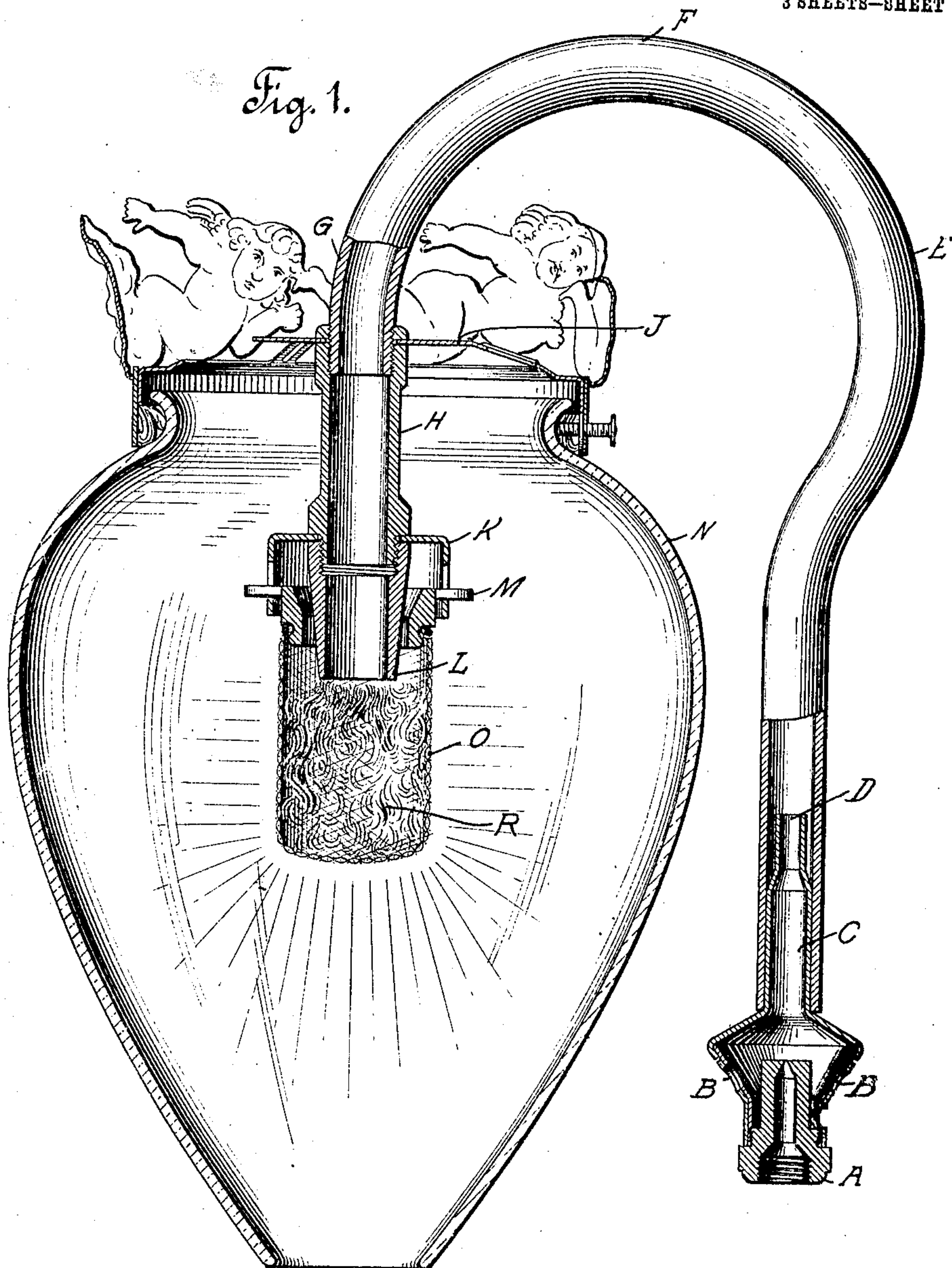


No. 872,070.

PATENTED NOV. 26, 1907.

J. LEDERER.  
INVERTED GAS BURNER.  
APPLICATION FILED DEC. 22, 1904

3 SHEETS—SHEET 1.



Witnesses  
Anna Burke.  
Thomas P. Dalton

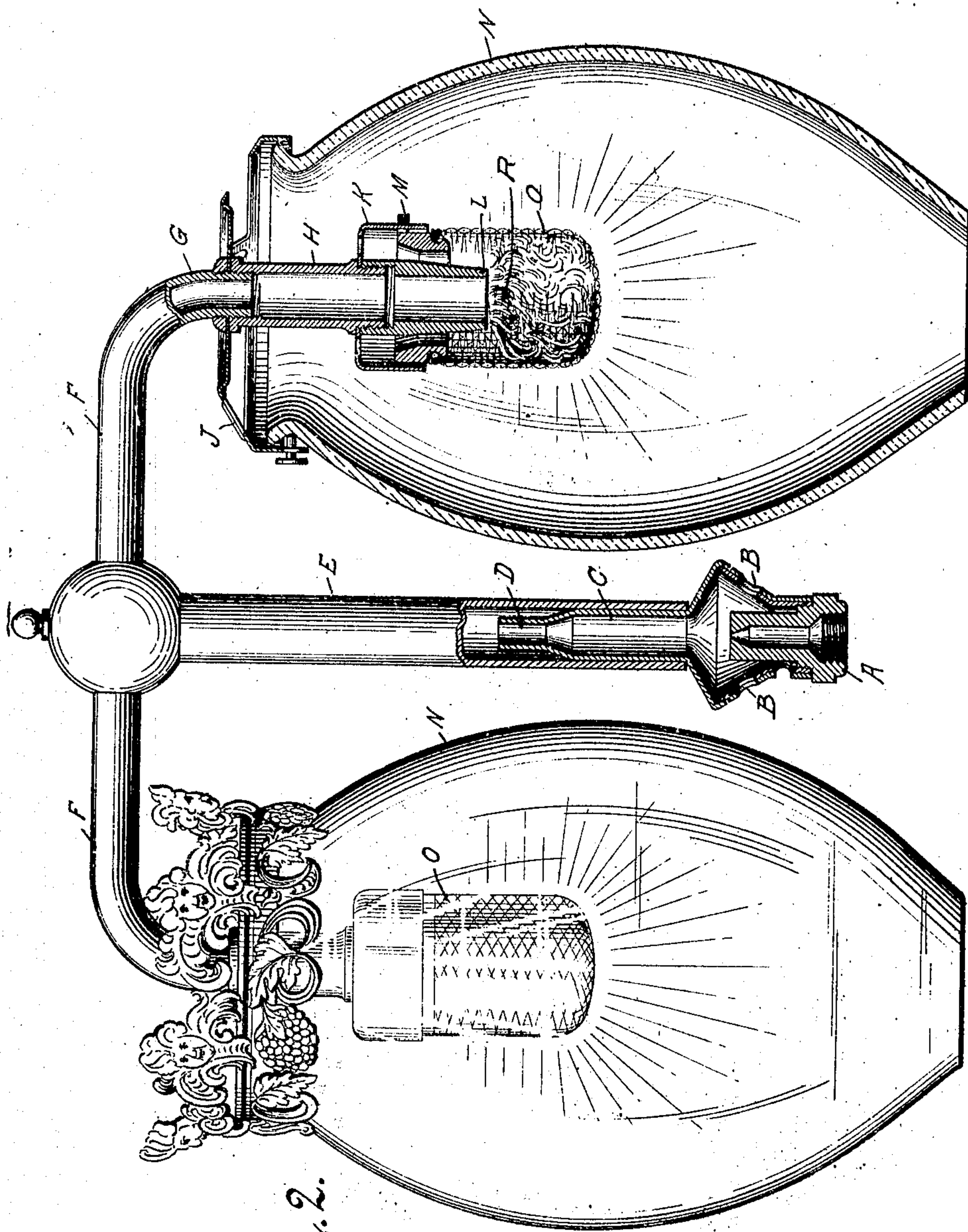
Joseph Lederer Inventor  
By his Attorney Louis Hicks

No. 872,070.

PATENTED NOV. 26, 1907.

J. LEDERER.  
INVERTED GAS BURNER.  
APPLICATION FILED DEC. 22, 1904.

3 SHEETS—SHEET 2.



Witnesses  
Anna Burke.  
Thomas P. Dalton

Joseph Hederman Inventor  
By his Attorney Louis Hight



No. 872,070.

PATENTED NOV. 26, 1907.

J. LEDERER.  
INVERTED GAS BURNER.  
APPLICATION FILED DEC. 22, 1904.

3 SHEETS—SHEET 3.

Fig. 3.

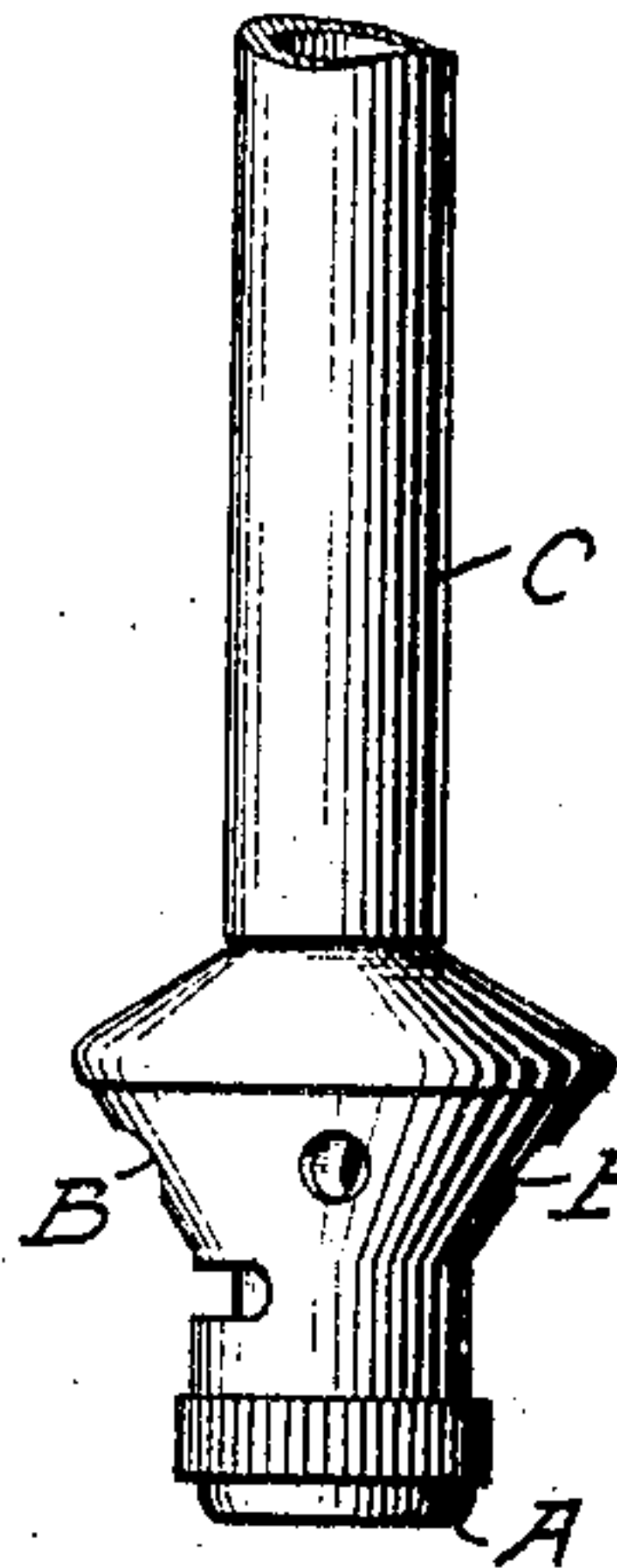


Fig. 4.

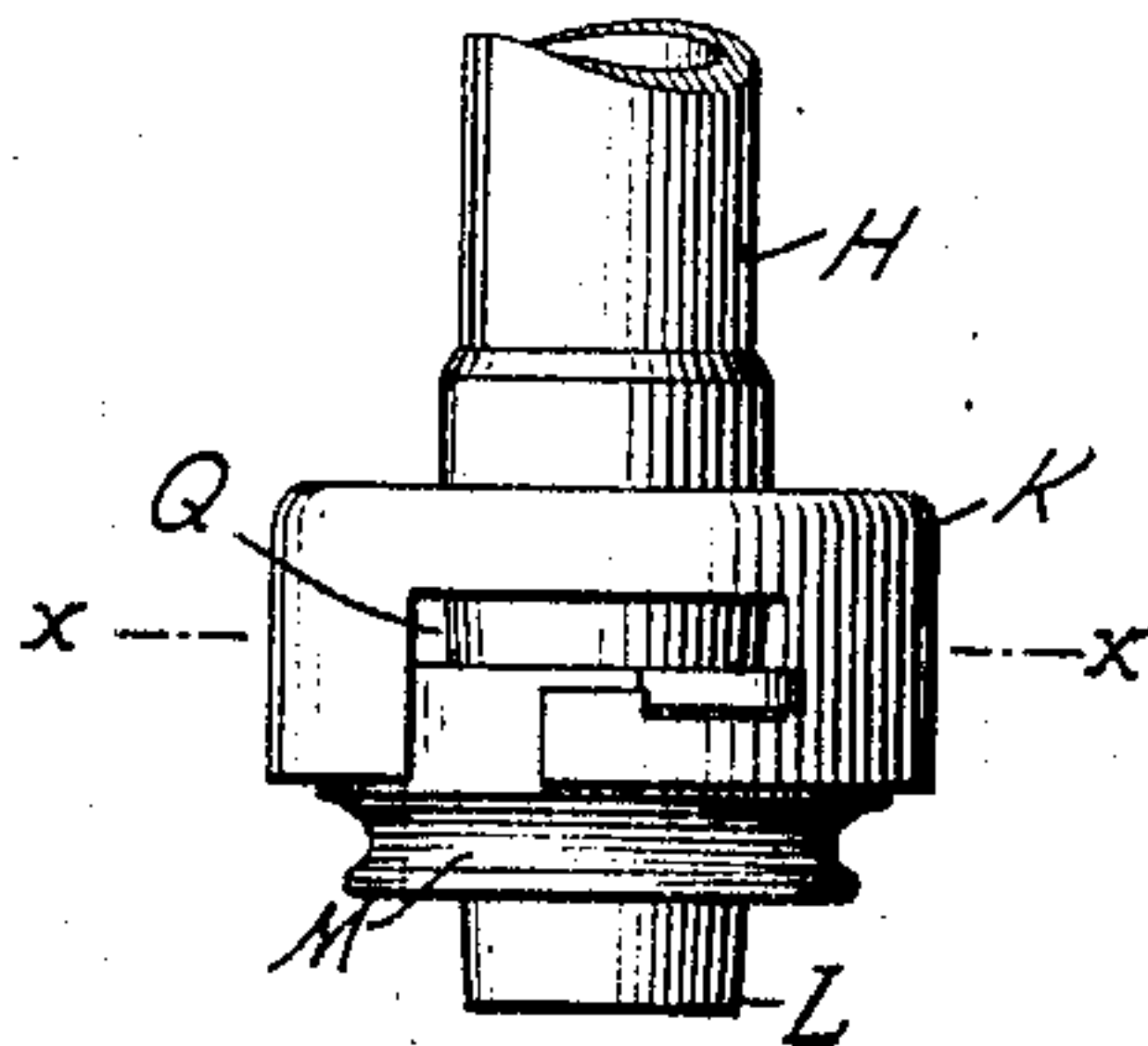


Fig. 5.

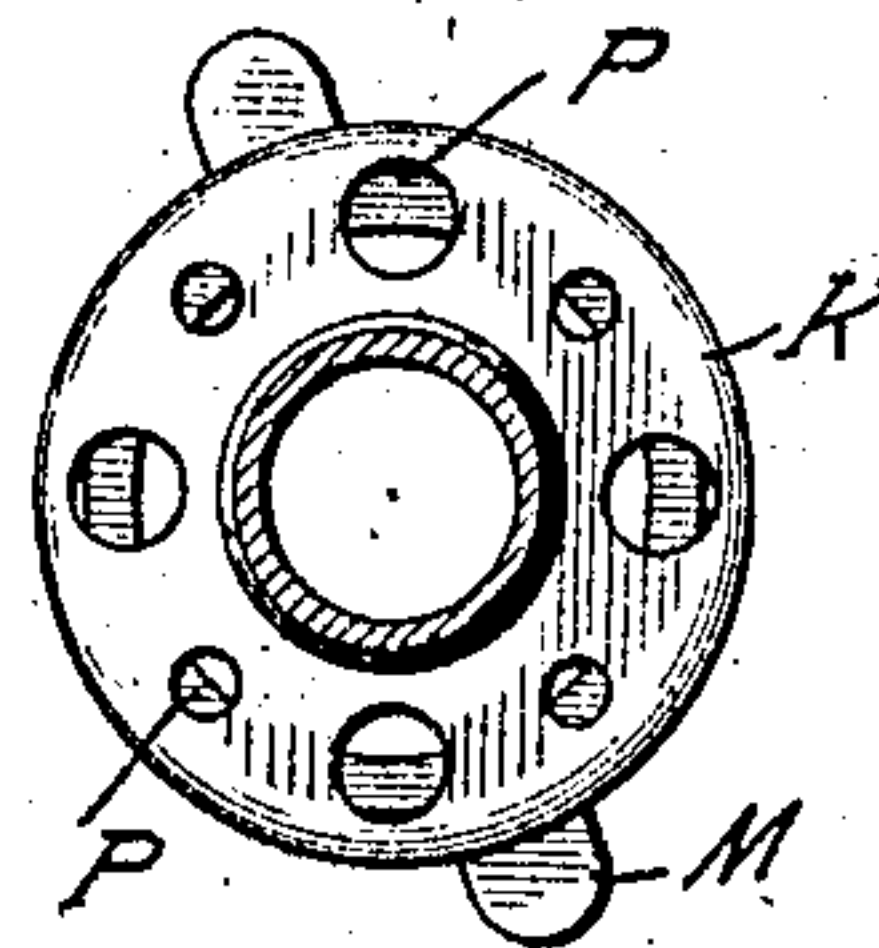
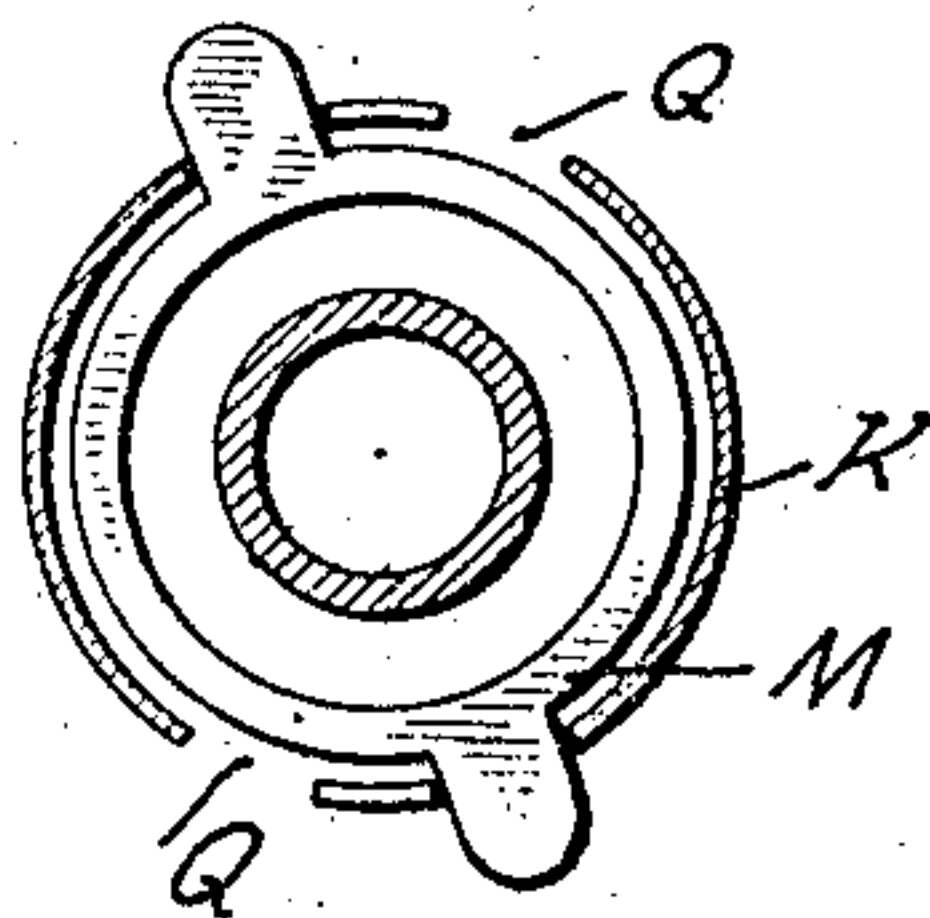


Fig. 6.



Witnesses  
*Anna Barker.*  
*Thomas D. Dalton*

*Joseph Lederer* Inventor  
By his Attorney *Louis Hicks*



# UNITED STATES PATENT OFFICE.

JOSEPH LEDERER, OF NEW YORK, N. Y.

## INVERTED GAS-BURNER.

No. 872,070.

Specification of Letters Patent.

Patented Nov. 26, 1907.

Application filed December 22, 1904. Serial No. 237,916.

To all whom it may concern:

Be it known that I, JOSEPH LEDERER, a citizen of the United States, residing in the city, county, and State of New York, have invented certain new and useful Improvements in Inverted Gas-Burners, of which the following is a specification.

This invention relates to inverted gas-burners of the Bunsen type and has for its object the production of a more perfect flame than has heretofore been obtained in such gas-burners. The flame is adapted to render incandescent a mantle for incandescent gas-light.

The invention is illustrated in the accompanying drawings which form part of this specification.

In the drawings Figure 1 is a vertical section, excepting part of the pipe, of a single gas-burner embodying this invention. Fig. 2 is a side elevation, partly in vertical section, of a double gas-burner embodying this invention. Fig. 3 is a side elevation of the lower part of the Bunsen-burner tube shown in vertical section in Figs. 1 and 2. Fig. 4 is a side elevation of the mouth of the Bunsen-burner with means attached for the support of a mantle for incandescent gas-light, shown in vertical section in Figs. 1 and 2. Fig. 5 is a view from above of the part shown in Fig. 4. Fig. 6 is a view from above of a horizontal section, along the line xx, of the part shown in Fig. 4.

In the drawings like letters denote like parts.

Heretofore, in inverted gas-burners for use with mantles for incandescent gas-light, one of the principal difficulties encountered has been the tendency of the bunsen flame to flash back and burn within the Bunsen tube. Moreover, difficulty has been experienced in obtaining a bunsen flame that would burn with a full and proper shape or form and with a perfectly blue flame or flame without yellow parts, the presence of which results in blackening or carbonizing of the mantle. These difficulties are obviated by this invention and a far more perfect flame, which renders the mantle fully incandescent without blackening, is obtained. The flame of an inverted gas-burner is far more sensitive than is the flame of an upright gas-burner and it requires a far more perfect pressure and more perfect mixture of gas and air to secure proper results.

In the drawings, A is a part of a Bunsen-

burner adapted to be connected with a gas supply pipe.

B B are holes or openings in the burner-tube for the admission of air into the tube to be admixed with the gas entering from the gas supply pipe. The mingling gas and air pass into the part C of the burner-tube which is smaller in diameter or extent of opening at its mouth or upper end D than it is below.

E is a pipe which carries the mingling gas and air upwards, then laterally, through the part F, and then downwards, through the part G, to the downwardly extending part H of the burner-tube. As shown in the drawings the part H is of greater diameter than the pipe, EFG, which conducts the mingling gas and air into it. The part H is adapted to screw on to the part G, thus permitting the globe-holder J to be placed and held firmly between the part H and a shoulder near the end of part G when the parts H and G have been screwed tightly together as shown in the drawing. In like manner, upon the lower end of the part H the pipe L is screwed or otherwise fastened, thus permitting the mantle-support K to be placed and held firmly between them when they have been screwed tightly together. The mantle-support K is adapted to receive and carry a ring M or other suitable means of attachment for one end of the mantle. A globe N is carried by the globe-holder J and a mantle for incandescent gas-light O is carried by the ring M of the mantle support K. As shown in Fig. 5 the upper horizontal part of the mantle-support K is provided with openings or perforations P, in addition to the openings Q at the side shown in Fig. 4. As shown in Figs. 1 and 2 the holes or openings BB for the admission of air into the burner-tube are below the level of the mouth L of the Bunsen-burner. As a consequence, the mingling gas and air flow upwards before reaching the mouth of the Bunsen-burner L. The upward flow of the mingling gas and air is in accordance with the natural tendency; hence a proper supply of gas and air is secured in the burner-tube.

In order to effect a better mixing of the gas and air and to increase the speed of the flowing gas and air the mouth or opening D of the tube C is narrower than is the lower part of the tube C, as shown in the drawing. The result of the upward flow of the mingling gas and air and of the narrowing of the tube C at



an upper part as at D is that the mixed gas and air burn with a flame R perfectly blue and of proper shape or form at the mouth L of the Bunsen-burner and the mantle is rendered completely incandescent and blackening of the mantle is avoided. In a double, inverted gas-burner or a gas-burner having a plurality of inverted mouths, as shown in Fig. 2, the narrowing of the tube C as at D is usually essential to securing an efficient, proper flame. In a single, inverted gas-burner, as shown in Fig. 1, the narrowing of the tube C as at D greatly improves the flame and the incandescent effect of the mantle. In practice, if the diameter of the tube C is  $1/2$  an inch the diameter of the exit D should be about  $3/8$  of an inch, the principle, however, being that in any given case the tube into which the mingling gas and air enters should be made sufficiently narrower at an upper part to insure a proper mixing of the gas and air and a sufficient speed of flow.

The pipe EFG is greater in diameter than the part D of the tube C from which the mingling gas and air flow into it. The greater diameter or extent of opening of the pipe EFG permits the gas and air issuing from the part D to spread and mix better than otherwise it would and the same effect is secured by the greater diameter or extent of opening of the part H over the diameter or extent of opening of the pipe EFG, or of the part F, as shown in Figs. 1 and 2. In a double, inverted gas-burner or inverted gas-burner having a plurality of inverted mouths, the part E of the pipe EFG should be greater in diameter than the parts F to insure a proper supply of gas and air to the several parts F, as shown in Fig. 2.

In an inverted gas-burner, constructed according to this invention, the gas and air are permitted to flow into the burner-tube and to mix below and to one side of the bunsen-flame and as a result the gas and air do not become heated until they reach the part of the pipe EFG above the flame. The overheating which takes place where the holes for the admission of air to the burner-tube and the burner-tube are above the bunsen flame is avoided by this invention. Such overheating tends to cause and often causes the flame to flash back and burn within the burner-tube at the holes for the admission of air. Moreover, in an inverted burner made according to this invention the upward flow of the mingling gas and air, the rapidity of their flow and the length and curve of pipe through which they flow also serve to prevent the flashing back of the flame.

In the drawings the tube C diminishing in diameter at its upper end D is constructed separate and distinct from the pipe EFG, and the pipe EFG has been fitted over the tube C. Obviously, however, the construc-

tion of these parts in separate pieces is unnecessary to secure the results above described, and the tube C with the narrowing at its upper end D, and the pipe EFG with its diameter or extent of opening greater than the diameter or extent of opening of the part D, may be constructed in one piece or in any other convenient manner, provided only that the principles above described be observed.

Whether the tube C with the narrowing at its upper end D is made separate and distinct from the pipe EFG or whether the tube C with the narrowing at its upper end and the pipe EFG are constructed in one piece or in any other convenient manner as above explained, the tube C and that part of the pipe EFG which ascends constitute an ascending or upward duct. The narrowing of the upward duct at some such point as D should be at an upper part of the upward duct, composed of the parts described, that is to say, the narrowing of the upward duct at some such point as D should be at a point or place at some distance above the lower end of the upward duct, as shown in the drawings.

An advantage in the construction of an inverted gas-burner in accordance with this invention, is that one or more efficient bunsen-flames can be obtained from arms FF, supplied with mixed gas and air from a single burner tube E with holes or openings BB, for the admission of air, as shown in Fig. 2.

What I claim is;

1. In a gas-burner for use with mantles for incandescent gas-light, the combination of an ascending duct for gas and air which diminishes in extent of opening at a point above the lower end of the ascending duct, and a descending duct provided with a downwardly opening orifice for the exit and ignition of the gas and air mixture and the formation, upon ignition, of an inverted flame, substantially as described.

2. In a gas-burner for use with mantles for incandescent gas-light, the combination of an upward duct for gas and air which is provided with an inlet for air at a lower part and which appreciably diminishes in extent of opening at an upward point of its ascent, and a downward duct provided with a downwardly opening orifice for the exit and ignition of the gas and air mixture and the formation, upon ignition, of an inverted flame, substantially as described.

3. In a gas-burner for use with mantles for incandescent gas-light, the combination of an upward duct for gas and air which is provided with an inlet for air at a lower part of the upward duct, a plurality of arms extending from an upper part of the upward duct for a plurality of flames and a plurality of downward ducts provided with downwardly opening orifices for the exit and ignition of the gas and air mixtures and formation, upon



ignition, of inverted flames, substantially as described.

4. In a gas-burner for use with mantles for incandescent gas-light, the combination of an upward duct for gas and air which appreciably diminishes in extent of opening at an upward point of its ascent, a plurality of arms extending from the upward duct for a plurality of flames and a plurality of downward ducts provided with downwardly opening orifices for the exit and ignition of the gas and air mixtures and the formation, upon ignition, of inverted flames, substantially as described.

5. In a gas-burner for use with mantles for incandescent gas-light, the combination of an upward duct for gas and air which is provided with an inlet for air at a lower part and which appreciably diminishes in extent of opening at an upward point of its ascent, a plurality of arms extending from the upward duct for a plurality of flames and a plurality of downward ducts provided with downwardly opening orifices for the exit and ignition of the gas and air mixtures and the formation, upon ignition, of inverted flames, substantially as described.

6. In a gas-burner, the combination of an upward duct for gas and air which has an inlet for air at a lower part and which appreciably diminishes in extent of opening at an upward point of its ascent, a downward duct provided with a downwardly opening orifice for the exit and ignition of the gas and air mixture and the formation, upon ignition, of an inverted flame and an inverted mantle for incandescent gas-light, substantially as described.

7. An inverted gas-burner for use with mantles for incandescent gas-light, provided with an upward and downward duct for gas and air which varies in extent of opening, diminishing and then increasing along the upward duct and again increasing in the downward duct near the mouth of the burner, substantially as described.

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

JOSEPH LEDERER.

Witnesses:

J. F. DUGGAN,  
C. T. HENDRICK.