(No Model.) 2 Sheets—Sheet 1.

J. J. LOWDEN.

PRESSURE REDUCING VALVE.

No. 391,807. Patented Oct. 30, 1888.

Fig. 1.

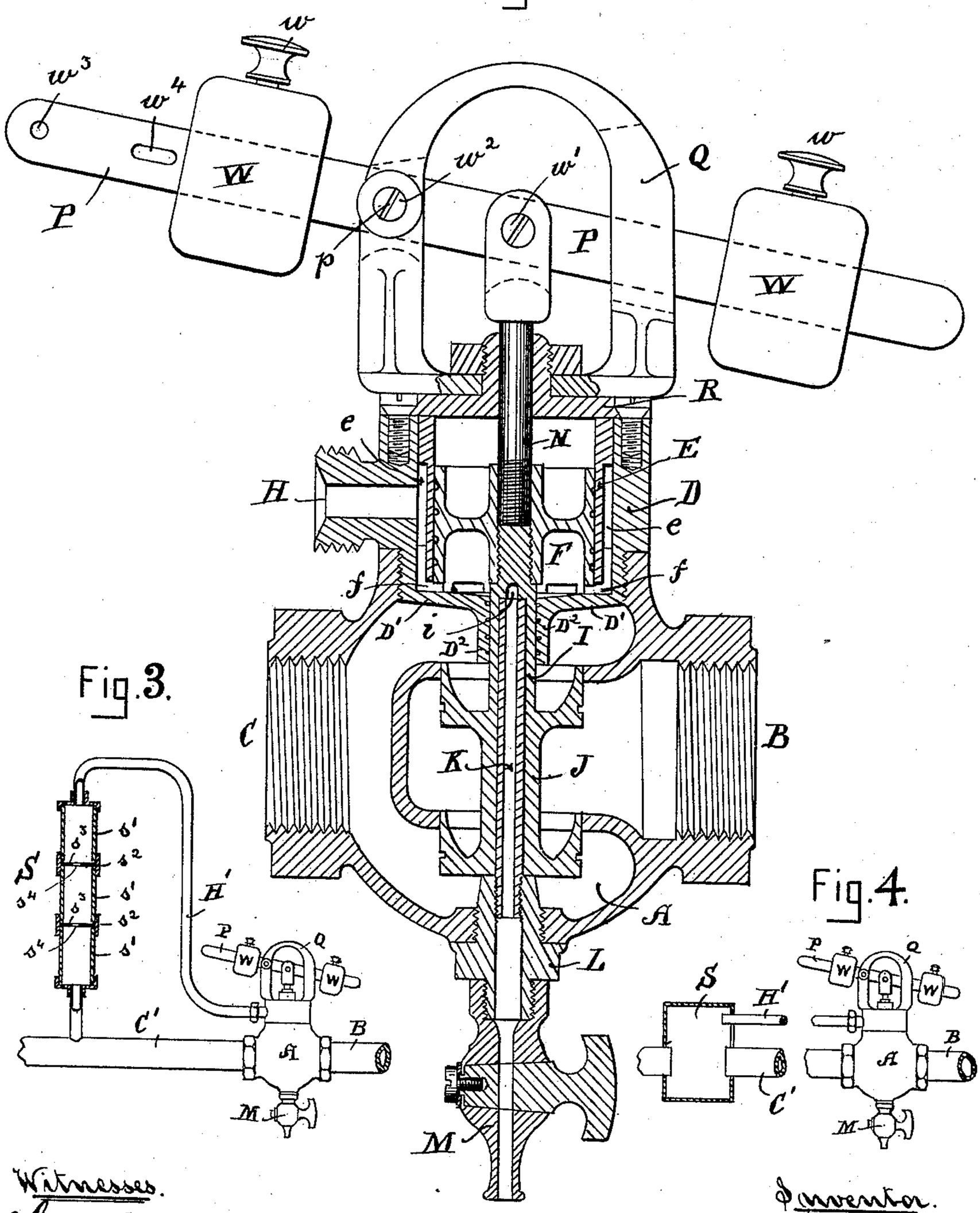

Fig. 3.

Fig. 4.

Witnesses.
Geo. G. Deltzer.
W. C. Ricker.

Inventor.
James J. Lowden.
by E. Blanta.
Attorney.

(No Model.) 2 Sheets—Sheet 2.

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PRESSURE REDUCING VALVE.

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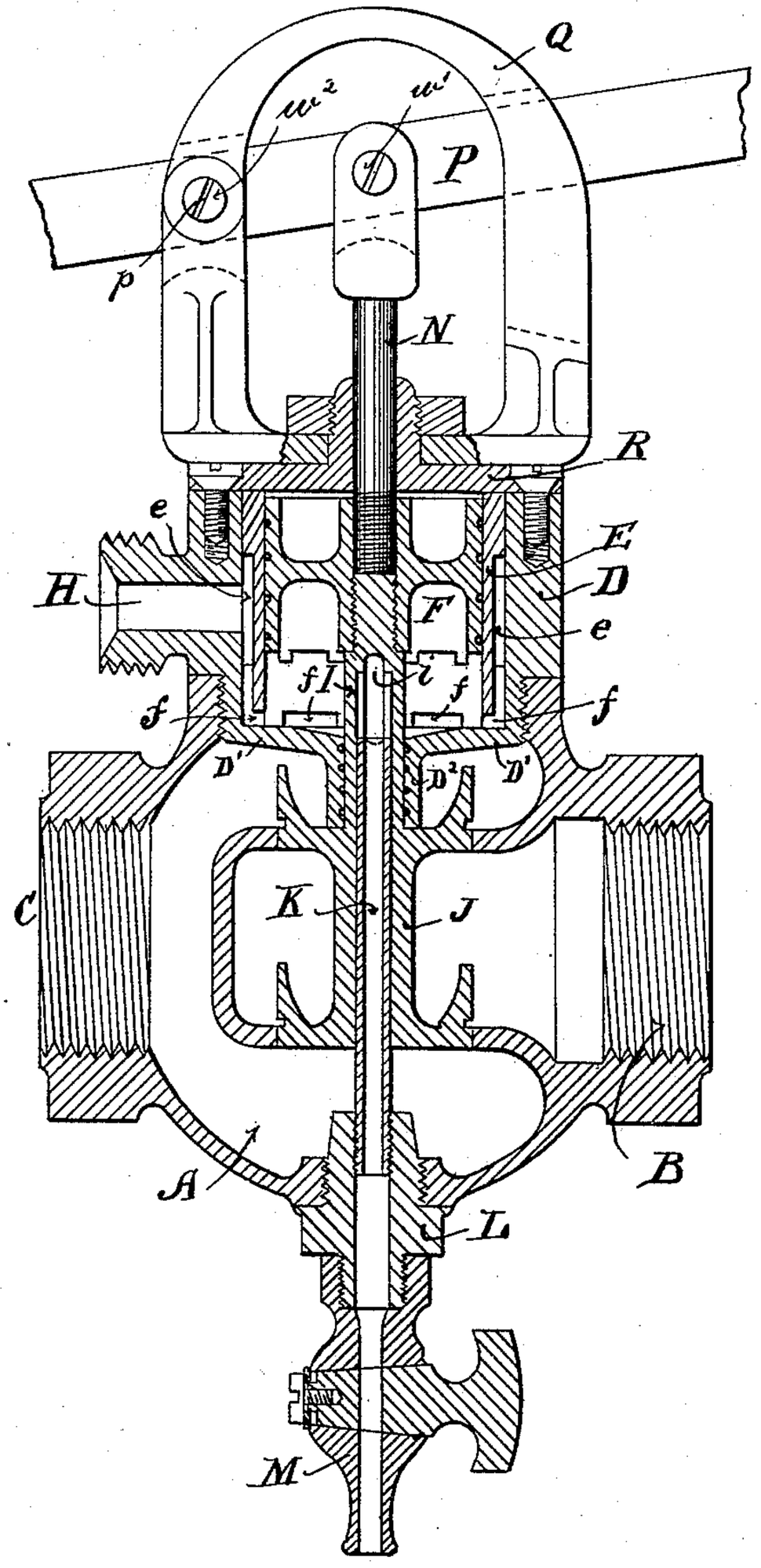
Fig. 2.



Witnesses.
J. George Seitzer.
W. G. Richter.

Inventor.
James J. Lowden.
by E. Planta.
Attorney.

UNITED STATES PATENT OFFICE.

JAMES J. LOWDEN, OF BOSTON, MASSACHUSETTS.

PRESSURE-REDUCING VALVE.

SPECIFICATION forming part of Letters Patent No. 391,807, dated October 30, 1888.

Application filed September 17, 1887. Serial No. 249,911. (No model.)

To all whom it may concern:

Be it known that I, JAMES J. LOWDEN, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented a new and useful Improvement in Pressure-Reducing Valves, of which the following is a specification.

My invention relates to that class of valves which are employed to regulate the pressure of steam, whereby a uniform lower pressure than that generated in the boiler may be maintained in the delivery or distributing pipes, no matter what the pressure or irregularities of the supply may be.

The invention consists in certain details of construction, hereinafter fully described, and pointed out in the claims.

Referring to the accompanying drawings, Figure 1 is a vertical section of a valve embodying my invention controlled by weights and in its normal position. Fig. 2 is a similar view showing the valve closed. Figs. 3 and 4 show the valve in connection with a receiver for breaking up the steam and preventing vibration or backlash of the valve.

A represents the body or valve-chamber.

B is the inlet, and C the outlet.

To the top of the body A is secured a cylinder or piston-chamber, D, in which is placed a loosely-fitting lining, E, provided with a recess, *e*, all around it, which communicates by ports *f* with the under side of a cylinder, F, which at its lower end is provided with corresponding ports. On the outside of this cylinder F, I form annular grooves or water-pockets that form a packing and prevent the escape of steam between the cylinder D and lining E.

H is the inlet for admitting steam from the low-pressure pipe to the recess *e*. To the lower part of the cylinder F is secured a hollow valve-stem, I, which may be cast in one with the double-seated valve J. In the upper part of the valve-stem I, just below the cylinder F, two or more long slots, *i*, are provided, so that the exhaust, and also any water formed by condensation in the cylinder D, will pass through the same and out of a pipe or tube, K, that connects with a plug, L, at the lower part of the body A, and to which a drip-cock, M, is attached.

At the bottom D′ of the cylinder or piston-chamber D is provided an extension, D^2, in which are formed annular grooves or water-pockets that form a packing and prevent steam escaping from the valve-chamber A to the piston-chamber D.

To the upper part of the cylinder F is connected a rod, N, to which a lever, P, is attached, said lever being fulcrumed at *p* in a saddle-frame, Q, secured to the cap or cover R of the piston-chamber D.

On the lever P are secured weights W W, that are held by thumb-screws *w w*, so that their position on the lever P can be readily adjusted, according to the pressure of steam required on the low-pressure side of the valve, and should the pressure required be so great that it cannot be regulated with the lever in the position shown, then the screws w' w^2 can be removed and the lever shifted, so that the fulcrum will be at its end w^3, and the screw w' will then pass through the slot w^4, and both the weights W can then be secured on its outer end, so that by this means the valve can be regulated to be lifted, say, from one-half pound pressure to the full-boiler pressure.

In connection with this valve I use a receiver, S, which, when the steam for operating the piston F is taken from a point near the valve, (on the low-pressure side,) I form as shown in Fig. 4, in which the receiver consists of preferably three sections of pipe, s' s', (but more or less may be employed,) connected together by unions s^2, and between each section of pipe is placed a composition plate or wire gage, s^3, with a small hole, s^4, in the center, after which it passes by pipe H′ to the piston-chamber D.

When the steam for operating the piston F is taken from a point distant from the valve, then the receiver S may consist of a simple tank, into which the steam enters after passing through the valve and is broken up, after which it passes through the pipe H′ to the piston-chamber D.

The operation is as follows: The weights W W are first adjusted upon the lever P, and the drip-cock M is opened to allow the condensed water to escape from the valve-chamber D. Steam is then turned on and admitted at B to the valve-chamber A, and passes through the valve and out at C on the low-pressure side. The steam for operating the piston F

passes through the receiver S, where its force is broken up so as to prevent any backlash and vibration, after which it passes by the pipe H′ and through the inlet H to the recess *e* in the lining E, thence through the ports *f* to the under side of the piston F, and if there is any excess of pressure above that required, it will raise the piston F and with it the valve J, and cause the steam to be cut off accordingly until the pressure is again reduced to the required standard, when the piston F, and with it the valve J, will be lowered by the weights W, and so on, the slightest variation in the pressure of the steam in the cylinder D causing the piston to rise and cut off the steam-supply. The space between the piston F and the cover R acts as an air-chamber and prevents the piston F from violent thumping or sudden jerks. The cover R, fitting loosely around the rod N, allows sufficient space for the air to escape gradually.

It will be seen that the valve is regulated by the stop-cock M, as well as by the weights W on lever P, for should the cock M be closed it will cause the pressure and products of condensation to bank under the piston F and prevent the latter from falling when the pressure of steam becomes lower than the standard; but when the cock M is open, then the exhaust and condensation will be free to escape, and the piston F will respond to the slightest variation of pressure. Thus the valve can be regulated to the greatest nicety, according as the drip-cock M is opened more or less, and as the steam first passes through the receiver S before it reaches the chamber D all chattering or vibration of the valve from backlash is prevented.

Although I have described this valve with reference to steam, it is obvious that it is equally applicable for compressed air.

What I claim as my invention is—

1. In a pressure-reducing valve having a piston working in a chamber separated from the valve-chamber, and to which steam is admitted from the low-pressure side, a pipe or tube passing through the valve, and a drip-cock to carry off the exhaust and products of condensation, substantially as set forth.

2. In combination with a pressure-reducing valve having a piston working in a chamber separated from the valve-chamber, and to which steam is admitted from the low-pressure side, a loosely-fitting lining provided with a recess all around it, and ports at its lower end to deliver steam on the under side of the piston, substantially as set forth.

3. A receiver, S, consisting of two or more compartments with composition plates, each provided with a small hole to break up the steam and prevent vibration and backlash, in combination with a pressure-reducing valve, substantially as and for the purposes described.

4. In a pressure-reducing valve, the double-seated valve J, valve-stem I, piston F, rod N, lever P, and weights W, in combination with the cylinder D, lining E, provided with recess *e*, and ports *f*, the pipe K, and drip-cock M, substantially as shown and described.

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

JAMES J. LOWDEN.

Witnesses:
L. W. HOWES,
E. PLANTA.