C. C. JENKINS.

Regulating Devices for Steam-Engines.

No. 213,202 Patented Mar. 11, 1879.

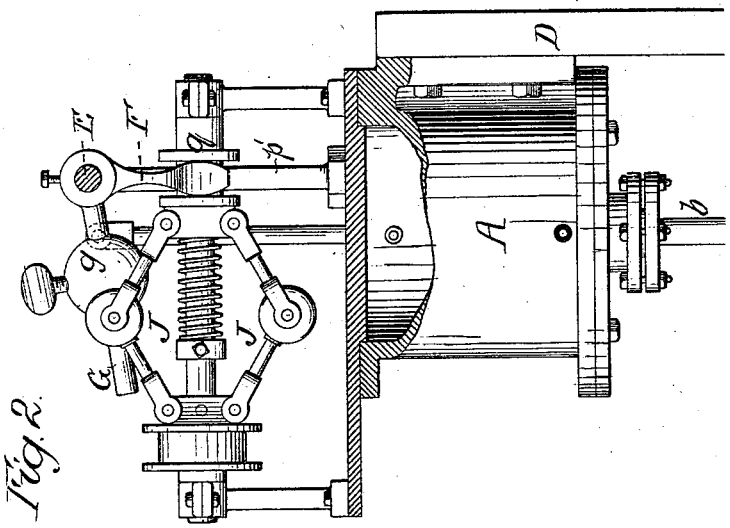

Fig. 2.

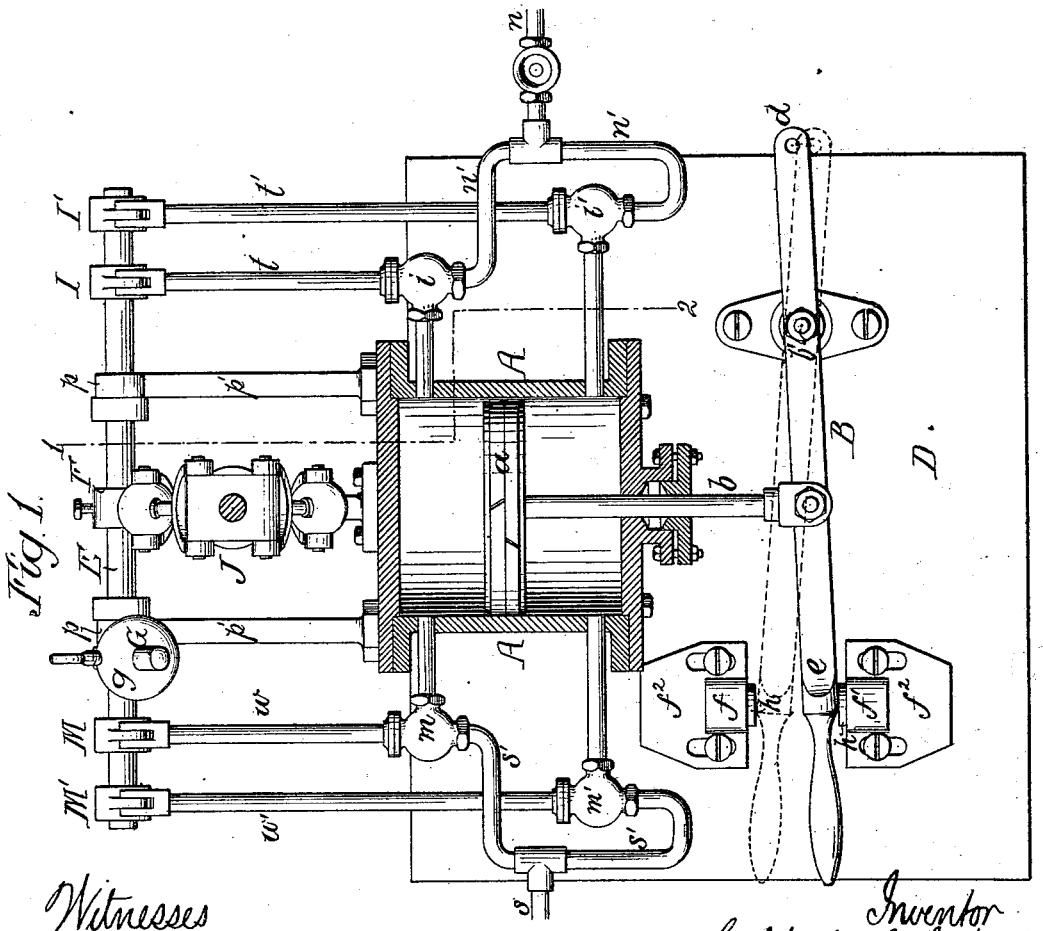

Fig. 1.

Witnesses

Harry Smith.

Inventor

Caldwell C. Jenkins

by his attorneys

Howson and Son

UNITED STATES PATENT OFFICE.

CALDWELL C. JENKINS, OF PHILADELPHIA, ASSIGNOR OF ONE-HALF HIS RIGHT TO CHARLES B. LEE, OF WEST CHESTER, PENNSYLVANIA.

IMPROVEMENT IN REGULATING DEVICES FOR STEAM-ENGINES.

Specification forming part of Letters Patent No. **213,202**, dated March 11, 1879; application filed January 17, 1879.

To all whom it may concern:

Be it known that I, CALDWELL C. JENKINS, of Philadelphia, Pennsylvania, have invented a new and useful Improvement in Regulating Devices for Steam-Engines, of which the following is a specification:

The object of my invention is to regulate the speed of steam-engines, and especially of marine engines, by the devices described hereinafter, so that although the duty of the governor is light, there shall be a prompt action of the heaviest throttle-valve in obedience to the governor.

The distinguishing feature of my invention is the use, in combination with certain valves, of a single piston, adapted to a cylinder of unifore bore throughout, instead of two pistons of different diameters, adapted to two cylinders, or to a duplex cylinder, as usual.

In the accompanying drawings, Figure 1 is a front view, partly in section, of my improved regulating device for steam-engines; and Fig. 2, a section of part of Fig. 1 on the line 1 2.

A is a cylinder, closed at both ends, and having a piston, *a*, the rod *b* of which passes through a stuffing-box in one of the ends of the cylinder, and is connected to a lever, B, the latter being pivoted at *b'* to the plate D, or to any fixed frame-work. One end, *d*, of this lever B is connected to the throttle-valve of the engine, the other end, *e*, passing between two stops, $f\,f^1$, which form parts of plates f^2, the latter being so secured to the plate D or other frame as to be adjustable from and toward each other. Each stop has a pad, *h*, of rubber, leather, or other like cushioning material, for the lever B to strike against during its operations.

Two valve-chests, *i* and *m*, are secured to and communicate with the interior of the cylinder A above the piston *a*, and two valve-chests, *i'* and *m'*, are secured to and communicate with the interior of the cylinder below said piston. While the mechanism is in operation the valve-chests *i* and *i'* communicate at all times, through branches *n' n'*, with a steam-supply pipe, *n*, and the valve-chests *m m'* communicate at all times, through branches *s' s'*, with an exhaust-pipe, *s*.

To bearings *p p*, forming, in the present instance, part of pillars *p' p'*, secured to the cover of the cylinder A, is adapted a rock-shaft, E, which is provided with a series of arms, I I', M M', F, and G. The arm F is adapted to the sliding sleeve *q* of a centrifugal governor, J, of any desired construction, and serves as the medium whereby the governor imparts a rocking movement to the shaft E as the speed of the engine increases or diminishes. The arm G carries a counterbalance-weight, *g*, adjustable on the arm, so as to insure the proper delicacy in the action of the governor at all times. The arm I is connected to the spindle *t* of the valve in the chest *i*, and the arm I' to the spindle *t'* of the valve in the chest *i'*, the arms M M' being similarly connected to the spindles *w w'* of the valves in the chests *m m'*.

The proper setting of the valves in the chests *i i'* and *m m'* will be best understood by the following description of the operation of the regulating mechanism.

When the engine is running at its normal and uniform speed the valves in the chests *i* and *m'* will be open, and the valves in the chests *i'* and *m* closed, in which case the interior of the cylinder A above the piston *a* will be open to the steam from the pipe *n*, and the interior of said cylinder below the piston to the exhaust-pipe *s*. The piston will consequently be in the position shown in Fig. 1, and the lever B in that shown by full lines in said figure, the end *e* of the lever bearing against the stop f^1, and the main throttle-valve, to which the opposite end, *d*, of the lever is connected, being open to an extent sufficient to permit the passage of a proper quantity of steam for driving the engine under ordinary circumstances.

Should there be a tendency of the engines to race, which is always the case with marine engines when the propeller rises from the water, there will be an increased speed of the governor J, corresponding with the increased speed of the engine, and the shaft E will be turned so as to impart such a movement to the arms I I' and M M' as will close the valves in the chests *i* and *m'*, and open the valves in the chests *i'* and *m*. The immediate result of this is, that the interior of the cylinder A above

the piston *a* will be cut off from the steam and opened to the exhaust, while the interior of the cylinder below the piston will be cut off from the exhaust and opened to the steam; consequently a sudden rising of the piston *a* will take place, thereby moving the lever B to the position shown by dotted lines in Fig. 1, and closing the main throttle-valve.

Should the speed of the engines be suddenly diminished, a reversal of the above-described operations will take place, and the lever B will be restored to the position shown by full lines, so as to again open the main throttle-valve.

The above description refers to the action of the regulating apparatus under a sudden increase or diminution in the speed of the engine. A gradual increase or diminution of speed would result in the gradual operation of the steam and exhaust valves, and a consequent gradual movement of the piston *a* and of the main throttle-valve. The movement of the piston and throttle-valve, in fact, will be in exact accordance with the requirements of the engine and almost simultaneous therewith.

It has not been deemed necessary to exhibit the character of the valves used in the chests *i i'* and *m m'*, as various kinds of valves may be employed, the ordinary cylindrical balanced valves being preferred, however, as they can be operated with but little exertion on the part of the governor.

Although I have shown and prefer to use the lever B as the means of transmitting the movement of the piston-rod *b* to the throttle-valve, the said lever may be dispensed with, if desired, the piston-rod *b*, for instance, being connected to the stem of a throttle-valve directly, or by means other than the lever B.

I claim as my invention—

A regulating device for steam-engines in which are combined the following elements, namely: a cylinder, A, closed at both ends, and having a piston the rod of which is connected to the throttle-valve, valves *i i'*, for admitting steam to the cylinder A, valves *m m'*, for exhausting steam from said cylinder A, a centrifugal governor, J, and devices, substantially as described, whereby the valves are operated in pairs by said governor, so as to open one end of the cylinder to the exhaust as the other end is opened to the steam, all substantially as set forth.

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

C. C. JENKINS.

Witnesses:
WILLIAM J. COOPER,
HARRY SMITH.