

No. 688,464.

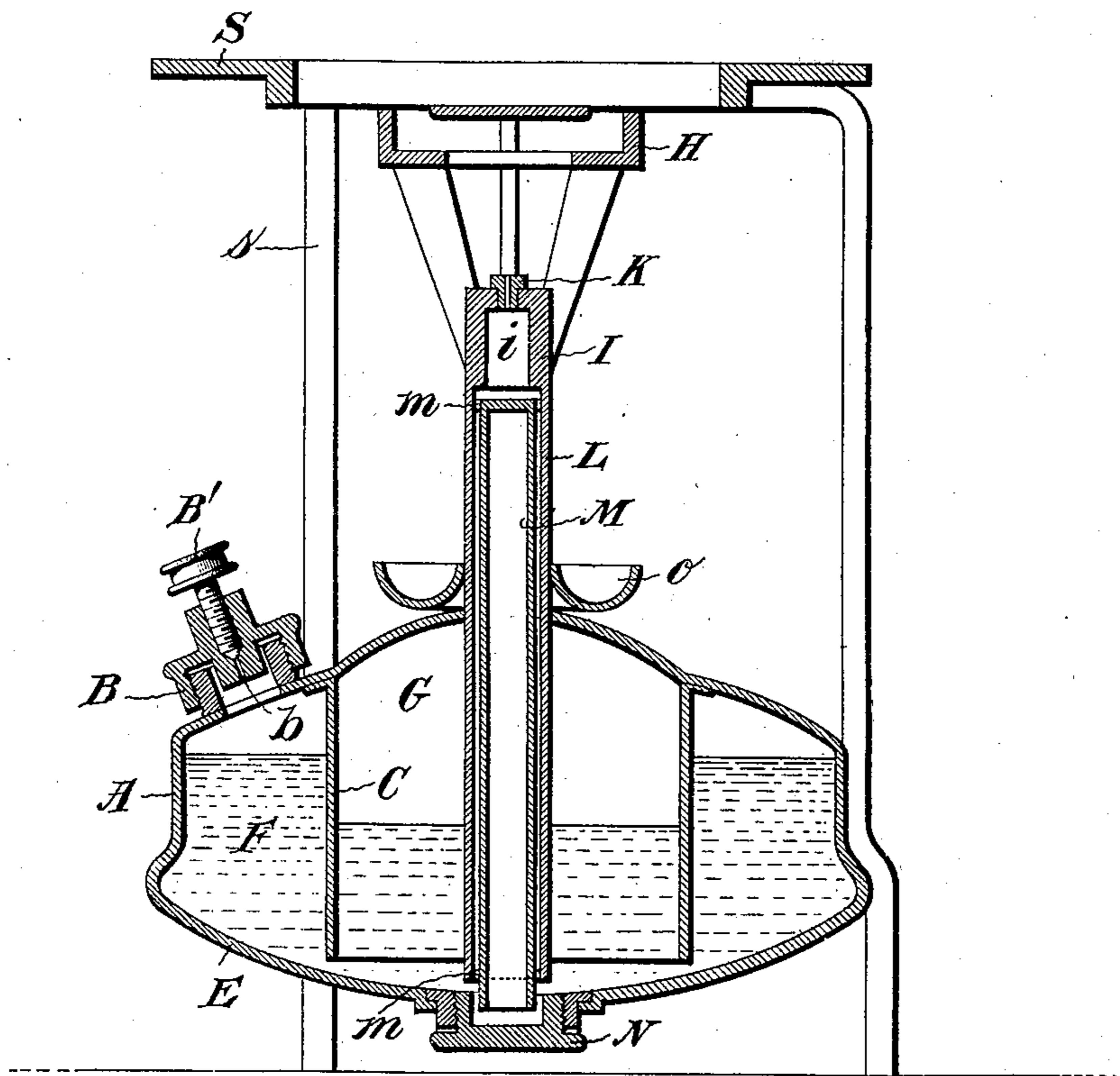
Patented Dec. 10, 1901.

P. GLUD.  
VAPOR BURNING LAMP.

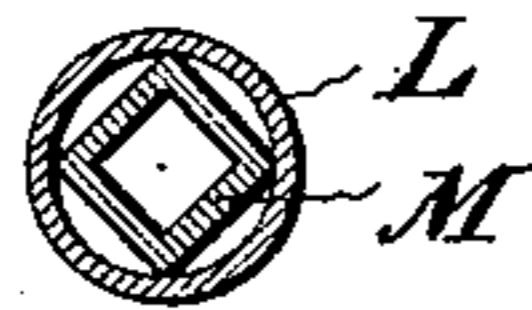
(Application filed Apr. 27, 1900.)

(No Model.)

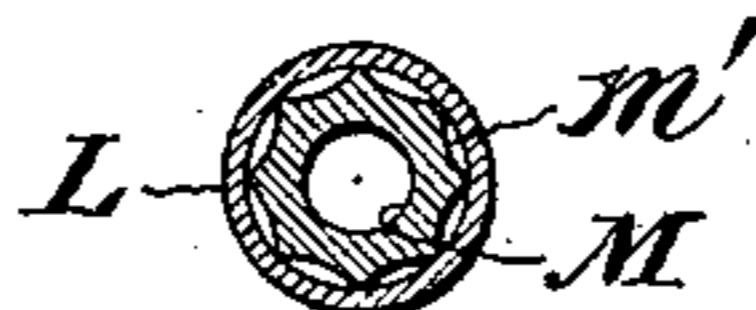
*Figs.*



*Fig. 2.*



*Fig. 3.*



*Witnesses:*  
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# UNITED STATES PATENT OFFICE.

POUL GLUD, OF FREDERIKSBERG-COPENHAGEN, DENMARK.

## VAPOR-BURNING LAMP.

SPECIFICATION forming part of Letters Patent No. 688,464, dated December 10, 1901.

Application filed April 27, 1900. Serial No. 14,626. (No model.)

*To all whom it may concern:*

Be it known that I, POUL GLUD, a subject of the King of Denmark, residing at Frederiksberg-Copenhagen, Denmark, have invented certain new and useful Improvements in Vapor-Burning Lamps; 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, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

This invention has relation to vapor-burning lamps, and more particularly to lamps burning a vaporized hydrocarbon and used for heating and cooking.

It has been the general practice in the use of lighter hydrocarbons—as gasolene, for instance—to feed the fuel automatically to the burner from an overhead tank or reservoir, and the danger of explosion inherent to this class of lamps is well known. This mode of feeding the liquid fuel to the burner has, however, been found impracticable when a heavier hydrocarbon, such as petroleum, is used, and recourse has been had to a pump for periodically forcing air into the reservoir or font and feeding the oil by the pressure exerted thereon by the air. This mode of feeding has also disadvantages in that it is very difficult to regulate the pressure and to maintain it uniform for any length of time, so that at times, especially after pumping air into the reservoir, the supply of oil to the font is an excessive one, resulting in imperfect vaporization and combustion and a carbon-laden vapor and flame, the carbon speedily choking up the comparatively fine vapor duct or ducts. To remedy this inconvenience, it has been proposed to divide the supply of oil fed to the vaporizing-chamber by forcing such oil through a number of capillary ducts with a view to effecting a substantially instantaneous vaporization as the oil passes from the ducts into the vaporizing-chamber. This arrangement, although producing good results, has also disadvantages in that the capillary ducts are liable to become speedily choked up by impurities held in suspension in the oil or by solid residues from the oil, the cleaning of these fine ducts being extremely difficult.

My invention has for its object an air-pressure feed; but instead of the air being compressed in the reservoir or font it is caused to expand therein by heat derived from the burner and vaporizing-chamber, thus dispensing with the air-pump and insuring a practically uniform pressure, and consequently a substantially uniform feed of oil to the vaporizing-chamber.

My invention has for its further object to so construct the lamp as that ready access can be had to all of its parts for the purpose of cleaning the same; but that my invention may be fully understood I will describe the same in detail, reference being had to the accompanying drawings.

Figure 1 is a vertical section of a cooking-stove equipped with my improved lamp, and Figs. 2 and 3 are cross-sections of modifications of the burner-tube.

In said drawings, S indicates a stand having an opening in its top for a cooking utensil, the lamp being supported from the legs s in any desired or well-known manner.

The font A of the lamp may have any suitable form in outline and is provided in its bottom with an opening closed, preferably, by a cupped or recessed screw-cap N and in its top with a filling-opening closed by a screw-cap B, having a vent-tube b, the vent of which is controlled by a screw-valve B'.

To the top or roof of the lamp is secured a partition C, which may be cylindrical or polygonal in cross-section, according to the cross-sectional form of the font, said partition extending nearly to the bottom of the font and being open at its lower end, thus dividing the font into two concentric chambers F and G. The cross-sectional area of the partition C—that is to say, of the air-chamber G—will depend upon the capacity of the vaporizing-chamber and may be varied. The central closed tube M will in the course of use become the most highly heated, and such oil as has escaped up the sides of the tube will be vaporized to mix with the air in said tube, thus forcing down the column of liquid in said tube, and when the pressure therein becomes too great will be automatically vented into the surrounding chamber G, the bubbles of gas rising through the oil in said chamber. In a similar manner when

there is too much gas or the air in said chamber G becomes highly heated it also escapes under the partition C into the channel F, where it is either vented through the valve B' or cooled down and added, with its reduced pressure due to cooling, to the pressure already in said chamber, if the valve B' is closed, thus always maintaining sufficient pressure to force the oil up between the two tubes L and M and maintaining that pressure by gas-pressure in the various chambers, combined with a differential height of liquid in said chambers. As soon as these chambers are automatically vented they become automatically closed or sealed by the liquid fuel. Furthermore, the pressure will increase with the amount of heat generated, be greatest in the central or fuel-feed tube, and least in the outer chamber, each chamber being somewhat cooler than the next interior one and automatically acting as a governor for feeding the fuel.

By reason of the air-tube M inserted in the burner-tube L there is a thin film of fuel or several such in the spaces *m*, whereby more rapid vaporization occurs than if a large body of fuel had to be heated, and the lamp can be started very much sooner.

An open-ended burner-tube L is arranged axially in and extends also near to the bottom of the font A, and on the upper end of said tube is mounted the vaporizer I, provided with the nipple K, said vaporizer carrying the flame-spreader or burner proper, H, of a well-known construction. To the burner-tube L, above the font, is secured the usual cup O for the reception of liquid fuel, as alcohol, for starting the lamp, and within said burner-tube is arranged a tube M, closed at its upper end and extending from near the lower open end of the vaporizing-chamber *i* into the screw-cap N. The cross-sectional area of tube M relatively to the like area of the burner-tube will depend in a measure upon the capacity of the vaporizing-chamber, but is such as to leave a narrow or substantially capillary space between the two, and said tube M may be cylindrical in cross-section, like the burner-tube, and held therein by friction only, to which end said tube M may be provided with lugs *m* at its upper and near its lower ends, or said tube M may be polygonal in cross-section, as shown in Fig. 2, and thus held frictionally within the burner-tube, or tube M may be a corrugated tube, Fig. 3, to form a series of narrow vertical passages *m'* and likewise held frictionally within the burner-tube.

The function or operation of the lamp is as follows: On filling the lamp with oil a body of air is confined within the chamber G above the level of the oil. This chamber is in practice sufficiently close to the burner and vaporizing-chamber to become heated not only by heat from the burner but by heat radiated from the vaporizer I and the burner-tube, causing the air therein to expand, the air-pressure forcing the oil through the passage or passages between the burner-tube L

and the inner tube M into the vaporizing-chamber *i*, wherein the oil is immediately vaporized, the vapor flowing through nipple K, where it is ignited, and thence to flame-spreader or burner H. The pressure of the air in chamber G, and consequently the feeding of the oil to the vaporizer I, can be readily controlled by the vent-valve B', as will be readily understood, especially since the air confined in chamber F will also be more or less heated, so that on opening the vent the pressure on the oil can be reduced to a greater or less extent, as may become necessary. There is also a body of air confined within the inner tube M, which air also expands under the action of heat, such air being in fact more highly heated than the air in chamber G and acting as a counter-pressure to that of the air in chamber G. Inasmuch as the pressure in the chamber F and tube M gradually increases from a minimum to a maximum pressure as the air is heated from a minimum to a maximum temperature the normal pressure on the oil will be a substantially uniform one equal to the difference in the pressure of the two bodies of air in G and M and the atmospheric pressure, and this feed-pressure can be readily regulated or adjusted by the vent-plug B' relieving the oil outside of chamber G from pressure to a greater or less extent, as hereinabove referred to.

It is obvious that the tube M may be a closed one, in which case the feed-pressure would, however, be more or less irregular and would require frequent adjustment through the medium of the vent-valve.

Obviously by removing the screw-cap N tube M can be readily drawn out and any sedimentary matter accumulated in the burner-tube removed.

In practice I prefer to provide the lamp with a concavo-convex bottom and use the recessed or chambered screw-cap N, into the chamber of which solid impurities in the oil may gravitate and from which chamber said impurities can be readily removed.

In starting the lamp some alcohol is poured into cup O and ignited, the vaporizer I and the air in tube M and chamber G will soon become heated and oil will be supplied to the vaporizer and burner, the vapor being ignited by the alcohol-flame, after which the operation of the lamp will become automatic.

To readily extinguish the lamp the vent may be opened to reduce the pressure on the oil and the jet of flame blown out.

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

1. A vapor-burning lamp, comprising a font having chambers intercommunicating at the bottom thereof, in combination with a vaporizing-tube extending through one of said chambers close to the bottom of the font, a removable tube inside the vaporizing-tube and closed at one end, arranged to

form one or more feed-passages between said tubes, a vaporizer on the outer end of the vaporizing-tube above the closed end of the inner tube and a burner on the vaporizing-tube, for the purpose set forth.

2. A vapor-burning lamp comprising a font having chambers intercommunicating at the bottom of said font; in combination with a vaporizing-tube extending through one of said chambers close to the bottom of the font, a removable tube therein closed at its upper end and arranged to form between the tubes a feed passage or passages, a vaporizer on the end of the vaporizing-tube above the closed end of the inner tube, a burner on the vaporizer, and means for removing said inner tube through the bottom of the font, for the purpose set forth.

3. A vapor-burning lamp comprising a font having three concentric chambers intercommunicating at the bottom of said font, in combination with an oil-feed tube encompassing the central chamber, said tube having its inner end close to the bottom of the font and carrying a burner at its outer end, for the purpose set forth.

4. A vapor-burning lamp comprising a font having a lower oil-space and concentric non-intercommunicating air-chambers above the level of the oil in said oil-space, in combination with an oil-feed tube encompassing one of said air-chambers, the inner end of said tube opening into the oil-space, and a burner at the outer end of said tube, for the purpose set forth.

5. In a vapor-burning lamp, a closed chamber, a burner feed-tube opening into the lower portion thereof, a burner on said tube and placed so that heat will be transmitted to said chamber therefrom, a second closed chamber adjacent the first-named chamber, the two chambers being in communication at their lower ends, substantially as set forth.

6. In a vapor-burning lamp, a number of concentric closed chambers, being in communication at their lower ends, a burner feed-tube opening into the lower portion of one of the chambers, a burner on said tube arranged to transmit heat to said chambers, said oil-feed tube comprising a tube L and a tube therein closed at its upper end, substantially as set forth.

7. In a vapor-burning lamp, a number of concentric closed chambers intercommunicating at their lower ends, a burner feed-tube opening into the lower portion of the central chamber, a burner on said tube arranged to transmit heat to said chamber, said oil-feed tube comprising a tube L and a tube therein closed at its upper end below the burner, and means in the bottom of the central chamber for removing said tube closed at its end, substantially as set forth.

In testimony that I claim the foregoing as my invention I have signed my name in presence of two subscribing witnesses.

POUL GLUD.

Witnesses:

FRED. R. NÔRLÔW,  
I. C. JACOBSEN.