C. L. DUENKEL.

INVERTED GAS LAMP.

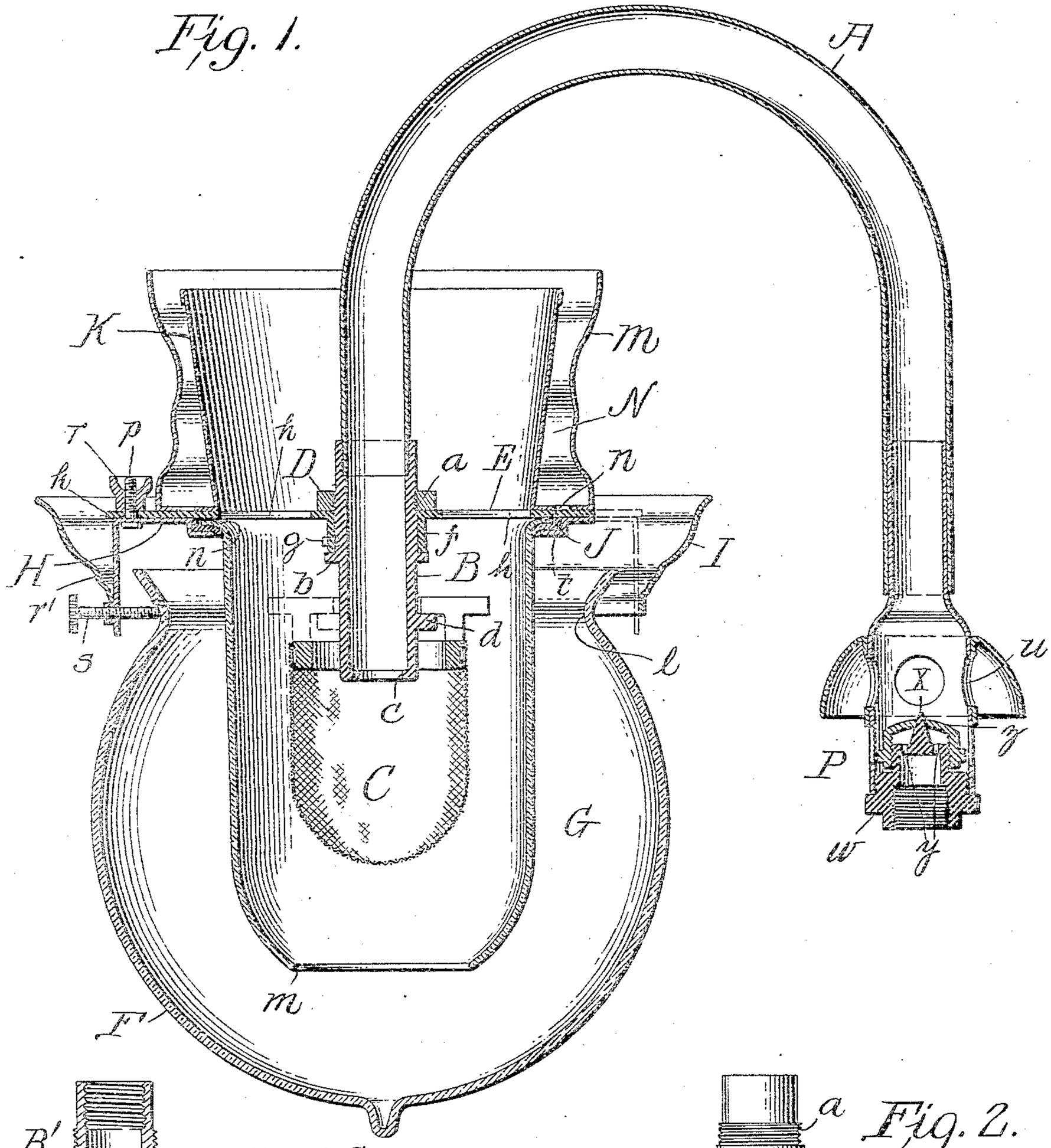
APPLICATION FILED OCT. 5, 1906.

936,098.

Patented Oct. 5, 1909.

2 SHEETS—SHEET 1.

Fig. 1.



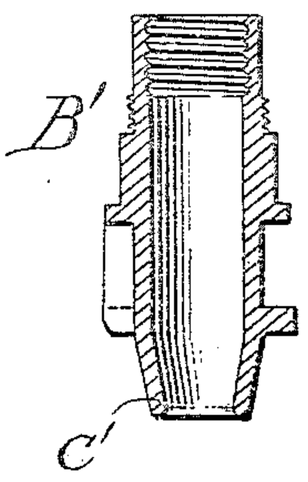


Fig. 2a.

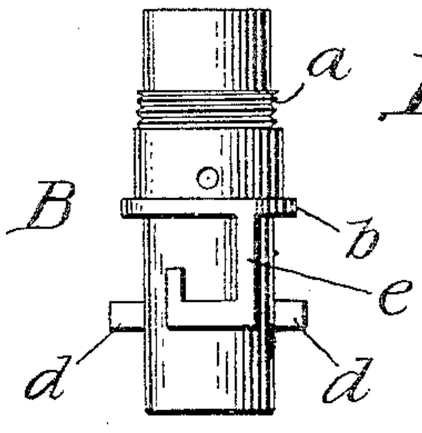


Fig. 2.

Witnesses

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2 SHEETS—SHEET 2.

Fig. 3.

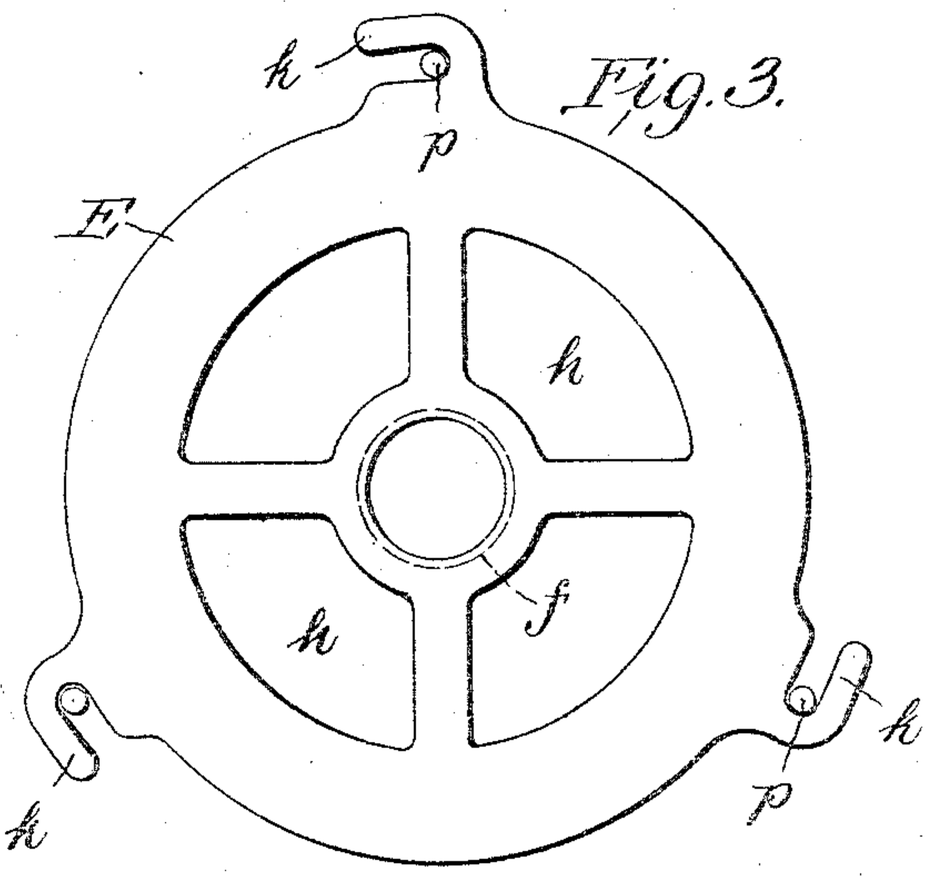


Fig. 6.

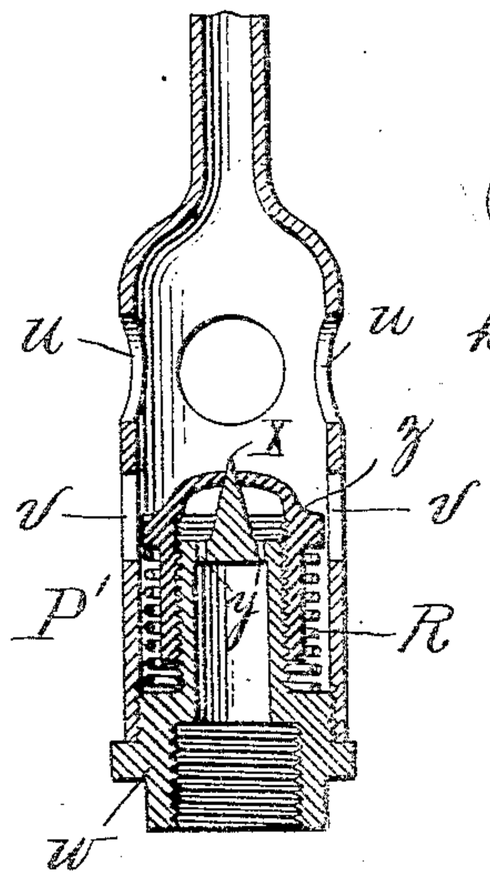


Fig. 7.

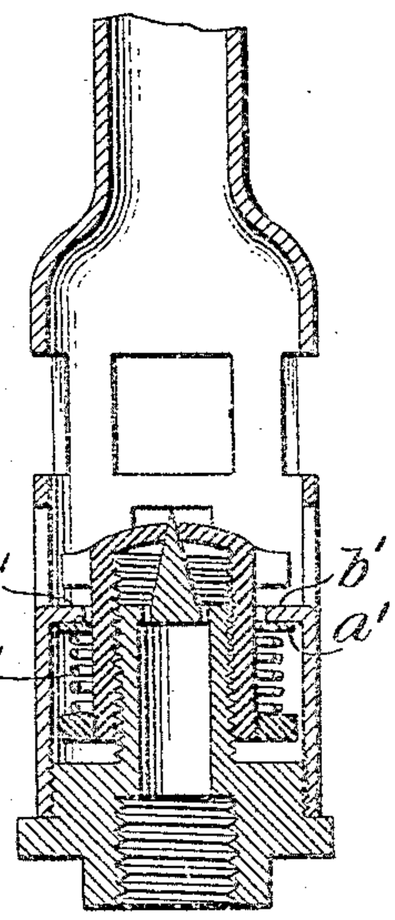


Fig. 4.

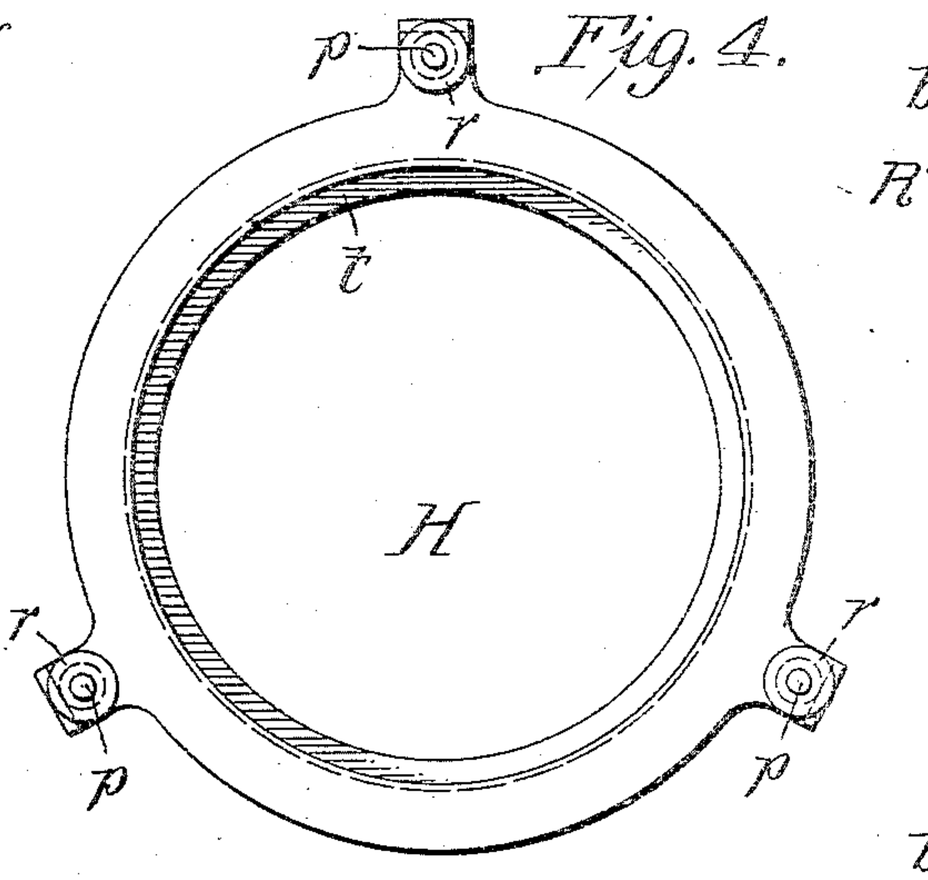


Fig. 9.

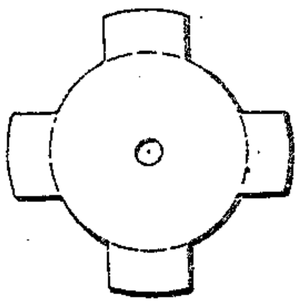


Fig. 8.

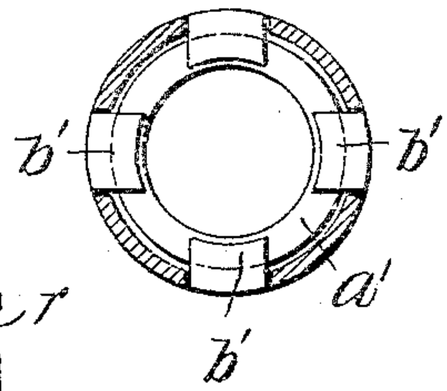


Fig. 5.

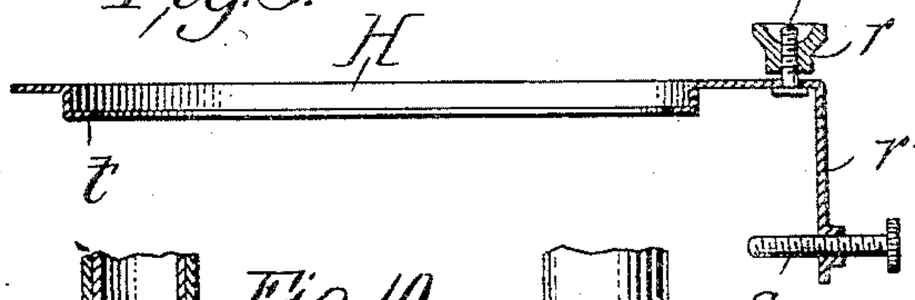


Fig. 12.

Fig. 10.

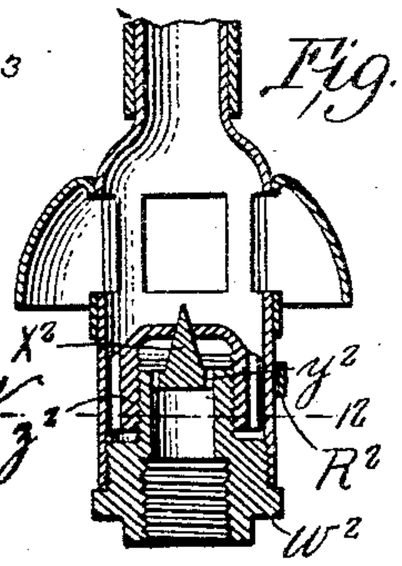
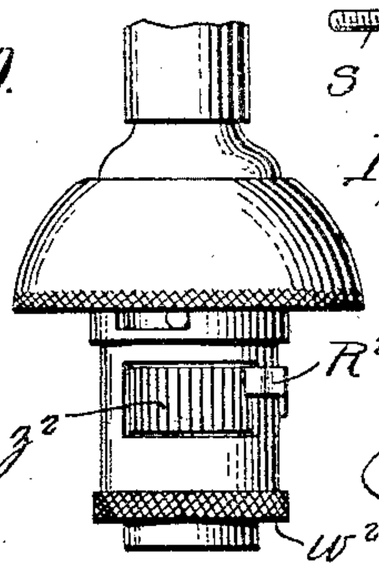


Fig. 11.



Witnesses

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UNITED STATES PATENT OFFICE.

CHARLES L. DUENKEL, OF EAST ORANGE, NEW JERSEY.

INVERTED GAS-LAMP.

936,098. Specification of Letters Patent. Patented Oct. 5, 1909.

Application filed October 5, 1906. Serial No. 337,610.

To all whom it may concern:

Be it known that I, CHARLES L. DUENKEL, a citizen of the United States, residing at East Orange, in the county of Essex and State of New Jersey, have invented new and useful Improvements in Inverted Gas-Lamps, of which the following is a specification.

My invention relates to incandescent gas burning lamps of the inverted type. In such lamps it is important at once to insure an ample supply of highly heated air to the mantle, thoroughly to support combustion and effectually to prevent flickering of the light.

In the preferred form of my construction as shown, I accomplish these results by providing an inner globe open at its top and bottom and inclosing a mantle heated to incandescence, and an outer globe open at its top only. As shown these inner and outer globes are so relatively arranged and constructed that air is drawn from the top of the outer globe down into the same and into contact with the inner globe thereby becoming heated. I have found it desirable in lamps of the above character to accelerate the normal speed of the air, or in other words to supply a large and constant volume of rapidly moving hot air to the mantle and I accomplish this by contracting the inner globe at its lower end to secure an injector effect and thus cause the air, after it passes upward through this contracted opening, to expand in the larger area of the inner globe and thus move rapidly over the surface of the mantle. In order to facilitate the free feed of hot air to the mantle, it is necessary to provide means for the rapid discharge of the gases of combustion, and in order to accomplish this, I arrange above the inner globe a chimney which in effect is a continuation of the inner globe and is of substantially the same diameter at its lower end as the inner globe is at its upper end, but which increases in diameter to its upper end. The gas supply pipe passes through this chimney, but otherwise it is unobstructed at its upper end so that the gases of combustion can escape freely and rapidly. By this construction a rapid draft is created and insures a plentiful supply of fresh heated air to the mantle.

In lamps of this character it is necessary also to regulate the supply of gas in order that the proper mixture of air and gas may be supplied to the burner and mantle. This necessity arises because the quality and pressure of gas varies in different locations.

The accompanying drawings illustrate a preferred form of my invention and in such drawings: Figure 1 is a vertical section of the inverted lamp constituting the preferred embodiment of my invention. Fig. 2 is an elevation of the tubular body or main lamp and mantle support. Fig. 2ª is a modification of same. Fig. 3 is a plan view of the main plate of the lamp. Fig. 4 is a plan view showing the ring utilized in the hanging of the outer globe and the inner globe of the lamp. Fig. 5 is a diametrical section of said ring. Fig. 6 is a detail vertical section of my novel gas regulator which may be used in lieu of the ordinary type shown in Fig. 1, in the discretion of the manufacturer. Figs. 7, 8 and 9 are detail views of another embodiment of the improved gas regulator. Figs. 10, 11 and 12 are views of another modified gas regulator, Fig. 12 being a section on line 12—12 of Fig. 10.

Referring by letter to the said drawings, and more particularly to Figs. 1 to 5 thereof: A is the pipe of my novel lamp, which is preferably of gooseneck form, and B is the tubular body of the lamp, which is preferably screwed on the discharge end of the pipe as illustrated. The said tubular body B is exteriorly threaded at *a* and exteriorly flanged at *b;* and it is provided at its lower end with an inwardly directed flange *c* or is otherwise reinforced at such point. It is also provided, slightly above its lower end, with exterior lugs *d d* and *e* for supporting an inverted mantle C; the lugs *d* being flat while the lug *e* is of the form shown in Fig. 2 in order to facilitate the proper placing of a mantle on the tubular body.

It is obvious that the tubular body B together with the lugs *d d* and *e* form a support for an inverted mantle. Consequently, whenever hereinafter I use the term "mantle support", I mean to designate this combination or some structure equivalent thereto.

D is an interiorly threaded collar which engages the thread *a* of body B, and E is the main supporting plate of the lamp, which has a central sleeve *f*, arranged on the body B and interposed between the flange *b* and the collar D. The said plate is held against turning on the body B by a dowel *g;* and, in addition to the before-mentioned sleeve *f*, it is provided with openings *h* for the upward passage of products of combustion, and pe-

ripheral hooks *k*, the function of which will be presently explained.

F is the outer globe of the lamp, which is closed at its bottom and open at its top, Fig. 1, and is provided adjacent to its top with a circumferential groove *l*.

G is the inner globe which is preferably, though not necessarily, contracted at its lower end, as indicated by *m*, and is provided at its upper end with an outwardly directed horizontal flange *n*, and H is the ring by which the globes F and G are carried. The said ring H is designed to be arranged under the plate E, Fig. 1, and is equipped with threaded bolts *p* arranged to enter the hooks *k* of plate E, and nuts *r* mounted on said bolts, above the said plate E. Thus it will be apparent that the ring H is securely and rigidly connected to the plate E, and yet may be expeditiously and easily detached therefrom when it is desired to remove the outer and inner globes for cleaning, for access to mantle or for any other purpose.

For the connection of the outer globe F, the ring H is provided with depending arms *r'* and screws *s* bearing in said arms and having their inner ends disposed in the groove *l* of the globe; the said arms *r'* also serving for the connection of an ornamental, metallic annulus I which is inclined outward from its points of connection so as to reduce the liability of it being discolored by the heat. For the connection of the inner globe G, the ring H is provided with an inner depression *t*, Figs. 1, 4 and 5. In this depression *t* is arranged a ring J of abestos or equivalent material, and on this asbestos ring bears the flange *n* of the globe G, whereby it will be apparent that rattling of the glass globe against the metal part will be prevented, and at the same time the glass is held away from the metal with a view of preventing the unequal expansion and contraction of the glass and metal cracking or breaking the former. The asbestos ring J is preferably of the angular form illustrated in cross-section in order to isolate not only the underside of the flange *n* but the edge thereof from the ring H.

K is a metallic chimney fixed in any approved manner on the main plate E and having its upper portion larger in area than its lower portion. As shown the lower portion of the chimney K is of substantially the same diameter as the upper end of the inner globe G and said chimney gradually increases in diameter to its upper end. The gas supply pipe A extends through the chimney but otherwise it is unobstructed and an annular space, entirely open and unobstructed at its upper end, is thus provided through which the gases of combustion will move rapidly and be freely discharged.

M is an ornamental wall, preferably of sheet-metal, fixed to the plate E and surrounding the chimney K and separated therefrom by an intervening air space N, whereby it will be observed that the heat due to the upward passage of products of combustion through said chimney K will be effectually prevented from discoloring the wall M and in that way rendering the lamp unsightly.

When my novel lamp is in use, atmospheric air is drawn from the top down into the outer globe F, and coming in contact with the inner globe G is highly heated by the same precedent to reaching the incandescent mantle, as is obviously desirable. It will be noticed, however, that the inner globe G bars the direct passage of air between the upper end of outer globe F and the mantle C, and in that way prevents air currents in an apartment from causing the light to flicker. The air enters the inner globe G at the lower end thereof, and by reason of said lower end being contracted, the heated air expands when it enters the said inner globe and passes up in the same, thus assuring a continuous and ample supply of hot oxygen to the mantle and the consequent maintenance of a brilliant light. From the upper end of the inner globe G which serves the additional function of a chimney, the products of combustion pass into the lower end of the metallic chimney K. Here, by reason of the area of the chimney K being gradually increased upward, another injector principle effect is obtained which assures a quick and thorough removal of the spent gases or carbon dioxid gas from the vicinity of the mantle.

It will further be noticed that by the use of my invention it is extremely easy to clean all parts and to remove one mantle and replace another. The lower detachable portion of what might be called the frame of the lamp, by which I mean the annular ring and connected parts, and which I will hereinafter refer to as the "base" of the frame, carries the outer and inner globe. What might be called the "top" portion of the frame carries the chimney and the mantle support and the mantle. Consequently when the two parts are detached the mantle and the chimney remain in their position when in use and the outer and inner globe come away with the base,—enabling the mantle to be removed and replaced and furthermore giving free and ready access to the inner and outer globes and permitting the ready removal of each of the same from the base for the purpose of cleaning or replacing.

For the purpose of regulating the supply of gas to the pipe A and mixing air with such gas, I may employ the ordinary, well-known regulator P shown in Fig. 1, or an improved regulator P', which latter is shown in Fig. 6. The said improved regulator

comprises the usual casing having apertures *u* and *v*, a hollow plug *w* fixed in the casing and having a needle *x* and gas-escape apertures *y*, a threaded cap *z* screwed on the plug *w* and having a central aperture receiving the needle *x*, and a coiled spring R interposed between abutments of the plug *w* and cap *z* and exerting upward pressure against the latter. The said spring R has for its function to force the cap *z* tight against the thread of the plug *w* and in that way prevent leakage of gas, and at the same time render the cap difficult to revolve so that its position will not be liable to be changed by vibration or shaking of the lamp fixture. This will be appreciated as an important advantage when it is remembered that when the ordinary regulator is employed, shaking or vibration of the fixture serves in time to change the adjustment of the cap and increases or diminishes the supply of gas to the lamp. Then if the threads are made tight fitting when cool with a view of avoiding the objection noted it will be seen that when the plug and cap are heated it is almost impossible for the operator to move the cap when he desires to increase or to diminish the supply of gas to the lamp.

In the modified tubular body or main lamp and mouth support B′ shown in Fig. 2ª, the contraction and reinforcement at the lower end is formed by tapering said end, as indicated by *c′*.

In the modified construction of regulator shown in Figs. 7 to 9, the spring R′ serves the same purpose as the spring R in Fig. 6, but is so arranged as to force the cap downward. Said spring R′ bears at its upper end against a ring *a′* disposed under lugs *b′* turned inward from the casing, and at its lower end the spring bears against a collar provided on the lower portion of the cap, with the result that said spring tends to shut off the gas in the event of vibrations occurring. To permit insertion of the plug in the casing from below, said plug is notched as shown best in Fig. 9 to adapt it to clear the lugs *b′*.

The modified gas regulator shown in Figs. 10, 11 and 12, comprises the usual casing having apertures, a hollow plug w^2 fixed in the casing and having a needle x^2 and gas-escape apertures y^2, a threaded cap z^2 screwed on the plug and having a central aperture receiving the needle and also having exterior ribs or corrugations z^3, and a spring R^2 fixedly connected at one end to the casing and having its opposite end bent inward to seat in the spaces intermediate the ribs or corrugations. The spring serves to lock the revolving cap in position, and by reason of its arrangement said spring has sufficient clearance to prevent the cap from being forced to one side at the needle point, being loose enough not to touch yet strong enough to hold the cap against casual rotation. The mere turning of the cap with the fingers is sufficient to overcome the strength of the spring which will jump over the ribs or corrugations of the cap. This construction of regulator is obviously inexpensive and at the same time highly efficient.

The springs R, R′ and R^2, heretofore referred to, each acts as a tension device to prevent movement of the regulator under the influence of shaking or vibration.

The construction herein shown and described constitutes the preferred embodiment of my invention, but I desire it understood that in practice such changes in the form, construction and relative arrangement of parts may be made as fairly fall within the scope of my invention as claimed.

Having described my invention, what I claim and desire to secure by Letters-Patent, is:

1. An inverted gas lamp comprising an outer globe closed at its lower end and open at its top, an inner globe open at both ends and communicating at its lower end with the interior of the outer globe,—the area of its lower end being less than that of any other portion thereof,—a chimney open at both ends and communicating at its lower end with the inner globe, a mantle supported within the inner globe, and a gas supply pipe arranged to supply gas within the mantle—the various parts being constructed and arranged to leave a substantially unobstructed passage from the top of the mantle to the atmosphere for the free escape of the gases of combustion.

2. An inverted gas lamp, comprising an outer globe closed at its lower end and open at its top, an inner globe open at both ends and communicating at its lower end with the interior of the outer globe—the area of its lower end being less than that of any other portion thereof—a chimney open at both ends and communicating at its lower end with the inner globe and having the area of its lower end substantially equal to the area of the upper end of the inner globe and less than the area of any other portion of the chimney, a mantle supported within the inner globe, a gas supply pipe arranged to supply gas within the mantle—the various parts being constructed and arranged to leave a substantially unobstructed passage from the top of the mantle to the atmosphere for the free escape of the gases of combustion.

3. An inverted gas lamp, comprising an outer globe closed at its lower end and open at its top, an inner globe open at both ends and communicating at its lower end with the interior of the outer globe—the area of its lower end being less than that of any other portion thereof—a chimney open at both ends and communicating at its lower end

with the inner globe, a mantle supported within the inner globe, a gas supply pipe arranged to supply gas within the mantle—the various parts being constructed and arranged to leave a substantially unobstructed passage from the top of the mantle to the atmosphere for the free escape of the gases of combustion—and a gas regulating device interposed between the source of supply and the mantle.

4. In an inverted gas lamp, a frame comprised of two parts namely a top and a base, an outer globe open at its top and closed at its lower end and an inner globe open at both ends and communicating at its lower end with the interior of the outer globe, both mounted in and carried by the base, a chimney and a mantle support both mounted in and carried by the top, a mantle mounted on said mantle support and extending within the inner globe, a gas supply pipe arranged to supply gas within the mantle, and means for detachably securing the top and base of the frame together.

5. In an inverted gas lamp, a frame comprised of two parts, namely a top and a base—the base comprising an annular ring,—an inner globe supported in said annular ring and surrounding said inner globe, a chimney and a mantle support both mounted in and carried by the top, a mantle mounted on said mantle support and extending within the inner globe, a gas supply pipe arranged to supply gas within the mantle, and means for detachably securing the top and base of the frame together.

6. In an inverted gas lamp, a frame comprised of two parts, namely a top and a base,—the base comprising an annular ring,—an inner globe supported in said annular ring, an outer globe supported from said annular ring and surrounding said inner globe, a chimney and a mantle support both mounted in and carried by the top, a mantle mounted on said mantle support and extending within the inner globe, a gas supply pipe passing substantially through the center of said top and secured to said top and arranged to supply gas within the mantle, and means for detachably securing the top and base of the frame together.

7. In an inverted gas lamp, a frame comprised of two parts, namely a top and a base, an outer globe closed at its lower end and open at its top, and an inner globe open at both ends and communicating at its lower end with the interior of the outer globe both mounted in and carried by the base, a chimney and a hollow mantle support both mounted in and carried by the top, a mantle mounted on said mantle support and extending within the inner globe, a gas supply pipe passing within the interior of and secured to the hollow mantle support, and means for detachably securing the top and base of the frame together.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

CHARLES L. DUENKEL.

Witnesses:
F. T. Ellethorpe,
Chas. G. Norris.