

(No Model.)

E. J. ARMSTRONG.
GOVERNOR FOR STEAM ENGINES.

No. 370,303.

Patented Sept. 20, 1887.

Fig. 1.

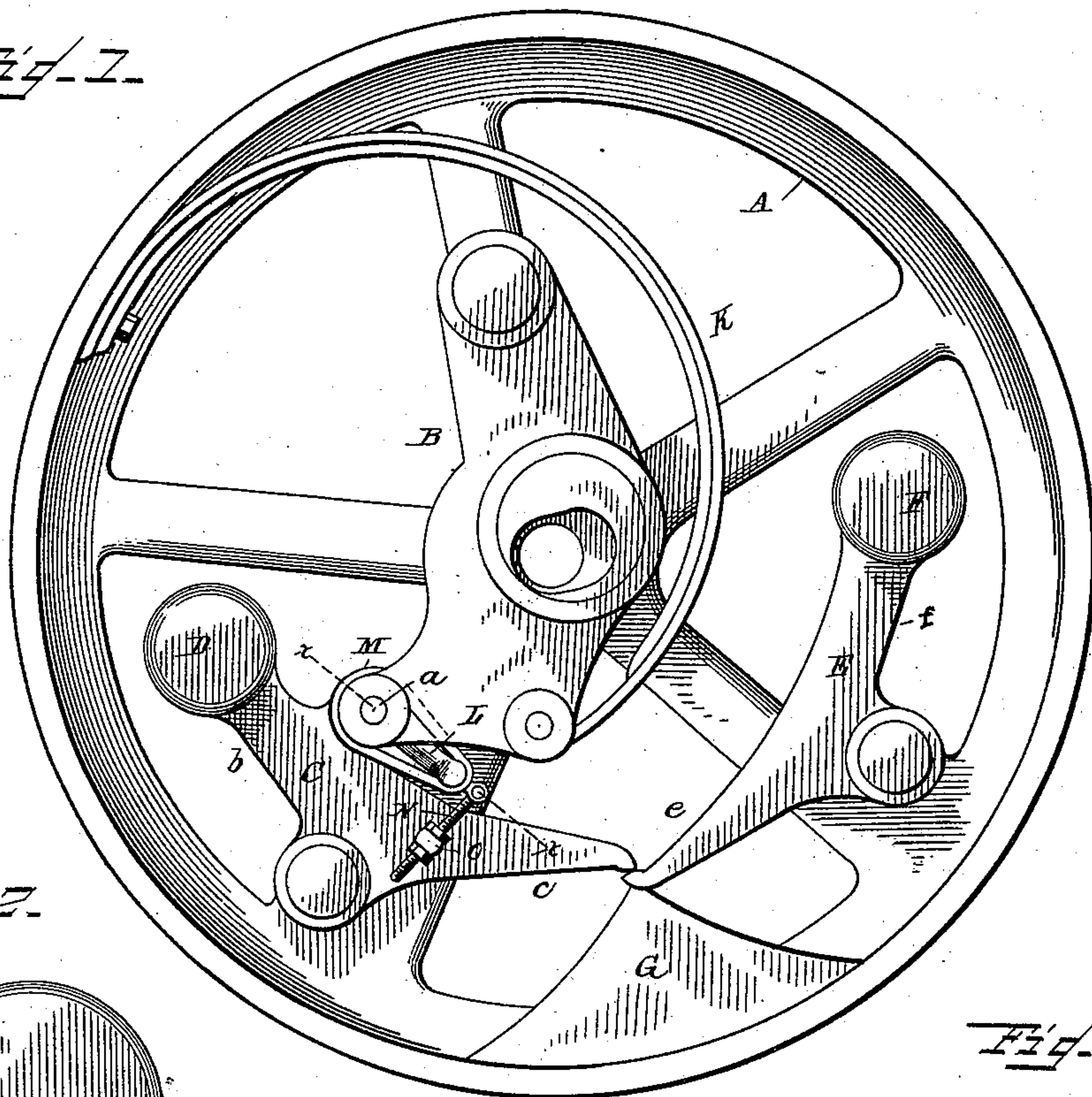


Fig. 2.

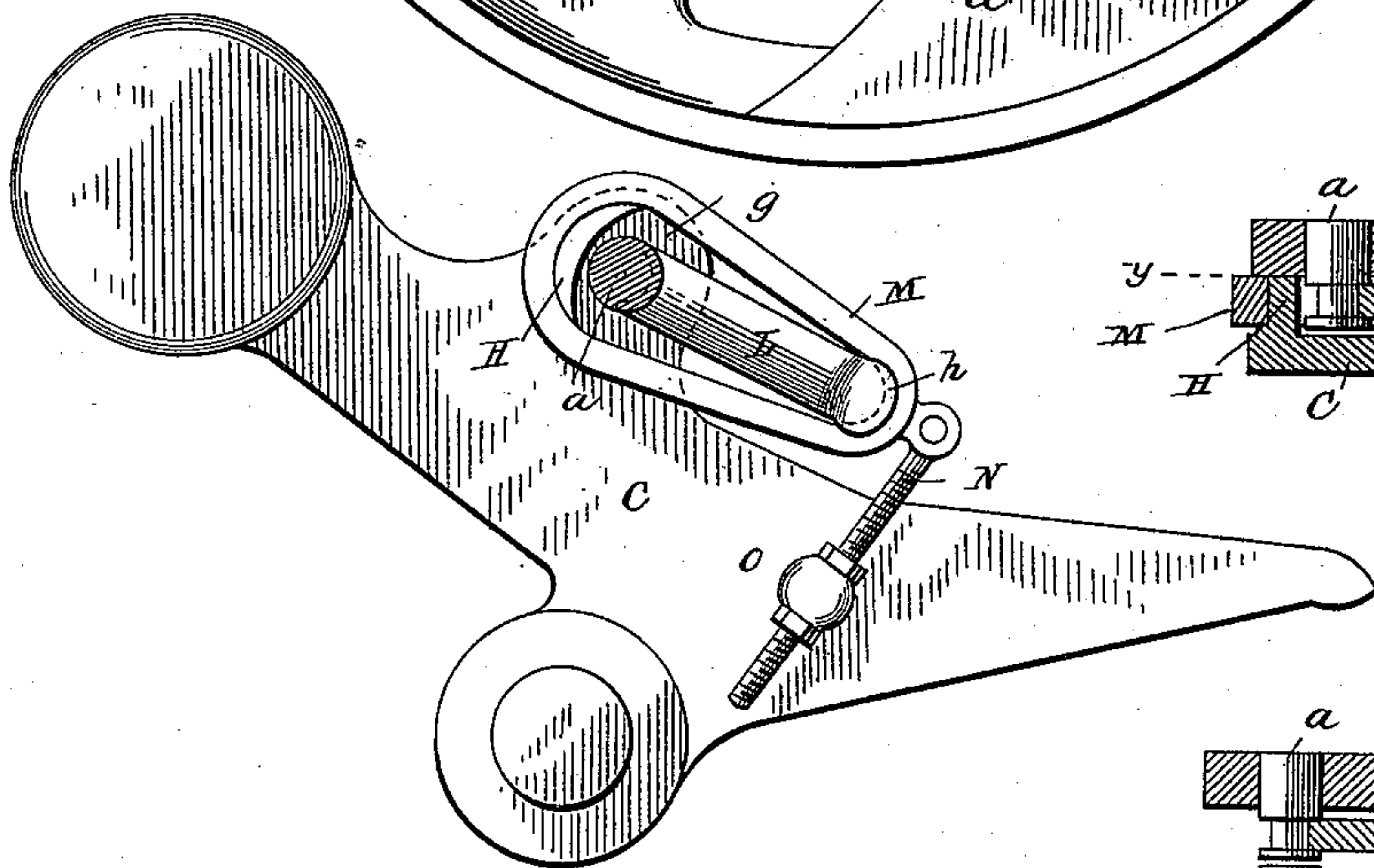


Fig. 3.

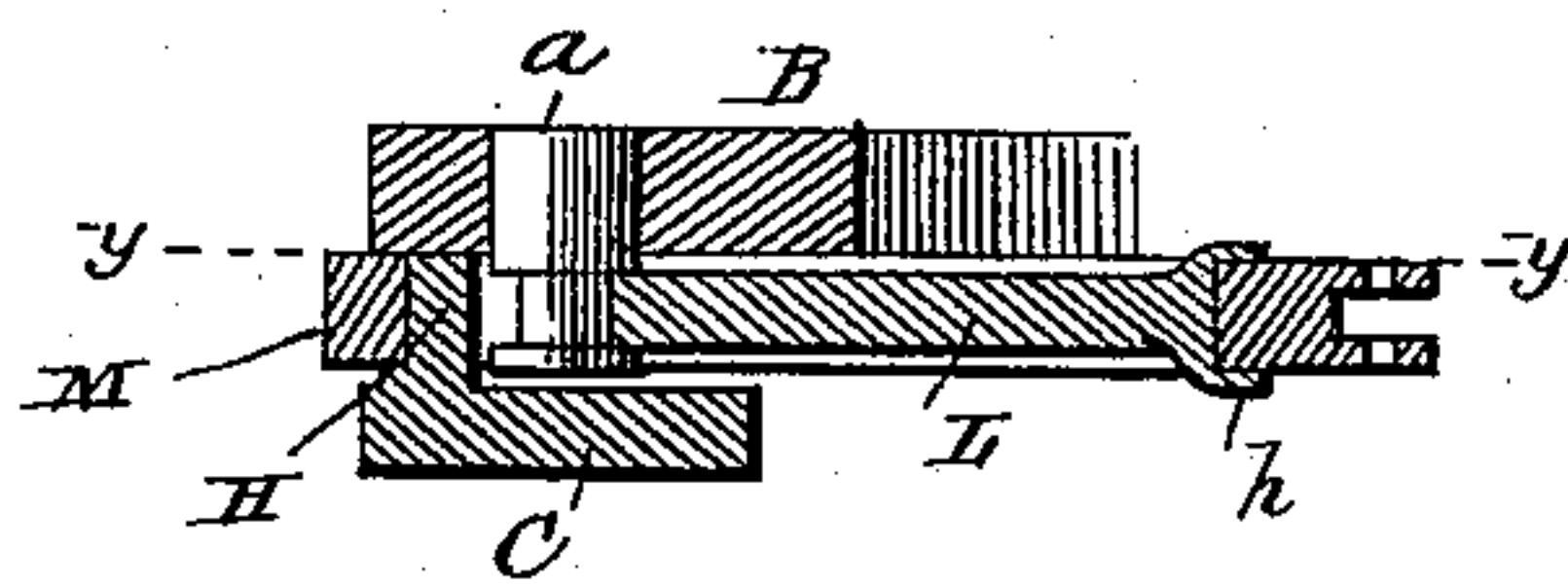
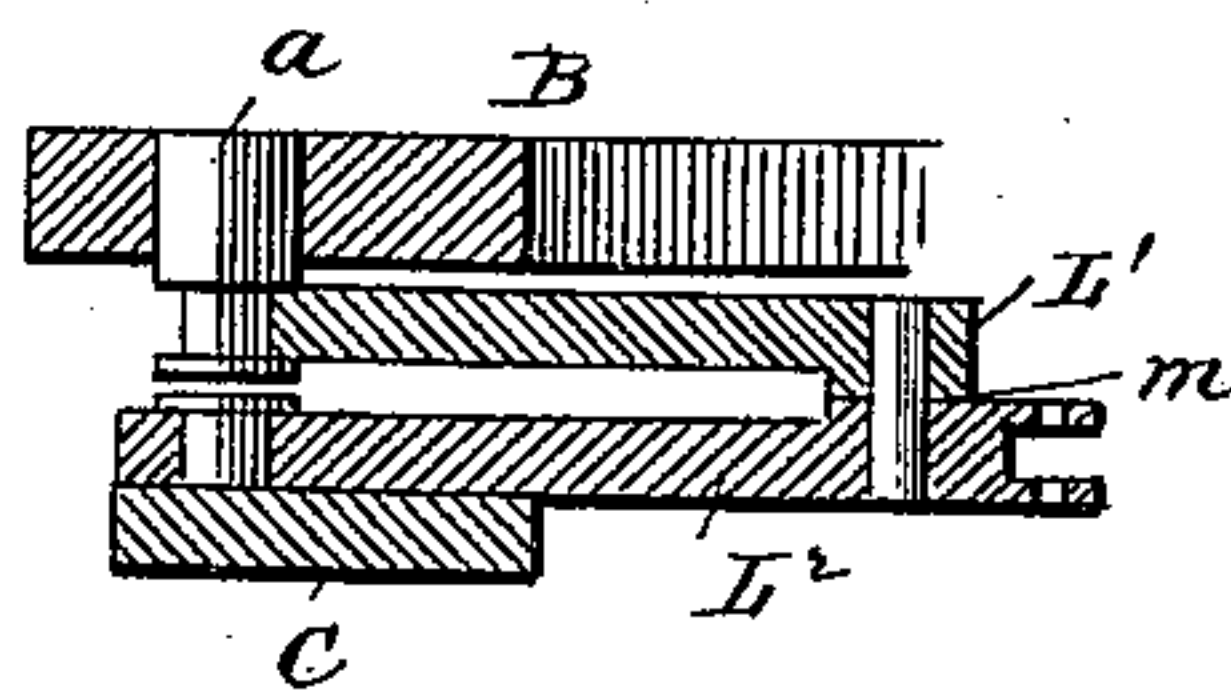


Fig. 4.



WITNESSES

Edwin H. Yewell,
Wm. J. H. H. H. H.

INVENTOR.

Edwin J. Armstrong,
By W. A. Redmond
His Attorney.

UNITED STATES PATENT OFFICE.

EDWIN J. ARMSTRONG, OF PAINTED POST, NEW YORK, ASSIGNOR TO THE
WESTON ENGINE COMPANY, OF SAME PLACE.

GOVERNOR FOR STEAM-ENGINES.

SPECIFICATION forming part of Letters Patent No. 370,303, dated September 20, 1887.

Application filed April 30, 1887. Serial No. 236,682. (No model.)

To all whom it may concern:

Be it known that I, EDWIN J. ARMSTRONG, a citizen of the United States, residing at Painted Post, in the county of Steuben and State of New York, have invented certain new and useful Improvements in Fly-Wheel Governors for Steam-Engines; 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.

This invention relates to fly-wheel governors for steam-engines; and it has for its object to provide simple and durable means whereby the governing mechanism may be regulated or adjusted to a nicety, and thus attain and preserve the degree of isochronism desired by the engineer, or which the nature of the work may require; and it consists in an adjustable connecting link and bar interposed between the weight-lever and a laterally-movable eccentric, substantially as hereinafter described and claimed.

In the accompanying drawings, forming a part of this specification, Figure 1 is a side elevation of a fly-wheel governor embodying my invention; Fig. 2, a detail view of the weight-lever, showing the pin *a* in section, the section being taken on the line Y Y, Fig. 3; Fig. 3, a detail section on the line *x x*, Fig. 1; and Fig. 4, a detail section of a modification of my device.

Similar letters refer to similar parts throughout the several views.

A represents a fly-wheel of any ordinary or desired construction, to a projection on which or to a spoke of the same the eccentric B is pivotally secured, so that it may have a free lateral movement across the main shaft of the engine.

C is a lever suitably pivoted to the wheel, and having two oppositely-projecting arms, *b c*, the former of which carries a weight, D, at its outer end, and the end of the other arm, *c*, rests on the point or tip of an arm, *e*, of a double-armed lever, E, the other arm, *f*, of which projects in an opposite direction to arm *e* and carries a weight, F. Both of these weights are rigidly secured to or cast with the arms. From the rim of the wheel a projection, G, extends inwardly, on which the end or point

of arm *e* rests when the governor is not in operation. The projection G shown in this instance is the balancing-plate, drawn to a point for the purpose named.

K is a flat spring having one end rigidly secured to the rim of the wheel and its other end suitably attached to a pin projecting from the lower end of the eccentric.

On the lever C a projection, *g*, is formed, from which a crescent-shaped lateral projection, H, springs, which, when the lever is at rest, is concentric with the pin *a*. This pin is secured in the end of the eccentric B and projects laterally therefrom, as plainly shown in Fig. 3. A circumferential groove is formed in the pin, and a rod or bar, L, has its bearing in said groove, the end of the rod being concaved to fit snugly in the groove between its flanges or sides, so that said rod cannot work sidewise. The other end of this rod L is rounded or formed on the arc of a circle and flattened on its sides, and is provided with side flanges, *h*, which fit closely on both sides of the smaller end of a link, M, whose larger end surrounds the crescent-shaped projection H on the projecting lug *g* of the lever C. The link and the projection H have a common center, or are concentric when at rest, and as the two bearing-points—that is, the outer side of the crescent-shaped projection and the inner side of the large end of the link—form a part of the same circle it follows that the link may be turned on the projection as on a pivot. The small end of the link has a suitable eye, which is pivoted to one end of an adjusting bolt or rod, N, said rod passing through a lug, O, rigidly secured to the lever C, and having nuts on each side of the lug and running on the rod N, to adjust said rod and hold it in its adjusted position.

In operation the lever C, which transmits the centrifugal force of the weights to overcome the centripetal force of the spring, transfers the strain to the link, and thence through the bar L to the eccentric to which the spring is attached, and the eccentric is thus moved across the crank-shaft.

It is evident that when the governor is at rest, the crescent-shaped projection and pin *a* being concentric with each other, the link may be moved through an arc without trans-

ferring any movement to the eccentric. Consequently the position of the link will make no difference in the centrifugal force required to start the eccentric in its movement across
 5 the shaft; but as the weights move outwardly and the eccentric and lever take a different position the crescent-shaped projection and the pin will no longer be concentric with each other, and in this position—that is, eccentric
 10 to each other—a movement of the link will change the leverage which the weights have over the spring. This change of leverage, though slight, is sufficient to change the closeness of the governor's action to a very consid-
 15 erable extent, and is a very desirable feature in an engine requiring close regulation, as the engineer is enabled thereby to set it to govern as closely as he may see fit.

The means for regulating or adjusting the
 20 link, as shown in Figs. 1, 2, and 3, are very simple, and is a preferred form; but it is evident that any means other than that described for pivotally holding and adjusting the link may be employed with good result, and I do
 25 not desire to be limited to this exact construction.

In Fig. 4 I show a modified form of the regulating device, being on a section on the same line as Fig. 3, in which I employ two bars or
 30 rods, L' L^2 , the former of which takes the place of rod L of the other figures, and the latter the place of the link. In this construction the rod L' bears against the pin a as it does in the first-named construction, but is
 35 pivotally connected with the rod L^2 at its outer end. The rod L^2 , which takes the place of the link, is pivotally secured to a pin on the lever, the center of which, when the governor is at rest, coincides with the axis of the pin a
 40 against which the rod L bears.

It is evident from the foregoing that the operation of this device will be the same as that of the first-described device.

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

1. In an automatic fly-wheel governor, a regulating device interposed between the weight-lever and the movable eccentric, and consisting of a bar or rod pivotally connected
 50 to the eccentric and pivotally connected with means for moving said rod in the arc of a circle, having its axis coincident with the axis of the pivotal point on which said rod presses or has its bearing, substantially as set forth. 55

2. In a fly-wheel governor, a regulating device interposed between the weight-lever and the movable eccentric, consisting of a rod or bar pivotally connected with the eccentric
 60 and with a bar or link pivotally connected to the weight-lever, and having its bearing normally concentric with the pivot supporting the first-named rod, and means for adjusting the link in the arc of a circle, substantially as described. 65

3. In a fly-wheel governor, a regulating device interposed between the weight-lever and the movable eccentric, consisting of a link pivotally connected with the weight-lever and
 70 with a bar, said bar being pivotally connected with the eccentric, an adjusting-rod pivotally connected to said link, and means for holding said rod in its adjusted position, substantially as set forth.

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

EDWIN J. ARMSTRONG.

Witnesses:

PHILIP MAURO,
 C. J. HEDRICK.