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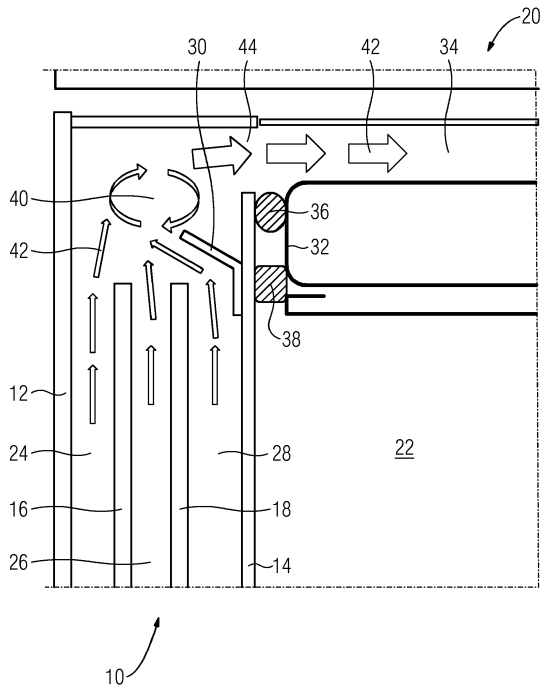
(54) OVEN DOOR FOR A COOKING OVEN

(57) The present invention relates to an oven door (10) for a cooking oven (20), in particular for a domestic cooking oven (20). The oven door (10) includes an outer glass panel (12) and an inner glass panel (14). The oven door (10) includes at least one intermediate glass panel (16, 18) arranged between the outer glass panel (12) and the inner glass panel (14). The lateral sides of the glass panels (12, 14, 16, 18) are directly or indirectly connected to each other. Air channels (24, 26, 28) are formed between the glass panels (12, 14, 16, 18). The oven door (10) includes at least one air-guiding element (30) arranged at the inner glass panel (14). The air-guiding element (30) includes at least one sheet element or strip extending into the interior space of the oven door (10), so that a cooling air stream (42) is deflected away from the inner glass panel (14). The level of the at least one sheet element or strip is adapted to the level of a top wall of an oven cavity (22) of the corresponding cooking oven (22) in a closed state of the oven door (10).

FIG 1



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Description

[0001] The present invention relates to an oven door for a cooking oven, in particular for a domestic cooking oven. Further, the present invention relates to a cooking oven, in particular a domestic cooking oven, for performing a pyrolytic cleaning function and a steam cooking function.

[0002] The inner side of a closed oven door is heated up, when the oven is in operation. A gasket arranged between said oven door and a cavity frame of the oven is also exposed to high temperatures. In particular, a self-cleaning oven is heated up to about 450°C during a pyrolytic cleaning function, wherein a gasket made of glass fibre is required. However, the gasket made of glass fibre is vapour permeable and not suitable for a steam cooking function. For example, a gasket made of silicone is used for the steam cooking function. The gasket made of silicone is steam-tight. However, the gasket made of silicone is damaged or destroyed at a temperature of about 240°C or higher. Thus, the gasket made of silicone is not suitable for the pyrolytic cleaning function.

[0003] FIG 6 shows a schematic sectional side view of an upper portion of an oven door 10 according to the prior art. The oven door 10 is attached at a cooking oven 20 and in a closed state. The oven door 10 includes an outer glass panel 12, an inner glass panel 14 and two intermediate glass panels 16 and 18. The inner glass panel 14 is arranged towards an oven cavity 22 of the cooking oven 20. The intermediate glass panels 16 and 18 are arranged between the outer glass panel 12 and the inner glass panel 14. The glass panels 12, 14, 16 and 18 are arranged parallel to each other.

[0004] The glass panels 12, 14, 16 and 18 are laterally connected to each other, so that air channels 24, 26 and 28 are formed between said glass panels 12, 14, 16 and 18. In the closed state of the oven door 10 the air channels 24, 26 and 28 extend vertically. An inlet of said air channels 24, 26 and 28 is formed in a bottom of the oven door 10. An outlet 44 of the air channels 24, 26 and 28 is formed at an upper inner side of the oven door 10. In the closed state of the oven door 10 the outlet 44 is connected to a suction channel 34 of the cooking oven 20, so that cooling air streams 42 are pulled bottom-up through the air channels 24, 26 and 28. The cooling air streams 42 within the air channels 24, 26 and 28 effect that the outer glass panel 12 is colder than the inner glass panel 14 and the oven cavity 22. By this way the cooling air streams 42 protect the user from heat generated by the cooking oven 20.

[0005] Between the oven door 10 and a cavity frame 32 of the cooking oven 20 a gasket 36 or 38 is arranged. The gasket 36 or 38 encloses a front opening of the oven cavity 22. The gasket 36 or 38 is either made of steam tight material like silicone or made of glass fibre. On the one hand, the gasket 36 or 38 made of glass fibre has a high heat resistance and allows the pyrolytic cleaning function. On the other hand, the gasket 36 or 38 made of glass fibre is vapour permeable and not suitable for the steam cooking function. In contrast, the gasket 36 or 38 made of silicone would be steam-tight. However, the gasket 36 or 38 made of silicone would be damaged or destroyed during the pyrolytic cleaning function.

[0006] It is an object of the present invention to provide an oven door, which is suitable for a pyrolytic cleaning function on the one hand and a steam cooking function on the other hand.

[0007] The object is achieved by the oven door according to claim 1.

[0008] According to the present invention an oven door for a cooking oven, in particular for a domestic cooking oven, is provided, wherein:

- the oven door includes an outer glass panel and an inner glass panel,
- the oven door includes at least one intermediate glass panel arranged between the outer glass panel and the inner glass panel,
- the lateral sides of the glass panels are directly or indirectly connected to each other,
- air channels are formed between the glass panels,
- the oven door includes at least one air-guiding element arranged at the inner glass panel,
- the air-guiding element includes at least one sheet element or strip extending into the interior space of the oven door, so that a cooling air stream is deflected away from the inner glass panel, and
- the level of the at least one sheet element or strip is adapted to the level of a top wall of an oven cavity of the corresponding cooking oven in a closed state of the oven door.

[0009] The inner glass panel of the oven door is arrangeable towards the oven cavity of the cooking oven, while the outer glass panel is provided for the outer side of said cooking oven. The core of the present invention is the air-guiding element with the at least one sheet element or strip arranged at the level of the top wall of the oven cavity. The sheet element or strip effects that in the oven door the cooling air stream along the inner glass panel is deflected away from said inner glass panel. By this way, the temperature of the inner glass panel above the level of the top wall of the oven cavity is lower than the temperature of the inner glass panel in front of the oven cavity. The air-guiding element allows the use of a silicone gasket between the inner glass panel and a front frame of the oven cavity. The silicone gasket has a temperature resistance of about 240°C, while the temperature in the oven cavity during a pyrolytic cleaning function is about 450°C. The air-guiding element effects that the temperature of the upper portion of the inner glass panel is suitable for the silicone gasket. The air-guiding element avoids a damage or destruction of the silicone gasket. The air-guiding element allows the pyrolytic cleaning function and a steam cooking function for the same cooking oven. The steam cooking function requires the steam-

tight silicone gasket on the one hand and the pyrolytic cleaning function generates a temperature of about 450°C on the other hand.

[0010] For example, the lateral sides of the glass panels are connected via a door frame and/or a pair of door columns.

[0011] In particular, the level of the top edge of the at least one intermediate glass panel is lower than the levels of the top edges of the outer glass panel and inner glass panel in the closed state of the oven door, wherein preferably a mixing chamber is formed between the outer glass panel and inner glass panel and above the at least one intermediate glass panel in the closed state of the oven door. Additionally, the air-guiding element generates turbulences in the mixing chamber, so that the air streams from the air channels are intermixed.

[0012] Preferably, at least one inlet of the air channels is formed in the bottom of the oven door.

[0013] Further, at least one outlet of the air channels may be formed in an upper portion of the inner side of the oven door and/or in a top side of said oven door. The outlet of the air channels is connectable to a suction channel of the cooking oven, so that a cooling air stream is generated in the air channels.

[0014] According to a preferred embodiment of the present invention, the air-guiding element is formed as an angle rail, wherein the one leg of said angle rail is arranged at the inner glass panel, while the other leg of said angle rail extends into the interior space of the oven door.

[0015] Optionally, an open end of the leg extending into the interior space of the oven door is arranged above the top edge of an adjacent intermediate glass panel, wherein preferably the distance between the open end of the leg extending into the interior space of the oven door and the top edge of the adjacent intermediate glass panel is marginally smaller than the distance between the inner glass panel and the adjacent intermediate glass panel. This allows a reduction of the inner air flow. However, if the air flow should be kept constant, then the opening would have the same size as the cross-section of the air channels, so that the cooling air streams from the air channels are only mixed.

[0016] The vertical distance between the open end of the leg extending into the interior space of the oven door and the top edge of the adjacent intermediate glass panel as well as the horizontal distance between said open end and the inner glass panel finally balance the dynamic of the air inside the oven door, i.e. the air flow and the air mixture in the top of the oven door.

[0017] According to one embodiment of the present invention, the level of the top edge of a further intermediate glass panel is arranged above the level of the open end of the leg extending into the interior space of the oven door.

[0018] Alternatively, the top edges of the intermediate glass panels may be arranged at the same level or substantially at the same level, wherein preferably the levels of the top edges of said intermediate glass panels are arranged beneath the level of the open end of the leg extending into the interior space of the oven door.

[0019] For example, the legs of the angle rail form an obtuse angle, wherein the leg extending into the interior space of the oven door is inclined upwards from the inner glass panel to said interior space in the closed state of the oven door.

[0020] According to an alternative embodiment of the present invention, the legs of the angle rail form a right angle or substantially a right angle.

[0021] Further, the air-guiding element may be directly attached at the inner glass panel. For example, the air-guiding element is fixed by adhesive, screws, clips or any other standard fixing methods.

[0022] Alternatively, the air-guiding element may be a part of or connected to a cover element arranged on the top side of the oven door.

[0023] Moreover, the air-guiding element may be a part of or connected to the door frame of the oven door.

[0024] Furthermore, the air-guiding element may include a horizontal elongated main part and two vertical elongated lateral parts in the closed state of the oven door.

[0025] Further, the present invention relates to a cooking oven, in particular a domestic cooking oven, for performing a pyrolytic cleaning function and a steam cooking function, wherein the cooking oven comprises at least one oven door mentioned above.

[0026] In particular, the cooking oven comprises at least one outer gasket and at least one inner gasket arranged between the oven door and a cavity frame of said cooking oven, wherein the outer gasket is made of steam tight material, in particular silicone, and the inner gasket is made of temperature resistant material, in particular glass fibre.

[0027] Novel and inventive features of the present invention are set forth in the appended claims.

[0028] The present invention will be described in further detail with reference to the drawings, in which

FIG 1 illustrates a schematic sectional side view of an upper portion of an oven door according to a first embodiment of the present invention, wherein said oven door is attached at a cooking oven and in a closed state,

FIG 2 illustrates a schematic sectional side view of the upper portion of the oven door according to the first embodiment of the present invention, wherein said oven door is attached at the cooking oven and in the closed state,

FIG 3 illustrates a schematic perspective sectional side view of the upper portion of the oven door according to a second embodiment of the present invention,

FIG 4 illustrates a schematic perspective sectional side view of the upper portion of the oven door according to a third embodiment of the present invention,

FIG 5 illustrates a schematic front view of an inner glass panel of the oven door according to a fourth embodiment of the present invention, and

FIG 6 illustrates a schematic sectional side view of the upper portion of the oven door according to the prior art, wherein said oven door is attached at the cooking oven and in the closed state.

[0029] FIG 1 illustrates a schematic sectional side view of an upper portion of an oven door 10 according to a first embodiment of the present invention, wherein said oven door 10 is attached at a cooking oven 20 and in a closed state. In particular, the oven door 10 is a drop-down door or a swing door.

[0030] The oven door 10 includes an outer glass panel 12, an inner glass panel 14 and two intermediate glass panels 16 and 18. The inner glass panel 14 is arranged towards an oven cavity 22, while the outer glass panel 12 forms a part of a front side of the cooking oven 20. The intermediate glass panels 16 and 18 are arranged between the outer glass panel 12 and the inner glass panel 14. The glass panels 12, 14, 16 and 18 are arranged parallel to each other. The terms "outer" and "inner" relate to the closed state of the oven door 10.

[0031] The glass panels 12, 14, 16 and 18 are laterally connected to each other, so that air channels 24, 26 and 28 are formed between said glass panels 12, 14, 16 and 18. For example, the lateral sides of the glass panels 12, 14, 16 and 18 are connected to each other by a pair of door columns. Further, the lateral sides of the glass panels 12, 14, 16 and 18 may be connected to each other by a door frame. In the closed state of the oven door 10 the air channels 24, 26 and 28 extend vertically.

[0032] An inlet of the air channels 24, 26 and 28 is formed in a bottom of the oven door 10. An outlet 44 of the air channels 24, 26 and 28 is formed at an upper inner side of the oven door 10. Alternatively or additionally, the outlet 44 of the air channels 24, 26 and 28 may be formed at a top side of the oven door 10. In the closed state of the oven door 10 the outlet 44 is connected to a suction channel 34 of the cooking oven 20, so that cooling air streams 42 are pulled bottom-up through the air channels 24, 26 and 28. The cooling air streams 42 within the air channels 24, 26 and 28 effect that the outer glass panel 12 is colder than the inner glass panel 14 and the oven cavity 22. The temperatures of the glass panels 12, 14, 16 and 18 decrease from the inner glass panel 14 to the outer glass panel 12. The cooling air streams 42 protect the user from heat generated in the oven cavity 22 of the cooking oven 20.

[0033] Between the inner glass panel 14 of the oven door 10 and a cavity frame 32 of the cooking oven 20 an outer gasket 36 and an inner gasket 38 are arranged. The outer gasket 36 and the inner gasket 38 enclose a front opening of the oven cavity 22. The outer gasket 36 is made of silicone, while the inner gasket 38 is made of glass fibre. On the one hand, the inner gasket 38 has higher heat resistance than the outer gasket 36. On the other hand, the outer gasket 36 is steam-tight, while the inner gasket 38 is vapour permeable. The outer gasket 36 made of silicone is suitable for steam cooking function, while the inner gasket 38 made of glass fibre is suitable for pyrolytic cleaning function.

[0034] Preferably, the outer gasket 36 and the inner gasket 38 are attached at the cavity frame 32 of the cooking oven 20. Alternatively, the outer gasket 36 and/or the inner gasket 38 may be attached at the inner glass panel 14 of the oven door 10.

[0035] In this example, the outer glass panel 12 extends from the bottom to the top of the oven door 10, while the inner glass panel 14 extends from the bottom 10 to the outlet 44. The heights of the intermediate glass panels 16 and 18 are lower than the height of the inner glass panel 14. In this example, the sizes of the intermediate glass panels 16 and 18 are marginally bigger than the front opening of the oven cavity 22.

[0036] The oven door 10 comprises an air-guiding element 30. In this example, the air-guiding element 30 is attached at the outer side of the inner glass panel 14. Preferably, the air-guiding element 30 is formed as an elongated angle rail. One leg of said angle rail is attached at the outer side of the inner glass panel 14, while the other leg of the angle rail extends into the interior space of the oven door 10. In this example, the legs of said angle rail form an obtuse angle, so that the leg extending into the interior space of the oven door 10 is inclined upwards. The angle rail of the air-guiding element 30 extends horizontally. In this embodiment, the air-guiding element 30 is arranged behind and marginally above the top edges of the intermediate glass panels 16 and 18. The terms "behind" and "above" relate to the closed state of the oven door 10 and to the position of the user.

[0037] The air-guiding element 30 generates turbulences of the cooling air streams 42. A mixing chamber 40 is formed between the outer glass panel 12 and inner glass panel 14 and above the intermediate glass panels 16 and 18. In the mixing chamber 40 the cooling air streams 42 from the air channels 24, 26 and 28 are intermixed. The hot air stream 42 from the inner air channel 28 is cooled down by the air streams 42 from the intermediate air channel 26 and the outer air channel 24. The air stream 42 of the inner air channel 28 in front of the oven cavity 22 is very hot, while the air stream 42 within the mixing chamber in front of the cavity frame 32 is cooled down. By this way, the upper portion of the inner glass panel 14 in front of the cavity frame 32 is colder than the portion of the inner glass panel 14 in front of the oven cavity 22. Thus, the gaskets 36 and 38, in particular the outer gasket 36 made of silicone, are not exposed to

a very high temperature. The portion of the inner glass panel 14 in front of the outer gasket 36 has a temperature lower than 240°C even if a pyrolytic cleaning process is performed. The air-guiding element 30 avoids a damage or destruction of the outer gasket 36 during the pyrolytic cleaning process. The air-guiding element 30 allows that the cooking oven 20 is suitable for the pyrolytic cleaning function on the one hand and the steam cooking function on the other hand.

[0038] In general, the air-guiding element 30 includes at least one sheet element or strip extending from the outer side of the inner glass panel 14 to the interior of the oven door 10. Preferably, the air-guiding element 30 is arranged at or marginally above the level of the top wall of the oven cavity 22. The air-guiding element 30 is made of high temperature plastic, metal and/or pressed insulating material. The air-guiding element 30 is fixed by adhesive, screws, clips or any other standard fixing methods.

[0039] FIG 2 illustrates a schematic sectional side view of the upper portion of the oven door 10 according to the first embodiment of the present invention, wherein said oven door 10 is attached at the cooking oven 20 and in the closed state.

[0040] The oven door 10 includes the outer glass panel 12, the inner glass panel 14 and the both intermediate glass panels 16 and 18 arranged between said outer glass panel 12 and inner glass panel 14. The inner glass panel 14 is arranged towards the oven cavity 22, while the outer glass panel 12 forms a part of the front side of the cooking oven 20. The glass panels 12, 14, 16 and 18 are arranged parallel to each other. The terms "outer" and "inner" relate to the closed state of the oven door 10.

[0041] The outer glass panel 12 extends from the bottom to the top of the oven door 10, while the inner glass panel 14 extends from the bottom 10 to the outlet 44. The heights of the intermediate glass panels 16 and 18 are lower than the height of the inner glass panel 14. In this example, the heights of the intermediate glass panels 16 and 18 are marginally bigger than the height of the front opening of the oven cavity 22.

[0042] The air-guiding element 30 is attached at the outer side of the inner glass panel 14. In this example, the air-guiding element 30 is formed as the elongated angle rail, wherein the one leg of said angle rail is attached at the outer side of the inner glass panel 14, while the other leg of the angle rail extends into the interior space of the oven door 10. The open end of the air-guiding element 30 is arranged in a vertical distance x above the upper edge of the adjacent intermediate glass panel 18. Further, the open end of the air-guiding element 30 is arranged in a horizontal distance y from the inner glass panel 14. The distances x and y of the open end of the air-guiding element 30 determines the cooling air streams 42 within the oven door 10, in particular in the mixing chamber 40. The distances x and y balance the dynamic of the cooling air streams inside the oven door, i.e. the air flow and the air mixture in the top of the oven door.

[0043] FIG 3 illustrates a schematic perspective sectional side view of the upper portion of the oven door 10 according to a second embodiment of the present invention.

[0044] The oven door 10 includes the outer glass panel 12, the inner glass panel 14 and two intermediate glass panels 16 and 18 arranged between said outer glass panel 12 and inner glass panel 14. The inner glass panel 14 is arranged towards the oven cavity 22, while the outer glass panel 12 forms the front panel of the oven door 10. The glass panels 12, 14, 16 and 18 are arranged parallel to each other.

[0045] The outer glass panel 12 extends from the bottom to the top of the oven door 10, while the inner glass panel 14 extends from the bottom 10 to the outlet 44. The heights of the intermediate glass panels 16 and 18 are lower than the height of the inner glass panel 14. The top edge of the inner intermediate glass panel 18 is substantially arranged at the level of the top wall of the oven cavity 22. The air-guiding element 30 is attached at the outer side of the inner glass panel 14, wherein the air-guiding element 30 is formed as the elongated angle rail. The one leg of said angle rail is attached at the outer side of the inner glass panel 14, while the other leg of the angle rail extends into the interior space of the oven door 10. Also in this example, the legs of the angle rail form an obtuse angle, so that the leg extending into the interior space of the oven door 10 is inclined upwards. Further, the open end of the leg extending into the interior space of the oven door 10 is arranged above the top edge of the inner intermediate glass panel 18. The top edge of the outer intermediate glass panel 16 is arranged above the level of the open end of the leg extending into the interior space of the oven door 10.

[0046] FIG 4 illustrates a schematic perspective sectional side view of the upper portion of the oven door 10 according to a third embodiment of the present invention.

[0047] The oven door 10 includes the outer glass panel 12, the inner glass panel 14 and two intermediate glass panels 16 and 18 arranged between said outer glass panel 12 and inner glass panel 14. The inner glass panel 14 is arranged towards the oven cavity 22, while the outer glass panel 12 forms the front panel of the oven door 10. The glass panels 12, 14, 16 and 18 are arranged parallel to each other.

[0048] The outer glass panel 12 extends from the bottom to the top of the oven door 10, while the inner glass panel 14 extends from the bottom 10 to the outlet 44. The heights of the intermediate glass panels 16 and 18 are lower than the height of the inner glass panel 14. The top edge of the inner intermediate glass panel 18 is substantially arranged at the level of the top wall of the oven cavity 22. The air-guiding element 30 is attached at the outer side of the inner glass panel 14. The air-guiding element 30 is formed as the elongated angle rail, wherein the one leg of said angle rail is attached at the outer side of the inner glass panel 14, while the other leg of the

angle rail extends into the interior space of the oven door 10. In this example, the legs of the angle rail form a right angle, so that the leg extending into the interior space of the oven door 10 is arranged horizontally. Moreover, the open end of the leg extending into the interior space of the oven door 10 is arranged above the top edge of the inner intermediate glass panel 18. In turn, the top edge of the outer intermediate glass panel 16 is arranged above the level of the leg extending into the interior space of the oven door 10.

[0049] FIG 5 illustrates a schematic front view of an inner glass panel 14 of the oven door 10 according to a fourth embodiment of the present invention.

[0050] The air-guiding element 30 is attached at the outer side of the inner glass panel 14. In this example, the air-guiding element 30 includes a horizontal main part and two vertical lateral parts. For example, the horizontal main part of the air-guiding element 30 is formed as the air-guiding elements 30 shown in FIG 1 to 4. The dotted line 36 represents the area, where the outer gasket 36 is pressed against the inner glass panel 14 in the closed state of the oven door 10. The lateral vertical parts of the air-guiding element 30 block heat and/or reduce the air stream. The horizontal part of the air-guiding element 30 guides hot air to the outer portions of the oven door 10. Moreover, the lateral vertical parts of the air-guiding element 30 conduct the cooling air streams, so that the temperature at the lateral sides of the oven door 10 increases.

[0051] The air-guiding element 30 according to the present invention provides a cool area in the upper portion of the inner glass panel 14, so that a damage or destruction of the outer gasket 36 made of silicone is avoided. The oven door 10 with the inventive air-guiding element 30 allows pyrolytic cleaning function on the one hand and steam cooking function on the other hand.

[0052] FIG 6 illustrates a schematic sectional side view of the upper portion of the oven door 10 according to the prior art, wherein said oven door 10 is attached at the cooking oven 20 and in the closed state.

[0053] The oven door 10 includes the outer glass panel 12, the inner glass panel 14 and two intermediate glass panels 16 and 18, wherein the inner glass panel 14 is arranged towards the oven cavity 22 of the cooking oven 20. The intermediate glass panels 16 and 18 are arranged between the outer glass panel 12 and the inner glass panel 14. The glass panels 12, 14, 16 and 18 are arranged parallel to each other.

[0054] The glass panels 12, 14, 16 and 18 are laterally connected to each other, so that air channels 24, 26 and 28 are formed between said glass panels 12, 14, 16 and 18. In the closed state of the oven door 10 the air channels 24, 26 and 28 extend vertically. The inlet of said air channels 24, 26 and 28 is formed in the bottom of the oven door 10. The outlet 44 of the air channels 24, 26 and 28 is formed at the upper inner side of the oven door 10. In the closed state of the oven door 10 the outlet 44 is connected to the suction channel 34 of the cooking oven 20, so that cooling air streams 42 are pulled bottom-up through the air channels 24, 26 and 28. The cooling air streams 42 within the air channels 24, 26 and 28 effect that the outer glass panel 12 is colder than the inner glass panel 14 and the oven cavity 22. By this way the cooling air streams 42 protect the user from heat generated by the cooking oven 20.

[0055] Between the oven door 10 and the cavity frame 32 of the cooking oven 20 the gasket 36 or 38 is arranged. The gasket 36 or 38 encloses the front opening of the oven cavity 22. The gasket 36 or 38 is either made of silicone or glass fibre.

[0056] On the one hand, the gasket 36 or 38 made of glass fibre has a high heat resistance and allows the pyrolytic cleaning function. On the other hand, the gasket 36 or 38 made of glass fibre is vapour permeable, but not suitable for the steam cooking function. The gasket 36 or 38 made of silicone would be steam-tight on the one hand. However, the gasket 36 or 38 made of silicone would be damaged or destroyed during the pyrolytic cleaning function on the other hand. Thus, the oven door 10 according to the prior art can be used either for pyrolytic cleaning function or steam cooking function, but not for both applications.

[0057] In contrast, according to the present invention the outer gasket 36 and the inner gasket 38 are arranged between the oven door 10 and the cavity frame 32 of the cooking oven 20, wherein said outer gasket 36 and inner gasket 38 enclose the front opening of the oven cavity 22. The outer gasket 36 is made of silicone and the inner gasket 38 is made of glass fibre.

[0058] On the one hand, the inner gasket 38 made of glass fibre has a high heat resistance and allows the pyrolytic cleaning function. On the other hand, the outer gasket 36 made of silicone is steam-tight and allows the steam cooking function. The air-guiding element 30 allows that the upper portion of the inner glass panel 14 in front of the cavity frame 32 is colder than the portion of the inner glass panel 14 in front of the oven cavity 22. Thus, the gaskets 36 and 38, in particular the outer gasket 36 made of silicone, are not exposed to a very high temperature. The portion of the inner glass panel 14 in front of the outer gasket 36 has a temperature lower than 240°C even if a pyrolytic cleaning process is performed. The air-guiding element 30 avoids a damage or destruction of the outer gasket 36 made of silicone during the pyrolytic cleaning process. Thus, the present invention allows that the oven door 10 can be used for pyrolytic cleaning function as well as for steam cooking function.

[0059] Although illustrative embodiments of the present invention have been described herein with reference to the accompanying drawings, it is to be understood that the present invention is not limited to those precise embodiments, and that various other changes and modifications may be affected therein by one skilled in the art without departing from the scope or spirit of the invention. All such changes and modifications are intended to be included within the scope of the invention as

defined by the appended claims.

List of reference numerals

[0060]

10 oven door
12 outer glass panel
14 outer intermediate glass panel
16 inner intermediate glass panel
18 inner glass panel
20 cooking oven
22 oven cavity
24 outer air channel
26 intermediate air channel
28 inner air channel
30 air-guiding element
32 cavity frame
34 suction channel
36 outer gasket, silicone gasket
38 inner gasket, glass fibre gasket
40 mixing chamber
42 cooling air stream
44 outlet

x vertical distance between the open end of the air-guiding element and the upper edge of the adjacent intermediate glass panel
y horizontal distance between the open end of the air-guiding element and the inner glass panel

Claims

1. An oven door (10) for a cooking oven (20), in particular for a domestic cooking oven (20), wherein:

- the oven door (10) includes an outer glass panel (12) and an inner glass panel (14),
- the oven door (10) includes at least one intermediate glass panel (16, 18) arranged between the outer glass panel (12) and the inner glass panel (14),
- the lateral sides of the glass panels (12, 14, 16, 18) are directly or indirectly connected to each other,
- air channels (24, 26, 28) are formed between the glass panels (12, 14, 16, 18),
- the oven door (10) includes at least one air-guiding element (30) arranged at the inner glass panel (14),
- the air-guiding element (30) includes at least one sheet element or strip extending into the interior space of the oven door (10), so that a cooling air stream (42) is deflected away from the inner glass panel (14), and
- the level of the at least one sheet element or strip is adapted to the level of a top wall of an oven cavity (22) of the corresponding cooking oven (22) in a closed state of the oven door (10).

2. The oven door according to claim 1, **characterised in that** the lateral sides of the glass panels (12, 14, 16, 18) are connected via a door frame and/or a pair of door columns.

3. The oven door according to claim 1 or 2, **characterised in that** the level of the top edge of the at least one intermediate glass panel (16, 18) is lower than the levels of the top edges of the outer glass panel (12) and inner glass panel (14) in the closed state of the oven door (10), wherein preferably a mixing chamber (40) is formed between the outer glass panel (12) and inner glass panel (14) and above the at least one intermediate glass panel (16, 18) in the closed state of the oven door (10).

4. The oven door according to any one of the preceding claims, **characterised in that** at least one inlet of the air channels (24, 26, 28) is formed in the bottom of the oven door (10).

5. The oven door according to any one of the preceding claims, **characterised in that** at least one outlet (44) of the air channels (24, 26, 28) is formed in an upper portion of the inner side of the oven door (10) and/or in a top side of said oven door (10).

6. The oven door according to any one of the preceding claims, **characterised in that** the air-guiding element (30) is formed as an angle rail, wherein the one leg of said angle rail is arranged at the inner glass panel (14), while the other leg of said angle rail extends into the interior space of the oven door (10).

7. The oven door according to claim 6, **characterised in that** an open end of the leg extending into the interior space of the oven door (10) is arranged above the top edge of an adjacent intermediate glass panel (18), wherein preferably the distance (x) between the open end of the leg extending into the interior space of the oven door (10) and the top edge of the adjacent intermediate glass panel (18) is marginally smaller than the distance between the inner glass panel (14) and the adjacent intermediate glass panel (18).

8. The oven door according to claim 7, **characterised in that** the level of the top edge of a further intermediate glass panel (16) is arranged above the level of the

open end of the leg extending into the interior space of the oven door (10) .

9. The oven door according to any one of the claims 1 to 7, **characterised in that**
the top edges of the intermediate glass panels (16, 18) are arranged at the same level or substantially at the same level, wherein preferably the levels of the top edges of said intermediate glass panels (16, 18) are arranged beneath the level of the open end of the leg extending into the interior space of the oven door (10).

10. The oven door according to any one of the claims 6 to 9, **characterised in that**
the legs of the angle rail form an obtuse angle, wherein the leg extending into the interior space of the oven door (10) is inclined upwards from the inner glass panel (14) to said interior space in the closed state of the oven door (10).

11. The oven door according to any one of the claims 6 to 9, **characterised in that**
the legs of the angle rail form a right angle or substantially a right angle.

12. The oven door according to any one of the preceding claims, **characterised in that**
the air-guiding element (30) is directly attached at the inner glass panel (14), the air-guiding element (30) is a part of or connected to a cover element arranged on the top side of the oven door (10), or the air-guiding element (30) is a part of or connected to a door frame of the oven door (10).

13. The oven door according to any one of the preceding claims, **characterised in that**
the air-guiding element (30) includes a horizontal elongated main part and two vertical elongated lateral parts in the closed state of the oven door (10).

14. A cooking oven (20), in particular a domestic cooking oven (20), for performing a pyrolytic cleaning function and a steam cooking function,
characterised in that
the cooking oven (20) comprises at least one oven door (10) according to any one of the preceding claims.

15. The cooking oven (20) according to claim 14,
characterised in that
the cooking oven (20) comprises at least one outer gasket (36) and at least one inner gasket (38) arranged between the oven door (10) and a cavity frame (32) of said cooking oven (20), wherein the outer gasket (36) is made of steam tight material, in particular silicone, and the inner gasket (38) is made of temperature resistant material, in particular glass fibre.

FIG 1

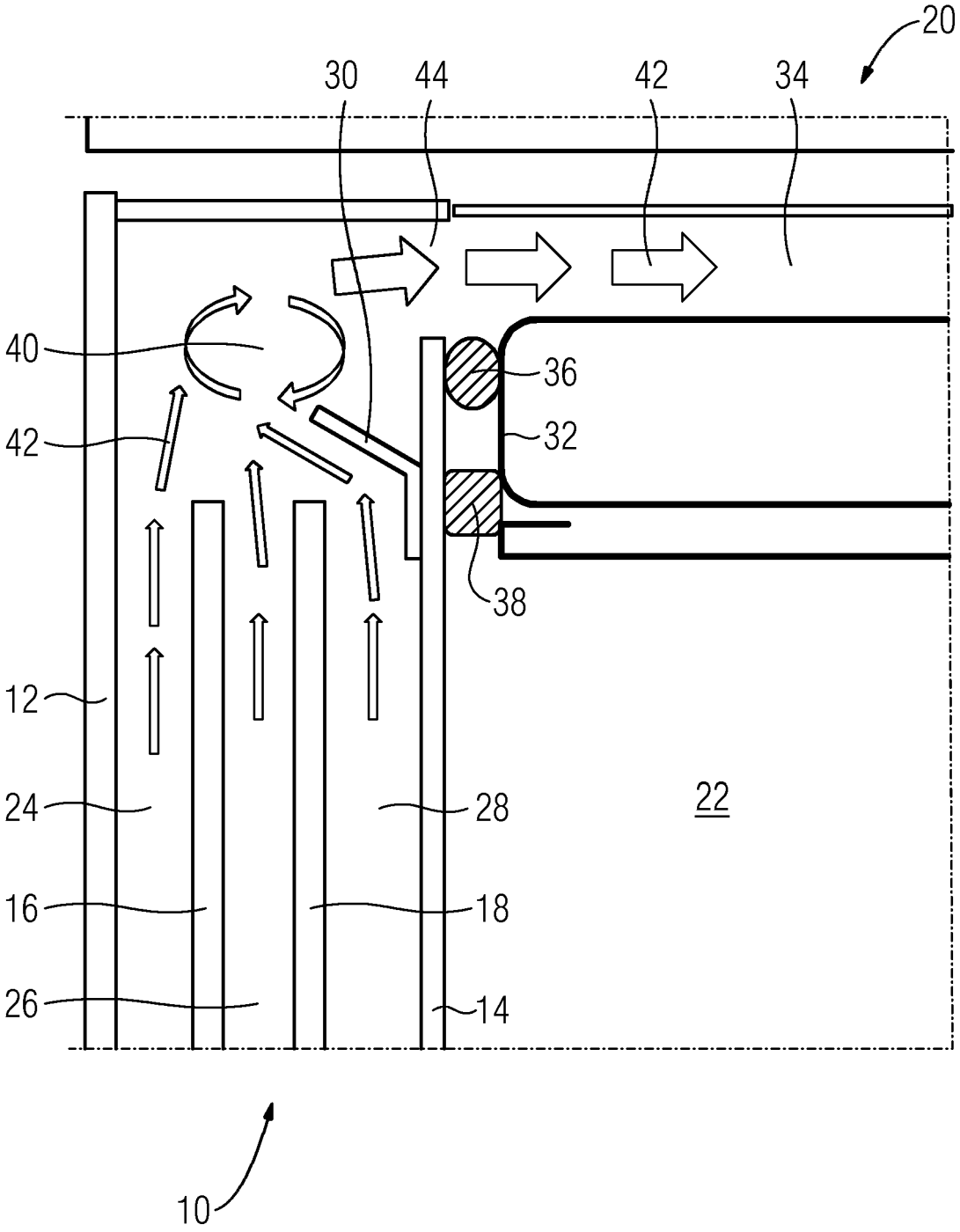


FIG 2

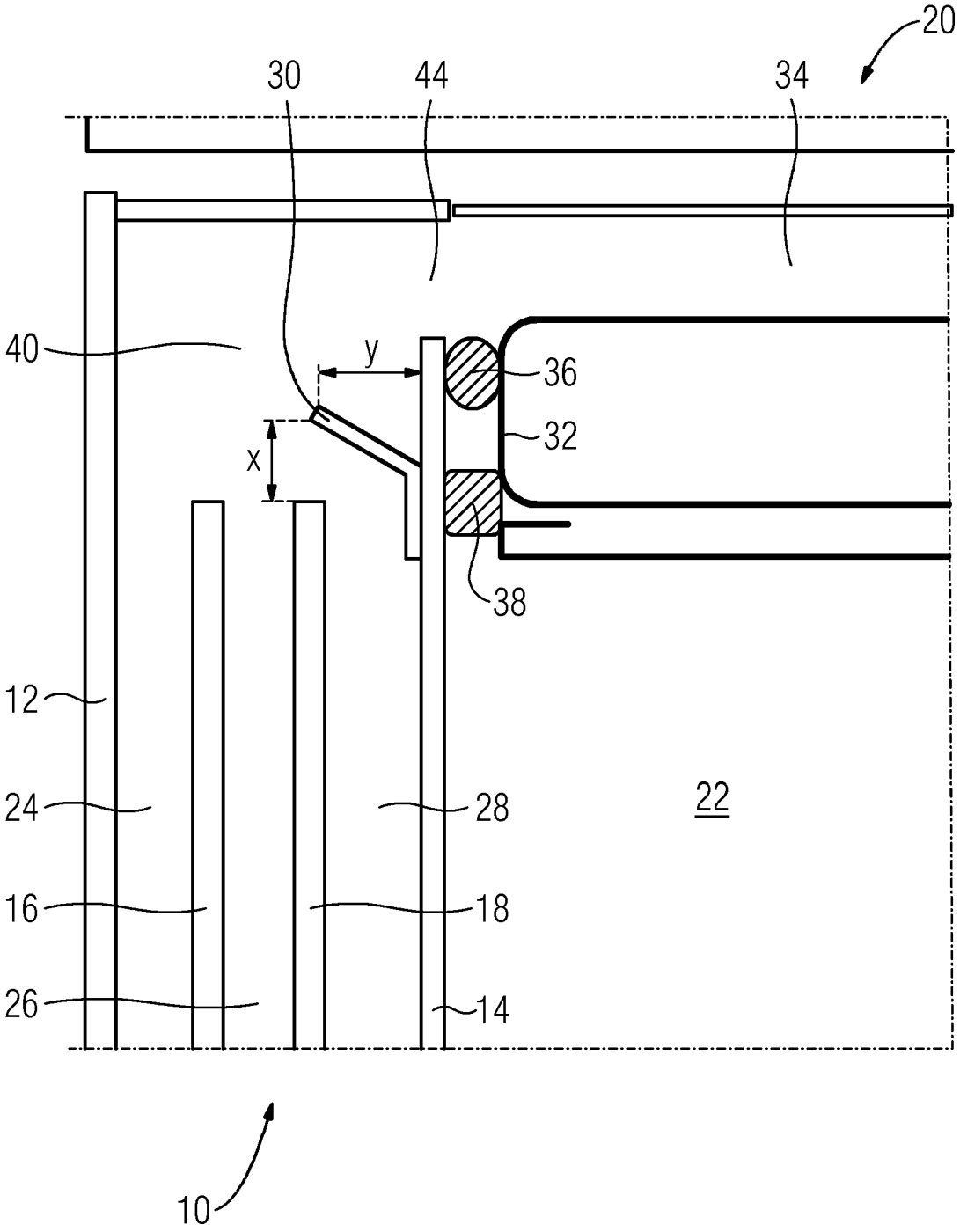


FIG 3

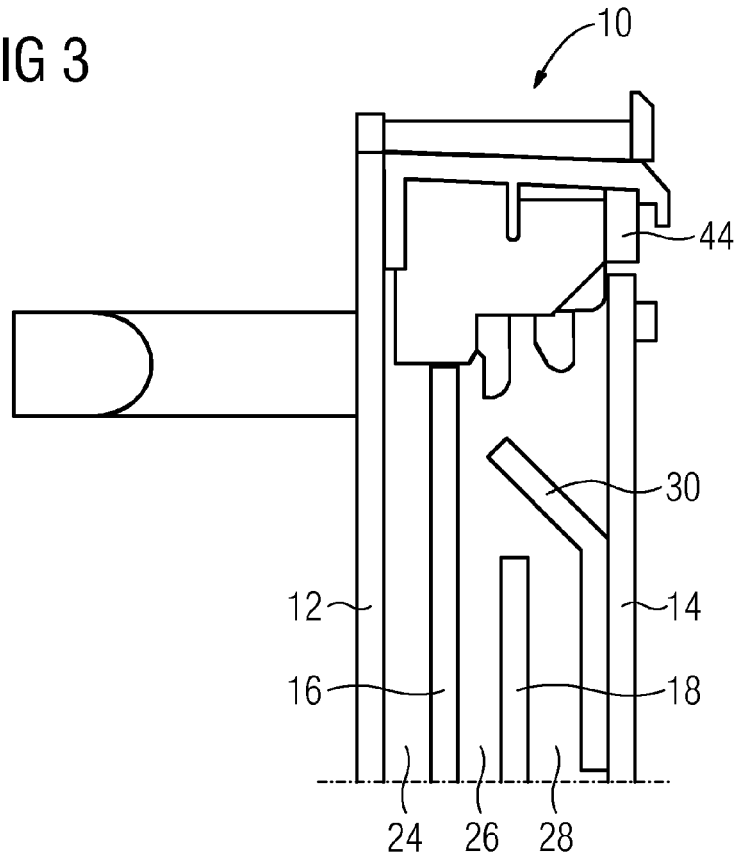


FIG 4

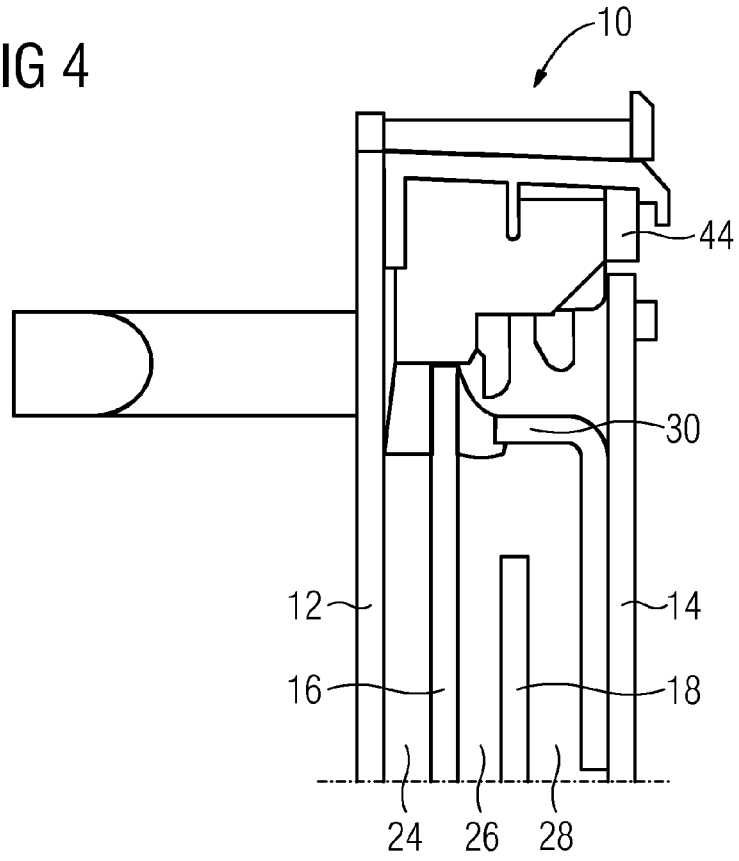


FIG 5

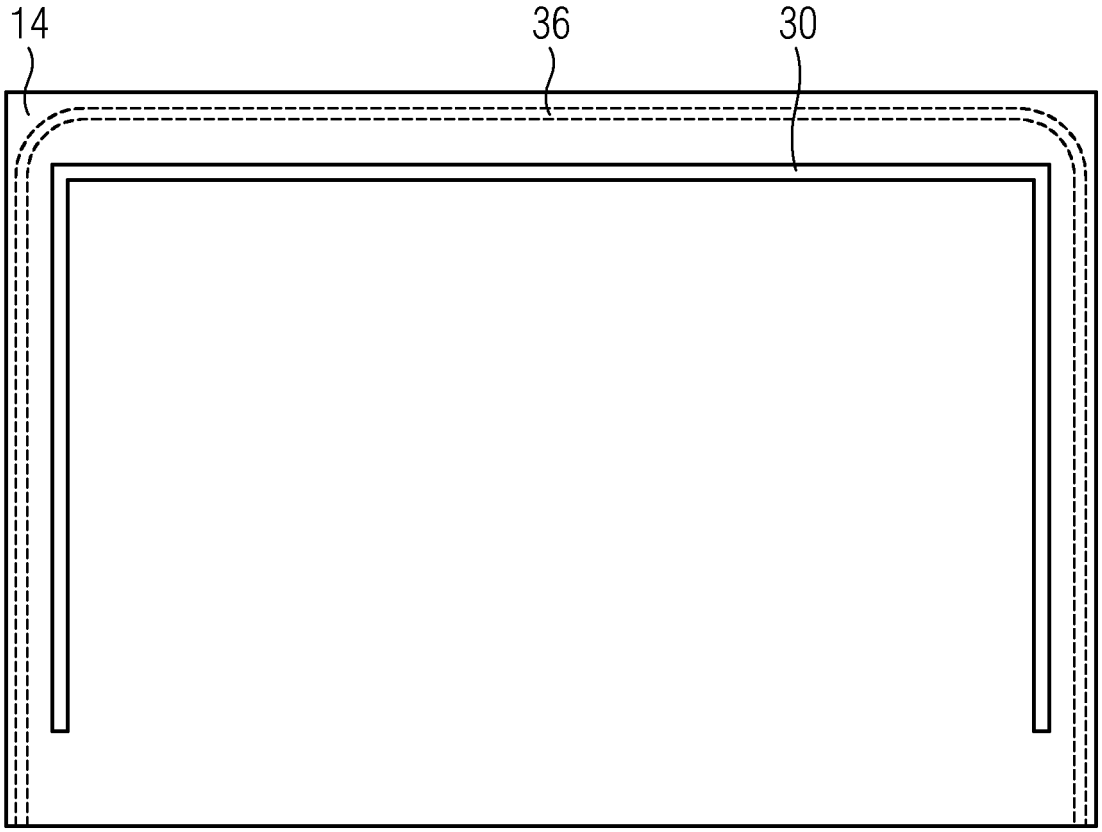
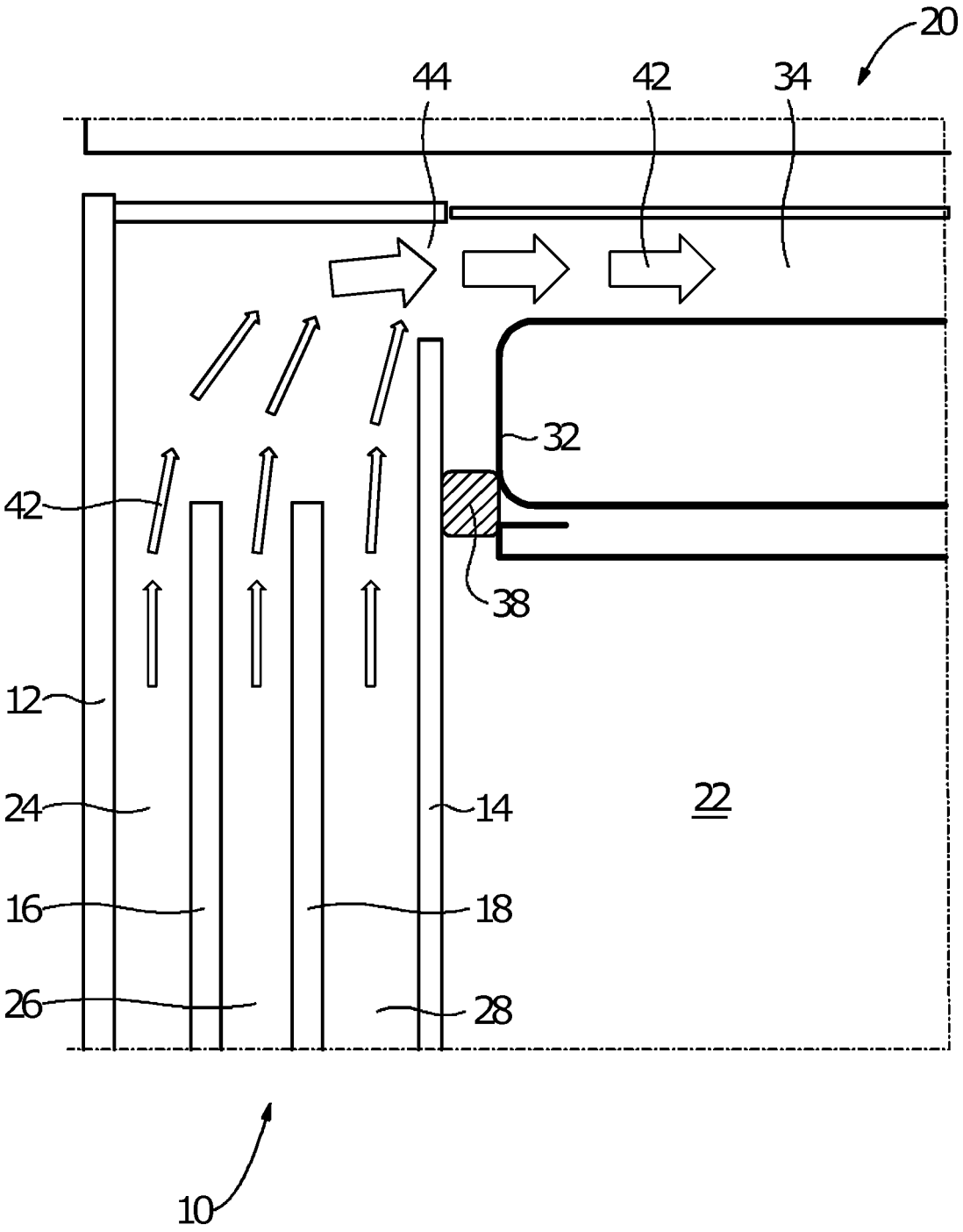


FIG 6



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EUROPEAN SEARCH REPORT

Application Number
EP 19 19 1091

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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	29 January 2020	Jalal, Rashwan

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