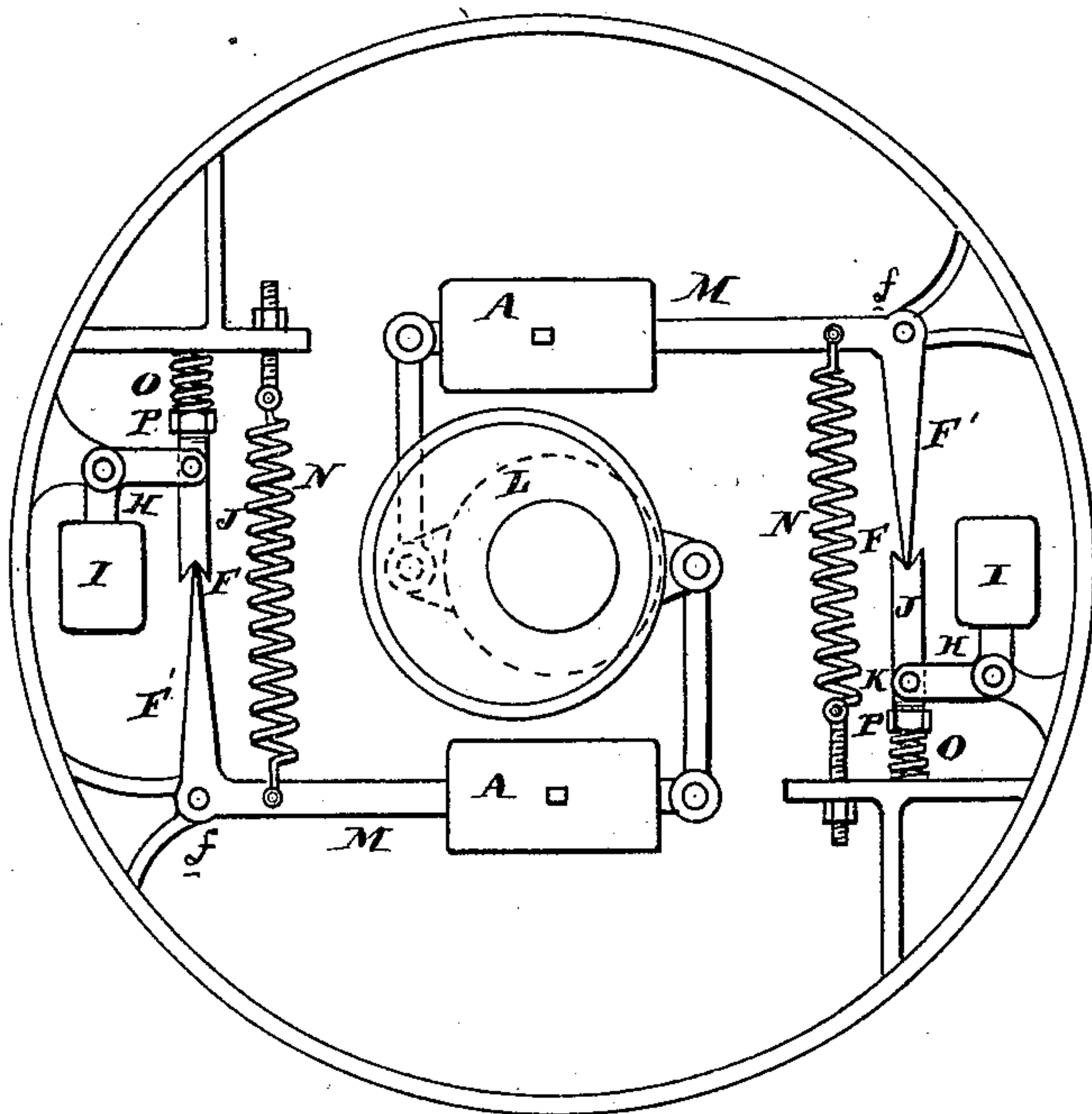


(No Model.)

J. CASHO.
GOVERNOR.

No. 335,270.

Patented Feb. 2, 1886.



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UNITED STATES PATENT OFFICE.

JOSEPH CASHO, OF THURLOW, PENNSYLVANIA.

GOVERNOR.

SPECIFICATION forming part of Letters Patent No. 335,270, dated February 2, 1886.

Application filed May 9, 1885. Serial No. 164,888. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH CASHO, of Thurlow, in the county of Delaware and State of Pennsylvania, have invented a new and useful
5 Improvement in Governors, of which the following is a specification.

My invention has reference to governors especially adapted for steam-engines; and it consists in suitable mechanism by which the
10 balls or weights which by centrifugal force are separated apart or allowed to approach each other, and thereby control the cut-off valve, and are assisted or retarded in their action by additional weight and lever mechanism, rendering them most sensitive and insuring the
15 speed of engine remaining uniform, no matter how much or variable the load may be, but more specifically in suitable lever-and-weight mechanism acting directly or indirectly upon
20 the balls, or their mechanism for actuating the governor by which they are practically increased or decreased in weight so far as their function or effect is concerned, and this too while the said balls are in motion, and in
25 details of construction, all of which are fully set forth in the following specification, and shown in the accompanying drawing, which forms part thereof.

Heretofore in operating ball-governors the
30 centrifugal force is relied upon wholly to control the time of the cut-off, and is more or less unreliable where there are great variations in the duty or load on the engine, not being sensitive to slight differences, requiring considerable time in which to adjust themselves, from
35 which defects it follows that the engine will not remain at a uniform speed if its load is materially and quickly varied. This is the result with all ball-governors or those acting
40 by centrifugal force, including the Judson, the Buckeye, the Armington and Sims, the Ide, &c., and the same defects will also be experienced more or less in the Huntoon.

The object of my invention is to overcome
45 these defects by producing a governor, or an attachment therefor by which the governor is made more sensitive to variations in the load.

In the drawing is shown a side elevation of a governor having my invention applied thereto.
50 The governor is secured to and rotates with the engine-shaft, and the eccentric is given a

different angular advance to vary the point of cut-off.

L is the eccentric, and is moved by levers M, the weights A thereof being acted on by
55 centrifugal force and opposed by the springs N in the usual manner. The levers M have the knife-edged arms F', and the links J are pressed in contact therewith by the levers H, having the weights I, which act by centrifugal
60 force.

O are springs, whose function is to keep the links J and arm F' in contact, and keep the levers H in a normal position when the engine
65 is not in motion.

P are adjusting-nuts to vary the tension of the spring O, which may be used, if desired, in place of weight I. Of course, in place of rotating the eccentric it may be moved to or from the shaft in the well-known way by le-
70 vers M.

Now, considering the governor as in working position for a given speed with a given load, it will be observed that should the load be decreased the tendency of the speed would
75 be to increase and the balls A moved farther apart. This action would move the eccentric, and through the lever F' move the knife-edge F toward the shaft and to one side of a line through the pivotal points *f* and *k*, in which
80 case the action of the weight I and its lever H is to quickly increase this separating of the balls, owing to the weight I counterbalancing to a certain extent the weight of the balls A, making the centrifugal force due to the speed
85 at which the governor is running relatively greater. If, on the other hand, an additional load be put upon the engine, the increased duty would make the engine slow down, and this action would be facilitated by the weight I, as
90 it would cause the knife-edge to move to the other side of the line between the points *f* and *k*, or away from the shaft, and thus tend to make the governor-balls A move toward the shaft more quickly. This weight I will there-
95 fore assist or oppose the action of centrifugal force the moment the load is decreased or increased; but when the governor is working with a normal load the weight I preferably exerts no power, as the pivotal points *f* and
100 *k* and the knife-edge F should be in the same line; but this state of things is not absolutely

necessary in carrying out the functions of my invention. The weight I in effect adds to or takes from the weight of the balls A. While in motion it is practically controlling their weight according to the demand, and making the governor extremely sensitive, preventing any material variations in speed of the engine, no matter how much the duty may be varied.

It is immaterial to my invention what the make of governor may be. The principles remain the same although the details of construction may be greatly modified.

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

1. The combination, with a governor, of auxiliary weight-and-lever mechanism, substantially as set forth, and an eccentric by which the action of the governor to vary the angular advance of the eccentric is assisted or opposed according as the speed of the engine is increased or decreased, the said weight-and-lever mechanism always acting with the tendency of the governor, substantially as and for the purpose specified.

2. The combination, with a governor, of auxiliary weight-and-lever mechanism, substantially as set forth, and an eccentric by which the action of the governor to move the eccentric is assisted or opposed, according as the speed of the engine is increased or decreased, the said weight-and-lever mechanism always acting with the tendency of the governor, substantially as and for the purpose specified.

3. A governor combined with lever F', link J, spring O, lever H, and weight I, combined and arranged substantially in the manner and for the purpose set forth.

4. A governor combined with lever F', link J, spring O, nut P, lever H, and weight I, combined and arranged substantially in the manner and for the purpose set forth.

In testimony of which invention I hereunto set my hand.

JOSEPH CASHO.

Witnesses:

R. M. HUNTER,
LISLE STOKES.