(No Model.) 2 Sheets—Sheet 1.

# O. W. BENNETT.

## GAS REGULATING BURNER.

No. 405,656. Patented June 18, 1889.

FIG. 1.

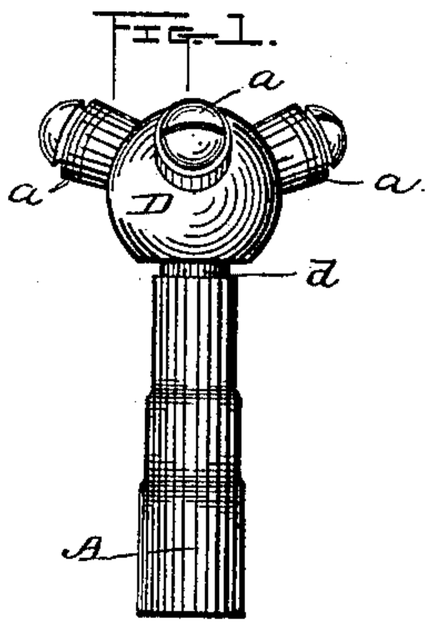



FIG. 2.

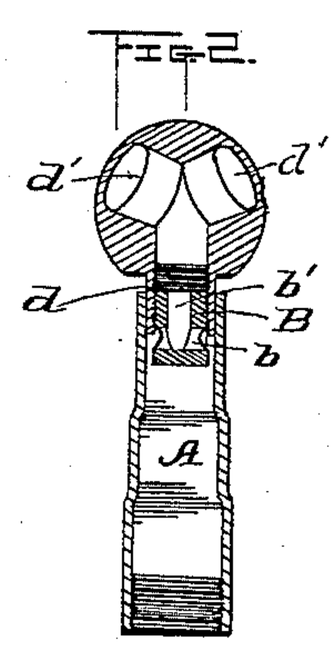



FIG. 5.

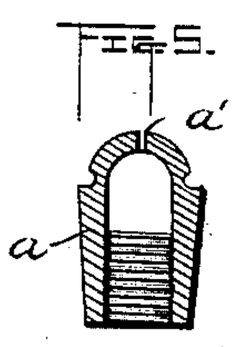



FIG. 6.

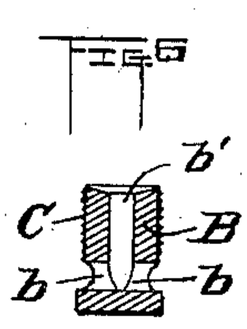



FIG. 3.

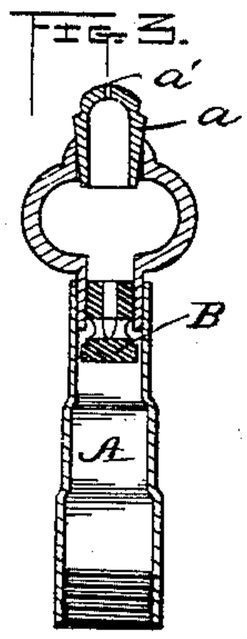
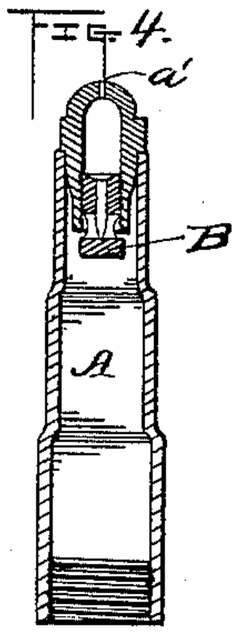



FIG. 4.




Witnesses
C. B. Seward.
C. L. Sturtevant

Inventor
Orson W. Bennett
By E. Bothwell
Attorney

(No Model.)

2 Sheets—Sheet 2.

# O. W. BENNETT.

## GAS REGULATING BURNER.

No. 405,656. Patented June 18, 1889.

FIG. 7.

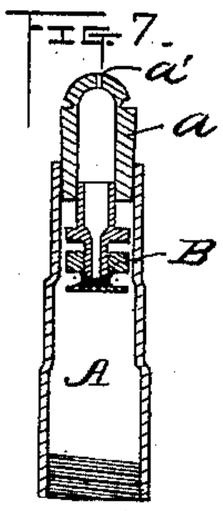



FIG. 8.

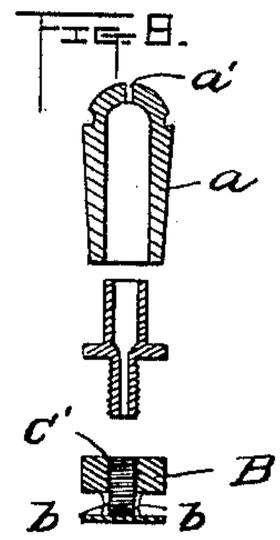



FIG. 12.

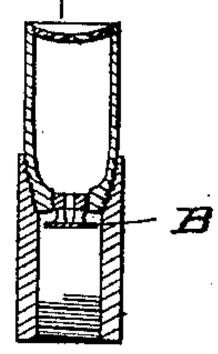



FIG. 9.

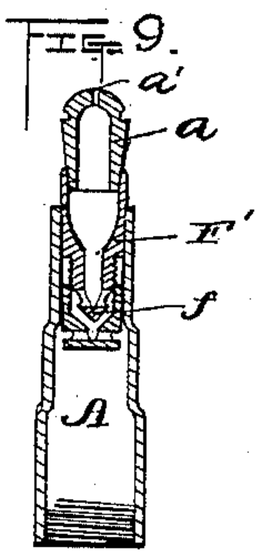



FIG. 10.

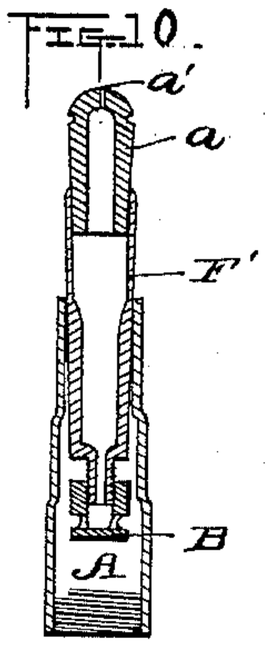
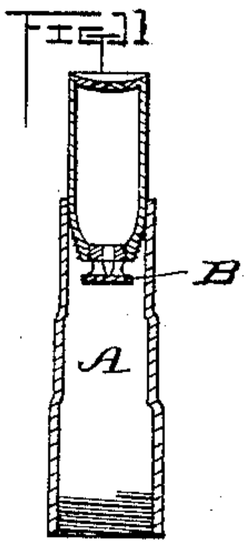



FIG. 11.




Witnesses
H. B. Seward.
C. L. Stuntevant.

Inventor
Orson W. Bennett
By E. B. Seward,
Attorney

# UNITED STATES PATENT OFFICE.

ORSON W. BENNETT, OF WASHINGTON, DISTRICT OF COLUMBIA.

## GAS-REGULATING BURNER.

SPECIFICATION forming part of Letters Patent No. 405,656, dated June 18, 1889.

Application filed October 18, 1888. Serial No. 288,426. (No model.)

*To all whom it may concern:*

Be it known that I, ORSON W. BENNETT, of Washington, in the District of Columbia, have invented certain new and useful Improvements in Gas-Regulating Burners; 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 gas-regulating burners.

It is well known that a considerable percentage of the gas employed as an illuminating agent is lost by what is commonly termed "blowing," where the gas escapes under pressure and is consumed rapidly, producing a high degree of heat and a consequent low illuminating-power; and even where the blowing is not audible and the flame remains fairly steady there is still a great portion of the flame which burns very pale, almost or quite invisible, adding little or nothing to the illuminating quality of the flame. It is found, however, that if the force of the jet issuing from the tip be reduced without materially decreasing the supply the above objectionable features are in a great degree overcome; and it is further found that by regulating the supply before it reaches the tip, rather than at the tip, a great saving is effected in the amount of the gas wasted and its illuminating-power increased.

The object is to provide means for regulating both the quantity of gas which shall be allowed to escape from the tip and also the force with which it shall escape.

A further object is to provide means of the above character which shall be capable of being applied to the great mass of burners now in use, as well as to particular forms, either ornamental or plain, and which may be furnished at a slight initial cost.

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

In the accompanying drawings, Figures 1 and 2 represent, respectively, an exterior and longitudinal sectional view of a burner in which the regulator is applied to a combination or cluster tip. Fig. 3 is a longitudinal section of a burner, showing the regulator applied to a single tip having an expansion-chamber. Fig. 4 is a longitudinal section of a burner, showing the regulator applied directly to a tip of ordinary form. Figs. 5 and 6 represent enlarged sectional views in detail of the ordinary form of tip and the regulator-plug adapted thereto. Fig. 7 represents a longitudinal sectional view of a burner in which the regulator is in two parts and applied to an ordinary tip. Fig. 8 is a view of the tip and the parts of the regulator in detail, shown in section. Figs. 9 and 10 represent burners in longitudinal section, showing different forms of the regulator-sections as applied to the ordinary tip. Fig. 11 represents a burner in longitudinal section, showing the English "Bray" tip provided with the regulator. Fig. 12 is a similar view showing the tip attached to a short pillar by a screw-thread.

A represents an ordinary pillar of a gas-burner, such as may be seen in common use, and *a* represents the ordinary lava or metallic tip of tubular form, slightly tapered on its outer surface, and provided at its discharge end with a narrow slit *a'*. Within the pillar and engaged with a tubular part of the burner through which the gas is forced to pass before reaching the discharge-opening an adjustable plug B is located. In the several forms represented by Figs. 1, 2, 3, 4, 11, and 12 the plug is shown engaged directly with the tip proper. In Figs. 7, 9, and 10 it is shown engaged with the tip by means of an intervening tube.

The plug B is provided with centripetal passages *b*, leading from its periphery toward one another, preferably in radial lines, and a passage *b'* leads from the adjacent ends of the passages *b* to the discharge end of the plug. The arrangement of the gas-passages in the plug is quite similar to that shown and described in my pending application filed March 3, 1888, Serial No. 266,044 and allowed September 5, 1888; but in my present application said plug is constructed either by an exterior screw-thread C, as shown in Fig. 6, or by an interior screw-thread C', as shown in Fig. 8, to be adjusted relatively to the tubular part of the burner, which it immediately

engages, so that said tubular part may be made to close and open the centripetal passages *b* to the entrance of the gas. The end of the plug B toward the gas-supply is constructed to admit gas freely to the outer ends of the passages *b*, preferably by being made smaller than the interior of the pillar or tube immediately surrounding the said end of the plug.

In the form of burner shown in Figs. 1 and 2 the tip consists of an enlarged chamber D, having a depending tubular projection *d*, adapted to slide or screw into the top of the pillar A. Under ordinary pressures the frictional contact of the tubular projection *d* with the pillar A will be sufficient; but under higher pressures the screw-thread engagement may be desirable.

The chamber D is provided with several openings *d'*, radiating from its interior, in which the ordinary tips *a* may be secured, producing the cluster or combination tip. The flames from the radiating openings will tend to heat the chamber D to a high degree and consequently expand the gas therein, while the particles of carbon on the upper sides of the flames will be more slowly consumed than on the under side, where the supply of oxygen is greater, and hence will glow for a longer time and increase the brilliancy of the flame.

The regulating-plug B is engaged with an interior thread in the projection *d*, and the walls of the latter serve to open or close the openings *b* in the plug as the latter is turned in or out of the said projection.

The tip with its regulator, as thus constructed may be applied to the pillars in common use by simply removing the ordinary tip and inserting it in its place. It may be removed at pleasure, and the regulator turned to admit a greater or less quantity of gas, and the gas which is admitted will divide itself by means of the passages *b* into opposing currents, which will impinge directly against one another as they reach the axis of the plug, and from that point the gas will pass under reduced speed to the discharge end of the tip and issue therefrom without blowing, causing a slow combustion, and consequent increased illuminating-power.

The form shown in Fig. 3 is quite similar in its general characteristics to that just described, the enlarged chamber being provided with but one discharge-opening instead of several.

In Figs. 4, 5, and 6 the said regulator-plug is shown adapted to engage directly the ordinary tip.

In Figs. 7 and 8 an intermediate tubular section F, interposed between the ordinary tip and the ordinary pillar, is shown, one end of said tubular section being fitted to engage the interior wall of the tip and the other to screw within the end of the plug B, closing and opening the passages *b* at their inner ends.

Figs. 9 and 10 show constructions quite similar in principle to that shown in Figs. 7 and 8; but in these forms the bases of the ordinary tips are fitted within the ends of the intermediate tubular sections F', and in Fig. 9 the lower end of the tubular section F' is closed, as shown at *f*.

Figs. 11 and 12 show the English Bray tip provided with the regulator-plug and secured in pillars—in Fig. 11 by friction and in Fig. 12 by screw-thread.

The above are some of the various forms in which my invention may be successfully and practically applied.

It is evident that many 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 strictly to the construction herein set forth; but,

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

1. The combination, with a pillar and a tip adapted to engage therewith, of a regulating-plug having opposing gas-passages leading from its periphery toward its axis and a passage leading from the opposing gas-passages to the end of the plug, the said regulating-plug being independent of the pillar and adjustably attached to the tip, substantially as set forth.

2. The combination, with a pillar and a tip adapted to engage therewith, of a regulating-plug having opposing gas-passages leading from its periphery toward its axis, and a passage leading from the opposing gas-passages to the end of the plug, the said tip being independent of the pillar, and a tubular part connecting the said plug with the tip, substantially as set forth.

3. The combination, with a pillar and a tip adapted to engage therewith, of a regulating-plug having opposing gas-passages leading from its periphery toward its axis, and a passage leading from the opposing gas-passages to the exterior of the plug, the said tip being independent of the pillar, and a tubular part, one end of which fits within the base of the tip and the opposite end of which forms a seat for the said plug, and a cut-off to the entrance of the gas, substantially as set forth.

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

ORSON W. BENNETT.

Witnesses:
E. C. SEWARD,
THOS. S. HOPKINS.