

[54] HUMIDIFIER

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261/DIG. 15

[51] Int. Cl.² B01F 3/04

[58] Field of Search..... 261/35, 36 R, 152, 154,
261/DIG. 15; 126/113; 138/30

[56]

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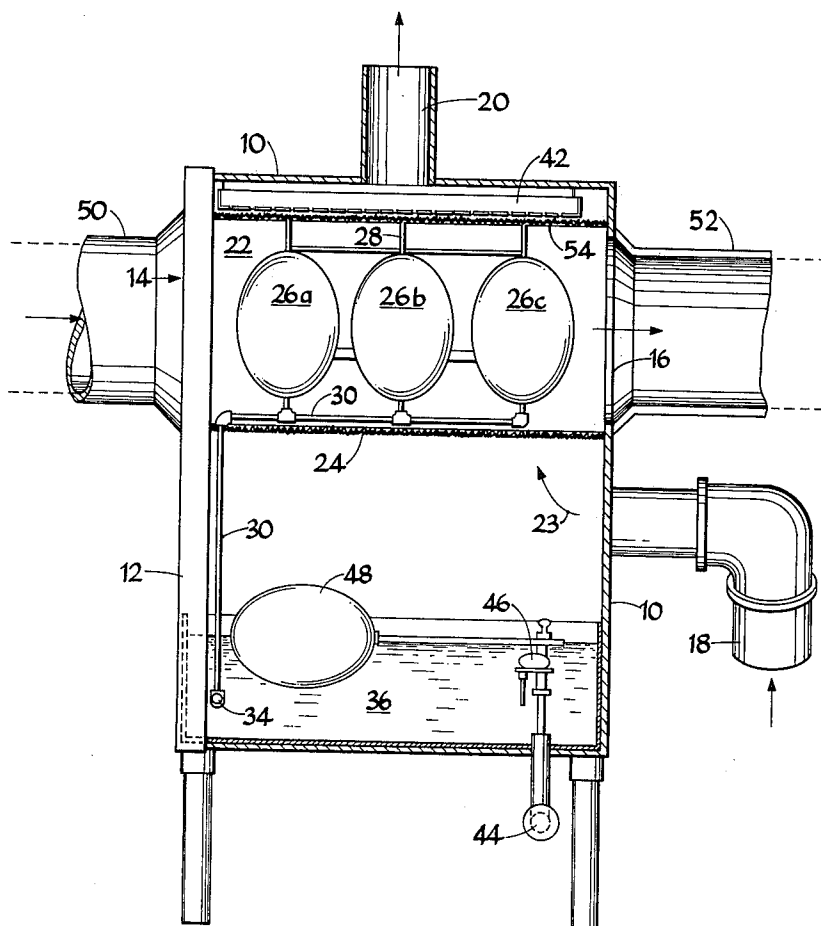
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ABSTRACT

Humidification apparatus comprising a housing having a flue gas inlet and outlet with a conduit extending therebetween, a circulating air inlet and outlet spaced apart so as to create a circulating air flow zone within the housing, an expansion chamber mounted within the flue gas conduit, a water dispersing medium mounted in and open to the flow zone, a water pipe connected to communicate between the chamber and medium and a water supply system connected to the expansion chamber, whereby, when the flue gas inlet is connected to a source of hot flue gases, water is forced from the expansion chamber to the dispersing medium and is picked up by the circulating air passing through the flow zone.

11 Claims, 2 Drawing Figures



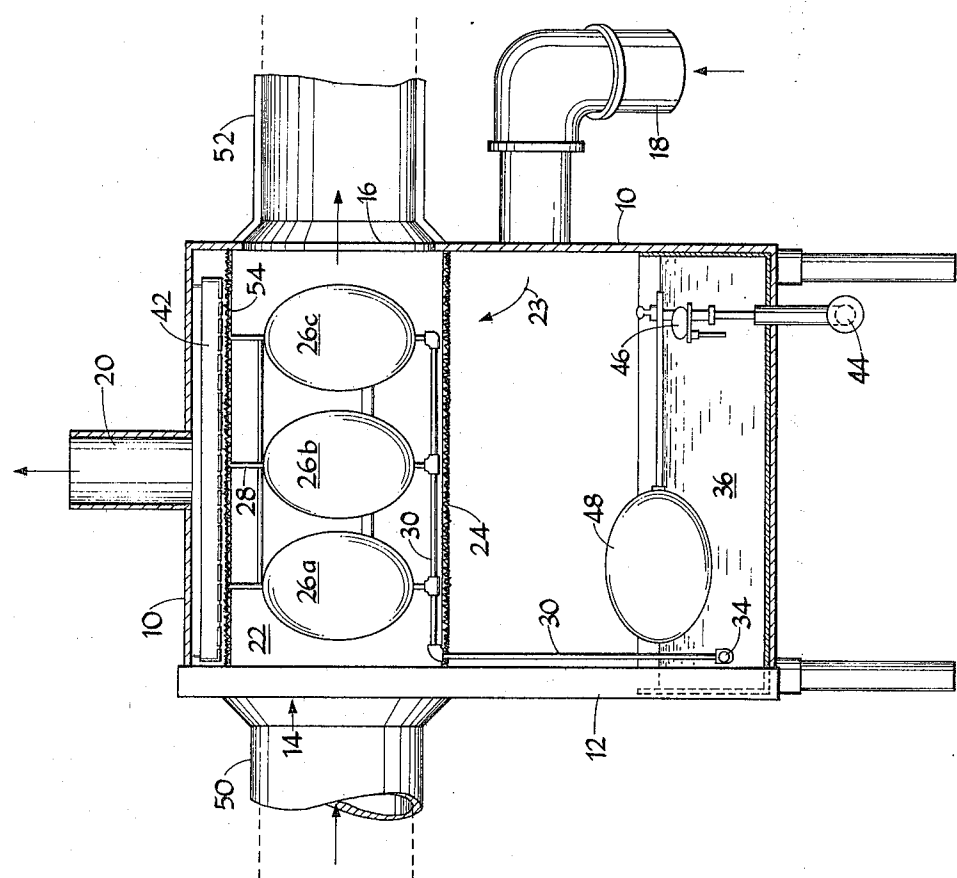


FIGURE 1

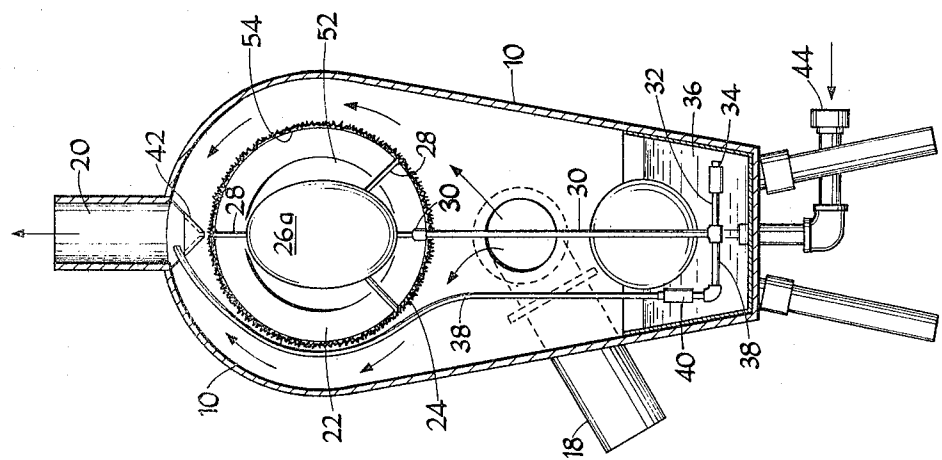


FIGURE 2

HUMIDIFIER

BACKGROUND OF THE INVENTION

This invention relates to a humidifying device useful, e.g., in conjunction with a hot air heating system in a home.

SUMMARY OF THE INVENTION

This invention provides a humidifying device which utilizes and thereby saves some of the heat contained in furnace flue gases that would normally be lost up the chimney; helps to heat the structure in which it is used; is fully automatic and safe; needs no external power source; may be easily added to any type of central heating system without interfering with its normal operation; is durable and essentially maintenance free; and is inexpensive to manufacture.

In general, the invention features a housing having a flue gas inlet and outlet with a conduit extending therebetween, a circulating air inlet and outlet spaced apart so as to create a circulating air flow zone within the housing, an expansion chamber mounted within the flue gas conduit, a water dispersing medium mounted in and open to the flow zone, a water pipe connected to communicate between the chamber and medium and a water supply system connected to the expansion chamber, whereby, when the flue gas inlet is connected to a source of hot flue gases, water is forced from the expansion chamber to the dispersing medium and is picked up by circulating air passing through the flow zone. In preferred embodiments, the dispersing medium is mounted in heat conducting relation to the flue gas conduit; the dispersing medium comprises a fireproof absorbent material, e.g., of asbestos; the flue gas conduit is mounted within the circulating air flow zone; the water supply system comprises a reservoir connected to the expansion chamber by a pipe having a check valve whereby water may flow to the chamber but not in the reverse direction; the water level in the reservoir is maintained by a float valve; the water pipe connecting the chamber with the dispersing medium has a check valve allowing flow only from the chamber to the medium; there is a plurality of expansion chambers; and there is a distribution trough fed by the water pipe from the chambers and mounted above the absorbent dispersing medium.

Other advantages and features of the invention will be apparent from the description and drawings herein of a preferred embodiment thereof.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a cut away side view of an embodiment of the invention attached to a flue;

FIG. 2 is a cut away front view of the apparatus of FIG. 1.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to the drawings, housing 10 has a cover 12, flue gas inlet 14 through the cover, flue gas outlet 16 through the wall opposite the cover, circulating air inlet 18 below outlet 16, and circulating air outlet 20 through the top wall of the housing. Flue gas conduit 22 extends from inlet 14 to outlet 16 in circulating air flow zone 23 between inlet 18 and outlet 20. Fireproof, water absorbent, asbestos layer 24 is wrapped around conduit 22.

Expansion chambers 26A, 26B and 26C, mounted on struts 28 within conduit 22, are connected in parallel to pipe 30 which leads through branch 32 and check valve 34 to water reservoir 36 at the bottom of housing 10, and through branch 38 and check valve 40 to a perforated distribution trough 42, positioned along the top of flue gas conduit 22. Check valves 34 and 40 respectively allow flow only from right to left and upward (FIG. 2). Reservoir 36 is fed by water pipe 44, and the water level is maintained by float valve 46 with its ball float 48.

In operation, when flue gas inlet 14 is connected to furnace flue 50, flue gas outlet 16 to chimney flue 52, and circulating air outlet 20 to the ducts of a warm air heating system, hot flue gases (unimpeded in flow because of the greater cross-sectional area of conduit 22 in relation to that of the flues) heat expansion chambers 26A, 26B, 26C and conduit wall 54. As trapped gas in the chambers expands, it forces hot water down pipe 30, through branch 38 and check valve 40, and up to distribution trough 42. As the water drips onto the hot dispersing medium, defined by absorbent layer 24, it vaporizes and is picked up by circulating air passing through inlet 18, outlet 20 and flow zone 23 therebetween. The circulating air is heated by contact with the hot dispersion medium.

When flue gas flow ceases, trapped gas in expansion chambers 26A, B and C contracts, and as the internal pressure falls below ambient air pressure, water from reservoir 36 passes through check valve 34 and refills the expansion chambers. During this refilling, pressure leakage into the expansion chambers through pipe branch 38 is prevented by check valve 40. Water taken from reservoir 36 is replenished by the automatic operation of float valve 46. When the furnace again begins to operate, the cycle is repeated.

Other embodiments are within the following claims.

What is claimed is:

1. A humidifying apparatus comprising

a housing having:

a flue gas inlet,

a flue gas outlet,

a circulating air inlet, and

a circulating air outlet spaced apart from said circulating air inlet to create a circulating air flow zone within said housing,

a flue gas conduit extending between said flue gas inlet and outlet,

an expansion chamber mounted in said conduit,

a water dispersing medium mounted in and open to said flow zone,

a water pipe connected to communicate between said chamber and said medium, and

a water supply system connected to said expansion chamber,

whereby, when said flue gas inlet is connected to a source of hot flue gases, water is forced from said expansion chamber to said dispersing medium to humidify circulating air passing through said flow zone.

2. The apparatus of claim 1 wherein said dispersing medium is mounted in heat conducting relation to a heat source.

3. The apparatus of claim 2 wherein said dispersing medium is wrapped around and in contact with said flue gas conduit.

4. The apparatus of claim 1 wherein said dispersing medium comprises absorbent material.

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5. The apparatus of claim 1 wherein said dispersing medium is made of asbestos.

6. The apparatus of claim 1 wherein said conduit is mounted within said circulating air flow zone.

7. The apparatus of claim 1 wherein said water supply system comprises a reservoir connected to said expansion chamber by a pipe having a check valve, whereby water may flow to said chamber but not in the reverse direction.

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8. The apparatus of claim 7 wherein said reservoir contains a float valve whereby the water level in said reservoir is maintained.

9. The apparatus of claim 1 wherein said water pipe is further connected in series with a check valve, whereby flow may proceed from said chamber to said medium but not in the reverse direction.

10. The apparatus of claim 1 wherein there is a plurality of expansion chambers.

11. The apparatus of claim 1 wherein a perforated distribution trough is mounted above said dispersing medium and said pipe extends to said trough.

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