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(72) Inventor: **Marijnen, Jacob Joseph**
3920 Lommel (BE)

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(74) Representative:
Smulders, Theodorus A.H.J., Ir. et al
Vereenigde Octrooibureaux
Nieuwe Parklaan 97
2587 BN 's-Gravenhage (NL)

(71) Applicant: **N.V. RADSON-ALUTHERM**
3530 Houthalen-Hechteren (BE)

(54) Exhaust piece for connecting a central heating apparatus to an open stack

(57) An assembly of a central heating apparatus (1), a stack (3) and a connecting piece (2), wherein the heating apparatus is at least provided with a fan (7) for the forced supply of combustion air, and with a flue gas discharge connection (6), wherein, for the connection to a stack of the open type, the connecting piece comprises an inlet pipe (12) which opens, via an opening (13), into a stack connecting pipe (14), to which stack connecting pipe there is also connected a pressure-equalizing pipe (15) which is in open communication with the space (A) in which the heating apparatus is installed, wherein, at the location of the opening where the inlet pipe opens into the stack connecting pipe, a flue gas guide plate (16) is provided, arranged so that the flue gases are guided into the stack connecting pipe without the flow rate of the flue gases being considerably increased, so that, as a result of the open communication via the pressure-equalizing pipe, the pressure in the stack connecting pipe is less than or equal to the pressure prevailing in the space in which the heating apparatus is installed.

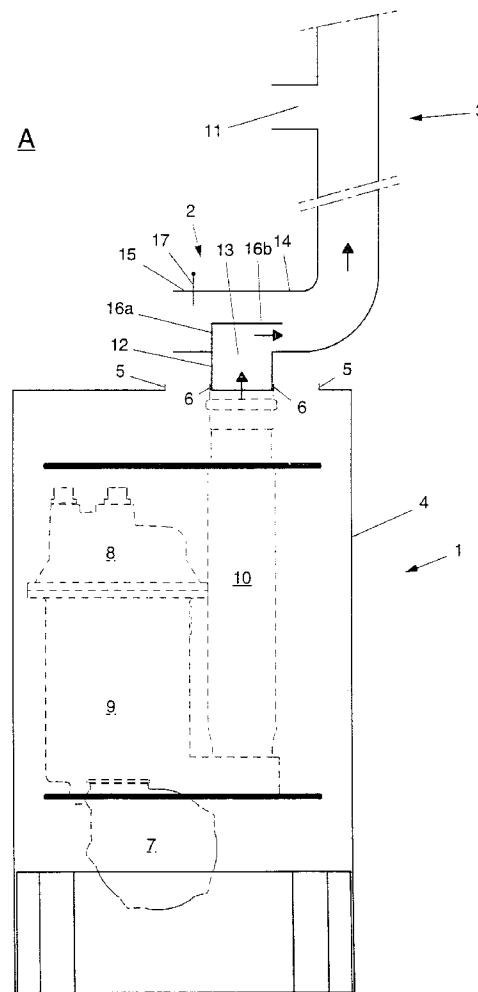


Fig. 1

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Description

The invention relates to an assembly of a central heating apparatus, a stack and a connecting piece, the heating apparatus being provided with a fan for the forced supply of combustion air, and with a flue gas discharge connection.

Such an assembly is known from European patent application EP-A-0 060 345. The connecting piece according to the known proposal is intended for admixing air in the flow of flue gas when the temperature of the flue gases is too low. The object aimed at by admixing this air is the prevention of condensation in the stack. The means for admixing air are either formed by a second air supply fan by means of which additional air is blown under pressure into the flue gas duct, or by a constriction in the flue gas duct so that, through acceleration of the flow rate, a reduced pressure is created in the flue gas duct, whereby ambient air is drawn in. After the flue gases have passed the constriction in the flue gas duct, the flow rate decreases again, as a result of which the pressure in the flue gas duct downstream of the constriction increases again. Hence, in the known proposal, it is highly probable that a super-atmospheric pressure prevails in the stack duct.

The modern generation of central heating apparatus typically comprises a fan by means of which the combustion air is fed to a burner at a certain excess pressure. As a consequence of this excess pressure, there also prevails an excess pressure in the combustion chamber as well as in the subsequent flue gas drafts. Moreover, in view of the combustion air supply fan present, it is very well possible that there also prevails an excess pressure in the flue gas exhaust pipe or stack to which the central heating apparatus is connected.

This is no problem when the heating apparatus is connected to a flue gas exhaust pipe which directly opens into the outside air without other apparatus, such as sanitary water heaters or gas hearths, being connected to this flue gas exhaust pipe.

However, in practice, the buildings in which, for heating purposes, the heating apparatus is installed, often do not possess a suitable space for installing the heating apparatus in such a manner that, also, a direct flue gas exhaust pipe, to which no other apparatus are connected, can open into the outside air. Often, there is in fact a heater room in which a former atmospheric heating apparatus to be replaced was installed and where a stack duct connection of such an atmospheric heating apparatus was also located. However, such stack ducts are mostly of the open type, i.e. the stack duct to which the central heating apparatus is to be connected is provided with more than one connecting opening, for connecting the flue gas outlets of, for instance, a sanitary water heater, gas hearth or like gas or oil-fired appliances. Connecting a central heating apparatus having forced combustion air supply by means of a fan to such open stack duct is not possible, because of the

excess pressure that may be created by the combustion air supply fan in the stack duct. The consequence of such excess pressure may be that via the other connections to the open stack duct, flue gases are blown into the building, with all its dangers of suffocation.

The object of this invention is to adapt the assembly of the type mentioned in the opening paragraph so that the stack can be a stack of the open type without entailing the danger of the formation of super-atmospheric pressure in the stack, and hence without involving the danger of flue gases ending up, via the other stack connections, in the building to be heated.

To this end, the assembly of the invention is characterized in that, for connecting the central heating apparatus to a stack of the open type, the connecting piece comprises a length of inlet pipe which opens, via an opening, into a length of stack connecting pipe, to which stack connecting pipe there is also connected a length of pressure-equalizing pipe which is in open communication with the space in which the heating apparatus is installed, while at the location of the opening where the inlet pipe opens into the stack connecting pipe, a flue gas guide plate is provided which is arranged so that the flue gases are guided into the stack connecting pipe without the flow rate of the flue gases being considerably increased, so that, as a result of the open communication via the pressure-equalizing pipe, the pressure in the stack connecting pipe is equal to, or, resulting from the chimney draft, less than, the pressure prevailing in the space in which the heating apparatus is installed.

Hence, with a length of pipe of such construction, it is provided that the pressure prevailing in the stack of the open type is equal to or less than the pressure prevailing in the space in which the central heating apparatus is installed. Since downstream of the stack connecting pipe, the pressure in the stack duct can never be higher than at the location of the stack connecting pipe - after all, at the location of the stack connecting pipe the greatest flow resistance is yet to be overcome -, the pressure in the other parts of the open stack duct is lower than the pressure prevailing in the stack connecting pipe, and, accordingly, lower than the pressure prevailing in the space in which the heating apparatus is installed. Hence, with the connecting piece forming part of the assembly according to the invention, it is effected that the pressure prevailing in the open stack duct is in each case lower than the pressure prevailing in the spaces in which other connecting openings of the stack duct are located. Hence, flue gases present in the stack duct are thus prevented from flowing into the other spaces of the building via the other connecting openings of the stack duct.

It is observed that in DE-A-31 50 151, a heat pump is described comprising a combustion engine by means of which a compressor of the heat pump is driven. The exhaust gases of the combustion engine are discharged, via a heat exchanger and a stack connecting piece, to a conventional chimney of a building.

The present invention, however, addresses an altogether different problem. Hitherto, it has been impossible to connect a modern central heating apparatus, comprising a burner, a heat exchanger and a fan for feeding, under pressure, combustion air to the burner, to a so-called open stack. For the solution of this specific problem, DE-A-31 50 151 provides no clue whatsoever.

Further elaborations of the assembly according to the invention are described in the subclaims and will be specified on the basis of an exemplary embodiment, with reference to the accompanying drawing.

The drawing shows a schematic side elevation of the assembly of a central heating apparatus 1, a connecting piece 2 and a part of an open stack 3. In the present exemplary embodiment, the central heating apparatus 1 comprises a closed case 4 having a combustion air feed opening 5 and a flue gas discharge opening 6. The heating apparatus 1 comprises a combustion air supply fan 7 which feeds, under pressure, the combustion air supplied via the combustion air feed opening 5 and necessary for the combustion of the fuel, to a burner 8. From the burner 8, the hot flue gases are passed along a heat exchanger 9 to be subsequently discharged to the flue gas discharge opening 6 via an internal flue gas discharge duct 10 included in the closed case 4.

Normally, such central heating apparatus 1 of the closed type has its combustion air feed opening 5 connected to a combustion air supply pipe, and its flue gas discharge opening 6 to a flue gas discharge pipe that directly opens into the outside air, without any other connecting openings being present in the flue gas discharge pipe.

In the present case, however, the central heating apparatus 1 is connected to a stack 3 of the open type, i.e. a stack provided with other connecting openings 11 to which other apparatus can be connected, such as for instance a heater or a gas hearth.

To prevent the possibility that an excess pressure occurs in the stack 3 as a consequence of the flue gases that are discharged under pressure by the combustion air supply fan 7, the assembly comprises a connecting piece 2 of a particular construction, connecting the flue gas discharge opening 6 to the open stack 3.

The connecting piece 3 comprises an inlet pipe 12 which, via an opening 13, opens into a stack connecting pipe 14, to which stack connecting pipe 14 there is also connected a pressure-equalizing pipe 15 which is in open communication with the space A in which the heating apparatus 1 is installed. At the location of the opening 13 where the inlet pipe opens into the stack connecting pipe 14, a flue gas guide plate 16 is arranged, disposed so that the flue gases are guided into the stack connecting pipe 14 without involving a considerable increase of the flow rate of the flue gases. It is thus provided that due to the open communication via the pressure-equalizing pipe 15, the pressure in the stack connecting pipe 14 is less than or equal to the pressure pre-

vailing in the space A in which the heating apparatus 1 is installed.

More in particular, the inlet pipe 12 extends perpendicularly to the stack connecting pipe 14. The pressure-equalizing pipe 15 extends in line with the stack connecting pipe 14. The flue gas guide plate 16 is constructed as a substantially L-shaped plate part 16, bent over at right angles and having a first leg 16a attached, on the side of the opening 13 proximal to the pressure-equalizing pipe 15, to the pressure-equalizing pipe 15. In the longitudinal direction of the stack connecting pipe 14 remote from the pressure-equalizing pipe 15, a second leg 16b of the L-shaped plate part 16 extends through at least a part of the length of the stack connecting pipe 14. The second leg 16b of the flue gas guide plate 16 is arranged in the stack connecting pipe 14 so that there is no constriction that has to be passed by the flue gases, so that the flue gases hardly, if at all, undergo an acceleration of the flow rate. This prevents the occurrence of a venturi or injector action whereby, due to a considerable decrease of the flow rate, a super-atmospheric pressure could as yet occur in the open stack duct 3.

Optionally, a temperature sensor 17 can be connected in the pressure-equalizing pipe 15, which sensor is connectable to, for instance, a control of the heating apparatus 1. When, for instance as a result of a stack stoppage, flue gas leaves the connecting piece 2 via the pressure-equalizing pipe 15, this is sensed by the temperature sensor 17. The signal fed by the temperature sensor 17 to the control of the heating apparatus 1 as a result of the increase of temperature can for instance have as a result that the control switches off the heating apparatus directly, so that the chance that more flue gases flow into the space A where the central heating apparatus 1 is installed is precluded.

It is understood that the invention is not limited to the exemplary embodiment described, but that various modifications are possible within the framework of the invention. For instance, the inlet pipe 12 need not necessarily extend perpendicularly to the stack connecting pipe 14, and the flue gas guide plate part 16 need not necessarily have a straight L-shape. The two legs 16a, 16b may very well be interconnected via a blending transition. Also, the position of the second leg 16b relative to the longitudinal center line of the stack connecting pipe 14 may vary. At any rate, the position should be chosen so that the flue gases do not have to pass a considerable constriction, so that the occurrence of a venturi or injector effect is prevented, which effect could result in an increase of pressure downstream of the constriction.

Claims

1. An assembly of a central heating apparatus (1), a stack (3) and a connecting piece (2), wherein the

heating apparatus (1) is at least provided with a fan (7) for the forced supply of combustion air, and with a flue gas discharge connection (6), characterized in that for connecting the central heating apparatus (1) to a stack (3) of the open type, the connecting piece (2) comprises an inlet pipe (12) which opens, via an opening (13), into a stack connecting pipe (14), to which stack connecting pipe (14) there is also connected a pressure-equalizing pipe (15) which is in open communication with the space (A) in which the heating apparatus (1) is installed, wherein, at the location of the opening (13) where the inlet pipe (12) opens into the stack connecting pipe (14), a flue gas guide plate (16) is provided, arranged so that the flue gases are guided into the stack connecting pipe (14) without the flow rate of the flue gases being considerably increased, so that, as a result of the open communication via the pressure-equalizing pipe (15), the pressure in the stack connecting pipe (14) is less than or equal to the pressure prevailing in the space (A) in which the heating apparatus (1) is installed.

2. An assembly according to claim 1, characterized in that the inlet pipe (12) extends perpendicularly to the stack connecting pipe (14), wherein the pressure-equalizing pipe (15) extends in line with the stack connecting pipe (14) and wherein the flue gas guide plate (16) is constructed as a substantially L-shaped plate part, bent over at right angles and having a first leg (16a) attached, on the side of said opening (13) proximal to the pressure-equalizing pipe (15), to the pressure-equalizing pipe (15), of which substantially L-shaped plate part (16) a second leg (16b) extends in the longitudinal direction of the stack connecting pipe (14) remote from the pressure-equalizing pipe (15), through at least a part of the length of the stack connecting pipe (14). An assembly according to claim 1 or 2, characterized in that in the pressure-equalizing pipe (15), a temperature sensor (17) is connected which is connectable to, for instance, a control of the heating apparatus (1).

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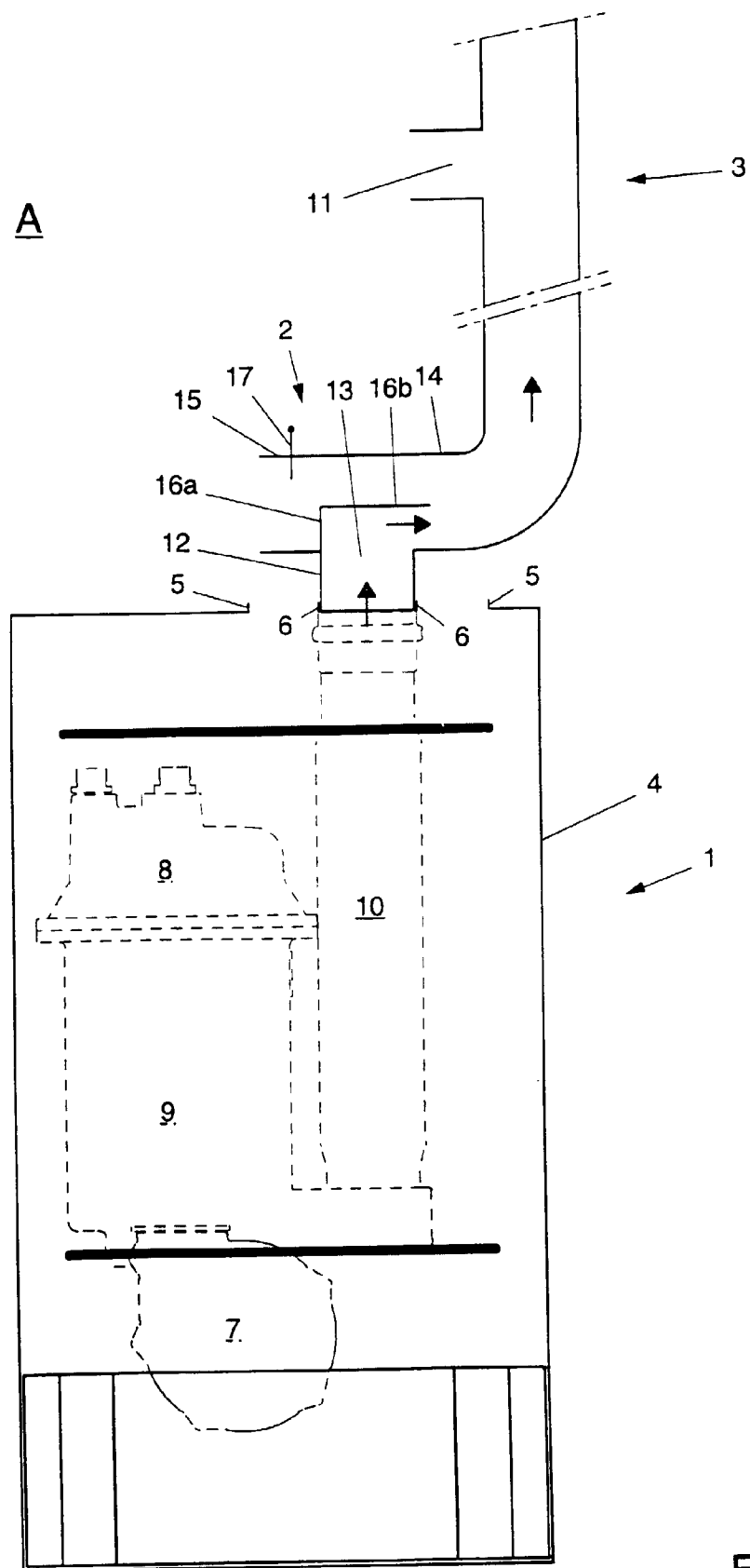


Fig. 1



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EUROPEAN SEARCH REPORT

Application Number
EP 97 20 0663

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,D	DE 31 50 151 A (FICHTEL & SACHS AG) 30 June 1983	1	F23L11/02 F23J11/00
Y	* page 1, paragraph 4; figure 1 *	3	

Y	FR 2 550 318 A (GAZ DE FRANCE) 8 February 1985	3	
	* page 7, line 21 - page 8, line 14; figure 1 *		

A,D	EP 0 060 345 A (BUDERUS AG) 22 September 1982	1	
	* the whole document *		

			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			F23L F23J
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
THE HAGUE		11 June 1997	Coli, E
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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