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SILENCER AND PRESSURE EQUALIZER FOR OIL BURNERS

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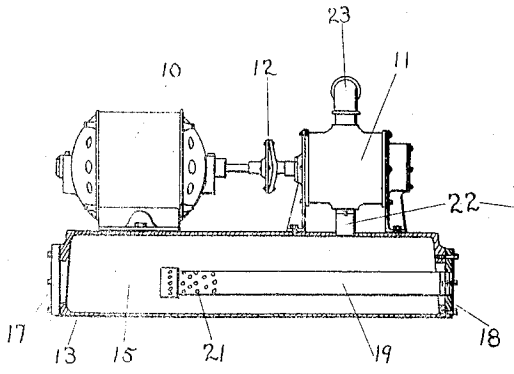



Fig. 1.

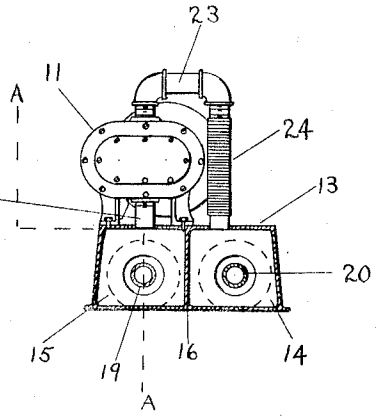



Fig. 2

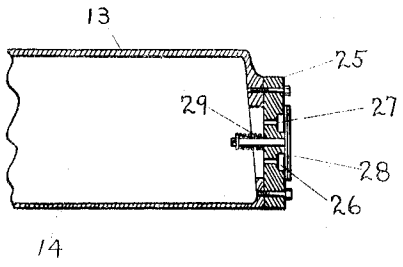



Fig. 3.

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# UNITED STATES PATENT OFFICE.

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## SILENCER AND PRESSURE EQUALIZER FOR OIL BURNERS.

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This invention relates to fuel oil burners and particularly pertains to a muffler base for use in the house heating type of burner.

In the use of electrically driven oil burning apparatus for house heating, it becomes necessary to reduce the noise accompanying the operation of the ordinary burner blower.

In the burning of liquid fuel one of the methods in common use is to atomize the fuel in some form of burner nozzle by means of air pressure supplied by a motor driven air blower. In the positive or pressure type of air blower the air is drawn into the blower and discharged from the same in the form of puffs or pulsations. These pulsations not only cause an objectionable noise at the blower but produce irregularity in the flame at the burner nozzle. In order to secure uniform and continuous combustion at the burner nozzle it is necessary to secure a uniform flow of air at the nozzle and where the positive type of blower is utilized for producing the air pressure for atomizing the liquid fuel, it is necessary to provide some means for equalizing the flow of air at the nozzle.

In case a burner nozzle becomes clogged with carbon the air space around the nozzle may be closed off and in the positive type of blower the air pressure would thus be so increased as to overload and possibly burn out the electric motor driving the blower. In order to eliminate this danger it is necessary to provide some means for preventing the pressure from exceeding a certain predetermined maximum.

It is the principal object of the present invention, therefore, to provide a form of base for mounting the motor, air blower, oil pump and other connected units of an oil burning system which shall act in such a way as to reduce the volume of sound usually produced by the inrush and outflow of air through the blower.

Another object of this invention is to provide a pressure equalizing chamber to insure a particularly uniform flow of air to the burner nozzle.

Another object of the invention is to provide means for preventing any excess of air pressure from overloading the electric motor in case of clogging of the air passage at the burner nozzle.

The present invention contemplates the use of a hollow base divided into two air tight compartments, each compartment taking the form both of a muffler and a pressure equalizing chamber, the base also forming a frame upon which an electric motor, blower, oil pump and other units of an oil burning system may be mounted.

The invention is illustrated by way of example in the accompanying drawings, in which:

Figure 1 is a view in elevation and in longitudinal section thru an oil burner muffler base, embodying the preferred form of the invention and taken on a line A A of Figure 2.

Figure 2 is a view in elevation and in section showing the end of the muffler base and disclosing the two separated air chambers with muffler tubes inserted.

Figure 3 is a view in longitudinal section through a portion of the muffler base and showing the detail of the air pressure relief valve in its relation to the base.

Referring more particularly to the accompanying drawing 10 indicates an electric motor, directly connected to an air blower 11 by means of a flexible coupling 12. Both motor and blower are mounted on a hollow base 13. This base is divided centrally into two air tight compartments 14 and 15 by means of a central partition 16. Openings at either end of the base are closed by means of caps 17 and 18. Inserted in these caps in each air compartment are muffler tubes 19 and 20. The inner ends of each of these muffler tubes are perforated by small holes 21. From the lower side of the blower 11 a short tube 22 is inserted thru the base 13 into the air space 15. At the top of the blower a U tube 23 connects with the compartment 14 of the base 13 thru a length of flexible tube 24.

Referring to Figure 3 a circular cap 25 is shown attached to the base 13. The center of this cap is recessed at the point 26 and perforated by a series of small holes 27. A valve 28 closes the opening 26, being held in place by means of the spring 29.

In the operation of the present invention the motor 10 drives the air blower 11 which causes air to be drawn thru the tube 22. At the same time air from the blower is expelled thru the pipes 23 and 24 into the hollow chamber of the base 14. The action of the blower is such that the air is drawn in in little puffs causing a rapid variation of

pressure. The air is expelled from the blower in the same manner. This rapid variation in pressure is absorbed thru the expansion and contraction of the air in the chambers 15 and 14. The incoming air is admitted from the atmosphere to the chamber 15 thru the tube 19 and is distributed uniformly thru the small perforations 21. The air pulsations caused by the intermittent action of the blower vanes are absorbed by the expansion of the air in the chamber 15. This causes the velocity of the air thru the tube 19 to be uniform, which deadens the sound which would otherwise be caused by the variations in pressure. The air leaving the blower thru the pipes 23 and 24 enters the chamber 14 of the muffler base. The pulsations of the outgoing air are absorbed by the compression of the air in the chamber 14 at the same time allowing a uniform outflow of air thru the perforated tube 20.

In case the air pressure in the chamber 14 at any time reaches a point where an overload on the motor might be produced, the air pressure in this chamber 14, acting on the valve 28 thru the perforations 27, is sufficient to cause the contraction of the spring 29 opening the relief valve and allowing the excess air to escape.

It will thus be seen that by the use of the mechanism here described the noise accompanying the operation of the ordinary motor driven air blower will be eliminated and at the same time the air pressure delivered to the burner nozzle will be equalized in such manner as to prevent fluctuation of the flame. At the same time means have been provided for insuring against the possibility of excess air pressure throwing an overload on the electric motor.

While I have shown the preferred form of my invention as now known to me it will be understood that various changes might be made in the combination and arrangement of parts by those skilled in the art, without departing from the spirit of the invention as claimed.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:—

1. In combination with an air blower for supplying air under pressure, an electric motor for driving said blower, a muffler base for mounting the blower, means for silencing the air passing thru said blower and means of equalizing the pressure of the air delivered from said blower.

2. In combination with an air blower for supplying air under pressure, two hollow chambers connected respectively to the intake and outlet ports of said blower, a perforated tube inserted in each hollow compartment and each tube communicating at one end with the outside of said compartment.

3. In combination with an air blower, an electric motor for driving said blower, a double chamber muffler base for mounting said blower, means provided for silencing the air passing thru said blower and of equalizing the air pressure delivered from the blower, and a relief valve mounted in said base for limiting the maximum air pressure delivered by said blower.

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