Sept. 30, 1941. R. J. FISCHER 2,257,548

OIL BURNER

Filed June 29, 1938

FIG. 1.

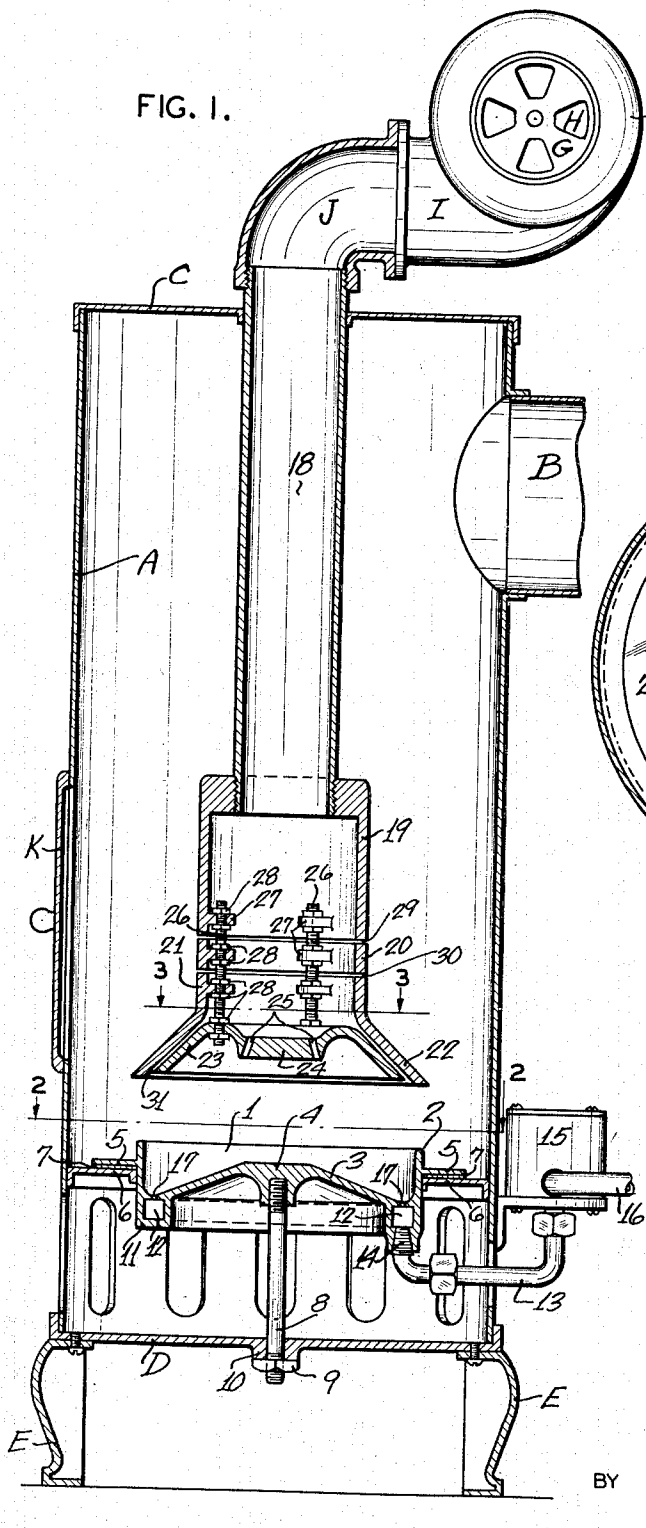
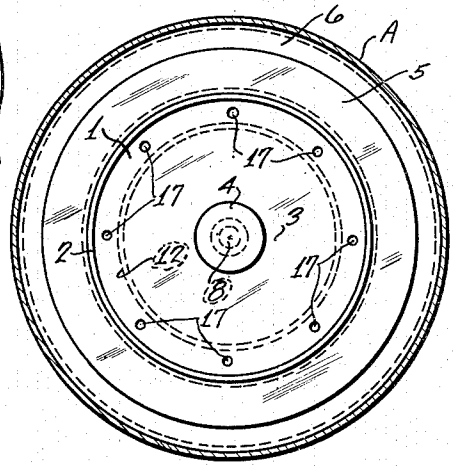


FIG. 2.



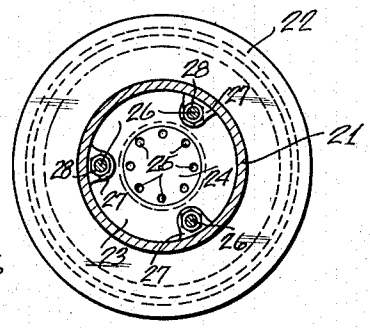


FIG. 3.

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OIL BURNER

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2 Claims. (Cl. 158—91)

My invention relates broadly to oil-burning apparatus, and has for its principal object more specifically to produce such an apparatus capable of burning with a blue flame, which, as is well known, is the most intense flame and one which is virtually free from carbon.

Another object is to produce such an apparatus which may be made of few parts of simple construction, and therefore be economical to manufacture and install. Another object is to reduce substantially the horsepower of the blower fan for introducing the necessary air to supply oxygen to the flame.

A still further object is to provide in a very simple manner means for regulating the amount of secondary air to the combustion zone of my apparatus, so as to secure for each unit the proper amount of air to secure ideal combustion with given amounts of oil consumed.

So far as I am aware, no commercially satisfactory blue flame oil burner has been produced. Every oil burner used for heating purposes, either in dwellings or business places, so far as I am advised, produces considerable carbon due to imperfect combustion of the oil vapor, besides not securing the requisite amount of heat for the quantity of oil consumed. By my simple arrangement I secure the maximum amount of heat from the oil consumed, and also I use a very small fan motor which is a saving in electric current; and by the complete combustion which I secure I do not require nearly as much oil to provide a given amount of heat as is generally required in oil burners on the market. Thus I materially reduce the cost of operation in my improved oil burner over any now on the market with which I am familiar. My one blower fan supplies both the primary and secondary air from a common source for combustion purposes, and both primary and secondary air currents proceed through the same supply chamber contained within the combustion zone of my burner.

Fig. 1 is a vertical section taken through my burner.

Fig. 2 is a horizontal cross-section taken on line 2—2, Fig. 1.

Fig. 3 is a transverse section taken on line 3—3, Fig. 1.

In the drawing I have shown for the sake of convenience a cylindrical housing A provided with a flue B, top C, bottom D, and supporting legs E. I provide within the lower portion of the housing A a bowl 1, open at the top to receive an air supply and having an annular, upwardly extending flange 2 and a bottom portion 3 which is preferably formed as shown in Fig. 1 with the center portion raised with its middle section 4 substantially flat. Said bowl 1 has no other air supply than is admitted at its open, upper end. A peripheral flange 5 projects outwardly from the flange 2 to permit said bowl 1 to be supported on the flange 6 which inwardly projects from the lower, inner face of the housing A. Between the flange 5 and the flange 6 is a washer 7, preferably of asbestos, to prevent the passage of any air therethrough. Threaded into the bottom portion 3 is a bolt 8 which passes downwardly through the middle section of the bottom D of the housing A. A nut 9 is threaded on the outer end of the bolt 8 and contacts with the downwardly extending member 10 through which said bolt 8 extends and thus holds the bowl 1 securely in place.

The bowl 1 is formed with a circular portion 11 which has an annular chamber 12, for the purpose of receiving a flow of oil through a pipe 13, which is tapped into the chamber 12 as shown at 14. The oil pipe 13 is attached to a constant level valve 15 of standard construction, and a pipe 16 leads from said valve 15 to an oil supply tank (not shown). A series of openings 17 connect the chamber 12 with the inside of the bowl 1 so that oil within said channel may get into the bowl 1.

I mount a blower fan F, preferably above the top of the housing A. This fan or blower has an air inlet opening controlled by the blades G, which may be turned to increase or decrease the size of the air inlet ports H. The fan F is operated by a fractional horsepower electric motor (not shown). These elements are of standard construction. The pipe I leads from the blower F and is coupled by the elbow J to a vertical pipe 18, which is fixed in and passes through the top C of the housing A. To the bottom of this pipe 18 is threaded a tubular member 19, which constitutes a chamber for receiving the air from the blower F through the pipe 18.

I provide an annular, air-conducting section 20 and a bottom, flanged, tubular member 21, which flange 22 flares outwardly and downwardly to form a bell. The internal diameter of the annular section 20 and the upper part of the bottom member 21 is preferably the same as the internal diameter of the tubular member 19. Within the flanged member 21 I place a flanged, bell-shaped member 23 which has a depressed central portion 24, in which is a series of air-discharge holes 25, preferably eight in number and circularly disposed in the portion 24, as

shown in Figs. 1 and 3. These holes 25 are preferably ⅛ inch in diameter and are slightly inclined outwardly, as shown in Fig. 1. The bell-shaped member 23, the section 20, and the bottom, flanged, bell-shaped, tubular member 21 are held together by bolts 26 passing through ears 27, and the several parts are adjustably secured in place by means of nuts 28 threaded on the bolts 26, so as to permit of an annular opening 29 of approximately 1/64 inch, and an annular opening 30 of approximately the same size. The bell 23 is spaced away from the bottom, flanged, tubular member 21 also approximately 1/64 inch to provide an inclined, annular, air-discharge vent 31. By this arrangement I can, if desired, close either or both annular openings 29 and 30, depending upon the amount of secondary air required to maintain perfect combustion of my oil vapor. The bottom, flanged, tubular member 21 is spaced above the top of the bowl 1. The bottom of the bell 23 is slightly above the bottom of the tubular member 21, as shown in Fig. 1.

In the operation of my burner, the oil flow to the bowl 1 through the pipe 13 is started and the oil is ignited either manually or by means of a pilot light, or an electric ignition member. At the same time, the blower F is also started. The air passes through the openings 25 and the annular opening 31 in lines somewhat oblique to the bowl 1, the air from the opening 31 being at a greater angle than the air from the openings 25. This gives the oil an opportunity to vaporize as it is discharged from the channel 12 through the openings 17. Secondary air is also discharged at a right angle from the openings 29 and 30 when both of these are open, or from whichever one is open. As the bowl 1 heats up (which it does speedily), the vaporization becomes more complete and the flame rapidly changes to a blue color, indicating that complete combustion is taking place, and this condition remains constant as long as the apparatus is operating. I have illustrated a door K in the housing A, if manual lighting of the oil is to be done. It is important, however, to keep the door K closed, as the entry of air through said door disturbs the proper combustion of the vapor admixed with the primary and secondary air introduced through the openings 25, 31, 29, and 30, and causes the blue flame to turn at certain points to yellow. It is important, therefore, that the combustion portion of my burner should not receive any air other than that introduced through the pipe 18. The bowl 1 is open only at its top and is rigidly and tightly seated in the bottom 6 of the housing A, and therefore the air directed through the openings 25 first reaches the oil in the bowl 1. The air through the opening 31 is at a more acute angle than the air from the openings 25. This causes a whirling motion of the air in the lower portion of the housing A and tends to produce a thorough commingling of the oil and air. The secondary air for combustion is supplied through one or both of the openings 29 and 30, the stream of such being directed at right angles into the combustion zone of the housing A. As this primary and secondary air is all that the oil can admix with and as I have complete control over the amount of such air through my blower F, it will be seen that I can within extremely close limits regulate and control my flame.

The constant level valve 15, which regulates the flow of the oil and prevents flooding of the bowl 1, is placed ½ inch above the bottom level of the bowl 1, that is, the portion of said bowl which receives the oil from the chamber 12. As the constant level valve is of standard construction, I do not think it necessary to describe the same.

The bowl 1 heats very quickly, and when heated the vaporization of the oil from the chamber 12 is very rapid.

After my oil burner has been once adjusted, no further attention is required. There is no collection of carbon to be gotten rid of, and the burner is always clean regardless of the length of service. The flue B conducts away any gases left after combustion of the oil vapor. It will be noted that by means of the bolts 27 I can regulate the size of the openings 29, 30, and 31, and once the proper size of such openings has been determined, no further regulation is required. The burner continues to operate with high efficiency without any necessity for cleaning at any time.

I claim:

1. An oil burner comprising an oil receiving bowl, means for supplying oil to said bowl, an air distributing member located above said bowl and having a blower fan associated therewith, the lower section of said member being bell-shaped and having a perforated closure in the lower end thereof for directing a stream of air into said bowl, said closure being spaced apart and adjustable from said bell to provide an outlet for air to be discharged at an angle to said bowl and beyond the outer edge of said bowl, means in said member for directing a stream of air horizontally from said member, means for adjusting the sizes of the air discharge openings in said member, a housing surrounding said bowl and said air distributing member, said bowl being located adjacent the bottom of said housing and sealed therein to prevent the outlet of any air from the bottom portion of said housing, said housing providing a combustion chamber above said bowl, and an outlet from said housing near its upper end for the egress of the products of combustion from said combustion chamber.

2. An oil burner comprising an oil receiving bowl, means for supplying oil to said bowl, an air distributing member comprising a plurality of adjustable sections located above said bowl and having a blower fan associated therewith, the lower section of said member being bell-shaped and having a perforated closure in the lower end thereof for directing a stream of air into said bowl, said closure being spaced apart and adjustable from said bell to provide an outlet for air to be discharged at an angle to said bowl and beyond the outer edge of said bowl, spaces between the adjustable sections providing discharge openings for directing a stream of air horizontally from said member, means for adjusting the sizes of the air discharge openings in said member, a housing surrounding said bowl and said air distributing member, said bowl being located adjacent the bottom of said housing and sealed therein to prevent the outlet of any air from the bottom portion of said housing, said housing providing a combustion chamber above said bowl, and an outlet from said housing near its upper end for the egress of the products of combustion from said combustion chamber.

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