

(No Model.)

2 Sheets—Sheet 1.

J. E. MILLER.

GAS REGULATOR.

No. 337,012.

Patented Mar. 2, 1886.

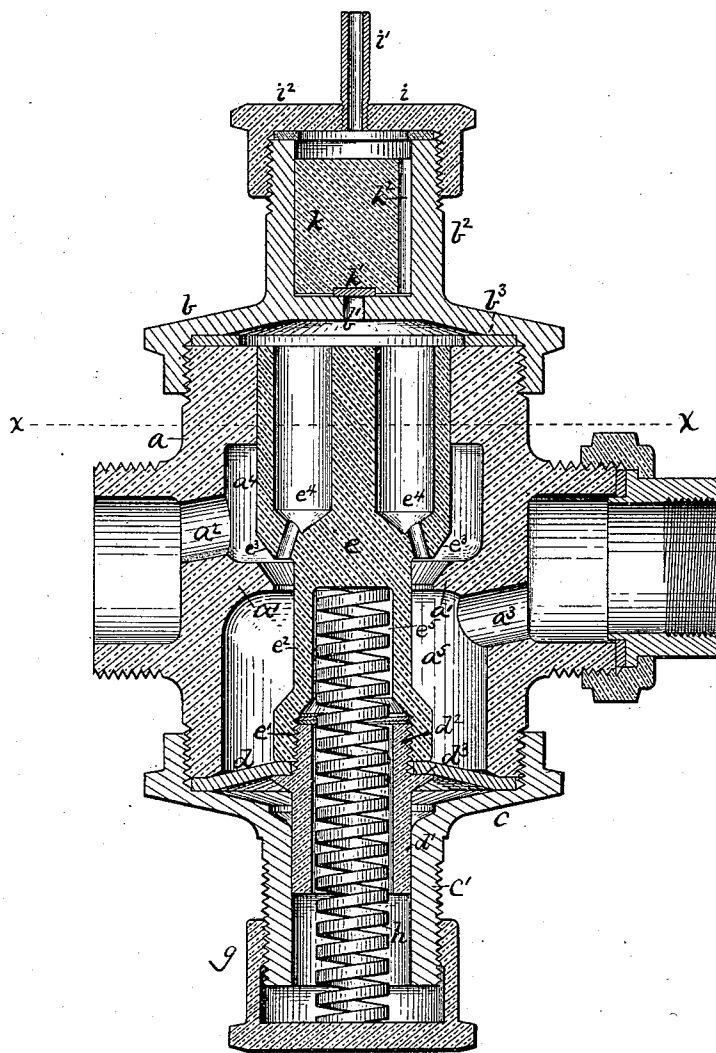


Fig. 1.

Witnesses.

J. A. Burns.

M. D. Conover.

Inventor.

John E. Miller.

by his attys

Bakewell & Kern

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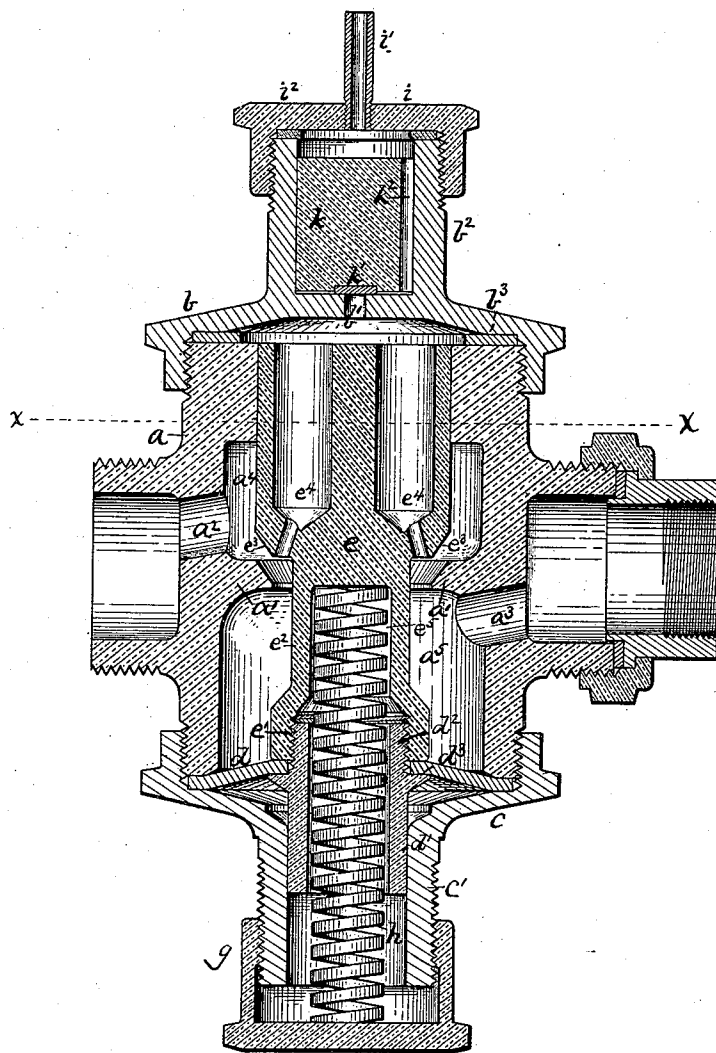


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Witnesses.

J. A. Burns.

M. J. Conover.

Inventor.

John E. Miller.

by his attys

Bakerwell & Kern

(No Model.)

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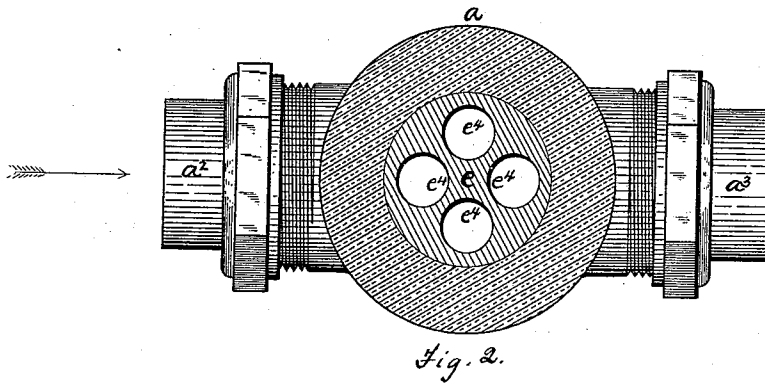


Fig. 2.

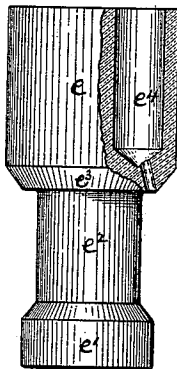


Fig. 3.

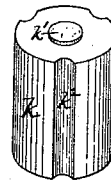


Fig. 4.

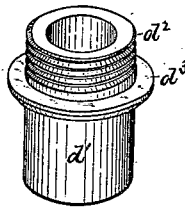
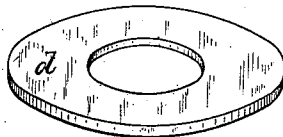


Fig. 5.

Witnesses.

J. A. Burns.

M. B. Corwin.

Inventor.

John E. Miller.

by his attys.

Bakewell & Kern.

UNITED STATES PATENT OFFICE.

JOHN ERNEST MILLER, OF PITTSBURG, PENNSYLVANIA, ASSIGNOR OF ONE-HALF TO AUGUSTUS H. HEISEY, OF SAME PLACE.

GAS-REGULATOR.

SPECIFICATION forming part of Letters Patent No. 337,012, dated March 2, 1886.

Application filed September 8, 1884. Renewed November 23, 1885. Serial No. 183,742. (No model.)

To all whom it may concern:

Be it known that I, JOHN E. MILLER, of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Gas-Regulators; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a vertical section of my improved regulator. Fig. 2 is a cross-section on the line xx of Fig. 1. Fig. 3 is a detached view of the valve partly broken away. Figs. 4 and 5 are detail views.

Like letters of reference indicate like parts in each.

The shell or case a of my improved regulator-valve is in this instance an ordinary steam-fitting, having an annular flange or seat extending across its interior cavity, below the inlet-opening a^2 and above the outlet-opening a^3 , so as to divide the interior into two chambers, a^4 and a^5 . The inlet and outlet openings are provided with suitable screw-nozzles for the attachment of the usual pipes. The upper end of the shell is closed by a screw-cap, b , which has a central opening, b' , and a cup-shaped valve-chamber, b^2 , on the upper side, and interposed between the end of the shell a and the cap is a gasket or packing-ring, b^3 . The lower end of the shell a is closed by a cap, c , which screws onto the shell, and thereby secures a flexible diaphragm, d , in place in the valve, the cap screwing down upon the edge of the diaphragm, which is interposed between it and the end of the shell a . The cap c has a tubular projection extending from its outer side, which is externally threaded, so as to receive a cap, g . Secured to the diaphragm d is a sleeve, d' , which extends up into the tube c' , and has a threaded nozzle or end, d^2 , which extends through the diaphragm. The main valve e of the regulator is secured to the nozzle d^2 by a screw-socket, e' , and the construction of the parts is such that when the socket e' is screwed onto the nozzle d^2 the diaphragm is compressed between the end of the socket e' and a flange, d^3 , which projects from the side of the sleeve d' at the base of the threaded portion d^2 . The valve e is cylindrical in cross-section, and has

a reduced portion or stem, e^2 , the internal shoulder between such reduced portion and the valve proper being preferably formed with a taper, e^3 . Extending axially through the valve e from the shoulder e^3 to the upper end are holes or openings e^4 , which, where they extend through the shoulder e^3 , are greatly reduced in size. The cap g screws onto and closes the tube c , and a spring, h , is interposed between the cap g and the bottom of the recess e^5 in the stem e^2 , the function of which is to hold the valve e open. The normal position of the valve e is open, as shown in Fig. 1.

The tension of the spring is regulated by the screw-cap g , so as to hold the valve e open or away from its seat at any desired pressure of gas in the main. If this pressure should increase abnormally, it acts on the upper side of the diaphragm d with sufficient power to overcome the spring h , and thereby force the valve toward its seat a' until it closes it sufficiently to give passage to the exact amount of gas which is being used. If no gas is being used in the service-mains, the pressure of the gas on the diaphragm d will cause the valve e to be closed. The valve e , being cylindrical, is balanced, there being no excess of pressure in any direction when it is closed.

The cup b^2 of the upper cap, b , is externally threaded, so as to receive a screw-cap, i , in the upper end of which is an opening provided with a tube, i' , and a gasket, i^2 , around said opening on the under side of the cap. In the cup b^2 is a valve, k , having a facing, k' , of rubber or other suitable material, and grooves k^2 in its sides. This valve k closes the opening b' in the upper cap, b , said opening b' being of small diameter. The purpose of this construction of valve k is to permit the escape of any leakage from the valve-chamber when the valve e is closed.

Natural gas is so low in temperature as to contract the metallic surfaces with which it comes in contact, and is of such a penetrating nature that it is impossible to prevent leakage between the sides of the valve and its socket and seat. The result is, that when the valve e is closed more or less leakage is going on from the chamber a^4 through the seat and up along the sides of the valve. This leakage collects in the top of the shell a , above the

valve *e*, where it accumulates until it attains sufficient pressure to raise the valve from its seat and escape through the grooves *k*² and tube *i*' into the open air.

5 When the valve *e* is open, and the gas is being used from the service-pipes, none passes up through the holes *e*¹, for the reason that the pressure necessary to raise the valve *k* is less than that of the gas in the chamber *a*³ and
10 service-mains connected therewith. The valve *k* may be adjusted by increasing or decreasing its weight or by regulating the size of the opening *b*' to suit any desired pressure in the service-pipes.

15 Practical experience with my improved valve has proved its efficiency. It effects a saving of gas, and is simple and cheap in construction.

Owing to the cylindrical portion of the valve
20 fitting in a cylindrical cavity in the casing, the action of the valve is rendered regular and even.

What I claim as my invention, and desire to secure by letters Patent, is—

25 1. The combination, in a gas-regulator, of a hollow casing, the interior of which is divided into chambers by a valve-seat, a valve situate

in one of the chambers and having a cylindrical portion fitting within a cylindrical cavity in the casing, a flexible diaphragm situate in the
30 other chamber and connected with the valve, and a spring situate in a tubular stem extending from the valve so as to act thereon, substantially as and for the purpose specified.

2. The combination, in a gas-regulator, of
35 a cylindrical valve having holes which form communication between the outlet-chamber and the dome of the valve-case when the valve is closed, with a port extending between the dome-chamber and an auxiliary valve-chamber, which is closed by a valve capable of being
40 raised by the pressure of gas in the dome-chamber, whereby an outlet is afforded for the escape of leakage of gas in the valve-chamber, substantially as and for the purposes
45 described.

In testimony whereof I have hereunto set my hand this 5th day of September, A. D. 1884.

JOHN ERNEST MILLER.

Witnesses:

W. B. CORWIN,
THOMAS W. BAKEWELL.