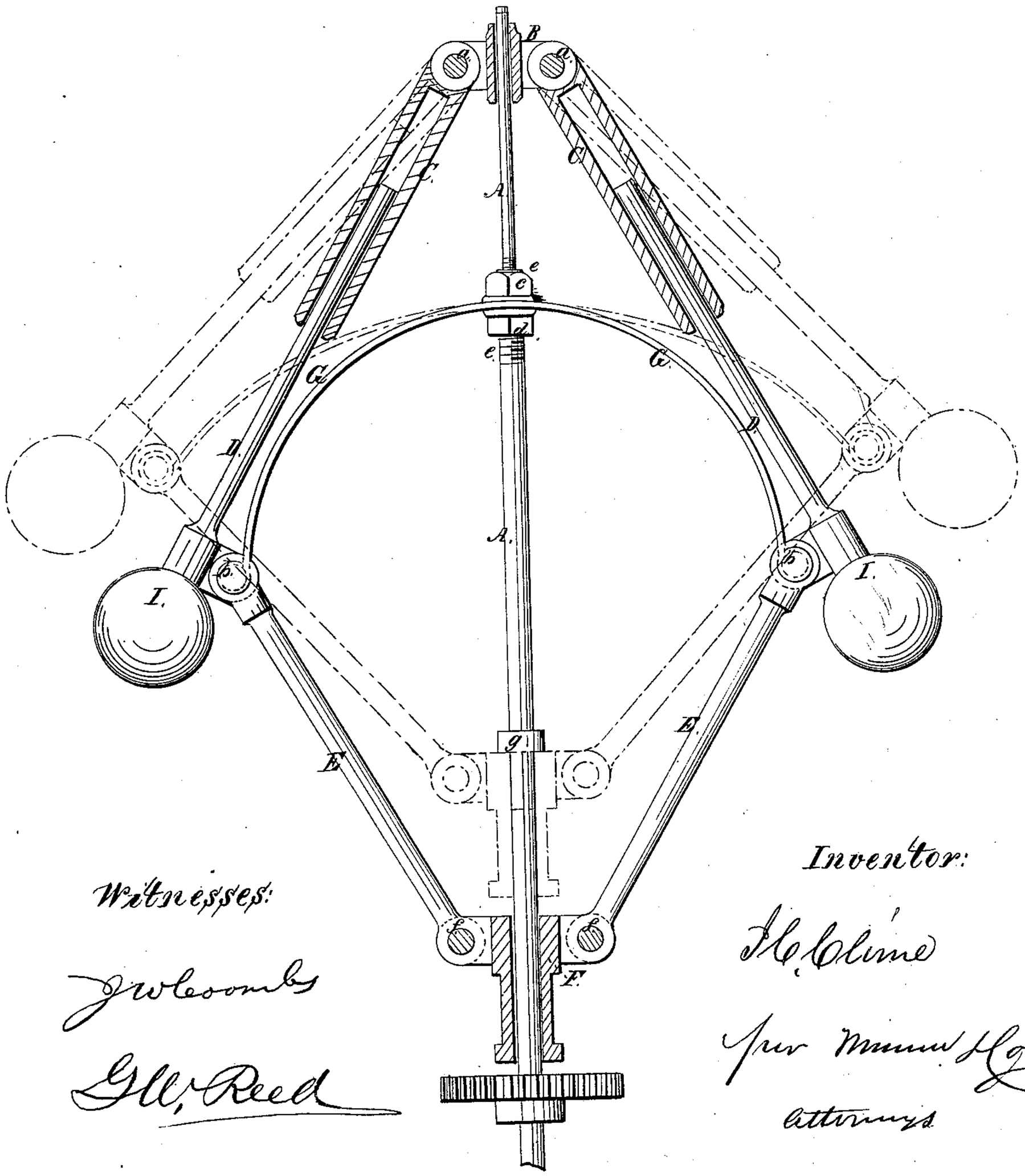
J. C. Clime,

Governor.

No. 37,609. Patented Feb. 10, 1863.



Witnesses:

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UNITED STATES PATENT OFFICE.

JOHN C. CLIME, OF PHILADELPHIA, PENNSYLVANIA.

IMPROVEMENT IN CENTRIFUGAL GOVERNORS.

Specification forming part of Letters Patent No. **37,609**, dated February 10, 1863.

To all whom it may concern:

Be it known that I, JOHN C. CLIME, of the city of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented a new and useful Improvement in Centrifugal Governors for Steam-Engines and other Motors; 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, forming part of this specification, said drawing representing a central longitudinal section of a governor.

This invention consists in the construction of the ball-arms partly of tubes and partly of bars fitted to slide in the said tubes in such manner as to elongate and shorten the arms, and in so connecting the said arms with the slide and applying a spring, in combination with the said arms, that as the balls move outward by the centrifugal force developed in their revolutions the spring is caused to shorten the arms, and so increase the movement of the slide produced by the change in the plane of revolution of the balls by increasing such change, thereby rendering the governor more sensitive and increasing its action upon the regulating valve or valves.

A is the main spindle of the governor, which may be arranged either vertically or in any other position, as the centrifugal force of the balls is counteracted by the spring hereinbefore mentioned, which will be presently described.

B is the cross-piece secured to the spindle for the attachment of the ball-arms, which are composed of the tubes C C and the bars D D fitted to slide lengthwise in the said tubes. The balls I I are screwed firmly onto the bars D D, and the tubes C C are attached by pin-joints *a a* to the cross-piece B. The bars D D are connected by pin-joints *b b* close to the balls with the rods E E, which are connected with the slide F by pin-joints *f f* in the usual manner, the slide being connected with the regulating valve or valves by any means commonly employed or that may be convenient.

G is the spring, of bow form, connected at its ends with the pins of the joints *b b*, and having at the middle of its length a hole through which a screw-thread, *e*, on the spindle passes in such manner as to permit of the adjustment of the spring by two nuts, *c d*, which are fitted to the said thread, one above and one below the spring.

g is a collar on the spindle A to limit the movement of the slide produced by the centrifugal motion of the balls. The centrifugal force developed in the balls by their revolution acts in opposition to the tendency of the spring to draw the balls toward the axis of the spindle, and as this force is increased or diminished by the increased or diminished velocity of the engine or motor to which the governor is attached, the balls fly out from or approach the axis, in the one case tending to straighten or reduce the curvature and strain the spring, as illustrated in red outlines in the drawing, and in the other case permitting it to curve itself or approach its normal position, as illustrated in black outline. As the balls fly out from the axis and reduce the curvature of and strain the spring, the spring forces the bars D D upward into the tubes C C, and so reduces the effective length of the ball-arms and increases the movement given to the slide F upward or in the opposite direction to that of the arrow shown on the spindle by the movement of the balls from the axis; and as the balls approach the axis and permit the spring to curve itself, the spring draws the bars D D out of the tubes C C, and so increases the effective length of the ball-arms and increases the movement given to the slide F downward or in the direction of the arrow shown on the spindle. This shortening and elongation of the arms by increasing the movement of the slide increases the sensitiveness of the governor.

The action of the governor may be varied according to the force required to operate the regulating-valve by changing the balls I I for heavier or lighter ones, adjusting the strain of the spring by means of the nuts *c d*.

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

The combination of the ball-arms composed of tubes C C and bars D D, or their equivalents, fitted together, as described, the spring G, the rods E E, and slide F, the whole arranged to operate substantially as and for the purpose herein specified.

Witnesses: JOHN C. CLIME.

ROBERT HUTCHINSON,

WILLIAM TIEPPERE.