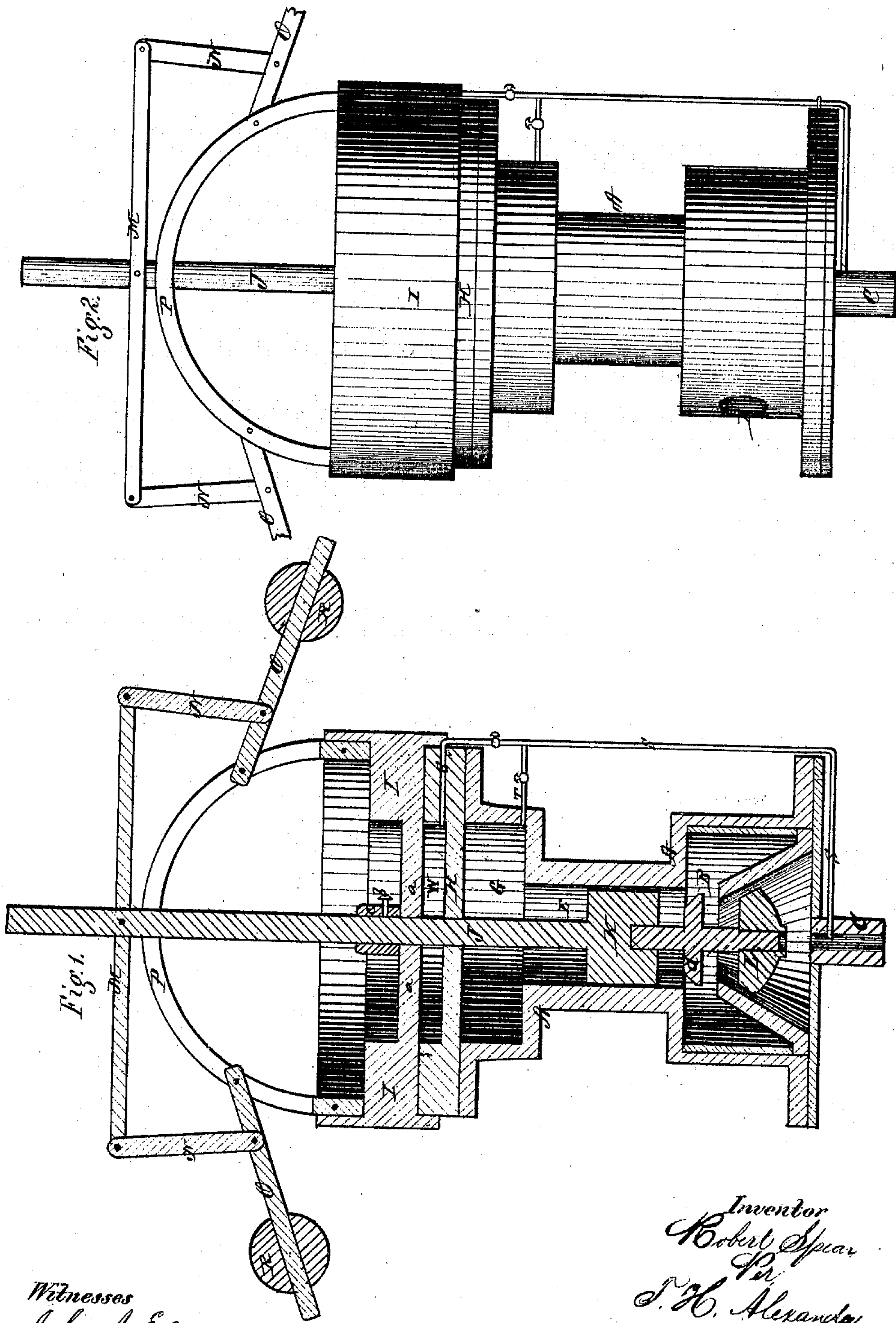


R. Spear,
Governor.

No. 97,324.

Patented Nov. 30. 1869.



Witnesses
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ROBERT SPEAR, OF NEW HAVEN, CONNECTICUT.

Letters Patent No. 97,324, dated November 30, 1869.

GOVERNOR.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that I, ROBERT SPEAR, of New Haven, in the county of New Haven, and State of Connecticut, have invented certain new and useful Improvements in Governors; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

The nature of my invention consists in so constructing a governor that its action will be entirely independent of any motion derived from the engine or machinery to be regulated, and by the combined and reciprocal action of gravity, with the pressure of steam or other motor, a uniform force will be exerted upon the engine or machinery to be operated, regardless of the amount of force, or its sudden changes, when in excess of that at which the governor is set or rated, substantially as hereinafter set forth.

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 longitudinal vertical section, and

Figure 2 is a side elevation of my invention.

A represents the casing or shell of my machine, so constructed as to form a chamber, B, at its lower end, having the pipe C, connecting with the boiler or power-source, and D, the egress or connection with the engine.

Above the chamber B is a cylindrical-shaped portion, E, open at both ends, and connecting with the upper chamber G, on top of which is the cover H.

On top of the cover H is placed a cap, I, the use of which will be hereinafter described.

The piston-rod J extends through the centre of the entire machine, uniting the piston K and the valve L, the piston being placed within the cylindrical portion E, and the valve at the entrance to the chamber B.

The sides of this entrance are inclined, resembling an inverted cone, and the sides of the valve L have the same angle, as seen in fig. 1.

a represents a pin through the piston-rod J, for the purpose of arresting the downward motion of the piston.

To the piston-rod J, a suitable distance above the machine, is attached a beam, M, the ends of which are, by means of pivoted bars N N, connected with two levers, O O. These levers are pivoted, at their inner ends, between two semicircular guide-bars P P, between the centre of which the piston-rod J passes.

On the levers O O are placed adjustable bars or weights, R R.

The guide-bars P P are secured, in any suitable manner, to the cap I.

From the inlet-pipe C, or from the boiler or power-source, a pipe, S, leads upward, conducting, by means of a branch-pipe, T, steam or fluid into the chamber G, above the piston K, and the upper end of the pipe S conducts it into the space or chamber W, formed between the cover H and cap I.

The required amount of the balls or weights R R depends upon the difference in the area of the upper surface of the valve L, and the lower surface of the piston K, as well as the length of the levers O O, upon which said weights are suspended.

The top of the piston K and the bottom of the valve L being the same size, when the steam or fluid is admitted from the pipe C, through the pipe S and branch-pipe T into the chamber G, the force or pressure in it becomes the same as in the boiler or power-source; consequently, the pressure on the lower side of the valve is neutralized. When, now, force is admitted into the chamber B, it tends to elevate the piston K, in proportion to its increased area, over the upper surface of the valve, which, in turn, is counteracted by the resistance of the weights R R upon the piston-rod J, as also by the tendency of the valve L, from its peculiar shape, to close the aperture of its case.

If, now, the outlet D is of the proper size, as compared with the inlet C, or, if too large, reduced by means of a stop-cock, the fluid or steam will be uniformly discharged, regardless of the increase or diminution in the power-source or boiler, so long as the pressure is greater than that at which the governor is set in gear by the position and amount of the weights. The reason of this is obvious, by considering the tendency of an increase of force to elevate or approximately close the valve L, while a diminution of force of the steam or fluid must have the opposite effect of tending to weaken the force in the chamber B, which force is the prop or support for the weights, which, by their dropping, depress the valve, thus enlarging the space between it and its seat.

By this means, a constant pressure is maintained in the chamber B, except that there may be an amount of friction, caused by the action of the piston K in its cylinder, and the piston-rod J through its stuffing-box, in the cover H.

This it is intended to obviate by the elastic part a of the cap I, (which is a cover to the chamber W,) and the position it assumes, by slipping upon the piston-rod J, said elastic cover being inflated by the steam or fluid entering the chamber W through the pipe S.

As the governor is set in gear, the elastic cover is attached to the piston-rod by a thumb-screw, b, passing through its stuffing-box c. Should, then, the power increase, causing a slight elevation in the piston, there is also an increased expansion of this elastic cover, the tube or pipe S connecting the chamber

W with the power-source; but if the force decreases, the elastic cover, being suitably tempered, exerts a certain depression on the piston-rod, which is intended and found by experiments to correspond with the amount of friction in the machine, the friction being plus the weight ascending, but minus descending, for which is substituted the accumulated force, as above described.

Supposing that fifty-one pounds of force per inch is required to raise the piston up, fifty of which are the gravity or weight to be raised, and friction amounting to one pound per inch to be overcome; then, by the action of the elastic cover *a*, the piston will not be delayed in its descent till the pressure in the chamber B has decreased to forty-nine pounds, or thereabout, as would otherwise be the case, but it will instantly fall so as to increase the receiving-orifice in proportion as the force may have weakened.

I would observe, that while I prefer to make the sides of the entrance to chamber B inclined, or like an inverted cone, yet I am fully aware that this entrance might be differently constructed or formed. I do not, therefore, confine myself to any peculiar formation of the valve or entrance to chamber B.

Having thus fully described my invention,

What I claim as new, and desire to secure by Letters Patent, is—

1. The case A, constructed as described, so as to form the chamber B, having inlet C and outlet D, the cylinder E, and chamber G, substantially as and for the purposes herein set forth.

2. In combination with the case A, constructed as

described, the cover H and cap I, forming the chamber W, substantially as and for the purposes herein set forth.

3. In combination with the case A, cover H, and cap I, the piston-rod J, piston K, and valve L, all constructed as described, and arranged to operate substantially in the manner and for the purposes herein set forth.

4. The arrangement of the semicircular guide-bars P P, piston-rod J, beam M, connecting-bars N N, levers O O, and weights R R, all substantially as and for the purposes herein set forth.

5. The elastic cover *a*, secured to the piston-rod J by the thumb-screw *b*, or other suitable means, and operating substantially as and for the purposes herein set forth.

6. The arrangement of the pipes S and T, whereby the steam or fluid is conducted from the boiler or power-source to the chambers G and W, substantially as and for the purposes herein set forth.

7. The entrance to the chamber B, formed in the shape of an inverted cone, in combination with the valve L, operating substantially as and for the purpose described.

In testimony that I claim the foregoing as my own, I affix my signature, in presence of two witnesses.

ROBERT SPEAR.

Witnesses:

T. H. ALEXANDER,
C. ALEXANDER.