Oct. 28, 1930. H. E. GRIESHABER 1,779,429

ESCAPE HATCH FOR SUBMARINES

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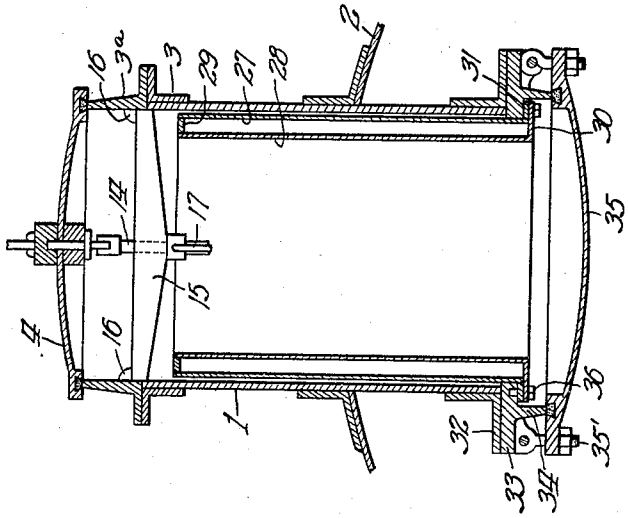


Fig. 1

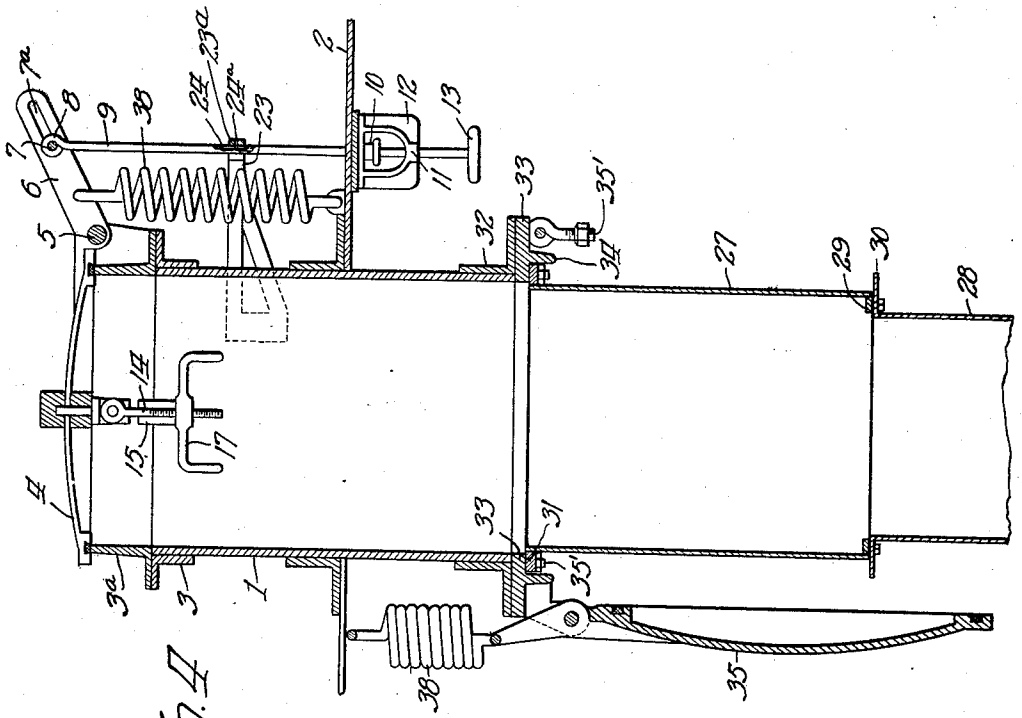


Fig. 4

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Fig. 2

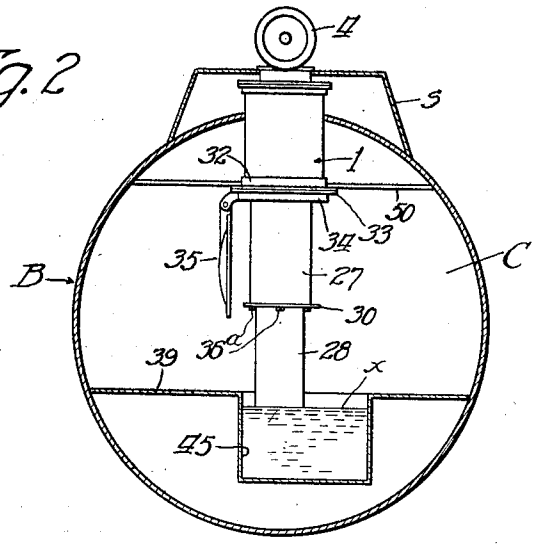
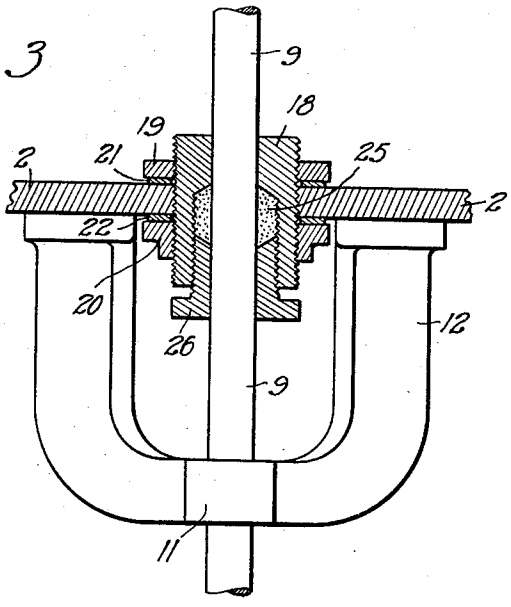


Fig. 3



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UNITED STATES PATENT OFFICE

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ESCAPE HATCH FOR SUBMARINES

Original application filed May 7, 1928, Serial No. 275,730. Divided and this application filed August 5, 1929. Serial No. 383,632.

This invention relates to submarine boats, and more particularly to an escape hatch structure therefor.

In the case of submarine boats which, due to collision or other cause, have been disabled and are unable to rise to the surface, it is desirable to provide means whereby the men can escape from the boat through an escape hatch without being subjected to pressure while immersed in the water for a longer period than is absolutely necessary. It is known to provide escape hatches in submarine boats, these hatches including a hatch trunk which extends downwardly a short distance into the compartment of the boat from the upper portion of the hull. In using these hatches the compartment is flooded until the water reaches the lower or inner end of the hatch trunk and effects a seal therewith. Under such conditions the men in the compartment are immersed in the water except for the upper portion of their bodies or their heads.

This is not usually seriously objectionable as the men can quickly escape from the compartment and are not subjected to high pressure in the water for an injuriously long period of time. In cases where the injured boat is at such a depth that the crew can not safely escape through the hatch without the use of diving suits or other apparatus and it is necessary for the men to remain in the compartment for some time after flooding thereof, this is objectionable. It has been found that a man can remain in a compartment filled with compressed air without suffering any ill effects therefrom for a much longer time than he can remain immersed in water under equal pressure. The water, at depths of 100 feet or more, such as that in which submarine boats operate, has a relatively low temperature. As a result, when the men in the compartment of the submarine boat are immersed in this water under pressure they are quickly chilled and their vitality is materially lowered. In consequence, the prospects of a man reaching the surface safely after being immersed in this water under pressure for an appreciable time are materially less than if the man were surrounded by compressed air, and not immersed in the water. It also appears that the water, regardless of its relatively low temperature, has an effect on men immersed therein under pressure which tends to quickly weaken the men and reduce their vitality.

One of the main objects of my invention is to provide simple and efficient means whereby the men in the compartment of a disabled submarine boat are enabled to remain in such compartment without being immersed in water after the escape hatch has been opened.

More specifically, my invention comprises an extensible hatch in conjunction with a well disposed to receive the lower end of the hatch when extended, this well being disposed below the compartment whereby the water does not rise into the compartment when the well is flooded, the men when escaping entering this well and passing therefrom into the hatch trunk. With the hatch fully extended the men have a dry deck where they can put on diving suits, and do not have to enter the water until after the diving suit has been completely applied and properly secured, and the man is ready to pass through the hatch trunk to be transferred to the rescue ship. Further objects and advantages of my invention will appear from the detailed description.

In the drawings:

Figure 1 is a sectional view through a hatch structure constructed in accordance with my invention, the upper portion of the hull of the submarine boat being shown fragmentarily, parts being shown in elevation;

Figure 2 is a transverse sectional view through a submarine boat of conventional type showing a hatch structure constructed in accordance with my invention as applied and extended;

Figure 3 is a vertical sectional view through the stuffing box for the hatch cover operating rod, parts being shown in elevation;

Figure 4 is a vertical sectional view through a hatch structure in accordance with my invention, as applied and extended.

This application is a division of my copending application for escape hatch for

submarines, Serial Number 275,730, filed May 7, 1928.

Referring more particularly to Figure 1, I provide a hatch structure which includes a trunk 1 which is fixedly secured to hull 2 of a submarine boat B. This trunk is provided at its upper end with an angle ring 3 to which is secured an angle ring 3ª. The cover 4, pivoted at 5 on ring 3ª, has arms 6, (Figure 4) extending therefrom these arms extending beyond the pintle 5 and being provided with slots 7ª which receive a pin 7. This pin passes through an eye 8 at the upper end of an operating rod 9 slidably mounted through a stuffing box 10 secured through hull 2. The rod 9 is also slidable through a guide collar 11 of a suitable bracket 12 secured to the inner face of hull 2, and is provided at its lower or inner end with a suitable head forming a handle 13, the rod being of T-shape.

The scuttle or cover 4 is secured closed by a screw 14 secured thereto and passing through a scuttle bar 15 which engages beneath lugs 16 extending from ring 3ª, a hand nut 17 being threaded onto the screw 14 and bearing against the bar. By loosening nut 17 and turning bar 15 from beneath the lugs 16, the scuttle is released so as to be opened. In this connection, it is to be noted that the scuttle 4 can be opened and closed independently of bar 9 which normally remains in its raised or inoperative position.

To insure proper engagement of eye 8 with pin 7, suitable means is provided for holding the rod 9 against turning movement. Such means may be of any suitable or preferred construction. In Figure 3 I have illustrated the rod 9 as operating through stuffing box 10 which includes a packing gland 18 extending through an opening in the top of hull 2. Suitable nuts 19 and 20 are screwed onto this gland and gaskets 21 and 22 are confined between the nuts 19 and 20, respectively, and the hull 2, these nuts being turned tightly into position to secure the packing gland and to form a fluid tight closure between the same and the hull.

Rod 9 also operates through a collar 23ª of a bracket 23 suitably secured to hatch trunk 1. A pin 24ª is secured in collar 23ª. This pin projects into a groove 24 formed in rod 9 and extending longitudinally thereof, and holds the rod against turning movement.

The bore of the packing gland 18 is enlarged at its inner portion to receive a packing 25, in a known manner, and a packing nut 26 fits snugly about rod 9 and screws into the packing gland compressing the packing 25 about the rod 9 so as to provide a fluid tight closure about the same. When the scuttle or hatch bar 15 has been released so as to release the scuttle or cover 4, this cover may then be opened from within the compartment of the submarine boat by pulling downwardly on rod 9 thus swinging the cover 4 into open position through engagement of eye 8 with the rod or pin 7.

The scuttle trunk 1 has associated therewith an outer telescoping section 27 and an inner telescoping section 28. Section 27 is provided at its upper end with an inner annular flange 29 when the section 27 is inverted and in its raised or inoperative position. The inner section 28 is provided with an outer flange member 30 at its lower end, and the trunk section 27 is provided, at its lower end, with an outer annular flange 31.

An angle ring 32 is secured to the lower end of trunk 40, and has secured thereto a flat ring 33 having a depending annular flange 34 providing a seat for a lower cover or scuttle 35 hingedly mounted on ring 33 and secured closed by dogs 35′.

When the trunk structure is in its normal non-extended or collapsed condition, the sections 27 and 28 are disposed within the main fixed section 1, in inverted position, with flange 31 seating on ring 33 and flange 30 seating against the under face of flange 31. Cap screws 36 pass through aligned openings in the flanges 30 and 31 and screw into ring 33 for detachably securing sections 27 and 28 thereto.

In the event that the submarine boat is disabled by collision or otherwise, and is unable to rise to the surface, the crew is assembled in a compartment provided with a telescoping hatch structure in accordance with my invention. The lower hatch cover 35 is then released and opened. Cap screws 36 are then removed and the sections 27 and 28 are withdrawn from trunk 1. Section 27 is then inverted and secured, by means of flange 31 and screws 36, to ring 33, and section 28 is similarly secured to flange 29, which is now at the lower end of section 27. In this connection, it will be noted that flange 30 is of proper width to seat against flange 29, and is provided with openings for reception of cap screws 36ª, such openings registering with threaded openings in flange 29. With the trunk in extended condition, the lower end of section 28 thereof extends into the upper end of a well 45 provided in hull 2 of the boat, which is of conventional construction and includes the superstructure S.

After this has been done, compressed air is admitted to the compartment C either from a supply carried on board the submarine boat or from a salvage vessel, until the pressure inside of the compartment is equal to or slightly greater than the pressure of the water at the depth of the submarine. The outer hatch cover 4 is then opened by means of the rod 9 in the manner described, it being understood that hatch bar 15 is released and turned into inoperative position before extension of the hatch trunk. Upon opening of the cover 4, the well 45 is flooded with

water, this water sealing the lower end of the extensible hatch trunk, the water level being indicated at X. The men within the compartment C stand upon the walking flat 39 of this compartment and are not immersed in the water.

In the event the depth at which the boat is submerged is too great for the men safely to attempt reaching the surface by passing upwardly through the hatch trunk and without the provision of a diving suit, a diver from a rescue ship at the surface enters the compartment C through the extended hatch trunk. This diver carries with him an additional diving suit and hose, this additional suit being put on by one of the men to be rescued who then enters the well 38 and passes into the hatch trunk, being raised to the surface in the usual manner. This operation is repeated until all of the men in the compartment have been rescued. In the event that the depth at which the boat is submerged is such that the men can safely attempt to reach the surface without the use of a diving suit or other apparatus, the men successively enter the well 45 and pass upwardly through the extended hatch trunk, swimming to the surface where they are rescued.

In either case, the men within the compartment C awaiting rescue are not immersed in the water and, consequently, do not have their vitality reduced thereby, thus very materially increasing the possibility of rescue of such men.

The compartment C is also provided with web frames 50 adjacent the inner end of trunk section, these web frames forming air locks in a known manner in the event that the trunk cannot be extended. In such case, the escape trunk can be utilized for the escape of the men, as at present. In the event the boat is not lying on an even keel, the hatch trunk can be extended until the lower or inner end thereof forms a seal with the water in the compartment C, thus reducing as far as possible the extent to which the men are immersed in the water and, consequently, conserving the vitality of the men to this extent. Under most conditions, however, the boat will be on an even keel so that the extensible hatch trunk can be used in full extended position as illustrated in Figure 2 and the full benefits of this trunk and the well cooperating therewith may be had.

Preferably, each of the hatch covers 4 and 35 has associated therewith a counterbalancing spring 38 which acts, in a known manner to counterbalance the cover.

While I prefer to use two telescoping sections for extending the hatch trunk downwardly, but one section may be used where conditions warrant. In either case, the length of the trunk is materially increased so that a comparatively great volume of air is entrapped, sufficient to permit escape through the trunk of men in the flooded compartment, while avoiding subjecting the men to high pressure when substantially fully submerged in water, which, as above pointed out, is highly objectionable.

As above indicated, and as will be understood by those skilled in the art, changes in construction and arrangement of parts of my invention may be resorted to without departing from the field and scope of the same, and I intend to include all such variations, as fall within the scope of the appended claims, in this application in which the preferred form only of my invention is disclosed.

I claim:

1. In a submarine boat, a hatch trunk, a removable cover for the outer end of the trunk, a tubular member fitting within the trunk and having a flange at one end, and means for detachably securing said flange to the lower end of the trunk.

2. In a submarine boat, a hatch trunk, a removable cover for the outer end of the trunk, a plurality of tubular members fitting within the trunk and removable through the lower end thereof, and means for detachably securing said members together and to the lower end of the trunk.

3. In a submarine boat, a hatch trunk, a removable cover for the outer end of the trunk, a plurality of tubular members fitting within the trunk in telescoping relation thereto and to each other and removable through the lower end of said trunk, means for detachably securing said members together and to the lower end of the trunk, and means operable interiorly of the hull for opening said hatch cover.

4. In a submarine boat, a hatch trunk, a removable cover for the outer end of the trunk, a tubular member telescoping the trunk, a second tubular member telescoping the first tubular member, said tubular members being removable from the trunk through the lower end thereof, and means for detachably securing said members together in extended relation and to the trunk in extended relation thereto.

In witness whereof, I hereunto subscribe my name this 1st day of August, 1929.

HUGO E. GRIESHABER.