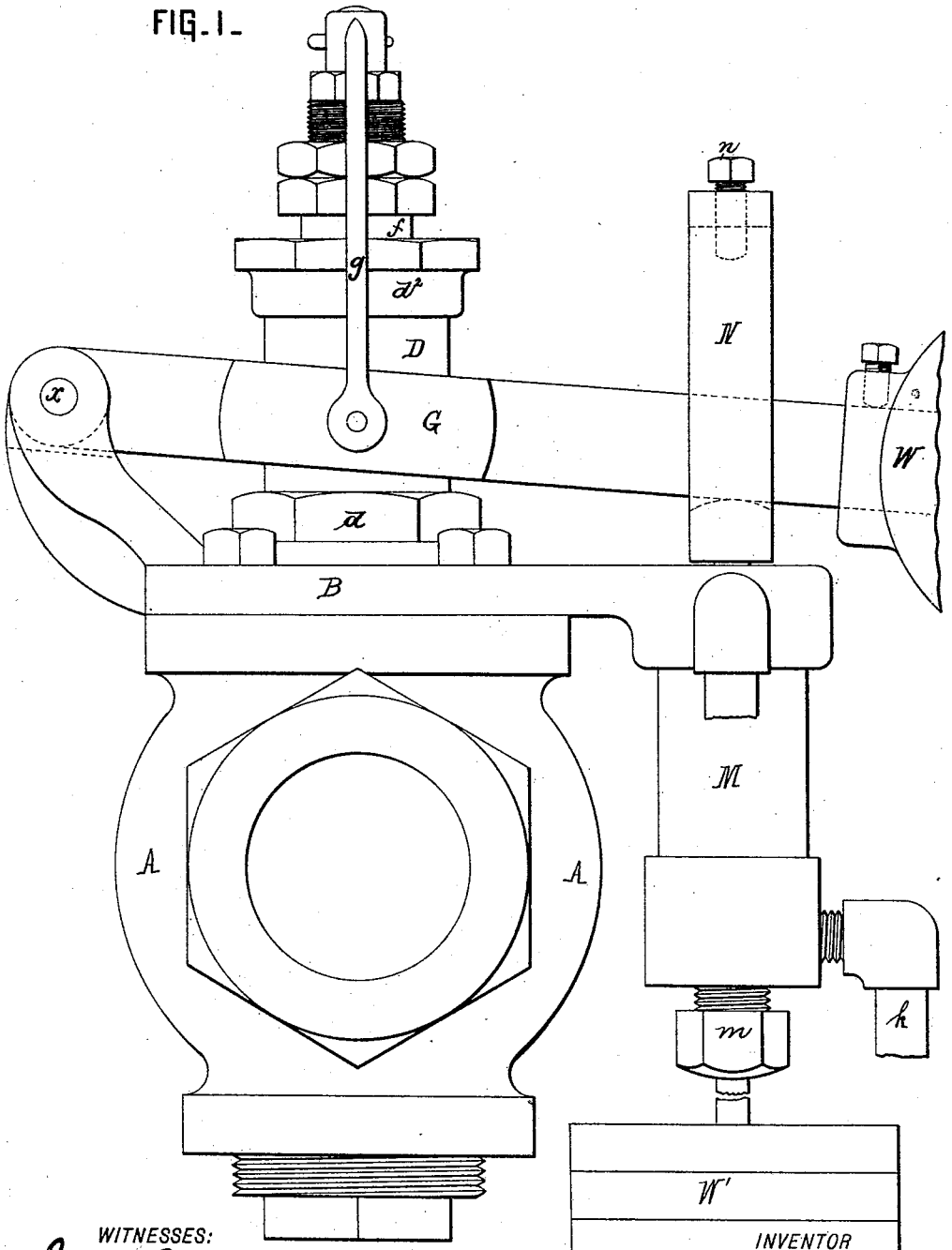
(No Model.) 3 Sheets—Sheet 1.

J. M. FOSTER.

PUMP REGULATOR.

No. 489,297. Patented Jan. 3, 1893.

FIG. 1.



WITNESSES:
George Baumann
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BY John M. Foster.
Howson & Howson
his ATTORNEYS.

(No Model.) 3 Sheets—Sheet 2.

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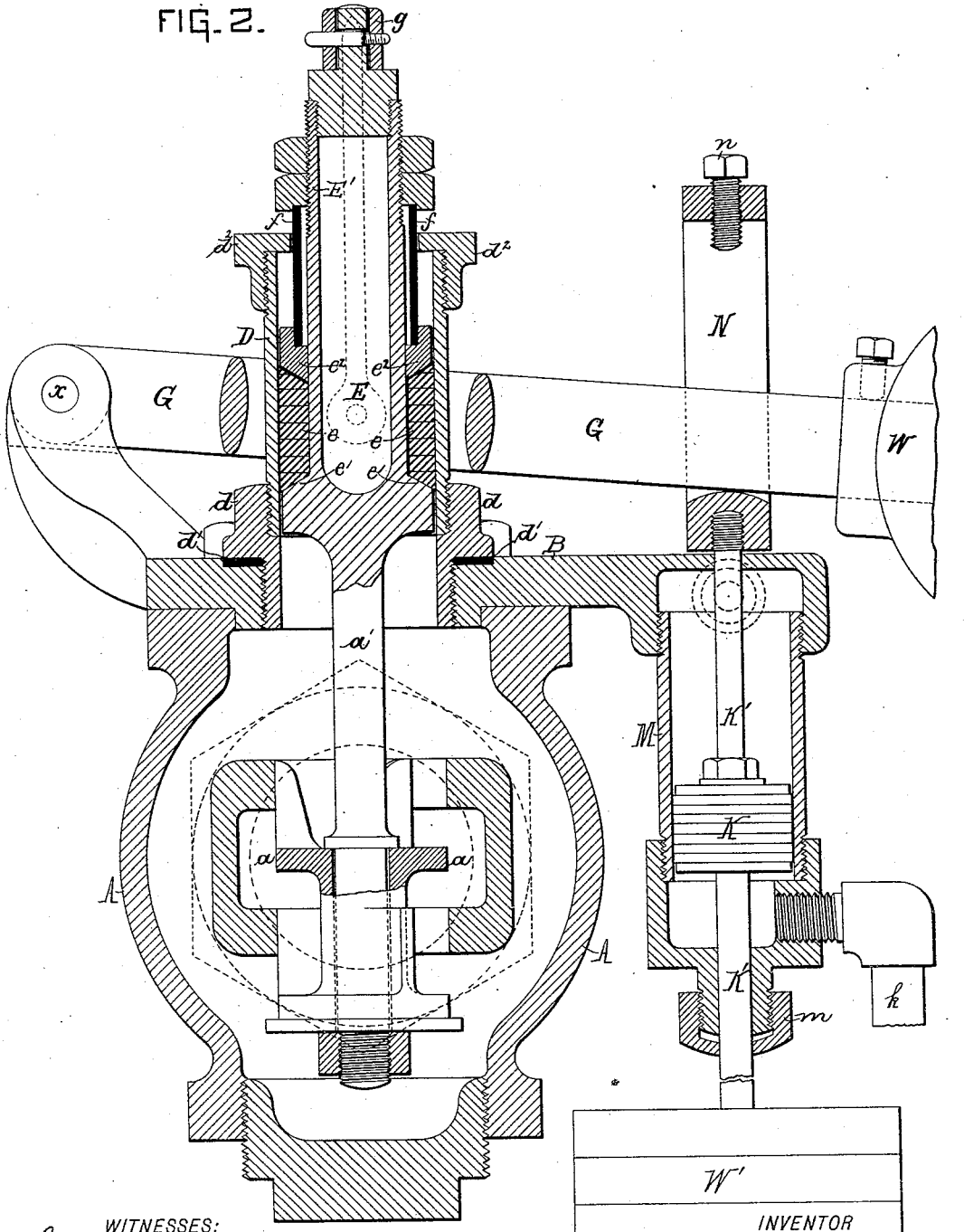
PUMP REGULATOR.

No. 489,297. Patented Jan. 3, 1893.

FIG. 2.



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PUMP REGULATOR.

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FIG. 3.

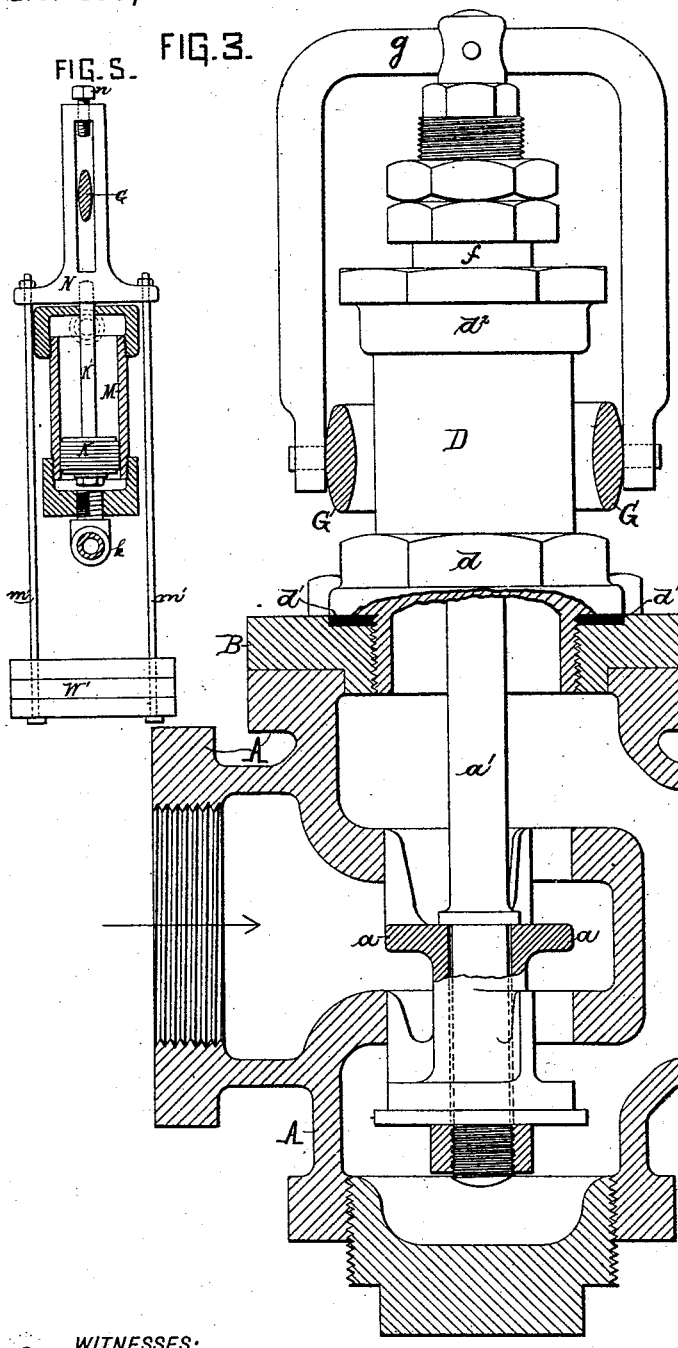
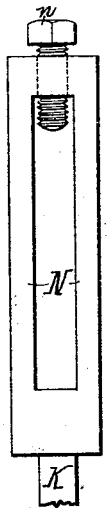


FIG. 5.

FIG. 4.



WITNESSES:
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UNITED STATES PATENT OFFICE.

JOHN M. FOSTER, OF CRANFORD, ASSIGNOR TO THE FOSTER ENGINEERING COMPANY, OF NEWARK, NEW JERSEY.

PUMP-REGULATOR.

SPECIFICATION forming part of Letters Patent No. 489,297, dated January 3, 1893.

Application filed October 14, 1892. Serial No. 448,854. (No model.)

To all whom it may concern:

Be it known that I, JOHN M. FOSTER, a citizen of the United States, and a resident of Cranford, Union county, New Jersey, have invented an Improved Regulator for Pumping-Engines, of which the following is a specification.

The object of my invention is to construct a simple and efficient fluid regulator or governor, such as is more especially adapted for the regulation or governing of pumping engines, or for controlling the flow of gas to steam boiler furnaces in which gas is used as a fuel.

In the accompanying drawings, I have shown my invention as applied to the construction of a pump governor, as I will now proceed to describe.

Figure 1 is an outside view of my improved steam pump governor; Fig. 2 is a vertical section of the same; Fig. 3 is a view showing a section through the valve at right angles to that of Fig. 2: Fig. 4 is a detached view of a part. Fig. 5 is a view illustrating a modification.

A is a valve casing containing a valve *a* of suitable construction which controls the flow of steam or other motive fluid to the engine. The valve is shown in this instance as a two-seated valve adapted to corresponding seats within the casing. The upper part of the casing is closed by a cap or bonnet B which carries a cylinder D in which works a piston E carried by or forming in part a continuation of the stem *a'* of the valve, and acted on by pressure of motive fluid in the delivery side of the valve. This stem *a'* passes through the center of the valve *a* with lateral freedom of motion to allow for possible differences between the axial line of the valve seating and the axial line of the cylinder D. This cylinder D is fitted at its lower end into a thimble *d* which is adapted to be screwed into the bonnet B of the valve casing, there being provided a packing *d'* in an annular recess in the cap B. The top of the cylinder D may be closed by a screw-cap d^2.

The piston E may be constructed in any suitable or convenient way, but I prefer to provide it with packing *e* which is clamped between the upper and lower disks *e'*, e^2. These disks have their faces which bear on the packing, beveled or coned, as shown, so that by pressing these disks toward each other the packing may be forced out against the cylinder D to make the piston steam-tight. The lower disk *e'* is in this instance carried by or it forms part of the stem *a'* of the valve, while the disk e^2 is movable on the body or stem of the piston by means of a sleeve or tubular follower *f* which is guided in the cap d^2 and is pressed upon by adjusting and jam nuts *f'* screwed onto the rod E' of the piston, as will be readily understood. By this means the packing can be tightened or loosened without turning off steam.

The upper end of the piston rod E' is connected with a counterbalancing lever G through the medium of a suitable yoke *g*. This lever G is pivoted in this instance at *x* to a suitable bracket on the cap or bonnet B and is provided with an adjustable weight W to suitably counterbalance the pressure of steam or other motive fluid on the underside of the piston E, for, as will have been understood, the lower end of the cylinder D is open to the interior of the valve casing A through which passes the steam or other motive fluid to the pumping engine.

In a cylinder M is a piston K acted upon by the pressure of water or other liquid from the pump admitted through the pipe *k*. For convenience of construction I prefer to secure this cylinder M to an extension of the cap or bonnet B of the valve casing. The piston K has its own adjustable counterweight W', which in Figs. 1, 2 and 3 is shown as applied to a lower extension of the piston rod K' passing through a stuffing box *m* at the lower end of the cylinder M containing the piston K. In Fig. 5 I have shown the piston rod as without a lower extension, the counterweights being suspended by rods *m'* from the fork N outside the cylinder.

The piston K is connected with the piston E through the counterbalancing lever G but with an intermediate lost motion, and in the present instance I have shown this as obtained by mounting a yoke or fork N on the upper end of the piston rod K'. This yoke or fork embraces the lever G and the slot of the fork may be open at the top but I prefer to close it as shown, and provide an adjustable set screw *n* for a purpose hereinafter explained.

In the drawings the valve *a* is shown as

fully open, giving a full head of steam. In practical operation, the full pressure of steam is turned on and allowed to enter the valve casing. The desired speed of the pump is then regulated by adjustment of the ball or counterbalance W which will bring the lever say to a horizontal position with a partial closing of the valve *a*. When the discharge pressure from the pump unduly increases, the piston K will be raised and the bottom of the fork N acting upon the underside of the lever G will raise the latter and move the valve toward its closed position to cut off the supply of steam or other motive fluid to the engine. When the pressure of water or other liquid from the pump is reduced to or below the desired normal degree, the piston K will descend under the action of its counterweight and the valve *a* will open again, but steadily and slowly, for because of the lost motion or loose connection between the lever G and piston K the latter is free to descend without the lever. If the lever G and piston K were connected to move both up and down together, the descent of the piston K would throw the valve *a* wide open so quickly as to cause the engine to race. But because the lever G is free to descend independently of the piston K, the valve *a*, piston E and weighted lever G can then do their work as a self-contained steam regulator.

In some constructions of pump regulator it may be desirable to cause the motive power engine to start again a little more quickly than it otherwise would, when the piston K descends, and in such case the set screw *n* may be employed, to strike the upper side of the lever G, just as the piston K is reaching the limit of its downward movement. For instance, in fire service, when it would be preferable to let the engine race rather than allow the water to fall too much, the set screw *n* may be employed and adjusted to strike the lever G on the downward movement of the piston K, as explained. The mounting of the cylinder M, as well as the steam cylinder and weighted lever, upon the cap or bonnet B, carries with it this advantage that the bonnet being mounted upon the valve casing and secured by say four or six equidistant screws, the lever can be set in any one of a corresponding number of positions, which is a great convenience in avoiding obstructions in the practical fitting up of the apparatus.

When my invention is to be applied to the governing of gas supply to the steam boiler furnaces, it will be understood that the steam pressure from the boiler acts on the piston K, while the valve *a* controls the flow of gas.

I claim as my invention:—

1. A governor for steam pumping engines and similar appliances, comprising a valve casing and valve controlling the supply of motive fluid, a cylinder with a piston connected to the valve and acted on by the motive fluid pressure, a cylinder with a piston acted on by the discharge pressure from the pump and a lost motion connection between the two pistons, substantially as set forth.

2. A governor for steam pumping engines and similar appliances, comprising a valve casing and valve controlling the supply of motive fluid, a cylinder with a piston connected to the valve and acted on by the motive fluid pressure, a cylinder with a piston acted on by the discharge pressure from the pump and a lever connection between the two pistons, with an intermediate lost motion, substantially as set forth.

3. A governor or regulator for steam pumping engines and similar appliances, comprising a valve casing and valve controlling the supply of motive fluid, a cylinder with a piston connected to the valve and acted on by the motive fluid pressure and a counterweight therefor, in combination with a cylinder having a piston acted on by the discharge pressure from the pump, and a counterweight therefor with a pivoted lever connecting the two pistons, with an intermediate lost motion.

4. A governor or regulator for steam pumping engines and similar appliances, comprising a valve-casing, a valve controlling the motive fluid, a piston carried by the said valve and acted on by the motive fluid pressure and a lever connected to the said piston in combination with a cylinder and a piston connected to the said lever with a lost motion, and acted on by the discharge pressure from the pump.

5. A governor for steam pumping engines and similar appliances comprising a valve casing and valve controlling the supply of motive fluid, a cylinder with a piston connected to the valve and acted on by the motive fluid pressure and a counterweighted lever therefor in combination with a cylinder having a counterweighted piston acted on by the discharge pressure from the pump and carrying a yoke or fork with an adjustable set screw, the said lever passing through said yoke or fork all substantially as described.

6. A governor for steam pumping engines and similar appliances, comprising a valve casing and valve controlling the supply of motive fluid, a cylinder with a piston connected to the valve and acted on by the motive fluid pressure and a counterweighted lever therefor in combination with a cylinder having a piston acted on by the discharge pressure from the pump, and connected to the said lever with a lost motion, the cap or bonnet of the valve casing carrying the two cylinders and lever, all substantially as and for the purpose set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOHN M. FOSTER.

Witnesses:
R. R. WALLACE,
W. A. KELLER.