

(No Model.)

A. H. CALKINS.
LIQUID FUEL BURNER.

No. 583,028.

Patented May 25, 1897.

Fig. 1.

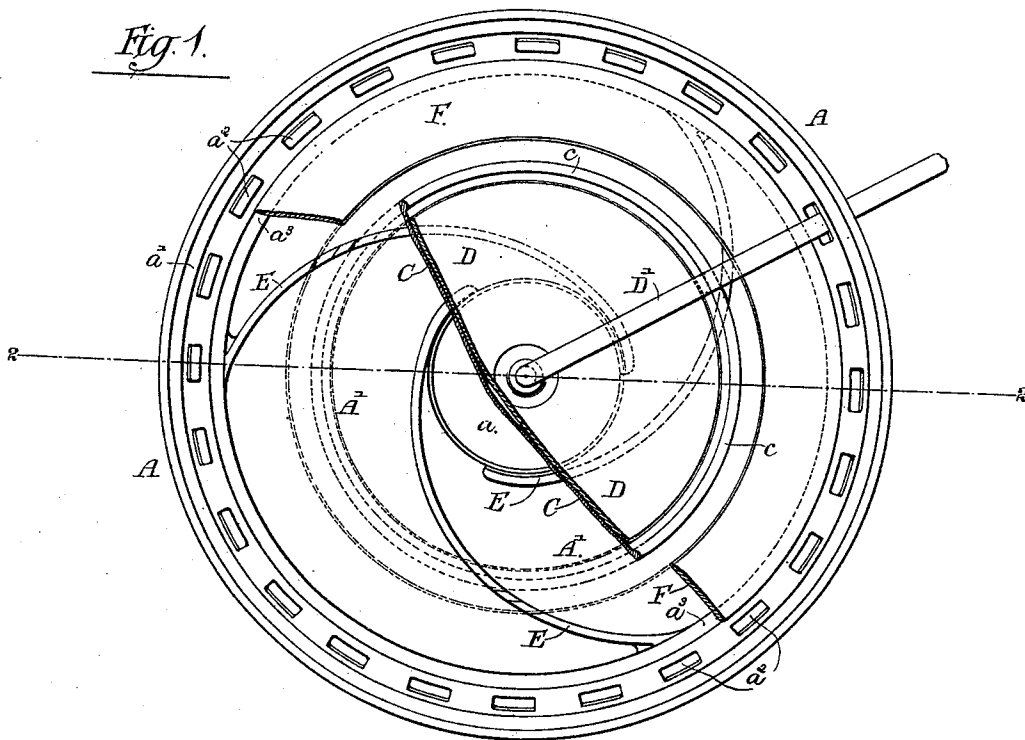
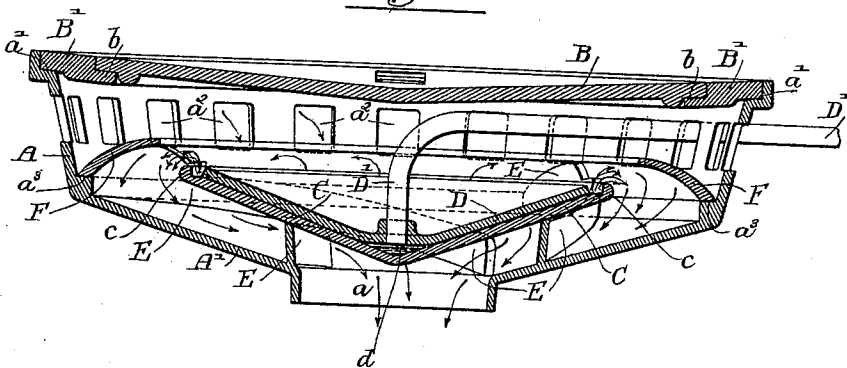


Fig. 2.



Witnesses:-

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UNITED STATES PATENT OFFICE.

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

LIQUID-FUEL BURNER.

SPECIFICATION forming part of Letters Patent No. 583,028, dated May 25, 1897.

Application filed March 12, 1888. Serial No. 266,921. (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
5 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,
10 which form a part of this specification.

My invention relates to appliances for burning liquid fuel for heating and cooking purposes, and more particularly to that class of liquid-fuel burners in which the liquid is fed
15 between heated burner-plates arranged in contact with each other, or practically so, in such manner as to be vaporized between said burner-plates and to issue from between said plates in the form of an inflammable gas.

20 The objects of my invention are to produce a liquid-fuel burner of the above type which shall be simple, compact, and inexpensive in its construction and thoroughly practicable and efficient in its operation and by means
25 of which the ignited gas shall issue from between the burner-plates in the form of a thin flat jet and be directly met and commingled with air entering the burner immediately adjacent to the jet, whereby a most thorough
30 and at the same time economical combustion of the fuel shall be attained.

To the above purposes my invention consists in certain peculiar and novel features of construction and arrangement, as hereinafter
35 described and claimed.

In order that my invention may be fully understood, I will proceed to describe it with reference to the accompanying drawings, in which—

40 Figure 1 is a plan view of a liquid-fuel burner embodying my invention, certain parts of the structure being broken away to expose other parts thereof. Fig. 2 is a central transverse vertical section of the burner,
45 taken on the line 2 2 of Fig. 1.

Referring now to the said drawings, C designates the lower burner-plate, this plate being in the form of a casting, having a circular outer margin and of concavo-convex shape
50 transversely, the concave side of the plate C

being placed uppermost. Directly above and within this lower burner-plate C is placed the upper burner-plate D, which is also in the form of a casting having a circular outer margin and of concavo-convex form trans-
55 versely, the convex side of this upper burner-plate being placed downwardly, so as to lie in direct contact with the concave upper side of the plate C. The lower surface of the upper burner-plate thus corresponds with the
60 upper surface of the lower burner-plate, and the former is supported directly upon the latter. As shown in the drawings, the upper burner-plate D is of slightly less diameter
65 than the lower burner-plate C, and the latter is provided with an upwardly-projecting rim c, which is located somewhat beyond or outside of the upper edge of the upper burner-plate D. An oil-supply pipe D' is passed
70 through the side wall of the outer casing A (to be hereinafter fully described) and extends above the burner and at its inner end portion passes downward through the center of the plate D in such manner as to communi-
75 cate with the space between the upper and lower burner-plates, the central portions of the burner-plates C and D being shown as so formed as to produce a slight cavity d at this point.

As above stated, the plates C and D are
80 placed very close together, the distance between the adjacent faces of plates being so slight as to prevent the entrance of flame between the plates while permitting the flow of oil and vapor between said plates. No pre-
85 cised distance at which the two plates are to be separated need be arbitrarily stated so long as it conforms to the conditions and requirements just stated; but it may be said that the plates should not in practice probably be
90 more than one-twentieth of an inch apart and that they will commonly be even closer than that. Usually the plates are employed with the surface roughness left by the mold-sand, the interstices produced by this surface
95 roughness being sufficient to permit the passage of the liquid and vapors and gases between the two plates. If the castings be finished, they may be provided with slight projections upon their adjacent faces (as by leav-
100

ing unfinished places thereon) for the purpose of permitting the passage of liquid, as just mentioned.

In the structure shown no means other than the lower plate C are shown for holding the upper plate in position, said upper plate resting by gravity directly upon the lower plate, and the forms of the two plates being such as to prevent all possibility of lateral displacement of the plates, even in the absence of any special retaining devices.

In the operation of this burner the liquid fuel enters between the two burner-plates at the centers thereof and flows outwardly and upwardly between the same, finding an outlet at the margin of the plate D, where it is ignited. The flames resulting from the ignition of the liquid fuel are carried over the surface of one of the burner-plates, (by means hereinafter explained,) and thus heat said plates to a high degree. The heating of one plate obviously causes the other burner-plate to become very hot, and consequently the liquid fuel becomes converted first into vapor and then into a gas before it reaches the outer margin of the burner-plates. Thus it will be seen that the escaping gas burns in the form of a thin flat jet at the margins of the two burner-plates.

The external shell or casing A of the form of burner illustrated consists of a basin-shaped casting, which is provided with a shallow conical bottom A', extending beneath and at some distance from the lower burner-plate C, and which is also adapted to fit within one of the top-plate holes of a cook-stove or other type of heating-stove. This bottom A' is also formed with an exit-opening *a*, which is shown as located centrally of the bottom and which serves to permit the downward escape of the flames in a body from the burner. When in use, the flames pass in a body beneath the burner, heating the burner-plates, as above stated, and thence flow downward through the outlet-opening *a* and into the stove, the body of flame thus also heating the stove, and the products of combustion finally passing out of the smoke-pipe of the stove. The outer portion or periphery of the shell or casing is of circular form and somewhat greater in diameter than the burner, and said outer portion or periphery stands approximately vertical a slight distance above the plane of the edges of the burner-plates. This outer or peripheral portion of the shell or casing is shown as provided with a number of air-inlet openings *a*², which are thus located slightly above and adjacent to the edges or outer margins of the burner, as shown.

A removable top plate B closes the top of the casing or shell A and is shown as resting at its edges in a rabbet *b*, formed in the inner edge of a ring B', the outer edge of said ring resting in a rabbet *a'*, formed in the upper edge of the periphery of the casing or shell A. Thus the burner heats the top plate B,

and consequently heats any utensil placed upon said top plate, and, if desired, said top plate may be removed and a utensil may be placed directly over the burner, so as to be directly heated thereby. An annular deflecting plate or flange F rests at its outer edge upon an annular shoulder *a*³, which is formed at the point of union of the bottom A and peripheral portion of the shell or casing A, and this deflector extends upwardly and inwardly from the shell or casing to a point somewhat outside of and beyond the outer margins of the burner for a purpose to be hereinafter explained.

Upon the upper surface of the basin-shaped bottom A' of the shell or casing A are formed a number of spirally-directed partitions or flanges E, which extend from the peripheral portion of the shell or casing inward to the outlet-opening *a* thereof, and which are thus located below the lower burner-plate C. The upper margins of these partitions E are so shaped as to conform to the under surface of the lower plate C of the burner, and said lower plate C is supported directly upon said partitions. These partitions E form spiral or tortuous channels which lead from the space which intervenes between the outer edges of the burner-plates to the outlet-opening *a*.

From the above description it will be seen that when the burner is in operation air is drawn inward through the inlet-apertures *a*² and is deflected downward and inward upon the flat thin jet of ignited vapor-gas issuing from between the burner-plates C and D. The air thus injected into the burner comes into direct and immediate contact with the ignited jet and completely mingles with and permeates said jet, this result being due to the described thin and flat form of the jet and insuring complete combustion of the vapor or gas. The products of combustion from the burner after leaving the jet-opening flow downward through the space between the edge of the burner and the periphery of the casing or shell A and enter the spiral channels formed by the partitions F. In these spiral channels the flames (which would otherwise form flat and direct currents) are massed in voluminous streams, which are caused to impinge extensively upon the lower burner-plate, so as to thoroughly heat the same, the flames finally passing out downwardly through the outlet-opening *a* and thence through the stove, as above described.

It will thus be seen that I have produced a liquid-fuel burner which is simple, durable, and compact in construction and which is exceedingly effective in its operation, the form of the ignited jet being such as to insure the most effective commingling of air therewith, and the location of the air-inlets relative to the jet being such as to further insure perfect mixture of air with the ignited jet, and a most thorough and at the same time economical combustion of the fuel being consequently insured.

Having thus described my invention, what I claim as new therein, and desire to secure by Letters Patent, is—

1. A liquid-fuel burner for stove-tops comprising two burner-plates having their adjacent surfaces parallel and practically in contact with each other, and means for feeding liquid fuel to the space between said plates, said plates having an annular margin at which the vaporized fuel is discharged and burned, and a casing or shell which surrounds the burner-plates and is provided with a central exit-opening in its bottom and with an inlet opening or openings in its upper part above said burner-plates, said burner-plates being supported within said casing or shell at a distance from the side and bottom walls thereof, substantially as described.

2. A liquid-fuel burner for stove-tops comprising two burner-plates having their adjacent surfaces parallel and practically in contact with each other, and means for feeding liquid fuel to the space between said plates, said plates having an annular margin at which the vaporized fuel is discharged and burned, and a casing or shell which surrounds the burner-plates and is provided with a central exit-opening in its bottom and with an inlet opening or openings in its upper part above the burner-plates, said burner-plates being supported within said casing or shell at a distance from the side and bottom walls

thereof, and an annular deflector-plate located within said casing and extending inwardly from the outer wall thereof above the level of the burner-plates, substantially as described. 35

3. A liquid-fuel burner for stove-tops comprising two burner-plates having their adjacent surfaces parallel and practically in contact with each other, and means for feeding liquid fuel to the space between said plates, said plates having an annular margin at which the vaporized fuel is discharged and burned, and a casing or shell which surrounds the burner-plates and is provided with a central exit-opening in its bottom and with an inlet-opening in its upper part above said plates, said burner-plates being supported within said casing or shell at a distance from the side and bottom walls thereof, and spiral projections located between the bottom wall of the shell or casing and the lowermost burner-plate and forming spiral passages leading from the periphery of the burner-plates to the exit-opening of the casing, substantially as described. 50 55

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

ALMON H. CALKINS.

Witnesses:

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O. N. WILLIS.