

(No Model.)

D. W. PAYNE & C. R. WILLIAMS.

SHIFTING ECCENTRIC.

No. 294,071.

Patented Feb. 26, 1884.

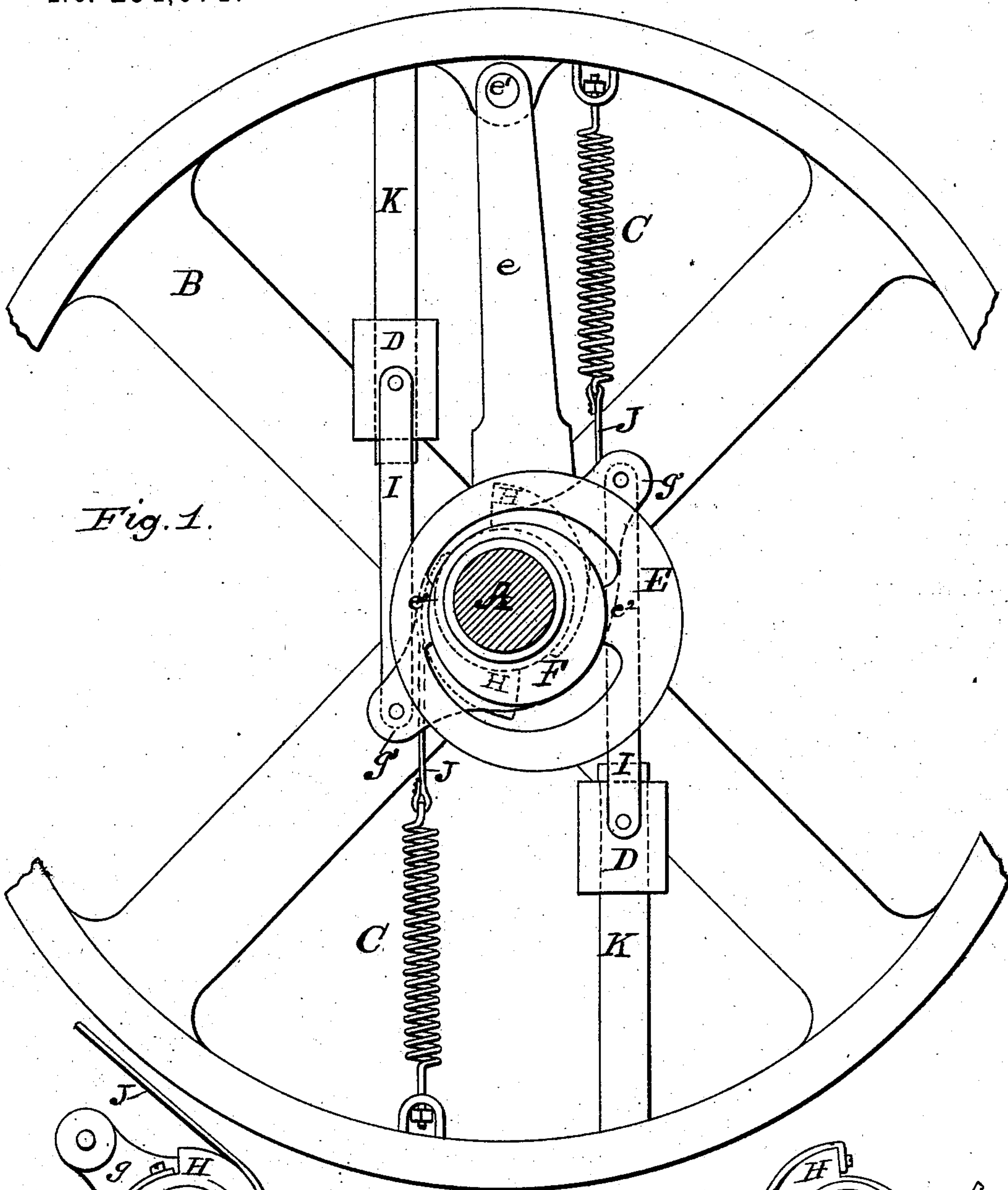
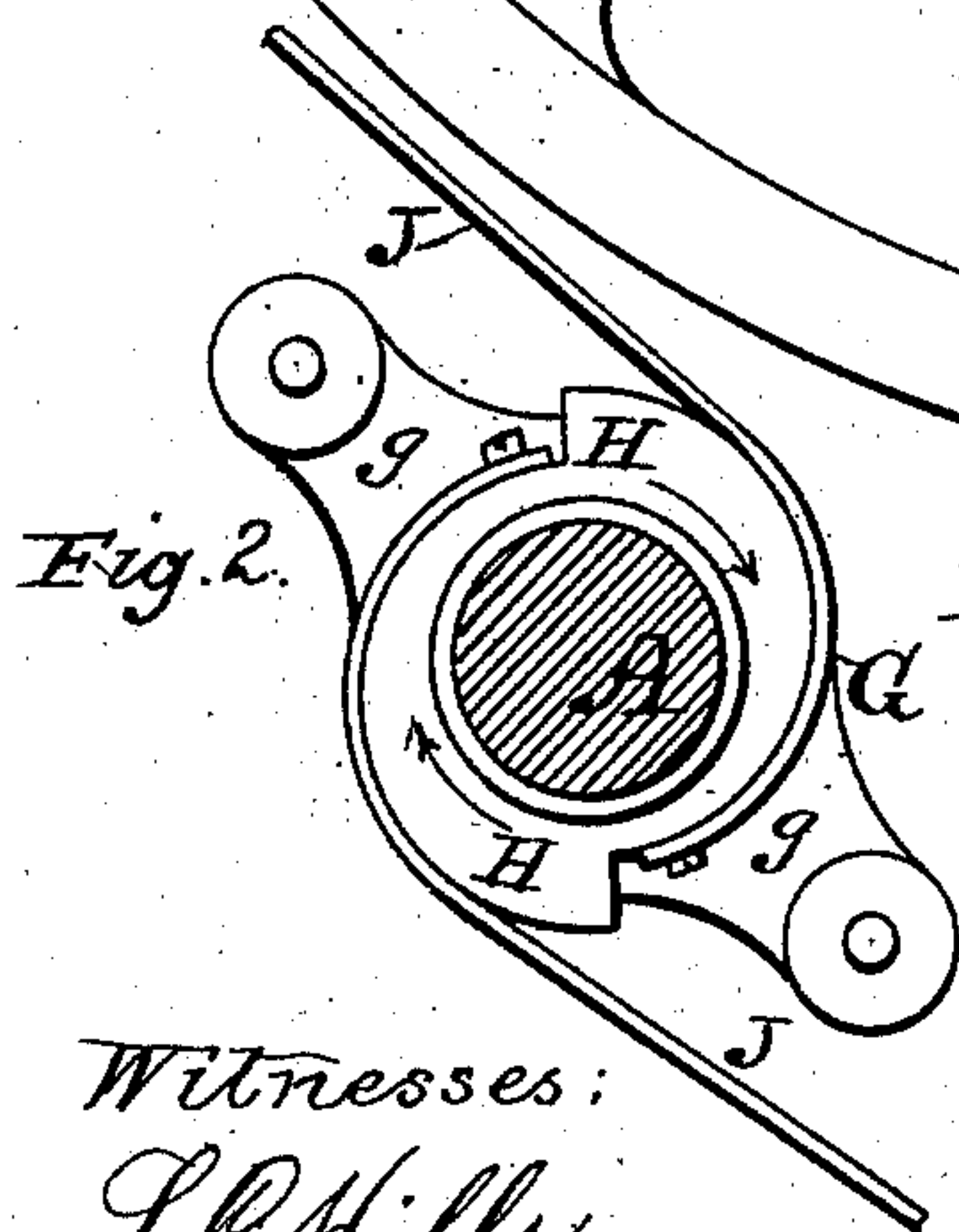


Fig. 1.



Witnesses:

L. C. Hills.

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Fig. 4.

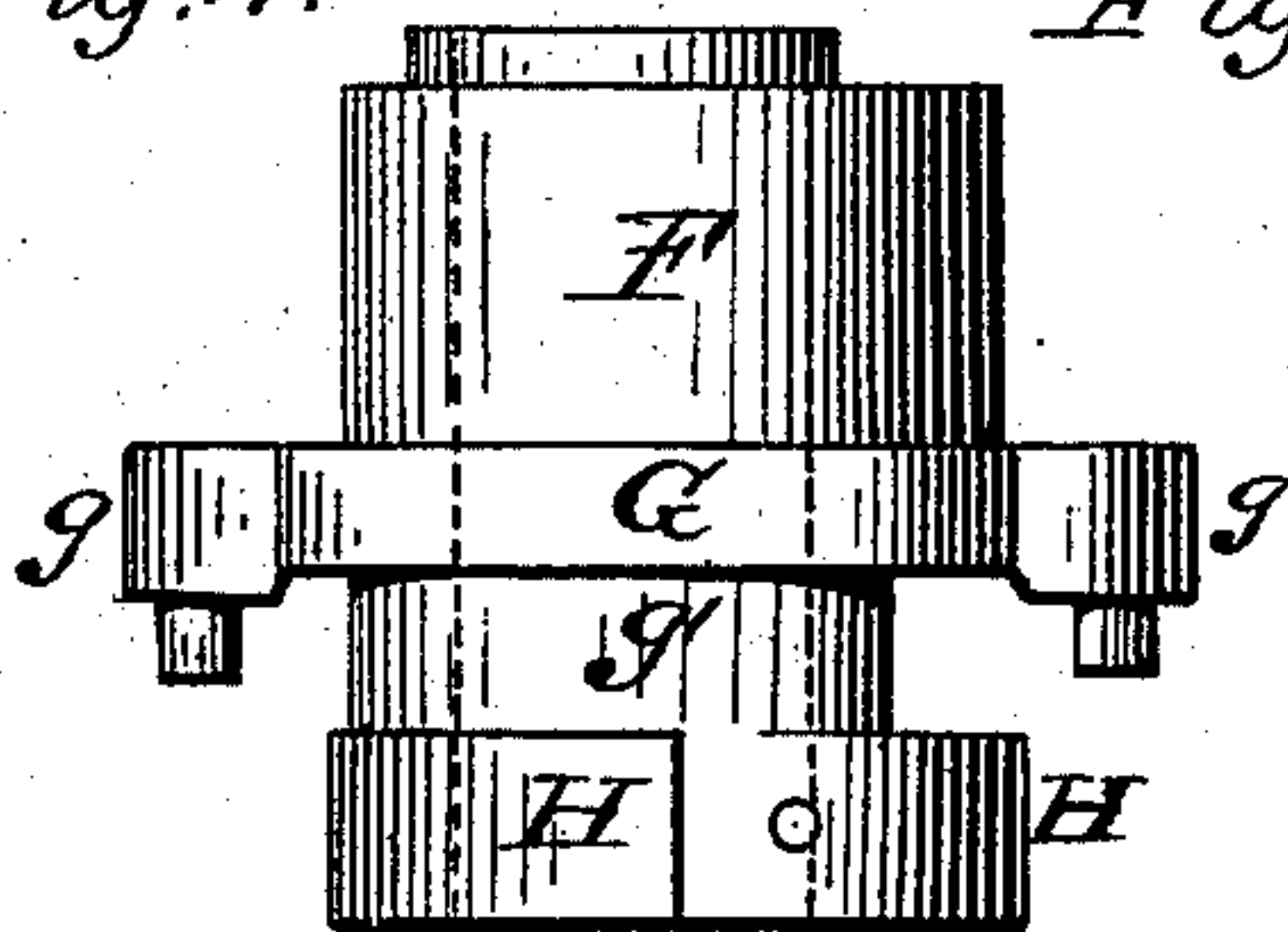
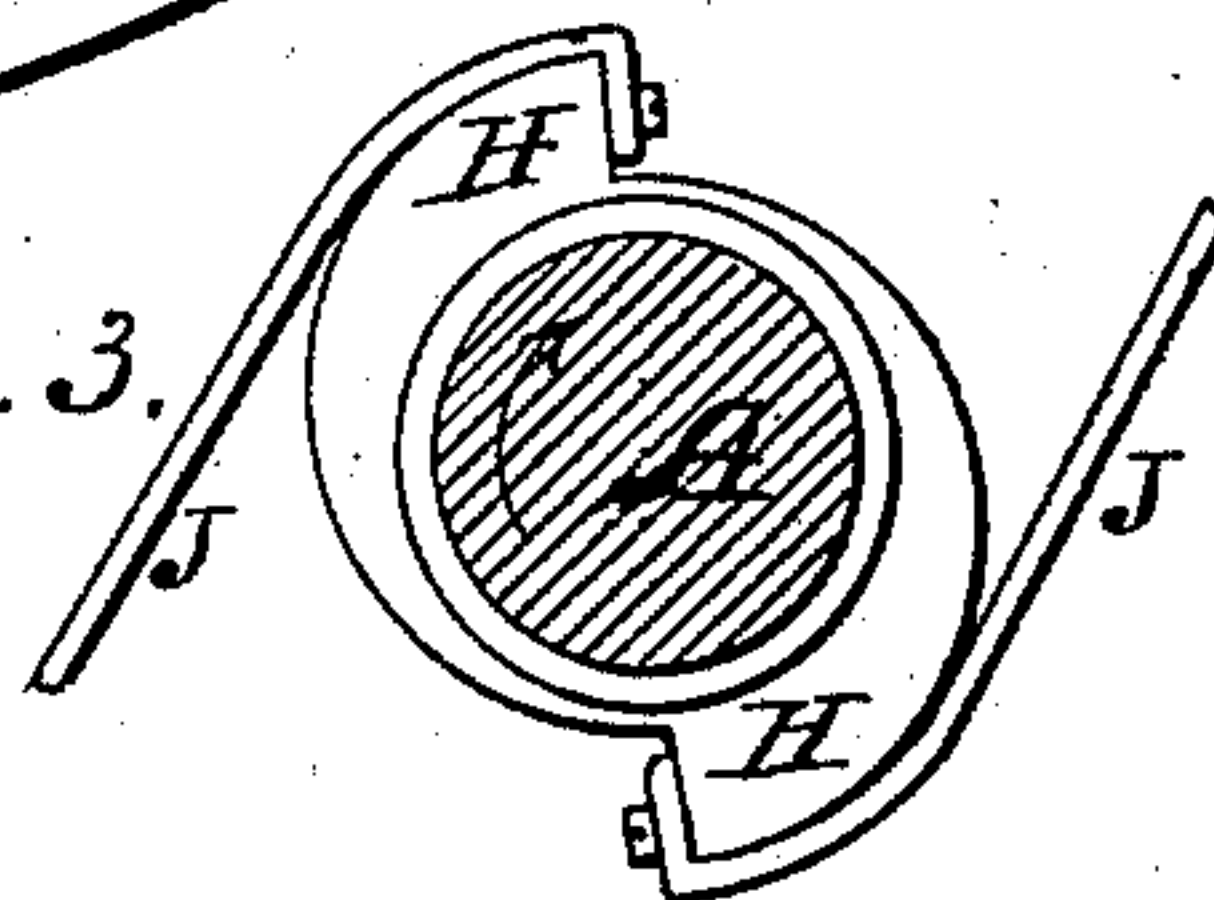


Fig. 3.



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# UNITED STATES PATENT OFFICE.

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## SHIFTING ECCENTRIC.

SPECIFICATION forming part of Letters Patent No. 294,071, dated February 26, 1884.

Application filed November 21, 1883. (No model.)

*To all whom it may concern:*

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

Figure 1 is a side elevation of a shifting eccentric constructed in accordance with our invention. Figs. 2 and 3 are side elevations of the inner eccentric and its adjuncts, and Fig. 4 is a plan of the same.

Like letters refer to like parts in all the figures.

The invention in this instance has reference to certain features which constitute an improvement on the shifting eccentrics shown, described, and claimed in our pending applications, Nos. 86,106 and 100,007, and novel devices are herein shown, but not claimed, as they form the subject-matter of said applications.

The object of this invention is to provide means for rendering the counterbalancing effect of the springs uniform throughout the entire movement of the weights, and, if desired, to render the effect of the springs and weights upon the valve more rapid or more sudden, as will hereinafter appear.

A represents the shaft, B the fly-wheel, C the springs, and D the weights of a shifting eccentric of the class to which our invention relates.

E represents an outer eccentric, which, by usual means, is connected with the valve-stem, and is suspended by an arm, *e*, to the wheel B, on a pivot, *e'*. The eccentric E bears at *e<sup>2</sup>* *e<sup>2</sup>* continuously upon an inner eccentric, F, which is loosely mounted upon the shaft A, and is connected to a plate, G, having arms *g* and a hub, *g'*, provided with peripheral cams H. The inner eccentric may be formed in one piece or casting, or in several pieces properly joined to each other. Links I connect the centrifugal weights D with the arms *g*, and the counterbalancing-springs are connected with the plate G by bands, straps, or chains J, which ride the faces of the cams H. In this instance the centrifugal weights D are arranged

upon straight guides K, disposed squarely within the wheel B; but it is evident that the weights may be suspended or pendulous, as is common in this class of governors. Each of the cams H covers, substantially, one-half of the circumference of the hub *g'*, and they are oppositely disposed, one to the other—that is to say, the highest point of one cam occurs at or near the lowest point of the other. The cams may also be arranged in either of two manners relative to the direction of rotation of the innereccentric—that is to say, the highest points of the cams may either follow (as in Fig. 2) or lead (as in Fig. 3) in the direction of the rotation of the eccentric when affected by the centrifugal weights, as hereinafter described.

It is well known that the operation of this class of eccentrics is such that when the speed of the engine increases beyond a normal or predetermined regulation, the weights D are caused to swing or move outwardly from the center of the wheel, and by means of the links I and plate G to move the innereccentric upon the shaft, and thus alter the position of the outer eccentric, so that the valve is partly closed, in order that the quantity of steam-supply may be reduced, and thus the increase of speed overcome. During this operation the springs C are distended, and when the normal speed is reached they automatically restore the desired relative position of the elements of the governor.

It will be apparent that when the springs are being distended the force required increases as the distention increases. So, by means of the cams H, with their highest points following, as shown by arrows, Fig. 2, we increase the leverage of the hub against the tension of the springs in proportion to the force required, and in this manner attain a uniformity in the counterbalancing effect of the springs. It also follows that if a sudden supply of steam is desired, as in the application of steam-motors to saw-mills and other machines where the labor is intermittent, the arrangement of the cams may be with their highest points in lead, as in Fig. 3, whereby slight variations in the positions of the weights near the center of the wheel effect more sudden changes in the valve by reason of the increased leverage of the cams



upon the springs at the beginning of their distention, and as said distention increases the leverage decreases, resulting in a tendency to slowly complete the movement of the valve in the act of cutting off the supply of steam. By regulating the normal speed to bring the straps, bands, or chains in contact at about the center, lengthwise, of the cams, as in Fig. 3, uniformity of action is secured, in addition to a constant tendency to slow movement of the valve in the act of cutting off. By means of the peripheral cams we secure most perfect regulation. With the arrangement shown in Fig. 2, with an increased load, there may be a tendency to reduced speed, and by reversing the arrangement of the cams, as in Fig. 3, the tendency is to increased speed when the load is applied.

We do not limit ourselves to the exact construction, proportion, and arrangement of the parts herein shown, but reserve the right to change the same in any manner and to any degree within the skill and judgment of persons conversant in the construction of steam-engines; nor do we restrict ourselves to the employment of the novelty of the construction herein claimed to governors in which double eccentrics are employed, as it is evident that the peripheral cams or their mechanical equivalent may be used in connection with any single eccentric governor, wherein weights and counterbalancing-springs are employed.

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

1. A shifting eccentric the hub of which is provided with peripheral cams, substantially as and for the purpose set forth.

2. In a shifting eccentric, a hub provided with peripheral cams, in combination with counterbalancing-springs and connecting straps, bands, or chains, substantially as specified.

3. In a shifting eccentric, a hub provided with peripheral cams, in combination with counterbalancing-springs, centrifugal weights, connecting links and straps, bands, or chains, substantially as specified.

4. In a steam-governor of the class specified, the combination of centrifugal weights and counterbalancing-springs with an eccentric formed with or connected to a hub having peripheral cams, and with devices for connecting the said eccentric with said springs and weights, substantially as specified.

5. The combination of an outer eccentric with an inner eccentric, having as adjuncts peripheral or circumferential cams, and with centrifugal weights and counterbalancing-springs, constructed and arranged substantially as and for the purpose described.

6. The combination of an eccentric, a link-plate, and oppositely-arranged peripheral cams with connecting straps, bands, or chains, substantially as specified.

7. The combination of the eccentric F, link-plate G, and cams H H, with the shaft A, wheel B, springs C, and centrifugal weights, and with links I and straps, bands, or chains J, substantially as shown and described.

8. The combination of shaft A, wheel B, guides K, weights D, links I, straps, bands, or chains J, and springs C, with an outer eccentric suspended by an arm to said wheel, and with the inner eccentric, having a link-plate and peripheral cams, substantially as shown and described.

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

DAVID W. PAYNE.

CHARLES R. WILLIAMS.

Witnesses:

E. C. POND,

E. C. VAN DUZER.