Jan. 1, 1929. 1,697,687

L. LOCKWOOD

OIL BURNING HEATER

Filed March 27, 1928

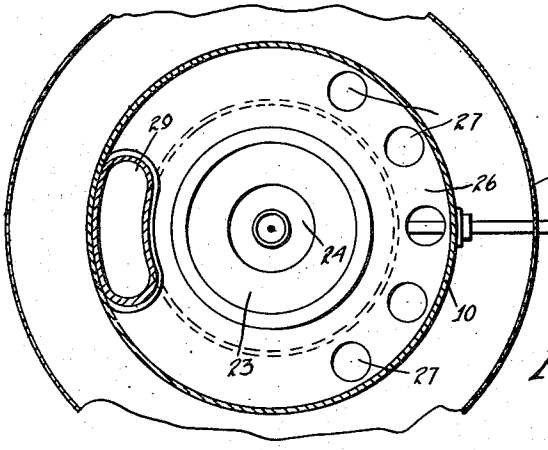



Fig. 2.

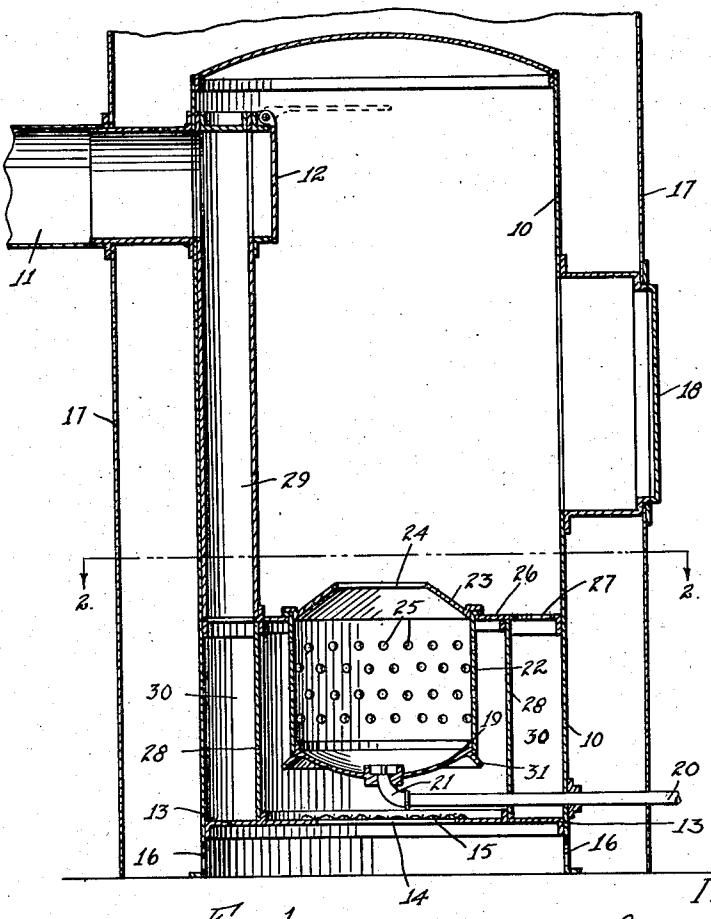



Fig. 1.

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# UNITED STATES PATENT OFFICE.

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## OIL-BURNING HEATER.

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My invention relates to that class of oil burning heaters in which a quantity of fuel oil is maintained in a shallow bowl fed from the bottom, and the oil is vaporized from the surface of the oil body by heat from the combustion.

My object is to provide a heater of this class with means whereby a quantity of oil contained in the oil bowl at the bottom will be constantly maintained in a relatively cool condition to thereby prevent the formation and deposits of carbon within this bowl which would tend to clog the oil in the delivery nozzle, and at the same time provide means for greatly increasing the relative heat of the air being delivered to the combustion chamber to thereby materially increase the vaporization and combustion of the oil from the surface of the oil bowl.

My invention consists in the construction, arrangement and combination of the various parts of the heater, whereby the objects contemplated are attained, as hereinafter more fully set forth, pointed out in my claims, and illustrated in the accompanying drawings, in which:

Figure 1 shows a vertical central sectional view through a furnace embodying my invention; and

Figure 2 shows a horizontal sectional view on the line 2—2 of Figure 1.

Referring to the accompanying drawings, I have used the reference numeral 10 to indicate generally the heater drum, preferably cylindrical and in an upright position. From this heater drum near the top a flue pipe 11 is projected, and this pipe where it enters the drum is provided with a damper 12. The bottom of the flue drum is indicated by the numeral 13 and is provided with a central opening at 14, preferably covered by a screen 15. The furnace wall below the bottom 13 is formed with air circulating openings 16. The entire heater may be provided with an enclosing jacket 17, and the heater preferably has an entrance door 18 to provide access to the interior of the heater.

Mounted within the heater near its bottom is an oil bowl 19 supplied by an oil pipe 20 through a nozzle 21. These parts are of the ordinary construction.

Above the bowl 19 is a cylindrical combustion chamber 22, preferably having a cone shaped upper end 23 with a discharge opening 24. The sides of the combustion chamber 22 are formed with perforations 25. This combustion chamber also is of the ordinary construction, and heretofore it has been customary to have the products of combustion pass from this chamber directly to the flue.

My improvement in heaters of this type consists in providing a horizontal partition 26 extended across the heating drum at about the top of the combustion chamber, and formed at its front edge with a series of air circulating openings 27. Below this partition 26 is a cylindrical partition 28 spaced apart from the drum 10 and also from the combustion chamber, and extending completely around the interior of the heater.

At the side of the heating drum adjacent to the flue, I have provided an upright auxiliary flue 29, extended through the partition 26 and in communication with the chamber 30 formed between the partition 28 and the drum 10.

I have also provided a deflector plate 31 extended from the bottom of the bowl 19 downwardly and outwardly all around the bowl. This deflector plate 31 performs two advantageous functions. When the heater is in operation and the air for combustion purposes is being drawn into the heater, this cold air will impinge directly upon the bottom of the bowl 19 and will be delayed in its passage upwardly by this deflector plate, to thereby provide a maximum amount of cooling to the bottom of the bowl. In addition to this, this deflector plate directs the cold incoming air toward the bottom of the partition 28, so that cold incoming air strikes this partition and is heated by radiation inwardly from the partition 28 during its passage upwardly between the partition 28 and the combustion chamber 22. Hence by the time the incoming air is delivered into the combustion chamber its temperature will have been raised to a considerable extent and this heated air is then discharged through the openings 25 directly toward the center of the bowl 19, as is well known, heated air will vaporize the fuel oil more rapidly and thoroughly than will air of lower temperature.

Hence, the double purpose is accomplished of maintaining the bottom of the oil bowl at a comparatively low temperature, and at the same time vaporize the oil from the surface of the bowl with air of relatively high temperature.

In practical operation, and when the heater is being started, the damper 12 is opened and

the products of combustion from the combustion chamber will pass directly to the flue. As soon, however, as the heater is sufficiently warmed by this combustion, the damper 12 is closed, whereupon the heat rising from the combustion chamber passes first upwardly to a point near the top of the heater drum, and is then deflected downwardly through the openings 27 in the partition 26, and passes adjacent to the partition 28 and from the front of the heater around in the chamber 30 to the flue 29 at the back of the heater, and then upwardly into the flue 29. During the time these products of combustion are passing in close contact with the partition 28, this partition will be heated to a considerable extent and the heat that is radiated from the partition 28 is applied to the incoming air to the combustion chamber and raises its temperature considerably, for aiding vaporization and combustion of the fuel from the surface of the fuel bowl. Obviously when the damper 12 is closed the products of combustion have an increased path of travel and apply heat to the bottom portion of the heater, thereby greatly increasing the amount of heat radiated from the heater.

I claim as my invention:

1. In an oil burning heater, the combination of a heater drum, a flue in communication with the heater drum, a damper for the flue, a bowl for receiving and retaining a quantity of fuel oil, a combustion chamber above the oil bowl, a substantially horizontal partition near the top of the combustion chamber and having air circulating openings formed in the front portion thereof, a cylindrical partition below the horizontal partition surrounding the combustion chamber and spaced apart from it, an auxiliary flue communicating with the chamber between the cylindrical partition and the heater drum, said flue being extended upwardly and in communication at its upper end with the main flue, and in such position that when the said damper is closed communication between the auxiliary flue and the main flue will remain open, said heater being also provided with means for admitting air for combustion purposes through the bottom of the heater and delivering same toward the bottom of the fuel bowl.

2. In an oil burning heater, the combination of a heater drum, a flue in communication with the heater drum, a damper for the flue, a bowl for receiving and retaining a quantity of fuel oil, a combustion chamber above the oil bowl, a substantially horizontal partition near the top of the combustion chamber and having air circulating openings formed in the front portion thereof, a cylindrical partition below the horizontal partition surrounding the combustion chamber and spaced apart from it, an auxiliary flue communicating with the chamber between the cylindrical partition and the heater drum, said flue being extended upwardly and in communication at its upper end with the main flue, and in such position that when the said damper is closed communication between the auxiliary flue and the main flue will remain open, said heater being also provided with means for admitting air for combustion purposes through the bottom of the heater and delivering the same toward the bottom of the fuel bowl; and a deflector plate at the bottom of the oil bowl extended downwardly and outwardly for retarding the circulation of the cold incoming air as it passes over the bottom of the fuel bowl and directing it toward the heated cylindrical partition to raise its temperature before entering the combustion chamber.

LEE LOCKWOOD.