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Improvements relating to gas burners.

The present specification discloses a gas burner arrangement for use in a solid fuel effect gas fire, the burner arrangement comprising a gas burner (3) located in a combustion chamber (5) directly under a simulated solid fuel element bed (7). The gas burner (3) is arranged to burn gas which has been aerated with a primary quantity of air which is insufficient for complete combustion. Inlets (11) are provided in the combustion chamber (5) to allow a secondary quantity of air to be drawn into the combustion chamber (5), the secondary quantity of air being insufficient for complete combustion but sufficient to produce flames within the combustion chamber (5), which are hot enough to heat the simulated solid fuel element bed (7) to a temperature at which sooting by the flames impinging in the bed (7), is minimised. Thus as the combusting gases pass through apertures (13) in the simulated solid fuel effect bed (7), they mix with the ambient air to complete combustion in the free air above the simulated solid fuel effect bed (7). This obviates the need for a chimney to carry away partially burnt gases.

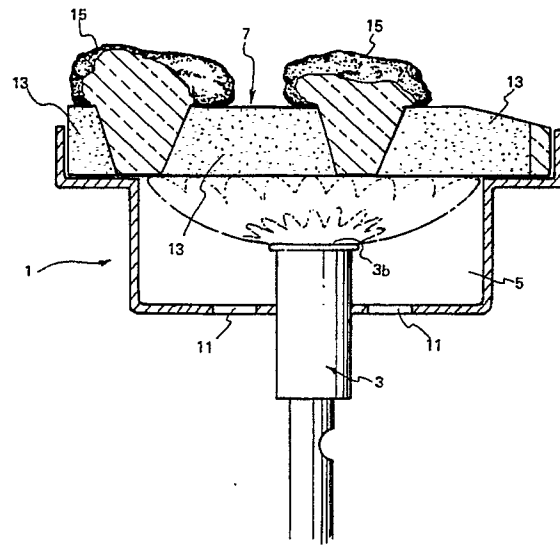


Fig. 1.

EP 0 400 845 A1

IMPROVEMENTS RELATING TO GAS BURNERS

The present invention relates to a gas burner arrangement for use in a solid fuel effect gas fire.

In certain known solid fuel effect gas fires, one or more aerated gas burners provide the main heat and glow and these or a number of under aerated or neat gas burners provide the wispy flames which add visual realism to the fire but little heat. This type of known arrangement requires selective control of the various burners to achieve optimum performance in respect of heat output and visual effect, otherwise poor combustion and sooting could occur. However such known fires are inherently prone to sooting and poor combustion due to the impingement of the flames on the simulated solid fuel elements beneath which the burners are conventionally located. Generally these known fires are used with a heat exchanger and the products of combustion have to be vented out via a chimney. If purely a decorative fire the products of combustion are immediately vented out via a chimney.

The aim of the present invention is to provide a simple but high efficiency gas burner arrangement which can provide a visual effect with good combustion, allowing use in unvented and vented type appliances.

According to the present invention there is provided a gas burner arrangement for use in a solid fuel effect gas fire, the burner arrangement comprising a gas burner located in a combustion chamber directly under a simulated solid fuel element bed, the gas burner being arranged to burn gas which has been aerated with a primary quantity of air, the combustion chamber having inlets through which a secondary quantity of air can be drawn into the combustion chamber to aid combustion within the combustion chamber, the simulated solid fuel element bed being provided with a number of apertures through which flames and gas/air mix can pass to mix with the ambient air and enable complete combustion to occur outside the combustion chamber above the simulated solid fuel element bed.

Preferably the burner used is a standard primary aerated strip type gas burner adjusted to give yellow tipped flames i.e. the quantity of primary air is insufficient for complete combustion to occur. The combustion chamber is preferably a rectangular open topped box configuration with the burner set in the base of the box, a simulated solid fuel effect construction made, for example, from a ceramic material, with said apertures being located between the fuel elements, closing the top of the combustion chamber. Inlets for secondary air are preferably located in the base region of the combustion chamber below the level of the outlet ports

of the burner, and are designed to provide insufficient air for complete combustion to occur, but sufficient air to cause the gases to burn in the combustion chamber with flames which are hot enough to heat the simulated solid fuel effect construction to a temperature at which sooting, i.e. depositing of carbon, by the flames impinging on the simulated solid fuel effect construction, is minimised. Excessive secondary air would result in yellow sooting flames below the simulated solid fuel effect construction. The balanced quantity of primary and secondary air is preferably sufficient to produce flames which are hot enough to make the solid fuel effect construction glow. Preferably the apertures in the solid fuel effect construction are of a size which results in the combustion chamber filling with burning gases, reverse air flow at the edges of the apertures being minimised. Thus as the combusting gases pass through the apertures in the simulated solid fuel effect construction, they mix with the ambient air and the combustion is completed with a yellow flame. As the final combustion takes place in free air and the flames do not impinge on any obstructions, the combustion performance attains enhanced results. A chimney therefore may or may not be provided or even required. Further, a heat exchanger may be provided of desired.

To facilitate ignition a pilot or ignition system may be provided in or adjacent to the combustion chamber. Further whilst a simplex burner allows the gas feed rate to be turned down to very low levels, a duplex type burner or two or more burners may of course be alternatively provided.

The burner arrangement of the present invention can thus be used to provide a visual effect without the paramount need for a chimney and thus the present invention may be used to advantage in, for example, a portable cabinet heater fed with bottled gas.

The present invention will now be further described, by way of example, with reference to the accompanying drawings, in which:-

Fig. 1 is a partially schematic cross-sectional view of a preferred embodiment of the present invention; and

Fig. 2 is a partially cutaway perspective view of the preferred embodiment of Fig.1.

The preferred embodiment of the present invention illustrated in the accompanying drawings comprises a burner arrangement 1 having a strip-like burner 3 which is arranged to burn gas aerated with a primary quantity of air, in a rectangular box-like combustion chamber 5. The strip-like burner 3 is an elongate ribbon-type burner with an arrange-

ment of outlet ports 3a in a generally horizontal upper surface 3b of the burner. The combustion chamber 5 is made of metal and has an open top which is closed over by a simulated solid fuel effect construction 7 which is made of a ceramic material and which has a number of apertures 13 between the simulated fuel elements 15. Alternatively, the combustion chamber can be completely made of a ceramic material.

The burner 3 is provided in the base 9 of the combustion chamber 5, directly beneath the simulated solid fuel effect construction 7. Alternatively a number of burners can be substituted. Also located in the base region 9 of the combustion chamber 5 below the level of the outlet ports 3a, are a number of elongate inlet apertures 11 for allowing a quantity of secondary air to be drawn into the combustion chamber 5.

The burner 3 is designed so that the gas it burns is insufficiently aerated by the primary air to produce complete combustion i.e. the quantity of primary air is only sufficient to produce yellow tipped flames when the fuel effect 7 is not in position. A quantity of secondary air is thus drawn into the combustion chamber 5 via the inlet apertures 11, though this is insufficient to complete combustion but sufficient to cause the gases to burn in the combustion chamber 5 with flames which are hot enough to heat the simulated solid fuel effect construction 7 to a temperature at which sooting by the flames impinging on the simulated solid fuel effect construction 7, is minimised. The combusting gases pass through the apertures 13 in the simulated fuel effect construction 7 the apertures 13 being of a size such that the combustion chamber 5 is filled with burning gases and reverse air flow around the edges of the apertures 13 is minimised. As the combusting gases pass through the apertures 13 they mix with the ambient air, combustion being thus completed with a yellow flame. As the final combustion takes place in the free air and the flames do not impinge on any obstructions, the combustion figures are good. A chimney or flue need not therefore be necessary.

The simulated solid fuel effect construction 7 is thus heated by the flames in the combustion chamber and thus acts as a radiant heater, with the hot gases passing through the apertures 13 causing the edges of the aperture 13 to become heated sufficiently to glow red as per a real fire, the yellow flames produced by complete combustion in the ambient atmosphere adding to the visual realism of the fire as well as to the heat output.

The fuel effect 7 can be constructed of multiple levels and segments from ceramic type materials or a combination of metal and ceramic or all metal configurations. These can be designed so as to modify the combustion characteristics to thus in-

duce variations in the flame colour and pattern, in conjunction with variations to the combustion chamber 5 which may be constructed of materials other than metal.

To facilitate ignition an igniter 17 in the form of a pilot or ignition system can be located in the combustion chamber 5.

The present invention thus provides a burner arrangement which provides a visual effect without the need for the previously essential chimney or flue.

Claims

1. A gas burner arrangement for use in a solid fuel effect gas fire, the burner arrangement being characterised by a gas burner (3) located in a combustion chamber (5) directly underneath a simulated solid fuel element construction (7), the gas burner (3) being arranged to burn gas which has been aerated with a primary quantity of air, the combustion chamber (5) having inlets (11) through which a secondary quantity of air can be drawn into the combustion chamber (5) to aid combustion within the combustion chamber (5), the simulated solid fuel element construction (7) being provided with a number of apertures (13) through which combustion gases can pass to mix with the ambient air and enable complete combustion to occur outside the combustion chamber (5) above the simulated solid fuel element construction (7).

2. A gas burner arrangement as claimed in claim 1, in which the gas burner (3) has outlet ports (3a) and the said inlets (11) for the secondary air are located below the level of the outlet ports (3a).

3. A gas burner arrangement as claimed in claim 1 or claim 2, in which the combustion chamber (5) is in the form of a rectangular box with the gas burner (3) located in the base region (9) of the box, the simulated solid fuel element construction (7) forming the top of the box.

4. A gas burner arrangement as claimed in any one of claims 1 to 3, in which the inlets (11) for the secondary air are located in the base (9) of the combustion chamber (5).

5. A gas burner arrangement as claimed in any one of claims 1 to 4, in which the burner (3) is an elongate ribbon-type burner with an arrangement of outlet ports (3a) in a generally horizontal upper surface (3b) of the burner (3).

6. A gas burner as claimed in any one of the preceding claims, in which the simulated solid fuel element construction (7) is a ceramic structure with said apertures (13) located between simulated solid fuel elements (15).

7. A gas burner arrangement as claimed in any one of the preceding claims, in which an igniter

(17) is located within the combustion chamber (5).

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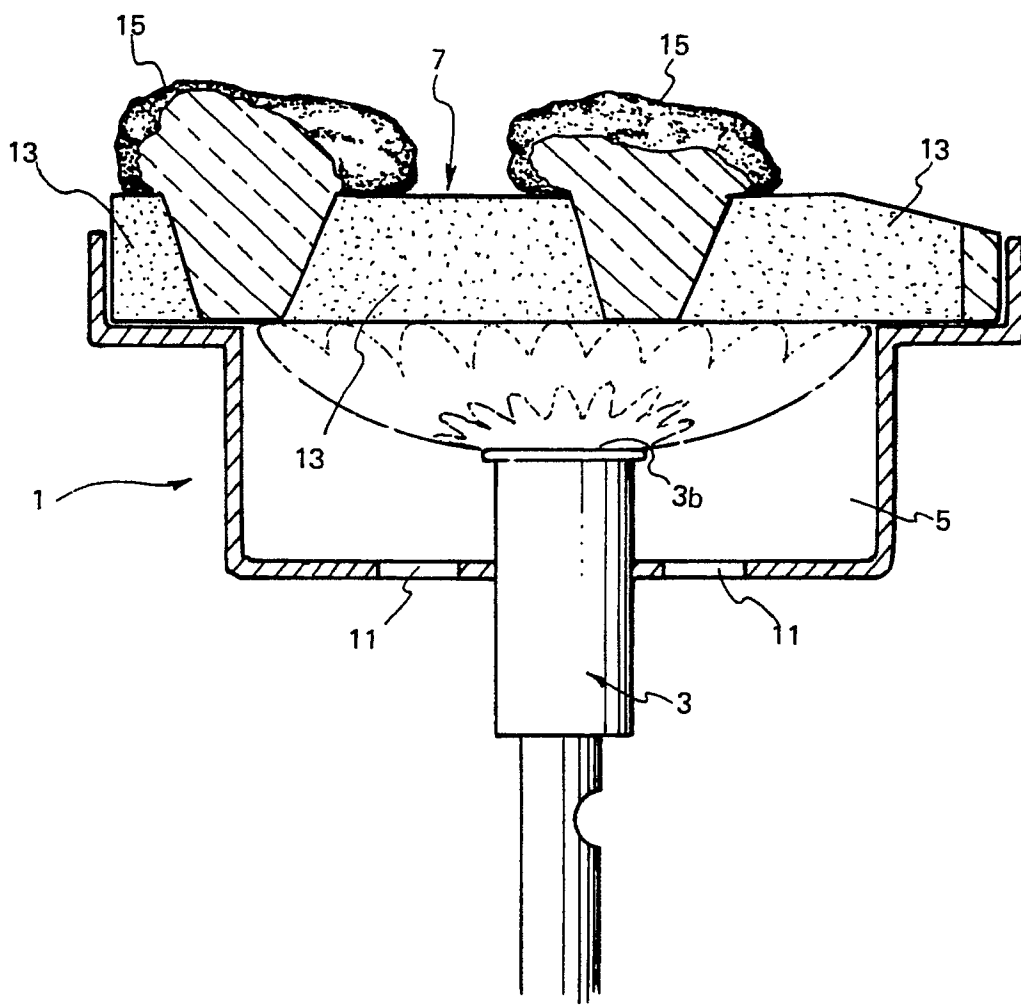


Fig. 1.

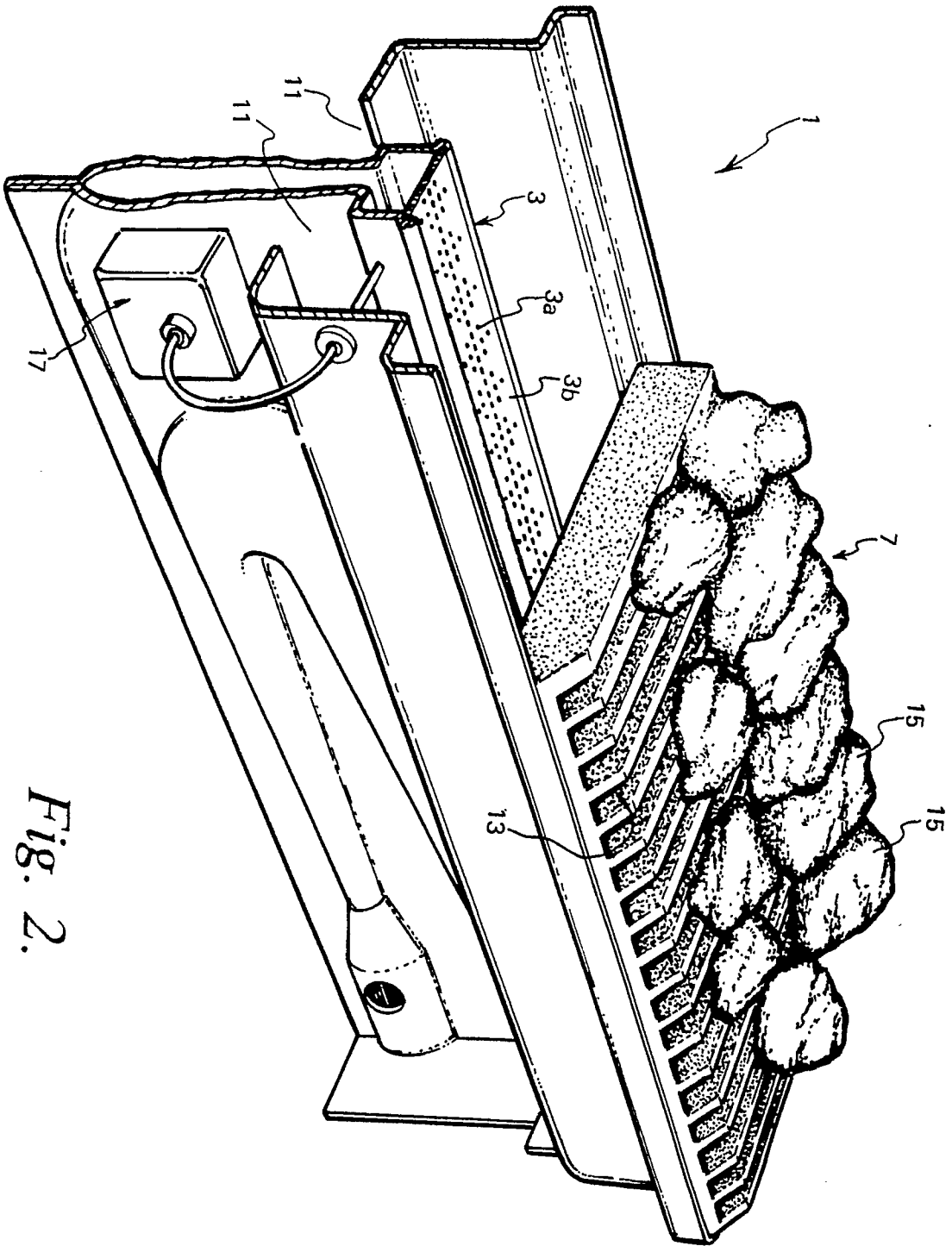


Fig. 2.



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.5)
X	FR-A-2343972 (FOSECO INTERNATIONAL) * page 5, line 9 - page 5, line 37; figures 1, 2 *	1-4	F24C3/00
A	GB-A-2040440 (VALOR HEATING) * the whole document *	1	
A	GB-A-2136949 (MITCHELL) * claims 1-5; figure 1 *	1	
A	GB-A-2179438 (FLAMELOG AND COAL FIRES) * claim 1; figures *	1	
A	EP-A-146371 (BAXI) * page 8, line 4 - page 8, line 9; figures 2, 10 *	7	
			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			F24C F24B F23D
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 05 SEPTEMBER 1990	Examiner VANHEUSDEN J.
CATEGORY OF CITED DOCUMENTS		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 I : document cited for other reasons & : member of the same patent family, corresponding document	
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			