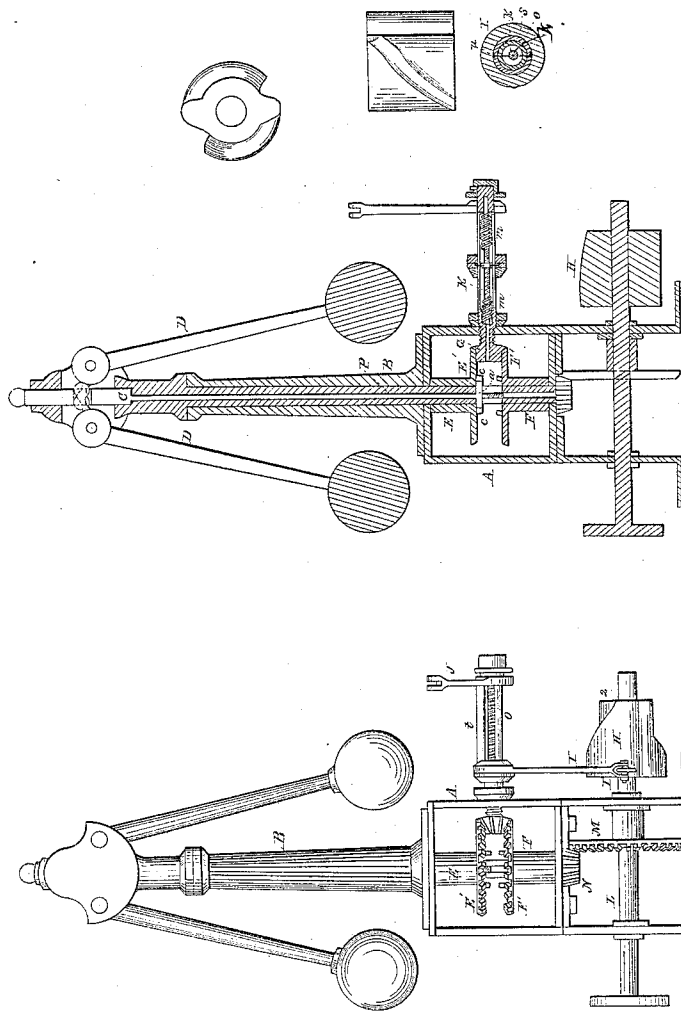


*W. G. Crutchfield,*  
*Governor.*

*N<sup>o</sup> 27,275.*

*Patented Feb. 28, 1860.*



Witnesses:  
*L. M. Alexander*  
*A. H. Goodman*

Inventor:  
*W. G. Crutchfield*

# UNITED STATES PATENT OFFICE.

W. G. CRUTCHFIELD, OF DAYTON, OHIO.

## OPERATING GOVERNOR-VALVE FOR STEAM-ENGINES.

Specification of Letters Patent No. 27,275, dated February 28, 1860.

*To all whom it may concern:*

Be it known that I, W. G. CRUTCHFIELD, of Dayton, in the county of Montgomery and State of Ohio, have invented certain  
5 new and useful Improvements in Governors for Steam Engines; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings and to the  
10 letters of reference marked thereon.

The nature of my invention consists in the employment of a cam cylinder and traversing lever for the purpose of adjusting the valve and regulating the quantity of steam  
15 substantially as hereinafter described.

In the annexed drawings Figure 1 represents a side elevation. Fig. 2 represents a vertical section. Fig. 3 is a plan view of the cam cylinder. Fig. 4 is an end view of the  
20 cam cylinder.

In the figures A represents a frame upon which is erected the tubular standard B. Through this standard passes a tube P, and through the tube P passes a rod C.

25 D, D, represent arms, with balls attached to one end, their other end being pivoted to wings which are secured to the upper end of the tube P. These arms connect with the rod C in the usual manner, so that when  
30 they turn and the balls are elevated by centrifugal action the said rod is depressed. Surrounding the tube P, near its lower extremity, and within the frame A, are two  
35 sleeves E and F, to which are connected two bevel wheels E' and F'. Between these bevel wheels is situated a beveled pinion G, which gears into both of said wheels. The pinion G is secured to one end of the screw shaft K, which passes through the tubular  
40 arm O. To the lower end of the tube P is secured the beveled pinion N, which gears into a bevel wheel M, which is secured to a horizontal shaft L. The lower end of the rod C is provided with a small cross piece a,  
45 which plays in a slot through the tube P between the wheels E' and F'.

On the faces of the wheels E' and F', between the gear teeth and the tube P, are secured small pins or projections c, c. The  
50 objects of these pins are as follows: When the balls on the arms (D) stand close to the standard B, the cross piece a, stands between the pins on the wheel E, and when said wheel turns, it revolves the pinion G in one direction, but as soon as the motion  
55 of the arms (D) is increased and the balls

begin to rise the rod C is depressed and the cross piece a catches between the pins on the face of the wheel F, which instantly reverses the motion of the pinion G and  
60 causes it to revolve in an opposite direction. The screw shaft k, revolves with the pinion G, as it is secured to it, and as it revolves it moves the lever I toward one or the other of its ends according to the direction in which  
65 it turns. The end of lever I, which surrounds the arm O, is provided with a slot in which the bar t slides as a guide to said lever. Within a cavity in the end of the lever I is a wheel s, and within the tubular  
70 arm O, and surrounding the shaft K is a small wheel x, which wheels are secured together by means of a pin u, which passes through each and through a long slot in the arm O. A screw being cut in the wheel x  
75 and it being made to fit over the shaft K, it will be seen that by turning the shaft the wheel will be made to move from one end to the other of it, according to the way which  
80 it is turned. The wheel x being secured to wheel s by means of a pin, and the wheel s being secured in the cavity of the end of lever I, it will be seen that as the wheel x is moved so the lever I will be moved cor-  
85 respondingly.

J represents a lever which connects with the lever I, by means of the bar t, in such a manner that when said lever I is moved up or down the lever J will be moved cor-  
90 respondingly.

H represents the section of a cam cylinder which is secured to the shaft L. This cylinder is formed by having two equal prominences upon it in the shape of rectangle  
95 triangles, at equal distances from each other on each side and their bases lying in the same direction. These prominences of course form two depressions between them which are of the same dimensions and shape as the prominences. The lever J being so  
100 attached to the cutter fly or any other form of valve so as to operate it by an up and down motion, and the lever I being provided with a friction wheel which is made to run upon the surface of the cylinder H, it will  
105 be seen that the prominences and depressions upon said cylinder will cause the lever I to move up and down, and consequently the lever J, by which means the valve is alternately opened and closed. The fact as  
110 to whether the valve will be opened longest or closed longest will depend upon which

end of the cylinder the wheel on the end of the lever is running closest to.

In using this governor the cylinder is so placed upon the shaft L, that when the engine runs below her speed the pin *a* will catch in the upper gear wheel F', and so revolve the pinion G and screw shaft *k* as to cause the lever I to move toward the large portion of the cam cylinder and thus give the engine more steam, but when the engine runs too fast the pin or crosspiece *a* catches into the lower gear wheel F', and causes the pinion G and shaft K to move in an opposite direction, moving the lever I toward the small end of the cylinder, or the outer end, when the wheel on the lever runs in the depressions in the cylinder, thus giving the engine less strain and making it run slower. The speed of the engine is thus regulated

by the traversing lever I, which connects with the lever J, which closes or opens the valve according to the speed at which she is running. Two engines may be run by the same governor by duplicating this regulating arrangement of the levers and the cam cylinder.

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

The arrangement of the sleeves E, and F, pinion G, screw shaft K, tubular arm O, lever I, wheels *s* and *x*, and cam cylinder H when the same are used substantially as and for the purpose herein specified.

W. G. CRUTCHFIELD.

Witnesses:

JAMES TURNER,  
G. C. RUTLEDGE.