Aug. 28, 1928.

1,682,587

J. M. WENZ

OIL BURNER

Filed Sept. 4, 1926

2 Sheets-Sheet 1

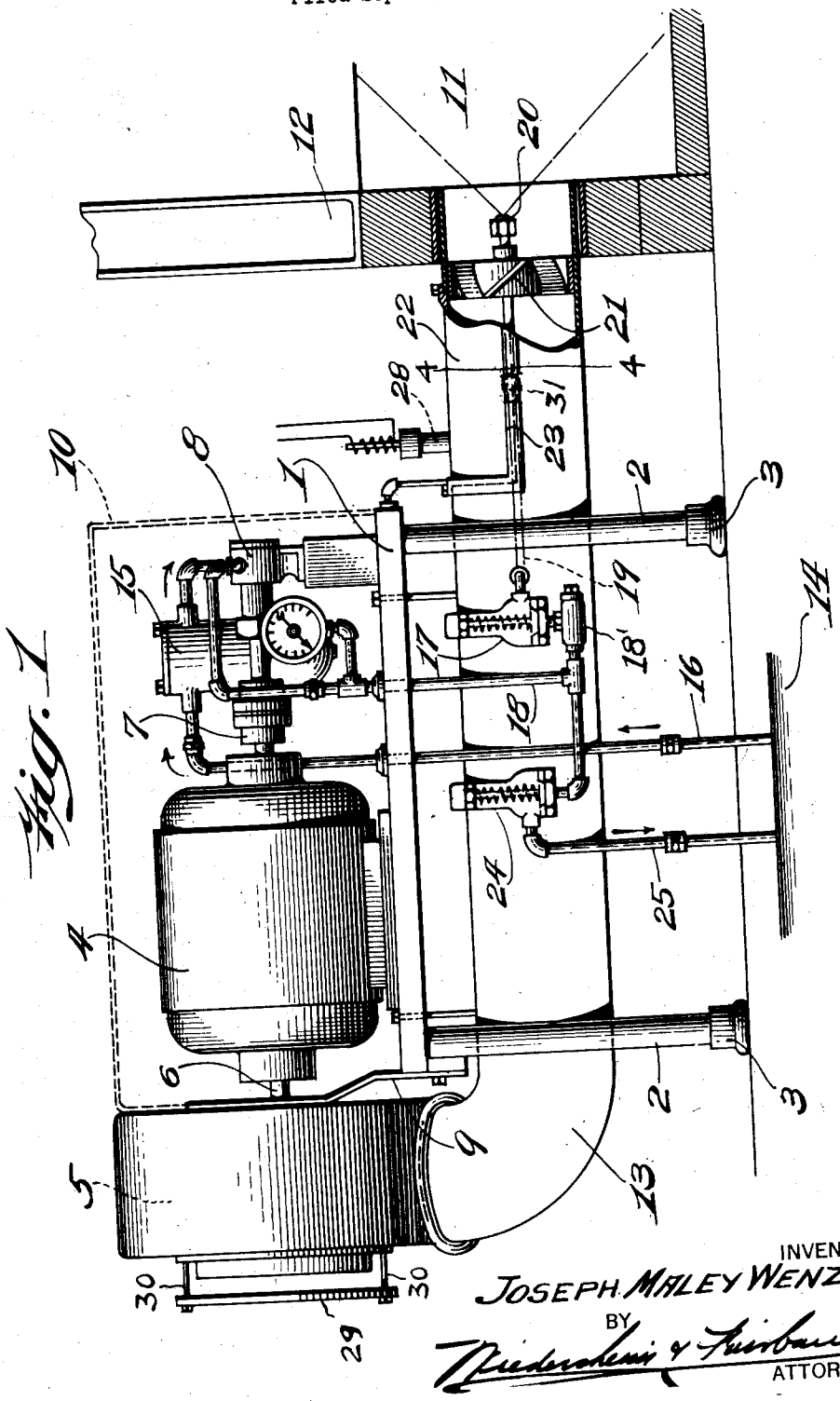


Fig. 1

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Fig. 2.

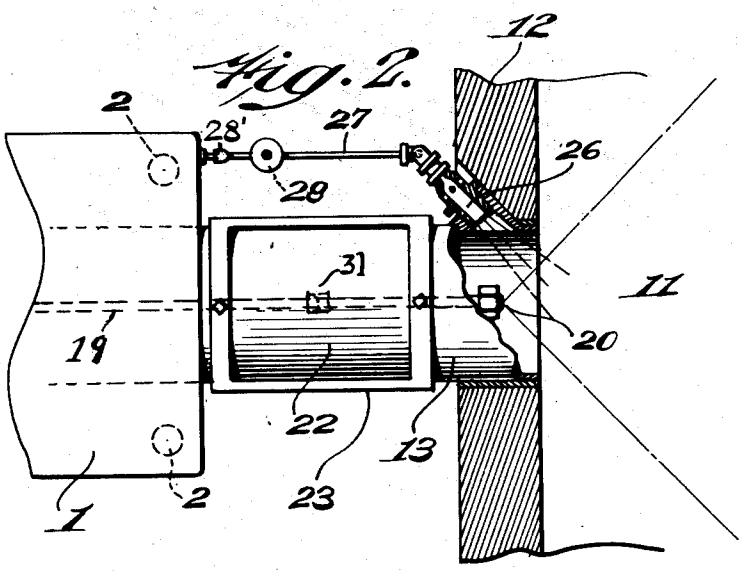


Fig. 3.

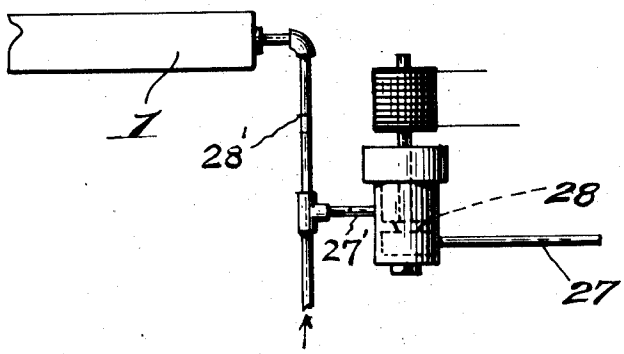
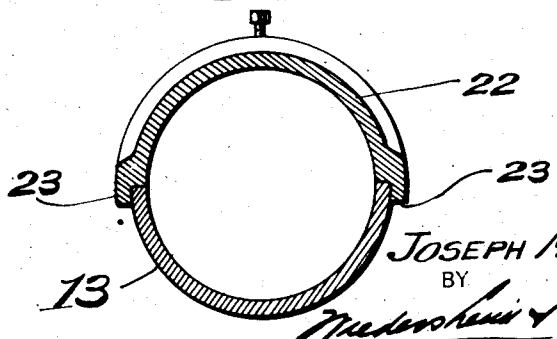


Fig. 4.



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UNITED STATES PATENT OFFICE.

JOSEPH MALEY WENZ, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO HOME COMFORT HEATER COMPANY, OF PHILADELPHIA, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

OIL BURNER.

Application filed September 4, 1926. Serial No. 133,565.

This invention, generally stated, relates to oil burners and has more especial relation to that type of oil burner used in homes, apartments, institutions, factories, and the like for heating and industrial purposes.

The leading object of the present invention resides in the provision of an oil burner of the character stated which is compact in form; simple of assembly; efficient in operation; and in which various standard parts may be employed, thus tending to reduce installation and operation costs; and in which the parts when assembled are capable of effecting thorough atomization and complete combustion, thereby resulting in a quiet, so-called soft, and clean flame practically free from carbon deposits.

My invention further consists of a novel arrangement and collocation of a motor, blower and oil pump, wherein the driving shafts thereof are in horizontal alignment so that said blower and oil pump operate in unison with the motor, the latter being arranged intermediately of said blower and pump, whereby a stable and balanced construction is produced.

It further consists in a novel arrangement of a unit composed of the three above named elements supported upon a suitable base, below which the air conduit from the blower leading to the ash pit is positioned, provision being made for conducting oil from the oil pump to a relief valve which is positioned below the level of the atomizer and the fuel pipe leading thereto, said relief valve in conjunction with another relief valve having an overflow conduit leading to the tank being also positioned below said base and in proximity to said air conduit, whereby a very compact and efficient apparatus is produced. It further consists in the provision of a door in the air conduit in proximity to the furnace which door when opened gives access to a coupling in the oil pipe leading to the atomizer, whereby the latter and its adjunct are readily accessible.

A further object of the present invention is to provide an oil burner of the character stated, in which is combined an arrangement, collocation and combination of parts for attaining the results sought by the leading object.

A still further object is to provide an oil burner of the character stated in which the parts are so arranged and combined as to reduce to a minimum the possibility of explosion and the like, thereby rendering the burner safe for home use.

The invention further consists of the novel construction hereinafter described and finally claimed.

For the purpose of illustrating my invention I have shown in the accompanying drawings one form thereof which is at present preferred by me, since the same has been found in practice to give satisfactory and reliable results, although it is to be understood that the various instrumentalities of which my invention consists can be variously arranged and organized and that my invention is not limited to the precise arrangement and organization of the instrumentalities as herein shown and described.

The nature, characteristic features and scope of the invention will be more fully understood from the following description taken in connection with the accompanying drawings forming part hereof, and in which:

Fig. 1, represents a view in side elevation partly in section illustrating the application of my novel oil burner and its adjuncts to heating apparatus.

Fig. 2, represents a fragmentary view in plan illustrating the right hand side of Fig. 1 and showing the gas pilot connection, the front furnace wall being in section.

Fig. 3, represents a fragmentary view in elevation hereinafter referred to, and showing the piping connections for the pilot.

Fig. 4, represents a view in vertical section of the air conduit showing the removable service door, the section being taken on line 4—4 of Fig. 4.

Referring to the drawings in detail, 1 designates a base plate supported upon standards 2, each standard being provided at its bottom with a rubber foot 3. Mounted upon the base plate 1 is a so-called repulsion start, induction type electric motor which is designated 4, and is connected at one end with a so-called multi-blade volume blower 5 by means of shaft 6 and is connected at its opposite end by means of a flexible coupling 7 with an oil pump 8, the shafts of said motor, pump and blower being in horizontal alignment. The blower 5 is supported from the base plate 1 by means of a bracket 9 or its equivalent and the motor and pump are

protected by a hood 10 shown in dotted lines in Fig. 1. The blower 5 is connected with the ash pit 11 of the furnace 12 by means of an air blast tube or conduit 13, which extends beneath the base plate 1 and between the standards 2. 14 designates a tank for containing oil or hydrocarbon fuel and leading from the tank to an oil suction strainer 15 is a pipe 16. Oil passing from the tank 14 through pipe 16 is strained at the point 15 and thereafter passes to the oil pump 8 of any suitable construction. From the pump 8 to a spring controlled relief valve 17 leads a pipe 18 in which is an oil strainer 18', and from the said relief valve 17 leads a pipe 19 which is positioned in the air blast tube 13 and communicates with the fuel oil atomizer 20, which is in communication with the ash pit 11 of the furnace 12. In juxtaposition to the atomizer 20 and within the air blast tube 13 is a device 21 comprised of spirally arranged fixed vanes, which are arranged at an angle to the longitudinal axis of the tube 13, thus imparting a whirling quantity of air to the atomizer 20. In order to gain access to the tube 13 adjacent the atomizer 20 and device 21, I employ a removable service top door 22, best seen in Figs. 1 and 4, which door is semi-circular in cross-section and flanged as at 23 upon opposite sides, for engaging and resting on the cooperative parts of the tube 13. Any oil delivered to the pump 8 but not needed at the atomizer 20 is returnable through the pressure relief valve 24 and from thence back to the tank 14 by means of a pipe 25. Ignition of the fuel issuing from burner or atomizer 20 is obtained by means of a pilot tube housing or burner 26, see Fig. 2, which pilot tube burner is arranged at an angle with respect to the burner 20 and is in direct communication with the conduit 13, so as to discharge thereinto near its exit into the ash pit 11. Thus the pilot tube burner is caused to enter the tube or conduit 13 at a point in front of the atmozer fuel injected into the ash pit from the burner 20, the advantages of which are apparent. The pilot tube burner 26 is connected by pipe 27 with any suitable source of gas supply, as the pipes 27', see Fig. 3, the upper pipe 28' serving merely as a support.

The magnetic gas valve 28 is hooked up in series with the stack switch and time switch (not shown) in any conventional manner, in which case the stack switch keeps the valve 28 magnetized and open, delivering an expanded pilot torch through the pipe 27 until the oil flame is kindled, after which the stack switch turns into running position, thereby cutting off the current to the magnetic gas valve 28, allowing the plunger valve therein to close and cutting down the gas torch to a pilot flame until it is again needed. The magnetic valve seen in Fig. 3 may be of any conventional type, and requires no detailed description, it being understood that when the circuit is closed and the magnet is energized the valve is unseated, and when the circuit is open or broken, the valve seats.

In order to regulate the amount of air admitted to the blower 5, I employ an adjustable air control plate 29, which is mounted on the adjustable bolts 30, seen at the left in Fig. 1, whereby it will be apparent that when said bolts are adjusted with respect to the blower 5, the plate 29 will have a valvular function and will control the amount of air entering the blower. I also preferably employ a coupling 31, as shown in dotted lines in Figs. 1 and 2, in the oil pipe 19 leading to the burner or atomizer 20, whereby when the door 22 is opened, the coupling members can be readily disconnected for the purpose of inspection and repair or for installing a new atomizer and its adjuncts.

I desire to call especial attention to the compact arrangement of the various elements seen in Fig. 1 since it will be apparent that the motor 4 is mounted intermediately of the blower, the oil strainer 15 and the pump 8, so that the shaft of the motor, blower and oil pump are all in horizontal alignment. By positioning the air conduit 13 below the base 1, space is economized and especial attention is called to the location and function of the relief valves 17 and 24. The function of the relief valve 17 is as follows: This spring loaded valve is set for a slightly lower pressure than the relief valve 24, its function being to eliminate the possibility of siphoning oil through the atomizer 20 when the burner is not in operation, it being apparent from Fig. 1 that the valve and its seat in the relief valve 17 are positioned lower than the atomizer or burner 20, thereby eliminating any oil drip at the atomizer 20. The pressure at which this valve 17 is set makes sure that all oil delivered to the atomizer 20 is thoroughly atomized and when the unit automatically stops, the flow of oil through the pipe 19 stops, thereby instantly eliminating the possibility of the oil drip. The fact that the valve 17 closes immediately upon the stopping of the unit seals pipe 18, thereby keeping the oil pump 8 constantly primed. The relief valve 24 is set to a higher pressure than the relief valve 17, and determines the atomizing pressure, valve 24 being adjustable for different pressures covering various sizes of installations.

I desire to call especial attention to the utilization of the space below the base 1 for the relief valves 17 and 24 above mentioned, said valves being positioned in proximity to the air conduit 13 and all being below the base 1, so that a very compact and

efficient structure is produced. The operation is as follows:

The motor 4 simultaneously forces the requisite supply of air through the conduit 13 and also simultaneously forces the requisite supply of oil from the pump 8 to the pipe 18 to the strainer 18', the relief valve 17 and pipe 19 to the atomizer 20. This small well protected gas pilot burns continuously in the pilot housing 26. Upon starting the unit, the small pilot flame automatically expands to a torch, which in turn ignites the atomizer oil at the top of the atomizer 20, this expanded torch being automatically cut down to the pilot flame, as soon as the oil fire is properly kindled, this being done by the use of a stack switch (not shown) in the chimney wired up in series with the magnetic valve 28, the oil flame continuing until either the desired room temperature is reached or an unsafe temperature at the furnace, in which case either thermostat automatically stops the motor 4, which in turn cuts off the oil, which in turn stops everything, cutting out the flame entirely.

The above operation is repeated when any thermostat again calls for heat. Should the motor 4 be automatically started by the use of a thermostat and atomized oil from the atomizer 20 fails to ignite, the stack switch (not shown) in the chimney automatically stops the motor through a timing switch within a predetermined time, approximately sixty seconds, thereby stopping everything and cutting off the oil and eliminating flooding the furnace with oil. In this case it is necessary to manually reset the time switch when the unit can be again started.

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

1. In a device of the character stated, a base, a unit superimposed thereupon and comprising a blower, oil pump and a motor, the latter being arranged between said blower and oil pump, an air conduit leading from said blower below said base, an oil conduit leading from said oil pump, an atomizer into which the oil is discharged, a relief valve in the line between said oil pump and atomizer and located at a point below said atomizer, and a second relief valve in communication with the oil supply pipe having an overflow leading to the source of oil supply both of said relief valves being located below the plane of said atomizer.

2. In a device of the character stated, a base, supports therefor, a unit superimposed thereupon and comprising a blower, an oil pump, and a motor, the shafts of said unit aligning, an air discharge conduit leading from said blower below said base and between said base supports, an oil discharge conduit leading from said oil pump, an atomizer from which the oil is discharged, a relief valve in the oil line between said oil pump and atomizer, a source of oil supply, a second relief valve between the oil pump and said source of oil supply, both said relief valves being located below the plane of said atomizer, a door in said conduit, located in proximity to the exit end thereof and a union in said oil supply pipe leading to the atomizer and exposed when said door is opened for enabling the atomizer and its adjuncts to be readily accessible.

JOSEPH MALEY WENZ.