J. EVERDING.

Marine-Engine Governor.

No. 168,147. Patented Sept. 28, 1875.

Fig. 1

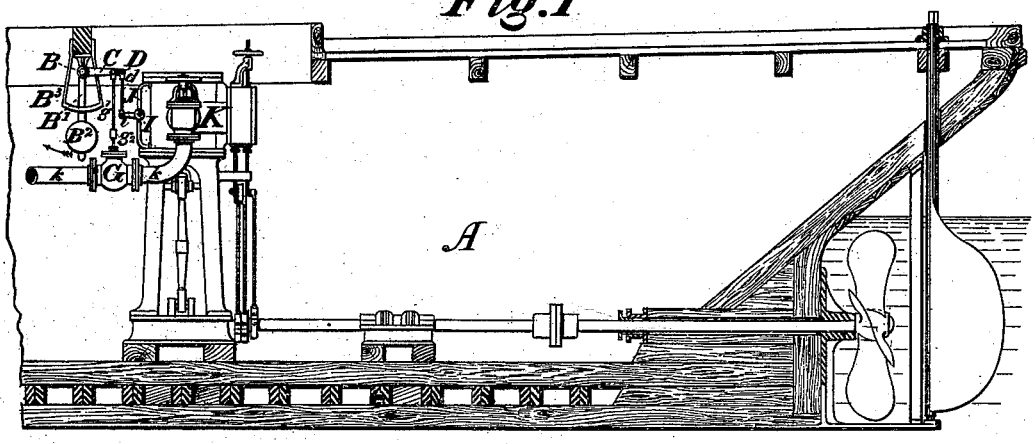


Fig. 2

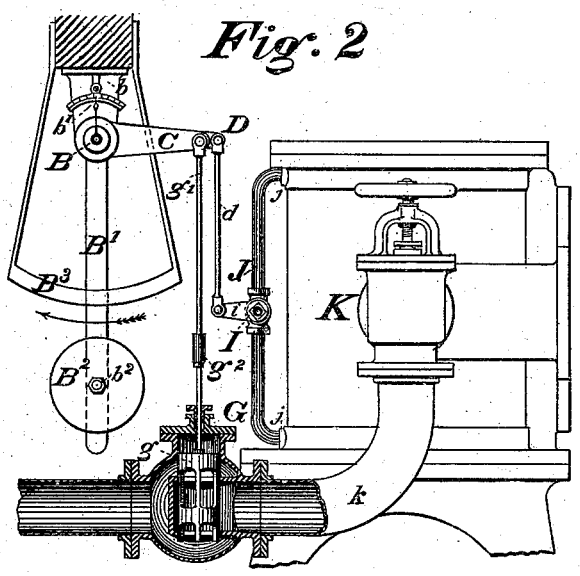


Fig. 3

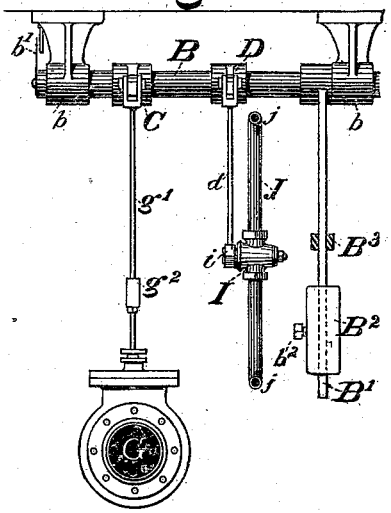
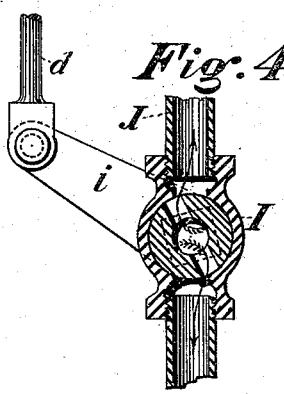


Fig. 4



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UNITED STATES PATENT OFFICE.

JOHN EVERDING, OF PHILADELPHIA, PENNSYLVANIA.

IMPROVEMENT IN MARINE-ENGINE GOVERNORS.

Specification forming part of Letters Patent No. **168,147**, dated September 28, 1875; application filed August 30, 1875.

To all whom it may concern:

Be it known that I, JOHN EVERDING, of the city and county of Philadelphia, in the State of Pennsylvania, have invented certain new and useful Improvements in Marine-Engine Governors, of which the following is a specification:

The object of my invention is to provide a simple and efficient device for preventing the excessive speed or "racing" of the engine of a steam-vessel, due to the elevation of the propeller-wheel out of the water by the pitching or fore-and-aft motions of the vessel in a heavy sea; to which end my improvements consist in the combination of a rock-shaft, a weighted arm or pendulum, a valve in the steam supply-pipe of the engine, and an atmospheric cock or valve communicating with both ends of the cylinder, as hereinafter more fully set forth.

In sea-going vessels the pitching in a heavy seaway will from time to time raise the propeller partially or even entirely out of the water, and, as at such intervals the resistance of the water to the revolutions of the propeller is correspondingly reduced or removed, the engine, which works at its normal speed while the propeller is submerged, will be driven at greatly-increased velocity by reason of the sudden diminution or withdrawal of resistance, and upon the subsidence of the stern of the vessel its velocity will be suddenly and violently checked. Straining and breakage of the engine, shaft, and wheel are the results of this irregular action, and numerous expedients have been proposed to remedy these evil effects.

It is obvious that only an automatic and practically instantaneously-operating device can properly perform this function, and, so far as within my knowledge and experience, the mechanism heretofore employed has been, like the laborious throttling of the engine by hand, deficient, in the respect that its operation was induced by or dependent upon, in a greater or less degree, an initial variation in the speed of the propeller and engine.

My invention provides automatic means for increasing and diminishing the supply of steam to the engine coincident with the fore-and-aft movements of the vessels, and proportioned in degree thereto, and its application is wholly independent of the moving parts of the engine, and of the form or position thereof.

In the accompanying drawings, Figure 1 is a vertical central section of the after portion of a steam-vessel having my improvements applied; Fig. 2, a view on an enlarged scale of my improvements, the regulating-valve body being shown in section; Fig. 3, a similar view of the rock-shaft and its attachments; and Fig. 4, an enlarged section of the atmospheric cock.

To carry out the object of my invention I provide a horizontal rock-shaft, B, which is mounted in bearings *b b* in any convenient part of the hull A of the vessel, tranversely to the keel, and, by preference, in the engine-room. An arm, B^1, is secured upon the shaft B, and carries a weight or pendulum, B^2, which may be made fast at any desired distance from the center of the shaft by a set-screw or pin, b^2. The arm B^1 is guided in its movements and its range of motion limited by a stationary segment, B^3. A pointer may be placed upon the shaft B to indicate upon a stationary dial-plate, b^1, the relative position of the arm B^1. A shorter arm, C, is secured upon the shaft B substantially at right angles to the arm B^1, and has its free end pivoted to one end of a rod, g^1, the other end of which is secured to a balanced valve, *g*, having its seat in a valve casing or body, G, in the steam supply-pipe *k* of the engine-cylinder K. A coupling, g^2, should be provided for the purpose of adjusting the valve g^1 in its seat by lengthening or shortening the valve-rod, as may be required. A third arm, D, is secured to the rock-shaft B, also substantially at right angles to the arm B^1, its free end being pivoted to one end of a rod, *d*, the other end of which is in turn pivoted to the lever *i* of an atmospheric cock or valve, I, placed in a pipe, J, which communicates with the cylinder near each of its ends. The plug of the cock I has a central longitudinal opening communicating with the atmosphere, so that when its transverse opening is in communication with the pipe J air will be admitted to one end of the cylinder, and steam allowed to escape from the other.

If preferred, the cock I may be made without the opening to the atmosphere, and in such

case it will act to establish an equilibrium of pressure on both sides of the piston.

The area of the regulating-valve *g* should be such as that, when open, it will allow of the passage of a full supply of steam to the throttle, and in marine engines of two or more cylinders a single regulating-valve in the main steam-pipe will suffice; but a separate atmospheric cock and pipe should be applied to each cylinder, except in the case of compound engines, where they are only required for the low-pressure cylinder or cylinders.

The operation of my improved governor is due solely to the law of gravitation. Upon the elevation of the stern and propeller wheel of the vessel by the fore-and-aft motion thereof the weighted arm B^1 will move to retain a perpendicular line in the direction of the arrow in Fig. 2, and will consequently depress the arms C and D. The attached valve *g* and cock I will be, respectively, correspondingly closed and opened. The relative lengths of the arms B^1 and C are such that when the stern of the vessel is raised sufficiently to expose all, or nearly all, of the propeller, the regulating-valve *g* will be entirely closed, and the supply of steam consequently shut off from the engine, and when the propeller is entirely submerged the valve will be full open. Between these two positions the valve will be partially and proportionately closed—that is to say, with a small amount of protrusion of the propeller from the water only a small proportion of the steam will be shut off, and correspondingly greater proportions of steam will be shut off for greater amounts of protrusion.

The office of the atmospheric cock I is, when opened, to establish communication between the atmosphere and the two ends of the cylinder, thereby admitting air on the exhaust side of the piston to impair or destroy the vacuum, and allowing the escape of steam from the steam side. The cock is set so that it will only operate in the extreme variation of movement of the vessel, and serves to supplement the action of the regulating-valve.

Inasmuch as my devices have no connection with the moving parts of the engine, it will be evident that their action has no dependence thereon, and, moreover, that they may be applied without in anywise interfering with existing arrangements for stopping, starting, reversing, and regulating the speed of the engines.

I am aware that a pendulum operating the regulating-valve of a marine steam-engine has been heretofore known, and do not, therefore, broadly claim such device.

I claim as my invention, and desire to secure by Letters Patent—

1. The combination, in a marine-engine governor, of a rock-shaft, a weighted arm attached thereto, and rock-arms, respectively, operating a regulating-valve in the steam supply-pipe, and an atmospheric cock or valve communicating with both ends of the engine-cylinder, substantially as set forth.

2. The combination, with a marine-engine governor, of a device for destroying the vacuum upon one side of the piston of the engine, and allowing the escape of steam from the other, substantially as set forth.

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