Aug. 4, 1953 S. J. HEIMAN 2,647,506

FORCED AIR SPACE HEATER WITH AIR-COOLED MOTOR

Filed Jan. 10, 1950

FIG. 1

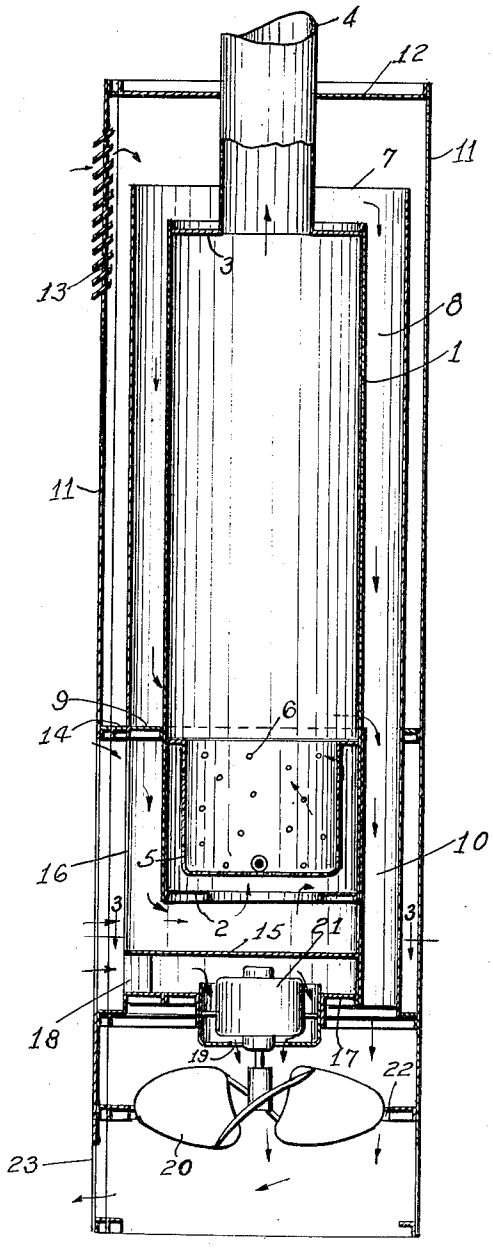


FIG. 2

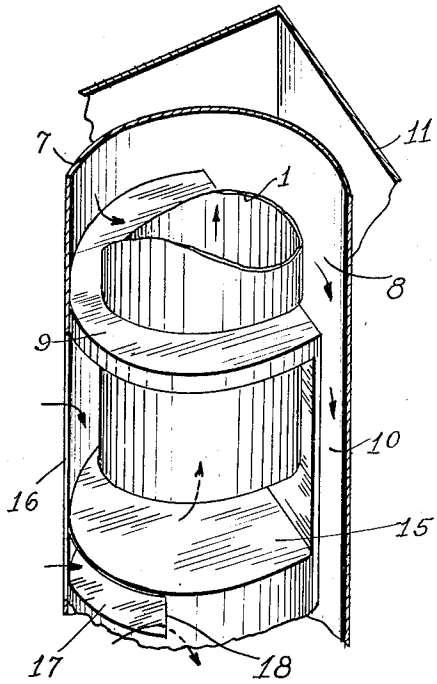
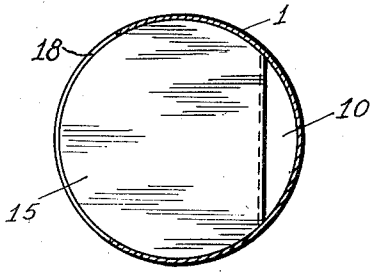


FIG. 3



INVENTOR
SIDNEY J. HEIMAN
BY: Ben V. Gilliam
ATTORNEY

Patented Aug. 4, 1953

2,647,506

UNITED STATES PATENT OFFICE

2,647,506

FORCED AIR SPACE HEATER WITH AIR-COOLED MOTOR

Sidney J. Heiman, St. Louis, Mo.

Application January 10, 1950, Serial No. 137,810

1 Claim. (Cl. 126—110)

1

This invention relates to space heaters wherein the heated air is forcibly discharged from adjacent the bottom of the heaters, and more particularly to means for cooling said air-forcing means during the operation of the heater.

The invention has among its objects, the production of such a heater that will be relatively simple in construction, positive in action, safe in its operation, comparatively inexpensive to make, will move sufficiently large volumes of air at all times during operation, and which will be otherwise satisfactory and efficient for use wherever deemed applicable.

One of the important objects of my invention is to so construct such a heater that the same will have three independent air-currents flowing therethrough, the first one for supplying the air for the combustion chamber, the second one for supplying the air to be heated and thence discharged from adjacent the bottom of the heater, and the third current to supply a medium for enveloping and cooling the motor that causes the circulation of said second current of air.

Another object of the invention is to build the aforesaid heater that the air to be heated and thence discharged to the place desired, is taken into the heater at substantially the top of the same so as to be at a comparatively high temperature at entrance, while the coolant air is entrained at adjacent the bottom of the heater so as to be initially at substantially low temperature.

A further object of my invention is to so construct a heater of the kind described, that said coolant air, after it has performed its cooling effect on the motor that actuates the body of heated air through its path, will be discharged into and intermingled with the said last-mentioned body of air, the volume of said coolant air being so minute in comparison to said volume of heated air as to have no material effect in lowering the temperature of the latter at discharge.

Many other objects and advantages of the construction herein shown and described, and the uses mentioned, will be obvious to those skilled in the art to which this invention appertains, as will be more clearly apparent from the disclosures herein given.

In the drawings, wherein like reference characters represent like or corresponding parts throughout the views,

Figure 1 is a vertical cross-section view through my improved heater;

Figure 2 is a fragmentary perspective view of a portion of the same, adjacent its lower end; and

Figure 3 is a transverse cross-sectional view,

2

taken substantially along the line 3—3 of Fig. 1.

Referring more particularly to the drawings, wherein I have illustrated the preferred embodiment of my invention, there is shown a heater of the type wherein the products of combustion are discharged beyond the room wherein the heater is to be located, and the heating of any predetermined space is done by entraining air into the heater and forcibly moving such air downwardly to absorb the heat from said combustion chamber and thence discharging the air thus heated, from adjacent the bottom of the heater.

The combustion chamber or drum 1 is preferably cylindrical and extends upright from the lower portion of the heater to adjacent the top of the same, this drum or shell having an open bottom end 2 and is closed by the top end 3, the latter end receiving the flue 4 extending upwardly and for carrying off the products of combustion to the outside atmosphere in the usual manner.

A pot or burner 5 is mounted in the lower end of said drum, for receiving the stream of oil or other combustible fluid for generating the heat for the device, said pot preferably provided with openings 6 therethrough that communicate with air entering the drum through the open bottom end 2 of the latter.

A second shell 7 is arranged concentric with the shell 1 so as to be spaced radially thereabout to provide an annular air passageway 8 between the shells, the upper end of the shell 7 terminating at or above the top end 3 of the drum 1.

A baffle 9 is provided transversely to bridge between said pair of shells and close the same thereat, except for providing an open space 10 or passageway between a reduced area between said shells, whereby air can not pass through the space between said shells except at said space 10.

Enclosing said pair of shells and concealing the other mechanism of the device, is a closure or casing of any desired cross-sectional shape, as for example the square shape shown, with the upright walls 11, said casing being provided with a top closure 12 through which the flue 4 projects. Louvers or other openings 13 are provided through one or more walls of the casing, adjacent the upper end of the latter, and through which air may be entrained to follow the path indicated by the arrows, as will be more clearly hereinafter set forth.

A baffle 14 may be provided intermediate the ends of said casing, at about the height of said

baffle 9, to prevent any air travel vertically past said baffle, between the casing and the adjacent shell, the side walls of said casing being imperforate except at said louvers, between said baffle 14 and the top of the casing.

A transverse wall 15 is interposed across the shells below and spaced from the bottom open end of the combustion shell, and an opening 16 is provided through the outer shell to communicate with the space between said bottom end of the combustion shell and the wall 15, for the supply of combustion air, as indicated by the arrows in the drawing, so that air entering into said space can not go anywhere except upwardly into the burner through said bottom opening.

Another transverse wall 17 is arranged substantially parallel to the wall 15 and is provided with an inlet opening 18 thereinto at its side, as shown, and is otherwise closed and sealed, except that it is provided with a discharge outlet adjacent its lower end, at 19.

A fan 20 is positioned in the space beneath the wall 17 and is powered by a motor 21 that is mounted in the chamber between the walls 15 and 17, the casing being opened at 22 below said fan so that when the fan is in operation, it will draw or entrain air through the louvers, from whence it travels downwardly past the hot drum to become heated during such travel, and then be directed by the baffle 9 to pass downwardly and be discharged through a discharge outlet to the space to be heated. A baffle ring 22 may be interposed in said lower portion of the casing, closely adjacent the periphery of said fan blades in their travel, so as to confine passage of air to that indicated by the arrows in the drawing.

The casing may be provided with a discharge opening 23 below the baffle 14, and air may enter the lower portion of the casing and flow into the combustion chamber through the opening 16 or into the cooling chamber through the opening 18. The air that is entrained into the cooling chamber, by the same fan that causes the downdraft of heated air between the shells, is taken from substantially the coolest level of the room, where it can do the most good as a coolant medium, and although it is discharged into the body of heated air as indicated, its amount is so small as not to materially lower the effective temperature of the latter air. As a matter of fact, this relatively fresh air improves the general healthfulness of the air discharged into the space to be heated.

The air entrained into the space between the shells, to become heated and discharged, is taken from approximately the warmest place of the heater casing, and this is important in aiding in efficiency when the casing is relatively tall.

From the foregoing description it is seen that there are three distinct currents of air travelling through the heater, each current being separate and independent from the others, but all serving together to accomplish the desired result. The first current of air is that used for supporting combustion of the fuel in the combustion chamber, and is taken from intermediate the height of

the heater. The second current is taken from adjacent the top of the heater, and is actuated downwardly by the fan, to become useful or heated and thence discharged into the room from adjacent the bottom of the heater. The third current of air is taken from a point closest to the floor as compared with the aforesaid two currents, and is actuated by the fan to travel over and envelope the fan motor and cool the latter prior to discharging into and intermingling with the discharging body of heated air from the first-mentioned current.

Thus, the shaft between the fan and motor may be relatively short to provide a more effective connection between the two, and although the motor is placed adjacent the heated body of air near its discharge from the heater, the motor will be maintained cool and in good operating condition.

Having thus described my invention, it is obvious that various immaterial modifications may be made in the same without departing from the spirit of my invention; hence I do not wish to be understood as limiting myself to the exact form, arrangement, combination and construction of parts herein shown and described, except as limited by the claim hereunto appended.

What I claim as new and desire to secure by Letters Patent is:

In a heater, an inner shell forming a combustion chamber and having an air inlet adjacent its bottom communicating with the atmosphere adjacent the heater and with a flue outlet adjacent its top and through which combustion gas discharges, an outer shell surrounding said inner shell and spaced therefrom and having an air inlet adjacent its top communicating with the atmosphere adjacent the heater and communicating with an outlet adjacent its bottom, a fan communicating with the space between said shells for directing the flow of air downwardly therebetween to become heated as it passes between said shells and thence discharge into the atmosphere from adjacent the heater bottom, a motor positioned in said heater above said fan and drivingly connected to the latter, and an air chamber housing in said heater and sealed from said heated air passage and enclosing said motor and having an inlet thereinto communicating with the atmosphere exteriorly of said housing and communicating with an outlet leading exteriorly from said housing and communicating with said fan whereby air is entrained by said fan to travel downwardly substantially separately of said heated air and to envelop and cool said motor.

SIDNEY J. HEIMAN.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
Re. 22,482	Schueder	May 16, 1944
1,982,139	Kercher	Nov. 27, 1934
2,228,201	Cotes	Jan. 7, 1941
2,314,696	Funk	Mar. 23, 1943