

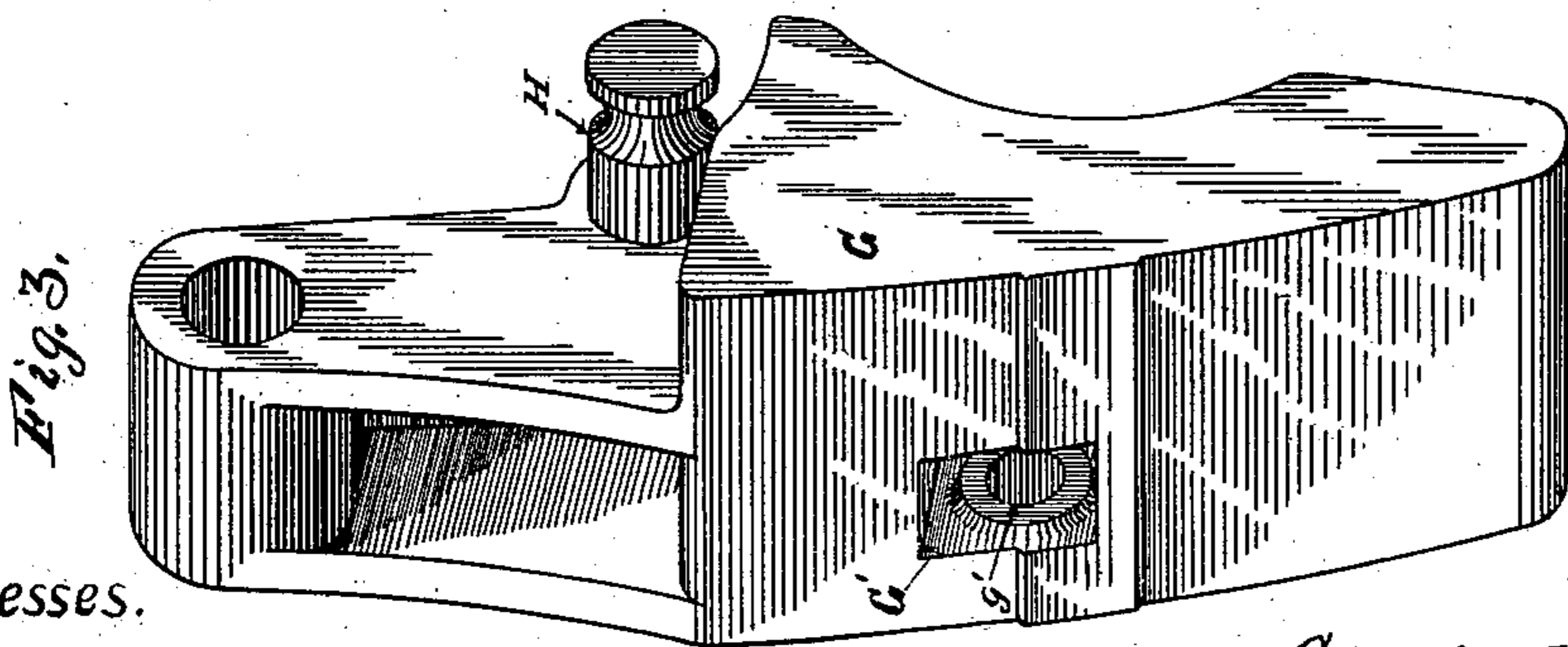
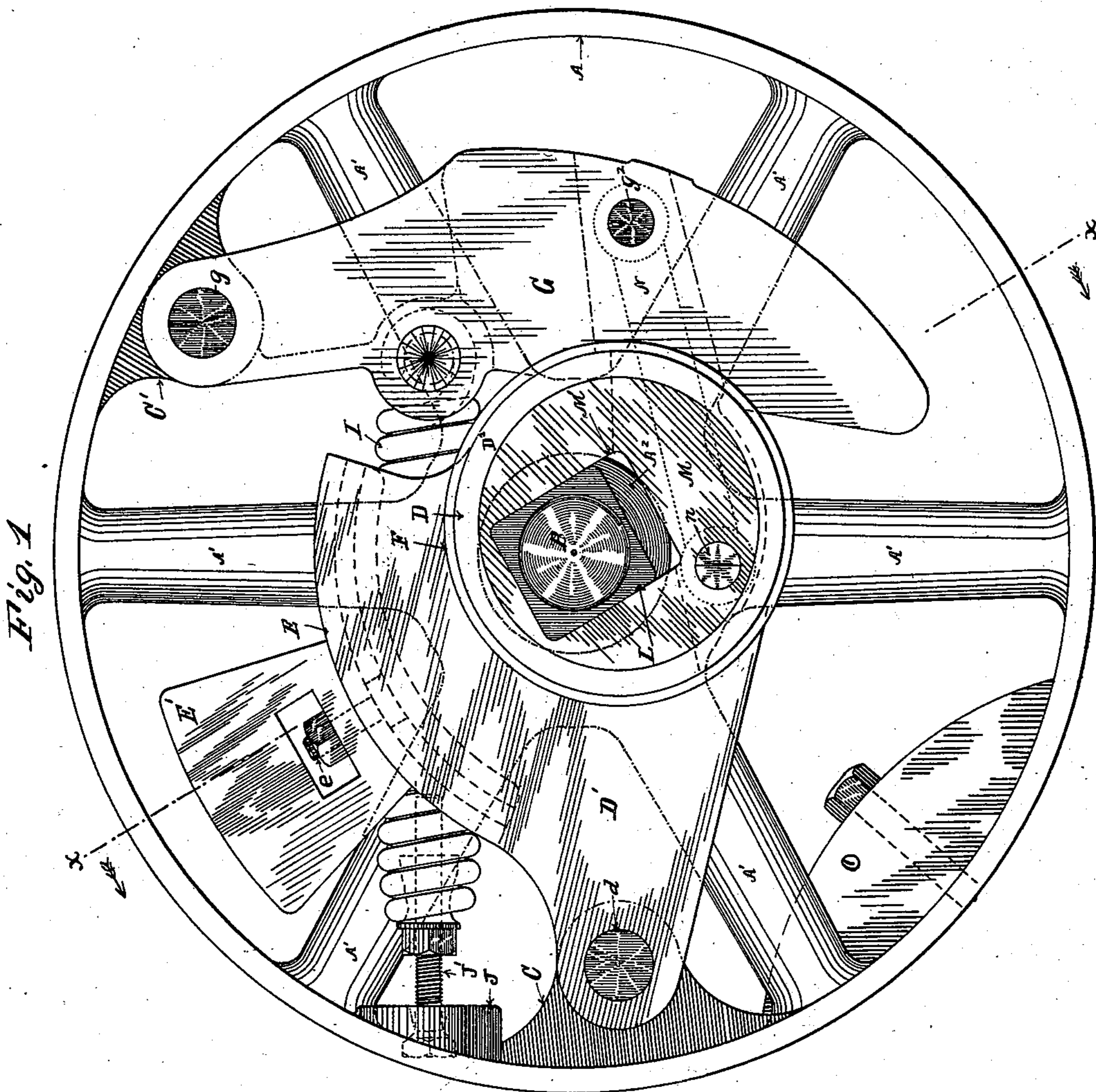
(No Model.)

2 Sheets—Sheet 1.

C. W. LAWRIE.
CUT-OFF REGULATOR.

No. 376,826.

Patented Jan. 24, 1888.



Witnesses.

W. W. Simpson
John Davis

Inventor.

Charles W Lawrie
Per J. S. Sturgeon
Att'y.

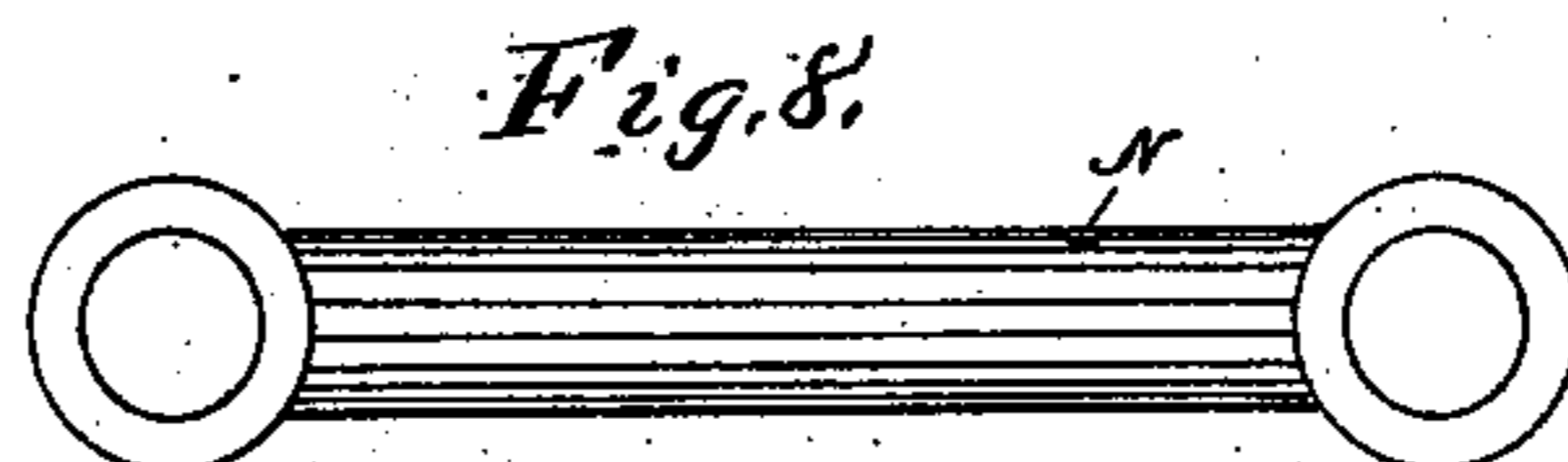
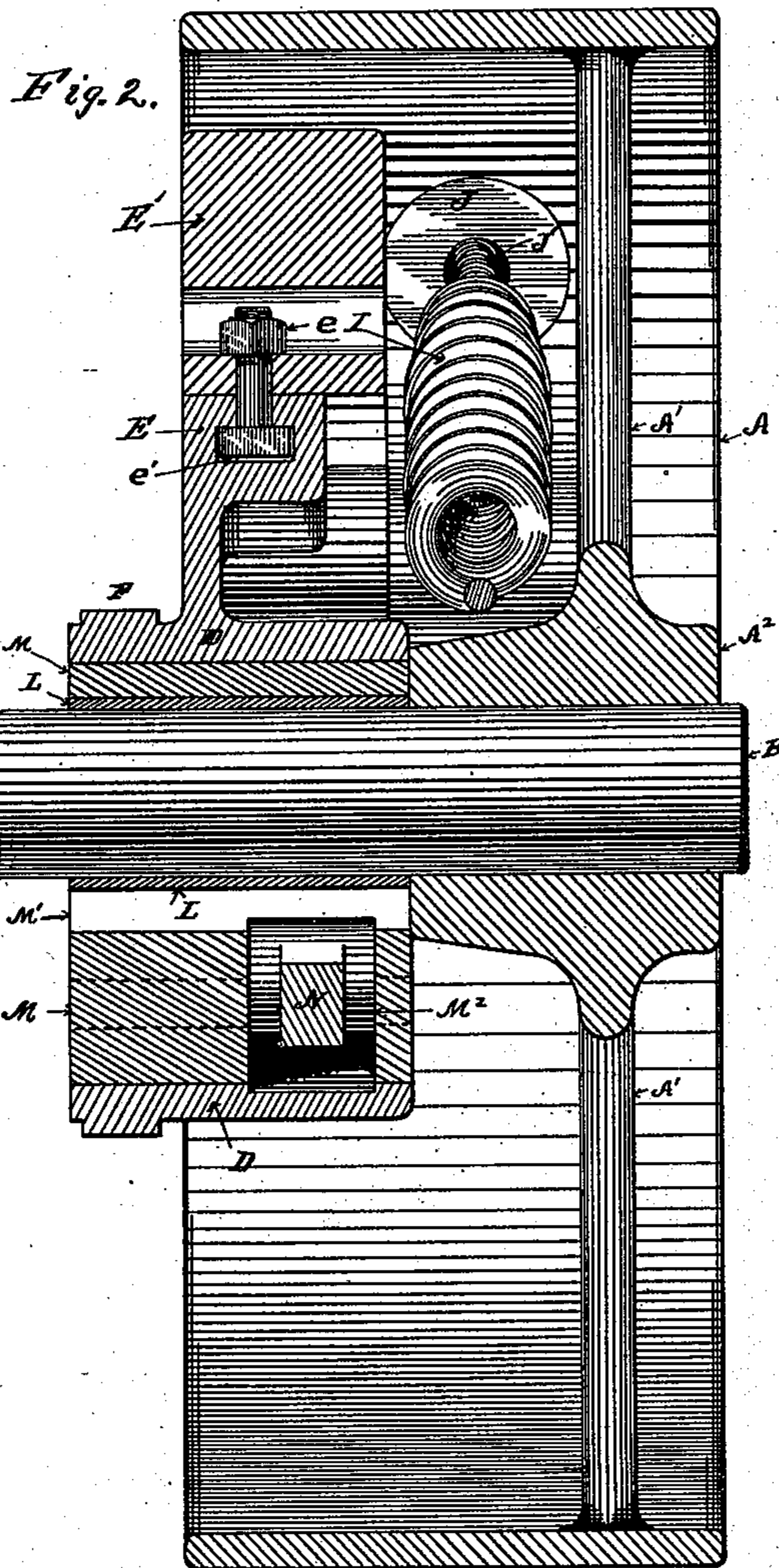
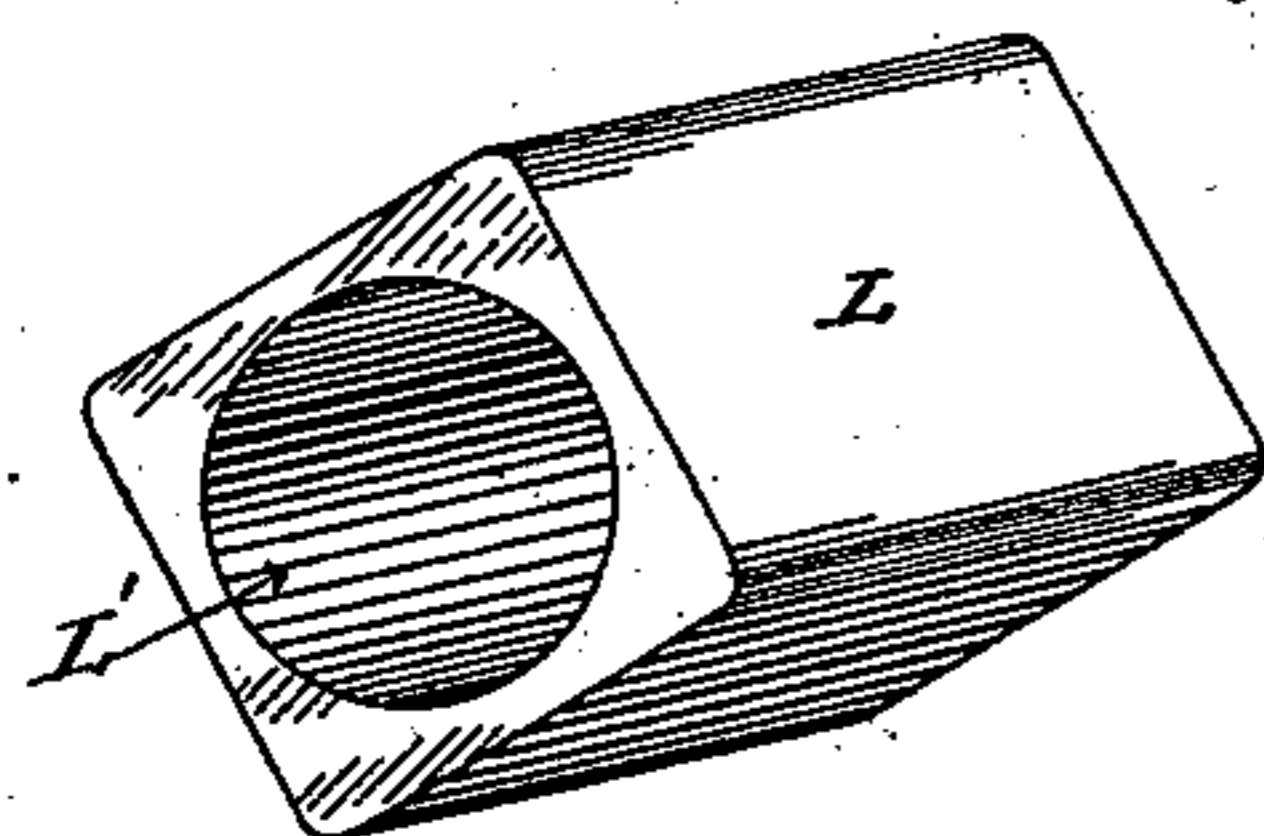
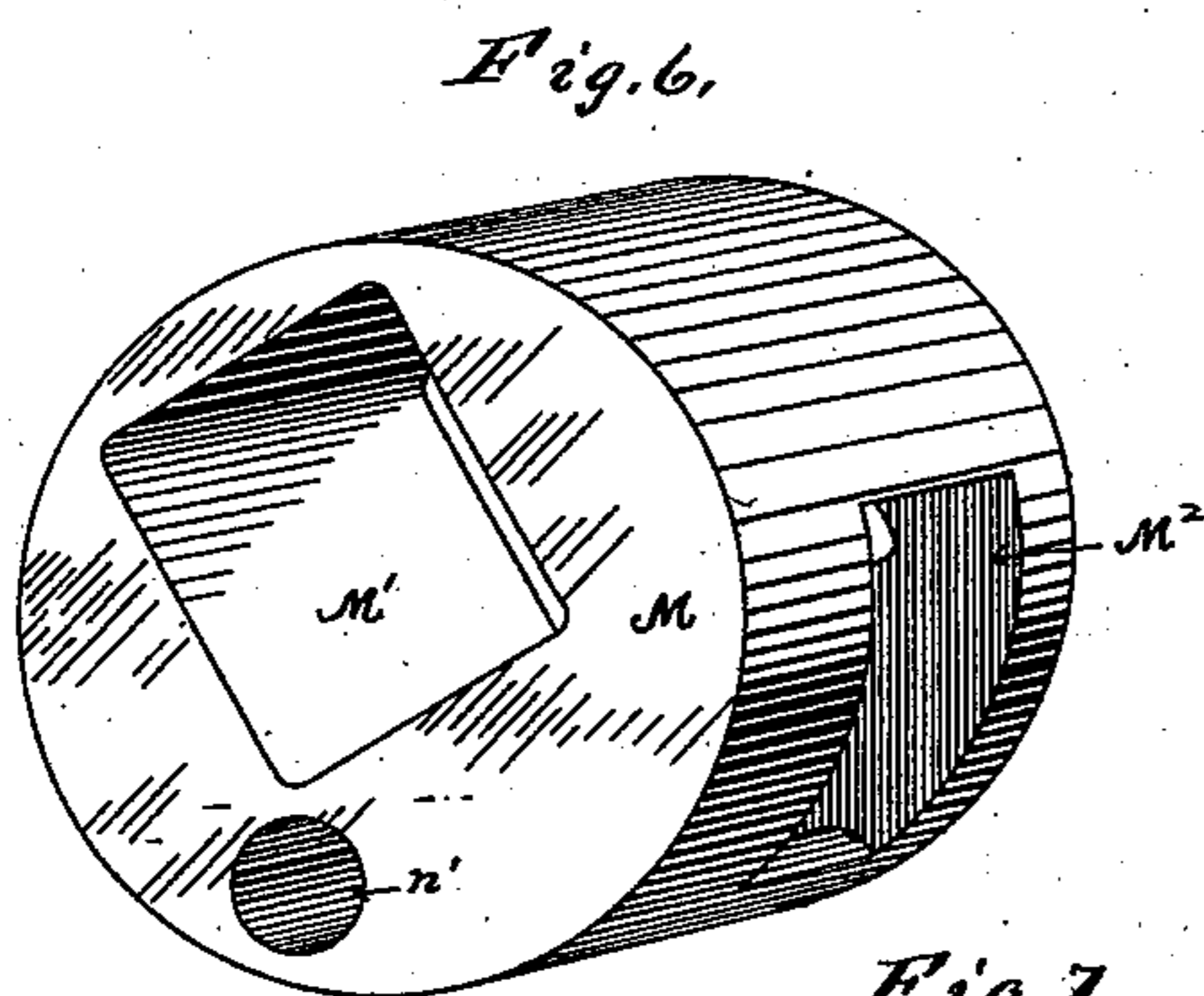
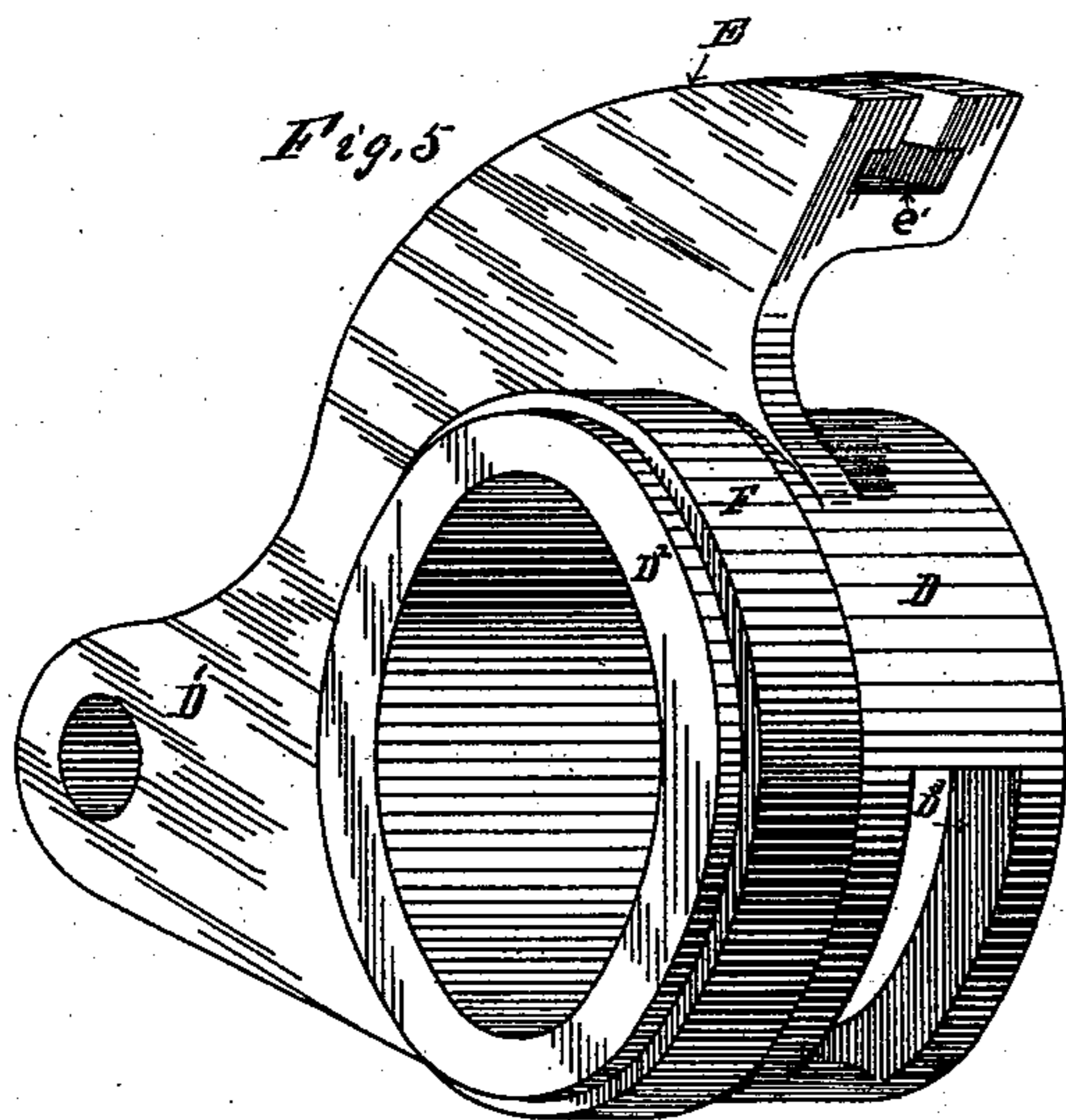
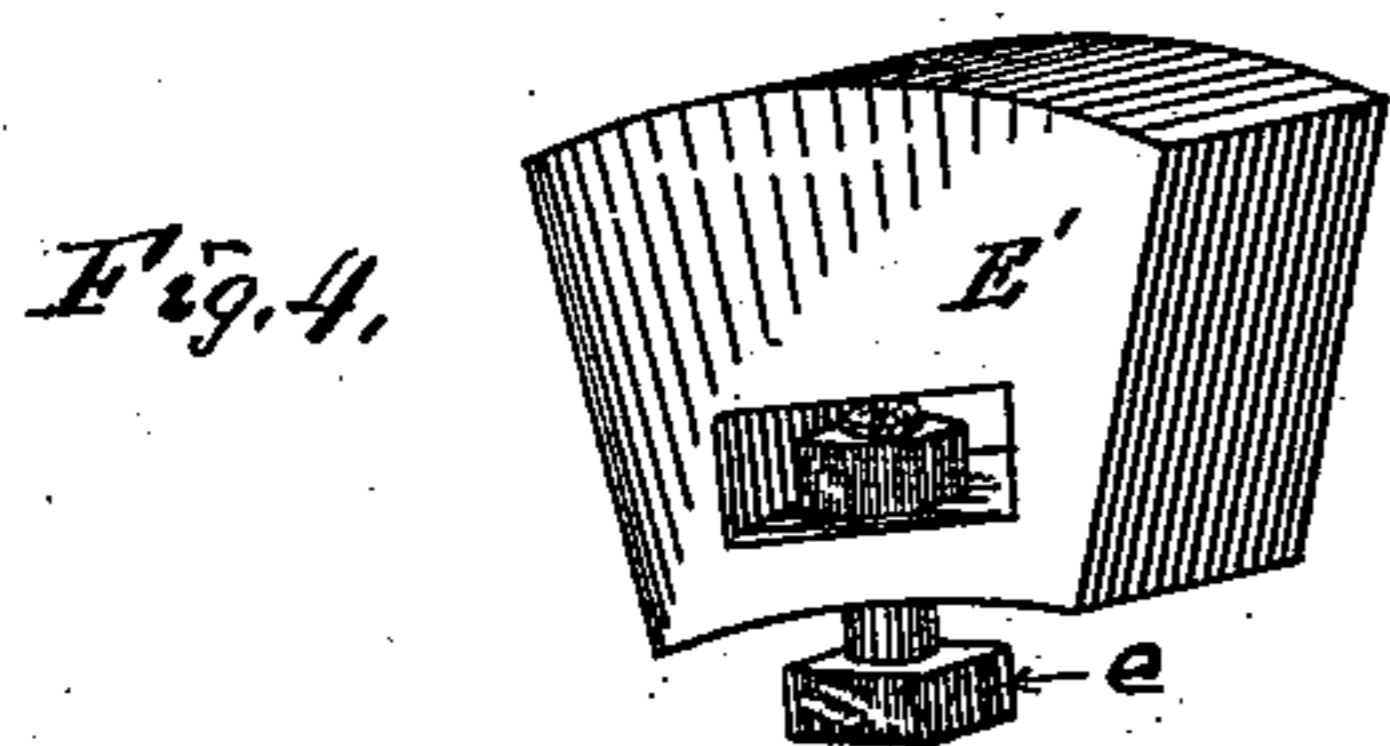
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2 Sheets—Sheet 2.

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Witnesses.

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UNITED STATES PATENT OFFICE.

CHARLES W. LAWRIE, OF ERIE, PENNSYLVANIA.

CUT-OFF REGULATOR.

SPECIFICATION forming part of Letters Patent No. 376,826, dated January 24, 1888.

Application filed May 23, 1887. Serial No. 239,130. (No model.)

To all whom it may concern:

Be it known that I, CHARLES W. LAWRIE, a citizen of the United States, residing at Erie, in the county of Erie and State of Pennsylvania, have invented certain new and useful Improvements in Automatic Cut-Off Regulators; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, forming part of this specification.

My invention consists in the improvements in automatic cut-off regulators set forth and explained hereinafter in the specification and claims, and illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation of my improved automatic cut-off regulator. Fig. 2 is a central cross-section of same on the line xx in Fig. 1, looking in the direction of the arrows. Fig. 3 is a perspective view of one of the weights used in my device. Fig. 4 is a like view of an adjustable weight used in my device. Fig. 5 is a like view of the eccentric ring and the arm and slotted arc secured thereto. Fig. 6 is a like view of the rotating bushing operating inside of the eccentric ring, Fig. 5. Fig. 7 is a like view of the supporting-block upon which the rotating bushing, Fig. 6, operates. Fig. 8 is a plan view of the link connecting the rotating bushing, Fig. 6, with the weight, Fig. 3.

Like letters refer to like parts in all the figures.

In constructing my improved cut-off regulator I make the pulley A of suitable size to inclose the mechanism hereinafter described within the periphery of its rim, and with arms A' and a hub, A², preferably at or near the side of the pulley A, by means whereof it is adapted to be secured to the shaft B in the usual manner.

On the inside of the rim of the pulley A, I cast or otherwise secure lugs C C', which are distant from each other preferably about one-third of the arc described by the rim of the pulley. However, their location on the pulley-rim may be varied, if desired.

On the lug C', I pivot a weight, G, Fig. 3,

by means of a pintle, g , which passes through the end of the weight G into the lug C', so that weight will swing freely upon the pintle g . On one side of the weight G, preferably about one-third of the length thereof from the pintle g , I secure a stud-pin, H, to which is secured one end of the spiral spring I, which spring extends from said stud-pin H on the weight G, at substantially a right angle to the edge of the weight, to a boss, J, on the inside of the rim of the pulley A, near the lug C thereon, to which boss J the other end of the spring I is secured, preferably by an adjustable fastening, J', by means whereof the tension of the spring I can be varied and adjusted.

In the edge of the weight G, on the plane of its movement, I make a slot or mortise, G', and an opening, g' , crossing said slot at right angles for a pintle, g^2 , for the purpose hereinafter set forth and explained.

On the lug C, I pivot the arm D' of the eccentric-ring D, Fig. 5, by means of a pintle, d , which passes through the end of the arm D' into the lug C, so that the arm D' and the eccentric-ring D and weight-arc E thereon will swing freely upon the pintle d , this slotted arc E being adapted to receive and support an adjustable weight, E', Fig. 4, which is preferably secured thereto by means of a bolt, e , operating in a slot, e' , in the arc E, and is thereby adapted to be adjusted and secured in place at any desired point thereon.

The outer end, D², of the eccentric-ring D is made long enough to project beyond the side of the pulley A, and is provided with an eccentric-strap bearing, F, and near the inner end of the eccentric-ring D, at a point nearly opposite to the bearing in the end of the arm D', I make a radial slot, D³, which extends through the shell of the ring, for the purpose hereinafter set forth.

In the eccentric-ring D, I place the rotating bushing M, Fig. 6, which consists of a cylinder, the outside whereof is turned off to fit the inside of the ring D and turn easily therein. Through this bushing M, preferably near the outside thereof, I make a longitudinal slot or mortise, M', preferably of rectangular or oblong shape, the greatest width of this slot being across the central part of the bushing M, toward the periphery thereof.

Near the inner end of the bushing M, I make

a radial slot, M^2 , so that when the bushing M is inserted into the eccentric-ring D the slots D^3 in the ring D and the slot M^2 in the bushing M will coincide. I also make a pintle-opening, n' , longitudinally through the bushing M and through the slot M^2 therein, for the purpose hereinafter set forth. In the slot M' in the rotating bushing M, I place the supporting-block L, Fig. 7. This block L has a central opening, L' , therein, bored out to fit and turn freely upon the shaft B. This block L is made to fit the slot M' the narrow way, while it slides freely therein the long way thereof, which permits the bushing M to move on the block L a considerable distance to and fro across the shaft B, carrying the eccentric-ring D, within which it is located, with it. In this slot M^2 in the rotating bushing M, I secure one end of the link N, Fig. 8, by means of a pintle, n , inserted into the hole n' through the opening in the end thereof, the link N passing out through the slot D^3 in the eccentric-ring D to the weight G, to which the other end thereof is secured by inserting it into the slot G' therein, where it is secured by a pintle, g^2 , the bushing M and the weight G being thus connected together. The movements of the weight G to and from the center of the pulley are communicated to and operate to rotate the bushing M upon the supporting-block L and within the eccentric-ring D, and thereby cause it to travel back and forth across the shaft B.

On the inside of the rim of the pulley A, I also secure a fixed weight, O, at such points as to counterbalance the weights G and E and the other mechanism hereinbefore described, so as to properly balance the whole device.

The mechanism hereinbefore described is especially adapted for regulating the movement of the valves of a steam-engine, though it may be utilized for other purposes. In operating it upon an engine the pulley A, with the mechanism therein contained, is mounted, preferably, upon the main shaft of the engine. The tension of the spring I and the location of the weight E' are then adjusted so that the centrifugal force of the weights E' and G substantially equalize each other. I then secure the eccentric-strap for connecting the valve-rod therewith in place upon the bearing F on the outer end, D^2 , of the eccentric-ring D, the entire mechanism being counterbalanced by a suitable weight, O, on the inside of the pulley-rim. In operation, as the speed of the engine increases, the centrifugal force exerted upon the weight G operates to move it outward upon its bearing g , which movement is communicated to the rotating bushing M by the link N and turns the bushing M within the eccentric-ring D, and, with the assistance of the force exerted by the weight E', carries the eccentric-ring D and the bushing M across the shaft B, the supporting-block L operating in the slot M' and serving as a guide and support therefor, and vice versa. A decrease of the speed of the engine operates to

move the bushing and eccentric-ring back in the opposite direction, the supporting-block L operating in the slot M' in the rotating bushing M as a locking device, which receives and sustains the strain of the eccentric, in whatever position the eccentric may for the time be, so that the eccentric acts substantially as a fixed eccentric in any position which it may for the time being assume and occupy.

I have thus fully described suitable mechanism for utilizing my invention, so as to enable others to construct and operate the same. However, I do not desire to limit myself to the particular construction and arrangement of parts shown, as many of the parts of my device can be modified both in construction and arrangement and good results obtained therewith.

Therefore, what I claim as new, and desire to secure by Letters Patent of the United States, is—

1. The combination, in an automatic cut-off regulator, of an eccentric-ring having an arm thereon adapted to be pivoted to a pulley, and a bushing adapted to rotate in said eccentric-ring, supported upon a block rotating on the shaft and operating in a slot in said bushing, with a weight pivoted to such pulley, and also coupled to said rotating bushing, and a spring connecting said weight to the pulley, substantially as and for the purpose set forth.

2. The combination, in an automatic cut-off regulator, of an eccentric-ring, having an arm on one side thereof adapted to be pivoted to a pulley, with an adjustable weight on said arm adapted to be adjusted and secured thereto, substantially as and for the purpose set forth.

3. The combination, in the eccentric of an automatic cut-off regulator, of an eccentric-ring having an arm on one side thereof adapted to be pivoted to a pulley, and a radial slot in said ring, with a bushing adapted to rotate therein, having an oblong longitudinal slot therein adapted to allow said bushing to move back and forth across a shaft, and a link passing through the slot in the eccentric-ring, connected with and adapted to rotate said bushing in said eccentric-ring, substantially as and for the purpose set forth.

4. The combination, in an automatic cut-off regulator, of a weight adapted to be pivoted to a pulley, and a spring operating against the force of said weight, with a link connecting said weight to a slotted bushing adapted to rotate in the eccentric-ring and supported by a block mounted on the shaft, substantially as and for the purpose set forth.

5. The combination, in an automatic cut-off regulator, of a weight adapted to be pivoted to a pulley, and a spring operating against the centrifugal force of said weight, with a bushing adapted to rotate in the eccentric-ring, connected with and operated by said weight and supported on a block rotating on the shaft, substantially as and for the purpose set forth.

6. The combination, in a bushing adapted

to rotate in the eccentric-ring of an automatic cut-off regulator, of an oblong longitudinal slot with a supporting-block adapted to rotate on a shaft and operate in said slot, substantially as and for the purpose set forth.

5 7. The combination, in the eccentric mechanism of an automatic cut-off regulator, of a slotted bushing, supported upon a rectangular block adapted to rotate on the shaft, with link-
10 and-weight mechanism adapted to automatically rotate said bushing in the eccentric-ring, substantially as and for the purpose set forth.

15 8. The combination, in an automatic cut-off regulator eccentric, of the ring D, having thereon the arm D', the slotted arc E, and the adjustable weight E', with the rotating bushing M, the supporting-block L, and the link N, substantially as and for the purpose set forth.

20 9. The combination, in an automatic cut-off

regulator, of the swinging weight G and the spring I, with the link M, connecting said weight with the rotating bushing M, substantially as and for the purpose set forth.

10. The combination, in an automatic cut- 25 off regulator, of the eccentric-arm D', having the eccentric-ring D and the slotted arc E thereon, and the adjustable weight E', secured upon said arc E, with the swinging weight G, the spring I, the link N, the rotating bushing 30 M, the supporting-block L, and the counter-balance-weight O, substantially as and for the purpose set forth.

In testimony whereof I affix my signature in presence of two witnesses.

CHARLES W. LAWRIE.

Witnesses:

W. W. SIMPSON,

H. J. CURTZE.