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(54) **WALL STRUCTURE**

WANDAUFBAU

STRUCTURE DE MUR

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Description

BACKGROUND

[0001] The invention relates to a wall structure comprising panels arranged on top of one another and side by side.

[0002] A problem with known wall structures comprising panels fixed to a support structure supporting the wall, such as steel structures or composite columns, is that heavy and long bolts extending over the thickness of the panel are needed. The structure is prone to cause bending forces to the bolts. Sometimes this may cause that panels settle or even collapse. The bending forces focusing to the bolts are significant especially when panels arranged side by side are fixed with a bolt plate held in place by a single bolt that is attached between the panels through a vertical panel seam, i.e. in this case the bolt is not penetrating the panel surface itself. Ongoing tendency towards increasing panel thicknesses is intensifying the problem.

[0003] CA3087396 discloses a wall structure that provides a high performance thermal wall system for the exterior of buildings. WO 2011/085507 discloses a facade insulation comprising a plurality of thermal insulation panels.

BRIEF DESCRIPTION

[0004] Viewed from a first aspect, there can be provided a wall structure comprising

- composite panels arranged on top of one another and side by side so that there is
- a vertical panel seam between the composite panels side by side, the vertical panel seam having a first width, and
- a horizontal panel seam between the composite panels arranged on top of one another, the wall structure further comprising:
- a wall support structure arranged for carrying at least part of the weight of the composite panels, and
- a support element arranged for transmitting at least part of the weight of the composite panel to the wall support structure, wherein the support element comprises

-- a first attachment part attached to the wall support structure and having a second width not more than the first width,

-- a second attachment part attached to an outer surface of the composite panel and having width more than the first width, and

-- a shaft part connecting the first attachment part to the second attachment part and having fourth width not more than the first width, wherein

- the shaft part is arranged in the vertical panel seam such that it extends diagonally downwards from the first attachment part to the second attachment part.

[0005] Thereby a wall structure where at least most of the weight of the panels is transferred through the support structure to the wall support structure so that bending forces exerting to fastening means, such as bolts, extending through the thickness of the composite panel may be limited or even eliminated.

[0006] The wall structure is characterised by what is stated in the independent claim. Some other embodiments are characterised by what is stated in the other claims. Inventive embodiments are also disclosed in the specification and drawings of this patent application.

[0007] In one embodiment, the second attachment part is attached to an upper half of the composite panel, such as to an upper edge area of the composite panel.

[0008] An advantage is that the first attachment part placed diagonally upwards from the second attachment part can be attached to the wall support structure prior to the panels above are attached, thus there is much room and good visibility to do the attachment work.

[0009] In one embodiment, the first attachment part comprises a mounting hole.

[0010] An advantage is that a simple attachment of the support element, optionally detachable attachment, may be achieved.

[0011] In one embodiment, the second attachment part is attached to two composite panels having the vertical panel seam therebetween.

[0012] An advantage is that a balanced attachment of the support element may be achieved, and the number of the support elements may be reduced.

[0013] In one embodiment, the wall support structure comprises connection points arranged on top of one another, and the first attachment part is attached to one of the connection points.

[0014] An advantage is that building of the wall structure may be simplified, and the connection points may be provided with threads to enable even more easy assembly.

[0015] In one embodiment, a second attachment hole is arranged in the second attachment part, said hole being aligned with the shaft part, and a second fastening means is arranged through the second attachment hole, said second fastening means extending in the vertical panel seam to the wall support structure and fastened thereto.

[0016] An advantage is that loosening of the panel from the wall support structure due to e.g. suction effects caused by wind may be limited or completely prevented.

[0017] In one embodiment, the wall support structure comprises connection points arranged on top of one another, the first attachment part is attached to one of the connection points, and the second fastening means is attached to another connection point arranged below the connection point to which the first attachment part is

fastened.

[0018] An advantage is that an easily built and firm wall structure may be achieved.

[0019] In one embodiment, the wall support structure comprises columns, such as concrete columns, steel columns or composite columns, and at least one of said columns is carrying least part of the weight of the composite panels.

[0020] An advantage is that a simple and low-capex wall structure may be achieved.

[0021] In one embodiment, the composite panel comprises a first face skin of sheet metal, a second face skin of sheet metal, and a core arranged between the first face skin and the second face skin.

[0022] An advantage is that a light, durable and insulating wall support structure may be achieved.

[0023] In one embodiment, the core is of foamed polyurethane.

[0024] An advantage is that a panel having good thermal insulation properties may be achieved.

[0025] In one embodiment, the core is of polyisocyanurate.

[0026] An advantage is that a panel having good thermal insulation properties and excellent fire behaviour may be achieved.

[0027] In one embodiment, the core is of mineral wool.

[0028] An advantage is that a panel having good thermal insulation properties and excellent fire behaviour may be achieved.

BRIEF DESCRIPTION OF FIGURES

[0029] Some embodiments illustrating the present disclosure are described in more detail in the attached drawings, in which

Figure 1 is a schematic side view of a wall structure in partial cross-section,

Figure 2 is a schematic front view of the wall structure shown in Figure 1,

Figure 3 is a schematic front view of a wall structure, and

Figure 4 is a schematic view of a detail of a wall structure.

[0030] In the figures, some embodiments are shown simplified for the sake of clarity. Similar parts are marked with the same reference numbers in the figures.

DETAILED DESCRIPTION

[0031] **Figure 1** is a schematic side view of a wall structure in partial cross-section, and **Figure 2** is a schematic front view of the wall structure shown in Figure 1.

[0032] The wall structure 100 comprises plurality of

composite panels 1 that are arranged on top of one another and side by side. Thus, there is at least one vertical panel seam 2 between the composite panels side by side. The vertical panel seam has a first width w1. This means that said panels are not arranged in contact but there is said first width w1 therebetween. In one embodiment, the width w1 is 20 mm to 50 mm, preferably 30 mm to 40 mm.

[0033] Furthermore, there is at least one horizontal panel seam 3 between the composite panels arranged on top of one another. In the horizontal panel seam 3, the panels may be arranged in contact with each other. In one embodiment, a seal or weather strip (not shown) may be arranged in the horizontal panel seam.

[0034] In one embodiment, the composite panel 1 comprises a first face skin 15 of sheet metal, a second face skin 16 of sheet metal, and a core 17 arranged between the first face skin and the second face skin.

[0035] In one embodiment, the face skins are made of steel.

[0036] In one embodiment, the face skins are made of aluminum.

[0037] The thickness of the first face skin and the second face skin is typically less than 1 mm, preferably 0,4 mm - 0,7 mm. The total thickness of the composite panel 1 may be e.g. 100 mm - 230 mm.

[0038] In one embodiment, the core 17 is of foamed polyurethane (PUR).

[0039] In one embodiment, the core 17 is of foamed polyisocyanurate (PIR).

[0040] In one embodiment, the core 17 is of mineral wool.

[0041] In one embodiment, the wall structure 100 may be a part of façade or a partition wall. The composite panel 1 may thus be a façade cladding panel element or a partition wall panel element.

[0042] The wall structure 100 further comprises at least one wall support structure 4, typically plurality of wall support structures, that are arranged for carrying at least part of the weight of the composite panels 1.

[0043] In one embodiment, the wall support structure 4 is a column or pillar, such as a concrete column, a steel column or a composite column. In one embodiment, the wall support structure 4 comprises a concrete wall.

[0044] The wall structure 100 further comprises at least one support element 5. The support element 5 transmits at least part of the weight of the composite panel 1 to the wall support structure 4. The support element 5 comprises a first attachment part 6 that is attached to the wall support structure 4. The maximum width of the first attachment part 6 is a second width w2 that is not more than the first width w1.

[0045] The support element 5 further comprises a second attachment part 7 attached to an outer surface of the composite panel 1, by e.g. fastening means 10, such as one or more screw(s). The second attachment part 7 has a width w3 that is more than the first width w1. Said outer surface is the surface is situated away from the

wall support structure 4.

[0046] The support element 5 still further comprises a shaft part 8 connecting the first attachment part 6 to the second attachment part 7. The shaft part 8 has a maximum width, i.e. a fourth width w_4 , that is not more than the first width w_1 . The shaft part 8, as well as the first attachment part, is arranged in the vertical panel seam 2 such that it extends diagonally downwards from the first attachment part 6 to the second attachment part 7.

[0047] In one embodiment, all the parts of the support element 5, i.e. the first attachment part 6, the second attachment part 7 and the shaft part 8 are made of one or more metal plates, such as steel plates. In another embodiment, the support element 5 is a molded element.

[0048] In one embodiment, the angle of the diagonal shaft part 8 in relation to the first attachment part 6 is selected in range of 30° - 80° , preferably 40° - 70° . The angle depends on e.g. the panel thickness. In one embodiment where the panel thickness is 230 mm, the angle may be 65° , for instance. The angle of the diagonal shaft part 8 in relation to the second attachment part 7 is at least substantially same as the angle between the shaft part 8 and the first attachment part 6.

[0049] In one embodiment, the second attachment part 7 is attached to an upper half of the composite panel 1. In one embodiment, such as shown in Figure 1, the second attachment part 7 is attached to an upper edge area of the composite panel 1. In one embodiment, such as shown in the Figures, the second attachment part 7 is attached to two composite panels 1 having the vertical panel seam 2 therebetween.

[0050] According to an idea, the second attachment part 7 has two functional tasks: firstly, it transmits at least part of the weight of the panel to the wall support structure 4 via the shaft part 8 and the first attachment part 6, and secondly, it prevents together with a second fastening means 12 the panel 1 from loosening or coming off from the wall support structure 4 due to a suction effect caused by wind. Said second fastening means 12 may comprise e.g. a bolt arranged through a second attachment hole 11 and extending in the vertical panel seam 2 to a threaded hole 14 in the wall support structure 4. The second fastening means 12 carries mainly horizontally affecting forces caused by suction effects of wind, but not the weight of the composite panel(s) that would cause bending forces thereto. Thus, the second fastening means may have a light structure.

[0051] The second attachment hole 11 is arranged in the second attachment part 7 and aligned with the shaft part 8 as shown in Figure 2. The second fastening means 12 extends in the vertical panel seam 2 to the wall support structure 4 and fastened thereto. In one embodiment, the second fastening means 12 is attached or fixed to one of connection points 13 arranged in the wall support structure. The connection point 13 may comprise a sleeve-like or bush-like shape, for instance.

[0052] In one embodiment, the second attachment hole 11 has an elongated shape as shown in Figure 2.

The elongated shape may help in matching the second fastening means 12 to the second attachment hole.

[0053] In one embodiment, the lower part of the composite panel 1 is attached to the wall support structure 4 with a third fastening means 18 and a support plate 20. The third fastening means 18 is arranged in the vertical panel seam 2 and the support plate 20 is preferably attached to the composite panel 1 by fastening means 10, such as screws. In one embodiment, the support plate 20 is attached to two composite panels 1 having the vertical panel seam 2 therebetween.

[0054] In one embodiment, such as shown in Figure 1, the third fastening means comprises a stud bolt that is attached permanently or removably to a connection point 13. Said connection point 13 is one of plurality of the connection points arranged on top of one another in the wall support structure 4.

[0055] The third fastening means 18 may have a light structure since it is not carrying the weight of the composite panel (s), at least not much. The weight of the composite panel (s) is carried by the support element (s) 5. The third fastening means 18 carries mainly horizontally affecting forces caused by suction effects of wind.

[0056] In one embodiment, also the support element 5 is attached to one of the connection points 13 by the first attachment part 6. In one embodiment, such as shown in the Figures, the first attachment part 6 comprises a mounting hole 9 that is arranged on the third fastening means 18 and fixed to the connection point 13 by a nut 19.

[0057] In one embodiment, the connection point 13 comprises an inner thread, and the third fastening means 18 (as well as the second fastening means 12) comprises an external thread that fits to the thread in the connection point 13. The first attachment part 6 having the mounting hole 9 can be arranged on the third fastening means 18 and fixed to the connection point 13 by a nut 19 that match with said external thread. In one embodiment, the second and the third fastening means 12, 18 having the external thread are fully threaded rods.

[0058] In one embodiment, the connection point 13 comprises an external thread (not shown), i.e. it may be a threaded rod, for instance. The first attachment part 6 having the mounting hole 9 is fixed to the wall support structure 4 by a socket (not shown) comprising an inner thread that is screwed on the connection point 13. The socket has an excess length of the inner thread not occupied by the external thread of the connection point. The second and the third fastening means 12, 18 may then be fixed to said socket.

[0059] In one embodiment, such as shown in Figure 1, the first attachment part 6 is attached to one of the connection points 13, and the second fastening means 12 is attached to another connection point 13 arranged below said connection point 13 to which the first attachment part 6 is fastened.

[0060] Figure 3 is a schematic front view of a wall structure. In one embodiment, the support plates 20

alternate with the second attachment parts 7 on the vertical panel seam 2. In one embodiment, such as shown in Figure 3, the support plates 20 have different dimensions as the second attachment parts 7. However, this is not always necessary, i.e. the support plates and the second attachment parts may have identical dimensions. Furthermore, the shapes of the support plates and the second attachment parts are not necessarily quadrangular.

[0061] In another embodiment, the connection point 13 to which the second fastening means 12 is fastened serves also as the connection point of the first attachment part of another support element (not shown) arranged below the support element. In other words, the third fastening means 18 of a lower arranged support element may also attach the second attachment part 7 of a higher arranged support element to the wall support structure 4. In this embodiment, the second attachment part 7 functions as the support plate 20 of the composite panel below.

[0062] In one embodiment, there may be sections, e.g. near the bottom or top of the wall structure 100, where two or more support elements 5 are installed in succession.

[0063] **Figure 4** is a schematic view of a detail of a wall structure. In one embodiment, lateral edges of the second attachment part 7 and/or of the flat attachment element 20 are bent or shaped such that said edges are lifted from the surface of the panel 1. This enables e.g. installation of a suitably shaped cover element 21, which may be slid over the vertical panel seam 2.

[0064] The invention is not limited solely to the embodiments described above, but instead many variations are possible within the scope of the inventive concept defined by the claims below.

[0065] The drawings and the related description are only intended to illustrate the idea of the invention. The invention may vary in detail within the scope of the inventive idea defined in the following claims.

REFERENCE SYMBOLS

[0066]

- | | |
|----|------------------------|
| 1 | composite panel |
| 2 | vertical panel seam |
| 3 | horizontal panel seam |
| 4 | wall support structure |
| 5 | support element |
| 6 | first attachment part |
| 7 | second attachment part |
| 8 | shaft part |
| 9 | mounting hole |
| 10 | fastening means |
| 11 | second attachment hole |
| 12 | second fastening means |
| 13 | connection point |
| 14 | threaded hole |
| 15 | first face skin |

- | | |
|----|-----------------------|
| 16 | second face skin |
| 17 | core |
| 18 | third fastening means |
| 19 | nut |
| 20 | support plate |
| 21 | cover element |

100 wall structure

10 w width

Claims

1. A wall structure (100), comprising

- | | |
|----|--|
| 15 | - composite panels (1) arranged on top of one another and side by side so that there is |
| | - a vertical panel seam (2) between the composite panels side by side, the vertical panel seam having a first width (w1), and |
| 20 | - a horizontal panel seam (3) between the composite panels arranged on top of one another, the wall structure further comprising: |
| | - a wall support structure (4) arranged for carrying at least part of the weight of the composite panels, and |
| 25 | - a support element (5) arranged for transmitting at least part of the weight of the composite panel to the wall support structure (4), wherein the support element (5) comprises |
| 30 | - a shaft part (8) arranged in the vertical panel seam (2) such that it extends diagonally downwards from a first attachment part (6) to a second attachment part (7) characterized in that |
| 35 | -- the first attachment part (6) is attached to the wall support structure (4) and having a second width (w2) not more than the first width (w1), |
| 40 | -- the second attachment part (7) is attached to an outer surface of the composite panel (1) and having width (w3) more than the first width (w1), and |
| 45 | -- the shaft part (8) is connecting the first attachment part (6) to the second attachment part (7) and having fourth width (w4) not more than the first width (w1). |

2. The wall structure according to claim 1, wherein

- | | |
|----|---|
| 50 | - the second attachment part (7) is attached to an upper half of the composite panel (1). |
|----|---|

3. The wall structure according to claim 1, wherein

- | | |
|----|--|
| 55 | - the second attachment part (7) is attached to an upper edge area of the composite panel (1), preferably to an upper half of the panel (1). |
|----|--|

4. The wall structure according to any one of the preceding claims, wherein

- the first attachment part (6) comprises a mounting hole (9).

5. The wall structure according to any one of the preceding claims, wherein

- the second attachment part (7) is attached to two composite panels (1) having the vertical panel seam (2) therebetween.

6. The wall structure according to any one of the preceding claims, wherein

- the second attachment part (7) is attached to the composite panel (1) by at least one fastening means (10), such as a screw.

7. The wall structure according to one of the preceding claims, wherein

- the wall support structure (4) comprises connection points (13) arranged on top of one another, and
- the first attachment part (6) is attached to one of the connection points (13).

8. The wall structure according to any one of the preceding claims, comprising

- a second attachment hole (11) arranged in the second attachment part (7) and aligned with the shaft part (8), and
- a second fastening means (12) arranged through the second attachment hole (11) and extending in the vertical panel seam (2) to the wall support structure (4) and fastened thereto.

9. The wall structure according to claim 8, wherein

- the wall support structure (4) comprises connection points (13) arranged on top of one another,
- the first attachment part (6) is attached to one of the connection points (13), and
- the second fastening means (12) is attached to another connection point (13) arranged below the connection point (13) to which the first attachment part (6) is fastened.

10. The wall structure according to any one of the preceding claims, comprising

- columns (14), such as concrete columns or steel columns, and
- at least one of said columns (14) is carrying

least part of the weight of the composite panels (1).

11. The wall structure according to any one of the preceding claims, wherein

- the composite panel (1) comprises a first face skin (15) of sheet metal, a second face skin (16) of sheet metal, and a core (17) arranged between the first face skin and the second face skin.

12. The wall structure according to claim 11, wherein

- the core (17) is of foamed polyurethane.

13. The wall structure according to claim 11, wherein

- the core (17) is of polyisocyanurate (PIR).

14. The wall structure according to claim 11, wherein

- the core (17) is of mineral wool.

15. The wall structure according to any one of the preceding claims, wherein

- the composite panel (1) is a façade cladding panel element, or a partition wall panel element.

Patentansprüche

1. Wandstruktur (100), umfassend

- Verbundplatten (1), die übereinander und nebeneinander angeordnet sind, so dass es
- eine vertikale Plattennaht (2) zwischen den nebeneinander angeordneten Verbundplatten gibt, wobei die vertikale Plattennaht eine erste Breite (w1) aufweist, und
- eine horizontale Plattennaht (3) zwischen den übereinander angeordneten Verbundplatten gibt, wobei die Wandstruktur ferner Folgendes umfasst:
- eine Wandstützstruktur (4), die zum Tragen mindestens eines Teils des Gewichts der Verbundplatten angeordnet ist, und
- ein Stützelement (5), das zum Übertragen mindestens eines Teils des Gewichts der Verbundplatte auf die Wandstützstruktur (4) angeordnet ist, wobei das Stützelement (5) Folgendes umfasst
- einen Schaffteil (8), der in der vertikalen Plattennaht (2) so angeordnet ist, dass er sich von einem ersten Befestigungsteil (6) zu einem zweiten Befestigungsteil (7) diagonal nach unten erstreckt, **dadurch gekennzeichnet, dass**

- der erste Befestigungsteil (6) an der Wandstützstruktur (4) befestigt ist und eine zweite Breite (w2) aufweist, die nicht größer als die erste Breite (w1) ist,
 -- der zweite Befestigungsteil (7) an einer Außenfläche der Verbundplatte (1) befestigt ist und eine Breite (w3) aufweist, die größer als die erste Breite (w1) ist, und
 -- der Schaftteil (8) den ersten Befestigungsteil (6) mit dem zweiten Befestigungsteil (7) verbindet und eine vierte Breite (w4) aufweist, die nicht größer als die erste Breite (w1) ist.
2. Wandstruktur nach Anspruch 1, wobei
- der zweite Befestigungsteil (7) an einer oberen Hälfte der Verbundplatte (1) befestigt ist.
3. Wandstruktur nach Anspruch 1, wobei
- der zweite Befestigungsteil (7) an einem oberen Randbereich der Verbundplatte (1), vorzugsweise an einer oberen Hälfte der Platte (1), befestigt ist.
4. Wandstruktur nach einem der vorhergehenden Ansprüche, wobei
- der erste Befestigungsteil (6) ein Montageloch (9) umfasst.
5. Wandstruktur nach einem der vorhergehenden Ansprüche, wobei
- der zweite Befestigungsteil (7) an zwei Verbundplatten (1) befestigt ist, die die vertikale Plattennaht (2) dazwischen aufweisen.
6. Wandstruktur nach einem der vorhergehenden Ansprüche, wobei
- der zweite Befestigungsteil (7) an der Verbundplatte (1) durch mindestens ein Befestigungsmittel (10), wie eine Schraube, befestigt ist.
7. Wandstruktur nach einem der vorhergehenden Ansprüche, wobei
- die Wandstützstruktur (4) Verbindungspunkte (13) umfasst, die übereinander angeordnet sind, und
 - der erste Befestigungsteil (6) an einem der Verbindungspunkte (13) befestigt ist.
8. Wandstruktur nach einem der vorhergehenden Ansprüche, umfassend
- ein zweites Befestigungsloch (11), das in dem zweiten Befestigungsteil (7) angeordnet und mit dem Schaftteil (8) ausgerichtet ist, und
 - ein zweites Befestigungsmittel (12), das durch das zweite Befestigungsloch (11) angeordnet ist und sich in der vertikalen Plattennaht (2) zu der Wandstützstruktur (4) erstreckt und daran befestigt ist.
9. Wandstruktur nach Anspruch 8, wobei
- die Wandstützstruktur (4) Verbindungspunkte (13) umfasst, die übereinander angeordnet sind,
 - der erste Befestigungsteil (6) an einem der Verbindungspunkte (13) befestigt ist, und
 - das zweite Befestigungsmittel (12) an einem anderen Verbindungspunkt (13) befestigt ist, der unter dem Verbindungspunkt (13) angeordnet ist, an dem der erste Befestigungsteil (6) befestigt ist.
10. Wandstruktur nach einem der vorhergehenden Ansprüche, umfassend
- Säulen (14), wie Betonsäulen oder Stahlsäulen, und
 - mindestens eine der Säulen (14) mindestens einen Teil des Gewichts der Verbundplatten (1) trägt.
11. Wandstruktur nach einem der vorhergehenden Ansprüche, wobei
- die Verbundplatte (1) eine erste Außenhaut (15) aus Blech, eine zweite Außenhaut (16) aus Blech und einen Kern (17), der zwischen der ersten Außenhaut und der zweiten Außenhaut angeordnet ist, umfasst.
12. Wandstruktur nach Anspruch 11, wobei
- der Kern (17) aus geschäumtem Polyurethan besteht.
13. Wandstruktur nach Anspruch 11, wobei
- der Kern (17) aus Polyisocyanurat (PIR) besteht.
14. Wandstruktur nach Anspruch 11, wobei
- der Kern (17) aus Mineralwolle besteht.
15. Wandstruktur nach einem der vorhergehenden Ansprüche, wobei
- die Verbundplatte (1) ein Fassadenverklei-

dungs-Plattenelement oder ein Trennwand-Plattenelement ist.

(1), de préférence à une moitié supérieure du panneau (1)

Revendications

1. Structure de mur (100), comprenant

- des panneaux composites (1) disposés les uns sur les autres et côte à côte de sorte qu'il y a
 - une jointure verticale (2) de panneaux entre les panneaux composites côte à côte, la jointure verticale entre panneaux présentant une première largeur (w1), et
 - une jointure horizontale (3) de panneaux entre les panneaux composites disposés les uns sur les autres, la structure de mur comprenant en outre :
 - une structure porteuse (4) de mur, agencée de manière à porter au moins une partie du poids des panneaux composites, et
 - un élément de support (5), agencé de manière à transmettre au moins une partie du poids du panneau composite à la structure porteuse (4) de mur, dans laquelle l'élément de support (5) comprend
 - une partie en tige (8), agencée dans la jointure verticale (2) de panneaux de sorte qu'elle s'étend diagonalement vers le bas à partir d'une première partie de fixation (6) jusqu'à une deuxième partie de fixation (7), **caractérisée en ce que**

-- la première partie de fixation (6) est fixée à la structure porteuse (4) de mur et présente une deuxième largeur (w2) ne dépassant pas la première largeur (w1),
 -- la deuxième partie de fixation (7) est fixée à une surface externe du panneau composite (1) et présente une largeur (w3) supérieure à la première largeur (w1), et
 -- la partie en tige (8) relie la première partie de fixation (6) à la deuxième partie de fixation (7) et présente une quatrième largeur (w4) non supérieure à la première largeur (w1).

2. Structure de mur selon la revendication 1, dans laquelle

- la deuxième partie de fixation (7) est fixée à une moitié supérieure du panneau composite (1).

3. Structure de mur selon la revendication 1, dans laquelle

- la deuxième partie de fixation (7) est fixée à une zone de bord supérieur du panneau composite

4. Structure de mur selon l'une quelconque des revendications précédentes, dans laquelle

- la première partie de fixation (6) comprend un trou de montage (9).

5. Structure de mur selon l'une quelconque des revendications précédentes, dans laquelle

- la deuxième partie de fixation (7) est fixée à deux panneaux composites (1) présentant la jointure verticale (2) de panneaux entre eux.

6. Structure de mur selon l'une quelconque des revendications précédentes, dans laquelle

- la deuxième partie de fixation (7) est fixée au panneau composite (1) par au moins un moyen de fixation (10), tel qu'une vis.

7. Structure de mur selon l'une des revendications précédentes, dans laquelle

- la structure porteuse (4) de mur comprend des points de liaison (13) agencés les uns sur les autres, et
 - la première partie de fixation (6) est fixée à l'un des points de liaison (13).

8. Structure de mur selon l'une quelconque des revendications précédentes, comprenant

- un deuxième trou de fixation (11), aménagé dans la deuxième partie de fixation (7) et étant aligné avec la partie en tige (8), et
 - un deuxième moyen de fixation (12), agencé à travers le deuxième trou de fixation (11) et s'étendant dans la jointure verticale (2) de panneaux jusqu'à la structure porteuse (4) de mur, et étant fixé à celle-ci.

9. Structure de mur selon la revendication 8, dans laquelle

- la structure porteuse (4) de mur comprend des points de liaison (13) agencés les uns sur les autres,
 - la première partie de fixation (6) est fixée à l'un des points de liaison (13), et
 - le deuxième moyen de fixation (12) est fixé à un autre point de liaison (13) disposé au-dessous du point de liaison (13) auquel la première partie de fixation (6) est fixée.

10. Structure de mur selon l'une quelconque des reven-

dications précédentes, comprenant

- des colonnes (14), telles que des colonnes en béton ou des colonnes en acier, et
 - au moins une desdites colonnes (14) porte au moins une partie du poids des panneaux composites (1). 5
- 11.** Structure de mur selon l'une quelconque des revendications précédentes, dans laquelle 10
- le panneau composite (1) comprend un premier parement (15) en tôle métallique, un deuxième parement (16) en tôle métallique, et une âme (17) disposée entre le premier parement et le deuxième parement. 15
- 12.** Structure de mur selon la revendication 11, dans laquelle 20
- l'âme (17) est en polyuréthane moussé.
- 13.** Structure de mur selon la revendication 11, dans laquelle 25
- l'âme (17) est en polyisocyanurate (PIR).
- 14.** Structure de mur selon la revendication 11, dans laquelle 30
- l'âme (17) est en laine minérale.
- 15.** Structure de mur selon l'une quelconque des revendications précédentes, dans laquelle 35
- le panneau composite (1) est un élément de panneau de bardage de façade, ou un élément de panneau de mur.

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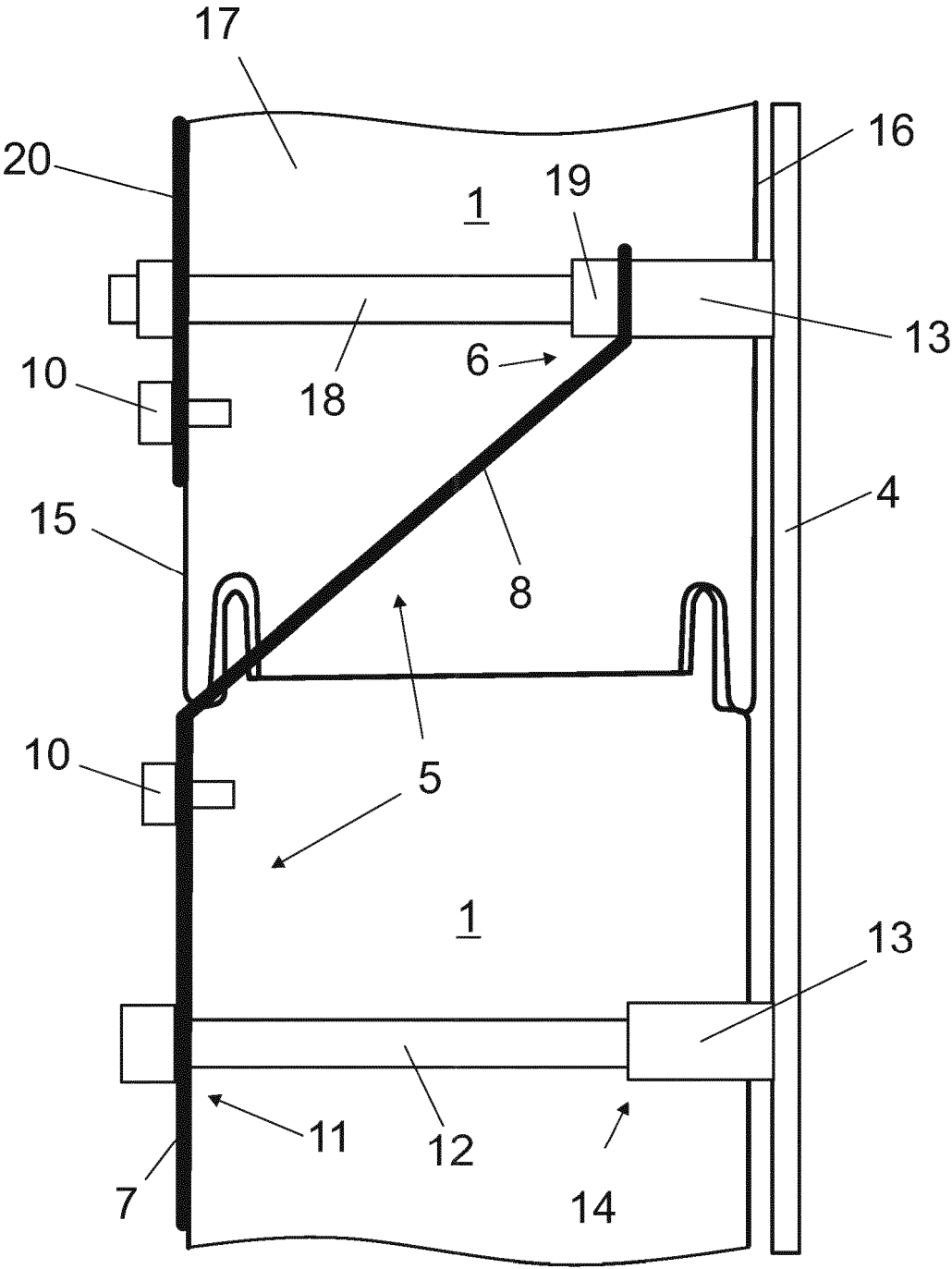


Fig. 1

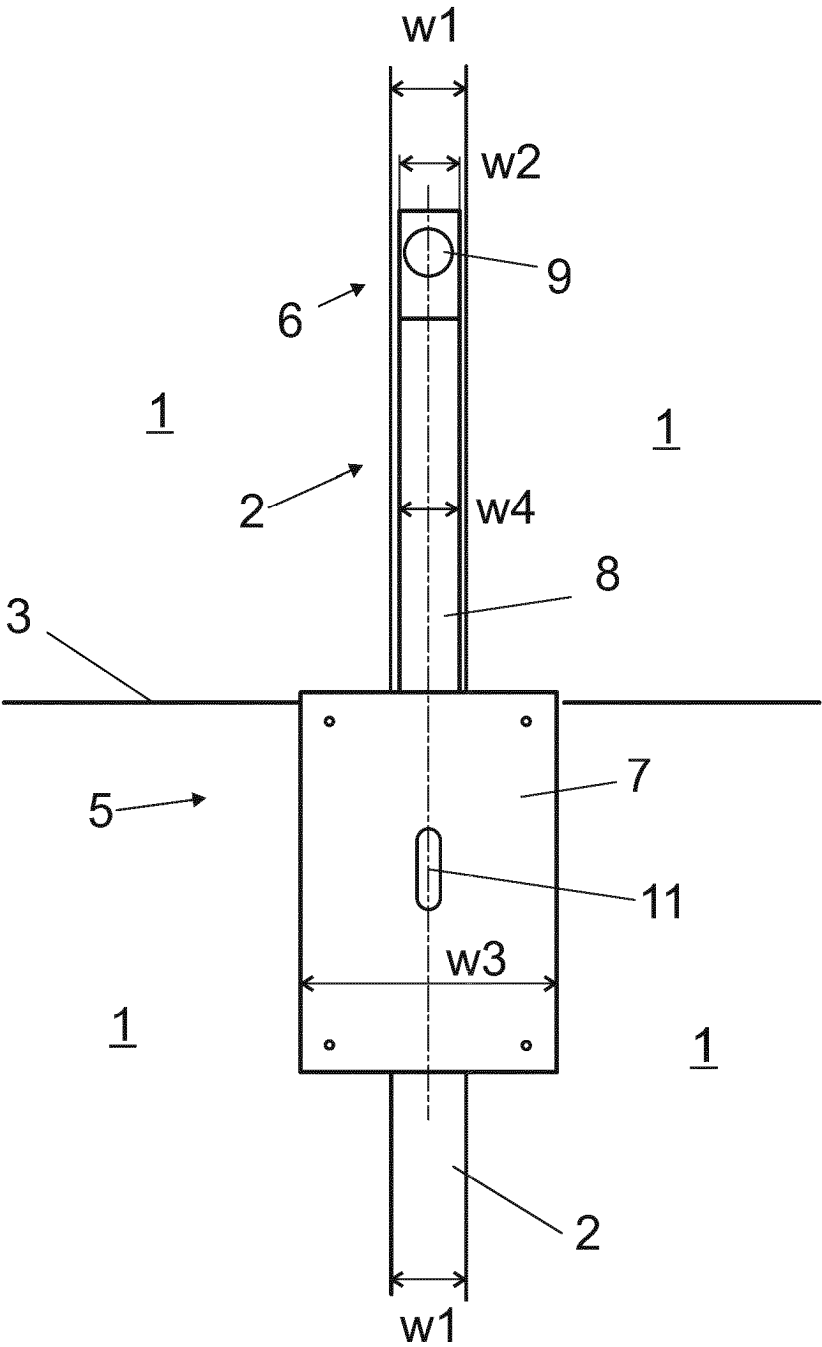
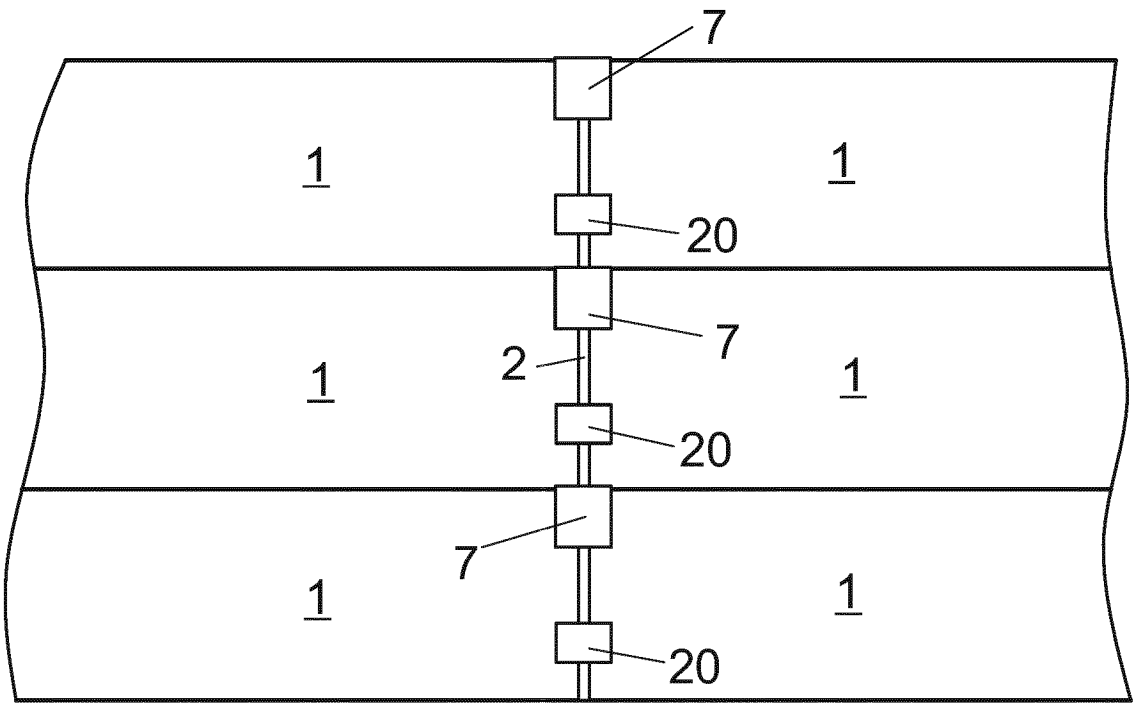


Fig. 2



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Fig. 3

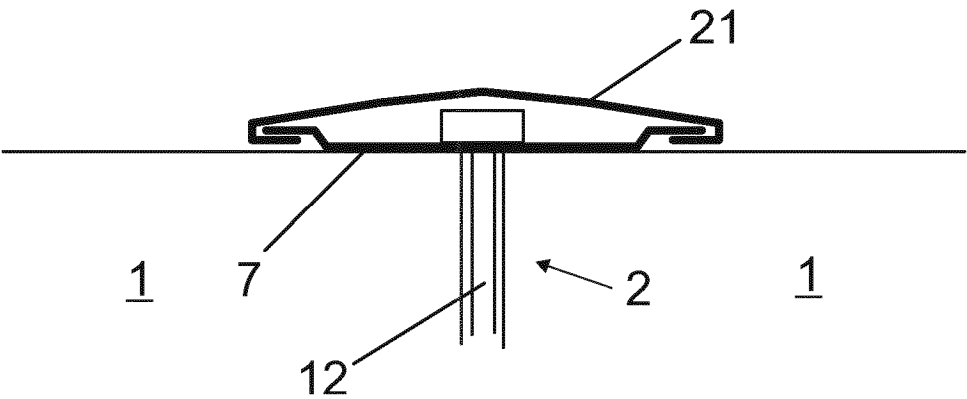


Fig. 4

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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