

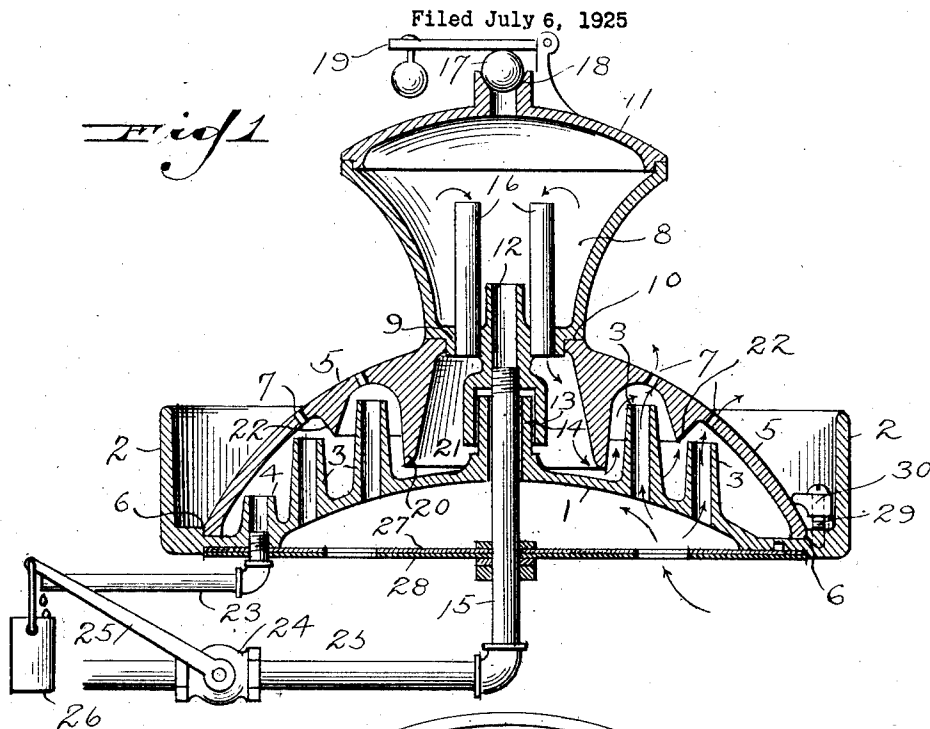
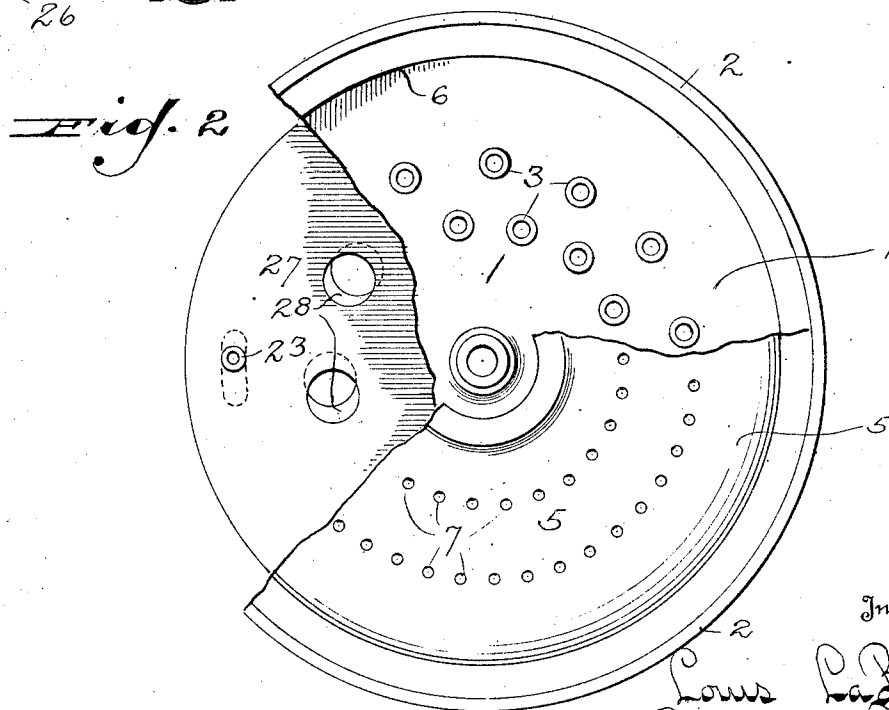
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OIL BURNER

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OIL BURNER.

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My invention relates to hydrocarbon fuel burners and more particularly to an oil burner of the vapor generator type wherein the oil is vaporized by being preheated, and the vapors subsequently intermixed with air to form the combustible mixture.

In the present invention there is contemplated a dome shaped mixing chamber, surmounted by a vaporizing chamber to which the liquid fuel is conducted, and wherein it is subjected to the heat of combustion of the previously vaporized fuel. Vapor conduits lead downward from the upper portion of the vaporizing chamber to the mixing chamber. Projecting upwardly from the bottom of the mixing chamber, and opening therethrough, are a plurality of air inlet nozzles extending into proximity to the burner openings for the combustible mixture in the dome of the mixing chamber. Interiorly the mixing chamber is provided with dependent baffles which compel the vapors to descend below the tops of the air inlet nozzles, passing close to the bottom of the mixing chamber and between the air nozzles in its course to the vent openings. This insures the thorough mixing of the fuel vapors and the air in proper proportions, and the deposit of any entrained particles of liquid fuel or unvaporized oil. The bottom of the chamber being dome shaped, drains the deposited liquid fuel to the outer margin of the burner where an overflow outlet is provided. Provision is made for automatically shutting off the fuel supply in the event that the deposit and overflow of liquid fuel from the mixing chamber becomes excessive, and a safety valve provides for relief of excessive vapor pressure. An adjustable regulating plate is provided to control the admission of air to the mixing chamber, in order that the fuel vapors and air may be intermixed in proper proportion.

The object of the invention is to simplify the construction as well as the means and mode of operation of such hydrocarbon fuel burners, whereby they will not only be cheapened in construction but will be more efficient in operation, automatic in action, easily controlled and unlikely to get out of repair.

A further object of the invention is to provide a burner in which the fuel will be thoroughly consumed, leaving a minimum of soot and residue.

A further object of the invention is to provide a burner having parts of simple design, easily accessible and necessitating a minimum amount of machine operations in the manufacture.

With the above primary and other incidental objects in view as will more fully appear in the specification, the invention consists of the features of construction, the parts and combinations thereof and the mode of operation, or their equivalents, as hereinafter described and set forth in the claims.

In the accompanying drawings wherein is shown the preferred, but obviously not necessarily the only form of embodiment of the invention. Fig. 1 is a vertical sectional view of the assembled hydrocarbon fuel burner forming the subject matter hereof. Fig. 2 is a top plan view, partly broken away, of the assembled burner.

Like parts are indicated by similar characters of reference throughout the several views.

While the present burner is especially designed for domestic use in furnaces and stoves, it is not limited to such use but may be applied to industrial purposes, in any sort of installation wherein a burner for liquid fuel is desired.

In constructing the burner there is employed a base 1 of convex form, and is surrounded by a standing flange 2. Projecting upward from the base are a plurality of tubular nozzles 3—3 the bores of which extend through the base 1 to the atmosphere. These air inlet nozzles 3 are arranged in spaced relation, either in concentric circles as shown in Fig. 2 or in haphazard relationship as may be found convenient or desirable.

At one side of the base 1 in proximity to the marginal flange 2 is a standing nipple or nozzle 4 of less height than the air nozzles 3 which forms an overflow drain for unvaporized fuel which may be deposited in the mixing chamber of the burner.

Overlying the base 1 and enclosing the air inlet nozzles 3—3 is a perforated dome 5, the margin of which rests in an annular rabbet 6 in the base 1 adjacent to the marginal flange 2. The dome 5 is of such curvature as to afford between the dome and base an intermediate mixing chamber in which are enclosed the air inlet nozzles 3.

The dome 5 is provided with a multitude of perforations 7, through which the combus-

tible mixture of vapor and air passes to be burned upon the outside of the dome 5.

At the apex of the dome 5 is formed a circular opening in which is seated a vaporizing chamber 8. The base 9 of the chamber 8 is formed with a marginal rabbet 10, in which the margin of the central opening of the dome 5 engages. The vapor chamber 8 is of an inverted bell shape, and is provided with a removable top 11.

Projecting centrally within the chamber 8 from the bottom 9 thereof, is a hollow stud of inlet nozzle 12 for the liquid fuel. A continuation of the fuel inlet nozzle of stud 12 extends at 13 below the bottom 9 of the vaporizing chamber, into the mixing chamber. The lower end of this extension 13 is counter bored to receive loosely the end of a hollow boss or hub 14, projecting upwardly from the base 1. Such loose connection compensates for expansion and contraction of parts. The fuel supply conduit 15 is threaded within the extension 13 of the inlet nozzle.

Extending through the bottom 9 of the vaporizing chamber and to points well above the terminal of the fuel inlet nozzle 12 are two or more vapor conduits 16 leading from the vaporizing chamber to the mixing compartment.

At the top of the vaporizing chamber 8 there is provided a safety vent, which for illustrative purposes has been shown controlled by a simple ball valve 17 resting upon a tapered seat 18 to which it is normally held by a weighted lever 19. Normally the valve remains closed. It is provided only for emergency use, in the event that the burner should for any reason become clogged, or the escape of the generated vapors through their usual channels be otherwise interrupted. In such event the accumulation of vapors under abnormally high pressure would be automatically relieved by the temporary unseating movement of the valve. Normally however the liquid fuel entering through the conduit 15, overflows the nozzle 12 into the bottom of the vaporizing chamber. The chamber 8, is subjected to intense heat of combustion of the vaporized mixture discharged through the perforations 7 of the dome 5. The liquid fuel is vaporized within the chamber 8. The vapors pass downward through the conduits 16, of which there are preferably four, into the mixing chamber intermediate the base 1 and dome 5.

The under side of the dome 5 is provided with an annular dependent baffle flange 20, which extends into proximity to the base 1, and hence well below the level of the tops of the air inlet nozzles 3. This baffle 20 forms beneath the dome 5 a central distributing compartment 21 which is in direct communication with the generating chamber 8

through the conduits 16, and from which the vapors pass beneath the baffle flange to all parts of the mixing chamber. The air supply entering the mixing chamber does so above the level of the entering fuel vapors. By entering the fuel vapors beneath the air supply it is found that a better and more uniform mixture is effected. Projecting from the under side of the dome 5 in proximity to the outermost series of air inlet nozzles is a second dependent baffle flange 22, which tends to direct downward below the level of the air inlet orifices any vapors which may have followed the under side of the dome 5. This baffle 22 possesses the further function of arresting and diverting to the outlet orifices 7 any vapors which may arise from the margin of the mixing chamber as a result of revaporization of condensed fuel, or of fuel particles which may enter the mixing chamber in a liquid form.

Any entrained particles of liquid fuel, or heavy portions which may be carried through the vapor conduits 16 from the vaporizing chamber 8 into the mixing chamber will be deposited in the bottom of such chamber along with any fuel condensation. Because of the convex form of the base 1, such fuel deposits will be drained to the outer margin of the mixing chamber. The separation of such heavy, or unvaporized portions of fuel is one of the purposes of the baffles 20 and 22. A considerable portion of such fuel deposit will be vaporized by the heat of the burner and will pass upward within the mixing chamber for intermixture with the air supply and escape through the perforations 7, to be consumed on the exterior of the dome 5.

Any excess accumulation of liquid fuel, whether of non volatile character, or due to over supply of fuel or insufficient vaporization, is drained from the mixing chamber through the overflow outlet 4.

Such overflow may be conducted through a pipe 23 back to the source of fuel supply, or to a suitable waste receptacle.

As a safety precaution, in the event that the burner should be accidentally extinguished, and the fuel continue to flow, such fuel overflow from the outlet 4 may be utilized to operate an automatic cut off valve in the fuel supply conduit 15.

As a conventional form of automatic cut off, there is shown in the conduit 15 an ordinary form of cut off valve 24, provided with an elongated operating lever 25. On the extremity of the lever 25 is a bucket or other receptacle 26, into which the overflow conduit 23 discharges. When the valve 24 is in its normal open position the operating lever is elevated, as shown. When, however, through accident or otherwise, the overflow of fuel from the burner becomes excessive, the weight of such excess fuel as

it accumulates in the bucket or receptacle 26 will depress the valve lever 25 and so shut off the fuel supply through the conduit 15.

As a means of regulating the air supply, to the mixing chamber, two perforated diaphragms 27 and 28 are provided beneath the concavo-convex base 1. The inner diaphragm 27 is stationarily secured to the burner base 1. The outer member 28 is revolvably mounted upon the supply conduit 15, permitting the perforations of the respective diaphragms to be moved into and out of registry to greater or less degree. Due to the concavity of the base 1, there is formed intermediate the base and the diaphragms 27—28 an air equalizing chamber, from which the air supply nozzles 3—3 lead to the mixing chamber. This insures even distribution of air to all parts of the burner and its uniform mixture with the fuel vapors. The dome 5 is held in position upon the base 1 by clamp studs 29 carrying overhanging heads 30 which loosely engage the dome 5 to retain it in position while permitting expansion and contraction without undue strain of the parts.

The standing flange 2 forms a gutter extending peripherally about the burner to receive a priming charge of fuel, by the combustion of which the burner is heated sufficiently to initiate its automatic generation of vapors.

From the above description it will be apparent that there is thus provided a burner of the character described, possessing the particular features of advantage before enumerated as desirable, but which obviously is susceptible of modification in its form, proportion, detail construction and arrangement of parts without departing from the principle involved, nor sacrificing any of its advantages.

While, in order to comply with the statutes, the invention has been described in language more or less specific as to structural features, it is to be understood that the invention is not limited to the specific details shown, but that the means and construction herein described comprises the preferred form of several modes of putting the invention into effect, and the invention is, therefore, claimed in any of its forms or modifications within the legitimate and valid scope of the appended claims.

Having thus described my invention, I claim:—

1. In a hydro-carbon fuel burner, two concavo-convex plates of different curvature superposed one upon the other to form an intermediate mixing chamber, a plurality of spaced vent perforations in the upper plate, a plurality of air inlet ducts extending through the lower plate and into proximity to the perforations of the upper plate, a vaporizing chamber to which liquid fuel

is supplied, a vapor conduit leading therefrom and discharging into the mixing chamber, and baffles in said mixing chamber directing the fuel vapors below the discharge orifices of the air inlet ducts whereby the air supply will be discharged between the vapor fuel supply and the vent perforations.

2. In a hydro-carbon fuel burner, two concavo-convex plates of different curvature superposed one upon the other to afford an intermediate mixing chamber, a plurality of perforations in the top plate for the escape of the combustible fuel mixture, air inlet jets extending through the lower plate, an air equalizing chamber beneath the lower plate common to all the air inlet jets, means for regulating the admission of air to said equalizing chamber, a vaporizing chamber to which liquid fuel is supplied and a vapor passage from the vaporizing chamber to the mixing chamber.

3. In a hydro-carbon fuel burner, two concavo-convex plates of different curvature superposed one upon the other to form therebetween a mixing chamber, a plurality of spaced perforations in the upper most plate, a plurality of spaced jet nozzles projecting upwardly from the lower most plate, a baffle dependent from the upper plate to a plane below the discharge openings of said jet nozzles, a vaporizing chamber, means for introducing vapors therefrom into the space intermediate the plates wherein the vapors are directed by said baffle below the entering air supply from said jet nozzles and means for regulating the air supply.

4. In a hydro-carbon burner, a pair of concavo-convex plates of different curvature superposed one upon the other, a plurality of vent perforations in the uppermost plate, a plurality of air jet nozzles projecting upward from the lower plate, a peripheral standing flange upon the lower plate forming an annular gutter, and means for introducing superheated fuel between said plates for intermixture with the air to form a combustible mixture.

5. In a hydrocarbon fuel burner, a chamber having a perforated top, a plurality of air inlet jet nozzles projecting within the chamber from the bottom thereof into proximity to the perforated top, a vaporizing chamber, a centrally disposed compartment within the chamber anteriorly of said perforations and jet nozzles, the walls of which extend into closely spaced relation with the bottom of the chamber and terminate below the level of the discharge orifices of said jet nozzles and a vapor conduit leading from the vaporizing chamber and discharging into said central compartment of the burner chamber.

6. In a hydro-carbon fuel burner, two concavo-convex plates superposed one upon the other to form an intermediate mixing cham-

ber, the upper plate having therein a plurality of spaced perforations, a plurality of air inlet jet nozzles projecting upward from the lower plate intermediate the said plates, a vaporizing chamber superposed upon said concavo-convex plates, a supply conduit for liquid fuel leading to the vaporizing chamber a vapor conduit extending through the bottom of the vaporizing chamber to a point adjacent the top thereof and communicating at its lower end with the space between said plates wherein the vapors are intermixed with the air admitted through the jet nozzles for combustion through the perforations of the upper plate.

7. In a hydro-carbon fuel burner, a mixing chamber having a perforated top wall, means for admitting air to said chamber, a vaporizing chamber mounted upon the top of the mixing chamber and separated therefrom, a fuel supply conduit leading through the mixing chamber to the vaporizing chamber, and terminating in elevated relation above the bottom thereof, vapor conduits elevated above the terminal of the supply conduit projecting through the bottom of the vaporizing chamber, and discharging thence downwardly, an annular dependent flange centrally disposed within the mixing chamber interiorly of said perforations and air admission means, said flange terminating in spaced relation with the bottom of the mixing chamber into which the vapor conduits discharge, and below the lower margin of which the vapor passes into the perforated portion of the mixing chamber.

8. In a hydro-carbon fuel burner, the combination with a concavo-convex mixing chamber having a perforated convex top wall, and means for admitting air thereto, of a vaporizing chamber subjected to the heat of combustion of the fuel mixture discharged through said perforations, a vapor conduit from said vaporizing chamber to the concave bottom of the mixing chamber, a dome shaped compartment within the mixing chamber into which the vapor conduit discharges, said compartment communicating through its bottom with the perforated portion of the mixing chamber, said vapor conduit extending within the vaporizing chamber and terminating adjacent the top thereof, and means for supplying liquid fuel to the vaporizing chamber.

9. In a fuel burner of the character described, a concavo-convex mixing chamber, a plurality of air inlet jet nozzles extending within the chamber from the concave bottom thereof, said chamber having a plurality of vent perforations in the convex top thereof for the combustible mixture, a central compartment in said chamber interiorly of said jet nozzles and vent perforations for receiving fuel vapors, said compartment communicating with the interior of the mix-

ing chamber adjacent to the bottom thereof and below the level of the discharge orifices of the air inlet nozzles, and means for supplying fuel vapors to said central compartment.

10. In a fuel burner of the character described, a mixing chamber having a perforated domed top, a series of air ducts extending through the bottom of the chamber and terminating within the chamber in proximity to the perforated top thereof, a centrally disposed compartment within said chamber open at its bottom through which it communicates with the surrounding portion of the chamber having the perforation therein from which fuel vapors are distributed to the surrounding perforated portions of the chamber, a vaporizer and means for supplying fuel vapors to said central compartment.

11. In a fuel burner of the character described, a dome shaped mixing chamber having a perforated top, a central compartment therein, outside which the perforations are located and which communicate with the perforated portions of the chamber through the bottom of the compartment, an inverted bell shaped vaporizing chamber resting upon the domed mixing chamber and surrounded by the perforated top area thereof, a vapor conduit extending within the vaporizing chamber and affording communication between the top of the domed mixing chamber and the top of the vaporizing chamber, and means for supplying liquid fuel to the vaporizing chamber.

12. In a fuel burner of the character described, a mixing chamber having a perforated top, means for admitting air to said chamber, a dependent annular flange forming a central compartment within the chamber having communication beneath said dependent flange with the surrounding portion of the mixing chamber and means for supplying fuel vapors to said central compartment, the vapors being distributed thence below the lower margin of the dependent flange to the perforated portion of the chamber.

13. In a fuel burner of the character described, a mixing chamber having a dome shaped top, a plurality of concentric dependent flanges on the under side of said domed top of the chamber, said top having therein a series of perforations communicating with the recesses formed by the flanges, a plurality of upstanding tubular nipples projecting within the mixing chamber from the bottom thereof and terminating within the recesses formed by said flanges, said tubular nipples forming air inlets through the bottom of the chamber and means for supplying fuel vapors to the interior of the mixing chamber.

14. In a fuel burner of the character de-

scribed, a mixing chamber having a perforated top, a plurality of dependent flanges on the under side of the top of the chamber forming inverted recesses with which the 5 perforations communicate, a series of up-standing tubular jet nozzles projecting from the bottom of the chamber within the recesses formed by the flanges, and a fuel vapor conduit discharging into the chamber at a point separated from the perforations 10 and discharge orifices of the jet nozzles by the interposed dependent flanges.

In testimony whereof, I have hereunto set my hand this 27th day of June, A. D. 1925.

LOUIS LA BRANCH.