

(No Model.)

2 Sheets—Sheet 1.

J. A. HUTCHINSON.
ENGINE GOVERNOR.

No. 495,089.

Patented Apr. 11, 1893.

Fig. 2.

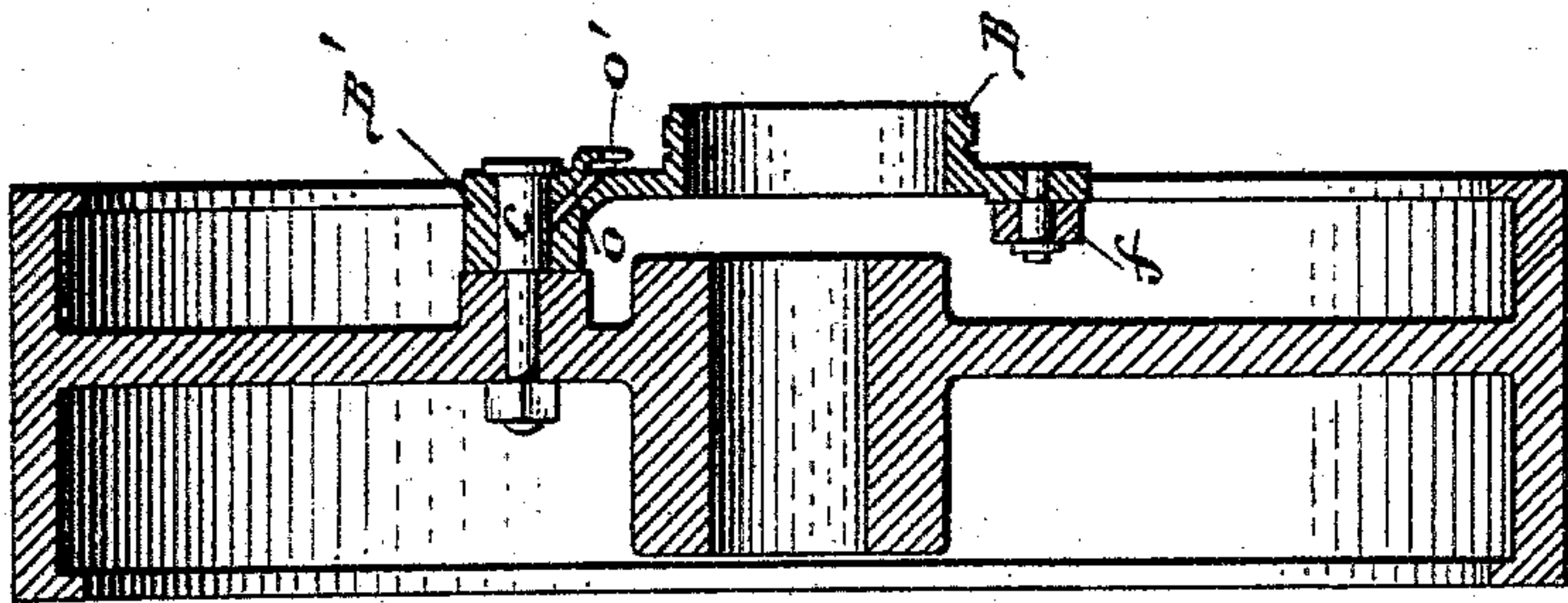
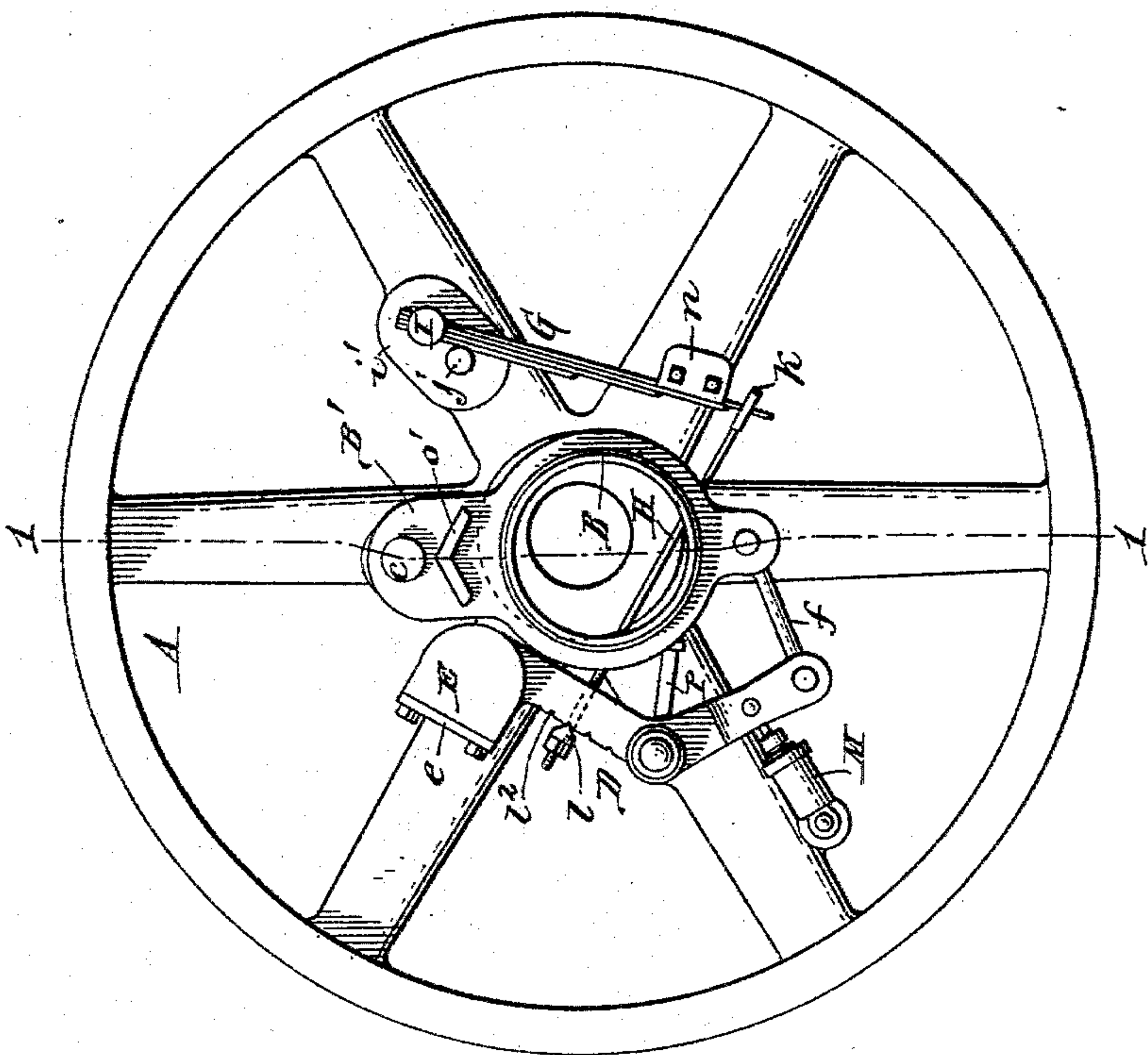


Fig. 1.



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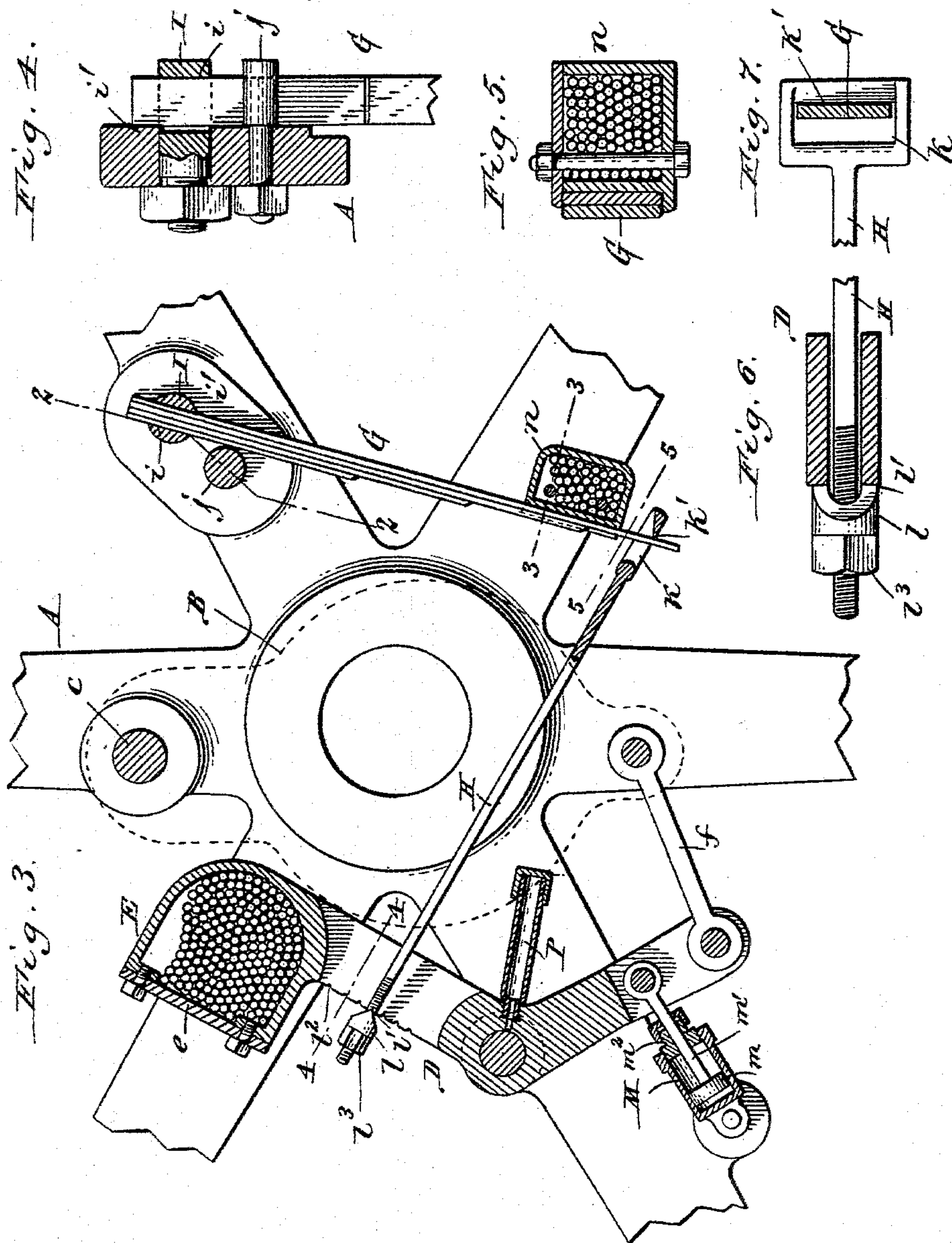
By Wilhelm Rönner.

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UNITED STATES PATENT OFFICE.

JOSEPH A. HUTCHINSON, OF BUFFALO, NEW YORK, ASSIGNOR OF ONE-THIRD TO THE JOHN T. NOYE MANUFACTURING COMPANY, OF SAME PLACE.

ENGINE-GOVERNOR.

SPECIFICATION forming part of Letters Patent No. 495,089, dated April 11, 1893.

Application filed May 7, 1892. Serial No. 432,148. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH A. HUTCHINSON, a citizen of the United States, residing at the city of Buffalo, in the county of Erie and State of New York, have invented a new and useful Improvement in Engine-Governors, of which the following is a specification.

This invention relates to that class of steam engine governors in which the parts of the governor are mounted upon a rotary wheel, disk or frame secured to the main shaft of the engine and which employ centrifugal weights revolving with said frame or pulley and a movable eccentric which operates the valve mechanism and whose throw is controlled by the movement of the centrifugal weights.

The objects of my invention are to provide a governor of this character having few parts, to render the governor easily adjustable, so that it can be regulated in accordance with the required duty of the engine and to reduce the friction of the parts of the governor to a minimum.

My invention has the further object to provide efficient means for lubricating the pivots of the shifting eccentric and the lever which carries the centrifugal weights.

In the accompanying drawings consisting of two sheets:—Figure 1 is a side elevation of my improved governor applied to a wheel or pulley. Fig. 2 is a cross section thereof in line 1—1, Fig. 1. Fig. 3 is a fragmentary sectional elevation of the governor, on an enlarged scale, the plane of section being at right angles to Fig. 2. Fig. 4 is a cross section in line 2—2, Fig. 3, showing the means for adjustably clamping the leaf-spring in place. Fig. 5 is a cross section in line 3—3, Fig. 3, on an enlarged scale. Fig. 6 is a cross section in line 4—4, Fig. 3, on an enlarged scale, showing the means for adjusting the link on the weighted lever. Fig. 7 is a cross section in line 5—5, Fig. 3, showing the loop at the end of said link.

Like letters of reference refer to like parts in the several figures.

A represents the wheel or other rotary structure to which the governor is applied

and which is mounted on the main shaft of the engine.

B is the movable or shifting eccentric by which the valve mechanism of the engine is operated. The valve mechanism is not shown in the drawings and may be of any ordinary construction. In the construction shown in the drawings, the eccentric is arranged to swing transversely of the shaft upon which the governor-wheel is mounted, the eccentric being provided on one side of its center with a lug B', whereby it is hung upon a stud or pivot c arranged on the wheel A on one side of its shaft. The swinging eccentric is provided with the usual slot or opening for the passage of the engine shaft, which opening is considerably larger than the shaft to permit the eccentric to vibrate freely without striking the shaft.

D is a lever pivoted between its ends to one of the arms of the wheel A and arranged on one side of the axis of the wheel, and E is a governor weight arranged at the outer end of the long arm of the lever D. This weight preferably consists of a pocket or receptacle containing shot or other material and provided with a removable lid e. The opposite short arm of the lever D is connected with the free end of the swinging eccentric by a link or rod f.

G is a flat spring arranged on the wheel A on that side of its axis opposite the lever D and which opposes the outward movement of the weight E. This spring is secured at one end to one of the arms of the wheel A, while its opposite free end is connected with the weighted arm of the lever D by a link H. The spring G is secured to the wheel A by a transverse clamping bolt I arranged in an opening in the adjacent arm of the wheel, and having in its outer projecting end a transverse slot through which the inner portion of the spring passes, as shown in Fig. 4. The inner edge of the spring bears against a flat boss i' and is clamped against said boss by the bolt I. Upon loosening the nut of the bolt, the spring may be adjusted lengthwise in the slot of the bolt to increase or diminish its effective length and vary its tension or resistance accordingly,

the nut being again tightened after adjusting the spring. The spring is preferably composed of a number of leaves of different lengths, as shown in the drawings, so that its tension may be further varied by adjusting the leaves relatively to each other.

j is a pin or abutment arranged on the wheel A on the inner side of the spring G, near its fastening-bolt, and against which the spring is strained.

The free outer end of the spring passes loosely through a loop k formed at the adjacent end of the link H and bears against the outer cross bar of said loop. This cross bar is provided on its inner side with a knife-edge k' to reduce its frictional contact with the spring. The long arm of the lever D, with which the opposite end of the link H is connected, is preferably bifurcated and the link is arranged between the jaws of the lever, as shown in Fig. 6. This link is made adjustable on the lever D by means of a block or washer l arranged on the adjacent end of the link and having a knife-edge l' which is adapted to engage with one of a series of notches l^2 formed in the outer edge of the long arm of the lever, at different distances from its fulcrum. The washer l is retained upon the link H by a screw-nut l^3 applied to the screw-threaded end portion of the link and bearing against the outer side of the washer. The knife-edge of the washer is retained in its notch in the lever by the tension of the spring G. The link is adjusted on the notched arm of the lever by loosening the nut l^3 to reduce the tension of the spring G and then shifting the link to the desired position, after which the nut is again tightened to restore the spring to the proper tension. By connecting the link with the lever D and spring G in the manner shown, the friction between these parts is reduced to a minimum.

M is a dash-pot or cylinder pivoted at its outer end to one arm of the wheel A.

m is the piston arranged in the dash-pot, and m' the piston-rod which extends through a stuffing box m^2 at the inner end of the dash-pot and is attached at its outer end to the short arm of the lever D. The dash-pot is filled with a suitable liquid and the piston has the usual opening or passage through which the liquid flows alternately from one side of the piston to the other as the piston plays in the dash-pot. This dash-pot retards the action of the weighted lever and prevents sudden or excessive fluctuations of the governor.

In the operation of the governor, the weight E tends to move outwardly by centrifugal force, which causes the long arm of the lever D to move outwardly and its short arm inwardly. This inward movement of the short arm causes the swinging eccentric to be shifted through the medium of the link f , thereby changing its eccentricity and varying the stroke of the cut-off valve correspondingly. The spring G is so tensioned as to re-

sist the further outward movement of the weight when it has shifted the eccentric to the proper position for running the engine at the desired speed with the average load. As soon as the speed exceeds this normal rate from any cause, the governor weight, owing to its increased centrifugal force, moves farther outward, thereby shifting the eccentric in the proper direction to diminish its throw and reducing the supply of steam to the engine. When the rate of speed falls below the normal, the governor weight is moved inward by the spring, owing to its diminished centrifugal force, whereby the eccentric is shifted in the opposite direction and its throw is increased, thus augmenting the supply of steam to the engine. By adjusting the link H toward or from the fulcrum of the lever D, the relative power of the resisting spring and governor weight may be varied to cause the engine to run at any desired rate of speed and with a dull or close regulation, in accordance with the particular duty to be performed by the engine.

In order to avoid severe strains upon the resisting spring and permit the use of a heavy spring of small initial tension, I prefer to provide the same with a comparatively small weight n , which, by its tendency to move outward, supplements the resistance of the spring to the outward movement of the large governor weight. This weight n is however not indispensable, and may be omitted, if desired.

Referring to Figs. 1 and 2, o is a radial oil-hole leading from the surface of the lug B' of the eccentric inwardly to the pivot on which the eccentric swings, and o' is an oil-trough or gutter arranged on said lug at the outer end of said oil-hole and facing the eccentric. This trough catches any oil which drains outward from the eccentric by centrifugal force and conducts it into the oil-hole whence it passes to the pivot of the eccentric and lubricates the same. The trough is preferably angular or V-shaped and arranged with its apex adjacent to the oil-hole.

The hub of the lever D is provided with an oil or grease cup P for lubricating the pivot of the lever. This cup is arranged to stand about radially to the wheel A when the lever is in the position in which the engine receives steam for the average load, and is filled with heavy oil or light grease of such a consistency that the same will be fed outward toward the pivot of the lever by centrifugal force.

I claim as my invention—

1. The combination with the rotary governor or wheel or frame, of a lever pivoted between its ends on one side of the axis of the wheel and carrying at one end a governor weight, a spring arranged on the opposite side of the wheel-axis and secured to the wheel, a link attached at one end to the free end of said spring and at its opposite end to the weighted arm of said lever, a shifting eccentric and a

separate link connecting the opposite end of the lever with the eccentric, substantially as set forth.

2. The combination with the rotary governor or wheel or frame, of a lever pivoted to the wheel on one side of its axis and carrying a governor weight, a flat spring arranged on the opposite side of the axis of the wheel and secured at one end to the wheel, a weight attached to said spring, a link connecting the opposite free end of said spring with the weighted lever, and a movable eccentric connected with said lever, substantially as set forth.

3. The combination with the rotary governor or wheel or frame, of a lever pivoted to the wheel on one side of its axis and carrying a governor weight, a flat spring secured to the wheel on the opposite side of its axis and made lengthwise adjustable thereon, whereby the effective length of the spring may be increased or diminished, substantially as set forth.

4. The combination with the rotary governor or frame or wheel, the weighted lever arranged on one side of the axis of the wheel and the movable eccentric connected therewith, of a flat resisting spring arranged on the opposite side of the axis of said wheel and connected with said lever, and a clamping bolt arranged on the wheel and having a transverse slot which receives said spring and whereby the latter is secured to the governor wheel, substantially as set forth.

5. The combination with the rotary governor or frame or wheel, the weighted lever arranged on one side of the axis of the wheel and the movable eccentric connected therewith, of a resisting spring arranged on the opposite side of the axis of said wheel, and a link connecting the weighted lever with said spring and made adjustable on the lever toward and from its fulcrum, substantially as set forth.

6. The combination with the rotary governor or frame or wheel, the weighted lever arranged on one side of the axis of the wheel and the movable eccentric connected therewith, of a resisting spring arranged on the opposite side of the axis of said wheel, and a link connecting the weighted lever with said spring and

provided at its end portions with knife edges bearing respectively against the spring and the lever, substantially as set forth.

7. The combination with the rotary governor or frame or wheel, the weighted lever arranged on one side of the axis of the wheel and the movable eccentric connected therewith, of a resisting spring arranged on the opposite side of the axis of said wheel, and a link connecting the weighted lever with said spring and provided at one end with a loop which receives the free end of said spring and at its opposite end with a knife-edge which bears against said lever, substantially as set forth.

8. The combination with the rotary governor or frame or wheel, of a lever pivoted between its ends to said wheel on one side of the axis thereof, a governor weight arranged on one arm of said lever, a movable eccentric connected with the other arm of said lever, a flat resisting spring arranged on the opposite side of the axis of the governor wheel, and a connecting link provided at one end with a loop which receives the free end of said spring and at its opposite end with a knife-edge which engages with one of a number of notches arranged on the weighted arm of said lever, substantially as set forth.

9. In a centrifugal governor, the combination with the rotary frame or wheel, of a swinging eccentric mounted upon a pivot arranged on said rotary frame and having an oil-hole extending from the surface of the eccentric to its pivot, and a gutter arranged at the outer end of said oil-hole, whereby the oil draining from the eccentric is conducted to said oil-hole, substantially as set forth.

10. The combination with the rotary governor or frame or wheel, the movable eccentric and the weighted lever pivoted to the governor frame, of a grease cup arranged about radially on the inner side of the hub of the lever, whereby the oil or grease in the cup is fed outward to the pivot of the lever by centrifugal force, substantially as set forth.

Witness my hand this 23d day of April, 1892.

JOSEPH A. HUTCHINSON.

Witnesses:

THEO. L. POPP,

JNO. J. BONNER.