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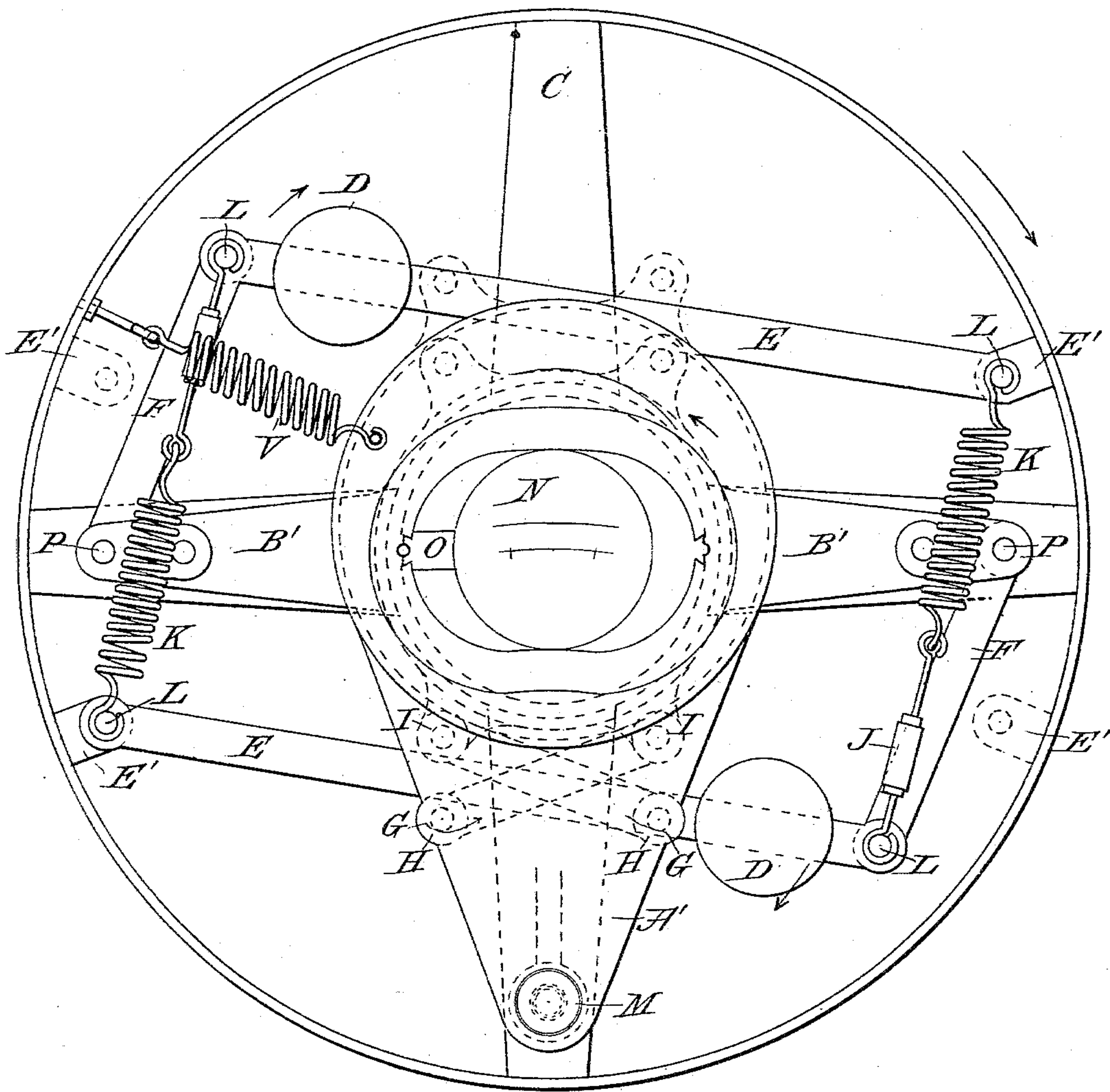
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R. M. BECK.
GOVERNOR FOR STEAM ENGINES.

No. 318,852.

Patented May 26, 1885.

Fig. 1.



Attest:

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Inventor:

Robert M. Beck
Per John C. Clendenen atty

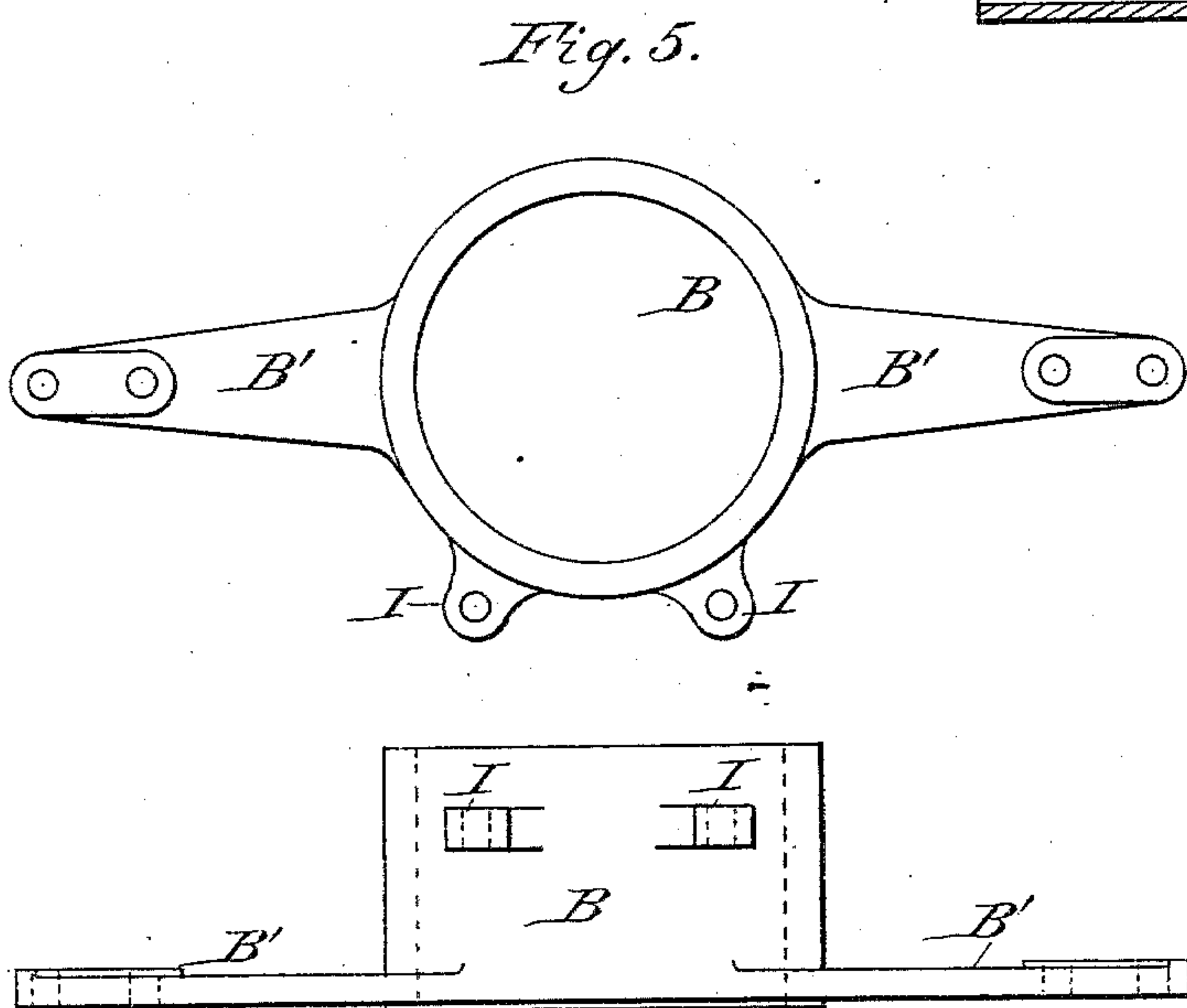
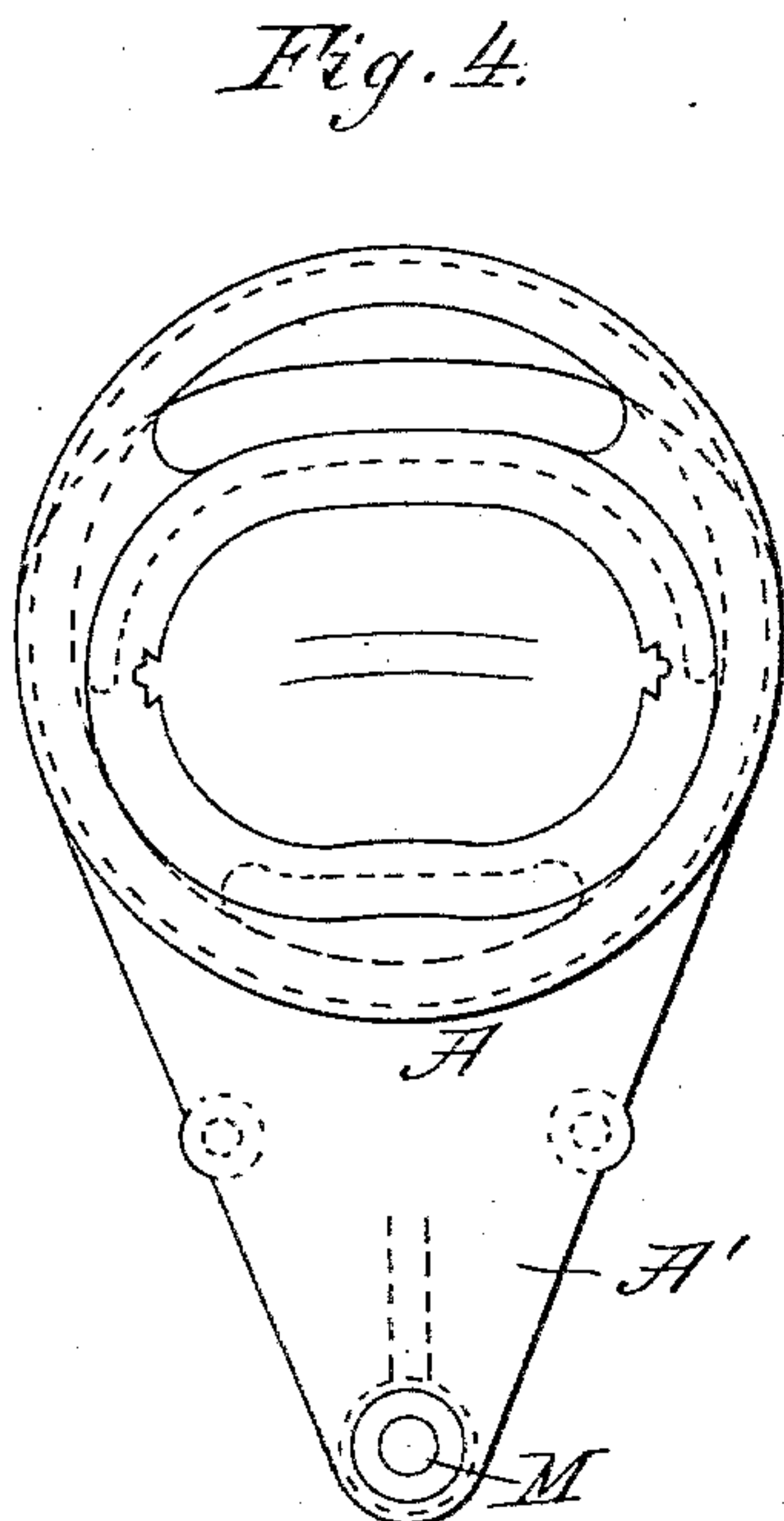
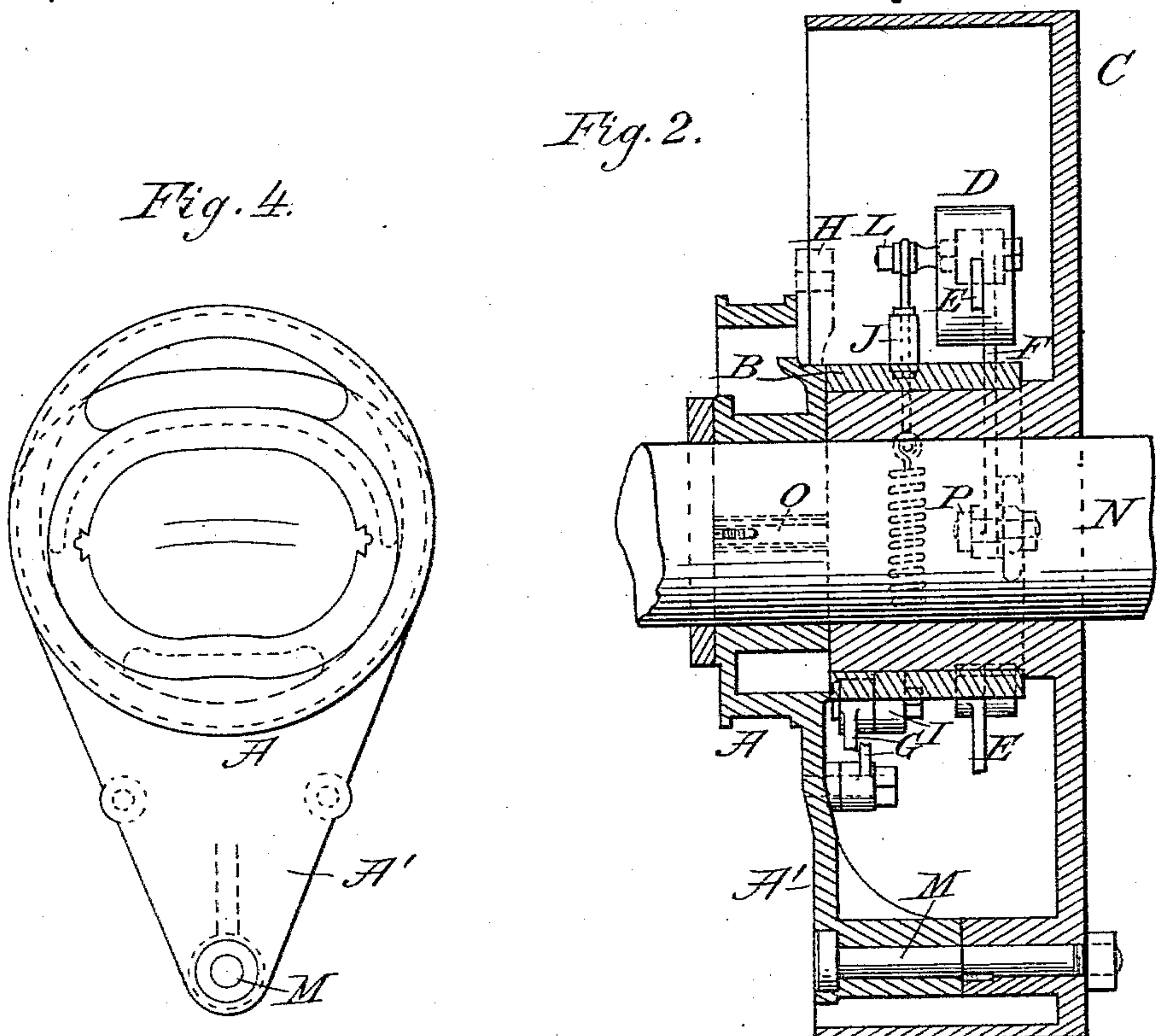
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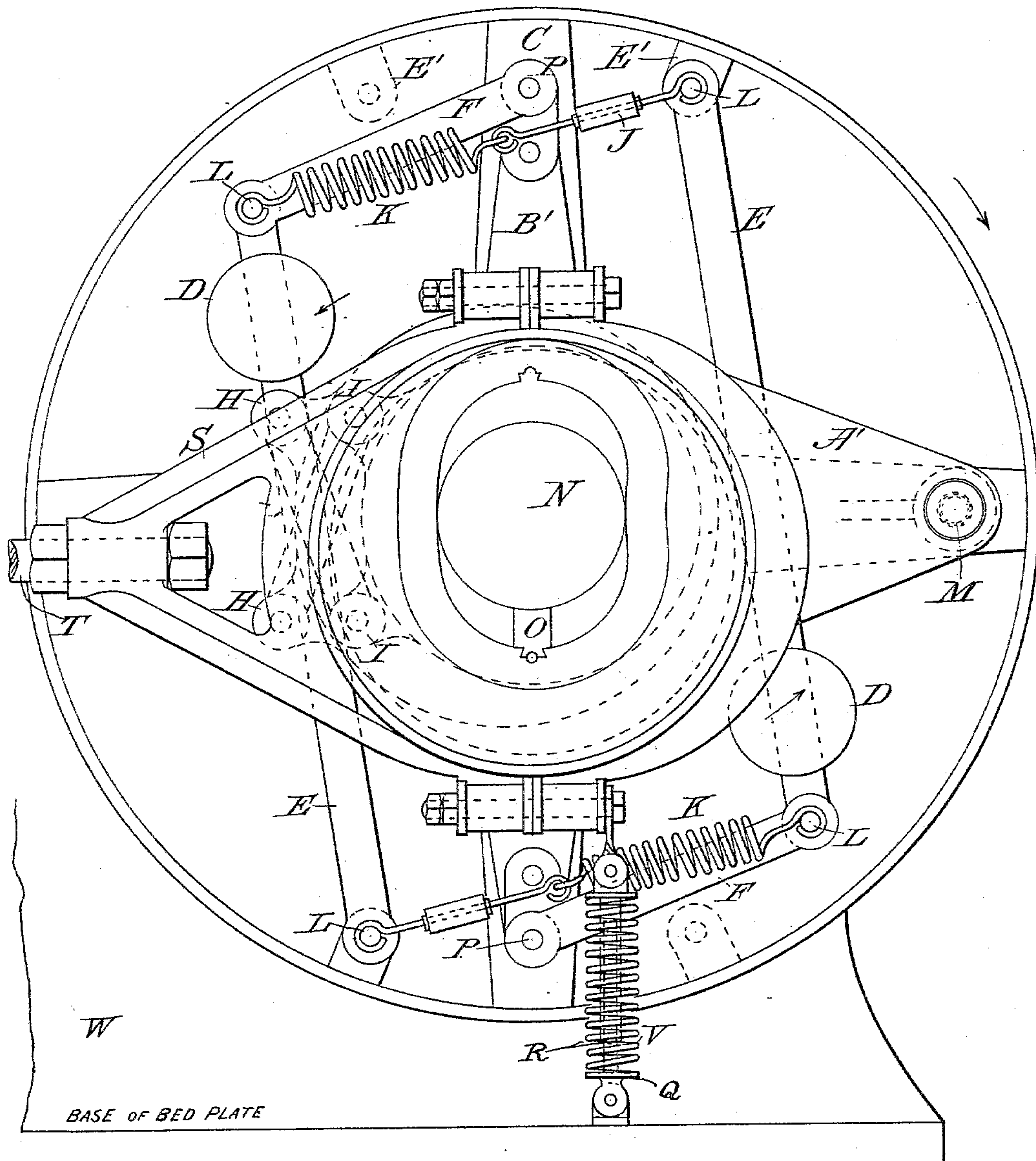
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R. M. BECK.
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Fig. 3.



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UNITED STATES PATENT OFFICE.

ROBERT M. BECK, OF CHAMBERSBURG, PENNSYLVANIA.

GOVERNOR FOR STEAM-ENGINES.

SPECIFICATION forming part of Letters Patent No. 318,852, dated May 26, 1885.

Application filed February 12, 1885. (No model.)

To all whom it may concern:

Be it known that I, ROBERT M. BECK, a citizen of the United States, residing at Chambersburg, in the county of Franklin and State of Pennsylvania, have invented certain new and useful Improvements in Governors for Steam-Engines; and I do 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 and figures of reference marked thereon, which form a part of this specification.

My invention has for its object the improvement of that class of wheel-governors for slide-valve steam-engines in which the governor-wheel is keyed to the engine-shaft, and carries weighted levers that are pivoted within the wheel-rim, said levers being connected by links to the arms of a vibratory sleeve, which is mounted on the hub of the governor-wheel and connected to a shifting eccentric, having an arm which is pivoted to said wheel.

My invention consists in certain peculiarities in the construction and combination of parts, as hereinafter more fully described and claimed.

In the annexed drawings, illustrating the invention, Figure 1 represents a face view of a governor-wheel provided with a shifting eccentric and embodying my improved arrangement of vibratory sleeve, weighted levers, springs, and links for actuating said eccentric. Fig. 2 is a vertical transverse section of Fig. 1. Fig. 3 shows the governor-wheel, with eccentric-actuating mechanism reversed. Fig. 4 is a plan view of the eccentric; and Fig. 5 represents a plan and elevation of the armed sleeve, which is arranged to vibrate on the hub of the governor-wheel.

Like letters of reference designate like parts in the several views.

The eccentric A is provided with an arm, A', and is arranged to swing over the engine-shaft N from a pin, M, by which said arm is pivotally connected to a boss on the flanged casing or governor-wheel C, which is securely keyed to the engine-shaft so as to rotate therewith. A sleeve or collar, B, having two arms, B' B', is mounted on the hub of the wheel C

back of the eccentric, and is vibrated by means of links F F that connect the arms B' B' to the ends of levers E E, that are fulcrumed to lugs E' E' within the rim of the wheel. These levers E E carry adjustable weights D D, and the free end of each lever is connected to the pivotal point of the opposite lever by a spiral spring, K, having an adjusting device attached to one end, by which the tension of the spring can be altered as required, so as to govern the travel of the weighted levers. This adjusting device consists, preferably, of a sleeved connection, J, having a right-hand screw in one end and a left-hand screw in the other end, one of said screws being connected to the spring K and the other one to the weighted lever E.

L L are pins for connecting the springs K and the sleeves J to the levers E, links F, and to the lugs E' on the rim of the wheel.

P P are bolts for connecting the links F F to the arms B' B' of the sleeve or collar B, that is supported on the hub of the wheel. The armed sleeve B is provided with bosses I I for the attachment of links G G, by which connection is made with bosses H H on the eccentric-arm, but when the governing mechanism is reversed, as illustrated in Fig. 3, the links will be connected to similar bosses, H H, on the body of the eccentric at its other end, the sleeve B with its bosses I I being also reversed.

The operation and advantages of this governing mechanism will be readily understood. It will be seen that the centrifugal action of the weighted levers E E tends to vibrate the armed sleeve B on the hub of the wheel, the travel of the levers being controlled, however, by the tension of the springs K K; but as the speed of the engine becomes excessive the tension of the springs is overcome, and the armed sleeve B is enabled to vibrate sufficiently to shift the eccentric A through the connecting-links G G, so as to automatically actuate the valve-rod and diminish or cut off the supply of steam. As the revolutions of the shaft decrease, the springs K K exert greater force on the weighted levers, and the mechanism is thereby caused to resume its normal position. It will be seen that the rim of the wheel C is provided with two sets of fulcruming lugs, E' E', for the weighted levers E E, so that the mechanism can be readily reversed, and thus made to oc-

copy the position shown in Fig. 1, or that shown in Fig. 3, as required. When arranged as shown in Fig. 1, the weights D D will swing with the wheel, while the arrangement shown in Fig. 3 allows them to swing against the wheel, their centrifugal force in both cases, however, being exerted in a direction tangential to the rotation of the wheel and its shaft. When arranged as shown in Fig. 3, with the sleeve B reversed and the links G G connected to bosses H H at the upper part of the eccentric, a greater range of travel is given to the weighted levers.

In order to prevent the eccentric from passing mid-gear, a removable stop, O, is keyed in one side between it and the shaft N. This stop is attached to the opposite side when the engine is reversed.

As represented in the drawings, the eccentric is at mid-gear, in which position all steam is cut off from the engine-cylinder. When the eccentric is at full throw, it is capable of giving a steam-opening of twelve inches area, the eccentric being then at an angular advance of the crank-pin of one hundred and twenty degrees.

In Fig. 3, S is the eccentric-strap, T the eccentric-rod, and W is a portion of the engine-frame. When the heavy side of an eccentric is rotating from a lower to a higher position, there is ordinarily a tendency thereof to fluctuate out of true and correct position under the influence of gravity, especially when the speed of the engine is diminished. This difficulty I overcome by means of an auxiliary spring, V, that may be attached at one end to one side of the eccentric-arm and at its other end to the rim of the governor-wheel, as shown in Fig. 1.

Instead of arranging the auxiliary spring V as shown in Fig. 1, it is preferably secured over or around a rod, R, provided near its lower end with a fixed collar, Q, on which said spring rests. This rod is pivoted to the engine-bed directly under the eccentric, as shown in Fig. 3, so it can vibrate with the motion of the eccentric; and the upper end of the spring is connected to the bottom of the eccentric-strap, so that when the eccentric moves downward it will compress the spring, the expansive force of which, as the eccentric moves upward, will counterbalance the dead-weight of the eccentric and its connections, and thereby overcome any tendency to downward fluctuation due to the force of gravity. It will be seen that when arranged as shown in Fig. 1

the tension of the spring V is exerted to a greater or less degree constantly to overcome any tendency to irregularity in the motion of the eccentric, while by the arrangement shown in Fig. 3 the spring only acts at the moment required, by reason of its expansive force acting against the compression caused by the weight of the eccentric. In the latter case, therefore, the strain is not constant. By either arrangement of the spring V any sudden fluctuation of power is prevented from causing irregularities in the movement of the eccentric.

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

1. The combination, with the flanged governor-wheel C, keyed to engine-shaft N, and the eccentric A, adapted to swing over said shaft and having an arm, A', pivoted to the wheel, of the sleeve B, mounted on the hub of the wheel and provided with arms B' B', the weighted levers E E, fulcrumed to the wheel and connected to the armed sleeve by links F F, the adjustable springs K K, and the links G G for connecting the eccentric and armed sleeve, substantially as described.

2. The combination, with the shifting eccentric A and the flanged governor-wheel C, having lugs E' E', of the vibratory sleeve B, provided with arms B' B', the links G G, adjustable weighted levers E E, links F F, and adjustable springs K K, substantially as described.

3. The combination of the shifting eccentric A, the governor-wheel C, the reversible weighted levers E E, fulcrumed to said wheel, a vibratory sleeve, B, mounted on the hub of said governor-wheel, in connection with the eccentric, and having arms B' B', that are connected to the weighted levers by links F F, the adjustable springs K K, and the auxiliary spring V, substantially as described.

4. The combination, with a shifting eccentric, of a spring, V, connected to the eccentric-strap and to a rod, R, that is pivoted to the engine-frame, said spring being adapted to act expansively against the eccentric for the purpose of overcoming any tendency to irregularity in the motion of the eccentric, substantially as described.

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

ROBERT M. BECK.

Witnesses:

W. B. BROWN,
D. K. WUNDERLICH.