

No. 812,956.

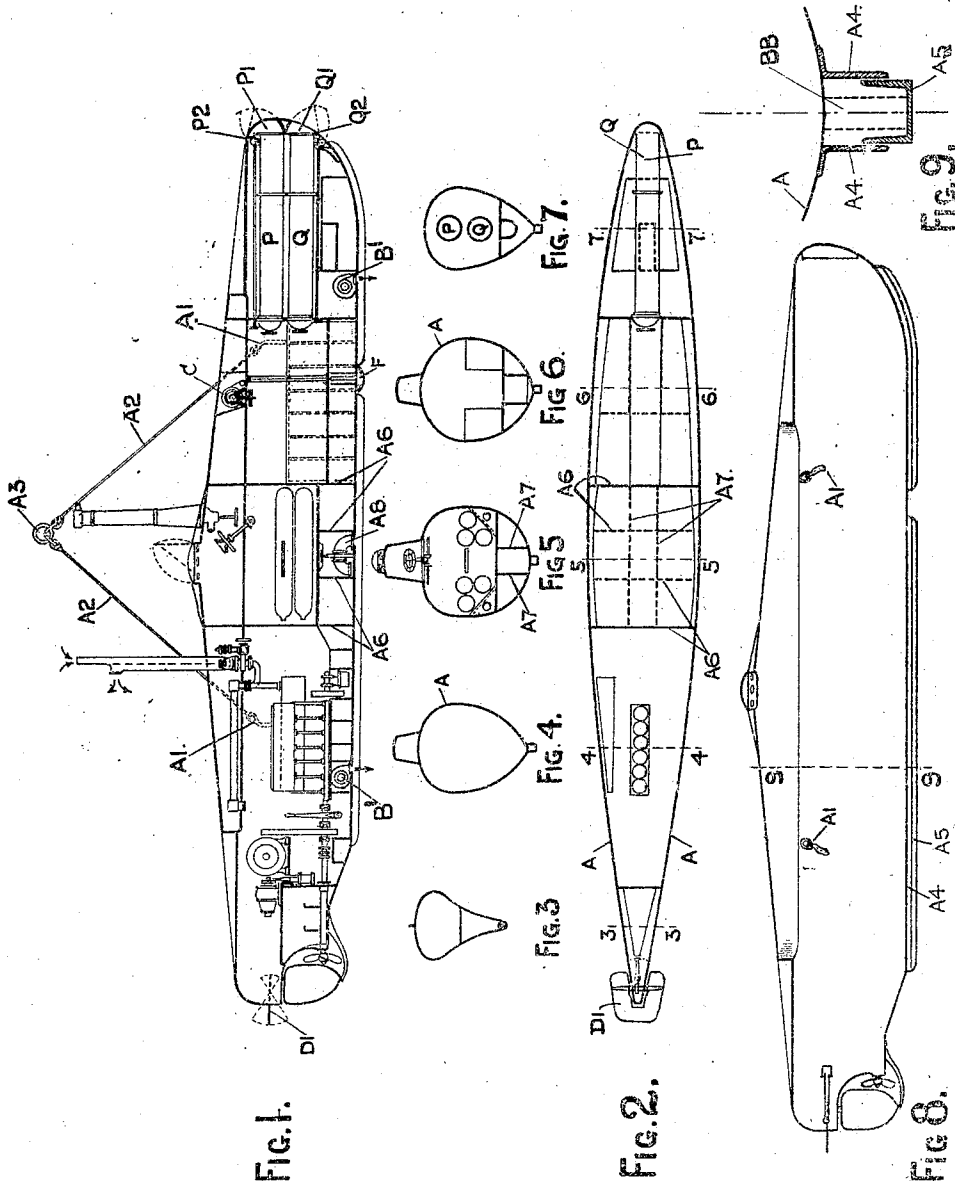
PATENTED FEB. 20, 1906.

G. SIMPSON.

SUBMARINE VESSEL AND MECHANISM CONNECTED THEREWITH.

APPLICATION FILED JAN. 18, 1905.

3 SHEETS—SHEET 1.



WITNESSES:

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3 SHEETS—SHEET 2.

Fig. 10.

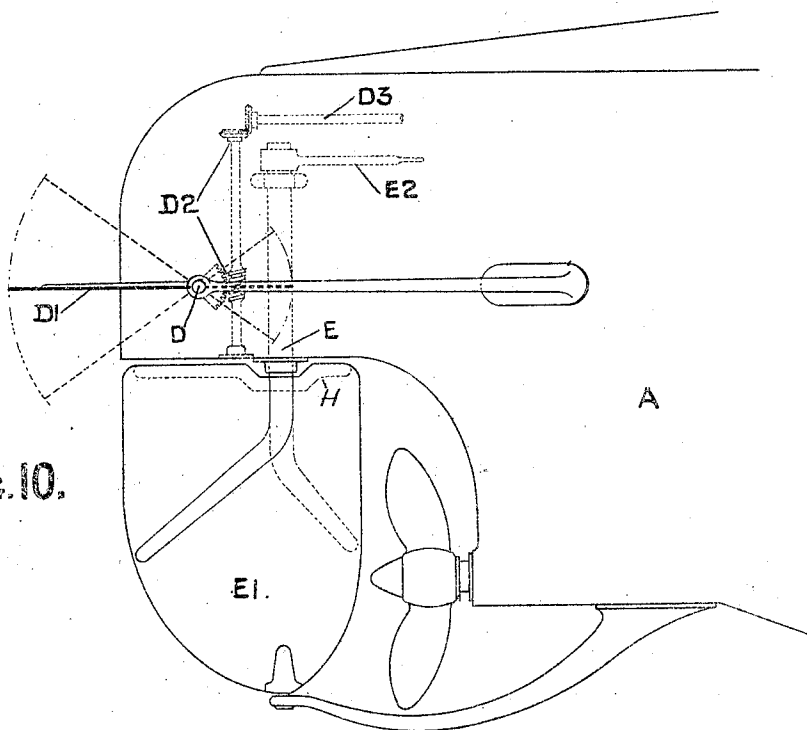
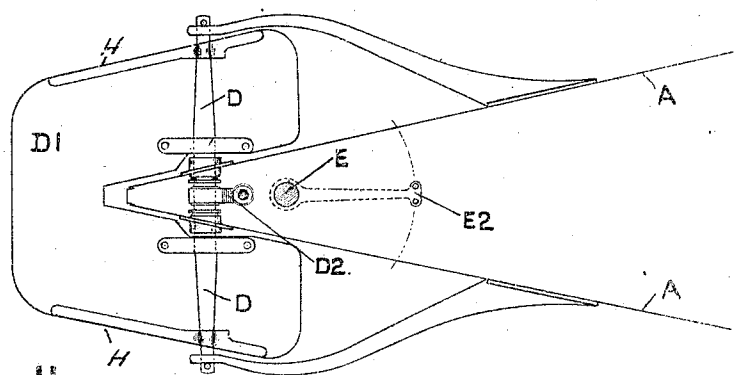


Fig. 11.



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3 SHEETS—SHEET 3.

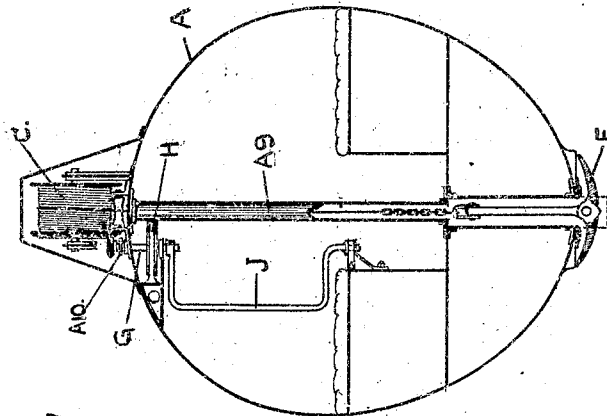


FIG 12.

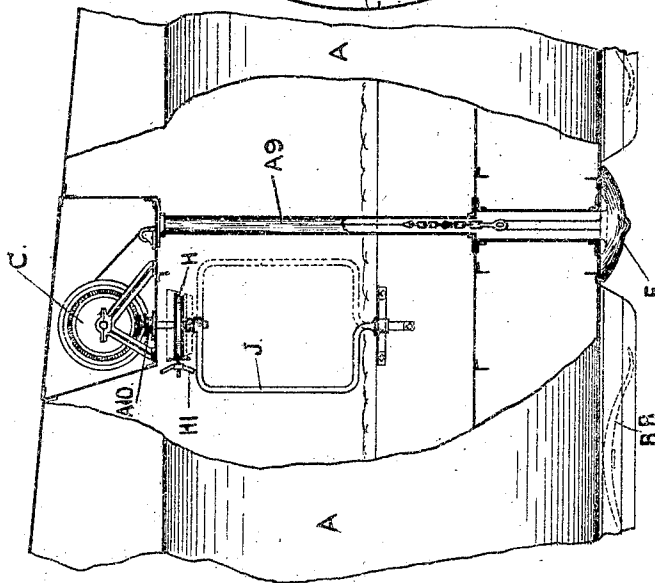


FIG 13.

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UNITED STATES PATENT OFFICE.

GEORGE SIMPSON, OF MARINER HARBOR, NEW YORK.

SUBMARINE VESSEL AND MECHANISM CONNECTED THEREWITH.

No. 812,956.

Specification of Letters Patent.

Patented Feb. 20, 1906.

Application filed January 18, 1905. Serial No. 241,541.

To all whom it may concern:

Be it known that I, GEORGE SIMPSON, a subject of the King of Great Britain and Ireland, residing at Mariner Harbor, Richmond county, in the city and State of New York, have invented certain useful and new Improvements in Submarine Vessels and Mechanism Connected Therewith, of which the following is a specification.

The following is a description of what I consider the best means of carrying out the invention.

The accompanying drawings form a part of this specification.

Figure 1 is a general longitudinal vertical section. Fig. 2 is a corresponding plan at approximately half the depth of vessel. Figs. 3, 4, 5, 6, and 7 are respectively transverse sections in the planes indicated by dotted lines in Fig. 2, the cross-section Fig. 3 being on the line 3 3 and the cross-section Fig. 4 being on the line 4 4, &c. Fig. 8 is a side elevation. The succeeding figures show portions on a larger scale. Fig. 9 is a part cross-section on the line 9 9 in Fig. 8. Fig. 10 is a side elevation of the extreme after portion. Fig. 11 is a corresponding plan view, partly in horizontal section. Fig. 12 is a transverse section at about the line 6 6 in Fig. 2. Fig. 13 is a corresponding side elevation, partly in central longitudinal section.

Similar letters of reference indicate corresponding parts in all the figures where they appear.

It is desirable to give a submarine war vessel a base which will at all times be available for the replenishing of fuel, air, ammunition, stores, and torpedoes. My invention provides for a submarine torpedo-boat or vedette of such dimensions, form, and weight as to be readily slingable to and from the deck or boat-skids of a battleship, cruiser, or other vessel, and for this purpose will have sling-plates or their equivalent arranged to serve this purpose. Up to the present successful submarines have been of such dimensions and weight as to make them too unwieldy and cumbersome to be slung with facility on board of a larger war vessel. This submarine torpedo-boat will, on the contrary, constitute part of a war vessel's boat outfit and can be carried at all times or only when on war service and can be used in any waters as part of the offensive equipment of the ship.

A is the hull of the vessel, supernumerals being employed when necessary to indicate

special parts thereof. $A^1 A^1$ are the pad-eyes, and $A^2 A^2$ are wire ropes or other suitable slings adapted to be engaged therewith and disengaged therefrom to allow of hoisting the entire vessel by any sufficient force applied at the apex A^3 . The entire structure is proportioned with reference to this capacity for being lifted by the boat-cranes, davits, or derricks with which all war vessels are provided.

Experience has shown with existing submarines that when a vessel is lying submerged in shallow water, as over harbor-bars or at the mouths of rivers, the vessel is subject to bumping the bottom, owing to the ground swell, the swell made by moving vessels, and other similar causes. The attendant jar or sudden shock reacts detrimentally on the main structure of the hull, causing leakage and derangement of machinery. To defend the submarine vessel against these sudden stresses, I provide a buffer or fender keel or keels having a base or bases sufficiently broad to take the impact and cushion it on powerful springs. $A^4 A^4$ are the sides of this keel. The space between is open and receives a series of strong springs $B B$, (shown in dotted lines,) the upper sides of which are strongly fastened to the hull A . The lower sides of the springs are bolted or otherwise secured to a stout bar A^5 , of rolled or built-up channel section, which engages between the sides A^4 with freedom for vertical motion several inches below the lower edges of the side plates A^4 .

In a vessel totally submerged it is well known that the shape of the displacement does not alter for any inclination. Therefore the upward force of buoyancy must always act through the same point—namely, the center of buoyancy—so that the stability at any angle of heel varies directly as the sine of that angle, and therefore to obtain the maximum of stability it is necessary to have a locus for the center of buoyancy as high up as possible, and this result I attain in my invention by making the transverse sections of the hull of approximately pear-shaped section. Sections such as those which I have described are shown by Figs. 3, 4, 5, 6, and 7, their corresponding locations being shown by dotted lines on Fig. 2.

Vessels of the submarine type are intended for cruising on the surface as well as completely submerged, and when in the former condition must have a certain amount of re-

serve buoyancy, which it is necessary to overcome or destroy before the vessel can be submerged. In my invention I provide submerging-compartments to be filled with water, which are incorporated within and are part of the structure of the vessel and placed as near to the fore and aft center of gravity of the displacement as practicable. These compartments are arranged on the cellular system, each cell or combination of cells adapted for containing a sufficient volume of water ballast to submerge the vessel, the whole system of cells being inclosed by the bottom and sides of the vessel and by a steel flat or inner bottom. The transverse plates A^6 and the longitudinal plates A^7 , which, with the sides and bottom of the vessel, constitute the cells, are shown. The valve A^8 , through which the cells are filled or emptied, is shown on Fig. 1.

In a submarine vessel the stability is the same in all directions—that is, whether for transverse or longitudinal inclinations. It will therefore be seen that such a vessel is exceedingly sensitive to anything tending to create a movement forward or aft of the center of buoyancy. I provide against this tendency toward involuntary downward plunging by fitting a centrifugal or other pumping appliance well forward and a similar one well aft, each connected with an independent driving-motor controlled automatically. As soon as the vessel's fore and aft trim deviates from the horizontal the pump at the lower end is set in motion and throws a reacting jet of water downward, thereby raising the submarine back to the horizontal position. In addition to insuring the horizontal equilibrium of the vessel these pumps may be used in combination to push the submarine upward equally at each end when it is desired to rise to the surface of the water on a short visit for observation purposes. $B' B'$ on the drawings, Fig. 1, show these pumping appliances; which are automatically controlled by an electrical pendulum-contact movement, (not shown,) placed, preferably, in the vicinity of the steersman. I combine with this slingable submarine vessel a single horizontal partially-balanced diving and ascending rudder D' , turning on a horizontal axis D and fitted symmetrically about the center line of the horizontal plane.

E' is a rudder carried on a vertical shaft E to control the lateral turning. This rudder is housed entirely within the over-all length of the submarine vessel. Each of these rudders has approximately one-third of its total area forward of its turning axis and is protected by guard shoes or brackets, one form of which is shown.

The horizontal shaft D of the driving-rudder D' is operated by gearing D^2 through a shaft D^3 either by hand or automatically.

The vertical shaft E of the rudder E' is

turned by a tiller E^2 . There may be any ordinary or suitable ropes or other connections for turning this by hand or automatically.

I provide anchoring-gear which can be readily hoisted or let go by the occupants or crew of the submerged vessel. The effectiveness of the vessel as a destructive agent is greatly enhanced and its radius of action increased by being able to reserve its fuel, air, &c., by lying at anchor either afloat, awash, or totally submerged until the opportunity presents itself for dealing the most effective blow.

A^9 is a strong pipe or tube of diameter suitable for the cable employed, increased in diameter at the lower part for housing the anchor-stock. A winch or reel C carries either a wire rope or chain cable, and the cable extends from C over a sheave or roller down inside of tube A^9 and attached to anchor F . Suitable gearing G is attached to the reel C and led through a stuffing box A^{10} into interior of the boat. Upon the gearing-shaft G is fitted a strong band-brake H of any ordinary or suitable type, the gearing-shaft terminating below the band-brake and of square section. When it is desired to let go the anchor, the nut H' on the band-brake must be eased off, and the anchor will run down by its own weight. Besides being able to check the speed at which the cable is being paid out, when enough cable is run off the nut H' will be tightened up and the revolutions of reel will cease, and the anchor F through reel will hold the vessel.

When it is desired to weigh anchor, a portable crank-handle J is shipped, one end being a square socket embracing the square end of gearing-shaft G , the other end being made round to easily revolve in a suitable step. One or two of the crew then man the crank-handle and wind the cable onto the reel C .

P and Q are torpedo-tubes, arranged one above the other and opening through the bow, where the torpedoes are introduced, the openings being closed with caps $P' Q'$. The upper cap P' is pivoted to the hull at P^2 immediately above the torpedo-tube P and opens forward and upward. The lower cap Q' is pivoted to the hull at Q^2 immediately below the mouth of the tube. This cap opens forward and downward, and both are operated by bevel-gears, the pin of the miter-wheel being made water-tight with a stuffing-gland.

I attach importance to the direction of hinging of the lower cap Q' . In cases where only one tube is employed the lower tube Q is selected.

Modifications may be made without departing from the principle or sacrificing the advantages of the invention. Parts of the invention can be used without the whole.

I propose to dispense with the eyes A' and

the lifting-slings A² when the vessel is assigned to a land base and operated from such.

I claim—

5 1. A submarine having a hull strengthened internally by transverse partitions A⁶ and longitudinal partitions A⁷ in the submerging water-tanks and externally by longitudinal plates A⁴ forming an open-faced keel and
10 inclosing between them a projecting spring-held bar A⁵, and the said submarine also having sling-receiving devices of sufficient strength to support the submarine in air attached to the submarine's hull above the center of gravity, torpedo-discharging and propeller-operating mechanism being carried by
15 said hull, substantially as described.

2. A submarine having each of the following features, namely: vertical rudder and
20 horizontal rudder, a hull devoid of external steering devices except said rudders and provided with an overhang above a rudder and propeller space, which hull is wider at both

ends at the mid-height of said overhang than at the corresponding distance below the center of gravity and is strengthened internally by transverse partitions A⁶ and longitudinal partitions A⁷ in the submerging water-tanks and externally by longitudinal plates A⁴ forming an open-faced keel, sling-receiving devices of sufficient strength to support the submarine in air attached to said hull at about the level of said mid-height, a projecting spring-held bar A⁵ between said keel-plates A⁴, and an internally-located
35 pump with vertical discharge for regulating the position of the submarine relatively to the plane of the horizon, substantially as described.

Signed in the city of New York aforesaid
this 16th day of January, 1905.

GEORGE SIMPSON.

Witnesses:

THOMAS DREW STETSON,
BESSIE G. BRADY.