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OIL BURNERS

Filed April 14, 1960

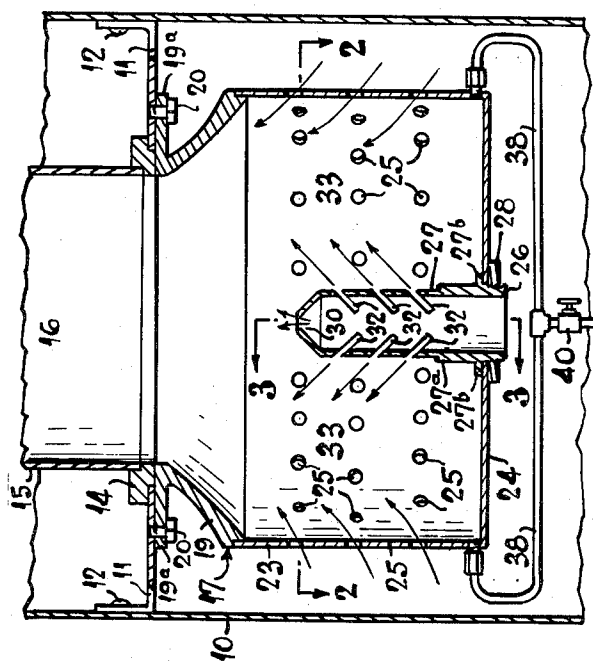


FIG. 1

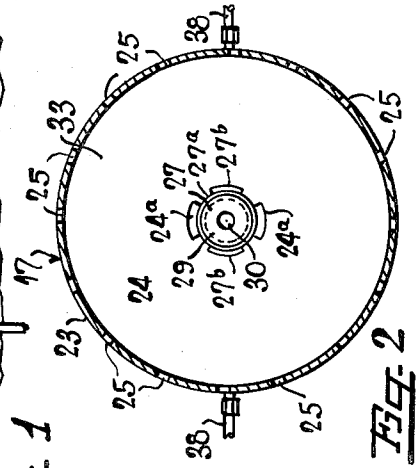


FIG. 2

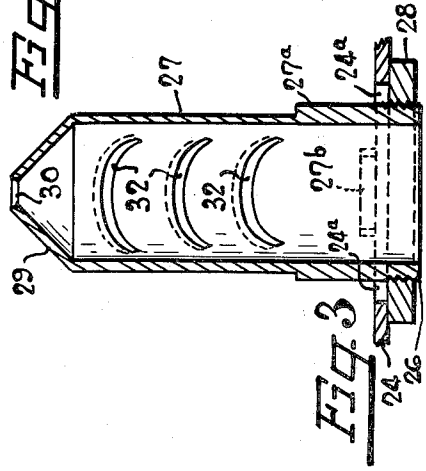


FIG. 3

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OIL BURNERS

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1 Claim. (Cl. 158—91)

This invention relates to a device for burning crude oil and the like and more especially to an oil burner adapted to produce heat for domestic and industrial purposes. The burner herein described is adapted to be arranged with respect to a combustion chamber of a furnace or stove in such a manner that the flame from the burner will enter and heat the chamber. From a structural standpoint, the invention comprises a novel arrangement of the parts of a tray-type burner in which a pair of concentrically arranged perforated tubular members extend upwardly from a flat bottom portion, and wherein that portion of the bottom between the concentric members receives the oil or fuel to be vaporized and burned. The space between the concentric members above the bottom portion serves as a combined vaporization and combustion chamber. Incomplete combustion and vaporization occurs in the lower portion of this space, but as the ignited vapors rise air is supplied in increasing quantites to produce a blue flame and complete combustion.

It is therefore an object of this invention to provide an oil burner having a novel arrangement of parts designed to increase the air intake and thereby decrease the fuel consumption.

It is another object of this invention to provide a burner of the class described wherein parallel sheets of air currents are directed from the central air distributor into the upper portion of the combustion chamber and toward the hottest part of the flame. Thus the air is caused to flow from a minimum number of orifices and along non-intersecting paths thereby reducing backdrafts caused by eddy currents and substantially improving the combustion processes.

It is a further object of this invention to provide an oil burner of the class described having its discharge end communicating with the lower end of the combustion chamber of a furnace or stove in combination with means for readily detaching the oil burner from the furnace or stove and also means for disassembling the burner elements whereby cleaning operations will be facilitated.

It is yet another object of this invention to provide an oil burner which is simple in construction, economical to manufacture, and which operates efficiently thereby reducing the accumulation of carbon.

Some of the objects of the invention having been stated, other objects will appear as the description proceeds when taken in connection with the accompanying drawings, in which—

FIGURE 1 is a vertical sectional view through one form of my improved oil burner showing the discharge end thereof arranged beneath the combustion chamber of a furnace or stove;

FIGURE 2 is a sectional plan view taken along line 2—2 in FIGURE 1, and

FIGURE 3 is an enlarged vertical sectional detail view taken along line 3—3 in FIGURE 1.

Referring more specifically to the drawings, the numeral 10 indicates an air jacket of a furnace or stove, said jacket having angle iron brackets 11 secured to the interior wall thereof as at 12. The outstanding legs of brackets 11 support a ring 14 upon which a pipe 15 is mounted, the ring and pipe being a portion of a conventional combustion chamber of a furnace or stove.

My improved oil burner 17 is arranged immediately beneath ring 14 with its upper discharge end communicating with the lower end of combustion chamber 16. The discharge end of the burner comprises a hollow substantially frusto-conical ring 19 having an outwardly extending flange 19*a* integral with its smaller upper end, the upper surface of said flange being detachably secured in face-to-face contact with the lower surfaces of brackets 11 and ring 14 by suitable means such as stud bolts 20. A cylindrical member 23 has its upper end secured to the lower enlarged end of the frusto-conical ring 19 and the lower end of member 23 is closed by a flat horizontally disposed plate 24 upon which fuel oil is deposited for burning.

The bottom 24 has a notched centrally disposed bore therein, which bore is penetrated by the lower threaded portion 26 of inner tubular member 27. Member 27 is detachably secured in position with respect to the notched bore by means of an enlarged base portion 27*a* having radial lugs 27*b* integral therewith, and also by means of a nut 28 on the threaded portion 26 which projects below the bottom. Member 27 may be detached by first loosening nut 28 and then rotating the member 90 degrees until lugs 27*b* coincide with notches 24*a* of the centrally disposed bore in bottom 24 (FIG. 3).

Integral with the upper end of inner tubular member 27 is a frusto-conical top portion 29 having opening 30 at its apex. The annular space 33 between members 23 and 27 serves as a combined vaporization and combustion chamber for the fuel deposited upon bottom 24.

In order to supply air to chamber 33, the walls of outer cylindrical member 23 are provided with perforations 25 through which air is directed inwardly. The sizes, number and spacing of perforations 25, taken in conjunction with slots 32 of member 27, are such as to insure proper combustion at the various levels in combustion chamber 33.

Similarly, the walls of inner tubular member 27 are provided with slots 32 therein, which slots lie in parallel planes, each forming an acute angle with the bottom 24. In the drawings, the planes intersect respectively along diameters of the inner cylindrical member or air distributor 27 and form dihedral angles, each of which is substantially bisected by the vertical center line of the tubular member 27, thus causing the air to be directed outwardly and upwardly in sheets from the center of the tubular member and respectively above fuel inlets 38 to be later described. More specifically, the air is directed upwardly through the interior of member 27, through opening 30 and slots 32, and into annular chamber 33 simultaneously with the flow of air radially inwardly into the chamber through perforations 25.

It will be noted by observing FIGURES 1 and 3 that the inner opposing faces of each inclined slot 32 are parallel. Furthermore, the width and angularity of each slot are so related to the wall thickness of the cylindrical body 27 that the air will be confined along a single plane while travelling through the wall. Since the slots 32 are vertically spaced in the wall of member 27 and since they are arranged parallel one with another and also positioned at right angles to a vertical plane passing through the vertical axis of member 27 and through fuel orifice 38, it will be apparent that the air will emit from member in the planes of the respective slots and substantially radially of member 27. The maximum slope of the emitting air will occur at the vertical plane and directly above the fuel orifice, thereby affording the most direct upward resistance to downdrafts along the critical area of inflowing fuel. The slope of the air emitting from each slot will decrease in proportion to its distance from said vertical plane.

Simultaneously with the above-described currents of air a fuel such as crude oil is fed radially inwardly beneath the upwardly and outwardly flowing sheets of air

and into the lower portion of chamber **33**. The fuel flows onto the flat upper surface of plate **24** from circumferentially arranged pipes **38**, there being one pipe **38** for each set of parallel slots **32**. The fuel which is deposited upon plate **24** is vaporized and ignited to produce a blue flame thereabove.

The above-described relationship between fuel pipes **28**, perforations **25**, and slots **32** shields the lower portions of the flame at the points of entry of the fuel from excessive drafts while directing the major portion of the air toward the upper portion of the flame. I have found that burners constructed in accordance with the principles of this invention will burn from 20% to 35% less fuel oil than conventional types, thus effecting a substantial economy in fuel costs.

At the bottom of chamber **33** the combustion is incomplete, but as the ignited vapor rises the respective inwardly and outwardly projecting streams of air are supplied in proper quantities through openings **25** and **32** to substantially complete the combustion at the upper portion of the chamber. The converging frusto-conical ring member **19** directs the gases and upper portion of the flame into chamber **16** of the stove or furnace.

The flow of fuel through pipes **38** into annular combustion chamber **33** may be regulated by suitable means such as control valve **40**. Also, the flow of air into chamber **33** may be the result of either a natural or forced draft, depending upon the conditions of operation.

In the drawings and specification preferred embodiments of the invention have been disclosed, and although specific terms are employed they are used in a generic sense and not intended for purpose of limitation, the scope of the invention being set forth in the following claim.

I claim:

An oil burner comprising an elongated vertically disposed perforated body, a bottom for said body, said bottom having a substantially horizontal upper surface, a second elongated hollow body comprising a vertical

cylindrical wall positioned within said first body with the outer surface of said wall spaced laterally from the inner surface of the first body to thereby provide a combustion chamber above said bottom and between the proximate wall surfaces of the respective bodies, said hollow body having an open lower end and a substantially restricted upper end portion, and means adjacent said upper surface and including at least one orifice in said first body for directing fuel horizontally inwardly toward said second hollow body and upon the latter surface, the vertical wall of said cylindrical hollow body being imperforate except for at least one set of vertically spaced slots, and the inner opposing walls of each of said slots lying respectively in parallel planes, said planes being positioned substantially at right angles to a vertical plane passing through the horizontal axis of the fuel orifice and through the vertical axis of the hollow body, said parallel planes also being inclined upwardly at an acute angle to said horizontal orifice axis, whereby when a draft is induced across the burner the combined forces of the parallel sheets of air will be initially directed outwardly and upwardly in opposition to downdrafts upon the path of inwardly directed fuel.

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