(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number: **0 480 595 A2**

(12) EUROPEAN PATENT APPLICATION

(21) Application number: **91308662.5**

(51) Int. Cl.5: **F24C 3/10**

(22) Date of filing: **24.09.91**

(30) Priority: **10.10.90 GB 9021987**

(43) Date of publication of application:
15.04.92 Bulletin 92/16

(84) Designated Contracting States:
AT BE CH DE ES FR IT LI LU NL SE

(71) Applicant: **CANNON INDUSTRIES LIMITED**
Gough Road, Cosely
Bilston West Midlands WV14 8XR(GB)

(72) Inventor: **Philips, Steven John**
50 Monsal Road
Great Barr, Birmingham., B42 2DH(GB)
Inventor: **Gibson, Andrew David**
199A Arphanage Road
Erdington, Birmingham, B24 0AE(GB)

(74) Representative: **Waters, Jeffrey et al**
GEC Patent Department, GEC Marconi Limited, West Hanningfield Road
Great Baddow, Chelmsford, Essex CM2 8HN(GB)

(54) Gas fire.

(57) In a gas fire, the radiant heat output from imitation coal pieces 2 caused to radiate by flames from a burner 1 is supplemented by convective air drawn into the base of the fire and passing through duct 6 before emerging through outlets 7, the duct being transversed by flue tubes 8, 9, 10, 11 to which combustion gases from the burner pass in the direction of the arrows B.

A problem with such a fire is if the flue outlet 12 become blocked because the flow of gases reverses direction relative to the arrows B and the burner then combusts within unsafe limits if the doors 4, 5 are closed. To overcome this some of the flue tubes 8, 10 are provided with openings 10a, partially shielded by shield 22, to allow escape of recirculating combustion products into the convection duct, thereby allowing the burner to continue operation in safe limits in the event of flue blockage.

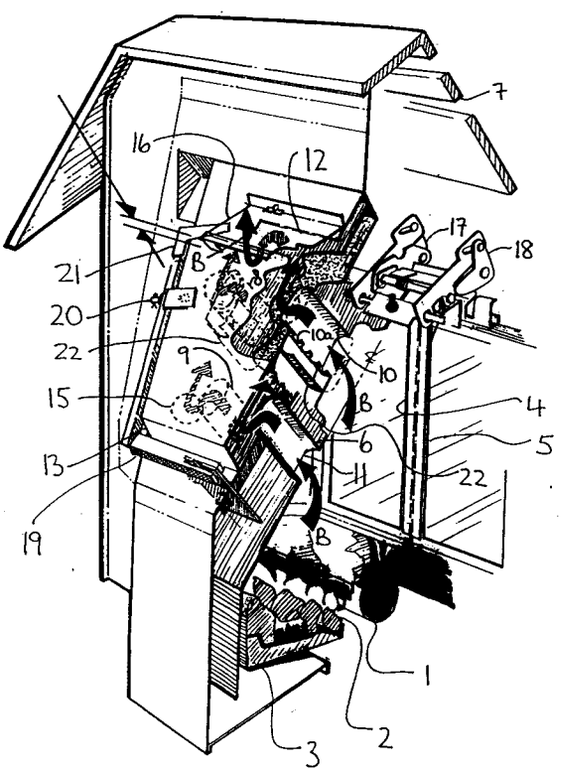

Fig 1.

EP 0 480 595 A2

This invention relates to gas fires, especially of the kind including a burner and a radiant unit arranged to be heated by flames from the burner to produce a source of radiant heat. It is known for the source of radiant heat to be supplemented by heated convection air from a duct which receives air drawn through the fire and which is traversed by a flue tube through which combustion products from the burner pass.

It has been proposed to provide such a fire with a door in front of the radiant unit e.g. of heat resistant glass, to enable the radiant unit to be enclosed: this increases the thermal efficiency of the fire since heated combustion gases are retained for longer in the fire.

However, if the flue outlet of the fire or chimney were to become blocked, the combustion products leaving the flue outlet would reverse direction and recirculate to the burner. The proportion of noxious gases in the combustion products in the fire would build up to dangerous levels, and these noxious products would permeate into the room via the convective duct.

The invention provides a gas fire comprising a burner, a radiant unit arranged to be heated by flames from the burner to produce a source of radiant heat, a transparent panel in front of the radiant unit, and a duct for the passage of convection air drawn through the fire, the duct being traversed by a flue tube through which combustion products from the burner pass, in order that the convection air is heated to supplement the heating from the radiant unit, the flue tube being provided with an opening so that, in the event of flue blockage, the combustion products can escape into the convection duct.

The presence of the opening prevents such a build-up of dangerous levels of noxious products since in the event of flue or chimney blockage, combustion products can escape into the room via the convection duct and the burner is allowed to continue operation within safe limits of combustion.

The opening is preferably in the side of the flue tube that is downstream relative to the flow of convective air, and a shield if preferably provided downstream of the opening.

The transparent panel enables the radiant unit to be enclosed, thereby improving the efficiency of combustion: it may be fixed, but may instead be movable e.g. it may be provided in a door which may be opened to enable the radiant heat from the radiant unit to be increased. In this case, a damper may be provided in the path of the combustion products through the flue outlet, which damper is movable to vary the flow of such products from the outlet, and the damper being coupled to the door by means of a linkage mechanism which causes the damper to open on opening of the door and partially to close on closure of the door.

A gas fire constructed in accordance with the invention will now be described by way of example with reference to the accompanying drawings, in which:

Figure 1 is a perspective view of the gas fire;

Figure 2 is a longitudinal cross section of a part of the gas fire; and

Figure 3 is a plan view of a flue tube.

The gas fire comprises a burner 1 arranged to direct gas rearwardly onto refractory radiation elements 2 in the form of imitation coal pieces supported on a refractory base 3. A pair of doors 4, 5 of heat resistant glass can be closed in front of the radiant units 2 to raise the temperature of combustion gases within the fire.

In addition to radiant heat from the fire, the fire includes a duct 6 in which convective air is heated to supplement the radiant heating. Air is drawn through inlets (not shown) at the bottom of the fire, and passes under the burner and imitation coal pieces into the duct (in the direction of the arrow A - Figure 2), and through the duct to outlets 7 which open into the room.

The duct 6 is traversed by several flue tubes 8, 9, 10, 11 (only one of which (10) is shown in Figure 2). Combustion gases from the fire must pass through these tubes in the direction of arrows B in order to reach the flue outlet 12 of the fire, and must also pass through box 13 above the duct 6, which contains baffle plate 14 having openings 15 offset with respect to the corresponding flue tubes. The heat exchanger thus created heats the air drawn into the bottom of the fire, which emerges into the room via the outlets 7.

A damper 16 is pivotable between two positions above the flue outlet. In dotted position, the flue outlet 12 is partially obscured and in the solid line position, the flue outlet 12 is opened. A linkage mechanism operated by doors 4, 5 pivots the damper 16 into its open position when the doors are open (to increase the draught and reduce the spillage of combustion products into the room) and into its partially closed position when the doors are closed (in which radiated heat is reduced but convective heat is increased). The damper takes up intermediate positions when one door is open or both doors are partially open.

The linkage mechanism comprises a pair of members 17, 18 which are pivoted when the doors are shut which in turn via a linkage (not shown) pivot a three sided frame 19 about pivot points 20 to lift and lower control surfaces 21.

A problem with such a fire is that, if the flue outlet 12 becomes blocked (e.g. due to a fall of soot in the chimney), or if the chimney itself becomes blocked, with the doors 4, 5 closed, combustion gases will tend to reverse direction with

respect to arrows B and recirculate to the region of the burner. The combustion then produced gradually becomes very noxious and these noxious combustion products fall below the burner and coal pieces, whereupon they leak into the room via the inlets (not shown) to the convective duct at the bottom of the fire but mostly through the convective duct itself and out into the room via the outlets 7.

To overcome this problem and in accordance with the invention, some of the flue tubes 8, 10 are provided with bleed openings (10a, 10b, 10c, 10d in Figure 2). Thus, in the event of recirculation, combustion gases will escape (in the direction of the arrows C) into the convection air duct 6 and will gradually escape to the room. A dangerous build up of noxious gases is thus avoided and the burners remain operating within safe limits.

In order to prevent, for practical purposes, the flow of combustion gases sucking in the convective air flow when the fire is operating normally, a shield 22 is provided downstream of the bleed openings 10a-d relative to the direction of convective air flow, and the shield is cut away at 23 to provide an opening for combustion gases.

Claims

1. A gas fire comprising a burner, a radiant unit arranged to be heated by flames from the burner to produce a source of radiant heat, a transparent panel in front of the radiant unit, and a duct for the passage of convection air drawn through the fire, the duct being traversed by a flue tube through which combustion products from the burner pass, in order that the convection air is heated to supplement the heating from the radiant unit, the flue tube being provided with an opening so that, in the event of flue blockage, the combustion products can escape into the convection duct.

2. A gas fire as claimed in claim 1, in which there is provided an opening in the side of the flue tube that is downstream relative to the flow of convective air, and a shield is provided downstream of the opening.

3. A gas fire as claimed in claim 1 or claim 2, in which the transparent panel is formed by a door which may be opened.

4. A gas fire as claimed in claim 3, in which there is provided a damper in the path of combustion product through the flue outlet, which damper is movable to vary the flow of such products from the outlet, the damper being coupled to the door by means of a linkage mechanism which causes the damper to open on opening of the door and partially to close on closure of the door.

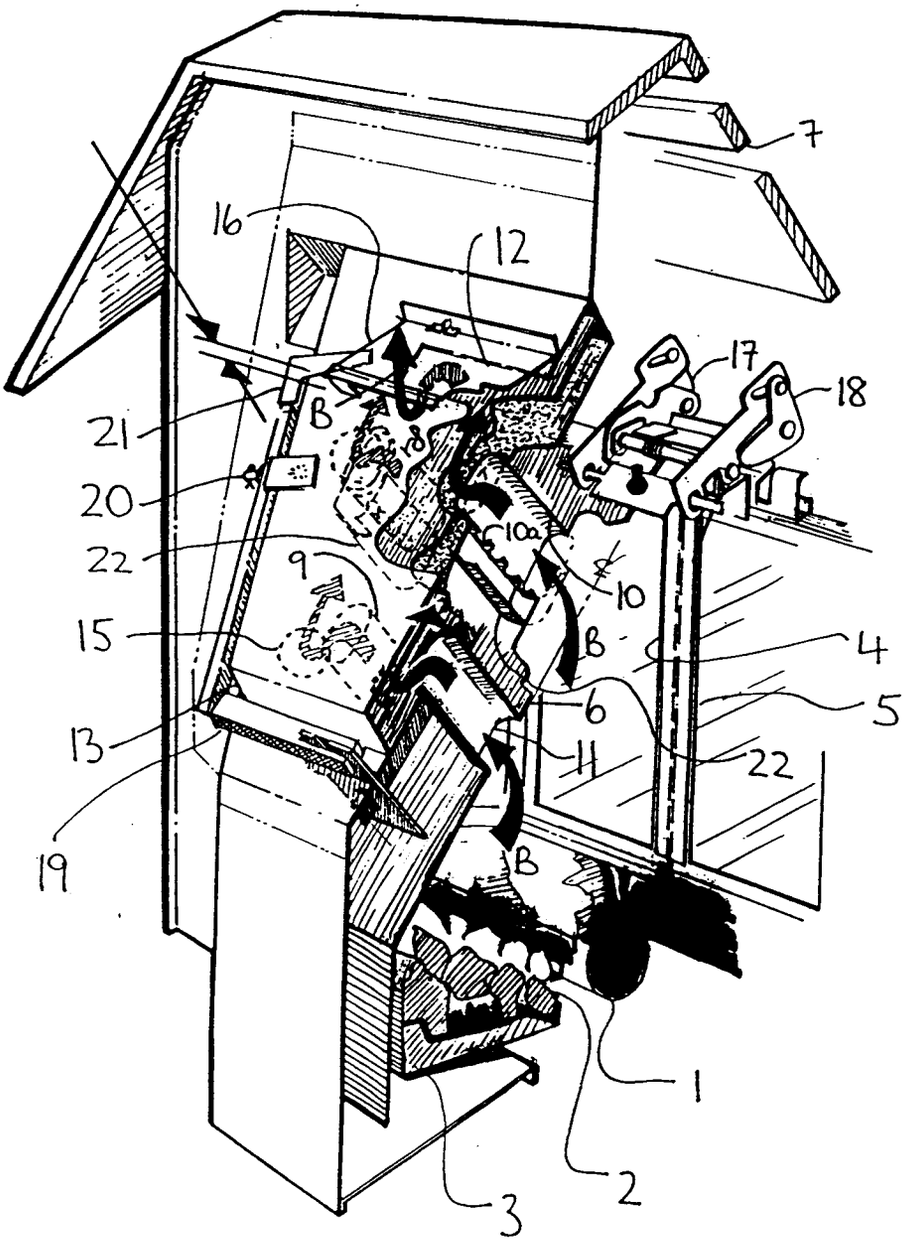

Fig 1.

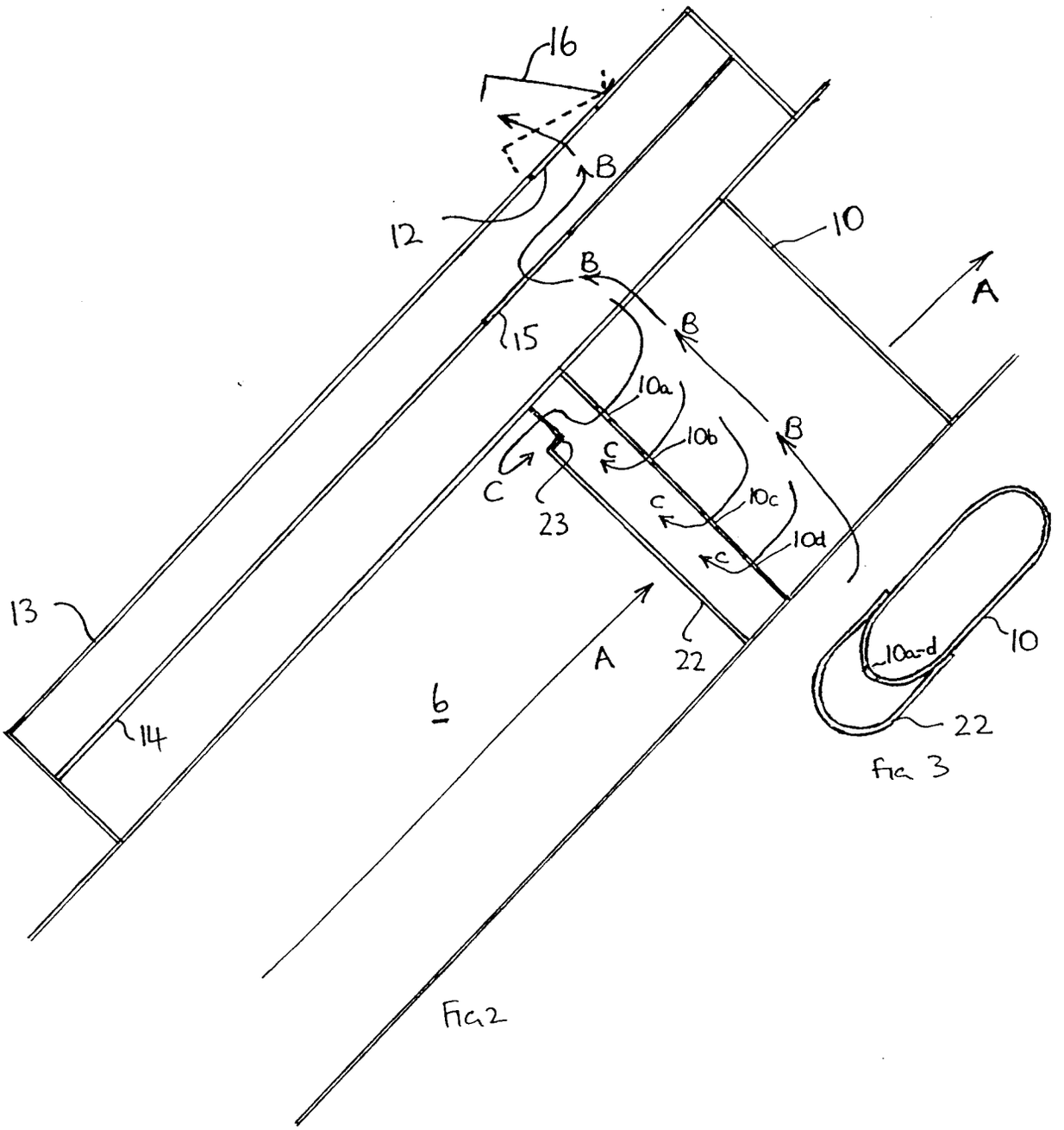

Fig 2

Fig 3