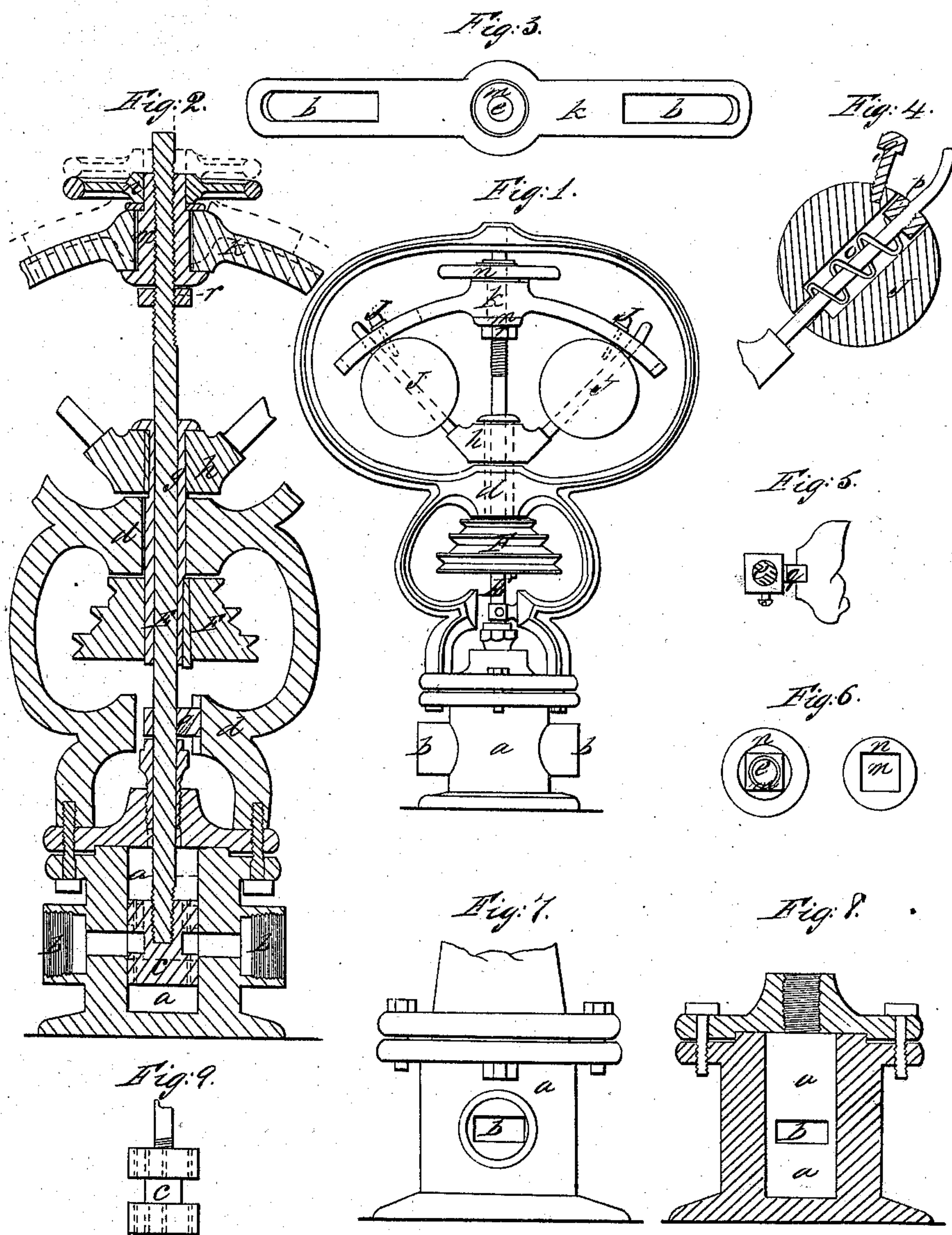


# A.F. Reeder, Steam Governor.

No 105,847.

Patented July 26. 1870.



Witnesses:

Geo. Glade  
W. M. Hatch

Inventor:

A. F. Reeder



# UNITED STATES PATENT OFFICE.

A. F. REEDER, OF NORMAL, ILLINOIS.

## STEAM-GOVERNOR.

Specification forming part of Letters Patent No. 105,847, dated July 26, 1870.

*To all whom it may concern:*

Be it known that I, A. F. REEDER, of the town of Normal, McLean county, and State of Illinois, have invented an Improvement in Steam-Governors; and I do declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

The nature of my invention consists in the construction and general arrangement of a governor for steam-engines the action of which shall be so direct and equal that the slightest upward motion of the balls will produce a corresponding and equal upward motion of the valve, and so as to effectually prevent lost motion on account of the wear of any and all of its parts; also, so as to dispense with all the gearing employed in the old governors, and to enable the engineer at any and all times, whether the machinery be in motion or not, to regulate the steam-power to be applied to the engine, so that any uniform power, within the capacity of the engine, can be attained for any desired period.

In order to enable others skilled in the art to which my invention appertains to make and use the same, I will now proceed to describe its construction and operation, referring to the annexed drawings, in which—

Figure 1 is a side elevation of the entire governor. Fig. 2 is a vertical section of the governor, showing the different parts and their connection and relation to each other. Fig. 3 is a plan view of the segment-bar, on which the balls operate and which raises the valve. Fig. 4 is a vertical section of one of the arms of the governor and its ball, with all their parts and connections, and the relations of those parts with each other. Fig. 5 is a horizontal section of the slide around the valve-stem, secured the same by a set-screw. Fig. 6 is a plan view of the attachment of the hand-wheel, by which the power of the engine may be regulated. Fig. 7 is a side view of the valve-chamber. Fig. 8 is a vertical section of the same, showing its interior arrangement and the steam-passage. Fig. 9 is a side view of the valve, with its balance-opening for the passage of steam above and below the valve, said openings being represented in this figure by dotted lines.

*a* represents the valve-chamber, through

which is a horizontal steam-passage, *b*, the steam passing through said passage from the boiler to the engine. In the chamber *a* is placed the valve *c*, which is provided with a circular groove around its center, allowing the steam to pass around the valve from the boiler to the engine. Through the valve *c*, above and below this groove, are vertical openings, as seen in Fig. 2, and in dotted lines in Fig. 9, for the purpose of allowing a certain amount of the steam to pass above and below the valve, to equalize the pressure on both sides, and thus balance the valve.

The valve-stem *E*, screwed into or otherwise firmly secured to the valve *c*, passes upward through the frame-work *d*, which supports the governor. This stem, after leaving the valve-chamber, has a slide, *q*, firmly secured to it by means of a set-screw, said slide moving vertically up and down with the valve-stem in a groove in the frame *d*, as shown in Fig. 5, thus steadying the valve in its motion. On the stem *E* is placed a hollow sleeve, *G*, to the lower end of which the pulley *F* is secured, said pulley being, by a belt, connected with a similar pulley on the main shaft of the engine or counter-shaft. To the upper end of the sleeve or hollow vertical shaft *G* the arms *h h* are secured. These arms are made of one piece, and stand at about forty or more degrees from a horizontal base, and the space on the sleeve *G*, between said arms and the pulley *F*, forms the journal, which passes through the frame *d*, said frame forming the journal-box in which it revolves. It will thus be seen that when the pulley *F* is revolved the arms *h h* also turn with the same velocity.

On each of the arms *h* is placed a ball, *I*, the arm passing through the same. Around the arm *h*, within the ball, is a chamber, *o*, extending to the upper side of the ball, as seen in Fig. 4. In this chamber around the arm is placed a spiral spring, *x*, the upper end of which bears against a nut, *p*, screwed onto the arm *h* within the opening to the chamber *o*.

On or near the upper end of the valve-stem *E* is placed a screw-sleeve, *M*, around which the segment-bar *k* revolves, said bar having at each end a slot, *L*, through which the ends of the arms *h h* project. Through these slots are also passed screws *J J* into the balls *I I*, which secure the bar *k* to said balls. When the pulley *F* and arms *h h* revolve, the balls *I I* also



revolve in a horizontal radius, and the balls being attached to the arms, as above described, are allowed, through centrifugal agency, to be thrown outward and upward, carrying the segment-bar *k* with them, and raising the valve. The valve-stem *E* does not revolve, being prevented from doing so by the slide *g*, but plays up and down by the raising or lowering of the balls, the balls being balanced by the spiral springs *x* and nuts *p* in the chambers *o* for the purpose of increasing or diminishing the weight of the balls, as required. If the nuts *p p* are screwed down, the springs *x x* will be correspondingly compressed, and consequently it will take a greater velocity or force to elevate the balls, while if the nuts are placed so that the springs are extended, the force or velocity required to accomplish the same object will, of course, not be so great; and hence the balls can be easily regulated to any pressure desired. It will readily be seen that the balls, rising on this angle, and sliding outward on the concave surface of the bar *k*, raise the stem; and, consequently, the valve making the motion direct and equal, so that the least motion of the balls upward produces a corresponding and equal diminution in the steam-passage from the boiler to the engine.

On the top of the screw-sleeve *M* is secured a wrench-wheel, *n*, by which means the power of the engine may be increased or diminished to any required power within its capacity by raising or lowering the valve-stem and valve, so as to regulate the amount of steam passing into the engine; or the valve may be raised, so as to bring its lower head directly opposite the steam-passage in the valve-chamber, making thereby a complete and convenient throttle or stop-valve.

Under the screw-sleeve *M* on the valve-stem is placed a set-nut, *r*, for the purpose of securing the segment-bar *k* in the position required.

The advantages of my governor over those now in use can be briefly stated, thus: Less motion of the balls up and down is necessary, rendering it much more sensitive to the engine; wear produces no lost motion; it is simpler and cheaper of construction; gives better command of the steam, and is more durable.

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

1. The valve *c*, constructed as described, with a circumferential groove and vertical openings, substantially as and for the purposes herein set forth.

2. The combination of the valve-chamber *a*, horizontal steam-passage *b*, and valve *c*, all constructed and arranged as described, to operate, substantially as and for the purposes herein set forth.

3. The combination of the valve-stem *E*, slide *g*, sleeve *G*, pulley *F*, and angular stationary revolving arms *h h*, balls *I I*, and curved bar *k*, all constructed as described, and operating substantially in the manner and for the purposes herein set forth.

4. The ball *I*, constructed as described, with a chamber, *o*, and having a spiral spring, *x*, in said chamber around the arm *h*, held and regulated by the adjustable nut *p*, substantially as and for the purposes herein set forth.

5. The segment-bar *k*, provided with slots *L L*, and secured to the balls *I I* by means of the screws *J J*, substantially as and for the purposes herein set forth.

6. The screw-sleeve *M*, wrench-wheel *n*, segment-bar *k*, and set-nut *r*, all substantially as and for the purposes herein set forth.

A. F. REEDER.

Witnesses:

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