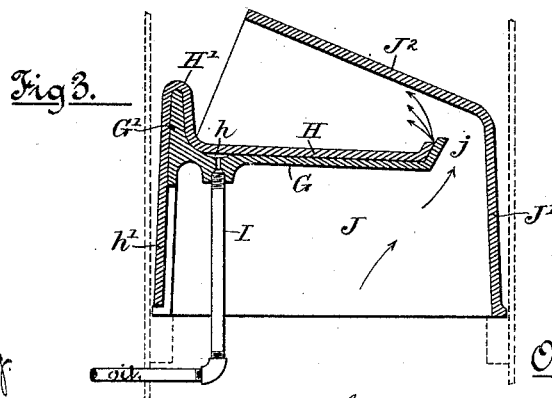
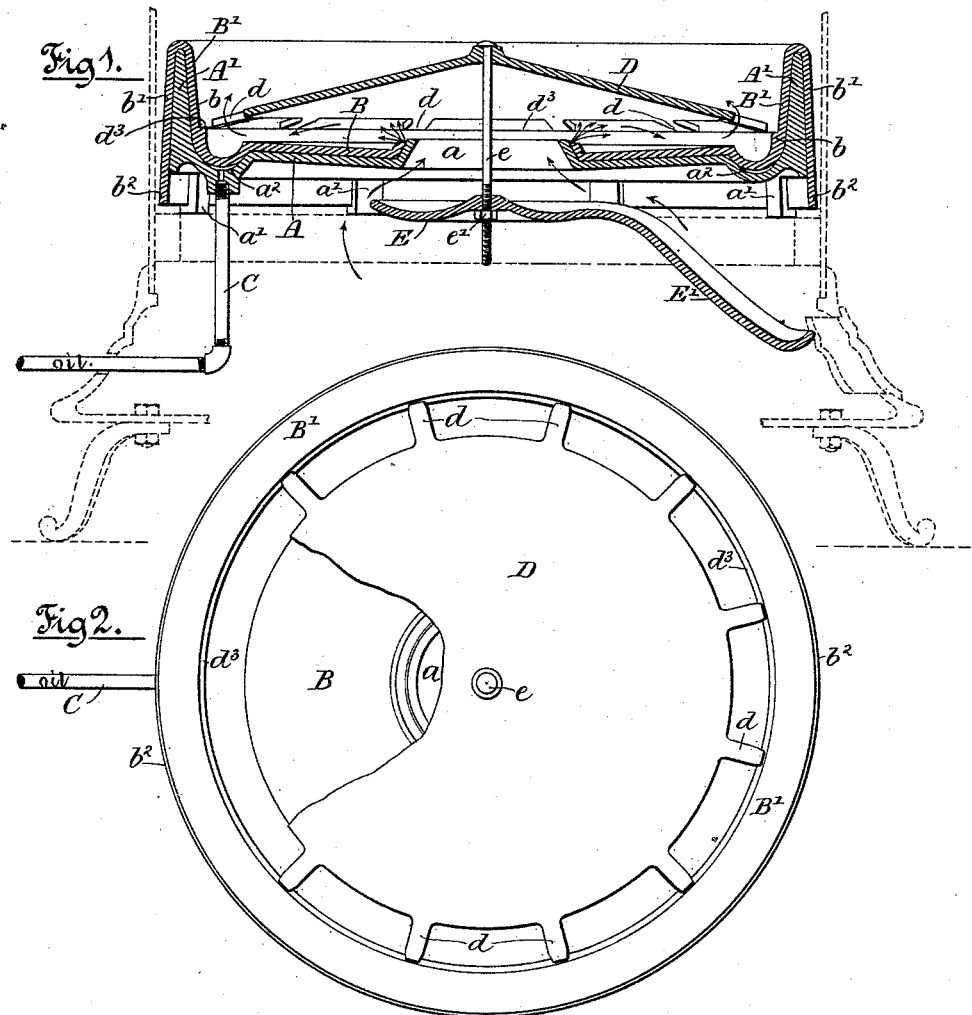


(No Model.)

A. H. CALKINS.  
LIQUID FUEL BURNER.

No. 419,823.

Patented Jan. 21, 1890.



Witnesses  
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# UNITED STATES PATENT OFFICE.

ALMON H. CALKINS, OF CHICAGO, ILLINOIS.

## LIQUID-FUEL BURNER.

SPECIFICATION forming part of Letters Patent No. 419,823, dated January 21, 1890.

Application filed December 7, 1888. Serial No. 292,934. (No model.)

*To all whom it may concern:*

Be it known that I, ALMON H. CALKINS, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Liquid-Fuel Burners; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to an improvement in burners for converting liquid fuel into vapor or gas and burning the same of that kind which comprise two parallel plates the adjacent surfaces of which are placed close together, and an oil-supply pipe communicating with the space between the plates, said plates having an extended area of heating-surfaces, between which the fuel is confined in passing from the supply-pipe to the margin of the plates, where it is burned in vaporous or gaseous form. A burner of this character is illustrated in a prior application, Serial No. 266,921, filed by me in the United States Patent Office March 12, 1888.

The present invention consists in the matters hereinafter described, and pointed out in the appended claims.

In the accompanying drawings, Figure 1 is a central vertical section of a burner embodying my invention. Fig. 2 is plan view thereof, a part of the upper plate of the burner being broken away to show parts beneath. Fig. 3 is a vertical section of a rectangular form of burner embodying the same general features of construction illustrated in the other figures.

As shown in Figs. 1 and 2, A is an annular casting or plate having the general form of a flat ring and provided with a central opening *a*. Said casting A is supported by resting at its margins upon lugs, a ledge, or any suitable or convenient support upon or within the heating apparatus or stove in connection with which the burner is used. In Fig. 1 the dotted lines indicate the sectional outline of a circular stove which is provided with a ledge upon which the said casting rests. At its outer margin the annular casting A is provided with an upwardly-extending cylindric flange A', and also preferably with a series of de-

pending lugs or legs *a'*, which rest upon the ledge or other support sustaining the burner.

B is a second annular plate or casting located over and resting upon the plate A. At its outer margin said plate B is provided with an upwardly-extending flange B', which is hollow or U-shaped in cross-section and fitted over the flange A' of the lower plate A.

*b* is the inner or rising part of the flange, B' and *b'* the outer or depending portion thereof. Said depending part *b'* of said flange is desirably extended below the level of the body of the plates A and B, so as to form an annular wall *b<sup>2</sup>*, for a purpose hereinafter stated.

In their parts adjacent to the central opening *a* the plates A and B are parallel with each other, and are so close together as to form an exceedingly narrow space or passage between them. Commonly the plates will be made of metal of ordinary smoothness—as, for instance, of cast-iron—and the plate B will rest upon or in contact with the plate A, the very slight irregularities in the surfaces of the iron plates affording the necessary space between the plates for the passage of the fuel. At the outer margins of the plates adjacent to the flanges A' B', but inside of the same, the plates are slightly separated from each other, or, in other words, are so shaped as to form an annular space or passage *a<sup>2</sup>* extending around the burner.

C is an oil-supply pipe connected with the said space or passage *a<sup>2</sup>*.

In the particular construction shown the plates A and B are both provided with a trough-shaped annular depression adjacent to the passage *a<sup>2</sup>*; but this construction is not important or essential. Said plates A and B are, furthermore, as shown in the drawings, provided with upwardly-turned flanges at their edges adjacent to the central opening *a*; but such flanges may be omitted or the edges may be of other shape without materially affecting the operation of the device.

D is a flame-deflecting plate. Said plate is located over the central parts of the plates A and B and reaches nearly to the flange B', so as to form therewith a narrow annular slot or opening, through which the flame escapes upwardly from the burner. Said deflecting-plate D is herein shown as made in the form

of a flattened cone arranged with its apex upwardly, and is provided with radial lugs or arms  $d$   $d$  at its margins, which rest upon a ledge  $d^2$  upon the plate B, and thereby sustain the deflecting-plate in position.

In the operation of the burner thus constructed, oil entering the passage  $a^2$  from the supply-pipe C passes from said passage inwardly between the plates A and B, and, being converted by the heat of said plates first into vaporous and then into gaseous form, is burned at the inner margins of the plates around the central opening  $a$ . Air for supporting combustion enters through said opening, while the flames pass outwardly and are deflected downwardly against the plate B by the action of the deflecting-plate D, thereby serving to retain said plates A and B at a high temperature during the operation of the burner.

E is an oil-cup sustained beneath the central opening  $a$  by means of a rod  $e$ , connected with the center of the deflecting-plate D. Said cup E has the general form of a circular trough, and is provided at one side with a lateral prolongation E' of trough form, which extends downwardly to a point convenient of access—as, for instance, to the door or draft-opening of a stove such as is shown in dotted lines in Fig. 1. The cup E, together with its extension or trough E', are intended for conveniently lighting the burner. For this purpose the cup E is supplied with a small quantity of liquid fuel, which is allowed to flow through the supply-pipe and between the plates before the burner is lighted. A portion of the fuel thus delivered to the cup E will flow downwardly along the trough E', and may be lighted at the lower part thereof, when the flame will communicate with the oil within the cup E, and will thereafter burn upwardly against the plates A and B until the latter have become sufficiently heated to vaporize the fuel between them, after which vapor and then gas will be burned at the inner margins of the plates as the temperature of the same rises. The cup E is desirably sustained by an adjustable nut  $e'$  upon the rod  $e$ , by which the cup may be raised and lowered as necessary to most effectually operate in lighting the burner.

The hollow or U-shaped flange B' of the upper plate B is intended to fit so closely against the flange A' as to prevent any considerable escape of vapor or gas between the outer margins of said plates A and B. The joint formed by said flanges may of course be made tight by the use of cement or otherwise; but for cheapness and convenience of construction I prefer to fit them with reasonable closeness and to provide the upper plate B with the depending wall  $b^2$ , hereinbefore described, which wall extends below the adjacent outer edge of the lower plate A, so that in case there is any slight escape of vapor or gas at this point, such vapor or gas will be confined by such outer wall  $b^2$ , and will flow

inwardly along the under surface of the plate A until caught and drawn inwardly by the air-current passing upwardly through the central opening  $a$ . Any small quantity of gas or vapor which thus escapes, therefore, is not wasted, but is burned with the other gas or vapor upon reaching the point of combustion at the inner margins of the plates. This particular feature of construction—namely, a depending wall or flange upon the top plate of a burner, extending outside of and below the margin of the lower plate of the burner—embodies an important improvement in burners of this general character, for the reason that it obviates the necessity of any special construction in the parts or the use of cement for the purpose of making a tight joint between the upper and lower plates of the burner, and, inasmuch as this feature of construction may be employed in many other forms of burner of the general character herein illustrated, I desire to broadly claim this feature, without restriction to the other features of construction herein illustrated and described.

I have, for instance, in Fig. 3, shown a depending flange or wall connected with the upper plate of the burner as applied to a burner of rectangular form. As shown in said Fig. 3, G is the lower plate of the burner and H the upper plate thereof. Said plates G and H are flat in their main parts, and are formed to provide near one of their side margins an oil-passage  $h$ , with which communicates an oil-supply pipe I, which in this instance is connected with the bottom plate G. At its side margins, adjacent to the passage  $h$ , the lower plate G is provided with an upwardly-extending flange G', over which fits a U-shaped flange H' upon the top plate H. Outside of the flange G' the flange H' is continued downwardly to form a wall  $h'$ , which extends a considerable distance below the adjacent margin of the lower plate G. In the particular construction shown in Fig. 3 the lower plate G is cast integral with vertical end walls J J and with a rear wall J', which form the main part of the burner-casing, an inclined deflecting-plate J<sup>2</sup> being also cast integral with the end walls J and rear wall J' in the manner illustrated. A space or opening  $j$  is formed between the inner margins of the burner-plates G and H and the wall J' of the casing, through which opening passes the air for supporting combustion, the vapor or gas being burned as it issues from between the margins of the plates adjacent to the said opening  $j$ . The deflecting-plate J<sup>2</sup> operates in the same manner as the deflecting-plate D (shown in Fig. 1) to throw the flames over or against the top plate H, and thereby insures the maintenance of the same at a high temperature during the operation of the burner. The flanges G' and H' are designed to form a substantially-tight joint between the margins of the plates G and H; but in case any vapor or gas escapes at this point the same

makes its escape from between the said plates G and H at a point considerably above the lower edge of the wall  $h'$ , so that the vapor or gas thus escaping is confined within the casing by said wall  $h'$ , and, becoming mixed with the air flowing to the opening  $j$ , is carried into the flame and there consumed.

I claim as my invention—

1. A burner for converting liquid fuel into vapor or gas and burning the same, comprising parallel top and bottom plates placed close together and an oil-supply pipe communicating with the space between said plates near one margin of the latter, the said top plate being provided with a depending flange or wall extending below the adjacent margins of the bottom plate, substantially as described.

2. A burner for converting liquid fuel into vapor or gas and burning the same, comprising an annular bottom plate, an annular top plate resting on the same, said plates having at their outer edges interfitting flanges, an annular oil-supply passage between said plates adjacent to the flanges, and an oil-supply pipe communicating with said oil-supply passage, substantially as described.

3. The combination, with a lower annular plate A, of an upper annular plate B, resting upon the same, an annular oil-supply passage between said plates and adjacent to their outer margins, an oil-pipe communicating with said oil-supply passage, and a horizontally-arranged deflecting-plate sustained above said plates A B, substantially as described.

4. The combination, with the plate A, provided with an annular flange A', of the plate B, provided with a U-shaped flange B', fitting over the flange A', an annular oil-passage between said plates near their outer margins, an oil-supply pipe communicating with said oil-

passage, and a horizontal flame-deflecting plate located over said plates A B and supported at its inner margins upon the flange B', substantially as described.

5. The combination, with the plates A B, having a central opening therein, and a deflecting-plate D, located over said plate, of an oil-cup E, located below the said central opening, and a supporting-rod sustaining said oil-cup from the said deflecting-plate, substantially as described.

6. The combination, with a burner comprising plates one of which rests upon the top of the other, said plates being provided with a central opening, of an oil-cup located beneath the said central opening and provided with a laterally-extending trough or extension E', by which flame may be communicated to the oil within the cup, substantially as described.

7. A burner for converting liquid fuel into vapor or gas and burning the same, comprising two horizontally-arranged plates parallel with and in close proximity to each other, and having an oil-passage between said plates and adjacent to one margin thereof, an oil-supply pipe communicating with said passage, an upwardly-extending flange upon the lower plate adjacent to said oil-passage, and an upwardly-extending U-shaped flange upon the top plate fitting over the flange of the bottom plate, the outer part of said U-shaped flange being extended downwardly below the adjacent margin of the lower plate to form a wall to confine any escaping vapor or gas, substantially as described.

In testimony that I claim the foregoing as my invention I affix my signature in presence of two witnesses.

ALMON H. CALKINS.

Witnesses:

C. CLARENCE POOLE,  
TAYLOR E. BROWN.