Feb. 14, 1956 O. FAUSER, JR 2,734,501

EXHAUST VENT AND DOWNDRAFT DIVERTER

Filed Feb. 9, 1953

FIG. 1

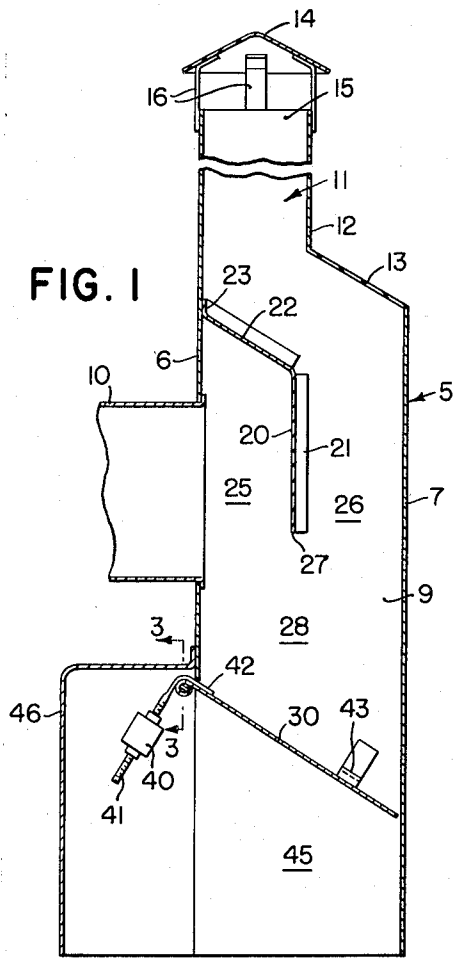
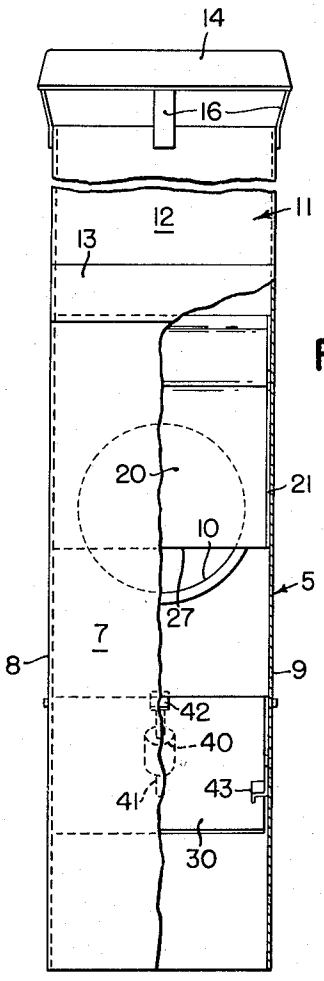


FIG. 2



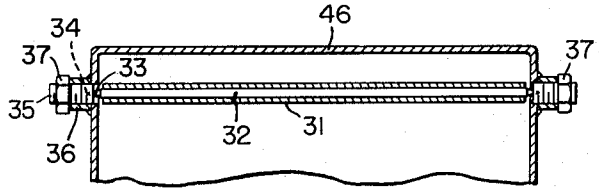


FIG. 3

INVENTOR.
OSCAR FAUSER JR.
BY
ATTORNEY

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EXHAUST VENT AND DOWNDRAFT DIVERTER

Oscar Fauser, Jr., Rock Island, Ill., assignor to Oscar Martin Manufacturing Co., Davenport, Iowa, a corporation of Iowa

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3 Claims. (Cl. 126—307)

The present invention is related generally to exhaust vents and is more particularly concerned with devices for venting the exhaust gases from heaters. Any heater, whether it burns coal, wood, oil or gas, must have some provision for conducting away the hot waste gases of combustion. Although any conventional vertical stack will perform this function under ordinary conditions, there are other conditions under which the conventional stack is ineffective. For example, should there occur a downward draft in the stack, the gases of combustion could be prevented from exhausting through the stack, or, under extreme conditions, they would be forced out of the heater into the space being heated, frequently resulting in the flame being extinguished.

Down drafts may be caused in many ways, often because of the deflection of wind into the stack by nearby buildings, hills, and other obstacles. When the heater is used on a moving vehicle such as a train or highway truck, the varying speed of the vehicle and the buildings, bridges and tunnels on the route of the vehicle, combine to produce drafts which make ordinary vents impractical. For example, heaters on highway trucks burning fuel oil or the like have been known to have their flames blown out by down drafts, thus resulting in the freezing of the cargo.

It is, therefore, a principal object of my invention to provide a novel and improved vent for carrying off the gases of combustion of a heater regardless of the direction and force of the wind in the vicinity and regardless of whether the draft in the vent is upward or downward. Other objects and advantages of my invention will become apparent to those skilled in the art after a consideration of the following description in which reference is had to the drawing appended hereto, in which

Figure 1 is a sectional elevational view of a vent embodying the principles of this invention;

Figure 2 is a side elevational view in which part is broken away to show the details of construction; and

Figure 3 is an enlarged sectional view taken along a line 3—3 in Figure 1.

Referring now to the drawings, the vent comprises a generally vertical housing 5 constructed preferably of sheet metal or other suitable material. The housing is principally rectangular in cross-section and includes a pair of opposed vertical side walls 6, 7 and a pair of opposed vertical end walls 8, 9.

An exhaust duct 10, preferably of circular cross-section, is connected through one side wall 6 in communication with the housing 5 and serves to conduct the hot waste gases of combustion from a heater (not shown) into the housing 5. A vertical stack 11 is connected in communication with the top of the housing 5 for conducting the hot waste gases out of the housing. The stack is preferably of rectangular cross-section and is formed by extending three of the walls 6, 8 and 9 upwardly and connecting the fourth wall 7 with the fourth wall 12 of the stack 11 by an inclined top wall 13. A hood 14 is supported over the top opening 15 of the stack by means of

legs 16, for preventing rain and snow from dropping into the stack.

Within the housing 5 is a generally vertical baffle 20 spaced in front of the duct 10 substantially perpendicular to the axis of the latter and substantially midway between the side walls 6, 7. The baffle 20 is supported at opposite edges thereof on the walls 8, 9, by means of suitable flanges 21, bolted or fixed thereto in any suitable manner. The baffle has an upper inclined portion 22 that extends generally parallel to the inclined top wall 13, and is secured at its upper end to the side wall 6 above the duct 10 by means of an end flange 23.

The baffle 20 divides the housing 5 into two passageways 25, 26 which communicate with the duct 10 and stack 11, respectively, and the lower end 27 of the baffle terminates slightly above the bottom of the duct 10 so that the lower portion of the housing 5 is one large chamber 28 that interconnects the two passageways 25, 26. As shown in the drawings, the cross sectional area of the stack passageway 26 is substantially uniform from the lower end 27 of the baffle to the top opening 15.

In the lower portion of the housing is disposed a damper 30, generally rectangular in shape and having an upper edge 31 rolled about a pivot pin 32, tapered at both ends 33. Each of the tapered ends 33 is received within the tapered recess 34 of a threaded bearing member 35. The bearing members 35 are screwed into sleeves 36 secured to the walls 8, 9, respectively, and are fixed in axially adjusted position by lock nuts 37.

A counterbalance weight 40 is threaded on a threaded rod 41 that is flattened at its upper end 42 and bends over the damper and is suitably welded thereto. The weight 40 can be adjustably screwed along the rod until it balances the weight of the damper about the axis of the pivot 32. Preferably, the weight should hold the damper up against a stop 43 fixed to one wall 9 of the housing, thus holding the damper in an inclined position in which it closes the bottom opening 45 of the housing 5. The housing has a lower extension 46 which houses the counterbalance mechanism.

In operation, normally the hot gases of combustion flow through the duct 10 into the passageway 25 in the housing 5, under the lower end 27 of the baffle 20, up through the passage 26 and stack 11 and out through the top 15. The heat in the gases creates a natural up draft in the stack 11 and the damper 30 is held against the stop 43 by the weight of the counterbalance 40, thereby closing the bottom of the housing.

In the event that air blowing into the top opening 15 creates a down draft in the stack, the air flows down through the passageway 26 into the chamber 28 where the downward pressure of the air opens the delicately counterbalanced damper 30 to permit the air to flow down through the open bottom 45 of the housing. The expansion of the air as it passes the lower end of the baffle into the chamber 28 creates a decrease in pressure that draws the hot gases from the passageway 25 into the chamber 28, from which they flow out through the open bottom of the housing.

I have found that it is desirable to provide a certain relationship between the cross-sectional areas of the various ducts and passages. The cross-sectional areas of the duct 10 and stack 11 should be substantially equal in order that the velocity of gases is normally substantially constant. The cross-sectional area of the lower chamber 28 is substantially equal to the sum of the areas of the duct 10 and stack 11; that is to say, double the area of the duct 10. As the baffle 20 substantially bisects the housing 5, the cross-sectional area of the passageways 25, 26 are also each equal to the areas of the duct 10 and stack 11. Thus, in the event of a down draft in the stack 11 the air does not create any back pressure in the chamber

28, therefore there is never any tendency for back pressure in the duct 10.

I have found in many tests of this vent on a heater in a highway truck that the flow of hot gases from the duct 10 is maintained constant regardless of drafts caused by velocity of the truck or direction of the wind. There have never been found any conditions under which a back draft will be caused in the duct 10, thus insuring that the flame in the heater is never blown out, as frequently occurs with ordinary stacks. Further, I have found that the static pressure in the duct 10 does not decrease to produce excess up draft in the duct or stack. The flow of gases in the duct 10 remains remarkably constant at all times.

If any rain or snow should enter the top of the stack under the hood 14, the baffle 20 prevents it from entering and running down the duct 10 into the heater. The moisture merely drops upon the damper 30 and runs off the lower edge of the latter and out through the bottom of the housing. Any accumulation of moisture or snow on the damper would cause the latter to lower until the moisture or snow has been discharged.

I do not intend to limit my invention to the particular details shown and described herein except as limited by the claims which follow.

I claim:

1. An exhaust vent for heaters and the like comprising, in combination, a vertically disposed housing, a duct connected in communication with a vertical side of said housing and adapted to conduct hot gases of combustion thereto, a stack connected in communication with the top of said housing for conducting said gases out of said housing, the bottom of said housing having an opening therein, a damper pivotally mounted interiorly of said housing in position to restrict said opening and to swing open in a direction outwardly of said housing, means for counterbalancing said damper whereby a slight down draft through said stack will open the damper, and a baffle extending from said side of the housing above said duct, downwardly in front of the latter in spaced relation thereto and having a lower terminal edge near the bottom of said duct to direct such down draft away from said duct and toward said bottom opening, the sides of said housing extending downwardly below said damper to shield the latter from the wind.

2. An exhaust vent for heaters and the like comprising, in combination, a generally vertical housing, a duct connected in communication with one vertical side of said housing and adapted to conduct hot gases of combustion thereto, a stack connected in communication with the top of said housing for conducting said gases out of said housing, the cross-sectional areas of said duct and stack being substantially equal and the cross-sectional area of said vertical housing being at least as great as the sum of the areas of said duct and stack, said housing having an open bottom and a baffle extending vertically in front of said duct for dividing said housing into two passageways, one communicating with said duct and the other with said stack, the lower end of said baffle terminating above the open bottom to provide a chamber connecting said passageways, a damper pivotally mounted interiorly of said housing in position to restrict said bottom opening and to swing open in a direction outwardly of said housing, the sides of said housing extending downwardly below said damper to shield the latter from the wind and means for counterbalancing said damper whereby a slight down draft through said stack will open the damper.

3. The combination set forth in claim 2, including the further provision that said stack has a substantially uniform cross sectional area from the top down to the lower end of said baffle, whereby the expansion of the air in a down draft as it passes the lower end creates a decrease in pressure that draws the hot gases from said duct.

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