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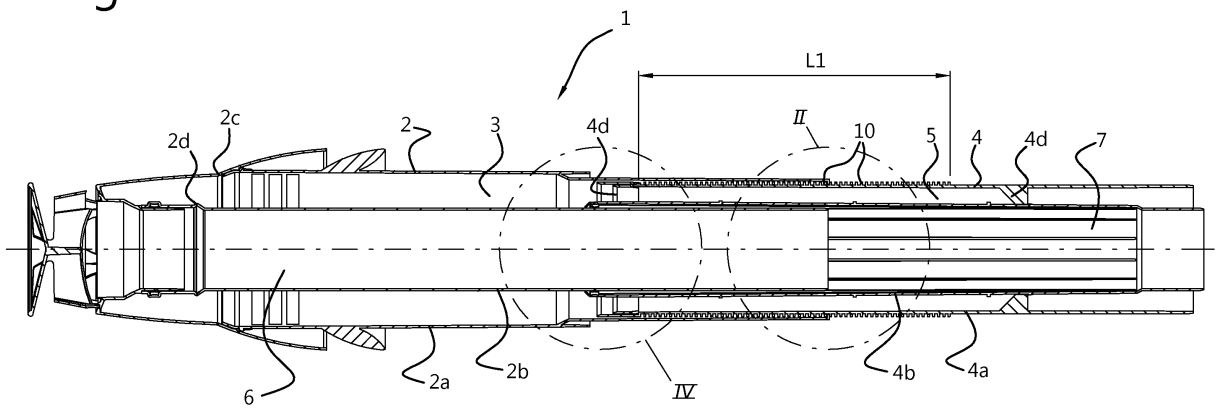
(54) FLUE GAS OUTLET ASSEMBLY

(57) Flue gas outlet assembly for supplying and/or discharging gases with a double wall tubular upper member (2) having an upper outer wall member (2a), an upper inner wall member (2b) and an upper annular duct (3) interposed there between, as well as a double wall tubular lower member (4) having a lower outer wall member (4a), a lower inner wall member (4b) and a lower annular duct (5) interposed there between. A locking member (10) in cooperative engagement with the double wall tubular upper member (2) and double wall tubular lower member (4) is present. The locking member (10) is arranged to allow relative movement between the double wall tubular upper member (2) and double wall tubular lower member (4) in a longitudinal direction, and to interlock the double wall tubular upper member (2) and double wall tubular lower member (4) by a relative rotational movement there between.

Fig. 1



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Description

Field of the invention

[0001] The present invention relates to a flue gas outlet assembly for supplying and/or discharging gases, more particularly to a telescopically arranged double wall 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-4,082,522 disclosed a metal chimney construction for use with heating fixtures. Pipe sections are joined together by an inside-outside coupling ring.

Summary of the invention

[0004] The present invention seeks to provide an improved flue gas outlet assembly of the type defined in the preamble above, wherein the flue gas outlet assembly allows for a small packaging footprint and is easily adjusted in length to meet various application requirements.

[0005] According to the invention, the flue gas outlet assembly comprises a double wall tubular upper member having an upper outer wall member, an upper inner wall member and an upper annular duct interposed there between, a double wall tubular lower member having a lower outer wall member, a lower inner wall member and a lower annular duct interposed there between, the double wall tubular upper member and the double wall tubular lower member being arranged to connect the upper annular duct to the lower annular duct, the flue gas outlet assembly further comprising a locking member in cooperative engagement with the double wall tubular upper member and double wall tubular lower member, the locking member being arranged to allow relative movement between the double wall tubular upper member and double wall tubular lower member in a longitudinal direction over a predetermined length, and to interlock the double wall tubular upper member and double wall tubular lower member by a relative rotational movement there between over a predetermined angle.

[0006] The flue gas outlet assembly according to the invention is easily lengthened from a retracted configuration to an extended configuration through a pull movement to lengthen the flue gas outlet assembly to a desired length and to interlock the double wall tubular upper member and double wall tubular lower member at the desired length by a straightforward relative rotational movement over a predetermined angle. Once interlocked, the flue gas outlet assembly is a substantially rigid and ready to be installed through e.g. a roof or wall. Conversely, the flue gas outlet assembly is easily retracted or readjusted in length by a turn and pull or push movement. In an interlocked configuration, the double wall tubular upper member and double wall tubular lower member are readily released in longitudinal direction by another rotational movement there between, which need not be in a direction opposite to the rotation direction used for interlocking the flue gas outlet assembly.

[0007] At all times the flue gas outlet assembly according to the present invention is a one piece component that is manually adjustable in length without the need to handle separate components, thereby improving installation speed and associated cost.

Short description of drawings

[0008] The present invention will be discussed in more detail hereinafter based on a number of exemplary embodiments with reference to the drawings, in which

Figure 1 shows a cross section of an embodiment of a flue gas outlet assembly according to the present invention;
Figure 2 shows a cross section of an embodiment of a locking member embodiment according to the present invention;
Figure 3 shows a cross section of another embodiment of a locking member according to the present invention;
Figure 4 shows a cross section of an embodiment of a sleeved end stop part according to the present invention;
Figure 5 shows an exploded view of an embodiment of a flue gas outlet assembly according to the present invention;
Figure 6 shows a three dimensional view of an embodiment of a flue gas outlet assembly according to the present invention; and
Figure 7 and 8 each show a perspective and cross sectional view of a further embodiment of a locking member according to the present invention.

Detailed description of exemplary embodiments

[0009] Figure 1 shows a cross section of an embodiment of a flue gas outlet assembly 1 according to the present invention. In the embodiment shown , the flue gas outlet assembly 1 comprises a double wall tubular upper member 2 having an upper outer wall member 2a and an upper inner wall member 2b. Interposed between the upper outer wall member 2a and the upper inner wall member 2b is an upper cavity, an upper passageway or an upper duct for allowing a gas to pass there through.

The upper cavity typically comprises an upper annular or annularly arranged duct 3.

[0010] The flue gas outlet assembly 1 further comprises a double wall tubular lower member 4 having a lower outer wall member 4a and a lower inner wall member 4b. Interposed between the lower outer wall member 4a and the lower inner wall member 4b is a lower cavity, a lower passageway or a lower duct 5 for allowing a gas to pass through. The lower duct 5 typically comprises a lower annular or annularly arranged duct 3.

[0011] The double wall tubular upper member 2 and the double wall tubular lower member 4 are arranged to connect the upper annular duct 3 to the lower annular duct 5, so that a continuous passageway is provided through the flue gas outlet assembly 1. In a typical application the passageway defined by the upper and lower annular ducts 3, 5 is used as a gas intake, but it may also function as a gas outlet in specific applications. The upper inner wall member 2b may typically comprise an upper inner duct 6 extending there through connected to a lower inner duct 7 of the lower inner wall member 4b. The upper inner duct 6 and lower inner duct 7 provide a further continuous passageway through the flue gas outlet assembly 1, wherein the further passageway is typically used as a gas exhaust duct, but it may also function as a gas intake duct when necessary.

[0012] The flue gas outlet assembly 1 of the present invention further comprises a locking member 10 in cooperative engagement with the double wall tubular upper member 2 and double wall tubular lower member 4. The locking member 10 of the present invention is arranged to allow for relative or mutual movement between the double wall tubular upper member 2 and double wall tubular lower member 4 in a longitudinal direction over a predetermined length. The locking member 10 is further arranged to interlock the double wall tubular upper member 2 and double wall tubular lower member 4 by a relative rotational movement there between over a predetermined angle. The locking member 10 is arranged for interlocking the double wall tubular upper member 2 and double wall tubular lower member 4 in a longitudinal direction of the flue gas outlet assembly 1, thereby fixing a desired extension length of the flue gas outlet assembly 1.

[0013] In actual use, the flue gas outlet assembly 1 of the present invention is advantageous as it can be shortened for packaging and transportation purposes and easily lengthened in one single movement when it is to be installed. Lengthening the flue gas outlet assembly 1 is readily accomplished by e.g. pulling the double wall tubular upper member 2 and double wall tubular lower member 4 apart in longitudinal fashion. Once a desired length of the flue gas assembly 1 has been reached, a relative rotational movement over a predetermined angle interlocks the double wall tubular upper member 2 and double wall tubular lower member 4 in the longitudinal direction. Should the flue gas outlet assembly 1 be further adjusted once interlocked, then a further rotational movement between the double wall tubular upper member 2 and double wall tubular lower member 4 allows said upper and lower members 2,4 to be released for adjusting the overall length of the flue gas outlet assembly 1.

[0014] In a typical embodiment the double wall tubular upper member 2 and double wall tubular lower member 4 are telescopically arranged and so the relative movement there between comprises telescopic movement when the flue gas outlet assembly 1 is lengthened or shortened by respectively pulling or pushing the double wall tubular upper member 2 and double wall tubular lower member 4. In the particular embodiment shown, the double wall tubular lower member 4 is longitudinally moveable or telescopically arranged within the upper annular duct 3. In many applications the telescopic range of movement between the double wall tubular upper member 2 and double wall tubular lower member 4 comprises 20 cm to 40 cm extension and retraction. Of course, longer telescopic ranges are possible, such as up to 150 cm extension or retraction if necessary, so that various onsite installation requirements can be met. For packaging purposes the retracted length of the flue gas outlet assembly may be 100 cm or less, thereby providing a small transportation footprint and allowing for a larger number of flue gas outlet assemblies 1 to fit on a single transportation pallet.

[0015] In order to provide a substantial concentric arrangement between the double wall tubular upper member 2 and double wall tubular lower member 4 for facilitating the telescopic movement there between, the double wall tubular lower member 4 may comprise a first spacer element 4d in a radial arrangement connecting the lower outer wall member 4a and lower inner wall member 4b. In some embodiments the first spaced element 4d may also provide an abutment face for the double wall tubular upper member 2 for defining a shortest possible retracted length of the flue gas outlet assembly 1, wherein the shortest possible retracted length will depend on packaging requirement of the flue gas outlet assembly 1.

[0016] In an even further embodiment, the double wall tubular upper member 2 comprises a second spacer element 2c in a radial arrangement connecting the upper outer wall member 2a and upper inner wall member 2b. The second spacer element 2c also provides substantial concentricity between the upper outer wall member 2a and upper inner wall member 2b, so that telescopic movement between the double wall tubular upper member 2 and the double wall tubular lower member 4 is facilitated.

[0017] In an embodiment, the second spaced element 2c may provide an abutment face for the double wall tubular lower member 4 for defining a shortest possible retracted length of the flue gas outlet assembly 1, so that the second spacer element 2c is in engagement with a maximally retracted double wall tubular lower member 4.

[0018] In an alternative embodiment, the double wall tubular upper member 2 may also comprise an end stop element 2d configured to prevent further telescopic short-

ening of the flue gas outlet assembly 1, as the end of lower inner member 4b will abut the end stop element 2d. In a typical embodiment, the end stop element 2d may be provided on an end part of the upper inner member 2b.

[0019] Figure 2 shows a detailed cross section (II) of an embodiment of a locking member 10 according to the present invention. In the embodiment shown, the locking member 10 comprises a plurality of radially extending members 12 provided in a lengthwise or longitudinal direction on one of the double wall tubular upper member 2 and the double wall tubular lower member 4. A further radially extending member 14 is provided on the other of the double wall tubular upper member 2 and double wall tubular lower member 4. The plurality of radially extending members 12 and further radially extending member 14 allow for a convenient en reliable cooperative interlocking engagement between the double wall tubular upper member 2 and the double wall tubular lower member 4, whereby, in a locking configuration, the double wall tubular upper member 2 and the double wall tubular lower member 4 are longitudinally or lengthwise immovably interconnected.

[0020] To obtain a reliable interlocked arrangement of the the double wall tubular upper member 2 and the double wall tubular lower member 4, the further radially extending member 14 and the plurality of radially extending members 12 are arranged to allow for a releasable clamping arrangement there between. The releasable clamping arrangement prevents spontaneous relative rotation between the double wall tubular upper member 2 and the double wall tubular lower member 4. The clamping arrangement can however be released by actively applying a counter rotation force, such as by hand, to rotate the double wall tubular upper member 2 relative to the double wall tubular lower member 4.

[0021] According to the invention, the flue gas outlet assembly 1 can be extended from an interlocked retracted minimum length (*Lmin*) to an interlocked extended maximum length (*Lmax*) or vice versa, wherein the further radially extending member 14 and the plurality of radially extending members 12 are arranged to allow for intermediate lengthening or retraction of the flue gas outlet assembly 1 between the interlocked minimum length (*Lmin*) and interlocked maximum length (*Lmax*). The difference between the interlocked minimum and interlocked maximum length (*Lmin*, *Lmax*) is the depicted interlocking adjustable length (*L1*), i.e. the length of the plurality of radially extending members 12 along which the double wall tubular upper member 2 and the double wall tubular lower member 4 can be interlocked.

[0022] In an advantageous embodiment, the plurality of radially extending members 12 have a predetermined relative pitch distance (d_p). The pitch distance may be construed as the distance between two consecutive or adjacent radially extending members 12, so that the flue gas outlet assembly 1 can be lengthened or retracted with increments equal to the pitch distance (d_p). Smaller pitch distances allow for finer length adjustments of the flue gas outlet assembly 1 than larger pitch distances.

[0023] In a particular embodiment such as the one shown in Figure 2, the plurality of radially extending members 12 may comprise a plurality of outwardly protruding members 12, and the further radially extending member 14 may comprise an inwardly protruding member 14. Of course, it is conceivable that the plurality of radially extending member comprises a plurality of inwardly protruding member 12, and the further radially extending member 14 then comprises an outwardly protruding member 14.

[0024] Figure 3 shows a cross section of a further aspect of the present invention embodiments relating to the features of a locking member 10. In the embodiment shown, each of the plurality of radially extending members 12 comprises a first ridge shaped element 12a circumferentially disposed over a predetermined first arc length *a1*.

[0025] According to the invention, two circumferentially disposed ridge shaped elements 12a can be positioned on both sides of the further radially extending member 14 through a rotational movement, see Figure 2 for example, thereby interlocking the double wall tubular upper member 2 and the double wall tubular lower member 4 in a longitudinal or lengthwise fashion. The first arc length *a1* determines at least in part an angular range of rotational movement in which the two ridge shaped elements 12a contribute to longitudinally interlocking the double wall tubular upper member 2 and the double wall tubular lower member 4.

[0026] For an improved cooperative engagement of the locking member 10 with the double wall tubular upper member 2 and double wall tubular lower member 4, the further radially extending member 14 may also comprise a second ridge shaped element 14a circumferentially disposed over a predetermined second arc length *a2*, wherein the second arc length *a2* also determines at least in part an angular range of rotational movement in which interlocking occurs between the double wall tubular upper member 2 and double wall tubular lower member 4.

[0027] In a typical embodiment the first ridge shaped element 12a comprises an elongated rectangular ridge shaped element or protrusion having a rectangular cross section and width *w1* as shown in Figure 2. In a further embodiment, the second ridge shaped element 14a may also comprise an elongated rectangular ridge shaped element or protrusion having a rectangular cross section and width *w2* as shown in Figure 2.

[0028] As mentioned earlier, a reliable interlocked arrangement of the double wall tubular upper member 2 and the double wall tubular lower member 4 may be achieved through a releasable clamping arrangement there between. Such a clamping arrangement may be obtained by choosing the width *w2* of the further radially extending member 14 somewhat larger than a gap between two adjacent first ridge shaped elements 12a. Hence in a clamping arrangement, the further radially

extending member 14 is essentially wedged between two successive radially extending members 12 for interlocking the double wall tubular upper member 2 and the double wall tubular lower member 4. Also, the width *w2* may vary over the circumferential direction, e.g. with a linear increase, allowing proper alignment in a first part of the rotational movement, and a locking in a second part of the rotational movement.

[0029] In an embodiments the first and second ridge shaped element 12a, 14a may each comprise a rectangular cross section as depicted in Figure 2. This ensures a congruent, reliable engagement there between when the double wall tubular upper member 2 and the double wall tubular lower member 4 are interlocked.

[0030] In alternative embodiments, the first and second ridge shaped element 12a, 14a may each comprise a triangular, trapezoid, or semi circular cross section. The cross section of a first ridge shape element 12a may be different from the second ridge shaped element 14a.

[0031] According to an embodiment of the present invention, the flue gas outlet assembly 1, in particular the locking member 10, may comprise multiple groups of the plurality of radially extending members 12 and further radially extending member 14 provided in a circumferential direction, wherein said groups may in advantageous embodiments be regularly distributed in circumferential direction of the flue gas outlet assembly 1.

[0032] In Figure 2 and 3 for example, two groups are shown, each group comprising a plurality of radially extending members 12 and a further radially extending member 14, wherein the plurality of radially extending members 12 of each group, as well as the further radially extending member 14 of each group are evenly distributed in circumferential direction.

[0033] In particular, in the embodiment of Figure 3 there are two, first ridge shaped elements 12a separated by a first pitch angle α_{p1} of substantially 180° degrees, and there are two, second ridge shaped elements 14a separated by a second pitch angle α_{p2} of substantially 180° degrees. The pitch angle may be viewed as an angle over which a regular circumferential pattern is obtained for two or more groups of the plurality of radially extending members 12 and the further radially extending member 14.

[0034] According to the invention, the first and second arc length *a1*, *a2* may be chosen so as to obtain a desired predetermined angle α_L over which a relative rotational movement is (maximally) required for interlocking to occur between the double wall tubular upper member 2 and the double wall tubular lower member 4. Rotational movement may be clockwise or counter clockwise.

[0035] In order to lengthen or retract the flue gas outlet assembly 1, the first and second arc length *a1*, *a2* may be chosen so as to leave sufficient room in circumferential sense between the plurality of radially extending members 12 and the further radial extending member 14 for lengthwise or longitudinally moving the plurality of radially extending members 12 with respect to the further radially extending member 14, i.e. for relative telescopic movement between the double wall tubular upper member 2 and the double wall tubular lower member 4.

[0036] The above is clarified in Figure 3, wherein the plurality of radially extending members 12 and the further radially extending member 14 are or become interlocked over a rotation angle α_L of between 10° and 45°. That is, the rotation angle α_L may be viewed as the predetermined angle of relative rotational movement between the double wall tubular upper member 2 and the double wall tubular lower member 4 for which interlocking occurs between said upper and lower member 2,4.

[0037] For example, in the embodiment shown, two outwardly protruding members 12 and two inwardly protruding members 14 are evenly spaced in circumferential sense. The first and second arc length *a1*, *a2* are chosen such that the rotation angle α_L is required, at most, for interlocking the double wall tubular upper member 2 and the double wall tubular lower member 4. A clockwise or counter clockwise rotation over the rotation angle α_L or more will then interlock the double wall tubular upper member 2 and the double wall tubular lower member 4 in the longitudinal direction. Typically, the rotation angle α_L of between 10° and 45° is in many application sufficient for providing the interlocked arrangement between the double wall tubular upper member 2 and the double wall tubular lower member 4.

[0038] Figure 4 shows a cross section of an embodiment of a sleeved end stop part 16 according to the present invention. In the embodiment shown, the further radially extending member 14 is provided on an end part 16 of the upper outer wall member 2a. Positioning the further radially extending member 14 on the end part 16 maximises the possible extension length of the flue gas outlet assembly 1. As depicted the upper or lower outer wall member 2a, 4a may comprise a sleeved end stop part 4c arranged for defining a maximum extendible length for the flue gas outlet assembly 1. The sleeved end stop part 4c is arranged to abut against the further radially extending member 14 when the flue gas outlet assembly 1 is maximally extended, thereby preventing accidental separation of the double wall tubular upper member 2 and the double wall tubular lower member 4.

[0039] In an embodiment, the flue gas outlet assembly 1 may further comprise a sealing element 18 in sealing engagement with the double wall tubular upper member 2 and the double wall tubular lower member 4. In a particular embodiment, such as the one shown in Figure 4, the sealing element 18 may be disposed between the double wall tubular upper member 2 and the double wall tubular lower member 4 for preventing any gas leakage there between.

[0040] Figure 5 shows an exploded view of an embodiment of a flue gas outlet assembly according to the present invention. This embodiment exemplifies the mutual assembly of the upper outer and upper inner members 2a, 2b and the lower outer and lower inner members 4a, 4b. In the exploded view, the interlocked adjustable

length (L1) defined by the plurality of radially extending members 12 is augmented with an non-interlocking adjustable length *L2* over which the flue gas assembly 1 can be retracted but cannot be interlocked. In this particular embodiment the non-interlocking adjustable length *L2* may further reduce the retractable length to meet smaller packaging requirements of the flue gas outlet assembly 1. The non-interlocking adjustable length L2 may by a particular placement of the second spacer element as shown in Figure 1 or the end stop element 2d of the double wall tubular upper member 2, in particular the upper inner member 2b. Further, in the embodiment shown the end part of the upper outer member 2a comprises the further radially extending member 14.

[0041] In an embodiment, an inner nominal diameter D_i of the lower inner wall member 4b is between 60 mm and 90 mm, and an outer nominal diameter D_o of the lower outer wall member 4a is between 100 mm and 150 mm. In another embodiment, an inner nominal diameter D_i of the lower inner wall member 4b is between 60 mm and 100 mm, and an outer nominal diameter D_o of the lower outer wall member 4a is between 100 mm and 150 mm. These embodiments allow for a lower annular duct 5 having sufficient capacity for most applications.

[0042] A practical embodiment is depicted in Figure 6, which shows a three dimensional view of an embodiment of a flue gas outlet assembly 1 according to the present invention. In this embodiment the flue gas outlet assembly 1 comprises two groups of the plurality of radially extending members 12, wherein the double wall tubular lower member 4 comprises two groups of longitudinally arranged radially extending members 12 separated over 180° degrees in circumferential sense. As shown, the end part 16 of the upper outer member 2a comprises the further radially extending member 14, which is in interlocked engagement with one of more radially extending members 12. The double wall tubular lower member 4 is telescopically and moveably arranged within the upper annular duct 3 (not shown) of the double wall tubular upper member 2. From a user perspective, the flue gas outlet assembly 1 can be manually adjusted by rotating the double wall tubular lower member 4 with respect to the double wall tubular upper member 2. Once the plurality of radially extending members 12 are cleared from the further radially extending member 14 through the rotational movement over the predetermined angle, i.e. the rotation angle α_L, the double wall tubular upper member 2 and double wall tubular lower member 4 are telescopically movable, thus retraceable or extendible.

[0043] Figure 7 and 8 each show a further embodiment of the plurality of radially extending members 12 and the further extending member 14. In particular, Figure 7 shows a three dimensional view and Figure 8 depicts a top view of an embodiment of a releasable clamping arrangement according to the present invention.

[0044] As mentioned above, in a clamping arrangement the further radially extending member 14 (e.g. the second ridge shaped element 14a) may be arranged for being wedged between two successive or adjacent radially extending members 12 (e.g. the first ridge shaped elements 12a) for interlocking the double wall tubular upper member 2 and the double wall tubular lower member 4.

[0045] To obtain a releasable clamping arrangement between the further radially extending member 14 and two consecutive or adjacent radially extending members 12, each of the plurality of radially extending members 12 may comprise a triangular profile 12b in circumferential direction. Consequently, the two consecutive or adjacent radially extending members 12 define a funnel shaped gap there between having a base width *w3* which is larger than a top width *w4* of the funnel shaped gap.

[0046] Upon insertion of the further radially extending member 14 into the funnel shaped gap through relative rotation of the double wall tubular lower member 4 with respect to the double wall tubular upper member 2, an increasing clamping force develops as the further radially extending member 14 wedges between the two adjacent radially extending members 12. At some point the clamping force will be sufficient for preventing spontaneous relative rotation between the double wall tubular upper member 2 and the double wall tubular lower member 4, so that said upper and lower member 2, 4 are effectively interlocked.

[0047] As depicted in Figure 8, in an embodiment the further radially extending member 14 may be provided with a bead shaped locking tip 17 congruently receivable into a locking pocket 13 defined by two adjacent radially extending members 12, such as two adjacent first ridge shaped elements 12a. The pitch distance *dp* may be viewed as the distance between two adjacent or consecutive locking pockets 13 defining the smallest possible interlocking adjustable length of the flue gas outlet assembly 1.

[0048] Releasing the double wall tubular upper member 2 and the double wall tubular lower member 4 is readily accomplished through an opposite rotation, thereby pulling the locking tip 17 from the locking pocket 13.

[0049] Note that in many embodiments the two adjacent radially extending members 12 may have sufficient resiliency or flexibility to allow for the further radially extending member 14 to be wedged there between with adequate clamping force. In the embodiment shown, for example, the locking tip 17 may have a width larger than the top width *w4*, so that once the locking tip 17 passes through the top width *w4* into the locking pocket 13, the locking tip 17 is firmly interlocked and relative rotation between the double wall tubular upper member 2 and the double wall tubular lower member 4 is thereby prevented. Imposing an opposite relative rotation releases the locking tip 17 from the locking pocket 13, so that the flue gas outlet assembly 1 is adjustable in length once again.

[0050] 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. E.g. in the embodiments shown in the drawings and described above, the lower outer wall 4a has an outer diameter slightly smaller or equal to an inner diameter of the upper outer wall 2a, allowing the lower member 4 to slide in the upper member 2. Of course this can be reversed in further embodiments. Also the lower inner wall 4b has an inner diameter slightly smaller than or equal to an outer diameter of the upper inner wall 2b. Also this can be reversed in further embodiments, as such or in combination with the selection of outer wall 2a, 4b diameters. Depending on the actual implementation, the position and direction of various components as described above can be suitably adapted, such as the plurality of radially extending member 12 and further radially extending member 14 of the locking member 10, and the sealing element 18.

Claims

1. Flue gas outlet assembly for supplying and/or discharging gases, comprising a double wall tubular upper member (2) having an upper outer wall member (2a), an upper inner wall member (2b) and an upper annular duct (3) interposed there between,
a double wall tubular lower member (4) having a lower outer wall member (4a), a lower inner wall member (4b) and a lower annular duct (5) interposed there between,
the double wall tubular upper member (2) and the double wall tubular lower member (4) being arranged to connect the upper annular duct (3) to the lower annular duct (5), the flue gas outlet assembly (1) further comprising
a locking member (10) in cooperative engagement with the double wall tubular upper member (2) and double wall tubular lower member (4), the locking member (10) being arranged to allow relative movement between the double wall tubular upper member (2) and double wall tubular lower member (4) in a longitudinal direction over a predetermined length, and to interlock the double wall tubular upper member (2) and double wall tubular lower member (4) by a relative rotational movement there between over a predetermined angle.

2. Flue gas outlet assembly according to claim 1, wherein the locking member (10) comprises a plurality of radially extending members (12) provided in a lengthwise direction on one of the double wall tubular upper member (2) and the double wall tubular lower member (4), and a further radially extending member (14) provided on the other of the double wall tubular upper member (2) and double wall tubular lower member (4).

3. Flue gas outlet assembly according to claim 2, wherein the further radially extending member (14) and the plurality of radially extending members (12) are arranged to allow a releasable clamping arrangement there between.

4. Flue gas outlet assembly according to claim 2 or 3, wherein the each of the plurality of radially extending members (12) comprises a first ridge shaped element (12a) circumferentially disposed over a predetermined first arc length (*a1*).

5. Flue gas outlet assembly according to any one of claims 2 to 4, wherein the plurality of radially extending members (12) have a predetermined pitch distance (d_p).

6. Flue gas outlet assembly according to any one of claims 2 to 5, wherein the further radially extending member (14) comprises a second ridge shaped element (14a) circumferentially disposed over a predetermined second arc length (*a2*).

7. Flue gas outlet assembly according to any one of claims 2 to 6, wherein multiple groups of the plurality of radially extending members (12) and further radially extending member (14) are provided in a circumferential direction.

8. Flue gas outlet assembly according to any one of claims 2 to 7, wherein the further radially extending members (14) is provided on an end part (16) of the upper outer wall member (2a).

9. Flue gas outlet assembly according to any one of claims 2 to 8, wherein the plurality of radially extending members (12) and the further radially extending member (14) are interlocked over a rotation angle (α_L) ofbetween 10° and 45°.

10. Flue gas outlet assembly according to any one of claims 1 to 9, wherein the upper or lower outer wall member (2a, 4a) comprises a sleeved end stop part (4c) arranged for defining a maximum extendible length for the flue gas outlet assembly (1).

11. Flue gas outlet assembly according to any one of claims 1 to 10, wherein the double wall tubular lower member (4) comprises a first spacer element (4d) in a radial arrangement connecting the lower outer wall member (4a) and lower inner wall member (4b).

12. Flue gas outlet assembly according to any one of claims 1 to 11, wherein the double wall tubular upper member (2) comprises a second spacer element (2c) in a radial arrangement connecting the upper outer wall member (2a) and upper inner wall member (2b).

13. Flue gas outlet assembly according to claim 12, wherein the second spacer element (2c) is in engagement with a maximally retracted double wall tubular lower member (4).

14. Flue gas outlet assembly according to any one of claims 1 to 13, further comprising a sealing element (18) in sealing engagement with the double wall tubular upper member (2) and the double wall tubular lower member (4).

15. Flue gas outlet assembly according to any one of claims 1 to 14, wherein an inner nominal diameter (D_i) of the lower inner wall member (4b) is between 60 mm and 100 mm, and an outer nominal diameter (D_o) of the lower outer wall member (4a) is between 100 mm and 150 mm.

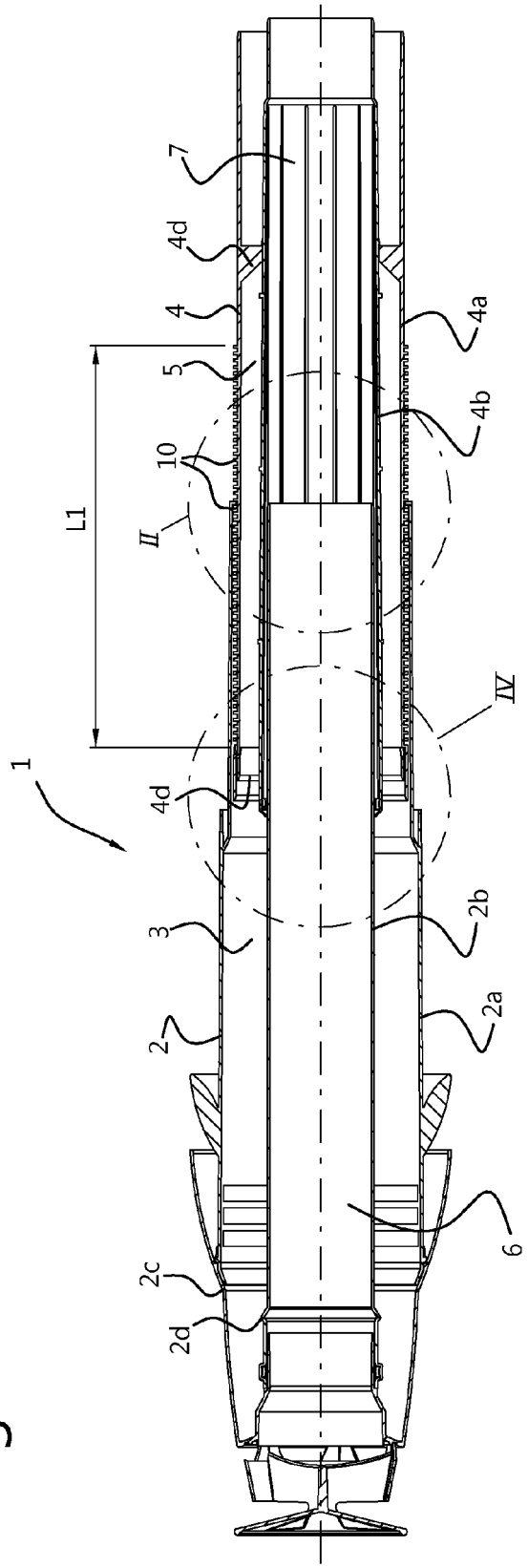


Fig. 1

Fig. 2

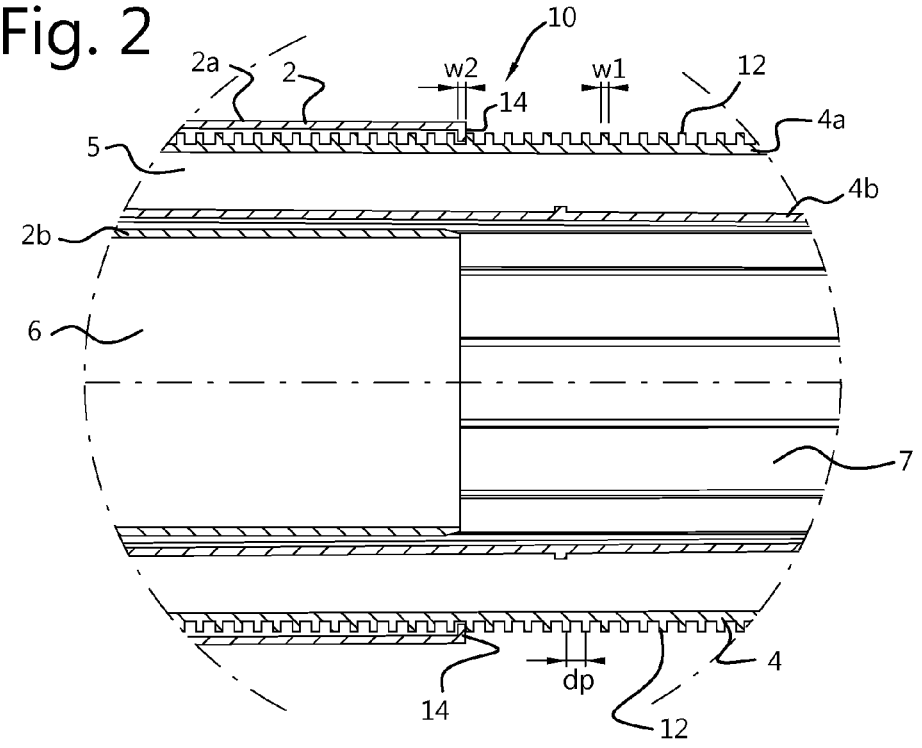

10
2a
2
w2
w1
12
14
4a
5
4b
2b
6
7
4
dp
14
12

Fig. 3

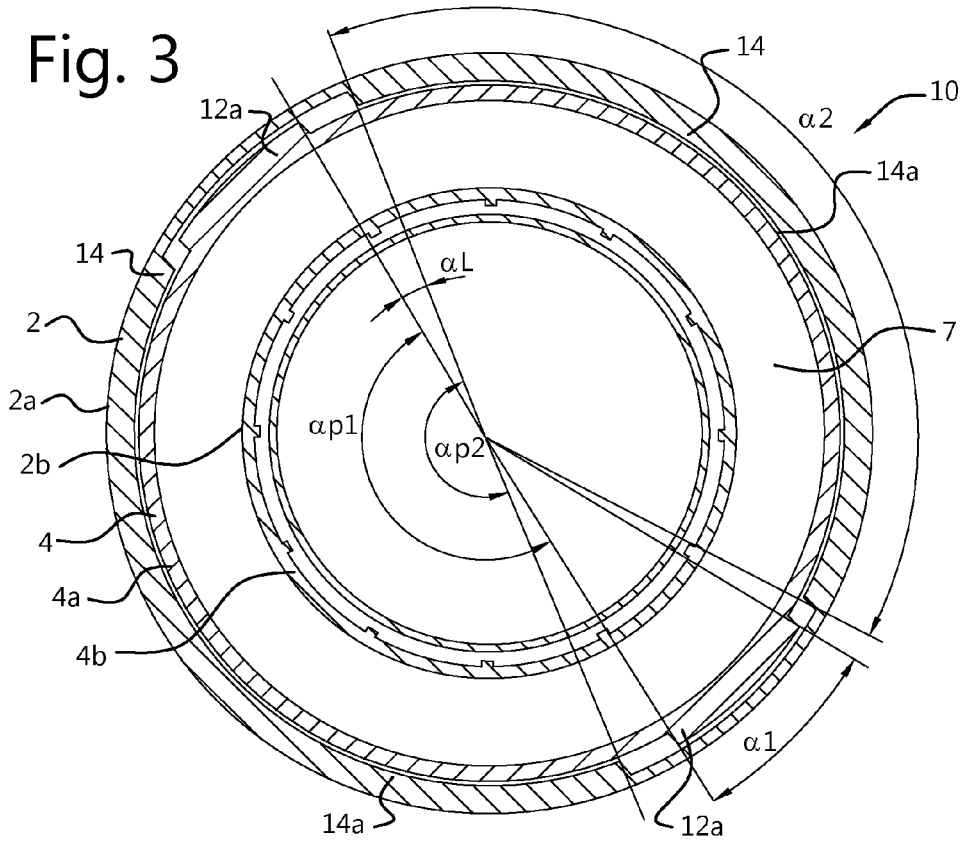

14
12a
α2
10
14a
14
αL
2
7
2a
αp1
αp2
2b
4
4a
4b
α1
14a
12a

Fig. 4

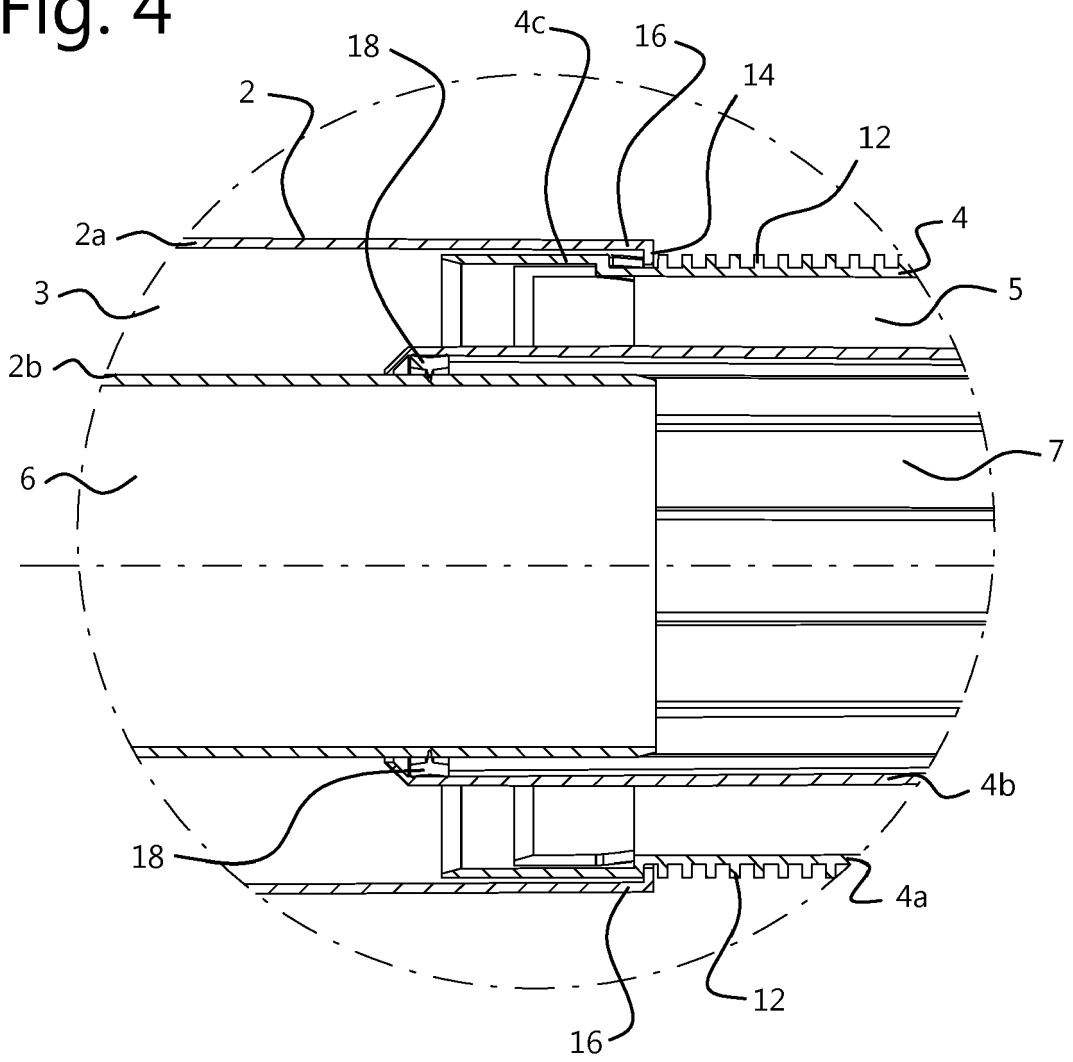


Fig. 5

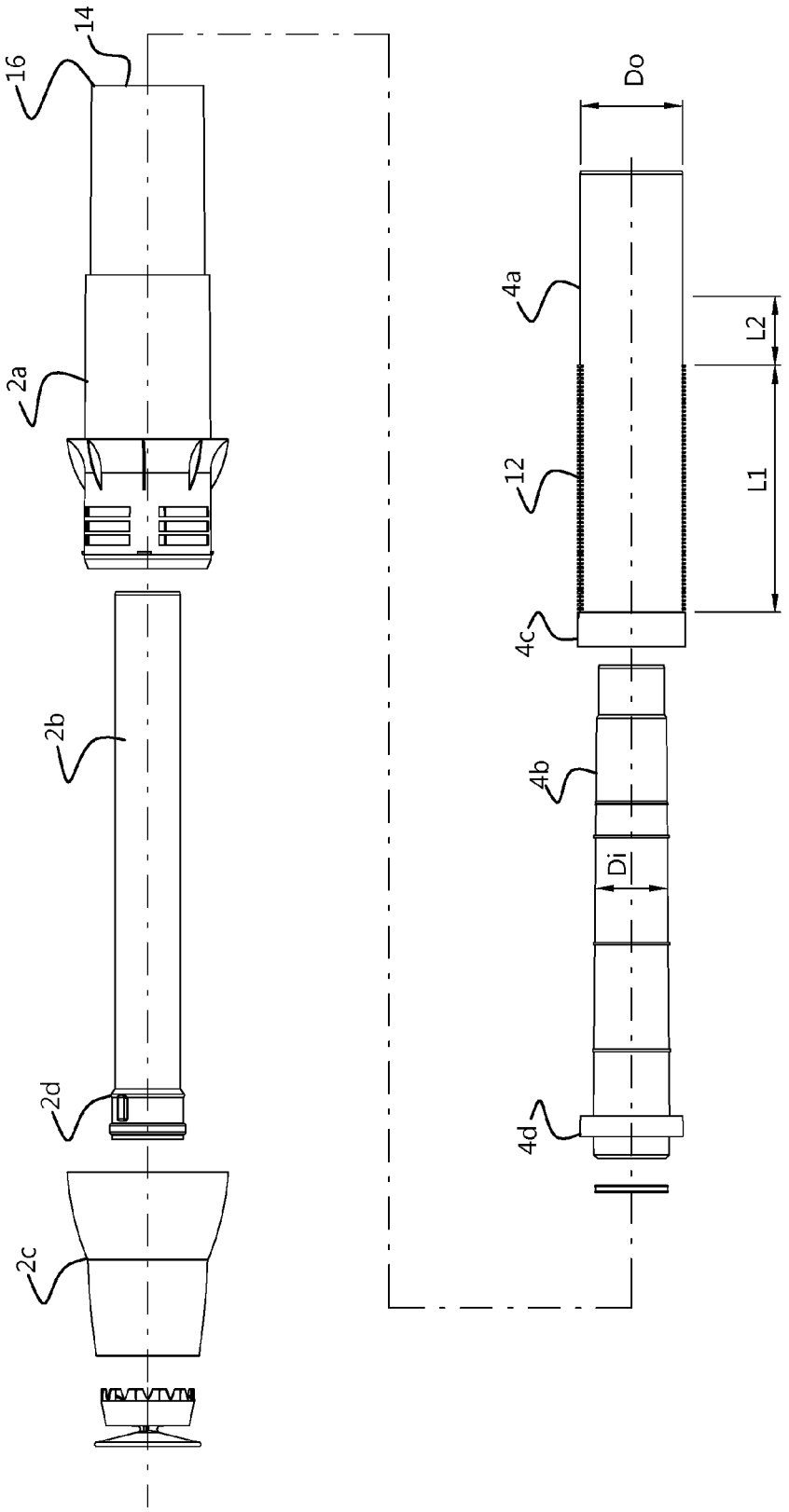


Fig. 6

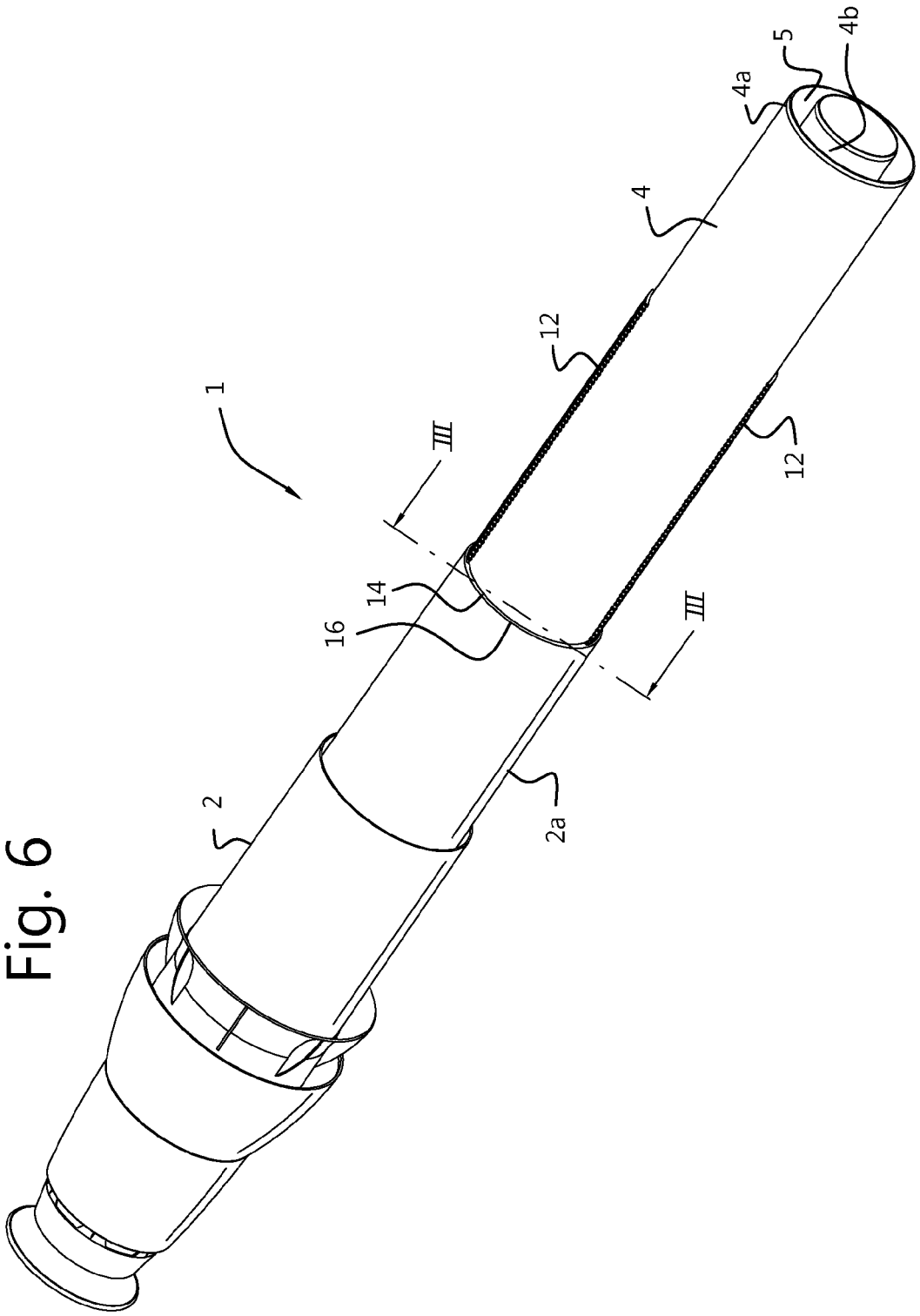


Fig. 7

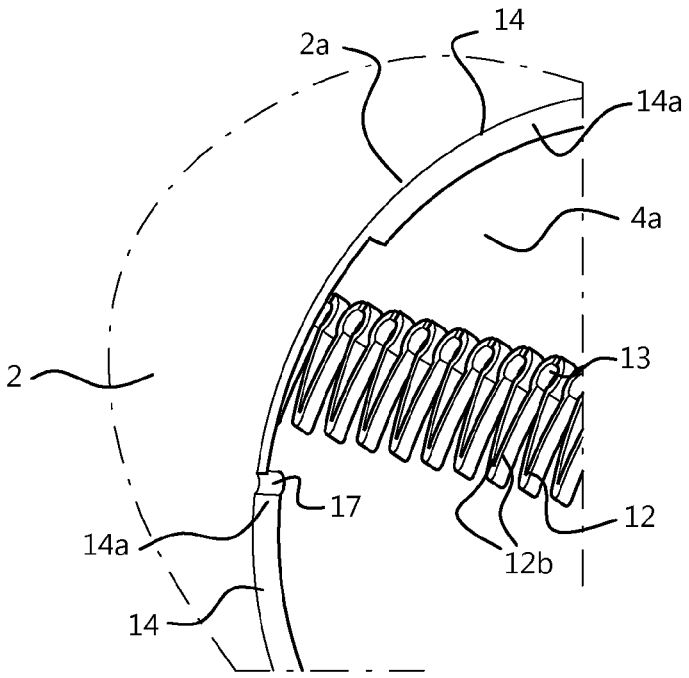
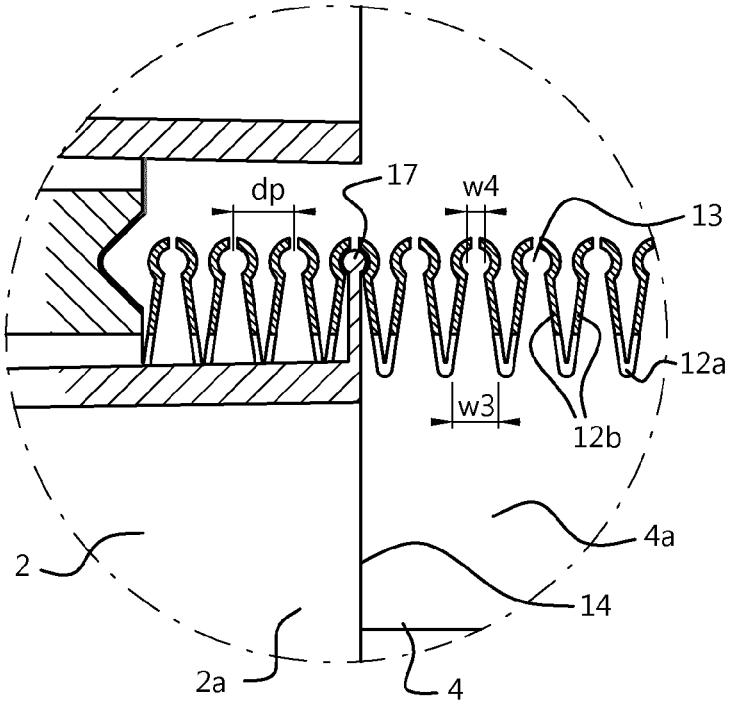


Fig. 8



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EUROPEAN SEARCH REPORT

Application Number
EP 15 19 0740

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X A	US 2 910 308 A (CARR JOHN H) 27 October 1959 (1959-10-27) * column 1, line 11 - line 17; figures 1-8 * * column 1, line 25 - line 31 * * column 1, line 54 - column 2, line 42 *	1,11,12, 15 2-10,13	INV. F23J11/00 F23L17/04 F23J13/04
A	GB 1 463 909 A (LEBLANC SA E L M) 9 February 1977 (1977-02-09) * the whole document *	1-15	
A	US 3 066 959 A (HARRY WHITE) 4 December 1962 (1962-12-04) * the whole document *	1-15	

TECHNICAL FIELDS SEARCHED (IPC)

F23J
F23L
F24C
F27D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	15 February 2016	Hauck, Gunther

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15-02-2016

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2910308 A	27-10-1959	NONE	
GB 1463909 A	09-02-1977	AT 347081 B	11-12-1978
		DE 2528350 A1	22-07-1976
		ES 440570 A1	01-03-1977
		FR 2298062 A1	13-08-1976
		GB 1463909 A	09-02-1977
		IT 1041582 B	10-01-1980
		JP S591925 B2	14-01-1984
		JP S5184441 A	23-07-1976
		NL 7509649 A	20-07-1976
US 3066959 A	04-12-1962	NONE	

EPO FORM P0459

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Patent documents cited in the description

- US 4082522 B **[0003]**