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(54) **COOKING OVEN**

(57) Cooking oven including a casing (10), wherein said cooking oven comprises the following parts:
- two side walls (12) forming lateral parts of the casing (10),
- a front frame (14) arranged at a front side of the casing (10),
- a treatment cavity being at least partially enclosed by at least one cavity wall (16) including at least one upper cavity lug (34.1) and at least one lower cavity lug (34.2) and being arranged inside the casing (10),
- a bottom part (36) of the casing (10) arranged beneath the side walls (12), and
- a top part (50) of the casing (10) arranged above the side walls (12), wherein
- a front end of the at least one cavity wall (16) forms an opening for charging food stuff to be cooked into the treatment cavity (18), wherein
- the front frame (14) surrounds said opening circumferentially,
- wherein the front frame (14) is coupled to the cavity wall (16) via coupling means (31.1,..., 31.3, 32.1,..., 32.7, 34.1, 34.2),
- wherein the coupling means comprise at least one upper frame lug (32.1) and one lower frame lug (32.2), wherein at least one of said upper and lower frame lugs (32.1, 32.2) comprise a first frame lug section (32.3) that is disposed offset relative to a second frame lug section (32.4) of the frame lug in a direction towards one of the side walls and adapted for lying against or supporting a first embossment of the one of the side walls and the second frame lug section (32.4) is disposed in a direction towards the cavity wall and adapted to lie against the corresponding one of said upper and lower cavity lugs (34.1, 34.2).

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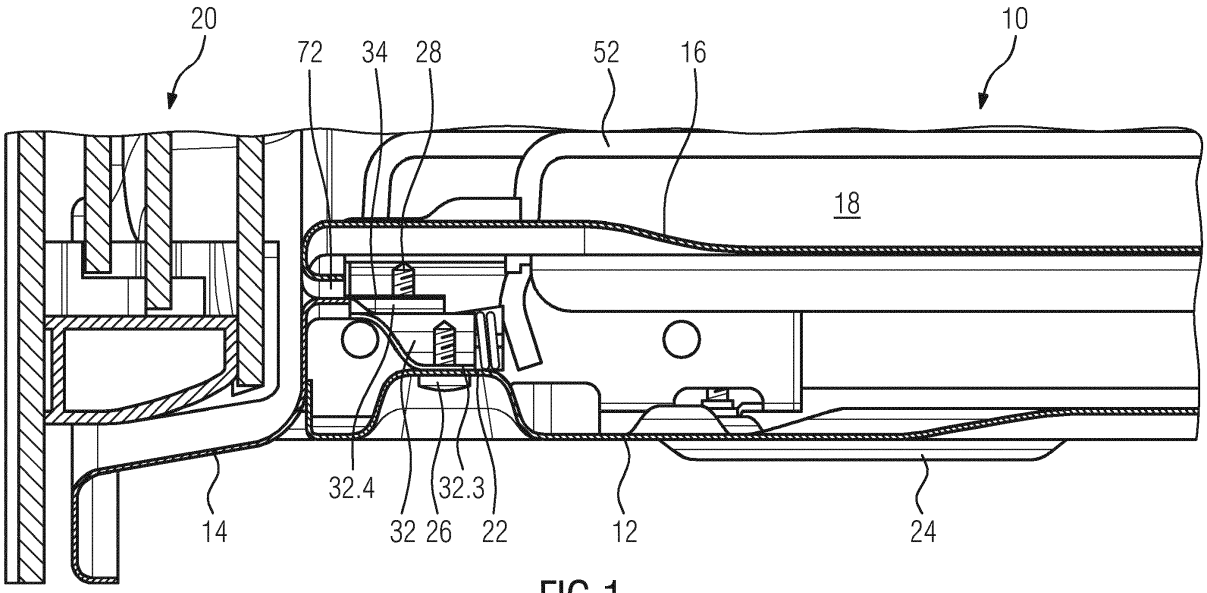


FIG 1

Description

[0001] The present invention relates to a domestic appliance, in particular to a cooking oven.

[0002] The casing for the domestic appliance is composed of several parts. Usually, the casing comprises a side wall, a front frame, a bottom part, a top part and a cavity wall.

[0003] The document EP 2 314 932 A1 discloses a bearing structure for a domestic appliance. The bearing structure comprises a bracket formed as an elongated vertical supporting device of a casing. The bracket comprises an elongated vertical bearing surface extending substantially over the whole length of the bracket, an elongated vertical front surface extending over a central portion of the bracket and an elongated vertical foldback extending over the central portion of the bracket. The bearing surface, the front surface and the foldback form at least in sections a U-shaped profile part and comprise at least one broadening for fixing sheets and/or further parts of the casing.

[0004] Additionally, the casing comprises intermediate connecting parts in order to join the parts of the casing. For example, an elongated vertical connecting part is arranged in the corner of the casing. Said elongated vertical connecting part is connected to the side wall on the one hand and to the front frame on the other hand. Additionally, the cavity wall may be connected to the elongated vertical connecting part. If the domestic appliance is a cooking oven, then the cavity wall encloses an oven cavity. For example, the parts mentioned above are connected via screws to the elongated vertical connecting part. However, this concept for the casing requires a relative high number of parts.

[0005] If the elongated vertical connecting part is used in the cooking oven, then the intermediate space between the side wall and the cavity wall cannot be completely insulated. In this case, the remaining space may act as a chimney delivering evaporated steam upwards into a portion, in which electric and electronic circuits are arranged. The steam may damage said circuits.

[0006] Further, a modification of the height of the casing requires the exchange of several parts. For example, external spacers with different heights may be selectively arranged at the bottom of the casing. It would be advantageous, if the different heights of the casing may be created by exchanging a minimum number of parts.

[0007] GB 2 355 070 A discloses a chassis for a cooking appliance. The chassis comprises at least one sub-assembly defining a cooking chamber. The sub-assembly is secured between two vertical elongated supporting elements. Hinges for closure means are mountable on the supporting elements. The sub-assembly includes a cavity wall and a front frame, wherein the sub-assembly is formed as a single-piece part. Thermal insulating material is disposed between the sub-assembly and the supporting elements.

[0008] It is an object of the present invention to provide a domestic appliance including a casing, wherein the number of parts is minimized, and wherein unnecessary energy losses are avoided.

[0009] The object is achieved by a domestic appliance A domestic appliance, in particular of a cooking oven, including a casing (10), wherein said the domestic appliance comprises the following parts:

- two side walls (12) forming lateral parts of the casing (10),
- a front frame (14) arranged at a front side of the casing (10),
- a treatment cavity being at least partially enclosed by at least one cavity wall (16) including at least one upper cavity lug (34.1) and at least one lower cavity lug (34.2) and being arranged inside the casing (10),
- a bottom part (36) of the casing (10) arranged beneath the side walls (12), and
- a top part (50) of the casing (10) arranged above the side walls (12), wherein
- a front end of the at least one cavity wall (16) forms an opening for charging food stuff to be cooked into the treatment cavity (18), wherein
- the front frame (14) surrounds said opening circumferentially,
- wherein the front frame (14) is coupled to the cavity wall (16) via coupling means (31.1,..., 31. 3, 32.1,..., 32.7, 34.1, 34.2)
- wherein the coupling means comprise at least one upper frame lug and one lower frame lug, wherein at least one of said upper and lower frame lugs comprise a first frame lug section that is disposed offset relative to a second frame lug section of the frame lug in a direction towards one of the side walls and adapted for lying against or supporting a first embossment of the one of the side walls and the second frame lug section is disposed in a direction towards the cavity wall and adapted to lie against the corresponding one of said upper and lower cavity lugs.

[0010] The core of the present invention is that adjacent parts of the casing are directly connected to each other on the one hand and the gap between the front frame and the cavity wall on the other hand. Adjacent parts of the casing include embossments and/or lug elements. The embossment and/or lug element of one part lie against or support the adjacent part. Any intermediate parts between them are not required. Thus, the number of parts of the casing is minimized. Advantageously, such a bearing structure allows build a self-supporting casing without supporting brackets or load bearing frame structures. Further, such a bearing structure allows improved insulation by reduction of insulation free spaces in the region of the connection between the side wall and the front frame. Such insulation free spaces may form chimneys which transport steam leaking from the interior of the oven cavity towards spaces comprising electronics and, thus, causing risk of electronics failure. The concept

according to the invention minimizes such insulation free spaces. One or both side walls may include at least one further embossment formed toward the interior of the casing, wherein said further embossment may be provided for fixing insulating material. Said insulating material may fill the space between the side wall and the cavity wall.

[0011] A gap formed between the front frame and the cavity wall may decouple thermally the front frame from the cavity wall. The front frame may be thermally insulated from the cavity wall. Thermal insulation between the front frame and the cavity wall avoids unnecessary energy losses.

[0012] Advantageously, at least two adjacent parts of the casing are directly connected or connectable to each other by at least one fasting element, and wherein at least one of the parts of the casing includes at least one embossment or lug element, and wherein the at least one embossment or lug element lies against or supports the adjacent part of the casing.

[0013] Further advantageously, a gap extends along the perimeter of said front frame and cavity wall, so that the front frame is substantially thermally decoupled from the cavity wall.

[0014] Thus, an advantageous thermal behaviour of front frame and cavity wall can be achieved.

[0015] Preferably, the side walls are directly connected or connectable to the front frame, wherein the side walls are spaced from the cavity wall without any contact between the side walls on the one hand and the cavity wall on the other hand. Since the side wall is connected to the front frame, but not to the cavity wall, also the side wall is thermally insulated from the cavity wall. The thermal insulation between the side wall and the front frame on the one hand and the cavity wall on the other hand avoids unnecessary energy losses.

[0016] According to a first aspect of the present invention, the side wall includes at least one first embossment extending into or, in other words, formed toward the interior of the casing, wherein said first embossment lies against or supports at least one frame lug of the front frame, wherein preferably said frame lug extends rearwards from the front frame. The first embossment may advantageously comprise a substantially U-shaped cross section. The first embossment minimizes the distance to the adjacent part. Further, a direct connection of the front frame and the side wall of the casing is achieved, wherein at the same time, a direct connection between the side wall and the oven cavity can be avoided. Thus, thermal conduction from the oven cavity to the casing can be minimized as well as the tolerance chain can be reduced advantageously.

[0017] In particular, the first embossment is elongated and extends parallel to a vertical front edge of the side wall, wherein the first embossment is arranged close to said front edge of the side wall, and wherein at least one first screw penetrates the first embossment and the frame lug.

[0018] Further, the cavity wall may include at least one cavity lug extending outwards from said cavity wall, wherein the cavity lug lies against the frame lug of the front frame, and wherein at least one second screw penetrates the frame lug and the cavity lug. The cavity wall has a separate connecting point.

[0019] Advantageously, the front frame includes an upper frame lug and a lower frame lug that are arranged on a flange in the region of the front end of the cavity wall, in particular a flange circumferentally surrounding the opening formed by the front end, wherein the upper and lower frame lugs are arranged vertically distanced from each other, wherein the first embossment of the side wall extends vertically at least over a length corresponding to the distance between said upper and lower frame lugs of the front frame. The flange may be bent in a direction towards a rear of the treatment cavity, preferably extending at least partially parallel to the cavity wall.

[0020] Further advantageously, said first embossment of the side wall lies against or supports both of said upper and lower frame lugs of the front frame and is fixed to at least one, preferably both, of said upper and lower frame lugs by at least one first screw.

[0021] Such a configuration allows a stable connection between side wall and front frame.

[0022] Advantageously, the cavity wall includes an upper cavity lug and a lower cavity lug that are arranged vertically distanced from each other, wherein the upper and lower cavity lugs are arranged corresponding to the arrangement of said upper and lower frame lugs of the front frame in such way that said upper and lower cavity lugs respectively lie against said upper and lower frame lug and are respectively fixed to at least one, preferably to both, of corresponding counterparts out of upper and lower frame lug by at least one second screw.

[0023] Thus, a stable and easy connection and assembling of side wall, front frame and oven cavity is enabled, wherein thermal conduction is reduced between these elements.

[0024] Advantageously, at least one of said upper and lower frame lugs of the front frame comprises a first frame lug section that is disposed in a direction towards the side wall and adapted for lying against or supporting said first embossment of the side wall and a second frame lug section that is disposed in a direction towards the cavity wall and adapted to lie against the corresponding one of said upper and lower cavity lugs, preferably wherein a plane of the first frame lug section is displaced parallel to a plane of the second frame lug section.

[0025] Advantageously, at least one of said upper and lower frame lugs of the front frame comprises at least one frame lug recess and said first embossment of the side wall comprises at least one, preferably two, bent lugs which is adapted for insertion into the frame lug recess of said at least one upper or lower frame lug of the front frame, preferably wherein a second bent lug extends perpendicularly relative to the first bent lug and wherein one of the bent lugs is adapted for contacting the frame lug outline of the first frame lug section, wherein

said two bent lugs are adapted for pre-fixing said sidewall respectively in at least one horizontal direction and at least one vertical direction before screwing, in particular wherein said two bent lugs of the first embossment of the side wall are arranged respectively below and above said the screw-hole for the first screw. Thus, prefixing of the side wall on the front frame is enabled prior to the final screwing process.

[0026] Further, the front frame includes inner frame lugs and outer frame lugs, wherein the inner frame lugs are connected or connectable to the cavity wall, while the outer frame lugs are connected or connectable to the side wall. The front frame may be arranged such that the inner frame lugs are arranged on a inner side of the front frame and that the outer frame lugs are arranged on an outer side of the front frame. The inner and outer frame lugs contribute that the cavity wall and the side wall are spaced from each other.

[0027] Moreover, the side wall may include at least one second embossment formed toward the exterior of the casing, wherein said second embossment lies against or supports at least one furniture enclosing at least partially the casing.

[0028] According to a second aspect of the invention, the bottom part includes two standing seams at its lateral side, wherein said standing seam encloses at least partially a lower edge of the corresponding side wall.

[0029] In particular, the side wall includes at least one third embossment formed toward the interior of the casing and arranged in the lower portion of said side wall, and the standing seam of the bottom part includes at least one fourth embossment formed toward the interior of the casing, wherein the third embossment and the fourth embossment are congruent to each other, so that the fourth embossment is received by the corresponding third embossment, and wherein preferably at least one third screw penetrates the fourth embossment and the third embossment.

[0030] According to a further embodiment of the present invention, the bottom part includes at least two fifth embossments arranged in the horizontal portion of said bottom part, wherein said fifth embossments extend upwards and support the lower edges of the side walls.

[0031] For example, the height of the casing is definable by the selection of the bottom part, wherein the number, the positions and/or the heights of the fifth embossments of said bottom part affect the height of the casing. The height of the casing is defined by only one part, namely the bottom part.

[0032] In a similar way, the height of the casing may be modifiable by an exchange of the bottom part, or definable by the selection of the bottom part, wherein the number, the positions and/or the heights of the fifth embossments of said bottom part affect the height of the casing. The height of the casing can be modified by exchanging only one part, namely the bottom part.

[0033] Advantageously, the bottom part of the casing includes at least one fifth embossment that is arranged in a region adjacent to a front end of the bottom part and that comprises a first bearing surface for supporting a hinge, in particular a hinge housing of the hinge, to which a door of the domestic appliance is attachable and which is pivotable about a horizontal axis, preferably wherein the hinge housing comprises at least partially a U-shaped cross section.

[0034] This allows attaching a hinge to the bottom part. In order to the change to the overall height of the casing, it is only necessary to use a different bottom part. The position of the hinge relative to the other components can be kept constant, by adapting only the height (or: depth) of the fifth embossment provided by the bottom part. Therefore, it is not necessary to change hinge position for changing the height of the casing, and in consequence, of the domestic appliance.

[0035] Advantageously, the fifth embossment adjacent to the front end includes an, preferably upwardly bent, first hinge fixing lug that is arranged in a position to contact a first hinge housing side wall of the hinge housing.

[0036] Further advantageously, at least one of said third embossment of the side wall and/or at least one of said fourth embossment of the bottom part includes a second bearing surface that is arranged to contact a second hinge housing side wall of the hinge housing of the hinge to support the second hinge housing side wall.

[0037] Further advantageously, the side wall comprises a second hinge fixing lug that is arranged in a position to contact a hinge housing upper wall.

[0038] Further advantageously, the first hinge fixing lug and/or the second hinge fixing lug and/or the first bearing surface and/or the second bearing surface support and hold the hinge housing in its intended position prior to additional fixation, in particular by screws.

[0039] Further advantageously, the hinge housing can be fixed to at least one of the standing seam of the bottom part and/or to a lower end region of the side wall by at least one screw, in particular by at least one of said third screws.

[0040] Thus, the bottom part comprises embossments providing support and fixation elements for the hinges. The hinges can be positioned correctly independent from the overall housing height, wherein the housing height is variable by using different bottom parts. In particular, the variable housing height is achieved, because all main components of the appliance, apart from the hinges, including the oven cavity are supported on the housing side wall.

[0041] According to a third aspect of the invention, the casing may comprise at least one control panel arranged above the front frame, wherein said control panel includes a pair of panel lugs, and wherein said panel lug lies against and/or is supported by a side wall lug protruding from the side wall, and wherein preferably an upper fourth screw penetrates the side wall lug and the panel lug.

[0042] Moreover, a lower fourth screw penetrates the

side wall lug and the front frame.

[0043] In particular, the front frame is provided for receiving a door.

[0044] Further, the present invention relates to a domestic appliance, in particular a cooking oven, wherein the domestic appliance comprises the casing mentioned above.

[0045] In particular, the domestic appliance is a cooking oven, wherein the cavity wall is a cavity wall enclosing at least partially an oven cavity, and wherein the door is an oven door.

[0046] It has to be noticed that the numbering (first to fifth embossments) of the embossments shall not be understood in a way that there must be at least more than one embossment. Each specific embossment may be provided with or without any other embossment.

[0047] Novel and inventive features of the present invention are set forth in the appended claims.

[0048] The present invention will be described in further detail with reference to the drawings, in which

FIG 1 illustrates a schematic sectional top view of a corner of a domestic appliance according to the first aspect of the present invention,

FIG 2 illustrates a schematic perspective view of the corner of the domestic appliance according to the first aspect of the present invention,

FIG 3 illustrates a schematic detailed sectional perspective view in an upper region of the corner of the domestic appliance according to the first aspect of the present invention,

FIG 4 illustrates a schematic perspective view of the corner of the domestic appliance according to the first aspect of the present invention, only a part of the side wall and the front frame are shown, all other parts are removed,

FIG 5 illustrates a schematic detailed sectional perspective view according to the detail as indicated in FIG 4,

FIG 6 illustrates a schematic view similar to FIG 4 from a different perspective and wherein the side wall is removed, but the front part of the oven cavity is shown,

FIG 7 illustrates a schematic side view of a domestic appliance according to the second aspect of the present invention, wherein said casing has a first height,

FIG 8 illustrates a schematic side view of the domestic appliance according to the second aspect of the present invention, wherein said casing has a second height,

FIG 9 illustrates a schematic side view of a lower portion of the domestic appliance according to the second aspect of the present invention, wherein said casing has the second height,

FIG 10 illustrates a schematic perspective view of a bottom corner of the domestic appliance, wherein a bottom part, a side wall and a hinge housing are shown and all other parts are removed,

FIG 11 schematic detailed perspective view according to the detail as indicated in FIG 10,

FIG 12 illustrates a schematic perspective view from below of a first example of a bottom part of the domestic appliance according to the second aspect of the present invention, wherein said domestic appliance has the second height,

FIG 13 illustrates a schematic perspective view from below of a second example of the bottom part of the domestic appliance according to the second aspect of the present invention, wherein said domestic appliance has the first height,

FIG 14 illustrates a schematic perspective rear view of the corner of the domestic appliance according to the third aspect of the present invention,

FIG 15 illustrates a schematic sectional top view of the corner of the domestic appliance according to the third aspect of the present invention, and

FIG 16 illustrates a schematic perspective rear view of the corner of the domestic appliance according to the third aspect of the present invention.

[0049] FIG 1 illustrates a schematic sectional top view of a corner of a casing 10 according to a preferred embodiment of the present invention. The casing 10 is provided for a domestic appliance. In this embodiment, the casing 10 is provided for a cooking oven. In general, the casing 10 may be provided for an arbitrary domestic appliance. The casing 10 is a self-supporting casing. Self-supporting shall be understood in that the casing walls, e.g. made of sheet metal, form the supporting structure of the domestic appliance. Thus, side walls 12, bottom wall 36 and a top part 50 form the casing 10 to house further appliance components and integrate the bearing structure for the appliance components. This means the bearing function for the appliance is integrated in the casing parts, in particular in the side walls 12, the bottom part 36 and the top part 50.

[0050] The casing 10 comprises two side walls 12, a front frame 14 and a cavity wall 16. In FIG 1, only one of the side walls 12 is shown. The front frame 14 is provided for receiving an oven door 20 of the cooking oven. The cavity wall 16 encloses an oven cavity 18 of the cooking oven. A heating element 52 is arranged inside the oven cavity 18. The side wall 12 is directly connected to the front frame 14 by at least one first screw 26. In turn, the front frame 14 is directly connected to the cavity wall 16 by at least one second screw 28.

[0051] In general, the domestic appliance is an arbitrary domestic appliance, wherein the cavity wall 16 encloses a treatment cavity 18, and wherein the front frame 14 is provided for receiving a door 20 of said domestic appliance.

[0052] The side wall 12, the front frame 14 and the cavity wall 16 are formed as separate parts. The front frame 14 encloses a front opening of the oven cavity 18. The oven cavity 18 is the space enclosed by the cavity wall 16.

[0053] The side wall 12 includes at least one first embossment 22 arranged close to the front frame 14. The first embossment 22 is formed toward the interior of the casing 10. In this example, the embossment 22 is elongated and extents vertically parallel to the front edge of the side wall 12. The front frame 14 includes at least one frame lug 32. Said frame lug 32 extends rearwards from the front frame 14. The frame lug 32 is provided for the connection between the side wall 12 and the front frame 14. The at least one first screw 26 penetrates the first embossment 22 of the side wall 12 and the frame lug 32 of the front frame 14. Further, the side wall 12 includes vertical bending edges at the front side and at the rear side.

[0054] The cavity wall 16 includes at least one cavity lug 34. Said cavity lug 34 extends outwards from the cavity wall 16. The cavity lug 34 is provided for the connection between the front frame 14 and the cavity wall 16. The at least one second screw 28 penetrates the frame lug 32 of the front frame 14 and the cavity lug 34 of the cavity wall 16. Thus, the at least one first screw 26 is provided for connecting the side wall 12 to the front frame 14, while the at least one second screw 28 is provided for connecting the cavity wall 18 to the front frame 14. The side wall 12 and the cavity wall 18 have different screw points. The side wall 12 is screwed to the front frame 14 only from a lateral direction, so that no screws are visible from the front side of the casing 10.

[0055] Further, the front frame 14 is spaced from the cavity wall 16. A gap 72 is formed between the front frame 14 and the cavity wall 16. The gap 72 extends along the perimeter of the front frame 14 and the cavity wall 16. The gap 72 decouples thermally the front frame 14 from the cavity wall 16. Thus, the front frame 14 is thermally insulated from the cavity wall 16. Since the side wall 12 is connected to the front frame 14, but not to the cavity wall 16, also the side wall 12 is thermally insulated from the cavity wall 16. The thermal insulation between the side wall 12 and the front frame 14 on the one hand and the cavity wall 16 on the other hand avoids unnecessary energy losses.

[0056] Preferably, the side wall 12 includes bent lugs, which are inserted in or insertable into recesses of the front frame 14. Alternatively or additionally, the front frame 14 includes bent lugs, which are inserted in or insertable into recesses of the side wall 12. Said bent lug and recesses allow that the side wall 12 may be prefixed at the front frame 14 before the at least one first screw 26 is inserted.

[0057] The side wall 12 includes at least one second embossment 24. In this example, the second embossment 24 is arranged in an upper central portion of the side wall 12. The second embossment 24 is formed toward the exterior of the casing 10. The second embossment 24 is provided as a distance element between the side wall 12 and furniture enclosing said casing 10. Preferably, the side wall 12 includes at least one further embossment formed toward the interior of the casing 10, wherein said further embossment is provided for fixing insulating material. Said insulating material fills the space between the side wall 12 and the cavity wall 16.

[0058] The first embossment 22 and the frame lug 32 allow the direct connection of the side wall 12 to the front frame 14 without any intermediate fastening means. In a similar way, the frame lug 32 and the cavity lug 34 allow the direct connection of the cavity wall 18 to the front frame 14 without any intermediate fastening means.

[0059] FIG 2 illustrates a schematic perspective view of the corner of the casing 10 according to the preferred embodiment of the present invention.

[0060] The casing 10 comprises the side walls 12, the front frame 14 and the cavity wall 16. The side wall 12 includes the first embossment 22 and the second embossment 24. Further, the casing 10 comprises a control panel 30, a bottom part 36 and a top part 50. The control panel 30 is arranged above the oven door 20 and attached at the side walls 12. The bottom part 36 forms the ground of the casing 10 and is attached at the side walls 12. The top part 50 is also attached at the side walls 12.

[0061] Moreover, the side wall 12 includes at least one third embossment 40. In this example, the side wall 12 includes three third embossments 40, wherein only two of said three third embossments 40 are shown in FIG 2. The bottom part 36 includes one standing seam 38 at each lateral side. Said standing seam 38 encloses the lower edge of the side wall 12. The standing seam 38 includes at least one fourth embossment 42. In this example, the standing seam 38 includes three fourth embossments 42, wherein two of said three fourth embossments 42 are shown in FIG 2. The at least one third embossment 40 and the at least one fourth embossment 42 are formed toward the interior of the casing 10. The at least one third embossment 40 and the at least one fourth embossment 42 are congruent with each other. The fourth embossment 42 of the bottom part 36 is received by the third embossment 40 of the side wall 12. The third

embossment 40 and the fourth embossment 42 allow an alignment between the side wall 12 and the bottom part 36.

[0062] FIG 3 illustrates a schematic detailed sectional perspective view of the corner of the casing 10 according to the preferred embodiment of the present invention.

[0063] FIG 3 clarifies the geometric properties of the side wall 12, the front frame 14, the cavity wall 16 and the oven door 20 in an upper region of the casing 10. The first embossment 22 of the side wall 12 allows that the side wall 12 lies against the frame lug 32 of the front frame 14, wherein said frame lug 32 is arranged beneath the cavity lug 34. The frame lug 32 is not shown in FIG 3.

[0064] The side wall 12, the front frame 14 and the cavity wall 16 are formed as separate parts. The front frame 14 encloses the front opening of the oven cavity 18. The front frame 14 is spaced from the cavity wall 16, so that the gap 72 is formed between the front frame 14 and the cavity wall 16. The gap 72 extends along the perimeter of the front frame 14 and the cavity wall 16. The gap 72 decouples thermally the front frame 14 from the cavity wall 16, so that the front frame 14 is thermally insulated from the cavity wall 16. The side wall 12 is connected to the front frame 14, but not to the cavity wall 16. Thus, also the side wall 12 is thermally insulated from the cavity wall 16. The thermal insulation between the side wall 12 and the front frame 14 on the one hand and the cavity wall 16 on the other hand avoids unnecessary energy losses.

[0065] FIG 4 illustrates a front corner of the domestic appliance. FIG 5 illustrates the connection between front frame and side wall of FIG 4 in detail.

[0066] A part of the side wall 12 of the casing and the front frame 14 are shown, all other parts are removed. The front frame 14 includes an upper frame lug 32.1 and a lower frame lug 32.2 that are arranged vertically distanced from each other. The first embossment 22 of the side wall 12 has a substantially U-shaped cross section and extends vertically at least over a length corresponding to the distance between said upper and lower frame lugs 32.1, 32.2 of the front frame 14.

[0067] Said first embossment 22 of the side wall 12 lies against or supports both of said upper and lower frame lugs 32.1, 32.2 of the front frame 14 and is fixed to at least one, preferably both, of said upper and lower frame lugs 32.1, 32.2 by at least one first screw 26.

[0068] As shown in FIG 1 and FIG 6, the cavity wall 16 includes an upper cavity lug 34.1 and a lower cavity lug 34.2 that are arranged vertically distanced from each other, wherein the upper and lower cavity lugs 34.1, 34.2 are arranged corresponding to the arrangement of said upper and lower frame lugs 32.1, 32.2 of the front frame 14 in such way that said upper and lower cavity lugs 34.1, 34.2 respectively lie against said upper and lower frame lug 32.1, 32.2 and are respectively fixed to at least one, preferably to both, of corresponding counterparts out of upper and lower frame lug 32.1, 32.2 by at least one second screw 28.

[0069] At least one of said upper and lower frame lugs 32.1, 32.2 of the front frame 14 comprises a first frame lug section 32.3 that is disposed offset relative to second frame lug section 32.4 in a direction towards the side wall 12 and adapted for lying against or supporting said first embossment 22 of the side wall 12 and the second frame lug section 32.4 that is disposed offset relative to the first frame lug section 32.3 in a direction towards the cavity wall 16 and adapted to lie against the corresponding one of said upper and lower cavity lugs 34.1, 34.2. The plane of the first frame lug section 32.3 is displaced offset relative to the plane of the second frame lug section 32.4 and the plane of the first frame lug section 32.3 extends in parallel to the plane of the second frame lug section 32.4.

[0070] The gap 72 is formed between the front frame 14 and the cavity wall 16. The gap 72 extends along the perimeter of the front frame 14 and the cavity wall 16. The only connecting points between the front frame 14 and the cavity wall 16 are formed by the upper frame lug 32.1 and the upper cavity lug 34.1 and by the lower frame lug 32.2 and lower cavity lug 34.2 on both sides. The front frame 14 is thermally decoupled from the cavity wall 16 by the gap 72. Thus, the front frame 14 is thermally insulated from the cavity wall 16. The thermal insulation between the front frame 14 and the cavity wall 16 avoids unnecessary energy losses.

[0071] As shown in FIG 5, each of said upper and lower frame lugs 32.1, 32.2 of the front frame 14 comprises at least one frame lug recess 32.5 and said first embossment 22 of the side wall 12 comprises at least one, preferably two, bent lugs 22.1, 22.2 which is adapted for insertion into the frame lug recess 32.5 of said at least one upper or lower frame lug 32.1, 32.2 of the front frame 14, preferably wherein a second bent lug 22.2 extends perpendicularly relative to the first bent lug 22.1 and wherein one of the bent lugs 22.1, 22.2 is adapted for contacting the frame lug outline 32.6 of the first frame lug section 32.3.

[0072] Said two bent lugs 22.1 are adapted for prefixing said sidewall 12 in at least one horizontal direction, i.e. the y-direction as shown in FIG 2 and at least one vertical direction, i.e. the z-direction as shown in FIG 2 before screwing, wherein said two bent lugs 22.1 of the first embossment 22 of the side wall 12 are arranged respectively below and above said the screw-hole 32.7 for the first screw 26. When on the upper frame lug and the lower frame lug 32.1, 32.2 the first bent lug 22.1 is in contact with the frame lug outline 32.6 and the second bent lug 22.2 engages the frame lug recess 32.5, then the front frame secured on the first embossment 22 in such way that it is disposed in its intended position relative to the side wall 12 without the necessity that the worker secures one of the parts manually during the following screwing steps.

[0073] FIG 6 is a schematic view of the same region as shown in FIG 4, from a different perspective. The side wall is removed and the front part of the oven cavity is

made visible.

[0074] In this example, the frame lugs 32.1, 32.2, 32.3 and 32.4 of the front frame 14 are arranged either inward or outward. The inner frame lugs 32.1, 32.2 and 32.4 of the front frame 14 are connected or connectable to the cavity wall 16, while the outer frame lugs 32.3 of the front frame 14 are connected or connectable to the side walls 12. The first embossment 22 of the side wall 12 corresponds with the outer frame lugs 32.3 of the front frame 14. In particular, the first embossment 22 of the side wall 12 extends vertically and allows the fixation of the side wall 12 to the front frame 14 in its upper and lower region.

[0075] The cavity wall 16 of the oven cavity 18 includes an upper cavity lug 34.1 and a lower cavity lug 34.2 (not visible) extending outwards from said cavity wall 16. The cavity lugs 34.1, 34.2 lie against the respective frame lugs 32.1, 32.2 of the front frame 14. At least one or more second screws 28 penetrate the frame lugs 32.1, 32.2 and the cavity lug 34.1, 34.2.

[0076] The upper cavity lug 34.1 lies against the second frame lug section 32.4 of upper frame lug 32.1, the lower cavity lug 34.2 lies against the second frame lug section 32.4 of the lower frame lug 32.2. Thus, cavity wall 16 and side wall 12 are distanced from each other by the form of the frame lugs 32.1, 32.2.

[0077] FIG 7 illustrates a schematic side view of the casing 10 according to the preferred embodiment of the present invention, wherein said casing 10 has a first height.

[0078] The casing 10 comprises the side walls 12, the front frame 14, the oven door 20, the control panel 30, the bottom part 36 and the top part 50. The side wall 12 includes the first embossment 22, the second embossment 24 and the third embossment 40. The bottom part 36 includes the standing seam 38 with the fourth embossment 42.

[0079] FIG 8 illustrates a schematic side view of the casing 10 according to the preferred embodiment of the present invention, wherein said casing 10 has a second height. FIG 4 and FIG 5 are substantially identical, wherein the casing 10 in FIG 5 is higher than the casing in FIG 4. The different heights result from different shapes of the bottom part 36. The details of the bottom part 36 are described below.

[0080] FIG 9 illustrates a schematic side view of a lower portion of the casing 10 according to the preferred embodiment of the present invention, wherein said casing 10 has the second height.

[0081] The casing 10 comprises the side walls 12, the front frame 14, the oven door 20 and the bottom part 36. The side wall 12 includes the first embossment 22 and the third embossments 40. The bottom part 36 includes the standing seam 38 with the fourth embossments 42. Further, the bottom part 36 includes six fifth embossments 46, wherein three fifth embossments 46 are shown in FIG 6. The fifth embossments 46 are formed in the horizontal portion of the bottom part 36. The fifth embossment 46 extends upwards. In this example, three fifth embossments 46 are arranged at each lateral side of the bottom part 36. The fifth embossments 46 support the lower edge of the side wall 12. Thus, the bigger height of the casing 10 in FIG 5 and 6 results from the fifth embossments 46 in the bottom part 36.

[0082] The bottom part 36 is attached at the side wall 12 by at least one third screw 44 at each lateral side. In this example, two third screws 44 attach the bottom part 36 at the side wall 12. Each third screw 44 penetrates the fourth embossment 42 in the standing seam 38 of the bottom part 36 and the third embossment 40 of the side wall 12.

[0083] FIG 10 a schematic perspective view of a bottom corner of the domestic appliance, wherein a bottom part, a side wall and a hinge housing are shown and all other parts are removed. FIG 11 illustrates the connection between side wall, bottom part and hinge housing of FIG 10 in detail.

[0084] The bottom part 36 of the casing 10 comprises at least one fifth embossment 46 that is arranged in a region adjacent to a front end 62 of the bottom part 36 and that comprises a first bearing surface 46.1 for supporting the hinge housing 60 of a hinge, to which a door of the domestic appliance may be attachable and which is pivotable about a horizontal axis supported by the hinge. The hinge housing 60 comprises a substantially U-shaped cross section and may house functional elements of the hinge such as a stationary arm, springs etc.

[0085] Said fifth embossment 46 is arranged adjacent to the front end 62 and includes an upwardly bent first hinge fixing lug 64 that is arranged in a position to contact a first hinge housing side wall 66 of the hinge housing 60. At least one of said third embossment 40 of the side wall 12 and/or at least one of said fourth embossment 42 of the bottom part 36 includes a second bearing surface that is arranged to contact a second hinge housing side wall of the hinge housing 60 of the hinge to support the second hinge housing side wall.

[0086] The side wall 12 comprises a second hinge fixing lug 68 that is arranged in a position to contact a hinge housing upper wall 70. The first hinge fixing lug 64 and/or the second hinge fixing lug 68 and/or the first bearing surface 46.1 and/or the second bearing surface support and hold the hinge housing 60 in its intended position prior to additional fixation by screws.

[0087] The hinge housing 60 can be fixed to at least one of the standing seam 38 of the bottom part 36 and/or to a lower end region of the side wall 12 by at least one screw, e.g. at least one of said third screws 44.

[0088] FIG 12 illustrates a schematic perspective view from below of a first example of the bottom part 35 of the casing 10 according to the preferred embodiment of the present invention, wherein said casing 10 has the second height.

[0089] The bottom part 36 includes the six fifth embossments 46, wherein three fifth embossments 46 are formed at each lateral side of said bottom part 36. The fifth embossments 46 are formed in the horizontal portion

of the bottom part 36 and extend upwards. The fifth embossments 46 support the lower edge of the side wall 12, so that the bigger height of the casing 10 in FIG 5 and 6 results from the six fifth embossments 46 in the bottom part 36.

FIG 13 illustrates a schematic perspective view from below of a second example of the bottom part 36 of the casing 10 according to the preferred embodiment of the present invention, wherein said casing 10 has the first height.

[0090] The bottom part 36 includes two fifth embossments 46, wherein one fifth embossment 46 is formed at each lateral side of said bottom part 36. The fifth embossments 46 are arranged in a front portion of the bottom part 36. The fifth embossments 46 are formed in the horizontal portion of the bottom part 36 and extend upwards. The lower edge of the side wall 12 is supported by the horizontal portion of the bottom part 36, so that the smaller height of the casing 10 in FIG 4 results from the shape of the bottom part 36 in FIG 8.

[0091] The first and second examples of the bottom part 36 allow two different heights for the casing 10 without changing any further parts. The distance between the bottom part 36 and a ground of the furniture receiving the casing 10 remains equal for both examples. Thus, an air stream for cooling purposes is not changed by the replacement of the bottom part 36.

[0092] FIG 14 illustrates a schematic perspective rear view of the corner of the casing 10 according to the preferred embodiment of the present invention. FIG 9 shows the upper right corner of the casing 10.

[0093] The casing 10 comprises the side wall 12, the front frame 14, the oven door 20, the control panel 30 and the top part 50. The side wall 12 includes the first embossment 22 and is fastened by the at least one first screw 26. Further, the side wall 12 includes at least one side wall lug 56. In this example, the side wall 12 includes one side wall lug 56. The control panel 30 includes at least one panel lug 58. In this example, the control panel 30 includes one panel lug 58. An upper fourth screw 48 penetrates the side wall lug 56 and the panel lug 58, so that the control panel 30 is connected to the side wall 12. A lower fourth screw 48 penetrates the side wall lug 56 and the front frame 14, so that the front frame 14 is additionally stabilized.

[0094] FIG 15 illustrates a schematic sectional top view of the corner of the casing 10 according to the preferred embodiment of the present invention. FIG 10 clarifies the arrangement of the side wall lug 56, the panel lug 58 and the upper fourth screw 48. The upper fourth screw 40 is inserted substantially from behind. Also the lower fourth screw 48 is inserted substantially from behind.

[0095] FIG 16 illustrates a schematic perspective rear view of the corner of the casing 10 according to the preferred embodiment of the present invention.

[0096] The casing 10 comprises the side wall 12, the front frame 14, the oven door 20, the control panel 30 and the top part 50. The side wall 12 includes the first embossment 22 and is fastened by the at least one first screw 26. The side wall 12 is connected to the control panel 30 by the upper fourth screw 48. The side wall 12 is connected to the front frame 14 by the lower fourth screw 48.

[0097] Further, the top part 50 is connected to the side wall 12 by at least one fifth screw 54. The fifth screw 54 penetrates the top part 50 and the side wall 12. The fifth screw 54 is inserted top down into the top part 50 and the side wall 12. Moreover, the top part 50 includes a lateral bending edge enclosing the upper edge of the side part.

[0098] The casing 10 according to the present invention requires a low number of parts, since adjacent parts of said casing 10 are directly connected to each other. This is enabled by the special geometric shapes of said parts, by the embossment and by the lugs.

[0099] 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

[0100]

10	casing
12	side wall
14	front frame
16	cavity wall
18	treatment cavity, oven cavity
20	oven door
22	first embossment
22.1	first bent lug
22.2	second bent lug
24	second embossment
26	first screw
28	second screw
30	control panel
32	frame lug
32.1	upper frame lug
32.2	lower frame lug
32.3	first frame lug section
32.4	second frame lug section
32.5	frame lug recess
32.6	frame lug outline
32.7	screw-hole
34	cavity lug
34.1	upper cavity lug
34.2	lower cavity lug
36	bottom part
38	standing seam

40 third embossment
42 fourth embossment
44 third screw
46 fifth embossment
46.1 first bearing surface
48 fourth screw
50 top part
52 heating element
54 fifth screw
56 side wall lug
58 panel lug
60 hinge housing
62 front end
64 first hinge fixing lug
66 hinge housing side wall
68 second hinge fixing lug
70 hinge housing upper wall
72 gap

Claims

1. Cooking oven including a casing (10), wherein said cooking oven comprises the following parts:

- two side walls (12) forming lateral parts of the casing (10),
- a front frame (14) arranged at a front side of the casing (10),
- a treatment cavity being at least partially enclosed by at least one cavity wall (16) including at least one upper cavity lug (34.1) and at least one lower cavity lug (34.2) and being arranged inside the casing (10),
- a bottom part (36) of the casing (10) arranged beneath the side walls (12), and
- a top part (50) of the casing (10) arranged above the side walls (12), wherein
- a front end of the at least one cavity wall (16) forms an opening for charging food stuff to be cooked into the treatment cavity (18), wherein
- the front frame (14) surrounds said opening circumferentially,
- wherein the front frame (14) is coupled to the cavity wall (16) via coupling means (31.1,..., 31.3, 32.1,..., 32.7, 34.1, 34.2),
- wherein the coupling means comprise at least one upper frame lug (32.1) and one lower frame lug (32.2), wherein at least one of said upper and lower frame lugs (32.1, 32.2) comprise a first frame lug section (32.3) that is disposed offset relative to a second frame lug section (32.4) of the frame lug in a direction towards one of the side walls and adapted for lying against or supporting a first embossment of the one of the side walls and the second frame lug section (32.4) is disposed in a direction towards the cavity wall and adapted to lie against the corresponding one of said upper and lower cavity lugs (34.1, 34.2).

2. The cooking oven according to claim 1, **characterised in that** at least two adjacent parts of the casing (10) are directly connected or connectable to each other by at least one fasting element (26, 28, 44, 48, 54), and wherein

- at least one of the parts of the casing (10) includes at least one embossment (22, 40, 42, 46) or lug element (32, 34, 56, 58), and wherein
- the at least one embossment (22, 40, 42, 46) or lug element (32, 34, 56, 58) lies against or supports the adjacent part of the casing (10).

3. The cooking oven according to claim 1 or 2, **characterised in that** the gap (72) extends along the perimeter of said front frame (14) and cavity wall (16), so that the front frame (14) is substantially thermally decoupled from the cavity wall (16), and/or wherein the side walls (12) are directly connected or connectable to the front frame (14), wherein the side walls (12) are spaced from the cavity wall (16) without any contact between the side walls (12) on the one hand and the cavity wall (16) on the other hand.

4. The cooking oven according to any one of the preceding claims,
characterised in that
the front frame (14) includes at least one frame lug (32) and at least one of said side walls (12) includes at least one first embossment (22), in particular comprising a substantially U-shaped cross section, extending into the interior of the casing (10), wherein said first embossment (22) of the side wall lies against or supports said frame lug (32) of the front frame (14), wherein preferably said frame lug (32) extends rearwards from the front frame (14), in particular wherein the first embossment (22) is elongated and extends substantially parallel to a vertical front edge of the side wall (12), wherein the first embossment (22) is arranged in a region adjacent to said front edge of the side wall (12), and wherein at least one first screw (26) penetrates the first embossment (22) and the frame lug (32).

5. The cooking oven according to any of the preceding claims,
characterised in that
the cavity wall (16) includes at least one cavity lug (34) extending outwards from said cavity wall (16), wherein the cavity lug (34) lies against the frame lug (32) of the front frame (14), and wherein at least one second screw (28) penetrates the frame lug (32) and the cavity lug (34), in particular wherein the front frame (14) includes an upper frame lug (32.1) and a lower frame lug (32.2) that are arranged vertically

distanced from each other, wherein the first embossment (22) of the side wall (12) extends vertically at least over a length corresponding to the distance between said upper and lower frame lugs (32.1, 32.2) of the front frame (14),
in particular wherein said first embossment (22) of the side wall (12) lies against or supports both of said upper and lower frame lugs (32.1, 32.2) of the front frame (14) and is fixed to at least one, preferably both, of said upper and lower frame lugs (32.1, 32.2) by at least one first screw (26) .

6. The cooking oven according to claim 5,
characterised in that
the cavity wall (16) includes a flange in the region of the front end, in particular a flange circumferentally surrounding the opening formed by the front end, wherein an upper cavity lug (34.1) and a lower cavity lug (34.2) that are arranged vertically distanced from each other are arranged on said flange, wherein the upper and lower cavity lugs (34.1, 34.2) are arranged corresponding to the arrangement of said upper and lower frame lugs (32.1, 32.2) of the front frame (14) in such way that said upper and lower cavity lugs (34.1, 34.2) respectively lie against said upper and lower frame lug (32.1, 32.2) and are respectively fixed to at least one, preferably to both, of corresponding counterparts out of upper and lower frame lug (32.1, 32.2) by at least one second screw (28),
in particular wherein the flange is bent in a direction towards a rear of the treatment cavity, preferably extending at least partially parallel to the cavity wall (16),
in particular wherein at least one of said upper and lower frame lugs (32.1, 32.2) of the front frame (14) comprises a first frame lug section (32.3) that is disposed in a direction towards the side wall (12) and adapted for lying against or supporting said first embossment (22) of the side wall (12) and a second frame lug section (32.4) that is disposed in a direction towards the cavity wall (16) and adapted to lie against the corresponding one of said upper and lower cavity lugs (34.1, 34.2).

7. The cooking oven according to claim 5 or 6,
characterised in that
a plane of the first frame lug section (32.3) is displaced parallel to a plane of the second frame lug section (32.4), in particular wherein at least one of said upper and lower frame lugs (32.1, 32.2) of the front frame (14) comprises at least one frame lug recess (32.5) and said first embossment (22) of the side wall (12) comprises at least one, preferably two, bent lugs (22.1, 22.2) which is adapted for insertion into the frame lug recess (32.5) of said at least one upper or lower frame lug (32.1, 32.2) of the front frame (14), in particular wherein a second bent lug (22.2) extends perpendicularly relative to the first bent lug (22.1) and wherein one of the bent lugs (22.1), (22.2) is adapted for contacting the frame lug outline (32.6) of the first frame lug section (32.3), wherein said two bent lugs (22.1) are adapted for pre-fixing said sidewall (12) respectively in at least one horizontal direction (y-direction) and at least one vertical direction (z-direction) before screwing, in particular wherein said two bent lugs (22.1) of the first embossment (22) of the side wall (12) are arranged respectively below and above said the screwhole (32.7) for the first screw (26).

8. The cooking oven according to any one of the claims 5 to 7,
characterised in that
the front frame (14) includes inner frame lugs (32.1, 32.2, 32.4) and outer frame lugs (32.3), wherein the front frame (14) is arranged such that the inner frame lugs (32.1, 32.2, 32.4) are arranged on a inner side of the front frame (14) and that the outer frame lugs (32.3) are arranged on an outer side of the front frame (14), wherein the inner frame lugs (32.1, 32.2, 32.4) are connected or connectable to the cavity wall (16), while the outer frame lugs (32.3) are connected or connectable to the side wall (12).

9. The cooking oven according to any one of the preceding claims,
characterised in that
the side wall (12) includes at least one second embossment (24) formed toward the exterior of the casing (10), wherein said second embossment (24) can lie against or supports at least one kitchen furniture enclosing at least partially the casing (10).

10. The cooking oven according to any one of the preceding claims,
characterised in that
the bottom part (36) includes two standing seams (38) at its lateral side, wherein said standing seam (38) encloses at least partially a lower edge of the corresponding side wall (12), in particular wherein the side wall (12) includes at least one third embossment (40) formed toward the interior of the casing (10) and arranged in the lower portion of said side wall (12), and the standing seam (38) of the bottom part (36) includes at least one fourth embossment (42) formed toward the interior of the casing (10), wherein the third embossment (40) and the fourth embossment (42) are congruent to each other, so that the fourth embossment (42) is received by the corresponding third embossment (40), and wherein preferably at least one third screw (44) penetrates the fourth embossment (42) and the third embossment (40).

11. The cooking oven according to any one of the preceding claims,

characterised in that
the bottom part (36) includes at least two embossments, in particular fifth embossments (46), arranged in the horizontal portion of said bottom part (36), wherein said embossments (46) extend upwards and support the lower edges of the side walls (12), wherein
the bottom part (36) of the casing (10) includes at least one fifth embossment (46) that is arranged in a region adjacent to a front end (62) of the bottom part (36) and that comprises a first bearing surface (46.1) for supporting a hinge, in particular a hinge housing (60) of the hinge, to which a door (20) of the cooking oven is attachable and which is pivotable about a horizontal axis, preferably wherein the hinge housing (60) comprises at least partially a U-shaped cross section,
in particular wherein said fifth embossment (46) adjacent to the front end (62) includes an, preferably upwardly bent, first hinge fixing lug (64) that is arranged in a position to contact a first hinge housing side wall (66) of the hinge housing (60),
in particular wherein at least one of said third embossment (40) of the side wall (12) and/or at least one of said fourth embossment (42) of the bottom part (36) includes a second bearing surface that is arranged to contact a second hinge housing side wall of the hinge housing (60) of the hinge to support the second hinge housing side wall,
in particular wherein the side wall (12) comprises a second hinge fixing lug (68) that is arranged in a position to contact a hinge housing upper wall (70),
in particular wherein the first hinge fixing lug (64) and/or the second hinge fixing lug (68) and/or the first bearing surface (64,1) and/or the second bearing surface support and hold the hinge housing (60) in its intended position prior to additional fixation, in particular by screws,
in particular wherein the hinge housing (60) can be fixed to at least one of the standing seam (38) of the bottom part (36) and/or to a lower end region of the side wall (12) by at least one screw, in particular by at least one of said third screws (44).

12. The cooking oven according to claim 13,
characterised in that
the height of the casing (10) is definable by the selection of the bottom part (36), wherein the number, the positions and/or the heights of the fifth embossments (46) of said bottom part (36) affect the height of the casing (10), or wherein
the height of the casing (10) is modifiable by an exchange of the bottom part (36), or definable by the selection of the bottom part (36), wherein the number, the positions and/or the heights of the fifth embossments (46) of said bottom part (36) affect the height of the casing (10).

13. The cooking oven according to any one of the preceding claims,
characterised in that
the casing (10) comprises at least one control panel (30) arranged above the front frame (14), wherein said control panel (30) includes a pair of panel lugs (58), and wherein said panel lug (58) lies against and/or is supported by a side wall lug (56) protruding from the side wall (12), and wherein preferably an upper fourth screw (48) penetrates the side wall lug (56) and the panel lug (58) or a lower fourth screw (48) penetrates the side wall lug (56) and the front frame (14), in particular wherein the front frame (14) is provided for receiving a door (20).

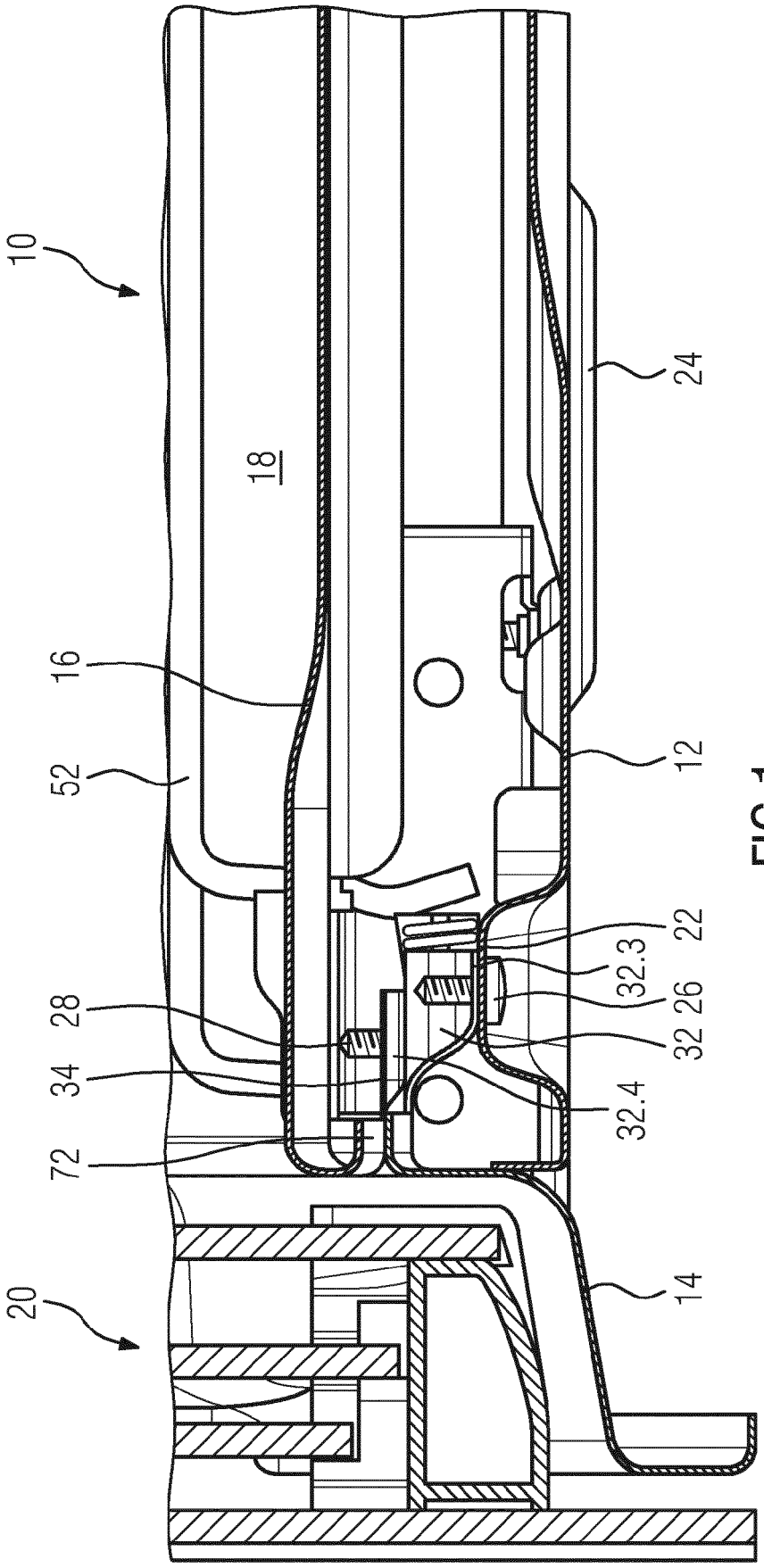


FIG 1

FIG 2

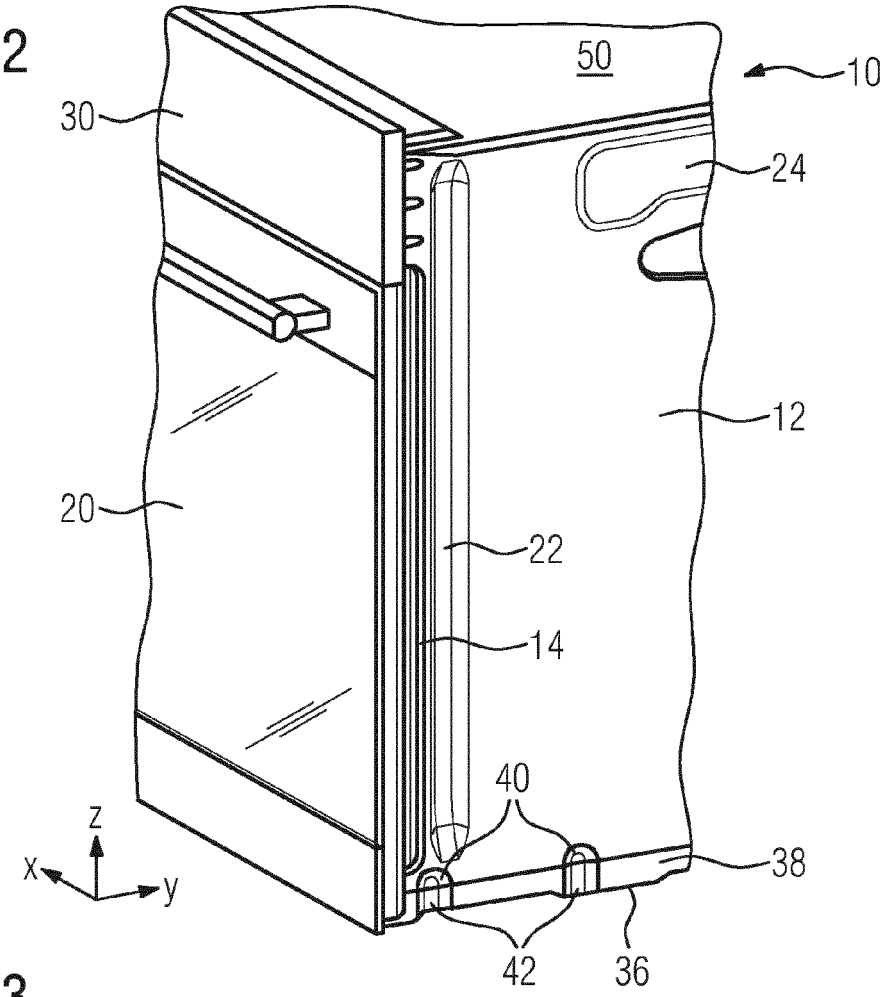


FIG 3

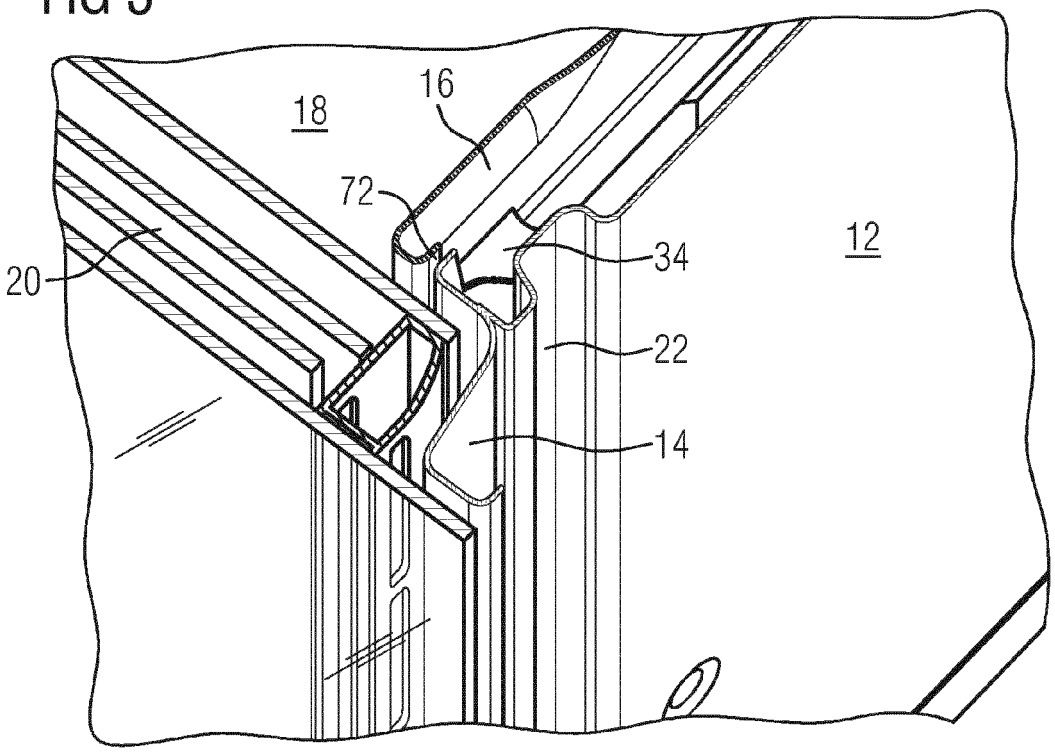


FIG 4

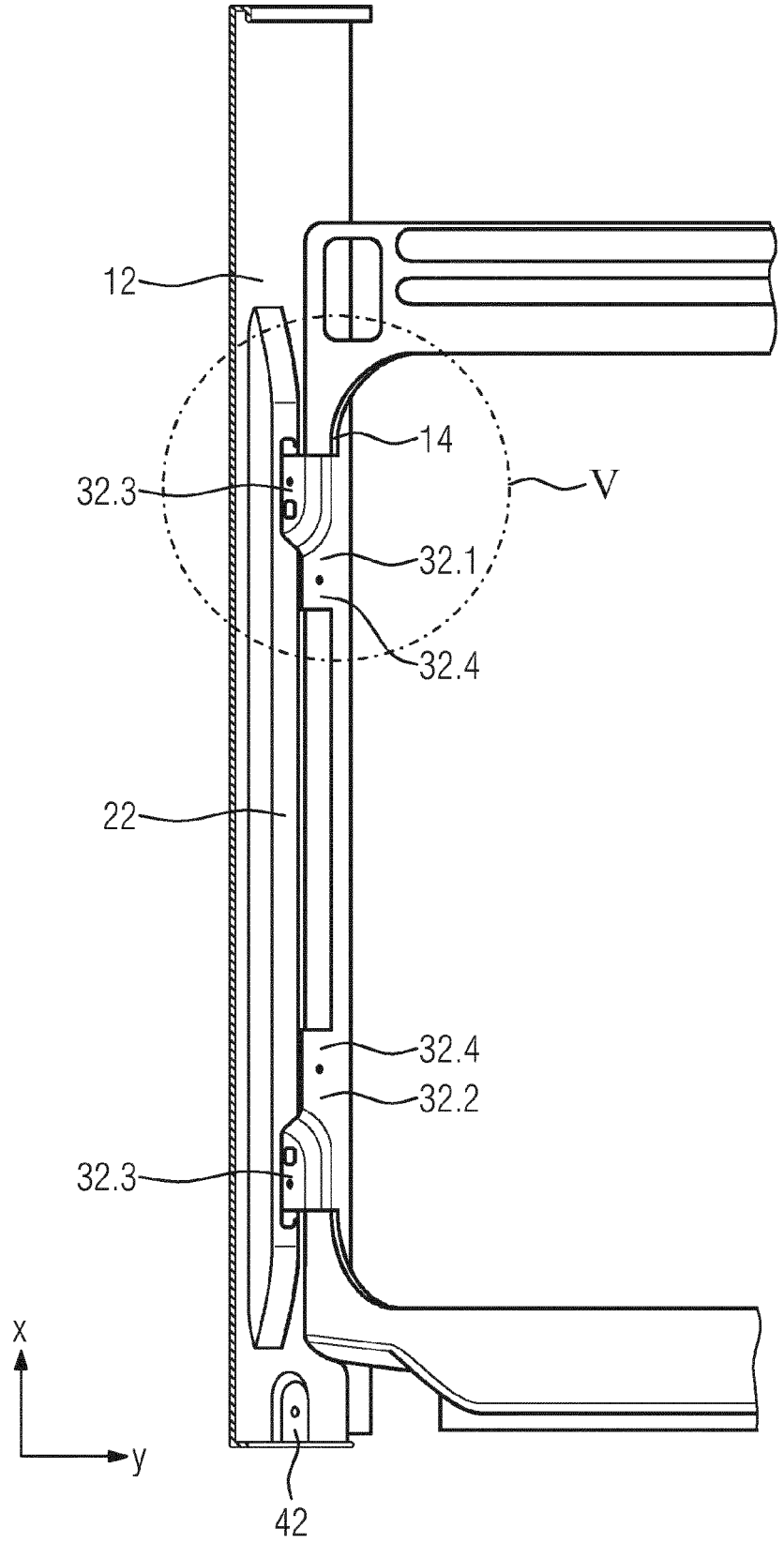


FIG 5

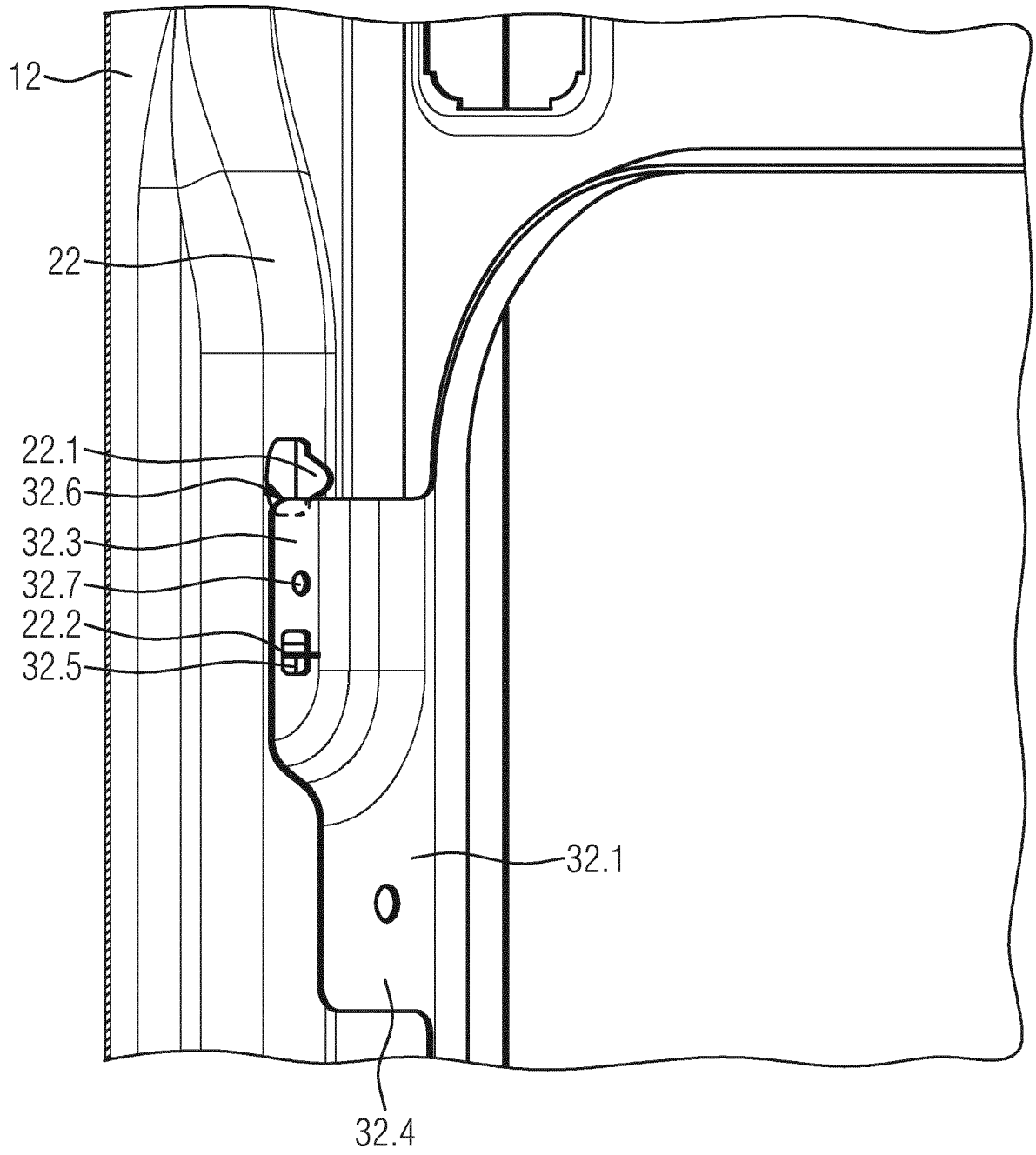
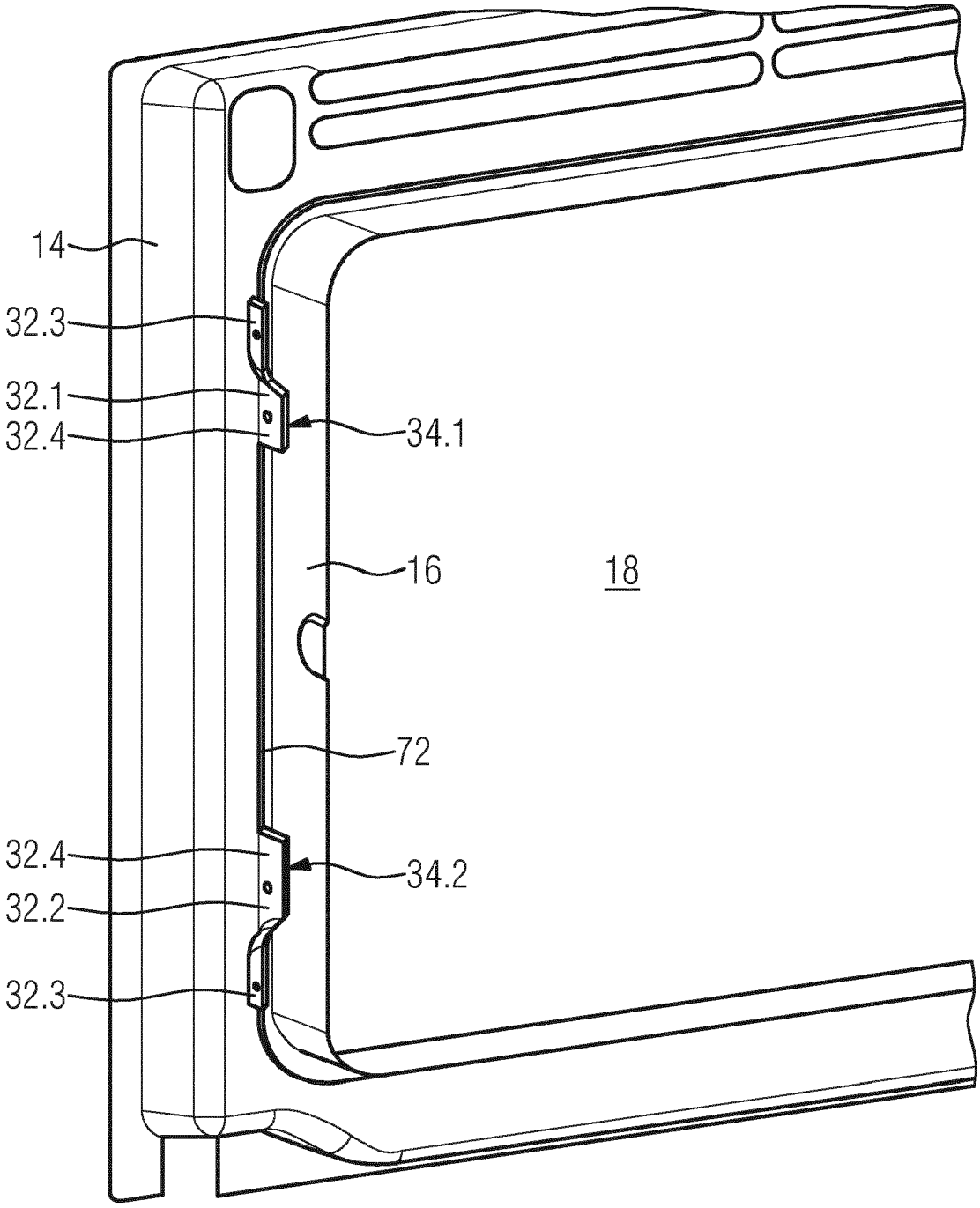


FIG 6



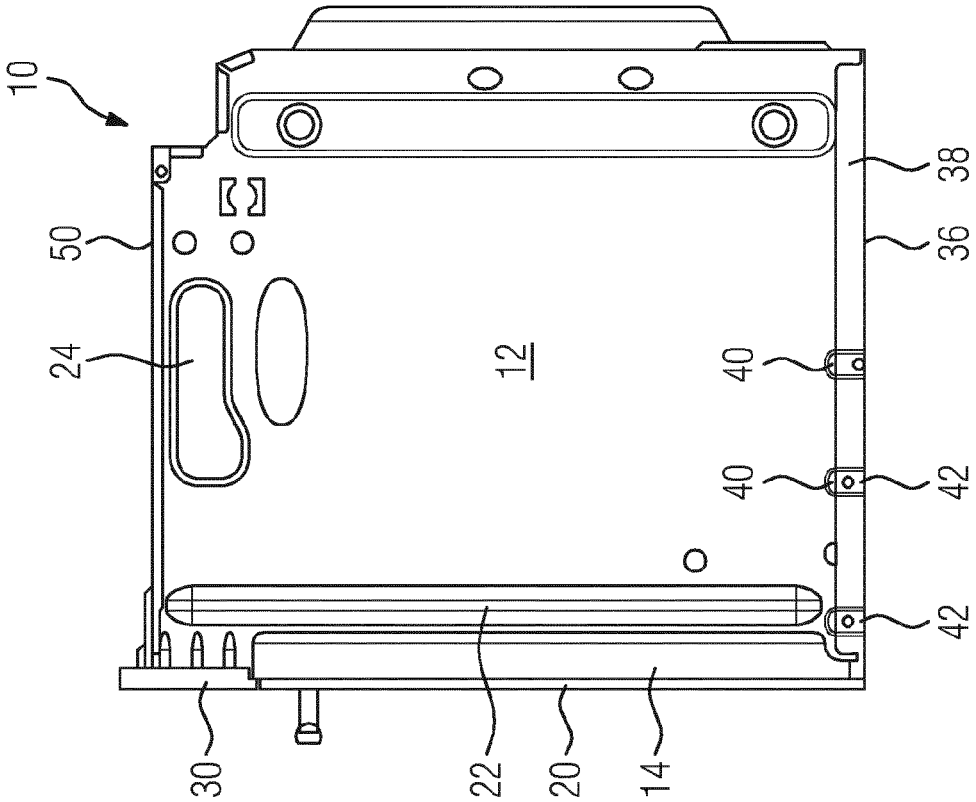

10
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FIG 8

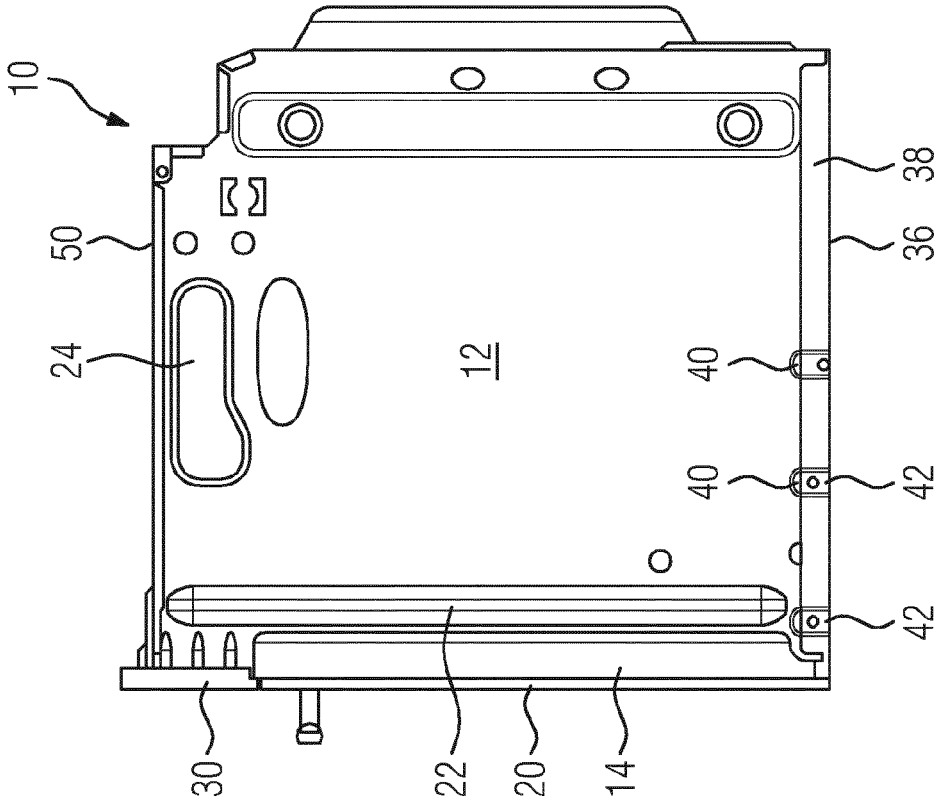
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FIG 7

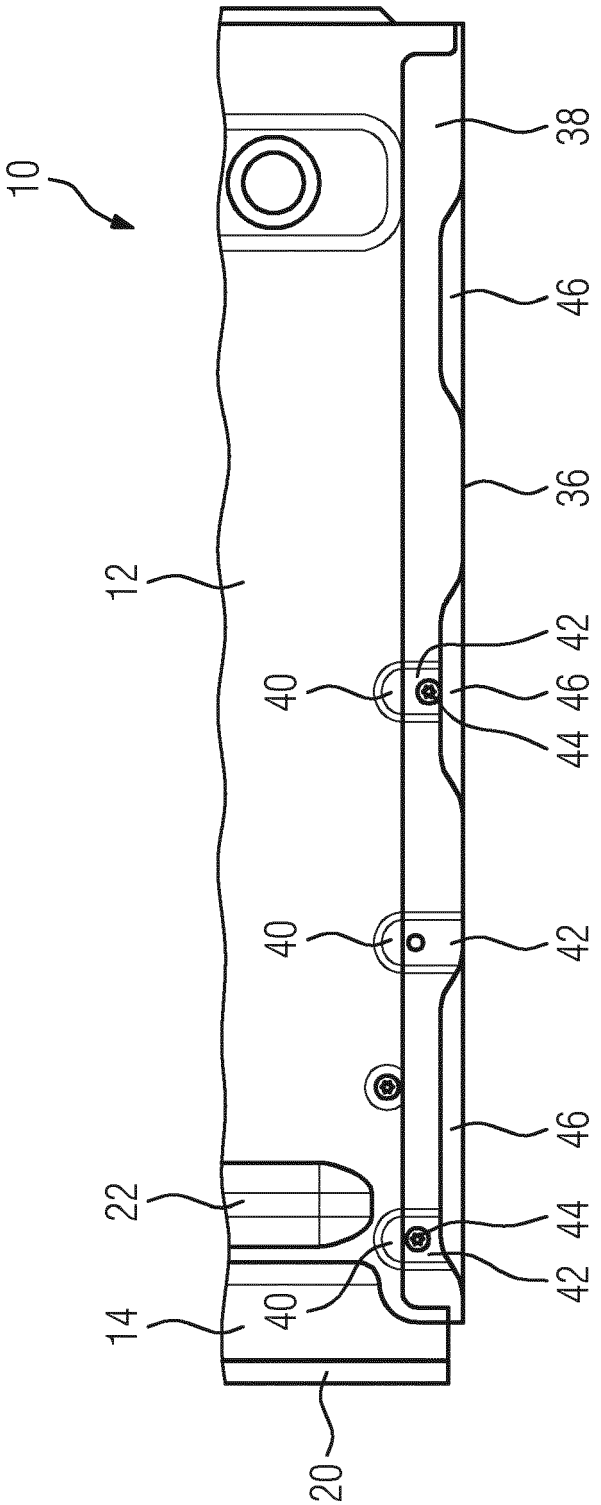


FIG 9

FIG 10

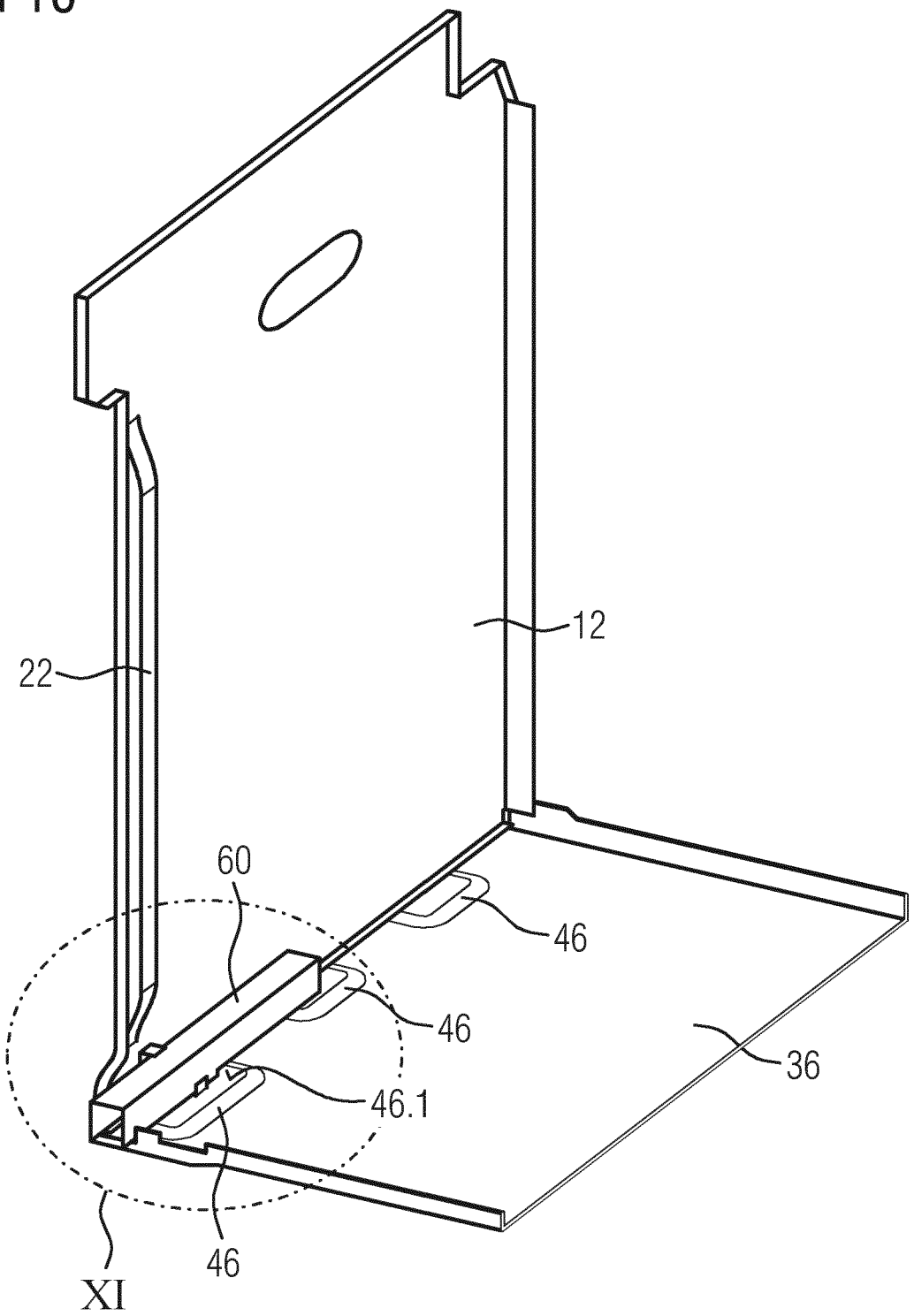
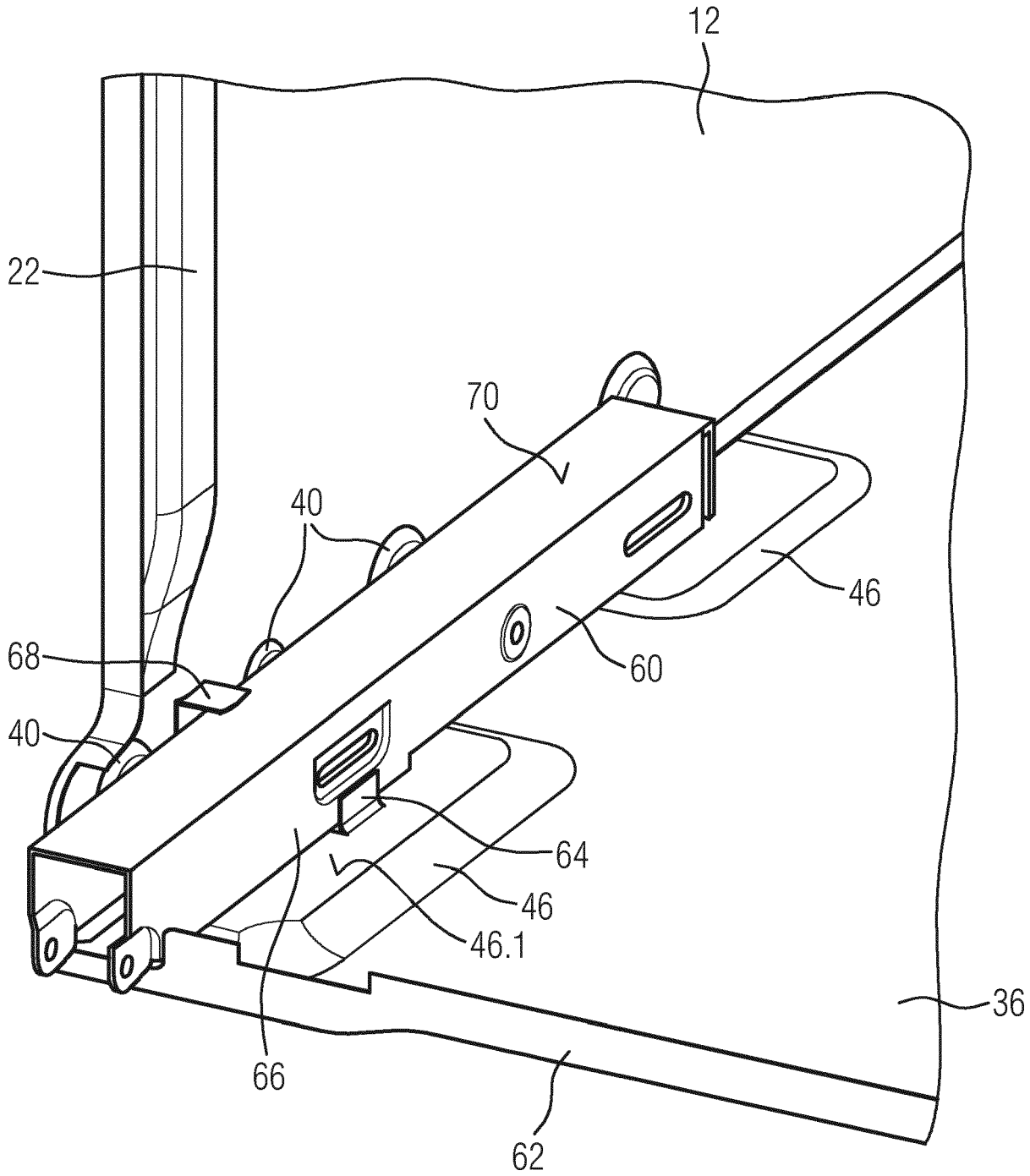


FIG 11



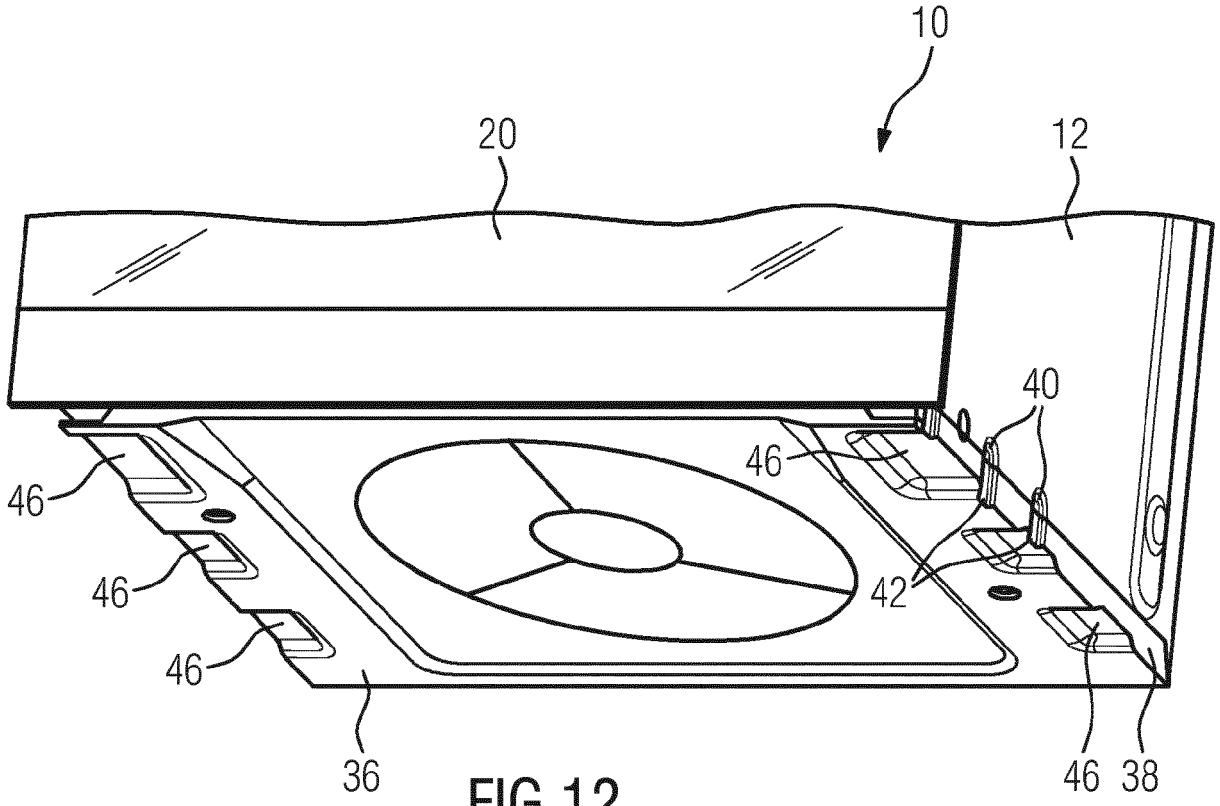


FIG 12

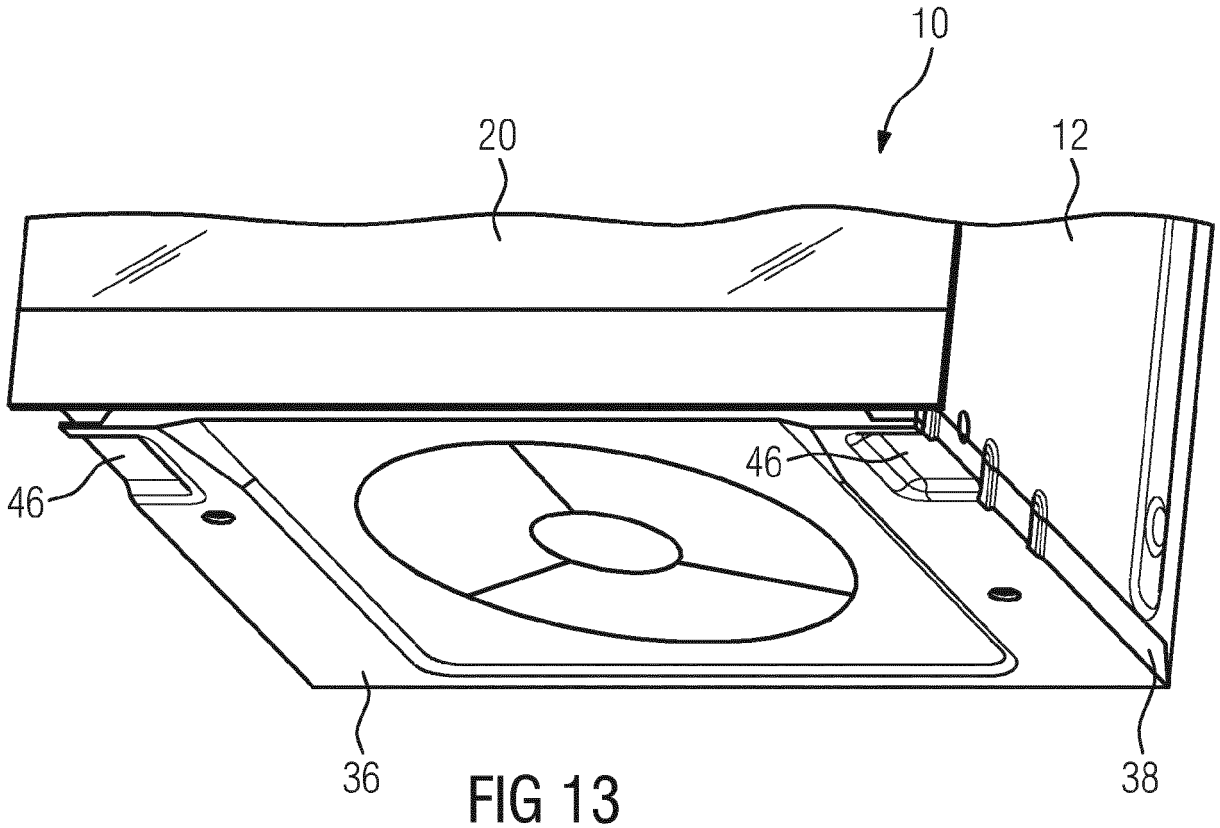


FIG 13

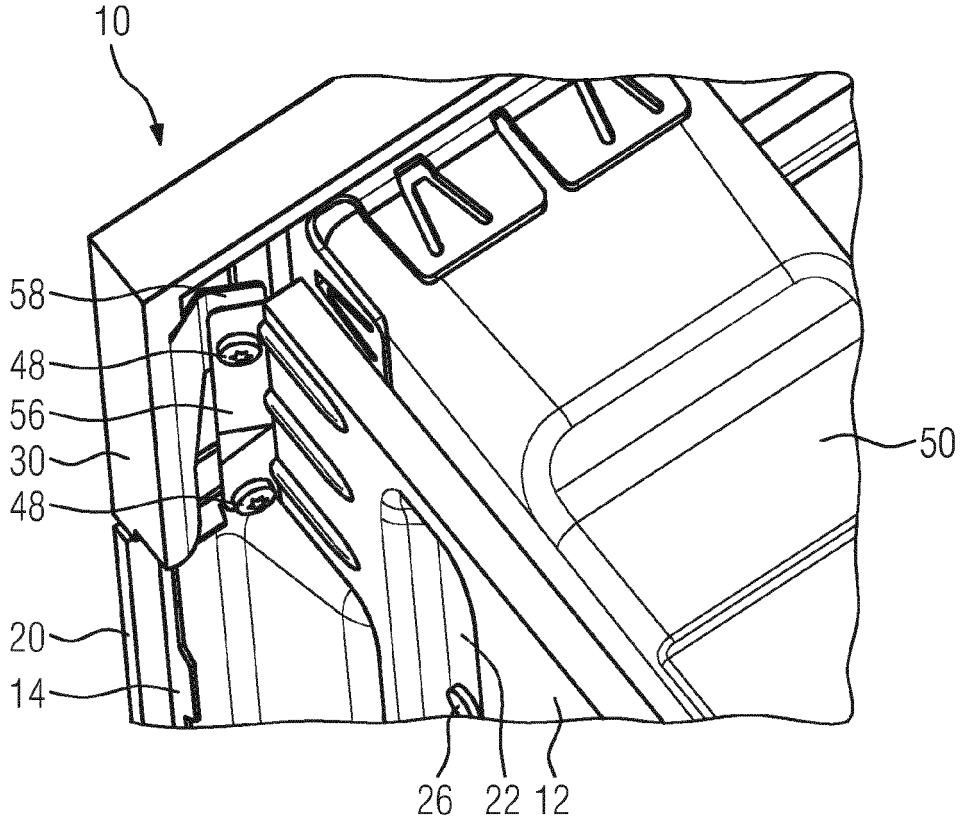


FIG 14

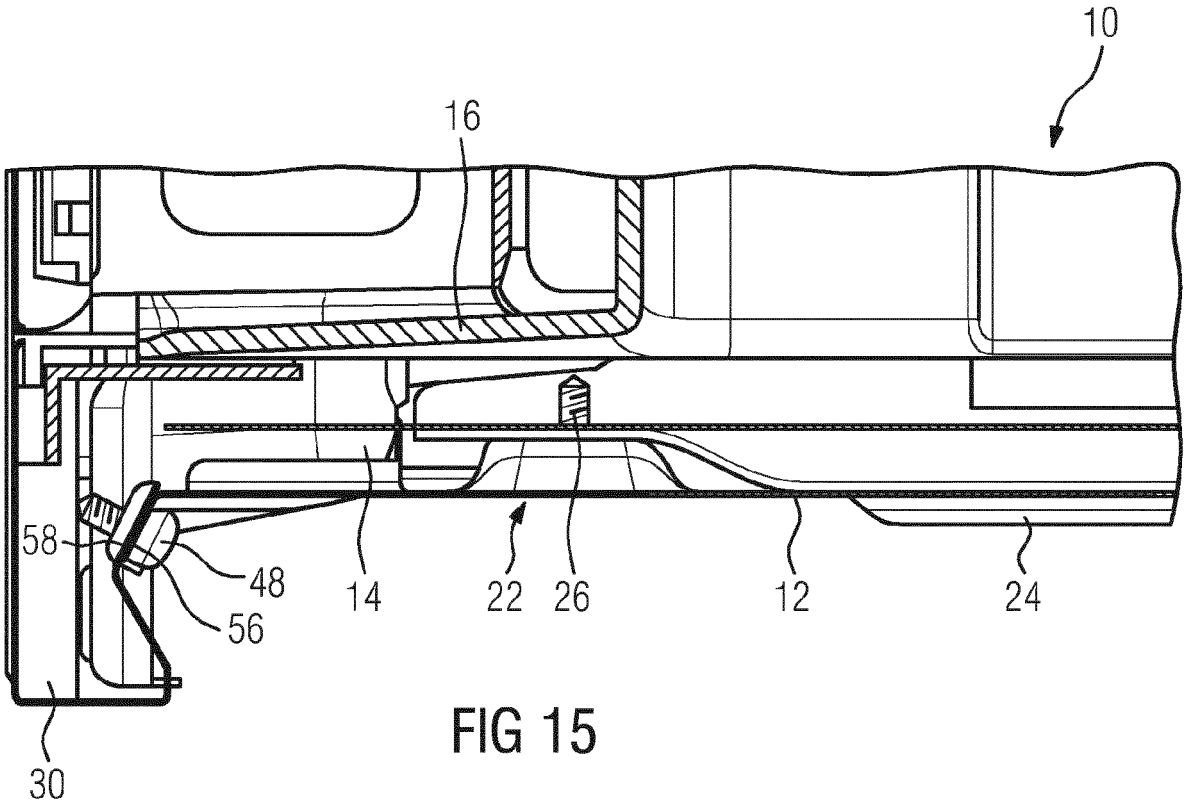


FIG 15

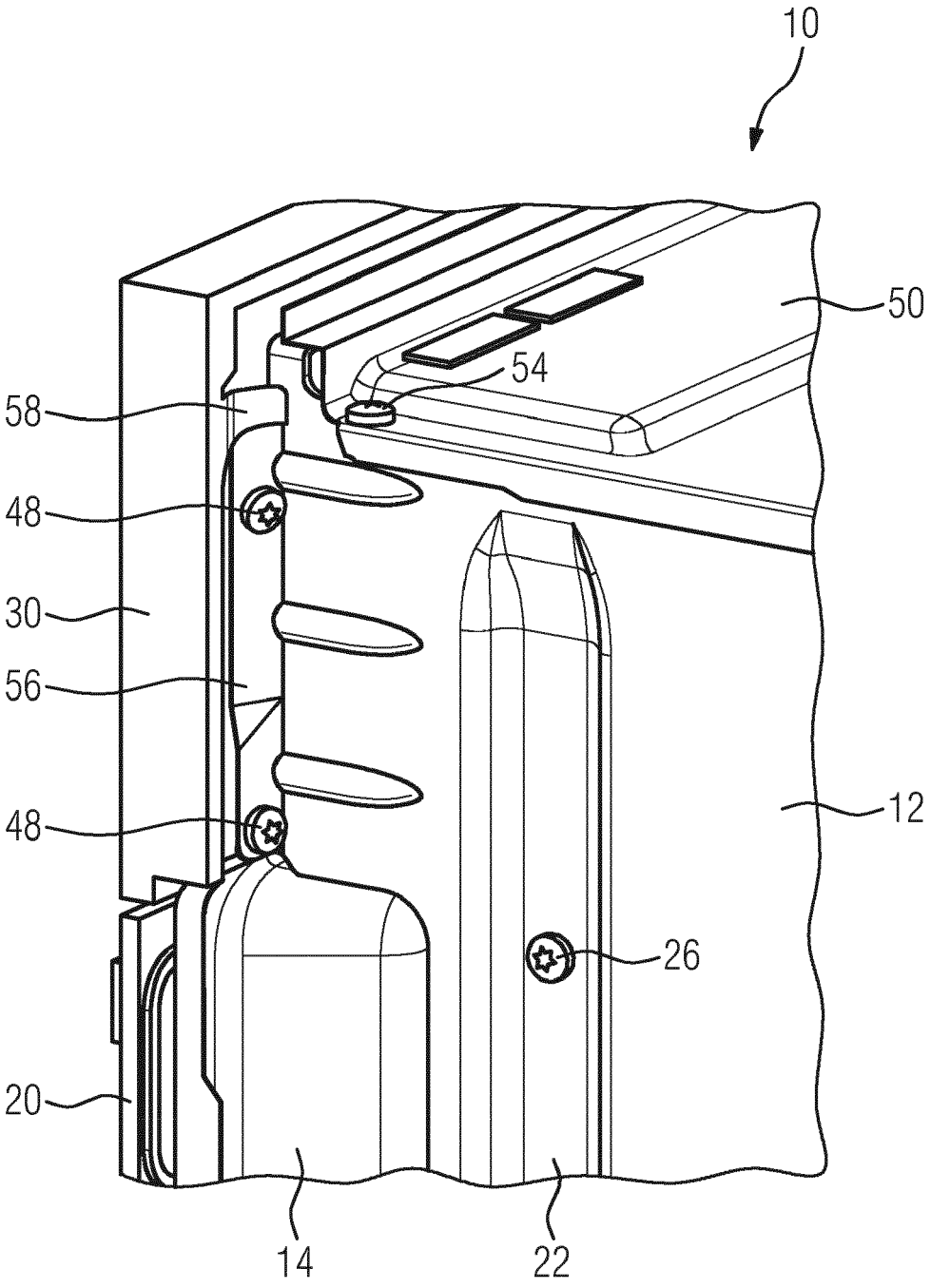


FIG 16

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Place of search	Date of completion of the search	Examiner
The Hague	16 December 2020	Rodriguez, Alexander

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