

(No Model.)

F. M. RITES.
GOVERNOR.

No. 527,720.

Patented Oct. 16, 1894.

FIG. 1.

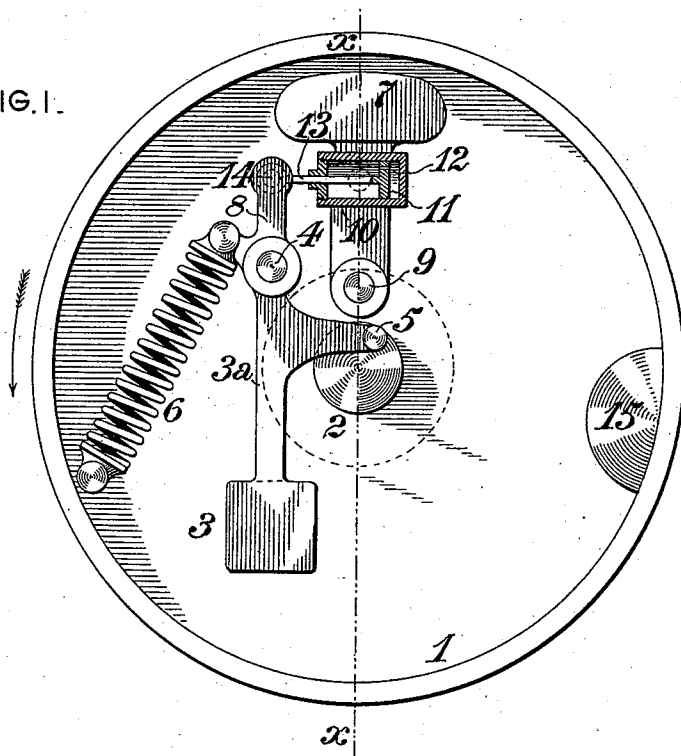
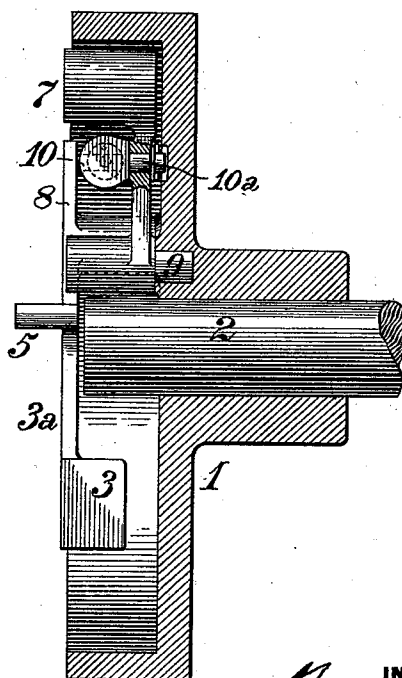


FIG. 2.



WITNESSES:

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GOVERNOR.

SPECIFICATION forming part of Letters Patent No. 527,720, dated October 16, 1894.

Application filed June 21, 1894. Serial No. 515,238. (No model.)

To all whom it may concern:

Be it known that I, FRANCIS M. RITES, a citizen of the United States, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented or discovered a certain new and useful Improvement in Governors, of which improvement the following is a specification.

The object of my invention is to simplify and perfect the construction of governors of the class or type of those located upon the crank shaft or countershaft of an engine, and to provide, in a governor of such type, a system of gravity balancing weights by means of which the degree and rapidity of regulation of the governor may be made more fully and effectively available than heretofore.

To this end, my invention, generally stated, consists in the combination of a primary centrifugally adjustable weight, adapted to be connected to an adjustable cut off or regulating device, and a secondary weight in gravity balance with the primary weight and connected to the supporting wheel or case so that its centrifugal force of adjustment is reduced to a minimum by being caused to act substantially through or in line with its pivot.

The improvement claimed is hereinafter fully set forth.

In the accompanying drawings: Figure 1 is a face view of a governor illustrating an embodiment of my invention; and Fig. 2, a transverse section, at the line *x, x*, of Fig. 1.

In the practice of my invention, the governor is, as heretofore, mounted and supported on a suitable disk wheel or case 1, fixed upon the crank shaft 2 of the engine, or upon a countershaft deriving motion therefrom. A primary centrifugally adjustable weight 3, which may be formed on or fixed to an arm 3^a, is pivoted, as by a bearing pin 4, to the supporting wheel 1, at a suitable distance from its center, so as to be subject to the rotative effect of centrifugal force about the axis of its bearing pin, and is connected, in this case, rigidly to a movable eccentric or eccentric pin 5, from which, through the usual connections, the distribution valve of the engine is actuated. The primary weight 3 is connected to a spring 6, the tension of which acts, as in the ordinary con-

structions, in opposition to the action of centrifugal force upon the primary weight 3. A secondary weight 7, is pivoted, by a pin 9 to the supporting wheel, its center of gravity being in line radially with its pivot, so that, in the rotation of the governor, it is brought by centrifugal force to, and held, (except during momentary adjustments) in a mean or neutral position in which its center of gravity, its center of vibration, and the center of the shaft, lie in a common straight line, as shown in Fig. 1, this being the position to which centrifugal force always tends to move it, and from which, centrifugal force is inactive to effect its displacement.

The primary weight 3 and secondary weight 7 are balanced as to gravity, one by the other, by being linked or coupled together by an articulated connection, interposed between them in such location as to oppose movement of either in the direction due to gravity. To promote close regulation and rapid adjustment, the weights are preferably connected through the intermediation of a dash pot device, although the employment of a device of such character is not an essential of my invention.

In the instance shown in Figs. 1 and 2, a cylinder or dash pot 10 is pivoted, by a trunnion 10^a, to one side of the arm which extends from the secondary weight 7 to its pivot bearing, and is provided with a piston 11, the rod 13, of which, is pivoted, at its outer end, to a pin 14, on an arm 8, formed integral with the primary weight 3, and extending in opposite direction to the arm 3^a thereof, from its pivot bearing. The space within the cylinder 10, behind its piston 11, is filled with an incompressible liquid, and a small hole 12 is formed in the piston 11, to allow the limited passage of liquid through the same, as in ordinary dash pot constructions.

A weight 15 is shown as fixed to the supporting wheel 1, to serve as a counterbalance for the governor system.

In the operation of a governor as, or substantially as, above described, upon a variation of load or pressure, or both, the action of centrifugal force upon the primary weight 3, and of inertia upon both the primary weight 3 and secondary weight 7, forces the connected weights into a new position, and thereby

causes the eccentric or eccentric pin to assume a new position of cut off. The secondary weight 7 is, consequently, swung out of its neutral or inactive position, and becomes, during adjustment, correspondingly subject to centrifugal force tending to restore it to said neutral position. By the intermediation of the dash pot, it is returned gradually to the neutral position, in which it becomes and remains inoperative as to centrifugal force, until the load or pressure again changes and induces a new adjustment. The piston of the dash pot device thus continually moves in its cylinder at each adjustment of the weights and eccentric pin, and it will be evident that the dash pot is not an obstruction to adjustment, but on the other hand acts to promote a closer regulation and more rapid adjustment.

In any and all positions of adjustment, the primary weight 3 will be maintained in position by the equal and opposing actions of centrifugal force and spring tension, and the secondary weight 7 will be maintained in its neutral position by the action of centrifugal force. During the momentary periods of adjustment the connected weights will be moved as above described. In all cases of mutual effort under the action of gravity or centrifugal force, the two weights influence each other through their intermediate connection, and are, by such connection, caused to be reciprocally gravity balancing weights, in all positions.

It is well recognized, in good practice, that while the forces of inertia and centrifugal action are necessarily present in the operation of all shaft governors, centrifugal force should be reduced materially, comparatively with the inertia of adjustment, in order that the spring capacity may be diminished and the rapidity of adjustment increased. My invention is designed to be in accordance with this operative principle, and by reciprocally balancing and reducing the aggregate centrifugal action of the two weights, to attain a maximum inertia effect and refinement in governing qualities, without complication of parts.

My invention is not limited in its application to shifting an eccentric or eccentric pin, for operating a steam distribution valve but may be employed to effect the adjustment of other forms of cut-off or regulating devices

such as a shifting link, or block, or a tripping device, or other adjustable member of a valve gear, and it may be employed to control the passage or flow of fluid by being connected to a throttle, or other regulating valve device, and is therefore not limited to employment with a distribution valve mechanism, or cut-off device, for controlling the expansion of a fluid. Nor is it limited in its application to devices for controlling fluid pressure, since it may be employed to effect the adjustment of parts of other devices, or mechanisms, which may or may not be operated by fluid pressure; such, for example, as a brake, or clutch, or a device for regulating or controlling the current or resistance of an electrical machine or apparatus.

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

1. The combination, in a governor, of a primary centrifugally adjustable weight, and a secondary weight in gravity balance with the primary weight and connected to the supporting wheel or case so that centrifugal force tending to hold it in normal position shall act through or in line with its pivot, substantially as set forth.

2. The combination, in a governor, of a primary centrifugally adjustable weight, a secondary weight pivoted to the supporting wheel or case independently of, and in gravity balance with, the primary weight and with its center of gravity normally in line with its pivot and the center of the shaft, and an articulated connection coupling the primary and secondary weights, substantially as set forth.

3. The combination, in a governor, of a primary centrifugally adjustable weight, a secondary weight pivoted to the supporting wheel or case independently of, and in gravity balance with, the primary weight and with its center of gravity normally in line with its pivot and the center of the shaft, and a dash pot device interposed between and connected to the primary and secondary weights, substantially as set forth.

In testimony whereof I have hereunto set my hand.

FRANCIS M. RITES.

Witnesses:

ALEX. M. DE HAVEN,
THOMAS G. ROBERTS.