C. G. ULLIN.

SUBMARINE VESSEL.

APPLICATION FILED OCT. 4, 1913.

1,125,772. Patented Jan. 19, 1915.

Fig. 1.

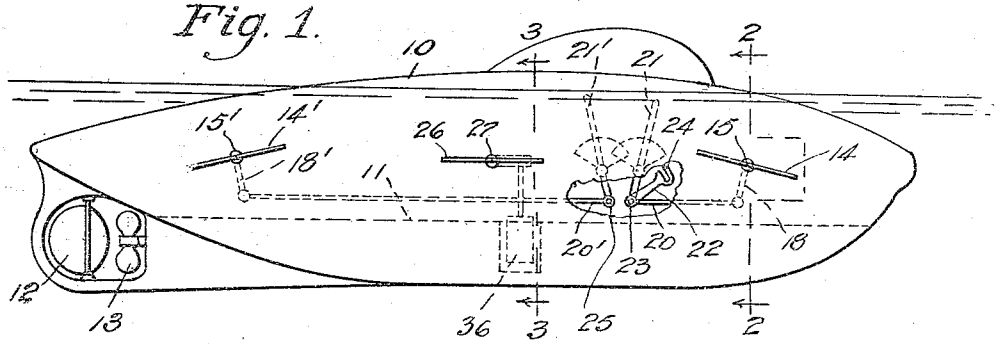


Fig. 2.

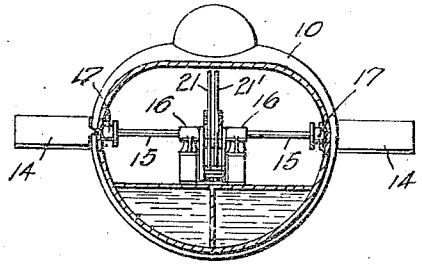


Fig. 3.

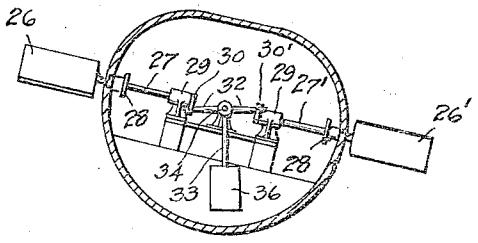


Fig. 4.

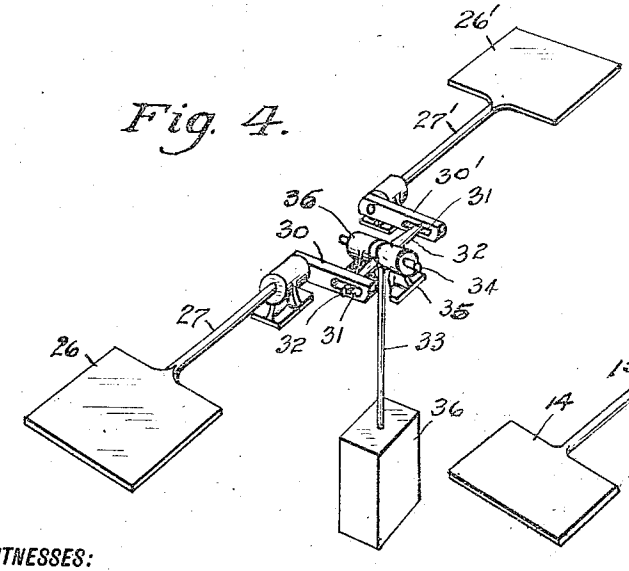
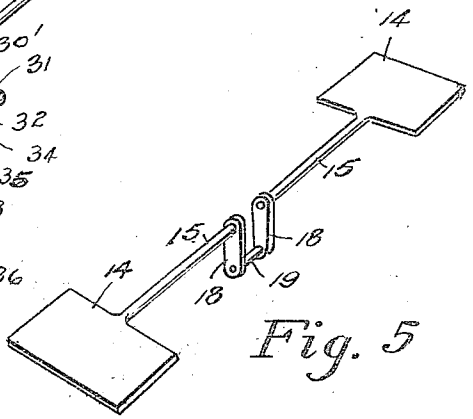


Fig. 5



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SUBMARINE VESSEL.

1,125,772. Specification of Letters Patent. Patented Jan. 19, 1915.

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To all whom it may concern:

Be it known that I, CARL G. ULLIN, a citizen of the United States, residing at Seattle, in the county of King and State of Washington, have invented certain new and useful Improvements in Submarine Vessels, of which the following is a specification.

This invention relates to submarine vessels; and its object is the provision of improved means for controlling the longitudinal inclination of the vessel when the same is traveling through the water for the purpose of steering the vessel in downward and upward directions to carry the vessel to selected depths.

A further object of the invention is to provide means for automatically regulating the lateral rolling of the vessel and tending to maintain the same in upright position.

With these ends in view, the invention consists in the novel construction and adaptation of devices, as will be hereinafter described and claimed.

In the accompanying drawings, Figure 1 is a side elevation of a submarine boat with the present invention applied thereto. Fig. 2 is a transverse view taken substantially through 2—2 of Fig. 1. Fig. 3 is a like view through 3—3 of Fig. 1. Fig. 4 is a perspective view of the devices employed for counteracting rolling movements of the vessel. Fig. 5 is a perspective view of a pair of boat-guiding fins and the coupling connections therefor.

The reference numeral 10 designates the hull of a submarine vessel provided with a water ballast tank 11 and having a steering rudder 12 and a power driven propeller 13, as usual.

Adjacent to the front end of the vessel and upon opposite sides of the same are blades or fins 14 which are, intermediate their lengths, rigidly secured to or formed on the outer ends of shafts 15. These shafts are arranged in axial alinement and are journaled in bearing boxes 16 and stuffing boxes 17 where they extend through the shell of the hull. The inner ends of the shafts 15 are provided with crank-arms 18 which are connected by a crank-pin 19. A reach-rod 20 connects said crank pin with an operating lever 21. Similarly, near the stern is provided at opposite sides of the vessel a pair of blades or fins such as 14^1 carried by the protruding ends of alined shafts 15^1 having crank arms 18^1 which are operatively connected by a reach-rod 20^1 with an operating lever 21^1.

22 is a link connected from one end by a pivotal pin 23 to the reach rod 20 and having a hook 24 at its free end for engagement with a stud 25 provided on the other rod 20^1.

The operation of the invention so far described is as follows: When the aforesaid fins are rotated about their axes through the instrumentality of the levers 21 or 21^1 to incline the fins with their forward ends lowermost, the currents of water caused by the progress of the vessel will act upon the fins to depress the same. If the fins are inclined to have the rear ends thereof lowermost, then, on the contrary, the tendency of the water currents is to exert an uplift on the fins. The fins, when operated in unison by utilizing the link 22, as before stated, to couple the reach rods of both the forward and rear pair of fins, will serve to cause the boat to ascend or descend, as the case may be, in the water without disturbing the longitudinal trim or inclination of the vessel. Under such conditions, however, the vertical movements of the vessel would be accomplished with less speed than where the forward and rearward fins are reversely disposed. For example, when the forward fins are directed to swerve the boat at that end downward and those at the rear end upwardly, the longitudinal axis of the vessel is quickly brought into the line in which the vessel is to be driven, and upon restoring the fins into a plane parallel with the vessel's axis, the vessel is propelled with less resistance by the water than when taking an oblique forward course.

I also provide in proximity to the midlength of the vessel a pair of fins 26 and 26^1 which are respectively carried on shafts 27 and 27^1 disposed in axial alinement and extending transversely through stuffing-boxes 28 and journaled in the latter and bearing-boxes 29. Provided on the inner ends of these shafts are forwardly extending crank-arms 30 and 30^1. These crank-arms are each provided with a slot 31 to receive the branch arms 32 of the stem 33 of a T-shaped lever. Said lever is fulcrumed upon a pin 34 which is arranged longitudinally of the vessel, and is supported by suitable standards such as 35. A weight or heavy body

36 depending upon the lever stem 33 is affected by gravity to retain the same in a vertical position.

Should the vessel from any cause get out of equilibrium, and roll or tilt transversely, the weight 36 will assert its power to retain the T-lever so that the arms 32 thereof will be horizontal, but inasmuch as the shafts 27 and 27^1 are tilted with the boat, the arms 32 will be influenced to rotate the fins 26 and 26^1 in reverse angular directions and with the forward edge of the downwardly tilted fin inclined upwardly and the other fin inclined downwardly. In such relative positions, the advance movement of the vessel will cause the water to impinge the respective fins so that they will coöperate for returning the boat to normal position by pushing up on the lower one and down upon the upper one. When the vessel is restored to upright position, the pendulum-like lever will be held by said weight so that the arms 32 thereof will yieldingly hold the fins 26 and 26^1 in a plane with each other and parallel with the longitudinal axis of the vessel.

What I claim, is—

1. The combination with a submarine vessel of pairs of axially alined shafts respectively extending through the shell of the vessel in proximity to the bow and stern thereof, a blade provided on the outer end of each of said shafts, crank-arms provided on the inner ends of said shafts, crank-pins respectively coupling the crank-arms of the bow and stern shafts with each other, reach rods connected with said crank-pins for operating the respective shafts to regulate the inclinations of the blades thereof, and levers connected to said rods whereby the blades may be coincidentally adjusted.

2. The combination with a submarine vessel of pairs of axially alined shafts extending through the shell of the vessel in proximity respectively to the bow and stern thereof, a blade on the outer end of each of said shafts, crank arms on the inner ends of the shafts, pins connecting said crank arms, means for coincidentally adjusting said blades, a pair of axially alined shafts in proximity to the midlength of the vessel, slotted crank arms on the inner ends of said last-named shafts; a T-shaped lever the branch-arms of which are supported by said slotted crank-arms, and a weight suspended from said T-shaped lever.

Signed at Seattle, Wash., this 26th day of September, 1913.

CARL G. ULLIN.

Witnesses:
E. PETERSON,
HORACE BARNES.

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