally closing said compartments, and means for releasing said doors to permit the same to move to open position to release the buoys contained therein when said ship is below the surface of a body of water, whereby to release the buoys contained therein to allow them to float to the surface of the body of water, substantially as and for the purpose specified.

4. In a means for raising a sunken ship to the surface of a body of water, a ship resting below the surface of a body of water, cables, means for passing said cables about the hull of said ship from the surface of the water, a pair of pontoons on the surface of the water respectively disposed on opposite sides of the vertical axis of said ship, said pontoons having rollers mounted thereon over which the said cables pass, and means for exerting a simultaneous pull on the ends of said cables, said means including tow boats movable over the surface of the body of water to which the free ends of said cables are attached.

5. In a means for raising a sunken ship to the surface of a body of water, a ship resting below the surface of a body of water, cables, means for passing said cables about the hull of said ship from the surface of the water, a pair of pontoons on the surface of the water respectively disposed on opposite sides of the vertical axis of said ship, said pontoons having rollers mounted thereon over which the said cables pass, tow boats movable over the surface of the body of water to which the free ends of said cables are detached for exerting a simultaneous pull on the ends of said cables to

lift said ship vertically to the surface of the water between said pontoons, and means for supporting said ship between said pontoons upon the surface of the water.

6. In an apparatus for raising sunken ships, a ship, straps counter-sunk in the sides of the hull of said ship and passing thereround, a continuous conduit provided in each of said straps, and cables passing through said conduits, substantially as and for the purpose specified.

In testimony whereof I have affixed my signature.

WILLIAM LA GRANGE.