

J. SANGSTER & W. S. GROSVENOR.

MARINE ENGINE-GOVERNOR.

No. 176,484.

Patented April 25, 1876.

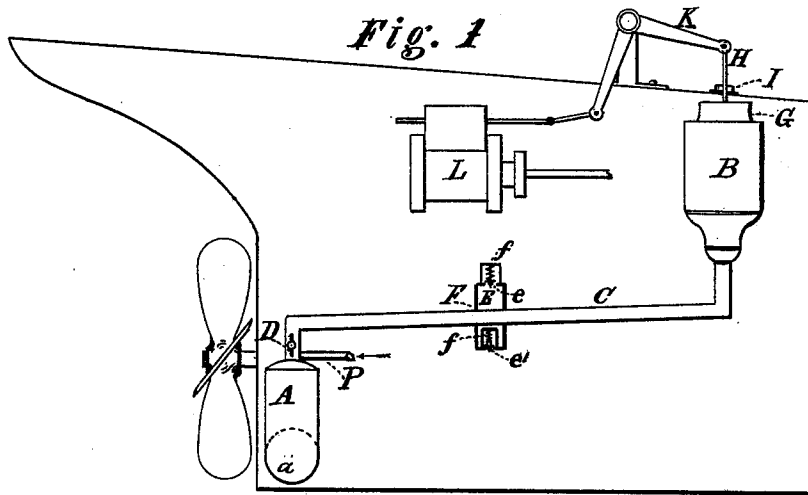


Fig. 2

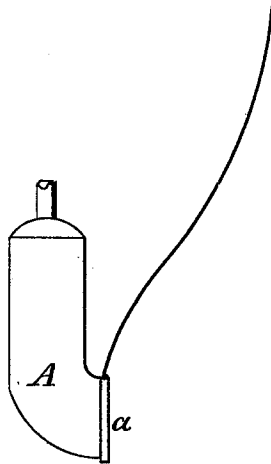


Fig. 3

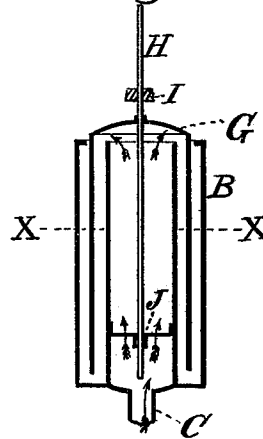
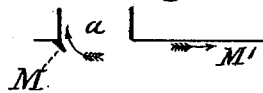


Fig. 4



Witnesses,

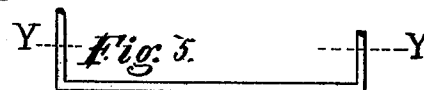
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JAMES SANGSTER AND WILLIAM S. GROSVENOR, OF BUFFALO, NEW YORK.

IMPROVEMENT IN MARINE-ENGINE GOVERNORS.

Specification forming part of Letters Patent No. **176,484**, dated April 25, 1876; application filed January 4, 1876.

To all whom it may concern:

Be it known that we, JAMES SANGSTER and WILLIAM S. GROSVENOR, both of the city of Buffalo, in the county of Erie and State of New York, have invented certain new and useful Improvements in Marine-Engine Governors, which improvements are fully set forth in the following specification, reference being had to the accompanying drawings.

This improvement relates to that class of marine-engine governors having their action controlled by the motion of the vessel. Its object is to provide a sensitive prompt governor, having sufficient force of action to properly control the speed of the engine when required, for the purpose of preventing the racing of the wheel or propeller when raised more or less out of the water by the pitching of the vessel in a rough sea.

The first part of our invention consists in controlling the steam-valve of a marine engine by the combined action of a gasometer-like pneumatic governor, composed of an inverted movable vessel and an annular vessel holding mercury or other liquid, for forming an air-tight and nearly frictionless joint between them, and an air and water tube having an outlet near the stern or bottom of the vessel, all being combined, and so arranged that a partial immersion of the boat in the water will cause a rise or movement of the water in the tube, so as to condense the air therein and move the air-holder, thereby imparting the necessary movement at the proper time, either to the valve of an auxiliary cylinder or a valve on the main engine.

The second part of our invention consists in the combination, with an air or water tube of a marine-engine governor, of an inlet and outlet relief-valve for regulating the pressure within, as will be more clearly hereinafter described.

In said drawings, Figure 1 is a side elevation illustrating our invention, the inlet and outlet relief-valve being in section. Fig. 2 represents a side view of a portion of the air and water tube; Fig. 3, a vertical longitudinal section through the apparatus for moving the valve of the engine. Fig. 4 is a view looking downward toward the opening leading to the

air and water tube. Fig. 5 shows a modified form of water-tube.

A is the lower portion of the air and water tube, connecting with the water through an opening *a*, in the side of the vessel, and with the valve-operating device B at some point in the vessel convenient to the engine. The portion A of the tube is made of larger diameter than the part C, so as to provide more room for the water and the means for more readily condensing the air in the smaller tube. It is not absolutely necessary that one portion of the tube should be smaller than the other, but we believe it is best, as the air is elastic, and a smaller tube holding less is more quickly acted on by the rise or motion of the water in the larger one than it would be if it were of the same diameter throughout. D represents a stop-cock for regulating the size of the opening leading from A to C, by which, as will be readily seen, the governor may be regulated so as to be more or less sensitive. E is the inlet and outlet valve device for controlling the pressure of air within the tube C. It is composed of two valves, *e e'*, one arranged within, and one arranged outside of, the case or vessel F. Both are held to their seats by a spring, *f*, which is adjusted to the pressure desired.

The device for operating the valve is composed of the annular vessel B and the movable inverted vessel G. The annular vessel is filled with mercury up to the line X X, or nearly so, or high enough to counterbalance a pressure of two or three pounds to the square inch. The vessel G is then inserted, as shown in Fig. 3, the mercury sealing the joint, and allowing it to move easily. Any other liquid would answer; but mercury is preferred on account of its weight.

H represents a rod rigidly fastened to the vessel G, for holding it at all times in line with B; it is held in position by supports I J.

In the drawing we have shown a connection, K, made with the valve of an auxiliary cylinder, L; but by increasing the size of the device it can be easily adapted for moving the valve of a larger engine.

M, in Fig. 4, represents a projecting strip, which may be arranged on the side of the opening *a* nearest the stern of the vessel, for

the purpose of directing the water into said opening, if required, as the vessel moves in the direction of the arrow M'.

Fig. 5 represents a modification of the water-tubes A, the operation of which is obvious, Y Y representing the water-line, which is changed by the motions of the boat, so as to operate the inverted vessel G by compressing the air or producing a partial vacuum, said tubes being arranged lengthwise at some convenient point within the vessel.

It will be understood that the arrangement shown in the drawing is adopted merely for conveniently exhibiting the invention. The relative position of the tubes A C and governor with reference to the position of the engine may be changed according to circumstances, so as to adapt it to the vessel.

The operation of our invention is as follows: When the stern of the vessel is made to dip into the water by the action of the waves, the water instantly rises within the tube A, and, compressing the air within tube C, moves the vessel G, and, by its connections, the valve, thereby admitting steam to the cylinder of the engine. When the stern of the vessel rises out of the water a partial vacuum is formed within the tube C and vessel G by the descent of the level of the water in A, thereby reversing the movement of the governor and shutting off the steam, and when necessary, through suitable connections, it may be made to admit air to the condenser, so as

to regulate the amount of vacuum at the same time. If required, a spring may be combined with the vessel G, to assist in its downward movement, or it may be made sufficiently heavy for that purpose. The tube A may be readily cleaned by admitting steam from the boiler through the pipe P, communication being first shut off from tube C by means of the stop-cock D. The object of the outlet and inlet relief-valve E is to provide the means for regulating the pressure or vacuum within the tube C and vessel G, so that the air cannot at any time force its way through the mercury in the annular vessel B.

We claim as our invention—

1. The combination, substantially as specified, of the water-tube, the gasometer-like pneumatic governor, composed of an annular vessel partly filled with mercury or other liquid, and a movable inverted vessel partly immersed in said liquid, and the steam-controlling valve connected with said inverted vessel.

2. The combination of an outlet and inlet relief-valve, E, with the air-tube C and vessel G of a marine governor, substantially as and for the purposes described.

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Witnesses:

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