C. HOFFMANN.
Gas-Regulator.

No. 216,186. Patented June 3, 1879.

Fig. 1.

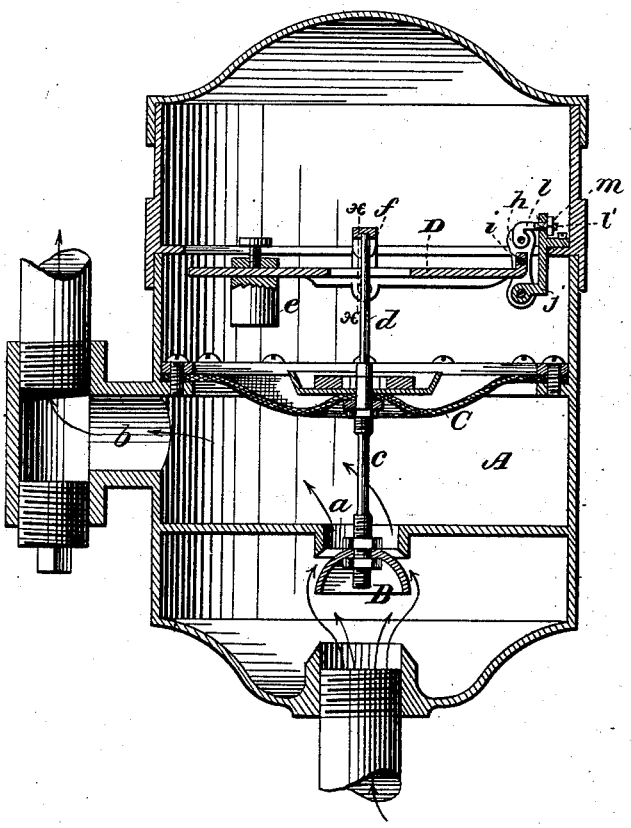


Fig. 2.

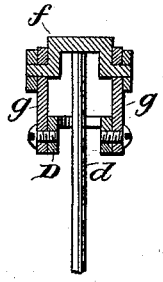
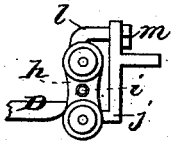


Fig. 3.



WITNESSES:

Jas. E. Hutchinson.

Albert H. Norris.

INVENTOR.

Chas. Hoffmann.

by Van Santvoord & Kauffs

Attorneys.

UNITED STATES PATENT OFFICE

CHARLES HOFFMANN, OF NEW YORK, N. Y.

IMPROVEMENT IN GAS-REGULATORS.

Specification forming part of Letters Patent No. **216,186**, dated June 3, 1879; application filed April 16, 1879.

To all whom it may concern:

Be it known that I, CHARLES HOFFMANN, of the city, county, and State of New York, have invented a new and useful Improvement in Gas-Regulators, which improvement is fully set forth in the following specification, reference being had to the accompanying drawings, in which—

Figure 1 represents a vertical central section of a regulator embodying my invention. Fig. 2 shows the connection of the valve-stem with the balance-lever in cross-section, the plane of section being indicated by the line *x x*, Fig. 1. Fig. 3 is a side view of the fulcrumed end of the balance-lever, its supporting-bracket, and the intermediate connections.

Similar letters indicate corresponding parts.

My invention relates to that class of regulators in which the flow of gas is controlled by means of a valve connected to a flexible diaphragm, which is acted upon by the gas. Prior to my invention the flexible diaphragm has been adapted to different pressures of gas through the medium of one or more balance-weights placed loosely thereon. This arrangement is objectionable on account of the difficulty experienced in determining the proper weight or weights; and with a view to overcome this objection I combine with the diaphragm a balance-lever carrying an adjustable weight, the lever being arranged to bear on a stem projecting upward from the diaphragm at the center thereof, so that the desired effect can be produced by simply moving the weight to different portions of the lever.

That part of the balance-lever bearing on the stem of the diaphragm consists of a yoke, which is connected to the lever by means of pivoted links, so that the stem remains perpendicular in its up-and-down motions and the ensuing vibratory motions of the lever. The balance-lever, moreover, has its fulcrum in pivoted links, whereby it is rendered capable of longitudinal motion and the effect of the yoke is increased, with these links being combined a stop to limit said motion of the lever.

In the drawings, the letter A designates a chamber, to which gas is admitted through an orifice, *a*, forming the seat for a valve, B, the gas being allowed to escape through an orifice, *b*; and C is a flexible diaphragm located in said chamber. The valve B is connected to the diaphragm C by means of a rod or stem, *c*, so that, as the pressure of the gas admitted to the chamber increases or decreases, the diaphragm rises or falls and the position of the valve changes, thereby regulating the flow of gas.

The diaphragm C carries an upwardly-projecting stem, *d*, which is located at the center thereof, and forms a continuation of the valve-stem *c*.

The letter D designates a lever, upon which is arranged an adjustable weight, *e*, and which bears on the upper end of the stem *d* by means of a yoke, *f*, this yoke being connected to the lever through the medium of pivoted links *g*. (See Fig. 2.) The fulcrum of the lever D is formed by pivoted links *h*, the lever being in this example provided with gudgeons *i*, (see Fig. 3,) which project in opposite directions from the end of said lever, and rest in bearings formed in the intermediate portions of the links. These links stand vertically parallel to each other on opposite sides of the end of the lever, and their lower ends are pivoted on a bracket, *j*, secured to the side of the chamber A. Between the upper ends of the links *h* is pivoted a stop, consisting of a bent plate, *l*, from the horizontal portion of which a pin, *l'*, projects through the upper portion of the bracket *j*, and is prevented by a head, *m*, from being withdrawn therefrom. The pin *l'* is, however, of sufficient length to permit the links *h* to have a slight vibratory motion, in order that the balance-lever may have a slight longitudinal play, the stop serving to limit the same.

It will be seen that the weight *e* on the lever D tends to balance the diaphragm C, and by moving said weight to different portions of the lever the diaphragm is adapted to different pressures of gas. By this method of balancing the diaphragm the least difficulty is had in accomplishing the desired object.

By the peculiar junction of the stem *d* with the balance-lever D, and also by the peculiar method of hanging said lever, said stem is caused to preserve a perpendicular position as the same moves up and down together with the diaphragm, the yoke *f* adapting itself to the stem, and the balance-lever being capable of a slight longitudinal motion.

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

1. In a gas-regulator, the combination, with a flexible diaphragm connected to a valve, of the balance-lever, having at or near its center a slot, and journaled at one end between pivoted links capable of a vibratory movement, and a yoke connected by pivoted links to the said lever, the yoke resting upon the upper end of a stem projecting from the diaphragm through the slot in the lever, the outer free end of the latter being provided with an adjustable weight, all substantially as and for the purpose described.

2. The combination, with the flexible diaphragm C, its upwardly-projecting stem *d*, and the balance-lever D, of pivoted links, in which said lever has its fulcrum, and a stop, *l*, connected to the pivoted links, substantially as and for the purpose described.

3. The combination of the yoke *f* and pivoted links *g*, the pivoted fulcrum-links *h*, and stop *l* with the balance-lever D, the flexible diaphragm C, and its stem *d*, substantially as and for the purpose described.

In testimony that I claim the foregoing I have hereunto set my hand and seal this 10th day of April, 1879.

CHAS. HOFFMANN. [L. S.]

Witnesses:

W. HAUFF,

CHAS. WAHLERS.