April 14, 1931. L. A. ANDREWS 1,800,976

SUBMARINE SAFETY DEVICE

Filed Aug. 8, 1928

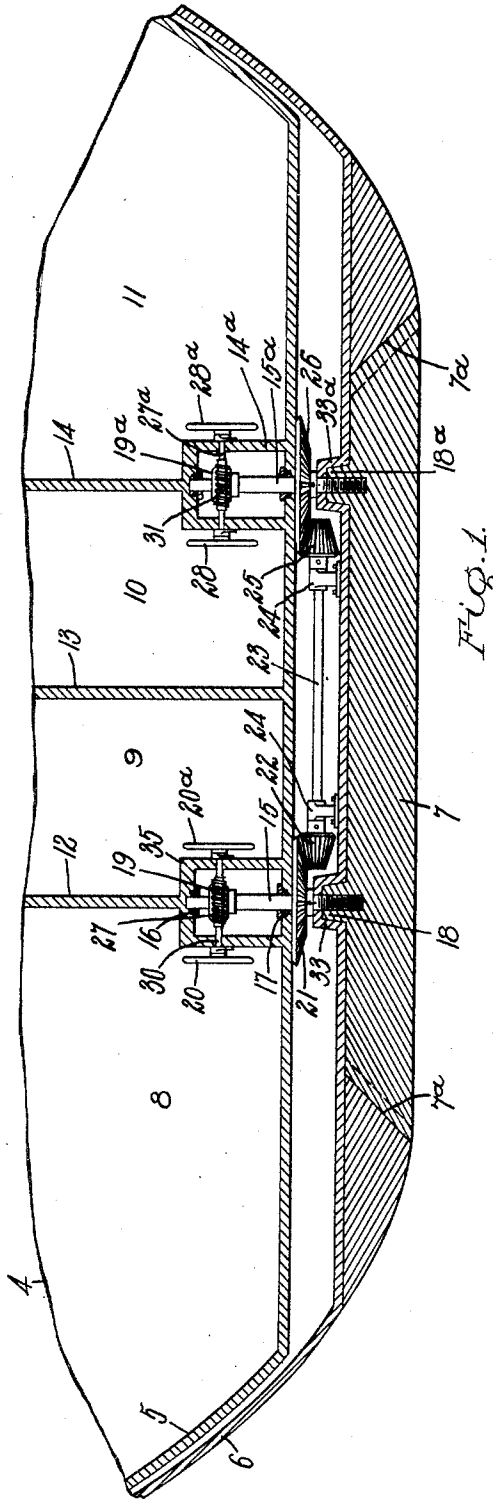


Fig. 1.

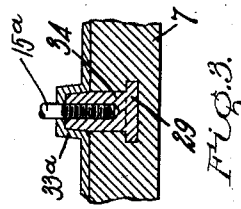


Fig. 3.

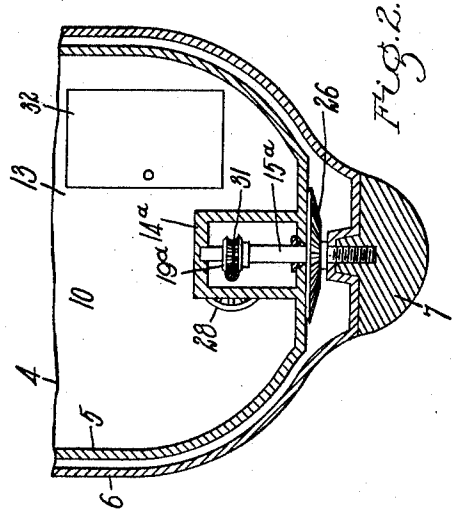


Fig. 2.

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Patented Apr. 14, 1931 1,800,976

UNITED STATES PATENT OFFICE

LOUIS A. ANDREWS, OF NEWTON UPPER FALLS, MASSACHUSETTS

SUBMARINE SAFETY DEVICE

Application filed August 8, 1928. Serial No. 298,227.

My invention relates to means for releasing a submarine from a portion of its load so as to enable it to rise to the surface in the event of its sinking by accident or to aid it to rise in any emergency when the ordinary means are inadequate.

My invention consists of a detachable keel, that may be released and dropped by mechanism operated by the crew of the submarine from the interior of the vessel.

In the accompanying drawing illustrating my invention Fig. 1 is a vertical longitudinal section of the hull of a submarine showing in elevation parts of the interior mechanism; Fig. 2 is a vertical transverse section of the same showing in elevation parts of the interior of the after compartment. Fig. 3 is a longitudinal vertical section of the metal keel showing a modification of the means for securing the detachable keel to the bottom of the vessel.

Similar numerals indicate corresponding parts in all the figures of the drawing.

Referring to the drawing, 4 is the hull of a submarine vessel, composed of the two shells 5 and 6, separated from each other by a narrow space, if desired, and packed with buoyant material like cork. 7 represents a detachable metal keel of such weight that when released and dropped from the bottom of the vessel, the vessel will rise to the surface of the water sufficiently to enable the crew to escape.

The submarine is shown divided into four compartments 8, 9, 10 and 11 respectively, and separated from each other by watertight bulkheads 12, 13 and 14. The particular number of compartments shown is not material to my invention; it is obvious that any number may be employed that may be desired, and that they will operate substantially the same as herein described. The upper surface of the keel 7 is cast in such form as to closely fit the bottom of the vessel and may be bent as shown, or grooved or otherwise shaped to correspond to the shape of the bottom of a given vessel. 18, 18^a are bosses cast on the metal keel 7, each of which has a vertical internal screw thread. The keel 7 at both ends forms a loose miter-joint 7^a with the hull for the purpose of protecting the end against injury from a blow, and also to give the keel more freedom to drop when released. The bulkhead 12 comprises a water-tight box 35, in which is located the vertical shaft 15 provided with a right hand screw thread end engaging the screw threaded hole in the boss 18. The shaft 15 is mounted in suitable water-tight bearings 16 located in the upper end of the box 35 and in water-tight bearings 17 in the bottom deck of the vessel. 19 is a worm gear fast on the shaft 15 near its upper end, and engaging the worm 27 on the horizontal shaft 30, one end of which is fixed to the hand wheel 20, and the other end to the hand wheel 20^a. The hand wheels 20 and 20^a are located on opposite sides of the bulkhead 12. 21 is a bevel gear fast to the shaft 15 and meshing with the bevel gear 22, fast on one end of the shaft 23, which is mounted in the bearings 24, 24. Fast on the other end of the shaft 23 is a bevel gear 25 meshing with the bevel gear 26 which is fast on the shaft 15^a, having a left hand screw thread on its lower end which engages the screw threaded hole in the boss 18^a.

The shaft 15^a is mounted and operated in a similar way to that of the shaft 15, and has a worm gear 19^a fast thereon near its upper end, which meshes with a worm 31 on the horizontal shaft 27^a having hand wheels 28, 28^a secured thereto. The location and connections of the shaft 15^a with respect to the bulkhead 14 and the box 14^a correspond to those of the shaft 15 and its connections relative to the bulkhead 12 and the box 35.

The boss 18 is enclosed in a water-tight box 33, through which the shaft 15 extends for the purpose of preventing a leak when the keel 7 is dropped. The boss 18^a is likewise enclosed in a box 33^a through which the shaft 15^a extends.

While not necessary to the use of my invention of the detachable keel, if desired the hull of the vessel may be rendered more buoyant by the employment of a packing of cork or similar material between the shells 5 and 6 of the hull.

It is evident that the hand wheels may

be located in different positions to suit the convenience of the crew. They may, of course, be mounted on vertical or horizontal shafts and located near the side of the bulkhead at any desired height, suitable gears for the purpose being employed in any of the familiar and well known ways.

It is also plain that only one hand wheel is necessary in a compartment, although it may be convenient to use more.

When either hand wheel is turned in the proper direction, both screw threaded rods are withdrawn from the keel 7 simultaneously through the operation of the gears shown, by reason of the screw threads on the rods being cut in opposite directions. It is obvious that several well known methods of gearing may be substituted for the particular arrangement shown and adapted to withdraw simultaneously the rods supporting the keel without departing from my invention.

In practice each hand wheel should be plainly marked by suitable words or symbols to show in what direction it should be turned. When the screw threads are tapped directly into the iron keel, it would be preferable to use rods engaging therewith made of some non-corrosive material.

In Fig. 3 I have shown a modification of the means for securing the metal keel 7 to the hull of the vessel, which consists of substituting nuts 34 for the bosses 18, 18ª, which may be made of brass or other non-corrosive metal, and are either cast in the keel or inserted through apertures cut for the purpose. The nuts 34 are provided with heads 29, and extend above the surface of the keel 7 a substantial distance to furnish additional support to the connection between the keel and the bottom of the hull.

In the event of damage to the submarine, causing it to sink, the crew could escape through a door of the damaged compartment, such as 32 in the after compartment 8, into a compartment free from water, and by means of one of the hand wheels operating to rotate the shafts 15, 15ª, they could release and drop the keel 7, in consequence of which the vessel would rise to the surface and enable the crew to be rescued.

It is apparent that the hand wheel 20 serves for the occupants of the compartment 7, the hand wheel 20ª for compartment 9, the hand wheel 28 for compartment 10, and the hand wheel 28ª for compartment 11.

What I claim and desire to secure by Letters Patent is:

A submarine vessel having a detachable keel and a plurality of water-tight compartments separated by bulkheads, each comprising a water-tight box, combined with a vertical shaft located in said box and engaging and supporting said keel, and means for rotating said shafts located on opposite sides of the bulkhead, in opposite directions and releasing said keel.

In testimony whereof I have hereunto set my hand this 18th day of July, 1928.

LOUIS A. ANDREWS.