

J. F. ALLEN.  
CUT-OFF GOVERNOR.

No. 395,376.

Patented Jan. 1, 1889.

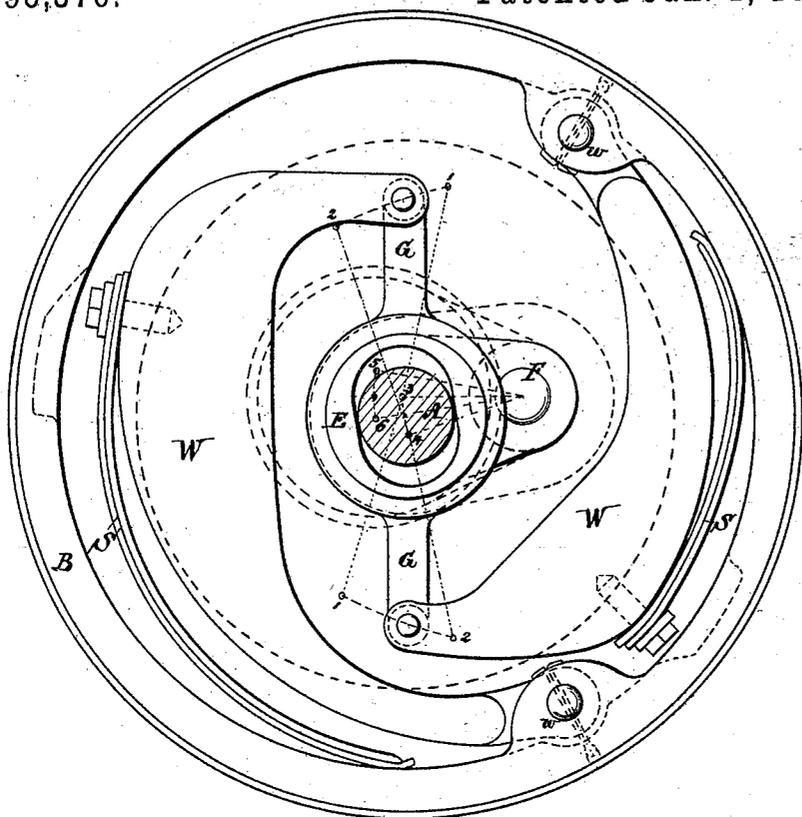


FIG. I.

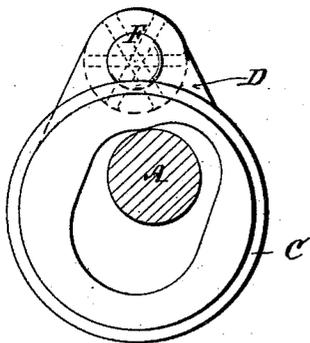


FIG. IV.

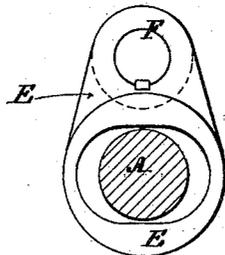


FIG. V.

WITNESSES

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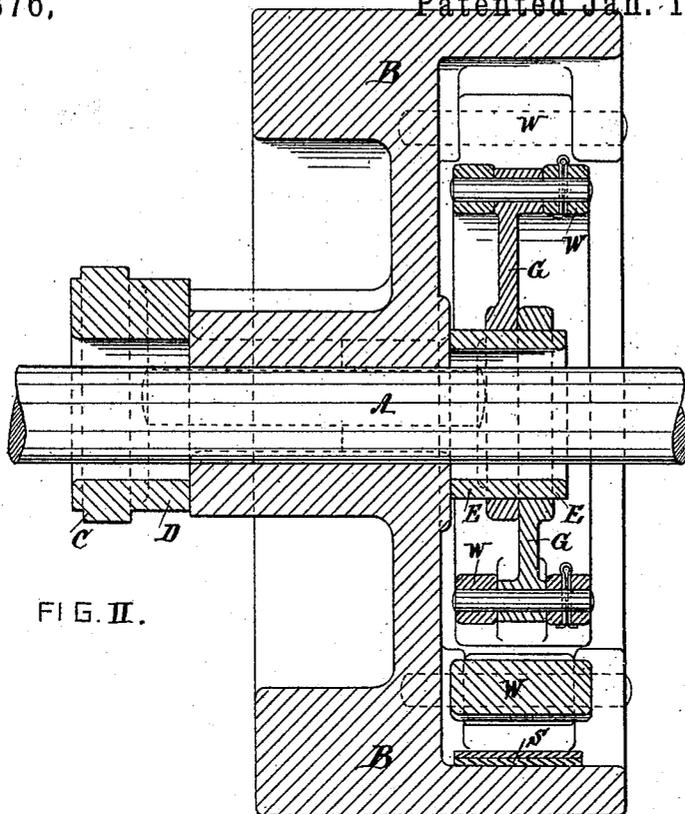


FIG. II.

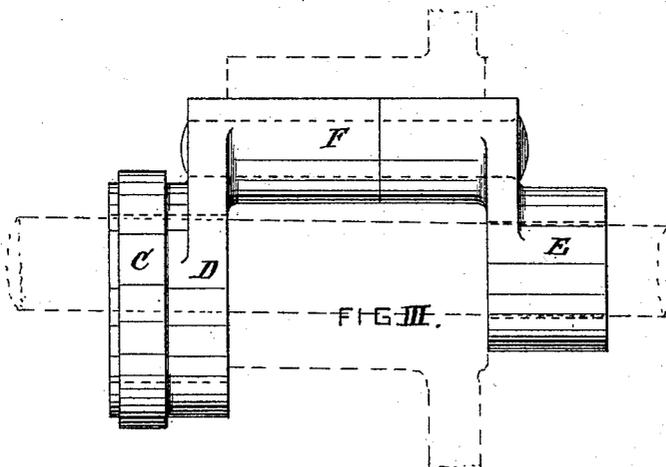


FIG. III.

WITNESSES

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# UNITED STATES PATENT OFFICE.

JOHN F. ALLEN, OF NEW YORK, N. Y.

## CUT-OFF GOVERNOR.

SPECIFICATION forming part of Letters Patent No. 395,376, dated January 1, 1889.

Application filed February 23, 1888. Serial No. 264,950. (No model.)

### *To all whom it may concern:*

Be it known that I, JOHN F. ALLEN, of New York city, New York, have invented a new and useful Improvement in Cut-Off Govern-

5 ors, of which the following is a specification.

My invention relates to improvements in automatic valve-gears in which the regulator or governor and eccentric are so arranged as to cut off the steam to correspond with the vary-  
10 ing load of the engine. This is accomplished when a constant lead of the valve is desired by causing the center of the eccentric to move upon the arc described by the end of the valve-connection attached to the eccentric whenever  
15 the engine is on its line of centers. When the eccentric operates a supplementary cut-off valve, the eccentric may be moved or advanced simply around the shaft, as a constant lead is not required in that case. The chief difficulty  
20 in operating valve-gears of this kind whenever the eccentric operates the valve is, that when the center of the eccentric is not in line with the center of the shaft or on dead-center in relation to the direction of the load or resist-  
25 ing force, or when the same is at right angles to the direction of this force, then the eccentric or regulator will be more easily moved than the valve itself, and whenever this occurs the valve-gear will become useless.

30 The object of my invention is to overcome this difficulty and at the same time make the regulator or governor more isochronal, and thereby keep the number of revolutions made by the engine more constant under the vary-  
35 ing load that may be required.

In the accompanying drawings, Figure I represents a side view of my improved cut-off governor for steam-engines. Fig. II is a vertical section of the same. Fig. III is a plan  
40 of the rock-shaft; Fig. IV, an end view of arm D and eccentric of the rock-shaft, and Fig. V an end view of arm E of the same.

B is a pulley or fly-wheel disk in which the mechanism is arranged, securely fastened to  
45 the shaft A.

F is a rock-shaft passing through the hub or web of the pulley or disk B and turning in the same. This rock-shaft is provided with an arm, D, upon which the eccentric C is sus-  
50 pended or arranged to form part of said arm. The other end of this rock-shaft is provided with an arm, E. The swinging ends of the

arms D and E are provided with suitable openings for the shaft A to pass freely at any position of the ends of said arms. (See Figs. IV  
55 and V.)

W W are two curved weights. One end of each is pivoted at *w* to the pulley or disk B, and their other free ends are connected through  
60 rods G G to the rock-shaft arm E. Thus the weights, in connection with the rods G, turning upon the arms E, form in effect a pair of reverse toggle-joints.

Upon the outer ends of the weights W W flat springs S S are bolted, the free ends of  
65 which bear against the inside of the rim of the pulley or disk B. These springs curve or roll upon the curved outer surfaces of the weights whenever the same are forced out-  
70 ward by centrifugal force sufficient to overcome the resistance of said springs.

By the inward or outward motion of the weights W W the centers of their free ends will move between the points 1 and 2, and  
75 through their connection with the free end of the arm E, through the rods G G, the center of the free end of this arm E will be moved between the points 3 and 4, moving thereby  
80 the center of the free end of the arm D, and consequently the center of the eccentric C between the points 5 and 6. Consequently the throw of the valve will be increased or diminished commensurate with the speed of the engine.

One of the important features of my inven-  
85 tion is that the eccentric is locked against any force acting parallel with a line passing through the joints of connection of one of the weights W, and as this passes off the force comes then to act parallel with a line passing  
90 through the joints of the other weight W.

It will be observed that the eccentric is more easily moved when the reaction caused by moving the valve acts in a line at right angles to a radial line drawn from the point of suspen-  
95 sion F to the center of the eccentric indicated by the arc from 5 to 6. It will also be observed that a line drawn through the points *w* of suspension of the weights W is nearly at right angles with the before-mentioned line.  
100 Therefore any force acting in the direction of the latter is locked by these fixed centers the more it approaches the line of dead-centers of these points of suspension.

Another important feature of my invention consists in the flat curved springs being curved or rolled upon the weights, whereby as the weights move outward the force of the same increases by shortening their length. At the same time the leverage of the weights to overcome these springs has become longer, thereby keeping their resistance more equal with the centrifugal force for all positions of the weights, or in a measure more isochronal. In place of using two weights, but one may be employed, though the result will not be as satisfactory.

Whenever the weights are arranged on the same side as the lever D, carrying the eccentric C, the rods G will be attached direct to this arm D, dispensing thereby with the second arm E.

What I claim is—

1. The combination of swinging weight W with the connecting-rod G, one end of the latter turning upon arm E, the whole constituting a reverse toggle-joint for moving arm E, substantially as specified.

2. The combination of curved weight W hinged to pulley B and connected through rod G with a rock-shaft, F, turning in the web of said pulley and supporting the eccentric C, with flat spring S, the spring being curved or rolled upon the outer surface of the weight, substantially as specified.

JOHN F. ALLEN.

Witnesses:

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