

(No Model.)

E. FAWCETT.

AUTOMATIC SHAFT GOVERNOR.

No. 349,215.

Patented Sept. 14, 1886.

Fig. 1.

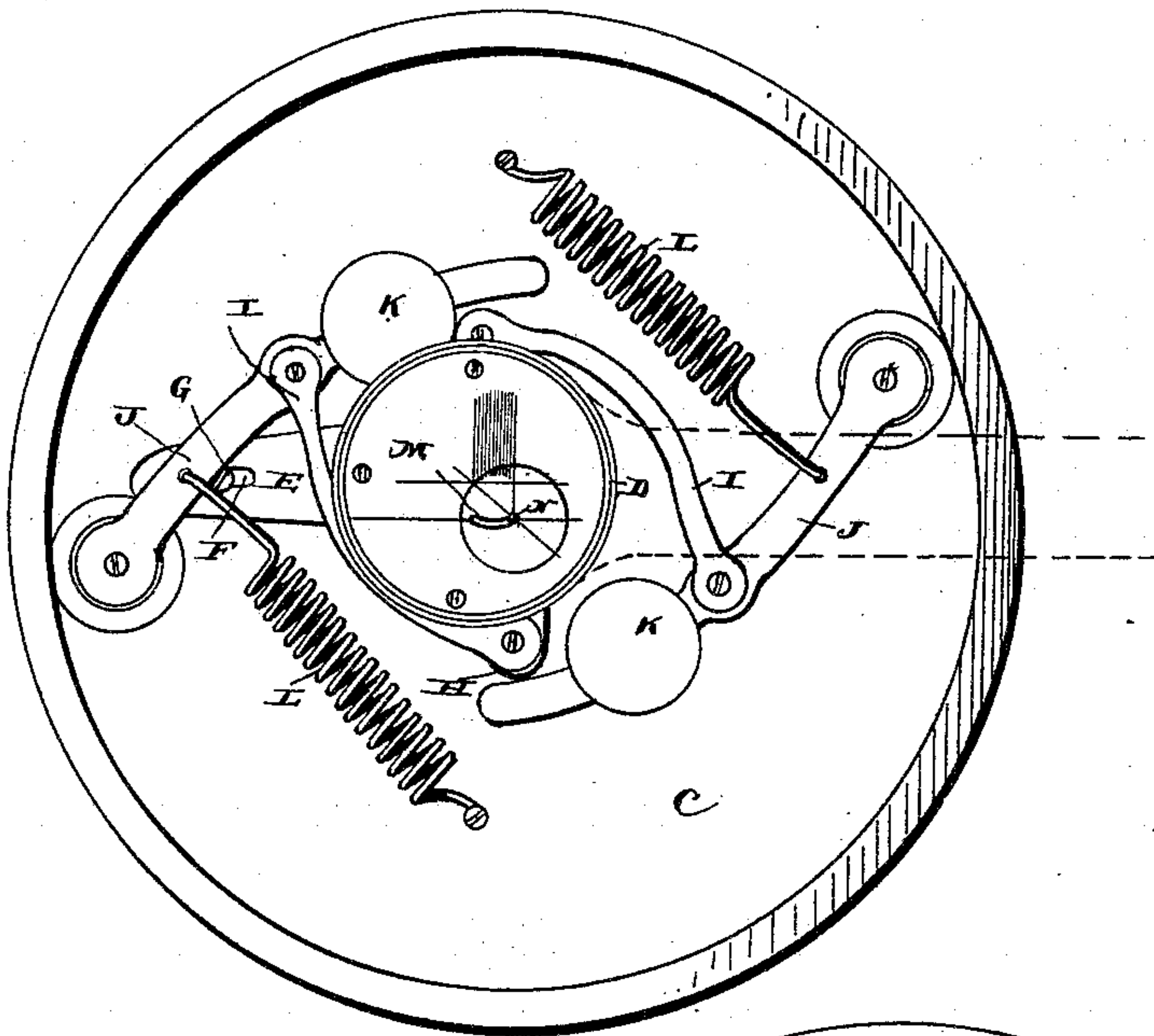


Fig. 2.

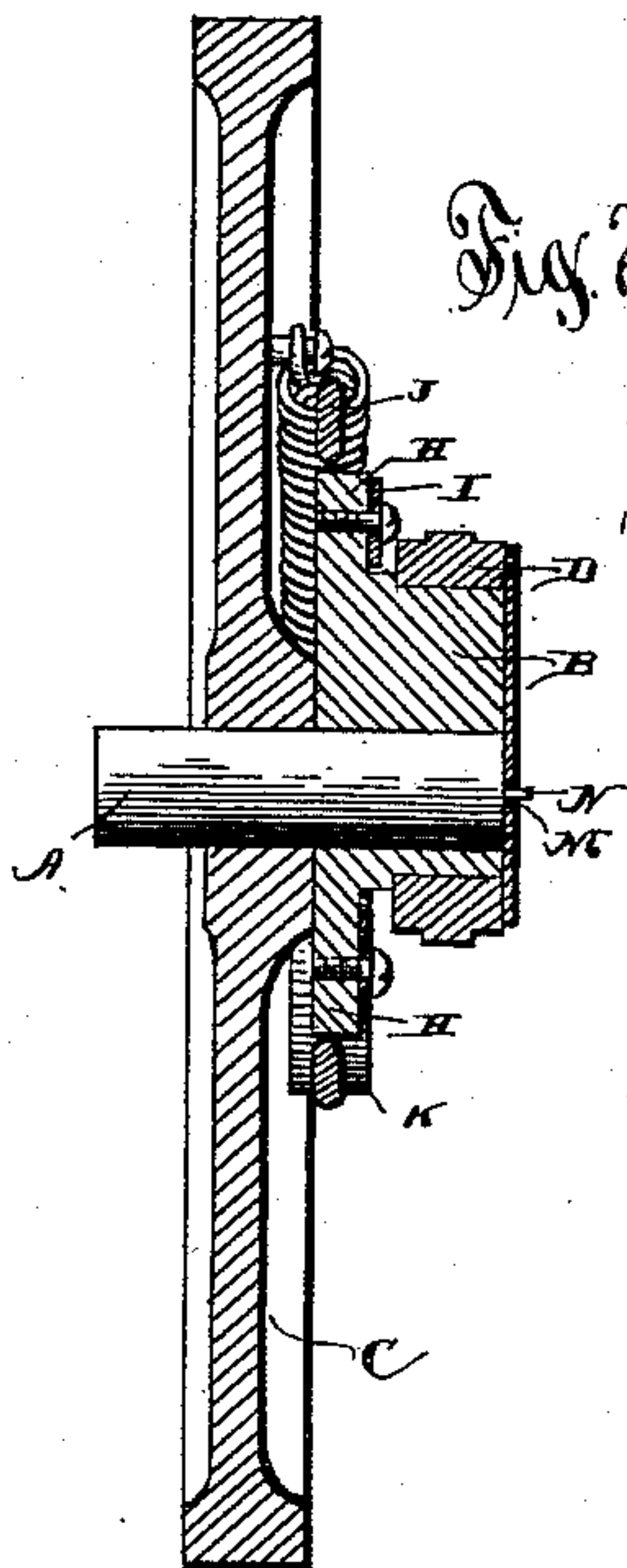
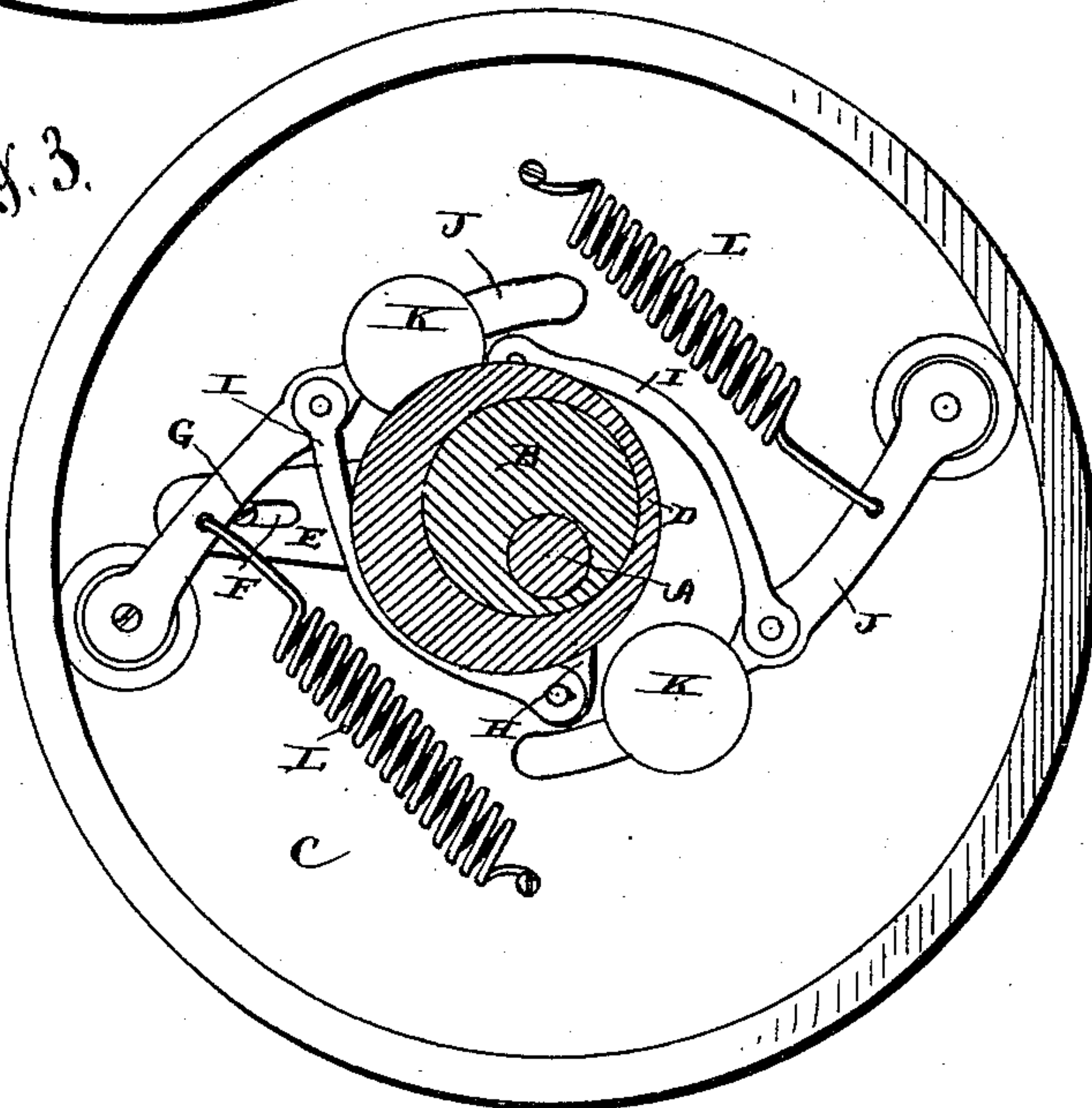


Fig. 3.



WITNESSES

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# UNITED STATES PATENT OFFICE.

EZRA FAWCETT, OF ALLIANCE, OHIO.

## AUTOMATIC SHAFT-GOVERNOR.

SPECIFICATION forming part of Letters Patent No. 349,215, dated September 14, 1886.

Application filed April 6, 1886. Serial No. 197,986. (No model.)

*To all whom it may concern:*

Be it known that I, EZRA FAWCETT, a citizen of the United States, and a resident of Alliance, in the county of Stark and State of Ohio, have invented certain new and useful Improvements in Automatic Shaft-Governors; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification, and in which—

Figure 1 is a front view of my improved shaft-governor or eccentric cut-off regulator, showing a diagram affixed to the face of the eccentric disk to illustrate the changes in the position of the eccentric disk. Fig. 2 is an axial sectional view of the same; and Fig. 3 is a sectional view on line *x x*, Fig. 2.

Similar letters of reference indicate corresponding parts in all the figures.

My invention has relation to that class of cut-off regulators or governors which is attached to the shaft of a steam-engine and regulates the position of the eccentric disk upon the shaft according to the speed of the engine, and automatically increases or decreases the lead of the valve in the valve-chest and regulates the cut-off according to the speed of the engine; and it consists in the improved construction and combination of parts of such a regulator or governor, as hereinafter more fully described and claimed.

In the accompanying drawings, the letter A indicates the shaft, to which the rotary motion is transferred, and an eccentric disk, B, is placed upon this shaft at a distance from a fly-wheel, C, upon the shaft. Another eccentric, D, turns upon the inner eccentric, and the valve-rod and the eccentric ring and rod are connected to this disk. The outer eccentric disk is provided with a laterally-projecting arm, E, which arm is provided with a longitudinal slot, F, with which slot it slides upon a stud, G, upon the wheel, and the inner eccentric disk is provided with two diametrically-opposite arms, H H, projecting from the inner side of the disk, to the ends of which arms arms I I are pivoted with their inner ends, while their outer ends are pivoted to weighted arms J J, pivoted at their ends to the

face of the wheel, and having weights K sliding adjustably upon their outer ends. The ends of spiral springs L are secured to the weighted arms, and have their other ends secured to the face of the wheel. It will be seen that as the speed of the shaft, and consequently of the wheel, increases, the weighted arms will be forced outward by the centrifugal power, and the arms, swinging out, will draw the arms of the eccentric disk, which will revolve slightly upon the shaft, and thus revolve within the outer eccentric, which will be moved partly transversely to the shaft in a small curve, the eccentric approaching closer to the center or axis of the shaft as the weighted arms are swung out by the centrifugal power created by the increase of speed. This movement of the eccentric will cause the valve to receive a shorter stroke, and at the same time the curve in the motion of the eccentric will change the lead or admission of steam into the cylinder of the engine, so that when the engine is running at a high speed the throw of the valve will be reduced in proportion to the increase of speed, causing the steam to work by expansion, and the steam will be admitted early into the cylinder when the engine is running at high speed.

For the purpose of more perfectly illustrating the motion of the eccentric by the throwing out of the weighted arms, I have shown a diagram affixed to the end or face of the eccentric disk, having a segmental slot, M, in which a pin, N, projects, which is secured at the axis of the shaft, the travel of the pin within the slot illustrating the inverted arc which the eccentric travels in with relation to the axis of the shaft. In this diagram the letter *a* indicates the center of the eccentric. *b* is the line parallel to the crank-pin, the said line indicating the relative position of the crank-pin and of the eccentric.

*c* is the circle which the center of the eccentric describes around the axis of the shaft when the weighted arms are not moved by the centrifugal force, the said circle traveling to one side and decreasing in diameter as the weighted arms are swung outward, the length of the line *d*, indicating the full throw of the eccentric, being the diameter of the circle, and the said diameter decreasing as the eccentric is moved across the shaft. The radius of the



larger circle is the diameter of a circle one  
arc, *e*, of which is the slot in which the pin  
moves, while the opposite segment of ninety  
degrees, which is lettered *f*, indicates the true  
5 line in which the eccentric travels across the  
shaft.

The fine parallel lines *g* indicate at their in-  
tersecting points with the segment the differ-  
ent points of cut-off of the valve, the cut-off of  
10 the valve being indicated by the position of  
the pin with relation to these lines.

I am aware that it is not new to construct  
shaft-governors by pivotally securing spring-  
actuated weighted arms to a disk and connect-  
15 ing the same with an inner and outer eccen-  
tric upon the shaft, and I do not claim such  
construction, broadly; but

I claim and desire to secure by Letters Pat-  
ent of the United States—

20 In an automatic governor or regulator for  
the cut-off and lead of steam-engines, the com-  
bination of a shaft having a fly-wheel secured

upon it, an eccentric turning upon the shaft  
and having two diametrically-opposite arms  
at its inner side, an eccentric disk turning 25  
upon the inner eccentric disk and having a  
laterally-projecting arm sliding with a longi-  
tudinal slot upon the face of the fly-wheel,  
arms pivoted with their ends upon the face of  
the wheel, near the rim of the same, and hav- 30  
ing weights secured adjustably to their outer  
ends, springs secured to the arms and to the  
wheel, drawing the arms inward, and arms piv-  
oted to the weighted arms and to the arms of  
the eccentric, as and for the purpose shown 35  
and set forth.

In testimony that I claim the foregoing as  
my own I have hereunto affixed my signature  
in presence of two witnesses.

EZRA FAWCETT.

Witnesses:

WILLIAM PAINTER,  
WILLIAM HESTOR.