United States Patent

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[73] Assignee **Raypak Company, Inc.**
a corporation of California

[54] **DRAFT HOOD**
3 Claims, 6 Drawing Figs.

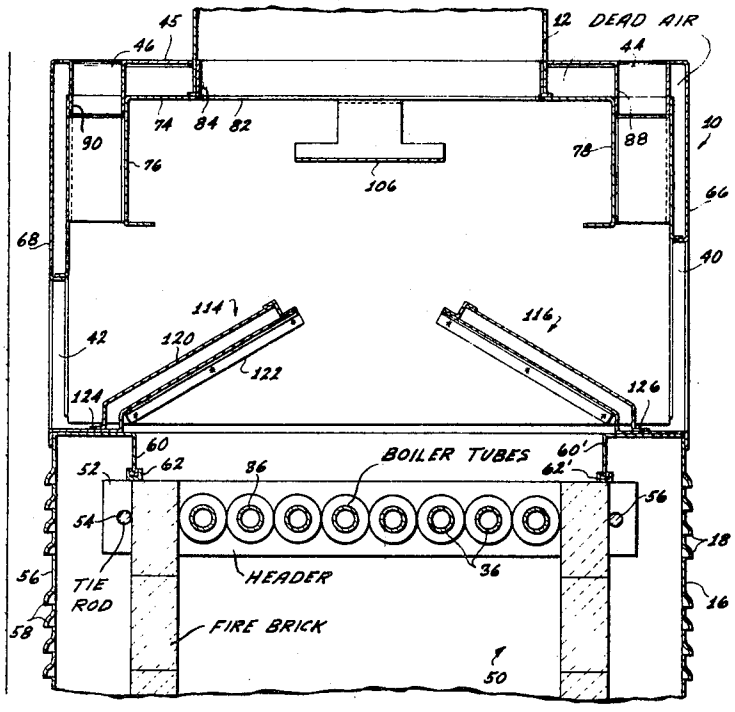
[52] U.S. Cl. 126/307
[51] Int. Cl. F23j 11/00
[50] Field of Search 126/307, 307A, 116

[56] **References Cited**
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ABSTRACT: The invention is a boiler or furnace construction having a built-in draft hood. The draft hood chamber has openings communicating with atmosphere through the top of the furnace housing and openings spaced downwardly from the top, opening at the front and back from the draft hood chamber. The arrangement of openings provides for a safety factor from the standpoint of fire hazard in the event of down drafts or a blocked flue.



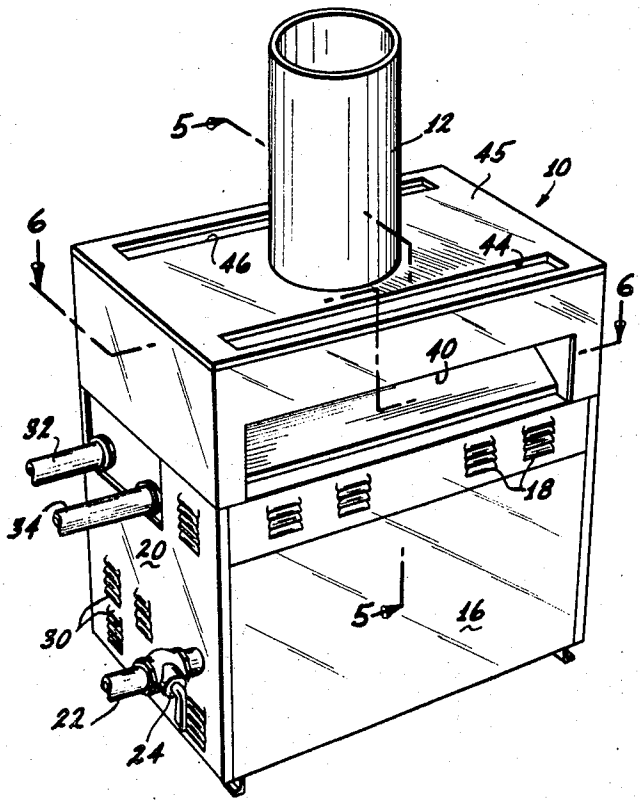
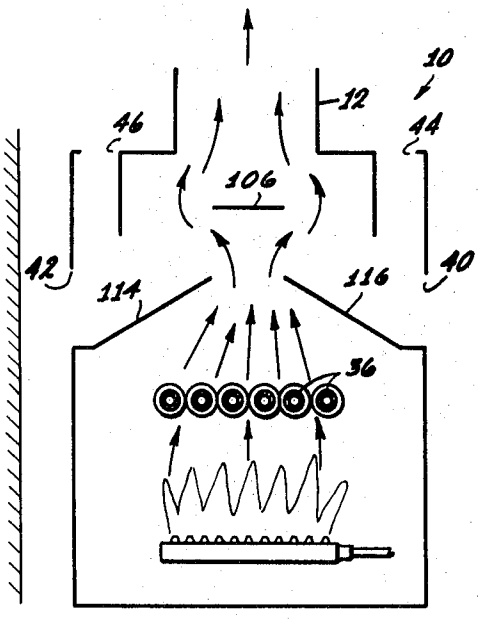
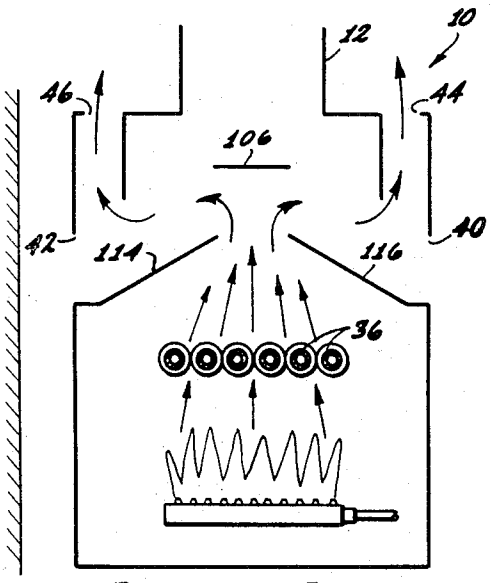


FIG. 1



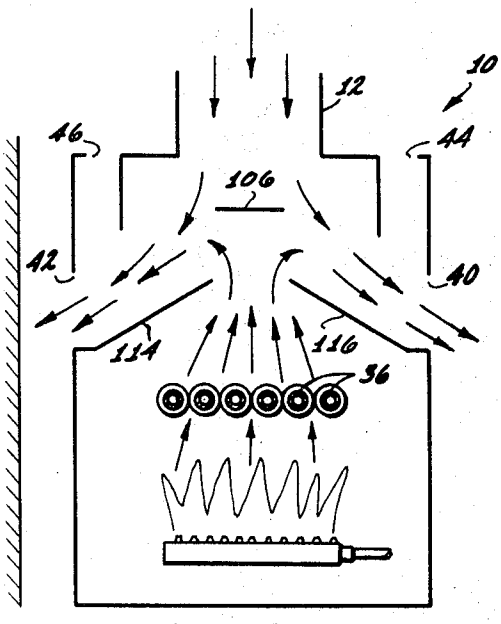
NORMAL OPERATION

FIG. 2



BLOCKED FLUE

FIG. 3



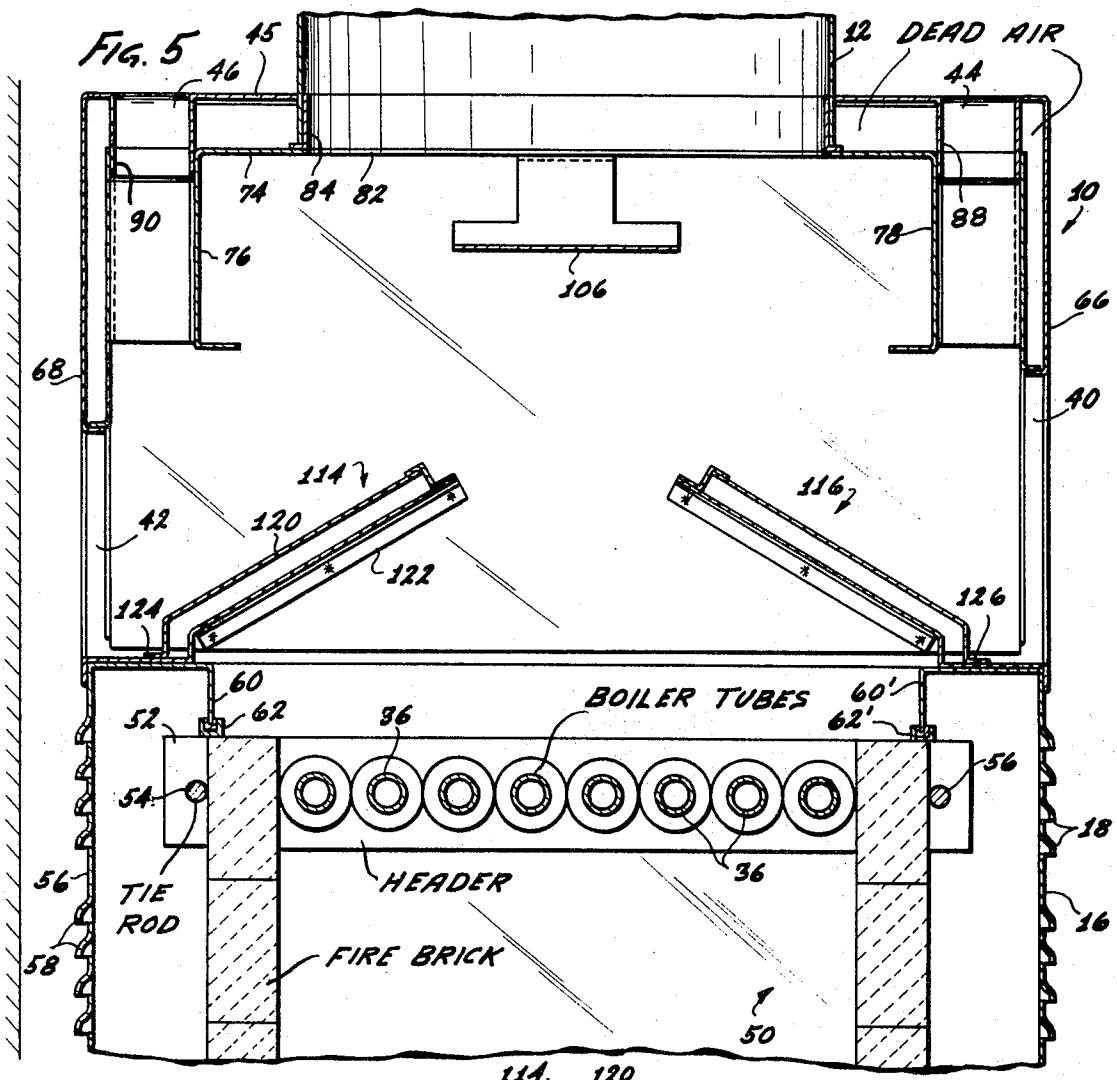
DOWNDRAFT

FIG. 4

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FIG. 5



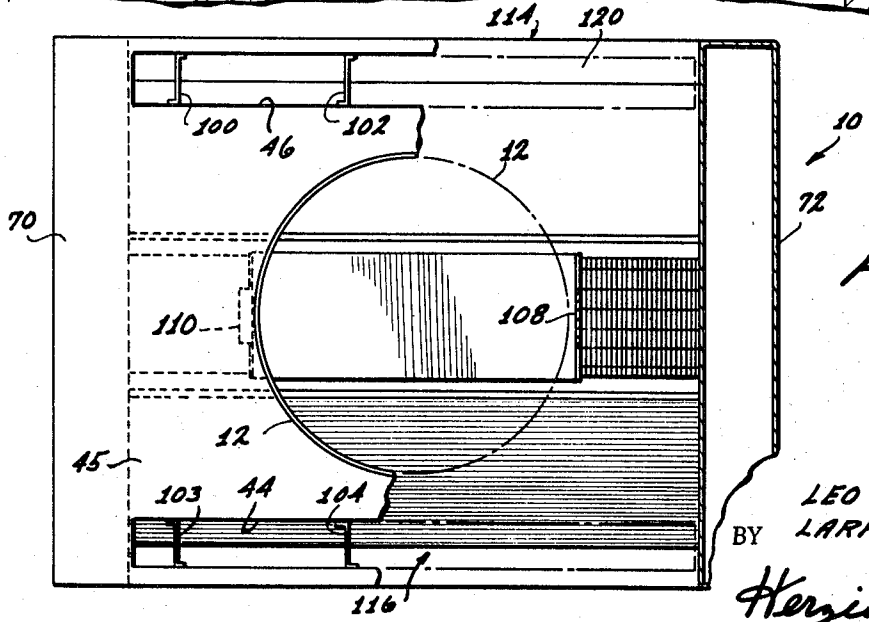


FIG. 6

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DRAFT HOOD

SUMMARY OF THE INVENTION

The invention relates to an improved draft hood used with a heating boiler or furnace. Draft hoods are known devices and normally constitute a separate device external to the boiler or furnace. The herein invention provides a construction whereby the draft hood is built into the furnace.

Draft hoods are devices that are known in the art and the American Gas Association, Inc. defines their functions as to, (1) assure the ready escape of the flue gases in the event of no draft, backdraft, or stoppage beyond the draft hood; (2) prevent a backdraft from entering an appliance; and (3) neutralize the effect of stack action of the chimney or gas vent upon the operation of the appliance. Conventionally, draft hoods are on the outside of the boiler or furnace connected to the flue or stack. Customarily, they have side or bottom openings exposing the interior of the draft hood to atmospheric pressure.

When a boiler with a draft hood is installed it is necessary that requirements of the American Gas Association with respect to fire hazards be met, and because of this the distance between the boiler or the furnace and the wall at the back becomes critical. This is because with conventional draft hoods if there is flue stoppage the gases of combustion can come out through the draft hood opening in the back and give rise to a temperature which will start a fire. The primary object of the invention is to provide a construction which eliminates this type of hazard and further to eliminate difficulties with respect to meeting the safety requirements of the American Gas Association.

The invention provides a construction where the draft hood is built into the boiler or furnace, that is, within the same housing. This makes it unnecessary to provide a draft hood as a separate device and furthermore the particular purposes and objectives of the invention are facilitated by this construction.

In the preferred form of the invention, the draft hood is formed in or built into the upper part of the boiler or furnace housing. The draft hood, of course, communicates with the gas discharge flue or stack. Openings are provided in the top of the furnace housing communicating with atmosphere and with the interior of the draft hood. Additional openings are provided spaced downwardly from the top of the furnace and openings at the front and back. This construction operates in a way that eliminates the fire hazard and accomplishes the purposes set forth in the foregoing. In the event of a downdraft atmospheric air coming down through the flue mixes and cools the combustion gases and escapes through the front and back openings; such a mixture of gases is not hot enough to create a fire hazard. In the event of flue stoppage, however, rather than a downdraft, the gases of combustion escape through the top openings from the draft hood rather than through the lower openings so that danger attendant to hot gases being discharged laterally rather than upwardly and impinging upon the combustible or inflammable walls is eliminated.

In accordance with the foregoing, the primary object of the invention is to provide an improved draft hood constructed to eliminate any fire hazard attendant to discharge of gases from the draft hood.

Another object is to provide a draft hood which is built into the boiler or furnace rather than being a separate device to reduce the overall height and constructed to facilitate the objective stated in the previous paragraph.

Another object is to provide a construction as described wherein openings are provided communicating with the draft hood in the top of the furnace housing as well as laterally (front and back) directed openings spaced downwardly from the top.

Further objects and additional advantages of the invention will become apparent from the following detailed description and annexed drawings wherein:

FIG. 1 is a perspective view of a boiler or furnace embodying the invention;

FIG. 2 is a diagrammatic view illustrating the flow of gases in normal operation;

FIG. 3 is a view like that of FIG. 2 illustrating the flow of gases in the event of a blocked flue;

FIG. 4 is a view like those of FIGD. 2 and 3 illustrating the flow of gases in the event of a downdraft.

FIG. 5 is a sectional view taken along the line 5–5 of FIG. 1;

FIG. 6 is a sectional view taken along the lines 6–6 of FIG. 1.

Referring now to the various FIGS. of the drawings, numeral 10 designates generally a boiler or furnace having the improved draft hood of the invention built into it. The furnace embodies a generally rectilinear housing or casing which in the exemplary form of the invention may be made of sheet metal. The furnace has a stack or flue 12. The furnace housing or cabinet has a front wall 16 having louvers 18 therein as shown. One end wall is shown at 20 with a gas inlet pipe 22 passing therethrough with a manual cutoff valve 24 in the pipe. In the exemplary form of the invention shown the furnace is gas-fired. The end wall 20 has louvers 30 therein as shown. Numerals 32 and 34 designate pipes connecting to the boiler tubes as shown at 36 in FIG. 5.

The draft hood is built into the upper part of the furnace housing or cabinet which is provided with a front opening as designated at 40 there being a similar but smaller opening at the rear as designated at 42 in FIG. 5. In the top of the cabinet or housing are openings 44 and 46 which communicate with the draft hood as will be described.

FIGS. 5 and 6 show the internal construction of the furnace and draft hood. The combustion chamber is designated at 50 and may be of conventional construction being formed of panels of fire brick as shown. At the upper part of the combustion chamber are the boiler tubes supported between tube sheets such as shown at 52 held together by tie rods 54 and 56. The back wall is designated at 56 having louvers 58 in it.

The upper part of the structure is supported above the combustion chamber by way of angle members 60 and 60' having feet as shown seated in channel members 62 and 62' engaging the top of the combustion chamber. As may be observed the walls of the combustion chamber are spaced inwardly from the side walls of the furnace or cabinet.

The draft hood is formed with the upper part of the furnace housing or cabinet. The draft hood structure comprises front and back walls 66 and 68 which are double as shown so that an insulating dead air space is provided within the walls. The end walls are of similar construction. The end wall construction is illustrated at 70 and 72 in FIG. 6. The flue or stack extends through the top wall 45 to an inwardly spaced top wall 74 having downwardly extending portions 76 and 78 spaced from the front and back walls of the housing or cabinet as shown. The inner top wall 74 has a circular opening 82 at the peripheral edge of which is an upstanding flange 84 which fits within the end of the flue or stack 12.

Extending inwardly from the top wall 45 of the housing from the openings 44 and 46 are the rectilinear frame formations 88 and 90 which form the channels or passageways providing communications between the atmosphere and the interior of the draft hood. These members extend down to a position below the inner top wall 74 and below the inner walls of the double wall panels 66 and 68 as shown. Vertical stiffeners are provided in the channels 88 and 90 as shown at 100 and 102 and 103 and 104 in FIG. 6.

Directly below the center of the opening of the flue 12 is a transverse baffle 106 which is supported at its ends by brackets 108 and 110 as shown (see FIG. 6). Positioned above the boiler tubes and above the combustion chamber, the top of which is open as shown are a pair of angularly positioned baffle members as designated at 114 and 116. The baffle member 114 comprises a metal housing designated at 120. The baffle member is supported by a supporting angle member such as shown at 122. The two baffles are of similar construction, being supported by a supporting angle member such as shown at 122. The two baffles are of similar construction, being supported as shown from the bottom part of the draft hood construction as indicated at 124 and 126.

The operation of the device will be understood from the diagrammatic views of FIGS. 2, 3, and 4. These views illustrate diagrammatically a gas-fired furnace. FIG. 2 shows the normal operation illustrating the upward flow of the gases of combustion around the baffle 106 and into the flue 12.

FIG. 3 illustrates the flow of gases in the event of a blocked or obstructed flue. In this event gases are not able to rise up the flue 12 and atmospheric air is not being forced down through this flue 12. Under these circumstances the gases of combustion will flow as indicated by the arrows, being exhausted through the ports or openings 44 and 46 in the top of the housing. Outward flow does not occur through the lateral, that is, the front and back openings 40 and 42. Thus, if the furnace is spaced fairly close to a back wall, or building walls as illustrated in FIG. 5 there will be no fire hazard since hot gases do not exhaust towards this wall.

FIG. 4 illustrates the flow of gases in the event of a downdraft. A downdraft may, of course, result from particular atmospheric conditions with atmospheric air coming down the flue 12, there being a negative pressure with the furnace housing. In the event of these circumstances the down-flowing air will travel as shown by the arrows, passing out through the front and back openings 40 and 42. Combustion gases can be entrained with and carried along with the downwardly moving air which cools the combustion gases sufficiently that no hazard is occasioned by their exhausting through these openings from the furnace housing.

From the foregoing those skilled in the art will readily understand the nature and construction of the invention and the manner in which it achieves and realizes all the advantages set forth in the foregoing, as well as the many additional advantages that are apparent from the detailed description. The foregoing disclosure is representative of a preferred form of the invention and is to be interpreted in an illustrative rather than a limiting sense, the invention to be accorded the full scope of the claims appended hereto.

We claim:

1. A draft hood for use with a furnace having a combustion chamber, comprising: a housing having a top wall, a bottom wall and side walls; a discharge opening in said top wall; an inlet opening in said bottom wall substantially directly below said discharge opening and adapted to receive products of combustion from a furnace combustion chamber; a transversely extending baffle member in said housing below said discharge opening extending substantially horizontally across the normal path of flow of gases from said inlet to said discharge opening; first openings through said top wall spaced laterally from said discharge opening; and second openings through certain of said side walls, spaced downwardly from said top wall and laterally outwardly of said inlet opening.

2. A draft hood as defined in claim 1 including further baffle means extending upwardly and inwardly from said bottom wall, on opposite sides of said inlet opening and arranged to direct downwardly flowing gases toward said second openings.

3. A draft hood as defined in claim 1 wherein the said second opening in one of said side walls is smaller than the said second opening in an opposed side wall.