T. B. DEXTER.

Gas-Burner.

No. 198,003. Patented Dec. 11, 1877

Fig. 1.

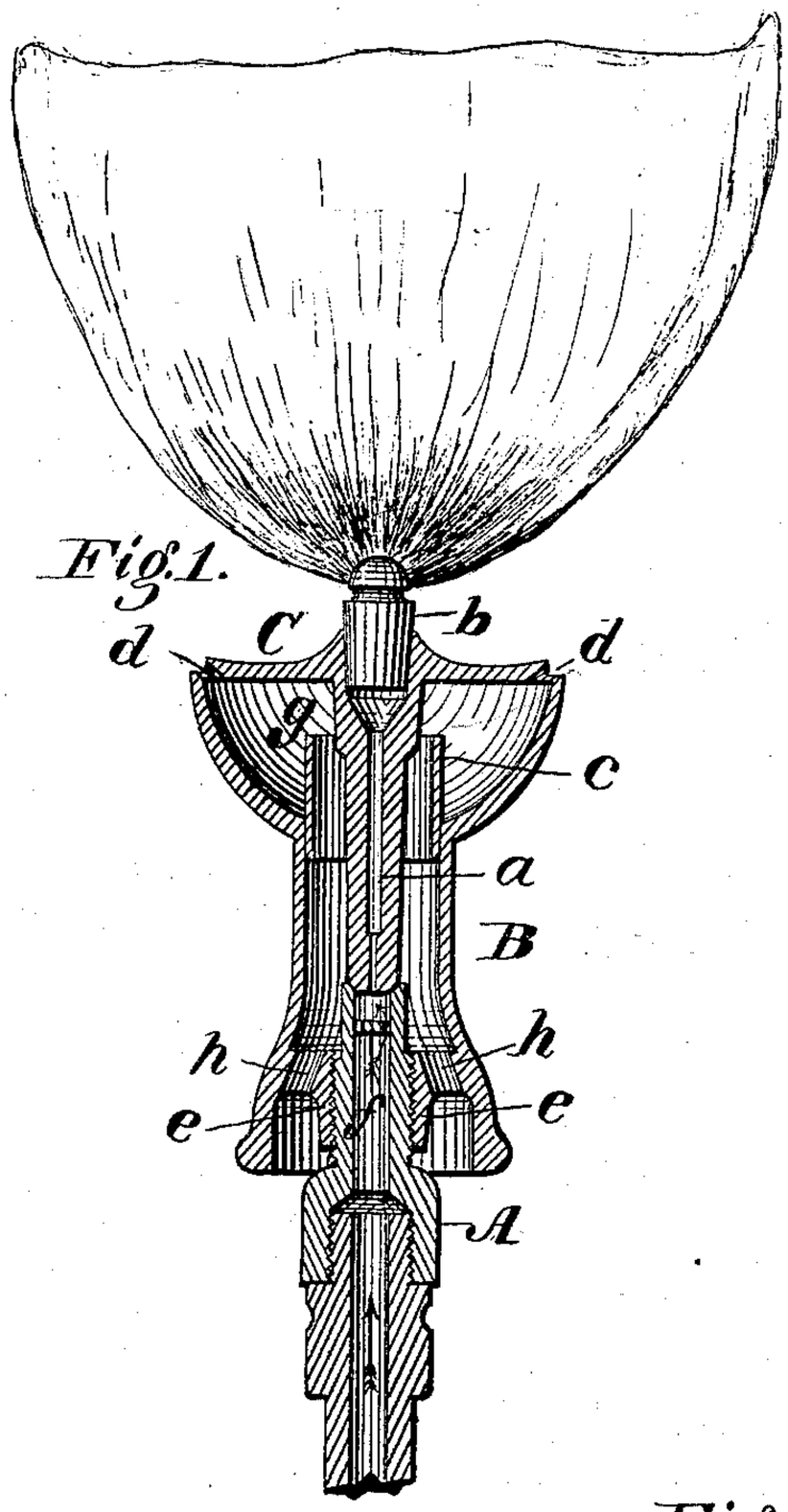



Fig. 2.

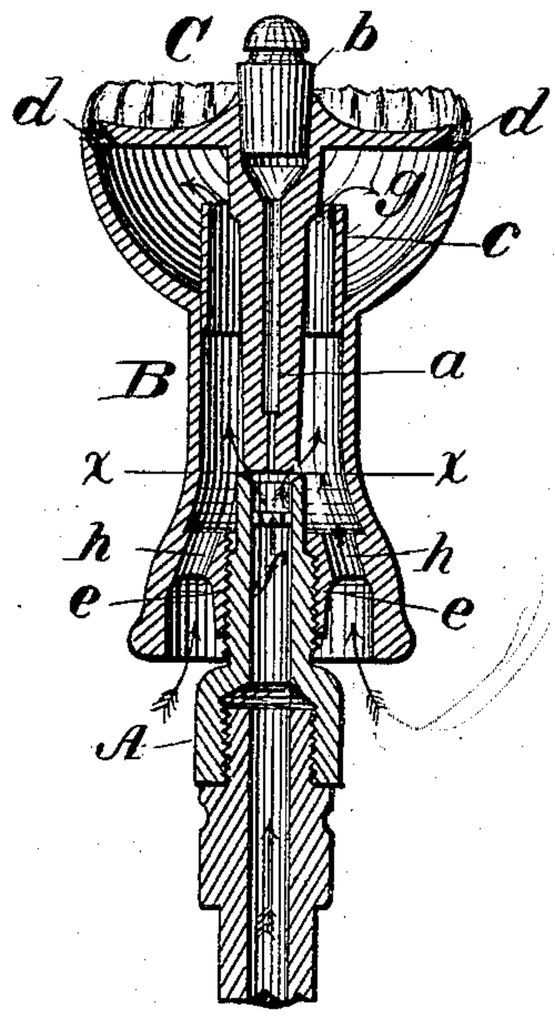
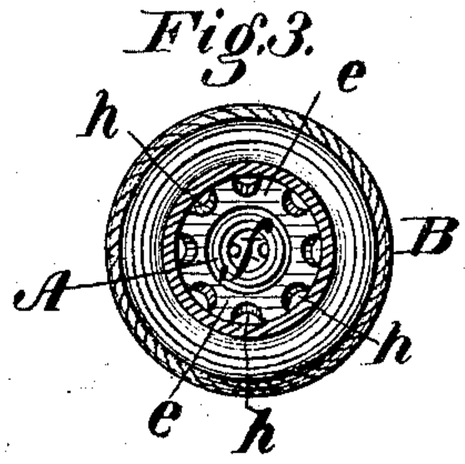



Fig. 3.




Witnesses:

Donn P. Twitchell.

Will H. Dodge.

Inventor:

Thomas B. Dexter,

By his Attys

Dodgerson

# UNITED STATES PATENT OFFICE.

THOMAS B. DEXTER, OF LYNN, MASSACHUSETTS.

## IMPROVEMENT IN GAS-BURNERS.

Specification forming part of Letters Patent No. **198,003,** dated December 11, 1877; application filed October 23, 1877.

*To all whom it may concern:*

Be it known that I, THOMAS B. DEXTER, of Lynn, in the county of Essex and State of Massachusetts, have invented certain Improvements in Gas-Burners, of which the following is a specification:

My invention relates to a gas-burner so constructed that it may be caused to produce, at will, either a luminous flame or a non-luminous heating-flame, or both, as occasion may require, the burner being intended for use in the sick-room, and similar places where both illuminating and heating flames are required, with the design of avoiding the necessity which now exists for either changing the burners or using separate lights for the two purposes.

The invention consists, primarily, in combining the two forms of burner in one, in such manner that either or both may be brought into use at will; and, secondarily, in certain details of construction, hereinafter explained.

The heating and the illuminating burners are provided each with its own orifice or orifices, and each produces its own flame separate and independent from that of the other, yet the two burners are so combined that they jointly constitute a single compound burner, which, being applied to the common gas-fixtures like the ordinary burner, will produce the two different flames, or either of them, at the will of the attendant. In changing from one flame to the other each will ignite the jets to produce the other.

The device may be described as a circular-top aero-gas burner, to burn ordinary coal-gas combined with atmospherie oxygen, with a pillar or illuminating burner through its center, the pillar-burner being severed and its upper part made adjustable, to serve as a valve to regulate the admission of the gas into the outer burner, as hereinafter more fully described and explained.

In the accompanying drawing, Figure 1 represents a vertical central section of my improved burner adjusted to produce an illuminating-flame; Fig. 2, a similar view of the burner adjusted to produce a heating-flame, and Fig. 3 a cross-section of the same on the line *x x*.

In constructing my improved burner I first provide a central tubular pillar, A, having a conical mouth at its upper end, and at its lower end a threaded socket of proper size to fit upon the ordinary gas-fixtures in use, in the same manner as a common burner, said pillar being provided, near its upper end, with an interior perforated diaphragm, *f*, and upon its exterior with a screw-thread, to receive and hold an outer shell or case, B. As represented in Figs. 1 and 2, this exterior shell or case consists of a tubular body, having near its lower end an internal hub or boss, *e*, threaded to fit the exterior of the pillar A, and provided with a series of holes or perforations, *h*, through which air may enter the exterior shell or case B around the pillar, the shell being enlarged at this point to give sufficient room or space for said perforations.

The case or shell B is extended upward a considerable distance above the upper end of the pillar A, and there enlarged or carried out in the form shown in Figs. 1 and 2, and has its upper end closed by a top plate, C, as shown. From this top plate C there extends downward, as shown in Figs. 1 and 2, a central tubular stem, *a*, of such length that when the case or shell B is turned or screwed to its lowest point on the pillar A, the lower end of the stem, which is conical or beveled, will seat itself, as in Fig. 1, in the upper end or mouth of the pillar A, and shut off communication between the latter and the interior space of the case or shell, but at the same time leaving an open passage from the pillar upward through the central stem, as shown. At its upper extremity the tubular stem *a* is furnished with a socket, to receive an ordinary illuminating burner-tip, *b*, or is fashioned into an ordinary metal tip; and around its upper edge or periphery the top plate C is grooved and furnished with a series of small holes or perforations, *d*, through which the gas issues to form the heating-flame. When the burner is thus constructed, and is applied to the ordinary gas-fixture, it will be seen that if the exterior shell or case B is turned to its lowest point, as indicated in Fig. 1, the gas, entering at the lower end through the pillar A, will pass upward through the same and the central tubular stem *a*, and

issue from the tip *b*, producing a large luminous flame, but will not escape or burn at any other point.

If, however, the exterior shell or case B be raised by turning it backward upon the pillar A, the central tubular stem *a* will be raised up from the mouth of the pillar, and a space or opening left, through which the gas may pass upward with considerable velocity into the outer case B, as shown in Fig. 2. When the opening thus formed is of sufficient size to permit all the gas which enters the pillar A to pass freely through it, the gas will pass into the outer case B, in preference to passing through the small opening of the stem *a*. As the gas enters the exterior case or shell B, it mingles with the oxygen of the atmospheric air, which enters the case or shell through the perforated hub or boss *e*, as previously mentioned, and the two, mingling with each other, pass upward into the chamber *g*, where they are more closely commingled.

In order to prevent the gas from passing out and being burned at the perforations before it becomes thoroughly intermingled with the oxygen of the air, the shell or case B has an interior tube, *c*, extending upward nearly to the top plate C, as shown, so that the gas and oxygen are caused to pass upward and over the top of this tube before entering the mixing-chamber, thereby keeping them longer in contact, and furnishing a large supply of gas at the point where the orifices are made, and thus preventing the gas from passing too quickly through the burner, and giving them sufficient time to become thoroughly commingled. From the chamber *g* the combined gas and oxygen issue at the orifices *d*, and burn with intense heat. When the flame is started a strong current is produced upward through the shell or case B, which causes an abundant supply of oxygen, and also tends to draw the gas from the pillar A into the same.

In order to further insure the passage of all the gas into the outer shell or case B, the perforations through the diaphragm *f* are made close against the walls or inner face of the pillar A, so that the gas shall be directed toward the same, instead of toward the central passage of the tubular stem *a*. The gas, passing upward in contact with the sides of the pillar A, is directed outward into the shell or case B by the conical or beveled end of the stem *a*.

In some cases it may be desirable to use both flames at once, which object may be attained by so adjusting the tubular valve-stem *a* that a space shall be left between it and the pillar A, through which the gas, or a portion of it, may enter the shell or case B; but this space or opening should be small enough to prevent the gas from passing freely through it, and thereby cause a resistance which will cause a portion of the gas to pass upward through the tubular valve-stem *a*, and issue at the tip *b*, the remainder issuing at the orifices *d*, and in this way the two flames may be used simultaneously.

When one flame is burning it may be used to light the jet or jets forming the other, the flame being changed from one to the other by simply turning the case or shell B, and thereby controlling the valve, as before described.

In order the more perfectly to insure the lighting of one burner by the flame of the other, the periphery of the top plate C is grooved, as before mentioned, and the jets emerge from the angle or corner of the groove, as shown in Figs. 1 and 2, and the upper face of the top plate C is made concave, as shown. This construction causes the flame of the heating-burner to curl inward at the top toward the central burner or tip *b*, thereby causing it to meet the gas from said tip and ignite the same when the change is being made from the heating to the illuminating burner, or causing the gas from the heating-burner to be thrown inward toward the central burner, for the purpose of being lighted thereby when the reverse change is being made.

The flow of gas to the compound burner is controlled by a stop-cock in the pipe, to which it is attached in the same manner as a common burner.

Having thus described my invention, what I claim is—

1. The combination, in one device, substantially as shown and described, of an illuminating gas-burner and an aero-gas burner, either or both of which may be adjusted for action at will.

2. A compound burner for both illuminating and heating purposes, consisting of a central burner for illuminating-gas, and an external burner for illuminating-gas mingled with atmospheric air, the two combined substantially as shown, so that either or both flames may be produced at will.

3. A compound burner for heating and illuminating purposes, having separate independent orifices for the escape of the illuminating and the heating gases, substantially as shown.

4. A compound burner constructed substantially as shown, whereby it is adapted for burning alternately two different kinds of gas, the one illuminating-gas, and the other a mixture of the same with atmospheric air, each through its own form of flame-orifice, said burner having its orifices arranged in such relation to each other that the flame from either shall ignite gas issuing from the other.

5. The combination of an outside adjustable shell or heating-burner having a central illuminating-burner therein, with a central pillar, A, substantially as shown and described.

6. The combination of the pillar A, containing the perforated diaphragm, with the adjustable outside shell B, provided with air-inlets *h*, gas-outlets *d*, the central tubular stem *a*, and tip *b*, substantially as shown.

7. A compound burner for heating and illuminating purposes, having a tip or orifice adapted to produce an illuminating-flame, and a separate orifice or orifices to produce a heating-flame, with means for controlling the admission of gas to the respective orifices separately, substantially as shown.

8. The burner having the concave top, the grooved edge or periphery, and the orifices opening in said groove, as shown, whereby the flame is given an inward tendency above the burner.

THOMAS B. DEXTER.

Witnesses:

EDWARD G. LINDSAY,

JOSEPH H. MASON.