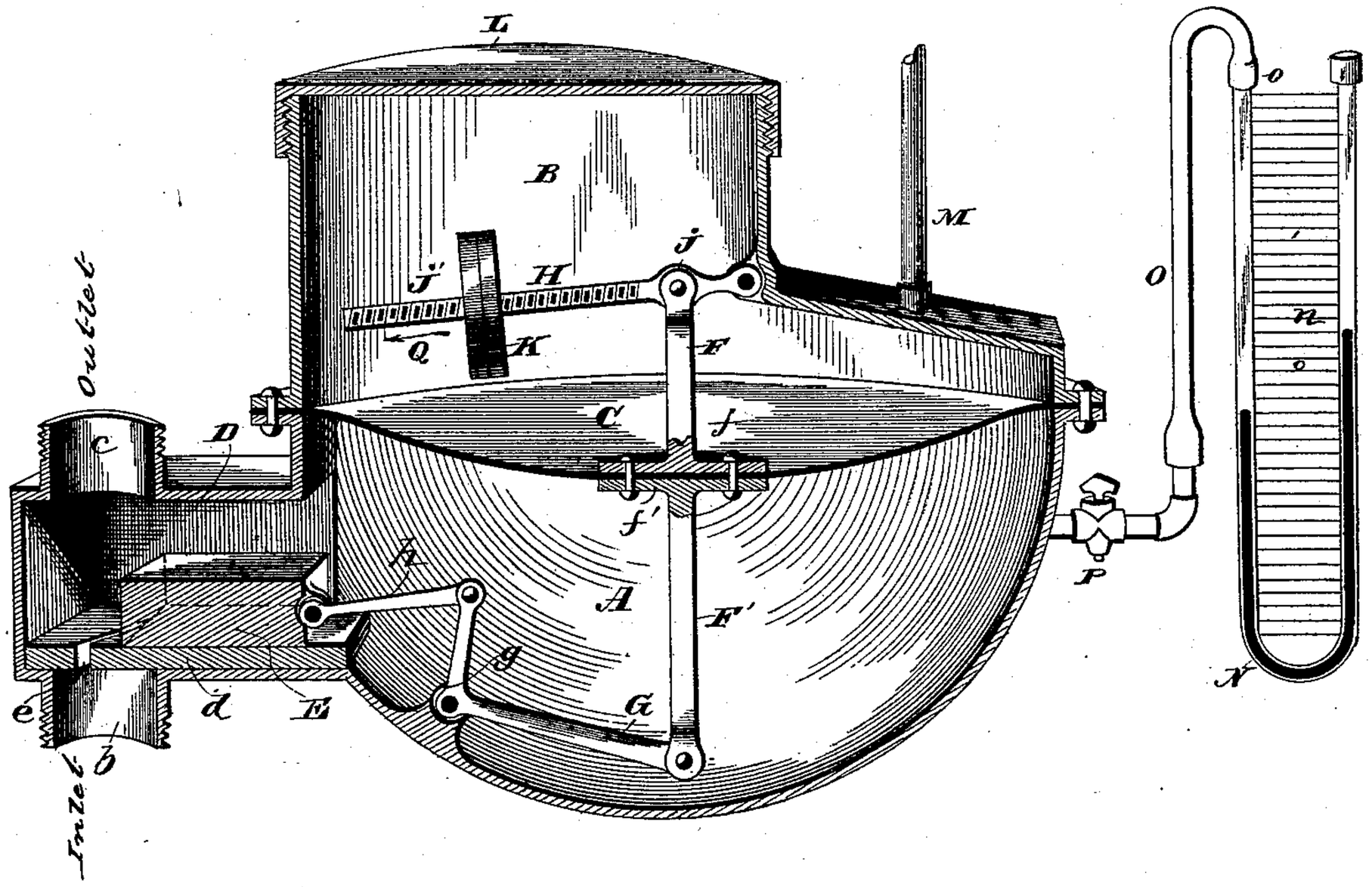
(No Model.)

W. M. JACKSON.

HIGH AND LOW GAS PRESSURE REGULATOR.

No. 360,774. Patented Apr. 5, 1887.

Fig. 1.



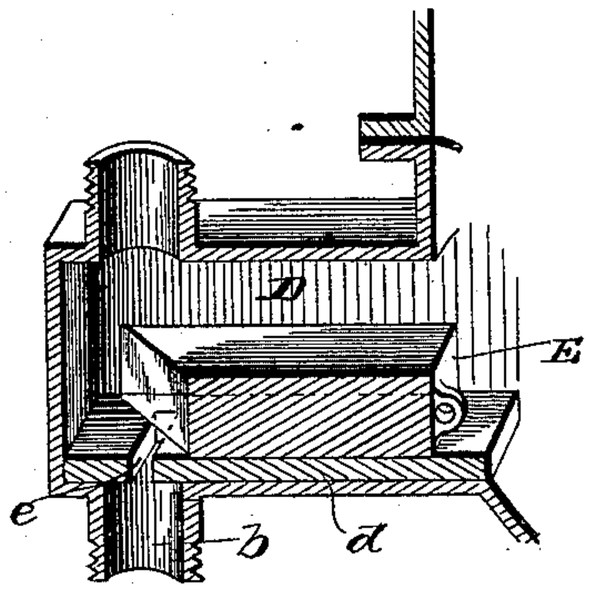


Fig. 3.

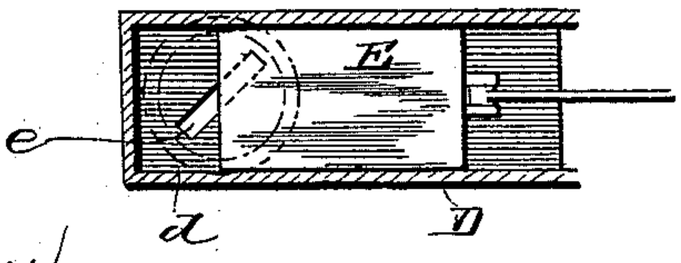


Fig. 2.

WITNESSES

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HIGH AND LOW GAS-PRESSURE REGULATOR.

SPECIFICATION forming part of Letters Patent No. 360,774, dated April 5, 1887.

Application filed December 16, 1886. Serial No. 221,769. (No model.)

To all whom it may concern:

Be it known that I, WALTER M. JACKSON, of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in High and Low Gas-Pressure Regulators; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to an improvement in high and low pressure gas-regulators.

Objection has arisen to that class of sliding-valve gas-regulators hitherto in use, because of the fact that the gas-inlet was so formed that it prevented the very gradual opening and closing desirable; and the object of my present invention is to provide means for the most gradual and automatic opening or closing of the gas-inlet.

A further object is to provide a simple and inexpensive and effective device for adjustment to any gas-service, which may be readily and accurately adjusted to regulate the exact supply of gas desired for consumption.

With these ends in view my invention consists in certain features of construction and combinations of parts, as will be hereinafter fully described, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a vertical longitudinal section of my improved gas-regulator with gage attached. Fig. 2 is a plan view of the valve. Fig. 3 shows a modified form of valve and port.

A represents a gas-chamber and B an air-chamber, the two being separated by a flexible diaphragm, C, and inclosed by any suitable boxes, though for economy preferably cast of metal in forms similar to those shown in the drawings. These boxes are secured together at their adjacent flanged edges, whereby the diaphragm C is securely held in place.

Extending laterally from the chamber A, and forming a continuation of the latter, is a gas-valve box, D, provided with the gas-inlet *b*, for connection with the main and outlet *c*, through which the gas is supplied to the burners, and having the valve-seat *d* formed on its bottom. In the seat *d* and directly over the inlet *b* a narrow and elongated slot or port, *e*, is diagonally located. A sliding valve, E, adapted to reciprocate on the valve-seat *d*, is guided thereon by the walls of the valve-box D, between which it reciprocates. The valve-seat *d* and the valve E are entirely separate from the boxes forming the air and gas chambers, being detachable and constructed of some non-corrosive metal or combinations of metals, while the shells or boxes themselves may be cast of any metal. By arranging the gas inlet or port and valve so that the latter gradually closes the port, the slightest increase of pressure on the diaphragm is transmitted to the valve and the latter moved only so far as needed to cut off this excess. If the pressure should diminish from any cause whatever, the valve will be moved so as to increase the size of the gas-inlet.

Secured together by the plates *f f'*, respectively above and below the diaphragm C, are the light upright rods F F', in such a manner as to have the effect of one continuous rod projecting vertically through the center of the diaphragm. To the lower end of the rod F' a bell-crank, G, is pivotally secured, which in turn is pivotally secured to a lug, *g*, projecting upward in the chamber A. The upper end of this bell-crank is loosely connected to the sliding valve E by the link *h*.

The upper rod, F, located in the air-chamber B, where it is safely inclosed and protected against disarrangement, is pivotally connected with a balance-lever, H. This lever H preferably has its short arm fulcrumed at point *j*. The opposite end or long arm of the lever is in the form of a screw-threaded stem, *j'*, carrying the adjustable weight K, which consists, substantially, of a pair of nuts adapted to turn on the stem, the two being desirable to lock each other, to prevent accidental displacement.

Above the balancing mechanism the walls of the chamber B are preferably rounded and more or less restricted, and a detachable cap, L, is placed to allow easy access to the chamber should it be desirable to regulate the balancing apparatus. Through the pipe M air is supplied to the air-chamber B, and the peculiarity of this pipe is due to the fact that it communicates directly with the outside air, in order that should the diaphragm C become broken or should it leak in any manner, allowing the escape of gas into the air-chamber B, there would be no escape of the leaking gas into the cellar or room where the regulator is

stationed, but all air would be carried off out of doors through pipe M.

A gage consisting of a U-shaped tube, N, containing a supply of water or similar liquid, and a graduated scale, *n*, is open at one end to receive free atmospheric pressure and connected to the gas-chamber by the pipe O. This gage may be detached from the chamber at point *o*, the gate P being turned to prevent the escape of gas.

In the modification shown in Fig. 3 the port *e* extends transversely of the valve-seat, instead of diagonally, and the sliding valve is beveled, the effect being the same, as before, to very gradually close or open the gas-port from one end toward the other by the reciprocation of this valve over the port.

To regulate the device the weight K is moved to the extreme end of the stem *j'* in direction indicated by arrow Q. Now, the gas is allowed to enter the regulator, the nut or weight K being turned toward the fulcrum of the lever until the desired pressure is indicated on the gage. This being properly adjusted, the fluctuation of the gas-flow is regulated by the valve E, the operation of which is to automatically close the port *e* from one end to the other as the gas enters in large quantities, thus closing it correspondingly as the diaphragm C is elevated by the gas-pressure and immediately opening the valve with the depression of the diaphragm, which takes place as soon as the pressure is decreased, the position of the weight K having the effect of normally depressing the diaphragm when its cushion of gas from the chamber A is sufficiently removed by consumption. Thus it will be seen that the adjustment of the valve E over the port *e* is very precise, and if the pressure of the gas is very great the port may be closed until the smallest possible aperture is left open.

It is evident that slight changes might be resorted to in the form and arrangement of the several parts described without departing from the spirit and scope of my invention; hence I do not wish to limit myself to the particular construction herein set forth; but,

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

1. The combination, with the air and gas chambers separated by a flexible diaphragm, of a valve-seat having a gas-port, a sliding valve adapted to close said port from one end toward the other, and devices connecting the diaphragm and sliding valve.

2. In a gas-regulator, the combination, with the air and gas chambers separated by a flexible diaphragm, of a valve-seat having an elongated gas-port, a sliding valve adapted to close said port from one end toward the other, a rod secured to the diaphragm, and a bell-crank lever and link connecting said rod and valve, substantially as set forth.

3. The combination, with the air and gas chamber separated by a flexible diaphragm, and a valve-seat having an elongated gas-inlet therein, and a valve adapted to slide on said seat and close the port from one end to the other, of a lever located in the air-chamber and connected with the diaphragm, balance-weights mounted on said lever, and means for operating the valve by the action of the diaphragm, substantially as set forth.

4. The combination, with the gas and air chambers, a flexible diaphragm, and a valve-box, the latter being in open communication with the gas-chamber and provided with an inlet and outlet, of a horizontally-sliding valve adapted to close said port from one end toward the other and a pipe communicating with the air-chamber and leading therefrom out of the house, for the purpose substantially as set forth.

5. The combination, with the air and gas chambers separated by a flexible diaphragm, a removable cap forming a partial cover for the air-chamber, a lever located in the air-chamber and connected with the diaphragm, and balance-weights mounted on said lever, of a gas-pressure gage removably secured to the gas-chamber, substantially as set forth.

6. The combination, with an air and gas chamber, a diaphragm separating them, a valve-box projecting laterally from the gas-chamber, this box being provided with a gas inlet and outlet, and a slotted valve-seat, of a sliding valve operated by the vibrations of the diaphragm, and an adjustable balancing mechanism for regulating the gas-pressure and a gage for measuring the same, substantially as set forth.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

WALTER M. JACKSON.

Witnesses:
W. C. DUVALL,
G. F. DOWNING.