

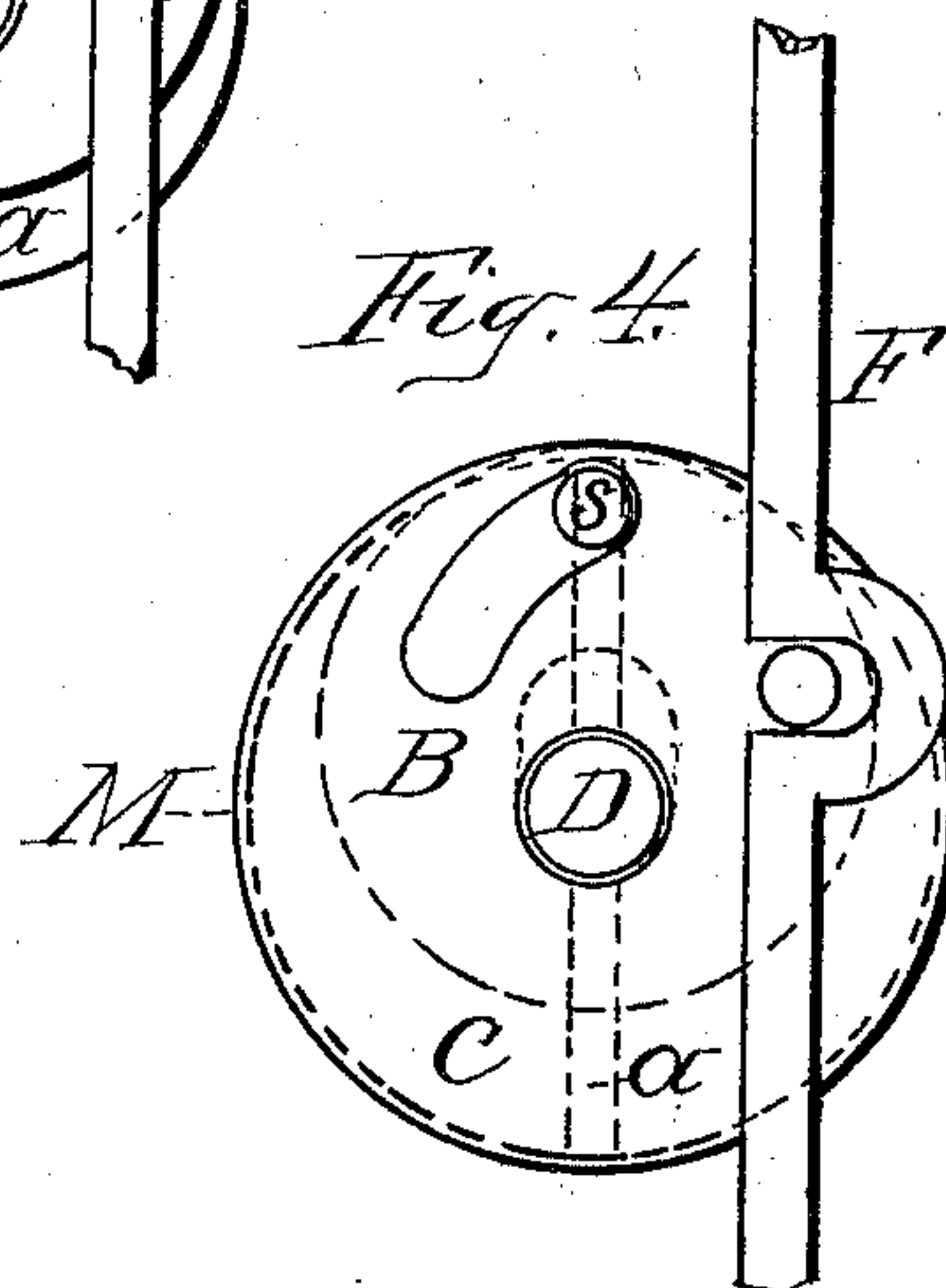
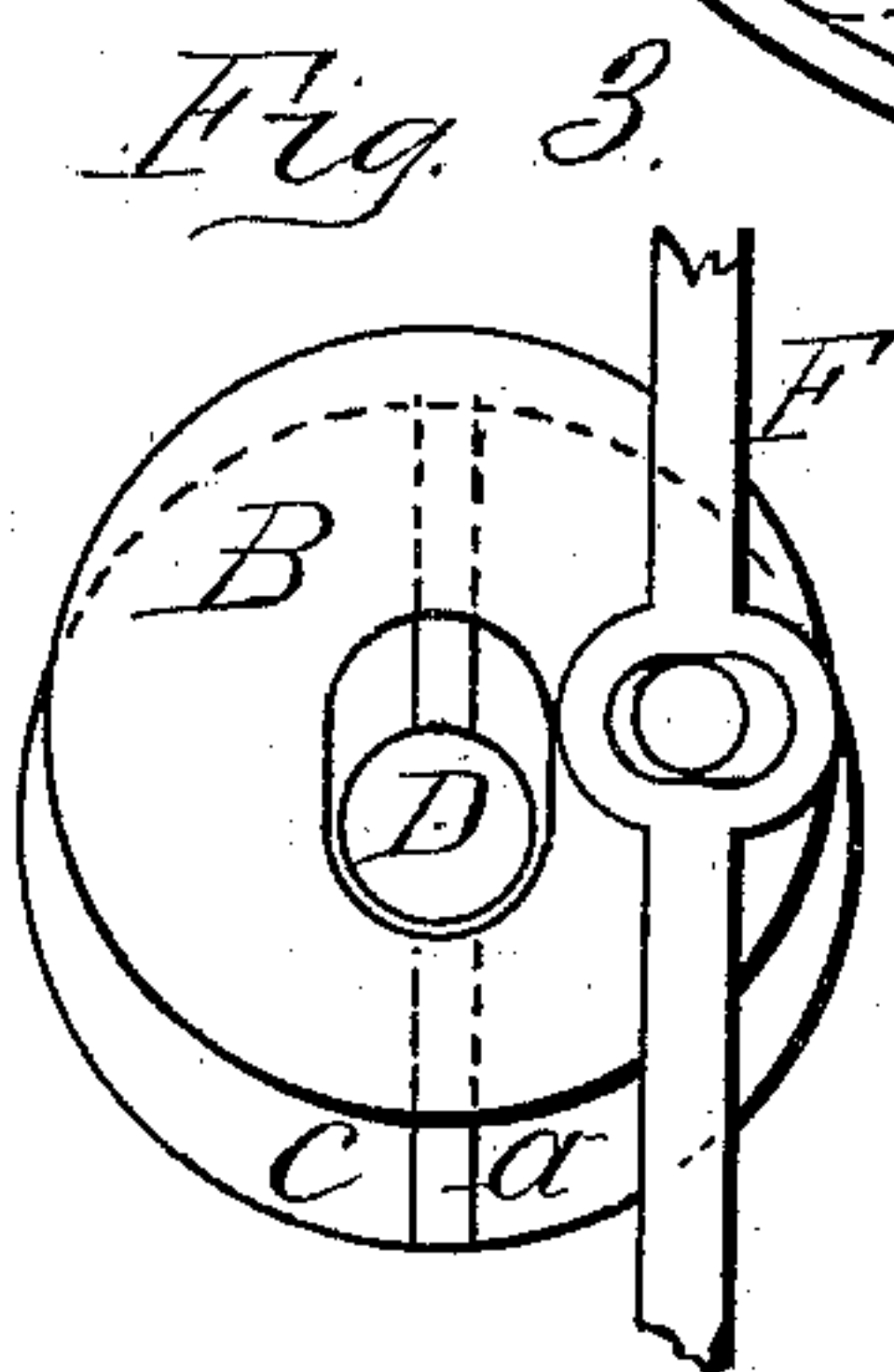
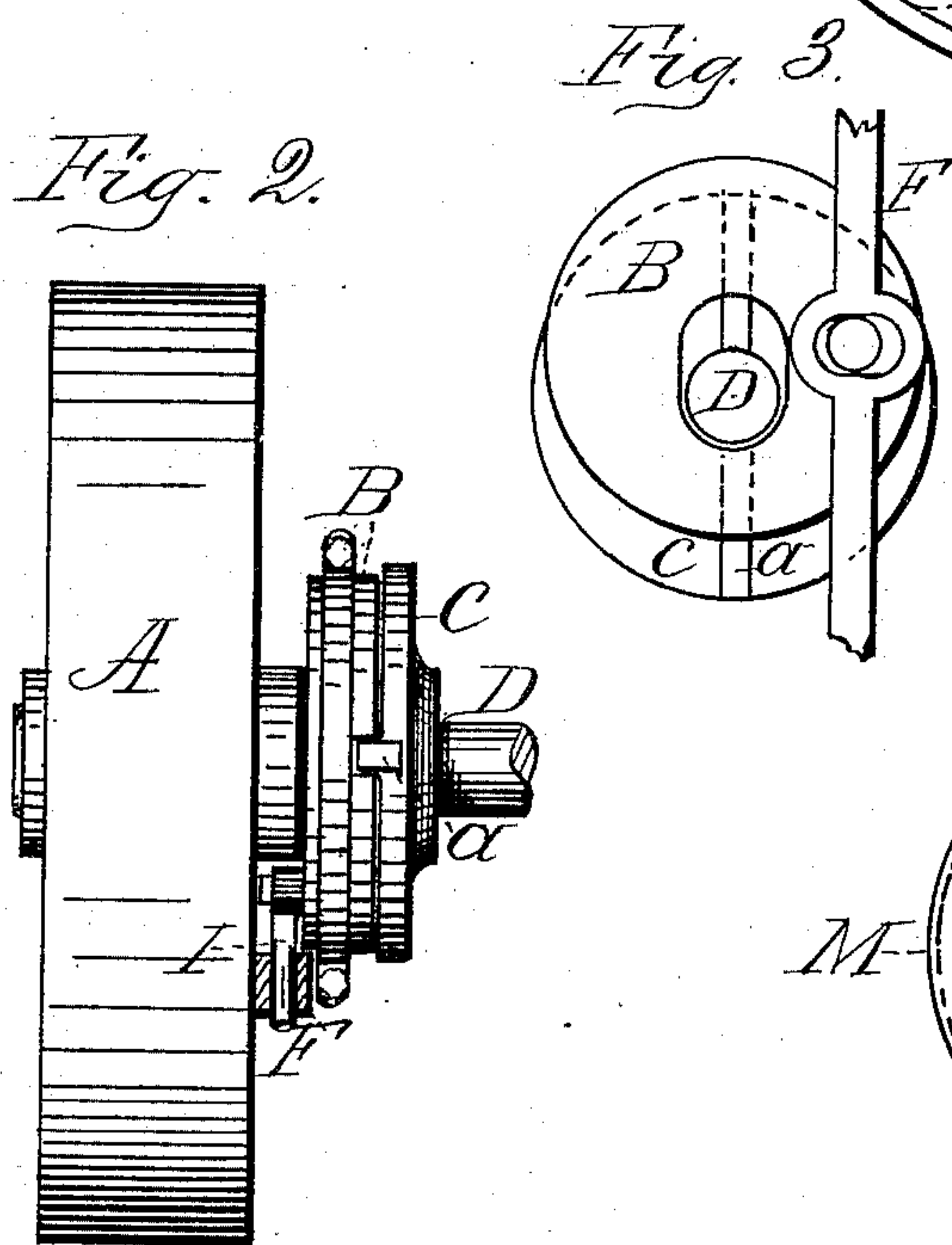
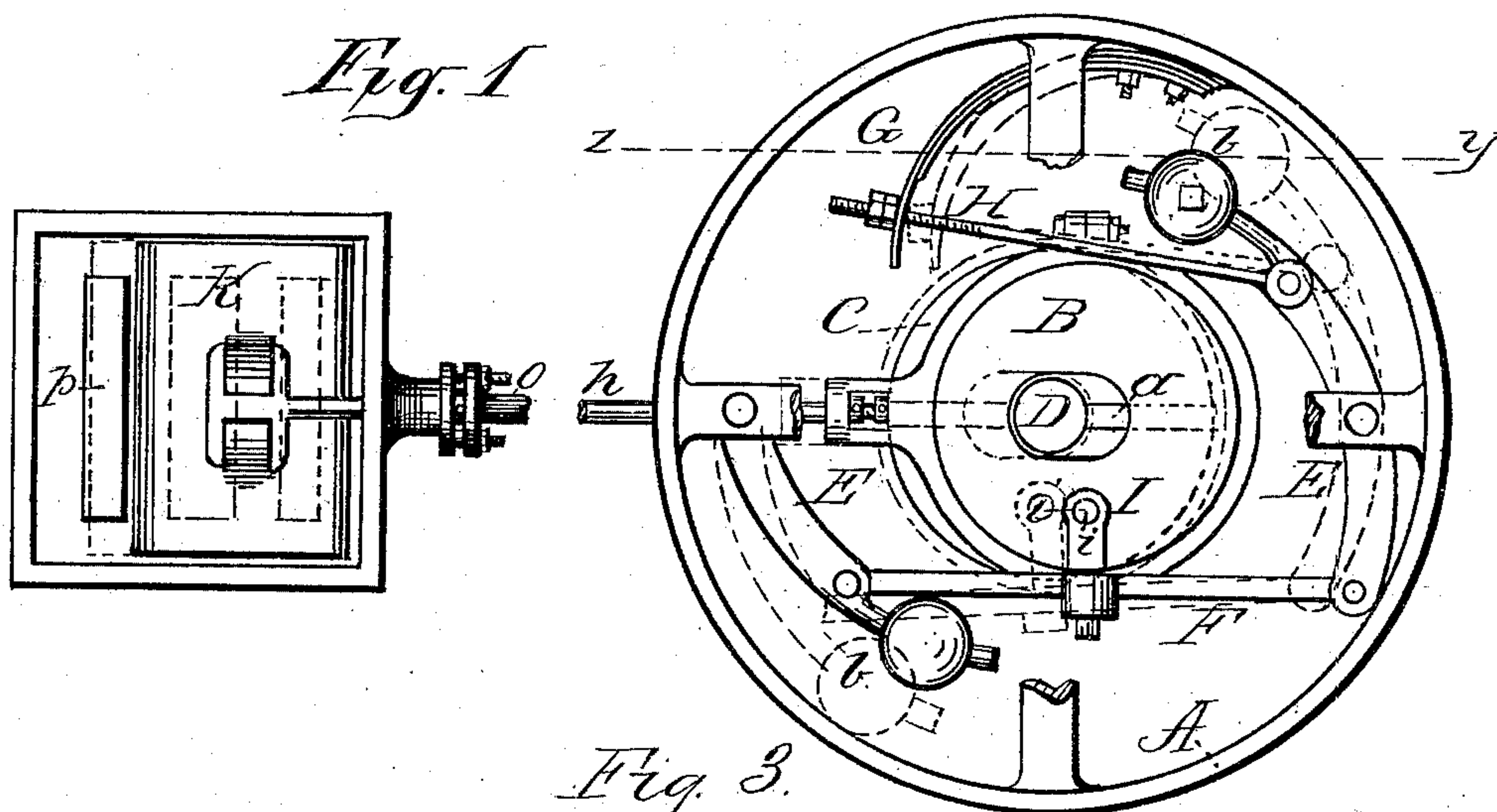
(No Model.)

T. A. GRIST.

AUTOMATIC GOVERNOR FOR STEAM ENGINES.

No. 277,710.

Patented May 15, 1883.



Witnesses.
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UNITED STATES PATENT OFFICE.

THOMAS A. GRIST, OF CEDAR RAPIDS, IOWA.

AUTOMATIC GOVERNOR FOR STEAM-ENGINES.

SPECIFICATION forming part of Letters Patent No. 277,710, dated May 15, 1883.

Application filed January 6, 1883. (No model.)

To all whom it may concern:

Be it known that I, THOMAS A. GRIST, of the city of Cedar Rapids, in the county of Linn and State of Iowa, have invented certain new and useful Improvements in Automatic Governors for Steam-Engines, of which the following is a specification.

My invention relates to that class of governors mounted on the main shaft and controlling the engine by increasing or diminishing the stroke of the valve-stem and consequent throw of the main valve; and the objects of the improvement are to provide a simple and inexpensive governor that shall be strong and durable, and act by a direct and positive change of stroke, making it as sensitive as possible to any variation in the revolution of the main shaft.

The invention consists in providing the eccentric which operates the valve-rod with a slot where it incloses the main shaft, and a channel or groove in a line parallel with such slot on the face of the eccentric, and in providing the main shaft with a flange having a feather corresponding to said groove, against the face of which flange the corresponding face of the eccentric bears, and in shifting said eccentric in a direct line across the main shaft by a system of levers, weights, and springs, hereinafter more particularly described.

In the accompanying sheet of drawings, forming a part of this specification, Figure 1 represents a side elevation of the invention with the hub of the fly-wheel removed, and also the interior of the steam-chest and relative positions of the valve; Fig. 2, a front elevation on line *yz*, showing the positions of the eccentric, flange, wheel, &c., on the shaft; and Figs. 3 and 4, modifications of the means for shifting the eccentric on the shaft.

Similar letters of reference indicate corresponding parts.

On the main shaft D is mounted a suitable wheel, A, which may be the fly-wheel or an independent wheel used solely for this purpose. In Fig. 1 the hub is removed to show the mechanism beyond.

B is an eccentric having a slot extending from near the center outward toward one side. This slot is made large enough that the main shaft D may pass through it and the eccentric

may move freely thereon. The eccentric is provided with straps and rod *h*, connecting with valve-stem *o* in the usual way. Behind this eccentric in Fig. 1 and at the right in Fig. 2 is a flange, C, which is secured to the shaft. Across the face of this flange is fitted a feather, *a*, and in the face of the eccentric is a corresponding groove running in a line parallel with the slot. This groove receives the feather when the eccentric and flange are brought together, as seen in Fig. 2, and the result is, that the eccentric, aside from its rotary motion, can only move in a straight line across the main shaft. It is held in place on the other side by the face of the hub of the wheel A or by a suitable collar.

The relative position of the eccentric on the shaft is changed by means of arms E E, pivoted on opposite sides of the wheel A, and having a connecting-rod, F, hinged thereto at a proper distance from the pivotal point, which has a connection with the eccentric and throws it in or out, according as the position of the arms changes, through the centrifugal force operating on weights *b b*, with which they are provided. A spring, G, furnishes the centripetal force, and is connected to one of the arms by means of an adjusting-rod, H. The connecting-rod F operates the eccentric through the medium of a short arm, I, secured to the eccentric by a stud, *i*, and its opposite end passing through a hole in said arm, allowing free movement between the position drawn and that indicated by dotted lines in Fig. 1.

I am well aware that but one of the arms E E is absolutely necessary to the working of my invention, and reserve the right to use one or both, as circumstances may require. In practice two arms and weights are preferable, inasmuch as they not only balance the wheel better, but are more accurate and reliable in responding to changes in the speed of the engine, the weight of one counterbalancing that of the other in all parts of the wheel's revolution.

As will be seen, the particular means by which the connecting-rod F operates the eccentric B is susceptible of considerable modification. For the purposes of this application three devices are shown. That in Fig. 1 has already been described. Another is shown in

Fig. 4, where, instead of a direct thrust by a rod, F, as in the former, the eccentric is thrown by means of a slotted disk, M, which is turned on the main shaft by said rod F. A stud, s, on the eccentric passes through a suitable slot in the disk; or, where the position of the parts will admit, both the disk M and the arm I may be dispensed with, and the eccentric be provided with a stud operating in the connecting-rod F, slotted transversely, as shown in Fig. 3.

The operation of the invention requires little explanation. As the wheel revolves, the centrifugal force tends to throw the weights *b b* toward the periphery, the effect of which is, at the extreme of speed, to change the eccentric from a full stroke to the minimum stroke indicated by the dotted lines in Fig. 1. A corresponding change is made in the throw of the valve K, so that instead of opening the port *p* to its full width only a slight opening is made, and the flow of steam to the cylinder is correspondingly diminished.

The advantages gained by this improvement are those of simplicity and cheapness of construction and increased sensitiveness to changes in the wheel's revolution, by virtue of

the eccentric moving across the shaft in a direct line, and the weights only traveling a short distance between minimum and maximum speed.

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

1. In an automatic governor, the disk or flange C, having feather *a*, and the eccentric B, slotted from near the center outward, and made to change its position in a straight line on the shaft D by means of the weighted arm E, connecting-arm F, and short arm I, substantially as set forth.

2. The combination of eccentric B, flange C, feather *a*, connecting-rod F, arm or arms E E, adjusting-rod H, and spring G, substantially as and for the purpose set forth.

In testimony that I claim the foregoing as my own, witness my hand this 29th day of December, 1882.

THOMAS A. GRIST.

Witnesses:

J. M. ST. JOHN,
S. H. ST. JOHN.