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(54) **Flammable fluid heating apparatus**

Heizgerät für ein entflammbares Medium

Appareil de chauffage à fluide inflammable

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Description

[0001] This invention relates to a flammable fluid fuelled heater, comprising the features of the preamble of claim 1. Such a houses is known from GB-A-2 275 331.

[0002] Traditional flammable fluid fuelled heaters such as gas fuelled heaters comprise a combustion chamber into which the flammable fluid is supplied and may be provided with an exhaust into the room into which the heater is housed. Such flueless units may be provided with catalytic converters forming a secondary combustion chamber above the primary combustion chamber to reduce the emissions in the exhaust. However, in trying to provide such units with an open front wall to provide an unobstructed view of the flames in accordance with a conventional fireplace, some difficulties might arise in minimising the size of that catalytic converter due to the large open front area for the drawing of air into the primary combustion unit increasing the overall throughput of the heater. A catalytic converter of reduced size causes an obstruction to the flow of air through the heater and this may lead to spilling of emissions directly from the primary combustion out through the open front of the unit and into the room into which the unit is housed. This can cause problems with such emissions reaching levels that are either unsafe or at least outside regulatory guidelines.

[0003] Another aspect of traditional fireplaces is attempts to provide a realistic artificial log assembly in the combustion chamber. There may be a preference for a primary combustion chamber and associated artificial log assembly which attempts to provide a visually larger fire than is physically present so that the overall size of the heater unit may be minimised by still providing a relatively large apparent fire area. Such traditional technology has included the provision of a mirror behind the artificial log assembly and primary combustion chamber. However, the reflected image in the mirror does not always provide a realistic appearance if there is a visually apparent division between the real image and the reflected image.

[0004] Dutch patent specification no. 8901777 discloses a flammable fluid fuelled heater employing a fan to drive a stream of air into a room around the heater.

[0005] UK patent specification no. 2207235 discloses a flammable fluid fuelled heater having a combustion chamber with an opening in at least one side to provide a view of a substantial portion of the combustion chamber and to expose the combustion chamber to the room where the heater is housed. The heater includes a flammable fluid fuel supply to the combustion chamber to, upon combustion, provide a substantial portion of yellow flame and to generate the products of combustion.

[0006] It is an object of the present invention to provide an improved flammable fluid fuelled heater.

[0007] According to the present invention there is provided a flammable fluid fuelled heater comprising: a pri-

mary combustion chamber having an opening in at least one side thereof to provide a view of a substantial portion of the primary combustion chamber; and to expose the primary combustion chamber to the room where the heater is housed; and a flammable fluid fuel supply to said primary combustion chamber to, upon combustion, provide a substantial portion of yellow flame and to generate products of combustion; characterised by a catalytic converter located in a secondary combustion chamber for receiving the product of combustion and generating an exhaust, and by air circulating means for driving a stream of air including at least a portion of said exhaust from the catalytic converter into the room where the heater is housed, wherein the stream projected across the opening, both reduces the effective size of the opening for air inlet which improves the ability to deplete oxygen within the combustion chamber and inhibits the spillage of the products of combustion adjacent the upper edge of the opening.

[0008] Flammable fluid fuelled heaters embodying the present invention will now be described, by way of example, with reference to the accompanying diagrammatic drawings in which:-

Figure 1 shows a cross-sectional view through one possible embodiment of the apparatus; and Figure 2 shows a front elevational view of the apparatus of Figure 1.

[0009] As shown in the drawings, a flammable fluid fuelled heater 1 has a primary combustion chamber 2 including a flammable fluid fuel supply 3 to provide a flammable fluid such as liquidified petroleum gas or compressed natural gas or other such fuels for combustion in the primary combustion chamber.

[0010] An outer housing 4 may be provided to house the apparatus and, in at least this preferred form of the invention, the primary combustion chamber 2 and outer housing 4 are provided with an opening 5 providing an unobstructed view of a substantial portion of the primary combustion chamber 2 and, in particular, that region in which combustion is occurring.

[0011] To provide a visually aesthetic fire, the fuel supply through the inlet 3 and the combustion characteristics within the primary combustion chamber 2 are such as to provide a flame having a substantially yellow appearance. To achieve this, the primary combustion chamber 2 must be depleted of oxygen content and this requires strict control over the inlet of oxygenated air into the primary combustion chamber 2 as well as the mixture of the fuel provided through the inlet 3.

[0012] The yellow flame characteristic providing a more aesthetically pleasing fireplace, also requires some incomplete combustion of the fuel in the primary combustion chamber. The emissions from such aesthetically pleasing flames are higher than a comparable heater assembly which is configured to burn with a substantially clean blue flame. Therefore, there is some risk

that spillage of the products of the primary combustion through the open front 5 may lead to the room in which the heater is housed, having raised levels of carbon monoxide and carbon dioxide.

[0013] Although it is perhaps possible to reduce such spillage through increasing the throughput through the apparatus 1 such that the large opening 5 into the primary combustion chamber 2 has sufficient draught to inhibit the exiting of the products of primary combustion through that opening, such a throughput leads to difficulty in achieving the yellow flames while still operating efficiently. Further, a large throughput requires a larger catalytic converter to accommodate the air flow. Also this increased throughput will have a cooling effect on a catalyst which increases the difficulty in achieving light off temperature.

[0014] The present invention includes an air circulating means 6 which may be of any convenient type to create an airstream or draught and, in this preferred form, is provided as a fan. The circulating means 6 is provided to create a stream of air 7 which projects across the opening 5. Such an airstream both reduces the effective size of the opening 5 for air inlet which improves the ability to deplete the oxygen within the primary combustion chamber as well as inhibiting the spillage of the products of combustion adjacent the upper edge of the opening 5. This is particularly the case when the airstream 7 is provided to project downwardly from an upper edge of the opening 5 as indicated in Figure 1.

[0015] In addition, a deflector 8 is running across the airstream to deflect some of the airstream back into the primary combustion chamber 2 which further helps to reduce spillage of products from the primary combustion as designated by arrow 9.

[0016] Again in the preferred form, the heating apparatus 1 may be provided as a flueless unit as indicated or, a unit in which at least a portion of the exhaust from the heater is directed into the room in which the heater 1 is housed. To improve the standard of those emissions, a secondary combustion chamber 10 which includes or comprises a catalytic converter may be provided. In this manner, the products of primary combustion may be drawn through the catalytic converter 10 and through an exhaust port 11 into the room in which the heater is housed and be relatively low in uncombusted hydrocarbons such as carbon monoxide and other pollutants. With the air inlet being provided at least partially by the open front 5, not only are the products of the primary combustion chamber further combusted to improve the exhaust quality but other odours in the room such as cooking odours may be removed through the catalytic converter 10.

[0017] Catalytic converters for such apparatus are relatively expensive and, therefore, the size of the catalytic converter required can become an important factor in providing a cost efficient heater. The minimisation of the size of the catalytic converter will also decrease the throughput capable from the catalytic converter 10. It is

normal in such units for the catalytic converter 10 to provide the greatest restriction to flow in the entire apparatus and this tends to increase any potential problems with spillage of products directly from the primary combustion chamber.

[0018] In the present invention, an air duct 12 may be provided in communication with the secondary combustion chamber or catalytic converter 10 and the exhaust port 11 so as to create an airstream across the outlet from the secondary combustion chamber 10. The duct 12 is also in communication with the air circulating means 6 to create the airstream and the flow of this airstream across the exit from the catalytic converter and provides the draft through the catalytic converter to improve overall throughput. Not only may such an arrangement improve the performance of the catalytic converter but also reduce the restriction that the converter provides in the apparatus and therefore decreasing the quantity of circulating products from the primary combustion as indicated by arrow 9.

[0019] The ducting 12 may also provide a number of other functions such as providing a fresh cooler airstream within the housing 4 to reduce the temperatures of the outer panels of the overall apparatus 1 forming the housing 4. Furthermore, should it be desired, the housing 4 and ducting 12 may be provided with an inlet 14 for connection to a vent to an area external to the room in which the heater is housed such as to the outside of a building. Such an inlet 14 allows ventilation of the room in conjunction with the heater apparatus 1.

[0020] Alternatively or additionally, the inlet for the ducting 12 may be in the base of the heater below the primary combustion chamber 2 such as the inlet 15.

[0021] The air circulating means 6 may be provided in a number of forms and also in a number of positions. In the preferred apparatus as shown in figure 1, the air circulating means 6 may be provided anywhere in communication with the ducting 12 to direct the airstream as suggested. This includes the positioning in a region beneath the primary combustion chamber 2 such as between the inlets 15 and 14.

[0022] It should also be noted that the inlet 14 for connection to an external source of air may be provided as an adjustable inlet so that the proportion of air drawn from an external source and the proportion of air drawn through an inlet such as inlet 15 from within the room can be balanced. This adjustment may be through the form of a baffle plate or similar which can adjust the size of the opening 14. This adjustment may be provided during manufacture and set to a suitable level or allow some manual or controlled adjustment.

[0023] In addition or alternatively to the baffle plate or similar control over the vent, the air circulating means 6 may be provided in the form of a variable speed fan to increase draft through the ducting 12 to increase the drawing of air from the outside. Of course, in a preferred form, it may be desirable to provide separate air circulating means 6 with at least one of these air circulating

means being primarily to draw air through the inlet 14 from an external source, This additional air circulating means or other form of control over the inlet 14 may be linked to a heater control system (not shown) to allow variation in the inlet air.

[0024] In some territories, regulatory requirements set down levels for ventilation in a room in which such a heater is housed. The air drawn through the inlet 14 from an external source may be measured through the inclusion of a suitable air flow sensor to ensure that the adequate ventilation levels are being met. This provides a verifiable control over the air coming into the room in which the heater is housed which will force air from within that room out through any available exit. Should the inlet air fall below a minimum limit, the heater can attempt to compensate by increasing the fan speed, size of the inlet vent or, if necessary, turn the unit off rather than continue to operate below a minimum level. This may involve a link into the gas supply to shut off the unit if the ventilation requirements are not being met.

[0025] The control over this inlet air from an external source can also provide other benefits. In a controlled heater which may involve a thermostatic control or similar, the quantity of gas being supplied to the unit may be adjusted to control the heat output from the heater. For example, a heating appliance may have a maximum capacity of 25MJ. Once the thermostatic or other controller suggests that the heater should reduce its output, this may be controlled through control of the quantity of gas supplied into the unit. However, as this gas supply continues to reduce, the flame height on the unit may also be effected. Once the gas consumption falls below, for example, half its maximum level, it may be decided that the flame height is now insufficient to provide a visually aesthetic appearance. In circumstances where gas consumption is of prime importance, such a reduction in flame height may be of no great concern. However, if the visual appearance of the fire is considered more important, it may be desirable to make the unit operate less efficiently so as to increase the flame height.

[0026] One manner of achieving this can be by again increasing the air flow from outside of the room in which the heater is housed. This increase of inlet air will effectively dump heated air within the room out through any available means. This dumping of heated air within the room allows the unit to continue to operate with a higher gas flow and greater heat output and hence higher visible flame.

[0027] Of course, control of the unit may also alter air flow through the unit and gas consumption as other variables related to the efficiency of the heater, heat output and flame height.

[0028] Flammable fluid fuelled heaters of a type to which the present invention relates are also often provided with an artificial log assembly within the primary combustion chamber 2 so as to give the appearance of a wood fire place. Any attempts to minimise the size of the overall heater 1 lead to some compromise being

made in the size of the fire and the artificial log assembly such as the artificial log assembly 16 comprising artificial logs 17.

[0029] In an attempt to provide a larger visual appearance to the fire, at least one portion of the primary combustion chamber 2 may be provided with a reflective surface such as the back wall 18. In this preferred form of the invention, the primary combustion chamber 2 is also provided with side walls 19 and 20 which are also provided as reflective surfaces to give a reflected image of the log assembly 16 and flames 21.

[0030] The problem with such reflective surfaces is often the appearance of two separate or distinct fires being the artificial log assembly 16 and flames 21 and the reflected image of both. There is an apparent discontinuity between the two images. In the present preferred embodiment, artificial logs 17 are provided to abut the reflective surfaces to provide an apparent continuity of the log into the reflective surface.

[0031] Referring to the rear base log 22 of the assembly 16, it can be seen that the upper edge 23 of this log is provided to abut the reflective back wall 18. As such the base log 22 is provided as a half round log in the artificial log assembly 16. Upon being abutted to the reflective surface 18, the reflective surface 18 provides a continuity to this log to give the appearance of a full round log when the real and reflected images of the base log 22 are varied. The base log 22 is provided having a longitudinal axis substantially parallel to the rear wall 18.

[0032] Similarly, additional logs 24 may be provided which abut the rear wall 18 such that the longitudinal axis of the logs 24 is substantially transverse to the plane of the rear wall 18. In this manner, the length of the log 24 appears to be extended in the reflective image and again providing some continuity into the reflected image.

[0033] In this preferred form where side walls 19 and 20 are also provided with reflective surfaces, the logs abutting those surfaces such as the front log 17 abut the side wall 20 substantially perpendicular to the plane of that reflective surface to provide some continuity into the reflective surface.

[0034] In this preferred form, at least a portion of the flames 21 will be provided intermediate of the logs perpendicular to the rear wall 18 such as logs 24 and the side walls 19 and 20 so as not to provide a gap in the flames in the primary combustion chamber and shown in the reflective surface of the side walls 19 and 20.

[0035] Another feature of the artificial log assembly 16 in this preferred form is that the logs such as log 17 across the heater 1 may be provided with a discontinuity such as a burnt out portion 25. Such artificial log assemblies are often constructed from ceramic fibre logs and these may have substantial variations in shrinkage in production. Therefore, the provision of logs across the heating apparatus 1 to accurately abut against both the side walls 19 and 20 can be exceedingly difficult. The provision of the burnt out portion 25 allows the trans-

verse log such as log 17 to be provided with an apparent naturally occurring reason for not extending entirely across the fire and creating the potential for gaps against the side walls 19 and 20 should a tight abutment against both be unable to be achieved.

[0036] The provision of the reflected extension of the logs 17, 24, etc., may lead to the selection of logs having diameters larger than chosen for a normal assembly. The diameters are chosen in keeping with those that appear natural for a fire as provided by both the real and reflective images combined and in keeping with the greater apparent length of the logs.

[0037] Thus it can be seen that at least the preferred form of this invention provides a heating apparatus 1 which may provide an open front 5 and yet provide some inhibition to the spillage of gases from the primary combustion chamber 2.

[0038] In addition, the heater 1 provides an artificial log assembly having reflective surfaces around the perimeter of the primary combustion chamber and the artificial log assembly having logs abutting the reflective surfaces so as to provide the appearance of continuity into the reflective surfaces.

Claims

1. A flammable fluid fuelled heater comprising: a primary combustion chamber (2) having an opening (5) in at least one side thereof to provide a view of a substantial portion of the primary combustion chamber (2); and to expose the primary combustion chamber to the room where the heater is housed; and a flammable fluid fuel supply (3) to said primary combustion chamber (2) to, upon combustion, provide a substantial portion of yellow flame and to generate products of combustion; **characterised by** a catalytic converter (10) located in a secondary combustion chamber for receiving the product of combustion and generating an exhaust, and by air circulating means (6) for driving a stream of air including at least a portion of said exhaust from the catalytic converter into the room where the heater is housed, wherein the stream projected across the opening, both reduces the effective size of the opening for air inlet which improves the ability to deplete oxygen within the combustion chamber and inhibits the spillage of the products of combustion adjacent the upper edge of the opening.
2. A heater according to Claim 1, **characterised in that** said air circulating means comprising at least one fan (6).
3. A heater according to Claim 1 or Claim 2, **characterised in that** said stream of air is directed over a portion of said opening (5) substantially from an upper edge of said opening (5).
4. A heater according to any preceding claim, **characterised by** a deflector (8) to deflect at least a portion of said airstream into said opening (5) and into said primary combustion chamber (2).
5. A heater according to Claim 1, **characterised in that** an exhaust port (11) from said catalytic converter (10) is provided to redirect said portion of exhaust from said exhaust into the room into which said heater is housed.
6. A heater according to Claim 5, **characterised in that** said air circulating means (6) provides a stream of air across an outlet from said secondary combustion chamber into said exhaust port (11) so as to assist in the drawing of the products of combustion through said secondary combustion chamber (10).
7. A heater according to Claim 5 or 6, **characterised in that** said air circulating means (6) is in communication with a duct (12) for the passage of air and said duct (12) is in communication with the exhaust port (11).
8. A heater according to Claim 7, **characterised in that** said duct (12) includes an inlet (14) connectable to a source of air externally to the room in which the heater is housed.
9. A heater according to Claim 8, wherein air drawn through said inlet (14) connectable to a source of air external to the room in which the heater is housed is . adjustable.
10. A heater according to any preceding claim, **characterised by** an artificial log assembly (17) provided in said primary combustion chamber (2);
at least one reflective surface (18, 19, 20) provided on at least one side of said primary combustion chamber (2) to provide a reflected view of said substantially yellow flame and artificial log assembly (17), said artificial log assembly (17) having at least one artificial log abutting a said reflective surface (18, 19, 20).
11. A heater according to Claim 10, **characterised in that** said at least one artificial log includes an elongate artificial log having a longitudinal axis substantially parallel to a said reflective surface (18, 19, 20) and providing a longitudinal upper edge abutting said reflective surface (18, 19, 20) such that the artificial log and the apparent reflection of said log creates the appearance of a full round log.
12. A heater according to Claim 10 or 11, **characterised in that** said artificial log assembly includes at least one artificial log abutting said reflective surface (18, 19, 20) and having a longitudinal axis sub-

stantially transverse to the plane of said reflective surface (18, 19, 20).

13. A heater according to any one of Claims 10 to 12, **characterised in that** said reflective surfaces (18, 19, 20) are provided on the rear and the side walls of the combustion chamber (2).

Patentansprüche

1. Heizgerät, das mit einem entflammbar Medium betrieben wird, mit einer primären Brennkammer (2), die in mindestens einer ihrer Seiten eine Öffnung (5) besitzt, um eine Sicht in einen erheblichen Teil der primären Brennkammer (2) zu bieten ; und um die primäre Brennkammer dem Raum auszusetzen, in dem das Heizgerät aufgestellt wurde ; und mit einer Brennstoffzufuhr (3) des entflammbar Mediums zu der primären Brennkammer (2), um bei Verbrennung einen wesentlichen Teil einer gelben Flamme zu liefern und Verbrennungsprodukte zu erzeugen ; **gekennzeichnet durch** einen Katalysator (10), der sich in einer sekundären Brennkammer befindet, um das Verbrennungsprodukt aufzunehmen und um einen Austritt zu erzeugen, und **gekennzeichnet durch** Luftzirkulationseinrichtungen (6), um einen Luftstrom und mindestens einen Teil des Austritts aus dem Katalysator in den Raum zu führen, in dem sich das Heizgerät befindet, wobei der Strom, der über die Öffnung verläuft, sowohl die effektive Größe der Öffnung für den Luft einlass reduziert, was die Fähigkeit verbessert, Sauerstoff innerhalb der Brennkammer abzubauen, als auch das Austreten der Verbrennungsprodukte an der Oberkante der Öffnung verhindert.
2. Heizgerät nach Anspruch 1, **dadurch gekennzeichnet, dass** die Luftzirkulationseinrichtung mindestens aus einem Gebläse (6) besteht.
3. Heizgerät nach Anspruch 1 oder 2, **dadurch gekennzeichnet, dass** der Luftstrom im wesentlichen von einer Oberkante der Öffnung (5) über einen Teil der Öffnung (5) geleitet wird.
4. Heizgerät nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** mindestens ein Teil des Luftstroms über einen Deflektor oder über ein Lenkblech (8) in die Öffnung (5) und in die primäre Brennkammer (2) abgelenkt wird.
5. Heizgerät nach Anspruch 1, **dadurch gekennzeichnet, dass** eine Austrittsöffnung (11) von dem Katalysator (10) aus vorgesehen ist, um einen Teil des Austritts von dem Austritt in den Raum umzuleiten, in dem sich das Heizgerät befindet.

6. Heizgerät nach Anspruch 5, **dadurch gekennzeichnet, dass** die Luftzirkulationseinrichtung (6) für einen Luftstrom über einen Auslass sorgt, und zwar von der sekundären Brennkammer in die Austrittsöffnung (11), so dass das Einsaugen der Verbrennungsprodukte durch die sekundäre Brennkammer (10) hindurch unterstützt wird.

7. Heizgerät nach Anspruch 5 oder 6, **dadurch gekennzeichnet, dass** die Luftzirkulationseinrichtung (6) mit einem Kanal (12) für den Luftdurchlass in Verbindung steht, und dass der Kanal (12) mit der Austrittsöffnung (11) in Verbindung steht.

8. Heizgerät nach Anspruch 7, **dadurch gekennzeichnet, dass** der Kanal (12) einen Einlass (14) besitzt, der mit einer Luftquelle außerhalb des Raumes, in dem das Heizgerät aufgestellt ist, verbunden werden kann.

9. Heizgerät nach Anspruch 8, bei dem die Luft, die durch den Einlass (14) eingesaugt wird, der mit einer Luftquelle außerhalb des Raumes, in dem das Heizgerät aufgestellt ist, verbunden werden kann, verstellbar ist.

10. Heizgerät nach einem der vorhergehenden Ansprüche, **gekennzeichnet durch** eine Anordnung von künstlichen Holzscheiten (17), die sich in der primären Brennkammer (2) befindet; mindestens eine reflektierende Oberfläche (18, 19, 20) an mindestens einer Seite der primären Brennkammer (2) bietet eine reflektierte Ansicht einer im wesentlichen gelben Flamme und eine Anordnung künstlicher Holzscheite (17), wobei die Anordnung künstlicher Holzscheite (17) mindestens einen künstlichen Holzscheit besitzt, der an eine reflektierende Oberfläche (18, 19, 20) anstößt.

11. Heizgerät nach Anspruch 10, **dadurch gekennzeichnet, dass** es sich bei mindestens einem der Holzscheite um einen langen, künstlichen Holzscheit handelt, der eine Längsachse besitzt, die im wesentlichen parallel zu einer der reflektierenden Oberflächen (18, 19, 20) verläuft, und eine längsverlaufende Oberkante besitzt, die an die reflektierende Oberfläche (18, 19, 20) anstößt, so dass der künstliche Holzscheit und die scheinbare Reflexion des Holzscheites das Erscheinungsbild eines ganzen, runden Holzstückes heraufbeschwören.

12. Heizgerät nach Anspruch 10 oder 11, **dadurch gekennzeichnet, dass** die Anordnung künstlicher Holzscheite mindestens aus einem künstlichen Holzscheit besteht, der an die reflektierenden Oberflächen (18, 19, 20) anstößt, und eine Längsachse hat, die im wesentlichen quer zu der Ebene der re-

flektierenden Oberfläche (18, 19, 20) verläuft.

13. Heizgerät nach einem der Ansprüche 10 bis 12, **dadurch gekennzeichnet, dass** sich die reflektierenden Oberflächen (18, 19, 20) an der Rückseite und an den Seitenwänden der Brennkammer (2) befinden.

Revendications

1. Appareil de chauffage alimenté en fluide inflammable, comprenant :

une chambre de combustion primaire (2) présentant une ouverture (5) dans au moins un côté afin de voir une portion importante de la chambre de combustion primaire (2) et d'exposer la chambre de combustion primaire à la pièce dans laquelle se trouve l'appareil de chauffage ; et une alimentation en fluide inflammable (3) destinée à alimenter ladite chambre de combustion primaire (2) afin d'obtenir, lors de combustion, une portion importante de flamme jaune et de générer des produits de combustion ;

caractérisé par un convertisseur catalytique (10) disposé dans une chambre de combustion secondaire destinée à recevoir les produits de combustion et à générer des gaz d'échappement, et par des moyens de circulation d'air (6) destinés à diriger un flux d'air incluant au moins une portion desdits gaz d'échappement du convertisseur catalytique dans la pièce dans laquelle se trouve l'appareil de chauffage, le flux qui passe par l'ouverture réduisant la dimension effective de l'ouverture d'admission d'air, ce qui améliore l'aptitude à appauvrir la chambre de combustion en oxygène, et inhibant aussi le déversement des produits de combustion près du bord supérieur de l'ouverture.

2. Appareil de chauffage selon la revendication 1, **caractérisé en ce que** lesdits moyens de circulation d'air comprennent au moins un ventilateur (6).

3. Appareil de chauffage selon la revendication 1 ou la revendication 2, **caractérisé en ce que** ledit flux d'air est dirigé sur une portion de ladite ouverture (5) sensiblement depuis un bord supérieur de ladite ouverture (5).

4. Appareil de chauffage selon l'une quelconque des revendications précédentes, **caractérisé par** un déflecteur (8) destiné à dévier une portion dudit flux d'air dans ladite ouverture (5) et dans ladite chambre de combustion primaire (2).

5. Appareil de chauffage selon la revendication 1, **caractérisé en ce qu'un** orifice d'échappement (11) en sortie dudit convertisseur catalytique (10) est prévu pour rediriger ladite portion des gaz d'échappement dans la pièce dans laquelle se trouve ledit appareil de chauffage.

6. Appareil de chauffage selon la revendication 5, **caractérisé en ce que** lesdits moyens de circulation d'air (6) fournissent un flux d'air à travers une sortie de ladite chambre de combustion secondaire dans ledit orifice d'échappement (11), afin de favoriser le tirage des produits de combustion à travers ladite chambre de combustion secondaire (10).

7. Appareil de chauffage selon la revendication 5 ou 6, **caractérisé en ce que** les moyens de circulation d'air (6) sont en communication avec un conduit (12) destiné au passage de l'air, et **en ce que** ledit conduit (12) est en communication avec l'orifice d'échappement (11).

8. Appareil de chauffage selon la revendication 7, **caractérisé en ce que** ledit conduit (12) inclut une entrée (14) pouvant être reliée à une source d'air disposée à l'extérieur de la pièce dans laquelle se trouve l'appareil de chauffage.

9. Appareil de chauffage selon la revendication 8, dans lequel on peut régler l'air tiré de ladite entrée (14) pouvant être reliée à une source d'air disposée à l'extérieur de la pièce dans laquelle se trouve l'appareil de chauffage.

10. Appareil de chauffage selon l'une quelconque des revendications précédentes, **caractérisé par** un ensemble de bûches artificielles (17) prévu dans ladite chambre de combustion primaire (2) ;

au moins une surface réfléchissante (18, 19, 20) étant prévue sur au moins un côté de ladite chambre de combustion primaire (2) afin de fournir une image réfléchie de ladite flamme sensiblement jaune et d'un ensemble de bûches artificielles (17), ledit ensemble de bûches artificielles (17) comportant au moins une bûche artificielle en appui contre ladite surface réfléchissante (18, 19, 20).

11. Appareil de chauffage selon la revendication 10, **caractérisé en ce qu'au** moins une bûche artificielle inclut une bûche artificielle allongée présentant un axe longitudinal sensiblement parallèle à ladite surface réfléchissante (18, 19, 20) et un bord supérieur longitudinal en appui contre ladite surface réfléchissante (18, 19, 20), de sorte que la bûche artificielle et l'image apparente de ladite bûche donne l'aspect d'une bûche ronde et pleine.

12. Appareil de chauffage selon la revendication 10 ou

11, **caractérisé en ce que** ladite bûche artificielle inclut au moins une bûche artificielle en appui contre ladite surface réfléchissante (18, 19, 20) et présentant un axe longitudinal sensiblement transversal au plan de ladite surface réfléchissante (18, 19, 20). 5

13. Appareil de chauffage selon l'une quelconque des revendications 10 à 12, **caractérisé en ce que** les surfaces réfléchissantes (18, 19, 20) sont prévues sur la paroi arrière et les parois latérales de la chambre de combustion (2). 10

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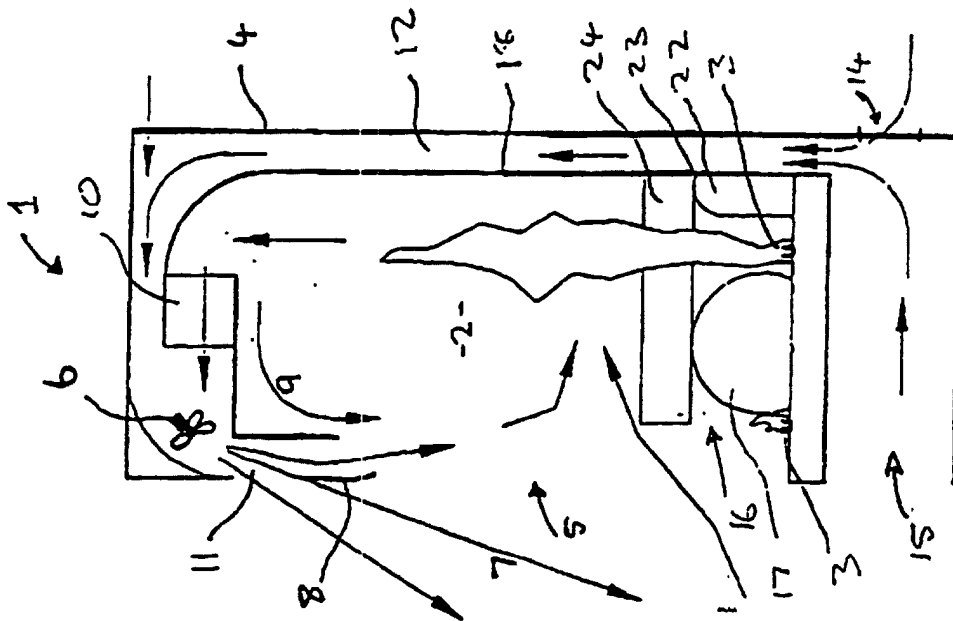


FIGURE 1

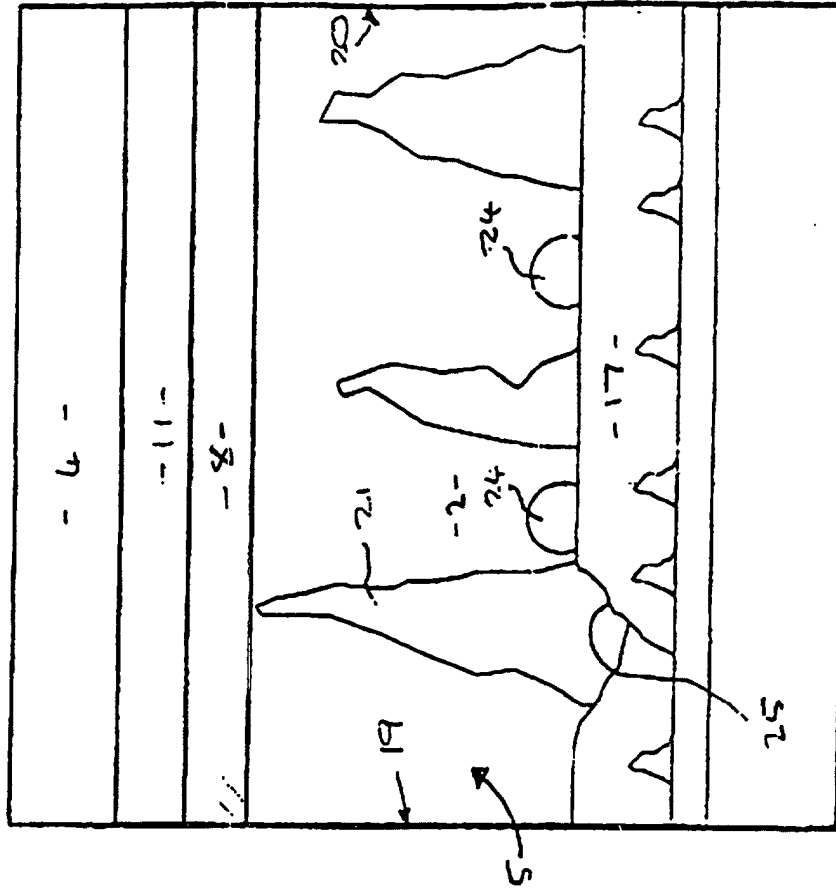


FIGURE 2