(No Model.)

D. P. DAVIS.

GOVERNOR FOR ENGINES.

No. 303,711. Patented Aug. 19, 1884.

Fig. 3.

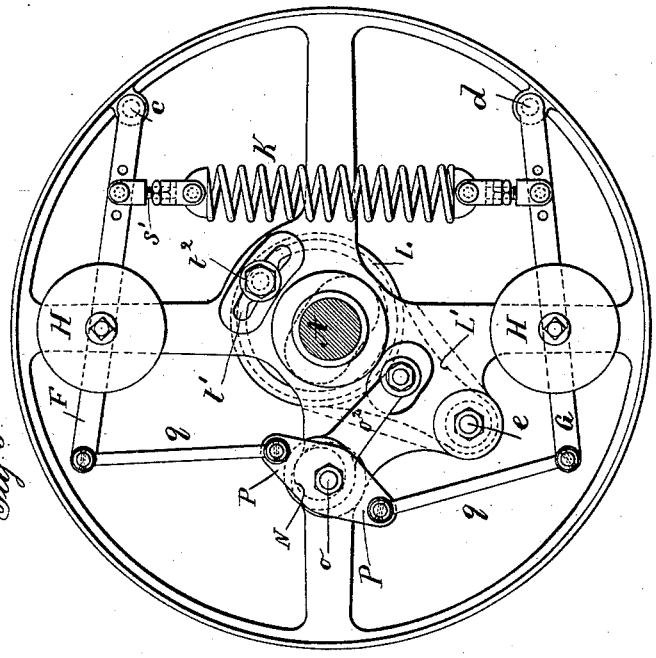


Fig. 1.

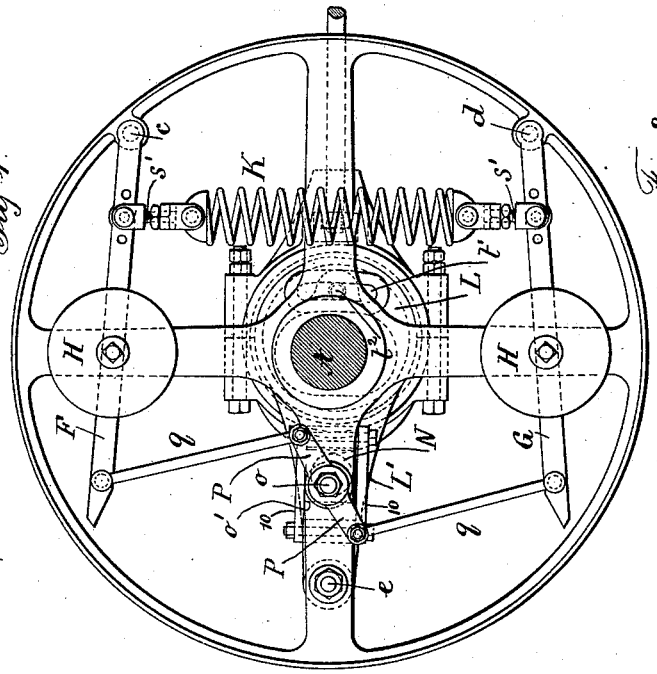
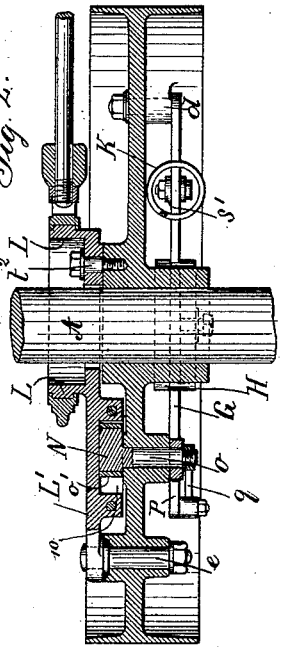


Fig. 2.



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DAVID P. DAVIS, OF JERSEY CITY, NEW JERSEY.

GOVERNOR FOR ENGINES.

SPECIFICATION forming part of Letters Patent No. 303,711, dated August 19, 1884.

Application filed April 8, 1884. (No model.)

To all whom it may concern:

Be it known that I, DAVID P. DAVIS, of Jersey City, in the county of Hudson and State of New Jersey, have invented an Improvement in Governors for Engines, of which the following is a specification.

Governors for steam-engines have been made to act upon the eccentric and move the same so as to change the position of the center of the eccentric in its relation to the axis of the shaft, and lessen the throw of the valve when the speed of the engine increases, and the reverse. In these cases difficulty has arisen in holding the eccentric with sufficient rigidity to prevent the eccentric itself being displaced, owing to the friction of the valve upon its seat.

My present invention relates to the combination, with the main shaft and the eccentric, of a pivoted arm supporting the eccentric, and a secondary eccentric acted upon by the governor balls and levers, so that the secondary eccentric is moved by the governor, and the main eccentric is shifted by the action of the secondary eccentric upon the pivoted arm. By this construction the governor is enabled to turn and to hold the secondary eccentric, and this acting upon the pivoted arm of the main eccentric can move the latter with facility; but there is no risk of the main eccentric becoming displaced by the friction of the engine-valve, because the secondary eccentric holds the parts in a very firm manner.

In the drawings, Figure 1 is an elevation of the wheel and parts connected with the eccentric. Fig. 2 is a sectional plan of the same, and Fig. 3 is an elevation of a slight modification in the positions of the parts.

The shaft A is usually provided with the crank to which the connecting-rod of the engine is applied. Upon this shaft A there is a wheel or arms for the pivots *c d e*. The pivots *c d* connect the arms F G of the governor. Upon these arms are the balls or weights H, which are adjustable, and there is a spring, K, acting in the reverse direction to the centrifugal force of the governor. The arms or levers F G may be placed in any convenient position in relation to each other and to the parts that are moved by them.

The main eccentric L is provided with an arm, L′, which extends to the pivot-bolt *e*, and the eccentric has an elongated opening through which the shaft A passes, so that said eccentric may be swung, with its arm L′, upon the pivot *e*. The eccentric-rod passes from the eccentric to the engine-valve in any well-known manner; and it is to be understood that the parts are to be proportioned, so that when the center of the eccentric L is nearest to the center of the shaft A the minimum amount of motion will be given to the valve, and that the motion of the engine-valve will be increased as the main eccentric L is swung in either direction, so as to increase the distance between the center of the eccentric and the center of the shaft A. When the valve receives its minimum motion, but little steam is introduced; but as the motion of the valve is augmented the power of the engine will be increased; hence it is only necessary to move the eccentric to the proper position to maintain uniformity of speed, or nearly so.

The secondary eccentric N is upon an axis, *o*, to which the cross-arms P are connected, and from these arms there are links *q*, extending to the levers F and G of the governor; and the parts are placed so that the secondary eccentric is turned as the governor-balls are thrown out by the centrifugal action. The secondary eccentric N acts upon the arm L′ of the main eccentric by being placed within a slot in such arm, as in Figs. 1 and 2, or else by a strap around the eccentric and link o^2, pivoted at its end to the said arm L′, as in Fig. 3, so that the main eccentric will be moved laterally by the governor, acting through the secondary eccentric, and such secondary eccentric forms a rigid support intervening between the arm of the main eccentric and the governor; hence the resistance or friction of the engine-valve will not be able to vary the position of the governor-balls by the lateral pressure upon the main eccentric, and the speed of the engine is availed of to accurately determine the action of the engine-valve. It is preferable to bolt the bars 10 to lugs upon the arm L′ of the main eccentric L, so as to form a parallel-sided space for the box *o′*, into which box the secondary eccentric N passes, so that the box will slide between the bars 10 as the eccentric N is turned, thereby giving the proper extent of bearing-surface and preventing looseness in the parts. The spring K is adjustable in its tension by the screws *s′*, ap-

plied at either or both ends, between the spring and lever, and the points of connection of the spring can be changed so as to be nearer to or farther from the fulcra. It is preferable to employ turn-buckle links at the ends of the spring, with right and left hand screw-threads and set-nuts, so that by loosening the set-nuts the spring and the parts of the turn-buckles connected therewith can be revolved to vary the tension of the spring, after which the set-nuts are clamped to hold the parts from turning. By applying only one spring it acts equally on both levers, and the speed can be regulated simply by varying the tension of the spring. The slot at t' in the eccentric receives the screw-bolt t^2, that passes into one of the arms of the wheel, so as to prevent the eccentric becoming misplaced laterally. It is to be understood that the fulcrum *e* for the lever-arm of the main eccentric L may be placed between such eccentric L and the end of the said lever-arm, so that the secondary eccentric may act upon the end of the arm instead of in the position represented. By changing the relative positions of the secondary eccentric to the lever-arms F G the said secondary eccentric can be made to move the main eccentric in the opposite direction to that represented by the drawings, so as to change the lead of the engine-valve, and cause the engine to revolve in the opposite direction.

I claim as my invention —

1. The main eccentric, the arm carrying the same, and the fixed pivot upon one arm of the wheel, in combination with a secondary eccentric, a pivot for the same upon one of the arms of the wheel, a cross-bar for the secondary eccentric, the governor-levers, and the links connecting the governor-levers to the cross-bar of the secondary eccentric, substantially as specified.

2. The secondary eccentric, having an axis upon one arm of the wheel, and the cross-bar or arms projecting from said eccentric, in combination with the governor, the connection from the governor to said arms, the main eccentric, and the pivoted arm for the same, upon which the secondary eccentric acts, substantially as set forth.

3. The combination, with the main eccentric, the governor-levers, and the connection to such main eccentric, of one adjustable spring extending from one lever of the governor to the other, and connected to such levers at equal distances from their pivots, substantially as set forth.

4. The main eccentric and the pivoted arm by which it is supported, in combination with the secondary eccentric, the box of such eccentric, the bars upon the eccentric-arm, between which the eccentric-box is received, and the governor and connections for moving such secondary eccentric, substantially as set forth.

Signed by me this 7th day of April, A.D. 1884.

DAVID P. DAVIS.

Witnesses:

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