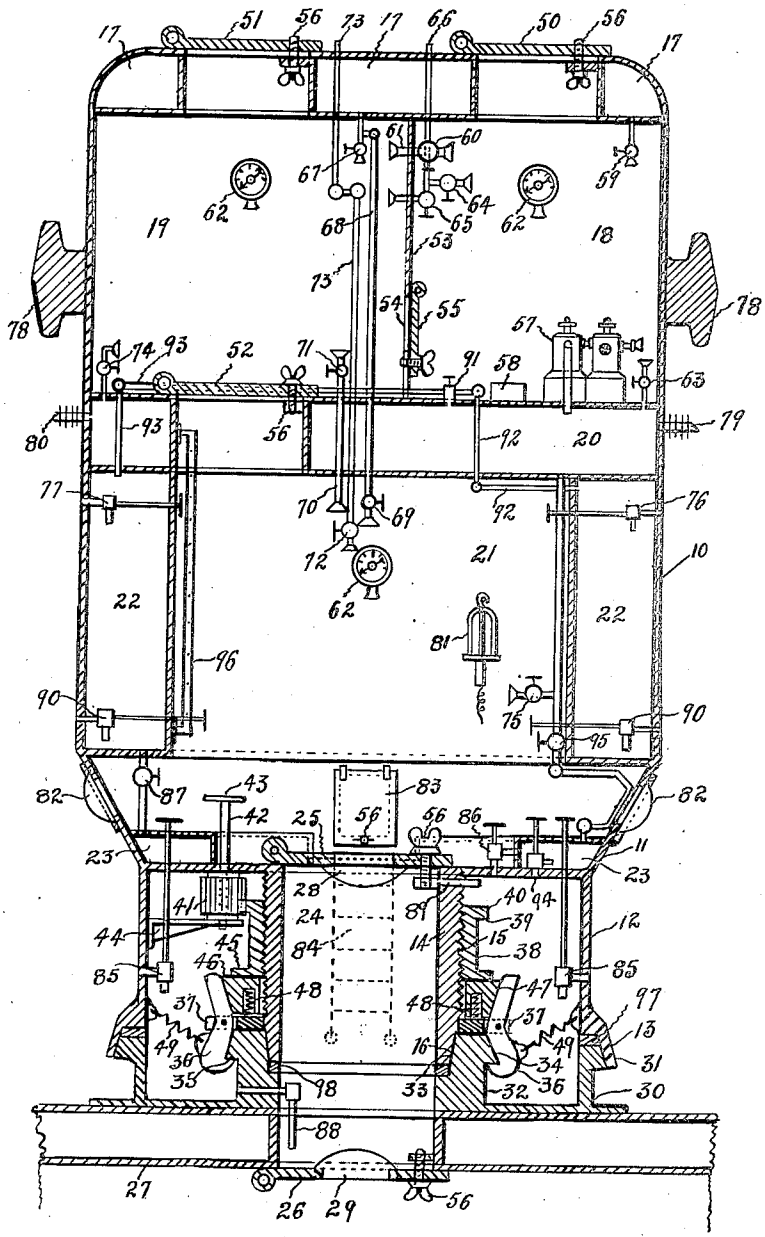
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SUBMERSIBLE RESCUE APPARATUS FOR SUBMARINES

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SUBMERSIBLE RESCUE APPARATUS FOR SUBMARINES

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1 Claim. (Cl. 114—16.8)

The invention relates to improvement in a submersible apparatus which may be easily attached to a sunken vessel or submarine to provide means whereby those imprisoned therein may be readily rescued therefrom and at the same time be supplied with aid such as may be needed in an emergency of this nature when released from the vessel or submarine.

Literary and constructive works have not been wanting on salvaging apparatus for submerged submarines at great depths, in which a diver can operate and rescue those imprisoned in the sunken vessel or submarine, and treat those rescued before releasing them to ordinary atmospheric pressure, thereby preventing what is commonly called caisson disease.

The present invention contemplates providing the conventional hull of the submarine or other vessel with a plurality of protruding flanged openings, adapted to receive the connecting portion of the submersible apparatus, the subject matter of this invention.

Among the other objects sought to be attained is the provision of an apparatus of this nature that is exceedingly simple; that is very durable; that is dependable in operation and highly efficient in use.

With these and other objects in view the invention has certain novel features of construction as hereinafter shown and pointed out in the drawing illustrative of an example of the submersible apparatus.

In order that this invention may be more clearly understood, reference may be made to the accompanying drawing which illustrates a convenient constructional form of this invention by way of example only, and in which:

The figure is a vertical sectional view of the apparatus showing same connected with the hull of a submarine vessel.

Similar reference characters designate similar parts throughout the drawing.

Referring now to the figure, the submersible apparatus 10 as a whole is of cylindrical or other suitable configuration, having a tapered section 11 terminating in a cylindrical portion 12 having a flange 13 integral therewith.

Concentrically arranged therein there is provided a cylindrical portion 14 having a threaded periphery 15 and a truncated conical end portion 16.

The apparatus is provided with an oxygen compartment 17, having therebelow two compartments 18 and 19.

Below the aforesaid compartments there is provided a compressed air compartment 20. Below the compressed air compartment there is provided another compartment 21.

In the compartment 21, there is provided a water ballast compartment 22 and a water receiving compartment 23, (and is hereinafter referred to as the water receiving tank). Below the compartment 21 there is provided a hatch 24. This hatch is provided with sealable doors or scuttles 25 and 26, the door 26 closing the opening in the submarine hull 27, which is shown fragmentary in the drawing. The doors 25 and 26 are provided with glass as at 28 and 29 to provide means for observation into the hatch, and also into the submarine after the apparatus is connected with the hull.

The connection 30 on the submarine hull is provided with a portion 31 to receive the flange 13 on the submersible apparatus. Concentrically arranged in the connection there is provided a portion 32 having a seat 33 therein to receive the truncated conical end portion 16 of the member 14. The outer periphery 34 of the member 32 on the hull is provided with an annular overhanging flange 35 adapted to receive the hooked end of the gripping fingers 36, 36 pivoted in the member 37 fast on the member 14.

On the member 14 there is provided a member 38 that threadedly engages the member 14. This member is provided with an enlarged or flaring portion or flange 39 the periphery 40 of which is provided with flutes, serrations or teeth adapted to engage the teeth on the pinion 41 fast on the shaft 42 having a hand wheel 43 fast on its upper end. The pinion with its shaft is supported and journalled in the bracket 44 in a suitable manner. The lower end of the member 38 is provided with a projecting annular flange 45 that contacts with the upper surface 46 of the annular wedge shaped member 47 that is slidably mounted on the member 14. This wedge shaped member is adapted to actuate the gripping instrumentalities or fingers.

The quoin or wedge shaped member is provided with a plurality of spaced helical springs 48. These springs are supported on the member 37 and are adapted to force the wedge shaped member upward when the member 38 is screwed upon the member 14 by means of the pinion 41. It will be noted that the pinion 41 is amply wide, so that when the member 38 is screwed down or up, the teeth 40 on the outer circumference of the flange 39, will be at all times in mesh therewith.

The gripping fingers are released from the

flange by means of helical springs 49 that pull the finger back when released from the influence of the locking wedge.

The compartments 18, 19, and 21 are closed by sealable doors 50, 51, and 52. Between the compartments 18 and 19 there is provided a wall 53 having an opening 54 therein closed by a door 55.

The doors are locked by means of screw-members as at 56, however the doors may be so locked that they may be opened from either the outside or inside of the apparatus, or from either side in the apparatus.

The compartment 18 is the diver's compartment. Within this chamber there is provided an electric operated compressor 57 by means of batteries 58. The compressed air compartment or storage 20 may be supplied with compressed air by this compressor. Oxygen may be let into the diver's compartment by means of the valve 59, and the pressure between the compartments 18 and 19 may be regulated by means of the valve 60 which are in communication with each other by means of a pipe 61. The compartments are each provided with a manometer 62. Compressed air may be admitted into the compartment 18 by means of the valve 63. The air pressure in the chamber 18 and 19 may be regulated by releasing same into sea water by means of the valves 64 and 65 through the pipe 66. By opening the valve 64 the air in compartment 18 may be reduced independently of compartment 19 and by opening both valves 64 and 65 both compartments may be depleted of excess pressure, or by opening valve 65 the pressure in compartment 19 may be reduced independently. Oxygen may be released into compartment 19 by opening the valve 67. A pipe line 68 communicates with the compartment 21 through which oxygen may be delivered into the compartment by opening the valve 69 in the compartment. The pressure may be equalized between the compartments 19 and 21 by means of the pipe line 70 controlled by the valve 71. The pressure in compartment 21 may be reduced by opening the valve 72 that controls the pipe line 73 that releases the pressure into the sea. The pressure may be built up in compartments 19 and 21 by opening the valve 74 in compartment 19, and by opening valve 75 in compartment 21.

To fill the water ballast compartment 22, the sea cocks 76 and 77 are opened, the opening of these valves allows the water to enter the compartment. When the compartment is supplied with sufficient water the sea cocks are closed. The device may now be made ready to be lowered, by means of suitable cables, not shown but understood in the art. The cables are secured to the trunnion 78, 78 and are controlled on the salvaging ship equipped with proper means to handle same.

The apparatus is also provided with armored conduits 79, 80. These conduits are connected to the compressed air compartment and provide a means for supplying compressed air thereto from the salvaging ship.

The telephone and light lines may also be carried by these conduits by means of which the diver may communicate with the surface ship as well as with the compartments in the apparatus, (not shown but understood in the art). A deep sea lamp is shown at 81 in compartment 21. It is to be understood that all compartments other than the hatch is provided with a like lamp.

The apparatus is provided with portholes 82 having glass therein for observation purposes. The chamber 21 is provided with a sealable door 83 through which the diver may leave the apparatus to enter the sea. When the pressure within the apparatus is equal to the pressure outside, the diver may open the door and leave the apparatus. A ladder 84 is provided outside the apparatus so that the diver may leave and again enter the device with little effort.

At a depth beyond 33 fathoms or about 200 feet, due to the great pressure the diver should not work outside the apparatus.

When the aparatus is brought into registry with the connecting member on the submarine the pressure of the water surrounding the connection makes it very difficult to make the connection with submarine hull. This is overcome by providing the water tank 23 in the apparatus. When the apparatus is brought into alignment and contacts with the connection, the sea cock or valves 85 and 85 are opened, and also the valve 86. By opening these valves the pressure outside with the water inside the connection is brought into equilibrium, and the pressure will be automatically set between the pressure outside and inside.

When the pressures are equalized the connection may be made with ease and dispatch. If the water ballast tank is not completely filled it may be utilized as an auxiliary means by opening the valve 87 this allows the water to pass into the ballast compartment thereby utilizing the empty space therein. The pressure in the hatch is equalized by means of the conduits 88 and 89. When the pressure is equalized the valves 85, 85, 86, and 87 if 87 is used are closed, and the locking connection is completed by screwing the member 38 down on the member 14 by means of the pinion 41 operated by the hand wheel 42 that forces the wedge shaped member downward thereby actuating the gripping fingers that engage the overhanging flange on the connection on the hull.

The hatch 24 is drained of water in any suitable manner such as a pump manually operated (not shown but understood in the art.)

The water ballast compartment is emptied by opening the valves 90, 90. When these valves are opened the diver, opens the valve 91, this allows the compressed air from the compressed air tank to pass through the pipe 92, 92 and 93, 93 into the compartment 22 to force the water out through the valves 90, 90.

The water tank 23 is emptied by opening the valve 94, and releasing compressed air thereinto by opening the valve 95. The compartment 21 is provided with a ladder 96 adapted to make the passage from compartment 19 to 21 easy for the diver by climbing from one to the other.

Annular resilient gaskets or seals 97 and 98 are provided in the joints to maintain air and water-tight relation therebetween when the apparatus is connected with the hull.

The operation of the apparatus is as follows: The apparatus is connected to the hull of the disabled vessel, the door 29 is opened, the entombed sailor passes into the hatch, the door then closes behind him. The door 28 is next opened and the sailor is passed into compartment 21. Several are thus released, some are allowed to remain in compartment 21 whilst others are instructed to enter compartment 19. When properly placed in the compartments the

door 52 is locked and one of the divers returns to the compartment 18. Instructions are relayed to the chambers where the necessary stages of decompression takes place before releasing the sailors to ordinary atmospheric pressure. The device is released from the hull and brought to the surface where the sailors are released.

The operation may be repeated until all are rescued, or it is decided at that further efforts would be futile.

The piping and valve is merely suggestive because the various valves may be duplicated in each of the respective chambers and operated therein if desired.

While I have herein shown and described a preferred arrangement of the apparatus, it will be readily understood that changes and modifications therein may be found desirable or essential in meeting the various exigencies of use, and I therefore desire to be understood as reserving the right to make any and all changes or modifications as may be found desirable or essential in so far as the same may fall within the spirit and scope of the invention as expressed in the following claim when broadly construed.

Having thus described my invention what I claim is:

A submersible rescue apparatus for a submarine comprising a casing, an oxygen compartment therein, two compartments therebelow ingress and egress openings into the aforesaid said two compartments, sealable doors for said compartments, a compressed air compartment below said two compartments, a compartment below the compressed air compartment, ingress and egress openings thereto, a sealable door therefor, a water ballast compartment in the compartment below the compressed air compartment, a water tank also in the aforesaid compartment and above the floor thereof, a connecting means, a hatchway in the said connecting means, a sealable door in a connection on a submarine hull, the said hatchway in the connecting means in the apparatus and connection on the submarine hull forming the complete hatchway, locking means exteriorly of the hatchway, operating means therefor, means controlling the operation of the locking means, means in the locking means operating in opposition to the controlling means, means for supplying oxygen and air to the compartments above and below the compressed air compartment, means for filling the ballast compartment with water, means for expelling the water therefrom, and controlled means adapted to exert an automatic controlling action upon water within the connecting means and the hatchway so that the apparatus may be easily connected with the submarine hull, and means for expelling water from the water tank after the apparatus is released from the hull.

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