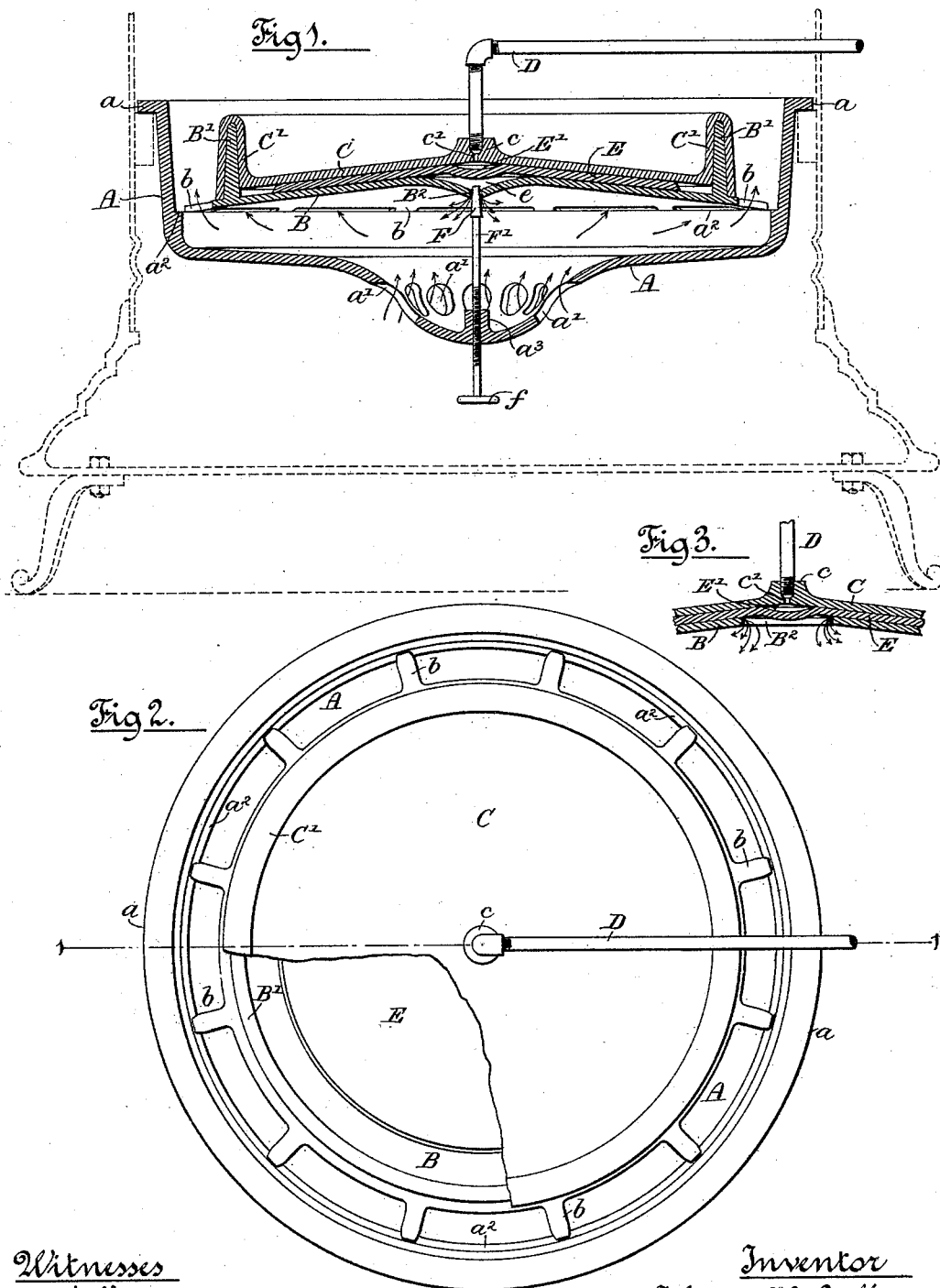


(No Model.)

A. H. CALKINS.  
LIQUID FUEL BURNER.

No. 419,822.

Patented Jan. 21, 1890.



Witnesses  
Wm. J. Henning  
Louis M. V. Whitehead.

Inventor  
Almon H. Calkins  
by Dayton, Poble & Brown  
Attorneys.

# UNITED STATES PATENT OFFICE.

ALMON H. CALKINS, OF CHICAGO, ILLINOIS.

## LIQUID-FUEL BURNER.

SPECIFICATION forming part of Letters Patent No. 419,822, dated January 21, 1890.

Application filed December 7, 1888. Serial No. 292,933. (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 improvements in oil-burners of that class shown in a prior application, Serial No. 266,921, filed by me in the United States Patent Office March 12, 1888, and comprising parallel plates the adjacent surfaces of which are placed close together, said plates having an extended area of heating-surfaces, between which the fuel is confined in passing from the supply-pipe to the margins of the plates, where the vapor or gas formed by the heating of the liquid fuel is burned.

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

In the accompanying drawings, illustrating the invention, Figure 1 is a central vertical section of an oil-burner embodying the same, taken upon line 1 1 of Fig. 2. Fig. 2 is a plan view of the burner shown in Fig. 1, with a part of the top plate broken away. Fig. 3 is a detail section showing a modification of the construction illustrated in Figs. 1 and 2.

As shown in the said drawings, A is a concave or basin shaped casting forming the exterior shell or casing of the burner. Said shell has a nearly flat bottom and approximately cylindric side walls, and is provided at its upper margin with an outwardly-extending flange *a*, which may engage suitable lugs or a ledge on a circular stove of the kind shown in dotted lines in Fig. 1, for supporting the burner. Said casing may, however, be otherwise supported within a stove or heating apparatus. Said shell is provided at its bottom, near its center, with a series of air-inlet openings *a'* *a'*.

Within the casting A is placed a circular plate B, which is arranged centrally within the said casting, above the bottom thereof.

Said plate B is somewhat smaller in diameter than the interior of the said casting A, and is preferably made in the shape of a flattened cone, arranged with its apex upwardly. The plate may be supported in any suitable manner within the casting A, but is herein shown as provided with radial arms or lugs *b* at its margins, which extend outwardly and rest upon an annular ledge *a*<sup>2</sup>, formed on the inner surface of the side wall of the casting A. Said plate B is provided near its outer margin with an annular rib or flange B', extending upwardly therefrom in the manner illustrated.

C is a second circular plate, having the same general shape as the plate B and placed over the latter. Said plate C is provided about its margins with a deep flange C', extending upwardly from the plate and provided with an annular recess extending inwardly therefrom from the under side of the plate C, thereby making the said flange C' hollow, or, in other words, giving it a U-shaped form in cross-section. Said U-shaped flange C' is fitted to and rests in contact with the flange B' of the plate B. Said plate C is further provided at its middle with a hub *c*, through which is formed an oil-aperture *c'*, and with which is connected an oil-supply pipe D.

E is a third plate, having the general shape of the plates B and C and inserted between the same, said plate E being made somewhat smaller in diameter than the plates B and C, so that it will enter freely within and will not bind at its edges against the said flange B'.

One or both of the plates C and E are recessed at the center thereof to form a small oil-chamber E', communicating with the inlet-passage *c'*, which extends through the upper plate C. The lower plate B is provided with a central opening B<sup>2</sup>, at which the vapor or gas formed from the oil fed to the burner is burned. As far as the general features of the invention are concerned, this hole may be varied in size and location, as may be found desirable or necessary in practice. In Fig. 3 the hole is shown as made of considerable size, and said plate B is shown in contact with the under surface of the plate E up to a point near the margins of the hole, so that the

vapor or gas is burned as it issues from between the said plates. As shown in Figs. 1 and 2, however, the central part of the plate B is dropped away from the plate E at its center, so as to bring the hole B<sup>2</sup> some distance below the center of the plate E, thereby forming a chamber or cavity *e* at this point, into which the vapor or gas passes from between the plates before it issues from the opening B<sup>2</sup> and is burned.

As a separate and further improvement, I provide, in connection with the plate B, constructed to form with the plate E a vapor or gas chamber *e*, in the manner described, a vertically-arranged tapered plug F, which passes through said opening B<sup>2</sup>, and is adapted for vertical adjustment therein to enable the passage for the exit of vapor or gas to be enlarged or diminished, as desired. Said tapered plug F may be adjustably sustained in any suitable manner; but as herein shown it is attached to a vertical shaft F', passing through the bottom of the casting A, and having screw-threaded engagement with a hub *a*<sup>3</sup>, cast upon the said casting. Said shaft F' has a hand-wheel *f* at its lower end, by which it may be easily turned for adjusting the position of the plug.

The plates B, C, and E are placed so close together as to form an exceedingly narrow space between them, and for this purpose are not usually supported free from contact with each other, but are made of metal of ordinary smoothness and are allowed to rest one upon the other. The flange B' is, however, fitted tightly to the U-shaped flange C', in order to prevent any considerable escape of vapor or gas at the margins of the plates B and C. Any slight escape of vapor or gas at these points is, however, of no great consequence, inasmuch as the same will be immediately burned at the outer margins of said plates.

In the operation of the burner thus constructed the oil fed through the pipe D into the chamber E' passes outwardly between the plates C, E, and B in the form of a very thin film, and inasmuch as said plates are heated by the flame of the burner is converted by the heat into vapor, and is further converted by the heat of such plates into a permanent vapor or gas, which is burned at the orifice B<sup>2</sup>. The flames from the combustion taking place at the orifice B<sup>2</sup> pass outwardly beneath the bottom plate B to the outer margins of said plate, and escape between said margins of the plate and the sides of the shell A. It will of course be seen that the flames impinge against the said bottom plate B as they pass outwardly over the same, and thereby retain the said plate and lower plates C and E in contact therewith at a high temperature. The bottom plate B will, however, be subjected to the greatest heat, and does, in fact, often become red hot, so that the vapor or gas pass-

ing between said plates B and E toward the exit-opening is very highly heated before it is burned. The form of burner herein shown, wherein an intermediate plate is interposed between two exterior plates, and wherein the oil is fed to the center of one of the exterior plates and burned at the center of the other exterior plate, has the important advantage of affording a large area of surfaces between which the fuel, either in a liquid, vaporous, or gaseous form, passes on its way from the oil-inlet pipe to the burning aperture B<sup>2</sup>. As far as this general feature of my invention is concerned, it may be carried out by the employment of plates shaped otherwise than in the particular manner shown, and I desire to claim, broadly, three plates arranged in the manner described. It is entirely obvious, for instance, that a joint between the margins of the exterior plates B and C may, as far as the operation of the three plates themselves is concerned, be made otherwise than in the particular manner illustrated.

The particular construction of the plates illustrated, embracing a joint between the outer plates made in the manner shown, is, however, of special advantage and utility as affording a cheap and simple construction in the parts, and the same is therefore specifically claimed as part of my invention.

I claim as my invention—

1. A burner for converting liquid fuel into vapor or gas and burning the same, comprising three parallel circular plates placed together with the edges of the exterior plates in contact with each other, and a fuel-supply pipe leading to the space between one of said exterior plates and the intermediate plate at one side of the burner, the exterior plate at the opposite side of the burner being provided with a central orifice at which the vapor or gas is burned, substantially as described.

2. A burner comprising a circular plate B, provided with a marginal flange B', a circular plate C, having a U-shaped marginal flange fitted over the flange B', an intermediate circular plate E, and an oil-pipe communicating with the space between the plates C and E at the center of the same, said plate B being provided with a central exit-orifice at which the vapor or gas is burned, substantially as described.

3. The combination, with the circular plate B, of a circular plate C, an intermediate plate E, and an oil-supply pipe communicating with the space between the plates C and E at the center of the burner, said plates B and C being in contact with each other at their edges, and the plate B being provided with a central vapor or gas exit opening B<sup>2</sup>, and having its central part separated from the plate E to form a vapor or gas chamber *e*, substantially as described.

4. The combination, with a circular plate B, of plates C and E, said plate B being provided with a central vapor or gas exit orifice B<sup>2</sup>, and being separated from the plate E at the center of the latter to form a vapor or gas chamber *e*, and an adjustable plug F, located within the said exit-orifice B<sup>2</sup>, 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.