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W. A. DODGE.

MEANS FOR ALTERING THE TRIM OF MARINE CRAFT.

(Application filed May 31, 1901.)

(No Model.)

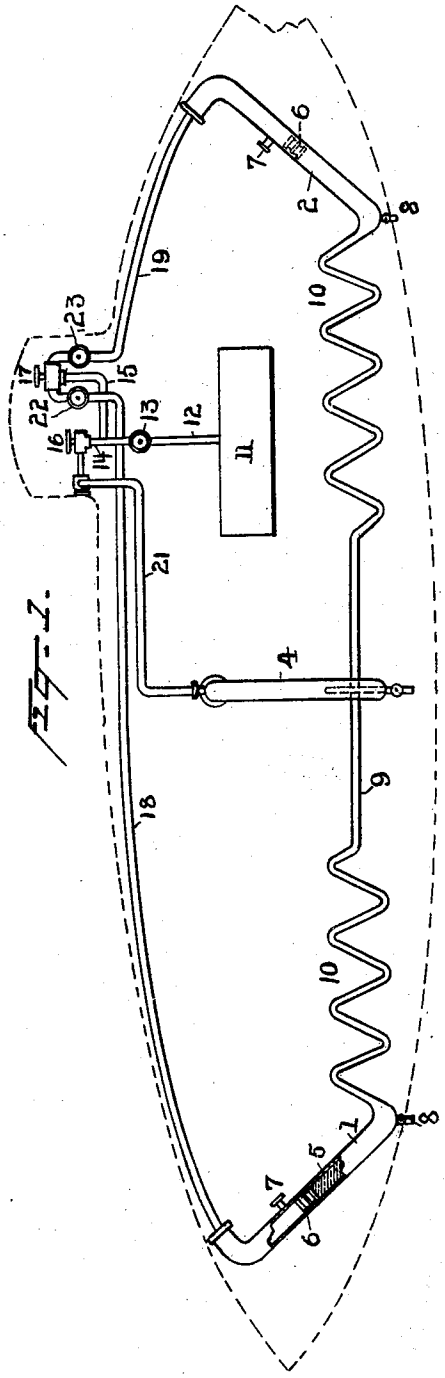


Fig. 1.

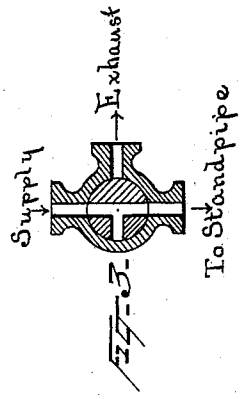


Fig. 3.

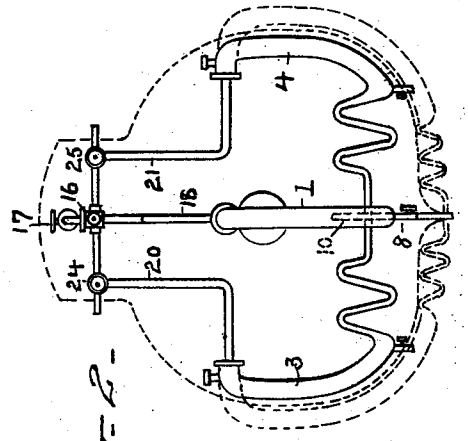


Fig. 2.

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UNITED STATES PATENT OFFICE.

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MEANS FOR ALTERING THE TRIM OF MARINE CRAFT.

SPECIFICATION forming part of Letters Patent No. 688,398, dated December 10, 1901.

Application filed May 31, 1901. Serial No. 62,573. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM A. DODGE, a citizen of the United States, residing at Fall River, in the county of Bristol and State of Massachusetts, have invented certain new and useful Improvements in Means for Altering the Trim of Marine Craft; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the figures of reference marked thereon, which form a part of this specification.

The invention relates to marine craft, and particularly to submarine boats, though it is applicable to vessels of all kinds.

The object of the invention is to provide means for quickly altering the trim of such craft either abeam or fore-and-aft, or both. It is well known that some such device is very desirable on many kinds of vessels, but especially in submarine boats, where the possibility of maintaining a course on a given level depends largely upon the ability to preserve an even trim of the hull.

My invention consists of two or more stand-pipes erected at the sides or ends (or both) of the vessel, those at the sides being connected by tubes and likewise those at the ends, the pipes and tubes being partially filled with some heavy liquid substance, preferably mercury. By means of suitable piping fluid-pressure can be admitted above the mercury in any given stand-pipe, thereby forcing the mercury through the tube or tubes into the opposite stand-pipe, and thus weighting down that end or side of the vessel, and consequently altering its trim.

The accompanying drawings illustrate diagrammatically the application of my invention to a submarine boat.

Figure 1 is a longitudinal elevation, and Fig. 2 a transverse elevation. Fig. 3 is a cross-section of one of the three-way valves.

The stand-pipes are shown as four in number 1 2 3 4, though any desired number may be used. They may be straight or curved and are placed as close to the ends and sides of the hull as practicable and consist of strong metallic pipes of sufficient size to contain a considerable quantity of mercury 5. This is preferably prevented from undue fluctuation by a float or piston 6, sliding freely in the pipe and resting on the mercury. Filling-nozzles 7 are provided for introducing the mercury and vent-cocks 8 for drawing it off when required. The lower ends of opposite stand-pipes, as 1 and 2 and 3 and 4, are connected by tubes 9, which are preferably provided with zigzag or spiral portions 10 in order to retard the flow of the mercury and prevent it from shifting too suddenly.

At some convenient point in the vessel is located a source of fluid-supply 11, such as a steam-boiler or a compressed-air tank or hydraulic reservoir. From this runs a pipe 12, controlled by a stop-cock 13 and divided into two or more branches 14 15. Each branch is controlled by a stop-valve 16 17 and is itself divided into branches 18 19 and 20 21, running, respectively, to the upper ends of the stand-pipes 1 2 3 4 and each provided with a three-way valve 22 23 24 25. The construction of these valves is shown in Fig. 3 and permits one to either admit fluid-pressure to the stand-pipe or exhaust it therefrom at will. All the valves are grouped near each other in some convenient place, such as the conning-tower.

The operation is as follows: Suppose all the valves to be open with equal fluid-pressure on the mercury in all the stand-pipes. The mercury under these conditions will stand at the same level in all the stand-pipes. If now, for instance, the vessel gets too much down by the head, the operator turns the valve 22, shutting off the fluid-supply and permitting the fluid-pressure in the pipe 18 to escape. The excess of pressure in the stand-pipe 2 at once drives the mercury aft through the pipe 9 to the after stand-pipe 1, where its additional weight brings down the stern of the boat and restores her to an even keel. In the same way any undue careening is corrected by forcing mercury from the lower to the upper side of the boat. When the trim has been restored, the equality of fluid-pressure in all the stand-pipes is restored by opening the valves.

If desired, the pipes may be placed outside the hull, as shown in dotted lines in Fig. 2.

Having thus described my invention, what I claim is—

1. Means for altering the trim of a marine craft, consisting of two stand-pipes near opposite portions of the hull, a tube connecting said stand-pipes and provided with zigzag or spiral portions, a mass of heavy liquid in said pipes and tubes, and means for forcing said liquid from one stand-pipe to the other.

2. Means for altering the trim of a marine craft, consisting of stand-pipes at opposite points of the hull, a tube connecting said pipes, a mass of heavy liquid in said pipes and tube, loose pistons in said pipes resting on said liquid, and means for forcing the liquid from one pipe to the other.

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

WILLIAM A. DODGE.

Witnesses:
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