

Aug. 2, 1949.

L. N. WALTER
FORCED AIR HEATER

2,478,069

Filed Dec. 1, 1945

2 Sheets-Sheet 1

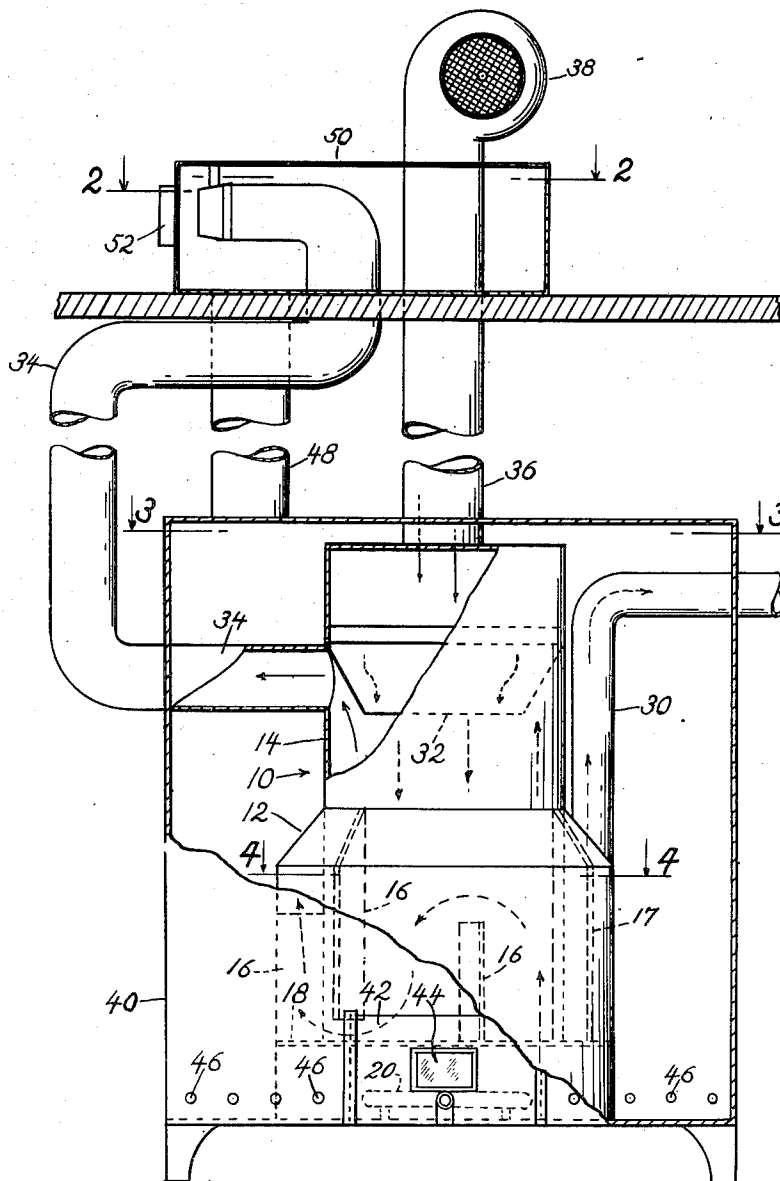


Fig. 1

LEO N. WALTER
INVENTOR.

BY

Leon T. Hooper

ATTORNEY.

Aug. 2, 1949.

L. N. WALTER
FORCED AIR HEATER

2,478,069

Filed Dec. 1, 1945

2 Sheets-Sheet 2

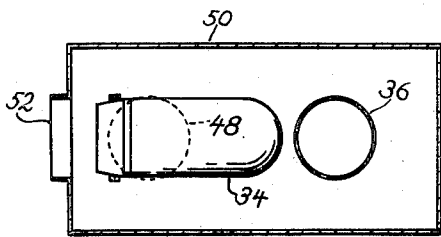


FIG. 2

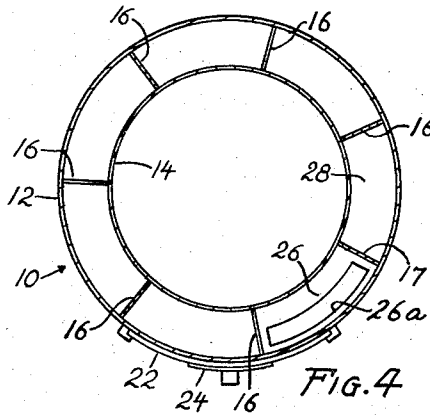


FIG. 4

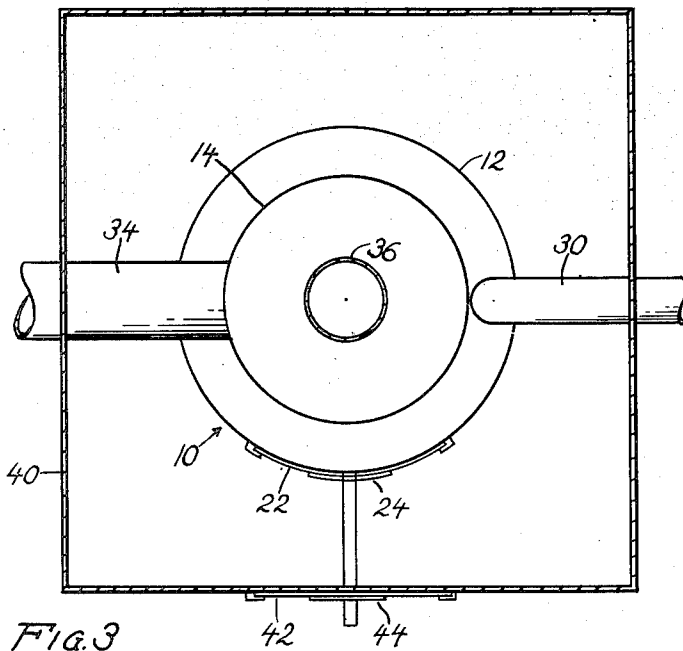


FIG. 3

LEO N. WALTER
INVENTOR.

BY

Leon T. Hooper

ATTORNEY.

UNITED STATES PATENT OFFICE

2,478,069

FORCED AIR HEATER

Leo N. Walter, Oak Glenn, Ill.

Application December 1, 1945, Serial No. 632,150

2 Claims. (Cl. 126—110)

1

This invention relates to an improved heater and outlet therefor which is especially adaptable for use in a forced air heating system. The improved heater and outlet may be used with any suitable kind of fuel.

One of the chief objects of advantage and importance of the device of this invention is the provision of improved means for circulating the air of the space being heated through ductwork in which it is heated and then returning it to the space. Furthermore the discharge portion of the duct work is arranged so as to aspirate air from the vicinity of the heating unit and thereby conduct additional heat to the point of discharge whereupon it is mixed with the stream of heated air and delivered into the space being heated.

A still further object of importance and advantage is the provision of means preventing the escape of heat through the flue and of conducting heat given off from the exterior of the heating unit to the space being heated.

Additional objects of advantage and importance will become apparent as the following description progresses, reference being had to the accompanying drawing wherein:

Fig. 1 is an elevation, partly in section, of a forced air heater arrangement which embodies the invention.

Fig. 2 is a horizontal section taken on line 2—2 of Fig. 1, looking in the direction indicated by the arrows.

Fig. 3 is a sectional view taken on line 3—3 of Fig. 1 looking in the direction indicated by the arrows.

Fig. 4 is a sectional view of the heater unit taken on line 4—4 of Fig. 1 looking in the direction indicated by the arrows.

The reference numeral 10 indicates generally the heater unit of the improved device of this invention. In the preferred embodiment of the invention the heater unit 10 comprises a cylindrical base member 12 into which is telescoped a longer cylindrical member 14. The base member 12 has a greater diameter than the cylindrical member 14, as is clearly shown in the drawings, and the space therebetween is provided with fins or baffles 16 and a partition 17 which are secured to each of the telescoped portions for a purpose hereinafter more fully explained. The edges of the partition 17 are sealed to the adjoining portions of the structure in air tight association.

The base portion 12 is divided by a wall 18 into upper and lower compartments. The lower compartment is utilized as a combustion chamber, and may have a burner 20 positioned therein, and the upper compartment houses the lower portion of the cylindrical member 14 the lower end of which is sealed to the wall 18. A service door, indicated by the reference numeral 22 (Figs.

2

3 and 4), provides for access to the combustion chamber and carries an inspection window 24 for visually observing conditions within the chamber during operation of the improved device. The wall 18 is apertured (Fig. 4) between one of the baffles 16 and the partition 17, preferably in the space indicated by the numeral 26. The aperture is shown at 26a. Consequently the products of combustion may pass from the combustion chamber into the space 26 and by following a pathway over one baffle 16 and under another eventually arrive at the space designated by the numeral 28 which is sealed from the next adjacent space 28 by the partition 17. In following the tortuous passage from the combustion chamber to the space 28 substantially all of the heat carried by the products of combustion is transferred to the walls of the cylindrical member 14 and base portion 12. Extending from the base portion 12 and providing an exhaust for space 28, and consequently the combustion chamber, is a flue 30. The flue 30 may extend to a chimney, not shown, or to some other suitable discharge point. Secondary air for supporting combustion may be delivered to the combustion chamber through apertures in the bottom of the chamber or by other suitable means.

The interior of the cylindrical member 14 is divided into two compartments by a substantially funnel shaped member 32. The member 32 is secured to the interior wall of the cylindrical member 14, as is best shown in Fig. 1, closely adjacent the upper end thereof and functions to direct incoming air into the center and toward the bottom of the member. Where it is so desired the member 32 may be omitted but the efficiency of the device is thereby somewhat impaired.

Extending from the upper portion of the lower compartment of the cylindrical member 14 is an outlet duct 34 which is adapted to convey heated air from the compartment. The outlet duct 34 may be extended to any suitable or desired location.

Projecting from the upper end of the cylindrical member 14 is an inlet duct 36. The duct 36 is provided with suitable means, as for instance a blower 38, for circulating air through the ducts 34 and 36 and the cylindrical member 14. It is to be noted that blower 38 is shown at the end of the inlet duct 36. This arrangement may be altered where it is so desired.

Encasing the heating unit 10 is a cabinet 40 which may be constructed of any suitable material and in any desired shape although the cabinet 40 shown in the drawing is represented as being substantially square. One vertical side of the cabinet is provided with a service door 42 which carries an inspection window 44. The door 42 and the window 44 of the cabinet 40 preferably align with the like members in the base portion

12. Where it is so desired the openings in the base 12 and the cabinet 40 may be connected by a duct, not shown, and the inner door may then be omitted. The sidewalls and top of the cabinet 40 are apertured to pass the flue 30 and the ducts 34 and 36 as is clearly shown in the drawings. The ducts and flue are preferably welded or otherwise secured to the cabinet to provide an air tight construction. Means are provided in the form of a plurality of apertures 46 and a duct 48 for circulating air over the exterior of the heater unit and the interior of the cabinet 40. The duct 48 extends from the top of the cabinet 40 to a point closely adjacent the discharge end of the outlet duct 34.

It is to be noted that the discharge end of the outlet duct 34 is encased in a box 50 having a discharge opening 52. The discharge opening 52 is aligned with the discharge end of the outlet duct 34 and when the device is in operation the flow of air from the outlet duct 34 through the discharge opening 52 sets up an aspirating action which draws air through the cabinet 40, duct 48, box 50 and is discharged into the space being heated. The duct 36 is in air-tight association with the box 50 as also are ducts 34 and 48.

In the preferred arrangement of the improved device of this invention the box 50 is positioned on the floor of the space being heated and the inlet of the blower 38 is positioned above the box. However it will be apparent that both inlet and outlet may be varied as desired without departing from the spirit or scope of the invention. Moreover the box 50, ducts, cabinet 40 and heater unit 10, or any of them may be suitably insulated if it is so desired. Furthermore suitable automatic controls for both blower and heater may be employed or the device may be manually controlled.

In the operation of the improved arrangement the blower 38 draws air from the space being heated and forces it downwardly through duct 36 into the upper compartment of cylindrical member 14 whereupon the funnel shaped member 32 directs the flow of air into the central portion of the lower compartment where it is heated, it of course being assumed that a fire is burning in the combustion chamber. The flow of air into the central portion of the lower chamber forces the flow of air outwardly and upwardly thereby picking up heat from the wall 18 and the interior wall of the cylindrical member 14, which is also the interior wall of the tortuous flue passage, and upon reaching the funnel shaped member is directed outwardly through the outlet duct 34. The flow of heated air through the discharge end of the outlet duct 34 into the box 50 and outlet opening 52 sets up an aspirating action which draws air through the apertures 46, the space between the walls of the cabinet and the heater unit 10 and the auxiliary duct 48 into the box 50. This air which carries the heat given off from the exterior of the heater unit 10 is mixed with the stream of heated air from the interior of the heater unit. Thus the flue passage is subjected to two distinct and separate streams of air which function to remove substantially all of the heat therefrom and therefore prevent waste through the chimney or stack. Furthermore, the volume of flow of heated air into the space being heated is greater than the volume removed by the blower

so that a slight pressure is built up in the space. The pressurized space tends to resist any infiltration of cold air from the outside and therefore maintains a substantially constant temperature within the space.

It will be apparent from the foregoing that herein is provided a novel yet simple and economical arrangement which delivers substantially all of the heat generated by the consumption of a minimum amount of fuel in a remotely located heating unit to a space being heated. Moreover the device functions to create a strong aspirating effect at the delivery end of the outlet 52 which causes a considerable flow of air through the cabinet and duct 48 to thereby remove heat from the space between the heater 10 and the cabinet 40 thereby preventing the escape of heat through the cabinet walls to the adjacent space.

It will also be apparent to those skilled in the art that numerous changes in construction and design may be made without departing from the spirit and scope of the invention. Accordingly the patent granted hereon is to be limited only by the terminology of the appended claims when given the range of equivalents to which they may be entitled.

I claim:

1. In a forced air heater, a heating unit comprising a pair of vertical cylindrical members, said cylindrical members being arranged in telescoping concentric spaced apart relation, a plurality of vertical baffles disposed in the space between said cylindrical members and maintaining them in spaced relation, a partition positioned within said space and sealed to said members, a wall sealed to the inner surface of the outer of said cylindrical members intermediate the ends thereof, said wall forming the bottom of the inner of said cylindrical members and being sealed to said partition, said wall having an aperture for combustion gas extending through said wall closely adjacent said partition said baffles and cylindrical members forming a passageway extending alternately over and under said baffles and thence to a flue outlet, duct means communicating with the interior of said inner cylindrical member and providing an inlet directing air toward said bottom wall and an outlet adjacent the upper end thereof, a blower disposed in said duct means to force air through said cylindrical member, and a burner arranged below said wall to heat the air forced through said cylindrical member.

2. The structure of claim 1 including a funnel shaped member positioned in the intermediate portion of said inner cylindrical member.

LEO N. WALTER.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
4,532	Wing	May 23, 1846
505,697	Bridges	Sept. 26, 1893
692,336	Patric	Feb. 4, 1902
1,002,298	Mies	Sept. 5, 1911
1,098,950	McGuire	June 2, 1914
2,073,424	La Fay	Mar. 9, 1937
2,291,232	Juby	July 28, 1942