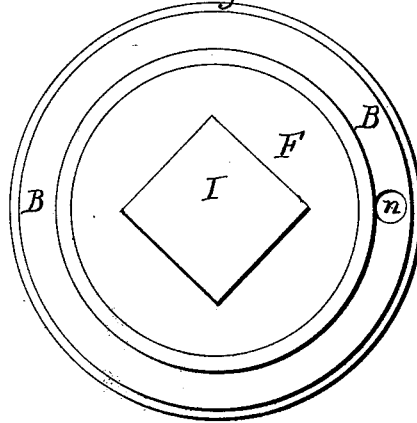
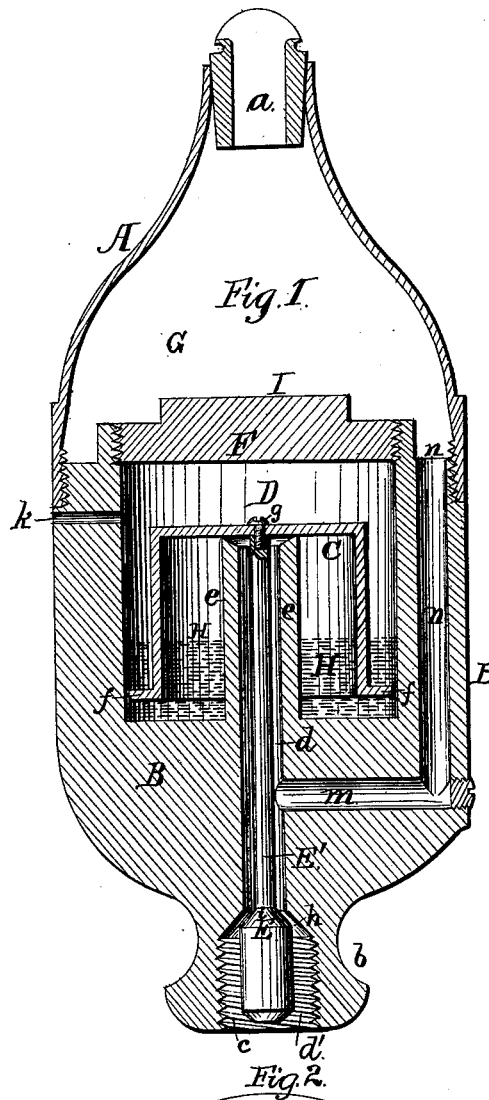


J. W. CLOUD.  
Gas-Regulating Burner.

No. 220,577.

Patented Oct. 14, 1879.



Attest:  
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# UNITED STATES PATENT OFFICE.

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## IMPROVEMENT IN GAS-REGULATING BURNERS.

Specification forming part of Letters Patent No. 220,577, dated October 14, 1879; application filed August 8, 1879.

*To all whom it may concern:*

Be it known that I, JOHN W. CLOUD, of Altoona, in the county of Blair and State of Pennsylvania, have invented certain new and useful Improvements in Self-Regulating Gas-Burners; and 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, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification, in which—

Figure 1 represents a central vertical section of a gas-burner to which my improvements have been applied, and Fig. 2 a top-plan view of the same with the upper half of the burner removed.

The invention relates to a new and improved automatic pressure-regulating gas-burner.

The invention consists in a novel construction of the burner, and in a novel arrangement, construction, and combination of its parts, whereby each burner can be separately and independently adjusted to burn at any required pressure exceeding the normal pressure of the atmosphere, and which is very desirable, as it is well known that ordinary gas-burners in the upper stories of a house permit, because of undue pressure, gas to escape unburned, while those in the lower story do not have pressure sufficient to insure a good and steady light.

To enable those skilled in the art to make, construct, and use my improvement, I will now proceed to describe its parts in detail.

In the drawings, the outer casing or shell of the burner is made in two parts, the upper half, A, carrying the burner-tip *a*, and the lower half, B, the devices for regulating the pressure.

The upper half, A, is provided with a female screw, and the lower half, B, with a male screw, by means of which they are secured together, as shown in Fig. 1.

The lower half, B, consists of a strong thick casting, in the lower end or neck, *b*, of which is formed a female screw, *c*, by means of which it is secured to the service-pipe. Through the neck *b* is formed an opening, *d*, which communicates with the interior of this part or half B

of the shell at the upper end of a hollow tube, *e*, which forms part of it, being cast with the shell B.

The upper part of the tube *e* is formed with a flaring or beveled mouth, on the outer and upper edge of which rests an inverted cup, C, the lower edge of which is provided with an outwardly-projecting flange, *f*, for a purpose hereinafter to be described.

Tube *e*, while it projects within the chamber D, formed by the shell B, does not project sufficiently far to reach its top, yet far enough to support the cup C without the lower edge of said cup resting on the bottom of chamber D.

Cup C carries a valve, E, and a valve-stem, E', and which are secured to the cup in any suitable manner—as, for instance, as shown in the drawings, by means of a metal screw, *g*. The opening *d*, as it opens into the enlarged opening *d'* of the neck *b* of the burner, is provided with a conically-shaped valve-seat, *h*, to correspond with and seat the conically-shaped valve-face *i* of the valve E. The valve-stem E' of valve E, which extends up through the opening *d* in the shell B and its continuation in the tube *e*, is made considerably smaller in diameter than the diameter of the opening *d* to give free passage to the gas from the service-pipe.

On the inner face of the upper end of the wall of shell B, which forms the chamber D, is cut a female-screw, into which takes a male thread cut on the peripheral face or edge of a screw-cap, F, which closes air and gas tight the upper end of chamber D, thereby cutting off all communication between the latter chamber and the chamber G, formed by the walls of the upper shell or half, A, of the gas-burner. On the upper side of cap F is formed a square-shaped projection, I, which serves as a hold for a wrench to screw cap F up into place.

Immediately below the lower end of shell A, where it screws on the upper end of shell B, is pierced in the latter a small hole, *k*, which is left open that there may be free communication between chamber D on the outside of cup C, above the mercury H in the bottom of chamber D, and the external atmosphere. This prevents undue pressure from being exerted on the outside of the cup.

On the opposite side of shell B, below the

bottom of chamber D, from the outside of the shell, is pierced a hole, *m*, the inner end of which communicates with the opening *d* in the shell and tube *e*. The outer end of this opening *m* is then plugged up or closed.

Within the wall of shell B, at right angles to opening *m*, is then pierced another opening, *n*, the lower end of which communicates with the opening *m*, and its upper end with chamber G and gas-burner tip *a*.

The weight of cup C and the valve-stem and valve E, which it carries, are made light or heavy, according as the normal pressure of the gas in connection with which it is to be used is little or great, so that their weight should just about counterbalance the pressure of the gas at which it is intended to be burned when the lower end of the cup is bedded in the mercury H in the bottom of chamber D; and for this purpose there must always be sufficient mercury in the chamber, above the lower end of cup C, to prevent the escape of gas from the interior of the latter into chamber D, on the outside of cup C, as otherwise it would escape into the room through the opening *k* in chamber D. When, however, the weight of the cup and its valve is too great, a small portion can be filed off the lower end of valve E, which is elongated for this purpose; or a little more mercury, which is of greater specific gravity, can be poured into chamber D, and thus by its buoyancy lighten the weight of the cup sufficiently to effect the object, and vice versa, unless the cup is much too light for the strong pressure of gas, in which case a heavier cup, valve-stem, and valve must be substituted, or else a different burner provided with a heavier cup, valve-stem, and valve put in its place.

In practice I prefer to use mercury, because of its high specific gravity and hence great adaptation for regulating the weight of the governing-cup and its appended valve-stem and valve; but glycerine or any suitable non-volatile fluid or oil, such as is commonly used in this class of cases, may be substituted therefor.

As a rule, burners of the same capacity per hour will be manufactured with cups and valves of different weights, so that the lightest will be used in the first story, the next lightest in the next story, and so on to the uppermost story, which will have the heaviest cup, &c.

The operation is simple. The cup is first put in its place. The valve-stem is then inserted into the opening *d* and pushed up through the opening in cup C, where it is secured to the latter by screw *g*. The regulated quantity of mercury H is then poured into chamber D, after which the screw-cap F is firmly fixed in place. This done, the upper shell, A, which carries the burner-tip *a*, is then screwed onto the lower half, B, and the burner is ready to be secured to the chandelier or bracket. This done and the gas turned on, the gas passes up

into the interior of tube *e* in opening *d*, and from the latter into and through the openings *m* and *n*, into chamber G, and out of the opening in the burner-tip *a*.

If the pressure is just right or lower than is required, no effect is produced on the cup C, but if greater than is required it slightly raises the latter, and in so doing raises the valve E and partially closes the opening between the valve and valve-seat, which forms the communication between the service-pipe and the openings *d*, *m*, and *n*, which lead to the burner, and thus checks the flow of gas, and thereby diminishes the pressure and quantity of gas which passes to and through the burner. If the pressure increases, the valve is raised higher, thus closing the passage more, and if it decreases the cup falls and enlarges the opening, giving passage to a greater volume of gas under a lower pressure, and so on with each and every change of pressure.

To prevent too sudden fluctuations in the flow of the gas, the cup C is provided with an outwardly-projecting flange, *f*, and which, being submerged beneath the mercury, prevents a too sudden rise and fall of the cup and its attached valve, and thereby yields a steadier and less fluctuating light.

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

1. The shell of a gas-burner provided with the continuous openings *d*, *m*, and *n*, arranged as described, and an internally-projecting supporting-tube, *e*, substantially as set forth.

2. The shell of a gas-burner provided with an annular chamber, internally-projecting supporting-tube *e*, continuous openings *d*, *m*, and *n*, arranged as described, and a cap-piece, F, substantially as set forth.

3. In combination with the shell of a gas-burner provided with openings *d*, *m*, and *n*, a cap-piece, F, internally-projecting supporting-tube *e*, mercury H, and a closed cup, C, carrying a valve-stem, E, and valve, substantially as set forth.

4. In combination with the shell of a gas-burner provided with openings *d*, *m*, *n*, and *k*, a cap-piece, F, tube *e*, mercury H, and a closed cup, C, carrying a valve-stem and valve, substantially as set forth.

5. In combination with the shell of a gas-burner provided with a chamber, D, and mercury H, and with openings *d*, *m*, and *n*, cap-piece F, and a cup, C, provided with a flange, *f*, and carrying a valve and valve-stem, substantially as set forth.

In testimony that I claim the foregoing I have hereunto set my hand this 22d day of July, 1879.

JOHN W. CLOUD.

Witnesses:

F. B. BROCK,

I. Y. KNIGHT.