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A. E. BORNEMEIER ET AL

OIL BURNER

Filed Dec. 29, 1924

Fig. 2.

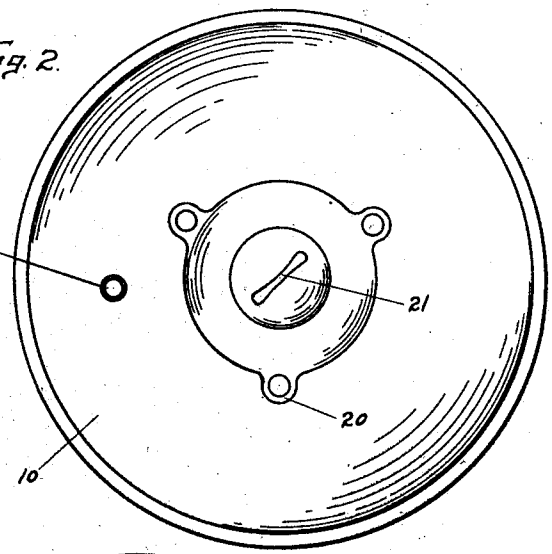


Fig. 3.

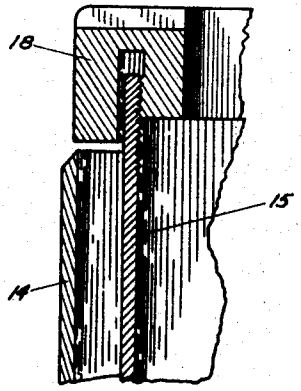
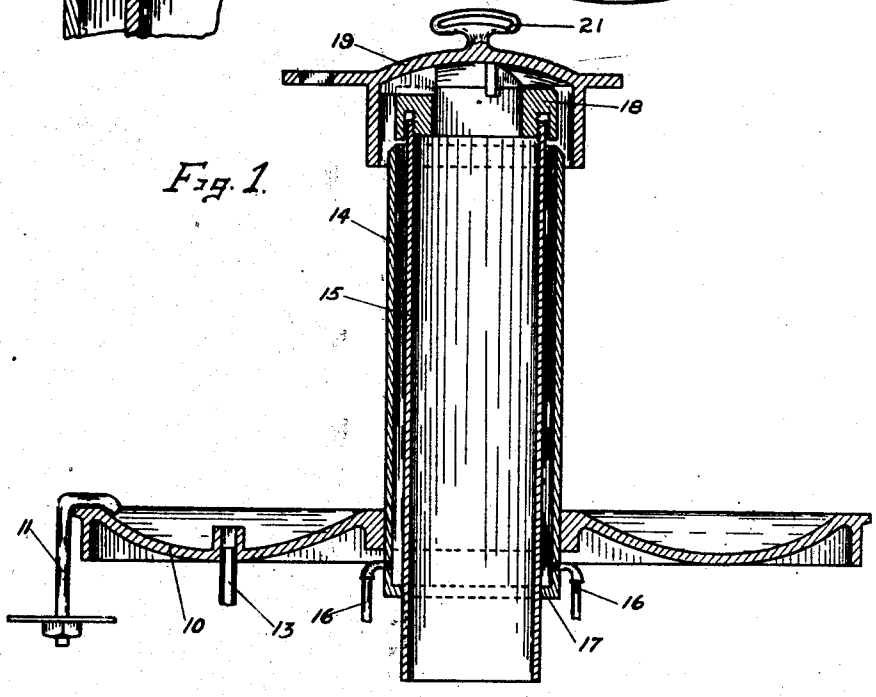


Fig. 1.



A. E. BORNEMEIER.
M. T. BORNEMEIER. INVENTORS

BY Emil F. Lange.
ATTORNEY.

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UNITED STATES PATENT OFFICE.

ARTHUR E. BORNEMEIER, OF LINCOLN, AND MARTIN T. BORNEMEIER, OF MURDOCK, NEBRASKA.

OIL BURNER.

Application filed December 29, 1924. Serial No. 758,655.

To all whom it may concern:

Be it known that we, ARTHUR E. BORNEMEIER and MARTIN T. BORNEMEIER, citizens of the United States, residing, respectively, at Lincoln, in the county of Lancaster and State of Nebraska, and at Murdock, in the county of Cass and State of Nebraska, have invented certain new and useful Improvements in Oil Burners, of which the following is a specification.

Our invention relates to power oil burners and it is designed for use in stoves, furnaces and other heating plants for the substitution of distillate or other relatively heavy fuel oils for the fuels ordinarily used in stoves and furnaces.

The main object of our invention is the provision of a fuel oil burner in which the combustion is perfect regardless of whether the burner is operated at its maximum or at its minimum capacity.

We further provide an oil burner which requires no skill in its operation and which can be operated with absolute safety by anyone and with the minimum of attention.

Another object of our invention is the provision of means whereby the outlet opening for the vaporized oil may be easily adjusted in size so as to properly proportion the oil vapor through the air with which the oil vapor is mixed before ignition.

Other of our objects are the provision of a burner which can be produced at a low cost and which can be easily installed in a stove or furnace, the installation of the burner requiring no delicate adjustments and therefore requiring no special skill.

Other objects will be pointed out in the following description which pertains to the preferred form of our invention.

Referring now to the drawings,

Figure 1 is a central vertical sectional view of the entire burner showing also one of the clamps for holding the burner secured to the grate.

Figure 2 is a top plan view of the entire burner.

Figure 3 is a sectional view of a fragmentary portion of our burner, showing in enlarged view the arrangement of parts for preventing carbonization at the fuel outlet.

Our burner consists of three main parts: a base, conduits for the fuel and air, and a flame spreader. The base, which is shown at 10 is designed to be secured to the grate of a stove or furnace on the upper side thereof. It is in the form of an annular pan with an open central portion. In order to prevent accidental displacement we secure the base pan to the grate by means of L-shaped bolts 11 as shown in Figure 1, the bolts being secured by means of nuts and washers on the under side of the grate. The base 10 is also provided with the usual overflow outlet 13, which is connected with an automatic shutoff (not shown).

The conduit for the fuel and air consists of two concentric tubes or cylinders 14 and 15, which are spaced from each other so as to provide a passage therebetween. The inner cylinder 15 is connected at its lower end with a power blower, which feeds a strong current of air through the cylinder to the flame. The cylinder 14 is provided at its lower end with one or more oil inlet pipes 16. The cylinder 14 terminates considerably short of the bottom of the cylinder 15 and is provided with a bottom in the form of a ring 17, which is firmly secured to both cylinders to form an air tight and oil tight connection between the cylinders. The cylinder 14 is secured in much the same manner to the base 10.

The cylinder 15 projects somewhat above the top of the cylinder 14 as shown in Figures 1 and 3. The projecting portion of the cylinder 15 is provided with screw threads on its inner surface for the reception of a hollow nut 18. This nut is provided with a central channel for the passage of the air current and with an annular socket for the reception of the upper end of the cylinder 15, and this socket is provided with the screw thread which is adapted to engage with the screw thread on the projecting extremity of the cylinder 15.

The nut 18 has substantially the same diameter as that of the cylinder 14. In order to function properly this diameter must be equal to or greater than the internal diameter of the cylinder 14. From an inspection of Figures 1 and 3 it will be seen that the oil and oil vapor flowing through the annular passage between the cylinders 14 and 15 finds its exit just underneath the edge of the nut 18. It will also be seen that as the nut 18 is screwed up or down, the outlet of the oil passage will be enlarged or

reduced in size, and that if the nut 18 is screwed down and seated on the upper edge of the cylinder 14 the outlet will be entirely closed.

The great difficulty with all oil burners is the tendency of the burner to accumulate carbon at or near the point of ignition. In our burner this point would be at the upper edge of the cylinder 14 and unless provisions were made for automatically removing this carbon the burner would in time become clogged. In our burner we have bevelled the cylinder 14 at its upper edge in such a manner that dislodged particles of carbon will fall outside the oil passage. It will also be seen that the screw threads on the nut 18 and on the upper end of the cylinder 15 are so positioned that neither the oil vapor nor the flame can come in contact with the screw threads. In our earlier experiments we found that if the screw threads were permitted to accumulate carbon the screw threads would then become so clogged that they would cease to function and it would be impossible to further adjust the outlets for the oil vapor.

The cap 19 as shown in Figure 1 serves primarily to direct the course of the flame and secondarily as a wrench for turning the nut 18. It consists of a cylindrical portion, which comes down over the fuel vapor outlet, and of a dished portion covering the top of the cylindrical portion. The nut 18 is provided in its upper surface with one or more radial grooves, and depending from the upper portion of the cap 19 there are wings corresponding in number and position with the grooves of the nut 18. These wings seat in the grooves so that when the cap 19 is turned the nut is also forced to turn. In order to make it easy to turn the cap 19 we have provided a plurality of apertured ears 20, preferably three in number. When it is desired to turn the cap it is only necessary to insert the end of the poker in the aperture of one of the ears and to impart the turning movement by pushing or pulling on the poker. The cap 19 simply rests on the burner and may be lifted off at any time to give access to the nut 18 and to other working parts of the burner. To facilitate the removal of the cap the cap is provided with a handle 21 having an aperture of sufficient size that the hand may be inserted.

During the operation of our burner a powerful current of air is forced upwardly through the cylinder 15 and then deflected downwardly on the outer side of the cylinder 14. The flame is formed by the ignition of the mixture of the oil vapor and air nearest the exit of the passage of the oil vapor. The powerful current of air meeting the current of oil vapor causes the two to be intimately mixed just before and during ignition and it also directs the flame downwardly against the outside wall of the cylinder 14. The cylinder 14 is thus surrounded throughout its entire length by a cylindrical sheet of flame which heats the cylinder 14 and thoroughly vaporizes even the heaviest of fuel oils before the oil is permitted to reach the exit. This thorough vaporization of oil combined with the thorough mixing of the oil vapor with the air insures that the combustion is almost perfect, leaving little or no unconsumed carbon. At its lower end the flame is directed outwardly by the pan 10 against the walls of the furnace.

Having thus described our invention in terms which will be readily understood by others skilled in the art to which it pertains, what we claim as new and desire to secure by Letters Patent of the United States is:—

1. An oil burner including an upright elongated cylinder for the upward passage of air, a second cylinder surrounding and concentric with said first cylinder, said second cylinder terminating below the level of the upper extremity of said first cylinder, said two cylinders being spaced apart to provide a passage for oil and oil vapor, a nut secured to said first cylinder, said nut being provided with an aperture for the exit of air from the said first cylinder, and means for adjusting said nut in a vertical direction to open or close the exit of the passage for oil vapor.

2. An oil burner comprising a vertically positioned elongated cylinder for the upward passage of air, the upper portion of said cylinder being screw threaded on its inner surface, a second cylinder surrounding and spaced from said first cylinder, the upper edge of said second cylinder being below the upper edge of said first cylinder, and a nut engaging the screw threaded portion of said first cylinder, said nut being provided with an aperture for the exit of air from said first cylinder, said nut being adapted to close the passage between the said two cylinders.

3. In an oil burner, an elongated cylinder which is adapted to convey a current of air upwardly, the upper portion of said cylinder being screw threaded on its inner surface, a second cylinder surrounding and spaced from said first cylinder, the space between said two cylinders being adapted to conduct an upward current of oil vapor, a nut secured to the screw threaded portion of said first cylinder and being adjustable thereon in a vertical direction, said nut being adapted to close the exit to the passage between said two cylinders, the upper edge of said second cylinder being bevelled whereby carbon deposits are automatically dislodged when said nut is forced down to

close the exit of the oil vapor passage, said nut being provided with a central aperture for the exit of air from said first cylinder.

4. In an oil burner, an elongated vertically positioned cylinder for conducting a current of air upwardly, a second cylinder surrounding and spaced from first cylinder, the space between said two cylinders being adapted to conduct oil vapor upwardly and having an exit at its upper extremity, means for introducing combustible oil into the lower portion of the space between said two cylinders, the upper portion of said first cylinder being screw threaded on its inner surface, a nut engaging the screw threaded portion of said first cylinder, said nut being provided with an aperture for the exit of air from said first cylinder, said nut being adapted to close the exit to the passage between said two cylinders, and a flame spreader surrounding the nut and the upper portion of said two cylinders, said flame spreader engaging said nut whereby the nut may be rotated, and a plurality of apertured ears extending radially from said flame spreader.

In testimony whereof we affix our signatures.

MARTIN T. BORNEMEIER.
ARTHUR E. BORNEMEIER.