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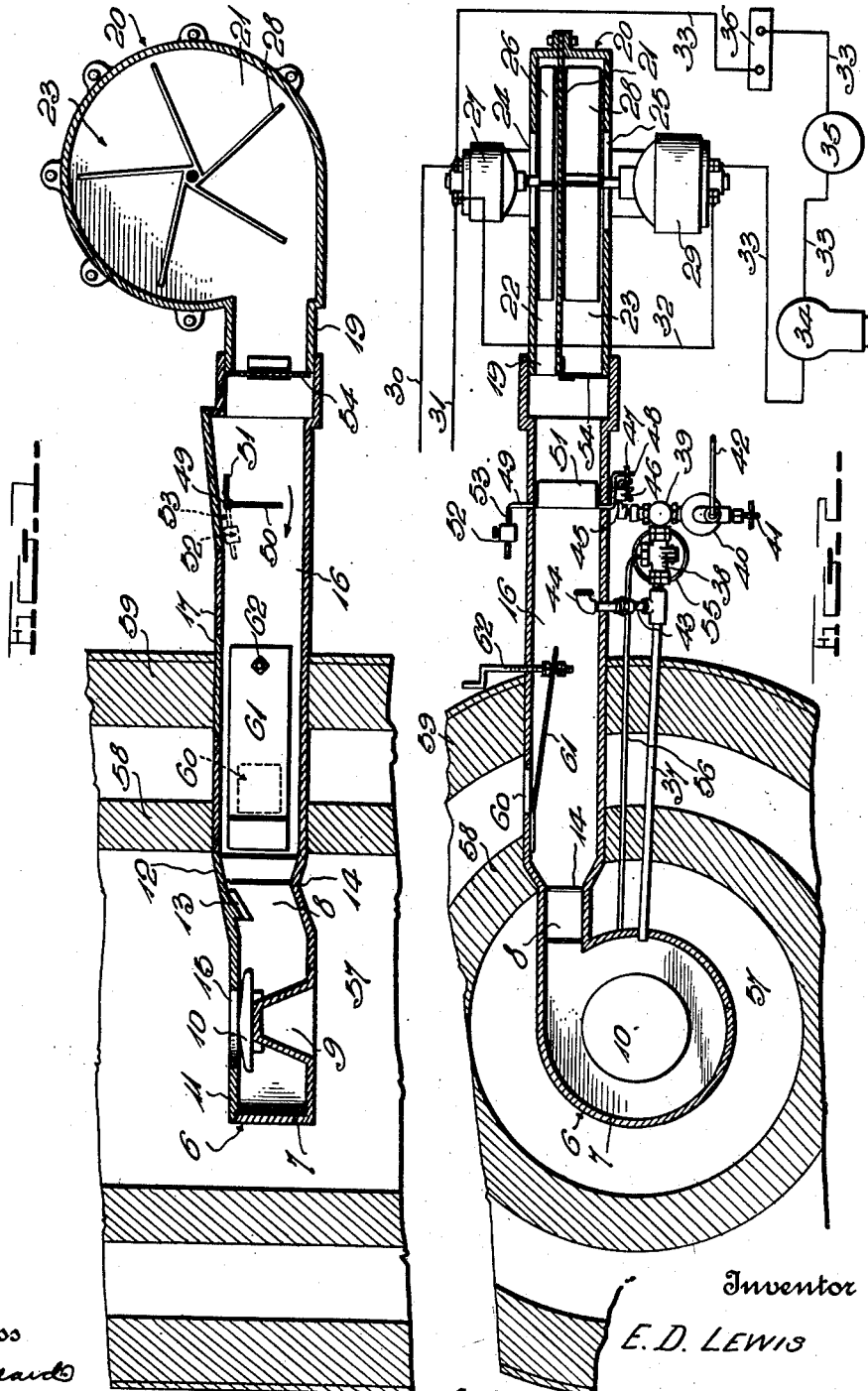
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1,620,111

OIL BURNING APPARATUS

Filed April 1, 1926

2 Sheets-Sheet 1



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FIG. 3

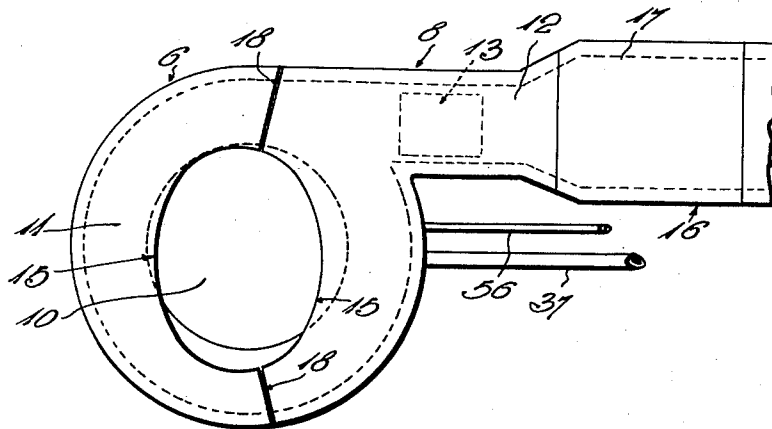


FIG. 4

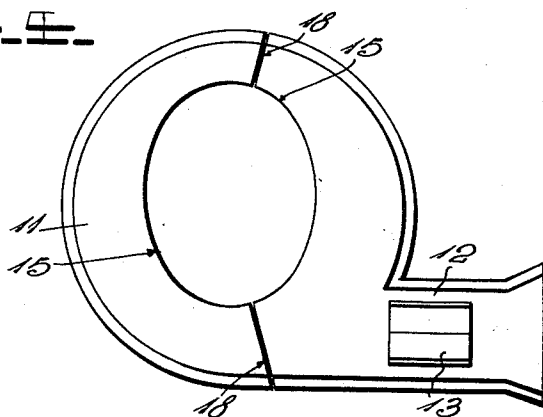
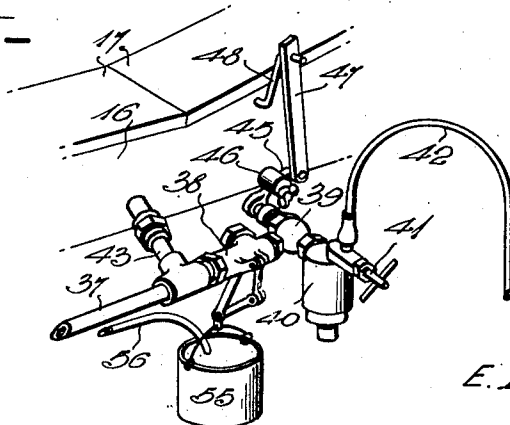


FIG. 5



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## UNITED STATES PATENT OFFICE

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## OIL-BURNING APPARATUS.

Application filed April 1, 1926. Serial No. 99,114.

The invention relates to improvements in oil burning apparatus, of the type in which a circular pot is provided having a tangential inlet for air under pressure, and a fuel supply line which discharges into said pot, said pot having a vapor escape opening in its top and a deflector under said opening. The invention also has reference to oil burning apparatuses in which the air is supplied by motor-driven blower blades and in which automatic controlling means are provided for the fuel.

One object of the invention is to provide a new and improved relation of gas or vapor discharge opening and deflector plate which will absolutely prevent the burner from making the usual roaring noise.

A further aim is to provide two blowers for furnishing the necessary air, said blowers being provided with separate motors and being of different sizes, so that when a low fire is desired, only the small blower need be operated, whereas both blowers are brought into play when a high fire is required. The small blower is continuously driven as long as the burner is in operation and by suitable means, such as a thermostatic switch, a pressure-static switch, or both, the circuit for the driving motor of the larger blower may be controlled, and a further object is to provide a manually controlled switch for taking the motor of the large blower out of control of the thermostatic, pressure-static or other automatic switch, when initially starting the burner, so that only a low fire can be operated until all parts of the burner structure become thoroughly and evenly heated. Otherwise, the burner would start operation at maximum capacity and its heating would be so rapid as to be injurious.

A still further aim of the invention is to provide automatic air-controlled means for closing the discharge of the large blower when the small blower is in operation, preventing any escape of air through the casing of said large blower.

Yet another aim is to provide novel means for utilizing the passage of air to the burner head, to control the supply of fuel to said head.

Yet another aim is to provide means for utilizing a portion of the air passing to the burner head, to positively force the fuel to said head, so that there is no danger of blowing the fire out when running a low fire.

The particular construction herein disclosed was designed primarily for use in connection with the combined chimney, furnace and ventilator shown by my U. S. Patent No. 1,573,406, and a further aim is to make novel provision for discharging some of the air traveling from the blowers toward the burner head into the air space between the fire box wall and the furnace jacket, instead of using the means shown in the above mentioned patent, for discharging air into this space.

With the foregoing in view, the invention resides in the novel subject matter herein-after described and claimed, the description being supplemented by the accompanying drawings.

Fig. 1 is a vertical longitudinal sectional view through an oil burning apparatus constructed in accordance with my invention.

Fig. 2 is a horizontal sectional view illustrating the motor wiring and adjuncts thereof in diagram.

Fig. 3 is a plan view of the burner head and associated parts.

Fig. 4 is a bottom plan view of the cover plate of the burner head.

Fig. 5 is a perspective view showing certain parts of the fuel controlling means to be hereinafter fully described.

In the drawings above briefly described, the numeral 6 designates a burner head which includes a pot 7 having a tangential air inlet neck 8 and an upstanding support 9 for a centrally positioned baffle plate 10, of circular outline. 11 designates a cover plate for the pot 7, said plate having an integral extension 12 closing the upper side of the neck 8 and provided with an appropriate deflector 13 for directing the air downwardly as it enters the pot. The lower portion or bottom 14 of this neck is preferably raised somewhat above the bottom of the pot 7 as indicated at 14 to prevent possible outward flow of oil from the pot, before the automatic oil shut-off may function, in case the

flame should for any reason be extinguished.

The cover plate 11 of the pot 7 is formed with a discharge opening 15 for the vaporized fuel and air. Ordinarily, an opening  
5 such as this, is in concentric relation with the baffle plate 10, but by extended experimentation, I have found that it is this relation which produces the objectionable roaring of the burner, and by such experimentation, I have discovered that giving the  
10 opening 15 an elliptical form and relating it with the deflector 10, in the manner illustrated in Fig. 3, positively silences the action of the burner. From Fig. 3, it will  
15 be observed that the opening 15 is elongated in a direction transverse to the neck 8, that its length is somewhat greater than the diameter of the baffle plate 10, and that its width is less than the diameter of said  
20 baffle plate. The end of this elliptical opening nearest to the neck 8, is substantially in vertical alinement with the peripheral edge of the plate 10, whereas the opposite end of said opening 15, is outwardly spaced  
25 beyond said peripheral edge of the plate 10. The two side edges of the opening 15 are inwardly spaced from the peripheral edge of the plate 10, the side edge nearest the neck 8 being preferably spaced inwardly  
30 from said edge, a greater distance than the opposed side edge of the opening. This exact relation has been found to produce the desired results in actual practice, but it is possible that other relations of elliptical  
35 opening and baffle plate could also produce good results.

An air supply passage 16 leads to the neck 8 and preferably has its sides and bottom joined integrally to said neck, the top of  
40 said passage however being preferably formed from a plurality of separate plates 17 to permit expansion and contraction without danger of breakage. For this same purpose, the cover plate 11 is preferably divided into sections, the meeting edges of  
45 which are designated at 18. The outer end of the passage 16 communicates with the air outlet 19 of a dual blower casing 20. This casing, in the present showing is divided by a vertical partition 21, into a small  
50 chamber 22 and a larger chamber 23, said chambers having air inlet eyes 24 and 25 respectively. In the chamber 22, a small blower 26 is disposed, said blower having  
55 an operating motor 27. A larger blower 28 is disposed in the chamber 23 and is provided with a driving motor 29. The two motors 27 and 29 are wired in parallel and it is intended that the motor 27 shall operate  
60 continually as long as the burner is in operation, whereas provision is made for cutting the motor 29 into or out of play, as occasion may demand. When only the blower 26 is operating, the burner is producing only a low fire, but when both

blowers 26 and 28 are in play, a high fire with intense heat is produced.

30 and 31 designate the current supply wires for the motor 27 to the usual terminals of the latter; 32 designates another  
70 wire from one terminal of motor 27 to one terminal of motor 29, and 33 has reference to wiring connecting the other terminals of the two motors, said wiring, in the present disclosure including a thermostatic switch  
75 34, a pressure-static switch 35, and a manually controlled switch 36. When all of these switches are closed, the circuit for the motor 29 is complete. When any one of them is opened, however, this motor is auto-  
80 matically cut out of operation and it will be seen that by opening the switch 36 when initially starting the burner, the motor 29 and the blower 28 cannot function. Thus, it is possible to start the burner only with  
85 a low flame, thereby insuring that it shall heat up gradually and in such manner as to prevent any possibility of injury. After this initial heating has taken place, the switch 36 may be closed and the control  
90 of the motor 29 left entirely to the thermostatic and pressure-static switches.

An oil supply pipe 37 is shown leading to the pot 7 from an emergency oil cut-off  
95 valve 38, which valve communicates with a flow-control valve 39, the latter receiving fuel from a strainer 40 having a fixed adjustment valve 41 for controlling the maximum amount of fuel entering the strainer,  
100 the valves and the pipe 37, from the supply line 42. The pipe 37 is provided with a lateral air-collecting branch 43 which extends through one side of the passage 16 and is provided with a terminal 44 which turns  
105 toward the blowers. This terminal 44 collects some of the air discharged through the passage 16 and shunts it through the pipe 37, thus insuring positive steady flow of oil to the burner head even when the control valve 39 is almost closed. Provision is made for  
110 automatically setting this valve 39 according to the strength of the air blast through the passage 16. In the present showing, the valve 39 is provided with an operating arm 45 which is upwardly swingable to reduce  
115 the flow through said valve and is downwardly swingable to increase said flow. To control the maximum closing of this valve, an adjustable eccentric 46 is preferably provided. A link 47 is pivoted to and rises  
120 from the arm 45, said link being connected to a crank 48 on the end of a rock shaft 49 which extends across the upper portion of the air passage 16. This rock shaft is provided preferably with two vanes 50 and 51,  
125 disposed at right angles to each other as shown in Fig. 1, the larger vane 50 normally hanging about vertical, whereas vane 51 is about horizontal, when only the small blower 26 is in operation, the vanes being  
130

held in this normal position by a weight 52 on an arm 53 of the shaft 49. It is thus insured that as long as only the blower 26 is in operation, the valve 39 shall be closed to the extent permitted by the eccentric 46, thus allowing only a small quantity of fuel to pass to the burner head. When the motor 29 is cut into play however, and drives the blower 28, the increased force of air through the passage 16, swings the vane 50 in the direction of the arrow in Fig. 1 and the vane 51 is then lowered into the air current so that the latter acts next against this vane and turns the rock shaft 49 to the maximum, for the purpose of opening the valve 39 as far as possible, allowing maximum feeding of oil to the burner head.

A valve plate 54 is pivoted to the inner end of the partition 21 to close the discharge from the chamber 23, when only the blower 26 is in operation, this valve plate being swung to the closed position of Fig. 2 by the air pressure within the passage 16. As soon as blower 28 comes into operation, however, the plate 54 is opened by the strength of the air current discharged by said blower and it remains open as long as motor 29 is in play.

55 designates an oil receptacle operatively connected with the emergency oil cutoff valve 38, and adapted to receive oil from an overflow pipe 56 which is connected with the pot 7, below the crest of the raised neck portion 14. No claim is made for this arrangement of parts, but it may be explained that if the burner should become extinguished, oil from the pipe 37 will pass through the overflow pipe 36 into the receptacle 55, thus causing the latter to lower and automatically close the valve 38 in a well known manner.

As hereinbefore stated, the invention was designed primarily for use in connection with a structure such as that shown in my U. S. Patent No. 1,573,406, although it is of course not restricted to such use. The burner head 6 is shown within the fire pot 57 of a furnace, with the passage 16 passing through the fire pot wall 58 and the furnace jacket 59. This passage is formed with an opening 60 communicating with the space between the wall 58 and the jacket 59, and a combined valve plate and air collector 61 is secured to one side of the passage 16 at the interior of the latter, the secured end of this plate 61 being disposed between the opening 60 and the burner head, whereas its other end diverges with respect to the apertured wall of the passage 16 and is connected with an appropriate adjusting device 62. By means of this adjusting device, the plate 61 may be sprung toward or from the wall of the passage 16 to a greater or lesser extent, thus controlling the amount of air shunted from the passage 16 into the space between the furnace jacket and the fire pot wall. The air entering this space performs the same

functions as that which reaches the corresponding space in the patented structure, above referred to.

On account of existing advantages for the general construction shown and described, it is preferably followed. However, within the scope of the invention as claimed, variations may of course be made.

**I claim:—**

1. An oil burning apparatus comprising a burner head having an oil inlet and an inlet passage for air under pressure, oil supply means for said inlet having a control valve, angularly disposed pivotally mounted vanes in said air passage adapted to be successively engaged and operated by a blast of air therethrough, and operating connections between said vanes and said control valve.

2. An oil burner comprising a pot having an oil inlet and a tangential inlet for air under pressure, a circular baffle plate centrally disposed within said pot and spaced above its bottom, a cover plate for said pot, said cover plate having an elliptically shaped opening disposed above said baffle plate and in excentric relation thereto.

3. An oil burner comprising a pot having an oil inlet and a tangential inlet for air under pressure, a circular baffle plate within said pot and spaced above its bottom, and a cover plate for said pot, said cover plate having an elliptical opening disposed above said baffle plate, said elliptical opening being elongated transversely of said air inlet, being of greater length than the diameter of said baffle plate, and being of less width than said diameter.

4. A structure as specified in claim 3; one end of said elliptical opening being substantially in line with the peripheral edge of the baffle plate while the other end of said elliptical opening is outwardly spaced from said peripheral edge, the side edges of said opening being inwardly spaced from said peripheral edge of said baffle plate.

5. Air supply means for the air inlet passage of an oil burner, said means comprising a fan housing partitioned into relatively small and large fan compartments, blower fans of relatively low and high capacity mounted in said compartments respectively, means for driving either the low capacity blower or both of said blowers, and means for automatically closing the outlet from the larger compartment when only the blower of small capacity is in operation.

6. In combination with a fire pot having a surrounding jacket, an oil burner within the fire pot and having a supply passage for air under pressure, said passage extending through the walls of the fire pot and jacket; an air outlet from said passage into the space between said wall and jacket, a combined air-directing and valve plate operatively associated with said opening to effect

discharge of a greater or lesser amount of air therethrough, and means connected with said plate for adjusting the same to vary its position with regard to said opening.

- 5 7. In an oil burning apparatus, an oil gasifying pot having a tangential trough-like inlet neck and a trough-like air pas-

sage connected with said neck, together with sectional covers for said pot and said passage, a section of the pot cover having an 10 integral extension covering said neck.

In testimony whereof I have hereunto affixed my signature.

EDWARD D. LEWIS.