ABSTRACT OF THE DISCLOSURE

A back draft safety device is provided for use in the jacket of a gas appliance which has front and rear walls connected by side walls, the side walls having lateral outlets. The device is positioned above the burner and lateral outlets. It comprises a horizontal baffle, which is U-shaped in cross section and which extends between the front and rear walls below the top flue connection on the jacket and above the lateral outlets. Two shields extend upwardly from the baffle and transversely thereto. One shield is positioned a given distance away from the rear wall of the jacket and the other shield is positioned the same distance away from the front wall. The shields have a length measured parallel to the front and rear walls of at least three times the width of the baffle as measured in the same direction.

This invention relates to a back draft safety device which is disposed internally of an appliance jacket of a gas-heated liquid heater, provided with lateral outlets. Back draft conditions occur when wind blows into the flue chimney from above. Back draft safety devices are known which direct the back draft together with the rising heating gases to the lateral outlets of the appliance jacket and prevent the back draft from passing into the combustion chamber. To achieve this, the back draft safety device is formed with a baffle arranged between the front wall and the back wall in the vicinity of the flue connecting socket, whereby the back draft is diverted to the lower lateral outlets. When no back draft is present, the rising heating gases flow around the baffle.

However, in such back draft safety devices the rising heating gases are not sufficiently carried along when a back draft is present and combustion is noticeably impaired. This is apparently due to the fact that in prior art back draft safety devices of the type indicated back draft and flue gas current do not contact each other on a sufficiently large area. If it is imagined that back draft and countercurrent flue gas current were solid flow bodies, they would contact each other only on the front surfaces facing each other. This, however, is not sufficient to provide for such an intimate contact between the back draft and the flue gas current that the flue gas current will be carried along by the back draft and directed towards the outlets.

It is therefore the object of this invention to design the back draft safety device in a manner such that there will be produced larger contact surfaces between back draft and flue gas current, that is, that the flow bodies of the back draft and of the flue gas current do not only contact each other on the front surfaces thereof, but also on the vertical side surfaces.

According to the invention this object is being attained by providing that shields project beyond the baffle. These shields are arranged parallel to the front wall and back wall and spaced therefrom. These shields are effective to restrict the back draft impinging on the baffle in its extent between front wall and back wall so that the flue gases may still rise in front of and behind the partial back drafts divided by the baffle and diverted towards the lateral outlets and thereby obtain better contact therewith. It has shown that certain residual flue gas portions still flow upwardly forwardly and backwardly of the partial back drafts, flowing between the shields and the front wall and the back wall, respectively. These residual portions are also drawn in by the back draft over the upper edges of the shields and are entrained thereby. It has also been shown that by these shields restricting the back draft in one dimension an unobjectionable amount of rising flue gas is obtained. Expeditiously, the length of the shields corresponds at least to three times the width of the baffle so that the shields also project laterally from the baffle far enough so as to achieve an effective restriction of the back draft.

An embodiment of this invention is more fully described hereinafter with reference to the schematic drawings, wherein

FIG. 1 illustrates schematically the back draft safety device in elevation;

FIG. 2 illustrates a side elevation view thereof. A fin block 1 through which water is to extend, constitutes the head of a heating section 2 in which rising gases rise and are in heat exchange with the water flowing through the fin block 1.

Above the fin block 1 integrally of an appliance jacket 3 which jacket is formed with lateral outlets 3'. There is disposed a back draft safety device 4 carrying a flue gas connecting socket 4' above inclined guiding surfaces 4'. Between the front wall 5 and the back wall 6 of the back draft safety device and closely below the flue gas connecting socket 4' a baffle 7 is mounted in web-like manner. Baffle 7 has turned up edges 7'. Shields 8, 8' project beyond the baffle 7. Shields 8, 8' are positioned parallel to the front wall and back wall (5, 6) at a distance a. The length of the shields 8, 8' corresponds at least to three times the width of the baffle 7 so that the shields 8, 8' project laterally from the baffle 7. As is indicated by the dash-dotted showing, the shields 8, 8' may be provided in such length that they join inclined guiding surfaces 4'. The back draft safety device also has deflector plates 9 which extend upwardly of the fin block 1. These divert the flue gas issuing from the fin block 1 from the outlet openings 3'. Under normal conditions, thus, when there is draft present in the flue pipe 10, the flue gas will flow around the baffle 7, without the flow resistance being substantially increased thereby. However, when due to unfavorable wind conditions a back draft will issue from the flue pipe 10, such back draft will impinge on the baffle 7 between the shields 8, 8'. These shields 8, 8' prevent the back draft from expanding along the baffle 7 towards the front wall 5 and the back wall 6. Instead the back draft is cut by the shields 8, 8', divided by the baffle 7 and diverted over the edges 7' towards the outlets 3' of the appliance jacket without contacting the front wall 5 and the back wall 6. These partial back drafts carry away a portion of the rising flue gas. However, since the flue gas may still rise along the front wall 5 and the back wall 6 in a thickness of layer corresponding approximately to the distance a forwardly and backwardly of the back drafts, the contact area between the partial back drafts and the rising flue gas layer is increased so that a greater amount of flue gas is diverted by the back drafts and entrained towards the outlet openings 3'. A portion of the flue gas still rises beyond the baffle 7 into the space defined on the one hand by the shields 8 and 8', respectively and the front wall 5 and the back wall 6, respectively. This portion of the flue gas current will be drawn in by the back draft over the upper edges of the shields 8, 8' and likewise be carried along towards the outlets 3'. It has shown that with an
arrangement of the type herein described combustion will  
also not be impaired if back draft occurs, which proves  
that an unobjectionable exhaust is obtained, it being  
essential that this is attained with a back draft safety  
device which due to the relatively small overall height is  
housed within the appliance jacket, whereby, thus the  
conventional back draft safety device consisting of lower  
hood and upper hood, disposed exteriorly of the appliance  
jarct, may be fully replaced thereby.

The invention is claimed as follows:

1. In the combination of a gas burner appliance having  
a jacket including a front wall, a rear wall, side walls  
connecting the front and rear walls and having lateral  
outlets therein, and a flue pipe connection at the top and  
and a back draft safety device embodied in said appliance  
and positioned above said lateral outlets and between the  
gas burner and the connection, the improvement com-  
prising: said device including a baffle extending between  
the front and rear walls and directly below said connection;  
a first shield having a face positioned transversely to  
and intersecting the baffle, and parallel to and spaced from  
the front wall; and a second shield having a face posi-  
tioned transversely to and intersecting the baffle and paral-  
el to and spaced from the rear wall; said shields extend-  
ing upwardly from said baffle.

2. In the combination set forth in claim 1, wherein  
said first shield is a given distance from said front wall  
and the second shield is the same distance from the rear  
wall, and the length of the shields as measured parallel  
to said front and rear walls is at least three times the  
width of the baffle as measured in the same direction.

3. In the combination set forth in claim 2, wherein  
said baffle is approximately horizontal and has upwardly  
extending flanges along the side edges thereof, said flanges  
extending upwardly a distance substantially less than the  
half of the shields.

4. In the combination set forth in claim 1, wherein  
said baffle is approximately horizontal and has upwardly  
extending flanges along the side edges thereof, said flanges extending upwardly a distance substantially less than the half of the shields.

References Cited

UNITED STATES PATENTS

2,031,314 2/1936  Hunter 126—307
2,487,776 11/1949  Cartier 126—307 X
2,592,235 4/1952  Cartier 126—307 X
2,703,569 3/1955  Yarbough 126—307

FOREIGN PATENTS

531,032 8/1931  Germany.

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