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(71) Applicant *(for all designated States except US)*: **ARCELIK ANONIM SIRKETI** [TR/TR]; E5 Ankara Asfalti Uzeri, Tuzla, 34950 Istanbul (TR).

(72) Inventors; and

(75) Inventors/Applicants *(for US only)*: **MAMATOGLU, Murat** [TR/TR]; Arcelik Anonim Sirketi, E5 Ankara Asfalti Uzeri, Tuzla, 34950 Istanbul (TR). **GOCER, Mehmet** [TR/TR]; Arcelik Anonim Sirketi, E5 Ankara Asfalti Uzeri, Tuzla, 34950 Istanbul (TR).

(74) Agent: **ANKARA PATENT BUREAU**; Bestekar Sokak No.10, Kavaklidere, 06680 Ankara (TR).

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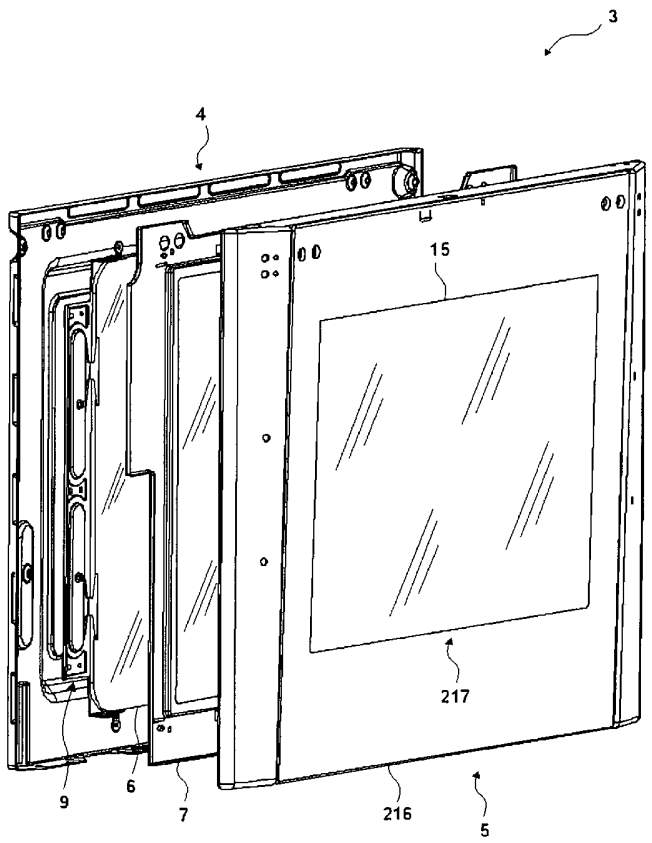
(54) Title: A COOKING APPLIANCE DOOR



(57) Abstract: This invention relates to a reasonably cold cooking appliance door (1) that does not adversely effect the heat dispersion of the cooking chamber (2) and does not cause an injury if contacted by the user.

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Description

A COOKING APPLIANCE DOOR

[001] This invention relates to a cooking appliance door having a small number of components which can be quickly and easily assembled.

[002] Various embodiments have been improved for reducing heat loss and keeping the temperature of the cooking appliance door below a certain level in cooking appliance doors. Panels utilized in the door designs preferably comprising glass and a plurality of panels for reducing the temperature of the outer panel placed on the door, are engaged in the door by fixing elements, adhesives and snap-fitting etc. type of fastening means. Utilizing detailed fixing elements for each glass increases both the number of components and assembly time.

[003] In the current state of the art, in the Unites States Patent no. 3877460, a door comprising an internal dead volume is described.

[004] In another state of the art, in the Unites States Patent no. 4606324, an oven door comprising a back and a front panel and a window unit, a window pane between these panels, a heat shield and an insulating layer is described. This oven door may be assembled effectively and mounted easily onto the oven.

[005] In the current state of the art, in the Unites States Patent no. 6561180, a description for an over door is given wherein all component parts are assembled by utilizing snap-fitting method.

[006] The object of this invention is the realisation of a cooking appliance door wherein heat loss is reduced and outer panel temperature is decreased, and quick and easy assembly is provided.

[007] The cooking appliance door designed to fulfill the object of the present invention is shown in the attached figures where;

[008] Figure 1 – is the schematic view of a cooking appliance door in closed position.

[009] Figure 2 – is the schematic view of a cooking appliance door in open position.

[010] Figure 3 – is the exploded view of a cooking appliance door.

[011] Figure 4 – is the perspective view of an inner panel.

[012] Figure 5 – is the perspective view of an additional middle panel.

[013] Figure 6 – is the top perspective view of a retainer.

[014] Figure 7 – is the detailed view of a retainer.

[015] Figure 8 – is the perspective view of a retainer.

[016] Figure 9 – is the side view of a retainer.

[017] Figure 10 – is the view of an inner panel onto which an inner panel windowpane and a retainer are placed.

[018] Figure 11 – is the view of an inner panel onto which a middle panel and a retainer

are placed.

[019] Figure 12 –is the exploded view of the inner panel, the middle panel and the retainer.

[020] Figure 13 – is the exploded view of the inner panel, the middle panel, the retainer and the additional middle panel before being fixed.

[021] Figure 14 – is the detailed view of the inner panel, the middle panel, the retainer and the additional middle panel.

[022] Figure 15 – is the detailed view of the middle panel, the retainer and the additional middle panel after being fixed.

[023] Elements shown in figures are numbered as follows:

1. Cooking appliance
2. Cooking chamber
3. Door
4. Inner panel
5. Outer panel
6. Middle panel
7. Additional middle panel
8. Hinge
9. Retainer
10. Windowpane tab
11. Middle panel tab
12. Clamp
13. Inner panel windowpane
14. Middle panel windowpane
15. Outer panel windowpane
16. 116., 216. Frame
17. 117., 217. Window opening
18. Slot
19. Support projections

[024] The cooking appliance (1) comprises a cooking chamber (2) where items to be cooked are placed, a door (3) which separates the cooking chamber (2) from the outer medium enabling the user to access the cooking chamber (2), and one or more hinges (8) providing the movement and assembly of the door (3) onto the cooking appliance (1). (Figure 1 and Figure 2)

[025] The cooking appliance door (3) of the present invention comprises an inner panel (4) which forms the surface in contact with the cooking chamber (2), an outer panel (5) forming the surface in contact with the outer medium, a middle panel (6) positioned in between the inner panel (4) and outer panel (5) being closer to inner panel (4), an

additional middle panel (7) interposed between the outer panel (5) and middle panel (6), and a retainer (9) enabling middle panel (6) attached on the inner panel (4) and additional middle panel (7) interposed between inner panel (4) and outer panel (5) to be fixed on the inner panel (4) in a spaced manner.

[026] Inner panel (4) preferably of a quadrilateral shape comprises a base and preferably a quadrilateral shaped window opening (17) on the base, a inner panel windowpane (13) covering this window opening (17) and allowing user to view the cooking chamber (2) without opening the door (3) when the door (3) is closed, and a frame (16) surrounding the window opening (17), having a specific level difference with the base and onto which the middle panel (6) and additional middle panel (7) are attached by means of a retainer (9) positioned on it. (Figure 4)

[027] During the cooking process, the middle panel (6) prevents the surface of inner panel (4) being comparatively cooler than other surfaces of cooking chamber (2) from adversely affecting the homogeneous heat dispersion in the cooking chamber (2).

[028] The middle panel (6) preferably produced in one-piece of glass material is fixed on the frame (16) by means of a retainer (9) in a manner encompassing the base and inner panel windowpane (13) on inner panel (4).

[029] The retainer (9) being fixed on the frame (16) comprises one or more windowpane tabs (10) which by bending over the inner panel windowpane (13) and supporting the inner panel windowpane (13) from back, provides for inner panel windowpane (13) to be sandwiched between the inner panel (4) and the retainer (9) restraining movement thereof, middle panel tab (11) enabling middle panel (6) to be positioned on the frame (16) secured in between the frame (16) and the retainer (9) restraining movement thereof, and one or more clamps (12) which enables the assembly of the additional middle panel (7) onto the inner panel (4) (Figure 6, Figure 7, Figure 8 and Figure 9) .

[030] The additional middle panel (7) minimizes the heat transfer between the cooking chamber (2) and the surface of outer panel (5) which the user may directly contact and therefore which should be below a specific temperature, or provides its cooling.

[031] The additional middle panel (7) is interposed between the middle panel (6) and the outer panel (5). The additional middle panel (7) comprises a window opening (117) which is covered preferably by a glass material, a middle panel windowpane (14) covering the window opening (117), a frame (116) preferably made of metal surrounding the middle panel windowpane (14), slots (18) wide enough for allowing the insertion of clamps (12) and of a number corresponding to those of clamps (12) positioned on the retainer (9), and one or more support projections (19) for supporting the middle panel (6) at the sides (Figure 5). In the preferred embodiment of the present invention, there are recess portions on the frame (116) corresponding to the places where the hinge (8) is mounted.

[032] The outer panel (5) similar in structure to the inner panel (4) comprises a window opening (217), and an outer panel windowpane (15) positioned on a frame (216) and an outer panel windowpane (15) enabling the user to view the cooking chamber (2). The front surface of outer panel (5) is preferably coated with a decorative material and there is also a handle on this surface allowing user to hold the door (3) of the cooking appliance (1).

[033] In the preferred embodiment of the present invention, the door (3) comprises one or more air inlet holes enabling the passage of the air from the cooking chamber (2) to the space within the inner panel (4) and the outer panel (5), opening to the lower edge of inner panel (4) and one or more air outlet holes on the upper edge of the inner panel (4) for allowing the air entering through the air inlet holes and passing through the door (3) to be discharged out of the door (3) .

[034] The component parts comprising the cooking appliance door (3) of said invention are assembled in the following way:

[035] A inner panel windowpane (13) having a size suitable for covering the window opening (17) is placed over the window opening (17) above the base of inner panel (4) . A sealing element preferably a fiberglass gasket is utilized for maintaining a leak proof condition. Once the inner panel (4) is thus arranged, two retainers (9) are positioned on both sides of window pane (9) symmetrically on the frame (16) of inner panel (4). The retainer (9) is fixed on the frame (16) by employing preferably a spot welding method. The windowpane tabs (10) of the retainer (9) which is fixed on inner panel (4), are positioned between the inner panel (4) base and the frame (16), these tabs (10) are bended so that they apply pressure on the inner panel windowpane (13) positioned on the inner panel (4). At the end of this process the inner panel windowpane (13) together with the sealing element is pressed on by the windowpane tabs (10) on two opposingly positioned retainers (9) and by pressing against the inner panel windowpane (13) fixed on the inner panel (4), providing support for the inner panel windowpane (13) (Figure 10).

[036]

[037] After the retainer (9) is fixed on the inner panel (4) and the windowpane tabs (10) are bended to support the inner panel windowpane (13) over the inner panel (4), the middle panel (6) is placed on the inner panel (4) frame (16) so as to cover the inner panel (4) base and the inner panel windowpane (13). The middle panel (6) is placed on the inner panel (4) in a leak proof way by a sealing element, preferably a fiberglass gasket, there between, by bending the middle panel tabs (11) on the retainer (9) over the middle panel (6) fixed on the inner panel (4). Thus, a closed insulation volume is provided between the inner panel (4) and the middle panel (6) fixed on the inner panel (4) providing a reduced heat transfer. (Figure 11 and Figure 12)

[038] The additional middle panel (7) is fixed on middle panel (6) attached on the inner panel (4) by way of inserting clamps (12) on the retainer (9) through the slots (18) on the frame (116) which constitutes the additional middle panel (7) and bending clamps (12) over the additional middle panel (7) to be fixed, and the middle panel (6) is supported by the support projections. Thus, channels for circulating the air outside being relatively cooler than the air inside the cooking chamber (2) without mixing with the hot air flowing from the cooking chamber (2) through middle panel (6) are formed by engaging outer panel (5) over additional middle panel (7) and heat transfer is reduced. The frame (116), preferably manufactured of sheet metal, engaged over the additional middle panel (7) is acting as a heat shield preventing the air having different temperatures on both sides of the additional middle panel (7) from mixing. (Figure 13, Figure 14, Figure 15)

[039] Once the additional middle panel (7) is attached on the inner panel (4), one or more hinges (8) preferably symmetrically positioned are assembled onto the inner panel (4) utilizing fixing elements.

[040] Finally the assembly of cooking appliance door (3) is completed by mounting the outer panel (5) on the inner panel (4) employing the fixing elements.

[041] With the cooking appliance door (3), which is the object of the present invention, the inner panel (4) surface being comparatively cooler than other surfaces of cooking chamber (2), is enabled to have almost equal temperatures as of other surfaces of cooking chamber (2) during the cooking process. In order to maintain an almost equal temperature of the inner panel (4) surface to that of the cooking chamber (2), the hot air flowing in from the cooking chamber (2) is circulated between the additional middle panel (7) and the middle panel (6) engaged on the inner panel (4). The cold air taken from the surroundings to the space between additional middle panel (7) and outer panel (5) is being circulated without mixing with the hot air between additional middle panel (7) and inner panel (4) enabling the outer panel (5) to have a temperature not harming the user. Hence both the homogeneous heat dispersion of the cooking chamber (2) is not adversely effected and a cold cooking appliance (1) door (3) is achieved that does not harm the user if contacted.

[042] By way of the retainer (9) positioned on the door (3) of the cooking appliance (1) of the present invention, the inner panel (4), middle panel (6) and the additional middle panel (7) are interconnected and secured without utilizing fixing elements in such a manner enabling both the sealing and the circulation of the air within the door (3), hence minimizing the number of component parts utilized thus causing reduction in costs and assembly time by reducing the number of component parts.

Claims

[001] A cooking appliance door (3) utilized in a cooking appliance (1) having a cooking chamber (2) into which items to be cooked are placed, comprising an inner panel (4) forming the surface in contact with the cooking chamber (2), having a window opening (17) and a inner panel windowpane (13) covering the window opening (17), an outer panel (5) forming the surface of the cooking appliance (1) door (3) in contact with the outer medium, a middle panel (6) positioned in between the inner panel (4) and the outer panel (5), and an additional middle panel (7) positioned in between the outer panel (5) and middle panel (6), and characterized by a retainer (9) enabling the inner panel windowpane (13) engaged on the inner panel (4), the middle panel (6) and the additional middle panel (7) to be interposed between inner panel (4) and outer panel (5) to be fixed on the inner panel (4) in a spaced manner.

[002] A cooking appliance door (3) as in Claim 1, characterized by a retainer (9) comprising one or more windowpane tabs (10) which, by bending over the inner panel windowpane (13), supports the inner panel windowpane (13) from back, providing inner panel windowpane (13) to be sandwiched between the inner panel (4) and itself restraining the movement thereof.

[003] A cooking appliance door (3) as in Claim 1 and 2, characterized by a retainer (9) comprising one or more middle panel tabs (11) enabling the middle panel (6) positioned on the inner panel (4) to be sandwiched between the inner panel (4) and itself restraining the movement thereof.

[004] A cooking appliance door (3) as in Claim 1, 2 or 3, characterized by a retainer (9) comprising one or more clamps (12) which provides the mounting of the additional middle panel (7) onto the inner panel (4).

[005] A cooking appliance door (3) as in Claim 1 or 2, characterized by an inner panel (4) comprising a frame (16) surrounding the window opening (17), having a specific level difference with the base .

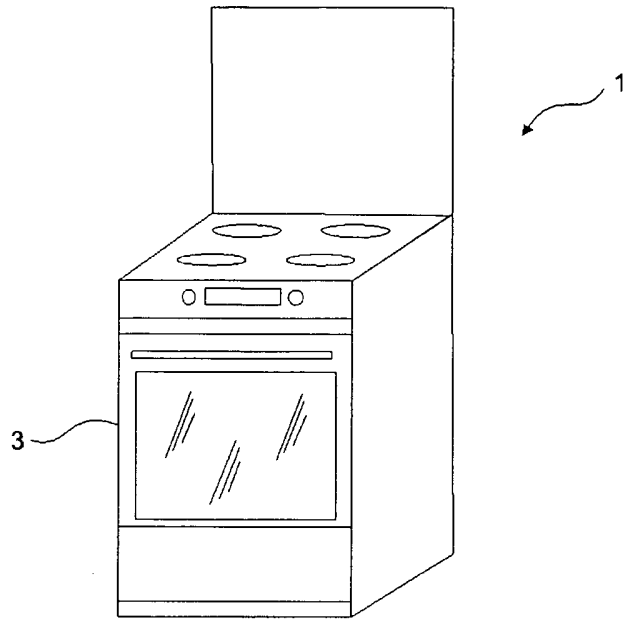
[006] A cooking appliance door (3) as in Claim 1, 2 or 3, characterized by a middle panel (6) preferably produced in one-piece and fixed on the frame (16) by means of a retainer (9) in a manner covering the base and the inner panel windowpane (13) over the inner panel (4).

[007] A cooking appliance door (3) as in Claim 4, characterized by an additional middle panel (7) comprising a window opening (117) positioned between the middle panel (6) and the outer panel (5), a middle panel windowpane (14) covering the window opening (117), a frame (116) surrounding the middle panel windowpane (14), slots (18) wide enough allowing the insertion of the clamps

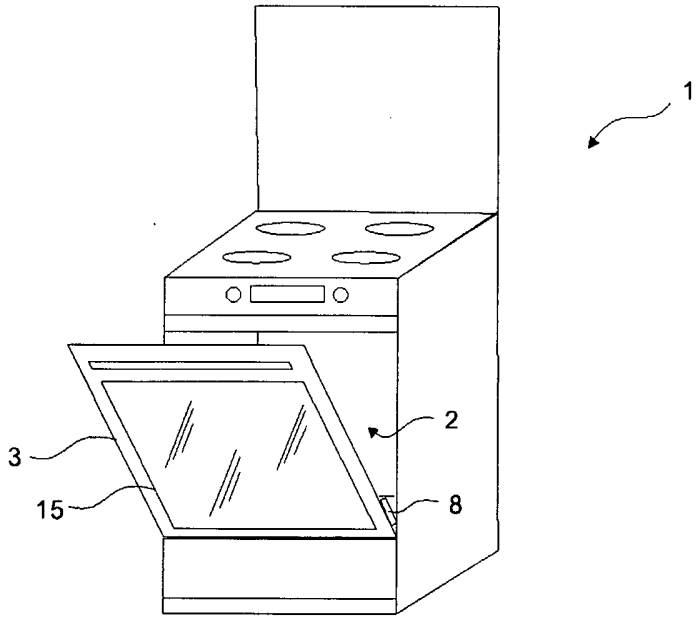
(12) of a number corresponding to those of clamps (12) positioned on the retainer (9).

[008] A cooking appliance door (3) as in Claim 7, characterized by an additional middle panel (7) comprising one or more support projections (19) supporting the middle panel (6) from its sides.

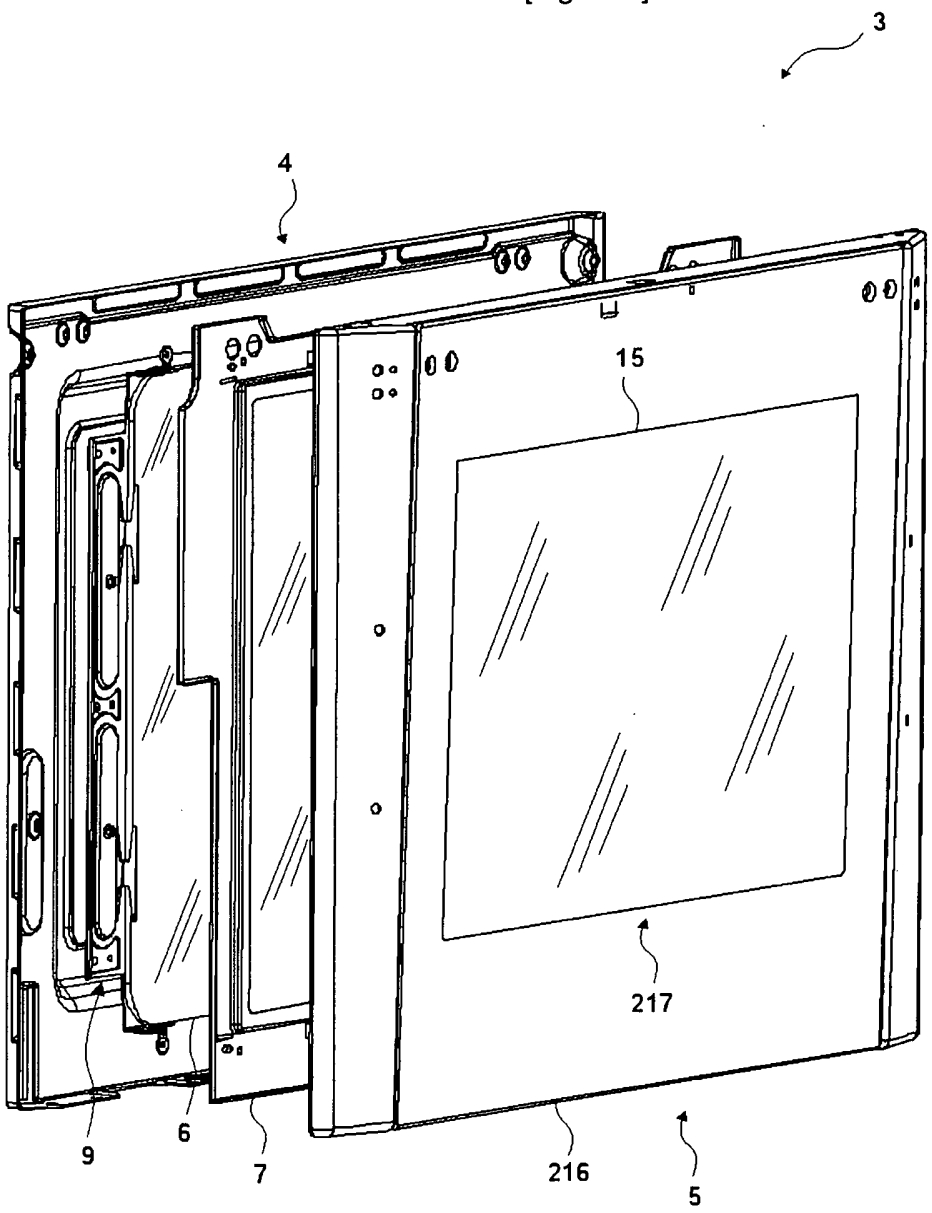
[Fig. 001]



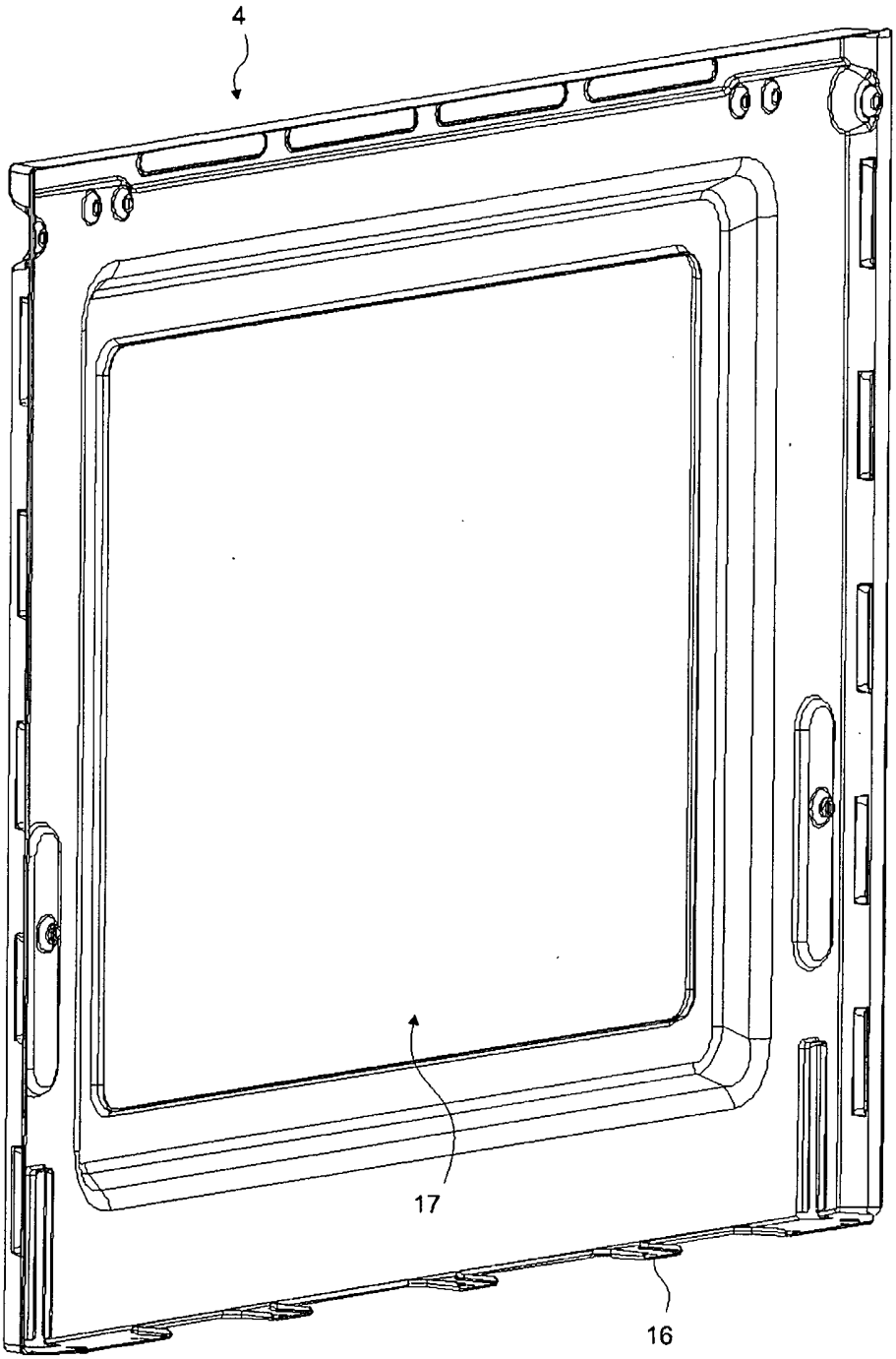
[Fig. 002]



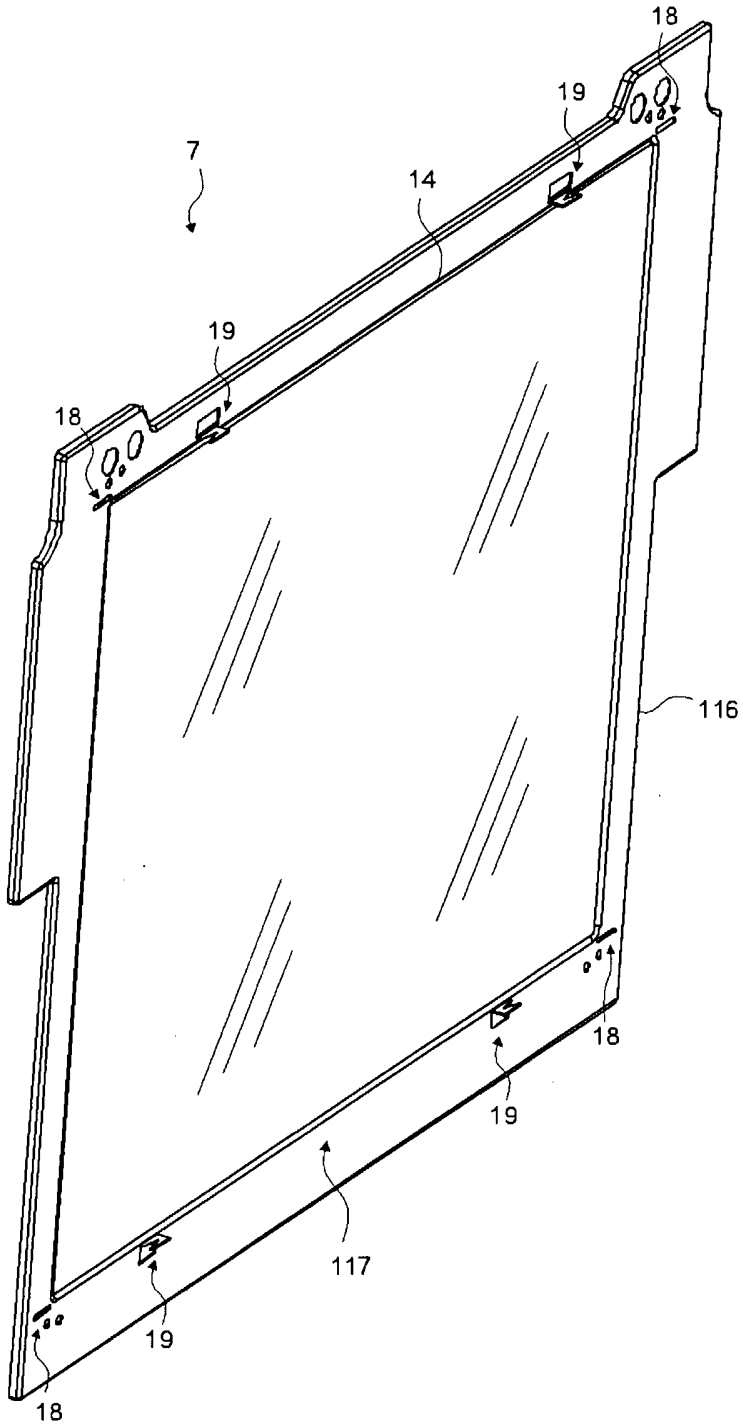
[Fig. 003]



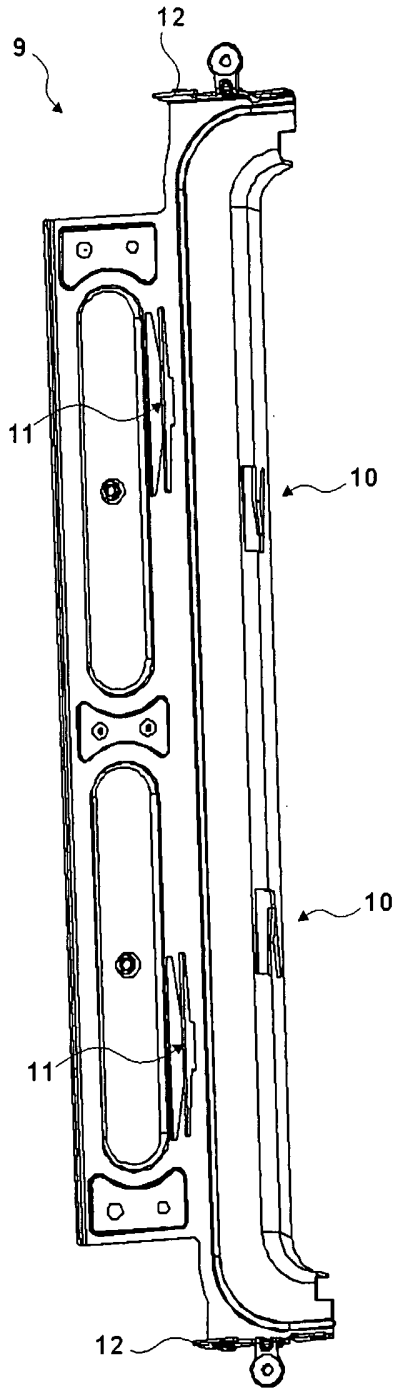
[Fig. 004]



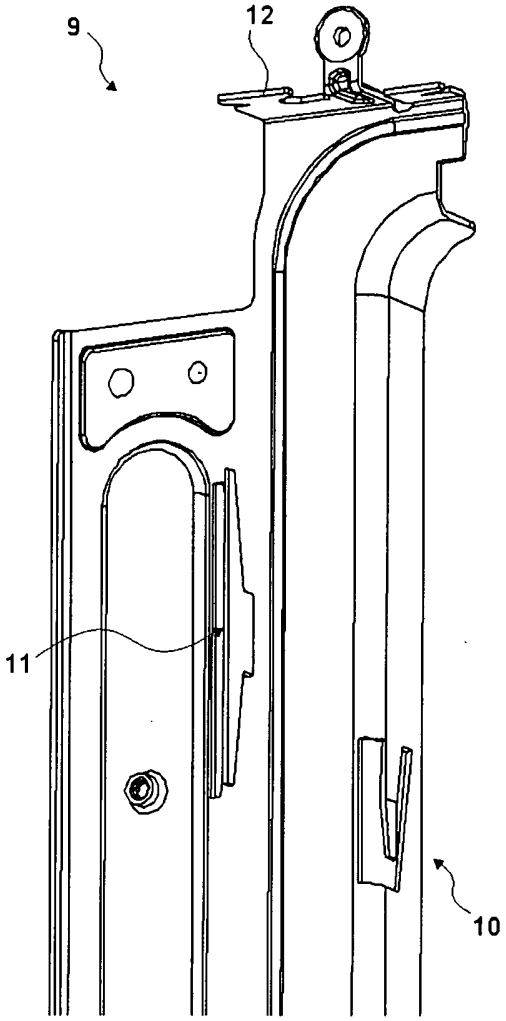
[Fig. 005]



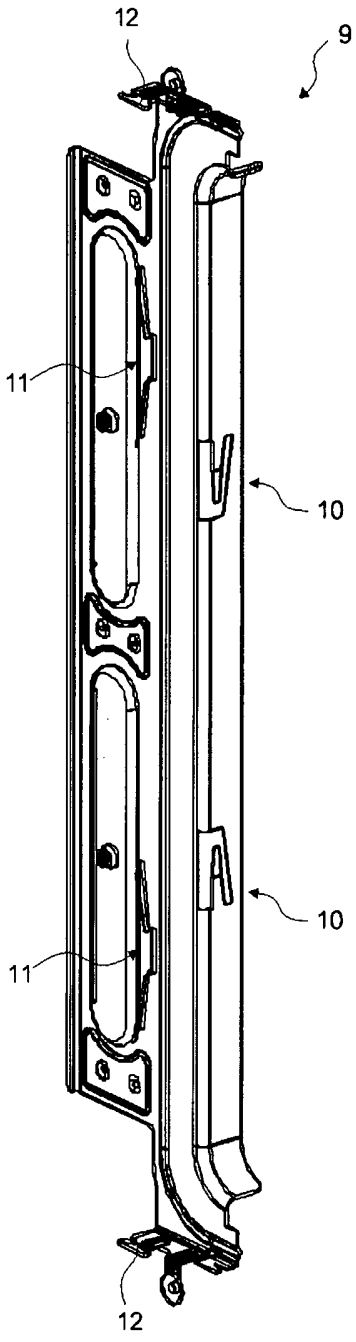
[Fig. 006]



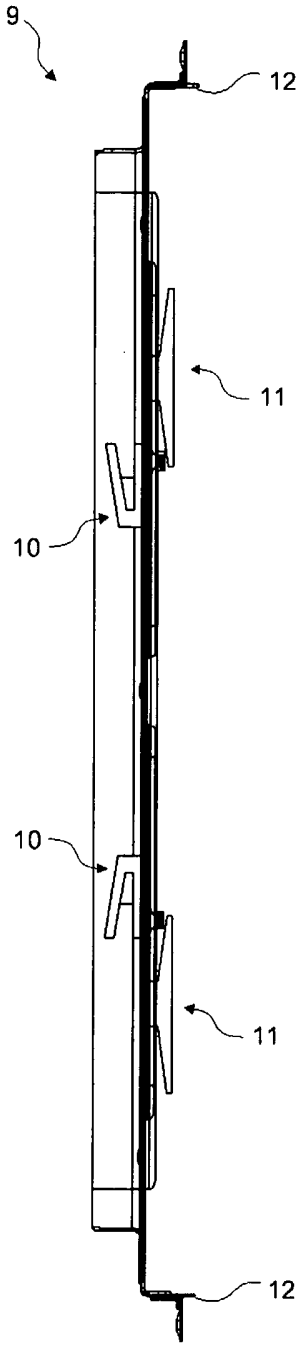
[Fig. 007]



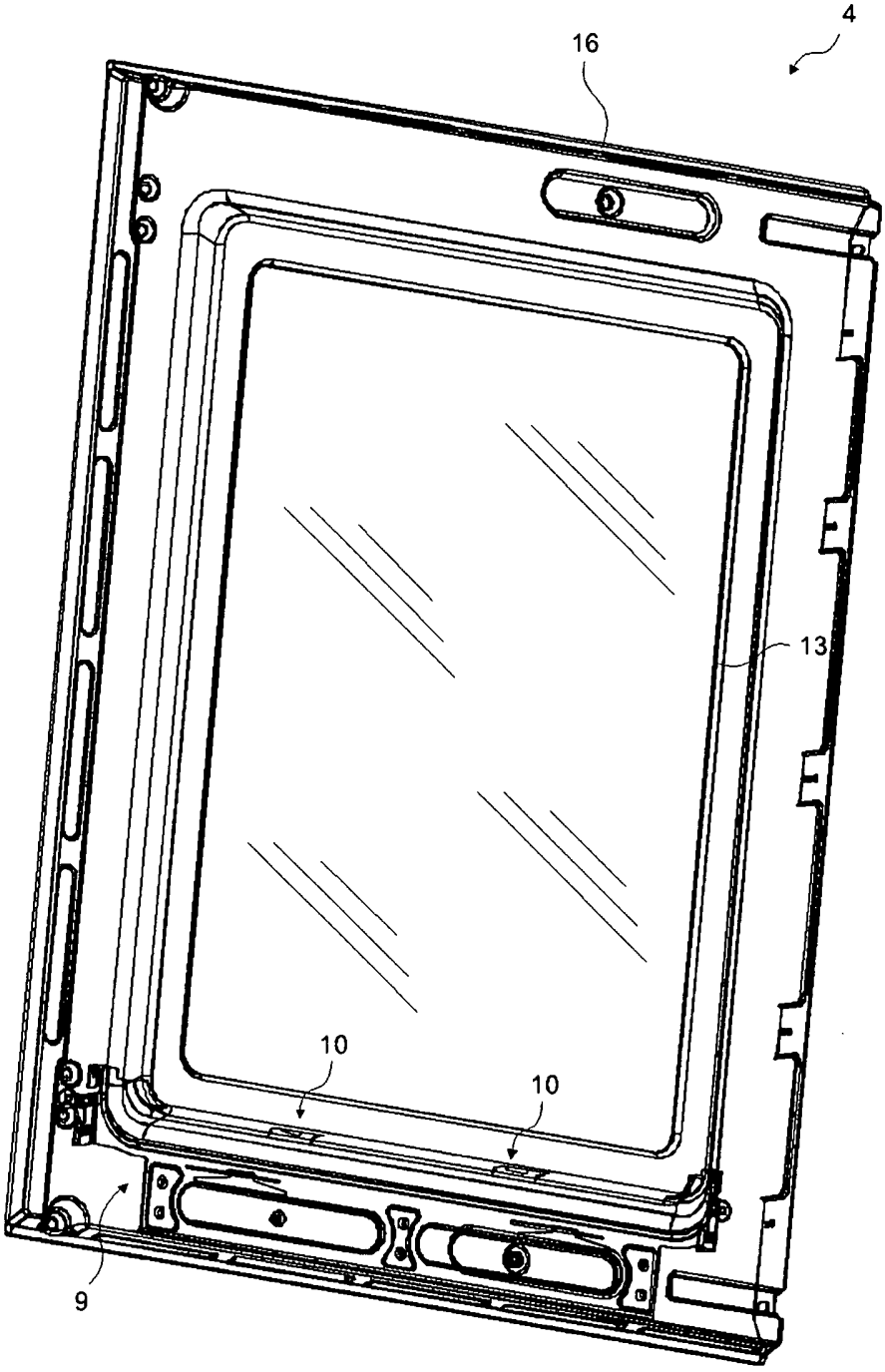
[Fig. 008]



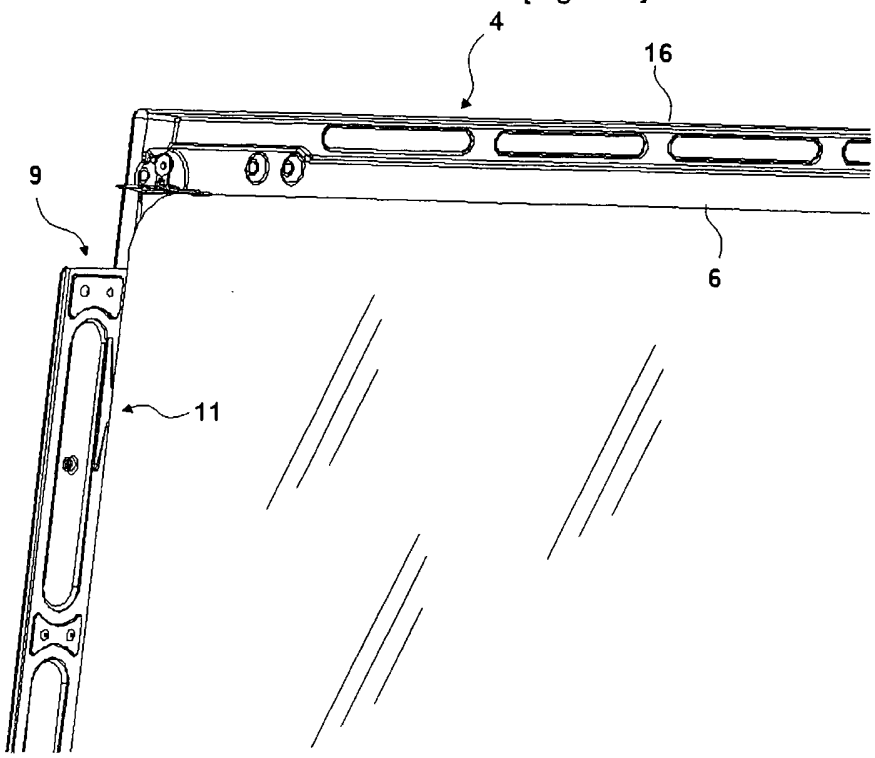
[Fig. 009]



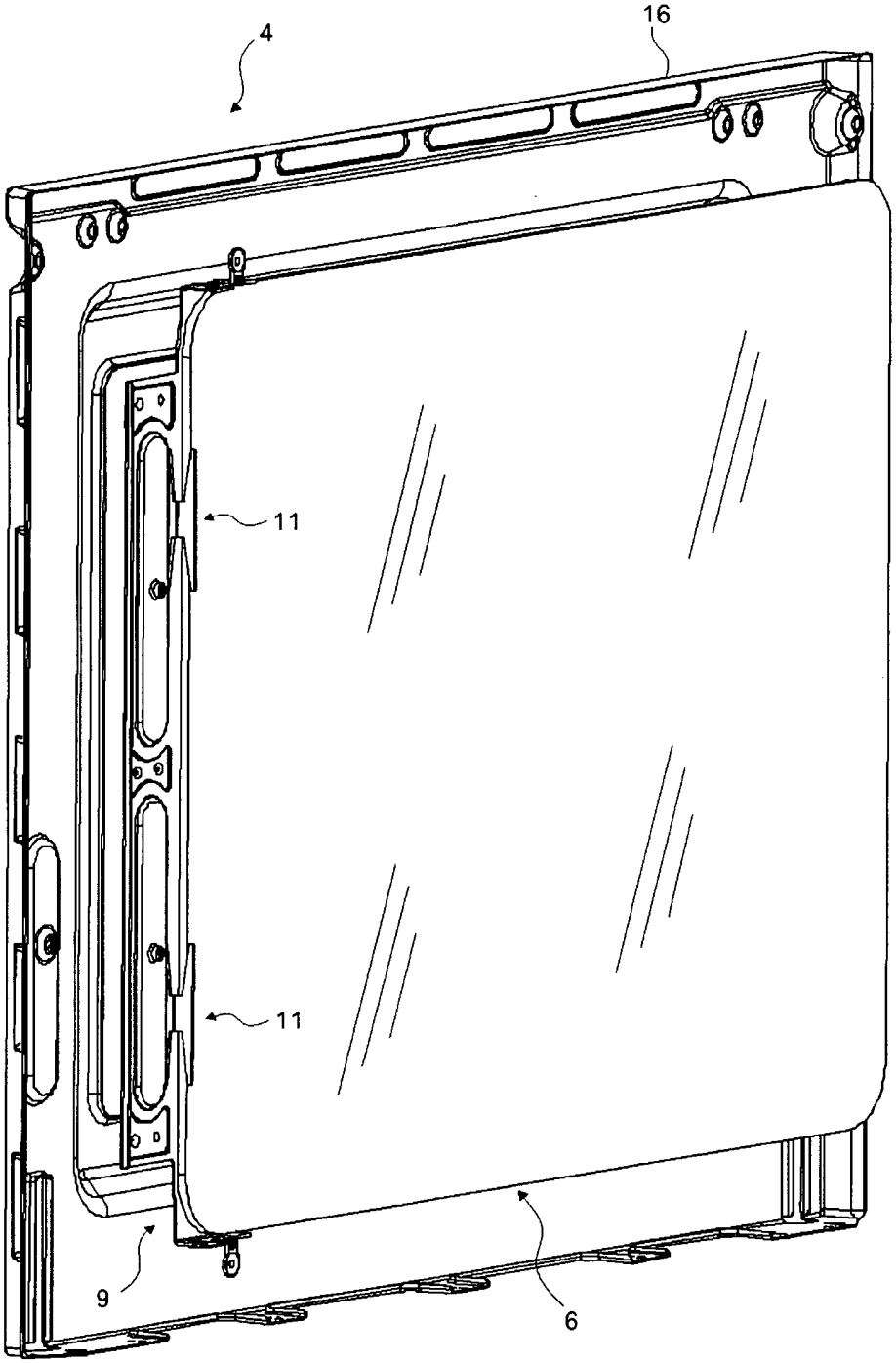
[Fig. 010]



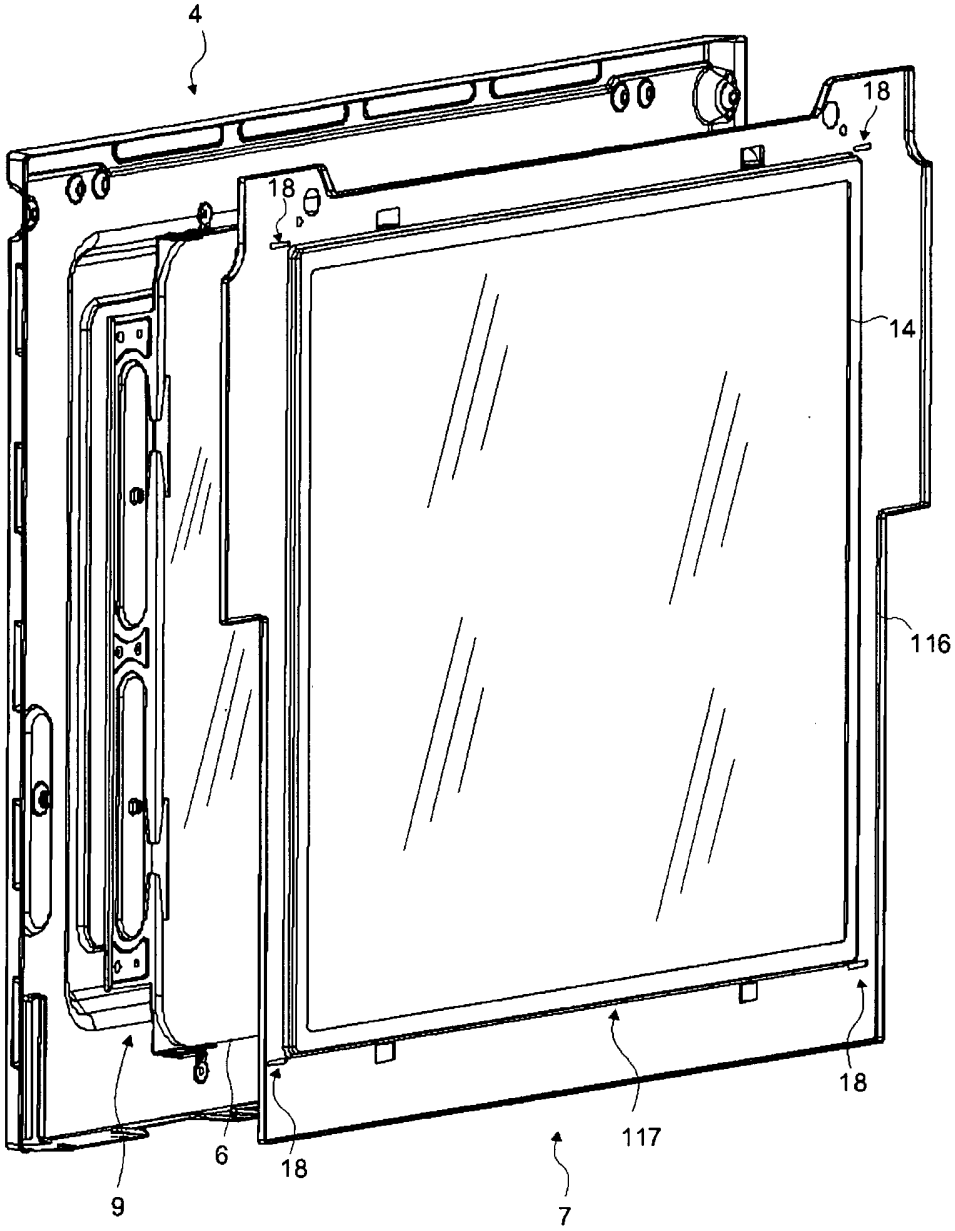
[Fig. 011]



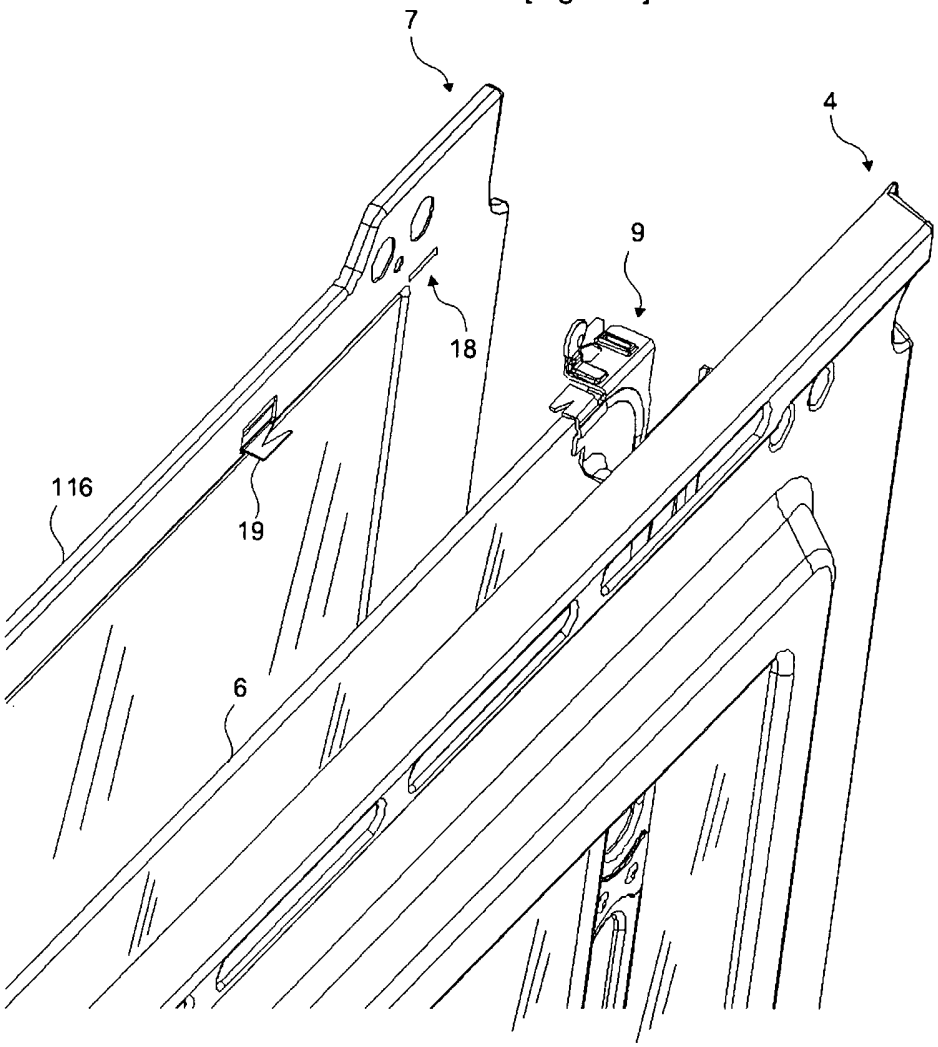
[Fig. 012]



[Fig. 013]



[Fig. 014]



[Fig. 015]