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(54) BOX-LIKE STRUCTURE AND VENTILATION UNIT

(57) Box-like structure (2) for manufacturing a ventilation unit (1); wherein the box-like structure (2) is a hollow body having a longitudinal axis (X) and an inner ventilation chamber (3); wherein the box-like structure (2) has a first and a second longitudinal opening (4; 5) opposed to each other and configured to establish a communication between said ventilation chamber (3) and the outside; wherein the hollow body of the box-like structure (2) is self-supporting and is made at least partially by an insulated panel (10).

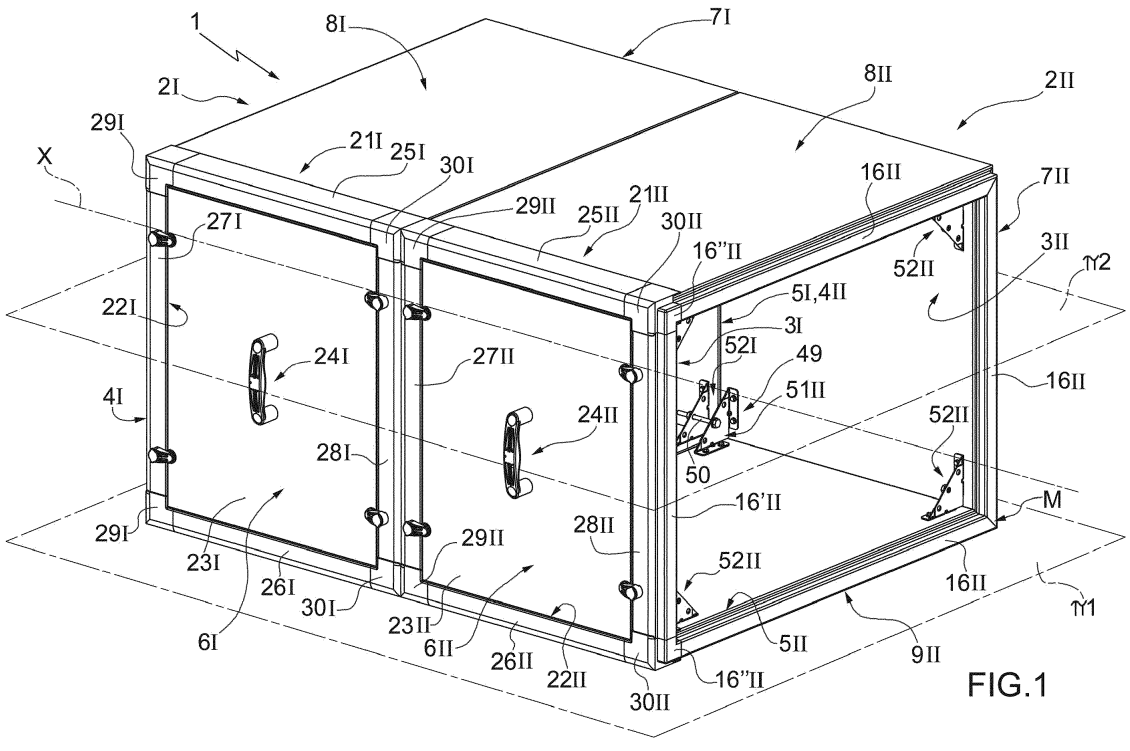

FIG.1

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Description

[0001] The present patent application relates to a box-like structure, to an insulated panel for manufacturing said box-like structure and to a ventilation unit.

[0002] It is known the use of ventilation units to ventilate an environment in a controlled manner. For example, some known ventilation units have box-like structures, similar to cabinets, having a ventilation chamber and one or more fans arranged inside the ventilation chamber.

[0003] In some known ventilation units, the box-like structure is a self-supporting panel made of a sheet of folded metal. Alternatively, it is known that the box-like structure includes a supporting frame and closing panels.

[0004] Known ventilation units have the disadvantage that box-like structures of the aforesaid type are fixed and bulky to transport. Moreover, the use of metal (for the sheet of the self-supporting panels or for the frame) increases the heat exchange between the ventilation chamber and the outside, thus reducing the thermal efficiency of the ventilation unit. The object of the present invention is to provide a box-like structure for a ventilation unit that is easy to transport. The object of the present invention is to provide an insulated panel configured to manufacture the box-like structure according to the present invention.

[0005] The object of the present invention is to provide a ventilation unit that is simply assembled and has no thermal bridges, in order to optimize the thermal efficiency of the ventilation unit and not to have any air leakage.

[0006] The object of the present invention is to provide a box-like structure, an insulated panel and a ventilation unit as set forth in the appended claims.

[0007] The invention will now be described with reference to the accompanying drawings illustrating a non-limiting embodiment, wherein:

Figure 1 is a front perspective view, with some parts removed for clarity's sake, of a ventilation unit according to the present invention;

Figure 2 is a rear exploded view, with some parts removed for clarity's sake, of two box-like structures of Figure 1 during the assembly for manufacturing the ventilation unit of Figure 1;

Figure 3 is a perspective view of an insulated panel for manufacturing a box-like structure according to Figure 1;

Figure 4 is a perspective view of the U-folded panel of Figure 3;

Figure 5 shows a detail of Figure 2 during the assembly;

Figure 6 shows, with some parts removed for clarity's sake, a section with respect to the plane n2 of Figure 1 of the junction point between two adjacent box-like structures;

Figure 7 is a perspective and partially enlarged view, with some portions removed for clarity's sake, of a detail of Figure 6;

Figure 8 is a perspective view of a detail of Figure 1;

Figure 9 shows an exploded view of a detail of Figure 1; and

Figure 10 is a perspective view of the assembled detail of Figure 9.

[0008] In Figure 1, the reference number 1 indicates in its whole a ventilation unit configured to house a fan (not shown) in a known manner. As better described hereinafter, the ventilation unit 1 may comprise one or more (preferably modular) box-like structures 2I, 2II connected to each other. Hereinafter, the characters I and II will be used to distinguish the components of two box-like structures 2, which are substantially equal and arranged side by side.

[0009] As shown in Figure 1, the ventilation unit 1 has a longitudinal axis X and comprises a plurality of box-like structures 2I, 2II, arranged side by side along the longitudinal axis X. In particular, Figure 2 shows two adjacent box-like structures 2I, 2II just before the assembly. Preferably, two adjacent box-like structures 2II, 2II are connected by using a male-female joint, as better described hereinafter.

[0010] As shown in Figure 1, each box-like structure 2 has a rectangular or cubic parallelepiped shape. Each box-like structure 2 has an inner ventilation chamber 3 configured to be crossed by an air flow and/or to house a fan. In particular, each box-like structure 2 has a pair of side openings 4, 5, which are parallel and opposed to each other. Each side opening 4, 5 is configured to establish a communication between the ventilation chamber 3 with the outside of the respective box-like structure 2.

[0011] As shown in Figure 1, the ventilation chambers 3I, 3II of both box-like structures 2I, 2II are in fluid communication with each other. In particular, a side opening 5I of a box-like structure 2 matches with a side opening 4II of the other box-like structure 2, so that the respective inner ventilation chambers 3I, 3II communicate.

[0012] As shown in Figure 1, each box-like structure 2 comprises a front wall 6, a rear wall 7, an upper wall 8 and a lower wall 9.

[0013] Advantageously, as shown in Figures 3 and 4, two or more walls of the box-like structure 2 are manufactured with a single insulated panel 10. In particular, Figures 3 and 4 show that three walls of the box-like structure 2 are made of a U-folded insulated panel. In particular, as shown in Figure 4, the insulated panel 10 is U-folded to form the rear wall 7, the upper wall 8 and the lower wall 9.

[0014] Advantageously, the box-like structure 2 is a self-supporting hollow body. The term "self-supporting structure" means a structure that can firmly remain in its upright position without using frames. In particular, "self-supporting" means that there are no uprights or beams to support one or more insulated panels in their position.

[0015] As shown in Figure 3, the insulated panel 10 is movable from an extended position to a folded position

(Figures 1, 2 and 4). When the insulated panel 10 is completely extended on a support plane, it has a longitudinal axis Y.

[0016] In particular, when fully extended on a plane, the insulated panel 10 has two longitudinal sides 13 and 14. In particular, the insulated panel 10 has a left longitudinal side 13 and a right longitudinal side 14, respectively. Hereinafter the terms "right" and "left" are used with reference to the box-like structure 2 resting on a support plane $\pi 1$, as shown in Figure 1. Advantageously, the left longitudinal side 13 has, at least partially, a groove 15. In other words, the left longitudinal side 13 is a side that has at least one female housing 15 for a male-female joint.

[0017] Advantageously, the right longitudinal side 14 includes a projection 16 protruding from the insulated panel 10 and is at least partially complementary to the groove 15 formed along the left longitudinal side 13. Advantageously, the insulated panel 10 is a male-female joint panel; this allows the insertion and the geometric coupling between the projection 16I and the groove 15II of two box-like structures 2I and 2II, as shown in detail in Figures 1, 2 and 5. Advantageously, the coupling between the projection 16 and the groove 15 is double-sided to provide a better sealing and thermal tightness at the junction point between the two adjacent box-like structures 2I and 2II.

[0018] As shown in Figure 3, the insulated panel 10 has a plurality of weakening lines 20, substantially transverse to the longitudinal axis Y of the insulated panel 10. The weakening lines 20 are configured to delimit three walls of the box-like structure 2 inside the insulated panel 10, in particular: the upper wall 8, the rear wall 7 and the lower wall 9.

[0019] The weakening lines 20 have been made in the insulated panel 10 by removing part of the material, thus removing part of the metal sheet 17 intended to be directly exposed inside the ventilation chamber 3 and part of the insulating material 19.

[0020] Advantageously, to bend by 90° two adjacent walls 7 and 9 or 7 and 8, a strip of material having a substantially isosceles trapezoidal shape with oblique sides mutually inclined at about 90° has been removed at each weakening line 20 in the insulated panel 10.

[0021] In this way, thanks to the presence of the continuous outer metal sheet 18, once U-folded the insulated panel 10 guarantees the continuity of the material at the edges, thus avoiding spots where any air leakage or thermal bridge may occur between the ventilation chamber 3 and the outside through the box-like structure 2.

[0022] As shown in Figure 3, once the insulated panel 10 is U-folded, the groove 15 faces the outside of the box-like structure 2 near a side opening 4, while the projection 16 protrudes out of the box-like structure 2 at the opposed side opening 5.

[0023] As shown in Figure 4, the U-folded insulated panel 10 has an upper edge 10 and a lower edge 12, parallel and opposed to each other.

[0024] As shown in detail in Figure 5, the insulated panel 10 is a panel generally known as a sandwich panel and comprises two parallel and opposed metal sheets 17 and 18 and a layer of insulating material 19 interposed between the two metal sheets 17 and 18. For example, the insulating material 19 includes expanded polyurethane or similar material. As shown in Figure 1, the box-like structure 2 comprises a frame 21, which sidely defines an access opening 22 through which a person can access the inside of the respective ventilation chamber 3.

[0025] The box-like structure 2 further comprises an inspection panel 23 configured to selectively close or open the access opening 22. The inspection panel 23 is configured to seal the ventilation chamber 3 cooperating with the frame 21. Advantageously, the inspection panel 23 comprises a gripping element 24, e.g. a handle, configured to be grabbed by a person in use.

[0026] The frame 21 is interposed between the inspection panel 23 and the insulated panel 10, as will be shown below.

[0027] Advantageously, the frame 21 includes, in turn, an upper crosspiece 25, a lower crosspiece 26, a left upright 27 and a right upright 28. The upper crosspiece 25 is applied to the upper edge 10 and the lower crosspiece 26 is applied to the lower edge 12.

[0028] Advantageously, an upright is male and an upright is female. The male upright matches with the female upright. The female upright has a groove 15' facing, in use, the outside of the box-like structure 2. The male upright (shown in greater detail in Figure 7) has a projection 16' configured to protrude, in use, out of the box-like structure 2. The male upright is configured to be inserted, and preferably be engaged, into the housing of the female upright. Advantageously, the frame 21 comprises a plurality of corner bodies, each of which is configured to connect the end of a crosspiece with an end of a respective upright.

[0029] According to the example shown in the figures, the left upright 27 is female and the upright 28 is male. According to the shown example, the groove 15' of the left upright 27 extends over the whole length of the left upright 27. In a complementary way, the projection 16' of the right upright 28 extends over the whole length of the right upright 28. The shape and size of the groove 15' and of the projection 16' are configured to allow the releasable insertion of the projection 16' into the groove 15'. The groove 15' and the projection 16' may have different shapes and proportions with respect to those shown, provided that they are at least partially complementary to each other. Obviously, the shape, number and size of the grooves 15' and of the projections 16' may vary depending on the different needs.

[0030] Figure 6 is a sectional view of the left female upright 27 and of the male upright 28. This particular embodiment of the uprights allows obtaining modular box-like structures 21, 2II.

[0031] Advantageously, the corner bodies are divided

into female corner bodies 29 and male corner bodies 30. Figure 8 shows an example of a male corner body 30.

[0032] In particular, as shown in Figures 1 and 2, the frame 21 comprises a female corner body 29 interposed between the left upright 27 (female) and the upper crosspiece 25 and a female corner body 29 interposed between the left upright 27 (female) and the lower crosspiece 26. The female corner bodies 29 and the male corner bodies 30 are configured to be applied to the crosspieces 25 and 26.

[0033] Advantageously, the female corner body 29 comprises a groove 15" similar to the groove 15 of the insulated body 10 and to the groove 15' of the female upright (the left upright 27). In this way, a continuous and regular female profile F is guaranteed along the whole perimeter of the box-like structure 2. In other words, the female profile F is provided by the union of the groove 15 of the insulated panel 10, of the groove 15' of the female upright (the left upright 27) and of the groove 15" of the female corner bodies 29. Analogously, the frame 21 comprises a male corner body 30 interposed between the male upright (the right upright 28) and the upper crosspiece 25 and a male corner body 30 interposed between the male upright (the right upright 28) and the lower crosspiece 26. Advantageously, the male corner body 30 comprises a projection 16" similar to the projection 16 of the insulated body 10 and to the projection 16' of the male upright (the right upright 28). In this way, a continuous and regular male profile M is guaranteed along the whole perimeter of the box-like structure 2. In other words, the male profile M is provided by the union of the projection 16 of the insulated panel 10, of the projection 16' of the male upright (the right upright 28) and of the projection 16" of the male corner bodies 30. Advantageously, the female profile F and the male profile M are double-sided to increase the sealing capacity between two box-like structures 2I, 2II connected to each other.

[0034] As shown in Figure 1, each box-like structure 2 has at its respective end a female profile F or a male profile M along the whole perimeter of the side opening 4 or 5, respectively. Therefore, advantageously, a box-like structure 2I of the aforesaid type is configured to obtain a male-female joint with one or more equal or complementary box-like structures 2II to provide a ventilation unit 1. Advantageously, the male-female joint along the whole contact perimeter between two adjacent box-like structures 2I, 2II guarantees the complete fluid waterproofing of the ventilation unit 1. Advantageously, the fluid waterproofing can be increased by employing silicone to seal the connection of two adjacent box-like structures 2I, 2II.

[0035] As shown in Figures 6 and 7, the inspection panel 23 advantageously comprises two metal shells 31 and 32 that intersect so as to form an air chamber 33.

[0036] The shell 31 is internal, in other words it is configured to face, at least partially, in use the inside of the ventilation chamber 3, while the shell 32 is external, namely it is configured to be exposed, at least partially, out of the box-like structure 2.

[0037] The inner shell 31 has a substantially cup-shaped body with an inner wall 34 and a collar 35 protruding along the perimeter of the inner wall toward the outer shell 32.

[0038] The outer shell 32, in turn, has a substantially cup-shaped body and is configured to be inserted at least partially into the inner shell 31.

[0039] As shown in detail in Figure 7, the outer shell 32 comprises an outer wall 36 and a tubular body 37 protruding along the perimeter of the outer wall 36 and configured to protrude in use toward the inner shell 31.

[0040] The inner wall 34 and the outer wall 36 have a shape that is substantially complementary to the shape of the access opening 22 defined by the frame 21.

[0041] In accordance with Figure 7, the frame 21 advantageously has an abutment edge 38, against which the inspection panel 23 is pressed when it is in the closing position of the box-like structure 2. To this end, the outer shell 32 substantially has a planar T-shape. In other words, the tubular body 37 has two transverse surfaces 39 and 40 substantially perpendicular to the outer wall 36, connected by an abutment surface 41 substantially parallel to the outer wall 36. The abutment surface 41 is configured to be pressed, in use, against the abutment edge 38 of the frame 21. Advantageously, the inspection panel 23 includes a double-seal gasket 42, which is configured to avoid any leakage along the connection between the inner shell 31 and the outer shell 37 of the inspection panel 23 and to avoid any leakage along the contact between the abutment surface 41 and the abutment edge 38.

[0042] As shown in Figure 7, the double-seal gasket 42 comprises a sleeve 43, which is fitted on the inner surface 39 and extends between the collar 35 and the inner surface 39. The double-seal gasket 42 further comprises a ring 44, protruding out of the sleeve 43 and configured to be crushed in use between the abutment surface 41 and the abutment edge 38. Advantageously, the ring 44 includes, in turn, a balloon 45, acting by compression and a baffle 46, acting by friction. Advantageously, the double-seal gasket 42 has inner cavities 47 to ensure even thermal insulation.

[0043] This guarantees the sealing between the inspection panel 23 and the frame 21. In Figures 6 and 7, the shown balloon 45 is crushed between the abutment surface 41 of the outer shell and the abutment edge 38 of the frame and a dotted line shows the balloon 45 in an open resting configuration, i.e. not crushed.

[0044] Moreover, the presence of the double-seal gasket 42 prevents any contact between the inner shell 31 and the outer shell 32, thus avoiding any thermal bridge at the inspection panel 23.

[0045] Advantageously, the frame 21 is made of plastic material. For example, the frame 21 is made of PVC. Advantageously, the frame 21 comprises a plurality of inner chambers 48, which can guarantee the thermal insulation of the frame 21. As shown in Figures 6, 7 and

8, the frame 21 advantageously has at least three inner chambers 48.

[0046] Advantageously, the ventilation unit 1 comprises one or more mounting systems 49, each of which is configured to centre and fasten two adjacent box-like structures 2I, 2II.

[0047] As shown in Figure 10, each mounting system 49 comprises a pair of supports 51, 52 and a transverse connecting element 50. Each support 51, 52 is secured to a respective box-like structure 2 and the transverse connecting element 50 is configured to fasten the supports 51, 52 to each other.

[0048] As shown in Figure 11, each support 51, 52 is made of a sheet having a connecting wall 53 and fastening tabs 54, 55. According to the shown example, the connecting wall 53 is triangular and is configured to protrude inside the ventilation chamber 3 to be substantially transverse, in particular perpendicular, to two respective adjacent walls of the box-like structure 2.

[0049] Each connecting wall 53 has an alignment hole 56. Two supports 51, 52 of a same mounting system 49 substantially mirror each other and the alignment holes 56 of the two connecting walls 53 are substantially formed in the same position so that they are aligned at the time of assembly. Each alignment hole 56 is configured to be crossed, at least partially, by the connecting element 50.

[0050] The fastening tabs 54, 55 are transverse, substantially perpendicular to the connecting wall 53 and are configured to fasten in a known way the connecting wall 53 to a respective wall of the box-like structure 2. As shown, the fastening tabs 54, 55 have holes and are configured to be fastened by means of the screws 57 to respective walls of the box-like structure 2.

[0051] Advantageously, the transverse connecting element 50 is a pin threaded at one end.

[0052] The mounting system 49 further comprises a harmonic steel sealing washer 58 configured to be fixed at a connecting wall 53 at the alignment hole 56. The sealing washer 58 is configured to penetrate into the pin.

[0053] Advantageously, the use of a pin 50 and of a harmonic steel sealing washer 58 guarantees the self-centring of the pin 50 with the sealing washer 58 and, consequently, the correction of possible centring or positioning errors between adjacent box-like structures 2I, 2II.

[0054] The mounting system 49 further comprises a bolt 59 and a force distribution element (washers 60). The bolt 59 is configured to be screwed on the threaded portion of the pin 50 at the other connecting wall 53. In this way, the pin 50 is fastened to the second connecting wall 53. Advantageously, each mounting system 49 of this type guarantees a holding capacity of 400 kg. Advantageously, the ventilation unit 1 comprises a mounting system 49 for each corner of the box-like structures 2I, 2II. Therefore, at the connection between two adjacent box-like structures 21, 211, a holding capacity of 400 kg is guaranteed for each corner. In use, for manufacturing each box-like structure 2, an insulated panel 10 is U-folded.

[0055] Then, the frame 21 is applied to the upper edge 10 and to the lower edge 12 to delimit the access opening 22. Advantageously, the upper crosspiece 25 is applied to the upper edge 10 and, correspondingly, the lower crosspiece 26 is applied to the lower edge 12.

[0056] Advantageously, the frame 21 is mounted so that the female corner bodies 29 and the female uprights 27 are arranged in use at the groove 15 of the insulated panel 10. Advantageously, the female profile F is made at a side opening 4 of the box-like structure 2.

[0057] Analogously, the frame 21 is mounted so that the male corner bodies 30 and the male uprights 28 are arranged in use at the projection 16 of the insulated panel 10. In this way, advantageously, the male profile M is made at a side opening 5 of the box-like structure 2.

[0058] Advantageously, a support 51, 52 is mounted at each side opening 4, 5 of the box-like structure 2, preferably at each corner. In particular, near the frame 21, the support 51, 52 is fastened, on the one side, to the insulated panel 10, and on the other side to the frame 21. Thus, the support 51, 52 guarantees the stability of the box-like structure 2, preventing it from folding on itself. Furthermore, the support 51, 52 allows the modular assembly of a plurality of box-like structures 2I, 2II for manufacturing a ventilation unit 1.

[0059] Then, the inspection panel 23 is mounted to close the access opening 22.

[0060] For manufacturing a ventilation unit 1, two box-like structures 2I, 2II of the aforesaid type are arranged side by side and joined together. In particular, the male profile M of a box-like structure 2I is inserted into the female profile F of the other box-like structure 2II.

[0061] Near the male-female joint of the box-like structures 2I, 2II, pairs of supports 51, 52 are provided with alignment holes 56 facing each other for each corner. Then, a connecting element 50 is applied for each pair of aligned supports 51, 52. In particular, a pin 50 is arranged through both alignment holes 56 and is kept in place by using the self-centring harmonic steel sealing washer 58 at one of the two supports 51 or 52. The use of the pin 50 and of the harmonic steel sealing washer 58 allows the correction of any geometric, positioning or dimensional errors between the adjacent box-like structures 2I, 2II.

[0062] The box-like structure 2 of the aforesaid type has the advantage of being able to be mounted when installed, thus requiring a reduced encumbrance when transported. In fact, the box-like structure 2 of the aforesaid type is formed by a set of components which, when dismantled, are flat, easily transportable and not bulky. In particular, most of the box-like structure 2 is made by an insulated panel 10, which is kept flat during the transport and is U-folded during the installation.

[0063] Moreover, the particular embodiment of the insulated panel 10 and of the frame 21 allows the modular installation of a plurality of box-like structures 2I, 2II, side by side, in order to obtain a ventilation unit 1 of the desired

size. Advantageously, the embodiment of the insulated panel 10, of the frame 21 and of the connection between the inspection panel 23 and the access opening 22 guarantees an optimal thermal insulation, thus avoiding the presence of any thermal bridge between the ventilation chamber 3 and the outside through the box-like structure 2.

[0064] Moreover, the particular embodiment of the insulated panel 10 and of the frame 21 guarantees complete fluid waterproofing and thermal insulation at the junction point of two adjacent box-like structures 2I, 2II.

[0065] From the aforesaid it is clear that each box-like structure 2 of the aforesaid type is of simple and inexpensive transport and guarantees a flexible manufacture of ventilation units 1 of different size depending on the number of box-like structures 2I, 2II coupled to each other. Moreover, each box-like structure 2 guarantees fluid waterproofing and optimal thermal insulation.

Claims

1. A box-like structure for a ventilation unit (1) comprising a hollow body, which has a longitudinal axis (X) and an inner ventilation chamber (3); wherein the hollow body has a first and a second longitudinal opening (4; 5), which are opposed to each other and are configured to establish a communication between said ventilation chamber (3) and the outside; wherein the hollow body has a front wall (6), a rear wall (7), an upper wall (8) and a lower wall (9); wherein the hollow body has an upper edge (11) and a lower edge (12) delimiting a side opening (4; 5) on the upper side and on the lower side, as well as relative to a support surface (π1); wherein the box-like structure (2) comprises a frame (21) applied to said upper edge (11) and to said lower edge (12); wherein the frame (21) comprises, in turn, an upper crosspiece (25), a lower crosspiece (26), a first and a second upright (27; 28); wherein the upper crosspiece (25) is applied to the upper edge (11) and the lower crosspiece (26) is applied to the lower edge (12); each upright (27; 28) being connected to a respective free end of the upper crosspiece (25) or of the lower crosspiece (26); wherein the frame (21) comprises four corner bodies (29, 30), each of them being configured to connect the end of a corresponding crosspiece (25; 26) to a respective end of an upright (27; 28).

2. A box-like structure according to claim 1 and having a groove (15, 15', 15"), namely a female profile (F), made along the perimeter of the first longitudinal opening (4); wherein the box-like structure (2) comprises a projection (16, 16', 16"), which longitudinally projects out of the perimeter of the second longitudinal opening (5); wherein said groove (15, 15', 15") is at least partially complementary to said projection (16, 16', 16"), so as to allow a plurality of said box-like structures (2; 21, 211) to be installed in a modular manner one next to the other.

3. A box-like structure according to claim 2, wherein the first upright (27) has a first groove (15') and the second upright (28) has a first projection (16'); wherein said first groove (15') and said first projection (16') are complementary to one another to allow said first projection (16') to be inserted, in use, into said first groove (15').

4. A box-like structure according to claim 2 or 3, wherein first corner bodies (30I) adjacent to the first upright (27) have respective second grooves (15"); wherein second corner bodies (30II) adjacent to the second upright (28) have respective second projections (16"); wherein each second groove (15") and each respective second projection (16") are complementary to each other to allow said second projection (16") to be inserted, in use, into said second groove (15").

5. A box-like structure according to claim 3 or 4, wherein said first groove (15') is substantially equal to said second grooves (15"); wherein said first projection (16') is substantially equal to said second projections (16").

6. A box-like structure according to any one of the preceding claims, wherein each crosspiece (25; 26), each upright (27; 28) and each corner body (29, 30) has three or more inner chambers.

7. A box-like structure according to any one of the preceding claims, wherein the frame (21) is configured to delimit an access opening (22) to the ventilation chamber (3); the box-like structure comprising an inspection panel (23), which is configured to be engaged into said frame (21), and being at least partially movable, so as to selectively open or close said access opening (22); wherein the frame (21) has an abutment edge (38), against which, in use, the inspection panel (23) is pressed; wherein the inspection panel (23) comprises a double-seal gasket (42), which is configured to be interposed, in use, between the frame (21) and the inspection panel (23).

8. A box-like structure according to claim 7, wherein the inspection panel (23) comprises, in turn, an inner shell (31) and an outer shell (32), which are made of metal and are coupled to one another so as to form an air chamber (33); wherein the double-seal gasket (42) is at least partially arranged between the inner shell (31) and the outer shell (32) to avoid any leakage between the air chamber (33) and the outside.

9. A box-like structure according to claim 7 or 8, wherein the double-seal gasket (42) has one or more inner cavities (47) to ensure even thermal insulation.

10. A ventilation unit comprising one or more box-like structures (2; 2I, 2II) according to any one of the claims from 1 to 7; wherein the projections (16I, 16'I, 16"I) of a first box-like structure (2I) are inserted into respective grooves (15II, 15'II, 15"II) of a second box-like structure (2II).

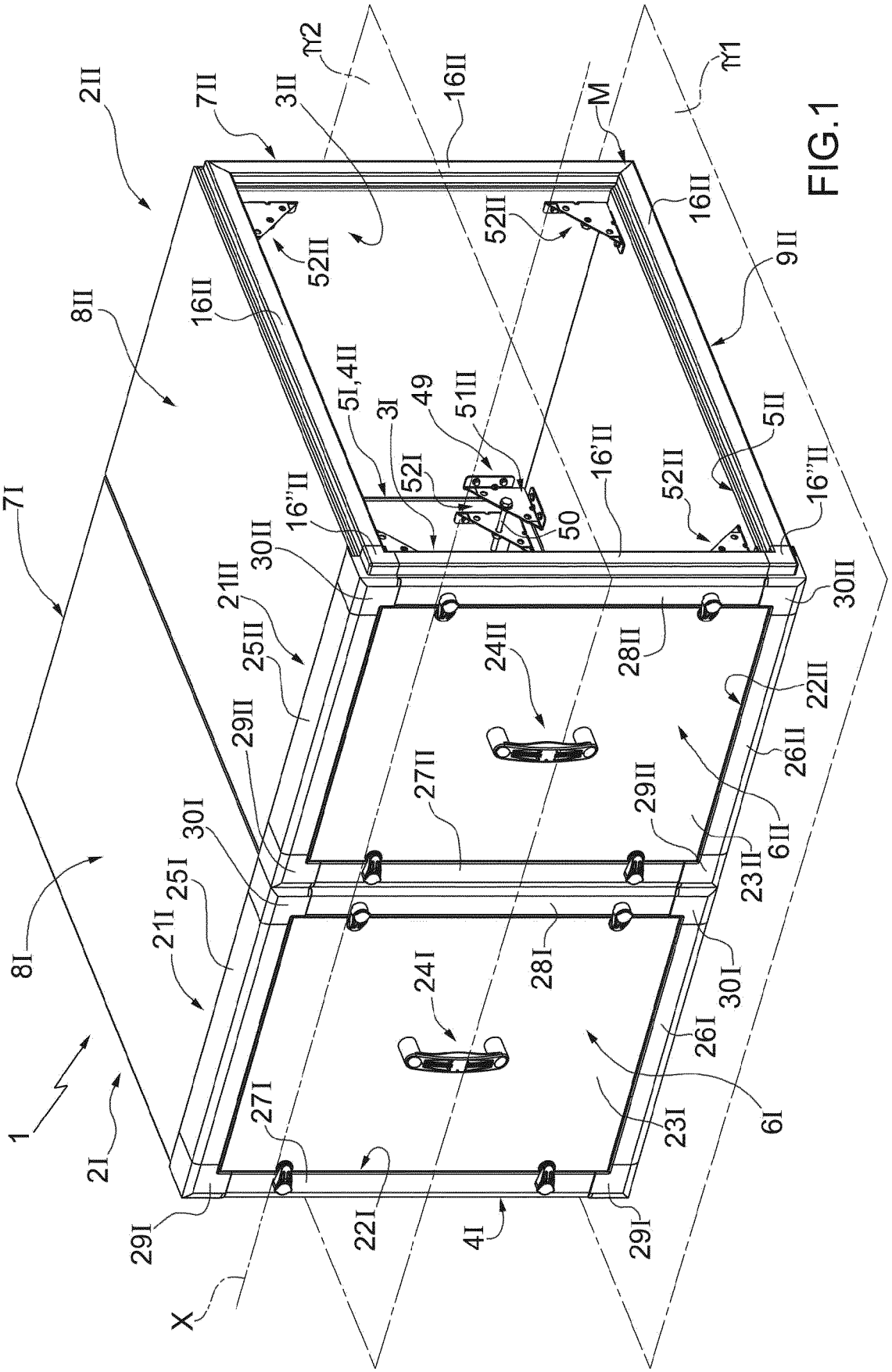
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FIG.1

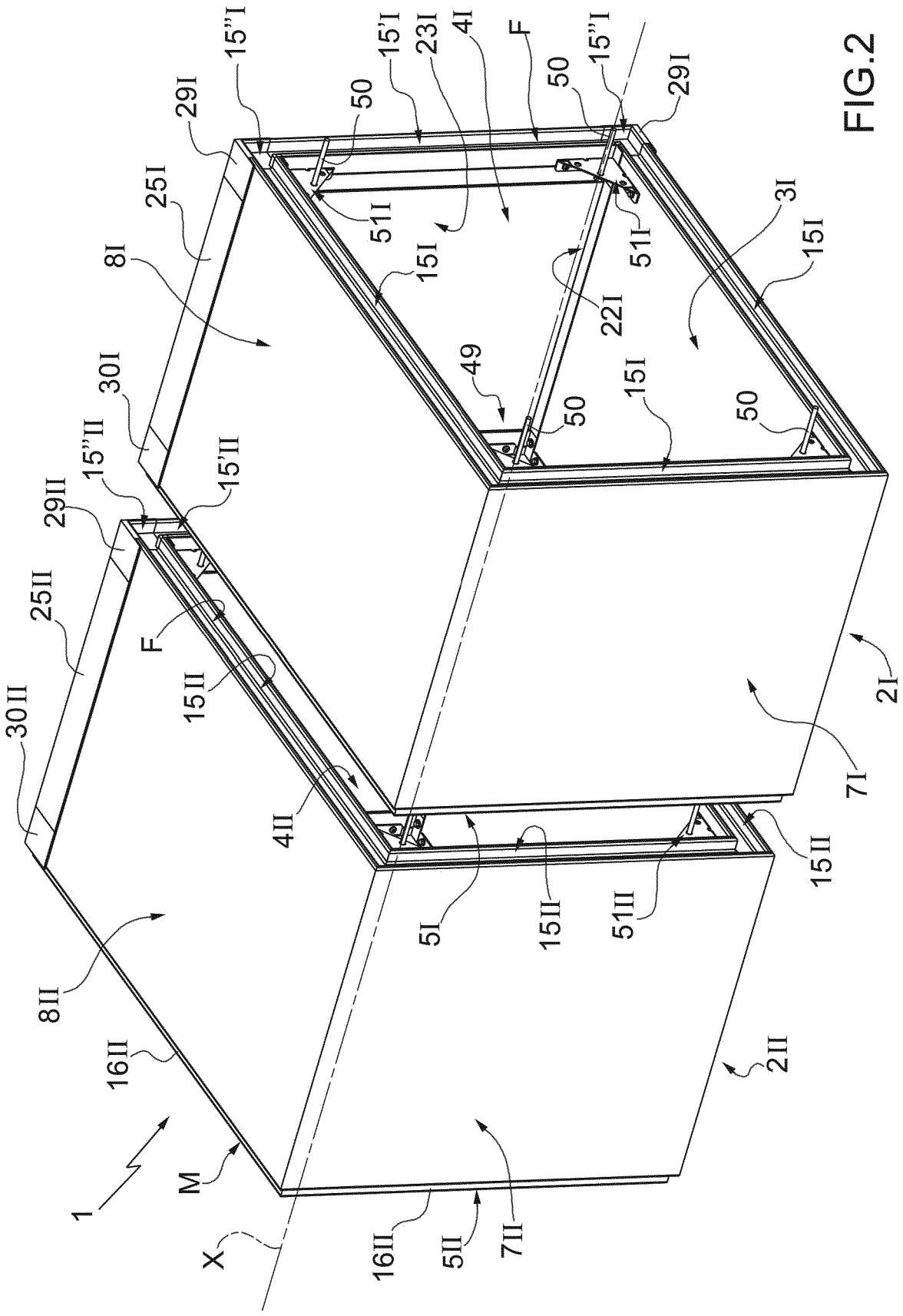
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FIG.2

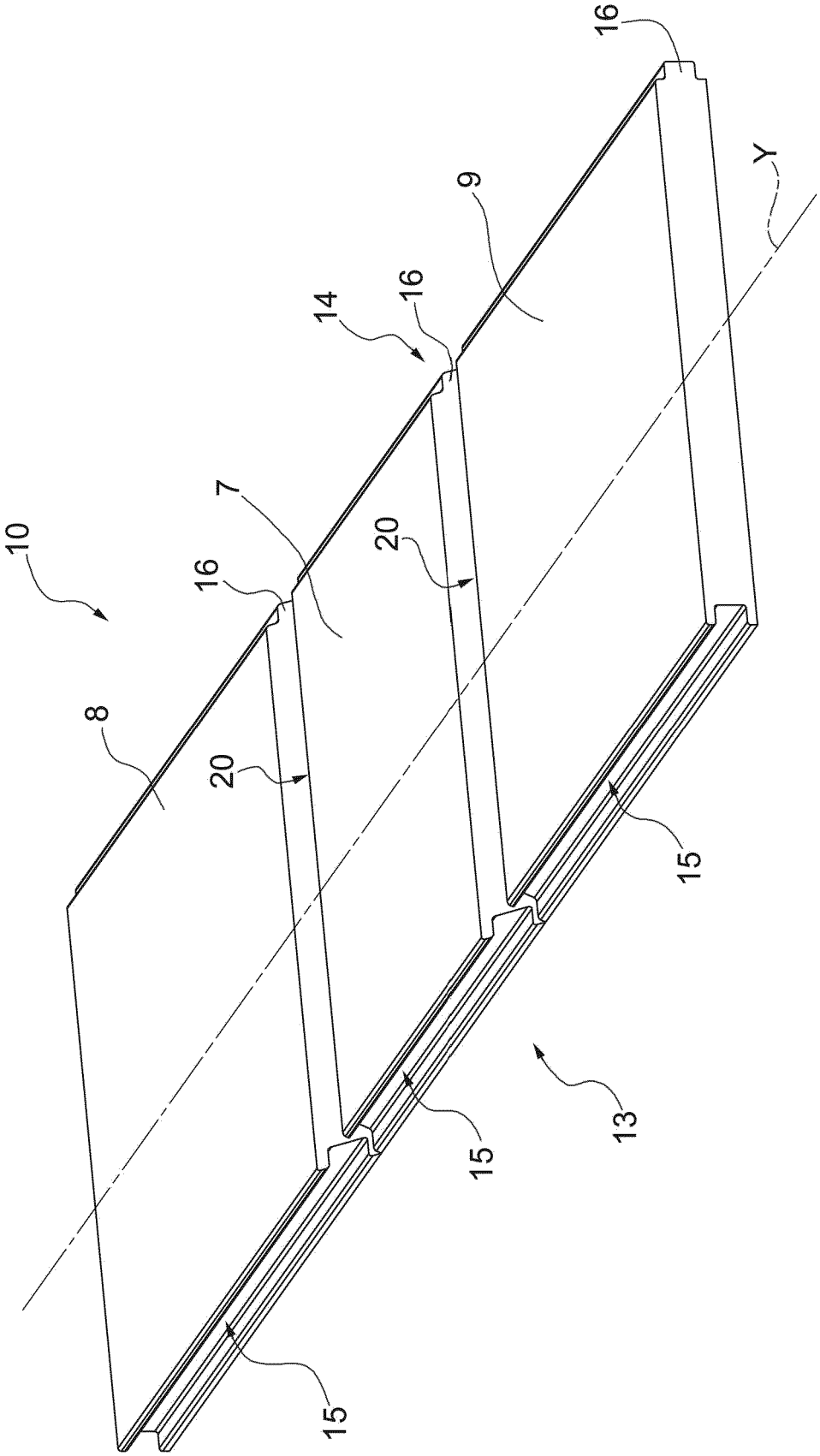

FIG.3

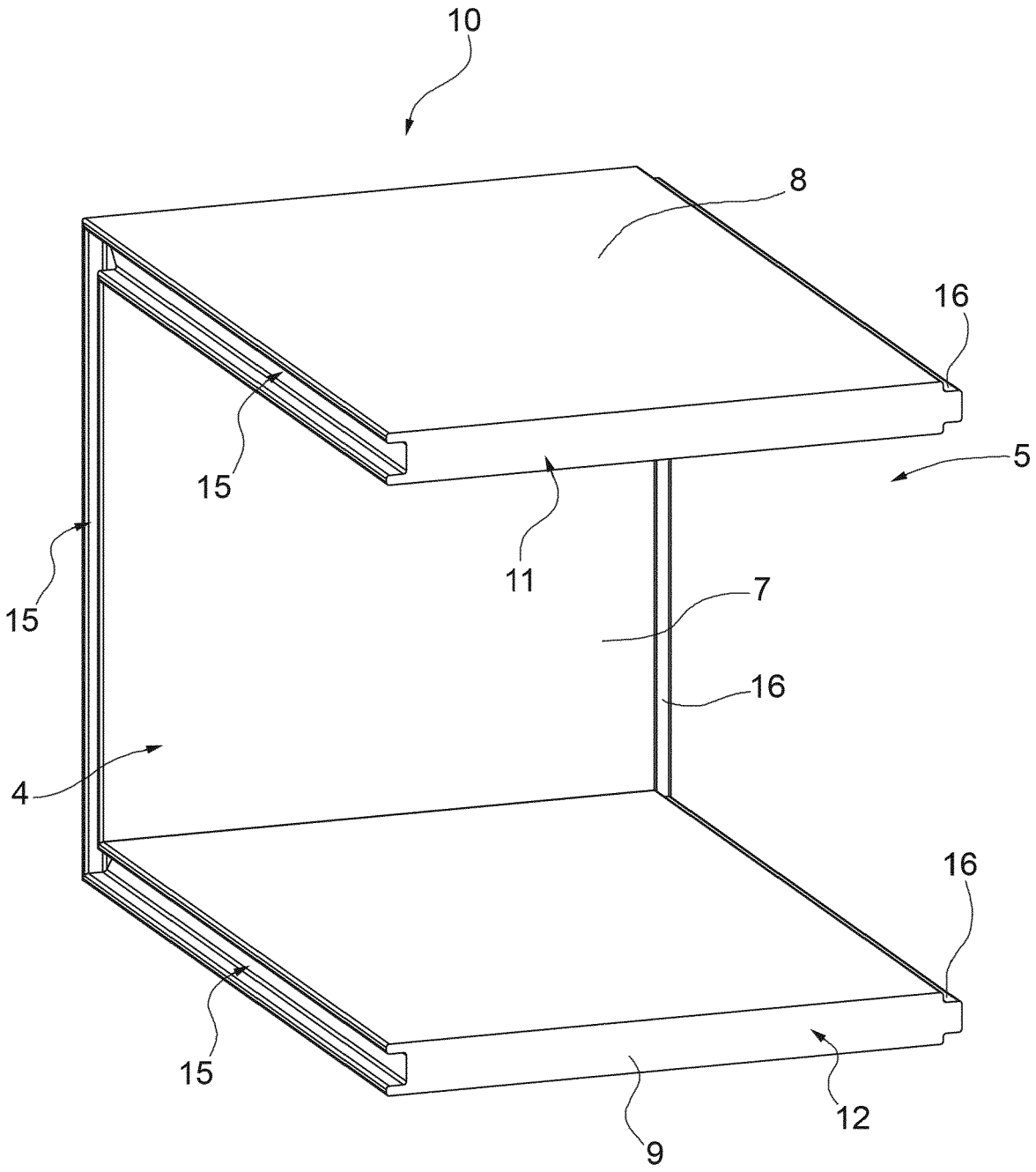

FIG.4

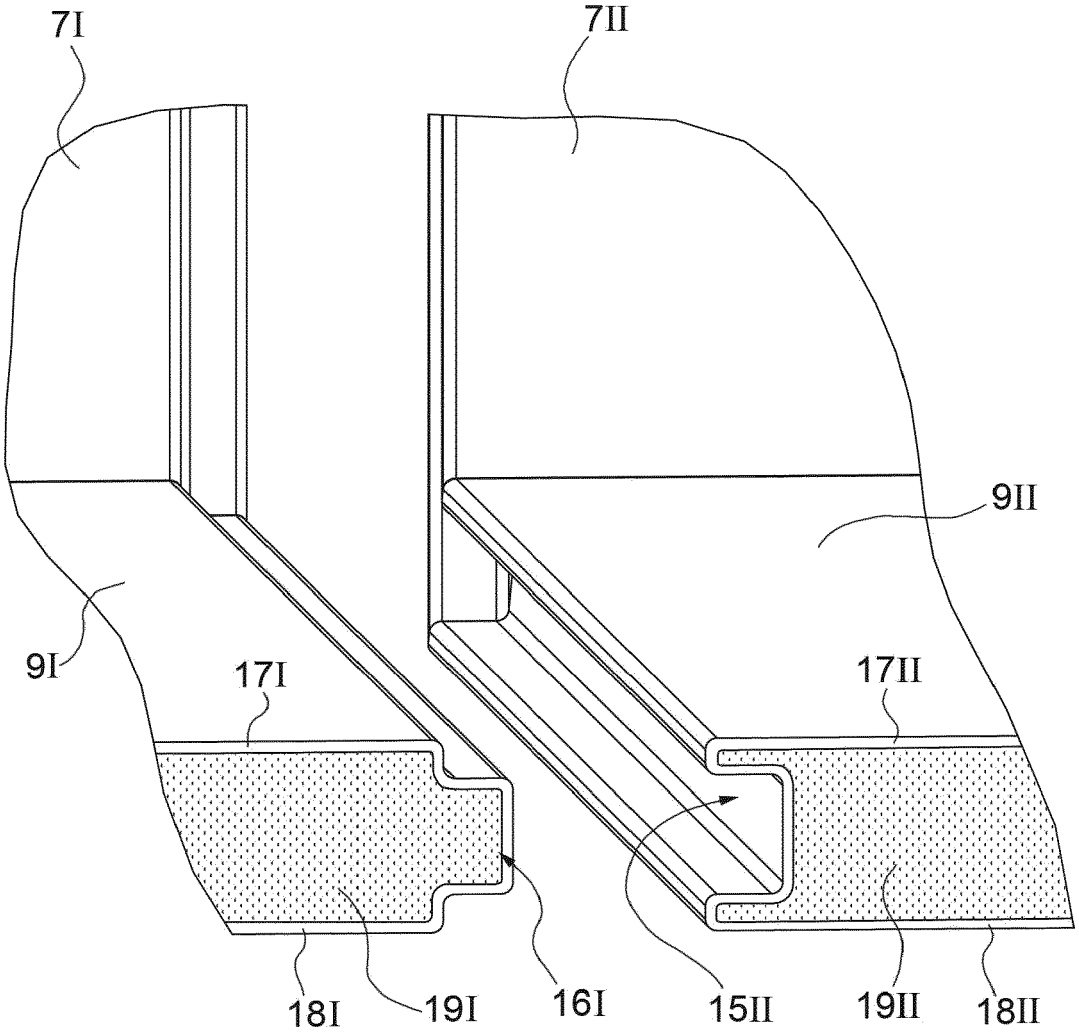

FIG.5

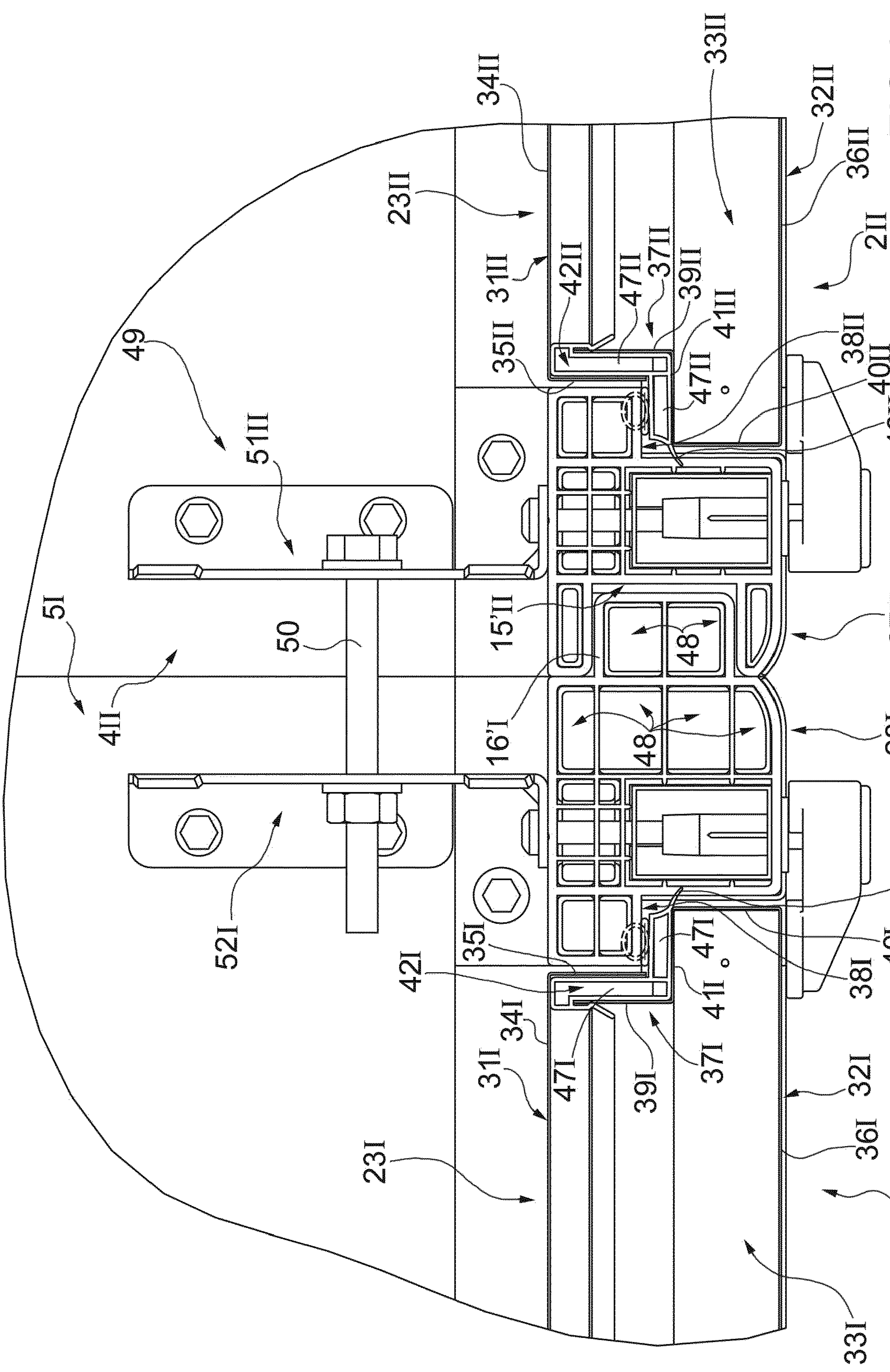
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FIG.6

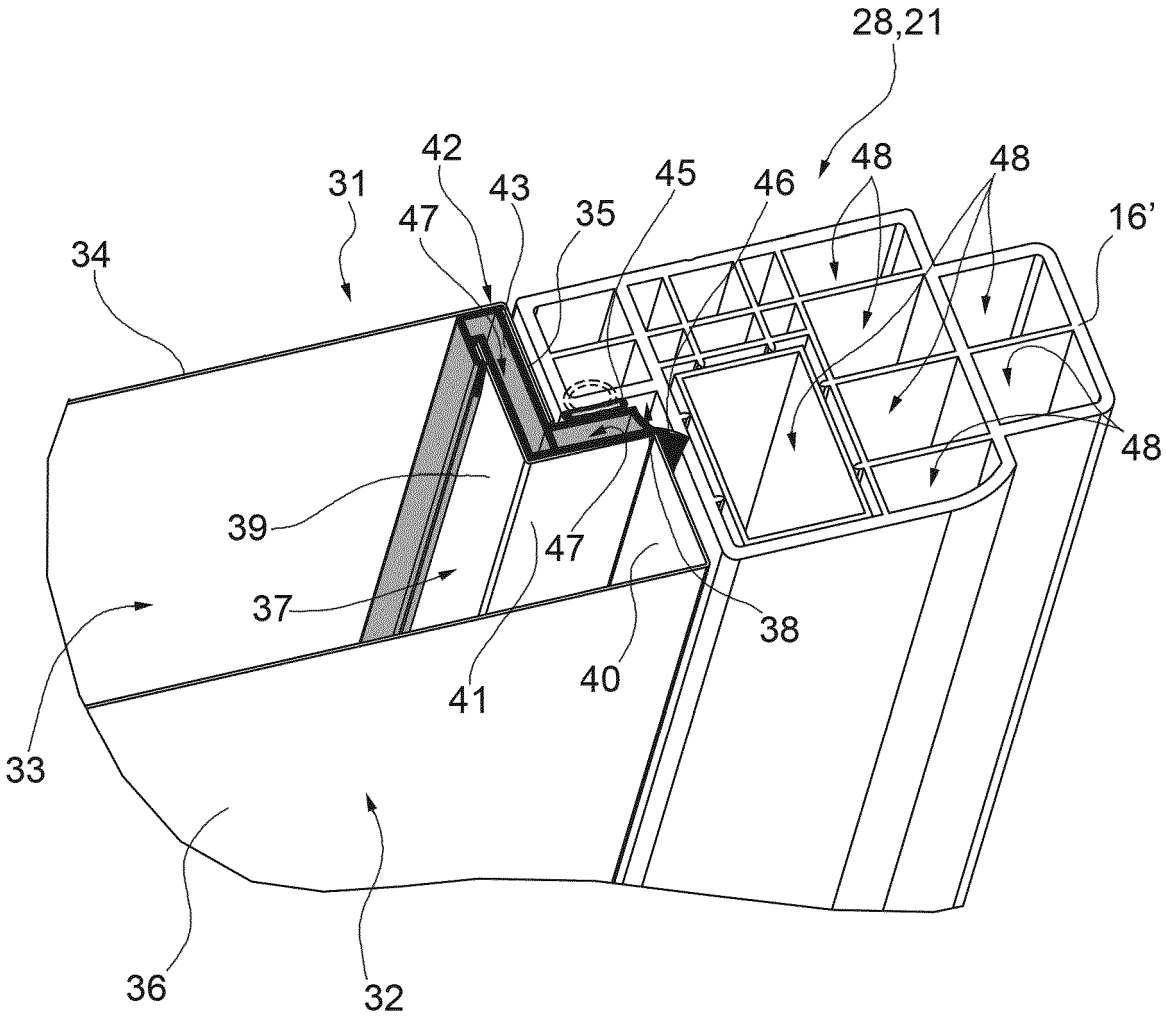

FIG.7

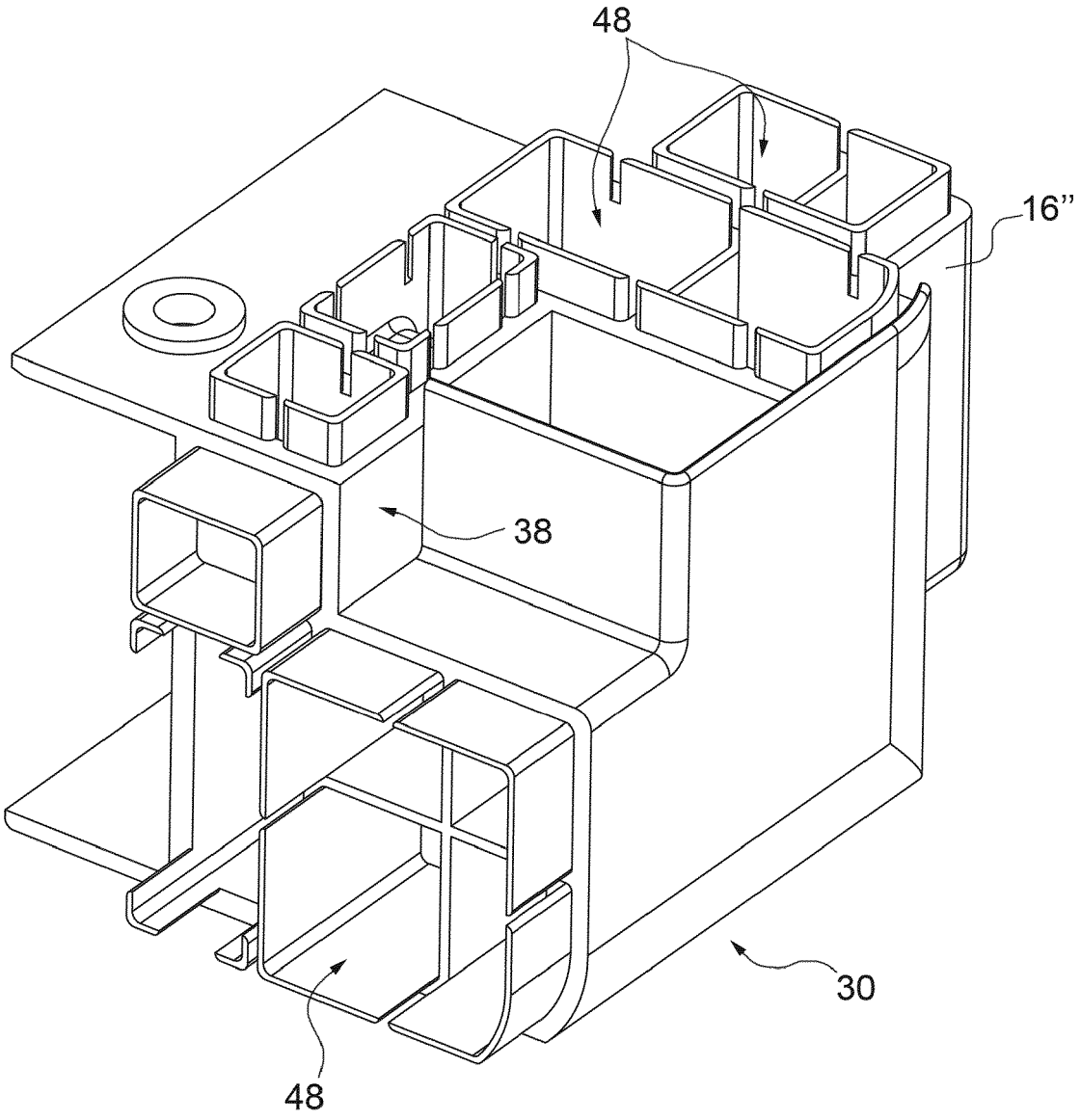

FIG.8

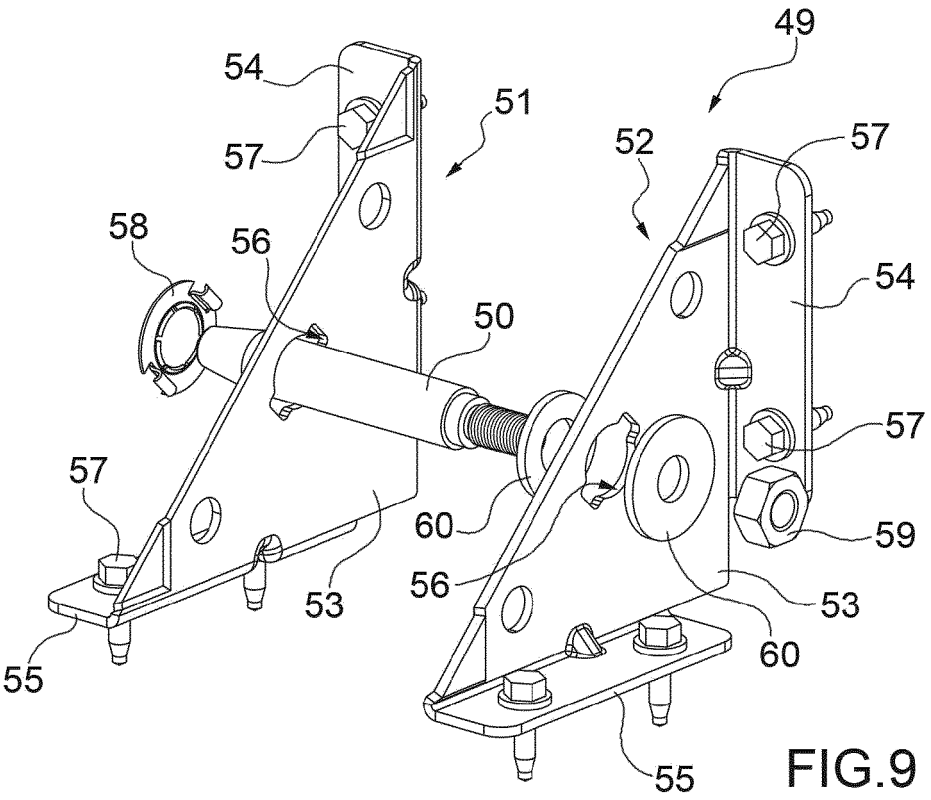
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FIG.9

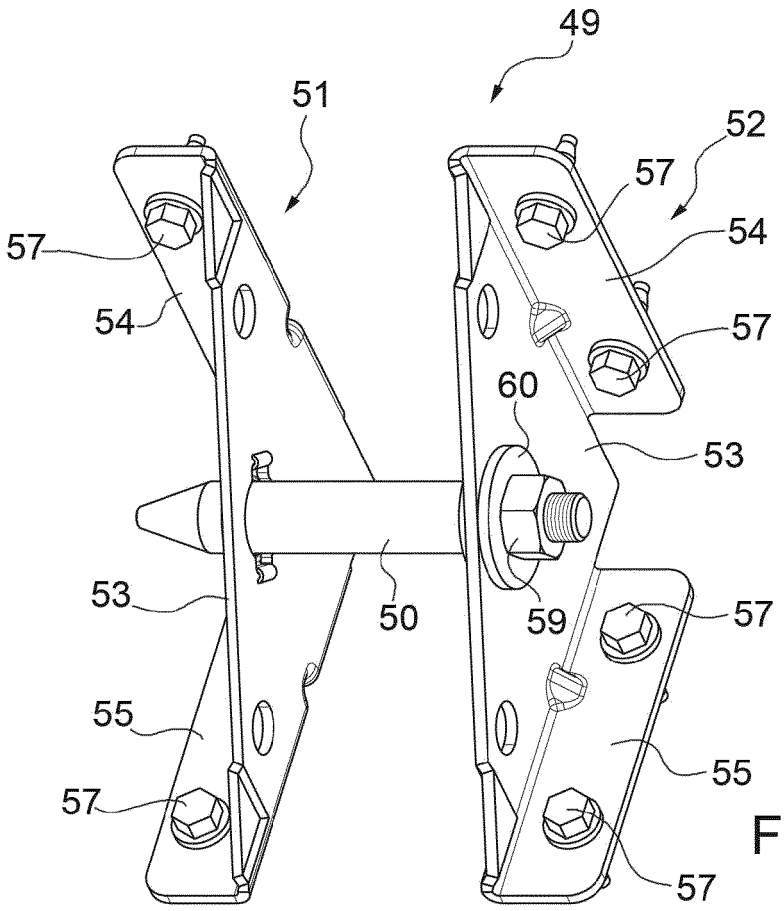
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FIG.10

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EUROPEAN SEARCH REPORT

Application Number
EP 17 17 8937

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A	* column 2, line 13 - line 46; figure 2 *	2-5,7-10	
A	DE 37 11 215 A1 (BAHCO VENTILATION AB [SE]) 8 October 1987 (1987-10-08) * abstract; figure 1 *	1-10	
A	EP 2 905 554 A1 (VECAM CO S P A [IT]) 12 August 2015 (2015-08-12) * abstract; figure 4 *	1-10	
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F24F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	15 November 2017	Valenza, Davide

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