Dec. 28, 1943. E. L. McCURTAIN 2,337,673

OIL BURNER

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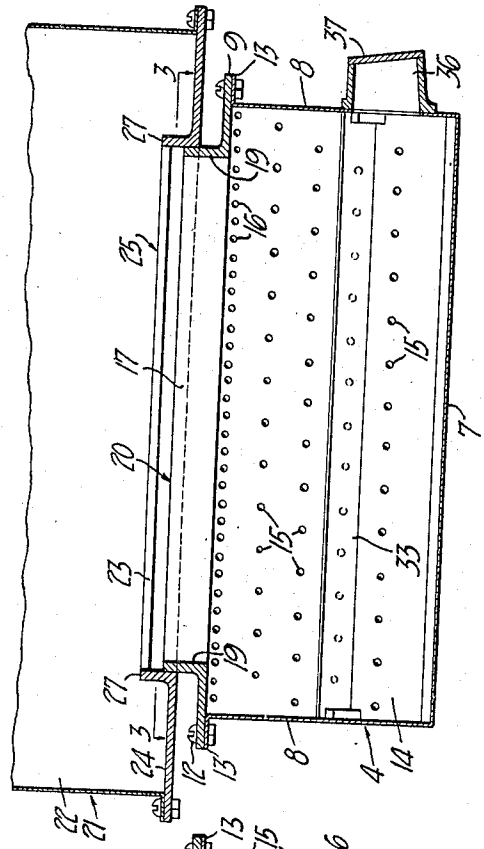


FIG. 1

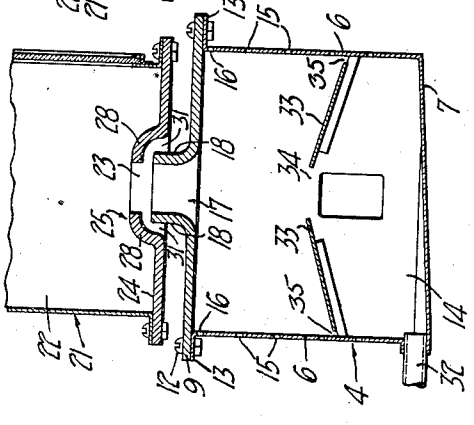


FIG. 2

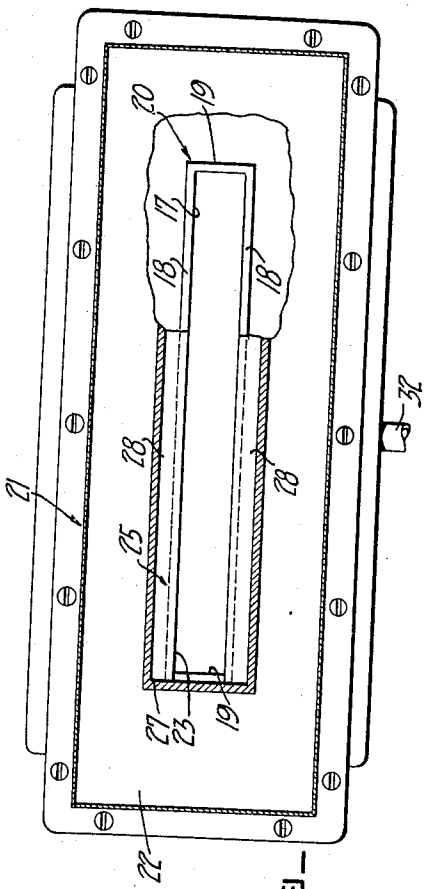


FIG. 3

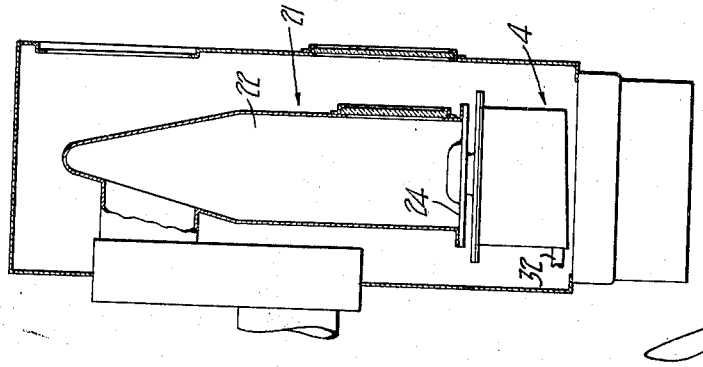


FIG. 4

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OIL BURNER

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Application February 4, 1939, Serial No. 254,619

1 Claim. (Cl. 158—91)

The invention relates to oil burners and particularly to the type which are adaptable to use in space heaters, furnaces, and other household heating equipment and appliances.

An object of the invention is to provide a wickless type of oil burner which, without the use of a flame spreader, will produce a flame of considerable spread and will burn with improved efficiency and uniformity over the entire width of the flame.

Another object is to provide a burner with the above mentioned advantages, having a construction and design which lends itself to low cost quantity production.

The invention possesses other objects and features of advantage, some of which, with the foregoing, will be set forth in the following description of the preferred form of the invention which is illustrated in the drawing accompanying and forming part of the specification. It is to be understood, however, that variations in the showing made by said drawing and description may be adopted within the scope of the invention as set forth in the claim.

Referring to said drawing:

Figure 1 is a vertical longitudinal sectional view of a burner constructed in accordance with my invention.

Figure 2 is a vertical cross-sectional view of the burner.

Figure 3 is a horizontal sectional view taken on the line 3—3 of Figure 1.

Figure 4 is a view similar to Figure 2 showing the burner arranged in a space heater.

The oil burner, in the embodiment of the invention illustrated, comprises a casing 4 having side, bottom and end walls 6, 7 and 8 respectively preferably formed of sheet metal, and a top wall 9 formed as an iron casting and secured by means of bolts 12 to a flange 13 provided on the side and end walls. The casing 4 defines what may be termed a generating chamber 14, into which oil is introduced for vaporization, and admixture with air, the side walls 6 of the casing being provided with perforations 15 for admission of primary air to the chamber. The casing is shown as rectangular in horizontal section, with the side walls of considerably greater dimension than the end walls, which latter are preferably imperforate. A concentration of air inlet openings 16 occurs in the side walls immediately under the top.

Formed in the top wall 9 of the casing is a narrow rectangular slot or opening 17, whose longer sides 18 are parallel to the side walls of the casing and exceed many times in length the linear dimension of the ends 19 of the opening. In the typical form of my burner represented in the drawing, with a casing of about six by fourteen inches in horizontal section, the opening would be approximately somewhat larger than one inch by eleven inches. The opening 17 has provided along the sides and ends thereof, a continuous flange 20 which extends upwardly from the top wall of the casing in a broad curve and forms with the opening a burner throat.

Above the generator casing 4 is a casing 21 which defines what may be termed a combustion chamber 22 and has an opening or slot 23 in the bottom wall 24 thereof corresponding to and in registration with the opening 17. The opening 23 has provided along the edges thereof a continuous flange 25, whose end portions 27 abut the end portions 19 of the flange 20, and whose side portions 28 lie opposite and in spaced relation to the side portion 18 of flange 20, so as to provide secondary air ports 31 leading to the burner throat, the walls 9 and 24 of the two casings being spaced whereby air may readily reach the ports from the exterior of the casings. The flange 25 extends upwardly into the combustion chamber so as to provide a continuation of the burner throat, and the side portions 28 thereof are bent inwardly so as to direct the secondary air toward the column rising through such throat. It is important to note that while a pair of secondary air ports are provided which are coextensive with the full horizontal length of the throat, the horizontal ends of the throat will be completely closed so that the application of an excessive amount of secondary air to the portions of the ascending column at and near such ends, and the consequent tendency to drop the burning zone in the generating chamber, will be prevented. It will thus be seen that a flame of very considerable width or spread is afforded and at the same time, the burning will be even and maintained at the desired level along the full width thereof.

As will be clear from Figure 2, the bottom wall 7 of the vapor generating chamber casing is inclined from one side wall of the casing to the other, and an oil feed pipe 32 extends into the chamber through one of the side walls between the ends thereof. The delivery end of the pipe is located so that the bottom thereof is at the lower edge of the inclined bottom wall 7, while the top thereof is approximately horizontally aligned with the upper level of such wall.

An important feature of my invention is the

provision of improved means in the vapor generating chamber for insuring a clean fire, particularly when the burner is operating on low fires. As will be clear from the drawing, there is provided in the chamber a pair of deflecting plates 33 which extend from adjacent the side walls upwardly and transversely across the chamber. The plates extend for the full length of the chamber but terminate short of each other at the center so as to define a slot or opening 34 substantially coextensive in width and length and in registration with the burner throat. Also the plates are spaced from the side walls so that openings 35 are provided thereat. In one sense the plates provide a partition dividing the chamber into upper and lower compartments, the lower compartment being dense with vapors too rich to burn, while the upper, at least at the sides, contains a mixture too lean to burn. Since the rich mixture at the bottom of the chamber is not diluted by the air entering above the plates, it is possible to burn a small quantity of oil without having combustion take place on such bottom. As long as the flame is confined to a zone near the plates, the fire will be relatively clean, regardless of whether the flame is above or below the plates. In other words, if there is sufficient reaction or oxidation taking place below the plates, the flame adjacent the plates and below the burner throat, will burn clean since the air holes above the plates will serve as secondary air supply inlets, while those below will provide the air for the reaction or oxidation of the oil vapor to alcohol or other products. I have found that the provision of the openings 35 afford communication between the upper and lower compartments for the full length of the chamber, aids quite materially in the maintenance of a clean fire, particularly at low fires.

It will be understood that in space heaters it is quite desirable that a maximum portion of the flame be visible at all times, in order that the heater shall afford as much as possible the effect or cheerfulness of an open fire. With the burner throat horizontally elongated, as hereinabove explained, this maximum spread of flame is effectively permitted. At the same time, as is important to note, the heat for vaporizing the oil in the chamber will be radiated from the top of the chamber for practically the entire length of the chamber. This latter feature causes vaporization of the oil to take place more uniformly throughout the chamber and what is equally important, makes the burner, even when of minimum size, operable at a relatively high capacity.

Ignition of the oil in the chamber may be effected through a lighter opening 36 provided in one of the end walls and closed by a door 37.

I claim:

In a burner of the character described, a casing defining a horizontally elongated oil vaporizing and air mixing chamber having perforated side walls and a burner throat centrally disposed in the top thereof and elongated lengthwise of and in substantial conformity with said chamber, deflecting members in said chamber extending for the length thereof parallel to the elongation of said burner throat and inwardly and upwardly from the side walls and defining between them an opening substantially coextensive and in registration with said throat, said chamber having a substantially plane bottom wall inclining between the side walls to provide a well for substantially the full length of said chamber and an oil inlet pipe leading to said well and having an inlet orifice with its lower side substantially flush with the lower side of the bottom wall and with the upper side at a higher level than the upper side of said wall.

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