July 11, 1939. E. L. BAUER 2,165,212

OIL BURNER

Filed Sept. 24, 1935 2 Sheets-Sheet 1

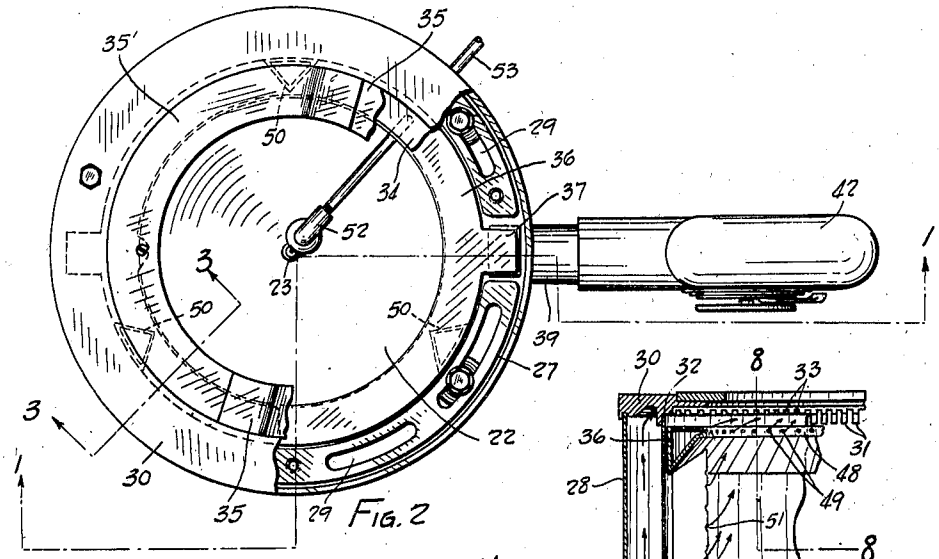


FIG. 2

FIG. 3

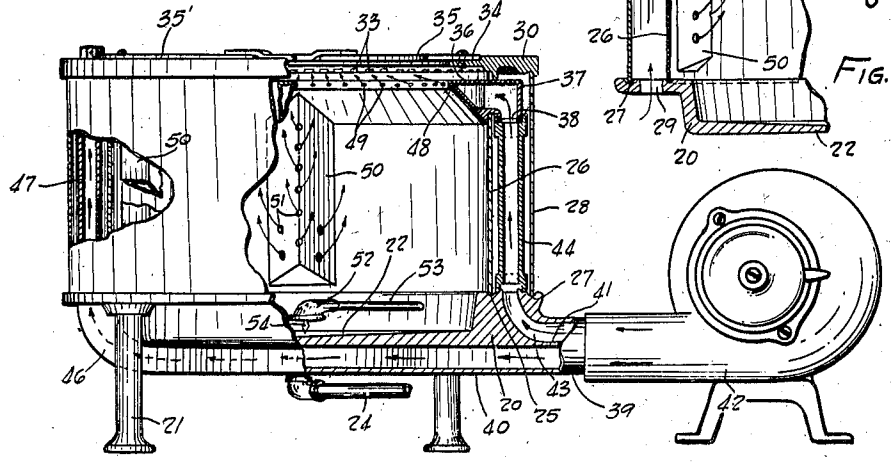


FIG. 1

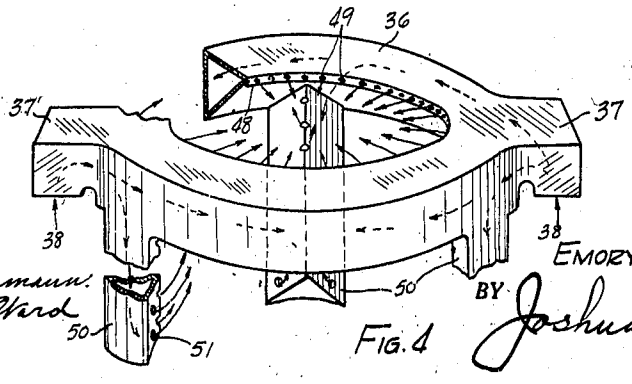


FIG. 4

WITNESSES:

Jackson F. Mossmann

Anna M. Ward

INVENTOR:

EMORY LOUIS BAUER.

BY Joshua B. Hobbs

ATTORNEY

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OIL BURNER

Filed Sept. 24, 1935 2 Sheets-Sheet 2

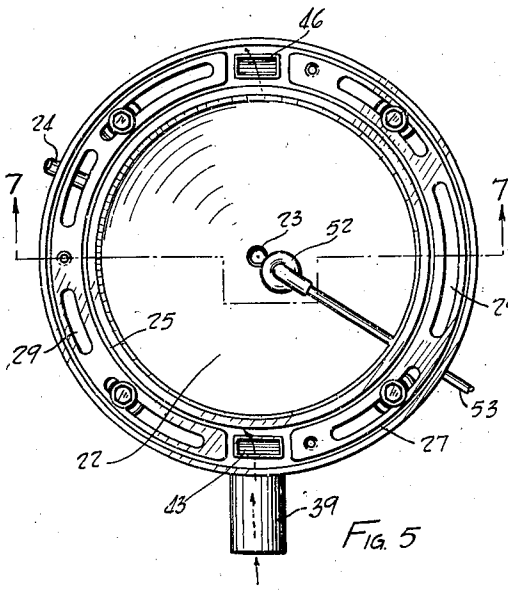


FIG. 5

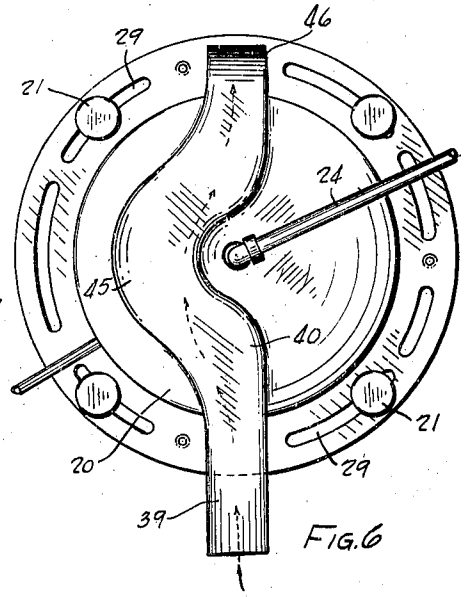


FIG. 6

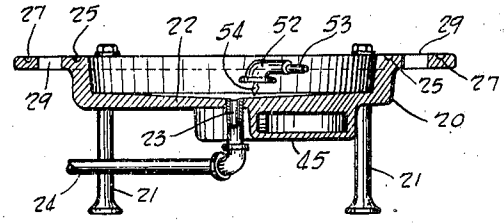


FIG. 7

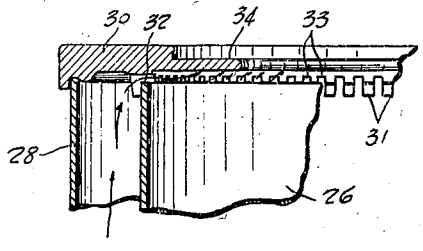


FIG. 8

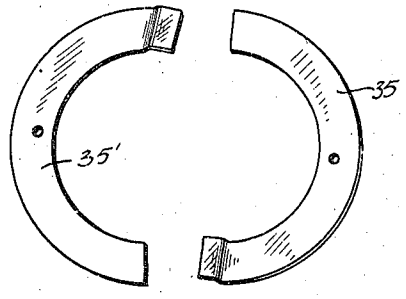


FIG. 9

WITNESSES:

Jackson L. Monmann.

Anna M. Ward

INVENTOR:

EMORY LOUIS BAUER.

BY Joshua R. H. Hopps

ATTORNEY

Patented July 11, 1939 2,165,212

UNITED STATES PATENT OFFICE

2,165,212

OIL BURNER

Emory Louis Bauer, Wilmington, Del., assignor to Emory L. Bauer, Inc., Wilmington, Del., a corporation of Delaware

Application September 24, 1935, Serial No. 41,854
In Canada February 16, 1935

2 Claims. (Cl. 158—92)

This invention relates to the art of oil burners, such as are commonly availed of for heating purposes, and the invention is primarily concerned with that type of burner, illustrated and described in the application of Emory Louis Bauer, for Oil burner, filed December 1, 1933, bearing Serial No. 700,392, and which application has resulted in Patent No. 2,014,714, dated September 17, 1935.

A burner made in accordance with the said patent application, above referred to, comprises, generally, a fire pot, to which fuel oil is supplied at a point adjacent to a pilot light, and the initial combustion causes a gasification of the oil so that it is readily susceptible to intermixture with air which is supplied to the fire pot. It is this admixture of gasified fuel oil and air which is consumed to provide for a smokeless combustion of the fuel with a very slight residue resulting therefrom.

An important object of the present invention is to provide, in an oil burner of the general character above noted, a fire pot construction with which is associated improved means for introducing the fuel oil into the burner, so as to render the said fuel oil readily susceptible to gasification under the effects of initial combustion. In attaining this end, the bottom of the fire pot is slightly depressed, and the fuel oil is introduced through an opening centrally of this depressed portion.

A further object of the instant invention is to provide, in association with a fire pot of the type above described, an air chamber for preheating the air, prior to the intermixing of the air with the gasified oil. In accordance with this invention, the preheating of the air not only enhances the intermixing effects, but also greatly improves the circulatory action of the air throughout the entire fire pot, so as to insure a complete carburetion at all the desired places in the fire pot.

Another objective of the invention is the provision of air conducting means for introducing air directly into the fire pot for the intermixture with the gasified fuel oil.

A somewhat more detailed object in view, is the provision of air conducting means across the bottom of the fire pot on the under side thereof, so as to introduce the air into the fire pot, under substantially equal pressure entirely thereabout.

Associated with this last mentioned objective, another end in view, is to provide an enlarged portion which is included in the air conducting means and located on the under side of the fire pot. The presence of this enlarged portion has the effect of equalizing or balancing the supply of air as it is admitted to the fire pot on both sides thereof.

Another objective in view is to provide, in an oil burner of the character described, a novel type of top structure which constitutes a means for controlling the direction which is taken by air currents, as the latter come from the source of air supply and the air-heating chamber. In accordance with the precepts of this invention, a plate is provided as the top closure for the said air chamber, and this plate is in the shape of a ring which is formed on its inner periphery with an inwardly extending flange, which flange is, in itself, effective to partially control the direction taken by the air emanating from the heating chamber. This flange may constitute a base, on which is mounted, additional structure for controlling the circulating action of the air and gasified oil which may be intermixed therewith.

In oil burners of the type with which this invention is concerned, a source of air supply is included as an essential element. This invention contemplates the use of a so-called blower which is effective to supply air to the fire pot and associated parts under pressure, and this blower is formed with an opening with which is operatively associated a closure member that may be adjusted with respect to the casing of the blower to vary the amount of air which is supplied by the latter mechanism.

The air conducting means introducing the air directly into the fire pot comprises, generally speaking, a ring that is located interiorly of the fire pot, adjacent to the upper edge thereof, and from it extend a plurality of arms, said ring and arms, all being formed with spaced openings, through which the air passes as it is introduced into the fire pot. This ring is connected to air conduits which lead from the blower.

Various other, more detailed objects and advantages will in part become apparent, and in part be hereinafter stated as the description of the invention proceeds.

The invention, therefore, comprises a fire pot which is surrounded by an air chamber, and which is formed with a slightly depressed bottom, in which is provided an opening for introducing fuel oil into the fire pot. A pilot light is located adjacent to said opening. At the upper edge of the fire pot, a ring is located, and from which ring depend a plurality of arms, and in which ring and arms are formed a plurality of spaced openings designed to have air pass therethrough. This ring is conductively connected at diametrically opposite points with conduits which extend to a

source of air supply in the form of a blower, and the connection between the ring and these conduits is tightly sealed by a novel type of packing.

The top of the air chamber is provided with means for deflecting and controlling the direction of air currents which come from the said chamber, and associated with the blower, are means for maintaining the closure thereof in any adjusted position.

For a full and more complete understanding of the invention, reference may be had to the following description and accompanying drawings wherein:

Figure 1 is a side view partly in elevation, and partly in section of a fire pot, made in accordance with the precepts of this invention. The plane on which this view is taken is indicated by the line 1—1 of Figure 2.

Figure 2 is a plan view of the fire pot shown in Figure 1, with certain parts broken away to more clearly bring out interior features of construction.

Figure 3 is a fragmentary view taken on a vertical section through the fire pot. The plane on which this view is taken is represented by the line 3—3 of Figure 2.

Figure 4 is a detailed view in perspective with parts broken away and shown in section, of the ring structure which is located interiorly of the fire pot, adjacent to the upper edge thereof.

Figure 5 is a top plan view of the base of the fire pot, with the structure removed.

Figure 6 is a bottom plan view of the fire pot bringing out the construction of the pressure chamber in the air conduit thereacross.

Figure 7 is a vertical section taken through the base of the fire pot. This view is taken about on the plane represented by the line 7—7 of Figure 5.

Figure 8 is a detailed fragmentary view in section of the air chamber and fire pot construction. This view is taken about on a plane represented by the line 8—8 of Figure 3.

Figure 9 is a detailed view in perspective of the split ring which is carried by the top closure for the air chamber for air deflecting purposes.

Referring now to the drawings wherein like reference characteristics denote corresponding parts.

An oil burner, made in accordance with this invention, comprises a base 20 which may be supported in any approved manner as by the legs shown at 21. The base 20 is provided with a bottom 22 which is formed with a slight depression therein that is conical in formation, as clearly brought out in Figures 1 and 7, and at the apex of this conical depression an inlet conduit 23 is threaded into an opening in the bottom 22, which is formed at this point, this arrangement being clearly developed in Figure 7. Extending from the inlet conduit 23 is a pipe 24 which may lead to any desired source of fuel oil supply.

The base 20 is formed with a groove or furrow 25 that extends about the bottom 22, and received in this groove or furrow 25 is the lower edge of a drum 26, which, together with the base 20 defines the combustion pot.

The base 20 is also formed with a second groove or furrow 27 which encircles the inner furrow 25, and received in this furrow 27 is the lower edge of a shell 28, which, together with the drum 26, defines an air chamber.

The base 20 is provided with a plurality of openings 29, through which air enters into the chamber between the drum 26 and shell 28.

At the top of the fire pot structure, the air chamber is closed by a top closure 30, which is provided with a plurality of downwardly extending lugs 31, which are spaced apart and formed with shoulders, as indicated at 32, and which shoulders engage the top edge of the drum 26.

These shoulders maintain the ring 30 spaced above the top edge of the drum 26, so that the lugs 31 define openings 33, through which air may pass from the chamber between the shell 28 and drum 26, into the interior of the fire pot.

The ring 30 is formed,on its inner periphery, with an inwardly extending flange 34, which functions to deflect the air passing through the openings 33 radially inwardly. This deflecting function may be furthered by a deflecting ring of split construction, which is shown in Figure 9, as comprising the parts 35 and 35'. This deflecting ring is carried by the flange 34.

Disposed within the drum 26, at the upper edge thereof, is an air conduit in the form of a ring 36. Obviously, the shape of this ring 36 will conform to the shape of the fire pot.

In the illustrated embodiment of the invention, the fire pot is shown as circular, but it is to be clearly understood that the invention is not to be limited in this respect, as the fire pot may be of rectangular or other non-circular formation. Attention is called to the fact that the air conduit 36 is triangular in cross section, and is formed at diametrically opposite sides with hollow extensions 37 and 37', each of which are formed with openings 38 which face downwardly.

It is notable that these extensions 37 are disposed within the air chamber defined between drum 26 and shell 28.

The base 20 is formed with an air inlet, as shown at 39 from which extends an air conduit 40 that is located on the under side of the bottom 22, and extends entirely thereacross. This air inlet 39 is divided by a partition 41, so that a current of air, under pressure, from a blower, shown at 42, is divided, a portion thereof passing through the air conduit 40, while the other portion is directed through the passageway 43 to a pipe 44, which is connected to the extension 37, as indicated at 38.

The conduit 40, which extends across the under side of the bottom 22, is provided with a pressure chamber in the form of an enlargement at 45, and this structure has been found to afford highly desirable results in that the air is delivered substantially uniformly to the extensions 37 on each side of the ring 36, so as to equalize and balance the distribution of air throughout the fire pot as it is admitted thereto.

It is notable that the passageway 43 and pipe 44 are not provided with such pressure chamber, by virtue of their shorter length. The conduit 40 is reduced at 46 and connected with a pipe 47 that extends upwardly through the air chamber between the shell 28 and drum 26 where it is connected to the extension 37'.

Referring now to Figure 4, the ring conduit 36 is shown as triangular in cross section and formed with an annular shoulder 48 having perforations 49 located on the inner edge of said shoulder. These perforations 49 communicate with the air space on the interior of the ring 36. Depending from the ring conduit 36, are a plurality of legs 50, which are of a hollow construction and are perforated at 51 and shown

as triangular in cross section, as is the ring 36; and three in number. It is to be clearly understood that the invention is not to be limited in these respects, because obviously these details could be varied without departing from the spirit of the invention.

Referring now more particularly to Figure 7, it is notable that overhanging the fuel inlet 23 is a pilot 52 which may be connected by a pipe 53 with any approved source of gas supply. This pilot 52 is effective to provide a flame at 54 which is directed downwardly immediately upon the top of the pool of oil which is introduced into the base 20 in the conical depression therein.

The mode of operation of the fire pot, above described, is thought to be obvious, but it may be briefly outlined by noting that fuel oil is conveyed by the pipe 24 to the inlet at 23 where it is introduced into the sump formed in the base 20. The pilot flame 54 causes initial combustion of this fuel oil so that it is gasified.

As combustion takes place in the fire pot defined by the base 20 and drum 26, air in the chamber between the shell 28 and drum 26, is heated. Due to this heating, the air passes upwardly and through the openings 33 into the interior of the fire pot. The direction which the air currents take in flowing through the openings 33 is controlled by the flange 34 and deflector ring 35. It will be noted that fresh air is continuously admitted to the chamber between the shell 28 and drum 26 through the openings 29.

From the conduits 40 and 43, the air passes through pipes 47 and 44 to the extensions 37' and 37 and into the ring conduit 36 and legs 50. This air then passes through the several openings 49 and 51 into the interior of the fire pot where it is intermixed with the gasified fuel oil. This mixture of air and gasified fuel oil passes upwardly and additional air from the chamber between the shell 28 and the drum 26 is also mixed therewith, whereupon the resulting gaseous mixture is completely consumed to provide a smokeless combustion of great heating efficiency.

With the oil burner of this invention, the fuel oil is consumed so that only a slight residue is left, and this residue is present only in the base 20 which may be cleaned at intervals which are spaced very far apart. It has been found that one cleaning for each annual period suffices for a season's operation of the fire pot.

While a preferred, specific embodiment of this invention is hereinbefore set forth, it is to be understood that I am not to be limited to the exact construction illustrated and described, because various modifications of these details may be provided in putting the invention into practice within the purview of the appended claims.

I claim:

1. An oil burner of the character described comprising a fire pot having an air-tight wall and a gas and flame outlet opening at its top, means for delivering oil into said fire pot, means for delivering air under pressure greater than atmospheric pressure into said fire pot, and means independent of said last-mentioned means for delivering a current of air by aspiration around and above said gas and flame outlet opening.

2. An oil burner of the character described comprising a fire pot having an air-tight wall and a gas and flame outlet opening at its top, means for delivering air under pressure greater than atmospheric pressure into said fire pot, and a jacket arranged around and spaced from said fire pot to provide an air conduit in communication with the atmosphere at its lower end and in communication with the space above and around said flame outlet opening of said fire pot at its upper end.

EMORY LOUIS BAUER.