

(19)



(11)

EP 2 796 786 B1

(12)

EUROPEAN PATENT SPECIFICATION

(45) Date of publication and mention
of the grant of the patent:
14.11.2018 Bulletin 2018/46

(51) Int Cl.:
F23L 17/12 ^(2006.01) **F23L 17/04** ^(2006.01)
F23J 13/02 ^(2006.01)

(21) Application number: **14165731.2**

(22) Date of filing: **24.04.2014**

(54) **Flue gas outlet assembly and method for installing the same**

Rauchgasauslassanordnung und Verfahren zur dessen Installation

Ensemble de sortie de gaz de fumée et procédé pour son installation

(84) Designated Contracting States:
**AL AT BE BG CH CY CZ DE DK EE ES FI FR GB
GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO
PL PT RO RS SE SI SK SM TR**

(30) Priority: **26.04.2013 NL 2010720**

(43) Date of publication of application:
29.10.2014 Bulletin 2014/44

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(56) References cited:
**DE-A1-102006 051 695 US-A- 4 082 322
US-A- 6 062 608**

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Description

Field of the invention

[0001] The present invention relates to a flue gas outlet assembly for the supply and/or discharge of gases. According to a further aspect, the present invention relates to a method of installing the flue gas outlet assembly.

Prior art

[0002] Flue gas outlet assemblies are used e.g. for boiler or central heating systems, and provide a flue gas outlet channel, sometimes combined with an air inlet channel. The part external to a roof of a building where the boiler or central heating system is present, is usually combined with an intermediate internal part, and installed as a single item through an aperture in the roof. The combined flue gas outlet assembly is stored and transported as a single unit.

[0003] American patent publication US-B-4,082,322 disclosed a metal chimney construction for use with heating fixtures. Pipe sections are joined together by an inside-outside coupling ring.

[0004] German patent publication DE-A-10 2006 051695 discloses an external chimney with a ceramic inner pipe and an outer casing, wherein spacer objects are provided to maintain an annular gap between the inner pipe and outer casing.

[0005] American patent US-B-6,062,608 discloses a coaxial flue system having an inner flue pipe residing within an outer flue pipe. Both are provided with male-female connector arrangements.

Summary of the invention

[0006] The present invention seeks to provide an optimized and improved flue gas outlet assembly which requires smaller packaging, storage and transportation volume, and which is easier to handle for everybody in the supply chain, and which is easier to unpack and install.

[0007] According to the present invention, a flue gas outlet assembly according to the preamble defined above is provided, wherein the flue gas outlet assembly comprises an outlet tube with an outlet end and a first connection end opposite the outlet end, and a connecting tube with a main connection end for connecting the flue gas outlet assembly to a further flue gas system and a second connection end opposite the main connection end, wherein the outlet tube and the connecting tube are separate parts, and the first connection end of the outlet tube and the main connection end of the connecting tube are dimensioned to slide into each other in a pre-operational condition.

[0008] In other words, the flue gas outlet assembly of the present invention comprises two separable tubular parts telescopically arranged in a pre-operational condition, wherein a first tubular part (e.g. outlet tube) is at

least partially disposed inside or over a second tubular part (e.g. connecting tube) for minimizing packaging, storage and transportation volume, space and/or length of the flue gas outlet assembly. A feature of the pre-operational condition is that the first or second tubular part is positioned in a mirrored or rotated manner with respect to its positioning or orientation in an operational condition, wherein the operational condition refers to an installed flue gas outlet assembly.

[0009] The pre-operational condition refers to a configuration of the flue gas outlet assembly specifically suited for packaging, storage and transportation as it has a reduced length relative to its installed or expanded length in the operational condition. The reduced length of the flue gas outlet assembly is made possible through the telescopic arrangement of the first and second tubular parts, i.e. the first and second tubular parts being slid into or over each other.

[0010] The operational condition on the other hand refers to a configuration of the flue gas outlet assembly specifically suited for installing said assembly, e.g. on a roof. According to the invention, in the operational condition the first or second tubular part is in a mirrored or rotated orientation with respect to its orientation in the pre-operational condition, as a result of which the relative telescopic movement of the first and second tubular part is not possible. More specifically, in the operational condition a connector end of the first tubular part is connected to a connector end of the second tubular part, wherein said connector ends do not allow for a substantial telescopic movement of the first and second tubular parts. Since there is no substantial telescopic movement of the first and second tubular parts in the operational condition, the flue gas outlet assembly has an expanded length suitable for placement through e.g. a roof.

[0011] According to a further aspect, the present invention provides an optimized method for installing the flue gas outlet assembly by bringing the flue gas outlet assembly from the pre-operational condition to the operational condition, wherein the method comprises providing a flue gas outlet assembly in the pre-operational condition, pulling the outlet tube out of the connecting tube, rotating the connecting tube such that the second connection end of the connecting tube faces the first connection end of the outlet tube, and connecting the outlet tube and connecting tube.

[0012] The inventive method can be carried out by a single person, wherein providing the flue gas outlet assembly comprises unpacking the flue gas outlet assembly in the pre-operational condition. Subsequently, pulling the outlet tube out of the connecting tube comprises linearly moving the outlet tube and connecting tube in opposite directions to completely separate the outlet tube from the connecting tube, thus sliding the outlet tube and connecting tube to fully separate the outlet tube from the connecting tube. Rotating the connecting tube comprises facing the second connection end of the connecting tube toward the first connecting end of the outlet tube. Rotating

the connecting tube typically involves a 180° degree rotation in a plane parallel to a longitudinal axis of the flue gas outlet assembly.

Short description of drawings

[0013] The present invention will be discussed in more detail hereinafter based on a number of exemplary embodiments with reference to the drawings, in which

Fig 1 shows an embodiment of a flue gas outlet assembly in a pre-operational condition according to the present invention;

Fig 2 shows a cross sectional view of an embodiment of a flue gas outlet assembly in an operational condition according to the present invention; and

Fig 3 shows a partial cross sectional view of an embodiment of a flue gas outlet assembly in an operational condition according to the present invention.

Detailed description of exemplary embodiments

[0014] According to the present invention embodiments, an improved flue gas outlet assembly is provided for the supply and/or discharge of gases to and from buildings. The flue gas outlet assembly of the present invention seeks to reduce the packaging, storage and transportation volume or space of said assembly. The present invention also seeks to provide a flue gas outlet assembly which is easier to handle for anyone in the supply chain.

[0015] Fig 1 shows an embodiment of a flue gas outlet assembly 1 in a pre-operational condition according to the present invention embodiments. More specifically, the flue gas outlet assembly 1 shown in Fig 1 depicts a flue gas outlet assembly 1 as it is provided by the manufacturer/distributor prior to installing said assembly 1, thus showing the flue gas outlet assembly 1 in a configuration as it is packaged prior to transporting said assembly 1 to the end-user. As shown, the flue gas outlet assembly 1 is in a pre-operational condition and comprises a telescopic sliding arrangement of an outlet tube 4 and connecting tube 10, wherein said tubes 4, 10 slide into or over each other in the pre-operational condition.

[0016] According to the invention, the telescopic arrangement of the outlet tube 4 and connecting tube 10 provides a significant reduction of the packaging, storage and transportation volume of the flue gas outlet assembly 1. The outlet tube 4 and connecting tube 10 are not only slidably arranged with respect to each other but are completely separable by moving the outlet tube 4 and connecting tube 10 in opposite directions along a longitudinal axis 1a of the flue gas outlet assembly 1.

[0017] The outlet tube 4 comprises an outlet end 6 and a first connection end 8 opposite the outlet end 6, wherein the outlet end 6 may be provided with an outlet cap 2 for enhancing operational characteristics such as draught, and for preventing various liquid and solid substances to

enter the outlet end 6, e.g. rain, birds, leaves and the like, during operational use of the flue gas outlet assembly 1.

[0018] The connecting tube 10 comprises a second connection end 14 opposite a main connection end 12 (see dashed line), wherein the main connection end 12 is used for connecting the flue gas outlet assembly 1 to a further flue gas system, such as a heating system and the like. The second connection end 14 is arranged to connect with the first connection end 8 in an operational condition, where the operational condition of the flue gas outlet assembly 1 will be further elaborated below.

[0019] The depicted arrangement of the outlet tube 4 and connecting tube 10 refers to a pre-operational condition, e.g. a telescopic sliding arrangement of the outlet tube 4 and connecting tube 10, prior to installing the flue gas outlet assembly 1. To allow for such a telescopic sliding arrangement the first connection end 8 of the outlet tube 4 and the main connection end 12 of the connecting tube 10 are dimensioned to slide into each other in the pre-operational condition. The telescopic sliding arrangement of the outlet tube 4 and connecting tube 10 reduces the amount of packaging, storage and transportation volume of the flue gas outlet assembly 1.

[0020] In most embodiments, the outlet tube 4 and connecting tube 10 may be made of plastic or metal materials, and even from mutually different materials, depending on the specific application. E.g. in general, the outlet tube 4 will be positioned external to a roof of a building, and the connecting tube 10 internal to the roof, and may thus be made of different material.

[0021] In summary, according to the present invention the flue gas outlet assembly 1 comprises an outlet tube 4 with an outlet end 6 and a first connection end 8 opposite the outlet end 6, and a connecting tube 10 with a main connection end 12 for connecting the flue gas outlet assembly 1 to a further flue gas system (e.g. piping in a building towards a flue gas source) and a second connection end 14 opposite the main connection end 12, wherein the outlet tube 4 and the connecting tube 10 are separate parts, and the first connection end 8 of the outlet tube 4 and the main connection end 12 of the connecting tube 10 are dimensioned to slide into each other in a pre-operational condition.

[0022] In the embodiment shown, the first connection end 8 of the outlet tube 4 and the main connection end 12 of the connecting tube 10 are dimensioned to slide into each other in a pre-operational condition over a predetermined length L. Put differently, the outlet tube 4 and connecting tube 10 are dimensioned such that said tubes 4, 10 can be telescopically arranged over a predetermined length L in a pre-operational condition, and thus the length L is the actual gain in transport or storage space needed. In advantageous embodiments, the first connection end 8 and main connection end 12 are provided with a restriction free space over the predetermined length L, so that both the outlet tube 4 and connecting tube 10 can smoothly and freely slide into each other in the pre-operational condition.

[0023] The telescopic arrangement of the outlet tube 4 and connecting tube 10 in the pre-operational condition may be accomplished in two ways. In a first embodiment, an inner diameter ID_8 of the first connection end 8 is larger than an outer diameter OD_{12} of the main connection end 12. So the connection tube 10 slides into the outlet tube 4. In a second embodiment, an inner diameter ID_{12} of the main connection end 12 is larger than an outer diameter OD_8 of the first connection end 8. So the connection tube 10 slides over outlet tube 4, i.e. the outlet tube 4 slides into the connection tube 10.

[0024] In both embodiments the connecting tube 10 may have a standardized diameter for sliding into the outlet tube 4, allowing connection to further standardized piping parts at the main connection end 12 of the connecting tube 10.

[0025] In a further embodiment, the connecting tube 10 and outlet tube 4 are fixedly attached by means of connecting elements. More precisely, the outlet tube 4 and/or connecting tube 10 may further comprise connecting elements for connecting the first connection end 8 of the outlet tube 4 and the second connection end 14 of the connecting tube 10 in an operational condition of the flue gas outlet assembly 1. Thus the second connecting end 14 engages with the first connecting end 8 and vice versa, wherein the connecting elements may be embodied by e.g. threaded connecting elements, cooperating snap-fit connecting elements, etc. (see description of embodiment of Fig. 3 below).

[0026] Fig 2 shows an operational condition of a flue gas outlet assembly 1 according to a further present invention embodiment. In this embodiment, the outlet tube 4 further comprises an inlet tube 16 coaxial around the outlet tube 4, and the connecting tube 10 further comprises a connecting inlet tube 18 coaxial around the connecting tube 10, the inlet tube 16 having an inlet end 20 and a first inlet connection end 22 opposite the inlet end 20, the connecting inlet tube 18 having a main inlet connection end 24 for connecting the flue gas outlet assembly 1 to a further flue gas system and a second inlet connection end 26 opposite the main inlet connection end (24). The inlet tube 16, in particular the inlet end 20, may be covered with an inlet cap 17 for preventing unwanted liquid and solid substances entering the inlet tube 16, e.g. rain, snow, hail, sand, dust and the like, and for separating a flue gas outlet stream exiting the outlet end 6 from an inlet stream into the inlet end 20.

[0027] The main inlet connection end 24 comprises an outer diameter OD_{24} and inner diameter ID_{24} , and the main connection end 12 comprises an outer diameter OD_{12} and inner diameter ID_{12} . These diameters can be chosen to meet certain specifications, such as required wall thicknesses and flow capacities through the main connection end 12 and main inlet connection end 24.

[0028] In the embodiment shown, the outlet tube 4 and connecting tube 10 provide a central passageway for gases through the flue gas outlet assembly 1. The concentric arrangement of the inlet tube 16 and outlet tube

4, and the concentric arrangement of the connecting inlet tube 18 and connecting tube 10, provide an annular passageway for gases through the flue gas outlet assembly 1.

[0029] The outlet cap 2 and inlet cap 17 may be viewed as first distance keeping elements for aligning the outlet end 6 and inlet end 20 on the longitudinal axis 1a, thereby ensuring a substantially uniform annular space between the outlet end 6 and inlet end 20 of the outlet tube 4 and inlet tube 16 respectively.

[0030] To allow for the pre-operational condition in which the flue gas outlet assembly 1 is compactly arranged (e.g. telescopically), the first inlet connection end 22 of the inlet tube 16 and the main inlet connection end 24 of the connecting inlet tube 18 are dimensioned to slide into each other in the pre-operational condition.

[0031] In advantageous embodiments, the first inlet connection end 22 of the inlet tube 16 and the main inlet connection end 24 of the connecting inlet tube 18 are dimensioned to slide into each other in a pre-operational condition over a predetermined length L.

[0032] According to the invention, the predetermined length L represents a reduction in overall length of the flue gas outlet assembly 1 and allows for a smaller packaging, storage and transportation volume or space of the flue gas outlet assembly 1. The pre-determined length L may be maximized such that the concentric arrangement of the outlet tube 4 and inlet tube 16, and the concentric arrangement of the connecting tube 10 and connecting inlet tube 18, can be slid into each other so that the packaging, storage and transportation volume or space is minimized.

[0033] In an embodiment, the first inlet connection end 22 and main inlet connection end 24 are provided with a restriction free space over the predetermined length L, so that concentric arrangement of the outlet tube 4 and inlet tube 16, and the concentric arrangement of the connecting tube 10 and connecting inlet tube 18, can be slid into each other unimpeded and with minimal force at least up to the pre-determined length L.

[0034] Fig 3 shows a partial cross sectional view of an the part of the flue gas outlet assembly 1 of Fig. 2 in the operational condition, wherein the connection between the first and second connection end 8, 14 and the first and second inlet connection end 22, 26 is depicted in greater detail. In the embodiment shown, the inlet tube 16, in particular the first inlet connection end 22, comprises an outer diameter OD_{22} and inner diameter ID_{22} . The outlet tube 4, in particular the first connection end 8, comprises an outer diameter OD_8 and inner diameter ID_8 . These diameters can be chosen in order meet certain specifications, such as required wall thicknesses and flow capacities through the inlet and outlet tube 4, 16 and so on.

[0035] In an embodiment, an inner diameter ID_{22} of the first inlet connection end 22 is larger than an outer diameter OD_{24} of the main inlet connection end 24, so that the main inlet connection end 24 slidably fits into the first

inlet connection end 22. Here, the main inlet connection end 24 may have standard dimensions according to a particular industrial norm, such as a standard inner and outer diameter, wherein the first inlet connection end 22 is adapted to non-standard dimensions to snugly but slidably fit over the main inlet connection end 24.

[0036] Alternatively, in an embodiment an inner diameter ID_{24} of the main inlet connection end 24 is larger than an outer diameter OD_{22} of the first inlet connection end 22. In this case the main inlet connecting end 24 is dimensioned to slide over the first inlet connection end 22, wherein the first inlet connection end 22 may have standard dimensions according to a particular industrial norm, such as a standard inner and outer diameter, wherein the main inlet connection end 24 is adapted to non-standard dimensions to snugly but slidably fit over the first inlet connection end 22.

[0037] In further embodiments it may be the case that standardized dimensions can be used for both the first inlet connection end 22 and the main inlet connection end 24 that allow for a snug but slidable fit between the first inlet connection end 22 and the main inlet connection end 24.

[0038] As mentioned earlier, the concentric alignment of the outlet end 6 and inlet end 20 may be accomplished by means of first distance keeping elements comprising the outlet cap 2 and inlet cap 17, wherein the concentric arrangement provides a uniform annular space between the outlet end 6 and inlet end 20.

[0039] In order to have a substantially centred and aligned concentric arrangement of the second connection end 14 and second inlet connection end 26, second distance keeping elements may be used comprising e. g. an outer sleeve 40 fixedly fitted to the connection inlet tube 18, in particular to the second inlet connection end 26. In certain embodiments the second distance keeping elements may further comprise an inner sleeve 38 fixedly fitted to the connecting tube 10, in particular to the second connection end 14. As shown, the inner and outer sleeve 38, 40 may be comprised by a single piece, such as a single injection moulded piece.

[0040] Therefore, according to an invention embodiment, the flue gas outlet assembly 1 may further comprise first distance keeping elements between the outlet tube 4 and inlet tube 16, attached at an outlet end 6 of the outlet tube 4 and an inlet end 20 of the inlet tube 16, and second distance keeping elements between the connecting tube 10 and connecting inlet tube 18, attached at a second connection end 14 of the connecting tube 10 and the second inlet connection end 26 of the connecting inlet tube 18.

[0041] The first distance keeping elements provide a substantially centred concentric arrangement of the outlet tube 4 and inlet tube 16, in particular the outlet end 6 and inlet end 20, and wherein the second distance keeping elements provide a substantially centred concentric arrangement of the connecting tube 10 and connecting inlet tube 18, in particular the second connection end 14

and second inlet connection end 26.

[0042] In further embodiments, the inlet tube 16 and/or connecting inlet tube 18 further comprise inlet connecting elements for connecting the first inlet connection end 22 of the inlet tube 16 and the second inlet connection end 26 of the connecting inlet tube 18 in an operational condition of the flue gas outlet assembly. In an embodiment, the outer sleeve 40 may comprise inlet connecting elements for connecting the inlet tube 16 to the connecting inlet tube 18, such as snap fit elements 32. Likewise, connecting elements such as snap fit elements may be provided for connecting the first connection end 8 of the outlet tube 4 and the second connection end 14 of the connecting tube 10.

[0043] In general, the inlet connecting elements and/or connecting elements comprise cooperating snap-fit elements for connecting the outlet tube 4 and connecting tube 10 and/or for connecting the inlet tube 16 to the connecting inlet tube 18.

[0044] In further embodiments, the flue gas outlet assembly 1 may comprise one or more sealing elements 34 between interface surfaces of the outlet tube 4 and connecting tube 10 and/or between interface surfaces of the inlet tube 6 and connecting inlet tube 18. So generally speaking, the inlet connecting elements and/or connecting elements comprise one or more sealing elements 34.

[0045] The one or more sealing elements typically prevent gas leakage between a central passageway and an annular passageway extending through the flue gas outlet assembly 1, the central passageway being defined by the outlet tube 4 and connecting tube 10, and the annular passageway being defined by an annular space between the outlet tube 4 and inlet tube 16, and the annular space between the connecting tube 10 and connecting inlet tube 18.

[0046] In the embodiment shown, the inner sleeve 38 snugly fits over the first connection end 8, wherein the inner sleeve 38 comprises a U-shaped ridge 42 and one or more sealing elements 34 disposed therein. The one or more sealing elements 34 provide a substantially gas-tight seal between the outlet tube 4, in particular the first connection end 8, and the connecting tube 10, in particular the second connection end 14.

[0047] A further component shown in the cross sectional view of Fig. 3 is an inlet tube flange 36 which is provided around the inlet tube 16 at the first inlet connection end 22. This flange 36 allows to better position the flue gas outlet assembly in the packaging mode, e.g. for positioning in a packaging box. This flange 36 is optional and has no function in the operational condition.

[0048] In summary, the flue gas outlet assembly 1 of the present invention comprises two main conditions. The first condition is depicted in Fig 1, which refers to the pre-operational condition of the flue gas outlet assembly 1, wherein the outlet tube 4 and connecting tube 10 slide into each other (e.g. telescopically) over a predetermined length L. The pre-operational condition allows for a significantly reduced packing, storage and transporting vol-

ume of the flue gas outlet assembly 1. The second condition is depicted in Fig 2 and refers to the operational condition of the flue gas outlet assembly 1, wherein the flue gas outlet assembly 1 allows for an expanded length for installing said assembly 1.

[0049] Generally speaking the flue gas outlet assembly 1 of the present invention comprises two separable tubular parts dimensioned to be telescopically arranged in the pre-operational condition, wherein a first tubular part is at least partially disposed inside or over a second tubular part. An important feature of the pre-operational condition is that the first or second tubular part is in a mirrored or rotated position with respect to its position or orientation in the operational condition. This is clearly shown in Fig 1, wherein the main connection end 12 is inserted into the outlet tube 4 over a predetermined length L, so that the flue gas outlet assembly 1 can be compactly stored without fixedly connecting the outlet tube 4 to the connecting tube 10. This telescopic arrangement would not be possible without rotating the connecting tube 10 first, because the second connection end 14 would otherwise impede the insertion of the connecting tube 10 into the outlet tube 4 over the pre-determined length L.

[0050] Fig 2 shows the operational condition of the flue gas outlet assembly 1, wherein the connecting tube 10, which has now a mirrored or rotated orientation with respect to its orientation in Fig 1. As shown, the second connecting end 14 now faces and engages with the first connecting end 8 and no further insertion is possible over the pre-determined length L.

[0051] According to a further aspect, the present invention provides a method of installing the flue gas outlet assembly 1, whereby the flue gas outlet assembly 1 can be brought from the pre-operational condition (e.g. "packaging mode") to the operational condition (e.g. "installation mode"). To that end, the method of installing a flue gas outlet assembly 1 comprises:

providing a flue gas outlet assembly 1 in the pre-operational condition,
pulling the outlet tube 4 out of the connecting tube 10,
rotating the connecting tube 10 such that the second connection end 14 of the connecting tube 10 faces the first connection end 8 of the outlet tube 4, and
connecting the outlet tube 4 and connecting tube 10.

[0052] According to the invention, pulling the outlet tube 4 out of the connecting tube 10 may be construed as meaning linearly moving (e.g. telescopically sliding) the outlet tube 4 and connecting tube 10 in opposite directions along the longitudinal axis 1a, as a result of which the outlet tube 4 is completely separated from the connecting tube 10.

[0053] In order to fixedly connect the outlet tube 4 to the connecting tube 10, thus connecting the first and second tubular parts of the flue gas outlet assembly 1, the connecting tube 10 is rotated such that the second connection end 14 faces the first connection end 8, thus ro-

tating the second connection end 14 until it is closest to the first connection end 8. Rotating the second connection end 14 typically involves a 180° degree rotation in a plane parallel to the longitudinal axis 1a of the flue gas outlet assembly 1.

[0054] In an embodiment, having separated the outlet tube 4 from the connecting tube 10, the outlet tube 4 could be rotated instead of the connecting tube 10. However, doing so would require a further translation of the outlet tube 4 or connecting tube 10 for facing the second connection end 14 toward the first connection end 8.

[0055] In most embodiments, connecting the outlet tube 4 to the connecting tube 10 comprises locking the connecting tube 10 to the outlet tube 4 by means of cooperating snap-fit connectors.

[0056] Up to this point the meaning of the words "inlet" and "outlet" in features such as the outlet tube 4 and inlet tube 6 should not be construed as defining a particular gas flow direction through the outlet tube 4 and inlet tube 6. The present invention does not impose restrictions on flow directions through the flue gas outlet assembly 1, so the terminology "inlet" and "outlet" are essentially interchangeable. In certain applications this implies that the outlet tube 4 may function as an intake and the inlet tube 6 may function as a discharge and vice versa.

[0057] The present invention embodiments have been described above with reference to a number of exemplary embodiments as shown in and described with reference to the drawings. Modifications and alternative implementations of some parts or elements are possible, and are included in the scope of protection as defined in the appended claims.

Claims

1. Flue gas outlet assembly, comprising an outlet tube (4) with an outlet end (6) and a first connection end (8) opposite the outlet end (6), and a connecting tube (10) with a main connection end (12) for connecting the flue gas outlet assembly (1) to a further flue gas system and a second connection end (14) opposite the main connection end (12), wherein the outlet tube (4) and the connecting tube (10) are separate parts, wherein the first connection end (8) of the outlet tube (4) and the main connection end (12) of the connecting tube (10) are dimensioned to slide into each other in a pre-operational condition.
2. Flue gas outlet assembly according to claim 1, wherein the first connection end (8) of the outlet tube (4) and the main connection end (12) of the connecting tube (10) are dimensioned to slide into each other in a pre-operational condition over a predetermined length (L).
3. Flue gas outlet assembly according to claim 2, wherein the first connection end (8) and main con-

nection end (12) are provided with a restriction free space over the predetermined length (L).

4. Flue gas outlet assembly according to claim 1, 2, or 3, wherein an inner diameter (ID_8) of the first connection end (8) is larger than an outer diameter (OD_{12}) of the main connection end (12). 5
5. Flue gas outlet assembly according to claim 1, 2 or 3, wherein an inner diameter (ID_{12}) of the main connection end (12) is larger than an outer diameter (OD_8) of the first connection end (8). 10
6. Flue gas outlet assembly according to any one of claims 1-5, wherein the outlet tube (4) and/or connecting tube (10) further comprise connecting elements for connecting the first connection end (8) of the outlet tube (4) and the second connection end (14) of the connecting tube (10) in an operational condition of the flue gas outlet assembly (1). 15 20
7. Flue gas outlet assembly according to any one of claims 1-6, wherein the outlet tube (4) further comprises an inlet tube (16) coaxial around the outlet tube (4), and the connecting tube (10) further comprises a connecting inlet tube (18) coaxial around the connecting tube (10), 25
the inlet tube (16) having an inlet end (20) and a first inlet connection end (22) opposite the inlet end (20), the connecting inlet tube (18) having a main inlet connection end (24) for connecting the flue gas outlet assembly (1) to a further flue gas system and a second inlet connection end (26) opposite the main inlet connection end (24), and wherein 30
the first inlet connection end (22) of the inlet tube (16) and the main inlet connection end (24) of the connecting inlet tube (18) are dimensioned to slide into each other in the pre-operational condition. 35
8. Flue gas outlet assembly according to claim 7, wherein the first inlet connection end (22) of the inlet tube (16) and the main inlet connection end (24) of the connecting inlet tube (16) are dimensioned to slide into each other in a pre-operational condition over a predetermined length (L). 40 45
9. Flue gas outlet assembly according to claim 8, wherein the first inlet connection end (22) and main inlet connection end (24) are provided with a restriction free space over the predetermined length (L). 50
10. Flue gas outlet assembly according to claim 7, 8, or 9, wherein an inner diameter (ID_{22}) of the first inlet connection end (22) is larger than an outer diameter (OD_{24}) of the main inlet connection end (24). 55
11. Flue gas outlet assembly according to claim 7, 8, or 9, wherein an inner diameter (ID_{24}) of the main inlet

connection end (24) is larger than an outer diameter (OD_{22}) of the first inlet connection end (22).

12. Flue gas outlet assembly according to any one of claims 7-11, further comprising first distance keeping elements between the outlet tube (4) and inlet tube (16), attached at an outlet end (6) of the outlet tube (4) and an inlet end (20) of the inlet tube (16), and second distance keeping elements between the connecting tube (10) and connecting inlet tube (18), attached at a second connection end (14) of the connecting tube (10) and the second inlet connection end (26) of the connecting inlet tube (18).
13. Flue gas outlet assembly according to any one of claims 7-12, wherein the inlet tube (16) and/or connecting inlet tube (18) further comprise inlet connecting elements for connecting the first inlet connection end (22) of the inlet tube (16) and the second inlet connection end (26) of the connecting inlet tube (18) in an operational condition of the flue gas outlet assembly.
14. Flue gas outlet assembly according to claim 6 or 13, wherein the inlet connecting elements and/or connecting elements comprise cooperating snap-fit elements (32).
15. Flue gas outlet assembly according to claim 6, 13, or 14, wherein the inlet connecting elements and/or connecting elements comprise one or more sealing elements (34).
16. Method of installing a flue gas outlet assembly according to any one of the claims 1-15, comprising :

providing a flue gas outlet assembly (1) in the pre-operational condition,
pulling the outlet tube (4) out of the connecting tube (10),
rotating the connecting tube (10) such that the second connection end (14) of the connecting tube (10) faces the first connection end (8) of the outlet tube (4), and
connecting the outlet tube (4) and connecting tube (10).

Patentansprüche

1. Rauchgasabzugseinheit, die ein Abzugsrohr (4) mit einem Abzugsende (6) und einem dem Abzugsende (6) gegenüberliegenden ersten Anschlussende (8) und ein Verbindungsrohr (10) mit einem Hauptanschlussende (12) für die Verbindung der Rauchgasabzugseinheit (1) mit einem weiteren Rauchgassystem und einem dem Hauptanschlussende (12) gegenüberliegenden zweiten Anschluss-

- sende (14) umfasst,
wobei das Abzugsrohr (4) und das Verbindungsrohr (10) verschiedene Teile sind,
wobei das erste Anschlussende (8) des Abzugsrohrs (4) und das Hauptanschlussende (12) des Verbindungsrohrs (10) so dimensioniert sind, dass sie sich vor der Inbetriebnahme ineinanderschieben lassen.
2. Rauchgasabzugseinheit nach Anspruch 1, wobei das erste Anschlussende (8) des Abzugsrohrs (4) und das Hauptanschlussende (12) des Verbindungsrohrs (10) so dimensioniert sind, dass sie sich vor der Inbetriebnahme über eine festgelegte Länge (L) ineinanderschieben lassen.
 3. Rauchgasabzugseinheit nach Anspruch 2, wobei das erste Anschlussende (8) und das Hauptanschlussende (12) mit einem beschränkungsfreien Zwischenraum über die festgelegte Länge (L) versehen sind.
 4. Rauchgasabzugseinheit nach Anspruch 1, 2 oder 3, wobei ein Innendurchmesser (ID_8) des ersten Anschlussendes (8) größer als ein Außendurchmesser (OD_{12}) des Hauptanschlussendes (12) ist.
 5. Rauchgasabzugseinheit nach Anspruch 1, 2 oder 3, wobei ein Innendurchmesser (ID_{12}) des Hauptanschlussendes (12) größer als ein Außendurchmesser (OD_8) des ersten Anschlussendes (8) ist.
 6. Rauchgasabzugseinheit nach einem der Ansprüche 1 bis 5, wobei das Abzugsrohr (4) und/oder das Verbindungsrohr (10) weiterhin Verbindungselemente für die Verbindung des ersten Anschlussendes (8) des Abzugsrohrs (4) mit dem zweiten Anschlussende (14) des Verbindungsrohrs (10) in dem dem Betrieb der Rauchgasabzugseinheit (1) entsprechenden Zustand umfassen.
 7. Rauchgasabzugseinheit nach einem der Ansprüche 1 bis 6, wobei das Abzugsrohr (4) ferner ein Einlassrohr (16), welches das Abzugsrohr (4) coaxial umgibt, umfasst, und das Verbindungsrohr (10) darüber hinaus ein Anschlusseinlassrohr (18), welches das Verbindungsrohr (10) coaxial umgibt, umfasst, wobei:
 - das Einlassrohr (16) ein Einlassende (20) und ein dem Einlassende (20) gegenüberliegendes erstes Einlassanschlussende (22) besitzt,
 - das Anschlusseinlassrohr (18) ein Haupteinlassanschlussende (24) für die Verbindung der Rauchgasabzugseinheit (1) mit einem weiteren Rauchgassystem und ein dem Haupteinlassanschlussende (24) gegenüberliegendes zweites Einlassanschlussende (26) besitzt und
 - das erste Einlassanschlussende (22) des Einlassrohrs (16) und das Haupteinlassanschlussende (24) des Anschlusseinlassrohrs (18) so dimensioniert sind, dass sie sich vor der Inbetriebnahme ineinanderschieben lassen.
 8. Rauchgasabzugseinheit nach Anspruch 7, wobei das erste Einlassanschlussende (22) des Einlassrohrs (16) und das Haupteinlassanschlussende (24) des Anschlusseinlassrohrs (18) so dimensioniert sind, dass sie sich vor der Inbetriebnahme über eine festgelegte Länge (L) ineinanderschieben lassen.
 9. Rauchgasabzugseinheit nach Anspruch 8, wobei das erste Einlassanschlussende (22) und das Haupteinlassanschlussende (24) mit einem beschränkungsfreien Zwischenraum über die festgelegte Länge (L) versehen sind.
 10. Rauchgasabzugseinheit nach Anspruch 7, 8 oder 9, wobei ein Innendurchmesser (ID_{22}) des ersten Einlassanschlussendes (22) größer als ein Außendurchmesser (OD_{24}) des Haupteinlassanschlussendes (24) ist.
 11. Rauchgasabzugseinheit nach Anspruch 7, 8 oder 9, wobei ein Innendurchmesser (ID_{24}) des Haupteinlassanschlussendes (24) größer als ein Außendurchmesser (OD_{22}) des ersten Einlassanschlussendes (22) ist.
 12. Rauchgasabzugseinheit nach einem der Ansprüche 7 bis 11, die weiterhin erste Abstandshalter zwischen dem Abzugsrohr (4) und dem Einlassrohr (16), die an einem Abzugsende (6) des Abzugsrohrs (4) und einem Einlassende (20) des Einlassrohrs (16) befestigt sind, und zweite Abstandshalter zwischen dem Verbindungsrohr (10) und dem Anschlusseinlassrohr (18), die an dem zweiten Anschlussende (14) des Verbindungsrohrs (10) und dem zweiten Einlassanschlussende (26) des Anschlusseinlassrohrs (18) befestigt sind, umfasst.
 13. Rauchgasabzugseinheit nach einem der Ansprüche 7 bis 12, wobei das Einlassrohr (16) und/oder das Anschlusseinlassrohr (18) ferner Einlassanschluss-elemente für die Verbindung des ersten Einlassanschlussendes (22) des Einlassrohrs (16) mit dem zweiten Einlassanschlussende (26) des Anschlusseinlassrohrs (18) in dem dem Betrieb der Rauchgasabzugseinheit entsprechenden Zustand umfasst/umfassen.
 14. Rauchgasabzugseinheit nach Anspruch 6 oder 13, wobei die Einlassanschluss-elemente und/oder Anschluss-elemente zusammenwirkende Schnappverschlusselemente (32) umfassen.
 15. Rauchgasabzugseinheit nach Anspruch 6, 13 oder

14, wobei die Einlassanschlusselemente und/oder Anschlusselemente ein oder mehrere Dichtungselemente (34) umfassen.

16. Verfahren zur Installation einer Rauchgasabzugseinheit nach einem der Ansprüche 1 bis 15, welches das:

- Bereitstellen einer Rauchgasabzugseinheit (1) im vor der Inbetriebnahme befindlichen Zustand,
- Abziehen des Abzugsrohrs (4) von dem Verbindungsrohr (10),
- Umdrehen des Verbindungsrohrs (10) derart, dass das zweite Anschlussende (14) des Verbindungsrohrs (10) dem ersten Anschlussende (8) des Abzugsrohrs (4) gegenübersteht und
- Verbinden des Abzugsrohrs (4) mit dem Verbindungsrohr (10)

umfasst.

Revendications

1. Ensemble de sortie de gaz de fumée comprenant un tube de sortie (4) avec une extrémité de sortie (6) et une première extrémité de raccordement (8) opposée à l'extrémité de sortie (6) et un tube de raccordement (10) avec une extrémité de raccordement principale (12) pour raccorder l'ensemble de sortie de gaz de fumée (1) à un autre système de gaz de fumée et une seconde extrémité de raccordement (14) opposée à l'extrémité de raccordement principale (12), dans lequel le tube de sortie (4) et le tube de raccordement (10) sont des parties séparées, dans lequel la première extrémité de raccordement (8) du tube de sortie (4) et l'extrémité de raccordement principale (12) du tube de raccordement (10) sont dimensionnées pour coulisser l'une à l'intérieur de l'autre dans une condition pré-opérationnelle.
2. Ensemble de sortie de gaz de fumée selon la revendication 1, dans lequel la première extrémité de raccordement (8) du tube de sortie (4) et l'extrémité de raccordement principale (12) du tube de raccordement (10) sont dimensionnées pour coulisser l'une dans l'autre dans une condition pré-opérationnelle sur une longueur (L) prédéterminée.
3. Ensemble de sortie de gaz de fumée selon la revendication 2, dans lequel la première extrémité de raccordement (8) et l'extrémité de raccordement principale (12) sont prévues avec un espace dépourvu de restriction sur la longueur (L) prédéterminée.
4. Ensemble de sortie de gaz de fumée selon la reven-

dication 1, 2 ou 3, dans lequel un diamètre interne (ID_8) de la première extrémité de raccordement (8) est supérieur à un diamètre externe (OD_{12}) de l'extrémité de raccordement principale (12).

5. Ensemble de sortie de gaz de fumée selon la revendication 1, 2 ou 3, dans lequel un diamètre interne (ID_{12}) de l'extrémité de raccordement principale (12) est supérieur à un diamètre externe (OD_8) de la première extrémité de raccordement (8).
6. Ensemble de sortie de gaz de fumée selon l'une quelconque des revendications 1 à 5, dans lequel le tube de sortie (4) et/ou le tube de raccordement (10) comprennent en outre des éléments de raccordement pour raccorder la première extrémité de raccordement (8) du tube de sortie (4) et la seconde extrémité de raccordement (14) du tube de raccordement (10) dans une condition opérationnelle de l'ensemble de sortie de gaz de fumée (1).
7. Ensemble de sortie de gaz de fumée selon l'une quelconque des revendications 1 à 6, dans lequel le tube de sortie (4) comprend en outre un tube d'entrée (16) coaxial autour du tube de sortie (4), et le tube de raccordement (10) comprend en outre un tube d'entrée de raccordement (18) coaxial autour du tube de raccordement (10), le tube d'entrée (16) ayant une extrémité d'entrée (1) et une première extrémité de raccordement d'entrée (22) opposée à l'extrémité d'entrée (20), le tube d'entrée de raccordement (18) ayant une extrémité de raccordement d'entrée principale (24) pour raccorder l'ensemble de sortie de gaz de fumée (1) à un autre système de gaz de fumée et une seconde extrémité de raccordement d'entrée (26) opposée à l'extrémité de raccordement d'entrée principale (24), et dans lequel : la première extrémité de raccordement d'entrée (22) du tube d'entrée (16) et l'extrémité de raccordement d'entrée principale (24) du tube d'entrée de raccordement (18) sont dimensionnées pour coulisser l'une à l'intérieur de l'autre dans la condition pré-opérationnelle.
8. Ensemble de sortie de gaz de fumée selon la revendication 7, dans lequel la première extrémité de raccordement d'entrée (22) du tube d'entrée (16) et l'extrémité de raccordement d'entrée principale (24) du tube d'entrée de raccordement (18) sont dimensionnées pour coulisser l'une à l'intérieur de l'autre dans une condition pré-opérationnelle sur une longueur (L) prédéterminée.
9. Ensemble de sortie de gaz de fumée selon la revendication 8, dans lequel la première extrémité de raccordement d'entrée (22) et l'extrémité de raccordement d'entrée principale (24) sont prévues avec un

espace dépourvu de restriction sur la longueur (L) prédéterminée.

10. Ensemble de sortie de gaz de fumée selon la revendication 7, 8 ou 9, dans lequel un diamètre interne (ID₂₂) de la première extrémité de raccordement d'entrée (22) est supérieur à un diamètre externe (OD₂₄) de l'extrémité de raccordement d'entrée principale (24). 5
11. Ensemble de sortie de gaz de fumée selon la revendication 7, 8 ou 9, dans lequel un diamètre interne (ID₂₄) de l'extrémité de raccordement d'entrée principale (24) est supérieur à un diamètre externe (OD₂₂) de la première extrémité de raccordement d'entrée (22). 10 15
12. Ensemble de sortie de gaz de fumée selon l'une quelconque des revendications 7 à 11, comprenant en outre des premiers éléments de maintien de distance entre le tube de sortie (4) et le tube d'entrée (16), fixés, au niveau d'une extrémité de sortie (6) du tube de sortie (4) et d'une extrémité d'entrée (20) du tube d'entrée (16), et des seconds éléments de maintien de distance entre le tube de raccordement (10) et le tube d'entrée de raccordement (18), fixés, au niveau d'une seconde extrémité de raccordement (14) du tube de raccordement (10) et de la seconde extrémité de raccordement d'entrée (26) du tube d'entrée de raccordement (18). 20 25 30
13. Ensemble de sortie de gaz de fumée selon l'une quelconque des revendications 7 à 12, dans lequel le tube d'entrée (16) et/ou le tube d'entrée de raccordement (18) comprennent en outre des éléments de raccordement d'entrée pour raccorder la première extrémité de raccordement d'entrée (22) du tube d'entrée (16) et la seconde extrémité de raccordement d'entrée (26) du tube d'entrée de raccordement (18) dans une condition opérationnelle de l'ensemble de sortie de gaz de fumée. 35 40
14. Ensemble de sortie de gaz de fumée selon la revendication 6 ou 13, dans lequel les éléments de raccordement d'entrée et/ou les éléments de raccordement comprennent des éléments d'encliquetage (32) coopératifs. 45
15. Ensemble de sortie de gaz de fumée selon la revendication 6, 13 ou 14, dans lequel les éléments de raccordement d'entrée et/ou les éléments de raccordement comprennent un ou plusieurs éléments d'étanchéité (34). 50
16. Procédé pour installer un ensemble de sortie de gaz de fumée selon l'une quelconque des revendications 1 à 15, comprenant les étapes consistant à : 55

prévoir un ensemble de sortie de gaz de fumée (1) dans une condition pré-opérationnelle, retirer le tube de sortie (4) du tube de raccordement (10), faire tourner le tube de raccordement (10) de sorte que la seconde extrémité de raccordement (14) du tube de raccordement (10) fait face à la première extrémité de raccordement (8) du tube de sortie (4), et raccorder le tube de sortie (4) et le tube de raccordement (10).

Fig. 1

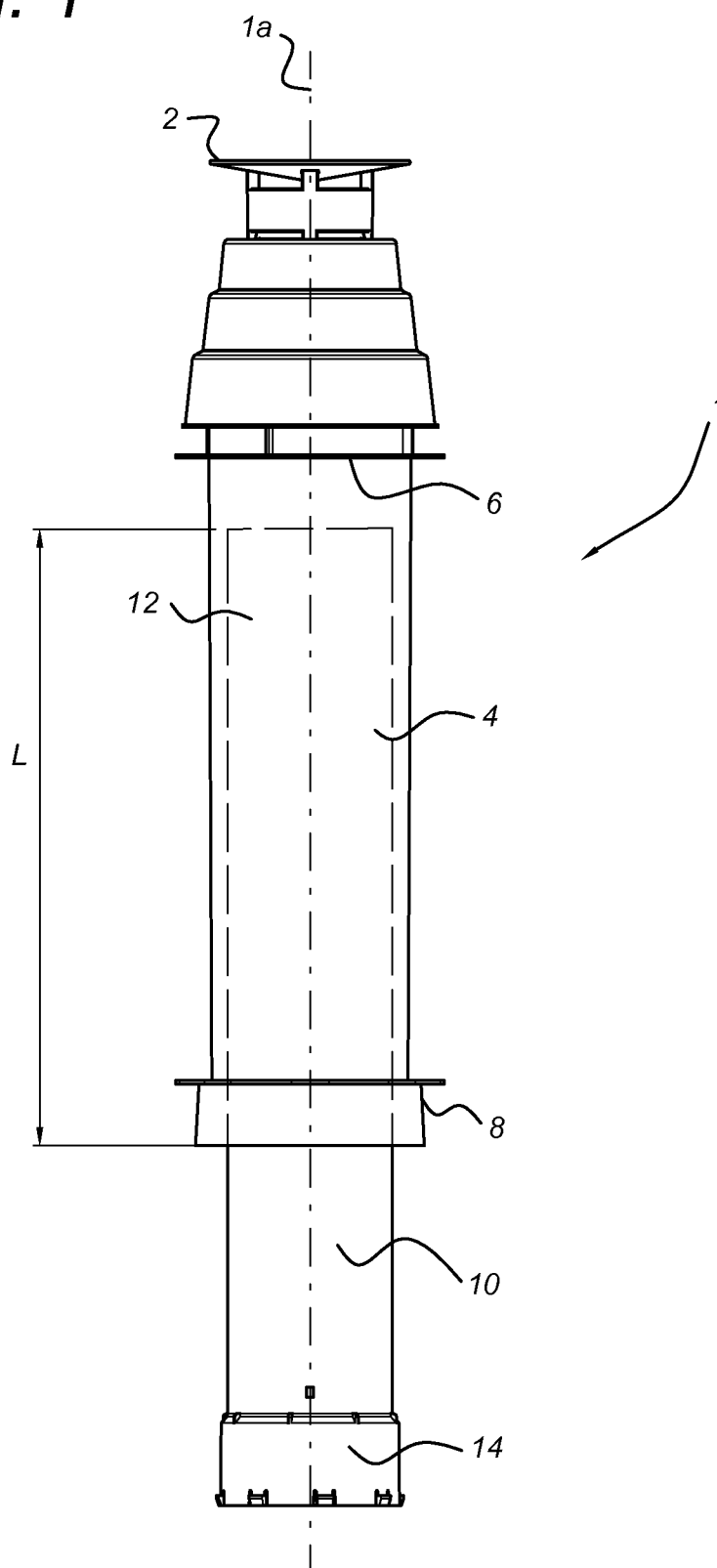


Fig. 2

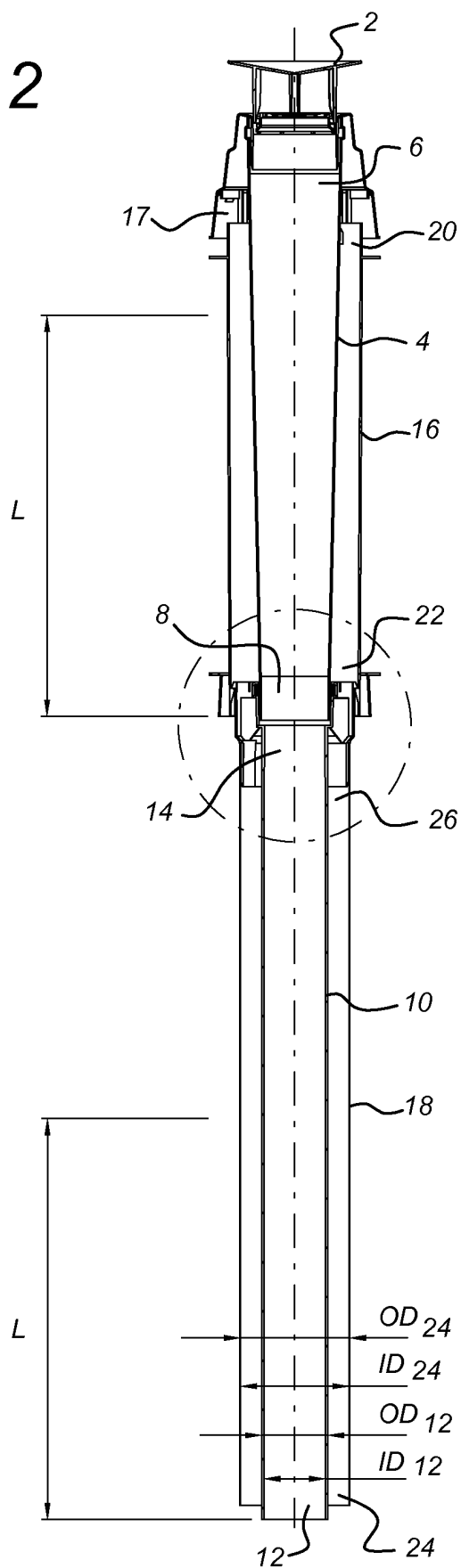
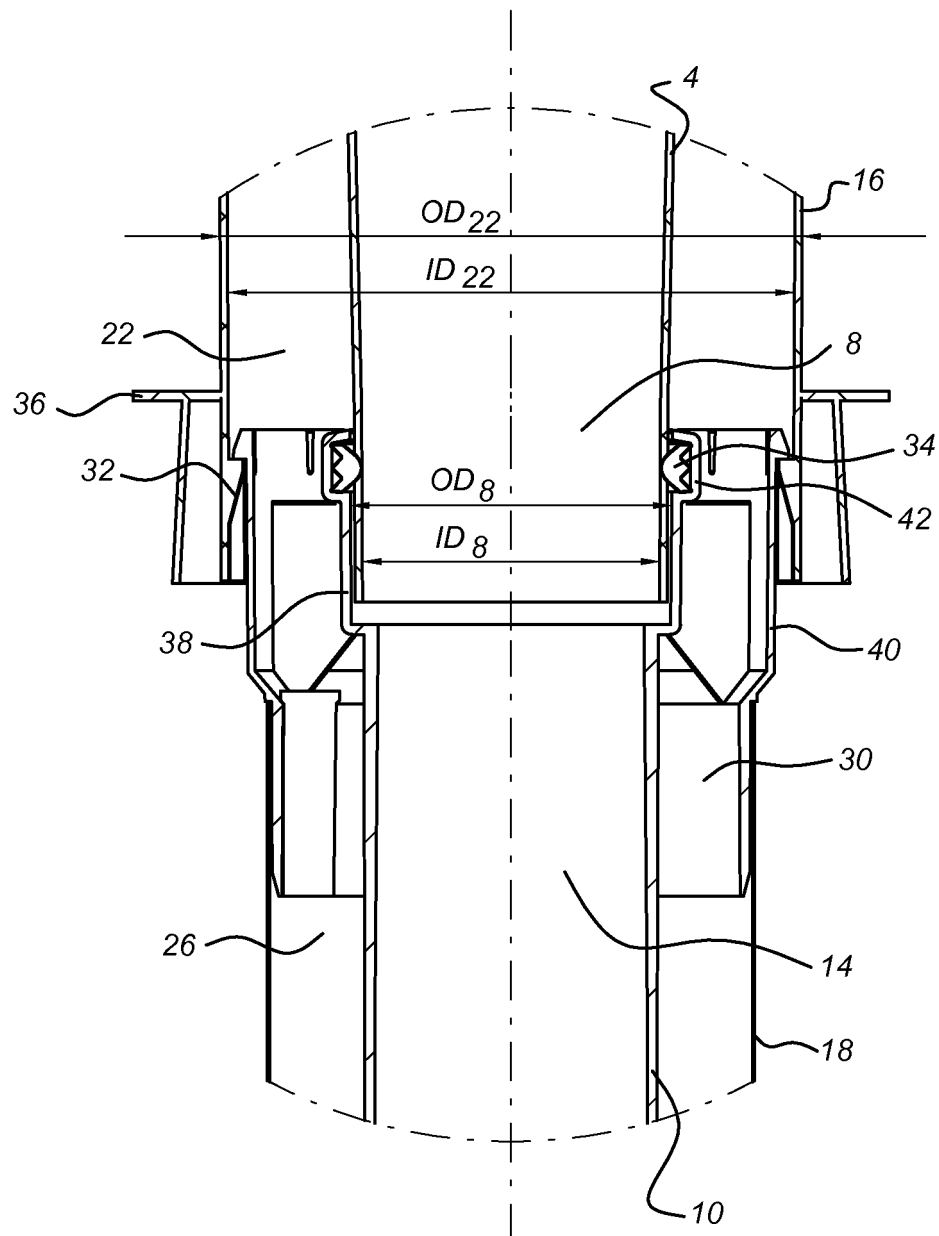


Fig. 3



REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- US 4082322 B [0003]
- DE 102006051695 A [0004]
- US 6062608 B [0005]