H. TABOR.

Governor for Valve Motions.

No. 206,500. Patented July 30, 1878.

Fig. 1.

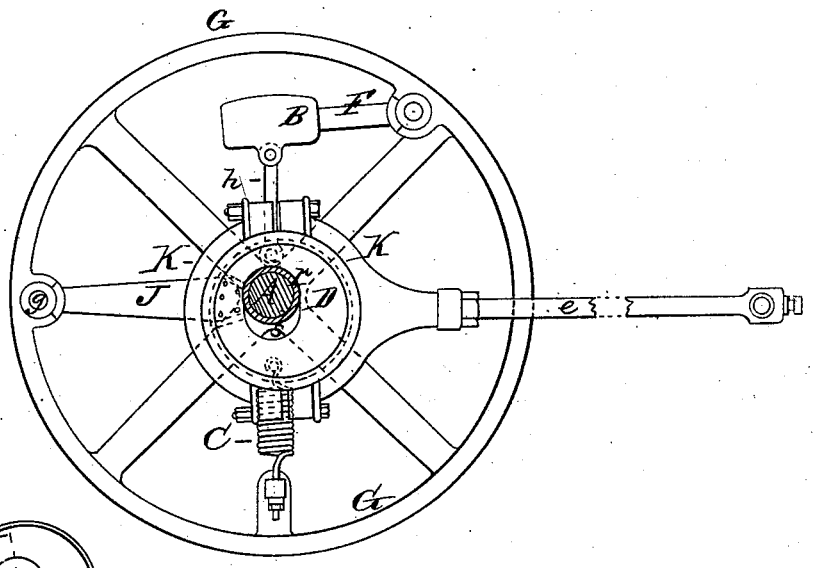


Fig. 3.

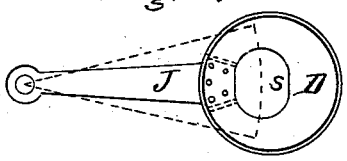
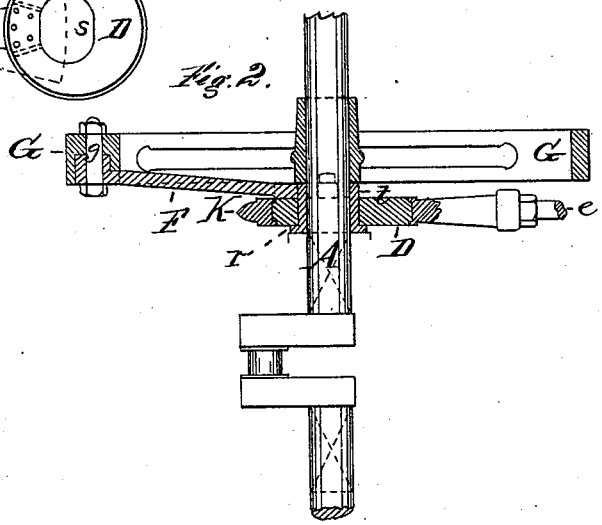


Fig. 2.



Witnesses
W. L. Bennem.
W. H. Isaacs.

Inventor
Harris Tabor
by his Atty
E. F. Kenrick

UNITED STATES PATENT OFFICE.

HARRIS TABOR, OF CORNING, NEW YORK, ASSIGNOR TO B. W. PAYNE & SONS, OF SAME PLACE.

IMPROVEMENT IN GOVERNORS FOR VALVE-MOTIONS.

Specification forming part of Letters Patent No. **206,500**, dated July 30, 1878; application filed February 12, 1878.

To all whom it may concern:

Be it known that I, HARRIS TABOR, of Corning, in the county of Steuben and State of New York, have made an invention of certain new and useful Improvements in Governors for Variable Cut-off Valve-Motions and for other purposes to which it may be applicable; and that the following is a full, clear, and exact description and specification of the same.

This invention relates to that class of governors in which the centrifugal ball or governor weight is applied directly to move the eccentric or its equivalent or substitute revolving on the same shaft with the governor-weight; and the object of the invention is to reduce the cost of the mechanism hitherto employed in such cases, and to supply it.

To this end the said invention consists of a certain new combination of mechanical devices, which are specified in detail at the close of this specification.

In order that the invention may be fully understood, I have represented in the accompanying drawing and will proceed to describe the best mode in which I have thus far embodied my improvements in a working machine.

Figure 1 of said drawings represents in section the crank-shaft of a steam-engine with my improvements (in elevation) applied thereto. Fig. 2 is a horizontal view of the same with certain parts in section. Fig. 3 is a side view of the eccentric and its arm detached from the other parts.

In the example represented in the said drawings the crank-shaft A of the steam-engine is fitted with the governor, composed of the fly-weight B and the spring C, and these two members are connected with the crank-shaft A of the engine and with the eccentric D, which imparts motion through its rod *e* to the slide-valve of the steam-cylinder. The fly-weight is connected with the crank-shaft A by means of a swinging arm, F, that is jointed to a wheel or pulley, G, which is secured to the crank-shaft A, so that the fly-weight, while caused by the said wheel to revolve with the crank-shaft A, can change its position radially thereof by swinging upon the pivot *g*, which forms the joint of its swinging arm. The fly-weight is connected with the eccentric through a link, *h*, pivoted at one end to the fly-weight and at the other to the eccentric D. The spring C also is connected at one end with the crank-shaft A by means of the wheel or pulley G, and at its other end with the eccentric, and the force of the spring operates antagonistically to the centrifugal force of the fly-weight. The eccentric D is mounted upon the crank-shaft, but is not secured immovably thereto, its disk being perforated with an opening, *s*, which permits it to vibrate crosswise of the said shaft under the action of the fly-weight and spring. In order that the eccentric may be caused to revolve with the crank-shaft, notwithstanding its connection therewith, it is fitted with a vibratable arm, J, which is secured at one end to the eccentric, and is pivoted at its outer end to the wheel or pulley G. This connection of the eccentric with the fly-wheel shaft A by means of the vibratable arm J and connecting-wheel G permits the center of the eccentric D to vibrate in one direction or the other, as the centrifugal force of the fly-weight exceeds or is less than the force exerted by the spring. In order that the eccentric may be secured from moving in the direction of the length of the shaft the face of the vibrating arm is confined sidewise between the adjacent end of the hub of the connecting-wheel G at one side and the flange *r* of a sleeve, *t*, applied to the crank-shaft. This sidewise confinement is not essential, as the action of the vibratable arm J holds the eccentric sidewise; but the sidewise confinement is added as a precautionary measure.

From the foregoing description and drawing it appears that the fly-weight and spring are combined directly with the eccentric, to be controlled or governed by their action, thus obviating the necessity of employing a secondary eccentric to transmit the force of the fly-weight and spring to the eccentric to be governed, rendering the application of the governing force direct, and rendering the combination of devices simple.

The eccentric-hoop K and eccentric-rod *e*, as well as the steam-valve controlled by the eccentric, may be of any approved construction adapted to the purpose; and as the residue of

the steam-engine need not differ from the corresponding parts of engines provided with governors of the same general class, it is not deemed necessary to represent it.

The device for connecting the spring, swinging arm of the fly-weight, and vibratable eccentric-arm with the revolving shaft A need not necessarily be a wheel, but may be a mere disk, plain or skeleton, or may consist of arms.

If deemed best, the spring may be arranged at the same side of the shaft as the fly-weight, provided it be arranged to move the fly-weight toward the shaft, and in this case the spring may be so constructed to form a spring-arm for the fly-weight, thus dispensing with the pivot at the outer end of the swinging arm.

The shaft A need not necessarily be the crank-shaft of a steam-engine, but may be any revolving shaft to which an eccentric and governor are applied.

I am aware that fly-weights and springs have been connected with eccentrics so as to move them crosswise of the crank-shafts of steam-engines; hence I no not claim, broadly, every combination of such devices. My combination is characterized by the connection of the eccentric with the rotating shaft by means of a vibratable arm as well as by the direct action of the fly-weight and spring upon the eccentric to be governed. These two features greatly simplify the construction of the mechanism, because, while, on the one hand, they render unnecessary the use of guides, gibs, and similar devices for holding the eccentric to its prescribed path of movement relatively to the shaft with which it revolves, they, on the other, dispense with the cost and friction of a secondary eccentric to transmit force from the spring or weight to the eccentric to be governed.

I claim as my invention—

The combination, substantially as before set forth, of the revolving shaft, connecting-wheel, eccentric, vibratable arm of the eccentric, fly-weight, and spring, the last two being directly connected with the said eccentric.

Witness my hand this 7th day of February, A. D. 1878.

HARRIS TABOR.

Witnesses:
GEORGE HITCHCOCK,
DAVID W. PAYNE.