

March 6, 1951

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2,543,980

VAPORIZING TYPE LIQUID FUEL BURNER

Filed Feb. 15, 1947

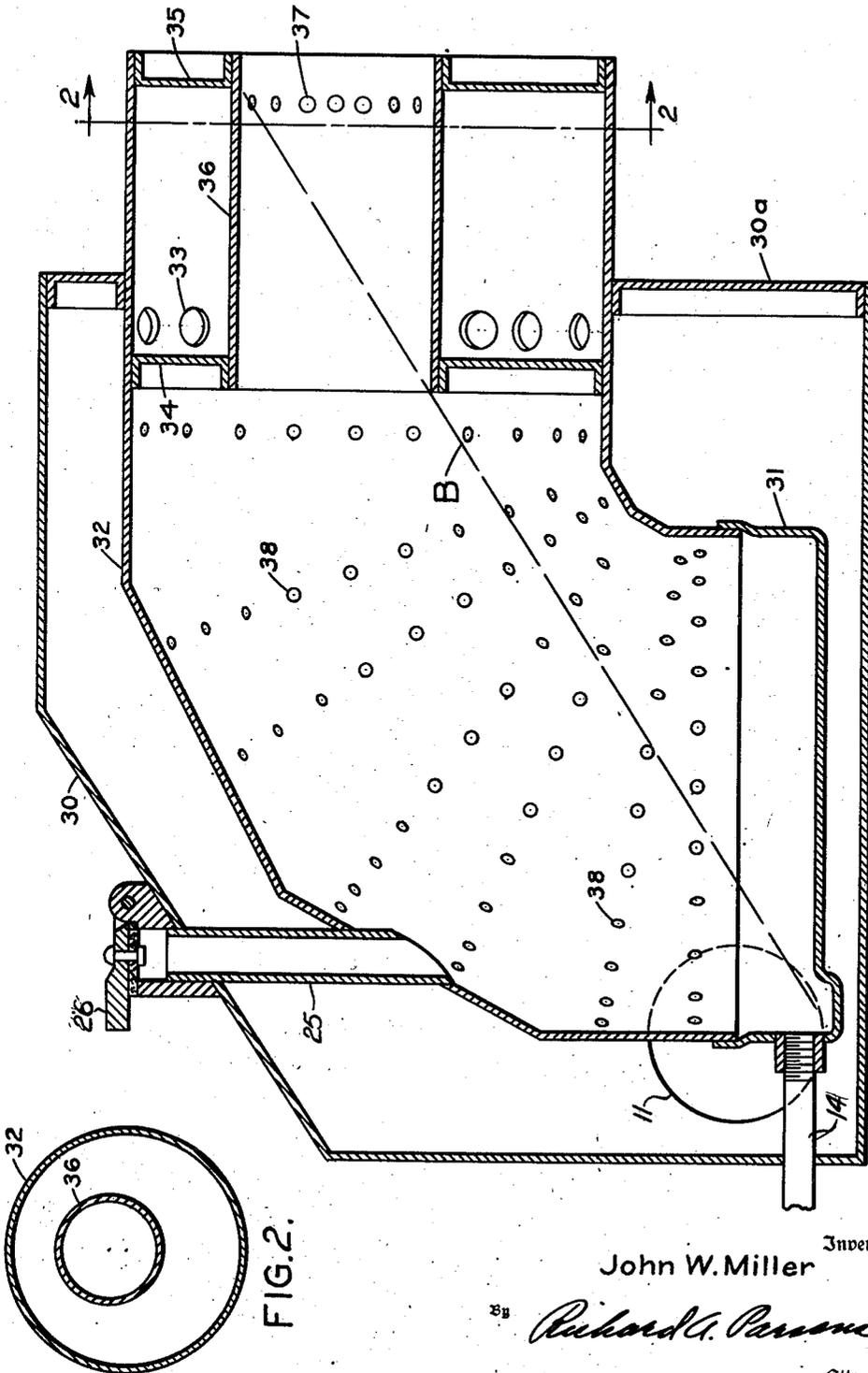


FIG. 1.

FIG. 2.

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# UNITED STATES PATENT OFFICE

2,543,980

## VAPORIZING TYPE LIQUID FUEL BURNER

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Application February 15, 1947, Serial No. 728,848

4 Claims. (Cl. 158—91)

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This invention relates to liquid fuel burners and more particularly to those of the vaporizing type.

In general, vaporizing burners are those in which fuel in liquid form flows onto the bottom wall of the burner, is vaporized, mixed with air, and burned; combustion occurring in most stages of operation, remote from the bottom wall. Fuel is admitted through an inlet in a wall of the burner and spreads over the burner bottom wall from the inlet. Except in rare instances the fuel does not wholly cover the bottom wall, but is vaporized before it does so. Thus there is nearly always a portion of the burner bottom wall which is dry. The portion of the burner bottom wall covered by fuel oil is nearly always cooler than the dry portion, because of the cooling and insulating effect of the incoming fuel.

Burners of the vaporizing type are very sensitive to changes in the temperature of the burner bottom wall, a relatively small temperature change causing a great difference in the generation of fuel vapors. It is desirable, therefore, to maintain the temperature of the burner bottom wall as uniform as possible. It is also desirable to keep the bottom wall as cool as possible, but without cooling it so much as to interfere with the proper generation of fuel vapors. By so doing, fuels of differing characteristics can be more efficiently burned.

Accordingly, the principal object of the invention is to improve the operation of burners of the vaporizing type by controlling the temperature of the burner bottom wall.

This object is attained by shielding the bottom wall of the burner by baffle means which obscures the bottom wall from the direct radiant heat rays emanating from the flame at the discharge opening in the burner.

In the drawings:

Figure 1 is a cross-sectional view of a burner embodying the present invention;

Figure 2 is a cross-sectional view on a reduced scale taken on substantially the line 2—2 of Figure 1.

The burner comprises an outer casing 30 having an upright front wall 30a, and a flat bottom. The outer casing 30 is sealed from the atmosphere except for a large air intake opening 11 formed in a side wall thereof. The burner located within the casing 30 comprises a burner bottom 31, and an elbow shaped tubular side wall 32. The tubular side wall 32 is extended a substantial distance beyond the upright front wall 30a of the casing 30 through which the side wall extends. The bottom 31 is adapted to con-

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tain liquid fuel introduced from a source (not shown) into the burner through a pipe 14 controlled by a suitable valve (not shown).

The tubular side wall is provided with primary air inlet openings 33. A plurality of relatively large air inlet openings 33 are formed in the side wall 32 adjacent the point where the side wall extends through the front wall 30a of the casing 30. An annular ring 34 is inserted into the side wall 32 just inside of the air inlet openings 33. A similar ring 35 is positioned within the free end of the side wall 32.

A cylindrical tube 36 which forms the discharge opening from the burner is connected to the inner perimeters of the rings 34 and 35. A plurality of secondary air inlet openings 37 are formed in the tube 36 just inwardly of the ring 35. Provision is made for igniting the fuel in the burner through a tube 25. The tube 25 extends downwardly through the upper portion of the casing 30 and the tubular side wall 32 of the burner. The tube is normally closed by means of a hinged cap 26.

Fuel is admitted to the burner through pipe 14. It is vaporized on the bottom of the burner and mixed with primary air entering through the primary air openings in the burner side wall, but does not at the high fire stage produce a combustible mixture. As the mixture of air and fuel vapors leaves the tube 36 it is mixed with secondary air entering through the openings 33 and the secondary air inlet openings 37 where a combustible mixture is formed and flame is initiated. The flame then issues from the mouth of the tube 36. At the high fire stage of operation combustion does not occur except at the discharge opening from the burner where the openings 37 are located. Thus it will be seen that the tube 36 shields the bottom of the burner and the surface of the oil thereon from direct radiant heat rays of the flame, because the flame issuing from the mouth of the burner cannot "see" the bottom of the burner. This is shown by the flat plane (indicated by the broken line B) extending from the bottom of the burner directly beneath the fuel inlet past the inner edge of tube 36 which intersects the tube 36 along a line located inwardly of the discharge opening or right hand end of tube 36.

Heretofore the description of the operation of the burner has dealt with only the "high fire" stage. It should not be assumed from such description that the burner cannot be operated at stages lower than high fire. In fact the burner disclosed herein can be satisfactorily operated at

less than maximum capacity by decreasing the flow of fuel to the burner. When the burner is operating at the lower stages, combustion will be initiated inside of the burner. However, when the burner is operating at less than high fire capacity there is less need to shield the entire surface of the fuel from the fire.

While the fuel inlet in the burner described has been located at the side opposite the discharge opening, it will be obvious that such a location is not essential to the full realization of the invention. The fuel may be introduced into the burner at any point in or around the bottom wall.

From the foregoing it will be seen that the present invention provides a simple burner which can be utilized to effectively burn fuel oils having varying characteristics.

The scope of the invention is indicated in the appended claims.

I claim:

1. A burner of the vaporizing type comprising a horizontal bottom wall forming a fuel receptacle, a substantially unobstructed tubular side wall connected thereto and extending upwardly and laterally therefrom, said side wall having a plurality of air inlet openings therein and located throughout said tubular side wall, an end wall connected to said side wall remote from said bottom wall and having a relatively large discharge opening therein, an elongated horizontal tube having its inner end in said discharge opening and connected to said end wall, said horizontal tube extending from said end wall in a direction away from said bottom wall, the outlet end of said horizontal tube being located such that any line passing through the said outlet end of said horizontal tube and any point on substantially the entire surface of the bottom wall of said fuel receptacle will intersect the bottom of said horizontal tube whereby the said bottom wall is shielded from the direct radiant heat of the flame at or beyond said outlet end.

2. A burner of the vaporizing type as defined in claim 1 wherein said tube is provided with a plurality of secondary air inlet openings adjacent the outlet end thereof.

3. A burner of the vaporizing type comprising a bottom wall forming a fuel receptacle, a substantially unobstructed tubular side wall connected thereto and extending upwardly and laterally therefrom, said side wall having a plurality of air inlet openings therein and located throughout said tubular side wall, an end wall connected to said side wall remote from said bottom wall and having a relatively large discharge opening therein, a laterally extending horizontal tube having its inner end positioned in said discharge opening, the outer end of said tube being located laterally from the inner end of said tube a distance such that any line passing through said outer end and any point on substantially the entire surface of the bottom wall of said receptacle will intersect the bottom of said horizontal tube whereby when the vaporized fuel is burning at the outlet end of said tube direct transmission of radiant heat rays between the outer end of the tube and the bottom wall is precluded.

4. A burner of the vaporizing type as defined in claim 3 wherein the external diameter of the tube is substantially the same as the diameter of the discharge opening in the end wall and said tube is provided with a plurality of secondary air inlet openings adjacent the outer end thereof.

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#### REFERENCES CITED

The following references are of record in the file of this patent:

#### UNITED STATES PATENTS

Number	Name	Date
1,648,041	Button	Nov. 8, 1927
2,067,783	Nunn, Jr.	Jan. 12, 1937
2,263,737	Miller et al.	Nov. 25, 1941
2,361,912	Breese	Nov. 7, 1944
2,391,567	Hager	Dec. 25, 1945
2,392,757	Miller	Jan. 8, 1946
2,396,813	Breese	Mar. 19, 1946
2,409,677	Grottenhouse	Oct. 22, 1946
2,425,026	Breese	Aug. 5, 1947