

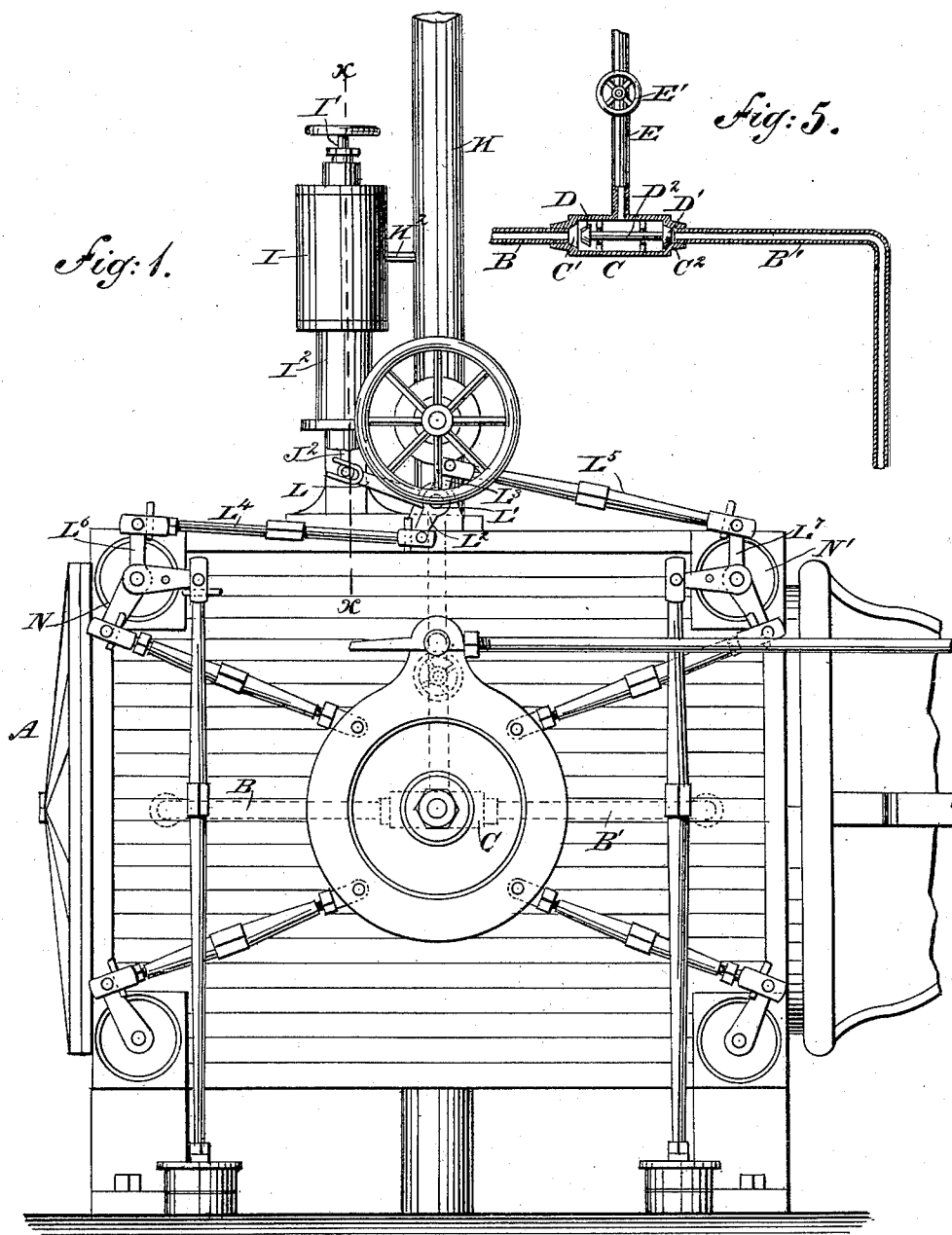
(No Model.)

2 Sheets—Sheet 1.

R. J. McILHENNY.  
ENGINE GOVERNOR.

No. 474,678.

Patented May 10, 1892.



WITNESSES:

Chas. Nida.  
S. Sedgwick

INVENTOR

R. J. McIlhenny  
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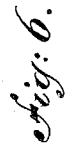
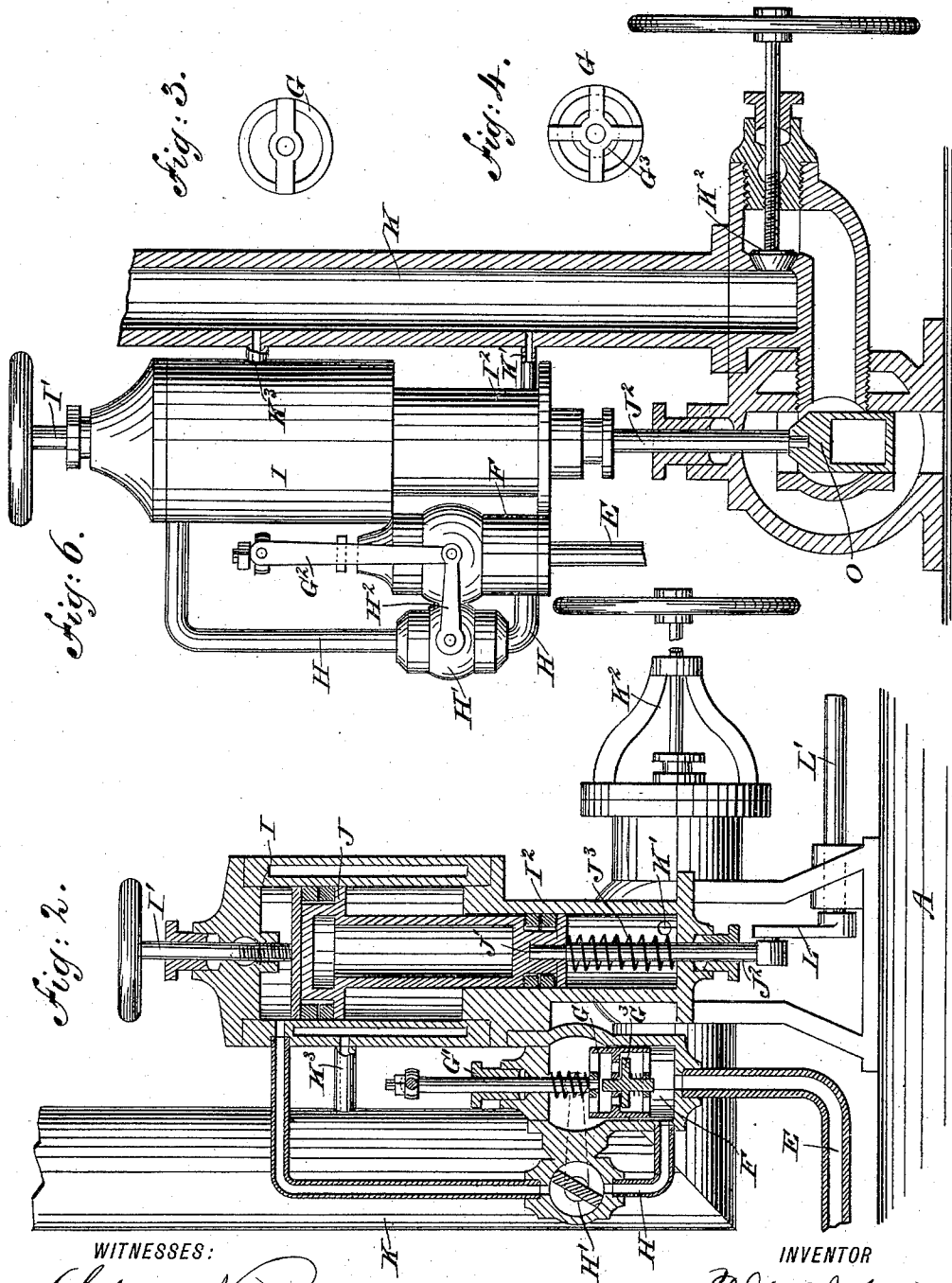
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# UNITED STATES PATENT OFFICE.

RICHARD J. McILHENNY, OF WILMINGTON, NORTH CAROLINA.

## ENGINE-GOVERNOR.

SPECIFICATION forming part of Letters Patent No. 474,678, dated May 10, 1892.

Application filed May 19, 1891. Serial No. 393,290. (No model.)

*To all whom it may concern:*

Be it known that I, RICHARD J. McILHENNY, of Wilmington, in the county of New Hanover and State of North Carolina, have invented a new and Improved Engine-Governor, of which the following is a full, clear, and exact description.

The object of the invention is to provide a new and improved steam-engine governor which is simple and durable in construction, very effective and positive in operation, admitting-steam quickly and in proper proportion to overcome the resistance of any load carried, or shutting off the motive agent or an increase of speed after release of the load.

The invention consists of a piston controlled by the initial pressure in the cylinder and controlling the movement of the inlet valve or valves for the cylinder.

The invention also consists of certain parts and details and combinations of the same, as will be hereinafter described, and then pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a side elevation of the improvement as applied to a Corliss engine. Fig. 2 is an enlarged transverse section of the improvement on the line *xx* of Fig. 1. Fig. 3 is a plan view of the equalizing-valve. Fig. 4 is an inverted plan view of the same. Fig. 5 is a sectional side elevation of the equalizing-pipe; and Fig. 6 is a side elevation of the improvement as applied to the throttle-valve, the latter being shown in section.

The ends of the cylinder A of the engine on which the improvement is applied are connected with the ends of pipes B and B', leading to a valve-casing C, formed at the entrance of the pipes B and B' with valve-seats C' and C'', respectively, adapted to be alternately opened and closed by valves D D', respectively, secured on the ends of a common valve-stem D<sup>2</sup>, mounted to slide longitudinally in the said valve-casing C. The latter is connected at or about its middle with a pipe E, provided with a valve E' and opening into a cylinder F, containing an equalizing-valve G, fitted to slide in the said cylinder. The lower end of the latter is connected by a pipe H

with the upper end of a cylinder I, containing a piston J, the upward movement of which is limited by a screw-rod I', held adjustably in the upper end or head of the said cylinder I. The pipe H is provided with a valve H', controlled from the equalizing-valve G, the latter being provided for this purpose on its stem G' with arms G<sup>2</sup>, pivotally connected with crank-arms H<sup>2</sup>, held on the stem of the valve H', so that when the said equalizing-valve G slides up and down in the cylinder F the valve H' is turned in its seat to regulate the communication between the cylinder F and the upper end of the cylinder I.

The piston J is formed on its under side with a piston-rod J', extending into a cylinder I<sup>2</sup>, considerably less in diameter than the cylinder I and connected by a pipe K' with a supply-pipe K, supplying the motive agent to the cylinder A in the usual manner and containing the valve K<sup>2</sup>. The piston-rod J' carries a stem J<sup>2</sup>, extending through a stuffing-box in the head of the said cylinder I<sup>2</sup> and connecting at its outer end with a crank-arm L, secured on a shaft L', carrying the arms L<sup>2</sup> and L<sup>3</sup>, pivotally connected by the links L<sup>4</sup> and L<sup>5</sup>, respectively, with the arms L<sup>6</sup> and L<sup>7</sup>, held on the stems of the valves N and N', regulating the inlet of the motive agent to the cylinder A. As shown in Fig. 1, the said valves N and N' are part of the Corliss engine previously mentioned. The cylinder I is preferably provided with a steam-jacket connected by a pipe K<sup>3</sup> with the supply-pipe K, so as to prevent loss of steam within the said cylinder I by radiation. As shown in Fig. 6, the stem J<sup>2</sup> is directly connected with the throttle-valve O, arranged in the supply-pipe K, as shown. The equalizing-valve G is provided with an auxiliary valve G<sup>3</sup>, which permits the motive agent to escape from above the equalizing-valve G in the upper end of the cylinder F at the time the engine cuts off and steam is expanding.

The operation is as follows: The initial pressure within the cylinder A at the forward stroke of the piston opens the double check-valve D or D' at the end of the corresponding pipe B or B', so that the opposite pipe B' or B is closed by the respective valve D' or D. The seated valve, in addition to the pressure, is held to its seat by the vacuum in the oppo-

site or exhausting end of the cylinder. Now the steam from the forward stroke, passing through the respective pipe and open valve, passes into the pipe E and to the cylinder F, thus exerting its pressure against the equalizing-valve G, thereby raising the latter until the steam passes the said valve and fills the space above it in the cylinder F. In doing so an equal pressure is produced above and below the equalizing-valve G, thereby allowing the valve to fall back to its seat. When the equalizing-valve G is lifted to a certain height previous to steam passing above it, the valve H' is actuated so that the motive agent can pass from the cylinder F through the pipe H into the upper end of the cylinder I to exert its pressure on the piston J. As the reduced end of the piston-rod J' of the said piston J is exposed to the boiler-pressure, the live steam in the upper end of the cylinder I, pressing on the larger area of the piston J, causes a downward movement of the latter, whereby the positions of the valves N and N' of the cylinder A are regulated. On the succeeding stroke of the engine, should there be the slightest increase or diminution of the load carried by the engine, then the steam passing up into the cylinder I through the pipe H will act the same as on the preceding stroke and will meet pressure at this point, so as to increase or diminish the registering-pressure of the preceding stroke in the cylinder I. The boiler-pressure, acting on the reduced end of the piston-rod J' of the piston J, effects pressure above the said piston, thus causing the steam-valves of the engine to open or close slightly, thereby allowing the engine to continue at the same rate of speed under whatever change of boiler-pressure, so that the governor performs its office in respect to the load carried by the engine irrespective of the boiler-pressure. The equalizing-valve G falls back to its seat after giving the pressure time to equalize at the cut-off valve H, with pressure from the cylinder I. By this action the pressures of the engine-strokes are registered. A spring J<sup>3</sup> is coiled on the rod J<sup>2</sup> and rests with one end on the head of the cylinder I<sup>2</sup>, and with its other end presses on the piston-rod J', so as to hold the latter and the piston J in a normal position at the time when steam is shut off. The governor acts similarly relative to the throttle-valve O—that is, regulates the amount of steam passing through the supply-pipe K to the cylinder I.

It will be seen that this governor is positive in its action and is part of the engine which it governs. The device requires no belt for driving it, thus obviating the serious troubles that breaking of a belt would cause. It will further be seen that the governor commences to act or check, within one-half revolution of the crank, the increased speed of the engine after being released of the load that resists the power of the same, and, on the other hand, it will act as quick to give steam to overcome

increased resistance of any load carried. The valve E' in the pipe E serves to regulate the flow of motive power to the cylinder F to prevent jerking of any of the valves, the aperture in the said valve E' being made sufficiently small for the purpose.

As shown in the drawings, the governor is intended to be set on top of the engine-cylinder, is very simple in construction, and not liable to get out of order. The device will work either on high or low pressure, stationary, or marine engines. As this governor has no balls governed by centrifugal force and gravitation, it renders it very adaptive to marine engines to prevent racing when the load is lifted. In case the load is taken off quickly the steam is cut off by the same movement.

Having thus fully described my invention, I claim as new and desire to secure by Letters Patent—

1. An engine-governor provided with a piston controlled from the initial pressure in the cylinder of the engine governed through an equalizing-valve and controlling the movements of an inlet valve or valves for the cylinder, substantially as shown and described.

2. An engine-governor provided with a piston having its reduced end pressed on by the motive agent and its larger end exposed to the initial pressure in the cylinder of the engine governed through an equalizing-valve, substantially as set forth.

3. In an engine-governor, the combination, with a piston having its reduced end pressed on by the motive agent and its larger end exposed to the initial pressure in the cylinder, of an equalizing-valve for controlling the flow of motive agent from the cylinder to the large end of the said piston, substantially as shown and described.

4. In an engine-governor, the combination, with an equalizing-valve controlled by the initial pressure in the cylinder, of a piston having its large end exposed to the cylinder-pressure controlled by the said equalizing-valve, the small end of the said piston being acted on by the motive power of the supply-pipe, substantially as shown and described.

5. In an engine-governor, the combination, with an equalizing-valve controlled by the initial pressure in the cylinder, of a piston having its large end exposed to the cylinder-pressure controlled by the said equalizing-valve, the small end of the said piston being acted on by the motive power of the supply-pipe, and means for connecting the reduced end of the said piston with the valves controlling the inlet of the steam to the cylinder, substantially as shown and described.

6. In an engine-governor, the combination, with a cylinder and an equalizing-valve fitted to slide therein, of a pipe leading from the said cylinder, a valve-casing into which opens the said pipe and provided with two valve-seats, a double valve fitted to slide in the said valve-casing, and pipes leading from

the said valve-casing to the ends of the cylinder, substantially as shown and described.

7. In an engine-governor, the combination, with a cylinder having a reduced end in communication with the steam-supply pipe, of a piston fitted to slide in the said cylinder and provided with a piston-rod extending into the said reduced end of the cylinder, a pipe extending into the upper end of the said cylinder, a check-valve held in the said pipe, a cylinder connected with the said pipe, and an equalizing-valve held in the said last-named cylinder and adapted to control the movement of the said check-valve, substantially as shown and described.

8. In an engine-governor, the combination, with a cylinder having a reduced end in com-

munication with the steam-supply pipe, of a piston fitted to slide in the said cylinder and provided with a piston-rod extending into the said reduced end of the cylinder, a pipe extending into the upper end of the said cylinder, a check-valve held in the said pipe, a cylinder connected with the said pipe, an equalizing-valve held in the said last-named cylinder and adapted to control the movement of the said check-valve, and an equalizing-pipe connected with the last-mentioned cylinder and with the ends of the engine-cylinder, substantially as described.

RICHARD J. McILHENNY.

Witnesses:

E. S. TENNENT,

THOS. C. McILHENNY.