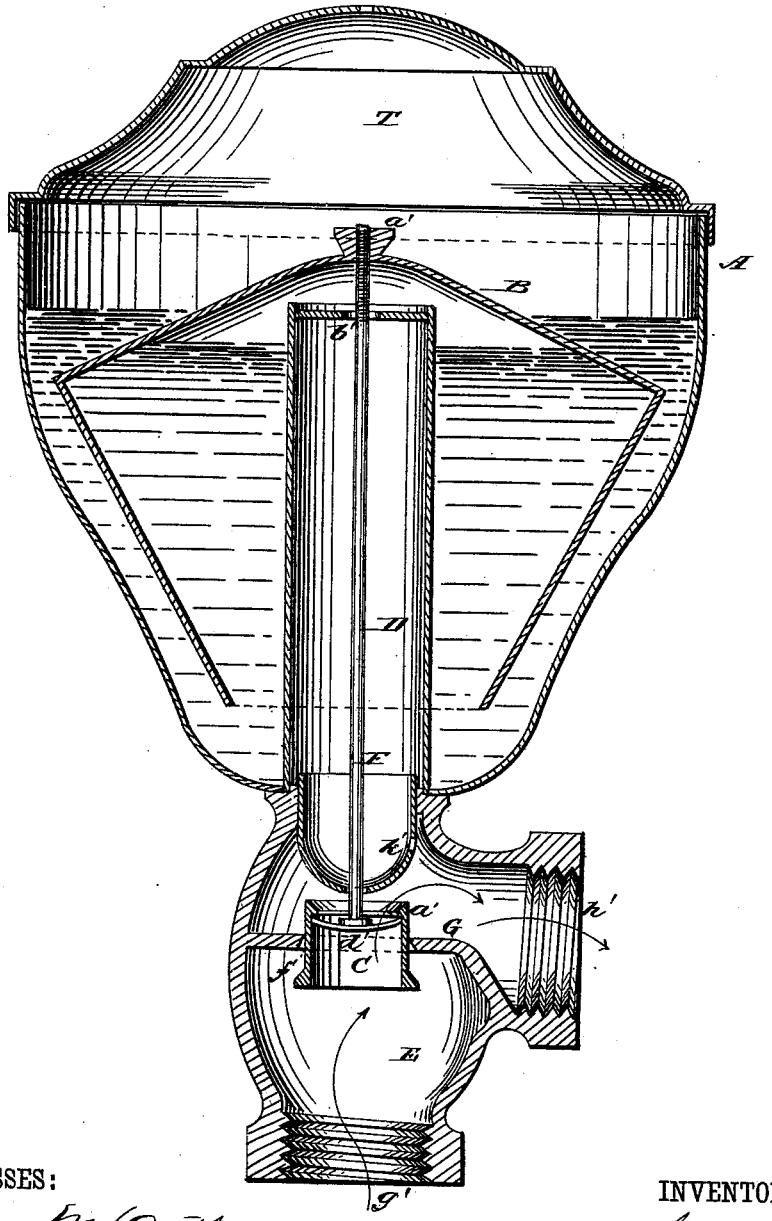
N. SLEEMAN.
Gas-Regulator.

No. 219,990. Patented Sept. 23, 1879.

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# UNITED STATES PATENT OFFICE.

NATHANIEL SLEEMAN, OF BIRMINGHAM, ASSIGNOR, BY MESNE ASSIGNMENT, TO NATIONAL GAS SAVING COMPANY, OF ANSONIA, CONN.

## IMPROVEMENT IN GAS-REGULATORS.

Specification forming part of Letters Patent No. **219,990**, dated September 23, 1879; application filed May 12, 1879.

*To all whom it may concern:*

Be it known that I, NATHANIEL SLEEMAN, of Birmingham, in the county of New Haven and State of Connecticut, have invented a new and Improved Gas-Regulator, of which the following is a specification.

The drawing represents a vertical section of the regulator.

The object of this invention is to furnish an automatic gas-regulator of superior accuracy and efficiency to any other now in use.

In the drawing, A represents the metallic case or shell, approaching the conical in form, and being of greater diameter at the top than at the bottom, inclosing a float, B, and tube D. Conforming somewhat with the shape of the case or shell and the top T, the sides of the float are formed of a wide conical ring, spreading outward toward the top, where it is united to a circular cover that slopes upward from all directions to its slightly-flattened center.

Projecting upward centrally through the bottom of the shell, and firmly secured thereto, is the tube D, whose upper end is fully open, and whose sides are drawn in at the lower end, which projects downward into the globe E in such a manner as to make the end hemispherical. This end is centrally pierced with a hole for the admission of the valve-stem F, which passes up through it, and is screwed into the nut $a'$ on the apex of the float. The guides $b'$ serve to retain the valve-rod centrally in the tube.

The valve C is a deep ring, in which the valve-rod is centrally secured to the cross-bars $d'$. The upper rim of the valve is beveled inwardly to fit closely against and upon the end of the tube D, and the lower rim is provided with a sloping exterior flange that fits closely, when the valve is raised, within the beveled opening $f'$ in the center of the diaphragm G of the globe.

By this construction I am enabled to seal the valve without the use of glycerine or other liquid, the advantage of which is, that in gas-regulators where the valve is sealed by a liquid the gas in its passage through the machine is compelled to pass over the sealing liquid, the effect of which is to render it so thick and gummy that the machine becomes in a very short time inoperative.

When ready for use the shell or case is partly filled with glycerine for the proper support and adjustment of the float and valve. The gas enters the regulator through the opening $g'$, and passes out through the opening $h'$.

It will be seen that the valve is so arranged and constructed as to offer a minimum resisting-surface to the pressure of the entering gas, so that the gas-pressure upon it is never enough to force it up and close it; yet its construction is such that it can adapt itself to a wide range of varying pressure, and be made to entirely cut off the entering gas, if desired.

All other gas-regulators of which I have knowledge are chiefly affected or controlled in their operations by the size of their valves—the larger the valve the more effect upon it has the pressure of the gas entering from below.

The ordinary flat valve is serviceable in combination with a flat-topped float, or with a float with perpendicular sides where the pressure of gas in the main varies but little, and a regulator provided with these will work automatically within narrow limits; but when the pressure rapidly varies, as it commonly does in the evening, from four or five tenths of an inch at one extreme to three or four inches at the other, this style of valve and float fail to properly and automatically regulate the flow to the burners unless frequent personal attention is given to adjust them with the weights, screws, or levers with which they are usually provided for such occasions.

All these difficulties are avoided by the combination of my annular double valve C with the float B. The valve *per se* is hardly affected by the pressure of the gas, while the float is so constructed that its oscillations or vibrations under varying pressures, and the consequent flickerings of the lights it controls, are reduced to a minimum. Its sloping sides afford it a hold in the glycerine in which they are immersed that makes it slower of motion, and the deeper its cover or top is immersed the less lifting-surface does it offer to the gas, in which respect it differs radically from the flat-topped floats, that, even to the point, almost, of com-

plete immersion, present a constant lifting-surface, and are, therefore, imperfect in their action. The relative position of this float and valve may be adjusted by screws at either end of the valve-rod, and also by the quantity of glycerine or other fluid introduced into the case or shell, an increased amount of which will reduce the lifting-surface of the float.

It will be seen that the gas does not pass through the body of the machine, and that only enough passes up the tube to afford a pressure-column under the float for regulating the flow to the lights. With an increased pressure within the float the glycerine within is proportionately depressed while it rises over the cover. As the pressure diminishes the inclosed glycerine rises, and the cover emerges in proportion from the liquid on its top.

Thus it will be seen that the connecting-valve is regulated in its movements entirely by the float, and in a more efficient manner than in regulators of the ordinary kind.

The small orifice *k'* in the side of the tube is for the upward passage of the gas to the space under the float.

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

1. The combination, with case A and cover T, of the float B, with conical sides and upward-sloping top, tube D, provided with a lower hemispherical end that serves as a valve-seat, and side orifice, *k'*, valve-rod F, passing centrally up through the tube and connected at its upper end with the center of the top of the float, annular valve C, attached by means of cross-bars *d'* to rod F, and having an inside bevel on its upper rim, and globe E, provided with a horizontal diaphragm, G, through which is a beveled aperture, *f'*, that serves as a valve-seat for the lower rim of the valve, substantially as herein shown, and for the purpose described.

2. In a gas-regulator, the combination of the float B with the shell A, the annular double valve C, the valve-stem F, the tube D, and the diaphragm G of the globe E.

3. In a gas-regulator, the combination of float B, annular double valve C, hemispherically-pointed tube D, provided with orifice *k'*, and diaphragm G, provided with aperture *f'*.

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