



Europäisches Patentamt
European Patent Office
Office européen des brevets



Publication number:

0 418 976 A1

12

EUROPEAN PATENT APPLICATION

21 Application number: **90202475.1**

51 Int. Cl.⁵: **F23L 17/04, F24C 15/00**

22 Date of filing: **19.09.90**

30 Priority: **21.09.89 NL 8902362**

72 Inventor: **Lauret, Robert Charles**

Zevenbergenstraat 12

NL-6844 CZ Arnhem(NL)

43 Date of publication of application:
27.03.91 Bulletin 91/13

84 Designated Contracting States:
AT BE CH DE FR GB IT LI NL

74 Representative: **Kooy, Leendert Willem et al**

OCTROOIBUREAU VRIESENDORP & GAADE

P.O. Box 266

NL-2501 AW The Hague(NL)

71 Applicant: **UBBINK NEDERLAND B.V.**
Verhuellweg 9
NL-6984 AA Doesburg(NL)

54 **Chimney.**

57 Assembly for supplying air to an appliance and discharging waste gases from said appliance, said assembly comprising a secondary air supply shaft (1) extending from the ambient air to a distribution chamber (3), a primary air supply shaft (4) extending from said distribution chamber (3) to said appliance, a primary discharge pipe (5) for waste gases extending from the appliance to the distribution chamber (3), a secondary discharge shaft (7) for waste gases extending from the distribution chamber (3) to the ambient air, and a jet nozzle (6) operating in the discharge shafts (5, 7) wherein the primary discharge shaft (5) connects to the jet nozzle (6), which is directed in the distribution chamber (3) towards the secondary discharge shaft (7) which is free of any means that creates sub-atmospheric pressure, such as e.g. a fan.

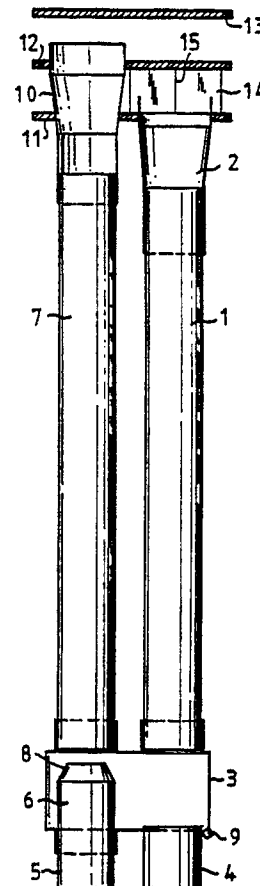


FIG.1

EP 0 418 976 A1

CHIMNEY

The invention relates to a chimney, comprising a supply shaft with an entrance for ambient air and a discharge shaft with an exit for waste gases, the supply shaft projecting through a wall and debouching in an appliance with a blower which discharges towards the discharge shaft also projecting through the wall, said wall being either the roof or a wall of a building.

The invented chimney has been developed for use with closed appliances with a gas burner and a fan for discharging the waste gases, i.e. the combustion gases, from the closed appliance and to force them through the discharge shaft towards the ambient air, while fresh air and therefore oxygen flows through the supply shaft towards the gas burner. The invented chimney is also applicable in systems for the ventilation of chambers, in which contaminated air is exhausted from the chamber by a fan, while fresh air flows through the supply shaft towards the chamber to be ventilated.

A disadvantage of the known chimneys is that, due to changes in the force and direction of the wind and due to varying thermal draught, the discharge through the discharge shaft and the supply through the supply shaft are not constant, and this affects either the operation of a gas burner in a closed gas appliance, or the ventilation of closed chamber so that this operation does not always take place to the desired extent.

According to the present invention, these disadvantages are removed in that the chimney referred to in the introduction comprises a pressure equalization chamber towards which a section of the supply shaft extends from its entrance, said section forming a secondary supply shaft, while moreover from this pressure equalization chamber a section of the discharge shaft extends towards its exit, said section forming a secondary discharge shaft, the remainder of the supply shaft extending from the pressure equalization chamber and forming the primary supply shaft and the remainder of the discharge shaft forming the primary discharge shaft and debouching via a jet nozzle, enforcing the flow rate, into the pressure equalization chamber.

The invented chimney is preferably characterized in that the jet nozzle is a shaft portion that converges towards the pressure equalization chamber.

In a special embodiment of the invented chimney, the distance between the exit of the jet nozzle and the entrance of the secondary discharge shaft inside the pressure equalization chamber is such that the discharge from the primary discharge shaft remains volumetrically more equalized in spite of the varying influence of wind on the secondary

supply shaft and on the secondary discharge shaft.

Other possible special embodiments of the invented chimney have been indicated in the sub-claims, as from accompanying claim 4.

The invention will be elucidated hereinafter on the basis of the following description of some of the embodiments of the invented chimney as indicated in the accompanying drawing.

In the drawing:

figure 1 is an axial section of a first embodiment of the invented chimney and

figure 2 is an axial section of a second embodiment of the invented chimney.

In the exemplary embodiment of the invented chimney shown in fig. 1 a secondary supply shaft 1 extends from its entrance member 2, which is in communication with ambient air, to a pressure equalization chamber 3 from which a primary supply shaft 4 extends to a closed gas appliance (not drawn) or chamber to be ventilated so as to supply it with fresh air.

A fan (not drawn) exhausts waste gases from the closed gas appliance or the chamber to be ventilated and forces these gases through a primary discharge shaft 5 towards a jet nozzle 6.

The jet nozzle 6 has e.g. a truncated, conical constriction towards the pressure equalization chamber 3, resulting in that the thrust is partially converted there into flow rate, resulting in that the total flow rate in the jet nozzle is raised.

The jet nozzle 6 debouches into the pressure equalization chamber 3 at such a distance from the entrance of a secondary discharge shaft 7 that the circulation of gases from the pressure equalization chamber 3 and through the primary supply shaft 4, onwards through the gas appliance (not drawn) or the chamber to be ventilated (not drawn), both fitted with a fan, via the primary discharge shaft with jet nozzle 6 up to again inside the pressure equalization chamber 3 remains equalized, in spite of changes in the air flow through the secondary supply shaft 1 towards the pressure equalization chamber and changes in the flow of gases from the pressure equalization chamber 3 at least substantially through the secondary discharge shaft 7 to the ambient air.

After all, the force and direction of the wind influence the flow through the secondary supply shaft 1 and the secondary discharge shaft 7, whereas on account of the invented pressure equalization chamber 3, the primary supply shaft 4 and the primary discharge shaft 5 with the jet nozzle 6 converging towards the pressure equalization chamber such effects are neutralized, resulting in that the circulation through the closed gas ap-

plicance or the chamber to be ventilated remains more equalized.

This neutralizing effect can be explained on account of the fact that if the air flow through the secondary supply shaft 1 increases, a larger part of said air flow is swept along by the waste gases flowing from said jet nozzle 6 up to and through the secondary discharge shaft 7. If on the other hand the air flow through the secondary supply shaft 1 is weakened under the influence of the weather, then a smaller portion of said air flow will be swept along by the waste gases flowing from the jet nozzle 6 up to inside and through the secondary discharge shaft 7.

Therefore the invention provides a secondary and a primary circuit, separated from one another by the pressure equalization chamber 3 and the jet nozzle 6. Furthermore the circulation through the primary supply shaft 4, the closed gas appliance or the chamber to be ventilated, the primary discharge shaft 5 and the jet nozzle 6 are increasingly determined by the operation of the fan pertaining to the closed gas appliance or to the chamber to be ventilated and therefore to a lesser extent by the influence of the wind.

Apart from an improved output of the closed gas appliance on account of the invented separation in primary and secondary circuits, the advantage of mixing combustion gases from the jet nozzle 6 with air swept along by said gases from the pressure equalization chamber 3 also occurs.

Whereas in the embodiment according to fig. 1 the secondary supply shaft 1 and the secondary discharge shaft 7 are juxtaposed, in another embodiment according to fig. 2 the secondary discharge shaft 7 can be disposed coaxially within the secondary supply shaft 1.

An advantage of the latter embodiment is heat transfer from the secondary discharge shaft 7 heated by combustion gases to the air flowing inwards through the secondary supply shaft.

Optimum circulation necessitates the feature that in the embodiment according to fig. 1 the free cross-section of the secondary supply shaft 1 is virtually equal to the free cross-section of the primary supply shaft 4. Furthermore for optimum circulation it is desirable that the free cross-section of the secondary discharge shaft 7 is virtually equal to the free cross-section of the primary discharge shaft 5. Moreover it is desirable for optimum operation that the free cross-section of the primary discharge shaft 5 is at least virtually equal to the free cross-section of the primary supply shaft 4.

It is clear that in the embodiment according to fig. 2 the term free cross-section of the secondary supply shaft 1 is used to refer to the cylindrical space around the outside of the secondary discharge shaft 7.

An additional advantage of the jet nozzle 6 is that its truncated, conical exterior 8 faces with its narrow end the entrance of the secondary discharge shaft 7. As a result, liquid condensed from the hot waste gases on the cooler wall of the secondary discharge shaft 7 will drip onto the conical outer wall 8 of the jet nozzle 6 and therefore it will not end up, through the primary discharge shaft 5 into the fan (not drawn) of the closed gas appliance (not drawn) or the chamber to be ventilated (also not drawn).

The separation into a secondary supply shaft 1 and a primary supply shaft 4 also yields the advantage that liquid that has possibly entered the secondary supply shaft 1 from the ambient air will not inevitably end up in the primary supply shaft 4. This implies that said liquid will not end up in the chamber to be ventilated (not drawn) or the closed gas appliance (not drawn). This favourable effect is enhanced in that the primary supply shaft 4 projects beyond the bottom of the pressure equalization chamber 3. According to figures 1 and 2, the pressure equalization chamber 3 comprises a discharge channel 9 for discharging the liquid collected in the pressure equalization chamber.

According to figures 1 and 2, preferably a nozzle 10, conically expanding from the secondary discharge shaft 7, is disposed at the exit of the secondary discharge shaft. After all, the flow rate of the waste gases flowing through the secondary discharge shaft will be partially converted into thrust in the nozzle 10 on account of its conical shape, thus decreasing the influence of wind on the outflow of waste gases to the ambient air.

As appears from figure 1, preferably an entrance member 2, conically converging towards the secondary supply shaft 1, is disposed at the entrance of the secondary supply shaft. After all, on account of said conical shape of the nozzle, the pressure of the wind will be partially converted into speed with which the air will be flowing faster through the supply shaft 1.

In order to prevent the inflow of rain water and snow and also to counteract that waste gases would mix with air flowing towards the secondary supply shaft 1, partitions 11, 12 and 13 according to figure 1 have been used, these partitions being a part of the system as extensively described in Dutch patent application 87 03097 of the present Applicant. Therefore said publication is referred to for further details and it is merely stated here that preferably two partitions 14 and 15, perpendicular to one another, are disposed above the entrance of the entrance member 2 in order to guide the wind more equally into said entrance. Partition 14 is disposed in the plane of the drawing and partition 15 is disposed perpendicularly thereto.

The entrance member 2 receives air that flows

between the partitions 11 and 12, whereas the nozzle 10 extends closed between the partitions 11 and 12 so as to avoid that waste gases end up in the entrance member 2. The waste gases flow through nozzle 10 up to between the partitions 12 and 13, and are blown away from that space. Partition 13 serves to prevent rain and snow from reaching nozzle 10.

In the embodiment according to figure 2, the nozzle 10 on the secondary discharge shaft 7 extends coaxially through a hood having a cap 21 and a sleeve 16 and being mounted on the secondary supply shaft 1. A partition 17 seals the sleeve 16 against the nozzle 10 so that waste gases from nozzle 10 can only flow out through openings in the sleeve without contaminating the air flowing into the supply shaft 1. Air flows through gates 19 in the sleeve 16 towards the supply shaft 1. At the level of the gates 19, radial guiding partitions 20 each extend from sleeve 16 towards the nozzle 10 and provide a more equalized influence of wind during the supply of air towards the supply shaft 1.

In the drawing the chimneys are shown in a vertical position, but the principle of the invention can be applied to the same effect in sloping or horizontal chimneys.

The secondary supply shaft 1 and the secondary discharge shaft 7 extend through a wall (not drawn), such as a roof or the wall of a building accommodating closed gas appliances and/or chambers to be ventilated.

Claims

1. Chimney comprising a supply shaft with an entrance for ambient air and a discharge shaft with an exit for waste gases, the supply shaft projecting through a wall and debouching in an appliance with a blower which discharges towards the discharge shaft also projecting through the wall, said wall being either the roof or a wall of a building, **characterized by** pressure equalization chamber towards which a section of the supply shaft extends from its entrance, said section forming a secondary supply shaft, while moreover from this pressure equalization chamber a section of the discharge shaft extends towards its exit, said section forming a secondary discharge shaft, the remainder of the supply shaft extending from the pressure equalization chamber and forming the primary supply shaft and the remainder of the discharge shaft forming the primary discharge shaft and debouching via a jet nozzle, enforcing the flow rate, into the pressure equalization chamber. Chimney according to claim 1, **characterized in that** the jet nozzle is a shaft portion that converges towards the pressure equalization chamber.

3. Chimney according to claim 1 or 2, **characterized in that** the distance between the exit end of the blower nozzle and the entrance of the secondary discharge shaft inside the pressure equalization chamber is such that the discharge from the primary discharge shaft remains volumetrically more equalized in spite of the varying influence of wind on the secondary supply shaft and on the secondary discharge shaft.

5. Chimney according to any one of the preceding claims, **characterized in that** the free cross-section of the secondary supply shaft is at least substantially equal to the free cross-section of the primary supply shaft.

6. Chimney according to any one of the preceding claims, **characterized in that** the free cross-section of the secondary discharge shaft is at least substantially equal to the free cross-section of the primary discharge shaft.

7. Chimney according to claim 5 or 6, **characterized in that** the free cross-section of the primary supply shaft is at least substantially equal to the free cross-section of the primary discharge shaft.

8. Chimney according to claim 7, **characterized in that** the secondary discharge shaft projects coaxially through the secondary supply shaft, the area of the cross-section of the supply shaft outside the discharge shaft being at least substantially equal to the area of the cross-section of the discharge shaft.

9. Chimney according to any one of the preceding claims, **characterized by** a nozzle mounted on the discharge end of the secondary discharge shaft and conically expanding from the discharge shaft.

10. Chimney according to any one of the preceding claims, **characterized by** radial guiding partitions at the entrance to the secondary supply shaft.

11. Chimney according to any one of the preceding claims, **characterized by** an entrance member mounted on the supply end of the secondary supply shaft and conically converging towards said supply shaft.

12. Chimney according to claims 9 and 10, **characterized by** a hood mounted on the supply end of the secondary supply shaft and having a cap portion and a sleeve portion, a sealing partition extending sealingly between the sleeve portion and the nozzle of the discharge shaft extending coaxially into the hood, the sleeve being provided, on either side of the sealing partition, with apertures that connect to the ambient air.

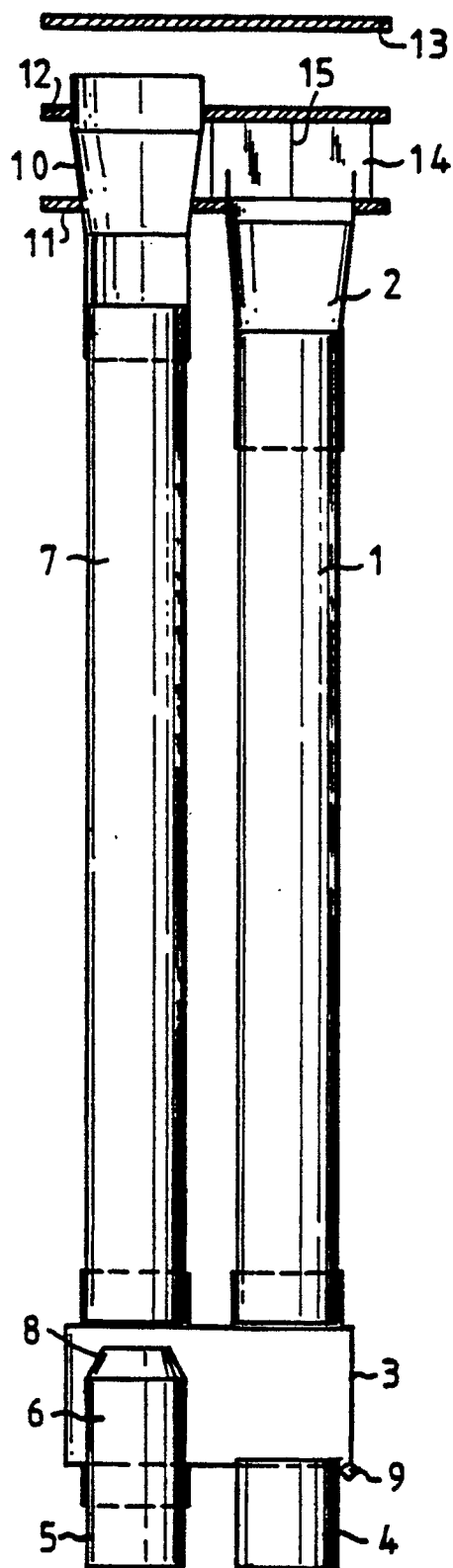


FIG. 1

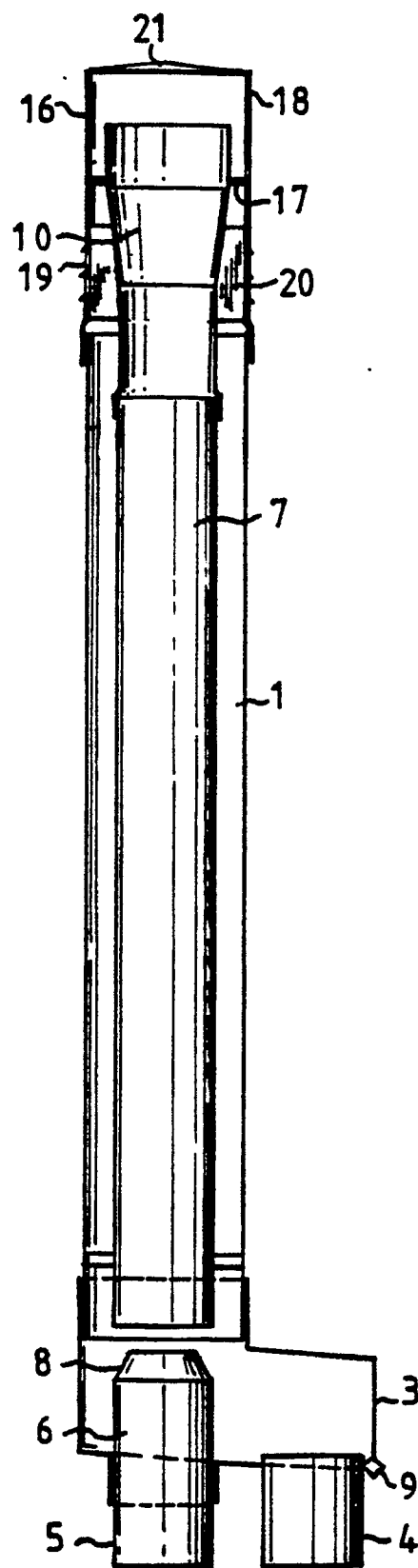


FIG. 2



European
Patent Office

EUROPEAN SEARCH REPORT

Application Number

EP 90 20 2475

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)
A	NL-A-8 701 374 (DRU) * page 5, line 15 - page 6, line 25; figure * - - -	1	F 23 L 17/04 F 24 C 15/00
A	GB-A-9 586 45 (WEBASTO) - - - - -		
			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			F 23 L F 23 J F 24 C F 24 F
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of search 12 December 90	Examiner PESCHEL G.
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			