(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 2 631 554 A2

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
28.08.2013 Bulletin 2013/35

(51) Int Cl.:
F24H 8/00 *(2006.01)* ***F23L 11/00*** *(2006.01)*
F23J 13/00 *(2006.01)*

(21) Application number: **13156976.6**

(22) Date of filing: **27.02.2013**

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

(30) Priority: **27.02.2012 NL 2008355**

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(54) Flow channel, in particular discharge channel, provided with a water seal, as well as a water seal for such a flow channel

(57) The invention relates to a flow channel for the passage therethrough of a fluid, such as flue gases from a heating boiler or the like. The flow channel comprises a first and a second flow channel part, between which a blocking element, such as a non-return valve, is disposed. The flow channel further comprises a water seal for diverting condensation around the blocking element from the second flow channel part to the first flow channel part in use. According to the invention, the flow channel comprises a water seal comprising two water seal elements, one of which operates in a first orientation of the water seal, and the further water seal element operates in a position of the flow channel rotated through substantially 90° relative to the first orientation.

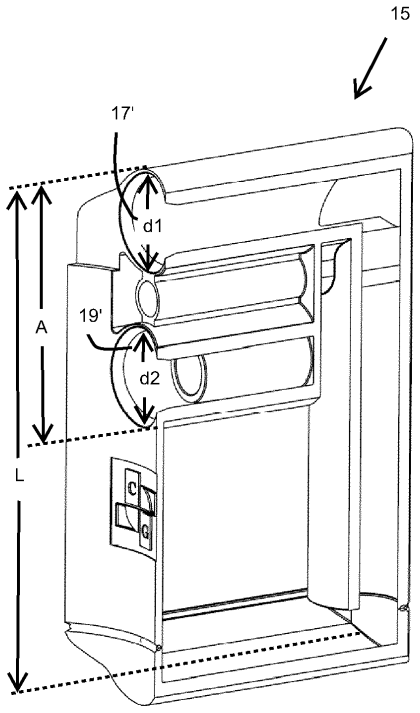

Fig. 2a

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Description

[0001] The invention relates to a flow channel provided with a water seal according to the preamble of claim 1.

[0002] The invention in particular relates to a discharge channel for discharging flue gases from a heating boiler or the like, which discharge channel comprises a first and a second discharge channel part, between which a non-return valve is disposed, and a water seal for diverting condensation around the non-return valve from the second discharge channel part to the first discharge channel part in use, which water seal comprises an inlet that opens into the second discharge channel part, which water seal further comprises an outlet, which outlet opens into the first discharge channel part, wherein the water seal comprises a water seal channel located outside the discharge channel, which water seal channel comprises at least two water seal channel parts including an angle with each other.

[0003] The invention further relates to a water seal for use in a flow channel, in particular a discharge channel.

[0004] DE-196.06.403 A1 describes and shows in figure 2 a flow channel made up of a first and a second flow channel part, which flow channel is provided with a water seal. The water seal shown therein comprises a U-shaped water seal channel made up of three water seal channel parts, the water seal channel being located externally of the flow channel. When the (over-) pressure in the first flow channel part drops, for example as a result of the heating boiler turning off, the first flow channel part is automatically sealed gastight from the second flow channel part by means of the non-return valve, so that the flue gases cannot flow back from the second flow channel part to the first flow channel part. The flue gases produce condensation in the second flow channel part, also in a closed position of the non-return valve. Said condensation is discharged around the closed non-return valve to the first flow channel part by means of the water seal channel and subsequently further discharged via the heating boiler.

[0005] A drawback of the flow channel known from figure 2 of DE-196.06.403 A1 is the fact that said flow channel can only be used in a substantially horizontal orientation.

[0006] Accordingly it is an object of the present invention to provide a flow channel, in particular a discharge channel, which can as standard be installed in a substantially horizontal orientation and in a substantially vertical orientation.

[0007] This object is achieved with the flow channel according to the invention as defined in claim 1.

[0008] At present, different flow channels are used for substantially horizontal applications than for substantially vertical applications. The flow channel, in particular a discharge channel, according to the present invention can be used substantially horizontally as well as substantially vertically, however, without adaptations being required.

[0009] According to the invention, the water seal comprises a water seal channel disposed outside the flow channel, wherein the water seal channel comprises a water seal element made up of at least two water seal channel parts that include an angle with each other, which water seal element operates in a first orientation of the water seal, for example in a horizontal application. According to the invention, the water seal channel also comprises a further water seal element which operates in a position of the flow channel rotated through substantially 90° relative to the first orientation, i.e. in a vertical position. Said further water seal element may be made up of the two water seal channels parts or of at least two further water seal channel parts, or of at least one water seal channel part and at least one further water seal channel part. Important in this regard is that two channel parts form a water seal in said first orientation, and that in the position rotated through substantially 90° relative to the first orientation, also two indentical and/or partially identical channel parts and/or other channel parts form a further water seal that operates in said second orientation.

[0010] A substantially horizontal application is provided by water seal channel parts of the water seal channel disposed externally of the flow channel, which include an angle with each other. In the flow channel according to one embodiment, this feature is combined in a relatively compact embodiment with the feature that the length of the water seal channel, measured in the longitudinal direction of the flow channel, is greater than the distance between the inlet and the outlet. In the case of a vertical orientation of the flow channel, the buffer space is located below the outlet on account of this feature. Said buffer space is filled with condensation in use, so that up to a particular pressure the gases from the second flow channel part cannot flow to the first flow channel part via the water seal.

[0011] In an alternative embodiment, which is less compact in the longitudinal direction but which, on the other hand, can be designed to be compact in a radial direction of the flow channel, the length of the water seal channel, measured in the longitudinal direction of the flow channel, is smaller than or equal to the distance between the inlet and the outlet.

[0012] The inlet and the outlet of the water seal are preferably designed so that they are both arranged in line with a surface of the flow channel, the inlet and the outlet being spaced some distance apart in longitudinal direction. The inlet and the outlet in that case define a plane which substantially coincides with an outer wall of the flow channel. In the above case, a water seal comprising two water seal elements will automatically be formed if the length of the water seal, measured in the longitudinal direction, is greater than the distance between the inlet and the outlet.

[0013] If the distance between the inlet and the outlet equals the length of the water seal, measured in the longitudinal direction, a water seal comprising two water a few elements will not be automatically formed. The water seal channel must in that case comprise at least three

water seal channel parts which are interconnected in such a manner that two water seal elements are formed, which water seal elements operate in a first orientation and in an orientation rotated through 90° relative to said first orientation, respectively.

[0014] The phrase "substantially horizontal application" as used herein is understood to mean that the flow channel extends with a slope of few degrees, 10 degrees at most, relative to the horizontal, which is usual for piping.

[0015] The specific shape of the water seal channel is not relevant to the measurement of the length in the longitudinal direction of the flow channel, so that it is possible for the water seal channel to comprise water seal channel parts including different angles with each other, of which only the length in the longitudinal direction of the flow channel is relevant rather than the total length of the water seal channel, which may extend in arbitrary directions.

[0016] The blocking element is preferably a non-return valve, but it may also be a control unit or a fan.

[0017] Returning the condensation to, for example, the heating boiler via the water seal bypass obviates the need for a separate connection point to the sewer system, which may for example be required by building regulations. The building regulations cannot require a separate connection point for aesthetic reasons or because the possibility of flue gases leaking into a space of a building via the connection point is undesirable.

[0018] In one embodiment, the flow channel is provided with a non-return valve channel for forming at least one drip gutter disposed between the flow channel and the non--return valve channel in the second flow channel part, by means of which drip gutter condensation can be led into the inlet of the water seal.

[0019] In particular in the case of a vertical orientation of the flow channel, the condensation will be optimally led to the inlet of the water seal via the drip gutter, so that the condensation can be discharged relatively quickly.

[0020] In another embodiment, the non-return valve channel has the shape of a truncated cylinder, on the truncated part of which non-return valve channel the non-return valve is mounted.

[0021] The truncated cylindrical shape with the non-return valve mounted thereon has the advantage that no condensation will remain on the non--return valve in the case of a horizontal orientation nor in the case of a vertical orientation of the flow channel, so that the non--return valve will continue to operate optimally. In addition, the non-return valve automatically closes under the influence of its own weight independently of the horizontal or vertical orientation thereof.

[0022] Preferably, the water seal and the flow channel are integrally connected.

[0023] The object of the present invention is achieved in particular with a discharge channel for discharging flue gases from a heating boiler or the like, which discharge channel comprises a first and a second discharge channel part, between which a non-return valve is disposed, and a water seal for diverting condensation around the non-return valve from the second discharge channel part to the first discharge channel part in use, which water seal comprises an inlet that opens into the second discharge channel part, which water seal further comprises an outlet, which outlet opens into the first discharge channel part, wherein the water seal comprises a water seal channel disposed outside the discharge channel, which water seal channel comprises at least two water seal channel parts that include an angle with each other, wherein the discharge channel is **characterised in that** the distance between the inlet and outlet of the water seal, seen in the longitudinal direction of the discharge channel, including the diameters of the inlet and the outlet, seen in the longitudinal direction of the discharge channel, is smaller than the length of the water seal channel measured in the longitudinal direction of the discharge channel.

[0024] The discharge channel may be configured analogously to the flow channel.

[0025] The object of the present invention is further to provide a water seal which can be provided on a flow channel irrespective of the fact whether the flow channel, in particular a discharge channel, is oriented substantially vertically or substantially horizontally.

[0026] This object is achieved with a water seal according to claim 11.

[0027] By designing the water seal to comprise two water seal elements, one being designed to operate in a first orientation and the other being designed to operate in an orientation rotated through 90°, the water seal can be used both on substantially horizontal and on substantially vertical flow channels, in particular discharge channels for flue gases, for example. Because of this, a fitter will need only one type of water seal for fitting a flow channel with a water seal, which saves storage space and transport costs.

[0028] Such a water seal can be configured in a simple manner if the length of the water seal channel, measured in the longitudinal direction of the flow channel, is greater than the distance between the inlet and the outlet of the water seal. This makes it possible in a relatively simple manner to use such a water seal not only horizontally but also vertically.

[0029] In one embodiment of the flow channel and/or the water seal described in the foregoing, one end of a water seal channel part is formed by the inlet of the water seal, whilst the other end of the first water seal channel part opens into a reservoir-like water seal channel part that is provided with the outlet of the water seal.

[0030] In one embodiment, the reservoir-like water seal channel part has a larger diameter than the water seal channel part that opens thereinto. The reservoir-like water seal channel part is the buffer where the condensation can collect, so that the water seal will be capable of withstanding a pre-calculated maximum pressure of the gases for a specific type of flow channel. In the simplest embodiment, the water seal channel part includes

an acute angle, for example an angle of 45 degrees, with the longitudinal direction of the flow channel and preferably opens into the reservoir-like water seal channel part without further twists or bends. The reservoir-like water seal channel part in that case comprises the outlet of the water seal, which, in the case of a vertical orientation of the flow channel, in which the longitudinal direction of the flow channel extends substantially parallel to the vertical, is disposed higher than the end of the water seal channel part that opens into the reservoir-like water seal channel part. Put differently, the distance between the inlet and the outlet of the water seal, seen in the longitudinal direction of the flow channel, including the diameters of the inlet and outlet, seen in the longitudinal direction of the flow channel, is smaller than the length of the water seal channel, measured in the longitudinal direction of the flow channel. Preferably, the first water seal channel part forms an L-shape with a second water seal channel part, one end of the L-shape comprising the inlet and the other end opening into the reservoir-like water seal channel part. In this way the dimensions of the water seal can remain relatively limited, whilst the buffer volume for the condensation is relatively large, irrespective of the orientation of the water seal.

[0031] If less buffer volume for the condensation is required, it is possible in another embodiment of the water seal to leave out the reservoir-like water seal channel part. In such an embodiment, the water seal channel comprises at least three water seal channel parts between the inlet and the outlet, which water seal channel parts include an angle with each other.

[0032] The invention will now be described with reference to non-limitative exemplary embodiments shown in the appended figures.

Figures 1a-c are a perspective view, a top plan view and a sectional view, respectively, of a flow channel according to the present invention;
Figures 2a, b are perspective views of the water seal according to the invention;
Figure 3 shows an alternative embodiment of a flow channel according to the invention;
Figure 4 shows an alternative embodiment of a flow channel according to the invention;
Figure 5 shows an alternative embodiment of a flow channel according to the invention;
Figure 6 shows an alternative embodiment of a flow channel according to the invention;
Figure 7 shows an alternative embodiment of a flow channel according to the invention.

[0033] Like parts are indicated by the same numerals in the various figures.

[0034] In figures 1a-c various views are shown of a flow channel 1 according to the present invention for discharging flue gases from a heating boiler (not shown) or the like. Although the flow channel 1 is shown in a vertical orientation, i.e. the central axis of the flow channel 1 illustrated in the dotted line 13 in figure 1c, which is representative of the longitudinal direction of the flow channel, extends substantially parallel to the vertical, it is also possible to use a substantially horizontal orientation for the flow channel 1 according to the invention, in which case the longitudinal direction 13 extends parallel to the horizontal with a slope of a few degrees.

[0035] The flow channel according to the invention comprises a flow channel outlet 3 defined by the flow channel wall 2 for emitting the exhaust gases into the atmosphere. It is possible for the flow channel outlet 3 of the discharge channel 1 to be connected to further pipes (not shown). The other end 4 of the flow channel 1 will be connected to other pipes (not shown) that are connected to the heating boiler. The flow channel 1 further comprises a first flow channel part 5 and a second flow channel part 7, between which a non-return valve 9 is disposed. In the illustrated embodiment, the first and the second flow channel part 5, 7 are integrally connected.

[0036] The flow channel 1 is internally provided with a non-return valve channel 11, on which a blocking element in the form of a non-return valve 9 is mounted, which non-return valve channel 11 has the shape of a truncated cylinder. The non-return valve channel 11 and the non-return valve 9 separate the first flow channel part 5 from the second flow channel part 7. This means that the flue gases cannot flow back from the second flow channel part 7 to the first flow channel part 5, or vice versa, in the closed position of the non-return valve 9.

[0037] The flow channel 1 is further provided with a water seal 15 that is integrally connected thereto, by means of which water seal condensation formed in the second flow channel part 7 is carried to the first control channel 5 in a controlled manner in use, also in the closed position of the non-return valve, which condensation is discharged to the sewer system, for example, via the first flow channel part 5 and the heating boiler. By returning the condensation to the heating boiler, for example, via the bypass of the water seal, a separate connection to the sewer system is not required.

[0038] An alternative water seal 15' is shown in figures 2a, b. Said water seal 15' must be mounted on a flow channel (not shown).

[0039] The water seal 15 comprises an inlet 17 disposed in a flow channel wall 2 of the flow channel 1, which inlet 17 opens into the second flow channel part 7, as well as an outlet 19 disposed in the channel wall 2 of the flow channel 1, which outlet 19 opens into the first flow channel part 5. The water seal 15' shown in figures 2a, b is provided with an inlet 17' to be connected to the second flow channel part 7, and also with an outlet 19' to be connected to the first flow channel part 5. Both embodiments of the water seal 15, 15' comprise a water seal channel 21 that extend between the inlet 17, 17' and the outlet 19, 19', which water seal channel comprises four water seal channel parts 23, 24, 25, 26, which include an angle with each other. The water seal channel 21 is disposed externally of the flow channel 1.

[0040] The four water seal channel parts 23, 24, 25, 26 of the water seal channel 21, which include an angle with each other, comprise a first water seal channel part 23 which is connected to a second water seal channel part 24 at an angle of about 90 degrees, said water seal channel parts together forming an L-shape. One end of the L-shape is formed by the inlet 17 and the other end 29 opens into a reservoir-like water seal channel part 25. The reservoir-like water seal channel part 25 comprises the inlet; in the illustrated embodiment, the reservoir-like water seal channel part 25 is connected to the outlet 19 via a further water seal channel part 26.

[0041] The water seal 15, 15' according to the invention comprises a first water seal element and a second water seal element, which operates at an orientation rotated through 90° relative to the first water seal element. In the illustrated embodiment, the flow channel comprises a distance A between the inlet 17, 17' and the outlet 19, 19' of the water seal 15, 15', seen in the longitudinal direction of the flow channel 1, including the diameters d1, d2 of the inlet 17, 17' and the outlet 19, 19', seen in the longitudinal direction 13 of the flow channel 1, which distance A is smaller than the length L, measured in the longitudinal direction 13 of the flow channel 1, of the water seal channel 21.

[0042] This feature, combined with the feature that the water seal 15, 15', more in particular the water seal channel 21, has a dimension in a direction transversely to the longitudinal direction 13, makes it possible to use the water seal 15, 15' both in the case of a horizontally oriented flow channel 1 and in the case of a vertically oriented flow channel.

[0043] In order to ensure an adequate operation of the water seal 15, 15', the water seal will have to be at least partially filled with condensation (not shown) in use.

[0044] The flow channel 1 is further provided with a drip gutter 31 formed in the second flow channel part 7, which drip gutter is disposed between the flow channel wall 2 of the flow channel 1 and the wall of the non-return valve channel 11. By means of said drip gutter 31, the condensation formed in the second flow channel part 7 can be optimally carried to the inlet 17 of the water seal 15, 15'.

[0045] Figure 3 shows an alternative embodiment of a flow channel 101 according to the invention, which flow channel 101 is also suitable for discharging flue gases from a heating boiler (not shown) or the like in a direction indicated by arrow P1, which direction corresponds to the longitudinal direction of the flow channel 101. Although the flow channel 101 is oriented substantially horizontally, i.e. the longitudinal direction P1 of the flow channel 101 extends substantially parallel to the horizontal, it is also possible to use a substantially vertical orientation for the flow channel 101 according to the invention.

[0046] The flow channel 101 comprises a flow channel outlet 103 defined by the flow channel wall 102 for emitting the exhaust gases into the atmosphere. The flow channel 101 further comprises a first flow channel part 105 and a second flow channel part 107, between which a non-return valve 109 is disposed.

[0047] The flow channel 101 is in particular characterised by a different type of water seal 115. Said water seal 115 also comprises an inlet 117 disposed in a flow channel wall 102 of the flow channel 101, which inlet 117 opens into the second flow channel part 107, as well as an outlet 119 disposed in the channel wall 102 of the flow channel 101, which outlet 119 opens into the first flow channel part 105. The water seal 115 comprises a water seal channel 121 extending between the inlet 117 and the outlet 119, which water seal channel is made up of five water seal channel parts 123, 124, 125, 126 of substantially the same diameter, which include an angle with each other. The water seal channel 115 has only two ends formed by the inlet 117 and the outlet 119, respectively.

[0048] The alternative water seal 115 according to the invention therefore comprises a first water seal element and a second water seal element, which operates at an orientation rotated through 90° relative to the first water seal element. In this embodiment, the alternative water seal comprises a distance A between the inlet 117 and the outlet 119 of the water seal 115, seen in the longitudinal direction P1 of the flow channel 101, including the diameters of the inlet 117 and the outlet 119, seen in the longitudinal direction P1 of the flow channel 101, which distance A is smaller than the length L, measured in the longitudinal direction P1 of the flow channel 101, of the water seal channel 21. Because of this feature, the water seal 115 can be used horizontally as well as vertically. On account of the absence of a reservoir-like water seal channel part, the water seal 115 has less buffer volume than the water seal 15, 15'; for certain applications the available buffer volume may suffice, however.

[0049] Figure 4 shows an alternative embodiment of a water seal according to the present invention, which can be mounted on a flow channel. This embodiment of the water seal 201 comprises a water seal channel 223, 226 extending between the inlet 217 and the outlet 227, which, in the present embodiment, only comprises two water seal channel parts 223 and 226 that include an angle with each other. The first water seal channel part 223 extends at an angle with the second water seal channel part 226, such that the two water seal channel parts 223, 226 together form a V-shape. In the illustrated, mounted condition the corner point 231 of the V-shape is positioned lower than the inlet 217. The distance L of the water seal, seen in the longitudinal direction of the flow channel 203, is thus greater than the distance A between the inlet 217 and the outlet 227 of the water seal. One end of the V-shape of the water seal channel parts 223 and 226 is formed by the inlet 217 and the other end is formed by the outlet 227. The V-shape of the water seal channel parts 223 and 226 is such that a V-shape having its open end at the upper side is obtained both in a horizontal and in a vertical position of the water seal 201. This configuration makes it possible to use the water

seal 201 both in a horizontal and in a vertical orientation, or, in other words, the water seal shown here comprises two water seal elements which are configured so that they operate at an angle of substantially 90° relative to each other, being formed by only two water seal channel parts 223, 226.

[0050] In general it is conceivable to use curved water seal channel parts rather than straight water seal channel parts, for example circular or ellipsoid channel parts. In that case these parts, too, comprise water seal channel parts that extend at an angle relative to each other.

[0051] The embodiment of the water seal 301 shown in figure 5 comprises a water seal channel part that extends between the inlet 317 and the outlet 327. The inlet 317 of the water seal 301 is connected to a U-shaped water seal element 322 via a first water seal channel part 321. The U-shaped water seal channel part 322 is also connected to a further water seal channel part 323. The water seal channel parts 323, 324, 325 form a second U-shaped water seal element 323, 324, 325. The second U-shaped water seal element 323, 324, 325 is rotated through an angle of 90° relative to the first water seal element 322. As can be seen in the figure, the distance L of the water seal, seen in the longitudinal direction of the flow channel is greater than the distance between the inlet 317 and the outlet at 327. Because of the placement of the two water seal elements, the water seal shown here operates both in a horizontal and in a vertical orientation thereof.

[0052] It is noted in this regard that this embodiment can also be used in two positions, viz. a vertical and a horizontal position, if the distance A between the inlet and the outlet equals the distance L, seen in the longitudinal direction of the water seal. Such an embodiment, which is otherwise substantially identical to the embodiment shown in figure 5 and which will not be discussed in more detail herein, therefore, is shown in figure 7.

[0053] Figure 6, to conclude, shows a further alternative water seal, in which use is made of in total three water seal channel parts 421, 422, 423 that include an angle with each other. The three water seal channel parts disposed at an angle relative to each other form two water seal elements, which operate in a horizontal or in a vertical position of the flow channel. The first water seal element 421, 422 operates in a vertical position of the flow channel and the second water seal element 422, 423 operates in a horizontal position of the flow channel.

[0054] In the illustrated embodiment 401, the flow channel comprises a distance A, seen in the longitudinal direction of the flow channel 402, 403, 405, 407 between the inlet 417 and the outlet 427 of the water seal, including the diameters of the inlet 417 and the outlet 427, seen in the longitudinal direction of the flow channel 402, 403, 405, 407, which distance A in this case equals the length L, measured in the longitudinal direction of the flow channel 402, 403, 405, 407, of the water seal channel 401.

[0055] If little buffer volume is needed, only two water seal channel parts of the water seal channel are required in the simplest variant of the water seal for realising the principle of the invention as worded in the claims, although this is not shown in the figures. The ends of the water seal channel parts are in that case connected to the inlet and the outlet of the water seals and the other ends are connected to each other. The two channel parts will extend in the same direction, at different acute angles, relative to the longitudinal direction of the flow channel for forming a water seal that exhibits the feature as claimed.

[0056] Although the interconnected water seal channel parts include an acute angle with each other in the illustrated embodiments, it is also conceivable for said parts to blend together via a curve.

Claims

1. A flow channel for the passage therethrough of a fluid, such as flue gases from a heating boiler or the like, which flow channel comprises a first and a second flow channel part, between which a blocking element, such as a non-return valve, is disposed, and which flow channel comprisesa water seal for diverting condensation around the blocking element from the second flow channel part to the first flow channel part in use, which water seal comprises an inlet that opens into the second flow channel part, which water seal further comprises an outlet, which outlet opens into the first flow channel part, wherein the water seal comprises a water seal channel located outside the flow channel, wherein the water seal channel comprises a water seal element formed by at least two water seal channel parts that include an angle with each other, which water seal element operates in a first orientation of the water seal, **characterised in that** the water seal channel comprises a further water seal element formed by at least one of the water seal channel parts and/or at least one further water seal channel part, which further water seal element operates in a position of the flow channel rotated through substantially 90° relative to the first orientation.

2. A flow channel according to claim 1, wherein the distance between the inlet and outlet of the water seal, seen in the longitudinal direction of the flow channel, including the diameters of the inlet and the outlet, seen in the longitudinal direction of the flow channel, is smaller than the length of the water seal channel measured in the longitudinal direction of the flow channel.

3. A flow channel according to claim 1, wherein the distance between the inlet and outlet of the water seal, seen in the longitudinal direction of the flow channel, including the diameters of the inlet and the outlet, seen in the longitudinal direction of the flow channel,

equals the length of the water seal channel measured in the longitudinal direction of the flow channel.

4. A flow channel according to claim 1, 2 or 3, wherein the flow channel is internally provided with a non-return valve channel for forming at least one drip gutter disposed between the flow channel and the non--return valve channel in the second flow channel part.

5. A flow channel according to claim 4, wherein the non-return valve channel has the shape of a truncated cylinder, on the truncated part of which non-return valve channel the non-return valve is mounted.

6. A flow channel according to at least one of the preceding claims, wherein one end of a water seal channel part is formed by the inlet of the water seal, whilst the other end of the first water seal channel part opens into a reservoir-like water seal channel part that is provided with the outlet of the water seal.

7. A flow channel according to claim 6, wherein the first water seal channel part forms an L-shape with a second water seal channel part, wherein one end of the L-shape comprises the inlet and the other end opens into the reservoir-like water seal channel part.

8. A flow channel according to claim 6 or 7 dependent on claim 6, wherein the reservoir-like water seal channel part is connected to the outlet via a further water seal channel part.

9. A flow channel according to any one of the preceding claims, wherein the water seal channel comprises at least three water seal channel parts between the inlet and the outlet, which water seal channel parts include an angle with each other.

10. A flow channel according to any one of the preceding claims, wherein the water seal and the flow channel are integrally connected.

11. A water seal for use in a flow channel comprising a first and a second flow channel part, between which a blocking element, such as a non-return valve, is disposed, the water seal comprising a water seal channel that can be positioned outside the flow channel, which water seal channel can be connected to the first flow channel part with a first end and which can be connected to the second flow channel part with a second end, wherein the water seal channel comprises a water seal element formed by at least two water seal channel parts that include an angle with each other, which water seal element operates in a first orientation of the water seal, **characterised in that** the water seal channel further comprises a further water seal element formed by at least one of the water seal channel parts and/or at least one further water seal channel part, which further water seal element operates in a position of the flow channel rotated through substantially 90° relative to the first orientation.

12. A water seal according to claim 11, wherein one end of a first water seal channel part is formed by the inlet of the water seal, whilst the other end of the first water seal channel part opens into a reservoir-like water seal channel part that is provided with the outlet of the water seal.

13. A water seal according to claim 12, wherein the first water seal channel part forms an L-shape with a second water seal channel part, wherein one end of the L-shape comprises the inlet and the other end opens into the reservoir-like water seal channel part.

14. A water seal according to claim 12 or 13 dependent on claim 12, wherein the reservoir-like water seal channel part is connected to the outlet via a further water seal channel part.

15. A water seal according to claim 11, wherein the water seal channel comprises at least three water seal channel parts between the inlet and the outlet, which water seal channel parts include an angle with each other.

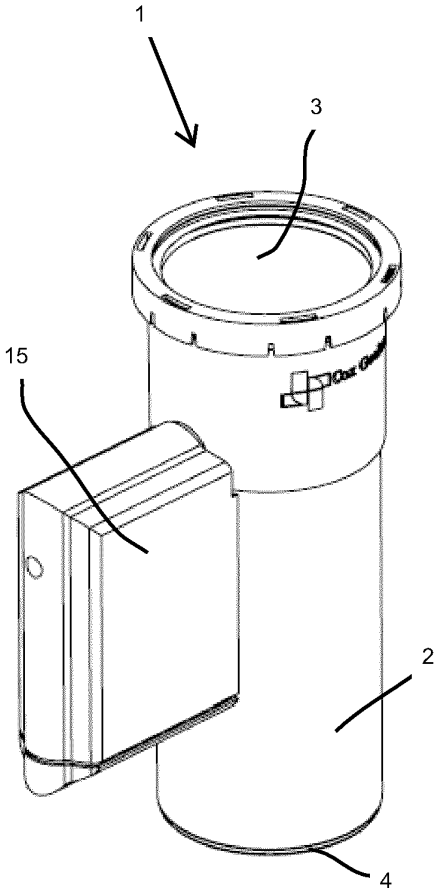

Fig. 1a

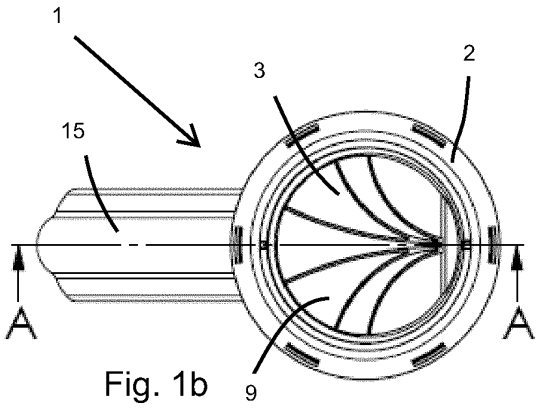

Fig. 1b

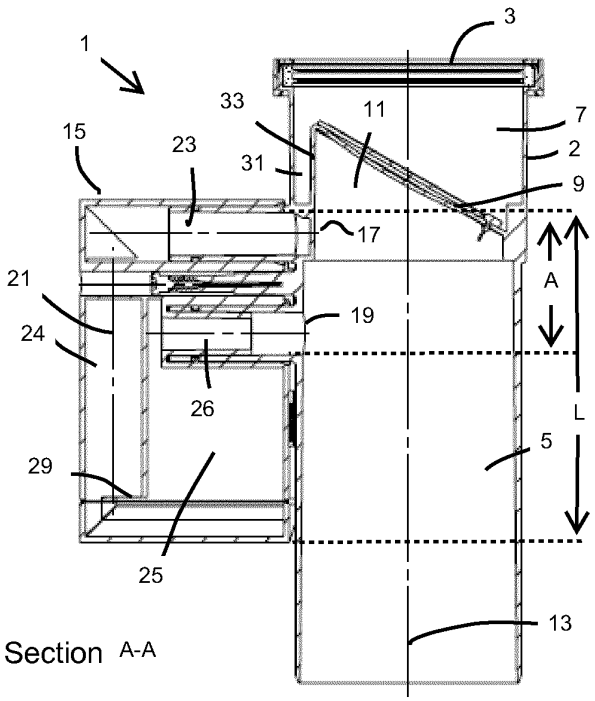

Fig. 1c

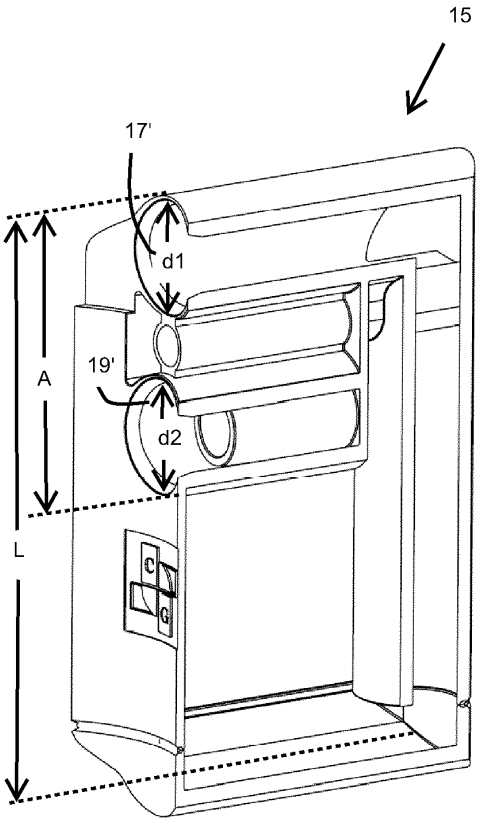

Fig. 2a

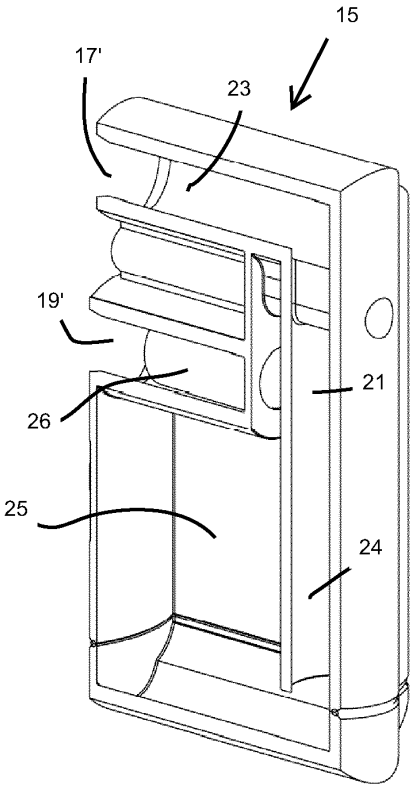

Fig. 2b

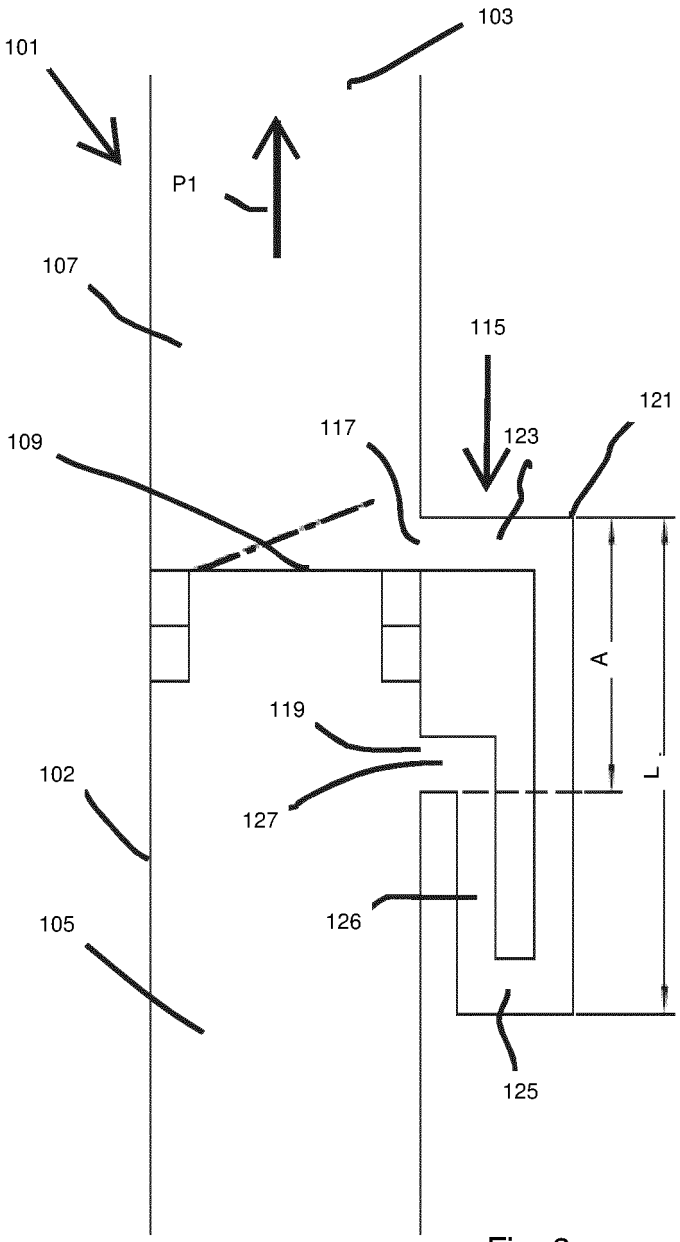

Fig. 3

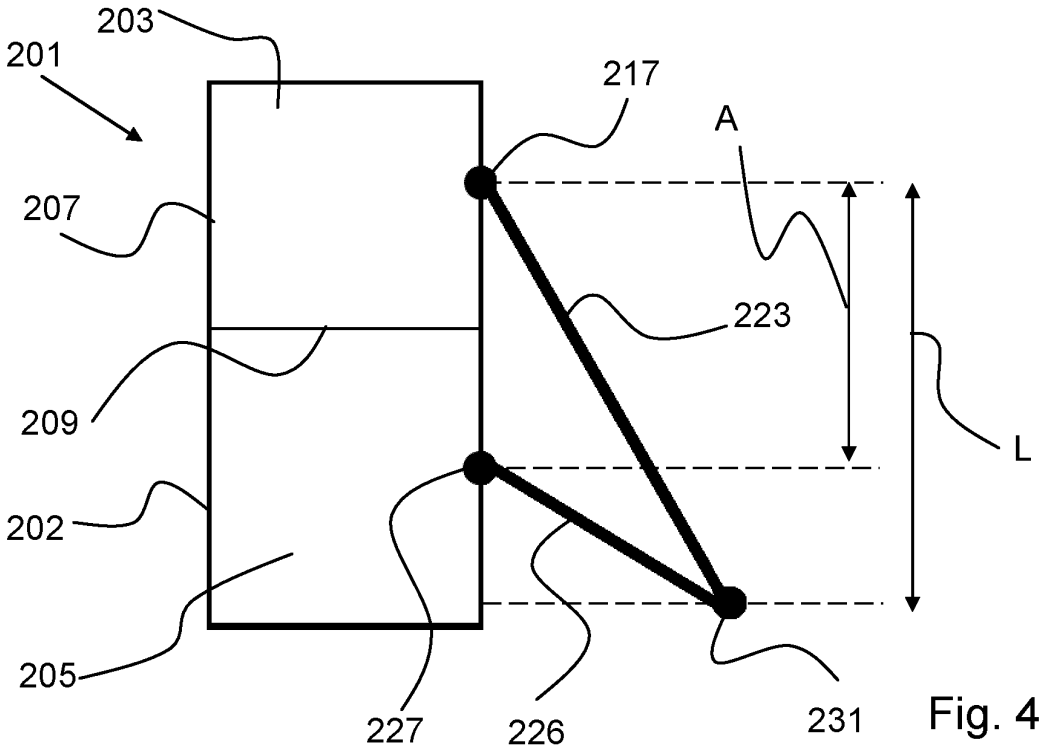
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Fig. 4

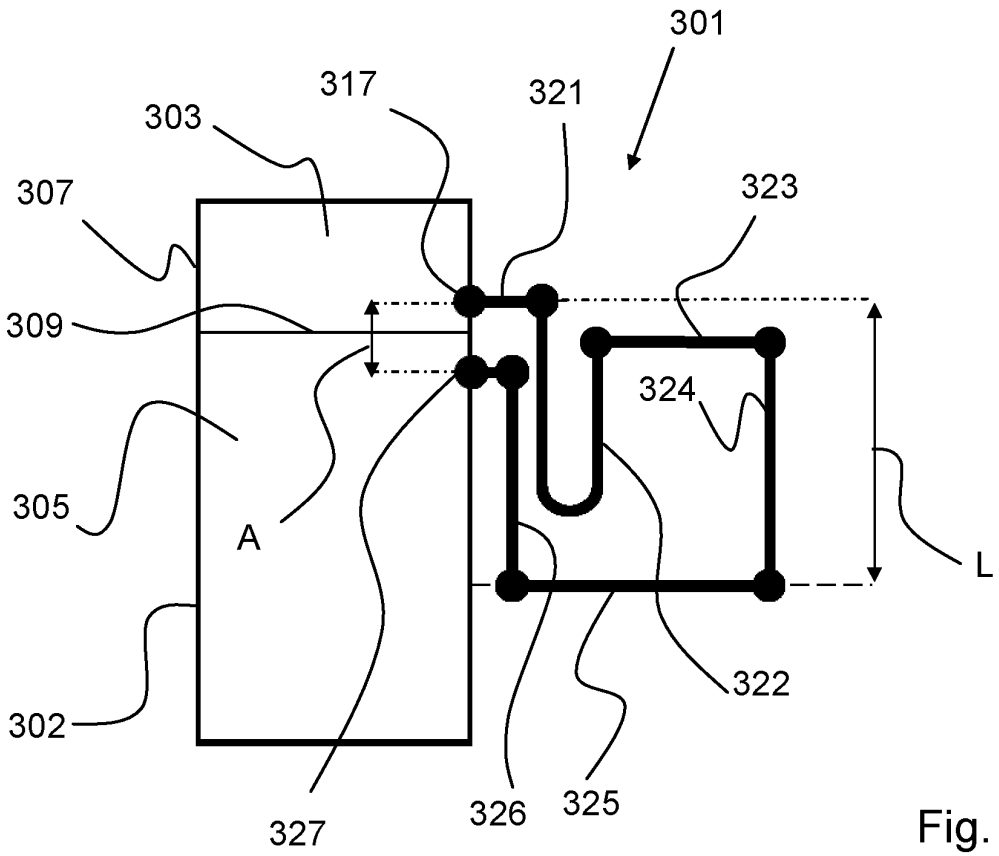
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Fig. 5

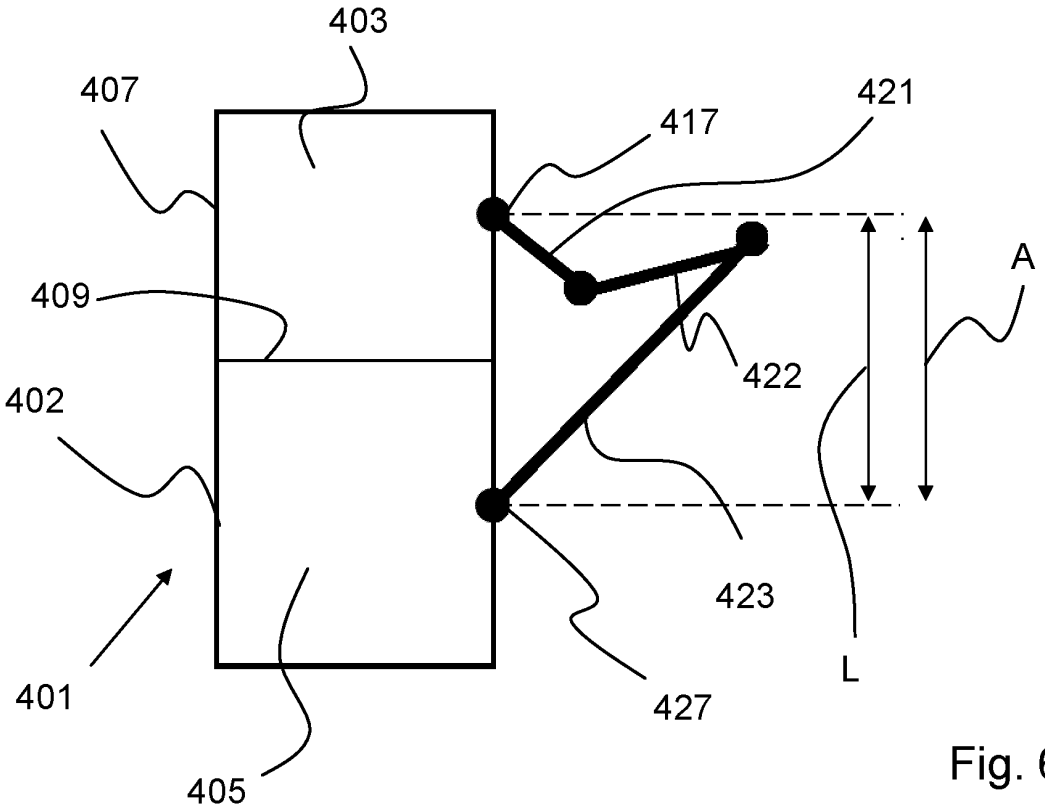
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Fig. 6

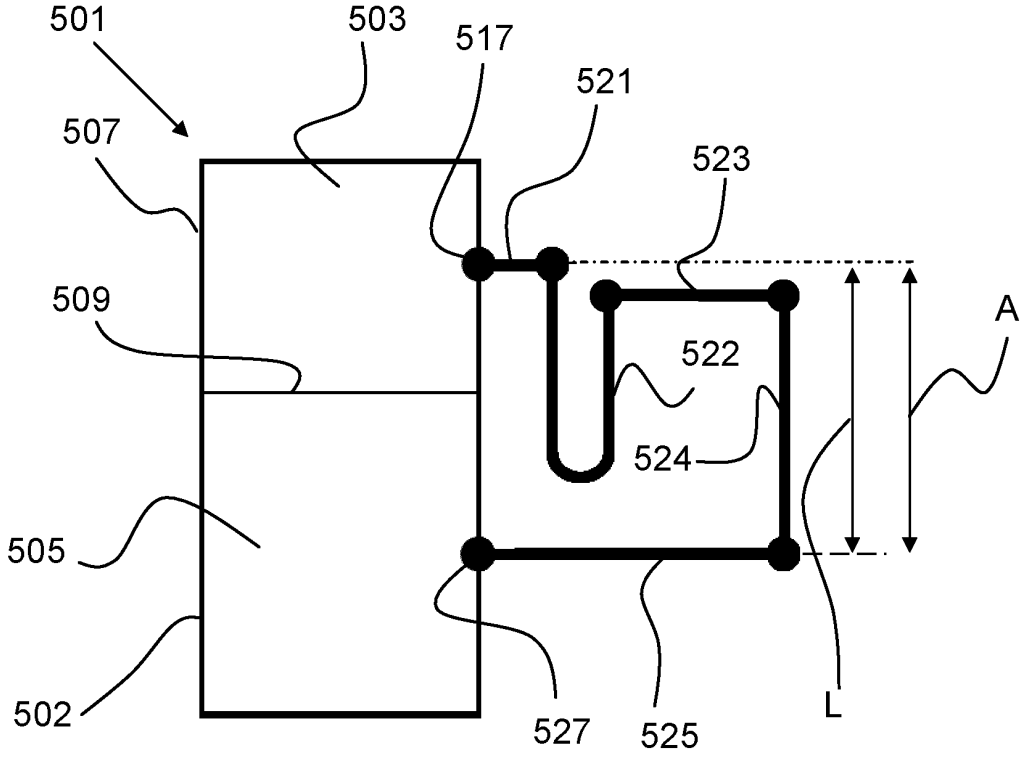
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Fig. 7

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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