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(54) **OVEN FOR COOKING FOODS**

(57) Oven for cooking foods, which comprises: a containment body (5) defining a cooking chamber (6); at least one fan (12) arranged in the cooking chamber (6) and actuatable for generating at least one air flow within the cooking chamber (6) itself; a dividing separator (18),

which is extended in the cooking chamber (6) and has resistance to the air flow that is variable along the height of the cooking chamber (6) itself in order to make the air flow uniform within the latter.

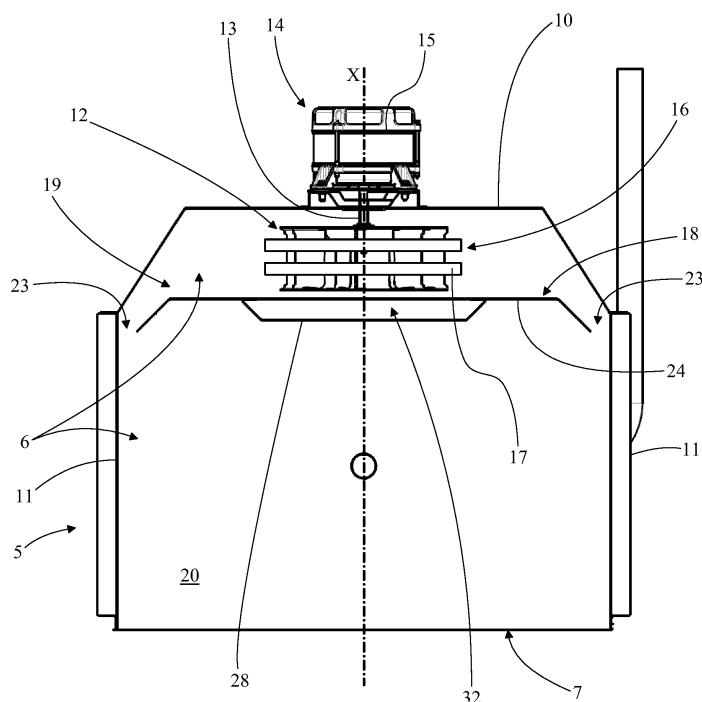


Fig. 5

Description

Field of application

[0001] The present invention regards an oven for cooking foods according to the preamble of claim 1.

[0002] The present oven is inserted in the field of the production of ovens, in particular ovens of professional type, and is adapted to be advantageously employed in the foodservice, gastronomy, pastry-making and bakery fields.

[0003] In particular, the present oven is intended to be advantageously used in a professional setting for the simultaneous cooking of foods arranged in multiple pans arranged on top of each other.

State of the art

[0004] Ovens for professional use are known on the market; such ovens conventionally comprise a load-bearing structure with box-like shape which at its interior delimits a cooking chamber into which the foods to be cooked are intended to be introduced.

[0005] More in detail, the load-bearing structure comprises a lower wall, an upper wall and two lateral walls, which together delimit the aforesaid cooking chamber. The load-bearing structure also comprises a bottom wall placed to close the rear of the cooking chamber.

[0006] The load-bearing structure is at the front provided with an access opening to the cooking chamber in order to allow the introduction of the foods to be cooked in the cooking chamber and to extract such foods from the latter upon completed cooking. A door is provided that is hinged to the load-bearing structure and actuatable to close the access opening during the cooking of the foods.

[0007] The foods to be cooked are intended to be inserted in the cooking chamber, arranged within multiple pans positioned on top of each other over multiple levels and supported for example by a pan rack trolley.

[0008] The oven also comprises heating means adapted to heat the air within the cooking chamber, and one or more fans (in particular of centrifugal type) each of which arranged within the cooking chamber and actuatable for generating a hot air flow that circulates in the cooking chamber itself in order to cook the foods in a uniform manner.

[0009] More in detail, each fan is positioned at the bottom wall of the load-bearing structure and is fixed to a horizontal rotation shaft mechanically connected to an electric motor actuatable in order to rotate the fan itself.

[0010] The heating means of the oven for example comprise an electrical heating element with circular shape and arranged around the corresponding fan in order to heat the air flow generated by the fan itself.

[0011] Advantageously, the oven comprises a separation panel arranged within the cooking chamber and positioned in front of the fans in a manner such to delimit,

with the bottom wall of the load-bearing structure, a space within which the fans and the electrical heating elements are positioned.

[0012] The separation panel is provided with one or more suction openings, each arranged in front of the corresponding fan in order to allow the passage of the air suctioned by the fan itself.

[0013] In addition, the separation panel is provided with two lateral edges, e.g. bent, which delimit two delivery openings with the lateral walls of the load-bearing structure. Through such openings, the air flow generated on the delivery line by the fans exits in order to be distributed within the cooking chamber in which the foods to be cooked are arranged.

[0014] In operation, when each fan is rotated, it axially suctions the air through the corresponding suction opening of the separation panel and radially expels the pressurized air, in a manner such that the air flow intercepts the electrical heating element, absorbing the heat thereof, and is then propagated within the cooking chamber in order to bring the heat to the foods to be cooked.

[0015] In particular, such air flow passes through the delivery openings of the separation panel, hitting the lateral walls of the oven, and flows towards the center of the cooking chamber, coming to be once again suctioned by the fan, in a manner such to generate an air circulation within the cooking chamber.

[0016] One drawback of the ovens of known type briefly mentioned above is due to the fact that the air circulates in a non-uniform manner at the different levels of the food pans, causing a non-uniform cooking of the foods arranged at the different levels.

[0017] In particular, since most of the air is suctioned by the fans at the zone in proximity to the suction openings of the separation panel, the trays positioned at the height of the suction openings are subjected to an air flow having flow rate much higher than those of the air flows that affect the pans arranged far from the suction openings. Consequently the foods arranged in the pans positioned in front of the suction openings undergo a precocious cooking with respect to the foods arranged in the other pans, with consequent non-uniformity of cooking of the foods which can cause an excessive cooking of some foods and an insufficient cooking of other foods.

[0018] Known from the patent EP 1992879 is an oven for cooking foods having a separation panel provided with openings distributed in a variable manner, in order to seek to uniformly distribute the air flow within the cooking chamber. Such oven of known type nevertheless has optimization limits of the food cooking quality.

Presentation of the invention

[0019] In this situation, the problem underlying the present invention is therefore to overcome the above-mentioned drawbacks by providing an oven for cooking foods which allows uniformly cooking foods arranged at different levels within the cooking chamber, in particular

ensuring that such foods at different levels are subjected to air flows having substantially the same flow rate.

[0020] A further object of the present invention is to provide an oven for cooking foods that is entirely reliable in operation.

[0021] A further object of the present invention is to provide an oven for cooking foods capable of operating with high energy efficiency.

[0022] A further object of the present invention is to provide an oven for cooking foods that is structurally simple and inexpensive to make.

Brief description of the drawings

[0023] The technical characteristics of the invention, according to the aforesaid objects, can be clearly seen in the contents of the below-reported claims and the advantages thereof will be more evident from the following detailed description, made with reference to the enclosed drawings, which represent a merely exemplifying and non-limiting embodiment of the invention, in which:

- figure 1 shows a front perspective view of the oven for cooking foods, object of the present invention;
- figure 2 shows a front perspective view of a detail of the present oven, relative to a containment body defining a cooking chamber;
- figure 3 shows a front view of the containment body illustrated in figure 2;
- figure 4 shows a sectional view of the containment body illustrated in figure 3 according to trace IV-IV of figure 3 itself;
- figure 5 shows a further sectional view of the containment body illustrated in figure 3 according to trace V-V of figure 3 itself;
- figure 6 illustrates a front view of a detail of the present oven, relative to a dividing wall arranged in the cooking chamber;
- figure 7 shows a sectional view of the dividing wall illustrated in figure 6 according to trace VII-VII of the figure 6 itself;
- figure 8 shows a front perspective view of a further detail of the present oven, relative to a distribution wall arranged in the cooking chamber;
- figure 9 illustrates front view of the distribution wall illustrated in figure 8;
- figure 10 shows a sectional view of the distribution wall illustrated in figure 9 according to trace X-X of figure 9 itself.

Detailed description of a preferred embodiment

[0024] With reference to the enclosed figures, reference number 1 overall indicates an example of the oven for cooking foods, object of the present invention.

[0025] Advantageously, the oven 1 is intended to be used, in particular in a professional setting, in the food-service, gastronomy, pastry-making and bakery fields,

and in general in the field of cooking foods.

[0026] With reference to the embodiment illustrated in figure 1, the oven 1 comprises a support structure 2 preferably provided with an external framework 3 with substantially box-like shape and having an openable front side.

[0027] Advantageously, the oven 1 comprises a door 4 which is hinged to the support structure 2 and is movable for opening and closing the front side of the external framework 3.

[0028] With reference to the embodiments illustrated in figures 2-5, the support structure 2 comprises a containment body 5 (preferably arranged within the external framework 3) which defines a cooking chamber 6 within which the foods to be cooked are intended to be arranged.

[0029] Advantageously, the containment body 5 is provided with a front opening 7 for the access to the cooking chamber 6, arranged preferably at the front side of the external framework 3 of the support structure 2 of the oven 1.

[0030] Advantageously, the door 4 of the oven 1 is movable between a closed position, in which it obstructs the front opening 7 of the containment body 5, and an open position, in which the front opening 7 is free of (i.e. not obstructed by) the door 4 in order to allow the introduction and the extraction of the foods into and from the cooking chamber 6.

[0031] According to the present invention, the containment body 5, in particular with box-like shape, is provided with an upper wall 8 and with a lower wall 9, preferably parallel to each other, and between which the cooking chamber 6 is extended height-wise.

[0032] Advantageously, the containment body 5 is provided with a supporting wall 10, which is placed to connect between upper wall 8 and the lower wall 9 and is preferably positioned as a rear closure of the containment body 5, in particular facing the front opening 7 of the latter.

[0033] Preferably, the containment body 5 comprises two lateral supporting walls 11, parallel to each other and facing, between which the cooking chamber 6 is extended width-wise.

[0034] The lateral supporting walls 11 are placed to connect between the upper wall 8 and the lower wall 9 and are extended in particular between the supporting wall 10 and the front opening 7 orthogonally to the supporting wall 10 itself.

[0035] According to the invention, the oven 1 comprises at least one fan 12, preferably of centrifugal type, arranged in the cooking chamber 6 at the supporting wall 10 and provided with a rotation axis X preferably orthogonal to the supporting wall 10 itself.

[0036] The fan 12 is actuatable for generating at least one air flow within the cooking chamber 6 adapted to uniformly distribute the heat within the cooking chamber 6 itself.

[0037] In accordance with the embodiment illustrated in the enclosed figures, the oven 1 comprises multiple

fans 12, e.g. two, arranged at different heights within the cooking chamber 6.

[0038] Of course, the oven 1 can also comprise only one fan 12, or even more than two fans 12, without departing from the protective scope of the present patent.

[0039] In accordance with the embodiment illustrated in the enclosed figures, the supporting wall 10, at which each fan 12 is arranged, is placed as a rear closure of the containment body 5. In accordance with a different non-illustrated embodiment, the supporting wall on which each fan 12 is positioned is obtained with one of the lateral supporting walls 11 of the containment body 5.

[0040] Advantageously, each fan 12 is adapted to be fixed to a corresponding rotation shaft 13, aligned with the rotation axis X of the fan 12 itself, rotatably constrained to the support structure 2 and arranged in particular to cross through the supporting wall 10 with axis orthogonal to the latter.

[0041] The oven 1 is advantageously provided with movement means 14 mechanically connected to the corresponding fan 12 in order to make it rotate around the rotation axis X.

[0042] The movement means 14 preferably comprise an electric motor 15, which is mechanically connected to the rotation shaft 13 of the corresponding fan 12 and is actuatable in order to rotate the rotation shaft 13 for the purpose of moving the fan 12.

[0043] With reference to the embodiments illustrated in figures 4 and 5, the movement means 14 are mounted on the supporting wall 10 of the containment body 5 outside the cooking chamber 6.

[0044] Advantageously, each fan 12 is extended along its rotation axis X between a rear side, directed towards the supporting wall 10, and an opposite front side through which the fan 12 is adapted to suction the air. In addition, the fan 12 is provided with a peripheral side, which is extended around the rotation axis X between the front side and the rear side and through which fan 12 is adapted to convey the air flow on the delivery line.

[0045] Preferably, the fan 12 is positioned with its rear side adjacent to the supporting wall 10.

[0046] Advantageously, the fan 12 comprises a support plate placed to at least partially close the rear side of the fan 12 itself. In particular, the support plate carries a hub centrally fixed thereto, and such hub is fixed to the rotation shaft 13 actuatable for moving the fan 12.

[0047] The fan 12 preferably comprises multiple blades arranged around the rotation axis X and in particular projectingly fixed on the support plate.

[0048] Advantageously, the blades of the fan 12 are arranged around the rotation axis X equidistant from the latter, preferably along a circular trajectory, and are in particular regularly distributed around the rotation axis X itself.

[0049] Preferably, the blades are separated from each other by delivery slits made along the peripheral side of the fan 12, and through such delivery slits the air is radially insufflated under pressure, as described in detail here-

inbelow.

[0050] Advantageously, the oven 1 comprises heating means 16 in operation associated with the cooking chamber 6 in order to heat the air within the latter. In particular, the heating means 16 are at least partially arranged in the cooking chamber 6, and are adapted to intercept the air flow generated on the delivery line by the fan 12 in order to heat the air itself.

[0051] Advantageously, according to the embodiment illustrated in the enclosed figures 4 and 5, the heating means 16 of the oven 1 comprise at least one electrical heating element 17 with substantially circular shape and arranged around the peripheral side of the fan 12, in a manner so as to intercept the air that exits under pressure from the delivery slits of the fan 12 itself, in order to transfer the heat to the air so as to heat it.

[0052] In accordance with a different non-illustrated embodiment, the heating means 16 comprise a gas burner provided with one or more radiant tubes arranged within the cooking chamber 6 alongside the fans 12 or around the latter in order to intercept the air that exits from the delivery slits of the fans 12 themselves.

[0053] According to the present invention, the oven 1 comprises a dividing separator 18, which is extended in the cooking chamber 6 between the upper wall 8 and the lower wall 9 of the containment body 5 according to an extension direction Y preferably parallel to the supporting wall 10 and orthogonal to the upper wall 8 and to the lower wall 9 themselves.

[0054] The dividing separator 18, which is preferably fixed to the containment body 5, separates the cooking chamber 6 into a ventilation space 19, which is extended between the supporting wall 10 and the dividing separator 18 and in which the fans 12 and preferably the heating means 16 are arranged, and a cooking space 20, which is extended preferably between the dividing separator 18 and the front opening 7 of the containment body 5 and in which the foods to be cooked are intended to be arranged.

[0055] Advantageously, the foods are intended to be arranged in the cooking space 20 of the cooking chamber 6 positioned in multiple pans arranged on top of each other at different heights along the height of the cooking chamber 6 itself. The pans are supported for example by a pan rack trolley or by shelves projecting into the cooking space 20 from the lateral supporting walls 11 of the containment body 5.

[0056] The dividing separator 18 is provided with at least one suction opening 21 through which the fans 12 are adapted to suction the air flow from the cooking space 20 towards the ventilation space 19, and advantageously with at least one delivery opening 23, through which the air flow emitted on the delivery line by the fans 12 passes from the ventilation space 19 to the cooking space 20.

[0057] Preferably, the dividing separator 18 is provided with multiple aforesaid suction openings 21 which are distributed in succession at least along the extension direction Y. Advantageously, the suction openings 21 of

the dividing separator 18 are distributed along the extension direction Y of the latter substantially along the entire height of the cooking chamber 6.

[0058] In accordance with the idea underlying the present invention, the suction openings 21 of the dividing separator 18 are distributed along the extension direction Y in a manner such that the dividing separator 18 has spatially-variable resistance to the flow at least along the extension direction Y itself.

[0059] Advantageously, the resistance to the flow of the dividing separator 18 decreases in moving away from the rotation axis X of each fan 12.

[0060] In particular, with the expression "resistance to the air flow" it is intended the capacity of the dividing separator 18 to be opposed to the passage of the air flow suctioned by the fans 12 from the cooking space 20 to the ventilation space 19, involving load losses of the air flow in the passage through the suction openings 21 of the dividing separator 18 itself.

[0061] The aforesaid configuration of the suction openings 21 of the dividing separator 18 allows making the flow rate of the air flow into the cooking space 20 substantially uniform along the entire height of the latter and, therefore, making the flow rate of the air flow uniform at the different levels at which the pans containing the foods to be cooked are intended to be arranged. Such foods, therefore, even if arranged at different levels along the height of the cooking space 20, receive an amount of heat from the air flow that is substantially equal with respect to each other, therefore ensuring a uniform cooking of the foods themselves.

[0062] More in detail, the configuration of the suction openings 21 involves higher resistance to the air flow of the dividing separator 18 at the zones of the cooking space 20 at the same height as the fans 12, limiting the amount of air suctioned by the fans 12 in such zones, while the dividing separator 18 has lower resistance to the air flow at the zones of the cooking space 20 at heights different from those of the fans 12, involving lower resistance to the suction of the fans 12 at the latter zones.

[0063] Since each fan 12 tends to generate a flow with higher flow rate in the zone in front of it and with smaller flow rate in the zones at different heights, the higher resistance to the air flow of the dividing separator 18 in front of the fans 12, and the lower resistance to the air flow of the dividing separator 18 in the zones at different heights cause a flow with flow rate substantially uniform along the entire height of the cooking space 20.

[0064] Advantageously, the dividing separator 18 is provided with a distribution interspace 32, which is arranged between the ventilation space 19 and the cooking space 20, extended along the extension direction Y between the upper wall 8 and the lower wall 9. The aforesaid distribution interspace 32 is connected, by means of at least one passage opening 27, to the ventilation space 19 and, by means of the aforesaid suction openings 21, to the cooking space 20.

[0065] Preferably, the distribution interspace 32 is ex-

tended along the extension direction Y substantially for the entire height of the cooking chamber 6, in particular between an upper end 33 arranged at the upper wall 8 of the containment body 5, and a lower end 34 arranged at the lower wall 9 of the containment body 5 itself.

[0066] In accordance with the embodiment illustrated in the enclosed figures, the dividing separator 18 comprises a separation wall 24 preferably provided with a first face 25 directed towards the supporting wall 10 and with a second face 26 directed in the direction opposite the first face 25 and in particular directed towards the front opening 7 of the containment body 5. On such separation wall 24, the aforesaid passage opening 27 is made which is extended in front of the corresponding fan 12, and in particular in front of the front side of the fan 12 itself, in order to allow the passage of the air suctioned by the latter.

[0067] In accordance with the embodiment illustrated in the enclosed figures, the separation wall 24 is provided with multiple passage openings 27, each arranged in front of the corresponding fan 12.

[0068] Advantageously, the passage opening 27 substantially has the same diameter size as the corresponding fan 12, with preferably circular shape.

[0069] The dividing separator 18 also comprises a distribution wall 28 which is extended in front of the second face 26 of the separation wall 24, extended along the extension direction Y between the upper wall 8 and the lower wall 9 passing in front of the passage openings 27. On such distribution wall 28, the aforesaid suction openings 21 are obtained.

[0070] The distribution wall 28 delimits, with the separation wall 24, the aforesaid distribution interspace 32, in a manner such that the thickness of the latter is extended between the separation wall 24 and the distribution wall 28.

[0071] In particular, the thickness of the distribution interspace 32 is delimited between the second face 26 of the separation wall 24 and the distribution wall 28.

[0072] In accordance with the embodiment illustrated in the enclosed figures, the separation wall 24 of the dividing separator 18 is extended according to the extension direction Y substantially along the entire height of the cooking chamber 6.

[0073] With reference to the example illustrated in figures 6 and 7, the dividing separator 18, and in particular its separation wall 24, is extended along the extension direction Y between an upper end 29 thereof, preferably fixed to the upper wall 8 of the containment body 5, and a lower end 30 preferably fixed to the lower wall 9 of the containment body 5 itself. In particular the upper end 29 and the lower end 30 of the separation wall 24 are provided with corresponding bent portions 29', 30' fixed, e. g. by means of screws or rivets, respectively to the upper wall 8 and to the lower wall 9 of the containment body 5.

[0074] Preferably, the dividing separator 18, and in particular its separation wall 24, is extended transversely to the extension direction Y between two lateral flaps 31,

parallel to the extension direction Y and preferably bent towards the cooking space 20. Such lateral flaps 31 delimit, with the corresponding lateral supporting walls 11 of the containment body 5, the corresponding delivery openings 23 through which the air flow generated on the delivery line by the fans 12 is conveyed from the ventilation space 19 to the cooking space 20 of the cooking chamber 6.

[0075] Preferably, the separation wall 24 is obtained with a first metal plate, e.g. made of steel.

[0076] Advantageously, with reference to the embodiment illustrated in figures 8-10, the distribution wall 28 is provided with an internal face 35, preferably of concave shape, directed towards the second face 26 of the separation wall 24 and delimiting the distribution interspace 32 with such second face 26.

[0077] Preferably, the distribution wall 28 is obtained with a second metal plate, e.g. made of steel, in particular with concave shape with concavity directed towards the separation wall 24.

[0078] Preferably, the distribution wall 28 is fixed to the second face 26 of the separation wall 24, by means of fixing means such as screws, rivets, glues, etc.

[0079] According to the invention, the dividing separator 18 comprises two lateral walls 38, which are placed to connect between the separation wall 24 and the distribution wall 28 to laterally delimit the distribution interspace 32 which in this manner is extended, transversely to the extension direction Y, between the aforesaid lateral walls 38.

[0080] Preferably, the lateral walls 38 are extended, between the upper end 33 and the lower end 34 of the distribution interspace 32, parallel to the extension direction Y and are in particular arranged parallel to each other.

[0081] In particular, the lateral walls 38 delimit corresponding lateral sides of the distribution interspace 32 that are at least partially closed.

[0082] Preferably, in accordance with the embodiment illustrated in figures 8-10, the suction openings 21 of the dividing separator 18 are also made on the lateral walls 38 of the latter.

[0083] Advantageously, with reference to the embodiment illustrated in figures 6-10, the distribution wall 28 comprises a central portion 36, preferably flat, which is spaced from the second face 26 of the separation wall 24 by means of the distribution interspace 32, and is extended transversely to the extension direction Y between two longitudinal edges 37 parallel to the extension direction Y itself. In addition, the distribution wall 28 comprises two attachment portions 38' which define the aforesaid lateral walls 38. Such attachment portions 38' are extended along the corresponding longitudinal edges 37 of the central portion 36, are bent towards the separation wall 24 and are fixed to the second face 26 of the latter. In particular, each attachment portion 38' comprises a bent appendage 39 fixed to the second face 26 of the separation wall 24, e.g. by means of screws.

[0084] In accordance with a different non-illustrated embodiment, the dividing separator 18 is integrally made. In accordance with a further different embodiment, the dividing separator 18 is made of more than two components, the separation wall 24 and/or the distribution wall 28 for example being made of two or more parts.

[0085] In accordance with a further different non-illustrated embodiment, the distribution wall 28 has a substantially flat shape and is fixed to the upper and lower walls 8, 9 of the containment body 5 of the oven 1, and the separation wall 24 has a substantially concave shape and is fixed to the distribution wall 28, in particular to a face of the latter directed towards the supporting wall 10 of the containment body 5, with the concavity of the separation wall 24 directed towards the distribution wall 28 in order to delimit the distribution interspace 32 therewith. In particular, according to the latter embodiment, the lateral walls 38 of the dividing separator 18 are integrally made with the separation wall 24.

[0086] Advantageously, the dividing separator 18 of the oven 1 is provided, along the extension direction Y, with one or more first sections 18', each of which extended in front of the corresponding fan 12 and in particular in front of the corresponding passage opening 27. In addition, the dividing separator 18 is provided with one or more second sections 18'', each of which extended outside the front projection of each fan 12 (such front projection being intended as the projection of the fan 12 on the dividing separator 18 according to the corresponding rotation axis X).

[0087] The second section 18'' of the dividing separator 18 has lower resistance to the air flow than the first section 18', in order to make the flow rate of the air flow uniform in the cooking space 20, as discussed above.

[0088] Preferably, a first part of the suction openings 21 extended into the first section 18' of the dividing separator 18 has smaller overall area than a second part of the suction openings 21 extended into the second section 18'' of the dividing separator 18 itself.

[0089] In particular, in accordance with the embodiment illustrated in the enclosed figures, the single suction openings 21 arranged in the first sections 18' of the dividing separator 18 have area greater than the single suction openings 21 arranged in the second sections 18'' of the dividing separator itself.

[0090] In accordance with a different embodiment, the suction openings 21 arranged in the first sections 18' of the dividing separator 18 are spaced from each other by solid portions of area greater than the suction openings 21 arranged in the second sections 18'' of the dividing separator itself.

[0091] Advantageously, in general, the first section 18' of the dividing separator 18 has a solid surface (extended between the suction openings 21) having overall area greater than the solid surface of the second section 18'', in a manner such that the first section 18' has a resistance to the air flow greater than that of the second section 18''.

[0092] Advantageously, the resistance to the air flow

of the dividing separator 18 varies in a gradual manner between each first section 18' and the adjacent second section 18", in a manner such that the resistance to the air flow continuously changes, without sudden shifts, between the first section 18' and the second section 18".

[0093] Advantageously, a third part of the suction openings 21, which is extended between each first section 18' and the adjacent second section 18" of the dividing separator 18, has overall area of size intermediate between the overall area of the first part of the suction openings 21 (arranged in the first section 18') and the overall area of the second part of the suction openings 21 (arranged in the second section 18").

[0094] For example, with reference to the embodiment illustrated in figure 8, the aforesaid third part comprises one or more suction openings 21 of size intermediate between that of the suction openings 21 of the first part (in the first section 18') and of the second part (in the second section 18").

[0095] In accordance with the embodiment illustrated in the enclosed figures, each suction opening 21 of the dividing separator 18, transversely to the extension direction Y, is extended with elongated shape along a longitudinal direction W thereof transverse to the extension direction Y, in particular with rectangular contour.

[0096] In accordance with different embodiments, the suction openings 21 can have circular or undulated shape.

[0097] In operation, when the fans 12 are actuated to rotate by the movement means 14, each fan 12 suctions the air from the front side thereof (such air reaches the fan 12 by passing through the corresponding passage opening 27 of the separation wall 24), bringing into reduced pressure conditions the distribution interspace 32 delimited between the separation wall 24 and the distribution wall 28. Consequently, the air is suctioned from the cooking space 20 into the distribution interspace 32 through the suction openings 21 of the distribution wall 28, generating an air flow into the cooking space 20 itself.

[0098] The air enters from the distribution interspace 32 into the ventilation space 19 through the passage openings 27 and is suctioned by the front side of the fans 12. Then the air is radially expelled by the peripheral side of each fan 12 through the delivery slits of the latter, and intercepts the heating means 16 (e.g. the electrical heating elements 17), coming to be heated. Then the heated air returns into the cooking space 20, passing through the delivery openings 23 of the dividing separator 18.

[0099] In particular, such air flow, which passes through the delivery openings 23, hits the lateral supporting walls 11 of the containment body 5, and flows towards the center of the cooking space 20, coming to be once again suctioned by the fans 12 through the suction openings 21 of the dividing separator 18, in a manner such to generate an air circulation within the cooking chamber 6.

[0100] The greater resistance to the air flow of the dividing separator 18 in the first sections 18' in front of the corresponding fans 12 causes a load loss between the

distribution interspace 32 and the cooking space 20, at such first sections 18', which is greater than the load loss (between the distribution interspace 32 and the cooking space 20) at the second sections 18" of the dividing separator 18 having lower resistance to the flow.

[0101] In this manner, the reduced pressure generated by each fan 12 is distributed in a uniform manner along substantially the entire extension of the distribution interspace 32 along the extension direction Y and hence along the entire height of the cooking chamber 6, therefore generating an air flow which crosses through the cooking space 20 (and which enters into the suction openings 21 of the dividing separator 18) having substantially uniform flow rate along the entire height of the cooking space 20 and hence over all the levels of the trays in which the foods to be cooked are arranged, ensuring a uniform cooking thereof as discussed above.

[0102] In particular, the lateral delimitation of the distribution interspace 32 given by the lateral walls 38 of the dividing separator 18 allows ensuring that the air suctioned by the fan 12 enters into the distribution interspace 32 substantially exclusively through the suction openings 21, allowing the efficient obtainment of the variable resistance to the air flow that allows ensuring the desired uniformity of the air flow in the cooking space 20.

[0103] The invention thus described therefore attains the pre-established objects.

Claims

1. Oven (1) for cooking foods, which comprises:

- a containment body (5), which defines a cooking chamber (6) and is provided with an upper wall (8) and with a lower wall (9) between which said cooking chamber (6) is extended height-wise;
- at least one fan (12) provided with a rotation axis (X), arranged in said cooking chamber (6) and actuable for generating at least one air flow within said cooking chamber (6);
- a dividing separator (18), which is extended in said cooking chamber (6) between said upper wall (8) and said lower wall (9) according to an extension direction (Y), said dividing separator (18) separating said cooking chamber (6) into a ventilation space (19), in which said fan (12) is arranged, and a cooking space (20), in which foods to be cooked are intended to be arranged,

said dividing separator (18) being provided with at least one suction opening (21), through which said fan (12) is adapted to suction said air flow from said cooking space (20) towards said ventilation space (19);

wherein said at least one suction opening (21) of said dividing separator (18) is distributed along said

extension direction (Y) in a manner such that said dividing separator (18) has spatially-variable resistance to the air flow at least along said extension direction (Y);

wherein the resistance to the flow of said dividing separator (18) decreases in moving away from the rotation axis (X) of said at least one fan (12);

wherein said dividing separator (18) is provided with a distribution interspace (32), which is arranged between said ventilation space (19) and said cooking space (20), extended at least along said extension direction (Y) between said upper wall (8) and said lower wall (9), and is connected to said ventilation space (19) by means of at least one passage opening (27), and to said cooking space (20) by means of said at least one suction opening (21); wherein said dividing separator (18) comprises:

- a separation wall (24), which is provided with said at least one passage opening (27);
- a distribution wall (28) extended at least along said extension direction (Y), passing in front of said at least one passage opening (27), said distribution wall (28) delimiting, with said separation wall (24), said distribution interspace (32) and being provided with said at least one suction opening (21);

said oven (1) being **characterized in that** said dividing separator (18) comprises at least two lateral walls (38), which are placed to connect between said separation wall (24) and said distribution wall (28) to laterally delimit said distribution interspace (32) which is extended, transversely to said extension direction (Y), between said lateral walls (38).

2. Oven (1) according to claim 1, **characterized in that** said distribution interspace (32) is extended along said extension direction (Y) substantially for the entire height of said cooking chamber (6).
3. Oven (1) according to claim 1 or 2, **characterized in that** said dividing separator (18) is extended along said extension direction (Y) between an upper end (29) fixed to the upper wall (8) of said containment body (5), and a lower end (30) fixed to the lower wall (9) of said containment body (5).
4. Oven (1) according to any one of the preceding claims, **characterized in that** said containment body (5) is provided with a supporting wall (10) which delimits, with said dividing separator (18), said ventilation space (19), said separation wall (24) being provided with a first face (25) directed towards said supporting wall (10) and with a second face (26) directed in the direction opposite said first face (25), and in front of such second face (26) said distribution wall (28) is positioned, which delimits, with said sec-

ond face (26), said distribution interspace (32).

5. Oven (1) according to claim 4, **characterized in that** said distribution wall (28) is fixed to the second face (26) of said separation wall (24).
6. Oven (1) according to any one of the preceding claims, **characterized in that** said distribution wall (28) comprises:
 - a central portion (36), which is spaced from said separation wall (24) by means of said distribution interspace (32), and is extended transversely to said extension direction (Y) between two longitudinal edges (37); said at least one suction opening (21) extended at least in said central portion (36);
 - two attachment portions (38'), which define said lateral walls (38), are extended along the corresponding said longitudinal edges (37) and are fixed to said separation wall (24) to laterally delimit said distribution interspace (32).
7. Oven (1) according to claims 5 and 6, **characterized in that** said attachment portions (38') are fixed to the second face (26) of said separation wall (24).
8. Oven (1) according to any one of the preceding claims, **characterized in that** said dividing separator (18) is provided with multiple said suction openings (21), which are distributed in succession at least along said extension direction (Y).
9. Oven (1) according to claim 8, **characterized in that** each said suction opening (21) is extended with elongated shape along a longitudinal direction (W) thereof transverse to said extension direction (Y).
10. Oven (1) according to any one of the preceding claims, **characterized in that** said at least one suction opening (21) is also made on said lateral walls (38).
11. Oven (1) according to any one of the preceding claims, **characterized in that** said dividing separator (18) is provided, along said extension direction (Y), with at least one first section (18') which is extended in front of said at least one fan (12), and with at least one second section (18'') which is extended outside the front projection of said at least one fan (12) and has lower resistance to the air flow than said at least one first section (18').
12. Oven (1) according to claim 11, **characterized in that** a first part of said at least one suction opening (21) extended in said first section (18') has smaller overall area with respect to a second part of said at least one suction opening (21) extended in said sec-

ond section (18").

13. Oven (1) according to claim 11 or 12, **characterized in that** said resistance to the air flow varies in a gradual manner between said first section (18') and said second section (18"). 5
14. Oven (1) according to claims 12 and 13, **characterized in that** said at least one suction opening (21) has at least one third part which is extended between said first section (18') and said second section (18") and has overall area of size intermediate between the overall area of said first part and the overall area of said second part. 10
15. Oven (1) according to any one of the preceding claims, **characterized in that** said dividing separator (18) is extended, transversely to said extension direction (Y), between two lateral flaps (31) bent towards said cooking space (20). 15 20

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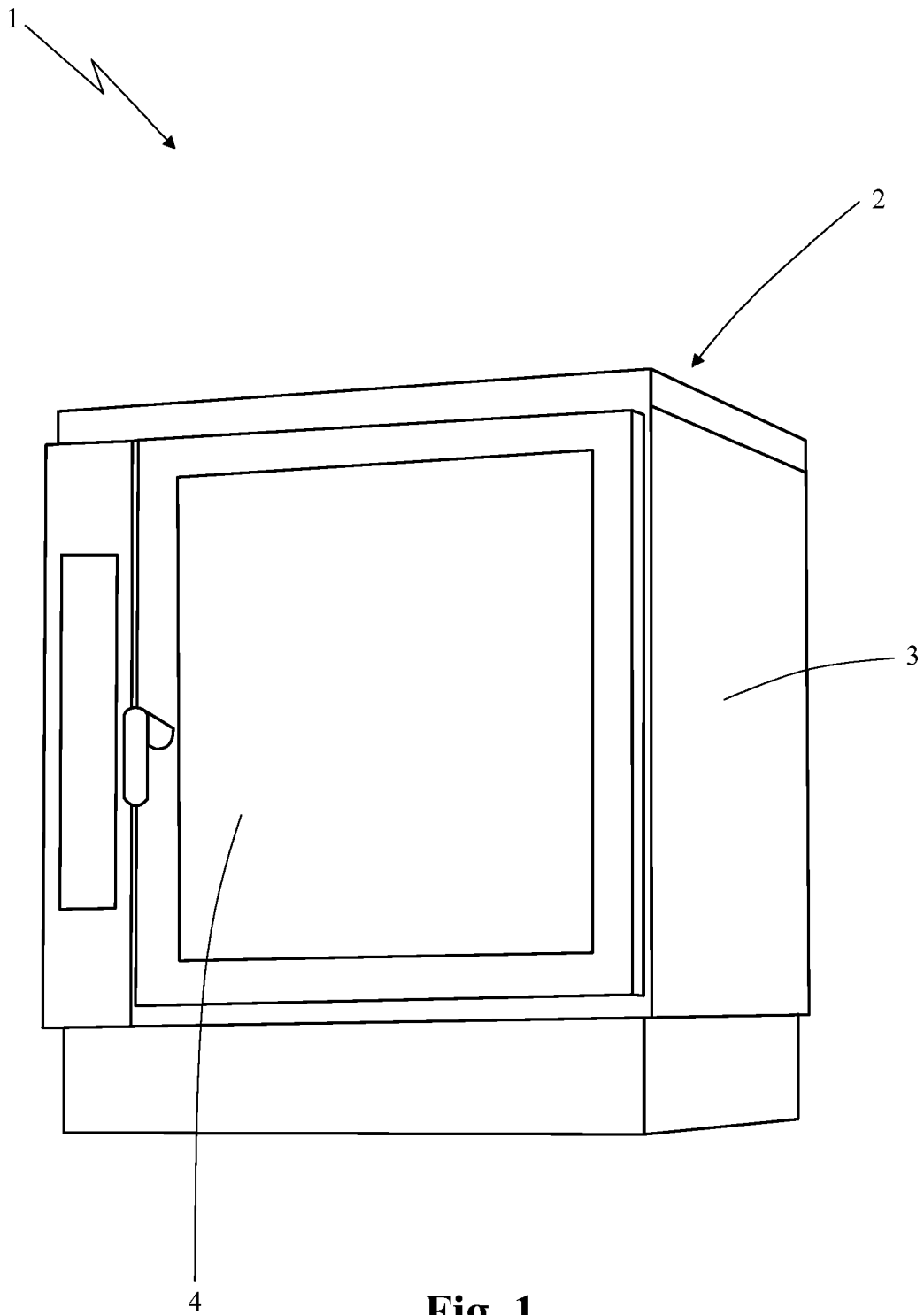


Fig. 1

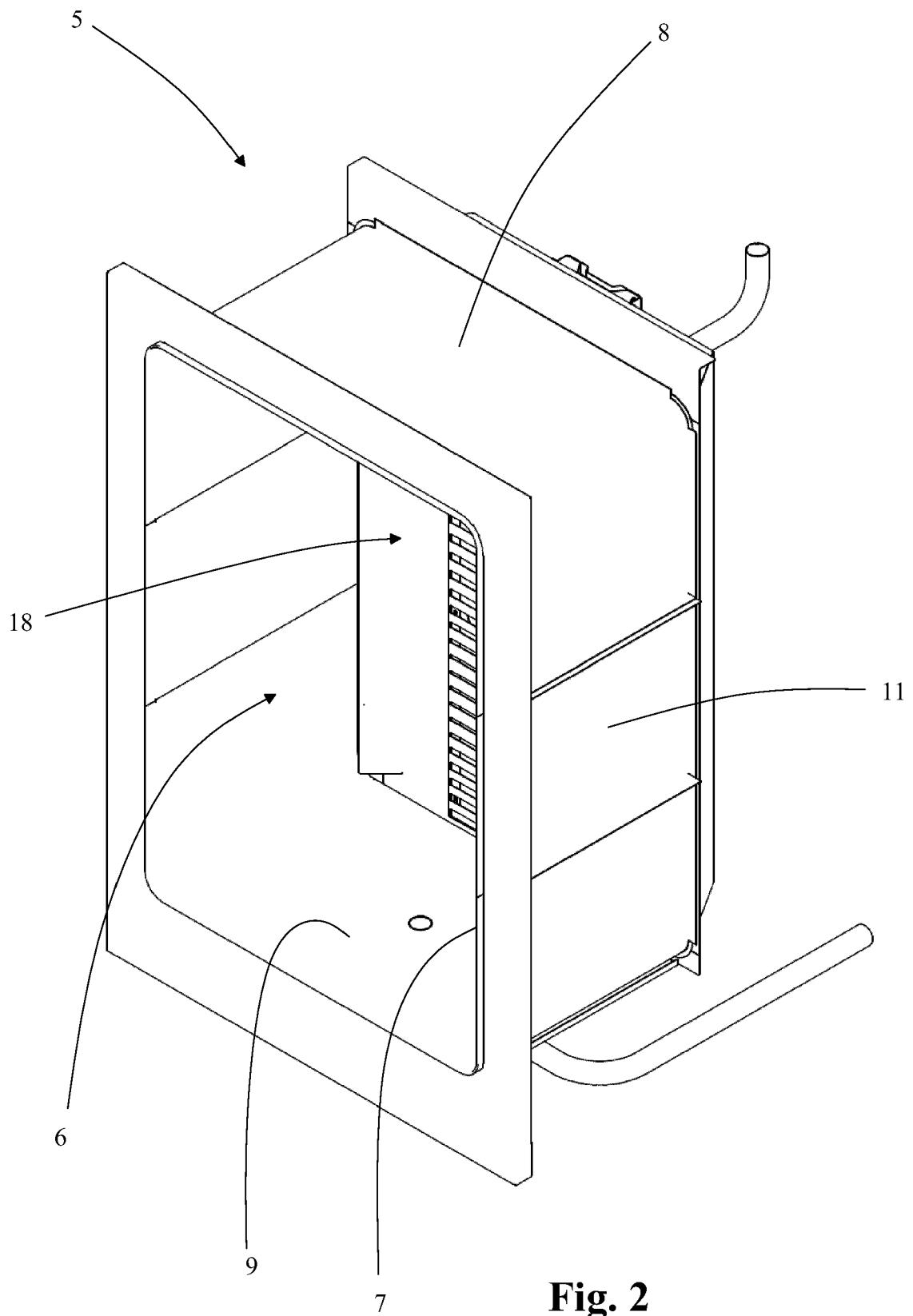


Fig. 2

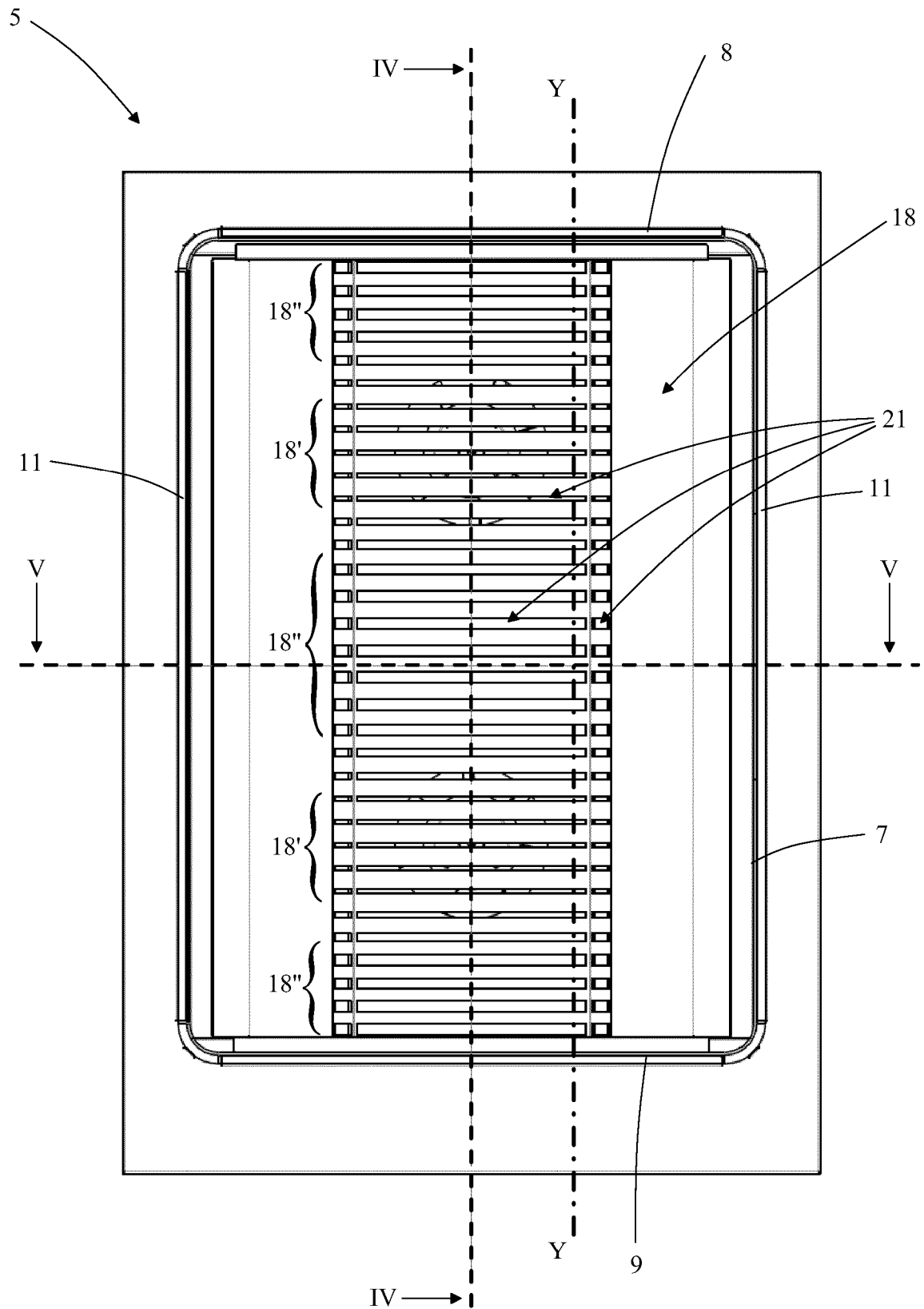


Fig. 3

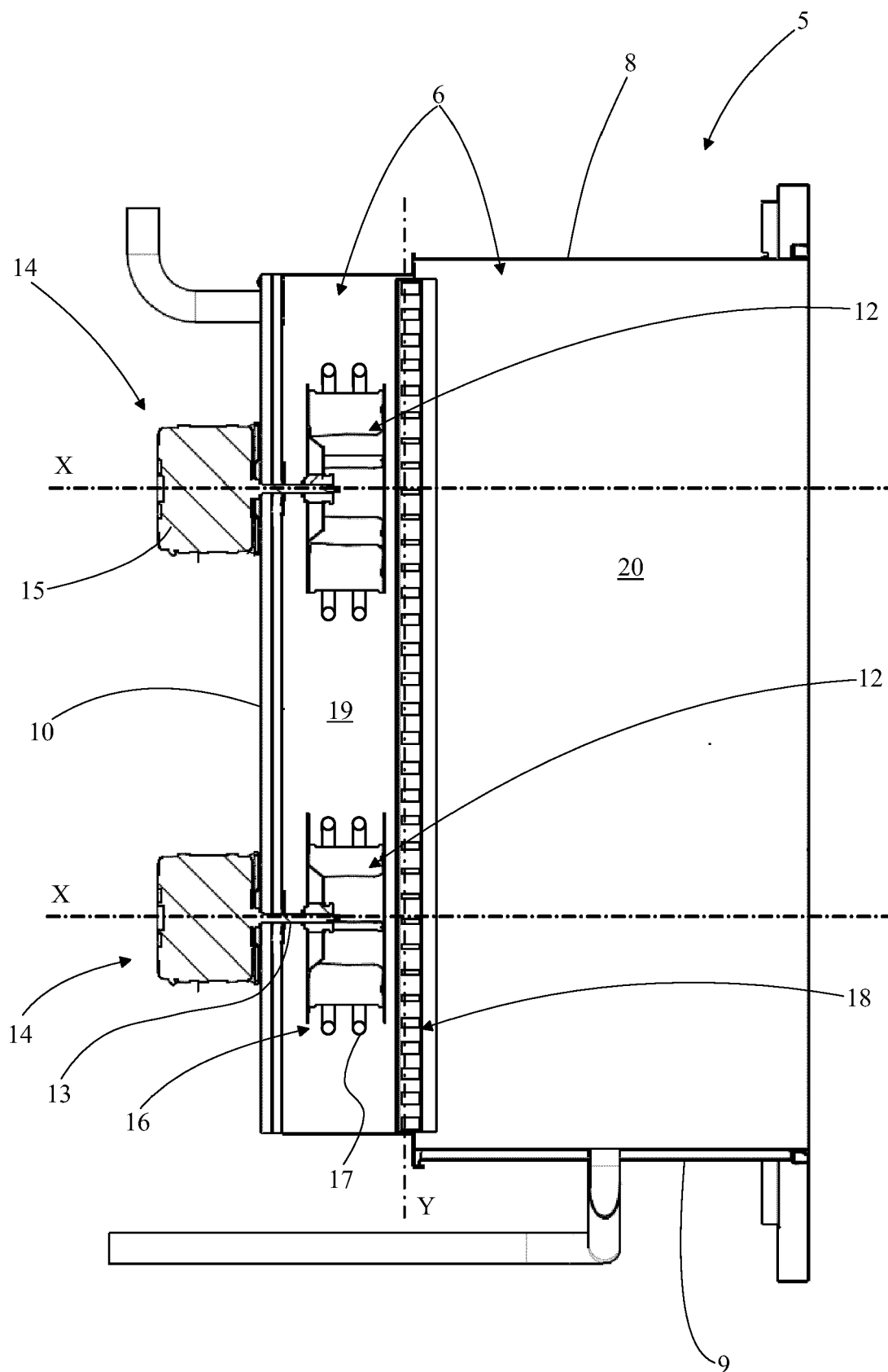


Fig. 4

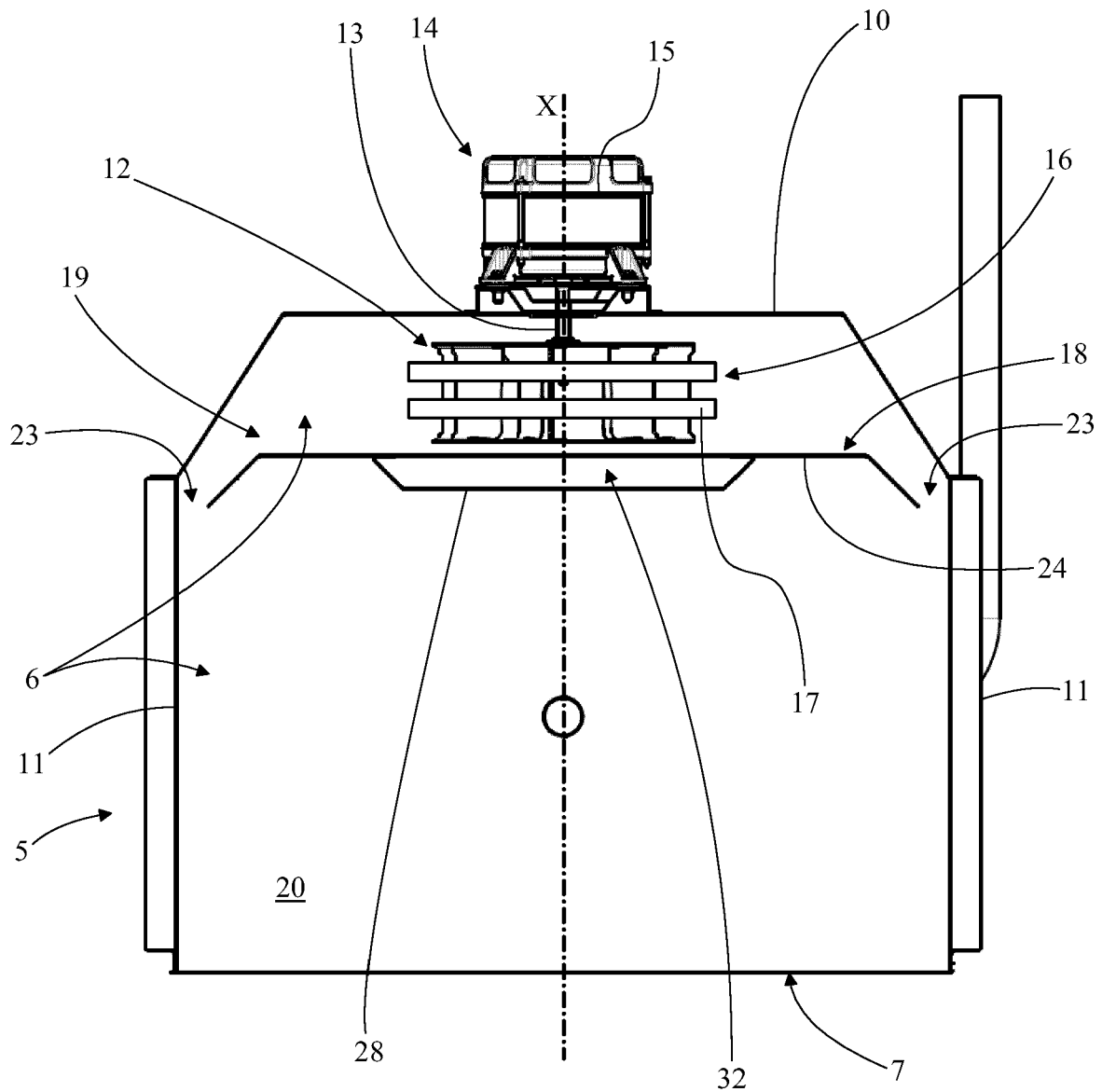


Fig. 5

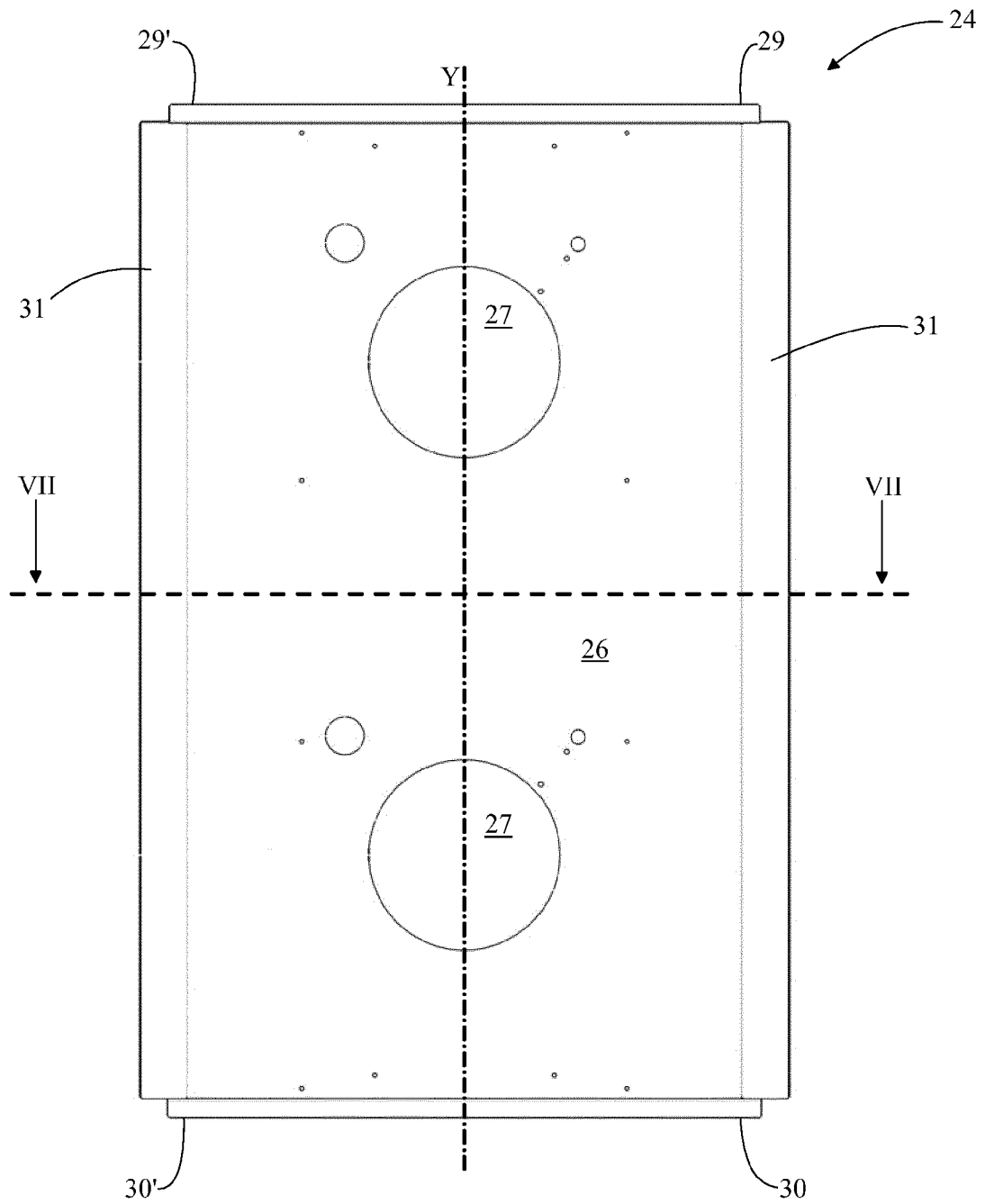


Fig. 6

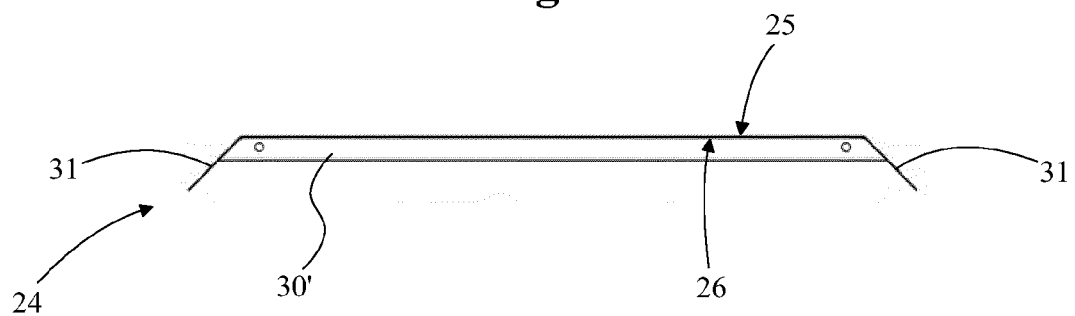


Fig. 7

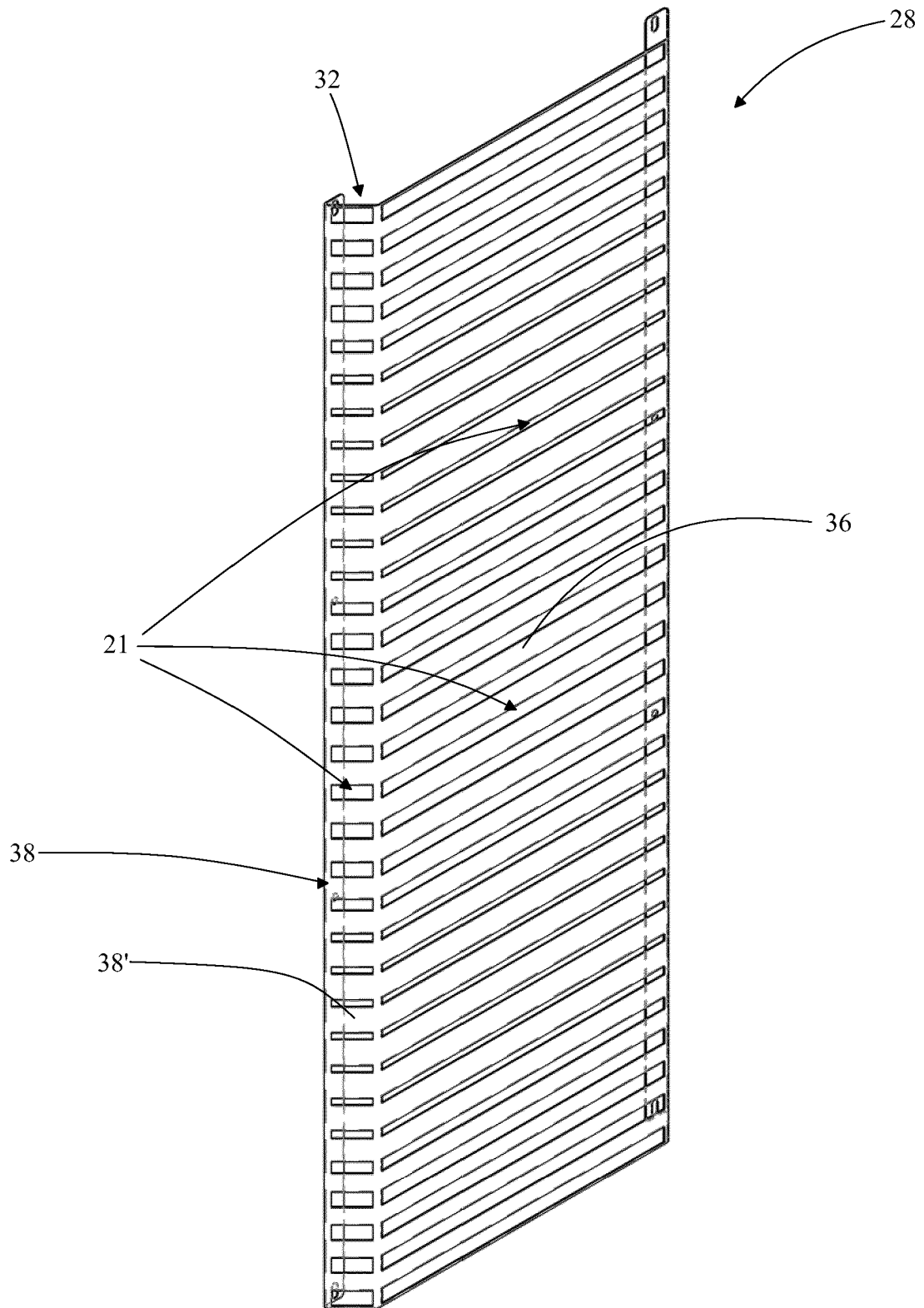


Fig. 8

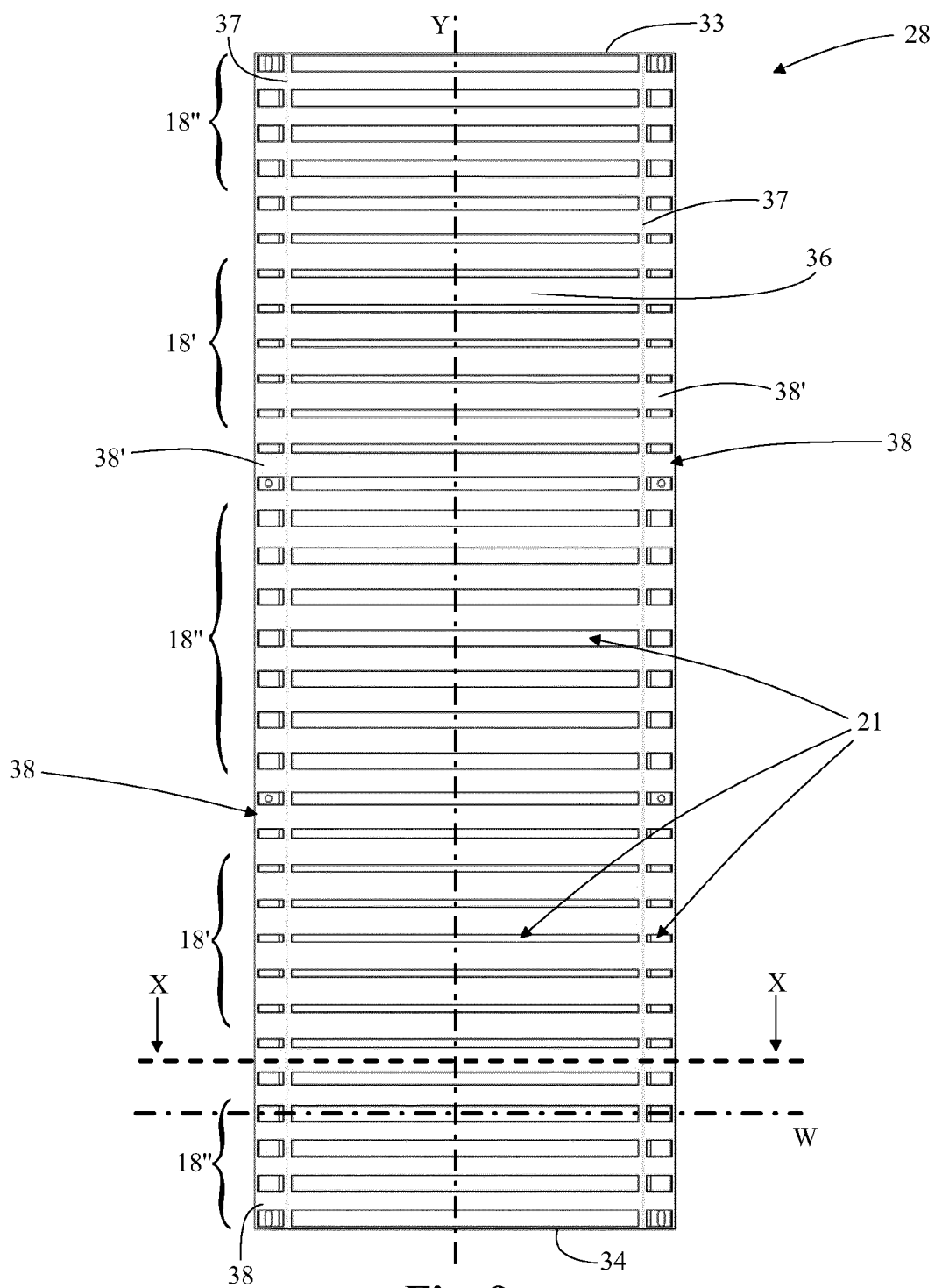


Fig. 9

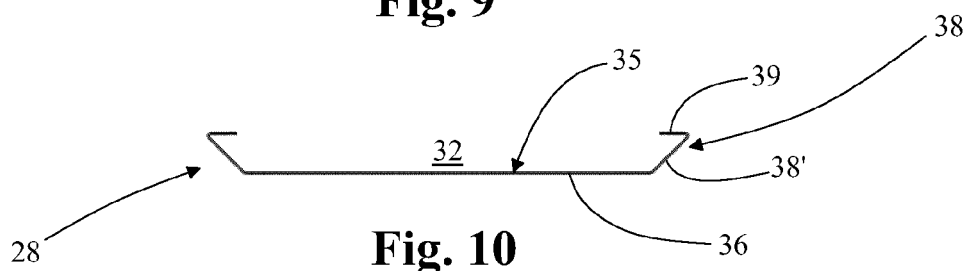


Fig. 10



EUROPEAN SEARCH REPORT

Application Number
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A	EP 2 735 806 A1 (MANITOWOC FOODSERVICE CO INC [US]) 28 May 2014 (2014-05-28) * paragraphs [0030] - [0033]; claim 1; figures 1,2,9 *	1	
			TECHNICAL FIELDS SEARCHED (IPC)
			F24C
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 22 May 2018	Examiner Meyers, Jerry
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The members are as contained in the European Patent Office EDP file on
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22-05-2018

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

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