



# UNITED STATES PATENT OFFICE.

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## ALCOHOL-LAMP.

SPECIFICATION forming part of Letters Patent No. 560,319, dated May 19, 1896.

Application filed December 10, 1895. Serial No. 571,623. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM J. D. MAST, a citizen of the United States, residing at Buffalo, in the county of Erie and State of New York, have invented new and useful Improvements in Alcohol-Lamps, of which the following is a specification.

This invention relates to that class of lamps which are employed for heating or cooking purposes, and more especially to lamps of this kind in which alcohol or a similar volatile fuel is used.

One of the objects of my invention is to so construct the lamp that the flame receives the requisite air supply to prevent smoking thereof and insure a steady burning of the lamp.

The invention has the further object to provide a reducer whereby the size of the flame may be diminished and which at the same time affords the necessary supply of air to the reduced flame to prevent smoking.

In the accompanying drawings, Figure 1 is a vertical section of my improved lamp, showing the reducer raised therefrom. Fig. 2 is a top plan view of the lamp with the reducer removed and a portion of the breast broken away. Fig. 3 is a horizontal section of the reducer in line 3 3, Fig. 1. Fig. 4 is a vertical section of a modified construction of the lamp. Fig. 5 is a top plan view thereof with a portion of the breast broken away.

Like letters of reference refer to like parts in the several figures.

A is the hollow body or bowl of the lamp, which may be spun of sheet metal and which contains a filling B, of asbestos or other refractory and absorbent material, which is saturated with alcohol or other suitable liquid fuel. The asbestos filling is covered by a diaphragm of fine gauze or wire-netting C, which confines the asbestos in the bowl. The central portion of this gauze covering is raised in the form of a cone or conoidal protuberance D, which forms the burner of the lamp.

E is an open annular breast or flange, arranged at the upper end of the bowl or body A and surrounding the burner-cone D. This breast is curved upwardly and inwardly, so as to overhang the outer portion of the gauze covering, and serves to prevent undue spread-

ing of the flame and at the same time forms with the opposing burner-cone an annular flame-space. The breast is provided at its lower edge with a marginal flange *e*, which is bent around a similar flange at the upper end of the bowl, whereby the breast is secured to the bowl. In the construction shown in the drawings the gauze covering is confined in place by bearing with its edge against the internal shoulder at the base of the breast; but it may be held in place in any other suitable manner. The breast is provided near its upper edge with an annular row of air-inlet apertures *f*, through which air is supplied to the upper portion of the flame-space.

G is a guard or ring arranged on the inner side of the breast opposite the air-apertures *f*, whereby the flame is prevented from issuing through said apertures. This ring is preferably suspended from the upper edge of the breast by interlocking lips or flanges formed on the respective parts, as shown at *g* in Fig. 1. The guard-ring is preferably conical or curved so as to extend upwardly and inwardly from the vicinity of the base of the breast and is provided opposite the air-apertures of the breast with air slots or passages *g*, which are arranged around the circumference of the ring and through which air is supplied to the upper portion of the flame. The guard-ring is separated from the surrounding breast by an intervening air space or passage *h* and the gauze covering C is depressed below the lower edge of the ring, as shown at *i*, so as to permit a portion of the air entering through the apertures of the breast to descend between the ring and the breast and pass around the lower edge of the ring into the flame-space, thereby supplying air to the root or base of the flame as well as to the upper portion thereof. By thus furnishing the flame with an air supply around its base in addition to the supply near its top the flickering and puffing of the flame which occurs when the flame is supplied with air only near the top is obviated. The top of the burner-cone is about on a level with or slightly above the level of the upper edge of the breast, as shown in the drawings. The cone thus fills the central portion of the space surrounded by the breast and leaves a comparatively narrow an-

nular flame-space between the same and the breast, thus bringing the inner side, as well as the outer side, of the flame within reach of the air supply and obtaining a practically smokeless combustion.

In the modified construction of the lamp shown in Figs. 4 and 5 the guard  $G'$  is secured at its lower edge between the interlocking flanges of the breast  $E'$  and the bowl, instead of being suspended from the breast, and the upper edge of the guard-ring is separated from the breast by an intervening annular space or air-passage  $g^2$ , whereby air is supplied to the upper portion of the flame. The ring is provided in its base or lower portion with air slots or passages  $h'$ , through which air is supplied to the base of the flame. In this construction the breast is provided with two annular rows of air-supply apertures  $f'$   $f^2$ , the upper row being arranged opposite the upper air-passage  $g^2$  and the lower row opposite the lower air-passages  $h'$ . The portion of the gauze covering below the air-apertures in the lower portion of the guard-ring is depressed or separated from the bottom of the ring, as in the first-described construction, to permit the air which enters the lower row of apertures in the breast to pass underneath the ring and mingle with the base portion of the flame.

It will be observed that in both of the constructions described the guard-ring is separated from the perforated diaphragm or covering, so that the incoming air can pass to the bottom of the ring and there enter the annular flame-space which extends upwardly and inwardly between the guard-ring and the raised central portion of the perforated diaphragm. In this passage the air sweeps along and commingles with a comparatively thin annular flame and effects a complete combustion of the fuel. In each construction one of the passages is formed between the free edge of the ring and the breast and the other passage by slots or apertures formed near the opposite edge of the ring.

$J$  represents the flame-reducer, which consists of a removable cap or concave plate made of the proper size to fit snugly over the breast. This cap is provided with a comparatively small flame-aperture  $j$ , formed centrally in the cap, so as to permit the flame to issue through it when the reducer is placed upon the lamp, thus diminishing the flame to the size of said aperture.

$k$  is a rim or collar formed around the reducing-aperture on the upper side of the cap and provided in its sides with air-inlet openings or passages  $k'$ , through which air is supplied to the diminished flame, thereby preventing smoking of the same.

$L$  is an extinguishing-cap adapted to be placed over the collar of the reducing-aperture. This cap is preferably hinged to the reducer and may be provided with a non-conducting handle for manipulating it.

By extending the burner-cone to the top of

the breast the further advantage is obtained that the flame is caused to rise through the reducing-aperture to a greater height than when the central portion of the gauze forming the burner is flat or substantially so.

I claim as my invention—

1. The combination with the bowl of a lamp containing an absorbent filling, of an inwardly-extending breast arranged at the top of the bowl and having air-inlet apertures, a perforated diaphragm covering said filling and having a convex central portion which is elevated to about the top of the breast, and a guard-ring arranged on the inner side of the breast, trending upwardly and inwardly and separated from the perforated diaphragm by an annular flame-space, substantially as set forth.

2. The combination with the body or bowl of the lamp adapted to contain an absorbent filling and a perforated diaphragm covering said filling, of an open inwardly-extending breast arranged at the top of the bowl and having air-inlet apertures, a guard-ring arranged on the inner side of said breast opposite said air-apertures, and an air-passage arranged at the base of said guard-ring through which the incoming air is permitted to pass around the lower portion of the ring into the flame-space, substantially as set forth.

3. The combination with the bowl of a lamp containing an absorbent filling, of an inwardly-extending breast arranged at the top of the bowl and having air-inlet apertures, a perforated diaphragm covering said filling and having a convex central portion which is raised to about the top of the breast, and a guard-ring arranged on the inner side of the breast, trending upwardly and inwardly at a distance from the convex central portion of the diaphragm and provided at its outer and lower end with an inlet through which air is admitted to the annular flame-space between the guard-ring and the perforated diaphragm, substantially as set forth.

4. The combination with the body or bowl of the lamp adapted to contain an absorbent filling and a perforated diaphragm covering said filling, of an open inwardly-extending breast arranged at the top of the bowl and having air-inlet apertures and a guard-ring arranged on the inner side of said breast and separated at its side from the breast and at its lower edge from said diaphragm forming an air-passage around the lower edge of the ring, whereby air is supplied to the base of the flame said ring being provided in its upper portion with air-inlet passages, whereby air is supplied to the upper portion of the flame, substantially as set forth.

5. The combination with the body or bowl adapted to contain an absorbent filling and a perforated diaphragm covering said filling, of an open inwardly-extending breast arranged at the top of the bowl and having air-inlet apertures, and a guard-ring arranged on the inner side of the breast and suspended

from the top thereof, and separated at its lower edge from the breast and said diaphragm by an intervening air-passage, substantially as set forth.

5 6. A reducer for an alcohol or similar lamp, consisting of a cap adapted to fit upon the lamp and having an aperture for the passage of the flame and a rim surrounding said open-

ing on the upper side of the cap and having air-inlet apertures, substantially as set forth. 10

Witness my hand this 30th day of November, 1895.

WILLIAM J. D. MAST.

Witnesses:

CARL F. GEYER,  
KATHRYN ELMORE.