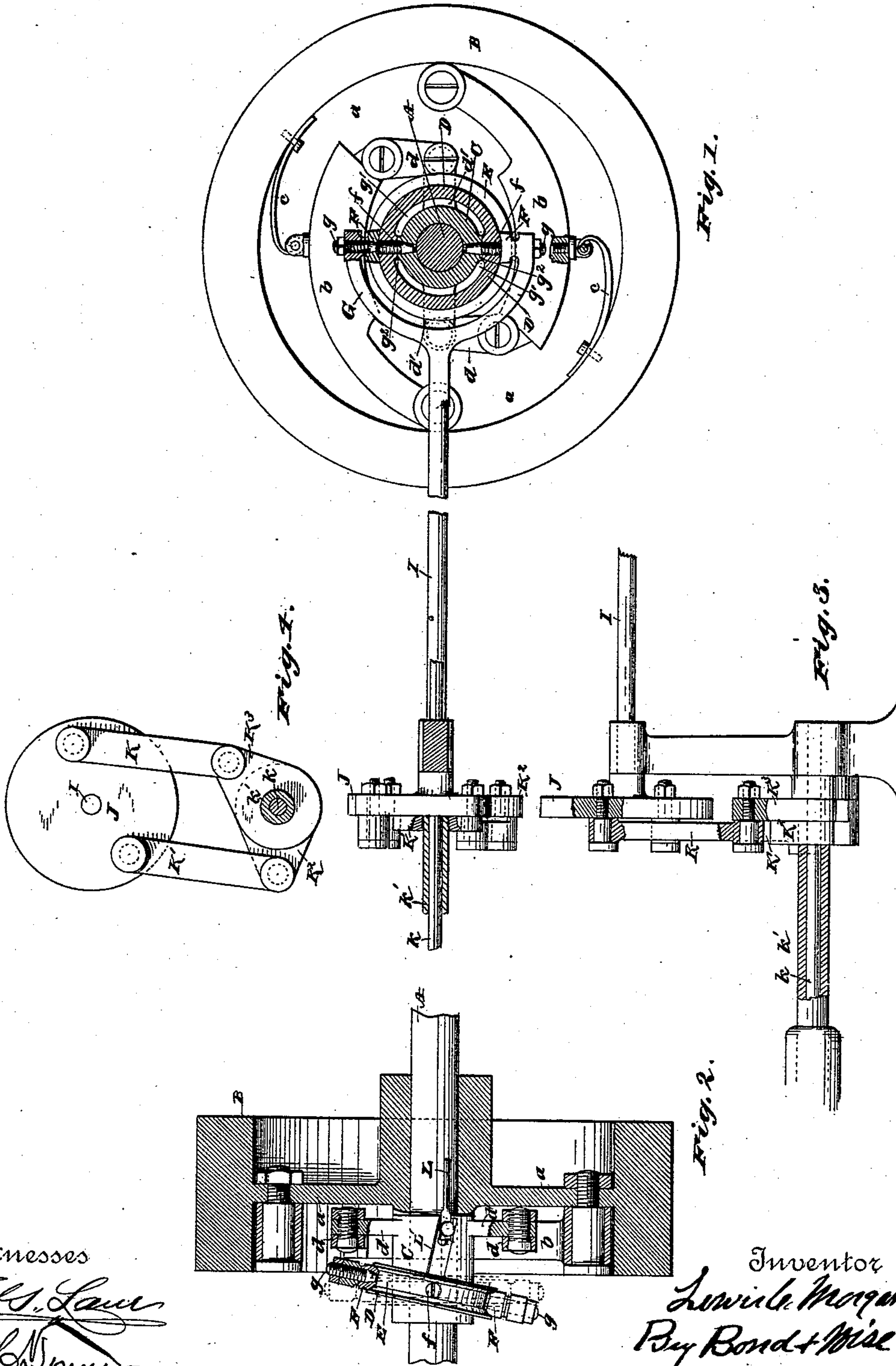


(No Model.)

L. C. MORGAN.
STEAM ENGINE GOVERNOR.

No. 414,816.

Patented Nov. 12, 1889.



Witnesses
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UNITED STATES PATENT OFFICE.

LEWIS C. MORGAN, OF CANTON, OHIO, ASSIGNOR OF ONE-HALF TO WILLIAM J. PIERO, OF SAME PLACE.

STEAM-ENGINE GOVERNOR.

SPECIFICATION forming part of Letters Patent No. 414,816, dated November 12, 1889.

Application filed April 15, 1889. Serial No. 307,329. (No model.)

To all whom it may concern:

Be it known that I, LEWIS C. MORGAN, a citizen of the United States, residing at Canton, in the county of Stark and State of Ohio, have
5 invented certain new and useful Improvements in Steam-Engine Governors; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the annexed drawings,
10 making a part of this specification, and to the letters and figures of reference marked thereon, in which—

Figure 1 is a side elevation showing the different parts properly located and attached.
15 Fig. 2 is a sectional view of the wheel, showing the different parts properly attached and in their normal position or the position when the engine is at rest. Fig. 3 is a top view of the valve-operating mechanism. Fig. 4 is an
20 end view of the valve-operating mechanism.

The present invention has relation to steam-engine governors; and it consists in the different parts and combination of parts hereinafter described, and particularly pointed
25 out in the claims.

Similar letters of reference indicate corresponding parts in all of the figures of the drawings.

In the accompanying drawings, A represents the engine-shaft, to which is attached
30 in any convenient and well-known manner the wheel B, which is provided with the web *a*. To the web *a* are pivotally attached the weighted arms *b*, which arms may be substantially of the form shown in Fig. 1.
35

For the purpose of causing the weighted arms *b* to be forced or pressed toward the engine-shaft A, the springs *c* are provided, which may be attached to the rim of the
40 wheel B, as illustrated in Fig. 1. To the free ends of the weighted arms are pivotally attached the connecting-links *d*. The opposite ends of these connecting-links are pivotally attached to the arms *d'*, which arms are
45 formed integral with the ring or thimble C.

For the purpose of holding the grooved ring D in proper position the screws *f* are provided, which are located substantially as shown in Figs. 1 and 2. The outer ends of
50 the screws *f* should be flush or a little below

the bottom of the groove E. The inner ends or portions of the screws *f* enter the ring or thimble C for the purpose hereinafter described.

The blocks or slides F are located substantially as shown in Figs. 1 and 2. To these
55 blocks or slides F are attached the ends of the yoke G by means of the set-screws *g*, which blocks or slides are for the purpose of holding the yoke G in proper position.
60

For the purpose of permitting the grooved ring D to oscillate laterally on the ring or thimble C the space *g'* is formed by means of the shoulders *g''*, which shoulders abut against
65 each other, as illustrated in Fig. 1, thereby providing suitable bearing-points for the grooved ring D.

The valve-rod I is preferably formed integral with the yoke G, and is provided with the disk J. To the disk J are pivotally
70 attached the connecting-bars K and K'. The opposite ends of these connecting-bars are pivotally attached to the arms K² and K³. The arms K² and K³ are independently attached to the shafts *k* and *k'*, the shaft *k* being located
75 within the shaft *k'*, as illustrated in Figs. 1, 4, and 3. These shafts *k* and *k'* are for the purpose of operating the valve, it being understood that the valves are located in the ordinary positions, and may be of any desired
80 kind and style, reference being had to the manner of operating the valves, which in this instance is done by an oscillating motion.

To the hub of the wheel B, or its equivalent, is securely attached the pin or arm L, to the
85 outer end of which is pivotally attached the connecting-link or arm L'. The opposite end of this connecting-link is securely and rigidly attached to the grooved ring D.

The operations of my invention are as follows: When the engine proper is put in
90 motion, the weighted arms *b* are forced away from the shaft A in proportion to the speed of the wheel B, said weighted arms moving on their pivotal connection to the web *a*,
95 thereby forcing the free ends of said weighted arms away from the shaft A, which moves the ring or thimble C by means of the connecting-links *d* and the arms *d'*, which in turn carry with said ring or thimble C the
100

grooved ring D, the movements of said ring or thimble C and the grooved ring D being in proportion to the speed of the wheel B and its shaft A. The set-screw *f* is for the purpose of carrying the grooved ring D with the thimble C. It will be seen that the differential motion of the ring or thimble C to the wheel B will cause the grooved ring D, together with the different parts, to oscillate laterally to the shaft A until the grooved ring D, together with the yoke G, assumes a position at right angles to the shaft A. The connecting-link or arm *L'* holds the grooved ring, and at the same time causes it to assume the position shown in the dotted lines in Fig. 2. The link *L*² is pivotally attached to the pin or arm *L* for the purpose of permitting the outer end of the connecting-link to describe an arc to compensate for the differential motion. It will be seen that the yoke G will follow the oscillating movements of the grooved ring D, and thereby rock or oscillate the valve-rod I, which in turn regulates the amount of steam permitted to enter the cylinder, and thereby govern the engine proper.

In Fig. 2 the pin *L* is shown exposed by reason of the wheel B, and its hub being shown in section.

By changing the length of the arm *L'* between its attached points the lead of the engine-valves may be varied by means of the grooved ring D straightening quicker when a short arm is attached than it does when a long arm is attached, thereby causing the valves to open sooner or later, according to the length of the arm *L'*.

It will be understood that I prefer to adjust the length of the arm *L'* to each engine; but,

if desired, arms having different lengths may be adjusted in the same engine by properly adjusting the different parts to which said arm is attached.

Having fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination of the shaft A, having mounted thereon the wheel B, the weighted arms *b*, the connecting-links *d*, pivotally attached to the free ends of the arms *b* and to the free ends of the arms *d'*, the ring or thimble C, the grooved ring D, and means for pivotally attaching the ring or thimble C and grooved ring together, the pin *L*, the arm *L'*, the yoke G, and the valve-rod I, substantially as and for the purpose specified.

2. The pin or arm *L*, having pivotally attached thereto the link or arm *L'*, the grooved ring D, and the valve-rod I, and means for oscillating the valve-rod I, substantially as and for the purpose specified.

3. The combination of the shaft A, having mounted thereon the wheel B, provided with the weighted arms *b*, the springs *c*, the links *d*, the arms *d'*, the ring or thimble C, the grooved ring D, the shoulders *g*², the screws *f*, and the attached yoke G, provided with the valve-rod I, substantially as and for the purpose specified.

In testimony that I claim the above I have hereunto subscribed my name in the presence of two witnesses.

LEWIS C. MORGAN.

Witnesses:

E. A. C. SMITH,
FRED W. BOND.