G. STEELE.

GOVERNORS FOR MARINE-ENGINES.

No. 193,050. Patented July 10, 1877.

Fig. 1.

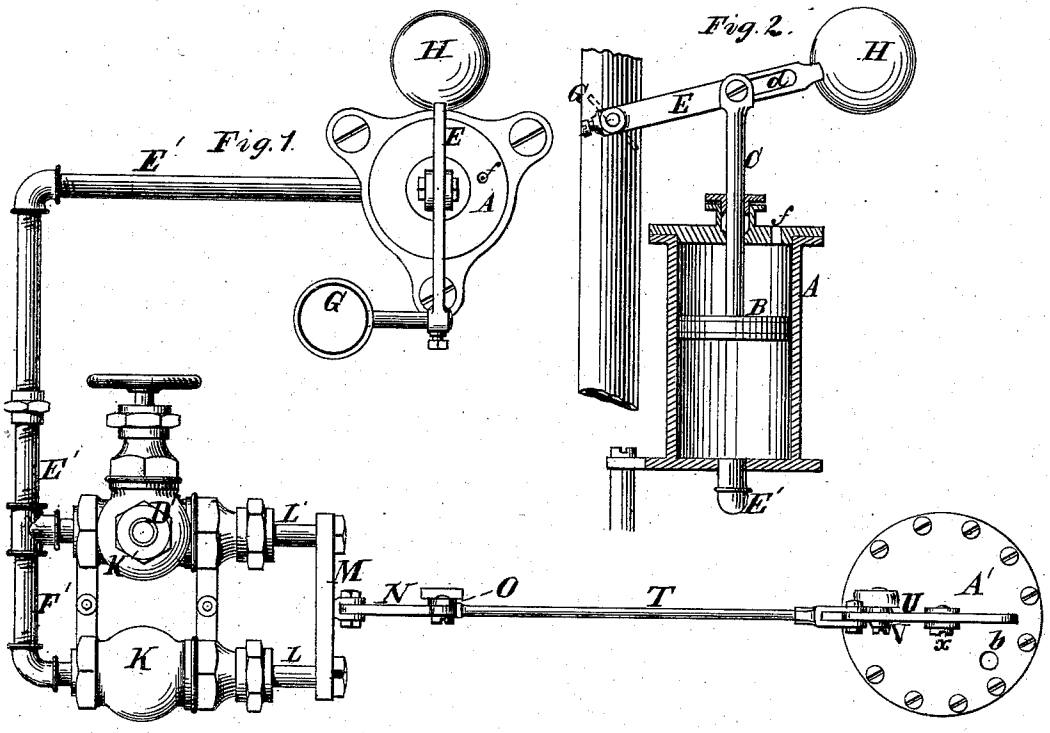


Fig. 2.

Fig. 4.

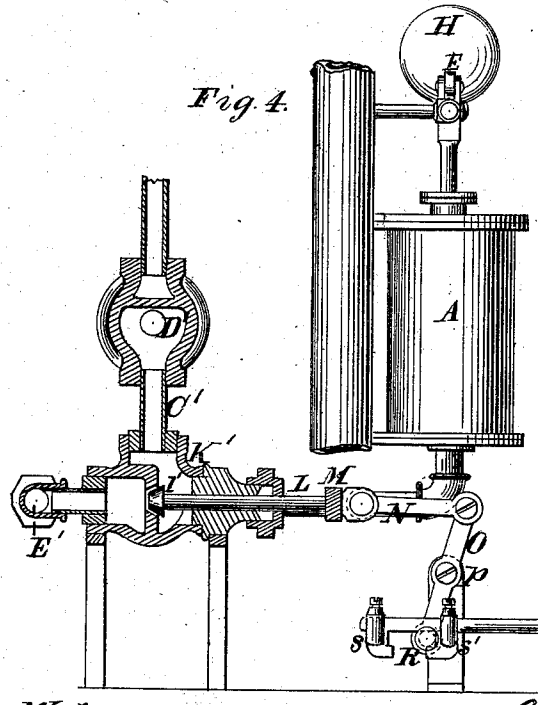
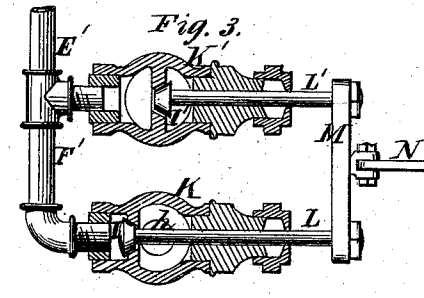
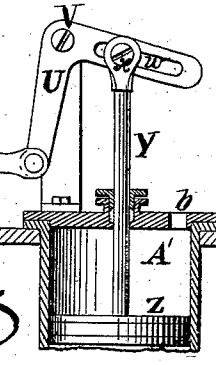


Fig. 3.





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UNITED STATES PATENT OFFICE.

GEORGE STEELE, OF NEW YORK, N. Y.

IMPROVEMENT IN GOVERNORS FOR MARINE ENGINES.

Specification forming part of Letters Patent No. **193,050**, dated July 10, 1877; application filed November 28, 1876.

To all whom it may concern:

Be it known that I, GEORGE STEELE, of the city, county, and State of New York, have invented an Improvement in Governors for Marine Steam-Engines; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawing, which forms part of this specification.

My invention consists in the combination, with a cylinder and a piston contained therein, and actuated by the pressure of water, in which the ship floats on the under side, and by atmospheric pressure on the upper side, of mechanism, to wit: a valve or valves connected with, and operated by, said piston, which valves, through suitable pipes, admit steam, water, or air to, and permit steam, water, or air to exhaust from, one end of a cylinder, the other end of which is open to the atmosphere, and a piston in which acts, through suitable mechanism connected with the throttle-valve in the induction-pipe of the engine, to close the said throttle-valve, the said throttle-valve when not so closed being opened by a weighted lever, as more fully hereinafter described.

Figure 1 in the accompanying drawing is a top view of the apparatus. Fig. 2 is a section through the cylinder, in which works the valve-controlling piston, and a partial side elevation of other parts. Fig. 3 is a horizontal longitudinal section through the valve-boxes of the apparatus. Fig. 4 is a side elevation of the cylinder containing the throttle-valve-controlling piston, a sectional view of the cylinder containing the piston which controls the eduction and induction valves, a vertical and longitudinal section of one of the valve-boxes, and a side elevation of other parts.

A, Figs. 1, 2, and 4, represents the cylinder containing the throttle-valve-controlling piston B, Fig. 2, to which is attached the piston-rod, C, Fig. 2, having at its upper end a pin working in the slot *d*, Fig. 2, of the weighted throttle-valve lever E, a hole, *f*, being formed in the cap of the cylinder A to admit air freely to the upper part of said cylinder.

When steam, water, or air under pressure is admitted to the lower part of the cylinder A, the piston B rises and acts through the piston-rod C and the lever E to close the throttle-valve G, Figs. 1 and 2; and when the said steam, water, or air escapes from said cylinder, the said piston, piston-rod, and lever fall, the lever E being actuated by the weight H at the end of said lever, and the throttle-valve G is opened. The induction and eduction of steam, water, or air to and from the cylinder A are controlled by the valves I I′, Figs. 3 and 4, which seat in opposite directions in the valve-boxes K K′, Figs. 1, 3, and 4. Two puppet-valves, of the kind known as angle-valves, are preferred, but other kinds of valves may be used, so arranged that when one is opened the other shall be closed tightly; or a single valve of any kind may be used, said valve being constructed to cover two ports in such manner that when one port is opened the other shall be simultaneously closed. The valve-stems L L′, Figs. 1, 3, and 4, are attached to a cross-head, M. The said cross-head is connected by a link, N, to the upper end of the rock-bar O, Figs. 1 and 4, which has its fulcrum at *p*, Fig. 4. At the lower end of the rock-bar O is a crank-wrist, R, Fig. 4, with which the adjustable hooks *s s′*, Fig. 4, attached to the connecting-rod T, Figs. 1 and 4, engage, when operated as hereinafter set forth. The said connecting-rod partly rests and slides on said crank-wrist when the motion of the said connecting-rod is insufficient to engage one or other of the said hooks with the said crank-wrist. The other end of the connecting-rod T is pivoted to one arm of a bell-crank lever, U, Figs. 1 and 4, said bell-crank lever having its fulcrum at V. The other arm of the bell-crank lever has a slot, *w*, Fig. 4, formed therein, in which works a pin, *x*, Figs. 1 and 4, said pin projecting from the upper end of the piston-rod Y, Fig. 4, said piston-rod being attached to the piston Z, working in the cylinder A′, Figs. 1 and 4. The bottom of the cylinder A′ is open. The top of said cylinder is provided with a cap, having formed therein an opening, *b*, Figs. 1 and 4, for the free admission of air.

The apparatus is so placed on board ship that the lower part of the cylinder A′ passes down through the hull of the vessel, near the stern, and so that when in a smooth sea the vessel is on an even keel the piston rests upon

the water in such manner that neither one of the hooks *s s'*, Fig. 4, engages the crank-wrist R; but when the stern of the vessel rises sufficiently to throw the propeller partly out of the water, the pressure of the external atmosphere passing in through the opening *b* in the cap of the cylinder A' causes the piston Z to descend in the cylinder A', in which said piston is tightly fitted or packed by leather packing, or otherwise to prevent leakage, and consequently, through the mechanism of the piston-rod Y, bell-crank lever U, connecting-rod T, hook *s'*, rock-bar O, link N, cross-head M, and valve-stems L L', to open the valve I' and close the valve I. When the stern of the vessel sinks sufficiently the above-described action is reversed, the valve I' is closed, and the valve I is opened.

Steam, water, or air under pressure is admitted to the valve-box K' through the pipe C', said pipe being provided with a valve, D', Figs. 1 and 4, and when the valve I' is open and the valve I is closed said steam, water, or air passes through the pipe E' into the cylinder A under the piston B, raising said piston, which, through the piston-rod C and weighted lever E, closes the throttle-valve G that supplies steam to the engines. This action occurs every time the stern of the vessel rises enough to raise the propeller from the water; or when in a racing sea the water recedes from the stern, leaving the propeller exposed, (in which latter case a pendulum governor would not act,) the valves I and I' being actuated as hereinbefore described.

When the vessel sinks, or the sea rises to an even keel, the action is reversed, the valve I' is closed, and the valve I is opened. The steam, water, or air then exhausts from the cylinder A, back through the pipe E', and through the extension F', Figs. 1 and 4, of the pipe E' to and through the valve I, and thence out of the exhaust-port *h* in the bottom of the valve-box K. The weighted lever E then controls the throttle-valve G to open it and admit steam to the engines.

The action of the apparatus as herein described applies to the full closing or opening of the throttle-valve; but it is obvious from the construction that any degree of partial opening or closing, as well as the full action of the throttle-valve, may be obtained by proper adjustment of the hooks *s s'*, and the proper placing of the cylinder A' in the stern of the hull.

When steam is used to actuate the piston B quicker action of the apparatus may be secured by connecting the exhaust-port *h* in the valve-box K, Fig. 4, with a condenser to accelerate the exhaust.

The piston Z in the cylinder A' may, moreover, be made to act as both a float and piston by making it hollow or of light material.

I claim—

The combination, with the throttle or regulating valve G, the water and air cylinder A', and the piston Z acted upon directly by water on its under surface, and by the atmosphere on its upper surface, of a steam, water, or air cylinder, A, containing a piston connected with said throttle-valve, and an induction or eduction valve or valves actuated by the piston Z and its connections to admit steam, water, or air to, and exhaust the same from, the said cylinder A, the whole operating substantially as described, and for the purpose herein set forth.

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