





# UNITED STATES PATENT OFFICE.

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## LIQUID-FUEL BURNER.

985,644.

Specification of Letters Patent.

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*To all whom it may concern:*

Be it known that I, JOHN J. VALLIER, a citizen of the United States, and a resident of Oakland, in the county of Alameda and State of California, have invented a new and Improved Liquid-Fuel Burner, of which the following is a full, clear, and exact description.

This invention relates to liquid fuel burn-  
ers, and more particularly to burners of this class in which the liquid fuel is vaporized by means of steam escaping at the fuel nozzle.

An object of the invention is to provide a simple, strong and efficient liquid fuel burner for use in connection with stoves, heaters and the like, in which the liquid fuel is vaporized by means of a steam jet, and which is provided with means for spreading the escaping liquid fuel and steam, thereby to form an effective flame.

A further object of the invention is to provide a device of the class described, in which the fuel nozzle and the spreading means are both adjustable to control the flow of liquid and the form of the flame.

A still further object of the invention is to provide a burner having an adjustable fuel nozzle and an adjustable member for spreading the escaping fuel mixture, the fuel being vaporized by means of steam escaping from a chamber surrounding the fuel nozzle and through an opening of the chamber adjacent to the nozzle outlet, the steam being formed in a coil, which is heated by the burner itself.

The invention consists in the construction and combination of parts to be more fully described hereinafter and particularly set forth in the claims.

Reference is to be had to the accompanying drawings forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the views, and in which—

Figure 1 is a longitudinal section of a stove showing my liquid fuel burner applied thereto; Fig. 2 is an enlarged vertical section of the burner; Fig. 3 is an enlarged plan view of the base of the burner; Fig. 4 is an enlarged plan view of the means for introducing the steam into the chamber surrounding the fuel nozzle; and Fig. 5 is a plan view showing a detail of the stove used in connection with the burner.

Referring more particularly to the draw-

ings, 10 represents a stove for cooking and heating purposes, and having a flue 11. It will be understood that while I have shown my invention applied, for example, to a stove of this kind, it can also be advantageously employed for all other purposes for which burners of this kind are used. The stove 10 has, near the bottom, cross-bars 12 upon which is arranged the burner base 13. The base may be mounted in place in any other suitable manner. The base comprises a substantially circular portion 14 and parallel, elongated extensions 15. A rim 16 encircles the portion 14 and the extensions 15 of the base. A steam drum or chamber 17 is arranged above the burner base and has formed integral therewith at the bottom, an inverted cup-shaped member 18, provided at the lower edge with a laterally disposed flange 19. The flange 19 rests upon blocks 20 carried by the burner base, and secured in position thereupon by means of screws or rivets 21, which extend through suitable openings of the blocks and engage properly formed openings of the flange 19. In this way, the drum and the cup-shaped member are rigidly mounted upon the base. The cup-shaped member communicates with the interior of the drum by means of an opening 22, having the upper edge 23 inwardly tapered or beveled, for a purpose which will appear hereinafter.

At the top, the drum 17 carries a hollow head 24, which is interiorly threaded and communicates with the inside of the drum through an opening 25 of the latter. A fuel nozzle 26 having a threaded portion 27 is arranged within the head 24, and extends into the drum. The end 28 of the nozzle, adjacent to the opening 22, is laterally extended and beveled to correspond to the shape of the edge 23, so that the end of the nozzle can cooperate with the opening of the drum to form a valve, as will appear more clearly hereinafter. The outer end of the nozzle is formed into a handle 29 which extends to the outside of the stove, through a proper opening 31 therefor in a part of the stove top. The part 30 consists, preferably, of a stovetop or the like. By turning the nozzle, it is moved toward or away from the opening 22 owing to the interior thread of the head 24 and the correspondingly threaded portion 27 of the nozzle, which engages therewith. Thus, the size of the outlet or valve opening of the steam



drum can be closely adjusted. The handle has a point 32, which is adapted to cooperate with indicating figures 33 marked upon the stove top portion 30, and serving to indicate the position of the nozzle with respect to the outlet opening of the steam drum. The head 24 has a lateral extension 34 communicating interiorly therewith and adapted to receive the end of the fuel supply pipe 35. The nozzle has a cut-away portion 36 at the extension 34 to permit the nozzle to be adjusted within certain limits without interfering with the communication between the fuel supply pipe 35 and the interior of the nozzle.

I provide a heating coil 37, arranged within the stove above the extensions 15 of the burner base. The coil is connected at one end with the water-supply pipe 38, and at the other end has a ring 39 arranged within the steam drum and surrounding the nozzle. The coil extends into the steam drum through a suitably formed extension 40 at the side of the drum. The ring 39, at the inside, has a plurality of perforations 41, through which the steam can escape into the drum.

An inverted conical or tapered spreading member 42, is arranged on the burner base and projects into the inverted cup-shaped member 18. The point of the spreading member is normally adjacent to the opening 22. Said spreading member has a threaded stem 43, arranged in a suitably threaded opening of the burner base and secured in position by a locking nut 44, at the under side of the base. This may be arranged so that it can be adjusted from the outside. By means of the threaded stem and the locking nut, the spreading member can be approached to or withdrawn from the opening 22 to adjust the form of the flame given by the burner. I prefer to provide the spreading member with a curved surface and a laterally extending flange 45, which deflects the fuel mixture escaping from the cup-shaped member 18, evenly, in all directions, and thus assists in producing a uniform, substantially annular flame. The upper portion of the spreading member is preferably rounded to conform to the shape of the member 18.

To start the burner, the fuel is turned on and is allowed to flow from the nozzle to the burner base, where it is ignited, the flames ascending from the extensions 15 of the burner base to heat the coil 37, so that when the water is turned on and enters the coil, it is converted into steam and enters the drum. The steam escapes from the drum through the valve opening between the edge 23 and the extension 28, and in flowing through the opening 22 draws with it the fuel from the fuel nozzle and vaporizes it. The mixture of steam and vaporized fuel

passes from the cup-shaped member 18, and is properly deflected and spread out by the member 42. The flames arising from the burner serve to maintain the coil in a heated condition, and any unconsumed fuel drips on to the burner base and is burned in the extensions 15, thus also serving to heat the coil.

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

1. A liquid fuel burner, comprising a chamber adapted to receive a fluid under pressure, a fuel nozzle in said chamber, said chamber having an opening adapted to cooperate with said nozzle, to constitute a vaporizing valve, said nozzle being movable to adjust said valve, a perforated ring about said nozzle, for introducing fluid into said chamber, and means for spreading the mixture of fluid and fuel vapor escaping through said valve.

2. A liquid fuel burner, comprising a chamber having an opening, a perforate member within said chamber for introducing a fluid under pressure into said chamber, a fuel nozzle within said chamber and arranged at said opening and adapted to cooperate therewith to form a vaporizing valve, and a tapered member arranged outside of said chamber and adapted to direct the mixture of fluid and fuel vapor escaping through said valve, in a plurality of directions.

3. A liquid fuel burner, comprising a fuel nozzle, a steam chamber surrounding said nozzle, a coil having a perforated ring within said chamber and surrounding said nozzle, said nozzle and said chamber constituting a vaporizing valve, said coil being arranged to receive heat from the burner, and an upwardly tapered spreading member located under said chamber.

4. A liquid fuel burner, comprising a steam drum having an opening, a fuel nozzle extending into said drum and adjustable toward and away from said opening, said nozzle and said opening being shaped to constitute a vaporizing valve, means for introducing steam into said drum, and a spreading member arranged at the outside of said opening and adjustable toward and away from the same, said nozzle having, outside of said drum, means for adjusting said nozzle, said member being tapered and having the point located under said opening.

5. A liquid fuel burner, comprising a base, a steam drum having an inverted cup-shaped member mounted upon said base, said drum having an opening communicating interiorly with said member, a fuel nozzle extending into said drum and having the end formed to cooperate with said opening to form a vaporizing valve, said nozzle being adjustable toward and away from said



opening, said drum having a head receiving said nozzle, a fuel inlet communicating interiorly with said head and said nozzle, means for adjusting said nozzle, means for introducing steam into said drum, and a tapered spreading member arranged upon said base and extending into said cup-shaped member, said spreading member being adjustable toward and away from said opening.

6. A liquid fuel burner, comprising a steam chamber having an opening, a fuel nozzle in said chamber and adjustable toward or away from said opening, said nozzle and said opening being shaped to constitute a vaporizing valve, a steam coil extending into said chamber and having an outlet therein adjacent to said nozzle, a burner base under said chamber, and a tapered spreading member arranged at the outside of said opening and adjustable toward and away from the same, said nozzle having, outside of said drum, means for adjusting said nozzle, said base being extended under said coil.

7. A liquid fuel burner, comprising a base, a steam drum having an inverted cup-shaped member mounted upon said base, said drum

having an opening communicating interiorly with said member and being provided with a head, a fuel nozzle extending into said drum through said head and having the end formed to cooperate with said opening to form a vaporizing valve, said nozzle, outside of said drum, having an adjusting handle, said head being interiorly threaded, said nozzle having a portion threaded to correspond to the interior thread of said head, a fuel inlet communicating interiorly with said head and said nozzle, a steam coil arranged above said base and having within said drum a ring surrounding said nozzle, said ring having outlet openings at the inner side, and a tapered spreading member arranged upon said base and extending into said cup-shaped member, said spreading member being adjustable toward and away from said opening.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOHN JAY VALLIER.

Witnesses:

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ANNA CUNNINGHAM.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."