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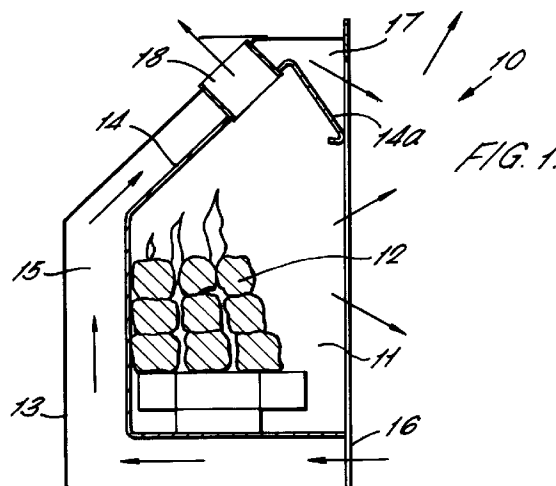
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(54) **Improvements in fireplace appliances.**

(57) The invention relates to improvements in fireplace appliances, and in particular to a device for reducing the amount of lost heat from fireplace appliances, such as convector boxes, inset gas fires or inset live effect fires. A convector box comprises an outer casing which surrounds an inner casing, the inner casing forming a combustion chamber in which gaseous fuel is to be combusted, the outer casing and inner casing each having a window aligned so that heat from the combustion chamber can pass outwardly, the space between the outer and inner casings forming a duct having an inlet through which air is drawn due to convection from outside the convector box, the air passing outwardly again, after heating, through a first outlet and the smoke and other combustion products passing through a second outlet wherein the second outlet is provided with a modifying plate which modifies the airflow through the second outlet.



The invention relates to improvements in fire-place appliances, and in particular to a device for reducing the amount of lost heat from fireplace appliances, such as convector boxes, inset gas fires or inset live effect fires.

Convector boxes work on the principle of drawing in air from the room in which the box is located, heating it as it passes through the box, expelling heated air by means of convection back into the room and passing fumes into the flue stack. Convector boxes generally achieve this by having a fire box containing burning fuel with a metal outercasing. An air warming duct is formed by the rear wall of the casing and the back of the fire box. The heat from the burning fuel elements not only warms the air in the convector air warming duct, but also radiates heat into the room. This is therefore a very efficient way of heating.

In a typical convector box the flue outlets, which are the conduits to transfer the combustion products from the fire box or combustion chamber to the flue-way, allow uninterrupted passages of fumes. Disadvantageously, large quantities of heat are also allowed to pass by the same outlets into the flue stack.

It is therefore an object of the present invention to overcome this disadvantage and to reduce the quantity of heat being passed via flue outlets.

According to the present invention, there is provided a convector box comprising an outer casing which surrounds an inner casing, the inner casing forming a combustion chamber in which gaseous fuel is to be combusted, the outer casing and inner casing each having a window aligned so that heat from the combustion chamber can pass outwardly, the space between the outer and inner casings forming a duct having an inlet through which air is drawn due to convection from outside the convector box, the air passing outwardly again, after heating, through a first outlet and the smoke and other combustion products passing through a second outlet wherein the second outlet is provided with a modifying plate which modifies the airflow through the second outlet.

Preferably, the modifying plate obscures at least part of the second outlet.

Preferably, the modifying plate has a flat surface.

Preferably, the modifying plate has a curved surface.

Preferably, the convector box further comprises an auxiliary modifying member.

Preferably, the auxiliary modifying member is located on the inner casing in the vicinity of the modifying plate.

There will now be described, by way of example only, preferred embodiments of the present invention, in which:-

Fig. 1 shows a side sectional view of a typical prior art convector box;

Fig. 2 shows a convector box according to the present invention;

Fig. 3 depicts a first modification to the convector box in Fig. 2; and

Fig. 4 depicts a second modification to the convector box in Fig. 2.

A typical convector box 10 is illustrated in Fig. 1 and comprises a fire box or combustion chamber 11 in which are located fuel elements 12. These may be naturally burning fuel elements such as coal or wood, gas elements, inset real effect fuel elements or the like.

The convector box 10 has an outer casing 13 which, together with the rear wall 14 of the fire box 11, forms an air warming duct 15. Obviously in some designs of fireplace appliances, this arrangement may be modified, for example having a separate air duct between the fire box and its casing. The rear wall 14 is provided with a return lip 14a in the area of the main outlet 17 which serves to prevent products of combustion from entering the room.

The air warming duct 15 has an inlet 16 located beneath the fire box 11 for drawing in air from the room in the direction of the arrows. The duct 15 also has a first outlet 17 for the heated air to pass back into the room, thus providing convection heating. A second outlet 18 is provided which allows smoke and other combustion products to exhaust from the fire box 11 to the chimney flue-way. There may also be a plurality of fume outlets 18.

In the convector box according to the invention, as shown in Fig. 2, a plate 19 is attached to the fire box rear wall 14 so as to cover part or all of the fume outlet 18.

The plate 19 alters the aerodynamic conditions above the fuel elements 12, changing the speed with which the fumes and heated air pass into the fume outlet 18. The plate 19 also modifies the airflow such that the flames and hot gases are drawn more intimately into contact with the rear wall 14 of the fire box 11, thus promoting greater heat exchange into the air warming duct 15.

The plate 19 is so arranged as to cover some or all of the fume outlet 18 according to how great a distortion of the aerodynamics is possible before fumes are caused to spill from the front of the convector box 10. The shape of the lower edge of the plate 19 and the geometry of the outlets 17, 18 have been shown to vary the spillage characteristics. The position of the plate 19 may also be varied in the distance by which it is spaced from the fire box rear wall 14. The distance also has an effect on the heat output, but again varies the spillage characteristics from the front of the fire.

Preferably, the plate 19 should be spaced at a distance of between 10mm and 25mm from the rear wall 14.

The plate 19 may be divided across the width of the fire, so allowing additional passage ways for the fume/air mixture to reach the fume outlets 18. When

such division takes place, it can be advantageous to vary the shape of the plate 19 to a circular or combination of rectangular plates with radiused ends.

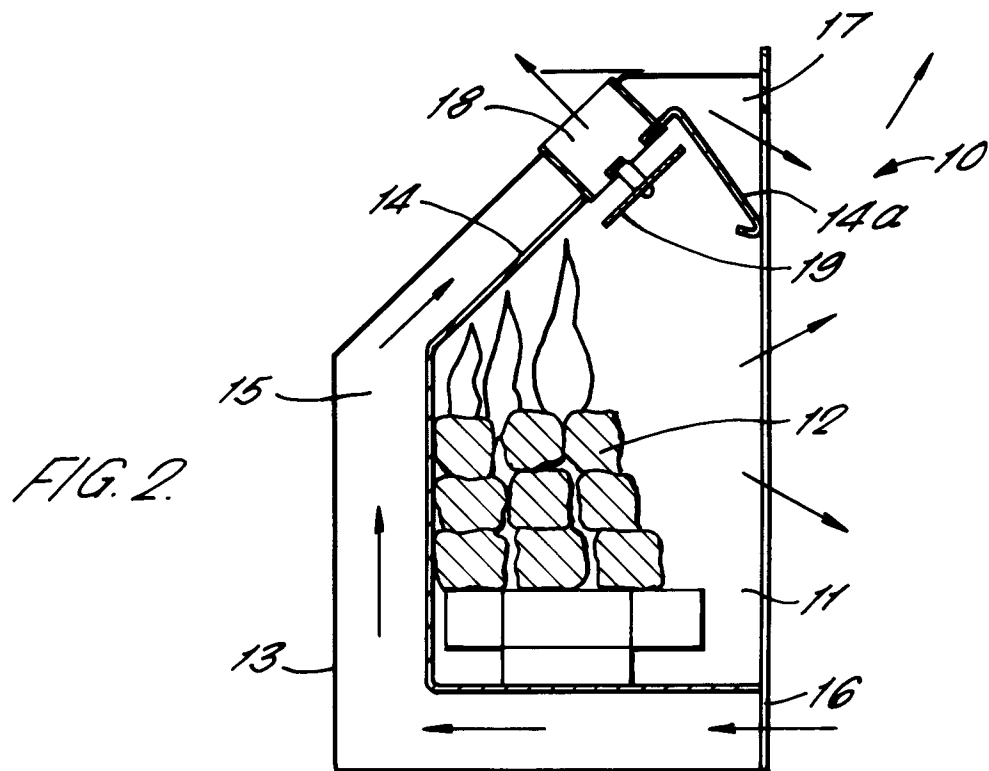
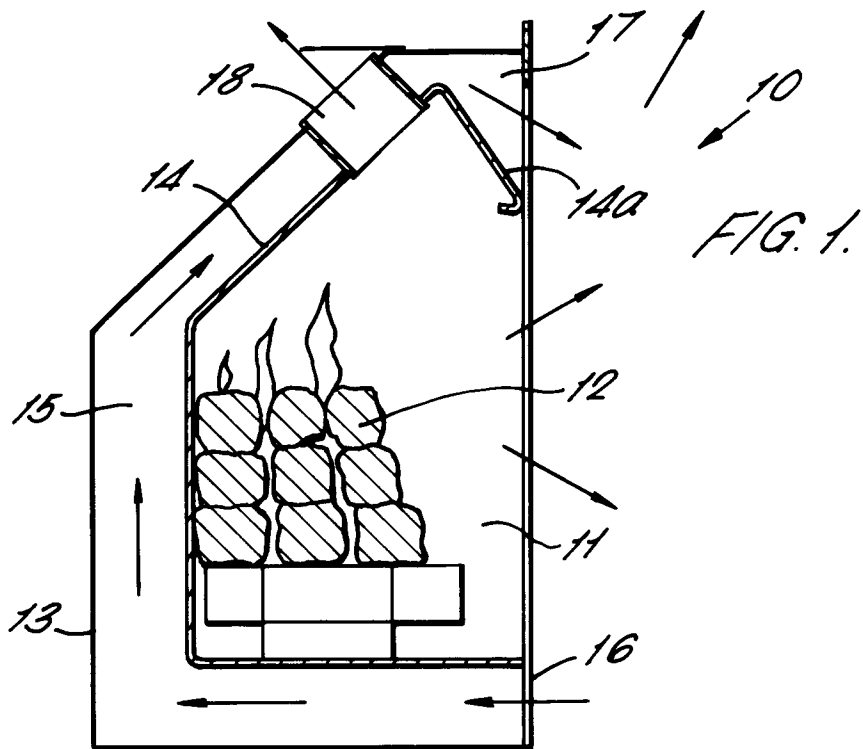
The plate 19 or a plurality of plates may be used in combination with further members which modify the flow arrangements, e.g. an extension of the return lip 14a of the rear wall 14. Fig. 3 depicts such a modification where the return lip 14a is extended at 14b and folded back onto itself.

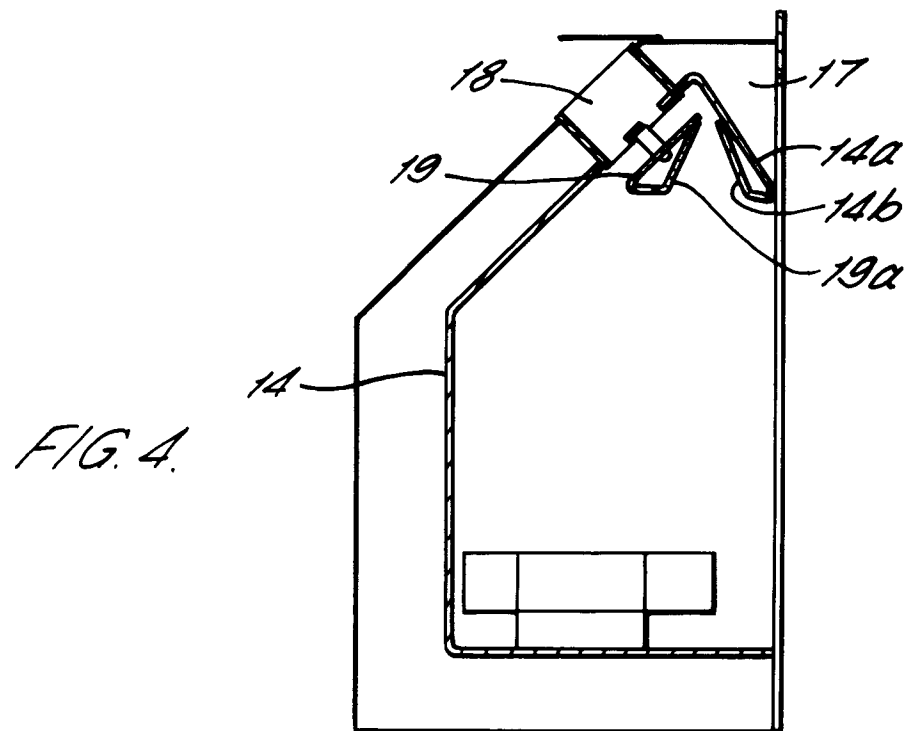
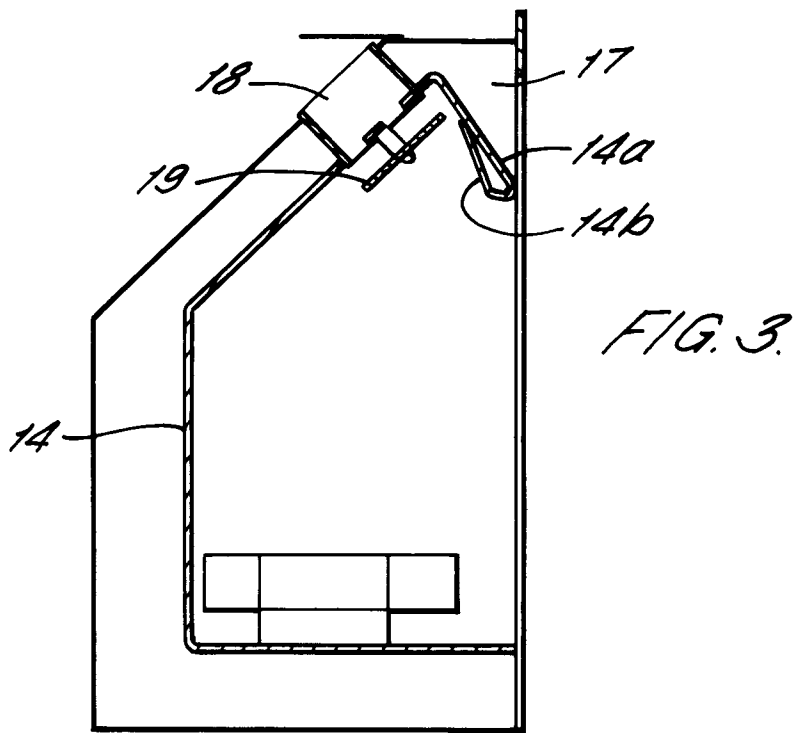
The cross-section of the plate or plates 19 may be varied from being flat to curved which, in combination with the shape of the top of the fire box 11 causes a venturi effect to accelerate the gas/air combination. Fig. 4 depicts such a modification where the plate 19 has a curved lower surface 19a which is similar in profile to the return lip 14a with extension 14b.

panying drawings.

Claims

1. A convector box comprising an outer casing which surrounds an inner casing, the inner casing forming a combustion chamber in which gaseous fuel is to be combusted, the outer casing and inner casing each having a window aligned so that heat from the combustion chamber can pass outwardly, the space between the outer and inner casings forming a duct having an inlet through which air is drawn due to convection from outside the convector box, the air passing outwardly again, after heating, through a first outlet and the smoke and other combustion products passing through a second outlet wherein the second outlet is provided with a modifying plate which modifies the airflow through the second outlet.
2. A convector box as claimed in claim 1 wherein the modifying plate obscures at least part of the second outlet.
3. A convector box as claimed in any preceding claim wherein the modifying plate has a flat surface.
4. A convector box as claimed in any preceding claim wherein the modifying plate has a curved surface.
5. A convector box as claimed in any preceding claim further comprising an auxiliary modifying member.
6. A convector box as claimed in claim 5 wherein the auxiliary modifying member is located on the inner casing in the vicinity of the modifying plate.
7. A convector box substantially as herein described and as illustrated in Figs. 2 and 4 of the accom-







European Patent
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EUROPEAN SEARCH REPORT

Application Number
EP 95 30 0739

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
X	CA-A-2 073 411 (SCHROETER) * page 6, line 1 - line 37; figures 1-4 * ---	1-3	F24B1/18
X	US-A-5 016 609 (SHIMEK) * abstract * * column 5, line 28 - line 54; figures * ---	1-6	
X	GB-A-2 193 569 (GLOW-WORM) * page 2, line 68 - line 112; figure 3 * ---	1-3	
A	EP-A-0 523 912 (VALOR) * abstract * ---	1	
A	GB-A-2 175 388 (J&R HILL) * the whole document * -----	1	
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			F24B F24C
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 17 May 1995	Examiner Vanheusden, J
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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