(No Model.) 2 Sheets—Sheet 1.

R. F. HATFIELD.

GAS PRESSURE REGULATOR.

No. 334,773. Patented Jan. 26, 1886.

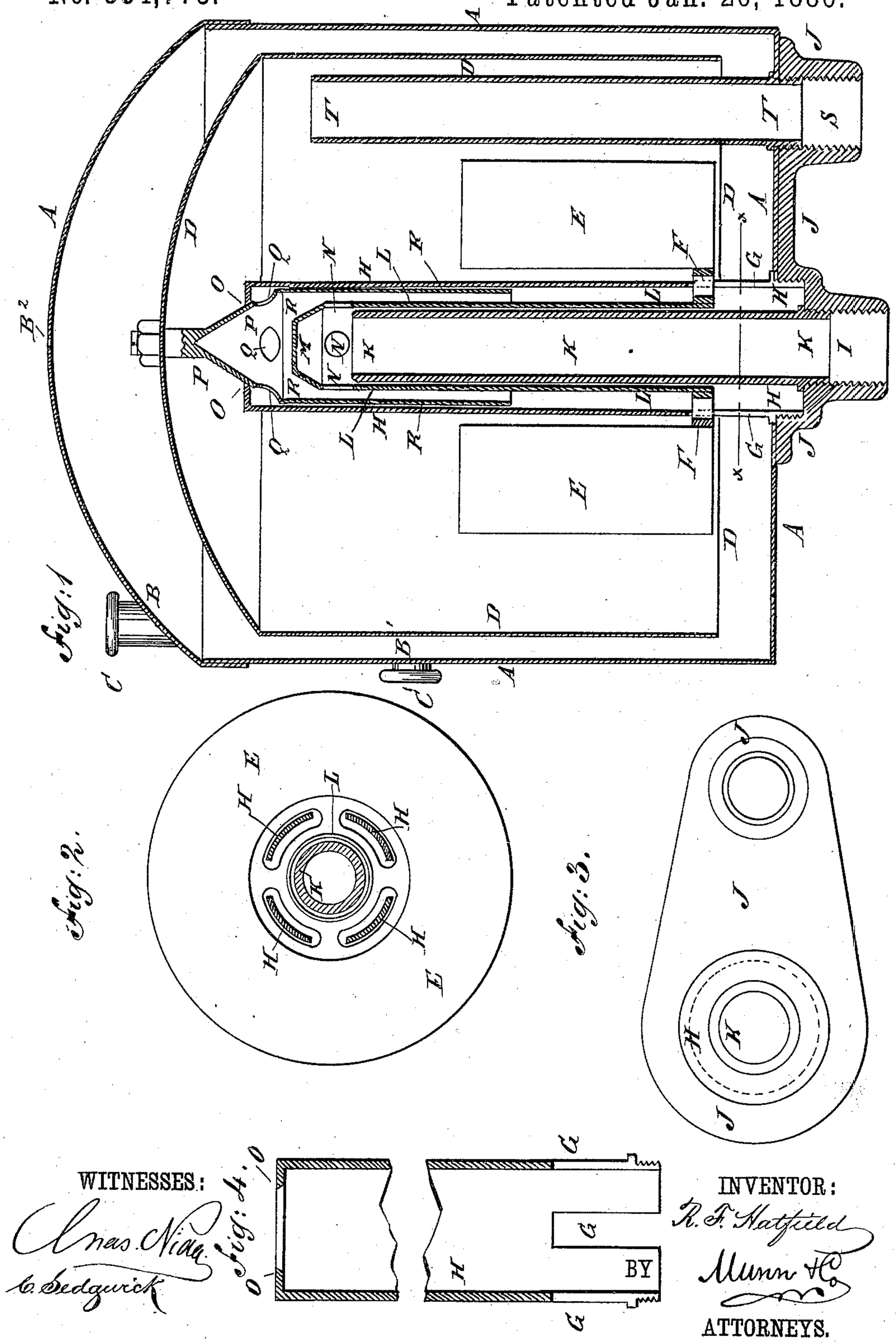

Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

WITNESSES:

Chas. Nida.

C. Sedgwick

INVENTOR:

R. F. Hatfield

Munn & Co

ATTORNEYS.

(No Model.) 2 Sheets—Sheet 2.

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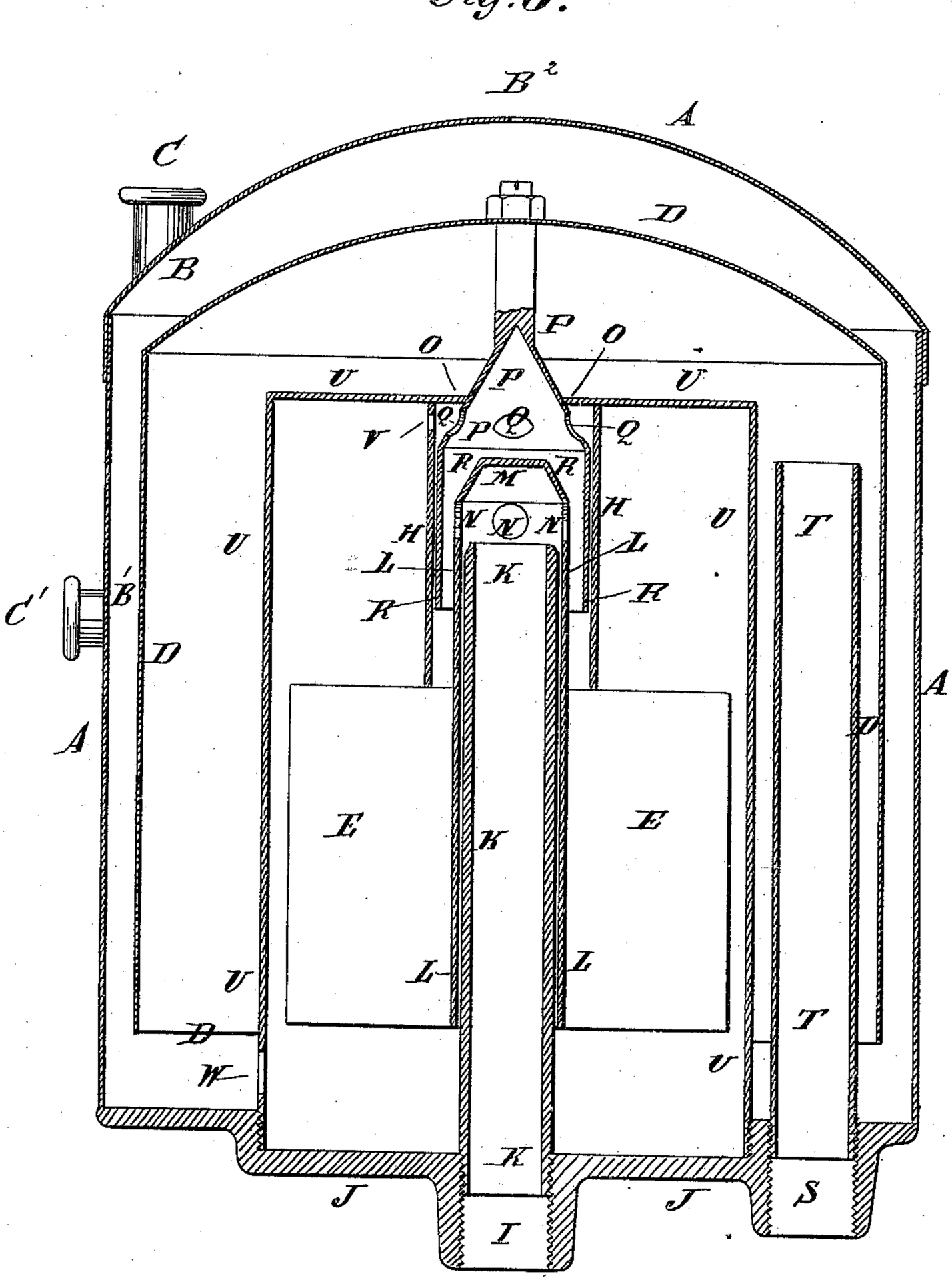
Fig: 5.



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UNITED STATES PATENT OFFICE.

ROBERT F. HATFIELD, OF NEW YORK, N. Y.

GAS-PRESSURE REGULATOR.

SPECIFICATION forming part of Letters Patent No. 334,773, dated January 26, 1886

Application filed April 25, 1885. Serial No. 163,457. (No model.)

To all whom it may concern:

Be it known that I, ROBERT F. HATFIELD, of the city, county, and State of New York, have invented certain new and useful Improvements in Gas-Pressure Regulators, of which the following is a full, clear, and exact description.

Reference is to be had to the accompanying drawings, forming part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a sectional side elevation of one of my improved gas-pressure regulators. Fig. 2 is a sectional view of a part of the same, taken through the line *x x*, Fig. 1, and looking upward. Fig. 3 is a bottom view of the casting attached to the bottom of the case of the regulator. Fig. 4 is a sectional side elevation of the outer or slotted pipe. Fig. 5 is a sectional side elevation of a modification of my improved gas-pressure regulator.

The object of this invention is to provide gas-pressure regulators constructed in such a manner that the float-valve and the regulator-valve shall be entirely independent of each other, so that the float-valve can settle to its seat with only the resistance of the gas-pressure in the inlet-pipe and without having to draw down the regulator with it.

The invention consists in the combination, with the inlet-pipe and regulator having valve apparatus operated by the gas-pressure, of a float and attached valve operated by the rise and fall of the liquid, and in the construction and combination of various parts of the gas-pressure regulator, as will be hereinafter fully described, and then pointed out in the claims.

A represents the case of the regulator, the top of which may be soldered or otherwise firmly secured in place.

In the top of the case A, near one side, is formed a hole, B, through which water or other suitable liquid can be poured into the said case.

In the side of the case A is formed an overflow-hole, B′, to prevent the liquid from rising too high in the case when the said case is being filled. The holes B B′ are closed with screw caps or plugs C C′, except when supplying the case A with liquid.

In the center of the top of the case A is formed a pin-hole, B^2, so that the air-pressure will be the same within and without the said case.

Within the case A is placed the regulator D, which is made of the same shape as the said case A, but smaller, so that there will be a space between the walls and the tops of the said case and regulator, as shown in the drawings. The regulator D is made with a close top and an open bottom, and within it is placed the float E, which is made smaller than the said regulator D, so that the said float can move up and down freely within the said regulator. The float E is made in annular form, and to the lower end of its inner wall are secured arms F, which pass through slots G in the lower part of the pipe H, the tops of the said slots G serving as stops for the float E in its upward movement. The lower end of the pipe H passes through a hole in the center of the bottom of the case A, and is screwed into the enlarged upper part of the opening I through the casting J, secured to the bottom of the said case A. The lower part of the smaller portion of the opening I is designed to receive a gas-pipe, and into the upper part of the said smaller portion of the opening I is screwed the inlet-pipe K, which projects upward into the interior of the regulator D. The inner ends of the arms F are secured to the lower end of the pipe L, which fits upon the inlet-pipe K, and slides up and down upon it as the float E rises and falls.

If desired, the arms F can be made in the form of an annular plate, having apertures through it to receive the arms formed in the lower part of the pipe H by the slots G, as shown in Fig. 2. The upper end, M, of the pipe L is closed, and is made in the form of a truncated cone, to fit upon the beveled upper end of the inlet-pipe K, and serve as a valve to close the said inlet-pipe K when the float E has nearly reached the bottom of the case A.

In the upper part of the pipe L, just below its conical top, are formed openings N, which are wholly uncovered when the float E and pipe L are at the upper end of their movement, and through which openings the gas passes on its way from the inlet-pipe K to the regulator D. With this construction, as the liquid in the case A lowers and the float E

and pipe L descend, the float-valve M is gradually closed, and is entirely closed before the said liquid becomes so low that there would be danger of gas escaping, so that the action of the float-valve is independent of the regulator. The upper end of the pipe H is provided with an inwardly-projecting annular flange, having its inner edge beveled to form an opening or seat, O, for the cone-valve P, which is attached to the top of the regulator D.

In the lower part of the cone P are formed openings Q, through which the gas passes from the inner to the outer side of the said valve P, so that it can pass through the upper end of the pipe H into the regulator D, when the valve P is lowered from its seat or opened.

To the lower edge of the valve P is secured the upper end of the guide-pipe R, which fits against the inner surface of the pipe H, to cause the valve P to move up and down vertically, and to bring it squarely to its seat O. With this construction the pressure upon the gas will be controlled entirely by the weight of the regulator D, and can be increased or lessened at will by placing weights upon the said regulator or removing them therefrom.

In the casting J is formed a second opening, S, into the lower part of which is designed to be screwed the pipe leading to the burners, and into the upper part of which is screwed the lower end of the outlet-pipe T, which passes water-tight through an aperture in the bottom of the case A, and projects upward into the upper part of the regulator D.

In the modification shown in Fig. 5, the lower part of the pipe H is cut off, so that the float E can be attached directly to the pipe L, the lower end of the pipe H serving as a stop for the float E to strike against at the end of its upward movement. In this case the float E and pipe H must be inclosed by a casing, U, to support the pipe H and to prevent gas from escaping through the lower end of the pipe H into the regulator when the float E is out of contact with the said pipe, a small hole, V, being formed in the upper part of the pipe H, to equalize the gas-pressure between the pipe H and the casing U, and a hole, W, being formed in the lower part of the casing U, for the free passage of the liquid in the case A, so that the said liquid will stand at the same height within and without the said casing U.

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

1. The combination, with the inlet-pipe and regulator, having valve apparatus operated by the gas-pressure, of an independent float and attached valve operated by the rise and fall of the liquid, substantially as shown and described.

2. In a gas-pressure regulator, the combination, with the case A, the regulator D, the float E, and the inlet-pipe K, of the pipe L, connected at its lower end with the said float, having a closed conical upper end, M, and provided with apertures N at its upper end, and the pipe H, substantially as herein shown and described, whereby the gas will be shut off independent of the regulator by the downward movement of the float, and the upward movement of the said float will be limited, as set forth.

3. In a gas-pressure regulator, the combination, with the case A, the regulator D, and the pipe H, having valve-seat O at its upper end, of the cone-valve P, having apertures Q in its sides, and provided with a guide-pipe, R, sliding upon the inner surface of the said pipe H, substantially as herein shown and described, whereby the gas-pressure is regulated independent of the float, as set forth.

ROBERT F. HATFIELD.

Witnesses:
EDGAR TATE,
WILLIAM ALBERT MILLEG.