C. C. WOLCOTT.

Electrical Marine-Engine Governor.

No. 168,548. Patented Oct. 5, 1875.

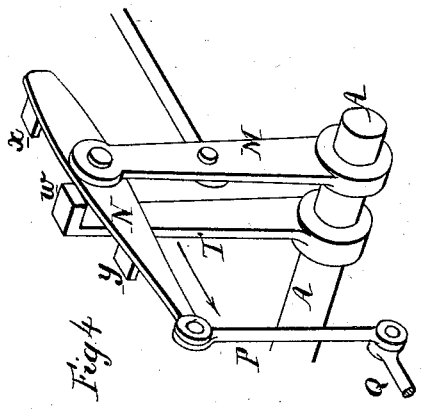


Fig. 4.

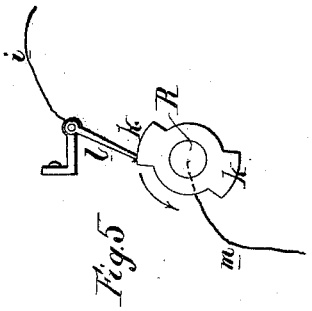


Fig. 5.

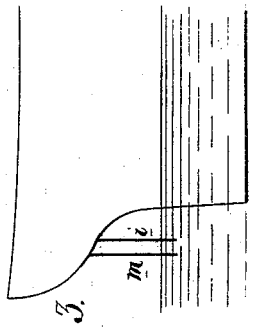


Fig. 3.

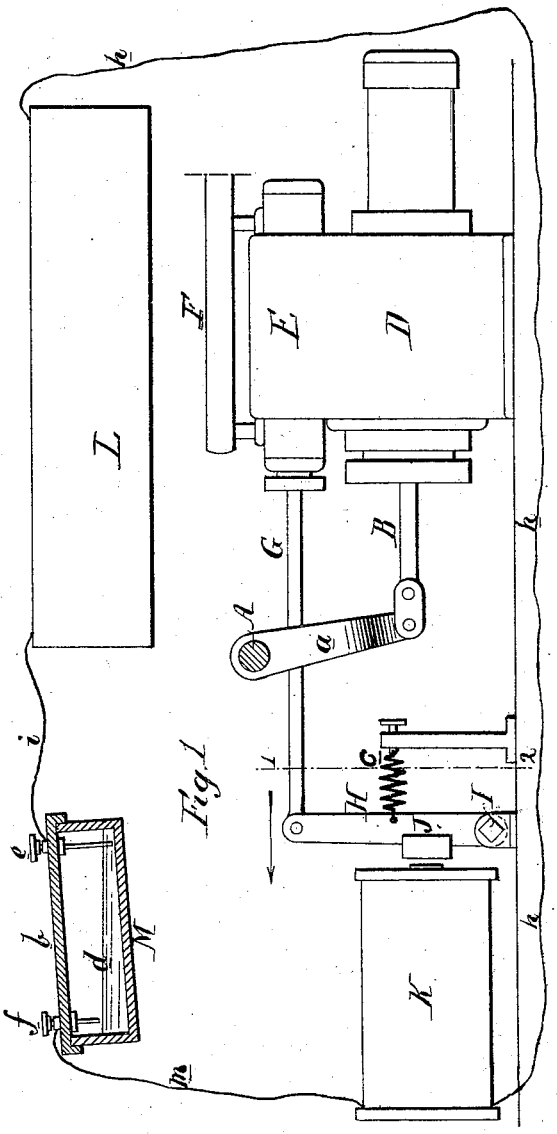


Fig. 1.

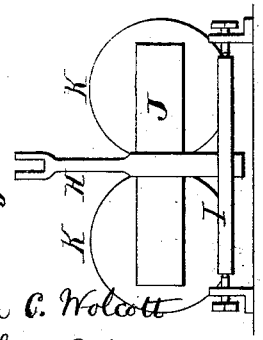


Fig. 2.

Witnesses,
Harry Smith
Hubert Howson

Christopher C. Wolcott
by his Attorneys,
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# UNITED STATES PATENT OFFICE.

CHRISTOPHER C. WOLCOTT, OF WASHINGTON, DISTRICT OF COLUMBIA.

## IMPROVEMENT IN ELECTRICAL MARINE-ENGINE GOVERNORS.

Specification forming part of Letters Patent No. **168,548**, dated October 5, 1875; application filed September 7, 1875.

*To all whom it may concern:*

Be it known that I, CHRISTOPHER C. WOLCOTT, of the city of Washington, District of Columbia, have invented an Improved Governor, of which the following is a specification:

The main object of my invention is to construct a sensitive marine governor by causing the making and breaking of an electric current due to the motion of the vessel, to control the force exerted to operate the throttle-valve of the engine, my invention being also applicable to the operation of the cut-off valves of engines generally.

In the accompanying drawing, Figure 1 is a view representing my invention as applied to a marine governor; Fig. 2, a section on the line 1 2, looking in the direction of the arrow; Fig. 3, a diagram illustrating a modification of my invention; Fig. 4, a view of a modification of part of Fig. 1, and Fig. 5 a device by which my invention may be applied to a cut-off.

In Fig. 1, A represents the spindle of the engine's throttle-valve, or it may represent a counter-shaft connected to the throttle-valve spindle. To the shaft A is secured an arm, *a*, connected to the outer end of the piston-rod B, the piston of which is contained within a small steam-cylinder, D. E is the valve-chest containing a valve which admits of different constructions; but I prefer a balanced or other valve which demands the least exertion to operate. Steam is admitted through a pipe, F, to the chest, and the latter has the usual exhaust-opening. The valve-spindle G is connected to an arm, H, secured to a shaft, I, which may be hung to any fixed object, in the manner shown in Fig. 2, or in any other suitable manner. To the arm H is secured the armature J, adapted to the double electro-magnet K K. M is a small glass or earthenware receptacle, provided with a cover, *b*, and containing a supply, *d*, of mercury. Near one end of this receptacle is a set-screw, *e*, the lower end of the stem of which is always immersed in the mercury, and near the opposite end of the receptacle is a screw, *f*, the stem of which is never in contact with the mercury, excepting under the circumstances explained hereafter. A wire, *h*, extends from the magnet to one pole of a battery, L, a wire, *i*, from the other pole of the battery to the screw *e*, and a wire, *m*, from the screw *f* to the magnet.

It will be seen there can be no electric circuit until the mercury is in contact with the stem of the screw *f*, and this never takes place excepting when the motion or position of the vessel is such as to induce the engines to race, as the running of the engines at a dangerous speed is technically termed, the receptacle M being arranged in the most advantageous position for insuring the prompt action of the mercury in accordance with the motion of the vessel, and the screw *f* being so adjusted that the mercury cannot come in contact with it unless an increased speed of the engines demand the formation of an electric circuit. As long as no electric circuit exists, the small steam-engine remains quiescent, the throttle-valve of the engine being open, the arm *a* in the position shown in Fig. 1, and the piston at the rear end of the cylinder; but the moment an electric circuit is formed the armature J will be brought into instant contact with the magnets, and the valve will be so operated that steam will be admitted to the rear of the piston and the arm *a* will consequently be so operated as to close the throttle-valve to an extent sufficient to prevent the racing of the engine, and this closing or partial closing of the throttle-valve will be continued as long as the electric circuit is continued, and consequently as long as the position of the vessel induces the engine to race.

The moment the circuit is broken, however, by the receding of the mercury from the point of the set-screw *f*, the arm H will be released and drawn back by a spring, *c*, to its original position, the piston of the engine will be moved rearward, and the throttle-valve will be opened.

It will be seen, without further description, that the governing of the engine is dependent upon the making and breaking of a current of electricity due to the motion of the vessel, and in obedience to the requirements of the engine. This making and breaking of the current of electricity may be accomplished by means other than those described—for instance, the vessel M may be entirely dispensed with, the wires *m* and *i* carried over the stern of the vessel, and both immersed in the sea, by pref-

erence, just over the screw, the wires, however, being adjustable, so that they can be arranged to suit the degree of pitching.

The salt-water in this case makes the connection, and while the arm H is held up to the magnets and the throttle-valve is open. The instant the stern rises out of the sea the wires leave the water, the circuit is broken, the arm H is released and drawn back by the spring, the piston is moved, and the throttle-valve closed, and remains closed until the stern sinks back again into the sea, and the wires *m* and *i* are again immersed, when the circuit is made, the arm H drawn up, and the throttle-valve is opened. A pendulum may also be used, in a manner which requires no explanation, for making or breaking the circuit in obedience to the position of the vessel and requirements of the engine.

It will be understood that the relative arrangement of engine, battery, and mercury-receptacle must be altered as the best locality in the vessel and other circumstances may suggest, the arrangement in the drawing being adopted merely for the convenient exhibition of the invention. The small engine may be operated by compressed air, or the engine may be dispensed with, and the force exerted to move the throttle-valve may be derived from the main engine of the vessel, and controlled by the making and breaking of an electric circuit due to the motion of the vessel.

The perspective view, Fig. 4, illustrates a device, through the medium of which power derived from the main engine is made to perform precisely the same duty as the small supplementary engine. In this case an arm, M, is hung loosely to the spindle A of the throttle-valve, and is vibrated at a comparatively rapid speed from the main engine of the vessel, through the medium of such connections as circumstances may suggest. A lever, N, is hung loosely to the arm M, and this lever has two projections, *x* and *y*, one on each side of the fulcrum, one arm of the lever being extended outward and connected by a link, P, to a lever, Q, which is controlled by the magnet. An arm, T, is secured to the valve-spindle A, and this arm has at the top a projection, *w*. It depends upon the making or breaking of the electric circuit, which of the projections, *x* or *y*, shall, during the vibrating movement of the arm M, strike the projection *w* on the lever T. If by the breaking of the circuit the long arm of the lever N be depressed the projection *x* will be within the range, and the projection *y* out of the range of the projection *w*, and the consequence of this will be the turning of the valve-spindle A in the direction of the arrow; but when the circuit is restored the projection *y* will come into play, and, striking the arm T, will move the valve-spindle in a contrary direction and close the valve.

It will thus be seen that it is immaterial whether the main power of the engine or that derived from a supplementary engine, or from other source, be used for operating the throttle-valve, providing the power acts in obedience to the making and breaking of an electric circuit due to the motion or position of the vessel.

When my invention has to be employed as a simple cut-off, without any regard to the movement of the vessel, I use the device shown in Fig. 5, which takes the place of the mercury-receptacle and its adjuncts.

In this case a shaft, R, is caused to revolve in unison with the crank-shaft of the engine, and on the shaft R are two projections, *k k*. An arm, *l*, is hung loosely to any suitable fixed object, and to this arm is connected the wire *i*, while the wire *m* is connected to the shaft R. As this shaft revolves the electric circuit will be broken whenever a projection, *k*, is free from the arm *l*, and will be restored when the latter is in contact with either projection, and these projections may be so formed that the valve, of which A is the spindle, shall cut off the steam at the desired points in the stroke of the engine.

I claim as my invention—

1. A marine governor, in which the making and breaking of an electric circuit, due to the motion of the vessel, is made to control the force applied to operate the throttle-valve, substantially as set forth.

2. As a medium through which the motion of the vessel is caused to make and break an electric circuit, the receptacle M containing a supply of mercury, and having adjustable attachments, *e* and *f*, for receiving the wires.

3. In combination with a throttle-valve of a steam-engine a steam, air, or other engine for operating the said valve, and an electro-magnet for operating the valve of the said engine, all substantially as specified.

4. A cut-off motion, in which the making and breaking of electric circuit, due to the engine, is made to control the force applied to operate the cut-off valve, substantially as set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

C. C. WOLCOTT.

Witnesses:
CHARLES E. FOSTER,
E. L. SCHMIDT.