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(54) **A BOX-LIKE WALL OF AN AIR-HANDLING UNIT AND A BOX-LIKE STRUCTURE COMPRISING SAID BOX-LIKE WALL**

(57) A box-like wall (5) of a self-supporting box-like structure (1) for an air-handling unit; the box-like wall (5) comprises: each panel (6, 7) with a flat central portion (9; 9A, 9B) provided with four edges (10; 10A, 10B) and two pairs of end portions (11; 11A, 11B); each end portion (11; 11A, 11B) extends from the respective edge (10; 10A, 10B) of the respective central portion (9; 9A, 9B); and each second end portion (11; 11B) comprises a section (19) bent at an angle (α) relative to its second central

portion (9; 9B); the second end portions (11; 11B) of each pair of second portions (11; 11B) are opposite and parallel to one another so that: one of the second end portions (11; 11B) of the pair defines an insertion portion (23) engageable, in use, with another box-like wall (5); whereas, the other second end portion (11; 11B) of the pair of second portions (11; 11B) of the same outer panel (7) defines a seat (24) engageable, in use, with an insertion portion (23) of another box-like wall (5).

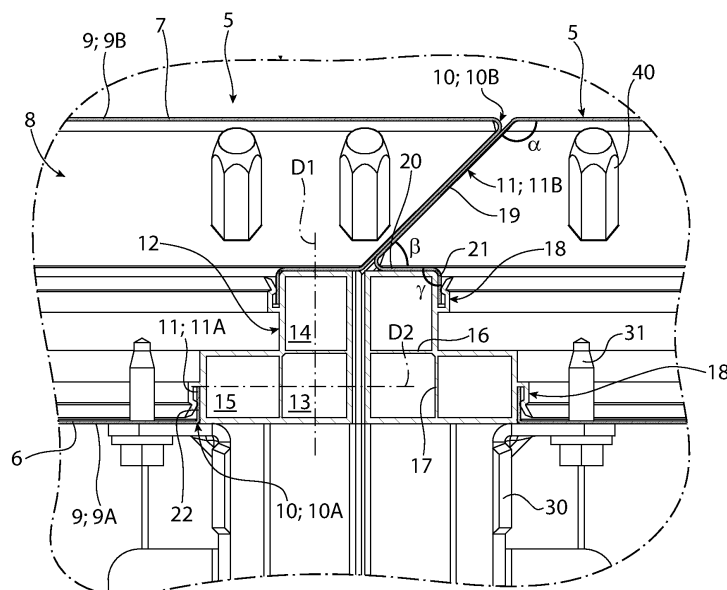


FIG. 2

Description

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This patent application claims priority from Italian patent application no. 102023000027906 filed on December 22, 2023, the entire disclosure of which is incorporated herein by reference.

FIELD OF THE ART

[0002] The present invention relates to a box-like wall of an air-handling unit and a box-like structure comprising said box-like wall.

[0003] The invention finds advantageous application (without thereby losing its generality) in the field of air-handling systems such as, for example, ventilation systems, air conditioning systems or aeration systems.

PRIOR ART

[0004] It is known to use air-handling units to treat (ventilate, condition, aerate) an environment in a controlled manner.

[0005] In the air-handling units, the air is conveyed inside a plurality of ducts (box-like structures) connected to one another so as to allow the passage of air inside the same. The ducts define box-like structures, which are made by connecting a plurality of box-like walls to one another. The air conveyed inside the duct has a pre-established temperature, which must be as constant as possible throughout the entire path.

[0006] However, at the junctions of the box-like structures, the problem of heat dispersion arises, which causes a deviation of the actual temperature of the air conveyed into the box-like structure from the theoretical temperature at which it should be. In other words, at the junctions a thermal gradient occurs, which is undesirable.

[0007] Currently, to limit heat loss, so-called box-like walls are used (that is, panels that comprise a sheet metal shell comprising an inner panel and an outer panel and that define a space between the same in which heat and sound insulating material is arranged), so as to thermally and acoustically insulate the wall.

[0008] In the currently known box-like walls, the connecting flaps arranged at the ends of the inner panel and of the outer panel are overlapped and joined to one another by placing the same side by side. At these joints, where the outer panel is in contact with the inner panel, they transmit heat from the inside to the outside, or vice versa, thus establishing a so-called thermal bridge, leading to a possible unwanted formation of condensation on the panel itself.

[0009] To overcome this problem, for some time now, walls have been produced that comprise an insulating element placed between the inner panel and the outer panel. Typically, the insulating element is formed by a flat layer of insulating material arranged between the two

walls. This solution, however, is not sufficient and allows poor results to be achieved in reducing the thermal bridge.

[0010] Insulating elements that further distance the two panels from one another are also known. However, these insulating elements can only be used in structures that use an outer frame (for example in aluminium or other materials) to which the walls are then fixed in order to ensure the stability thereof.

[0011] The known type box-like structures are formed by a plurality of box-like walls connected to one another. The box-like walls have faces at the connection areas that are side by side and adjacent to one another, which are orthogonal to the longitudinal extension of the duct and that are flat. Therefore, in the currently known box-like structures, in addition to or instead of the forming of the thermal bridge, the disadvantage may arise that the flat faces, which require perfect flatness, favour the leakage (in and out) of fluids, such as air. Furthermore, through the hollow spaces formed between the two connected box-like walls, particles can undesirably enter the duct itself.

[0012] To overcome this problem, sealing elements have been arranged between the two flat faces in the past, but these are not able to guarantee leak tightness.

[0013] Flat-faced box-like walls also have the disadvantage that they are difficult to install, as the walls to be connected must be perfectly aligned with one another, a condition that is difficult to satisfy at the time of installation on site.

[0014] Document WO9322593A1 relates to a method for the production of a structural element and the respective structural element thus obtained.

DESCRIPTION OF THE INVENTION

[0015] The object of the present invention is to provide a box-like wall of an air-handling unit and a box-like structure comprising said box-like wall which are free from the drawbacks of the state of the art and that are easy and inexpensive to produce.

[0016] According to the present invention, a box-like wall of an air-handling unit is provided as claimed in the independent claims that follow and, preferably, in any of the claims dependent directly or indirectly on the independent claims.

[0017] In addition, according to the present invention, an air-handling unit is provided with said panel as claimed in the independent claims that follow and, preferably, in any of the claims dependent directly or indirectly on the independent claims.

[0018] The claims describe preferred embodiments of the present invention and form an integral part of the present description.

BRIEF DESCRIPTION OF THE DRAWING

[0019] The present invention will now be described

with reference to the attached drawings, which illustrate a non-limiting embodiment thereof:

- Figure 1 is a sectional view of a duct of a ventilation unit; and
- Figure 2 is an enlarged view of a portion of Figure 1.

PREFERRED EMBODIMENTS OF THE INVENTION

[0020] In Figure 1, number 1 denotes as a whole a self-supporting box-like structure (such as, for example) for an air-handling unit (not illustrated). The air-handling unit comprises for example (but not limited to) a ventilation unit.

[0021] The box-like structure 1 is a modular structure, that is, a structure 1 that comprises several modules that are substantially equal to one another and that are arranged side by side and connected to one another. The connection occurs, for example, by means of connecting means 40 (illustrated in Figure 2).

[0022] The box-like structure 1 is self-supporting, that is, it is a structure that is able to remain stably upright without the use of frames. In particular, self-supporting means that there are no uprights or beams to support in a relative position one or more box-like walls 5 (described in detail in the following).

[0023] The box-like structure 1 comprises a hollow body 2 through which air flows, which has a central axis X and has two through-openings 3 and 4 that are opposite one another along the central axis X.

[0024] The hollow body 2 comprises a front wall (not illustrated in the figures), a rear wall 5B, an upper wall 5C and a lower wall 5D, each of which is a box-like wall 5 made according to the present invention. In the following disclosure, reference will be made to a generic box-like wall 5, without reference to its positioning (namely, whether it is a front wall, a rear wall 5B, an upper wall 5C or a lower wall 5D), as they are all substantially the same.

[0025] Each box-like wall 5 comprises an inner panel 6 and an outer panel 7, both rectangular in shape, which are arranged parallel to, spaced apart from, and facing one another. In other words, the inner panel 6 and the outer panel 7 define a cavity (compartment) 8 between the same. Preferably, each box-like wall 5 is insulated. In other words, the wall 5 is configured to house insulating material (of a known type and therefore not described in detail) in the cavity 8. The panels 6 and 7 have been illustrated in dark grey in Figure 2.

[0026] The term "inner" and "outer" refers to the mutual positioning of the panels 6 and 7 when the box-like wall 5 is connected to other box-like walls 5 to define, together, the box-like structure 1. Therefore, the inner panel 6 is arranged closer to the central axis X of box-like structure 1 relative to the outer panel 7.

[0027] The inner panel 6 and the outer panel 7 are not directly connected to one another. In other words, no portion of the inner panel 6 is in contact with any portion of

the outer panel 7.

[0028] Each panel 6 and 7 comprises a central portion 9 which is flat and has four edges 10 and two pairs of end portions 11. Each end portion 11 extends from each side of the central portion 9 and is bent relative to the same. As illustrated in detail in Figure 2, which shows an enlarged detail of Figure 1, each end portion 11 extends from the respective edge 10 of the central portion 9. In particular, in the figures with 9A, 10A and 11A the portions 9 and 11 have been indicated, as well as the edges 10 referred to the inner panel 6; whereas, with 9B and 11B the portions 9 and 11 have been indicated, as well as the edges 10 referred to the outer panel 7. The end portions 11A and 11B are spaced apart from one another (that is, they are not in direct contact with one another).

[0029] According to a first aspect of the present invention, the box-like wall 5 comprises a plurality, in particular four, of thermal insulation elements 12, each of which is arranged between the two panels 6 and 7 (in particular at the end portions 11) to which it is respectively connected. The thermal insulation elements 12 extend (namely, are arranged) in particular along the edges 10 of the box-like wall 5.

[0030] The thermal insulation element 12 has a longitudinal extension L (orthogonal to the drawing plane of Figure 2) and comprises three hollow chambers 13, 14 and 15 that extend parallel to the extension L and are configured to collect a fluid, in particular air, inside the same. The chambers 13 and 14 are arranged side by side and adjacent to one another along a direction D1, which is transverse, in particular orthogonal, to the longitudinal extension L. Whereas, the chambers 13 and 15 are arranged side by side (in particular overlapping in Figure 2) and adjacent to one another along a direction D2. The direction D2 is transverse, in particular orthogonal, to the direction D1 and to the longitudinal extension L.

[0031] Advantageously, the insulation element 12 is arranged between the two panels 6 and 7, so that the end portions 11B of the outer panel 7 are connected to the chamber 14 of the respective insulation element 12 and the end portions 11A of the inner panel 6 are connected to the chamber 15 of the respective insulation element 12.

[0032] Advantageously, but not limited to, as illustrated in Figure 2, the three chambers 13, 14 and 15 each have a cross-section (in particular orthogonal) to the longitudinal extension L that is rectangular in shape. Each chamber 13, 14 and 15 comprises two parallel, opposite, and facing side walls 16 and two parallel, opposite, and facing end walls 17. The end walls 17 are arranged orthogonally to the respective side walls 16. In particular, the chambers 13 and 14 are adjacent to one another at one of the respective side walls 16; whereas the chambers 13 and 15 are adjacent to one another at one of the respective end walls 17. In particular, the chambers 13 and 14 and 13 and 15 are separated from one another by a wall that they have in common.

[0033] Advantageously, but not limited to, as illustrated in Figure 2, the walls 16 and 17 arranged on the inside of

the element 12 (namely, the walls 16 and 17 through which two chambers 13 and 14 or 13 and 15 face one another) have a thickness that is less than the walls 16 and 17 defining the outer perimeter of the element 12. The term "thickness" refers to the dimension measured parallel to direction D1 for the wall 16 and parallel to direction D2 for the wall 17).

[0034] According to a possible alternative, all the walls 16 and 17 (both inner and outer) have the same thickness.

[0035] Advantageously, but not limited to, according to the embodiment illustrated in the attached figures, the three chambers 13, 14 and 15 have dimensions (in particular a height and a width measured in particular parallel and orthogonal to the directions D1 and D2) that are substantially equal to one another.

[0036] According to a possible alternative embodiment, at least one chamber 13, 14 or 15 has dimensions (in particular the height and the width measured in particular parallel and orthogonal to the directions D1 and D2) that are different relative to the same dimensions of the other two chambers 13, 14 or 15.

[0037] Advantageously, the two chambers 13 and 14 or 13 and 15 facing one another are both arranged aligned with one another.

[0038] According to a possible embodiment not illustrated, at least one of the chambers 13, 14 and 15 can be staggered (that is, not aligned) relative to the other two chambers.

[0039] Preferably, to facilitate the connection between the element 12 and the respective two panels 6 and 7 facing said element 12, the element 12 comprises locking means 18 at one of the end walls 17 of the chamber 14 and at one of the end walls 17 of the chamber 15, by means of which, in use, the insulation element 12 is connectable to the respective panels 6 and 7. In particular, each locking means 18 is configured to be engaged by the respective end portion 11A or 11B of the respective panel 6 or 7.

[0040] Advantageously, as illustrated in the attached figures, two locking means 18 are provided and they are both arranged at the end walls 17 of the chambers 14 and 15 facing the cavity 8. Preferably (as illustrated in Figure 2), but not limited to, each locking means 18 comprises (in particular is formed by) a tab that protrudes from the respective end wall 17 (in particular it extends towards the cavity 8). The tab extends parallel to said end wall 17 (namely, with an extension parallel to the direction D1). The two tabs of the chambers 14 and 15 have opposite extension orientations. In other words, the tab of the chamber 14 has an extension orientation so that it faces the end portion 11B of the outer panel 7 engaging the same; whereas, the tab of the chamber 15 has an extension orientation so that it faces the end portion 11A of the inner panel 6 engaging the same.

[0041] Preferably, to further implement the thermal insulation between the panels 6 and 7, the insulation element 12 is made of PVC-RAU. PVC-RAU is a soft

plastic material that guarantees perfect thermal insulation of the box-like structure 1 and complete breaking of the thermal bridge. PVC-RAU also has the advantage of being highly resistant to exposure to light (particularly UV rays) and atmospheric agents (e.g., corrosion), thus ensuring that the technological and mechanical characteristics remain unchanged over time.

[0042] Advantageously, but not limited to, each end portion 11B of the outer panel 7 is defined by a profile (namely, a cross-section, in particular parallel to the plane defined by the directions D1 and D2) that extends parallel to the longitudinal extension L of the element 12 and transversely, in particular orthogonally to the directions D1 and D2. In particular, the end portion 11B of the outer panel 7 has a dimension (measured parallel to the longitudinal extension L of the element 12) equal to the same dimension of the element 12.

[0043] The cross-section, in particular parallel to the plane defined by the directions D1 and D2, (namely, the profile) of the end portion 11B of the outer panel 7 comprises at least one section 19 that is connected to the central portion 9B and is inclined at an angle α relative to the central portion 9B itself. The angle α is comprised between 120° and 150° , in particular it is equal to 135° . Preferably, the sections 19 of each pair of end portions 11B of the outer panel 7 are parallel to one another.

[0044] Advantageously, but not limited to, the cross-section, in particular parallel to the plane defined by the directions D1 and D2, (namely, the profile) of each end portion 11B of the outer panel 7 comprises the section 19, a section 20 and a section 21. The sections 19, 20 and 21 are in particular arranged in succession as illustrated in detail in Figure 2. The section 20 is connected to the section 19 and is inclined at an angle β relative to said section 19. The angle β is comprised between 30° and 60° , in particular it is equal to 45° . The section 20 is parallel to and spaced apart from the central portion 9B of the outer panel 7. Whereas, the section 21 is connected to the section 20 and is inclined at an angle γ relative to said section 20. The angle γ is comprised between 30° and 60° , in particular it is equal to 45° . The section 21 is orthogonal to the central portion 9B.

[0045] Advantageously, the single mutual inclinations of the sections 19, 20 and 21 are formed by bending the panel 7. The edges between the sections 19 and 20, as well as 20 and 21, are rounded.

[0046] Whereas, each end portion 11A of the inner panel 6 is defined, in particular is formed by a single flap 22 that is bent transversely, in particular orthogonally, relative to the central portion 9A.

[0047] Advantageously, but not limitedly, to ensure the stability of the box-like structure 1, reinforcing elements 30 can be provided (such as, for example, the corner elements illustrated in Figures 1 and 2) that are arranged between two panels 6 and 7, and connected to the same by means of connecting means 31 (illustrated schematically in Figure 2). The reinforcing elements 30 are not frames.

[0048] According to a further aspect of the present invention, which is in addition or in substitution to what was previously described and relating to the elimination of the thermal bridge by means of the insulation element 12, the following is a description of how to facilitate the assembly of the box-like walls 5 in order to form the box-like structure 1. In particular, according to a possible embodiment (in particular illustrated in the attached figures) regarding this last aspect, the insulation element 12 can be made as previously described. According to a possible embodiment (not illustrated) regarding this last aspect, the insulation element 12 can alternatively be of a known type and therefore will not be detailed in the following.

[0049] To simplify the assembly of the single box-like walls 5 so as to define the box-like structure 1, the box-like wall 5 comprises the two panels 6 and 7, both rectangular in shape, which are arranged parallel to, spaced apart from, and facing one another. Each panel 6 or 7 comprises the flat central portion 9 provided with the four edges 10 and the two pairs of end portions 11, each of which extends from the respective edge 10 of the central portion 9. The outer panel 7 comprises each end portion 11B bent at the angle α (the one previously described) relative to its central portion 9B (namely, it comprises the previously described section 19). The end portions 11B of each pair of portions 11B are opposite (that is, they protrude from two edges 10B of the portion 9B that are opposite to one another) and parallel to one another so that one of the end portions 11B of the pair defines an insertion portion 23 (in particular the end 11B that extends beyond the side dimensions of the central portion 9B) that is engageable, in use, with another box-like wall 5 (in particular in the seat 24 of the other box-like wall 5 to which it is connected). Whereas, the other end portion 11B of the pair of portions 11B of the same outer panel 7 defines a seat 24 that is engageable, in use, with an insertion portion 23 of another box-like wall 5. The end portion 11B of the pair of portions 11B defining the seat 24 remains within the dimensions of the central portion 9B (namely, it does not extend beyond the side dimensions of the central portion 9B) thus defining the seat 24.

[0050] In the present disclosure, the term "side dimensions" means the dimension delimited by an imaginary line drawn orthogonally to the central portion 9B and passing through the respective edge 10B.

[0051] Therefore, each outer panel 7 has the insertion portion 23 (at one of the end portions 11B) and the seat 24 (at the end portion 11B, which is opposite to the other end 11B of the same pair of the same outer panel 7). In other words, for each pair of portions 11B of the panel 7, the insertion portion 23 is defined at an edge 10B of the central portion 9B that is opposite relative to the edge 10B, in which the seat 24 is defined.

[0052] Also in this case, the cross-section, in particular parallel to the plane defined by the directions D1 and D2, (namely, the profile) of the end 11B of the outer panel 7 in addition to the section 19 may also comprise the sections

20 and 21 with the characteristics previously described. Whereas, each end portion 11A of the inner panel 6 is defined by the single flap 22 previously described.

[0053] Advantageously, but not limited to, for both aspects (both thermal bridge reduction and ease of assembly), the box-like structure 1 has in particular, at the front wall, inspection doors (not illustrated) that can be opened and that allow access to the hollow body 2 so as to allow access to the hollow body 2 or to the air-handling units contained therein and to perform the required maintenance. The inspection doors are connected to uprights (preferably also made of PVC-RAU plastic material). The uprights (not illustrated) allow the inspection doors to be fixed on their vertical direction and contribute in breaking the thermal bridge while maintaining the characteristics of the rest of the box-like structure 1. The uprights have faces that are facing and are connected to the box-like walls 5 that have a shape complementary to the wall 5 itself. In other words, the upright also has at least one portion inclined at the angle α , which, thanks to this, defines a shape connection between the upright, inspection doors and box-like wall 5, thus preventing air leakage.

[0054] What has been described so far has a number of advantages.

[0055] First of all, the structure 1 obtained from the box-like walls 5 is self-supporting.

[0056] Furthermore, the element 12 does not protrude beyond the side dimensions of the wall 5 and in particular of the outer panel 7. The section 19 therefore defines an abutment at which, in use, the walls 5 are connected to one another. Therefore, the section 19 ensures that during assembly, the element 12 cannot be inadvertently damaged, such as drilled, thus compromising its function of breaking the thermal bridge.

[0057] The thermal insulation provided by the element 12 is not only due to the material with which it was made, but also to the presence of the air chambers 13, 14 and 15 which further amplify the insulation.

[0058] Furthermore, thanks to the presence of the insulation element 12 provided with the chambers 13, 14 and 15 as previously described, the box-like wall 5 has a reduced thermal bridge, since the outer panel 7 and the inner panel 6 are decoupled from one another. In particular, as illustrated in Figure 2, the ends 11A and 11B are spaced apart from one another both along the direction D1 and the direction D2. The ends 11A and 11B therefore do not have overlapping areas, in which they are in contact with one another. Therefore, the ends 11A and 11B are sufficiently distant from one another (both in the direction D1 and D2) to prevent any type of heat transmission (in particular thermal conduction) between the same. This aspect is further amplified by making the thermal insulation element 12 in PVC, in particular PVC-RAU.

[0059] Laboratory tests have shown that the insulation element 12 provided with the three chambers 13, 14 and 15 is able to reach a thermal bridge factor equal to TB1

according to the UNI EN 1886 regulation.

[0060] The thermal insulation element 12 not only prevents the thermal bridge from forming between the two panels 6 and 7, but also contributes to the seal against leaks and prevents humidity, water, or any other unwanted element (for example, particles) from infiltrating into the air-handling unit.

[0061] The box-like wall 5 made as previously described (for both aspects, namely, both for the reduction of the thermal bridge and for facilitating the assembly) has the advantage of being installable in a self-supporting structure 1. Therefore, it does not require the use of frames that provide structural stability to the box-like wall 5.

[0062] The box-like wall 5 with the end portion 11B provided with at least the bent section 19 at the angle α (even more so if the angle α is equal to 45°) has the advantage that the wall 5 itself defines on one side (in particular the end 11B which extends beyond the side dimensions of the central portion 9B) the insertion portion 23 and on the other side (in particular the end 11B which remains within the side dimensions of the central portion 9B) the seat 24. In this way, the seat 24 of a wall 5 acts as a solicitation for the insertion portion 23 of another wall 5 to be connected, thus guiding the coupling between the two. Furthermore, the coupling that is formed is a shape coupling ensuring that the two walls 5 are kept in a respective position relative to one another.

[0063] Furthermore, the wall 5 provided with the end portion 11B provided with the bent section 19 at the angle α has the advantage that the leakage (both in the entry into the hollow body 2 and in the exit from the hollow body 2) of fluids is reduced. In other words, the inclined section 19 of the portion 11B ensures that the incoming fluids (typically, untreated air or liquids) cannot enter the inside of the hollow body 2. Similarly, the inclined section 19 of the portion 11B ensures that the outgoing fluids (typically treated air) can exit, thus reducing the supplied flow rate. This is further amplified by forming the end 11B with the three sections 19, 20 and 21, which therefore define a labyrinth (namely, tortuous path) for the fluid, thus preventing leakage (in and out), making the box-like structure 1 hermetically sealed.

Claims

1. A box-like wall (5) of a self-supporting box-like structure (1) for an air-handling unit; the box-like wall (5) comprises:

an inner panel (6) and an outer panel (7) both rectangular in shape, which are arranged parallel to, spaced apart from, and facing one another; the inner panel (6) comprises a first flat central portion (9; 9A) provided with four first edges (10; 10A) and two pairs of first end portions (11; 11A); the outer panel (7) comprises a

second flat central portion (9; 9B) provided with four second edges (10; 10B) and two pairs of second end portions (11; 11B); each end portion (11; 11A, 11B) extends from the respective edge (10; 10A, 10B) of the respective central portion (9; 9A, 9B); and

each second end portion (11; 11B) of the outer panel (7) comprises a first section (19) bent at a first angle (α) relative to its second central portion (9; 9B); wherein the second end portions (11; 11B) of each pair of second portions (11; 11B) are opposite and parallel to one another, so that:

one of the second end portions (11; 11B) of the pair defines an insertion portion (23) that is engageable, in use, with another box-like wall (5); while, the other second end portion (11; 11B) of the pair of second portions (11; 11B) of the same outer panel (7) defines a seat (24) that is engageable, in use, by an insertion portion (23) of another box-like wall (5).

2. The box-like wall (5) according to claim 1, wherein the first angle (α) is comprised between 120° and 150° , in particular equal to 135° .
3. The box-like wall (5) according to claim 1 or 2, wherein a cross-section of each second end portion (11; 11B) comprises:

the first section (19) of the second end portion (11; 11B) bent at the first angle (α) relative to the second central portion (9; 9B);

a second section (20) that is connected to the first section (19) and is inclined at a second angle (β) relative to the first section (19); wherein the second angle (β) is comprised between 30° and 60° , in particular it is equal to 45° ; and wherein the second section (20) is parallel to and spaced apart from the second central portion (9; 9B); and

a third section (21) that is connected to the second section (20) and is inclined at a third angle (γ) relative to the second section (20); wherein the third angle (γ) is comprised between 30° and 60° , in particular it is equal to 45° ; and wherein the third section (21) is orthogonal to the second central portion (9; 9B).

4. The box-like wall (5) according to any preceding claim, wherein each second end portion (11; 11A) of the inner panel (6) is defined by a single flap (22) that is folded transversely, in particular orthogonally relative to the second central portion (9; 9A).
5. The box-like wall (5) according to any preceding claim, wherein the inner panel (6) and the outer panel (7) are not directly connected to one another.

6. The box-like wall (5) according to claim 5, wherein between the inner panel (6) and the outer panel (7) a plurality, in particular four, of thermal insulation elements (12) are arranged, each of which is respectively connected to the inner panel (6) and to the outer panel (7). 5

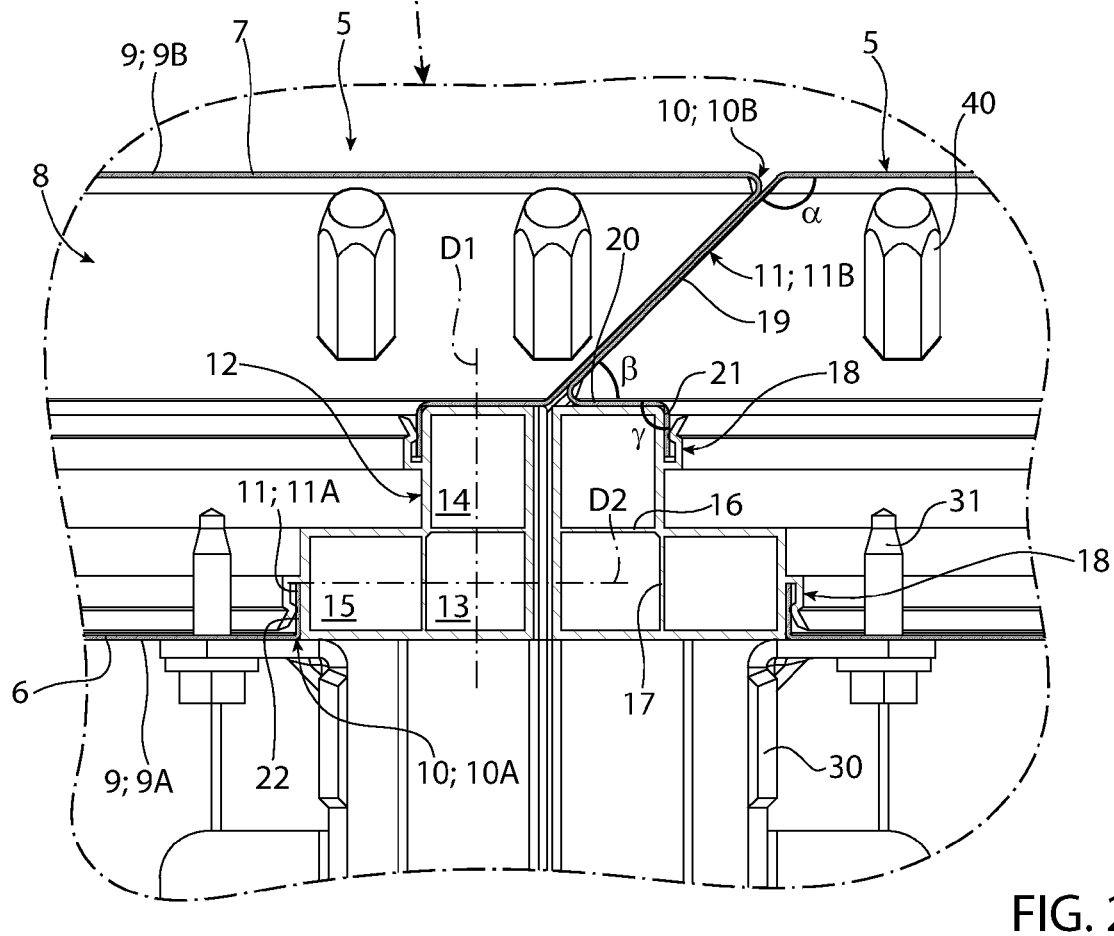
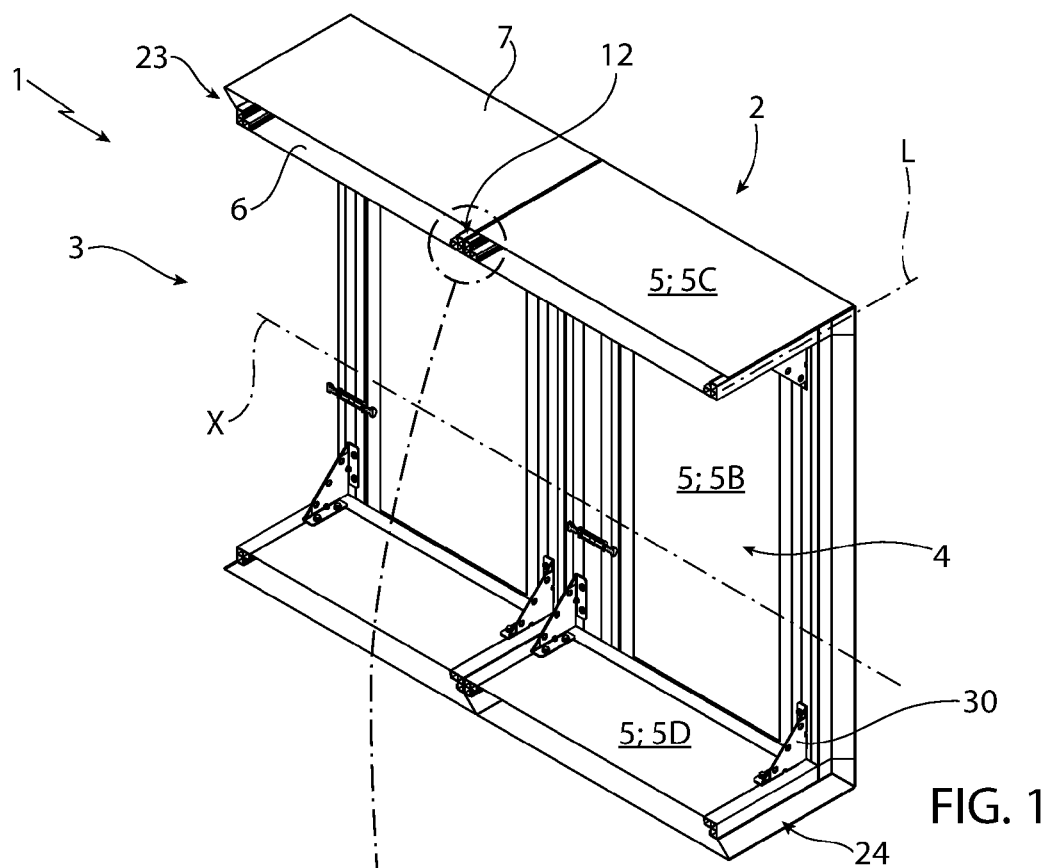
7. The box-like wall (5) according to claim 6, wherein the insulation element (12) has a longitudinal extension (L) and comprises three hollow chambers (13, 14, 15) extending parallel to the longitudinal extension (L) and configured to collect a fluid, in particular air, inside the same; the first and second chambers (14) are arranged side by side and adjacent to one another along a first direction (D1), which is transverse, in particular, orthogonal to the longitudinal extension (L); while the first and third chambers (13, 15) are arranged side by side and adjacent to one another along a second direction (D2), which is transverse, in particular orthogonal, to the first direction (D1) and to the longitudinal extension (L). 10 15 20

8. The box-like wall (5) according to claim 7, wherein the three chambers (13, 14, 15) each have a cross-section, in particular orthogonal, to the longitudinal extension (L) which is rectangular in shape; each chamber (13, 14, 15) comprises two parallel side walls (16), opposite and facing one another and two parallel end walls (17), opposite and facing one another; the end walls (17) are arranged orthogonally to the respective side walls (16); and the first and second chambers (13, 14) are adjacent to one another at the respective side walls (16); whereas, the first and third chambers (13, 15) are adjacent to one another at the respective end walls (17). 25 30 35

9. The box-like wall (5) according to any one of the claims from 7 to 8, wherein the insulation element (12) is made of PVC-RAU. 40

10. A self-supporting box-like structure (1) for an air-handling unit comprising a hollow body (2) which has a central axis (X) and has two through openings (3; 4) opposite to one another along the central axis (X) through which the air flows; the hollow body (2) comprises a front wall, a rear wall (5B), an upper wall (5C) and a lower wall (5D), each of which is a box-like wall (5) made according to one of the claims from 1 to 9. 45 50

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EUROPEAN SEARCH REPORT

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EP 24 22 1008

DOCUMENTS CONSIDERED TO BE RELEVANT

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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO.

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