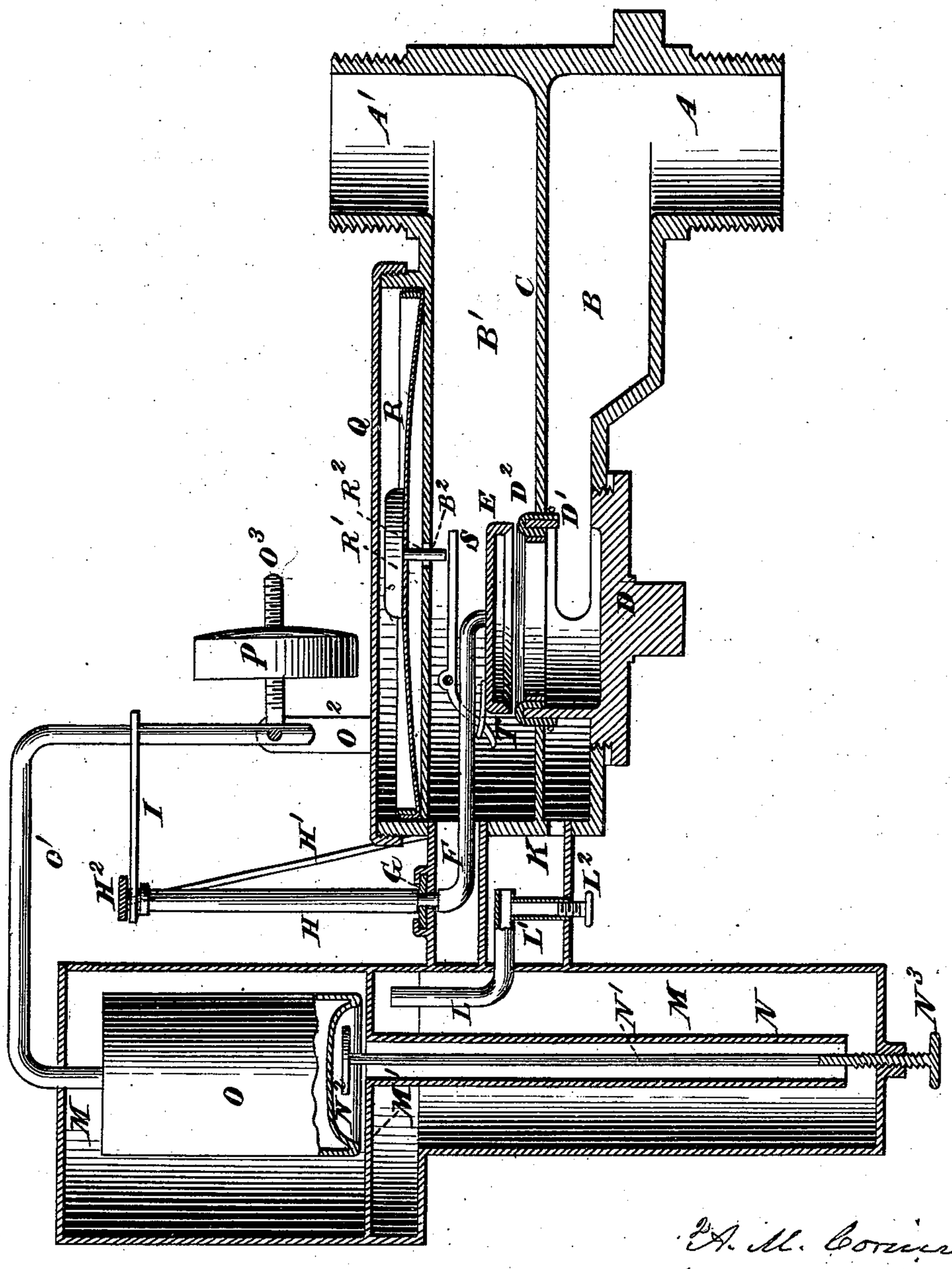
W. L. HORNE & A. M. CORNING.

Fluid-Pressure Regulator.

No. 227,785. Patented May 18, 1880.



Witnesses.

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UNITED STATES PATENT OFFICE.

WILLIAM L. HORNE AND ARTHUR M. CORNING, OF MERIDEN, CONNECTICUT;
SAID CORNING ASSIGNOR TO SAID HORNE.

FLUID-PRESSURE REGULATOR.

SPECIFICATION forming part of Letters Patent No. 227,785, dated May 18, 1880.

Application filed April 12, 1879.

To all whom it may concern:

Be it known that we, WILLIAM L. HORNE and ARTHUR M. CORNING, of Meriden, in the county of New Haven and State of Connecticut, have invented certain new and useful Improvements in Pressure-Regulators for Fluids, &c., of which the following is a specification.

Our invention relates to an apparatus for maintaining a regular flow of gases, &c., notwithstanding the varying pressure in the main. This is accomplished by a series of valves and levers operated by the pressure of the gas coming from the main pipe, the operations of which will be fully explained hereinafter.

The annexed drawing, making a part of this specification, is a transverse vertical section of the apparatus.

The gas enters through the induction-pipe A into a chamber, B B′, formed with a partition, C, dividing it into two chambers. Both the partition C and the bottom of the chamber B are cut away to admit the valve-seat D, which is formed as shown, being cut away at D′ to permit the free flow of the gas from chamber B through D into the chamber B′.

The object of having the valve-seat extend through the bottom of the chamber B is to permit its removal without difficulty.

E is the valve, placed above the valve-seat D, and regulates the flow of gas from chamber B into chamber B′, from which the service or eduction pipe A′ is supplied.

D^2 is a packing on the upper edge of the tubular valve-seat.

The valve E is attached to the lever F H, which has its fulcrum in the hinge G, which forms a flexible bearing, which permits the free oscillation of the lever at the same time that it prevents the escape of gas.

In the case as illustrated the hinge G is formed of a sheet of india-rubber embracing a portion of the lever turned down to form shoulders, the upper one of which bears on the upper surface of G, which is fitted close to the stem of the lever, thus forming a cheap and effective hinge.

Any other form of gas-tight joint may be used instead of the rubber which will allow sufficient play to the lever while it prevents the escape of gas.

The upper end of the lever carries a yoke, H^2, which is supported on flexible arms H′, fastened to the outside of the case B.

The upper end of the lever F H is connected, by a rod, I, to the bent rod O′, which will be hereinafter explained.

K is a chamber having an open communication with the chamber B, out of which leads the pipe L into a chamber, M. A branch pipe, L′, leading from the lower end of the pipe L, opens through the bottom of the chamber K, and is closed by a plug, L^2. The chamber M is divided into two compartments by a diaphragm, M′, which has a tubular extension, N, opening near the bottom of the lower chamber.

A rod, N′, is attached to the valve N^2, passing down through the tube N and through the bottom of the chamber M, and threaded, so that by turning the head N^3 the stop or valve N^2 may be raised or lowered, so as to regulate the size of the aperture connecting the upper and lower sections of the chamber M.

O is a float in the upper section of the chamber M, hung on a bent rod, O′, which passes out through an opening in the top of chamber M, and is bent, as shown in the drawing, its lower end being connected to a shaft which rests in bearings formed in standards O^2.

A horizontal arm, O^3, having a thread cut on it, is attached to the rod O′ and carries an adjustable counterpoise, P.

A chamber, Q, is formed above the chamber B′, as shown, having an opening at B^2 through the top of the chamber B′.

A flexible diaphragm, R, is placed in the chamber Q, and supports a weight, R′, furnished with a stem, R^2, which passes through the diaphragm R with a gas-tight joint, and through the hole B^2, extending into the chamber B′.

S is a bent lever, pivoted to a rod attached to the walls of the chamber B′ and bent so that the short arm shall pass through a bail, T, attached to the valve E, so that in case the valve E should fail to operate for the admission of gas into the chamber B′, there being no pressure of gas to sustain the diaphragm R, the weight R′ will fall, and will bear on the lever S so as to lift the valve.

The lower section of the chamber M may be filled to the top of the pipe L with any suitable fluid, such as glycerine, by pouring the fluid in through an opening formed in the upper section of the chamber. The valve or stop N^2 being open, the liquid will pass through the tube N and into the lower section of the chamber. By leaving the plug L^2 open it will be readily ascertained when the chamber is filled to a sufficient height.

The diaphragm M′ is placed at a suitable distance above the lower end of the enlargement of the chamber M, in order that the pressure of the gas contained therein may be maintained at the same point it attains to in the main A, and still be sufficient to maintain the liquid in the tube N at its proper height, and thus enable it to act upon the float.

When the apparatus is attached to the main and distributing pipes the gas entering through A B K L into the top of the lower section of the chamber M will, by its normal pressure, force the liquid down from the top of the lower section of chamber M and up through the tube N, under the valve N^2, (now raised,) and into the upper section of the chamber M, which will contain the amount displaced by the pressure of the gas, surrounding and buoying the float O, the weight of which is regulated by the adjustment of the counterpoise P.

Should the pressure in the main be increased above the normal, the liquid will be forced down in the top of the lower section of the chamber M and correspondingly raised in the upper chamber, thereby lifting the float O, oscillating the arm O′, and, through the connecting-rod I, drawing the upper end of the lever F H to the right, (in the case illustrated,) and causing the valve E to approach its seat in the diaphragm C, thus controlling the gas passing from chamber B to chamber B′ and correspondingly reducing the pressure in the distributing-pipes.

If the pressure in the main is reduced, the fluid will run down from the upper section of chamber M, causing a corresponding fall in the float O, and, through the connecting mechanism, lifting the valve E, allowing a more free flow of gas from chamber B into chamber B′. Thus the shifting of the position of the valve automatically will maintain an equal pressure in the distributing-pipes, with a varying pressure in the main.

Should the pressure in B′ become so reduced as to not afford a sufficient supply of gas to the burners, the descent of the diaphragm R and weight R′ will serve to lift the valve through the instrumentalities of the lever S, and to hold it open until the pressure in B′ has been brought up to the normal.

What we claim as our invention, and desire to secure by Letters Patent, is—

1. The combination, in an apparatus for governing the flow of a fluid, of chamber M, float O, tubes L and N, valve N^2, and branch pipe L′, provided with plug L^2, substantially as set forth.

2. The combination, in an apparatus for governing the flow of a fluid, of the valve E, lever F H, and hinge G, which forms a fulcrum for the lever, and at the same time preventing the escape of the gas, substantially as set forth.

3. The combination of the chamber M, the float O, the bent rod O′, the arm O^3, the counter-balance P, the connecting-rod I, and lever H F, and the valve E, the lever S, and the loaded diaphragm K, the parts being constructed and arranged for operation substantially as set forth.

4. In combination with the float O, automatically operated by the shifting level of a fluid, the arm O′, connecting-rod I, and oscillating lever F H, and valve E, regulating the orifice between the chamber B and B′ by the rise and fall of the fluid, substantially as set forth.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

WM. L. HORNE.
A. M. CORNING.

Witnesses:
GEO. W. SMITH,
FRANKLIN PLATT.