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(54) Roof passage system

(57) Roof passage (10) for the passage of gasses through a roof, comprising a placement part to be placed on the roof, a hollow shaft (20) extending from the placement part which shaft in the placed condition of the roof passage with its centre line is substantially vertically oriented, a first gas channel (23) extending through the shaft to an end section (40) at the outer end of the shaft, a core (71) extending parallel to the centre line and through which the centre line extends, and at least one water separation wall (72) extending from the core with a directional component transverse to the centre line over substantially the entire flow-through width between the core and the circumferential boundary of the first gas channel, wherein with a directional component in the circumferential direction and a directional component parallel to the centre line the water separation wall extends downwards around the core in the direction of the placement part.

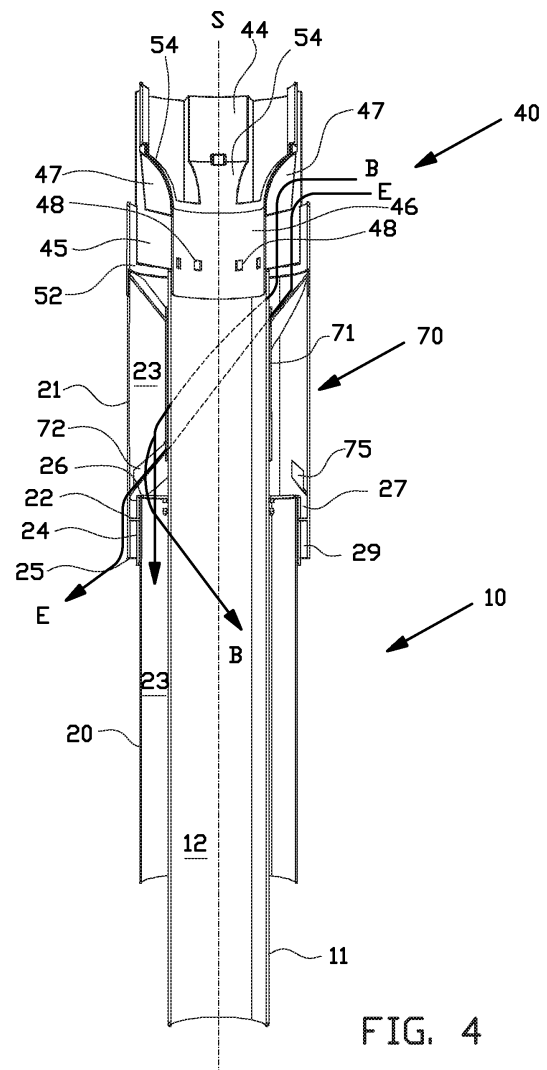


FIG. 4

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Description

BACKGROUND OF THE INVENTION

[0001] The invention relates to a roof passage for the passage of gasses through a roof.

[0002] Roof passages project from the roof, as a result of which rain falling down may enter in the roof passage and flow through to the installation connected to the roof passage. Precipitation flowing through may be undesirable, for instance in the supply of combustion air to a high efficiency boiler for central heating or when the roof passage is connected to a ventilating duct.

[0003] It is an object of the invention to provide a roof passage that provides for the discharge of precipitation entering the roof passage.

[0004] The invention further relates to a roof passage for the passage of flue gas and combustion air through a roof. Such roof passages form a part of a closed combustion system such as a gas-fired high efficiency boiler for central heating.

[0005] Known roof passages comprise a hollow shaft and a flue gas pipe extending concentrically through it, wherein the space between the flue gas pipe and the hollow shaft forms a separate channel for the combustion air. The flue gas outlet is situated higher than the combustion air inlet, wherein undesired recirculation of flue gas to the combustion air inlet is traditionally counteracted by selecting a sufficiently large distance between the inlet and outlet. In addition obstacles can be arranged or diameter jumps can be used between the inlet and the outlet. The minimum height of the roof passage is dictated by the prescribed snow height under which the connected combustion system still needs to be operational. This means that the height of the roof passage is a sum of the height of the inlet and the used distance between the inlet and the outlet. This may lead to ostentatious roof passages.

[0006] It is an object of the invention to provide a roof passage having an acceptable height with respect to a prescribed snow height under which a combustion system connected thereto still has to be operational in a safe way.

[0007] It is an object of the invention to provide a roof passage having advantageous aerodynamic properties.

SUMMARY OF THE INVENTION

[0008] According to one aspect the invention provides a roof passage for the passage of gasses through a roof, comprising a placement part to be placed on the roof, a hollow shaft extending from the placement part which shaft in the placed condition of the roof passage with its centre line is substantially vertically oriented, a first gas channel extending through the shaft to an end section at the outer end of the shaft, a core extending parallel to the centre line and through which the centre line extends, and at least one water separation wall extending from

the core with a directional component transverse to the centre line over substantially the entire flow-through width between the core and the circumferential boundary of the first gas channel, wherein with a directional component in the circumferential direction and a directional component parallel to the centre line the water separation wall extends downwards around the core in the direction of the placement part.

[0009] The water separation wall extends over substantially the flow-through width and like a helical part runs circumferentially inclined through the first gas channel, as a result of which precipitation entering via the end section will be able to meet the water separation wall in the path through the first gas channel and will drop down on it. Passage of precipitation to the installation connected to the roof passage can thus be counteracted.

[0010] In a manufacturing-technically advantageous embodiment the water separation wall is substantially straight plate-shaped or formed out of a straight plate.

[0011] In one embodiment the water separation wall extends around the core according to a screw or helix, preferably according to a screw or helix of a constant pitch. A screw or helix is able to collect precipitation that drops in or descends vertically whereas the gasses passed through are only urged to rotate about the centre line, which causes an advantageously low flow-through resistance or pressure drop in the gas to pass by.

[0012] In one embodiment the first gas channel comprises several water separation walls around the core, wherein in a projection parallel to the centre line the water separation walls partially overlap each other. The overlap in the downwardly inclined water separation walls ensure that precipitation dropping in or descending vertically always ends up on at least one of the water separation walls.

[0013] The precipitation ended up on the water separation wall can be discharged therefrom when the water separation wall at its outer end that is oriented towards the placement part has been provided with a raised retaining wall for guiding water in the direction of the inner wall of the shaft.

[0014] In one embodiment at the inside the hollow shaft is provided with a gutter extending in the first gas channel in circumferential direction, for the collection of water from the water separation wall, wherein the hollow shaft preferably is provided with at least one drainage opening that passes through for the discharge of water from the circumferential gutter. In that way precipitation will then be able to descend along the circumferential boundary all round or along the inside of the hollow shaft and end up in the gutter.

[0015] The water separation wall can easily drain water into the gutter when at its bottom side the water separation wall is supported on or in the gutter.

[0016] An embodiment of the roof passage suitable for the connection to a high efficiency boiler for central heating comprises a second gas channel extending separate from the first gas channel through the hollow shaft and

through the core and the first gas channel extends concentrically around the second gas channel.

[0017] In an assembly-technically advantageous embodiment the water separation wall or water separation walls are fixedly connected to the core and form a separate precipitation separator with it that has been placed in the hollow shaft as an insert piece.

[0018] The inserted separate precipitation separator can after insertion be kept in its place when the end section confines the precipitation separator in the hollow shaft.

[0019] In an embodiment of the roof passage suitable for ventilation purposes the first gas channel is intended for discharge of inside air of a building in a manner so as to be directed upwardly to the outside.

[0020] In one embodiment the roof passage comprises only one gas channel extending substantially parallel to the centre line, which gas channel is the first gas channel.

[0021] In one embodiment that is suitable for connection to a high efficiency boiler for central heating the first gas channel is intended for outwardly directed discharge of flue gas from a combustion appliance and the second gas channel is intended for inwardly directed supply of combustion air to the combustion appliance.

[0022] In one embodiment thereof the end section is provided with a series of inlet openings extending around the centre line, for the inflow of combustion air substantially transverse to the centre line, and an air guiding wall which is oriented radially inwards from an upper boundary of the inlet openings and subsequently according to a smooth curve deflects to a direction parallel to the centre line. Wind dropping in transverse to the centre line can then be urged downwards to the high efficiency boiler for central heating to enhance the refreshing action.

[0023] According to a second aspect, the invention provides a roof passage for the passage of flue gas and combustion air through a roof, comprising a placement part or covering part to be placed on the roof, a hollow shaft extending from the placement part which shaft in placed condition of the roof passage with its centre line is substantially vertically oriented, a flue gas channel and a combustion air channel that extend separate from each other through the shaft, and an end section at the outer end of the shaft, wherein the end section is provided with at least one first outlet opening for flue gas from the flue gas channel, at least one second outlet opening for flue gas from the flue gas channel, which outlet opening with respect to the first outlet opening considered in the direction of the centre line, is recessed towards the placement part and at least one inlet opening for combustion air to the combustion air channel which inlet opening is situated between the first and second outlet opening considered in the direction of the centre line.

[0024] Considered in the direction of the centre line the inlet, opening for combustion air is situated between the first and the second outlet opening. As a result both in case of a fall wind and a rising wind around the roof passage an outlet opening is situated on the lee side of

the inlet opening. Undesirable recirculation of flue gas to the combustion air is thus counteracted. The presence of an outlet opening both above and below the inlet opening renders it possible to keep the overall height of the roof passage with respect to a prescribed snow height acceptable.

[0025] The first outlet opening is capable of at least partially determining the upper portion of the roof passage when the first outlet opening bounds a portion of the upper end of the end section facing away from the placement part.

[0026] In one embodiment the end section has several first outlet openings separated from each other and distributed around the centre line, which outlet openings, considered in the direction of the centre line, are situated at the same height. The emission of flue gas can then take place in the same advantageous manner under various side wind directions.

[0027] In one embodiment the first outlet opening bounds the end of the first outlet channel that extends substantially parallel to the centre line at the location of the first outlet opening. The flue gas thus acquires a vertical directional component, as a result of which the flue gas can simply be emitted due to thermal.

[0028] In one embodiment each first outlet opening bounds the end of its own first outlet channel, as a result of which the flue gas can be distributed over the outlet channels for instance for acquiring said vertical directional component. This enhances a laminar outflow of the flue gas.

[0029] In one embodiment the end section has several second outlet openings separated from each other and distributed around the centre line, which outlet openings, considered in the direction of the centre line, are situated at the same height. In case of a downwardly inclined incoming fall wind there is always a second outlet opening present on the lee side of the roof passage, there where a local vacuum prevails to enhance the emission of the flue gas.

[0030] In one embodiment the second outlet opening bounds the end of the second outlet channel which from the combustion air channel deflects downwards and subsequently radially to the outside in order to enhance the emission of the flue gas in case of a fall wind.

[0031] In one embodiment each second outlet opening bounds the ends of its own second outlet channel.

[0032] In one embodiment the end section has several inlet openings separated from each other and distributed around the centre line, which inlet openings, considered in the direction of the centre line, are situated at the same height. In case of a side wind dropping in, the inlet openings on the weather side are able to receive the fresh combustion air, which has hardly been mixed with emitted flue gas if at all.

[0033] In one embodiment the inlet opening bounds the beginning of an inlet channel that deflects radially inwards and subsequently downwards to the combustion air channel. In case of a side wind dropping in the fresh

combustion air can then be driven in the direction of the vertically extending combustion air channel.

[0034] In one embodiment each inlet opening bounds the beginning of its own inlet channel, as a result of which in case of various side wind directions the fresh combustion air can be driven in the combustion air channel.

[0035] In one embodiment the centre of the inlet opening, considered in circumferential direction about the centre line, has a staggered position with respect to the centre of the first outlet opening and/or second outlet opening. A short vertical fall wind on the roof passage leads the flue gas around the inlet opening, as a result of which the flue gas is not returned to the combustion appliance.

[0036] In the embodiment having several outlet openings and inlet openings the first inlet openings and/or second outlet openings on the one hand and the inlet openings on the other hand for that purpose have alternating positions considered around the centre line.

[0037] In one embodiment the first and second outlet openings, considered in the direction of the centre line, are situated straight below one another. Rising flue gas can in that case be emitted during a short fall wind via the second outlet opening instead of via the first outlet opening by only deflecting in a vertical plane within the end section.

[0038] Accumulation of flue gas between the first and second outlet opening during a transition from a rising wind to a fall wind can be counteracted when the first and second outlet channel merge into each other considered in the direction of the centre line.

[0039] In particular the inlet opening and the first outlet opening and/or inlet opening and the second outlet opening can be spaced apart from each other considered in the direction of the centre line.

[0040] The distribution of the flue gas over the outlet channels, such as the first and second outlet channels can be enhanced when the end section is provided with a central distribution chamber between the flue gas channel and the outlet channels.

[0041] In one embodiment the end section, considered in the direction of the centre line over the length adjacent to the first outlet opening and the inlet opening, at least in cross-section transverse to the centre line, has a constant main contour at the outside. In the upright roof passage this ensures an even longitudinal flow of wind, which is aerodynamically advantageous, particularly in case of side wind or wind ascending along a roof. A return flow of flue gas to the combustion air channel can as a result be counteracted.

[0042] Alternatively or additionally the end section, considered in the direction of the centre line over the length adjacent to the first outlet opening and the second outlet opening, at least in cross-section transverse to the centre line, has a constant main contour at the outside.

[0043] Said aerodynamically advantageous properties can be achieved more particularly when the shaft between the end section and the placement part, considered in the direction of the centre line over its length, at

least in cross-section transverse to the centre line, has a constant main contour at the outside.

[0044] The aerodynamically advantageous properties are substantially the same in several wind directions when the roof passage over the said length has a straight, circle-cylindrical outer side.

[0045] In one embodiment the combustion air channel is bounded at the outside by the inside of the hollow shaft.

[0046] In one embodiment the flue gas channel and the combustion air channel extend concentrically with respect to each other through the shaft, wherein the combustion air channel preferably extends around the flue gas channel.

[0047] In one embodiment the roof passage is provided with at least one water separation wall which with a directional component transverse to the centre line extends over substantially the entire flow-through width of the combustion air channel, wherein with a directional component in the circumferential direction and a directional component parallel to the centre line the water separation wall extends downwards in the direction of the placement part. The water separation wall extends over the flow-through width and like a helical part runs circumferentially inclined through the combustion air channel, as a result of which precipitation entering via the inlet opening will be able to meet the water separation wall in the path through the combustion air inlet and is able drop down on it. Passage of precipitation to the combustion appliance can thus be counteracted.

[0048] In a manufacturing-technically advantageous embodiment the water separation wall is substantially straight plate-shaped or formed out of a straight plate.

[0049] In one embodiment the combustion channel is provided with several water separation walls, wherein in a projection parallel to the centre line the water separation walls partially overlap each other. The overlap in the downwardly inclined water separation walls ensures that precipitation descending vertically always ends up on at least one of the water separation walls.

[0050] The precipitation ended up on the water separation wall can be discharged therefrom when the water separation wall at its outer end that is oriented towards the covering part has been provided with a raised retaining wall for guiding water in the direction of the inner wall of the shaft.

[0051] In one embodiment the hollow shaft is provided with at least one through-going drainage opening for the discharge of water from the combustion air channel.

[0052] In one embodiment at its inside the hollow shaft is provided with a circumferential gutter extending in the combustion channel and connected to the drainage opening. In that way precipitation can then descend all round along the inside of the hollow shaft and end up in the gutter.

[0053] The aspects and measures described in this description and the claims of the application and/or shown in the drawings of this application may where possible also be used individually. Said individual aspects

and other aspects may be the subject of divisional patent applications relating thereto. This particularly applies to the measures and aspects that are described per se in the sub claims.

SHORT DESCRIPTION OF THE DRAWINGS

[0054] The invention will be elucidated on the basis of a number of exemplary embodiments shown in the attached drawings, in which:

Figure 1 shows an isometric view of a first roof passage according to the invention, placed on a placement part;

Figures 2A-2C show an isometric side view, an isometric diagonal top view and a straight top view of the roof passage according to figure 1, without the placement part;

Figures 3A-3C show an isometric side view, an isometric diagonal top view and a straight top view of the roof passage according to figure 2, of which the hood has been removed;

Figure 4 shows a longitudinal section of the roof passage according to the preceding figures, in which a first internal precipitation separator is visible; and

Figures 5A and 5B show isometric views of the precipitation separator according to figure 4 in two rotational positions about the centre line of the roof passage;

Figure 5C shows a top view of the precipitation separator according to figure 4;

Figure 6 shows an isometric side view of a second roof passage according to the invention;

Figure 7 shows a longitudinal section of the roof passage according to figure 6, in which a second internal precipitation separator is visible;

Figures 8A and 8B show an isometric view and a top view of the precipitation separator according to figure 7;

Figure 9 shows an isometric side view of a third roof passage according to the invention;

Figure 10 shows a longitudinal section of the roof passage according to figure 9, in which a third internal precipitation separator is visible; and

Figures 11A and 11B show an isometric view and a top view of the precipitation separator according to figure 10.

DETAILED DESCRIPTION OF THE DRAWINGS

[0055] Figure 1 shows a first roof passage 10 according to the invention. The first roof passage 10 made of synthetic material has been inserted through a tile-shaped placement part or covering part 1 known per se on a pitched roof (not shown) of a building, wherein the first roof passage 10 with its centre line S vertically oriented, supports on the raised edge of a footing 2 of the placement part 1. In figures 2A-2C the first roof passage 10 is shown without the placement part 1. Figure 4 shows a longitudinal section as a result of which the inside is visible.

[0056] The first roof passage 10 is intended to be connected to a so-called closed combustion appliance having a combustion air supply and a flue gas discharge, such as a gas-fired or oil-fired high efficiency boiler for central heating. The first roof passage 10 is provided with a straight, circle-cylindrical inner pipe 11 bounding a flue gas channel 12, and a shaft or first outer pipe 20 extending concentrically around it, and a second outer pipe 21 which in cooperation with the inner pipe 11 bound an air inlet channel 23. The first outer pipe 20 is partially inserted in a coupling sleeve 24 which by means of a circumferential bridge 22 is connected to the second outer pipe 21. The second outer pipe 21 and the coupling sleeve 24 together with the circumferential bridge 22 bound a circumferential drainage gutter 27 having drainage openings 28 all round in the second outer pipe 21. The second outer pipe 21 and the coupling sleeve 24 together with the circumferential bridge 22 bound a circumferential insertion space 29 for the raised edge of the footing 2.

[0057] At the upper side the first roof passage 10 comprises an end section 40 having a straight, circle-cylindrical circumferential wall 41 which has been fittingly placed over a narrowing 30 of the second outer pipe 21, wherein the narrowing 30 has been provided with self-locking snap cams 31 which when placing the end section on top have ended up in openings intended for that purpose in the circumferential wall 41. At the bottom side, the circumferential wall 41 is positioned so as to butt all round on the second outer pipe 21 and has the same outer diameter as the second outer pipe 21. As a result the first roof passage 10 over its entire outer side over the length, has the same constant outer contour or outer circumference, in this example circular, which can already be seen from a great distance.

[0058] As is clearly shown in figure 3B at its upper side the circumferential wall 41 is provided with four recesses 42 distributed in the circumference ending in the upper end of the end section 40, which recesses considered in a planar working drawing of the circumferential wall 41 have similarly shaped rectangular contours. As a result four similarly shaped battlements 43 have been defined all round in the circumferential wall 41, which battlements bound the circular outer contour of the circumferential wall 41. The battlements 43 on both sides merge into axially and radially oriented partitions 45 that are con-

nected to recessed and axially extending channel walls 44 that have a constant curve with respect to the centre line S of the roof passage 10.

[0059] The end section 40 has been provided with a hood 60 which has been taken off and then shown upside down in figure 3B. The hood 60 comprises a central upper wall 61 which considered from the upper side has a convex bulge within a circumferential circle. Around the upper wall 61 four similarly shaped side hood members 62 have been provided that have been distributed all round. The side hood members 62 each comprise a straight upper wall 63 that extends radially and in circumferential direction, and which forms a continuation of the convex upper wall 61, an axially extending outer wall 66 following the curve of the upper wall 63, two axially and radially extending side walls 64 that are connected to the outer wall 66 and the upper walls 63, and partition walls 65 extending axially and in circumferential direction that are connected to the upper wall 61 and the side walls 64. At the inside of the side hood members 62 a straight partition 67 that is connected to the outer wall 66 extends between the side walls 64. In the placed condition of the hood 60 the side hood members 62 are situated in a fitting manner between the battlements 43, wherein the upper walls 63 in axial direction are positioned a few centimetres above the outer ends of the battlements 43. The battlements 43 in cooperation with the partition walls 65 of the hood 60 bound four first flue gas outlets 55 extending parallel to the centre line S at the outside and which end at the outer end of the roof passage 10, and the free bottom sides of the outer walls 66 of the hood 60 within the four recesses 42 bound four similarly shaped combustion air outlets 53.

[0060] The circumferential wall 41 of the end section 40 in this example is provided with four second flue gas outlets 56 straight below the battlements 43 which outlets in the working drawing of the circumferential wall 41 have a rectangular contour. At the inside the end section 40 has been provided with a straight circle cylindrical centre bush 46. Said centre bush 46 is borne at the outside by the radially oriented partitions 45, at the upper side by four walls 54 deflecting according to a smooth curve towards the recessed channel walls 44, and at the bottom side by four bottom walls 49 which at their sides are connected to the radial partitions 45 and which extend to the centre bush 46 from the long lower edge of the second flue gas outlets 56 and transverse to the centre line S. At the opposite outer side the deflecting walls 54 have been provided with orienting partitions 47 oriented radially to the combustion air outlets 53.

[0061] In the middle bush 46 drainage openings 48 have been provided bordering the radial partitions 45 and the bottom walls 49. From the long upper edge of the openings of the second flue gas outlets 56 in radial inward direction downwardly inclined and oriented orienting partitions 50 extend which at the sides are connected to the radial partitions 45 and which with the free edge facing away from the second flue gas outlet 56 are spaced apart from the centre bush 46 in order to keep a vertical pas-

sage open. The centre bush 46 has been placed in the inner pipe 11, wherein the centre bush 46 at a short distance from the lower edge has been provided with self-locking snap cams (not shown) which have ended up in openings in the inner pipe 11.

[0062] As shown in figure 4 the first roof passage 10 has been provided with a first internal precipitation separator 70 made of synthetic material. The first precipitation separator 70 comprises a straight cylinder 71 that has been placed or slid around the inner pipe 11, and two half moon-shaped, substantially straight guide plates 72. The guide plates 72 have a bent inner edge 77 along which the guide plates 72 are connected to the straight cylinder 71 in a watertight manner, a bent outer edge 76 that fittingly abuts the inner side of the second outer pipe 21, a straight pilot edge 78 and a straight end edge 79. In a longitudinal section A according to a plane comprising the centre line S, at the location of halfway the length of the guide plates 72, the guide plates 72 over the flow-through width of the air inlet channel 23 are substantially transverse to the centre line S.

[0063] Considered from the pilot edge 78 to the end edge 79, the guide plates 72 enclose the centre line S of the roof passage 10. As a result the guide plates 72 each form a helical part, screw part or spiral part in the air inlet channel 23. Considered in top view according to the centre line S as shown in figure 5C an overlap is present at the location of the end edges 78, 79. The end edges 79, that form the lowest point of the guide plates 72, have been provided with a retaining wall 75 extending in axial and radial direction and downwardly descending in the direction of the bent outer edge 76. The precipitation separator 70 is positioned on the coupling sleeve 26 of the second outer pipe 21, so that the lowest outer ends of the retaining walls 75 are positioned straight above the circumferential drainage gutter 27.

[0064] The roof passage 10 is adapted for under various wind conditions leading flue gas to the outside and guiding fresh combustion air to the inside without mixing it to a considerable extent with the emitted flue gas around the end section 40. In figure 1 two critical wind conditions are shown.

[0065] The first critical wind condition regards an upwardly inclined wind W1 along the roof surface. In that case the heated flue gasses, as shown in figure 3B, due to thermal go in upward direction C through the inner pipe 11 and within the end section 40 are driven and distributed radially to the outside to leave the first roof passage 10 via the uppermost first flue gas outlets 55 in direction C. Without mixing with the outgoing flue gasses, fresh combustion air is able to enter in direction B via the air inlets 56 situated below there and guided by the orienting partitions 47 and via the outside of the deflecting walls 54 be passed vertically to the air inlet channel 23. Within the second outer pipe 21 due to the guide plates 72 of the first precipitation separator 70, the air flow is subjected to approximately half a turn over one of the guide plates 72 in order to subsequently continue its way within

the first outer pipe 20 in substantially vertical direction through the air inlet channel 23.

[0066] The second critical wind condition regards a vertical fall wind W2. The fresh combustion air then follows the same route in direction B as described above. The heated flue gasses moving upwards in direction D through the inner pipe 11 due to thermal, however, experience a counter-pressure due to the fall wind W2, as a result of which within the end section 40 the flue gasses are driven and distributed radially to the outside in order to be deflected downwards in direction D and leave the roof passage 10 via the second flue gas outlets 56 situated below the air inlets 53. Also due to the staggered position in circumferential direction of the combustion air inlets 53 and the second flue gas outlets 56 there is hardly any mixing of flue gas with fresh combustion air.

[0067] Precipitation that ends up in the end section 40 via the first flue gas outlets 55 or second flue gas outlets 56, is drained over the descending orienting partitions 50 and bottom walls 49 and through the drainage openings 48 in the centre bush 46 and the consecutive inner pipe 11. The closed combustion appliance connected to the first roof passage 10 is adapted for swallowing this water. Precipitation ending up in the end section 40 via the air inlets 53, in direction E always meets at least one of the guide plates 72 that overlap each other partially in vertical projection. The precipitation thus runs in direction E over the guide plates 72, wherein it is either passed radially to the outside against the inner wall of the second outer pipe 21, or runs further over the guide plate 72 in question until it is passed against the inner wall of the second outer pipe 21 by the retaining wall 75. In both cases the precipitation ends up in the circumferential drainage gutter 27 in order to leave the second outer pipe 21 and therefore the air inlet channel 23 in direction E via the drainage openings 28. The precipitation continues its way unhindered via the outer side of the placement part 1.

[0068] Considered in the direction of the centre line S, the first flue gas outlets 55 and the second flue gas outlets 56 are spaced apart, in this example even straight below one another, wherein considered in the same direction the combustion air inlets 53 are situated between the first flue gas outlets 55 and the second flue gas outlets 56. Therefore even under the said critical wind condition there is an acceptably low recirculation of flue gas as combustion gas. This effect is achieved under an acceptable height H of the lowest second flue gas outlets 56, which height H is dictated by the prescribed maximum snow height on the roof under which the combustion appliance connected to the roof passage 10 should still be able to work safely.

[0069] In this example the end section 40 has a straight circle-cylindrical outer contour. Alternatively the end section 40 has a conical shape wherein in cross-section transverse to the centre line S it has a constant shape, for instance circular again. Alternatively the end section in this cross-section is square with bevelled corners.

[0070] Figure 6 shows a second roof passage 110 ac-

cording to the invention. The second roof passage 110 made of synthetic material is inserted in the same way through the placement part or covering part 1 (not shown) as the first roof passage 10 is, so that the centre line S is vertically oriented. Figure 7 shows a longitudinal section as a result of which the inner side is visible.

[0071] The second roof passage 110 is intended to be connected to a closed combustion appliance. The second roof passage 110 is provided with a straight, circle-cylindrical inner pipe 111 bounding a flue gas channel 112, and a shaft or first outer pipe 120 extending concentrically around it, and a second, upwardly slightly conically widening outer pipe 121 which in cooperation with the inner pipe 111 bound an air inlet channel 123. The first outer pipe 120 is partially inserted in a coupling sleeve 124 which by means of a circumferential bridge 122 is connected to the second outer pipe 121. The second outer pipe 121 and the coupling sleeve 124 together with the circumferential bridge 122 bound a circumferential drainage gutter 127 having drainage openings 128 all round in the second outer pipe 121. The second outer pipe 121 and the coupling sleeve 124 together with the circumferential bridge 122 bound a circumferential insertion space 129 for the raised edge of the footing 2.

[0072] At the upper side the second roof passage 110 comprises an end section 140. The end section 140 comprises a first end section member 143 and a second end section member 154 that have been secured onto each other. The first end section member 143 comprises a straight, circle-cylindrical first circumferential wall 141 that is fittingly placed over a narrowing 130 of the second outer pipe 121, and a straight, circle-cylindrical second circumferential wall 144 that are kept at a fixed distance from each other in order to bound a circumferential series of air inlet openings 153 between them.

[0073] The first end section member 143 is provided with a centre bush 146 which at the lower side is straight circle-cylindrical to connect to the inner pipe 111, and which at the upper side deflects all round to the outside according to a smooth curve in order to connect to the lower edge of the second circumferential wall 144. The inner pipe 111 is connected to the first circumferential wall 141 by means of straight radial partitions 145. The radial partitions 145 also bear two radial orienting rings 149 that ensure the vertical division of the air inlet openings 153. The centre bush 146 is placed in the inner pipe 111, wherein at a short distance from the lower edge the centre bush 146 is provided with self-locking snap cams (not shown) that have ended up in the openings in the inner pipe 111.

[0074] The second end section member 154 comprises an upwardly slightly conically narrowing circumferential wall 156 that is fittingly placed over a narrowing 164 of the first end section member 143. The inner space forms a continuation of the flue gas channel 112 that ends under a hollow hood 160. The hood 160 is provided all round with vertical, slit-shaped flue gas outlet openings 161. The second end section member 154 can be

removed from the narrowing in order to place between the first end section member 143 and the second end section member 154, a straight, circle-cylindrical hollow extension piece (not shown) that is also provided with a narrowing at the upper side. In that way the distance between the flue gas outlet openings 161 and the air inlet openings 153 can be increased, for instance when heavy flue gasses are emitted that should not be allowed to circulate back via the air inlet openings either.

[0075] As shown in figure 7 the second roof passage 110 is provided with a second internal precipitation separator 170 that is made of synthetic material. The second precipitation separator 170 comprises a straight cylinder 171 that has been placed or slid around the inner pipe 111, and three guide plates 172. The guide plates 172 have an inner edge 177 that is circumferential according to a helix or screw of a constant pitch, along which inner edge the guide plates 172 are connected in a watertight manner to the straight cylinder 171, an outer edge 176 that is also circumferential according to a helix or screw and fittingly abuts the inner side of the widening second outer pipe 121, a straight pilot edge 178 and a straight end edge 179. In a longitudinal section A according to a plane comprising the centre line S, the guide plates 172 over the flow-through width of the air inlet channel 123 are substantially transverse to the centre line S. The guide plates 172 traverse at least half a revolution around the centre line S, and therefore enclose the centre line S of the roof passage 110 considered from the pilot edge 178 to the end edge 179. The guide plates 172 thus each form a helix part or screw part of a constant pitch in the air inlet channel 123. In top view, considered according to centre line S as shown in figure 8B, an overlap is present at the location of the pilot edges 178 and the end edges 179. The end edges 179, forming the lowest point of the guide plates 172, have been provided with a raised retaining wall 175 extending in radial direction, in order to form a drainage gutter that is horizontal or situated slightly at a fall towards the outside. The second precipitation separator 170 sits on the coupling sleeve 126 of the second outer pipe 121, so that the lowest outer ends of the end edges 179 and the retaining walls 175 are straight above the circumferential drainage gutter 127.

[0076] Precipitation that ends up in the end section 140 via the flue gas outlets 161, is drained in the centre bush 146 and the consecutive inner pipe 111. The closed combustion appliance connected to the second roof passage 110 is adapted for swallowing this water. Precipitation ending up in the end section 140 via the air inlets 153, in direction E always meets at least one of the guide plates 172 that partially overlap each other in vertical projection. The precipitation thus runs in direction E over the guide plates 172, wherein it is passed either radially to the outside against the inner wall of the second outer pipe 121 or runs further down the guide plate 172 in question until it is passed against the inner wall of the second outer pipe 121 by the retaining wall 175. In both cases the precipitation ends up in the circumferential drainage gutter

127 in order to leave the second outer pipe 121 and therefore the air inlet channel 123 in direction E via the drainage openings 128. The precipitation then continues its way unhindered via the outside of the placement part 1. The combustion air taken in via the air inlets 153 at the location of the second precipitation separator 170 is subjected to amply half a screw motion in direction B, in which the air experiences a relatively low resistance because it regards a passage over a track with a substantially constant flow-through surface.

[0077] Figure 9 shows a third roof passage 210 according to the invention. The third roof passage 210 made of synthetic material is inserted through the placement part or covering part 1 (not shown) in the same way as the first roof passage 10, so that the centre line S is vertically oriented. Figure 10 shows a longitudinal section as a result of which the inner side is visible.

[0078] The third roof passage 210 is intended to be connected to a closed ventilation system. The third roof passage 210 is provided with a straight, circle-cylindrical shaft or first pipe 220, and a second, upwardly slightly conically widening pipe 221 together bounding a ventilating duct 223. The first pipe 220 is partially inserted in a coupling sleeve 224 which by means of a circumferential bridge 222 is connected to the second pipe 221. The second pipe 221 and the coupling sleeve 224 together with the circumferential bridge 222 bound a circumferential drainage gutter 227 having drainage openings 228 all round in the second pipe 221. The second pipe 221 and the coupling sleeve 224 together with the circumferential bridge 222 bound a circumferential insertion space 229 for the raised edge of the footing 2.

[0079] At the upper side the third roof passage 210 comprises an end section 240. The end section 240 comprises a straight, circle-cylindrical first circumferential wall 241 that is fittingly placed over a narrowing 230 of the second pipe 221, and a convex hood 260 having at the lower side a straight, circle-cylindrical second circumferential wall 244 which by means of radial partitions 245 are kept at a fixed distance from each other in order to bound a circumferential series of air inlet openings 253 in between them. The radial partitions 245 also bear a radial orienting ring 249 that ensures the vertical division of the air inlet openings 253. Behind the air inlet openings 253 the first circumferential wall 241 is inwardly continued by means of a circumferential base 246 having the same shape as the orienting ring 249. The orienting ring 249 and the circumferential base 246 are smoothly upwardly oriented all round from the outside inwards in radial direction in order to by means of wind dropping in promote a natural upward draught in the ventilating duct 223.

[0080] As shown in figure 10 the third roof passage 210 is provided with a third internal precipitation separator 270 that is made of synthetic material. The third precipitation separator 270 is placed in its entirety in the ventilating duct 223. The third precipitation separator 270 comprises a slim straight base rod 271 and three guide plates 272. The guide plates 272 have an inner edge 277

that is circumferential according to a helix or screw of a constant pitch along which inner edge the guide plates 272 are connected in a watertight manner to the straight base rod 271, an outer edge 276 that is also circumferential according to a helix or screw and fittingly abuts the inner side of the widening second pipe 221, a straight pilot edge 278 and a straight end edge 279. In a longitudinal section A according to a plane comprising the centre line S the guide plates 272 over the flow-through width of the ventilating duct 223 are substantially transverse to the centre line S, within which a slight fall is possible in radial outward direction. The guide plates 272 traverse at least half a revolution around the centre line S, and therefore enclose the centre line S of roof passage 210 considered from the pilot edge 278 to the end edge 279. The guide plates 272 thus each form a helix part or screw part of a constant pitch in the ventilating duct 223. In top view considered according to the centre line S as shown in figure 11B, at the location of the pilot edges 278 and the end edges 279 slope radially. The third precipitation separator 270 sits on the coupling sleeve 226 of the second pipe 221, so that the lowest outer ends of the end edges 279 are straight above the circumferential drainage gutter 227.

[0081] Precipitation ending up in the end section 240 via the air inlets 253, in direction E always meets at least one of the guide plates 272 that overlap each other partially in vertical projection. The precipitation thus runs in direction E over the guide plates 272, wherein it is passed either radially to the outside against the inner wall of the second pipe 221, or runs further down the guide plate 272 in question until hanging from the end edge 279 it is passed against the inner wall of the second pipe 221. In both cases the precipitation ends up in the circumferential drainage gutter 227 in order to leave the second pipe 221 and therefore the air inlet channel 223 in direction E via the drainage openings 228. The precipitation continues its way unhindered via the outside of the placement part 1. The ventilation air emitted via the air inlets 253 at the location of the third precipitation separator 270 is subjected to amply half a screw motion in direction B, in which the air experiences a relatively low resistance as it regards a passage over a track having a substantially constant flow-through surface.

[0082] The above description is included to illustrate the operation of preferred embodiments of the invention and not to limit the scope of the invention. Starting from the above explanation many variations that fall within the spirit and scope of the present invention will be evident to an expert.

Claims

1. Roof passage for the passage of gasses through a roof, comprising a placement part to be placed on the roof, a hollow shaft extending from the placement part which shaft in the placed condition of the roof

passage with its centre line is substantially vertically oriented, a first gas channel extending through the shaft to an end section at the outer end of the shaft, a core extending parallel to the centre line and through which the centre line extends, and at least one water separation wall extending from the core with a directional component transverse to the centre line over substantially the entire flow-through width between the core and the circumferential boundary of the first gas channel, wherein with a directional component in the circumferential direction and a directional component parallel to the centre line the water separation wall extends downwards around the core in the direction of the placement part.

2. Roof passage according to claim 1, wherein the water separation wall is substantially straight plate-shaped or formed out of a straight plate.
3. Roof passage according to claim 1 or 2, wherein the water separation wall extends around the core according to a screw or helix.
4. Roof passage according to claim 3, wherein the water separation wall extends around the core according to a screw or helix of a constant pitch.
5. Roof passage according to any one of the preceding claims, wherein the first gas channel comprises several water separation walls around the core, wherein in projection parallel to the centre line the water separation walls partially overlap each other.
6. Roof passage according to any one of the preceding claims, wherein the water separation wall at its outer end that is oriented towards the placement part has been provided with an raised retaining wall for guiding water in the direction of the inner wall of the shaft.
7. Roof passage according to any one of the preceding claims, wherein at the inside the hollow shaft is provided with a circumferential gutter extending in the first gas channel, for the collection of water from the water separation wall, wherein the hollow shaft preferably is provided with at least one continuing drainage opening for the discharge of water from the circumferential gutter.
8. Roof passage according to claim 7, wherein at its bottom side the water separation wall is supported on or in the gutter.
9. Roof passage according to any one of the preceding claims, comprising a second gas channel extending through the hollow shaft separated from the first gas channel and through the core and the first gas channel extends concentrically around the second gas channel.

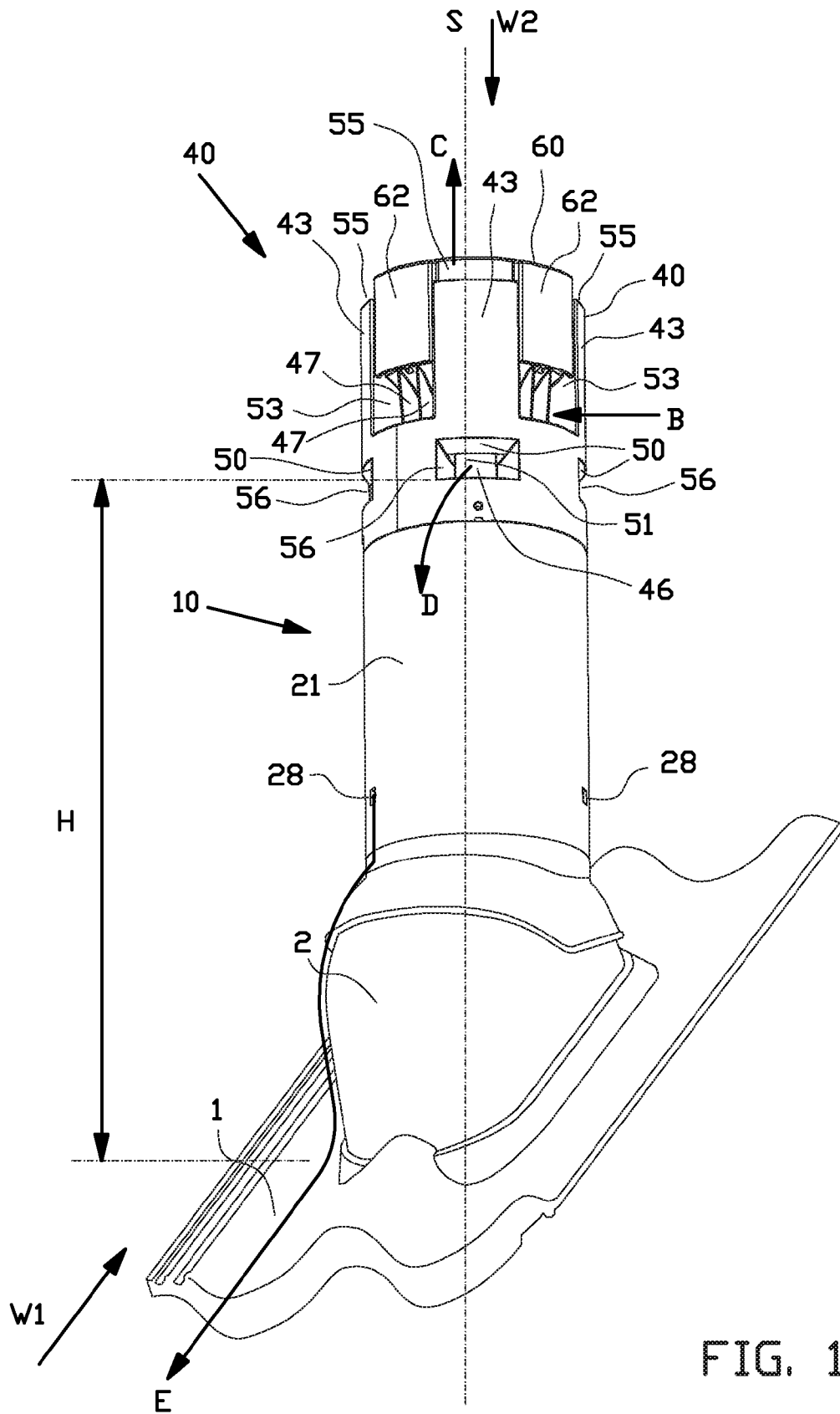
10. Roof passage according to any one of the preceding claims, wherein the water separation wall or water separation walls are fixedly connected to the core and form a separate precipitation separator with it that has been placed in the hollow shaft as an insert piece. 5
11. Roof passage according to claim 10, wherein the end section confines the precipitation separator in the hollow shaft. 10
12. Roof passage according to any one of the preceding claims, wherein the first gas channel is intended for discharge of inside air of a building in a manner so as to be directed upwardly to the outside. 15
13. Roof passage according to any one of the preceding claims, comprising only one gas channel extending substantially parallel to the centre line and being the first gas channel. 20
14. Roof passage according to claim 1-11, wherein the first gas channel is intended for outwardly directed discharge of flue gas from a combustion appliance and the second gas channel is intended for inwardly directed supply of combustion air to the combustion appliance. 25
15. Roof passage according to claim 14, wherein the end section is provided with a series of inlet openings extending around the centre line, for the inflow of combustion air substantially transverse to the centre line, and an air guiding wall which is oriented radially inwards from an upper boundary of the inlet openings and subsequently according to a smooth curve deflects to a direction parallel to the centre line. 30 35

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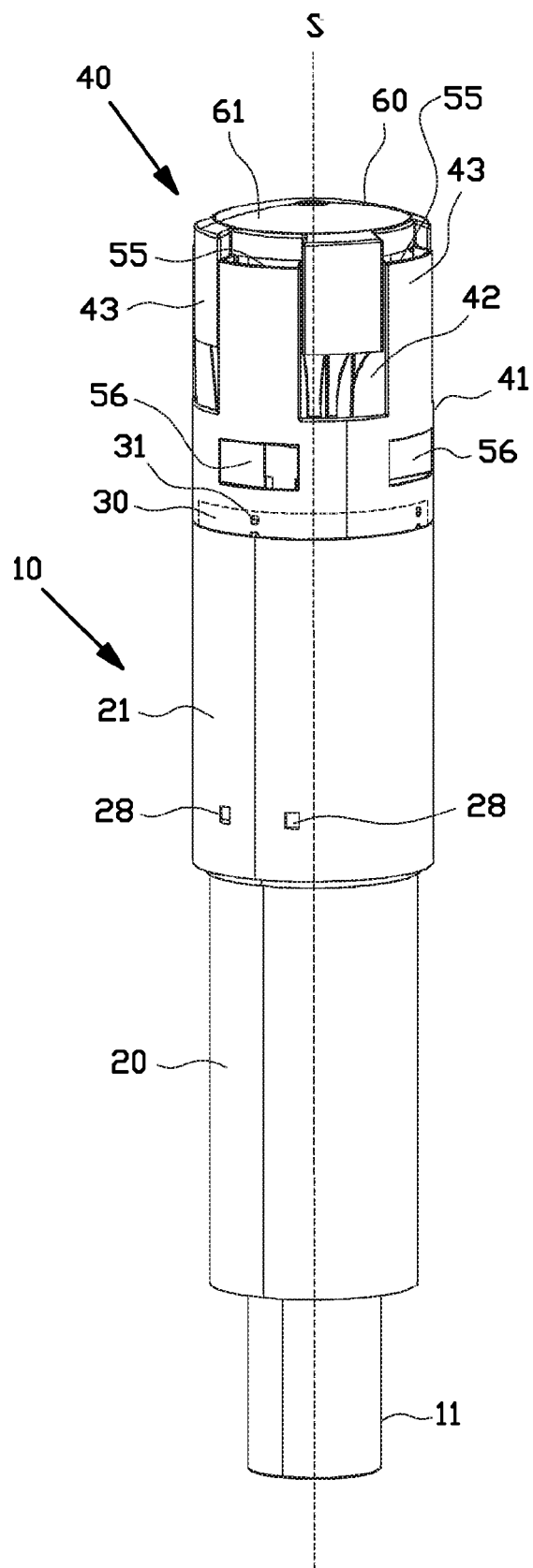
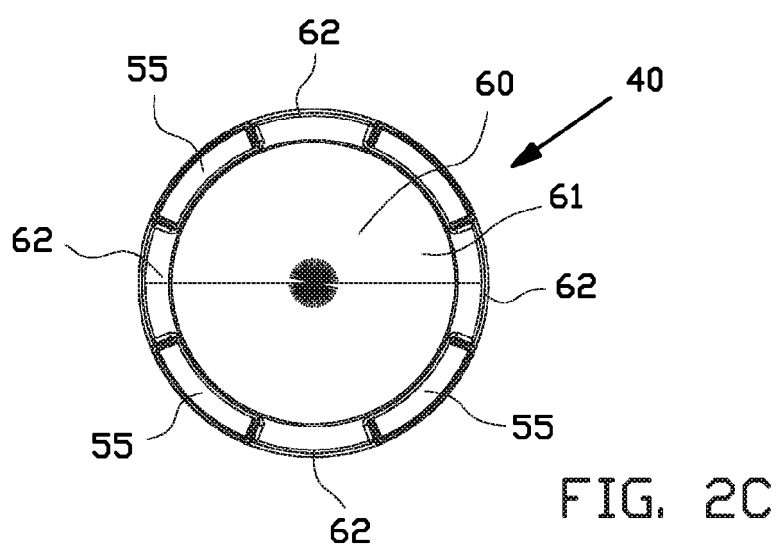
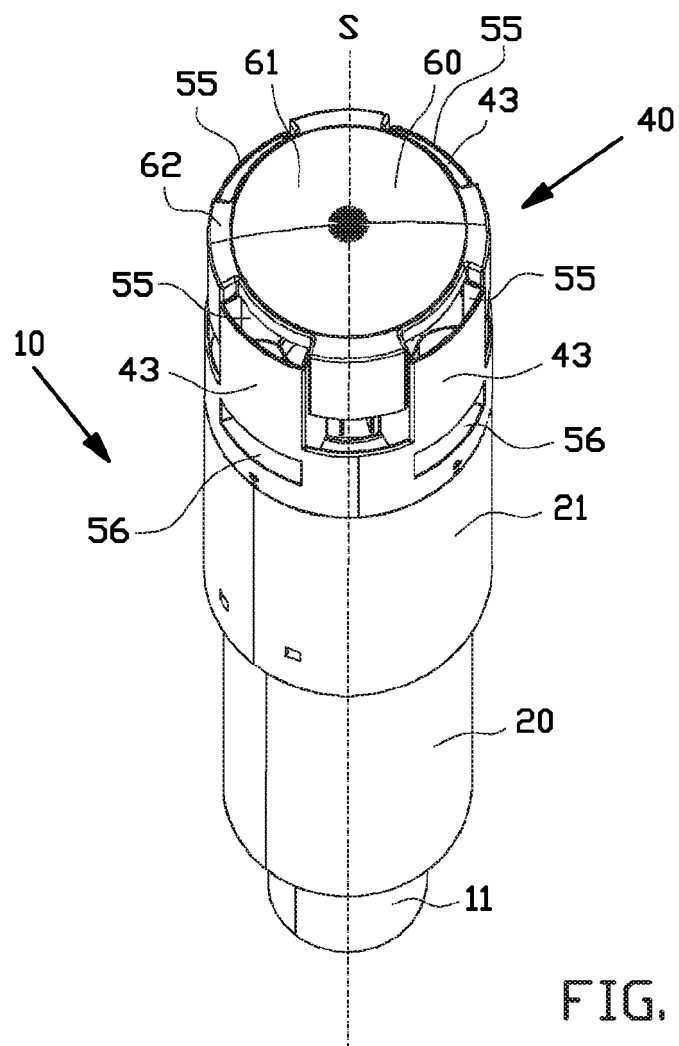


FIG. 2A



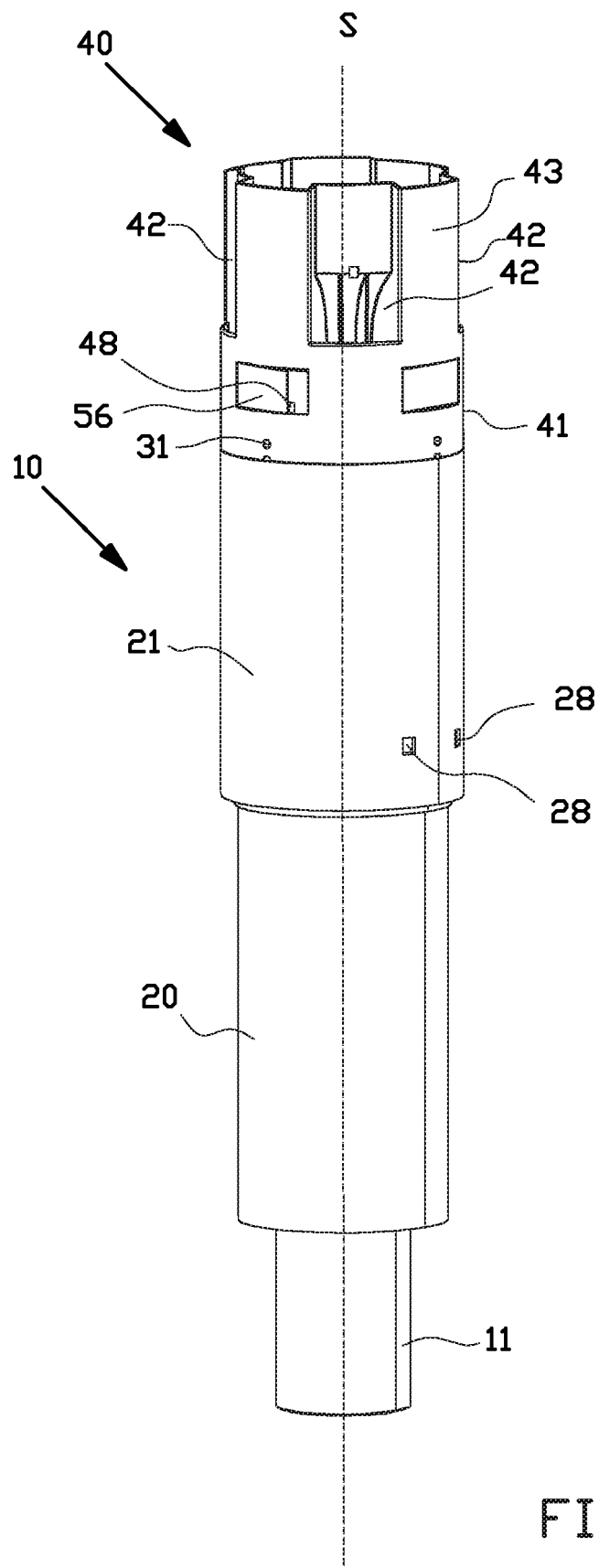


FIG. 3A

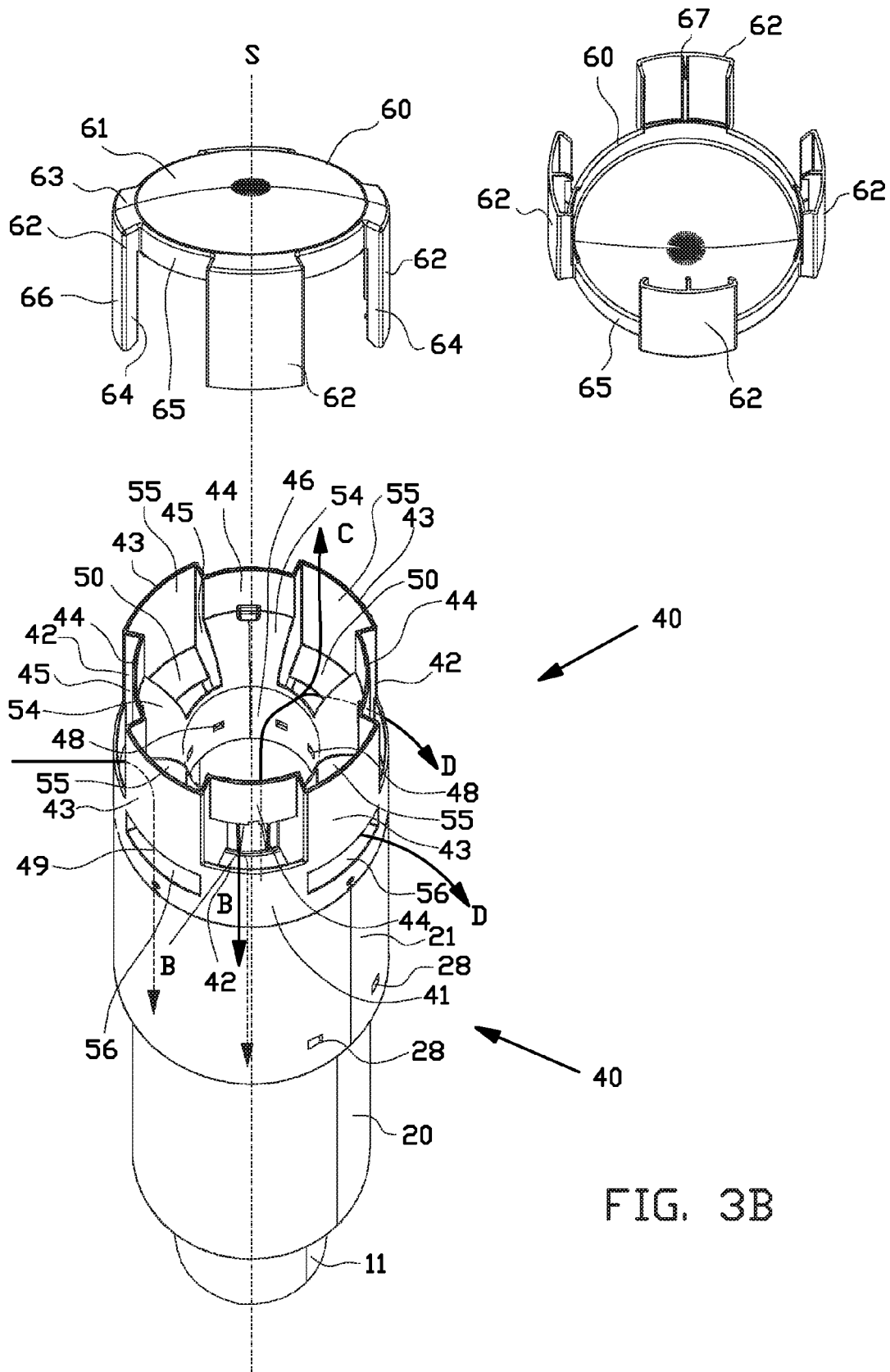


FIG. 3B

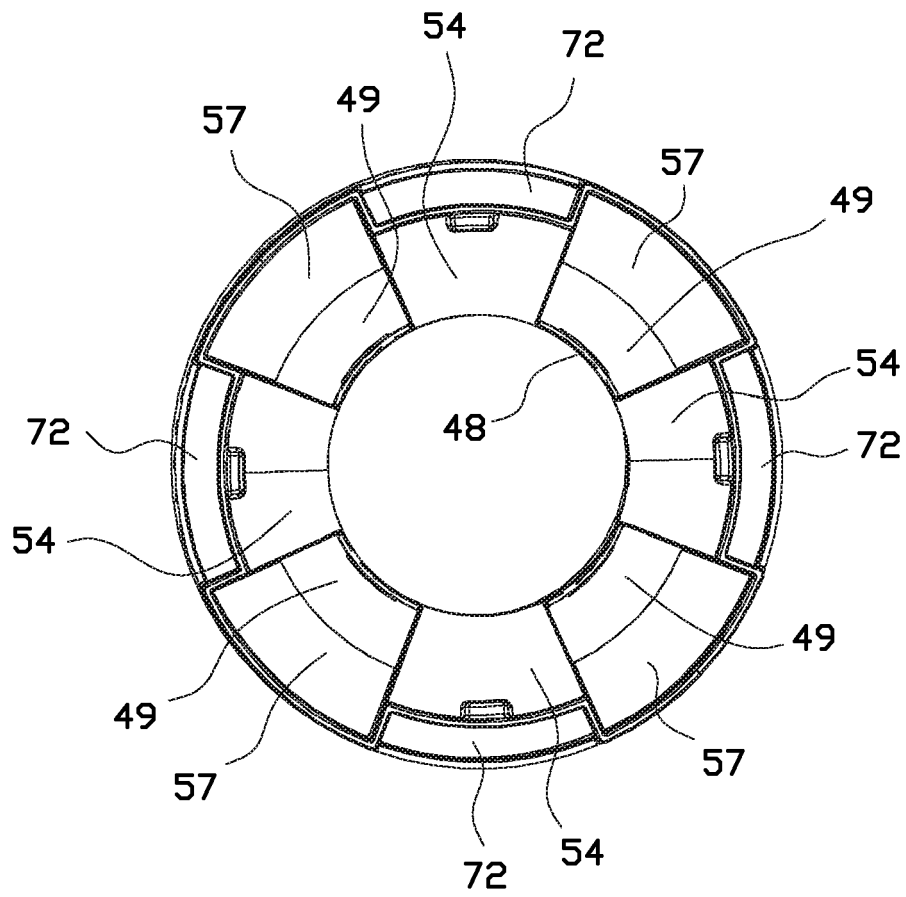
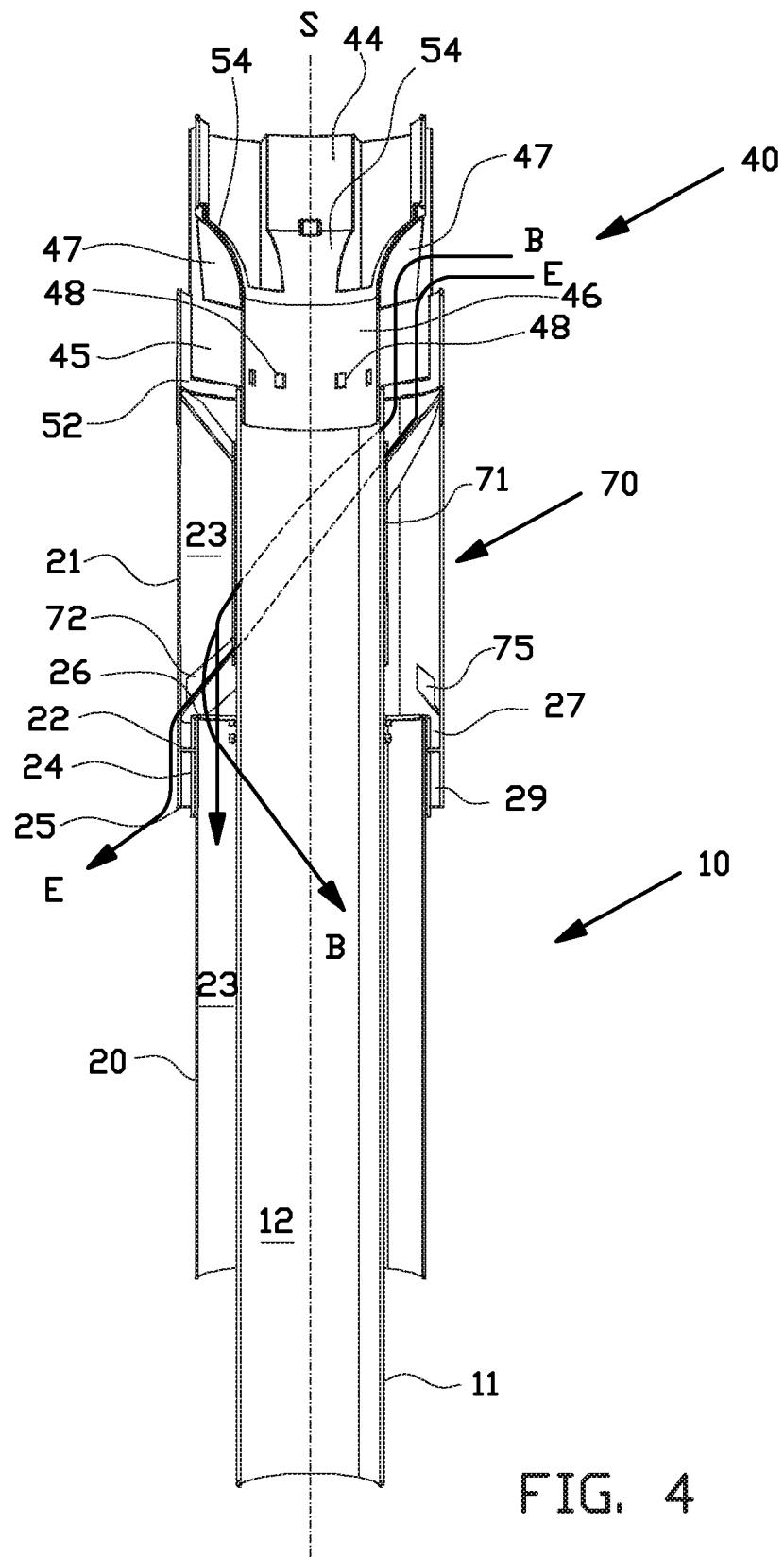
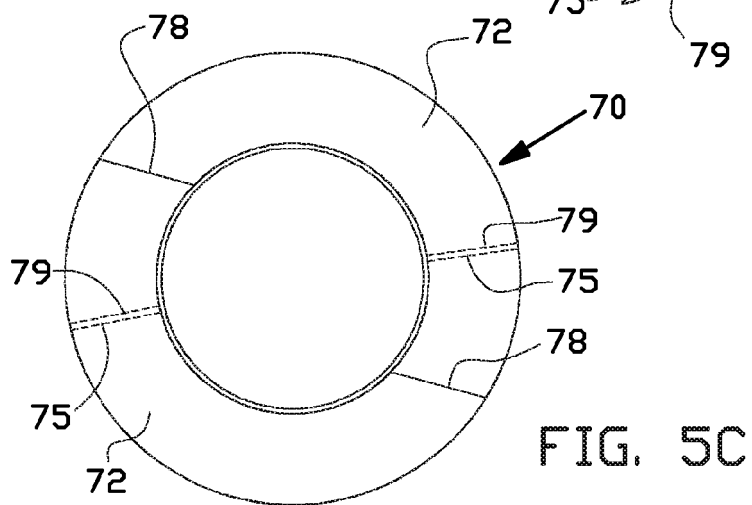
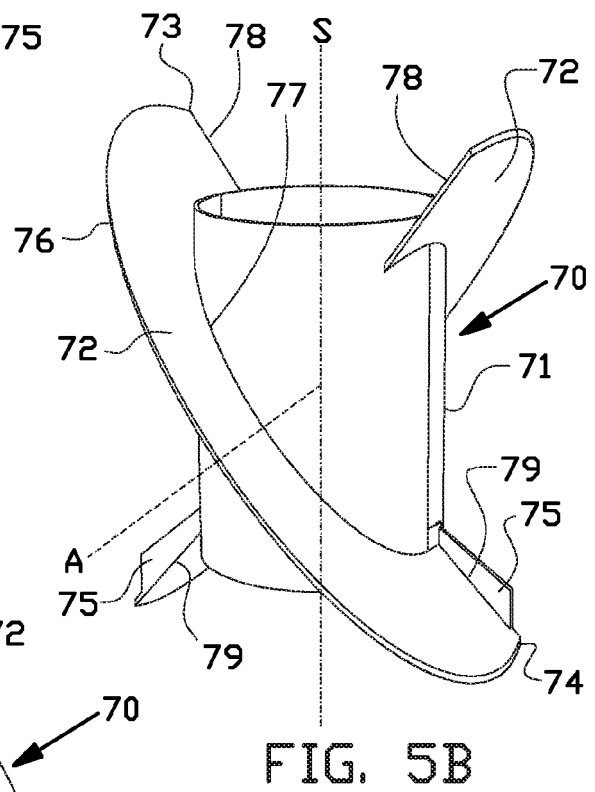
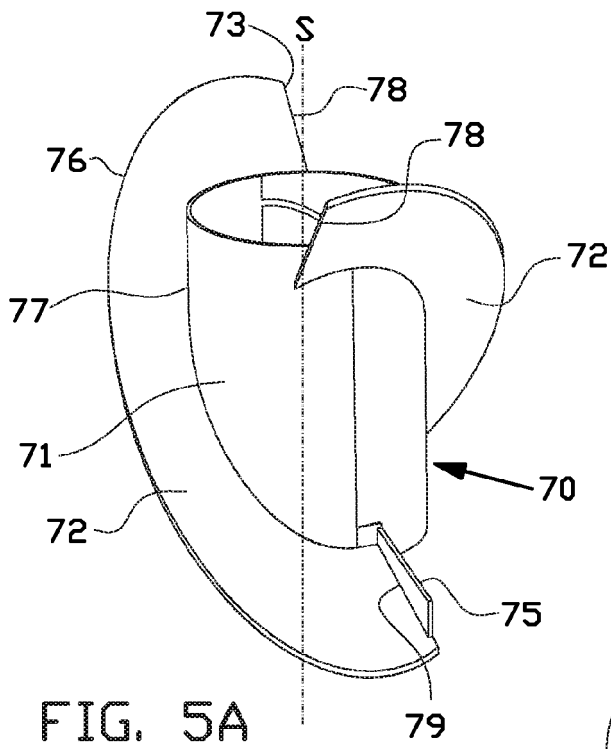


FIG. 3C





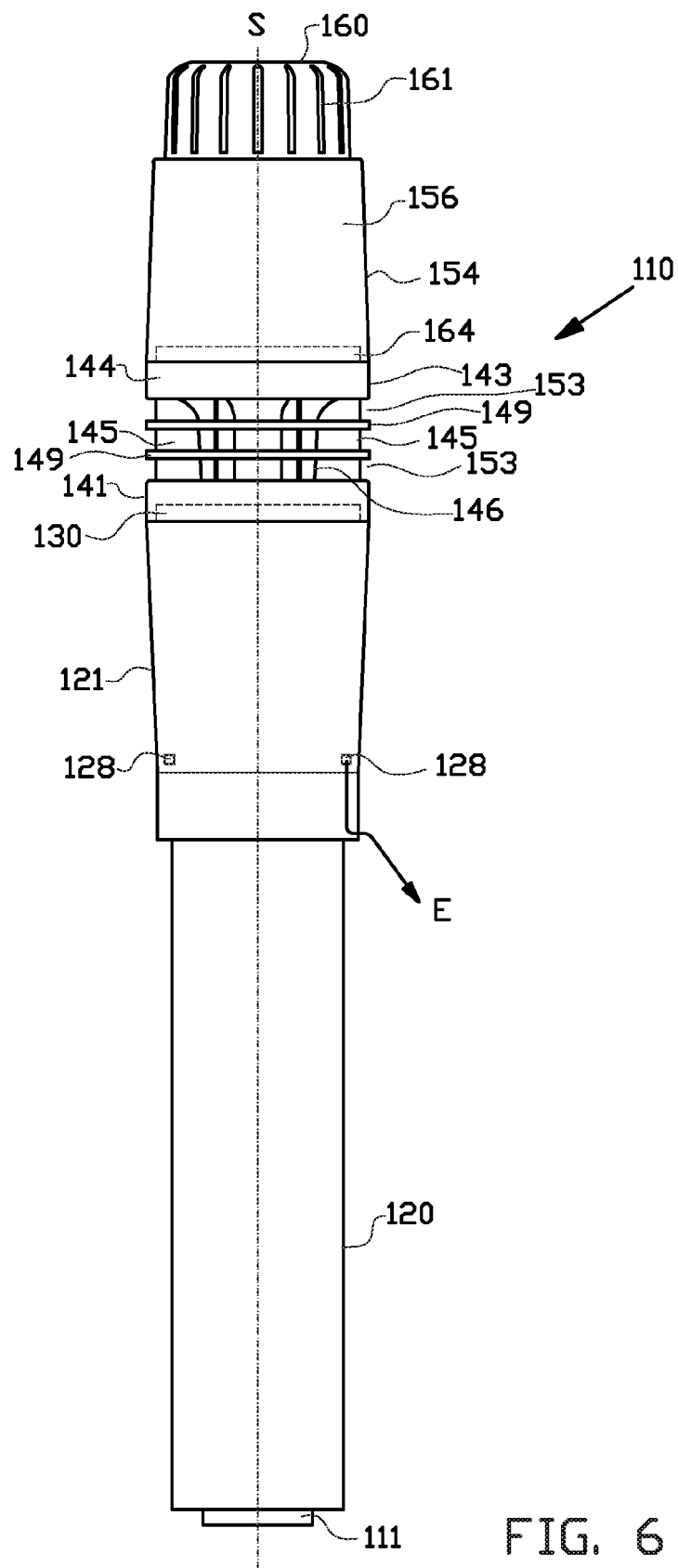


FIG. 6

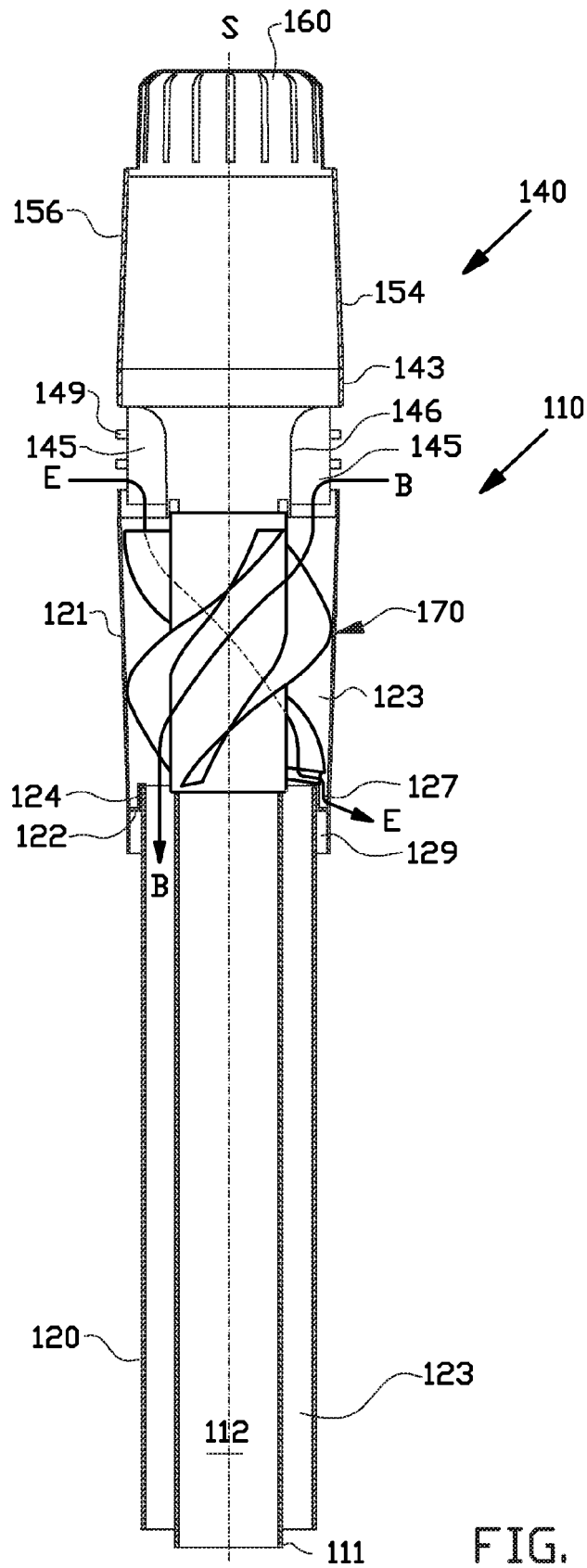


FIG. 7

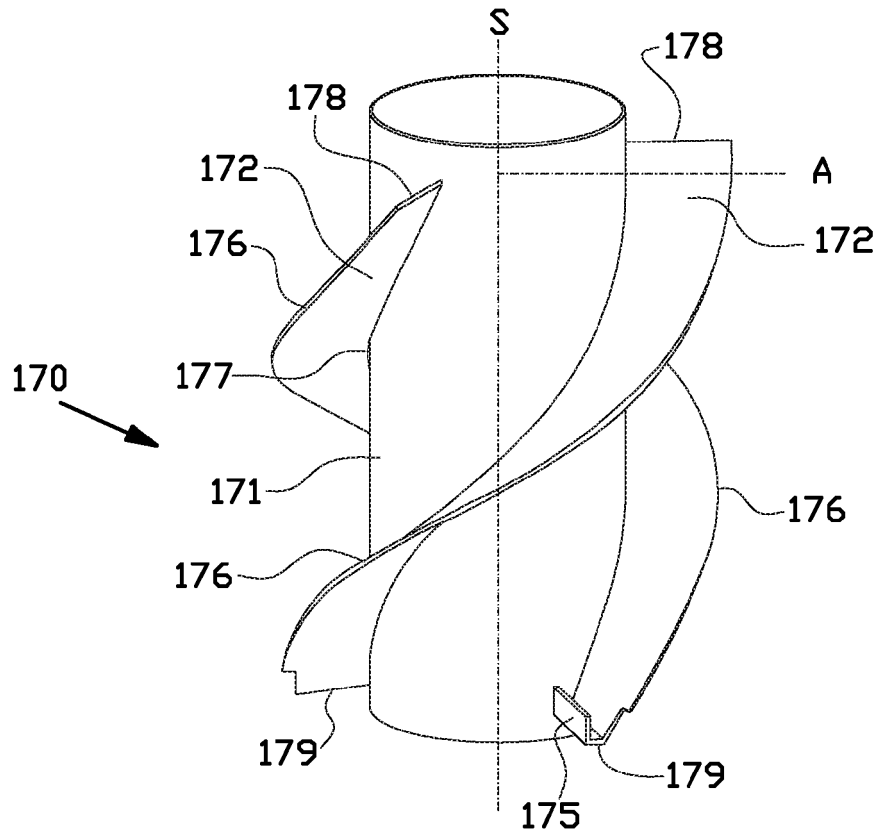


FIG. 8A

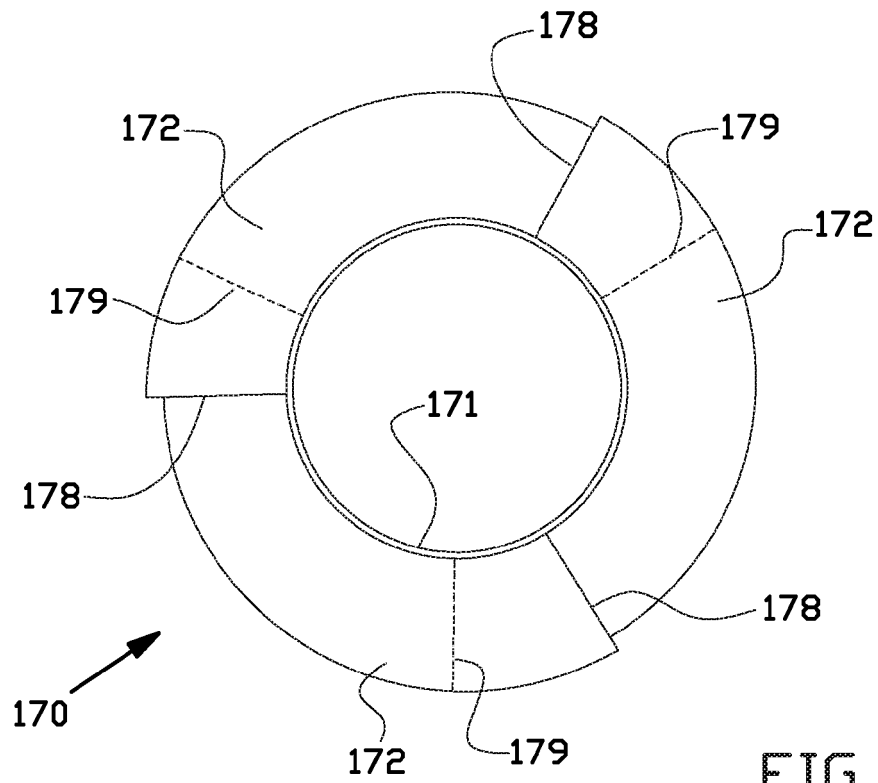


FIG. 8B

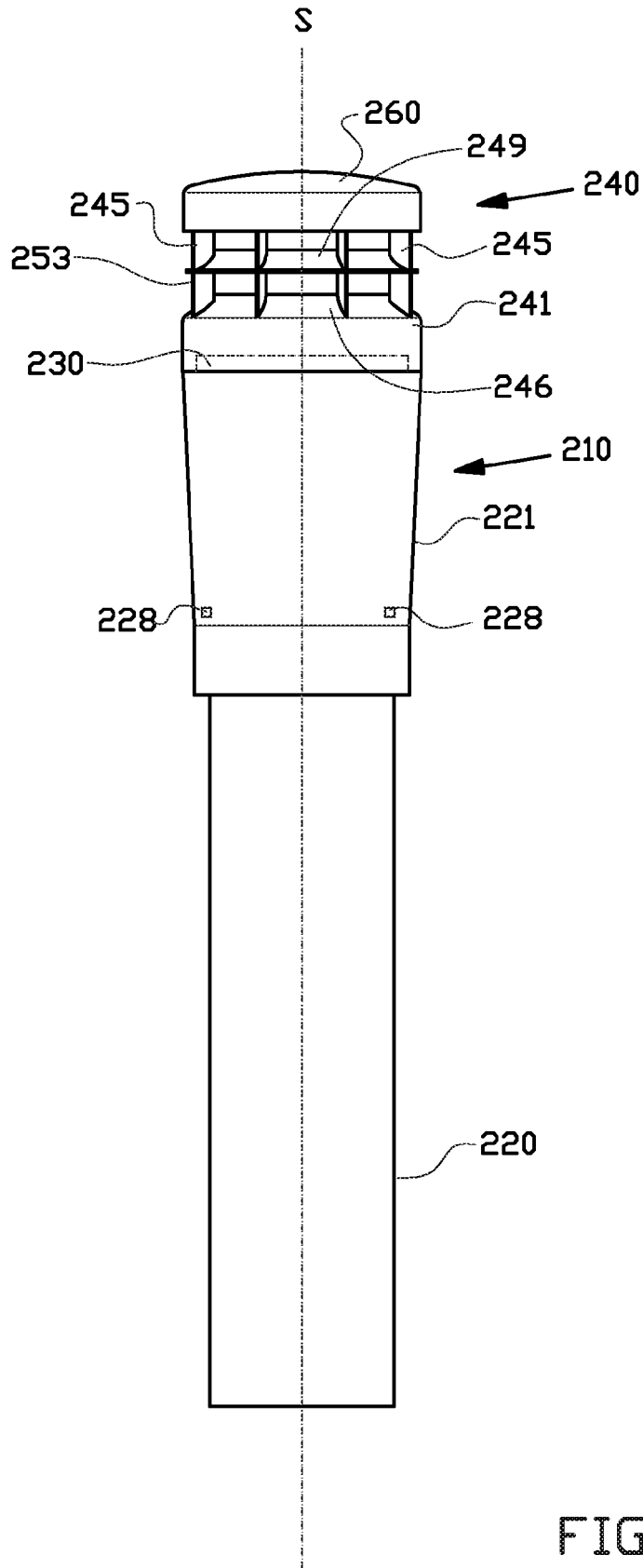
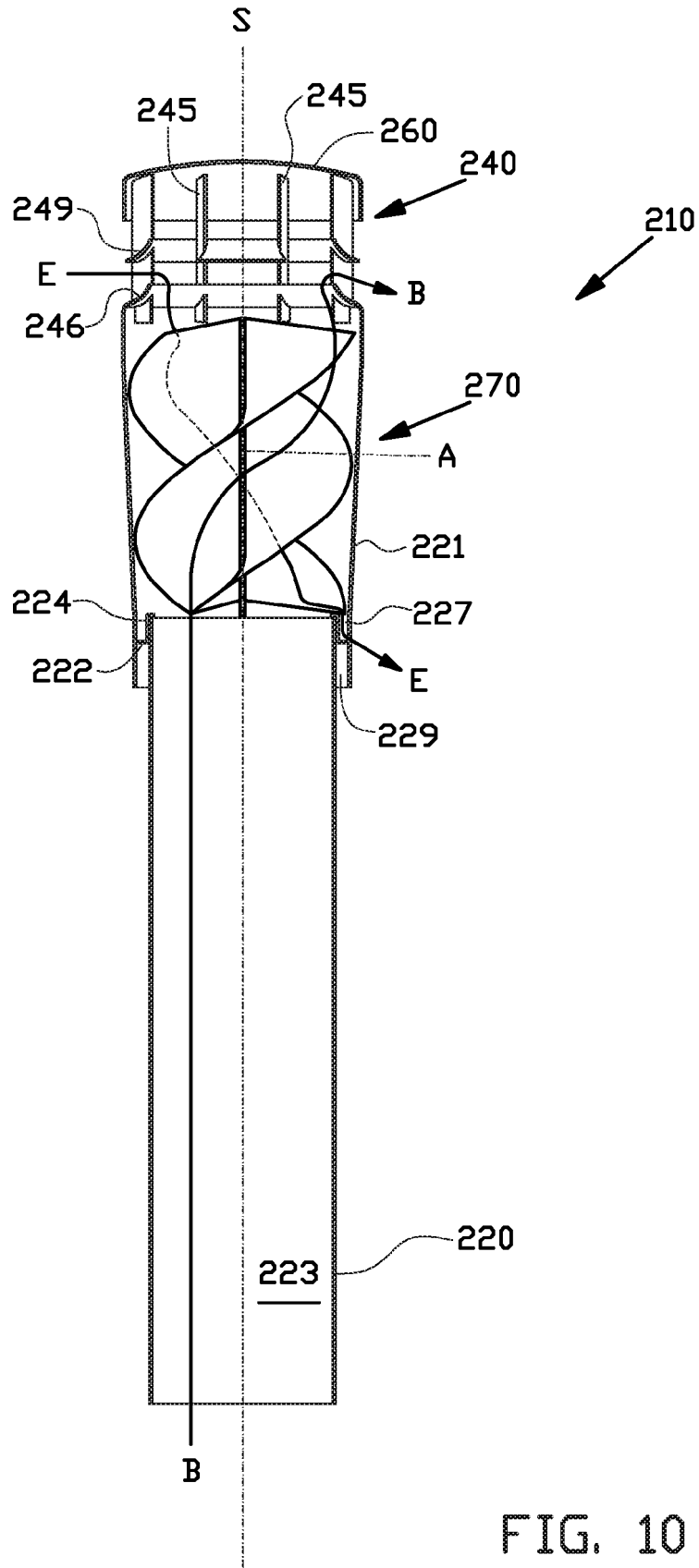
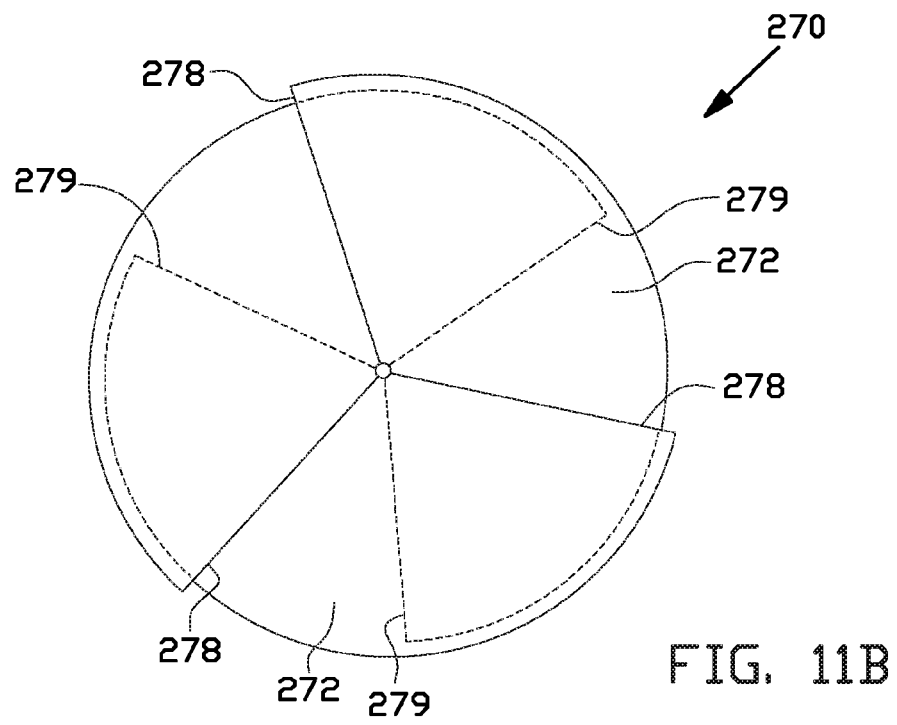
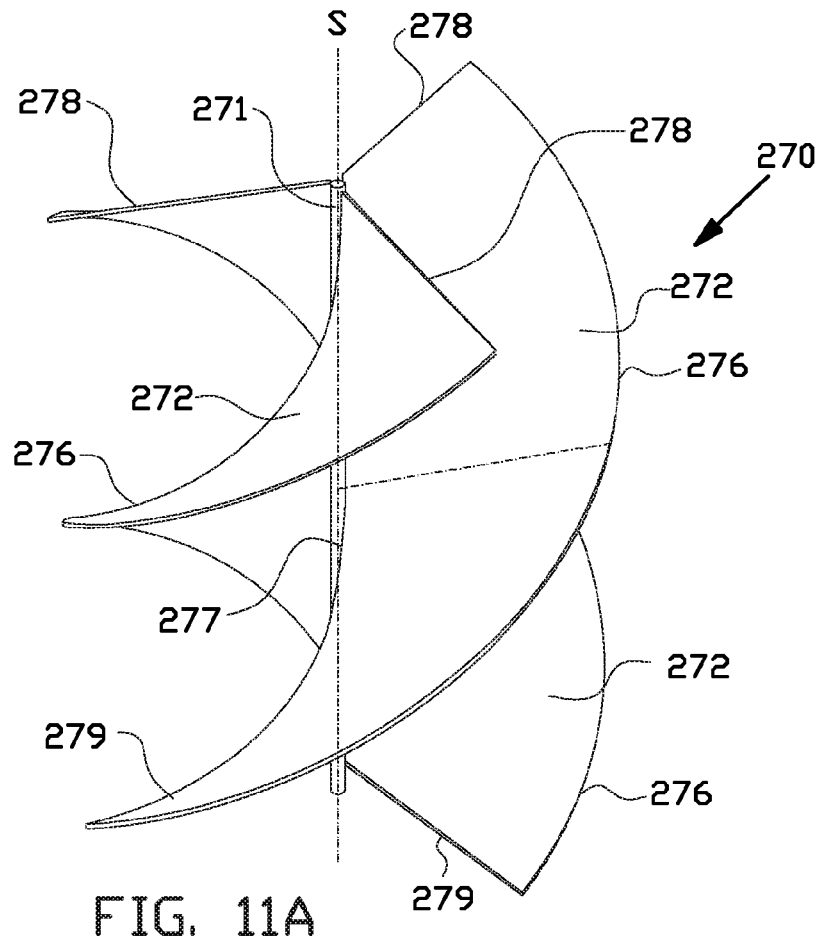


FIG. 9







EUROPEAN SEARCH REPORT

Application Number
EP 10 16 0058

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	GB 2 368 632 A (BERWICK CONSTRUCTION COMPANY [GB]) 8 May 2002 (2002-05-08) * page 5, line 28 - page 7, line 8; figures 3,4,5 *	1-4,6,7, 10,12,13	INV. F23L17/04 F23J13/02 F23L17/14 F23J13/08
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X	DE 103 11 451 A1 (BERNHARD POLL GMBH [DE]) 30 September 2004 (2004-09-30) * paragraphs [0022], [0023]; figures *	1-5,10, 12,13	
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Place of search The Hague		Date of completion of the search 2 August 2010	Examiner Coli, Enrico
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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02-08-2010

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