G. STEELE.

GOVERNORS FOR MARINE STEAM-ENGINES.

No. 185,051. Patented Dec. 5, 1876.

Fig. 1

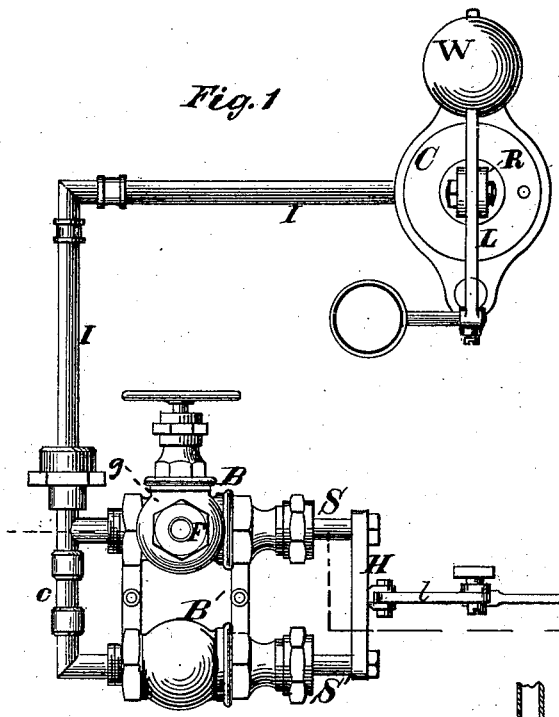


Fig. 2

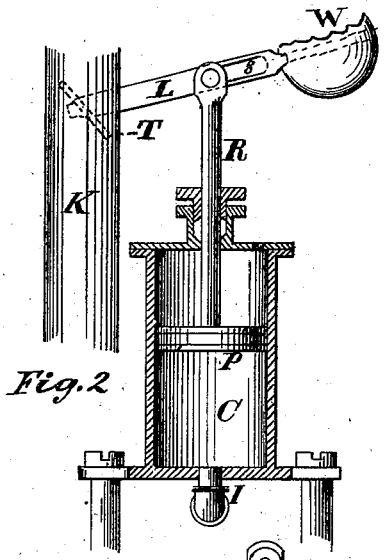


Fig. 3

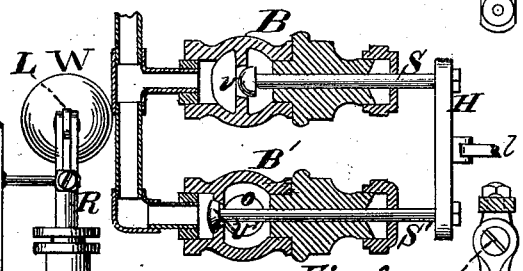
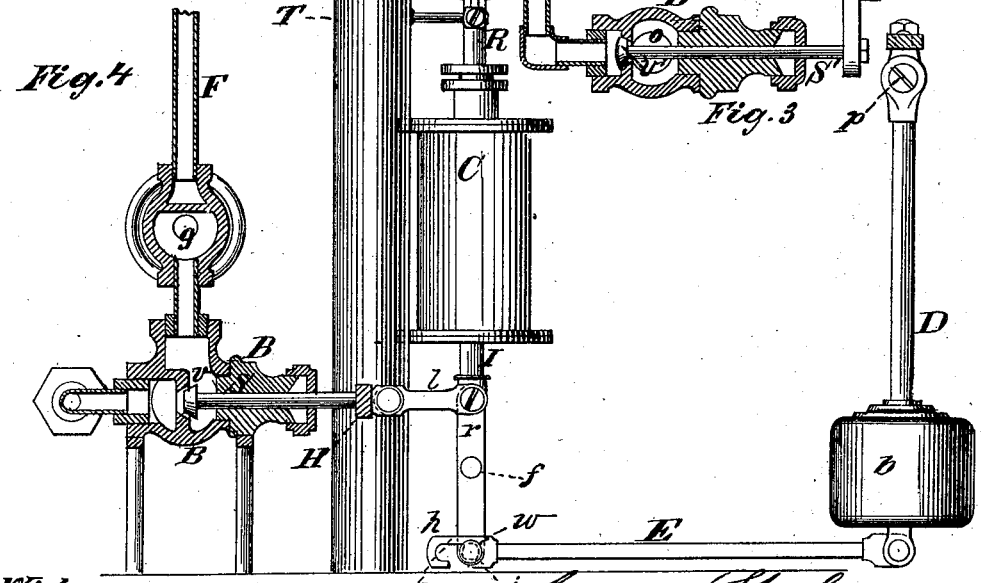


Fig. 4



Witnesses:
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UNITED STATES PATENT OFFICE.

GEORGE STEELE, OF MOTT HAVEN, NEW YORK, N. Y.

IMPROVEMENT IN GOVERNORS FOR MARINE STEAM-ENGINES.

Specification forming part of Letters Patent No. **185,051**, dated December 5, 1876; application filed April 11, 1876.

To all whom it may concern:

Be it known that I, GEORGE STEELE, of Mott Haven, in 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 a part of this specification.

My invention has for its object to cause the pitching motion of vessels at sea, which alternately lifts out of the water and submerges more or less the propellers of such vessels, to act upon mechanism controlling the admission of steam to a cylinder whose piston is connected with and operates the throttle-valve in one direction, a weighted lever operating the throttle-valve in the opposite direction, in such manner that, when the propeller is lifted out of the water, the steam is cut off from the engines.

The invention consists in the combination, with a pendulum, which, as the vessel pitches, nearly maintains a vertical position in a plane parallel to the keel of the vessel, of mechanism—to wit, angle-valves—connected with and operated by the said pendulum, which valves, through suitable pipes, admit steam to, and permit steam to exhaust from, one end of a steam-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.

Figure 1 in the accompanying drawing is a top view of the apparatus. Fig. 2 is a section through the steam-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 steam-cylinder, the pendulum and its connecting-rod, the induction-pipe of the engine in which the throttle-valve works, a vertical section through one of the valve-boxes, and a vertical section through the induction-pipe which supplies steam to the governor-cylinder.

C represents the steam-cylinder of the governor, in which works the piston P, the piston-rod R having at its upper end a pin working in the slot *s* of the throttle-valve lever L, and the said piston-rod working in a guide in the upper cap of the said cylinder C in such manner as to freely permit the exit and entrance of air to and from the upper end of the said cylinder, above the piston P. When the steam is admitted to the cylinder C the piston P rises and acts through the piston-rod R and the lever L to close the throttle-valve T, and, when the steam escapes, the said piston, piston-rod, and lever fall, and the lever L is acted upon by the weight W, fixed upon the said throttle-valve lever, and the throttle-valve is opened. The induction and eduction of steam to and from the cylinder C is controlled by the valves *v v'*, which seat, in opposite directions in the valve-boxes B B'. Two puppet-valves, of the kind known as angle-globe valves, are so arranged that simultaneously with the opening of one the other shall be closed tightly. The valve-stems S S', respectively, of the valves *v v'*, are attached to a cross-head, H. The cross-head H is connected by a link, *l*, to the upper end of the rock-bar *r*, which has its fulcrum at *f*, Fig. 4. At the lower end of the rock-bar *r* is a crank-wrist, *w*, Fig. 4, with which the hook *h* of the connecting-rod E engages, as shown in Fig. 4. The other end of the rod E is pivoted to the pendulum D, which is suspended by a pivot, *p*. The hook *h* has a shank, *m*, which rests upon the wrist *w*. The heavy ball *b* of the pendulum D resists any force which tends to force it out of the line joining its center of gravity and the earth's center of attraction. Therefore, when the vessel pitches, all the parts of the apparatus which are rigidly attached to the vessel, and move with it, change their relation of distance to or from the said vertical line in which the pendulum hangs. Thus the pendulum would appear to an observer on board the vessel to swing, relatively to the vessel, in a vertical plane parallel with the ship's keel. The apparatus is so arranged that, when the distance between the pendulum-ball and the rock-bar *r* is lessened sufficiently to bring the shoulder *i* at the end of the shank *m* of the hook *h* to bear against the wrist *w* of the rock-bar *r*, the inertia of said

pendulum-ball will, through the intervening parts E *r l* H, and the valve-stems S S′, open the valve *v* and close the valve *v′*. Steam is admitted to the valve-box B through the pipe F, provided with the valve *g*, and when the valve *v* is open and the valve *v′* is closed, steam passes through the pipe I to the cylinder C, entering under the piston *p* and raising the same, which acts through the piston-rod R and lever L to close the throttle-valve and shut off the steam in the induction-pipe K, which supplies steam to the engines. On the contrary, when the valve *v* is closed and the valve *v′* is opened, the steam exhausts from the cylinder C, and, passing back through the pipe I and its continuation *c* to the valve-box B, escapes at the opening *o*, in the bottom of the said valve-box. The weight W on the throttle-valve lever then opens the throttle and the engines receive steam through the pipe K. The parts are, moreover, adjusted so that the shoulder *i* of the hook *h* on the connecting-rod E abuts against the wrist *w* of the rock-bar *r*, when the stern of the vessel rises above an even keel enough to raise the screw out of the water. When the stern of the vessel sinks below the line of an even keel, submerging the screw deeply, the shank *m* of the hook *h* slides along on the wrist *w* of of the rock-bar *r*, and therefore does not actuate the said rock-bar and parts connected with it, and consequently the weight on the lever L opens and keeps the throttle-valve fully open.

Instead of steam, water may be used to actuate the piston P in the cylinder C, the water being supplied to said cylinder under pressure from a pump, or through other appliances.

I claim—

The combination, with the pendulum *b* and the throttle or regulating valve T, of the cylinder C, receiving steam or water only at one end, and open to the atmosphere at the other end, the piston P, the induction-pipes F and I, the eduction-pipe *c*, the exhaust-port *o*, and the angle-valves *v v′*, connected with the pendulum by the connecting-rod E, substantially as and for the purpose specified.

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Witnesses:

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