

(No Model.)

2 Sheets—Sheet 1.

C. CLAMOND.
ILLUMINATING BURNER.

No. 297,767.

Patented Apr. 29, 1884.

Fig. 1.

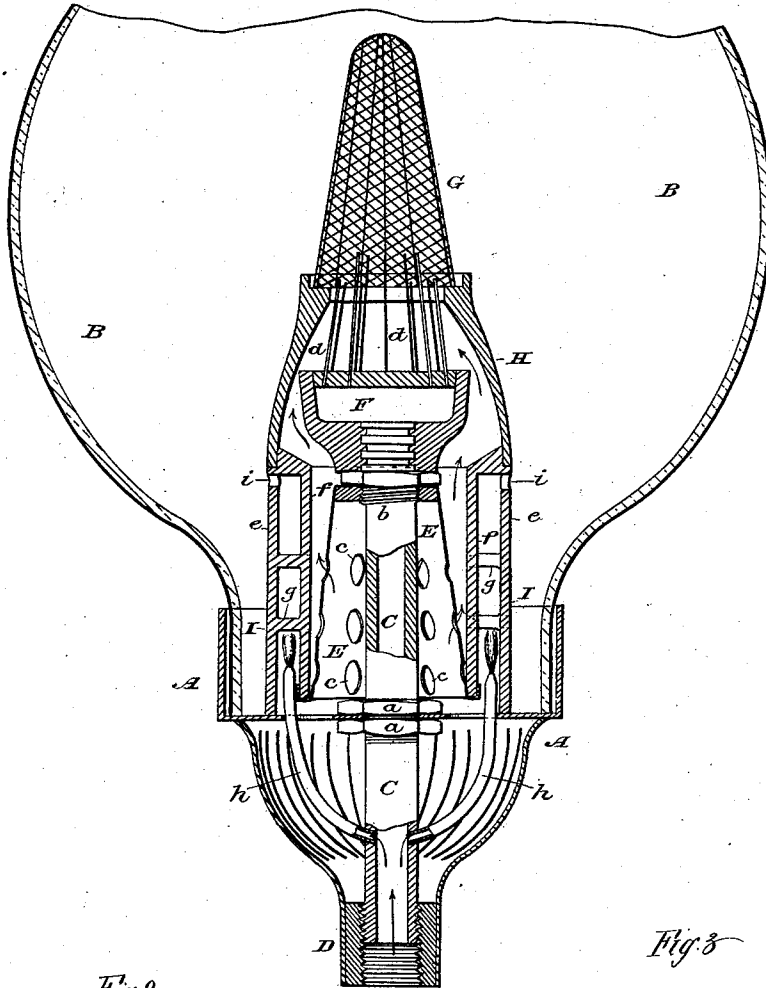
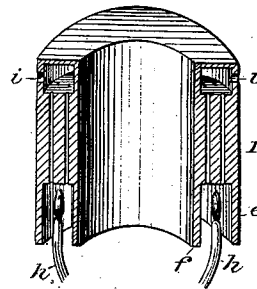


Fig. 2



Fig. 3



WITNESSES:

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INVENTOR:

Charles Clamond

By his Attorneys,

Burke, Fraser & Corning

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Fig. 4.

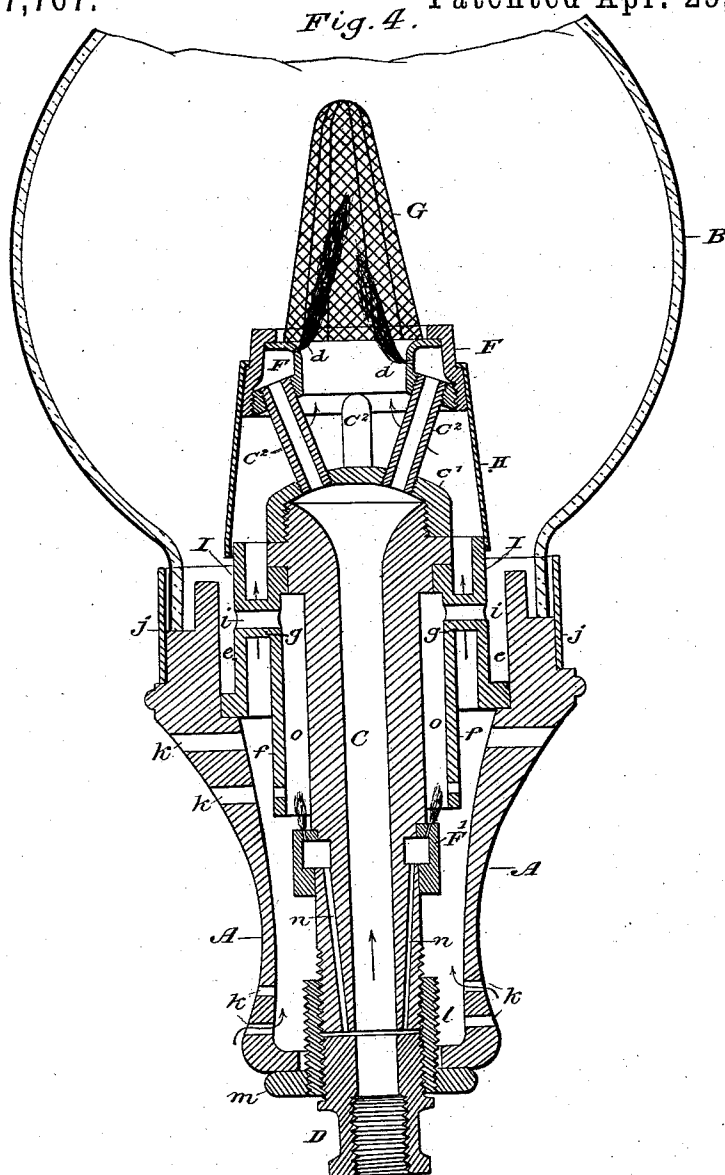
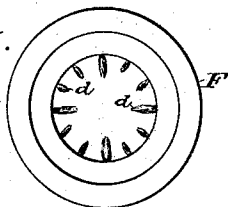


Fig. 5.



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UNITED STATES PATENT OFFICE.

CHARLES CLAMOND, OF PARIS, FRANCE.

ILLUMINATING-BURNER.

SPECIFICATION forming part of Letters Patent No. 297,767, dated April 29, 1884.

Application filed January 8, 1884. (No model.) Patented in France May 20, 1880, No. 136,771; in Belgium May 28, 1880, No. 61,763; in Italy June 17, 1881, No. 19,600, and in England June 20, 1883, No. 2,062.

To all whom it may concern:

Be it known that I, CHARLES CLAMOND, a citizen of the French Republic, residing at Paris, France, have invented an Apparatus or Burner for Producing Intense White Light, of which the following is a specification.

My present invention relates to further improvements in the class of burners of which that described in the Patent No. 282,053, of July 31, 1883, is a type. In that burner the axial gas-inlet tube was closed at the top and perforated at its sides for the escape of the gas laterally into a cylindrical chamber, from whence it passed to the magnesian basket through a series of rather large tubes. The wall of the gas-chamber was perforated to allow numerous jets of gas to pass laterally into an exterior flame-chamber, where they were ignited and burned in contact with the inner wall of an annular exterior air conduit or passage, thus heating the air on its way to the burning-point. My present invention differs from the above-described burner in that the axial gas-inlet pipe is imperforated and the gas passed up directly into a gas-chamber at the top of the inlet-pipe, which is provided either with very small jet-tubes or very small jet-apertures, which insures a more thorough admixture of the gas with the hot air at the burning-point, and consequently more thorough combustion. The flame-chamber, which is an annular drum or chamber formed of two concentric cylinders made in one piece, is arranged, by preference, exteriorly to the annular air-passage, and is heated by special jets arranged at its bottom. A perforated bell is arranged in the air-passage to deflect the air outward against the heated inner wall of the flame-chamber. The heated air passes up around the gas-chamber and jet apparatus, and mixes thoroughly with the gas at the burning-point.

In the drawings, which serve to illustrate my invention, Figure 1 is a vertical mid-section of my improved burner; and Figs. 2 and 3 are detached views of modifications of parts thereof, which will be hereinafter described. Fig. 4 is a sectional view of a modification of my burner, and Fig. 5 is a plan of the tip of

the burner shown in said Fig. 4, with the 50 magnesian cage removed.

Referring to Fig. 1, A is the base of the burner, which is provided with a rim to retain in place and uphold the glass chimney B. Airtosupport combustion enters freely through 55 slits or apertures in the base A.

C is an imperforated axial tube for the admission of gas. This tube has a screw-threaded socket, D, and is secured to the platform of base A by nuts *a a*. Surrounding the tube C 60 is a frusto-conical bell, E, secured to the tube at *b*, and provided with perforations *c c*. Screwed or otherwise secured to the upper end of tube C is a gas-chamber, F, in the cap of which are fixed slender jet-tubes *d d*, which 65 incline a little toward a common center at their tops, and which project up into a magnesian basket, G. This basket rests on a deflecting dome, H, and this dome houses the gas-chamber F, and rests in turn on an annular 70 drum, I, which surrounds the gas-tube C and bell E. This drum comprises an outer shell, *e*, and an inner shell, *f*, the two being connected together at intervals by ties *g g*. The outer shell, *e*, rests upon the base A, but the 75 inner shell is shorter and is supported by the outer shell. The annular space between *e* and *f* is closed at their tops, as shown, and forms the flame-chamber before referred to.

Having briefly described the principal parts 80 of my burner, I will now describe its operation, and refer to the other features in doing so.

The gas enters through tube C, passes upward into the chamber F, and thence out 85 through the jet-tubes *d*, at the tips of which it is ignited. These tubes *d* may be of different lengths, and may tap the crown of chamber F at regular or irregular intervals. I generally arrange them in two concentric 90 circles. The draft produced by chimney B causes the air to enter at the base of the burner, whence it passes up into bell E, and issues from thence through the perforations *c*, impinging upon the interior wall, *f*, of cylinder I. 95 It passes thence upward around the gas-chamber F, and is deflected inward by dome or cone H among the jet-tubes *d*. The upward

current of air surrounds each jet, and supplies it with air for combustion, which is effected in the basket G, and the latter raised to incandescence.

5 In order to heat the air in its upward passage, I provide gas-jet tubes *h h*, which tap the main gas-tube C within the base A and extend upward into the annular space or flame-chamber between the walls of drum or cylinder I. These jets are lighted, and, being
10 supplied with air which enters under the edge of the inner wall, *f*, heat the said cylinder I. The ties *g* serve to transmit the heat from one wall to the other, and the products of combustion pass off through outlets *i i* in the wall
15 *e*. Thus it will be seen that the perforated bell E causes the upward current of air to impinge upon the highly-heated wall *f*, and by this means the temperature of the air is raised to the proper point before it reaches the jets,
20 where it is combined. This arrangement produces very perfect combustion.

In Fig. 2 I have shown the tube *h* as provided with a double or forked jet, and in Fig.
25 3 I have shown a modification of the construction of cylinder I in which the annular space between its walls is partly closed by a solid block, and this block has vertical bores or flues formed in it for the passage of the products of
30 combustion and flame.

In Fig. 4 I have shown a modified construction of my burner, which I will now describe, premising that the same letters of reference are employed as those in Fig. 1, so far as may
35 be. The principal parts of the burner in this construction I prefer to make of porcelain or other ceramic or vitreous material. C is the tubular gas-inlet pipe, the bore of which is enlarged or flared at its upper part. C' is a cap
40 secured to the top of said pipe. This forms a primary gas-chamber. C² are tubes which connect pipe C with an annular gas-chamber, F, on which rests the cage G. H is an inclosing cone, which may be of sheet metal. I
45 is an annular cylinder upon which the shouldered tube C rests. This cylinder I has two walls, *e* and *f*, and its outer wall, *e*, rests on and is upheld by a shoulder on the base A. This base has a raised flange, *j*, which forms a recess to receive the base of the chimney B.
50 The air is free to enter base A at various apertures *k k*. Screwed onto the lower end of tube C is a sleeve, *l*, screw-threaded internally and externally. This passes through the bottom of base A, and a nut, *m*, holds the
55 several parts together. D is a socket-piece, which screws into sleeve *l*.

Having thus generally described the construction of the burner shown in Figs. 4 and
60 5, I will now describe its operation, introducing the minor features as I proceed.

The gas enters C through the tubular socket-piece D and passes up through C and tubes C² into gas-chamber F. This annular
65 chamber surrounds the aperture through which the hot air must pass on its way upward, and

its inner wall is perforated with small holes to permit jets of gas *d* to escape radially inward toward the axis of the burner. I prefer to arrange these jets in alternate order,
70 one lower down and jetting inward nearly horizontal, and the other higher up and jetting upward and inward at an angle of about forty-five degrees. These are shown at the right and left in Fig. 4. The air enters the
75 base of the burner at holes *k*, and flows upward between walls *e* and *f* of cylinder I, whereby it is heated, thence over the top of tube C among tubes C², and thence up through the aperture in gas-chamber F. In doing so
80 it mixes thoroughly with the gas from jets *d* and burns in cage G.

In order to heat the air, a small gas-chamber, F', is arranged around the tube C at the base of cylinder I, and gas is admitted to this
85 through small bores *n* in the walls of tube C. In the crown of the gas-chamber F' are small jet-apertures, through which burning jets of the gas extend upward into the base of an
90 annular space, *o*, forming a flame-chamber between the wall *f* of cylinder I and the wall of tube C. Air is supplied to the small jets through holes in the lower end of *f*, and the products of combustion escape through hollow
95 ties *g* into the chimney B.

The amount of gas admitted to the small bores *n* may be regulated by screwing in or out the socket-piece D, which may be made to close these almost entirely.

In lieu of burning ordinary coal-gas, I may
100 burn hydrogen gas, carbonic oxide, or the vapors of hydrocarbons—such as gasoline, naphtha, &c., or a mixture of these.

I do not herein claim the construction shown in my former patent, referred to herein.
105

I claim as my invention—

1. In a burner wherein hot air is supplied to the flame, the combination, with the imperforated axial gas-inlet tube C, bearing on its upper end a gas-chamber and jet apparatus,
110 of the annular flame-chamber arranged exterior thereto and provided with heating gas-jets at its base, and the annular air-passage or conduit arranged and adapted to be heated, substantially as set forth.
115

2. In a burner wherein hot air is supplied to the flame, the combination, with the imperforated axial gas-inlet tube C, bearing a gas-chamber and jet apparatus, of the drum I,
120 made in one piece and containing the annular flame-chamber, and the gas-jets *h*, arranged at the base of said chamber, the flame-chamber being arranged exterior to the annular passage through which the air passes upward to the burning-point, substantially as set forth.
125

3. The means for heating the air in its passage to the burning-point, comprising the perforated bell E, the annular cylinder I, and the pipes *h*, for admitting gas to the jets at the base of said cylinder, all constructed
130 substantially as set forth.

4. In a burner, the combination, with the

dome H, provided with an orifice for the passage of the jet-tubes, and the imperforated gas-inlet pipe C, provided with a gas-chamber, F, of the slender jet-tubes *d*, inclined inward, as shown, and extending upward into the aperture in the dome, substantially as set forth.

5 5. The combination, in a burner, of the gas pipe or tube C, the gas-chamber F, the small jet-tubes *d d*, the magnesian basket G, the cone H, the annular cylinder I, the perforated bell E, and jet-tubes *h h*, all arranged substantially as set forth.

6. The combination of the basket G, the gas-chamber F, and the jet-tubes *d*, made very slender, of unequal length, and inclined inward, as described. 15

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

CHARLES CLAMOND.

Witnesses:

ROBT. M. HOOPER,
AMAND RITTER.