

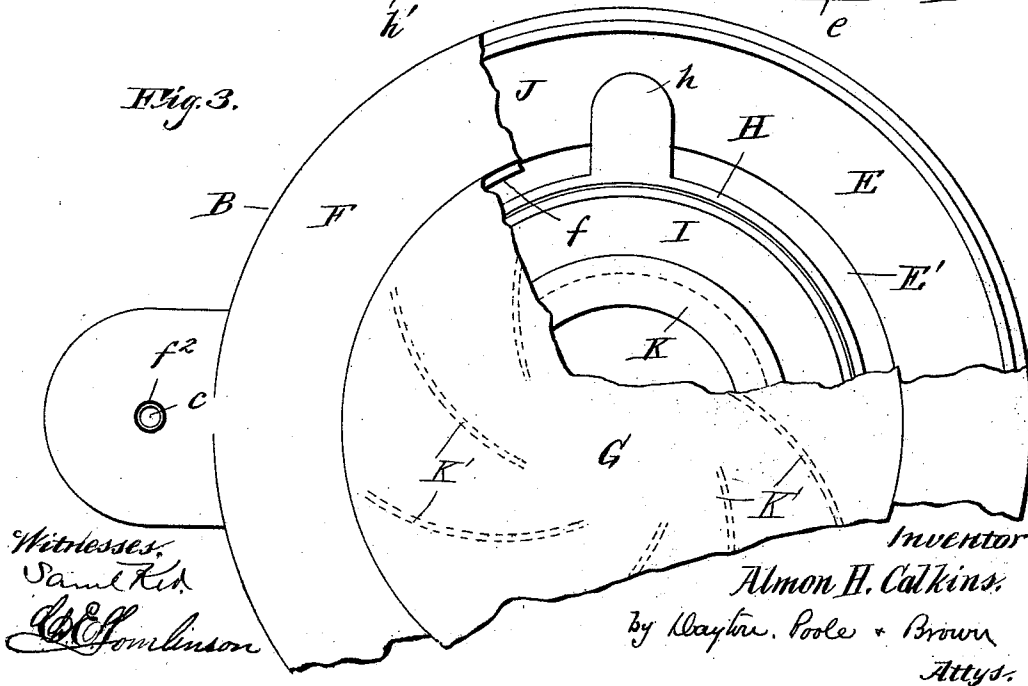
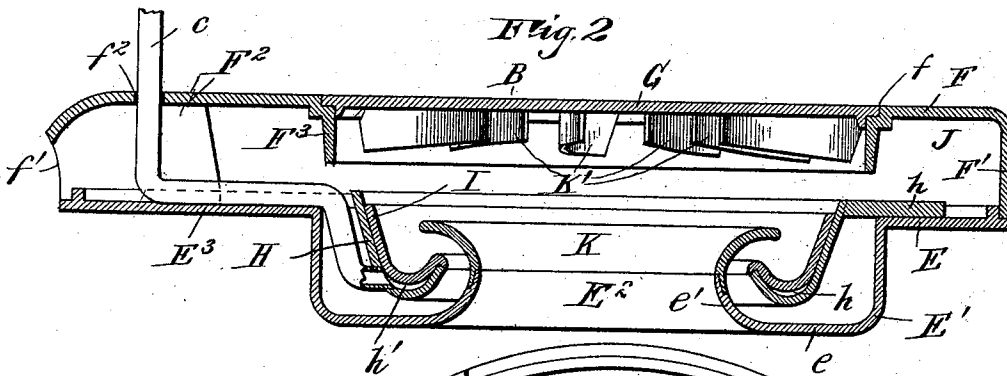
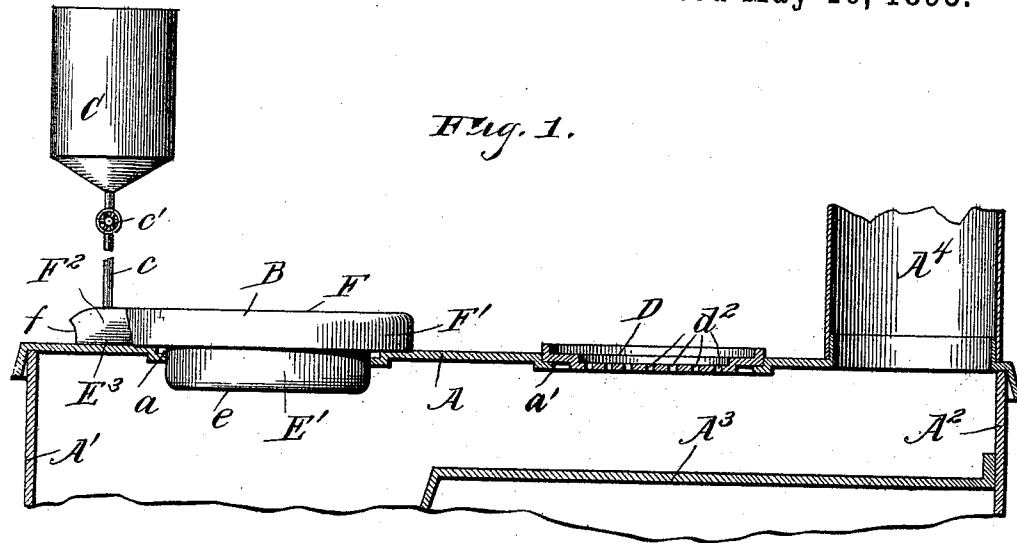
(No Model.)

3 Sheets—Sheet 1.

A. H. CALKINS.
OIL BURNER.

No. 497,490.

Patented May 16, 1893.



Witnesses:
Samuel Red.
J. E. J. J. J.

Inventor
Almon H. Calkins.
By Clayton, Poole & Brown
Attys.

(No Model.)

3 Sheets—Sheet 2.

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Fig. 4.

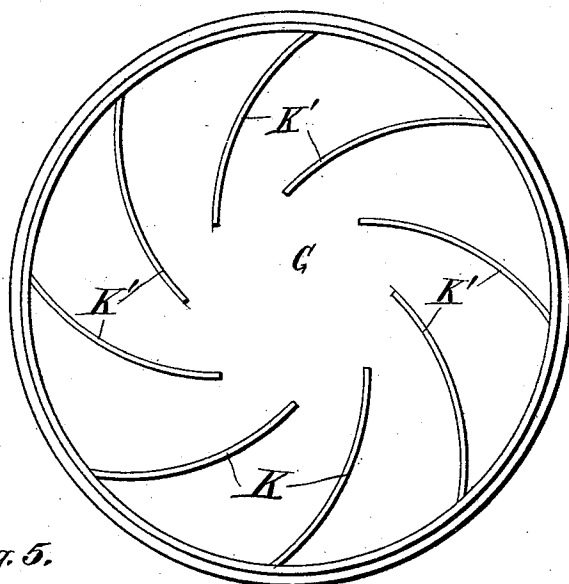
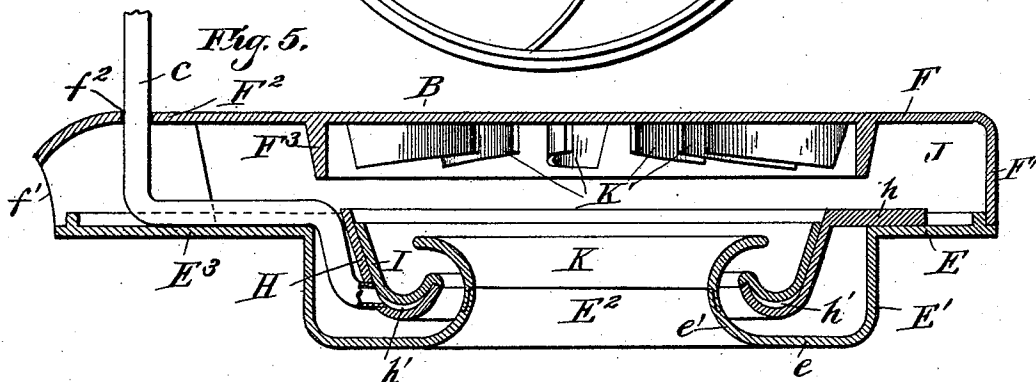


Fig. 5.



Witnesses:

Samuel L. Robinson

Inventor,

Almon H. Calkins.

by Clayton, Poole & Brown,

Attys.

(No Model.)

3 Sheets—Sheet 3.

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Fig. 6.

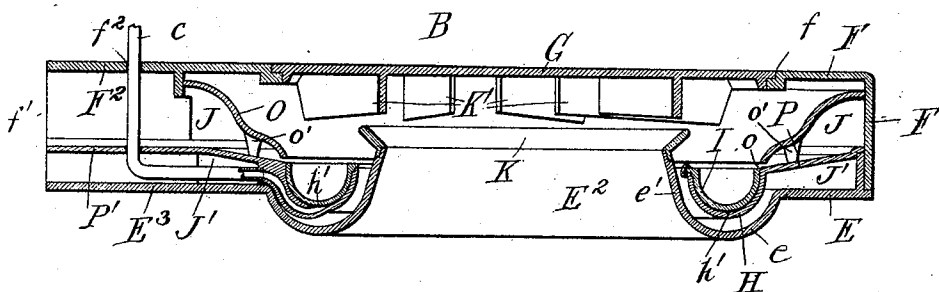
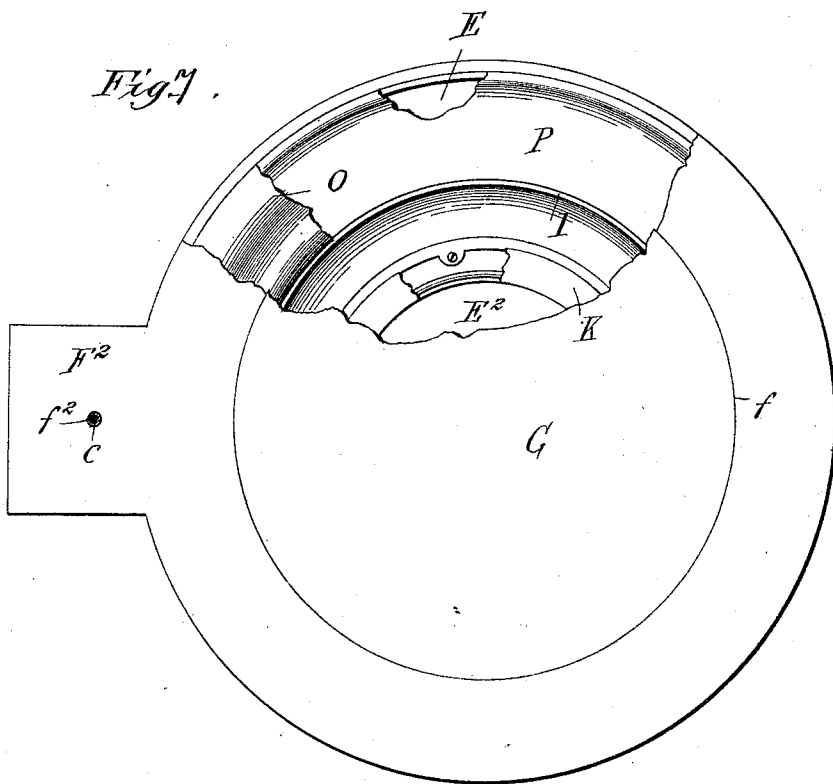


Fig. 7.



Witnesses

Samuel Kel.
C. Robinson

Inventor

Almon H. Calkins.

By Clayton, Poole & Brown

Attorneys.

UNITED STATES PATENT OFFICE.

ALMON H. CALKINS, OF EVANSTON, ASSIGNOR TO THE CHICAGO OIL BURNER
AND STOVE COMPANY, OF CHICAGO, ILLINOIS.

OIL-BURNER.

SPECIFICATION forming part of Letters Patent No. 497,490, dated May 16, 1893.

Application filed April 19, 1892. Serial No. 429,704. (No model.)

To all whom it may concern:

Be it known that I, ALMON H. CALKINS, of Evanston, in the county of Cook and State of Illinois, have invented certain new and useful
5 Improvements in Oil-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
10 form a part of this specification.

This invention relates to heating or cooking apparatus adapted for burning oil or other liquid hydro-carbons, and it consists in certain peculiar and novel features of construction
15 and arrangement, as hereinafter described and claimed.

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

20 In the accompanying drawings: Figure 1 is a view in central vertical section of the upper part of a cooking stove, and of a burner applied thereto, the burner being shown in side elevation. Fig. 2 is an enlarged, central, vertical section of the burner in detached condition; Fig. 3 the plan view thereof with parts
25 broken away to show other parts beneath; Fig. 4 a view from beneath of the removable top-plate of the burner. Fig. 5 is a central vertical section of a burner differing somewhat in construction from that shown in Fig. 2. Fig. 6 is a central transverse vertical section of a modified form of the burner. Fig. 7
30 is a plan view of the same, parts being broken away.
35

As shown in the drawings, A indicates the horizontal top plate of a stove provided with the usual holes *a a'* for cooking vessels.

40 A² A³ are the front and back walls of the stove, A⁴ the top of the stove oven and A⁵ the smoke pipe.

B indicates as a whole an oil burner which rests on the top plate A within the hole *a*, C an oil tank, which supplies the burner through
45 a pipe *c* controlled by valve *c'*, and D a perforated plate placed over or within the rear hole *a'* or that over the oven.

The burner B is constructed as follows:

The outer casing of the burner consists of a horizontal bottom plate E adapted to rest
50 upon the top surface of the stove, and provided with a circular depending part E' of proper size to pass through the hole in the said plate and to extend into the fire-box or fire space of the stove. In the center of said
55 depending part E' is located a central opening E² which forms the exit opening of the burner through which the flames from the same escape downwardly into the interior of the stove, said opening E² being surrounded
60 by an upturned flange *e'* forming an extension of the practically horizontal bottom *e* of the said depending part E' of the bottom plate.

F is a top plate which rests over the bottom
65 plate E and is provided at its margins with a vertical side wall F' fitted at its lower edge against the outer margin of the bottom plate E. Said top plate F is provided with a central orifice *f* which is closed by a removable
70 cover G, and the bottom plate E and top plate F together constitute the exterior casing of the burner and form a combustion chamber in which the fuel is burned, the outlet of which is formed by the opening E² of the bottom
75 plate as hereinbefore described. At one side of the outer shell or casing, the bottom and top plates are extended in the form of projections E³ F² so as to form a tubular extension having an opening *f'* through which air
80 for supporting combustion is admitted to the interior of the casing.

The oil burning devices consist of two annular or ring-shaped plates H and I which
85 are arranged with their adjacent faces in contact with each other or practically so, and between which the oil to be burned is fed and is vaporized or converted into gas by the heat of the plates in passing outwardly to the
90 margins of the same where it is burned.

The plates H and I, which constitute the burner proper, are constructed in the same manner as the similar burner plates shown in the prior patent, No. 427,893, granted to
95 Alonzo Noteman on the 13th day of May, 1890.

As shown in the drawings, the plate H

which is the lower burner plate, is sustained within the lower part of the burner by means of radial lugs or projections h h which extend outwardly from the upper margin of the plate and rest upon the horizontal part of the bottom plate E so as to sustain the said plate H centrally within the depending part E' of the bottom plate between the outer wall thereof and the inner upturned flange e' . The burner plate I rests within and is supported upon the plate H.

In the construction shown the annular burner plates H and I are of approximately "U" shape in cross-sectional form with their inner margins located considerably below their outer ones. In other words, the plates are made of trough shape with their outer edges considerably higher than their inner edges. At the lower parts of the plates between the same is formed a space or channel h' to which the oil is fed and through which the oil passes around the entire circumference of the plates so that it may pass uniformly outward between the marginal parts of the plates to the edges thereof, where it escapes from between the same in the form of vapor or gas and is thereafter burned.

In the construction shown the plates are united at their inner edges by a joint formed by fitting the margins of the plates to each other, or by cement so as to prevent the escape of oil or vapor at such inner edges, whereby the oil is caused to travel outwardly and upwardly between the plates, and, being vaporized or converted into gas by the heat thereof, issues in the form of vapor or gas at the upper and outer margins thereof. The supply pipe c is shown as extending downwardly through a hole f^2 in the extension F^2 of the top plate and carried inwardly and connected with the space or channel h' between the plates H and I.

F^3 is a depending flange formed on the inner margin of the top plate F around the hole f therein and reaching part way to the bottom plate E so that an annular slot or opening is formed between the lower edge of said flange F^3 and the horizontal part of the bottom plate. Said flange, together with the bottom and top plates and the side wall F' , forms an annular air space or chamber J which is supplied with air from the inlet opening f' and from which the air escapes inwardly to the burner plates throughout the entire circumference of the burner. The burner plates are made somewhat smaller in diameter than the said flange F^3 so that the annular air inlet opening formed between the lower margin of the flange and the bottom plate E is located outside of and about on the same level with the upper margins of said burner plates, so that air for supporting combustion is delivered close to the point where the gas issues from between the plates and combustion first takes place. Air for supporting combustion not only enters above the upper margins of the burner plates

and passes over the same, but a part of the air supplied through the annular duct or chamber J passes downwardly between the burner plates to the outer wall of the depending part of the burner casing, and around the burner plates so as to reach the inner surface of the annular flame produced by the burning gas. The delivery at the desired point of the air thus passing below and around the burner plates is facilitated by a deflecting ring K which is placed upon the upper margin of the flange e' , and which extends upwardly and outwardly over the lower and inner margins of the burner plates so as to deflect the air passing around the burner plates outwardly and upwardly toward the upper margins of the plates at which the fuel is burned.

K' K' K' indicate a series of obliquely arranged or spiral deflectors arranged over the burner plates and extending inwardly from the flange F^3 toward the center of the burner. In the particular construction shown in Figs. 1, 2, 3 and 4 the said deflectors K' have the form of depending flanges attached to the lower surface of the cover G and preferably cast integrally therewith. These deflectors are so arranged that the flame rising in an annular sheet from the margins of the burner plate will come in contact with the same and remain in contact therewith as it passes inwardly toward the central exit opening E^2 . The effect of the deflecting plates thus arranged is to give a rotary motion to the flames within the burner casing so as to facilitate combustion by securing a more complete admixture of air with the burning gas, and to increase the heating effect of the flame on the burner plates, by which they are better adapted to perform their function of vaporizing the oil.

The advantage of giving a rotary motion to the flame may be more readily understood by consideration of the fact that the flame issuing from a burner of the character described is usually a very long and thin one, so that in an ordinary cooking stove the flame will pass in a thin stream through the body of the stove, and a long distance into the smoke pipe. It is desirable therefore to concentrate the flame so as to give it more body and thickness and less length, and this result is accomplished largely by giving rotary motion to the flame so that it will issue from the burner while still in rotary motion and thus remain in a more compact form and thereby impart a greater degree of heat to the parts of the stove adjacent to the burner, than would otherwise be the case.

The location of spiral deflectors K' on the top wall of the burner, in the manner illustrated, affords in connection with an annular burner a simple and desirable construction for producing the desired rotary or whirling motion of the flames from the burner.

In Fig. 5 is shown a burner corresponding

in all essential respects with that shown in the other figures of the drawings excepting that the top plate F is without any central opening and the deflectors K' K' are attached directly to said top plate.

In Figs. 6 and 7 is shown a form of burner which is like that illustrated in Figs. 1 to 4 with the exception that in this instance in the place of the flange F³ made integral with the top plate, a separate circular plate, O, is employed to separate the air passage J from the central space or combustion chamber of the burner, and a partition, P, is arranged to extend outwardly from the outer margin of the lower burner plate H to the side wall of the casing so as to form a separate air passage, J', below the main air passage J for supplying air to the space beneath the burner plates. The plate O in this instance, is shown as extending from the upper part of the outer wall of the casing downwardly and inwardly to a point adjacent to the outer margins of the burner plates so as to form a narrow annular slot, o, adjacent to the flame for the admission of air thereto from the passage J. Said plate O performs the same function as the said flange F³ of dividing the passage J from the central space of the burner, or, in other words, it forms the side wall of the combustion chamber in the same manner as does the said flange F³.

The partition P is shown as made integral with and forming an outward extension of the lower burner plate H, this being a simple and desirable construction in practice. The presence of said partition P makes it possible to control the relative quantity of air supplied to the inner and outer surfaces of the flame; it being obvious that the quantity of air delivered from the passages J and J' will be dependent upon the relative sizes of the inlet openings of said passages and the said inlet openings may be made of desired proportionate sizes by properly locating the part P' of the partition P which projects into the tubular extension through which air is admitted into the casing.

The plate O is shown as supported by means of lugs, o' o', which rest on the partition P, but it may be otherwise sustained, as found convenient or desirable.

I claim as my invention—

1. A burner for liquid fuel, comprising a casing provided with a central exit opening for products of combustion, and a burner consisting of two annular plates arranged concentrically within the casing, said casing being provided with an annular slot or opening located adjacent to the burner plates for admission of air to the flame, and said annular plates being sustained at a distance from the walls of the casing so that air from the said slot may pass both above and below the plates and thereby obtain access to both sides of the flame, substantially as described.

2. A burner for liquid fuel, comprising a

casing adapted to fit at its bottom within a hole in the top of a stove and provided in said bottom with a central exit opening for products of combustion, a burner located within the casing and consisting of two annular plates surrounding the central exit opening, said casing being provided with an annular slot or opening adjacent to the burner plates for admission of air to the flame, and said annular burner plates being sustained at a distance from the wall of the casing so that air from the said slot may pass both above and below the plates and thereby have access to both sides of the annular flame, and an outwardly extending annular deflector placed around the central exit opening in the bottom of the casing and operating to deflect air passing below the burner plates outwardly toward the inner surface of the flame, substantially as described.

3. An oil burner comprising an exterior casing the bottom of which is adapted to fit within the hole in the top of a stove, and which is provided with a central exit opening, an annular burner located within the casing concentric with the central exit opening thereof and a plurality of spiral deflectors attached to and depending from the top wall of the burner casing, substantially as described.

4. A burner for liquid fuel comprising a casing adapted to fit at its bottom within a hole in the top of a stove, and provided in said bottom with a central exit opening for products of combustion, a burner located within the casing and consisting of two annular plates surrounding the central exit opening, said casing being provided with a combustion chamber, and an annular air duct or passage extending around the combustion chamber and communicating with the same by means of an annular slot or opening located adjacent to the burner plates, substantially as described.

5. A burner for liquid fuel comprising a casing adapted to fit at its bottom within a hole in the top of a stove, and provided in said bottom with a central exit opening for products of combustion, a burner located within the casing and consisting of two annular plates surrounding the central exit opening, said casing being provided with a combustion chamber, an annular air duct or passage extending around the combustion chamber and communicating with the same by means of an annular slot or opening located adjacent to the burner plates, and a partition, P, extending outwardly from the margin of the lower burner plate and dividing said air duct or passage into two separate passages, J, J', substantially as described.

6. An oil burning device comprising an outer casing having a central exit opening, an annular burner and an annular air supply duct, said casing being provided with an air

inlet opening communicating with said air
duct and an oil supply pipe extending
through said air inlet opening to the burner
whereby the said oil supply pipe is kept cool
5 by the air entering the casing, 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,
G. W. HIGGINS, Jr.