

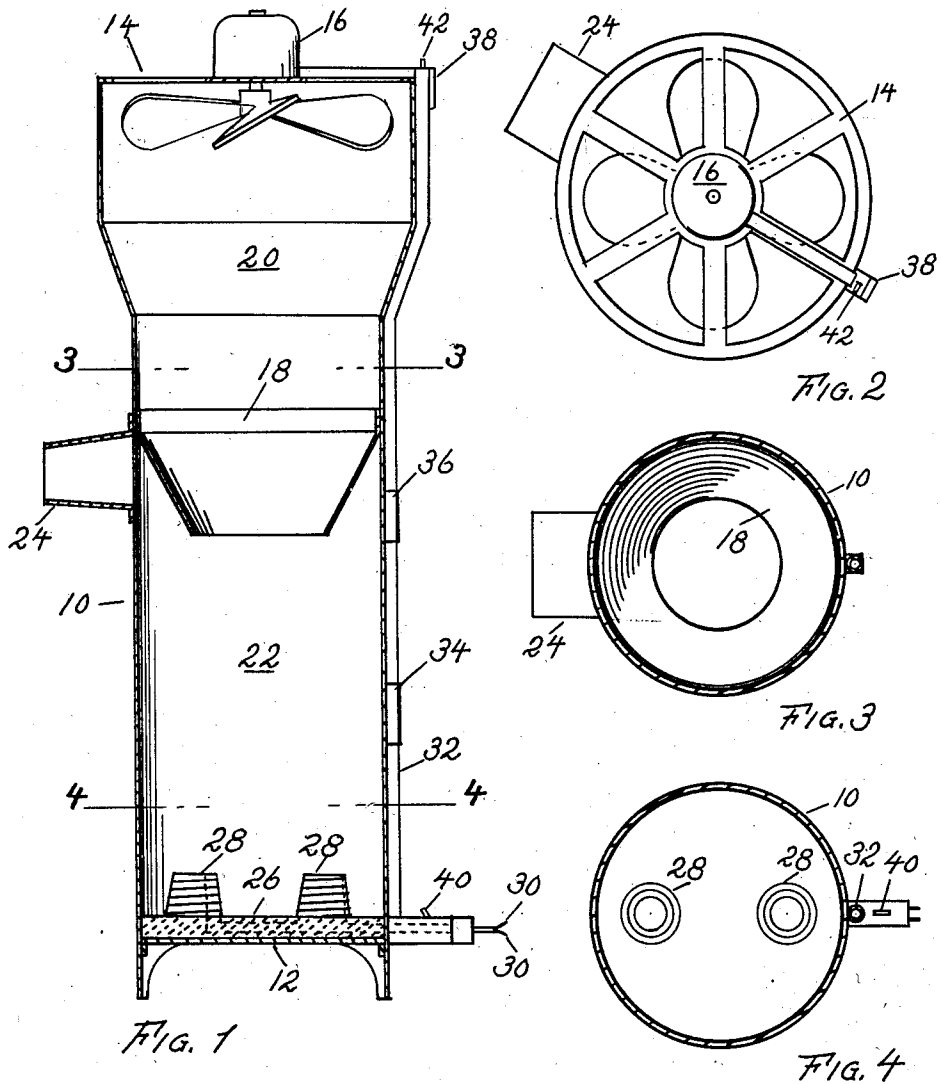
Dec. 18, 1945.

L. N. WALTER
HEATER CONSTRUCTION

2,391,111

Filed Feb. 25, 1944

2 Sheets-Sheet 1



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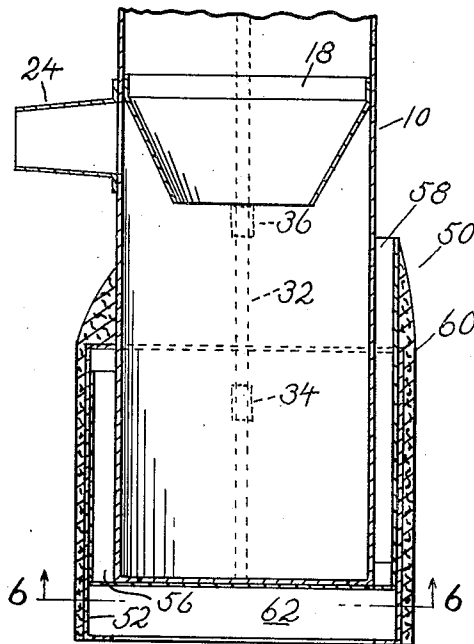


FIG. 5

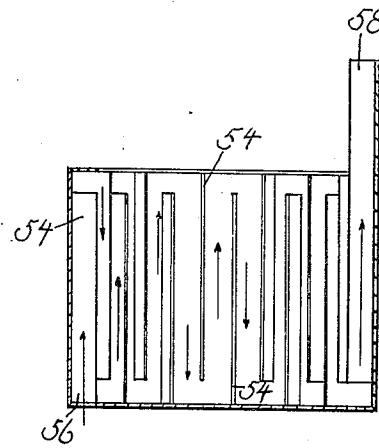


FIG. 7

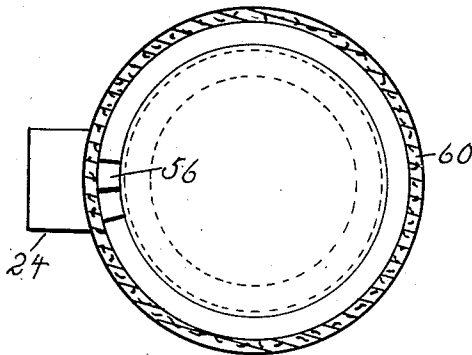


FIG. 6

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HEATER CONSTRUCTION

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10 Claims. (Cl. 219—39)

This invention relates to an improved heater construction and has for one of its principal objects the provision of means wherein cool air may be forced into the central portion of the mixing chamber of a heater and as a pressure is built up therein the heated air is expelled from the outer portion of the chamber. The improved construction which is especially adapted to be incorporated in small portable heaters may also be built into larger units.

Another object of importance and advantage resides in the provision of means for directing entering air downwardly through the central portion of the mixing chamber to the heating point and then upwardly along the outer portion of the chamber and through a point of discharge intermediate the ends thereof.

Still another object of advantage and importance is the provision of means whereby gas, electricity, or other heating means may be employed with the improved device of this invention. Furthermore, control means such as condition responsive devices may be employed to render the improved device fully automatic.

An additional object of advantage and importance resides in the provision of means for economically producing an efficient, sturdy and simple heater which may be employed with electrical, gas or other heating agents.

Other objects of advantage and importance will become apparent as the following detailed description progresses, references being had to the accompanying drawings wherein

Fig. 1 is a vertical section of a portable heater which embodies the invention.

Fig. 2 is a top plan view thereof.

Fig. 3 is a sectional view taken on line 3—3 of Fig. 1.

Fig. 4 is a sectional view taken on line 4—4 of Fig. 1.

Fig. 5 is a vertical section of a slightly modified form of the device, parts thereof being broken away.

Fig. 6 is a sectional view taken on the line 6—6 of Fig. 5 looking in the direction indicated by the arrows.

Fig. 7 is a detailed view of a portion of the lower portion of the device shown in Fig. 5.

The reference numeral 10 indicates generally the body of the improved device of this invention. In the preferred embodiment of the device the body 10 is cylindrical, as is clearly shown in the drawings. The lower portion of the body 10 is provided with a closure 12 and the upper

end of the body 10 carries an apertured member 14.

Secured to the apertured member 14 on the upper end of the body 10 is an electric fan 16. The fan is positioned to draw air through the apertured member 14 and force it downwardly into the body 10. Secured to the interior surface of the body 10 intermediate the ends thereof is an apertured member 18. The apertured member 18, which is substantially in the form of a truncated cone, divides the body 10 into an upper air receiving chamber 20 and a lower mixing chamber 22. Air drawn into the body 10 by the fan 16 is forced downwardly through the chamber 20 and through the truncated cone shaped member 18 and into the central portion of the mixing chamber 22. The tendency of this current of air is to continue downwardly until turned near the bottom of the chamber, and thence to travel outwardly and upwardly to the outer surface of the cone shaped member 18 and thence to atmosphere through a port 24.

Positioned on the closure member 12 is a heat resistant member 26 upon which heating elements 28, 28 may be positioned. The heating elements 28, 28 are electrically connected to a source of supply through lead wires 30, 30. An electric circuit in a conduit 32 also extends through a limit switch 34, a starting switch 36 and a thermostat 38 to the electric fan 16. Manually operated switches 40 and 42 are also provided in the heating and fan circuits.

In operating the improved device of this invention the lead wires 30, 30 may be plugged into a convenient outlet, not shown, and the manually operated switches 40 and 42 moved to "on" position. In the event the temperature of the room in which the improved device is positioned is below a predetermined minimum, the portion of the circuit passing through the thermostat 38 is closed and the heating elements are immediately energized. As the heating elements warm up the chamber 22, the interior surface thereof becoming warm activates the starting switch 36, which upon closing starts the fan 16. Operation of the fan forces air downwardly through the chamber toward the heating elements 28, 28 and outwardly through the discharge port 24, as previously explained. In the event the chamber 22 becomes overheated, the limit switch 34 functions to open the circuit to the heating elements without disrupting the fan circuit. Consequently, the continued blast of air entering the chamber quickly lowers the temperature therein to a normal operating range, whereupon the limit

switch again closes and re-energizes the heating elements. As the temperature within the space being heated raises the thermostat 38 becomes satisfied and opens the circuits to both fan and heater, thus completing the cycle of operation.

A slightly modified form of the invention is shown in Figs. 5, 6 and 7 wherein the lower portion of the device is slightly altered to accommodate a gas or other heating element. In this embodiment of the device the same reference numerals are used to indicate similar parts shown in the preferred embodiment. In the modified embodiment the body 10 is nested in a cylindrical member generally indicated by the reference numeral 50. The outer wall of the body 10 is spaced from the inner wall 52 of the member 50, as is clearly shown in Fig. 5.

Positioned between the spaced walls of the nested members 10 and 50 is a plurality of baffle plates 54, 54. The baffle plates are staggered with respect to their ends so as to alternately form passages over and under each successive plate. Thus a passageway is provided through the space between the nested bodies from an inlet port 56 to an outlet port 58. Consequently heat generated beneath the members 10 and 50 is conveyed through the passage formed by the baffles 54, 54 and is transferred to the lower portion of the body 10.

In the modified form of the invention it has been found advisable to provide the outer surface of the member 50 with an insulated member 60, such as asbestos, or the like, and also to extend the side walls thereof to form a heating chamber 62 in the lower portion of the member.

In operation the modified form of the invention is substantially the same as in the preferred embodiment with the exception that the limit switch 34 and the thermostat 38 may be employed to operate a gas valve instead of a switch.

It will be apparent from the foregoing that herein is provided an exceptionally sturdy and efficient device which may be universally used. Furthermore the structures shown herein may be modified without departing from the principles of providing a heater wherein the flow of heated air is dependent entirely upon pressure built up through the action of a fan opposed to a heating element.

It will also be apparent to those skilled in the art to which the device appertains that numerous details of construction and design may be altered and changed without departing from the spirit or scope of the invention. Accordingly the patent granted hereon is not to be limited to the preferred embodiment here shown or in any other manner except as is necessitated by the terminology of the appended claims when given the range of equivalents to which they may be entitled.

I claim:

1. In a heater, a cylindrical member having an open end and a closed end, a heating element positioned in said closed end, a fan positioned in said open end and adapted to force air through said cylindrical member toward said heating element, an annular member secured to the walls of said cylindrical member intermediate the ends thereof, the inner edges of said annular member being directed inwardly and downwardly to define the upper limits of a mixing chamber, an outlet penetrating the wall of said cylindrical member closely adjacent and below said annular member, and a cylindrical member enclosing the lower portion of said first named cylindrical member and extend-

ing therebelow and providing a combustion chamber beneath said first cylindrical member.

2. In a heater, a body having an open end and a closed end, an apertured partition positioned intermediate the ends of said body to provide a mixing chamber, means for directing a flow of air through said apertured partition into said mixing chamber, means for heating the air entering said chamber, said heating means including a chamber formed exteriorly of the closed end of said body, and means closely adjacent said apertured partition for passing heated air from said mixing chamber.

3. In a portable heater, a body having an apertured partition intermediate the ends thereof dividing said body into an upper receiving and a lower mixing chamber, said chambers being in communication with each other, means for directing a flow of air downwardly through said apertured partition and through the central portion of said mixing chamber and thence upwardly adjacent the outer walls of said body, means for discharging the upwardly flowing air from said body at a point near the upper part of said mixing chamber, and means for heating said air as it is circulated within said mixing chamber, said means for heating being disposed on the exterior of said body.

4. In a heater, a body having an open end and a closed end, a heating element in which said closed end is nested and providing means for heating said closed end, a fan in said open end disposed to force air into said body and toward said heated end, means dividing the interior of said body into upper and lower chambers, said means comprising a member in the form of an inverted truncated cone and being positioned to direct air from said fan and upper chamber into the central portion of said lower chamber, and means for exhausting air from said lower chamber at a point above its entry into said lower chamber.

5. In a heater, a hollow body having an open end and a closed end, a member into which said body is positioned providing means for heating said closed end, means for forcing air through said open end and toward said closed end, a substantially funnel shaped member positioned intermediate said ends and adapted to direct incoming air toward the center of said closed end, and port means above the discharge end of said funnel shaped member for exhausting air from said body.

6. In a heater, a cylindrical body having an open end and a closed end, a plurality of vertical fins in spaced relation positioned on the lower portion of said body, said fins being in alternately staggered relation, closure members positioned on the ends of said alternately staggered fins, an insulating member encasing said fins and the lower end of said body, said insulating member and said fins combining to form a flue encasing the lower portion of said body, an electric fan positioned adjacent the upper end of said body, an apertured partition positioned in said body intermediate the ends thereof, and an outlet port formed in said body at a point beneath said partition.

7. In a heater, a hollow body having an open upper end and a lower closed end, a discharge port intermediate said ends, an apertured partition secured within said body at a point above said discharge port, a second hollow body telescoped over the lower portion of said first named body, the walls of said bodies being spaced apart,

a plurality of fins disposed between said bodies, said fins being alternately staggered to provide a single passage encasing the lower portion of said first named hollow body, an inlet formed in said second body beneath certain of said fins, an upwardly projecting outlet on the opposite side of said body, and means for forcing a current of air downwardly through said partition.

8. In a heater, a hollow body having a closed lower end and an open upper end, a partition substantially in the form of a truncated cone dividing said body into upper and lower compartments, means for heating said lower compartment, said means comprising a combustion chamber beneath the closed end of said hollow body, a continuous flue extending from said chamber around the peripheral surface of the lower portion of said body, means for driving a current of air downwardly through said truncated cone partition, and means for expelling said air from said lower compartment.

9. In a heater, a hollow body, a closure covering

one end of said body, a substantially dish-shaped apertured partition intermediate the ends of said body, means for conveying a heated fluid over the outer lower surface of said body, means for directing a current of air toward the closed end of said body, and a discharge port in said body below said dish-shaped partition.

10. In a heater, a body, a closure over one end of said body, the other end of said body being open to atmosphere, an apertured partition intermediate the ends of said body, a second body within which said first named body is nested, said second body having a closure adjacent the lower end thereof, the vertical walls of said bodies being spaced apart, a plurality of baffles in spaced relation engaging said walls and providing a single continuous passage, a heat impervious material covering the walls of said second body, and a discharge port for said first named body positioned between the upper end of said second body and said apertured partition.

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