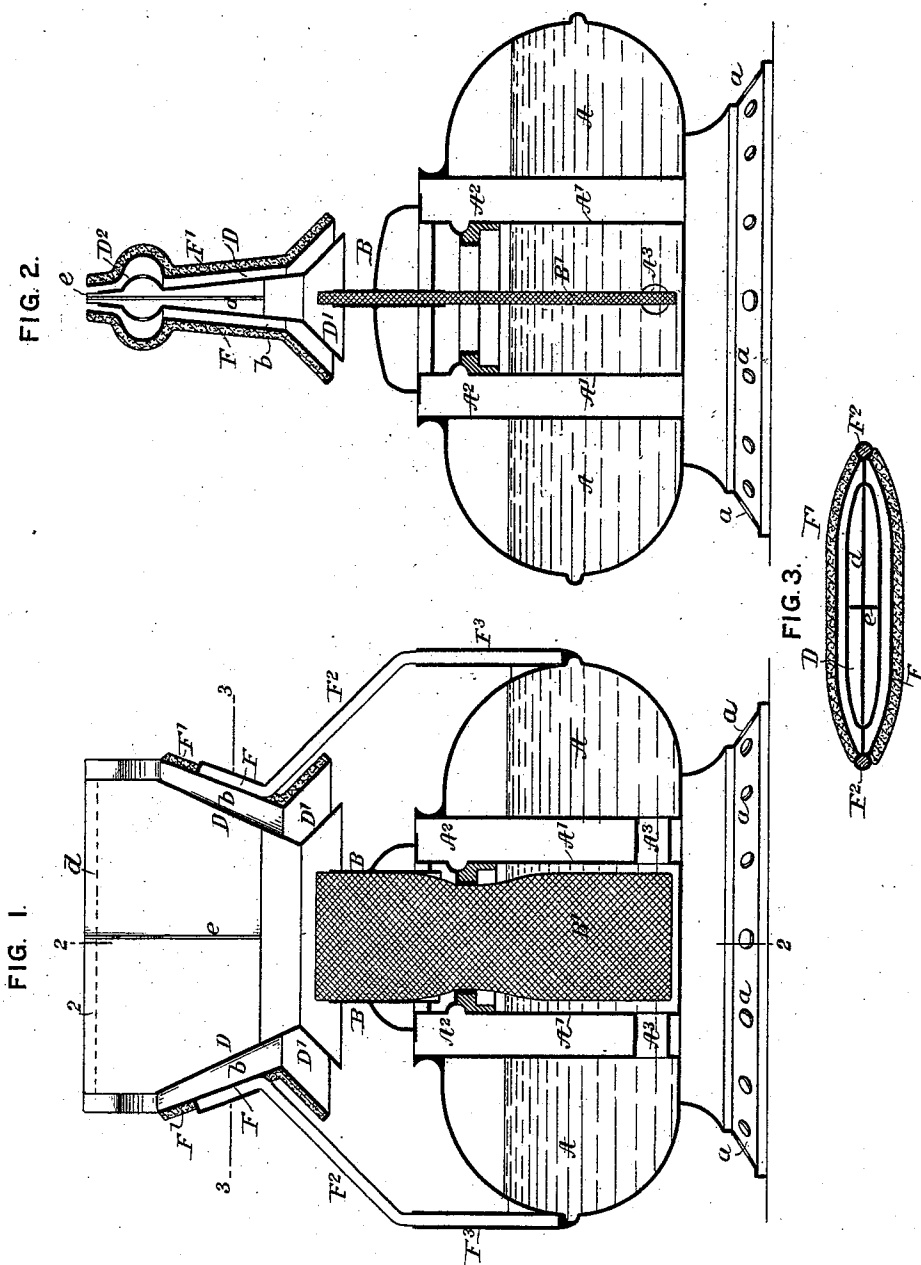


H. F. SMITH.
GAS GENERATING BURNER FOR LAMPS.

No. 541,508.

Patented June 25, 1895.



WITNESSES.

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FIG. 4.

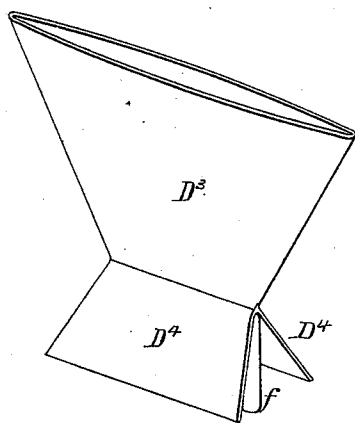


FIG. 5.

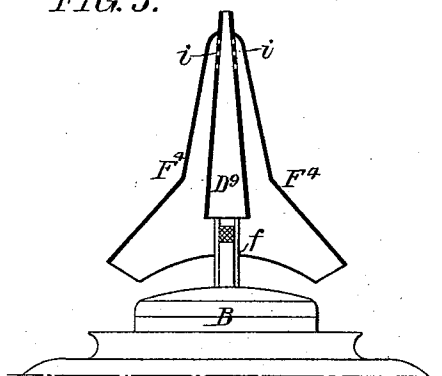


FIG. 7.

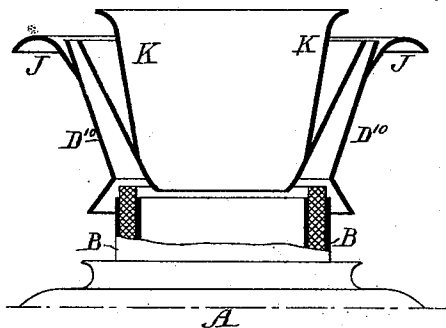
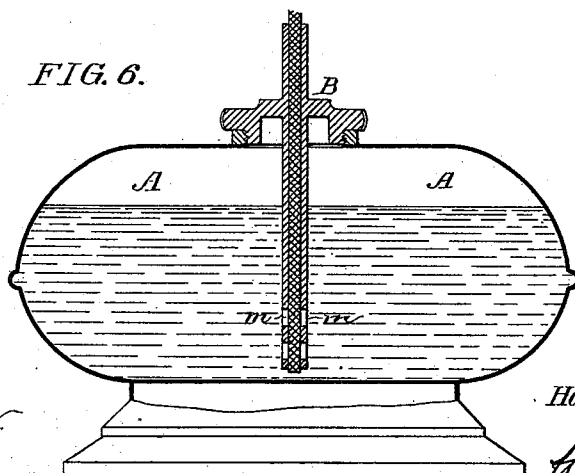


FIG. 6.



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UNITED STATES PATENT OFFICE.

HARPER F. SMITH, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR OF TWO-THIRDS TO WILLIAM F. McCULLY AND GEORGE McGOWAN, OF SAME PLACE.

GAS-GENERATING BURNER FOR LAMPS.

SPECIFICATION forming part of Letters Patent No. 541,508, dated June 25, 1895.

Application filed November 21, 1893. Serial No. 491,569. (No model.)

To all whom it may concern:

Be it known that I, HARPER F. SMITH, a citizen of the United States, residing in Philadelphia, Pennsylvania, have invented certain
5 Improvements in Gas-Generating Burners for Lamps, of which the following is a specification.

The object of my invention is to construct a lamp burner, which will generate an illuminating gas from ordinary illuminating oils such as are commonly termed "headlight" oils, of the highest known fire test, as well as from the more volatile and inflammable oils, such as gasoline, the illuminating flame
15 being formed at a distance more or less remote from the end of the wick tube, one of the advantages of the improved burner being that a larger and more brilliant flame can be produced than when said illuminating flame is
20 formed directly at the end of the wick.

With this object in view, my invention comprises a burner having two points of ignition, one at the wick and the other some distance above the same, as well as numerous
25 details of construction having for their objects the proper support of the burner hood, provision for the protection of the primary flame while insuring the proper supply of air thereto, and the feeding of a proper supply of air to the secondary or illuminating flame.
30

In the accompanying drawings, Figure 1 is a longitudinal section of a lamp-fount with burner constructed in accordance with my
35 invention. Fig. 2 is a transverse section of the same on the line 2 2, Fig. 1. Fig. 3 is a sectional plan view on the line 3 3, Fig. 1; and Figs. 4 to 7, inclusive, are views illustrating various modified forms of burner in which
40 the essential features of my invention are embodied.

In Figs. 1, 2 and 3 A represents the fount or reservoir of a lamp which, in this case, supports an internal fount A' carrying the
45 wick tube B of the burner and serving as the chamber for the wick B' which may be an ordinary textile wick intended to be raised and lowered to regulate the size of the flame or to compensate for the gradual combustion
50 of the wick, although the wick which I prefer to use is one of asbestos fiber which will

not be consumed by the heat and which therefore does not require adjustment after having once been set to produce the volume of flame required.

The supplementary fount A' is separated from the fount A by an annular space A², crossed at the bottom by short pipes A³, which serve to convey the oil from the fount A to the fount A' and thus supply the wick, the annular chamber A² serving as a passage for air which enters the base of the lamp through openings a formed therein, as shown in Figs. 1 and 2. Any ordinary form of fount may,
55 however, be employed.

Suitably mounted above the wick tube of the burner is a hood D which extends upward some distance from the wick tube and receives at its lower end the primary flame from the wick and conducts the same to the top of the
60 hood at which point it is ignited to form the secondary or illuminating flame.

The hood D is flared outwardly from its lower end to its upper end in a longitudinal direction, but is contracted from the lower
65 end to the upper end in a lateral direction, so that the volume of the primary flame received from the wick is spread out in order that the secondary or illuminating flame will be considerably wider than the wick, the hood
70 also providing means for mixing air with the primary flame and for highly heating the mixture so that the secondary or illuminating flame is increased both in volume and brilliancy as compared with a flame produced
75 directly at the end of the wick, as usual.

The hood D has at the lower end an outwardly flared shield or guard D' which serves not only to protect the primary flame from sudden drafts, but also to direct air inward
80 toward the top of the wick and thus support combustion, the primary flame and the air mixed therewith rising through the hood, and, if desired, receiving a second supply of air before it issues from the upper end of the
85 hood.

In the form of burner shown in Figs. 1 and 2 the hood D has an expanded portion D² some distance below its upper end so as to form an expansion chamber, this expanded
90 portion of the hood being perforated to permit of an inflow of air.

Surrounding the hood D is an outer hood F substantially conforming in shape with said hood D and serving to form, around the latter, an air passage *b*, the air rising through this passage becoming highly heated by contact with the hood D before entering the latter, or coming into contact with the secondary flame at the upper end of the hood and in order to prevent any loss of this heat by radiation, the outer hood F is preferably provided with a non-conducting covering F' of any appropriate character. When the outer hood F is not used a like non-conducting covering may be applied to the hood D.

The hood F extends above the hood D, and also beyond the ends of the same, so as to shield the supplementary flame at the point where the latter issues from the top of said hood D, thus lessening the risk of extinguishment of the flame by sudden or strong draft.

For the purpose of still further protecting the illuminating flame I locate within the hood D a longitudinal partition *d* and a transverse partition *e* which by preference extend slightly above the top of the hood, and serve to divide the chamber within said hood into four parts, so that the illuminating flame is composed of four independent sections. Hence in order to extinguish the flame it is necessary to blow out all four sections of the flame simultaneously, the maintenance of any one section serving to re-ignite the other sections on the cessation of the blast.

As shown in Figs. 1 and 2, the outer hood F is provided at each end with a supporting rod F² adapted to a socket F³ on the lamp fount, and the hood D is supported within the hood F so that the duplex hood structure can be readily removed when it is desired to gain access to the wick, and as readily replaced. Other means of supporting the hood structure may however be adopted. For instance in Fig. 4 I have shown a hood D³ provided with depending wings *f*, intended to embrace the opposite ends of the wick tube B and thus support the hood thereon, the shields which in this case are represented at D⁴ being discontinued at the ends of the hood so as to provide for access to the wick from said ends, although if desired the shields may extend around the ends of the hood and access may be gained to the wick from beneath said shields, or by lifting or removing the hood for the purpose.

In the modification shown in Fig. 5 the outer hood F⁴ is extended downward so as to form a shield for the primary flame, and the air passes into the inner hood D⁹ directly through openings *i* formed in said hood below the top of the outer hood F⁴.

In applying my invention to lamps using gasoline or like highly volatile and inflammable oils its is preferable to extend the wick tube B down close to the bottom of the fount as shown in Fig. 6, the lower portion of the wick tube being provided with notches or perforations *m* so that the wick is almost en-

tirely inclosed, the oil gaining access thereto only at the lower end throughout the limited area afforded by these notches or perforations.

In Fig. 7 I have illustrated the application of my invention to an annular burner, the hood D¹⁰ in this case being likewise annular and flared outward from bottom to top. In order to protect the flame issuing from the top of the hood, I have combined with said hood an external deflector J and an internal deflector K, the external deflector being in the form of a curved plate secured to the outside of the hood and projecting upwardly and outwardly beyond the same, while the internal deflector is in the form of a tube flared outwardly at the top and extending some distance above the top of the hood. The external deflector prevents the access of a blast of air to the base of the flame issuing from the hood while the internal deflector prevents the blowing of air directly across the top of the hood, and it may also be plated or burnished so as to serve as a reflector.

My invention is distinct from that class of burners which have a wick tube or combustion chamber extending some distance above the top of the wick, for in my burner there are two independent points of ignition, the first being at the surface of the wick, and the second above the top of the hood. The primary flame is simply due to the volatilization and ignition of the oil at the top of the wick, and is not a bright or illuminating flame, but as said primary flame rises through the hood it is mixed with air in such quantity and subjected to heat of such a degree that it is converted into a gas, which, on issuing from the enlarged upper end of the hood, forms a secondary or illuminating flame which is not only large, but of great brilliancy.

Although I prefer to form the inner hood in the manner shown in Fig. 1, that is to say, with a gradual outward flare in its upper portion, the increase in longitudinal dimensions of the hood may be effected by one or more abrupt changes or steps as shown for instance by dotted lines.

Having thus described my invention, I claim and desire to secure by Letters Patent—

1. The combination in a lamp burner, of a wick tube and a hood mounted above the same and open at top and bottom, whereby a primary flame is formed at the surface of the wick, said flame rising with a supply of air through the hood so as to form a supplementary or illuminating flame at the top of the latter, the wick being accessible through the open bottom of the hood without removing the latter substantially as specified.

2. The combination in a lamp burner, of a wick tube with a hood mounted above the same and open at top and bottom so as to form a primary flame at the wick, and an illuminating flame at the top of the hood, the lower portion of the hood forming a shield or guard

for the primary flame but permitting ready access thereto without removing the hood, substantially as specified.

3. The combination in a lamp burner, of the
5 wick tube, with a hood mounted above the same and open at top and bottom so as to form a primary flame at the wick and an illuminating flame at the top of the hood, said hood having perforations immediately below
10 the top for permitting the entrance of air into the hood, substantially as specified.

4. The combination in a lamp burner, of the wick tube with a hood mounted above the same and open at top and bottom so as to form
15 a primary flame at the wick, and an illuminating flame at the top of the hood, said hood having, immediately below the top, an expanded portion perforated for the inlet of air, substantially as specified.

20 5. The combination in a lamp burner, of a wick tube, with a hood mounted above the wick tube and open at top and bottom so as to form a primary flame at the wick and an illuminating flame at the top of the hood, said
25 hood having a longitudinal partition for dividing the volume of gas therein, substantially as specified.

6. The combination in a lamp burner, of a wick tube, with a hood mounted above the

wick tube and open at top and bottom so as
30 to form a primary flame at the wick and an illuminating flame at the top of the hood, said hood having a transverse partition for dividing the volume of gas therein, substantially
35 as specified.

7. The combination in a lamp burner, of the wick tube, with a hood mounted above the wick tube and open at top and bottom so as to form a primary flame at the wick and an
40 illuminating flame at the top of the hood, said hood having longitudinal and transverse partitions for dividing the volume of gas therein, substantially as specified.

8. The combination in a lamp burner, of a wick tube, with a hood mounted above the
45 wick tube and open at top and bottom so as to form a primary flame at the wick and an illuminating flame at the top of the hood, said hood having a partition extending above the
50 top of the hood, substantially as specified.

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

HARPER F. SMITH.

Witnesses:

FRANK E. BECHTOLD,
JOSEPH H. KLEIN.