E. B. REILLY.

CENTER OF GRAVITY SHIFTING DEVICE FOR SUBMARINE BOATS.

APPLICATION FILED MAY 6, 1916.

1,244,243. Patented Oct. 23, 1917.

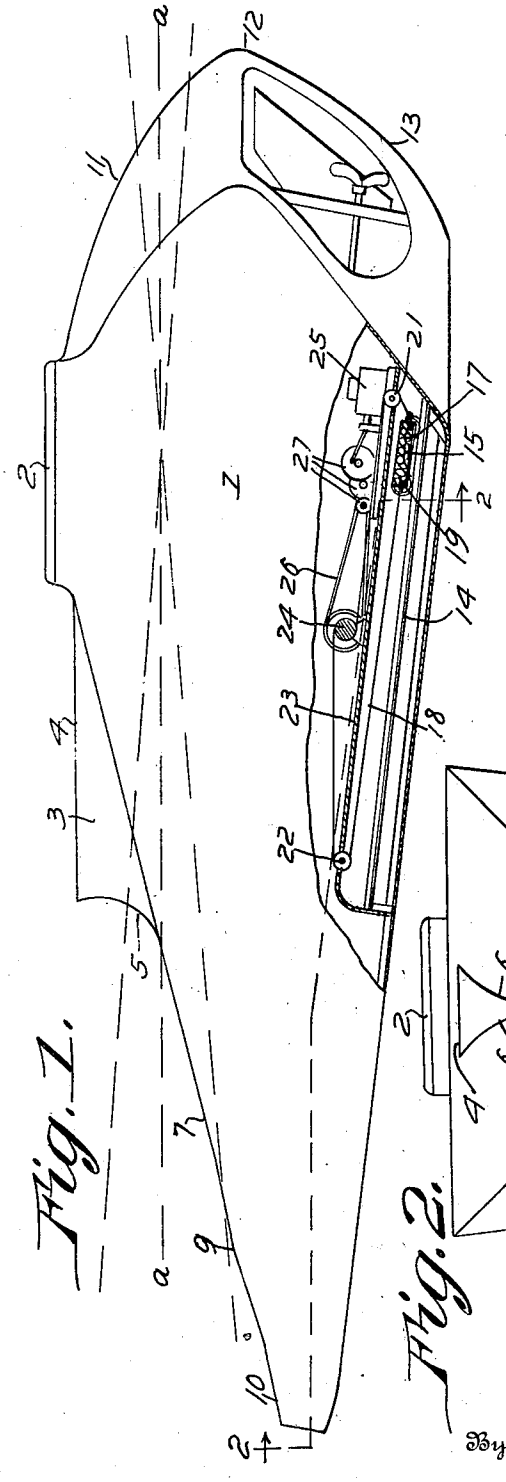


Fig. 1.

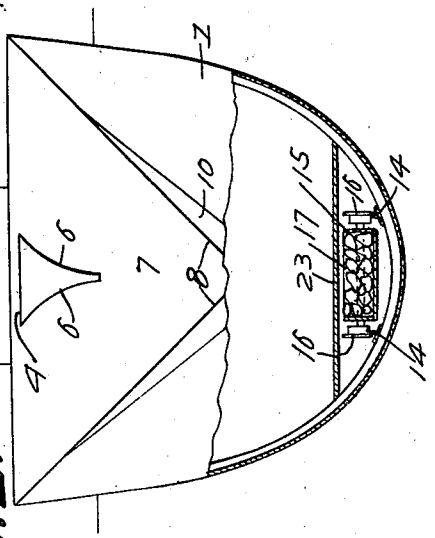


Fig. 2.

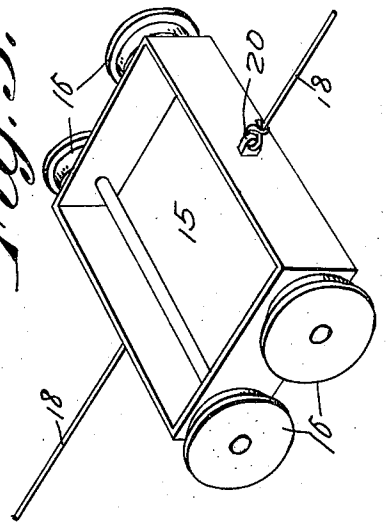


Fig. 3.

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UNITED STATES PATENT OFFICE.

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CENTER-OF-GRAVITY-SHIFTING DEVICE FOR SUBMARINE BOATS.

1,244,243. Specification of Letters Patent. Patented Oct. 23, 1917.

Application filed May 6, 1916. Serial No. 95,843.

To all whom it may concern:

Be it known that I, EDWARD B. REILLY, a citizen of the United States, residing at Atlantic City, in the county of Atlantic and State of New Jersey, have invented certain new and useful Improvements in Center-of-Gravity-Shifting Devices for Submarine Boats, of which the following is a specification.

This invention relates to submarines having a hull provided with a flat upper surface extending forwardly and downwardly from the conning tower to the stem and a transversely curved lower surface, the boat being provided with means for shifting the center of gravity to vary the vertical component of the water resistance on the front of the boat and thus control its vertical movements.

The upper surface is flat from the conning tower to the bow, extending from its widest point forward and downwardly at an angle to the longitudinal axis of the boat. At the higher velocities the ballast is not shifted so much as at the lower velocities. I attain this without the use of rudders or any other form of external attachments, thus leaving the outside of the hull of the boat smooth and presenting no obstructions to its progress or for contact with rocks or anything else that might be in its course.

The shifting of the boat's center of gravity may be accomplished in a variety of ways by the concentration of any weight at any one particular spot along the length of the boat, and its velocity is controlled by whatever means of propulsion with which it may be provided.

It is to be understood that my present invention does not pertain to the shifting of the center of gravity for the purpose of making the boat ride the surface at greater speed or holding the boat in a better position for speed while it is submerged. I change my center of gravity for the purpose of altering the resistance of the water upon the hull of the boat and am thereby enabled to rise or sink to any desired depth.

I dispense with water tanks heretofore employed, as well as the necessity of filling or emptying such tanks and rising devices, and employ a stable ballast readily controlled and held at any desired spot so as to change the center of gravity as occasion may require and to hold the same when once fixed until necessity arises for changing it.

Other objects and advantages of the invention will hereinafter appear and the novel features thereof will be particularly pointed out in the appended claims.

The invention is clearly illustrated in the accompanying drawings, which, with the numerals of reference marked thereon, form a part of this specification, and in which—

Figure 1 is a side elevation of a submarine boat equipped with my present improvement, a portion being broken away and parts shown in section.

Fig. 2 is a view partly in elevation and partly in section, as on the line 2—2 of Fig. 1 looking in the direction of the arrows.

Fig. 3 is an enlarged perspective view of the carriage for containing the weight or ballast.

Like numerals of reference indicate like parts throughout the different views.

Referring to the drawings,

1 designates the hull of the boat which may or may not be provided with a conning tower. Forward of the elevated portion 2 which would contain the tower if one were employed, there is a member 3 having a flat surface 4 which may constitute a deck, the forward end of this member being curved downwardly and forwardly, as seen at 5, and the opposite sides concaved, as seen at 6, 6, in Fig. 2. Forward of this member 3, the upper surface of the hull is broadened and flattened, as seen at 7, the opposite sides thereof tapering, as seen at 8, to the point 9 and thence formed upon another incline, as seen at 10, which merges into the incline 9, as shown in Figs. 1 and 2. Thus I have no lateral projections such as vanes or blades or the like extended beyond the outer surface of the hull or shell which is thus left perfectly smooth and without obstruction, as seen in Fig. 2.

The stern of the boat is formed upon the rearward and downward curve 11 to a point 12 below the water line *a*—*a* when the boat is riding upon the surface and thence downwardly and forwardly curved, as at 13.

Any suitable form of propulsion may be employed, but as the present invention does not pertain to any particular means of pro-

pulsion it is thought unnecessary to go thereinto in detail.

In order to change the center of gravity for diving or rising or for any other position, I provide a shiftable ballast disposed entirely within the hull, at the bottom thereof and preferably along the longitudinal center, as seen in Fig. 2. For this purpose I provide tracks 14 of any suitable character affixed in position in any preferred way and upon these tracks I mount to travel a carriage 15 having wheels 16 running upon the tracks and in this carriage may be placed ballast 17 which may be of any suitable material or character. By shifting this ballast toward the bow or toward the stern, as occasion may require, I can easily and quickly and positively change the center of gravity and thus change angle of the boat. This carriage may be operated and controlled in any suitable manner. In the present instance I have shown a wire or cable or the like 18 attached at one end to one end of the carriage, as seen at 19, and at the other end to the other end of the carriage, as seen at 20 in Figs. 1 and 3. This cable passes over pulleys 21 and 22 at opposite ends of a platform or support 23 provided within the hull, as seen in Figs. 1 and 2, and the opposite ends of the cable are wound in opposite directions upon a drum 24 operated in any suitable manner from an engine or motor 25 mounted on said platform and operatively connected with the shaft or drum through the medium of the belt 26 and gearing 27 which may be of any well-known character. The carriage may be moved forward or backward, its movements being perfectly under the control of the operator in a well-known way, and the carriage will be positively held in its adjusted position.

The dash lines in Fig. 1 indicate the relative angles when the boat is rising or going down or traveling on a substantially horizontal course, these different positions or angles being determined by the position of the adjustable ballast, as will be readily understood.

By having the ballast mechanism entirely within the hull of the boat, I avoid all exterior projecting parts and hence dispense with the liability of the same becoming injured by contact with rocks or other obstructions or by entanglement with any growths that may be encountered while the boat is in motion.

Modifications in details may be resorted to without departing from the spirit of the invention or sacrificing any of its advantages.

What is claimed as new is:—

1. A submarine boat having a transversely curved lower surface and a flat upper surface extending from its widest point to the bow and downwardly at an angle to the longitudinal axis of the boat, combined with bodily shiftable means within the hull bodily movable fore and aft for shifting the center of gravity to vary the vertical component of the water resistance on said flat upper surface of the boat and thus control its vertical position.

2. A submarine boat having a transversely curved lower surface and a flat upper surface extending from its widest portion at the conning tower to the bow and downwardly at an angle to the longitudinal axis of the boat, a carriage mounted for movement bodily fore and aft within the hull at an angle to said upper surface to shift the center of gravity, means disposed in alinement with said carriage and operatively connected with the opposite ends thereof near the bottom of the hull, and means for moving the same and holding the carriage in its adjusted positions.

In testimony whereof I affix my signature in the presence of two witnesses.

EDWARD B. REILLY.

Witnesses:
WM. C. FISHER,
JESSE H. STEWART.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."