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(54) **PANEL ASSEMBLY COMPRISING A PANEL AND A FRAME**

PANEELANORDNUNG UMFASSEND EIN PANEEL UND EINEN RAHMEN

ENSEMBLE PANNEAU COMPRENANT UN PANNEAU ET UN CADRE

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Description

[0001] The present invention relates to a panel assembly comprising a panel and a frame, which panel can be hinged between an open and a closed position with respect to the frame.

[0002] The invention in particular relates to a panel assembly, also referred to as "roof hatch" or "roof door", which is intended to allow a user safe access to horizontal or slightly sloping roofs, in combination with a ladder, folding steps or a fixed staircase. Such roof hatches are also supplied in special versions, for example fire resistant and/or explosion relief versions. An explosion relief panel, in practice also called "explosion vent" is known, for example from NL 2000112. Said known panel assembly is used in particular for diverting any explosive forces to which the structure of a building in which there is a risk of gas or dust explosions is exposed directly via the panel so as to spare the building.

[0003] A drawback of the known panel is that it is made of a thermally conductive material, so that heat transfer between the outside of the building and the inside of the building can take place via the panel assembly. This is disadvantageous, because heat is thus lost from the building when the outside temperature is lower than the temperature in the building, or, quite the opposite, because heat enters the building when the outside temperature is higher. Both situations involve a loss of energy because additional heating or cooling and/or ventilation of the building is needed.

[0004] It is an object of the invention to improve the known panel assembly. It is in particular an object of the invention to provide a panel assembly by means of the heat transfer through the panel assembly is at least reduced.

[0005] In order to accomplish that object, the panel assembly of the kind described in the introductory paragraph according to the preamble of claim 1 is characterised in that the parts of the panel assembly that face outward in use are thermally separated from the parts of the panel assembly that face inward in use, wherein an insulating strip is provided between the panel and the frame, wherein said strip is made of a synthetic material, in particular rubber, characterized in that the frame comprises an inner wall and at least partially an outer wall, wherein the outer wall faces outward in use, wherein the inner wall faces inward in use, and wherein the inner wall and the outer wall define a space for accommodating a second insulating material, wherein the inner wall and the outer wall of the frame comprise edges that extend at least substantially perpendicularly from the inner wall and the outer wall near a first end zone, wherein the two edges of the inner wall and the outer wall face one another and wherein a third insulating strip is provided between the two edges. By providing thermal separations or interruptions between the parts of the panel assembly that face outward in use and the parts of the panel assembly that face inward in use, at least less heat transfer is possible between the outward facing parts and the inward facing parts of the panel assembly. As a result, less energy is needed for maintaining the desired temperature in the building in which the panel assembly is installed. As indicated, an insulating strip is provided between the panel and the frame, which strip is made of a synthetic material, for example rubber. Preferably, two insulating, hollow, air-containing sections are provided between the panel and the frame, which sections are in particular made of a flexible synthetic material or of rubber. Said third insulating strip is in particular made of a synthetic material with a coefficient of thermal conduction (λ) as low as possible.

[0006] European patent publication no. 1 387 020 discloses an inspection flap for reversibly closing an opening in a wall/ceiling covering comprises a frame fixed to the wall/ceiling covering, and a facing panel removably arranged in the frame. The facing panel is permanently connected on the inner side of the wall/ceiling covering facing the opening with a high-temperature- and/or flame-resistant panel which fills the opening.

[0007] US patent publication no. 4,299,059 teaches a ceiling-mounted attic door features a continuous outer panel of flame-resistant plaster board, an intermediate layer of thermal insulating material and marginal sealing gaskets and insulating strips arranged to thermally seal the marginal edges of the door when it occupies a normally closed position within its associated door opening.

[0008] Belgium patent publication no. 900.741 discloses a fire-door having a central symmetrical insulating panel covered on each face by a layer of mineral wool of high density. Alternatively, the outer layers can be of plastics foam or insulating panels. The thickness of the outer layers is selected to determine the performance of the door. The outer surfaces of the composite are enclosed by sheet steel, or fire resistant material panels, the peripheral edges of which are retained by screws. The edges are recessed to take a heat-expansible material.

[0009] In a preferred embodiment of a panel assembly according to the invention, the panel comprises two spaced, plate-shaped walls, the first plate-shaped wall facing outward in use and the second plate-shaped wall facing inward in use, which two plate-shaped walls define a space in which an insulation material is present. The panel in particular comprises plastic connecting means for connecting the two plate-shaped walls. In another preferred variant, the two plate-shaped walls are glued together.

[0010] In another preferred embodiment of a panel assembly according to the invention, the two plate-shaped walls comprise edges that extend at least substantially perpendicularly from the walls near the circumferential zones thereof, wherein the two edges of the two plate-shaped walls face one another, and wherein a second insulating strip is provided between the two edges. Said insulating strip is in particular made of a synthetic material with a coefficient of thermal conduction (λ) as low as pos-

sible.

[0011] The invention will now be explained in more detail with reference to figures illustrated in a drawing, in which

- Figure 1 is a perspective view of a panel assembly according to an embodiment of the invention installed in a building;
- Figure 2 is a cross-sectional view of the panel assembly of figure 1; and
- Figure 3 is a cross-sectional perspective view of the panel of figure 1.

[0012] In figure 1 there is shown a panel assembly 1 comprising a panel 2 and a frame 3, which panel assembly 1 is installed in the roof of a building 6. The panel 2 can be hinged between an open position and a closed position relative to the frame 3 by means of hinges 4, which open position of the panel 2 is shown in figure 1. As figure 2 shows, two strips 5 are provided near the circumferential zone of the panel 2, which strips 5 are preferably made of a synthetic material, more preferably rubber. Said strips 5 insulate the panel 2 from the frame 3 in the closed position, so that transfer of heat from the panel 2 to the frame 3 is not possible. Furthermore, as also appears from figure 2, the presence of the strips 5 prevents air from flowing from outside the building 6 into the building 6, and/or vice versa, via a clearance that may be present between the panel 2 and the frame 3.

[0013] As figure 2 shows, the panel 2 comprises two spaced plate-shaped walls 10,11. The first wall 10 faces the outer side of the building 6 and the second wall 11 faces the inner side of the building 6. An insulation material 12 is provided between the two walls 10,11, which insulation material 12 is preferably made of polyurethane. In another preferred variant, PIR/PUR with a coefficient of thermal conduction (λ) as low as possible, for example 0.021 W/m.K, is used. As appears from figure 3, the two walls 10,11 are connected by means of screws 13 which extend through the insulation material 12 and which engage in a threaded cylinder 14. The screws 13 and/or the cylinders 14 are preferably made of plastic material. Preferably, several screws 13 and cylinders 14 are provided, preferably near a circumferential zone of the panel 2.

[0014] From figure 1 it furthermore appears that the two walls 10,11 are provided with upright edges 15 and 16, respectively. The upright edges 15, 16 extend perpendicularly from the walls 10, 11, with the edges 15, 16 facing each other. The edges 15, 16 extend partially parallel to each other, whilst an insulating strip 17 is provided between the two edges 15, 16. Said strip thus extends near the circumferential zone of the panel 2, in such a manner that the outward facing side of the panel 2 is thermally separated from the inward facing side of the panel 2.

[0015] It furthermore appears from figure 2 that the frame 3 comprises an inner wall 20, which faces the inner side of the building 6. The frame 3 further at least partially comprises an outer wall 21, which extends parallel to and spaced from the inner wall 20. An insulation material 22 is provided between the inner wall 20 and the upper wall 21. From figure 2 it further appears that the outer wall 21 comprises a section 23, under which the roof covering of the roof is to terminate and which functions to drain away moisture present on the outer wall 21, in such a manner that said moisture cannot enter the building 6.

[0016] As figure 2 furthermore shows, the wall 20 and the outer wall 21 are provided with edges 24,25 extending perpendicularly thereto near end zones thereof. Said edges 24,25 are arranged at an angle of about 90°, such that the end zones of the inner wall 20 and the outer wall 21 exhibit a U-shape. Between said edges 24,25 an insulation strip 26 is provided, which insulation strip thermally separates the inner wall 21 from the upper wall 21.

[0017] As figure 2 further shows, the strips 5 extend or on either side of the strips 17,26. In this way heat is efficiently prevented from flowing from outside the building 6 into the building 6, and vice versa, through the space 28 between the panel 2 and the frame 3. Furthermore, any heat transfer between the outer wall 25 of the frame 3 and the wall 10 of the panel 2 as well as between the inner wall 24 of the freight 3 and the wall 11 of the panel 2 is prevented in an efficient manner.

[0018] It is noted that the invention is not limited to the embodiment discussed in the foregoing, but that it also extends to other variants that fall within the scope of the appended claims. Thus it will be apparent that the panel and/or the frame may be configured differently, in which connection it is important that a part of the panel and/or the frame that faces upwards in use be thermally separated from a part of the panel and/or the frame that faces inwards in use. It is furthermore noted that the phrase "a panel assembly in use" is understood to mean a panel assembly installed in or on a building.

Claims

1. A panel assembly (1) comprising a panel (2) and a frame (3), which panel (2) can be hinged between an open and a closed position relative to the frame (3), wherein the parts of the panel assembly (1) that face outward in use are thermally separated from the parts of the panel assembly (1) that face inward in use, wherein an insulating strip (5) is provided between the panel (2) and the frame (3), wherein said strip (5) is made of a synthetic material, and wherein the frame (3) comprises an inner wall (20) and at least partially an outer wall (21), wherein the outer wall (21) faces outward in use, wherein the inner wall (20) faces inward in use, **characterized in that** the inner wall (20) and the outer wall (21) define a space for accommodating a second insulating material

(22), wherein the inner wall (20) and the outer wall (21) of the frame (3) comprise edges (24, 25) that extend at least substantially perpendicularly from the inner wall (20) and the outer wall (21) near a first end zone, wherein the two edges (24, 25) of the inner wall (20) and the outer wall (21) face one another and wherein a third insulating strip (26) is provided between the two edges (24, 25).

2. A panel assembly (1) according to claim 1, wherein the panel (2) comprises two spaced, plate-shaped walls (10, 11), the first plate-shaped wall (10) facing outward in use and the second plate-shaped wall (11) facing inward in use, which two plate-shaped walls (10, 11) define a space in which an insulation material (12) is present.

3. A panel assembly (1) according to claim 2, wherein the panel (2) comprises connecting means (13, 14) for connecting the two plate-shaped walls.

4. A panel assembly (1) according to claim 3, wherein said connecting means (13, 14) are made of plastic material.

5. A panel assembly (1) according to claim 2, 3 or 4, wherein the two plate-shaped walls (10, 11) comprise edges (15, 16) that extend at least substantially perpendicularly from the walls (10, 11) near the circumferential zones thereof, wherein the two edges (15, 16) of the two plate-shaped walls (10, 11) face one another, and wherein a second insulating strip (17) is provided between the two edges (15, 16).

Patentansprüche

1. Paneelanordnung (1) umfassend ein Paneel (2) und einen Rahmen (3), welches Paneel (2) zwischen einer offenen und einer geschlossenen Position relativ zu dem Rahmen (3) verschwenkt werden kann, wobei die Teile der Paneelanordnung (1), die bei Verwendung nach außen zeigen, thermisch von den Teilen der Paneelanordnung (1) getrennt sind, die bei Verwendung nach innen zeigen, wobei ein Isolationsstreifen (5) zwischen dem Paneel (2) und dem Rahmen (3) bereitgestellt ist, wobei der Streifen (5) aus einem synthetischen Material gemacht ist, der Rahmen (3) eine innere Wand (20) und wenigstens teilweise eine äußere Wand (21) umfasst, wobei die äußere Wand (21) bei Verwendung nach außen zeigt, wobei die innere Wand (20) bei Verwendung nach innen zeigt, und wobei sie **dadurch gekennzeichnet ist, dass** die innere Wand (20) und die äußere Wand (21) einen Raum zur Aufnahme eines zweiten Isolationsmaterials (22) definieren, wobei die innere Wand (20) und die äußere Wand (21) des Rahmens (3) Ränder (24, 25) umfassen, die sich im wesentlichen senkrecht von der inneren Wand (20) und der äußeren Wand (21) nahe einer ersten Endzone erstrecken, wobei die zwei Ränder (24, 25) der inneren Wand (20) und der äußeren Wand (21) einander gegenüber liegen und wobei ein dritter Isolationsstreifen (26) zwischen den zwei Rändern (24, 25) bereitgestellt ist.

2. Paneelanordnung (1) nach Anspruch 1, wobei das Paneel (2) zwei beabstandete, plattenförmige Wände (10, 11) umfasst, wobei die erste plattenförmige Wand (10) bei Verwendung nach außen zeigt und die zweite plattenförmige Wand (11) bei Verwendung nach innen zeigt, welche zwei plattenförmigen Wände (10, 11) einen Raum definieren, in welchem ein Isolationsmaterial (12) vorhanden ist.

3. Paneelanordnung (1) nach Anspruch 2, wobei das Paneel (2) Verbindungsmittel (13, 14) zum Verbinden der zwei plattenförmigen Wände umfasst.

4. Paneelanordnung (1) nach Anspruch 3, wobei die Verbindungsmittel (13, 14) aus Kunststoffmaterial hergestellt sind.

5. Paneelanordnung (1) nach Anspruch 2, 3 oder 4, wobei die zwei plattenförmigen Wände (10, 11) Ränder (15, 16) umfassen, die sich wenigstens im wesentlichen senkrecht von den Wänden (10, 11) nahe der Umfangszonen derselben erstrecken, wobei die zwei Ränder (15, 16) der zwei plattenförmigen Wände (10, 11) einander gegenüber liegen, und wobei ein zweiter Isolationsstreifen (17) zwischen den zwei Rändern (15, 16) bereitgestellt ist.

Revendications

1. Ensemble panneau (1) comportant un panneau (2) et un bâti (3), lequel panneau (2) peut pivoter entre une position ouverte et une position fermée par rapport au bâti (3), dans lequel les parties de l'ensemble panneau (1) tournées vers l'extérieur sont séparées thermiquement des parties de l'ensemble panneau (1) tournées vers l'intérieur en fonctionnement, dans lequel une bande isolante (5) est prévue entre le panneau (2) et le bâti (3), dans lequel ladite bande (5) est réalisée en matériau synthétique et dans lequel le bâti (3) comporte une paroi intérieure (20) et au moins partiellement une paroi extérieure (21), dans lequel la paroi extérieure (21) est tournée vers l'extérieur en fonctionnement, dans lequel la paroi intérieure (20) est tournée vers l'intérieur en fonctionnement, **caractérisé en ce que** la paroi intérieure (20) et la paroi extérieure (21) délimitent un espace permettant d'accommoder un second matériau isolant (22), dans lequel la paroi intérieure (20) et la paroi extérieure (21) du bâti (3) comportent des

bords (24, 25) s'étendant de manière au moins sensiblement perpendiculaire à partir de la paroi intérieure (20) et la paroi extérieure (21) au niveau d'une première zone d'extrémité, dans lequel les deux bords (24, 25) de la paroi intérieure (20) et de la paroi extérieure (21) se trouvent face à face et dans lequel une troisième bande isolante (26) est prévue entre les deux bords (24, 25).

2. Ensemble panneau (1) selon la revendication 1, dans lequel le panneau (2) comporte deux parois espacées en forme de plaques (10, 11), la première paroi en forme de plaque (10) étant tournée vers l'extérieur en fonctionnement et la seconde paroi en forme de plaque (11) étant tournée vers l'intérieur en fonctionnement, lesquelles deux parois en forme de plaques (10, 11) délimitent un espace dans lequel un matériau isolant (12) est présent.

3. Ensemble panneau (1) selon la revendication 2, dans lequel la paroi (2) comporte des moyens de connexion (13, 14) permettant de connecter les deux parois en forme de plaques.

4. Ensemble panneau (1) selon la revendication 3, dans lequel lesdits moyens de connexion (13, 14) sont réalisés en matériau plastique.

5. Ensemble panneau (1) selon la revendication 2, 3 ou 4, dans lequel les deux parois en forme de plaques (10, 11) comportent des bords (15, 16) s'étendant de manière au moins sensiblement perpendiculaire à partir des parois (10, 11) au niveau de zones circonférentielles de ces dernières, dans lequel les deux bords (15, 16) des deux parois en forme de plaques (10, 11) se trouvent face à face, et dans lequel une seconde bande isolante (17) est prévue entre les deux bords (15, 16).

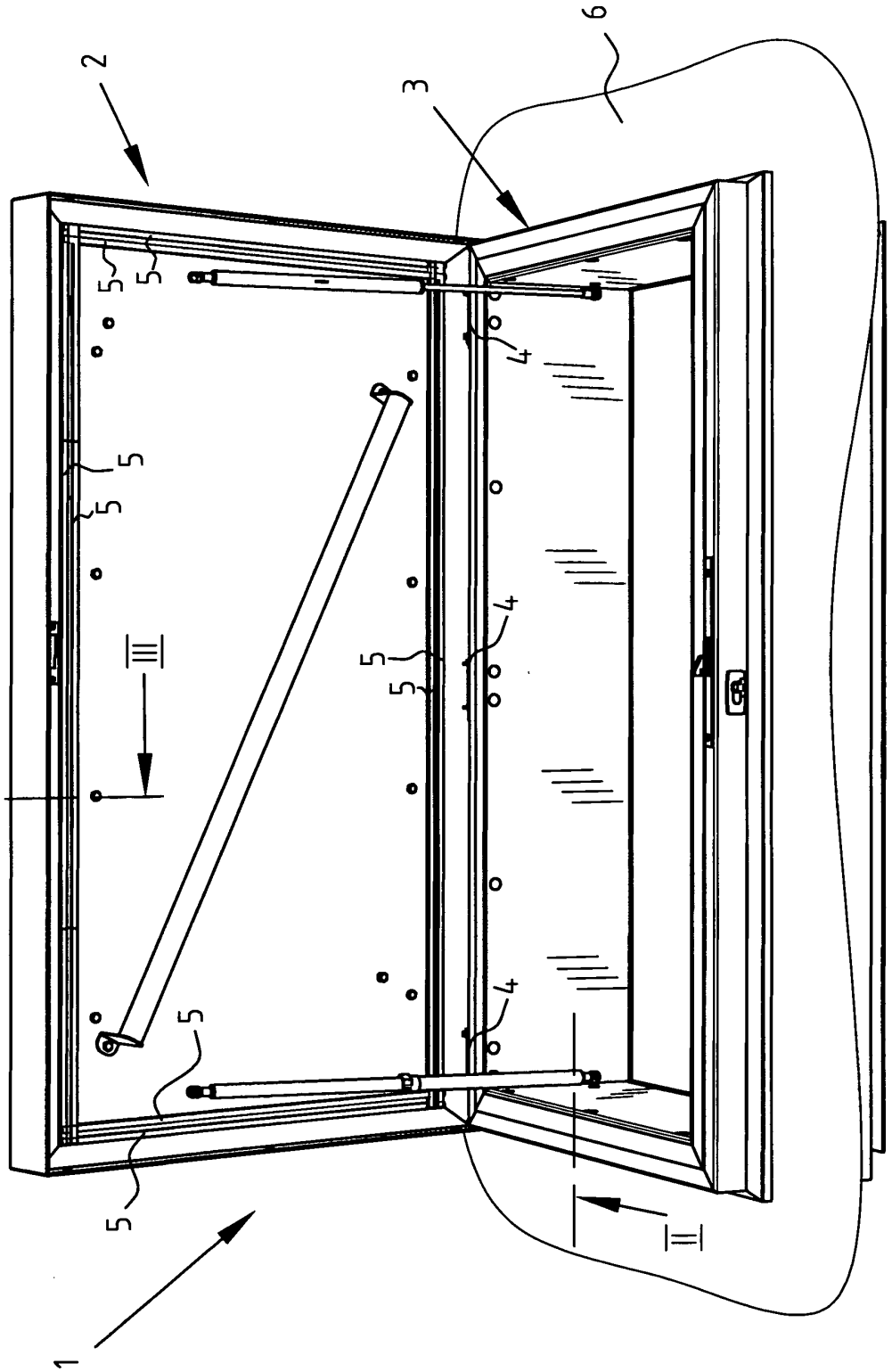


FIG. 1

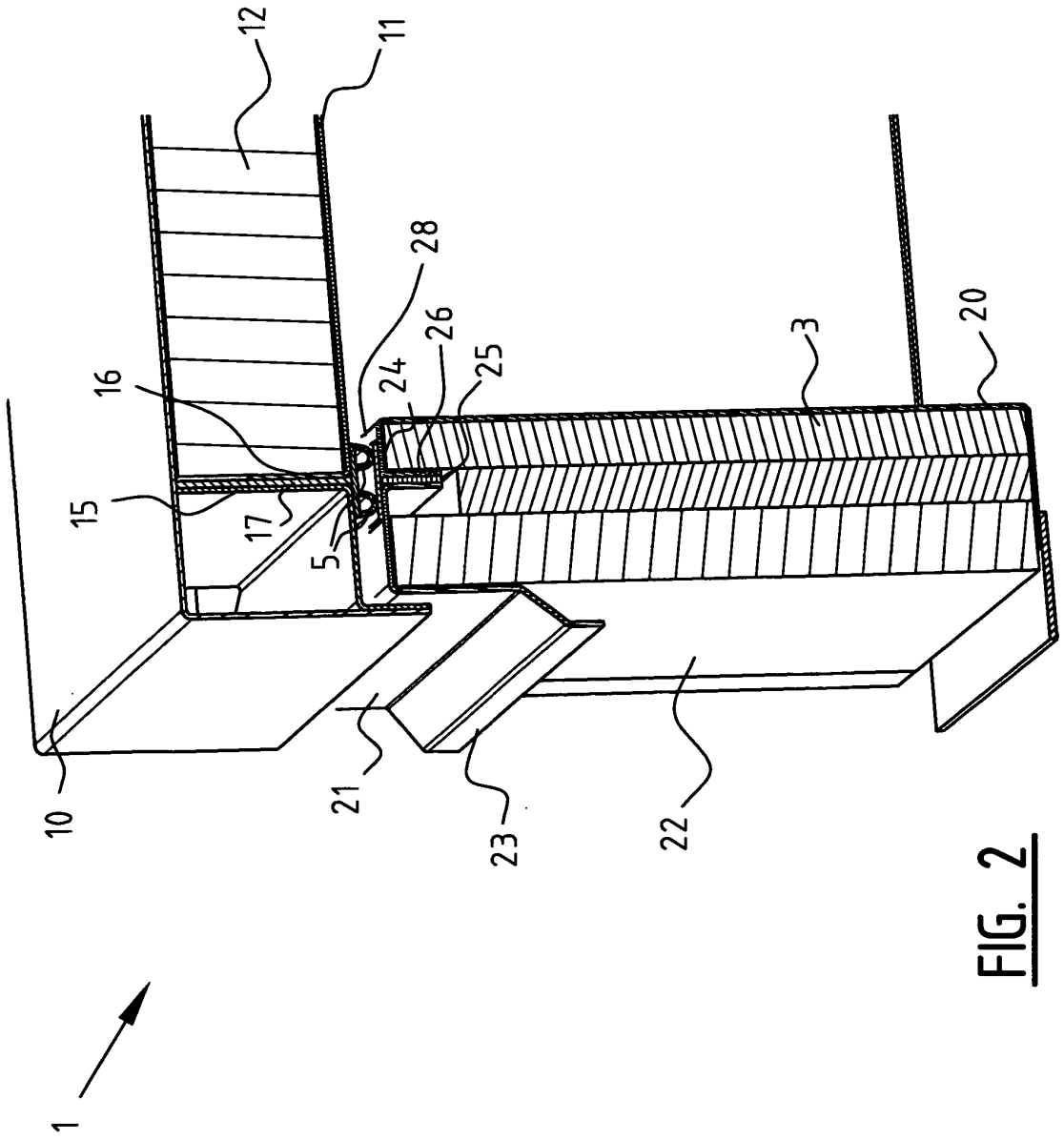


FIG. 2

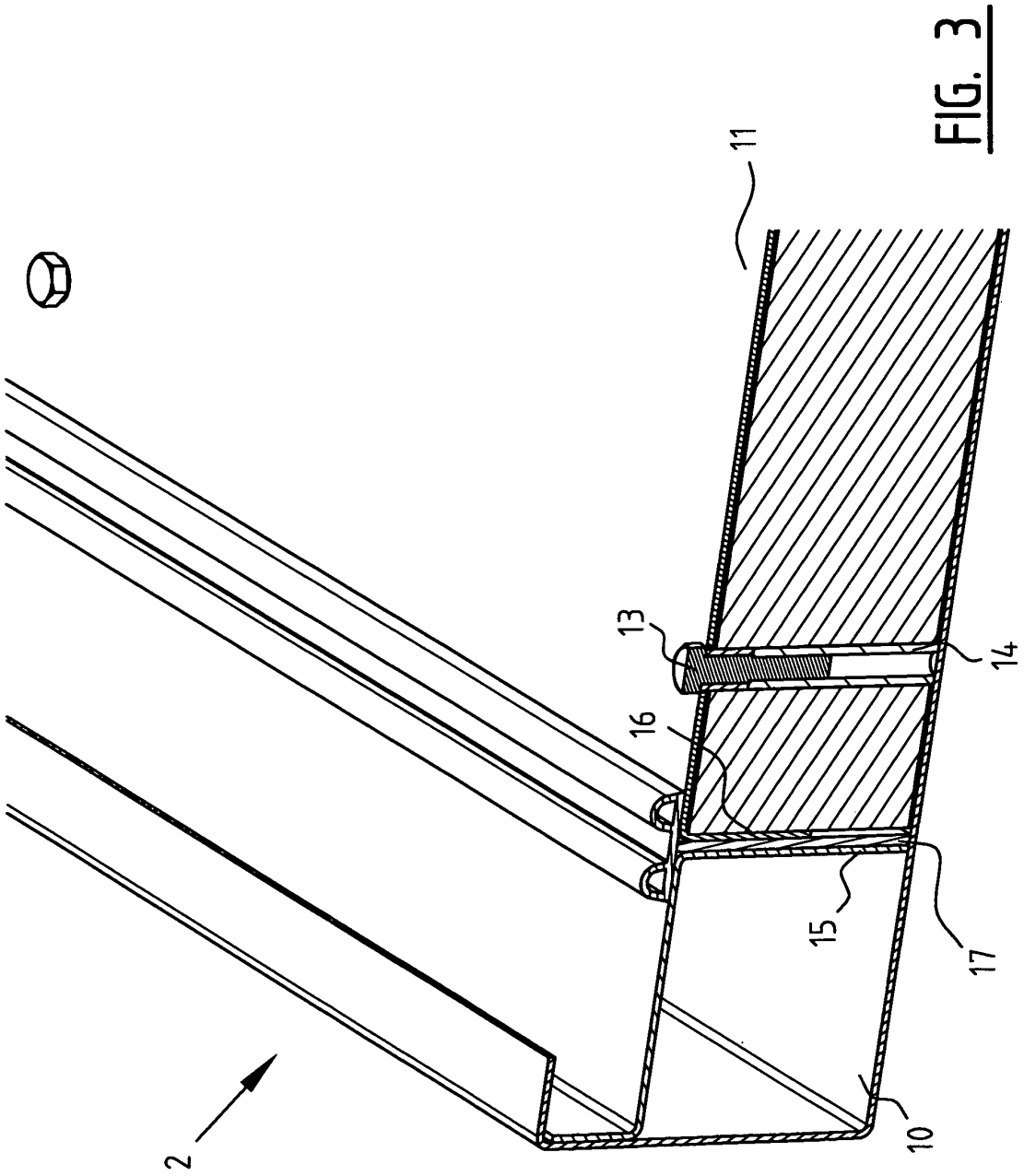


FIG. 3

REFERENCES CITED IN THE DESCRIPTION

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- BE 900741 **[0008]**