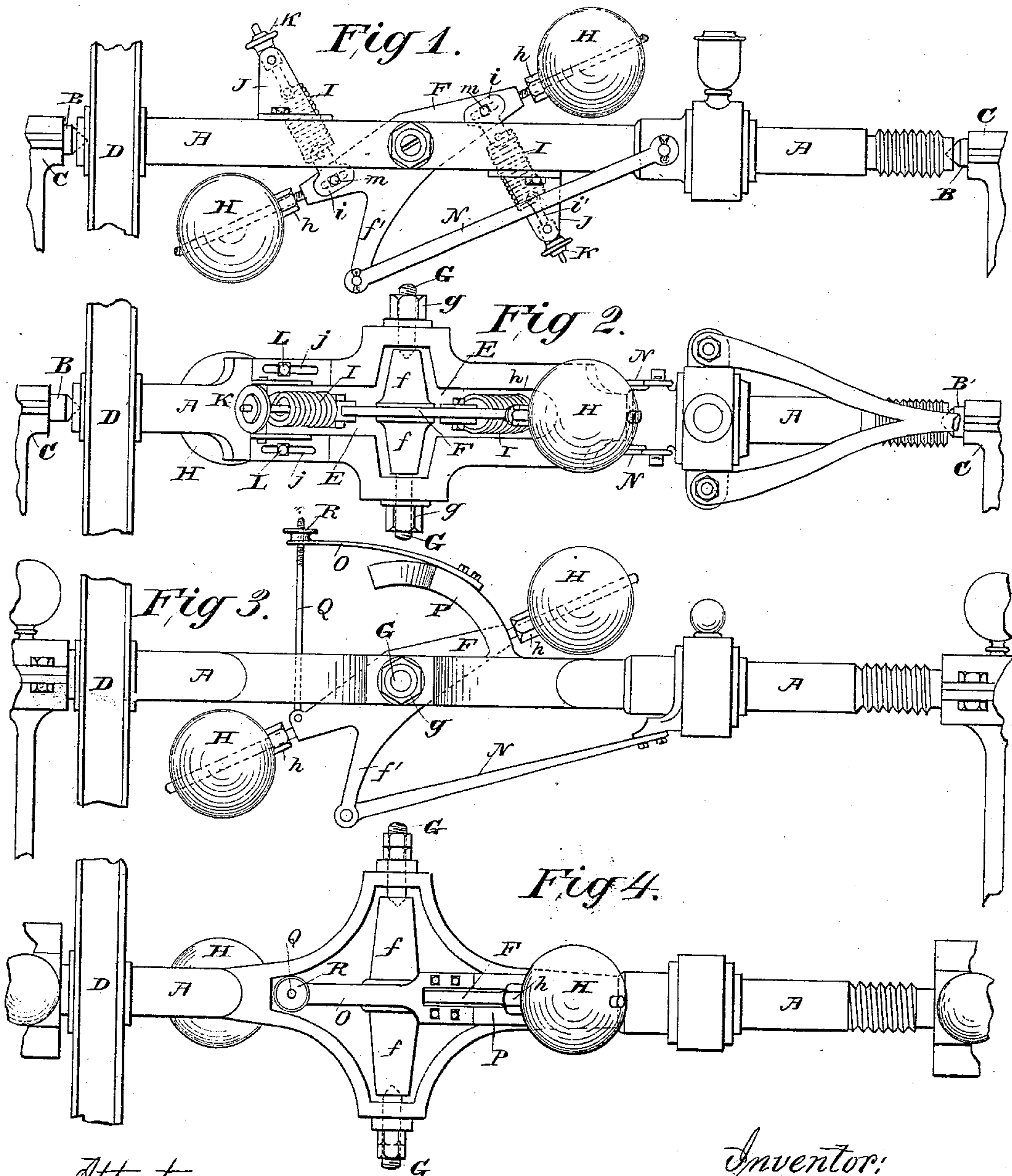


(No Model.)

J. C. HENRY.
SPEED GOVERNOR.

No. 270,430.

Patented Jan. 9, 1883.



Attest:
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UNITED STATES PATENT OFFICE.

JOHN C. HENRY, OF KANSAS CITY, MISSOURI, ASSIGNOR OF ONE-HALF TO
L. W. TOWNE AND P. F. CLINTON, OF SAME PLACE, AND J. L. BARNES,
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SPEED-GOVERNOR.

SPECIFICATION forming part of Letters Patent No. 270,430, dated January 9, 1883.

Application filed May 4, 1882. (No model.)

To all whom it may concern:

Be it known that I, JOHN C. HENRY, a citizen of the United States, residing at Kansas City, in the county of Jackson and State of Missouri, have invented certain new and useful Improvements in Speed - Governors, of which the following is a specification.

My invention has for its object the provision of a governor or regulator, which, while of great strength and very simple, is at the same time very delicate in operation, responding to the slight increment in the speed of rotation of the governor-shaft, and yet not affected by any sudden jarring of the engine or other motor to which it may be applied. To this end I construct the governor or regulator somewhat on the principle of the Silver governor—that is to say, I cast the governor-shaft with a longitudinal slot in which I hang a governor-arm. This arm is so balanced that its ends will be thrown away from the shaft when the same is revolved, suitable springs being provided for its retraction on the cessation of the motion of the shaft.

In governors of this character as formerly constructed there has generally been provided a single spring, which was so arranged that, while acting to retract the governor-arm, it bore heavily upon the stationary part or frame of the instrument, the effect being to produce a heavy bearing and great friction between the end of the governor-shaft and its journal. This friction, varying with the speed at which the governor-shaft is rotated, must necessarily be very great when the said shaft is rotated at a high rate of speed, even though the governor itself be very light. This heavy friction necessarily quickly wears away the brass or other journal of the shaft, changing its position therein, and rendering its work entirely unreliable and unfit for use where accuracy is required. To avoid this difficulty I place a spring or springs used for this purpose between the governor arm and shaft, in the manner presently to be described, so as to bring their full bearing upon the slow-moving pivots or trunnions of the governor-arm, instead of upon the swift-moving journals of the governor-shaft. I further provide this spring or springs and other parts of the governor with

means of delicate adjustment for insuring their accurate working, in a manner to be hereinafter more fully set forth.

In the accompanying drawings, Figure 1 is a side elevation of my governor in its preferred form. Fig. 2 is a plan of the same. Fig. 3 is a side elevation of a modification thereof. Fig. 4 is a plan of the same.

In the drawings, A represents a rotary governor-shaft, preferably supported by trunnion-pins B B, whose conical ends bear in conical sockets in the ends of the governor-shaft, and which are supported in standards or brackets C, so as to be adjustable therein for the purpose of taking up the wear in the bearings.

D is a pulley-wheel for imparting motion to the governor-shaft, and may be keyed or otherwise fixed thereon.

The shaft A is cast with a slot, E, in one portion thereof. In the slot is hung the governor-arm F, cast in one with trunnions *ff*, by means of which the said arm is supported through the medium of trunnion-pins G, adjustable in shaft A, and having nuts *g* for fixing them in any desired position thereon. By means of these adjustable trunnion-pins any wear may be taken up in the bearing of the trunnions *ff*, and the governor-arm accurately set to an exactly axial position on the rotary shaft. The ends of the governor-arm F are screw-threaded, as shown in Fig. 1, for the reception and adjustment thereon of suitable weights or balls, H. Nuts *h* serve to fix the weights H to any position on the arm F at which they may be set. It will be seen that one or both of the balls H may be moved inward or outward on the governor-arm, so as to exactly equalize their effect, and consequently balance the momentum of the two ends of the governor-arm when in action. By this means a perfectly equable motion is secured for the governor-arm, and the weight being equally balanced on both sides of its fulcrum *f*, the governor is not liable to be rendered spasmodic and irregular in its action by the jarring or uneven motion of the motor to which the governor may be attached.

To forcibly retract the governor-arm I provide a spring, I, bolted at one end, *i*, to the governor-arm, and at the other end being pro-

vided with a screw-threaded tongue, i' , which passes through an eye in an abutment, J, in which it is held by a thumb-nut, K. The abutment or abutments J are slotted, as shown at j in Fig. 2, through which slots bolts L pass to secure the abutments to the governor-shafts. The end i of the spring I is also slotted, as shown, for the reception of a bolt, m , which secures this end of the spring to the arm F.

It will thus be seen that three methods of adjustment, both as to strength, tension, and position of the spring I, are provided. Thus the abutment J may be moved outward or inward along the shaft A, the thumb-nut K may be tightened or loosened on the tongue i' , and the other end, i , may be moved outward or inward on the arm F to increase or lessen its effective force thereon.

If desired, a further means of adjustment may be provided by making the inner end of the tongue i' with an eye for the reception of the end of the spring, more or less of which may be passed through the said eye, accordingly as it is desired to change the quality of said spring.

I have above described a single spring as applied to the governor; but it is obviously preferable to use and I have here shown two springs so applied.

The arrangement above described, besides possessing the advantage before set forth of bringing the heavy bearing of the springs upon the slow-moving fulcrum of the governor-arm instead of upon the swift-moving journals of the rotary shaft, allows of the use for this purpose of spiral springs, which are preferable on account of their delicacy and evenness of action to flat and other springs commonly employed.

An arm, f' , projecting from the governor-arm F and cast in one therewith, bears at its end a connecting-rod, N, employed to transmit the motion of the governor or regulator to the throttle-valve of an engine, or, as I have described in an application of even date herewith, to a pen for the purpose of recording the speed and distance traveled of a locomotive or other object to which this instrument may be applied.

In Figs. 3 and 4 I have illustrated a modification of the governor, showing the ends of the governor-shaft having bearing in journal-boxes in customary manner, instead of on trun-

nion-pins, as before described. I have here also shown a method in which a flat spring, O, may be substituted for the spiral springs I. The said spring O is fixed to a bracket, P, on shaft A, and has at its outer end an eye for the reception of a screw-threaded rod, Q, whose other end is hinged to the arm F. A thumb-nut, R, on the rod Q permits the increasing or diminishing of the tension of the spring O.

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

1. A governor or regulator consisting of rigid arm F, pivotal about an axis transverse to the governor-shaft, and a spring or springs the ends of which are attached to the said arm and shaft, respectively, said spring or springs being so arranged as to bear upon the slowly-moving pivot of the governor-arm, substantially as and for the purpose set forth.

2. The combination of slotted shaft A, weighted governor-arm F, fulcrumed therein, and springs I I, having their ends attached respectively to the governor-arm and to the rotary shaft, substantially as and for the purpose set forth.

3. In combination with rotary shaft A and governor-arm F, pivoted to said shaft on an axis transverse thereto, spring or springs I, fixed between the said shaft and arm, and having devices for regulating their tension or length, as set forth.

4. In combination with the rotary governor-shaft, the rigid governor-arm, a spring or springs arranged between said shaft and arm, and means for permitting the adjustment of said spring or springs outward or inward on said arm, substantially as set forth.

5. In combination with governor-arm F and shaft A, the springs I I, adjustable as to strength, position, and tension on arm F and shaft A, as set forth.

6. The combination of slotted shaft A, governor-arm F, hung on adjustable trunnion-pins G, and carrying balls or weights H, capable of radial adjustment, abutment or abutments J, adjustable on shaft A, and spring or springs I, capable of adjustment at each end, as set forth.

JOHN C. HENRY.

Witnesses:

H. E. KNIGHT,
L. M. HOPKINS.