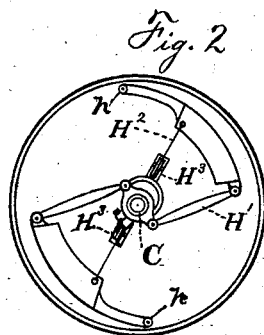
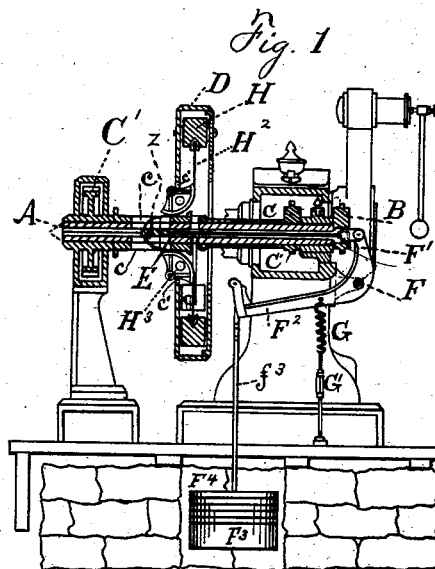


(No Model.)

F. D. CUMMER.
GOVERNOR FOR STEAM ENGINES.

No. 260,004.

Patented June 27, 1882.



WITNESSES

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FRANKLIN D. CUMMER, OF DETROIT, MICHIGAN, ASSIGNOR TO THE CUMMER ENGINE COMPANY, OF CLEVELAND, OHIO.

GOVERNOR FOR STEAM-ENGINES.

SPECIFICATION forming part of Letters Patent No. 260,004, dated June 27, 1882.

Application filed September 7, 1881. (No model.)

To all whom it may concern:

Be it known that I, FRANKLIN D. CUMMER, of Detroit, county of Wayne, State of Michigan, have invented a new and useful Improvement in Governors for Steam-Engines; and I declare the following to be a full, clear, and exact description of the same, such as will enable others skilled in the art to which it pertains to make and use it, reference being had to the accompanying drawings, which form a part of this specification

My invention in a governor consists essentially in combining with flying weights arranged to revolve in a vertical plane a stationary weight operating to furnish a centripetal force that may be easily adjusted to equal, or nearly equal, as may be desired, the centrifugal force of the flying weights when they are at their inner position and revolving at the desired speed; also, in certain other novel features of construction, as will be hereinafter more particularly pointed out, and specified in the claims.

In the drawings, Figure 1 presents a view in section and elevation of an engine-governor embodying the features of my invention. Fig. 2 is a separate view, illustrating the arrangement of the flying weights.

It is well known that the office of a governor is not to hold the engine against any variation in its speed, but is designed simply to restore the speed quickly and as nearly as possible to its normal state when any variation has taken place. The difference between the normal or desired speed and that obtained or maintained by the governor, and the time required by the governor to adjust itself to the changes in speed, chiefly occasioned by change of load or pressure, are the true and best measures of the value that the governor may possess.

It is the object of this invention to produce a governor of that type wherein the flying weights revolve in a vertical plane which shall respond quickly to any change of speed, in which the centripetal mechanism shall not itself revolve with the flying weights, and in which the increased or decreased centrifugal force of the flying weights as their radial distances increase or decrease is compensated, so that at all speeds the conditions in the governor

shall be constant, or, more fully, that under all conditions the centrifugal and centripetal forces shall increase or decrease in the same ratio, or as nearly so as may be desired.

To this end, A is a shaft. B is an eccentric, which ordinarily moves the main admission-valve. C is a concentric shaft sleeved upon the shaft A.

D is an annular case, which contains the flying weights. It is permanently attached to the shaft C, to which is also attached the gear C', by which the governor is operated.

E is a plunger or thrust rod at the center of the shaft A. It revolves in a step which is pivotally attached to the end of the short arm F' of the lever F. Connected to the end of the long arm F² is suspended a weight or weights, F³.

G is a spring, which is preferably provided with means G' for varying its initial tension. The hub of governor-case D and the shaft B are slotted at c and c' for the passage of the cable or band H² and cross-bar Z.

H represents the flying weights, pivoted at h to the case, and at their free ends connected by rods H' with the eccentric sleeve C, so that as the motion of the weights is accelerated, and by their centrifugal action they recede from the shaft, they will in the usual way operate to slightly turn forward the sleeve C, or in the reverse direction should the speed decrease, and vary the relative position of the eccentric C', which governs the cut-off valve.

H² is a cable or band, preferably of steel, which is secured to the weights, and, extending radially toward the center, it passes over pulleys or quadrants H³ and through the slots c and c' over the cross-bar, where it exerts a longitudinal pressure against the plunger-rod E.

The operation of the device is briefly as follows: The weights F³ are increased or diminished to correspond with the required speed. Now, should the speed relax, the weights F³, assisted by the spring G, will respond instantly, draw back the flying weights toward the shaft, rotate the eccentric B, thus giving more steam to the engine, and will thereby restore within a very small fraction of a revolution the normal speed. The spring G is of such tension that it will exactly compensate

for the increase or decrease of centrifugal force as the flying weights increase or decrease their radial distance. It is thus seen that the mechanism for bringing the flying weights back toward the shaft, or, in other words, for exerting the requisite centripetal force, is practically stationary beneath the engine and does not revolve with the weights. It therefore always operates under like conditions and without danger of becoming disordered, whereas in those constructions that carry the centripetal mechanism in the case with the flying weights its ability to respond is measurably varied as the speed varies, and the apparatus is very liable to get out of order. Thus avoiding the use of the usual centripetal springs and the necessity of maintaining so high and destructive an initial tension upon such springs, by my apparatus I am also enabled to readily change the speed while under motion by simply adding or subtracting weights at F³, and the disposition of the weights beneath the engine, as shown, is also very convenient.

25 I am aware that a governor has been provided with flying weights having their centrifugal motion opposed by a non-rotating weight; and I do not claim such construction, broadly.

What I claim is—

30 1. In a governor, the combination, with a shaft arranged to operate a main steam-supply valve, of a sleeve and eccentric arranged to rotate upon said shaft, a pair of flying weights pivoted to a support projecting from said shaft, 35 means for communicating a rocking motion to said sleeve from said weights, a thrust-rod ar-

ranged loosely and centrally within said shaft, means for imparting a longitudinal motion to the thrust-rod from the weights, and a variable resistance arranged to oppose the thrust of the thrust-rod, substantially as described. 40

2. The combination, with the centrally-bored shaft A, carrying the eccentric for operating the main valve, of the sleeve C, surrounding said shaft and provided with means for receiving rotary motion, the casing D, fixed upon said shaft, the flying weights pivoted in said casing, the thrust-rod E, arranged centrally within said shaft, means for communicating a rocking motion from said weights to said shaft and a longitudinal movement from said weights to the thrust-rod, the lever F, having its end provided with a step in which said thrust-rod turns, and means for opposing a variable resistance to the movement of said lever, substantially as described. 55

3. The combination, with the lever F, having the step on one arm and a weight attached to the other arm, the thrust-rod having one end in said step, the flying weights, and means, substantially as described, for transmitting motion from said weights to the eccentric on the shaft and to said thrust-rod, of adjustable means for automatically varying the resistance of the said lever to the thrust of said thrust-rod. 60

In testimony whereof I sign this specification in the presence of two witnesses.

FRANKLIN D. CUMMER.

Witnesses:

J. EDWARD WARREN,
SAMUEL E. THOMAS.