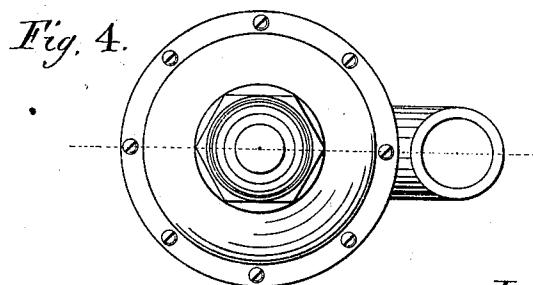
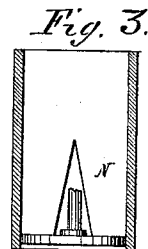
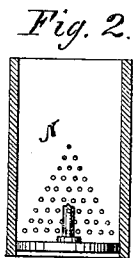
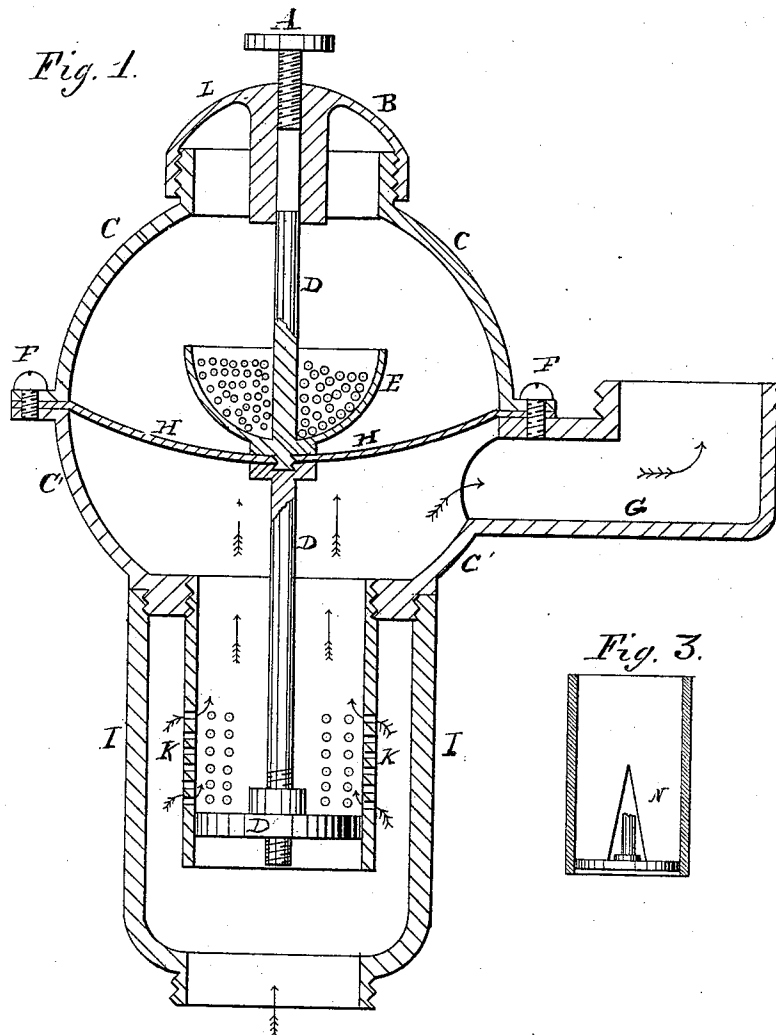


M. TOULMIN.  
GAS REGULATOR.

No. 175,526.

Patented March 28, 1876.



Witnesses:  
J. B. Toulmin  
H. A. Toulmin.

Inventor:  
Morton Toulmin

# UNITED STATES PATENT OFFICE.

MORTON TOULMIN, OF WASHINGTON, DISTRICT OF COLUMBIA.

## IMPROVEMENT IN GAS-REGULATORS.

Specification forming part of Letters Patent No. 175,526, dated March 28, 1876; application filed March 8, 1876.

*To all whom it may concern:*

Be it known that I, MORTON TOULMIN, of Washington city, in the county of Washington and District of Columbia, have invented certain new and useful Improvements in Gas-Regulators; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawing, and to the letters of reference marked thereon, which form a part of this specification.

The object of my invention is to construct a machine to equalize the pressure of illuminating-gas as it issues from the burners, thereby producing a uniform, steady light, as well as effecting a saving in the consumption of the gas.

This invention relates to that class of gas-regulators consisting of an upper and a lower vessel, of any convenient shape, and furnished with flanges, between which may be inserted a diaphragm of any flexible material, such as leather, bladder, or very thin metal. This diaphragm is inserted between the flanges of the upper and lower vessels, and is secured permanently in that position by means of screws or bolts, which are inserted in the flanges and through holes made near the outer edges of the diaphragm.

In the drawings annexed, forming a part of this specification, Figure 1 is a vertical section, taken on the line X X; Fig. 2, view in detail, showing arrangement of the perforations; Fig. 3, view in detail, showing shape of slots. Fig. 4 is a plan.

A is a thumb-screw, or a screw furnished with a milled head. B is a cap or cover, attached to C by means of a screw-thread, P, or by any other convenient method, and furnished with air-hole L. C is the upper vessel, and is chiefly intended to preserve the interior from injury. D is a guide-rod, to which is attached a semi-spherical or funnel-shaped cup, E, to hold small shot. The shot are intended to serve the purpose of minutely-divided weights to counteract the upward pressure of the gas, as well as to regulate the same. The weight of the shot causes the diaphragm to descend when the pressure of the gas is di-

minished. H is a diaphragm, which may be made of any flexible material impervious to gas. The diaphragm is made in the form or shape of a saucer. I wet the leather and put it between a convex and concave mold, where it remains under pressure until dry. This form of making the diaphragm gives greater play for the piston than when made of a flat piece of leather. C' is the lower vessel, and is the receptacle for gas as it issues from the meter. F are screws or bolts, which pass through the outer edges of the diaphragm H, and the flanges of the upper and lower vessels fastening the whole together in such a way as to make the lower vessel gas-tight, except through the outlet or arm G, which communicates with, or is attached to, the pipe which supplies the burners with gas. The piston-rod D penetrates the diaphragm H, and has attached to its lower end a piston, D'. K is a cylinder, made, preferably, of brass. The lower end of this cylinder has annular or other shaped perforations N, and it is through these perforations that the gas, as it comes from the meter, flows into the cylinder, and thence to the interior of the lower vessel C'. The perforations N should be arranged in a triangular form, as shown in Fig. 2, or a triangular slot, as in Fig. 3. By this means the flow of gas is regulated with the greatest nicety, from the supply necessary, for a single burner to that of the largest establishment. I is a casing, inclosing the cylinder K, with sufficient space between the two to permit the gas to surround the cylinder K on all sides. The casing I is attached to the bottom of the lower vessel by means of a screw-joint, and rendered gas-tight by a leather washer or other suitable means. G is an arm projecting from the side of the lower vessel, through which the gas flows in its passage to the pipe which supplies the burners. As the gas flows from the meter into the casing I it penetrates the perforations N, and thus reaches the interior of the lower vessel C'. The quantity of gas which will pass through the perforations will be governed by the position of the piston D'. If the piston is near the bottom of the cylinder K a large quantity of gas will pass through the perforation, and the quantity passing through will gradually be reduced as the pis-

ton rises toward the top of the cylinder. The piston D' is nicely fitted to the cylinder K, but not so tight as to prevent its motion up and down with the least possible friction.

When there is any excess in the pressure of the gas upon the bottom of the piston and on the bottom of the diaphragm H, the diaphragm rises and carries with it the piston D', thus shutting off the lower tier of perforations, and thus cutting off the supply of gas to the lower vessel, and rendering it uniform as it issues from the burners. On the other hand, with any decrease in the pressure of the gas, the weight of the shot causes the diaphragm to descend and carry with it the piston D', thus allowing the gas to pass through a greater number of the perforations, and furnish an increased supply of gas to the burners. The cup E holds small shot, which counterbalance by their weight the pressure of the gas on the diaphragm, and regulate the flow of gas. The small size of shot enables this adjustment to be made with the greatest accuracy.

Instead of forming the piston D' of a single piece of solid metal, it may be made of leather in the shape of an inverted cup, within which may be another cup of thin elastic metal, split radially from the circumference nearly to the center, and by its elasticity keep the leather cup in contact with the sides of

the interior of the pipe K, to make it fit as nearly gas-tight as possible, without too much friction. The thumb screw A is intended to screw down until it touches the top of the rod D, and prevent it rising too high. Also, by this means, the piston D' may be forced down the cylinder K, and add to the number of perforations through which gas may flow, and also prevent all of them from being closed.

I am aware that in Patent No. 163,255 I. Rehn has a device showing an opening or passage in the side of the burner, of a conical form, and I disclaim this device; but

I do claim—

1. The cylinder K, having perforations N in the form of a triangle, as shown in Fig. 2, piston-rod D, having a bearing in the cap B, and piston D', as and for the purpose described and set forth.

2. The screw A and cap B, in combination with the rod D, diaphragm H, piston D', and perforated cylinder K, as and for the purpose described and shown.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

MORTON TOULMIN.

Witnesses:

JOHN W. FRAZEE,  
H. A. HALL.