R. M. POTTER & W. W. THOMAS.

Gas-Regulator.

No. 162,685. Patented April 27, 1875.

Fig: 1

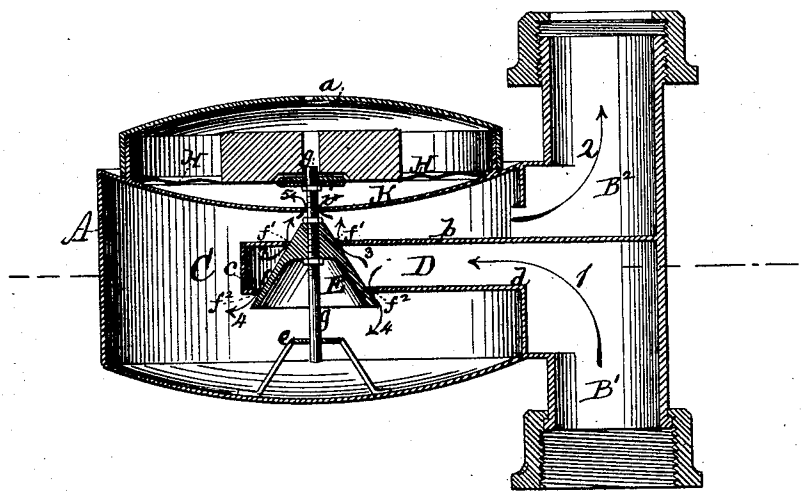
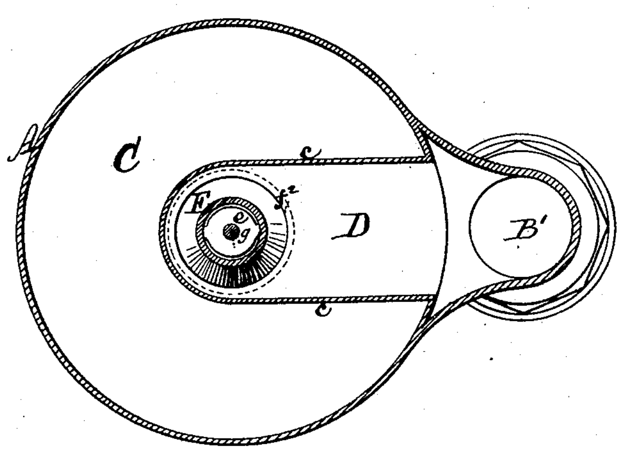


Fig: 2



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UNITED STATES PATENT OFFICE.

ROBERT M. POTTER AND WILLIAM W. THOMAS, OF JERSEY CITY, N. J.

IMPROVEMENT IN GAS-REGULATORS.

Specification forming part of Letters Patent No. **162,685**, dated April 27, 1875; application filed March 17, 1875.

To all whom it may concern:

Be it known that we, ROBERT M. POTTER and WILLIAM W. THOMAS, both of Jersey City, in the county of Hudson and State of New Jersey, have invented certain Improvements in Gas-Regulators; and we do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawing forming part of this specification.

Our invention consists in a novel construction of the inlet and outlet chambers and arrangement of valve-seats, whereby a passage is afforded from the inlet to the outlet chamber both above and below, and whereby the valve is more nearly balanced.

In the accompanying drawing, Figure 1 is a central vertical sectional view of a gas-regulator constructed according to our invention. Fig. 2 is a horizontal sectional view taken in the line *x x* of Fig. 1.

A represents a vessel of any suitable shape, preferably that of a short cylinder arranged in a vertical position. To one side of the vessel A is attached a tube which is divided by a partition, so as to form an inlet-pipe, B^1, leading to the interior of the vessel, and an outlet-pipe, B^2, leading therefrom. The interior of the vessel forms a gas-chamber, C. The partition *b*, which divides the attached pipe B^1 B^2, extends into the chamber C beyond its center, and forms the top of the inlet-chamber D, the sides and bottom of which are formed by partitions *c d*, the latter being bent downward and joined to the bottom of the chamber C, as shown in Fig. 1, by which means an inlet-chamber is formed inside of the outlet-chamber C. In the partitions *c d* are formed seats f^1 f^2 for the valve E, which is conical in form, and is attached to a valve-stem, *g*, the lower end of which works freely in bearings in a bracket, *e*, attached to the bottom of the chamber C. The upper end of the valve-stem is attached to the center of a diaphragm, H, the edges of which are attached to the sides of the chamber C. The diaphragm is, preferably, composed of bladder or other animal membrane, though any suitable material may be used. Sufficient space is left between the diaphragm and the top *a* of the vessel A to allow of suitable play of the valve.

The gas from the meter or service-pipe enters the regulator through the inlet-pipe B^1, as indicated by the arrow 1, passing through the inlet-chamber D to the valve E, upon reaching which it passes through the upper seat f^1 and lower seat f^2, as indicated by the arrows 3 and 4, into the outlet-chamber C, from which it passes by the outlet-pipe B^2, as indicated by the arrow 2. When the pressure of gas becomes too great, either by extinguishing one or more burners in a building or other place, or by reason of an excess of pressure at the gas-works, or from any other cause, the upward pressure against the diaphragm has the effect of raising its central portion, and with it the valve-stem *g* and valve E, so as to diminish the space between the valve and its seats f^1 f^2, and reduce the quantity of gas passing through the same.

By constructing the valve in conical form, and providing two seats for the same, a passage is afforded for the gas from the inlet-chamber D to the outlet-chamber C both above and below the inlet-chamber, as indicated by the arrows 3 and 4, and the valve is more nearly balanced than in the ordinary construction, as the impingement of the gas against the lower portion of the conical valve has a tendency to overcome or compensate for the effect of the upward pressure against the diaphragm.

In order to prevent the valve from being closed by any sudden variation in the pressure of the gas passing through the regulator a guard-plate, K, is employed. This guard-plate is of metal, and may be flat or concavo-convex. Its edge or periphery its attached to the sides of the chamber C immediately under the diaphragm, and through its center runs the valve-stem *g*. The opening *i* in the center may be large enough to allow the passage of gas, as indicated by the arrows 5, or the valve-stem may fit snugly in said opening, and perforations may be provided in other parts of the plate for the passage of gas. By means of this perforated plate the gas passes gradually to the diaphragm until the space between it and the plate is filled, and, as the gas is allowed to circulate through the perforations, the pressure is uniform above and below the guard-plate.

In case of any sudden increase or variation

in the pressure of the gas, the guard-plate prevents such variation from being communicated too suddenly to the diaphragm, and thereby prevents the valve from being pressed so closely into its seats as to entirely obstruct the passage of gas through the same.

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

The combination, in a gas-regulator having an enlarged gas-chamber, C, and a diaphragm, H, of the inlet-chamber D, constructed at its top and bottom with valve-seats f^1 f^2, and arranged horizontally within the gas-chamber, and the conical valve E, arranged within the inlet-chamber and connected with the diaphragm, all substantially as described.

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Witnesses:
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