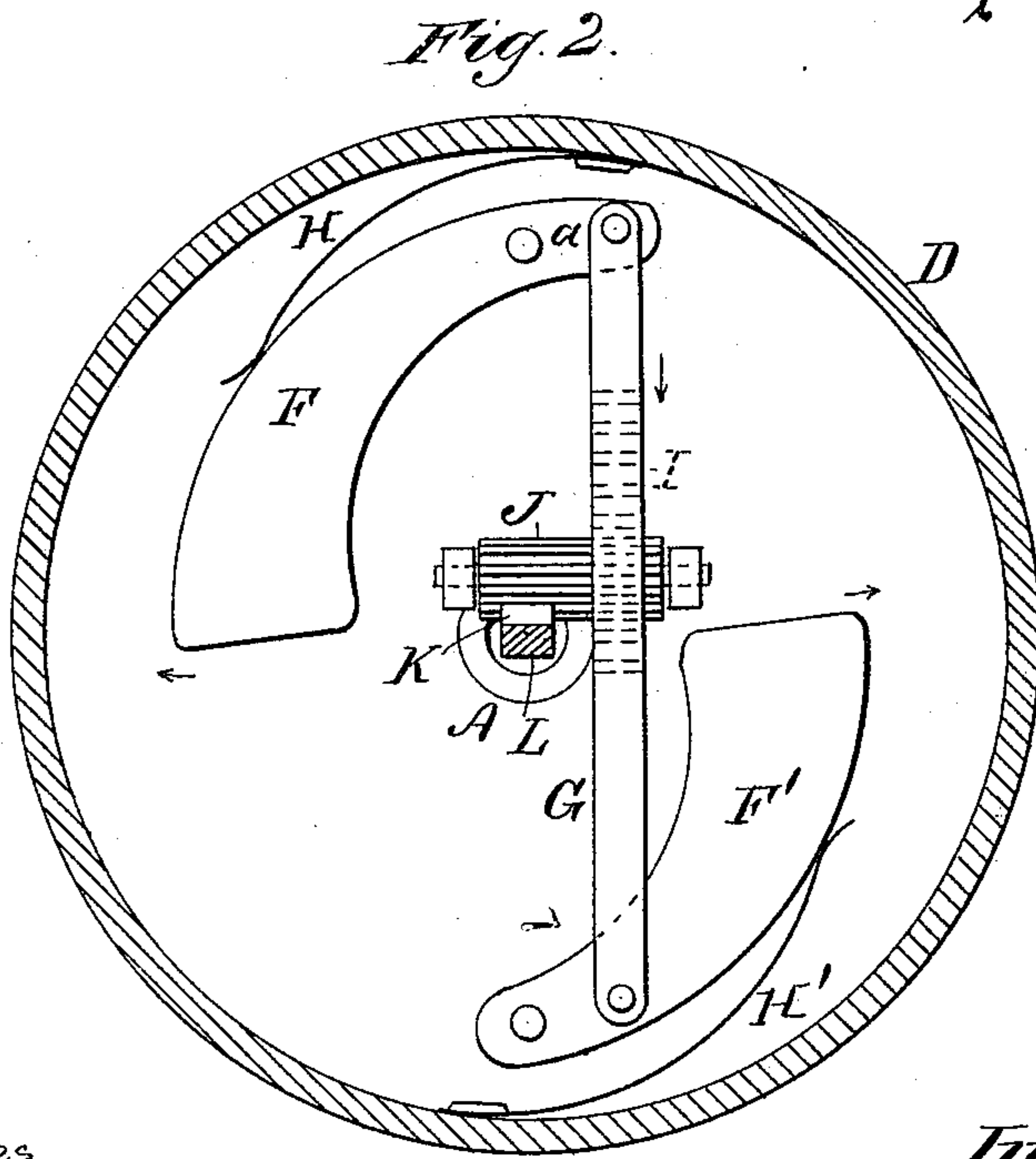
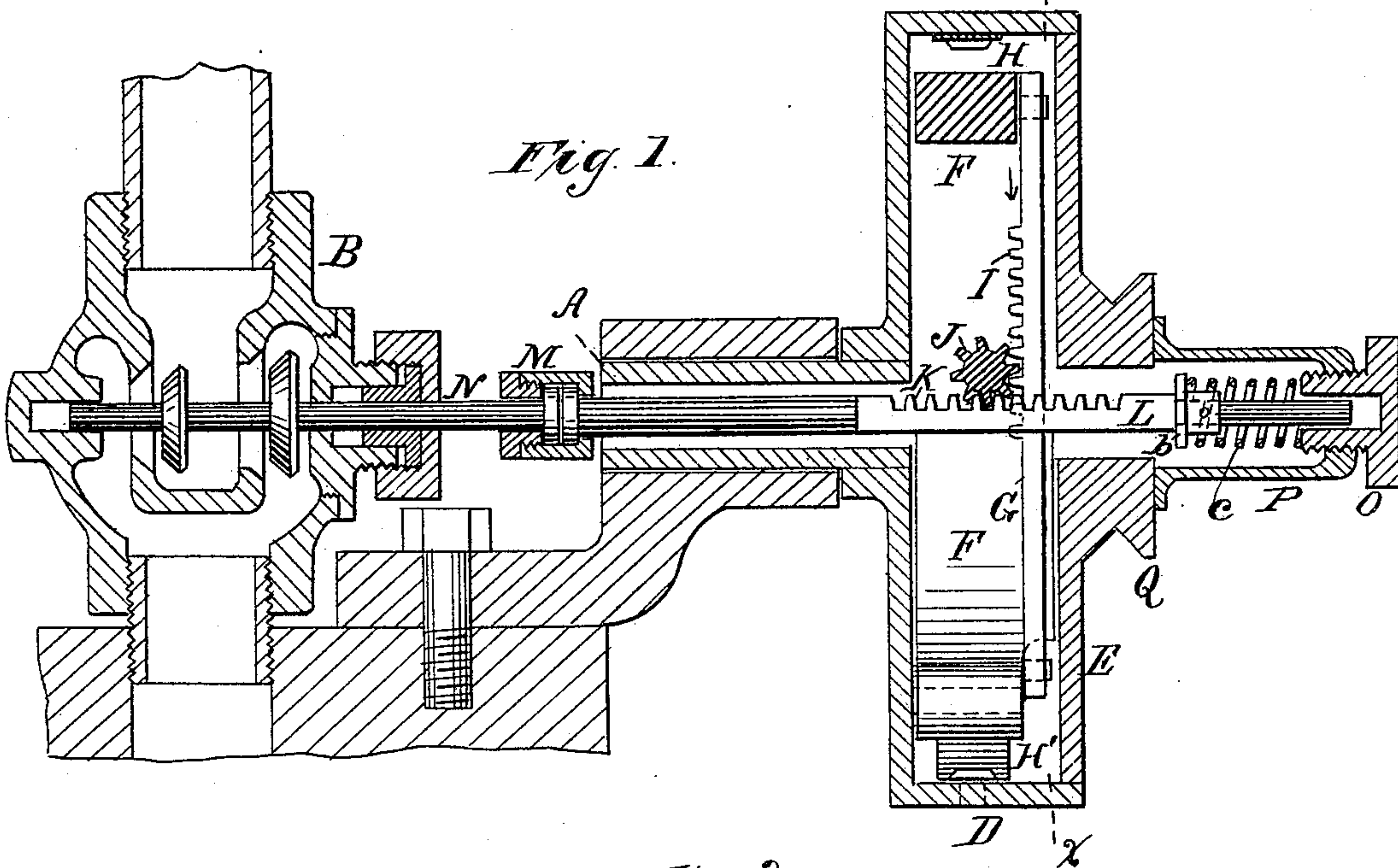


(No Model.)

G. M. HOPKINS.
ENGINE GOVERNOR.

No. 379,872.

Patented Mar. 20, 1888.



Witnesses
H. P. Parker
A. A. Hopkins.

Inventor.
Geo M. Hopkins.

UNITED STATES PATENT OFFICE.

GEORGE M. HOPKINS, OF BROOKLYN, ASSIGNOR TO THE ECONOMIC MOTOR COMPANY, OF NEW YORK, N. Y.

ENGINE-GOVERNOR.

SPECIFICATION forming part of Letters Patent No. 379,872, dated March 20, 1888.

Application filed June 29, 1885. Serial No. 170,077. (No model.)

To all whom it may concern:

Be it known that I, GEORGE M. HOPKINS, of Brooklyn, in the county of Kings and State of New York, have invented a new and useful Improvement in Engine-Governors, of which the following is a specification, reference being had to the annexed drawings, forming a part thereof, in which—

Figure 1 is a side sectional elevation. Fig. 2 is a vertical transverse section taken on line *x x* in Fig. 1.

The object of my invention is to provide a simple, inexpensive, and sensitive governor for steam or gas engines.

My invention consists in a cylindrical casing secured axially to a hollow shaft and containing weighted levers and opposing springs, the weighted levers being connected by a rack-bar arranged to transfer the motion of the levers to the valve-operating spindle extending through the hollow shaft.

It also consists in the combination, with the valve-actuating spindle, of an adjustable spring opposing the springs of the weighted levers, and serving to regulate the speed of the engine by varying the amount of resistance to the centrifugal action of the weighted levers.

To the hollow shaft A, journaled axially in line with the governor-valve B, is secured a cylindrical drum, D, having a removable cap, E. To the plane inner surface of the drum are pivoted two weighted levers, F F', the lever F being of the first order and having an arm, *a*, projecting beyond its pivot, the lever F' being of the second order and pivoted to a bar, G, which is also pivoted at its opposite end to the arm *a* of the lever F, so that when the arms F F' are swung outward by centrifugal action in opposite directions the bar G will be moved in the same direction by the combined action of the two weighted levers.

Curved springs H H', secured to the inner surface of the cylindrical shell of the drum D, tend to press the levers F F' toward the center of the drum and in opposition to the movement of the said levers, due to centrifugal action. The bar G has attached to or formed upon its inner surface a rack, I, which engages a pinion, J, journaled in fixed supports in the drum D. The pinion J is of sufficient

length to engage a rack, K, formed on a rod, L, extending axially through the drum D and through the hollow shaft A. One end of the rod L is connected by a swivel-joint, M, with the spindle N of the governor-valve B, so that the rod L may turn without revolving the spindle N, but cannot move longitudinally without carrying the rod N with it. The opposite end of the rod L extends into a hollow screw, O, which turns in a threaded opening in the cap P, attached to the cover E of the drum D. On the rod L is formed or secured a collar, *b*, between which and the inner end of the screw O, and surrounding the rod L, is placed a spiral spring, *c*, which tends to press the rod L toward the governor-valve B, or in the direction required to close the valve.

Any convenient means may be employed for imparting motion to the drum D; but I prefer to form a pulley, Q, on the cap E and to drive the drum by a belt from a pulley on the shaft of the engine extending around the said pulley Q. When the drum D is revolved, the arms F F' being thrown outward by centrifugal force in opposition to the pressure of the springs H H', the bar G, connecting the two levers and carrying the rack I, moves in the direction indicated by the arrow and imparts motion to the pinion J, which in turn, by engagement with the rack K, moves the rod L in the direction required to close the valve B. Any diminution in the speed of the drum D permits the spring H H' to return the levers F F' and move the rack-bar G in the opposite direction, thereby opening the valve B. The action of the governor may be varied by increasing or diminishing the tension of the springs H H'; but I prefer to provide the opposing spring C, which may be put under greater or less tension, thereby accomplishing the same result.

I am aware that governors have been constructed in which pivoted weighted arms have been inclosed in a cylindrical casing. Therefore I do not broadly claim this construction.

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

1. The combination, in an engine-governor, of a cylindrical drum inclosing two pivoted

weighted levers arranged to swing by centrifugal force in opposite directions, springs adapted to oppose the outward movement of the levers, a rack-bar jointed to the two pivoted weighted levers and arranged to be moved in one direction by the opposite movements of the two pivoted weighted levers, a pinion journaled in the drum and engaged by the rack-bar, and a valve-operating rod provided with a rack arranged to be engaged by the pinion, as herein specified.

2. The combination, in a governor constructed substantially as herein described, of a valve-

operating rod and a spring arranged to act thereon in unison with the weighted levers, and springs attached to the inner face of the governor casing and arranged to press directly against the weighted levers to oppose the outward pressure of the weighted levers due to centrifugal action, substantially as herein specified.

GEO. M. HOPKINS.

Witnesses:

E. G. DUVALL, Jr.,
A. A. HOPKINS.