(No Model.) 2 Sheets—Sheet 1.

L. G. FRANCIS.

GAS LAMP.

No. 365,336. Patented June 21, 1887.

Fig. 1.

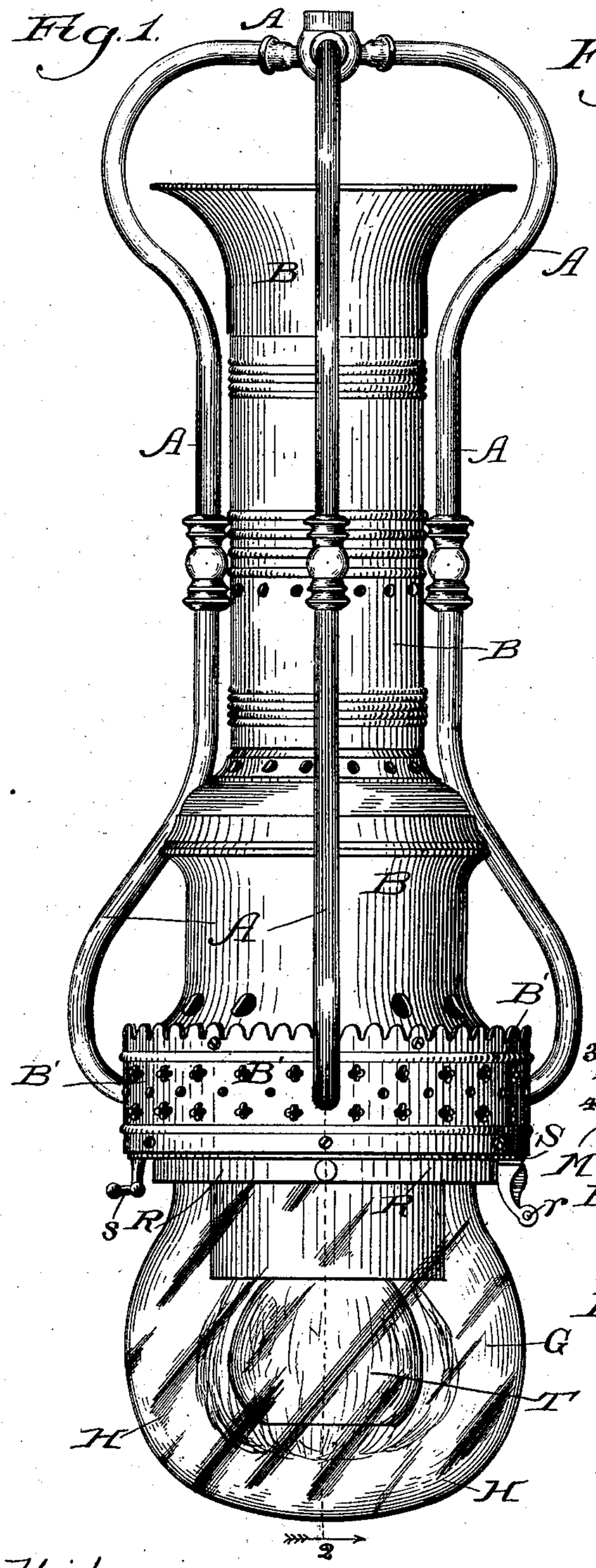
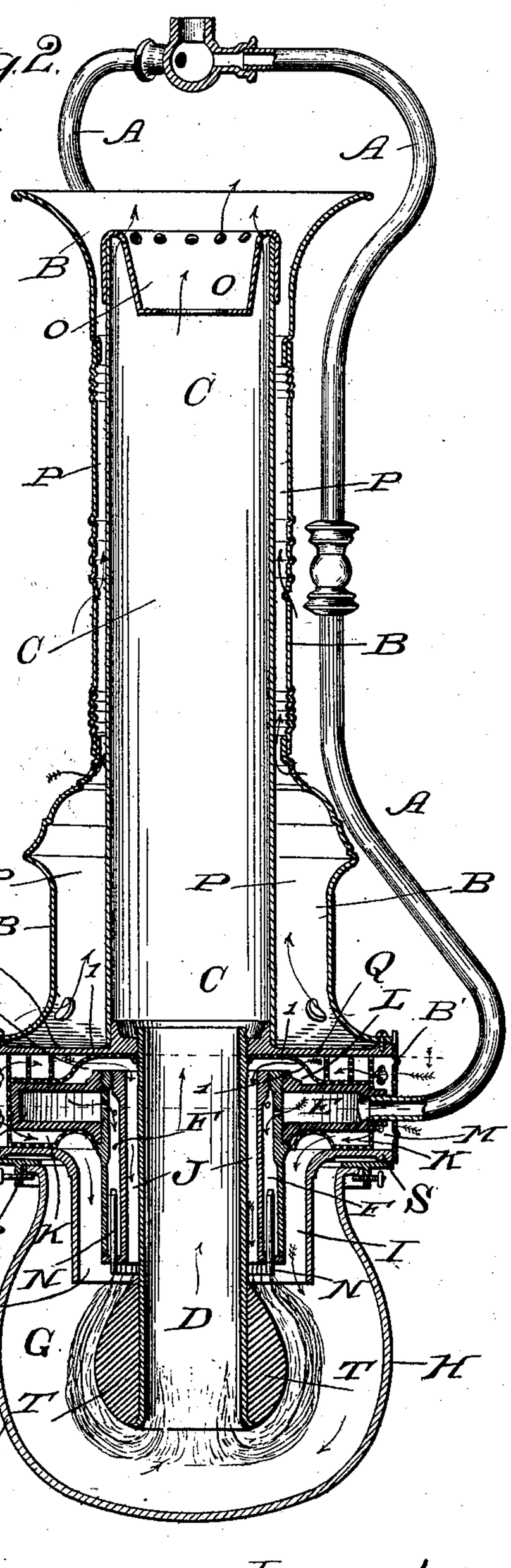


Fig. 2.



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Inventor:
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(No Model.) 2 Sheets—Sheet 2.

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Fig. 3.

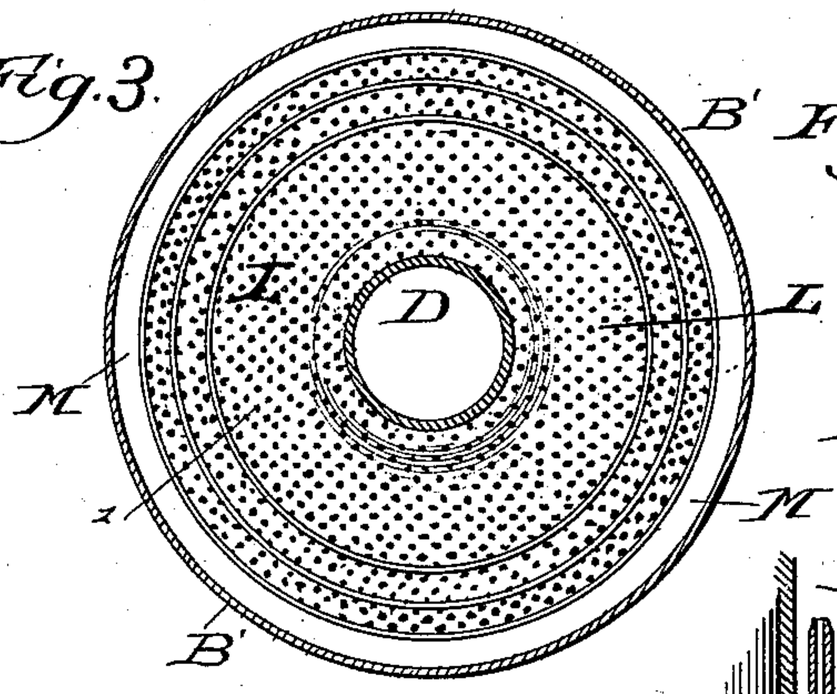


Fig. 4.

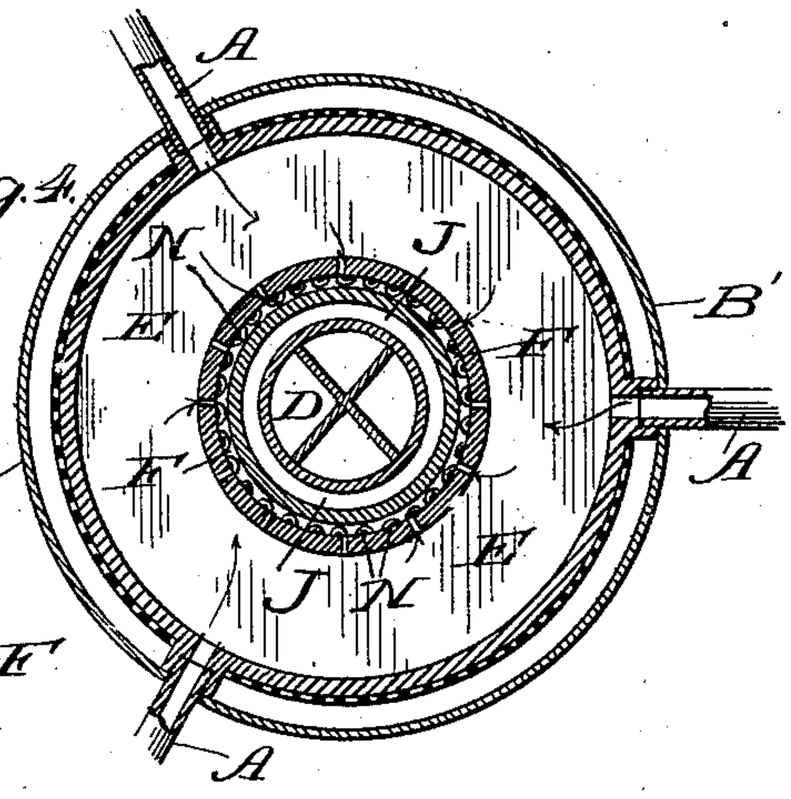


Fig. 5.

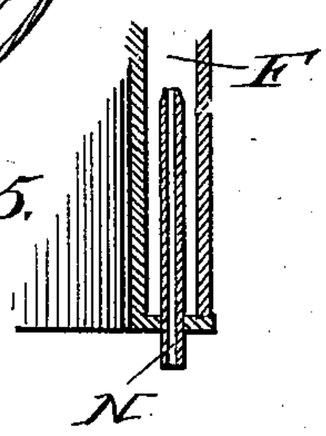


Fig. 6.

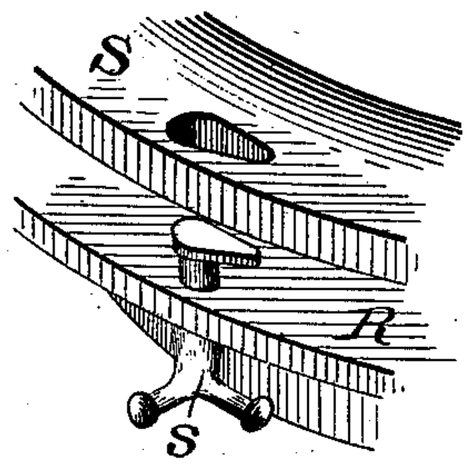


Fig. 7.

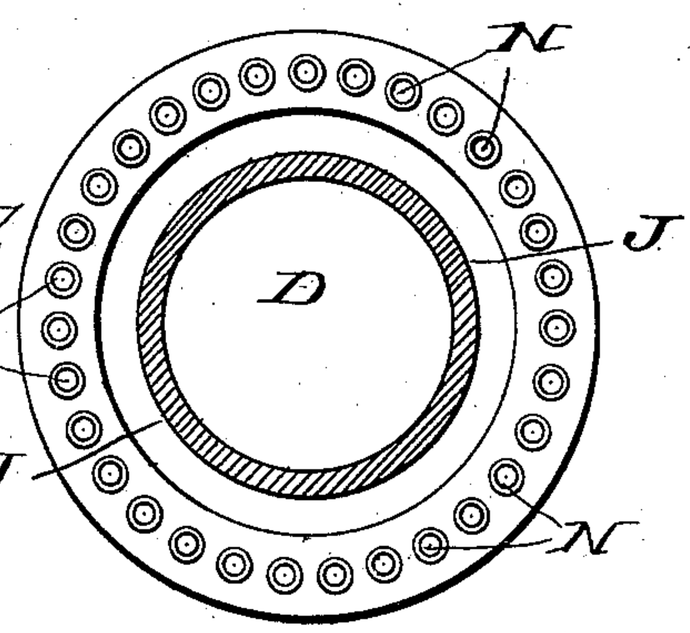
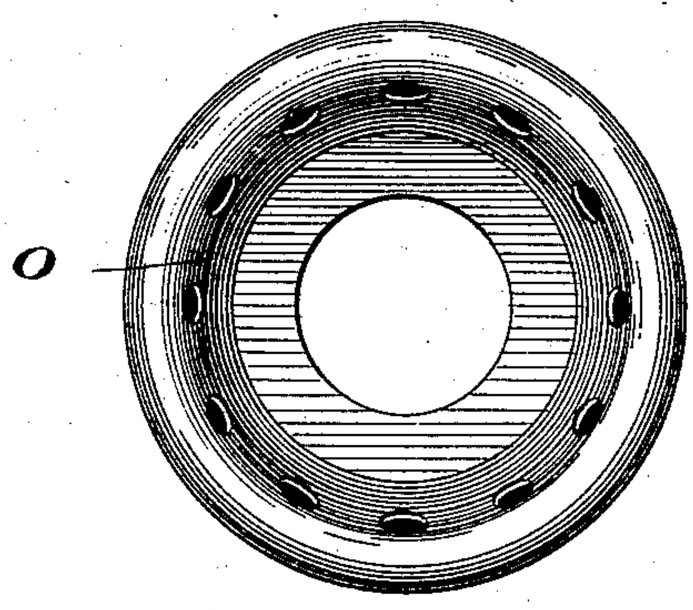


Fig. 8.



Witnesses:
Chas. E. Gaylord.
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Inventor:
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Att'ys.

UNITED STATES PATENT OFFICE.

LEWIS G. FRANCIS, OF CHICAGO, ASSIGNOR TO ALFRED C. FRANCIS, OF ROCHELLE, ILLINOIS.

GAS-LAMP.

SPECIFICATION forming part of Letters Patent No. 365,336, dated June 21, 1887.

Application filed December 2, 1886. Serial No. 220,438. (No model.)

To all whom it may concern:

Be it known that I, LEWIS G. FRANCIS, a citizen of the United States, residing at Chicago, Illinois, have invented certain new and useful Improvements in Gas Lamps or Burners, of which the following is a specification.

In the drawings, Figure 1 is a side elevation of my improved lamp. Fig. 2 is a vertical sectional view of the same. Fig. 3 is a plan view of the lamp, taken at the point indicated by line 3 in Fig. 2. Fig. 4 is a plan view of the lamp, taken at the point indicated by line 4 in Fig. 2. Fig. 5 is an enlarged vertical section of the gas-reservoir and one of the burners. Fig. 6 is an enlarged perspective of the bottom plate of the lamp, to which it is hinged. Fig. 7 is a plan view of the burner viewed from below, and Fig. 8 is a plan view of the smoke-chamber viewed from above.

In the drawings, A represents the gas-pipes or conduits by which the gas is conveyed to the burners; B, the external wall or case of the lamp; C, the upper part of the smoke-flue; D, the lower part of the smoke-flue; E, the gas-chamber; F, the gas-reservoir; G, the combustion-chamber; H, the globe forming such combustion-chamber; I, the external air-flue; J, the internal air-flue; K, the lower air-chamber; L, the upper air-chamber; M, the primary air-space; N, the burners; O, the cap to the smoke-flue, and P an air-space between the casing B and the smoke-flue C.

In making my improved gas lamp or burner, I construct it with an external case or wall, B, in which the parts are to be located, and which is intended to present an attractive external appearance. Within this casing I locate a smoke-flue, divided, preferably, into an upper and lower part, which are designated as C and D, respectively. The lower part, D, of this smoke-flue is preferably screwed into a plate, Q, to which the lower part of the case B is attached, and on which the upper part, C, of the flue rests. At the top of the smoke-flue I provide a cap, O, which rests over the top of the flue and projects down somewhat into the same. This cap should be preferably in the shape of an inverted frustum of a cone, so that a space will be afforded between it and the wall of the smoke-flue proper, and it should have perforations, as shown in Fig. 2. The object of this cap is to prevent the too rapid ascent of the air, which would be occasioned were the draft not diminished to some extent. It may be omitted entirely; but I have found that its use enables me to secure a more even and steady flame, and I therefore prefer to use it.

Between the upper portion, C, of the flue and the case B, I make, by preference, an air-space, P, into which the air is permitted to enter above the plate Q, and near the bottom of the space, as indicated by the arrows in Fig. 2. The current of air which constantly enters and passes up through this space prevents the external casing, B, from becoming unduly heated and thus discolored.

The pipes or conduits leading from the source of gas-supply pass through a perforated ring, B′, (shown in Figs. 1 and 2,) and are screwed into the outer wall of the chamber E, which I term the "gas-chamber." This external perforated ring, B′, incloses a chamber or space, M. (Shown in Fig. 2.) The air passes freely through the perforation into this space, which I term the "primary air-chamber," while the gas is carried through this chamber in the pipes and discharged into the gas-chamber E. From the gas-chamber E the gas passes through perforations into the gas-reservoir F, as shown in Fig. 2, and as indicated by the arrows leading from the chamber E. This chamber is closed, except that there are perforations leading from it to the chamber E for the admission of the gas, as above described, and that it is provided with tubes at the bottom. These tubes, leading from the bottom of the chamber E, which I designate by the letter N, and which are shown more particularly in Figs. 2 and 5, constitute the burners. They preferably extend up into the gas-reservoir F some distance and also some distance below the bottom of this reservoir, and have their upper ends beveled or sharpened, as shown in Figs. 2 and 5. The object of having them extended up and beveled is to enable any particles of solid carbon that may be contained in the gas and which have passed with the gas through the gas-chamber E into the gas-reservoir F to lodge in the bottom of the gas-reservoir, and to prevent them from being carried through to the

burning orifices, as would probably be the case did these burner-tubes not extend up into the reservoir and were they not thus sharpened; and I have found that I have secured better results by having these burner-tubes extend down somewhat below the plates which form the bottom of the gas-reservoir, as shown in Fig. 5, as each separate jet of flame is thus kept distinct and independent from its fellows until it is fully ignited and burning.

To supply the carbon of the gas with the necessary oxygen to support proper combustion, I arrange for a constant admission of air into the primary air-chamber M, as above described. The air thus entering this chamber is divided into two currents or parts, one passing above and the other below the gas-chamber E, as indicated by the arrows in Fig. 2. Each of these divisions or currents of air is strained, so to speak, by having it pass through a number of strainers or perforated partitions or rings shown in Fig. 2, and the tops of which are shown also in Fig. 3. The main one of these perforated partitions, which, for identification, I have marked as 1 in Fig. 2, is shown in plan in Fig. 3. By reference to Figs. 2 and 3, it will be seen that I employ three other vertical perforated straining-partitions; but the number which should be employed should be left largely to the judgment of the constructor of the lamp. I have found that I get better results by employing several successive strainers than where I employ only one, and I have therefore shown several in Figs. 2 and 3 in order to illustrate the best mode which I have found for applying or using my invention; but I do not wish to be confined or limited to any special number of strainers. The air that passes below the gas-chamber E, as indicated by arrows in Fig. 2, passes through a horizontal chamber, which I have termed the "lower air-chamber," K, and through the strainers into a vertical chamber, I, which I have termed the "external air-chamber." This air-chamber is an annular space around the gas-reservoir F, and opens at the bottom into the combustion-chamber G, into which the burner-tubes N also open. The air which passes above the gas-chamber E, as indicated by the arrows in Fig. 2, after passing through a horizontal chamber, which I have termed the "upper air-chamber," L, and through the strainers enters a vertical chamber, J, which I have termed the "internal air-chamber," and which is an annular space between the gas-reservoir F and the lower part, D, of the smoke-flue. This chamber also opens into the combustion-chamber G at its lower end. The lower air-chamber and the external air-chamber open into each other, and the upper air-chamber and the internal air-chamber open into each other, forming, for all practical purposes, two continuous air-chambers, which may broadly be designated as the "external" and the "internal" air-chambers. We thus have the gas-burners and the external and the internal air-chambers all opening into the same combustion-chamber, G. This chamber is formed by the globe H, which is preferably made of glass to secure the necessary transparency, open at its upper end and fastened by thumb-screws to a ring or globe-holder, R, which is hinged by a hinge, *r*, to a ring, S, which turns downward, as shown in Fig. 2, to form the outside wall of the external air-chamber, I. The globe and the globe-holder R may be turned back by means of the hinge *r* to light the gas or for other purposes, and may be locked or fastened in place by the lock *s*. (Shown in Figs. 1 and 6.) In this way I provide an air-tight combustion-chamber, except as the air enters the same from the chambers I and J, and at the same time secure an easy access to the burners whenever I desire to light the gas or to examine them for any purpose. The lower part, D, of the air-flue is externally enlarged, preferably as shown by the portion T in Fig. 2, to form a deflector, so that the flames of gas are spread before entering the flue D, by which a greater and more perfect illumination is secured.

It will be noticed that the smoke-flue is provided with vertical partitions, as shown in Fig. 4, although this may be dispensed with, if preferred, so that the flue will be one cylindrical chamber, as shown in Figs. 3 and 7. As the gas passes into the chamber E, and thence into the reservoir F, it will be heated and expanded by the great heat passing up through the flue D, and which radiates out through the walls of the surrounding chambers until it heats the gas-reservoir and receiving-chamber. The air supplying oxygen to the flame is of course also heated and expanded by the same means, so that when the combustion-chamber is reached at the point where the ignition takes place the air and the gas are both in the most favorable condition possible for complete and perfect combustion, so that I get the greatest amount of illumination from the least quantity of gas possible.

I am aware of the construction shown in Letters Patent of the United States to O'Neil, No. 344,195, dated June 22, 1886; in Letters Patent of the United States to Gordon, No. 345,499, dated July 13, 1886; in German Letters Patent to Westphal, No. 27,480, of 1883, and in English Letters Patent to Sugg, No. 2,355, of 1883; and I desire to disclaim each and all of these constructions.

What I regard as new, and desire to secure by Letters Patent, is—

1. In a gas-lamp, the combination of a gas-receiving chamber, E, incoming gas-conduits A, opening into the receiving-chamber, a gas-reservoir, F, opening into the receiving-chamber, burner-tubes N, leading from the reservoir into a combustion-chamber, G, an air-chamber, I, closed at the top, surrounding the gas-reservoir and provided with side inlets for air, air-passages external and internal to the gas-reservoir and opening into the combustion-chamber, a combustion-chamber into which the burner-tubes and the air-passages open,

and a smoke-flue, D, leading therefrom, substantially as described.

2. In a gas-lamp, the combination of a gas-receiving chamber, E, incoming gas-conduits A, opening into the receiving-chamber, a gas-reservoir, F, opening into the receiving-chamber, burner-tubes N, leading from the reservoir into a combustion-chamber, G, an air-chamber, I, closed at the top, surrounding the gas-reservoir, provided with side inlets for air and with perforated strainers or partitions located between the inlet and the exit of the air, air-passages external and internal to the gas-reservoir and opening into the combustion-chamber, a combustion-chamber into which the burner-tubes and the air-passages open, and a smoke-flue, D, leading therefrom, substantially as described.

3. In a gas-lamp, the combination of a gas-receiving chamber, E, incoming gas-conduits A, opening into the receiving-chamber, a gas-reservoir, F, opening into the receiving-chamber, burner-tubes N, leading from the reservoir into a combustion-chamber, G, an air-chamber, I, closed at the top, surrounding the gas-reservoir and provided with side inlets for air, air-passages external and internal to the gas-reservoir and opening into the combustion-chamber, a jacket, B, open at the top, perforated at the bottom, and surrounding the chimney C, to permit an upward current of cool air to pass, a combustion-chamber into which the burner-tubes and the air-passages open, and a smoke-flue, D, leading therefrom, substantially as described.

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Witnesses:
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EPHRAIM BANNING.