

(No Model.)

D. W. PAYNE & C. R. WILLIAMS.
STEAM GOVERNOR OR SHIFTING ECCENTRIC.

No. 294,069.

Patented Feb. 26, 1884.

Fig. 1.

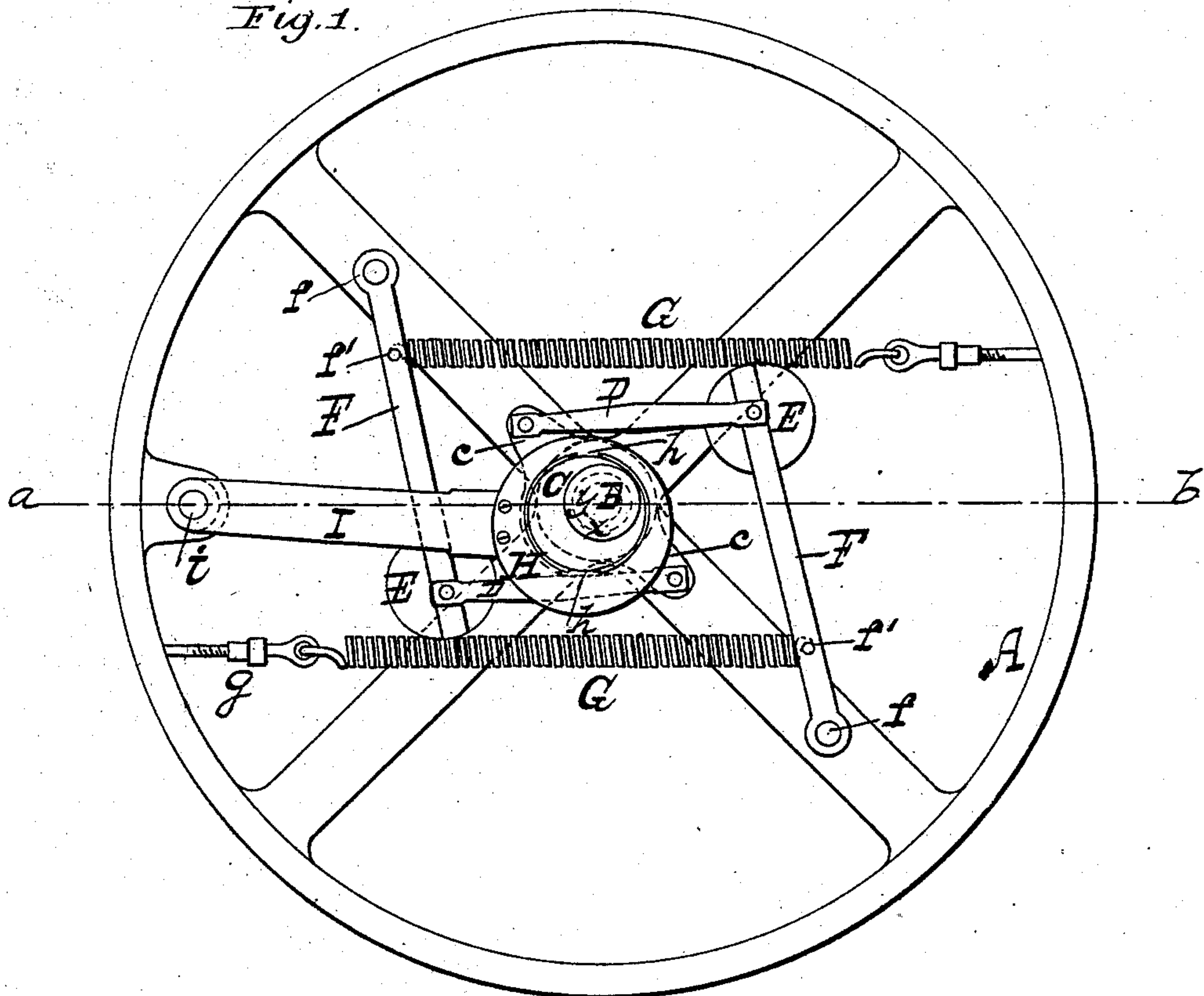


Fig. 2.

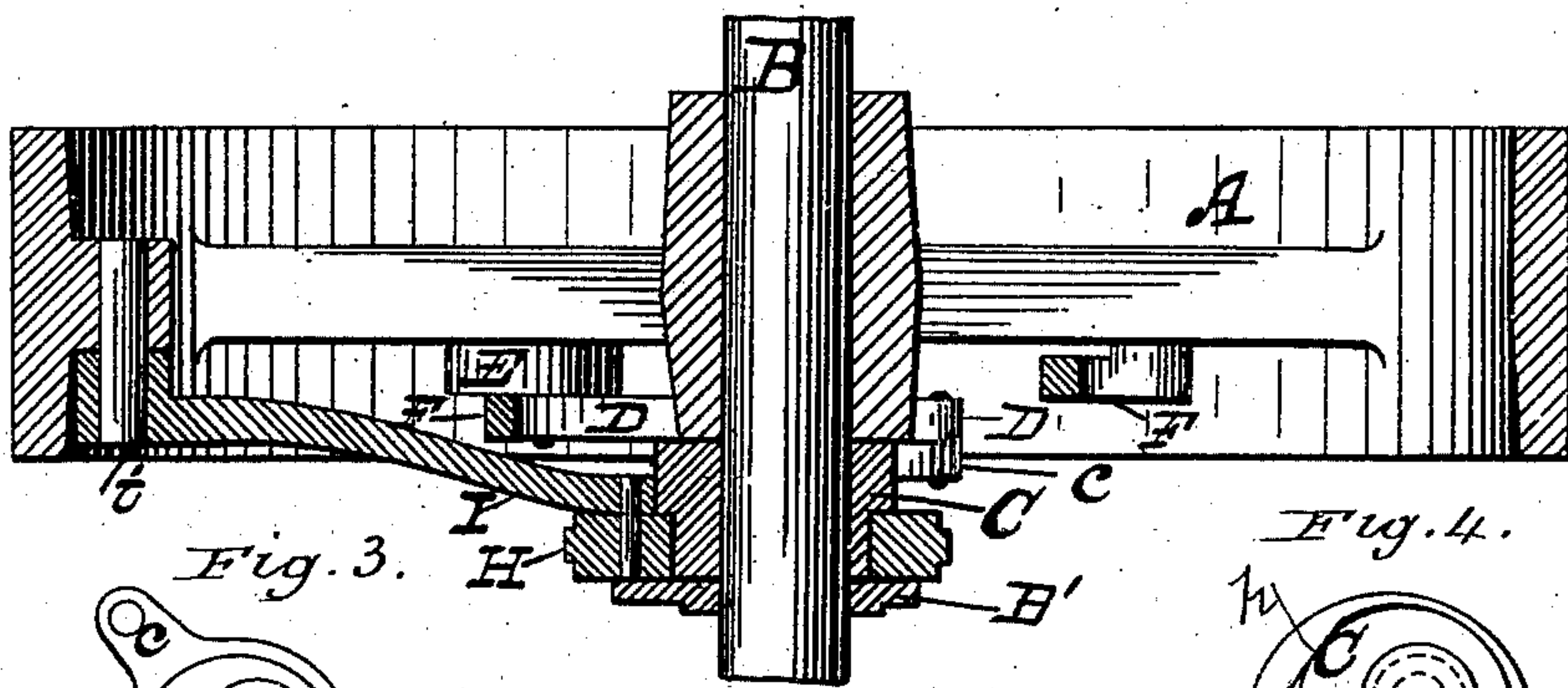


Fig. 3.

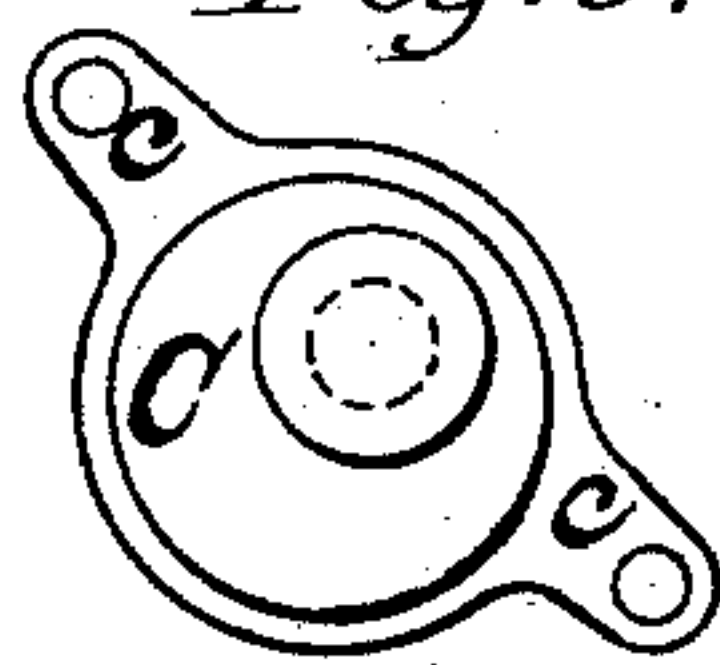
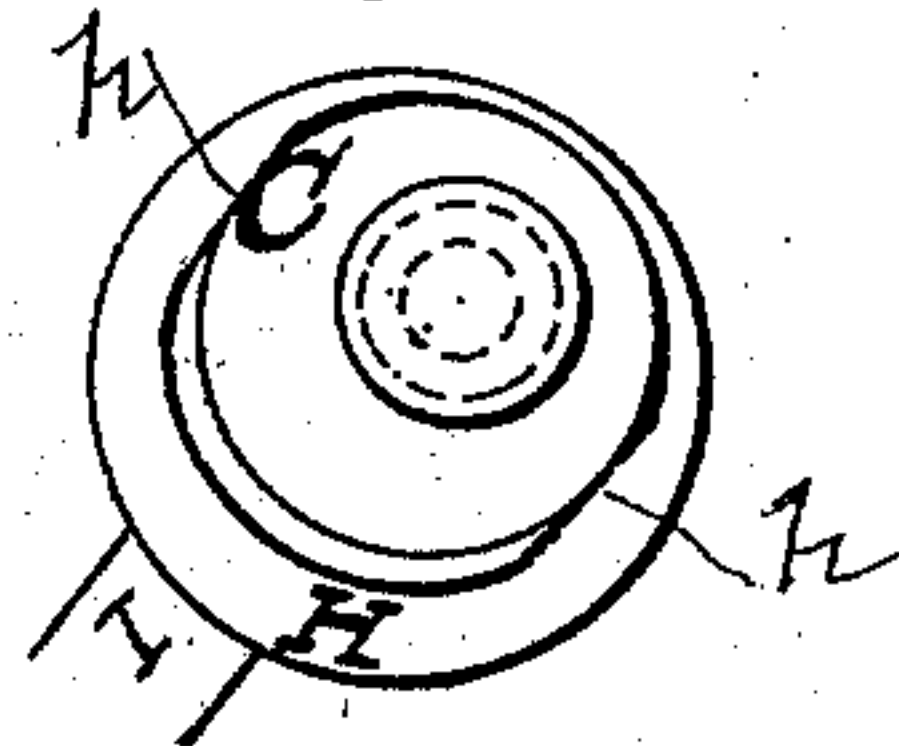


Fig. 4.



Witnesses

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UNITED STATES PATENT OFFICE.

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STEAM-GOVERNOR OR SHIFTING ECCENTRIC.

SPECIFICATION forming part of Letters Patent No. 294,069, dated February 26, 1884.

Application filed February 24, 1883. (No model.)

To all whom it may concern:

Be it known that we, D. W. PAYNE and CHARLES R. WILLIAMS, citizens of the United States, residing at Corning, in the county of Steuben and State of New York, have invented certain new and useful Improvements in Steam-Governors or Shifting Eccentrics, of which the following is a specification, reference being had therein to the accompanying drawings.

Our invention relates to that class of shifting eccentrics which are employed as governors for steam-engines, and which comprise in their construction means for giving to the main or valve operating eccentric an angular motion relative to the shaft upon which it is mounted, said means consisting in some instances of a carriage upon which said eccentric is secured, and both being slotted for the embracement of the shaft to permit angular movement of the carriage and eccentric, while in other instances the main eccentric has been mounted upon a secondary eccentric; and in all instances above indicated centrifugal weights and counterbalancing-springs have been employed.

Our improvements have reference to this class of governors or eccentrics, and their nature, operation, advantages, and novelty will be hereinafter fully described and specifically set forth in the claims.

In the drawings, Figure 1 is a side elevation, Fig. 2 a horizontal section, and Fig. 3 a detail, of a governor or shifting eccentric constructed in accordance with our invention. Fig. 4 is a detail showing interior bearing-surfaces which do not project bodily or abruptly inward, as hereinafter described.

Like letters refer to like parts in all the figures.

A represents a wheel (or it may be any suitable frame-work adapted to the operative elements employed) secured to the shaft B.

Adjacent to the hub of wheel A is rotatably mounted and secured against longitudinal movement by a collar, B', a secondary eccentric, C, which in this instance is a single casting comprising the eccentric and two oppositely-projecting lugs, c c, adapted to be pivotally connected with links D, which are in like manner connected with weights E, secured to arms F, pivotally secured to the frame-work

or wheel, as at f. The links D may be connected with either the weights or arms. Retractable springs G are secured to the arms F at f', and adjustably connected to the frame-work or wheel in any suitable place, as at g.

As thus far described, it will be seen that as the shaft and wheel or frame-work revolve with varying velocity, the weights E are, by centrifugal force, thrown more or less away from the center of motion and against the tension of the springs G, and by means of the links D and lugs c the eccentric C is caused to rotate slightly upon the shaft, its center being moved from x to y, thus projecting its longest radius from the shaft and toward the line of motion of the valve-stem, which line may be assumed, as at a b, a central horizontal line through Fig. 1.

Upon the secondary eccentric C is mounted the main or valve-operating eccentric H, the inner bearing of which in this instance comprises solely two projections, h, arranged opposite each other.

In constructing our governor the fitting of the main upon the secondary eccentric requires merely the planing off of the faces of projections h h, and thus reducing the cost of manufacture in this respect and securing desired advantages in operation and use, as hereinafter set forth. The main eccentric H is pivotally suspended to the wheel or frame-work in this instance, at i, by an arm, I, which permits a movement of the eccentric only in a direction across the shaft and line of movement in substantially a line at right angles thereto. Whenever the link I and longer radius of the inner eccentric, C, coincide with or are brought into the line (a b) of motion, said radius projects into the space between the bearings or projections h h. A third retractile spring may, if desired, be secured to the eccentric H, or to the arm I and to the wheel or frame-work, to take up any wear or looseness of the eccentrics upon each other.

It is apparent that when the secondary eccentric is operated by the weights and links, as above described, the main eccentric as well as the valve, connected therewith in any of the well-known modes, are also affected in their operation—that is to say, the point of cut-off is automatically varied as the labor required

of the engine is increased or diminished. As shown in Fig. 1, the eccentric H has its greatest travel with an existing tendency to increased speed of rotation, arising from a reduction in the amount of labor required of the engine or otherwise, whereby the weights are thrown out and the eccentric H is carried in the direction from x to y more or less, and the valve is thereby operated to secure a proper regulation of the admission of steam into the cylinder in accordance with the labor to be performed. An increase of steam-pressure produces a like action of the elements of the governor, and an opposite action thereof occurs when reduced speed of rotation is occasioned by an increase of the labor required or by a reduction in the pressure of steam. By suspending the eccentric from the frame-work or wheel all movements of the same, except at right angles to the line of motion, are avoided, and this, in connection with the constant contact of the secondary eccentric, so far relieves the springs from the resistance of the valve-system that they have only the function of counterbalancing the weights to perform, and may thus be much lighter than hitherto, where, in slotted eccentrics and similar devices, in order to overcome the strong tendency to jumping, irregularity of motion, and vibrating or trembling of the eccentric against the shaft, the springs have been necessarily of very strong, heavy material and high tension. The projections h upon the inner bearing of the main eccentric aid materially in securing a firmness of construction, which obviates all tendency to such a vibration of the eccentric.

If desired, many minor variations in the construction of the parts may be made. Compressible instead of retractile springs G may be employed. The projections $h h$ may be of steel or other suitable bearing material, and made separate from and dovetailed into the main eccentric, and secured therein adjustably to take up the natural wear thereof; or said projections may be formed of, set into, or secured upon, the secondary eccentric and adapted to fit a continuous eccentric contour or bearing formed in the main eccentric. So far as relates to the particular form of eccentrics herein shown as adapted to each other, the projections being upon either of the two, they are of themselves sufficient as independent elements for operation jointly with other centrifugal weights and springs than those constructed and arranged as herein shown; and also the suspended eccentric may be set aside and one not so suspended, but adapted by projections to be in constant contact with a secondary ec-

centric, may be substituted therefor; but we deem such and similar variations as comprehended by our invention.

The modification shown in Fig. 4 has been heretofore used in connection with gearing formed integral with the inner eccentric, which gearing has been operated by hand to vary the position of the main eccentric, and so far the same is disclaimed as of our invention.

Having described our invention and its operation, what we claim is—

1. An eccentric provided with interiorly-projecting bearing-surfaces, as $h h$, substantially as specified.

2. The combination of an outer eccentric having interiorly-projecting bearings $h h$ with an inner eccentric mounted loosely upon a shaft, and having a continuous bearing upon said interiorly-projecting bearings, substantially as specified.

3. The combination of an outer eccentric adapted to be suspended to a wheel or disk, and provided with interiorly-projecting bearing-surfaces arranged opposite each other and on opposite sides of the line of suspension, with an inner eccentric mounted loosely upon the shaft and adapted to bear continuously upon said oppositely-located bearings, and to be automatically rotated upon said shaft, substantially as specified.

4. The combination of a shaft, and an inner eccentric mounted loosely thereon and connected to centrifugal weights, with an outer eccentric mounted upon said inner eccentric, suspended upon a wheel or disk and connected with the valve, substantially as specified.

5. The combination of the wheel A, shaft B, eccentric C, and eccentric H, having interiorly-projecting bearings $h h$, substantially as specified.

6. The combination of the wheel A, shaft B, and eccentric C, having lugs $c c$, connected to centrifugal weights, with eccentric H, having interiorly-projecting bearings $h h$, and arm I, substantially as specified.

7. The combination of wheel A, shaft B, centrifugal weights E, links D, and springs G, with eccentrics C and H, the latter having internal projections, $h h$, and an arm, I, pivotally secured to the wheel, substantially as shown and described.

In testimony whereof we affix our signatures in presence of two witnesses.

DAVID W. PAYNE.

CHARLES R. WILLIAMS.

Witnesses:

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CHAS. V. HUCHINS.