

H. C. E. LINDTKE.
LIFE SAVING ATTACHMENT FOR SUBMARINES.
APPLICATION FILED OCT. 14, 1912.

1,064,351.

Patented June 19, 1913
2 SHEETS—SHEET 1.

Fig. 1.

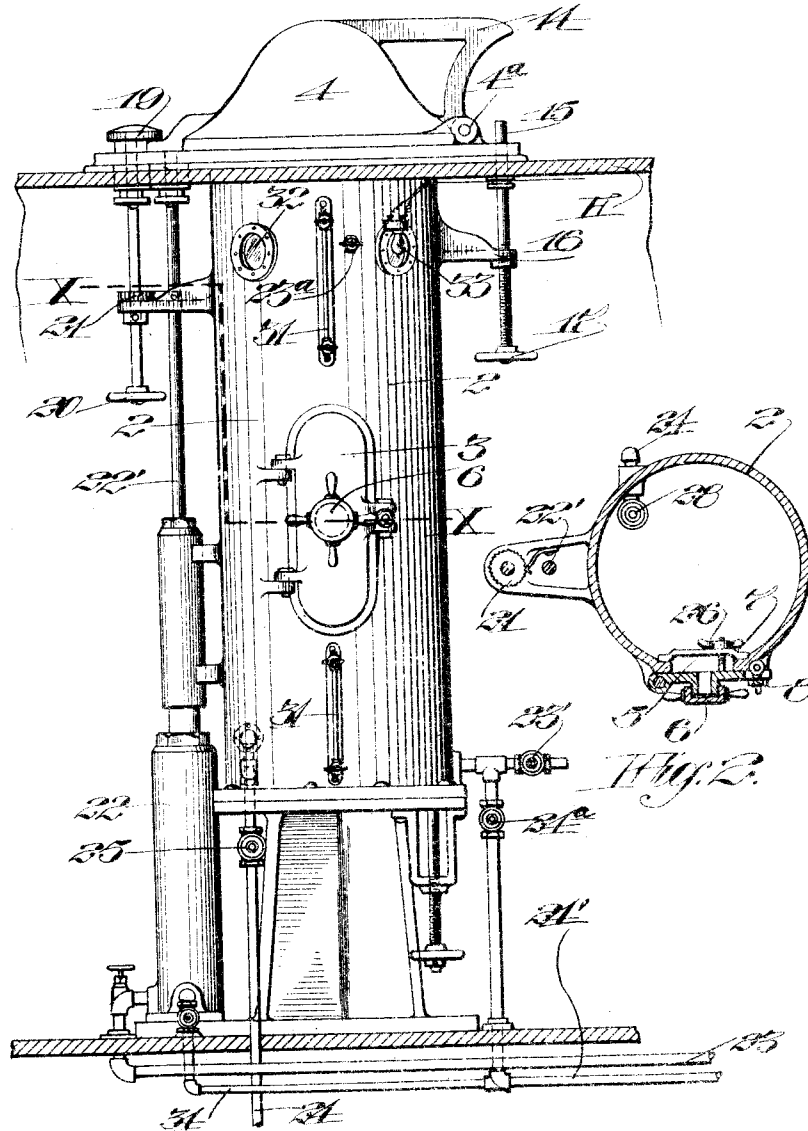


Fig. 2.

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H. C. E. LINDTKE.
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2 SHEETS—SHEET 2.

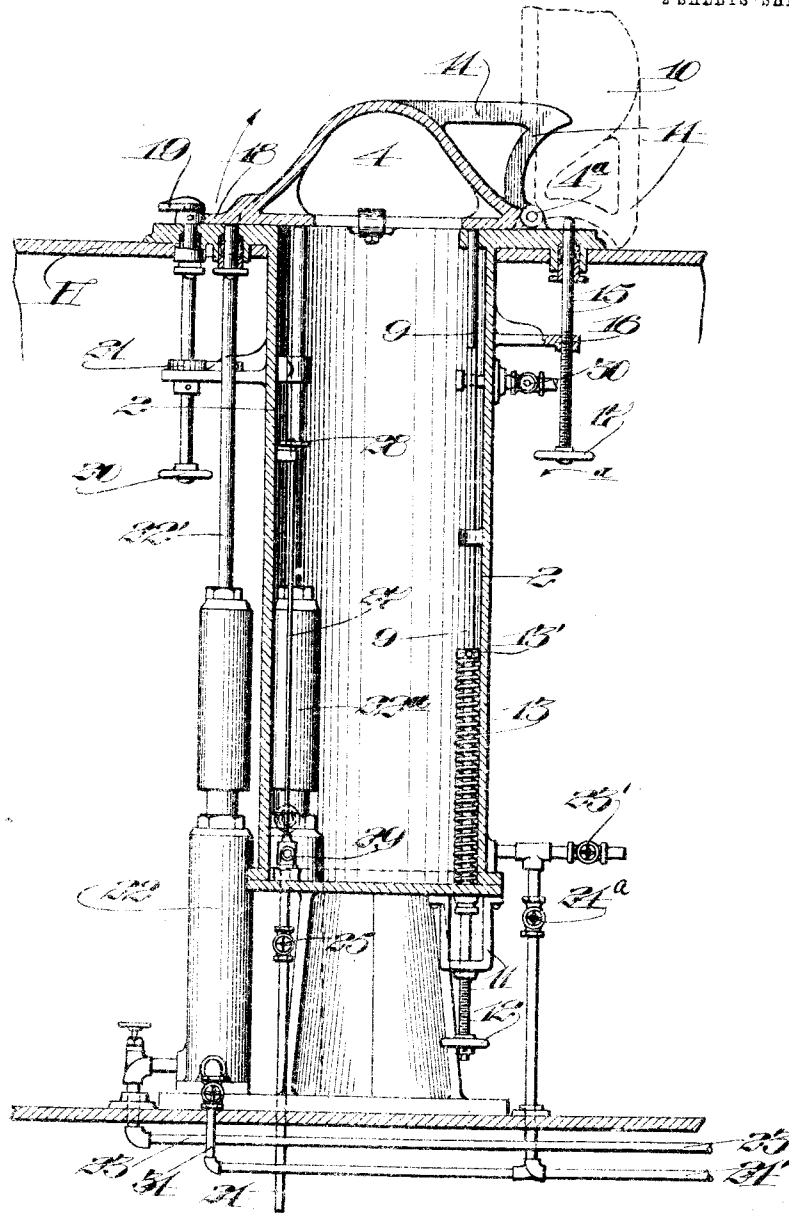


Fig. 5.

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LIFE-SAVING ATTACHMENT FOR SUBMARINES.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, HERMAN C. E. LINDTKE, a citizen of the United States, residing at Emeryville, in the county of Alameda and State of California, have invented new and useful Improvements in Life-Saving Attachments for Submarines, of which the following is a specification.

This invention relates to a means whereby escape may be made from a sunken and disabled submarine.

The object of the invention is to provide new and useful improvements in submarine boats, whereby convenient means is afforded for the escape of the crew in case the submerged boat becomes disabled and incapable of rising to the surface of the water; the said means permitting a diver or other person to leave the boat for investigating or other purposes.

A further object of the invention is to provide certain means which will permit the escape of the last man aboard.

The invention consists of the parts and the construction and combination of parts as hereinafter more fully described and claimed, having reference to the accompanying drawings, in which—

Figure 1 is a side elevation of the device. Fig. 2 is a cross section on the line X—X of Fig. 1. Fig. 3 is a longitudinal vertical section.

In the drawings A indicates the shell or hull of a submarine boat, which may be of any desired type of structure. Suitably connected to the upper part of the shell of the submarine, within the vessel and at a point preferably near the conning tower, is a downwardly projecting tube or cylinder 2, having a door 3 permitting the persons to pass from the boat into the interior of the chamber, or vice versa. The top of the tube communicating with the exterior is provided with a second door 4, provided with certain operating and locking means hereinafter to be described. The door 3 is provided with a handhold opening 5, normally closed by a screw cap 6, which, when removed, permits insertion of the hand to operate a locking mechanism indicated at 7, allowing it to be opened from the inside.

The outside of the door is provided with a common locking means consisting of a hinge, lever and locking bar 8. The main exit door 4 is hinged, as shown at 4^a, and is automatically opened by a spring-pressed

rod 9. This rod 9 will operate to throw the door into the open position, shown by dotted lines at 10, when certain releasing means are opened. The spring-pressed rod 9 is provided for the purpose of insuring a positive means which will insure a complete opening of the door 4 when exit is desired. The lower end of the rod 9 extends through the exit tube and a bracket 11 and is threaded to receive a hand-wheel or nut 12, making it possible to retract the rod against the compression of the spring 13 when it is desired to close the outer door 4. The moment the outer door or closure has been secured in place, it becomes possible to unscrew the nut 12 or lower it into the position shown in Fig. 3; leaving the rod 9 free to be projected to lift the cover when this is released, the outward movement of the rod being limited by the position of the nut 12 when the nut engages with the bracket 11. The door 4 is also provided with a cam attachment 14, so positioned as to be engageable with a rod 15 operable from the inside of the vessel. The rod is threaded and passes through a nut 16 and is provided with a hand-wheel 17 by which the rod may be advanced or retracted to close the door; this being accomplished by engagement of the rod with the cam 14.

Turning the hand-wheel in the direction of arrow *a* will feed the rod in an outward direction and force the door into the closed position, as shown in Fig. 3. The door is also provided with an extension 18, engageable with a lock 19 controlled by a hand-wheel or lever 20 on the inside of the vessel. It is also provided with a friction means, generally indicated at 21, for the purpose of holding the lock in any position in which it may be turned.

22 indicates a hydraulic lift which is provided for the purpose of assisting in opening the outer door 4 under certain conditions. The pressure to operate the lift is conveyed through a pipe 23 from any suitable means, as a hand or power pump, not here shown.

In operation, it being necessary or desired to make the escape from a disabled submarine in which the foregoing apparatus is installed, it becomes necessary for the person or persons desiring to escape to apply a diver's suit or a helmet of any suitable kind, provided with provisions which will supply air for a limited time. The per-

son then enters the chamber or tube 2 through the inner door, which is then closed from the inside by the locking mechanism 8 by other members of the crew. The locking mechanism 19 securing the outer door 4 is then operated to release the catch 18, leaving the door free to open when certain pressures and conditions have been overcome by the automatic opener 9. Water from the outside is then admitted into the chamber through a pipe 24 by opening a valve 25, which will allow the water to enter and flood the chamber. The water gradually rising in the chamber will compress the air contained in the same until the pressure of the outside surrounding water and the air pressure become equalized. The moment this balanced state of pressure has been attained, the rod 9 will become operative to open the outer door 4; this being accomplished by the pressure of the spring 13 acting on the collar 13', thus allowing the person to escape from the tube.

One of the main objects of this invention is to provide means whereby the last member of the crew may escape, which is accomplished by the following means: Supposing all members of the crew have escaped, with the exception of the last operator, this member may escape by first closing the outer cover 4. This is accomplished by turning the hand-wheel 17 in the direction of the arrow *a*, which will feed the rod 15 outwardly and force the cover 4 into closed position. Before the closing of the cover it becomes necessary to retract the automatic door opening rod 9 which was projected in an outward direction by opening the cover. This is accomplished by turning the hand-wheel or nut 12 in a direction which will retract the rod against the pressure of the spring 13. The rod having been retracted, it is possible to close the outer cover by the means just described. In order to permit the rod to again be projected to open the door, it is necessary to turn the nut 12 into the lower position shown in Fig. 3; the distance between the bracket 11 and the nut 12 being the amount of projection necessary to open the door. The lock 19 is then turned by the hand-wheel 20 to engage the lug 18 and secure the cover. This having been accomplished, it becomes necessary to remove the water contained within the chamber 2. The water may be discharged by opening a valve 23' and an air vent 23'', allowing the water to drain into the interior of the vessel, or by opening the valve 24', which may be connected to a suction pump, not here shown, which will draw water from the chamber and discharge it outside of the vessel. The chamber being emptied of the water, may now be opened by releasing the lock 8 on the inner door, and the lock 19 securing the outer cover may be turned into the re-

leased position, as shown in Fig. 2. The external pressure being more than sufficient to secure the door in the locked position, the rod 15 is returned to its normal position, indicated in Fig. 3, so as not to interfere with the opening of the cover. The operator having applied the necessary helmet or suit may then enter the inner door and secure same by the inner lock 7, which consists of a bracket extending across the door opening and a bolt secured to the door so positioned as to pass through the inner bracket. The outer end of the bolt is secured to the bracket by a nut 26 for the purpose of locking the door. The door having been secured, it only becomes necessary to flood the chamber, as before described, until internal and external pressures equalize. This is accomplished by a rod 27, provided with a hand-wheel 28, through the operation of which a valve 29 may be opened on the inside of the chamber to flood same. The moment the external and internal pressures equalize, as before described, it will be understood that the rod 9 will become operable to lift the door into the open position, which will permit the escape of the operator.

For the purpose of aiding the last man to escape from the tube, it has proven of great advantage, and sometimes a necessity, to fit the inside of the cylinder with a hydraulic lift 22' for the purpose of lifting or assisting in lifting the outer cover. This hydraulic lift may be operated by any suitable means, as a hand pump or pressure supply from the interior of the vessel.

It will be understood that the tube may be used by a diver when it is necessary to make certain repairs or investigations around the ship. With this purpose in view, I have provided a connection 30, to which an air tube, not here shown, may be connected. The tube may otherwise be fitted with water gages 31 and suitable light openings 32. The light openings 32 may be provided for the purpose of admitting light to the interior of the chamber in order to ascertain if a person has escaped. One or more of the openings, as 32, may be provided with electric lights, as 33, which may be used when necessary.

The hydraulic lift 22 and operating rod 22' are only used under certain conditions when more or less difficulty is met with in opening the outer cover 4. 34 indicates a drain pipe connecting with the hydraulic lift and the main suction pipe line 24', for the purpose of draining the hydraulic lift to return it to its normal position.

The apparatus is simple, compact and reliable in its actions, and may be positioned in any suitable or convenient place within the vessel. The materials and finish of the several parts are such as experience and judgment of the manufacturer may dictate.

It will be understood that various changes in form, proportions and minor details of construction may be resorted to within the scope of the appended claims.

5 Having thus described my invention, what I claim and desire to secure by Letters Patent is—

1. The combination with a vessel adapted to be submerged, of a compartment within the vessel having an opening therein-
10 to and an opening outside the vessel, closures for said openings, locks operable from either the inside or the outside of said compartment controlling the closure of the opening
15 communicating with the interior of the vessel, a locking means operable from the interior of the vessel for locking or unlocking the exterior cover, means operable from the exterior of the chamber for flooding the
20 chamber to equalize exterior and interior pressures, means operable from the interior of the chamber for flooding the chamber, an automatic means within the chamber for opening the exterior closure, a secondary
25 means within the chamber for forcing the exterior closure open, and means operable from the interior of the vessel to close said cover.

2. The combination with a vessel adapted
30 to be submerged, of a compartment within the vessel having an opening therein and an opening outside the vessel, closures for said openings, locks operable from either the inside or the outside of said compart-
35 ment controlling the closure of the opening communicating with the interior of the vessel, a locking means operable from the interior of the vessel for locking or unlock-
40 ing the exterior cover, means operable from the exterior of the chamber for flooding the chamber to equalize exterior and interior pressures, means operable from the interior
45 of the chamber for flooding the chamber, an automatic means within the chamber for opening the exterior closure, a secondary means within the chamber for forcing the
50 exterior closure open, said means comprising a vertically disposed rod suitably journaled on the inside of the chamber so positioned as to have one end engageable with
55 the inner edge of the outer closure and the other end projecting through the lower portion of the chamber, a spring surrounding said rod, a collar secured to the rod against which the spring acts, threads formed on the lower end of the rod and a nut for controlling the position of the rod, and means operable from the interior of the vessel to close said cover.

60 3. The combination with a vessel adapted

to be submerged, of a compartment within the vessel having an opening therein and an opening outside the vessel, closures for said openings, locks operable from either the inside or the outside of said compart- 65 ment controlling the closure of the opening communicating with the interior of the vessel, a locking means operable from the interior of the vessel for locking or unlocking the exterior cover, means operable from the 70 exterior of the chamber for flooding the chamber to equalize exterior and interior pressures, means operable from the interior of the chamber for flooding the chamber, an automatic means within the chamber for 75 opening the exterior closure, a secondary means within the chamber for forcing the exterior closure open, said means comprising a vertically disposed rod suitably jour- 80 naled on the inside of the chamber so positioned as to have one end engageable with the inner edge of the outer closure and the other end projecting through the lower por-
tion of the chamber, a spring surrounding said rod, a collar secured to the rod against 85 which the spring acts, threads formed on the lower end of the rod and a nut for controlling the position of the rod, means operable from the interior of the vessel to close
said cover, said means comprising a cam 90 formed on the outer closure, a rod engageable with said cam, and means for operating said rod.

4. The combination with a vessel adapted to be submerged, of a compartment within 95 the vessel having an opening therein and an opening outside the vessel, closures for said openings, locks operable from either the inside or outside of said compartment controlling the closure of the opening com- 100 municating with the interior of the vessel, means operable from the exterior of the chamber for flooding the chamber to equalize exterior and interior pressures, means operable from the interior of the chamber 105 for flooding the chamber, an automatic means within the chamber for opening the exterior closure, a secondary means within the chamber for forcing the exterior closure open, and a hand-controlled fluid-actuated 110 means within the chamber for forcing the outer closure into open position.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

HERMAN C. E. LINDTKE.

Witnesses:

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W. W. HEALEY.