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(54) **PANEL AND SELF-SUPPORTING MODULAR FACADE CLADDING SYSTEM INCLUDING SAID PANEL**

PANEEL UND SELBSTTRAGENDES MODULARES FASSADENVERKLEIDUNGSSYSTEM MIT BESAGTEM PANEEL

PANNEAU ET SYSTÈME DE REVÊTEMENT DE FAÇADE MODULAIRE AUTOPORTANT COMPRENANT LEDIT PANNEAU

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Description

TECHNICAL FIELD OF THE INVENTION

[0001] The present invention is encompassed in the field of construction materials and systems employed in building sites.

[0002] Specifically, the invention refers to a lightweight panel that can be employed as a basic part to form a self-supporting modular facade cladding, where the panel is composed of three parts: a central screen-wall part, an inner lining part and an outer ventilated facade part. The object of the present invention is also a self-supporting modular facade cladding system comprising a plurality of panels such as that which is the object of the present invention.

BACKGROUND OF THE INVENTION

[0003] At present, there are prefabricated concrete panels employed to form modular facades, which are excessively heavy and provide poor aesthetics to the facade cladding. Likewise, lightweight glass and aluminium panels are known, which constitute the current solution for forming lightweight modular facades, however, the latter do not contribute to the structural stability of the facade, and even less do they result in well-insulated facade elements, either thermally or acoustically.

[0004] Facade panels with a metal structure are also known, which have limitations in terms of versatility, weight, types of panels, connections and anchors, amount of materials and layers, insulation problems and thermal bridge breakage, greater complexity of placement and lower performance.

[0005] Likewise, facades formed with insulated multilayer sandwich panels are known, such as the one shown in EP 2256265, which can form the intermediate element or part, i.e., the screen-wall, of a more complex facade wall, which also includes a ventilated facade part and an inner lining part. Where, the screen-wall part is comprised of a succession of sheets or elements of different materials fastened to each other by layers of adhesives, among them, metal sheets, plasterboard sheets, fibreglass mesh or non-woven fabric, wood fibres, oriented mineral wool fibre, etc., which make up a complex sandwich panel. This sandwich panel has the drawback of not having self-supporting capacity, i.e., it needs to be placed in an additional structure that acts as a supporting structure.

[0006] On the other hand, as shown in EP 1099807, the screen-wall parts of the modular facades are known to be anchored frontally to the slab of the building, i.e., on the edge of the slab. This has the drawback that the anchoring part to be used between the screen-wall part and the slab will be different depending on the composition of the slab, i.e., depending on whether said slab is made of wood, steel or concrete. In addition, the fastening of the screen-wall part at the front of the slab requires it to be placed from an auxiliary means, for example, a scaffold, lifting basket, etc., which implies extra costs, longer times and complexity of assembly depending on the height of the slab in question. On the other hand, with the frontal anchoring to the slab, in case of fire, the anchoring part is exposed to the fire at the most important point of transmission between floors. In addition, adjusting the anchoring part on the edge of the slab has movement limitation, vertically, due to the plumb, and horizontally, due to the parallelism with respect to the slab edge. Another drawback is that the screen-wall part must be manufactured with just the right measurements, without vertical gaps, since the holes drilled in said screen-wall part must coincide exactly with the anchoring part arranged on the edge of the slab for assembly. In addition, since the anchors are arranged on the edge of the slab, after having placed the screen-wall part, said anchors and the connections to the screen-wall part could not be revised.

[0007] Accordingly, a panel that allows to overcome the above-mentioned drawbacks of the known techniques need to be designed in a simple and economical way.

DESCRIPTION OF THE INVENTION

[0008] The present invention is established and characterised in the independent claim, while the dependent claims describe other characteristics thereof.

[0009] The object of the invention is a panel for self-supporting facade cladding.

[0010] The panel comprises a novel structure as it is formed by three parts: a screen-wall part, an inner lining part and a ventilated facade part.

[0011] Where, the screen-wall part consists of:

- a first self-supporting wooden structure, which is filled with a first layer of insulating material,
- an oriented strand board (OSB) and a first fire-resistant-type plasterboard, which are fastened on each of the sides of the first self-supporting structure,
- a wood fibre cement board that is fastened to the first self-supporting structure through fastening means that pass through the oriented strand board (OSB), and
- a waterproofing sheet, which is fastened to the wood fibre cement board and to at least one perimeter edge of a frame of the first self-supporting structure.

[0012] The inner lining part consists of:

- a second self-supporting structure, which is filled with a second layer of insulating material, the second self-supporting structure is arranged outside the first fire-resistant-type plasterboard, and
- a second plasterboard, which is fastened to the second self-supporting structure.

[0013] On the other hand, the ventilated facade part comprises:

- a third self-supporting structure, which, is fastened to the first self-supporting structure through fastening means that pass through the waterproofing sheet, the wood fibre cement board and the oriented strand board (OSB), and
- an outer finishing element, which, is fastened to the third self-supporting structure.

[0014] Thus, a more lightweight prefabricated panel is provided (its transport to the building site is conditioned by its dimensions and not by its weight), based on eco-materials (more sustainable materials and with a smaller carbon footprint) that replace the steel employed in the structure of known panels, they provide the building with maximum thermal insulation, and therefore, greater energy efficiency, and are safer against fire.

[0015] The object of the present invention is also a self-supporting modular facade cladding system, which can be anchored to the slabs that form a plurality of floors of a building site.

[0016] The cladding system comprises a plurality of panels such as the panel object of the present application, where, a screen-wall part of each of said panels is anchored, by means of first anchoring means, only above the upper slab of the corresponding floor of the building site, and the screen-wall parts of the adjacent panels are joined together by means of second anchoring means, the latter, arranged between each of the frames of first self-supporting structures of the respective screen-wall portions.

[0017] Thus, the panels hang from the upper slabs of the corresponding floors of the building site, so that anchors are only used on the upper face of the slabs, while the adjacent panels are fastened to each other, forming the building facade cladding in a pass-through manner in front of the slabs (not between the slabs as is usual), conferring greater stability of the structural assembly of the facade cladding, the types of different panels to be designed and developed are reduced, and at the same time, thermal bridges are avoided. In addition, the anchors are hidden behind the panel structure, so that, in terms of aesthetics, the industrial processing of the facade is not visible.

[0018] In addition, thanks to the arrangement of the anchors on the upper face of the slabs, the same anchoring part can be used regardless of the slab material, be it wood, steel or concrete, only being necessary to vary the rods that are inserted into the slab to hold said anchors to the slab. In addition, no auxiliary means are required, such as scaffolding, a lifting basket, etc., for the placement and fastening of the screen-wall parts to the slab. Simply, the operator places from the same floor, only protected by a lifeline and the corresponding harness, with freedom to undertake the rest of the tasks of the works. In addition, the placement of the anchor on the upper face of the slab, in the event of a fire, said anchors are protected by said slab from the fire coming from the lower floor. On the other hand, it is possible to adjust the position of the anchor both vertically and horizontally in an easy and effective way; it is further possible, during assembly, to assume possible manufacturing clearances of the screen-wall part. In the same way, with the anchors arranged on the upper face of the slab, revisions of said anchors and connections to the corresponding screen-wall part can be made after the latter has been fastened to the slab before closing with the inner lining part, so that the anchor is protected against fire and possible water leaks.

[0019] The particular structure given to the panels is what allows the modular cladding system to be arranged on the facade in the position mentioned above, i.e., in a pass-through manner in front of the slabs, which allows its installation to be carried out in a more agile, faster and safer manner, saving costs both in time and human and material resources, which makes it ideal for use in residential buildings, as prefabricated elements that cover the facade of the building, with an important competitive advantage in terms of energy efficiency, as the construction of "almost zero" energy consumption buildings is achieved, leading to a significant decrease in the energy expenditure of the housing user.

[0020] In addition, there will be a greater quality and aesthetics in the cladding of the building, with the possibility of including greater diversity of finishes to the facade, as well as, greater ease of replacement thereof in the future, due to damage or change of the design of the facade.

[0021] Another advantage of the present facade cladding system is that, after the placement of the panels that form it, there is no need to perform any finishing work, or use of auxiliary means, on the outside the building, since the facade is fully finished.

[0022] On the other hand, the building is projected with a facade considered as lightweight, i.e., less than 200 kg/m^2 in weight, which confers advantages in optimising the calculation of structures and foundations of the building, as its weight is less than the bulk of this type of known construction solutions; also, it complies with the features required by the Technical Building Code (CTE) .

[0023] In summary, with the proposed panel, the drawbacks presented by panels with a metal supporting structure currently employed in facade cladding systems are removed, such as the need for using a greater amount of layers and materials to increase both thermal and acoustic insulation, greater weight of the prefabricated panel, the need to carry out two anchoring levels, i.e., to the upper and lower slab (supporting instead of self-supporting structure), greater amount of panels and typologies, more complex connections and joints, less rapid assembly and execution, as well as greater manufacturing costs.

BRIEF DESCRIPTION OF THE DRAWINGS

[0024] This specification is supplemented by a set of drawings illustrating the preferred embodiment and never intended to limit the invention.

Figure 1 represents a sectional view of the panel for self-supporting facade cladding.

Figure 2 represents a front view of the first self-supporting structure of the screen-wall part of the panel of Figure 1.

Figure 3 represents a sectional view, on a vertical plane, of the self-supporting modular facade cladding system, formed by a plurality of panels as shown in Figure 1.

Figure 4 represents an enlarged view or detail of Figure 3.

Figure 5 represents an enlarged view or detail, on a horizontal plane, of the system of Figure 3.

Figures 6 and 7 represent respective sectional views, in the vertical plane, of the panel for self-supporting facade cladding of Figure 1, showing other possible embodiments of the ventilated facade part of said panel.

Figure 8 depicts a cross-sectional view, in the horizontal plane, of the panel of Figure 7.

DETAILED DESCRIPTION OF THE INVENTION

[0025] The present invention is a prefabricated panel for self-supporting facade cladding, as well as a self-supporting modular facade cladding system comprising a plurality of said panels.

[0026] As shown in Figure 1, the panel is a composite panel comprising a screen-wall part (1.1), an inner lining part (1.2) and a ventilated facade part (1.3).

[0027] The screen-wall part (1.1) comprises a first self-supporting wooden structure (1.11), which includes a frame (1.111), for example, as shown in Figure 2, formed by horizontal crossbeams (1.1111) and vertical joists (1.1112), which may be subdivided by a plurality of first vertical battens (1.112). The distances between the first vertical battens (1.112) will vary depending on the stresses of the facade, heights, location, action of the wind, etc.

[0028] As shown in Figure 1, the first supporting structure (1.11) is filled with a first layer of insulating material (1.12). In a preferred embodiment, said first layer of insulating material (1.12) is mineral wool.

[0029] Likewise, the screen-wall part (1.1) comprises an oriented strand board (OSB) (1.16) and a first fire-resistant-type plasterboard (1.14); to which, for this purpose, fibreglass, for example, is added, to its plaster core. The oriented strand board (OSB) (1.16) and the first plasterboard (1.14) are fastened on each of the sides of the first supporting structure (1.11), on the outer side and on the inner side respectively, forming, next to said first supporting structure (1.11), a gap that encloses the first layer of insulating material (1.12).

[0030] Additionally, the screen-wall part (1.1) comprises a wood fibre cement board (1.13) fastened to the first self-supporting structure (1.11) through fastening means that pass through the oriented strand board (OSB) (1.16).

[0031] Thus, the oriented strand board (OSB) (1.16) constitutes a structural part of the self-supporting facade cladding that works together with the first self-supporting structure (1.11), allowing to decrease, by structural calculation, the cross section of the sawn wood with which said first self-supporting structure (1.11) is formed, and it further advantageously allows the use of nails instead of screws as means of fastening the rest of the panel elements for the self-supporting facade cladding that need to be fastened to the first self-supporting structure (1.11), which favours the automation of the panel manufacturing, since the manufacturing machinery used for it works better and faster with nails than with screws.

[0032] Additionally, the screen-wall part (1.1) comprises a waterproofing sheet (1.15), which is fastened to the wood fibre cement board (1.13), and to at least the perimeter edge of the frame (1.111) of the first supporting structure (1.11). For example, the waterproofing sheet (1.15) can be a first ethylene-propylene-diene-methylene (EPDM) sheet, and it can be fastened to said elements (1.13, 1.111) by means of staples (not shown in the figures). In other words, the waterproofing sheet (1.15) is of a dimension such that it covers the wood fibre cement board (1.13), and at a minimum, the perimeter edge of the frame (1.111) of the first supporting structure (1.11) .

[0033] As for the inner lining part (1.2) of the panel (1), said part (1.2) comprises a second self-supporting structure (1.21), preferably of cold-formed galvanised steel, which could be formed by a plurality of second vertical battens (1.211). Where, the second self-supporting structure (1.21) is filled with a second layer of insulating material (1.22). In a preferred embodiment, said second layer of insulating material (1.22) is mineral wool.

[0034] The second self-supporting structure (1.21) is arranged next to the first fire-resistant-type plasterboard (1.14) of the screen-wall part (1.1), with a minimum separation between each other such that it guarantees acoustic attenuation.

[0035] Likewise, the inner lining part (1.2) comprises a second plasterboard (1.23). For example, the second plasterboard (1.23) can an N type, i.e., of the type with a standard plasterboard core; or, a WA type, i.e., waterproof type, which, for this purpose, for example, its cellulose has been treated with silicone and silicone oils (water-repellent treatment) are incorporated into its plaster core. As can be understood, the use of one type or another of plasterboard will respond to the characteristics and functions of the living space which is internally lined,

i.e., the WA type would be employed for lining bathrooms, kitchens, changing rooms, laundry rooms, wash houses, or similar, and type N, for lining living spaces that do not require special conditions, such as living rooms, dining rooms, bedrooms, etc.

[0036] The second plasterboard (1.23) is fastened to the second self-supporting structure (1.21), such that the second layer of insulating material (1.22) is enclosed between the first plasterboard (1.14) of the screen-wall part (1.1) and said second plasterboard (1.23).

[0037] On the other hand, the ventilated facade part (1.3) of the panel (1) comprises a third self-supporting structure (1.31), for example, made of sawn wood, which is fastened to the first supporting structure (1.11) through fastening means (any known fastening means that are suitable, not shown in the figures), for example, nails, which, would be arranged passing through the waterproofing sheet (1.15), the wood fibre cement board (1.13) and the oriented strand board (OSB) (1.16).

[0038] Likewise, the ventilated facade part (1.3) comprises an outer finishing element (1.32), which is fastened to the third self-supporting structure (1.31). Preferably, the outer finishing element (1.32) is a slab of material selected from the group consisting of fibre cement, concrete, marble, ceramic, stone, wood, plastic, glass, or any other ventilated facade finishing element, according to the aesthetics designed for the facade of the building.

[0039] For its part, the third self-supporting structure (1.31) could be formed by a plurality of third vertical battens (1.311), which create a separation between the waterproofing sheet (1.15) and the outer finishing element (1.32), forming the exterior of the building cladding as a ventilated facade.

[0040] In another possible embodiment, shown in Figure 6, the ventilated facade part (1.3) of the panel (1) can comprise a second ethylene-propylene-diene-methylene (EPDM) sheet (1.33), which is arranged between the outer finishing element (1.32) and the third self-supporting structure (1.31), with a view to guaranteeing airtightness in the space or separation formed, by said third self-supporting structure (1.31), between the waterproofing sheet (1.15) and the outer finishing element (1.32). In this embodiment, the outer finishing element (1.32) can be fastened, for example, by means of screws (not shown in the figures) as fastening means, to the third self-supporting structure (1.31).

[0041] In another possible embodiment of the ventilated facade part (1.3) of the panel (1), shown in Figures 7 and 8, the outer finishing element (1.32) is fastened to the third self-supporting structure (1.31) by means of metal fastening profiles (1.34), preferably arranged perpendicular to the third vertical battens (1.311) of the third self-supporting structure (1.31), where said fastening profiles (1.34) allow the use of other types of fastening means, such as staples (not shown in the figures), either visible or hidden, to carry out the fastening of the outer finishing element (1.32) to the third self-supporting structure (1.31). Conveniently, the metal fastening profiles (1.34) could be of the "omega" type, such as those shown in Figure 7, however any other suitable profile configuration could be employed.

[0042] Additionally, in this embodiment shown in Figures 7 and 8, it is preferred that a metal sheet (1.35) is arranged between the fastening profiles (1.34) and the third self-supporting structure (1.31). In this way, said metal sheet (1.35) acts as a fire-resistant means within the ventilated facade part (1.3), keeping insulated the space formed by the third self-supporting structure (1.31), between the waterproofing sheet (1.15) and the outer finishing element (1.32).

[0043] Thus, the panel (1) can be advantageously prefabricated in the workshop, completely finished with the incorporation of windows, doors, gaps, corner panels, etc., as required, and with maximum dimensions only limited by the requirements of the means of transport that will transport it to the building site, and not, by its weight, thanks to replacing the metal supporting structure usually employed in these prefabricated panels with a wooden one.

[0044] The prefabrication of the panel (1) in the workshop will be performed in series, thereby reducing production costs and improving the quality due to the high degree of prefabrication, as well as the industrial processing of the facade, since said panel (1) is employed as basis of a modular facade cladding system, also the object of the present invention.

[0045] As for the self-supporting modular facade cladding system, as shown in Figure 3, it can be anchored to slabs (2) that form a plurality of floors of a building site.

[0046] Advantageously, it is preferred that the assembly between the ventilated facade part (1.3) and the screen-wall part (1.1) of the panel (1) be performed in the workshop, and transported as an assembly to the building site; however, the assembly of the inner lining part (1.2) of the panel (1) could be performed "on site" at the building site, such that the inner lining portion (1.2), by means of its second self-supporting structure (1.21), is perfectly fastened between the upper and lower slabs (2) that form the corresponding floor of the building site.

[0047] As mentioned, the cladding system comprises a plurality of panels (1), where the screen-wall part (1.1) of each panel (1) is anchored only above the upper slab (2) of the corresponding floor of the building site that it covers, by means of first anchoring means (3).

[0048] Thus, in the modular facade cladding formed by the system, the panels (1) hang from the upper slabs (2) of the corresponding floors of the building site, such that only one row of first anchoring means (3) is employed arranged between the upper face (2.1) of the slabs (2) and an inner upper side of the screen-wall part (1.1) of each panel (1), in the latter case, fastened to its first supporting structure (1.11), for example, to the first vertical battens (1.112), passing through the first fire-resistant-type plasterboard (1.14).

[0049] On the other hand, the screen-wall parts (1.1) of the adjacent panels (1), with which the facade cladding

is formed, are joined together by means of second anchoring means (4), arranged between each of the frames (1.111) of the first supporting structures (1.11) of the respective screen-wall parts (1.1). For example, as represented in Figures 3 to 5, the second anchoring means (4) could be a screw and nut joint, however, said joint could be by means of threaded screws, or any other type of known convenient anchoring means.

[0050] With a view to having access to the first self-supporting structure (1.11), to carry out the anchoring thereof commented above both to the slab (2) and to the first self-supporting structures (1.11) of the screen-wall parts (1.1) of the adjacent panels (1), it is preferred that, at the workshop, the first fire-resistant-type plasterboard (1.14) is not fully fastened to said first self-supporting structure (1.11).

[0051] In this way, the assemblies of ventilated facade part (1.3)-screen-wall part (1.1) of the panels (1) with which the modular cladding is formed are arranged in a self-supporting and pass-through manner in front of the slabs (2), providing the building with a lightweight facade of less than 200 kg/m^2.

[0052] Advantageously, and thanks to the fact that the panels (1) are anchored only above the slab (2), the connection between the screen-wall parts (1.1) of adjacent panels (1) is arranged in a manner not facing the slab (2) corresponding to the building site, thus avoiding the use of an additional element that breaks the thermal bridge with respect to said slab (2). For example, said connection between the panels (1) could be arranged about 500 mm above the upper face (2.1) of the corresponding slab (2). With this, the slab (2) faces the inner faces of the screen-wall parts (1.1) of the panels (1) that form the facade cladding, it being not necessary to have an additional insulation element between said screen-wall parts (1.1) of the panels (1) and the corresponding slab (2) .

[0053] Additionally, it is preferred that an ethylene-propylene-diene-methylene (EPDM) joint (5) be arranged at the connection between the screen-wall parts (1.1) of adjacent panels (1), with a view to achieving the impermeability of the connection.

[0054] Likewise, for the same purpose, it is preferred that the waterproofing sheet (1.15) of the screen-wall part (1.1) of the panel (1) comprises free upper (1.151) and side (1.152) ends, which, advantageously, as shown in Figures 4 and 5, at the time of performing the connections between the adjacent panels (1), the upper end (1.151) can be folded upward and fastened to the self-supporting structure (1.11) of the screen-wall part (1.1) of the adjacent upper panel (1), and the side end (1.152) of said waterproofing sheet (1.15) can be folded and fastened to the self-supporting structure (1.11) of the screen-wall part (1.1) of the adjacent side panel (1). In both cases, after fastening the ends (1.151, 1.152) of the waterproofing sheet (1.15) onto the corresponding first self-supporting structures (1.11), to the latter, the respective first fire-resistant-type plasterboards (1.14) will be fastened in their entirety, such that said boards (1.14) are also protected from internal fire propagation.

[0055] Thus, ensuring the total impermeability at the connection between the panels (1) that form the self-supporting modular facade cladding is achieved.

Claims

1. Panel (1) for self-supporting facade cladding, comprising a screen-wall part (1.1), an inner lining part (1.2) and a ventilated facade part (1.3), wherein

- the screen-wall part (1.1) consists of:
  - a first self-supporting wooden structure (1.11), which is filled with a first layer of insulating material (1.12),
  - an oriented strand board (OSB) (1.16) and a first fire-resistant-type plasterboard (1.14), which are fastened on each of the sides of the first self-supporting wooden structure (1.11),
  - a wood fibre cement board (1.13), which is fastened to the first self-supporting wooden structure (1.11) through fastening means that pass through the oriented strand board (OSB) (1.16), and
  - a waterproofing sheet (1,15), which is fastened to the wood fibre cement board (1,13), and at least one perimeter edge of a frame (1,111) of the first self-supporting wooden structure (1,11);
- the inner lining part (1.2) consists of:
  - a second self-supporting structure (1.21), which is filled with a second layer of insulating material (1.22), the second self-supporting structure (1.21) being arranged next to the first fire-resistant-type plasterboard (1.14), and
  - a second plasterboard (1.23), which is fastened to the second self-supporting structure (1.21); and
- the ventilated facade part (1.3) comprises:
  - a third self-supporting structure (1.31), which is fastened to the first self-supporting wooden structure (1.11) through fastening means that pass through the waterproofing sheet (1.15), the wood fibre cement board (1.13), and the oriented strand board (OSB) (1.16), and
  - an outer finishing element (1.32), which is fastened to the third self-supporting structure (1.31).

2. Panel according to claim 1, wherein the third self-supporting structure (1.31) is made of sawn wood.

3. Panel according to claim 1, wherein the first and second layers of insulating material (1.12, 1.22) are made of mineral wool.

4. Panel according to claim 1, wherein the second plasterboard (1.23) is N or WR type.

5. Panel according to claim 1, wherein the waterproofing sheet (1.15) is a first ethylene-propylene-diene-methylene (EPDM) sheet.

6. Panel according to claim 1, wherein a second ethylene-propylene-diene-methylene (EPDM) sheet (1.33) is arranged between the outer finishing element (1.32) and the third self-supporting structure (1.31).

7. Panel according to claim 1, wherein the outer finishing element (1.32) is fastened to the third self-supporting structure (1.31) by means of metal fastening profiles (1.34).

8. Panel according to claim 7, wherein a metal sheet (1.35) is arranged between the fastening profiles (1.34) and the third self-supporting structure (1.31).

9. Panel according to claim 1, wherein the outer finishing element (1.32) is a slab of material selected from the group consisting of fibre cement, concrete, marble, ceramic, stone, wood, plastic or glass.

10. Self-supporting modular facade cladding system, which can be anchored to slabs (2) that form a plurality of floors of a building site, comprising a plurality of panels (1) according to any of the preceding claims, wherein a screen-wall part (1.1) of each panel (1) is able to be anchored only above the upper slab (2) of the corresponding floor of the building site by means of first anchoring means (3), and the screen-wall parts (1.1) of the adjacent panels (1) are joined together by means of second anchoring means (4) arranged between each of the frames (1,111) of first self-supporting structures (1,11) of the respective screen-wall portions (1.1).

11. System according to claim 10, wherein an assembly between a ventilated facade part (1.3) and the screen-wall part (1.1) of the panel (1) has been performed in a workshop, and transported as an assembly to the building site.

12. System according to claim 10, wherein an assembly of an inner lining part (1.2) of the panel (1) has been carried out "on site" at the building site, and the inner lining part (1.2) can be fastened, by means of its second self-supporting structure (1.21), between the upper and lower slabs (2) that form the corresponding floor of the building site.

13. System according to claim 10, wherein the connection between the screen-wall parts (1.1) of adjacent panels (1) can be arranged in a manner not facing the slab (2) of the building site.

14. System according to claim 10, wherein an ethylene-propylene-diene-methylene (EPDM) joint (5) is arranged at the connection between the screen-wall parts (1.1) of adjacent panels (1).

15. System according to claim 10, wherein an upper end (1.151) of a waterproofing sheet (1.15) of the screen-wall part (1.1) of the panel (1) is folded upward and fastened to a first self-supporting structure (1.11) of the screen-wall part (1.1) of another adjacent upper panel (1), and a side end (1,152) of the waterproofing sheet (1,15) of the panel (1) is folded and fastened to a first self-supporting structure (1.11) of the screen-wall part (1.1) of another adjacent side panel (1).

Patentansprüche

1. Paneel(1) für eine selbsttragende Fassadenverkleidung, umfassend ein Sichtschutzwandteil (1.1), ein Innenverkleidungsteil (1.2) und ein belüftetes Fassadenteil (1.3), wobei

   - das Sichtschutzwandteil (1.1) aus Folgendem besteht:

     - einer ersten selbsttragenden Holzkonstruktion (1.11), die mit einer ersten Schicht Dämmmaterial (1.12) verfüllt ist,
     - einer OSB-Platte (1.16) und einer ersten feuerbeständigen Gipskartonplatte (1.14), die an jeder der Seiten der ersten selbsttragenden Holzkonstruktion (1.11) befestigt sind,
     - einer Holzwolle-Leichtbauplatte (1.13), die mit durch die OSB-Platte (1.16) verlaufenden Befestigungsmitteln an der ersten selbsttragenden Holzkonstruktion (1.11) befestigt ist, und
     - einer Abdichtfolie (1,15), die an der Holzwolle-Leichtbauplatte (1,13) und mindestens einer Umfangskante eines Rahmens (1,111) der ersten selbsttragenden Holzkonstruktion (1,11) befestigt ist;

   - das Innenverkleidungsteil (1.2) aus Folgendem besteht:

- einer zweiten selbsttragenden Konstruktion (1.21), die mit einer zweiten Schicht Dämmmaterial (1.22) verfüllt ist, wobei die zweite selbsttragende Konstruktion (1.21) neben der ersten feuerbeständigen Gipskartonplatte (1.14) angeordnet ist, und
- einer zweiten Gipskartonplatte (1.23), die an der zweiten selbsttragenden Konstruktion (1.21) befestigt ist; und

- das belüftete Fassadenteil (1.3) Folgendes umfasst:

  - eine dritte selbsttragende Konstruktion (1.31), die mit durch die Abdichtfolie (1.15), die Holzwolle-Leichtbauplatte (1.13) und die OSB-Platte (1.16) verlaufenden Befestigungsmitteln an der ersten selbsttragenden Holzkonstruktion (1.11) befestigt ist, und
  - ein äußeres Abschlusselement (1.32), das an der dritten selbsttragenden Konstruktion (1.31) befestigt ist.

2. Paneel nach Anspruch 1, wobei die dritte selbsttragende Konstruktion (1.31) aus Schnittholz hergestellt ist.

3. Paneel nach Anspruch 1, wobei die erste und die zweite Schicht Dämmmaterial (1.12, 1.22) aus Mineralwolle hergestellt ist.

4. Paneel nach Anspruch 1, wobei die zweite Gipskartonplatte (1.23) vom Typ N oder WR ist.

5. Paneel nach Anspruch 1, wobei die Abdichtfolie (1.15) eine erste Ethylen-Propylen-Dien-Methylen(EPDM)-Folie ist.

6. Paneel nach Anspruch 1, wobei zwischen dem äußeren Abschlusselement (1.32) und der dritten selbsttragenden Konstruktion (1.31) eine zweite Ethylen-Propylen-Dien-Methylen(EPDM)-Folie (1.33) angeordnet ist.

7. Paneel nach Anspruch 1, wobei das äußere Abschlusselement (1.32) mittels Metallbefestigungsprofilen (1.34) an der dritten selbsttragenden Konstruktion (1.31) befestigt ist.

8. Paneel nach Anspruch 7, wobei zwischen den Befestigungsprofilen (1.34) und der dritten selbsttragenden Konstruktion (1.31) ein Metallblech (1.35) angeordnet ist.

9. Paneel nach Anspruch 1, wobei das äußere Abschlusselement (1.32) eine Tafel aus einem Material ist, ausgewählt aus der Gruppe, bestehend aus Faserzement, Beton, Marmor, Keramik, Stein, Holz, Kunststoff oder Glas.

10. Selbsttragendes modulares Fassadenverkleidungssystem, das an Tafeln (2) verankert werden kann, die eine Vielzahl von Geschossen einer Baustelle bilden, umfassend eine Vielzahl von Paneelen (1) nach einem der vorhergehenden Ansprüche, wobei ein Sichtschutzwandteil (1.1) jedes Paneels (1) in der Lage ist, mittels erster Verankerungsmittel (3) nur über der oberen Tafel (2) des entsprechenden Geschosses der Baustelle verankert zu werden, und das Sichtschutzwandteil (1.1) der benachbarten Paneele (1) mittels zweiter Verankerungsmittel (4), die zwischen jedem der Rahmen (1,111) erster selbsttragender Konstruktionen (1,11) des jeweiligen Sichtschutzwandteils (1.1) angeordnet sind, miteinander verbunden sind.

11. System nach Anspruch 10, wobei ein Zusammenbau eines belüfteten Fassadenteils (1.3) und des Sichtschutzwandteils (1.1) des Paneels (1) in einer Werkstatt durchgeführt und als Zusammenbau zu der Baustelle transportiert wurde.

12. System nach Anspruch 10, wobei ein Zusammenbau eines Innenverkleidungsteils (1.2) des Paneels (1) "vor Ort" auf der Baustelle durchgeführt wurde und das Innenverkleidungsteil (1.2) mittels seiner zweiten selbsttragenden Konstruktion (1.21) zwischen der oberen und der unteren Tafel (2), die das entsprechende Geschoss der Baustelle bilden, befestigt werden kann.

13. System nach Anspruch 10, wobei die Verbindung zwischen den Sichtschutzwandteilen (1.1) benachbarter Paneele (1) derart angeordnet werden kann, dass sie nicht der Tafel (2) der Baustelle zugewandt ist.

14. System nach Anspruch 10, wobei an der Verbindung zwischen den Sichtschutzwandteilen (1.1) benachbarter Paneele (1) eine Ethylen-Propylen-Dien-Methylen(EPDM)-Verbindung (5) angeordnet ist.

15. System nach Anspruch 10, wobei ein oberes Ende (1.151) einer Abdichtfolie (1.15) des Sichtschutzwandteils (1.1) des Paneels (1) nach oben gefaltet und an einer ersten selbsttragenden Konstruktion (1.11) des Sichtschutzwandteils (1.1) eines anderen benachbarten oberen Paneels (1) befestigt ist und ein Seitenende (1,152) der Abdichtfolie (1,15) des Paneels (1) gefaltet und an einer ersten selbsttragenden Konstruktion (1.11) des Sichtschutzwandteils (1.1) eines anderen benachbarten seitlichen Paneels (1) befestigt ist.

Revendications

1. Panneau (1) pour un revêtement de façade autoportant, comprenant une partie d'écran mural (1.1), une partie de doublage intérieur (1.2) et une partie de façade ventilée (1.3), dans lequel

- la partie d'écran mural (1.1) est constituée des éléments suivants :

  - une première structure en bois autoportante (1.11), qui est remplie d'une première couche de matériau isolant (1.12),
  - un panneau à copeaux orientés (OSB) (1.16) et une première plaque de plâtre de type résistant au feu (1.14), qui sont fixés sur chacun des côtés de la première structure en bois autoportante (1.11),
  - un panneau de bois et fibres de ciment (1.13), qui est fixé à la première structure en bois autoportante (1.11) par l'intermédiaire d'un moyen de fixation qui traverse le panneau à copeaux orientés (OSB) (1.16) et
  - une feuille d'étanchéité (1,15), qui est fixée au panneau de bois et fibres de ciment (1,13) et à au moins un bord périmétrique d'un cadre (1,111) de la première structure en bois autoportante (1,11) ;

- la partie de doublage intérieur (1.2) est constituée des éléments suivants :

  - une deuxième structure autoportante (1.21), qui est remplie d'une seconde couche de matériau isolant (1.22), la deuxième structure autoportante (1.21) étant agencée à côté de la première plaque de plâtre de type résistant au feu (1.14) et
  - une seconde plaque de plâtre (1.23), qui est fixée à la deuxième structure autoportante (1.21) ; et

- la partie de façade ventilée (1.3) comprend :

  - une troisième structure autoportante (1.31), qui est fixée à la première structure en bois autoportante (1.11) par l'intermédiaire d'un moyen de fixation qui traverse la feuille d'étanchéité (1.15), le panneau de bois et fibres de ciment (1.13) et le panneau à copeaux orientés (OSB) (1.16), et
  - un élément de finition extérieur (1.32), qui est fixé à la troisième structure autoportante (1.31).

2. Panneau selon la revendication 1, dans lequel la troisième structure autoportante (1.31) est fabriquée en bois scié.

3. Panneau selon la revendication 1, dans lequel les première et seconde couches de matériau isolant (1.12, 1.22) sont en laine minérale.

4. Panneau selon la revendication 1, dans lequel la seconde plaque de plâtre (1.23) est de type N ou WR.

5. Panneau selon la revendication 1, dans lequel la feuille d'étanchéité (1.15) est une première feuille d'éthylène-propylène-diène-méthylène (EPDM).

6. Panneau selon la revendication 1, dans lequel une seconde feuille d'éthylène-propylène-diène-méthylène (EPDM) (1.33) est agencée entre l'élément de finition extérieur (1.32) et la troisième structure autoportante (1.31).

7. Panneau selon la revendication 1, dans lequel l'élément de finition extérieur (1.32) est fixé à la troisième structure autoportante (1.31) au moyen de profilés de fixation (1.34) métalliques.

8. Panneau selon la revendication 7, dans lequel une tôle métallique (1.35) est agencée entre les profilés de fixation (1.34) et la troisième structure autoportante (1.31).

9. Panneau selon la revendication 1, dans lequel l'élément de finition extérieur (1.32) est une dalle en matériau choisi dans le groupe constitué de fibrociment, de béton, de marbre, de céramique, de pierre, de bois, de plastique ou de verre.

10. Système de revêtement de façade modulaire autoportant, qui peut être ancré à des dalles (2) qui forment une pluralité d'étages d'un chantier, comprenant une pluralité de panneaux (1) selon l'une quelconque des revendications précédentes, dans lequel une partie d'écran mural (1.1) de chaque panneau (1) est apte à être ancrée uniquement au-dessus de la dalle (2) supérieure de l'étage correspondant du chantier au moyen d'un premier moyen d'ancrage (3) et les parties d'écran mural (1.1) des panneaux adjacents (1) sont assemblées au moyen d'un second moyen d'ancrage (4) agencé entre chacun des cadres (1,111) de premières structures autoportantes (1,11) des portions d'écran mural (1.1) respectives.

11. Système selon la revendication 10, dans lequel un assemblage entre une partie de façade ventilée (1.3) et la partie d'écran mural (1.1) du panneau (1) a été réalisé en atelier et transporté sous forme d'ensemble sur le chantier.

12. Système selon la revendication 10, dans lequel un

assemblage d'une partie de revêtement intérieur (1.2) du panneau (1) a été réalisé « sur place », sur le chantier, et la partie de revêtement intérieur (1.2) peut être fixée, au moyen de sa deuxième structure autoportante (1.21), entre les dalles (2) supérieure et inférieure qui forment l'étage correspondant du chantier.

13. Système selon la revendication 10, dans lequel la liaison entre les parties d'écran mural (1.1) de panneaux (1) adjacents peut être agencée de manière à ne pas faire face à la dalle (2) du chantier.

14. Système selon la revendication 10, dans lequel un joint en éthylène-propylène-diène-méthylène (EPDM) (5) est agencé au niveau de la liaison entre les parties d'écran mural (1.1) de panneaux adjacents (1).

15. Système selon la revendication 10, dans lequel une extrémité supérieure (1.151) d'une feuille d'étanchéité (1.15) de la partie d'écran mural (1.1) du panneau (1) est repliée vers le haut et fixée à une première structure autoportante (1.11) de la partie d'écran mural (1.1) d'un autre panneau (1) supérieur adjacent et une extrémité latérale (1,152) de la feuille d'étanchéité (1,15) du panneau (1) est pliée et fixée à une première structure autoportante (1.11) de la partie d'écran mural (1.1) d'un autre panneau (1) latéral adjacent.

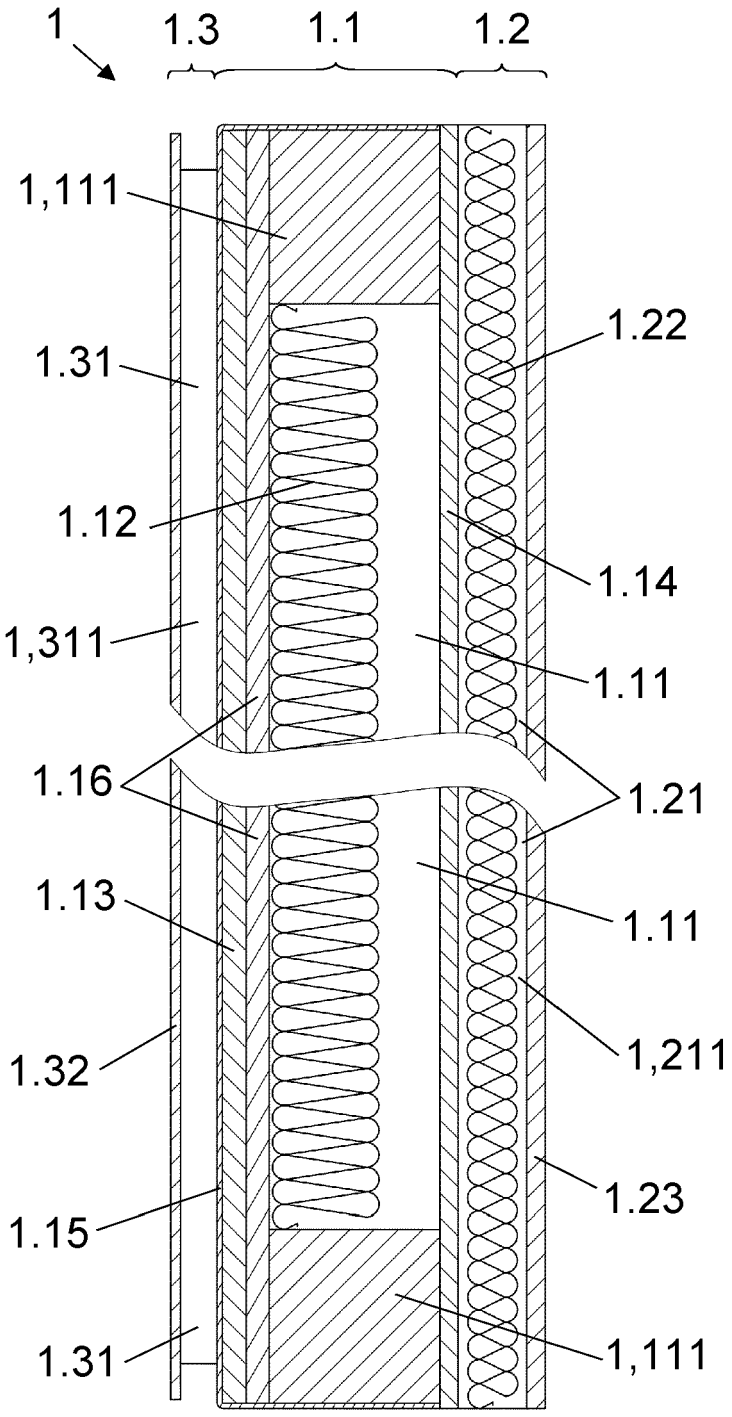
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Fig. 1

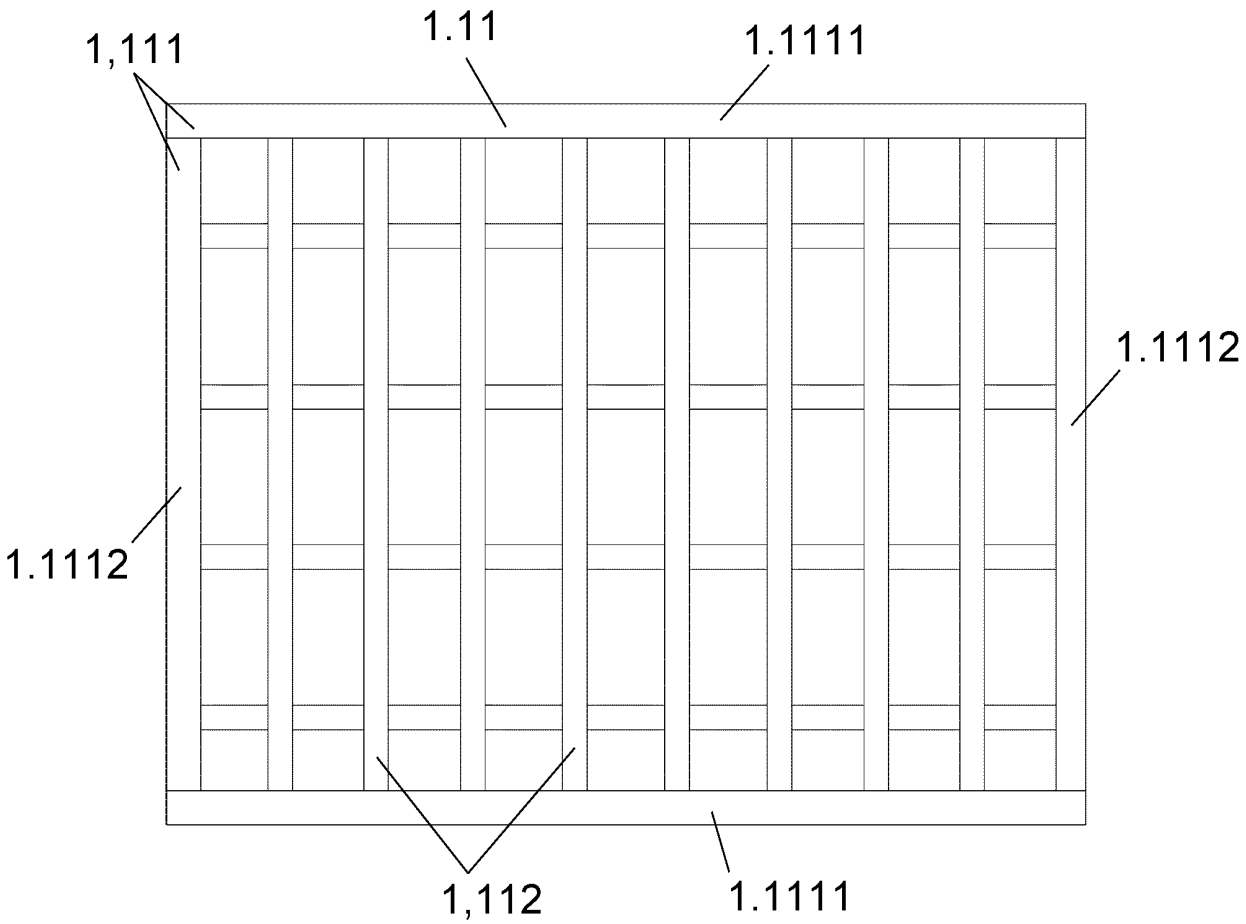

Fig. 2

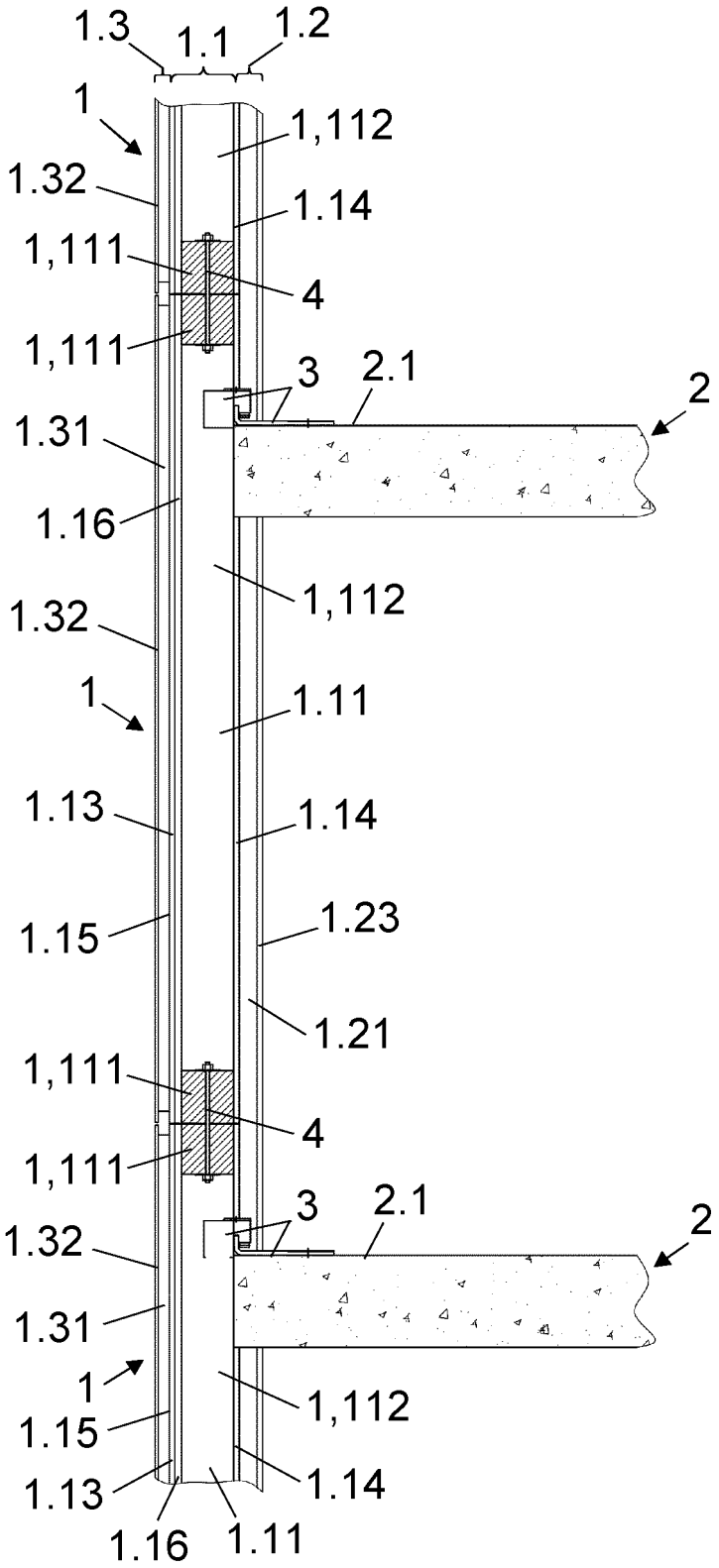
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Fig. 3

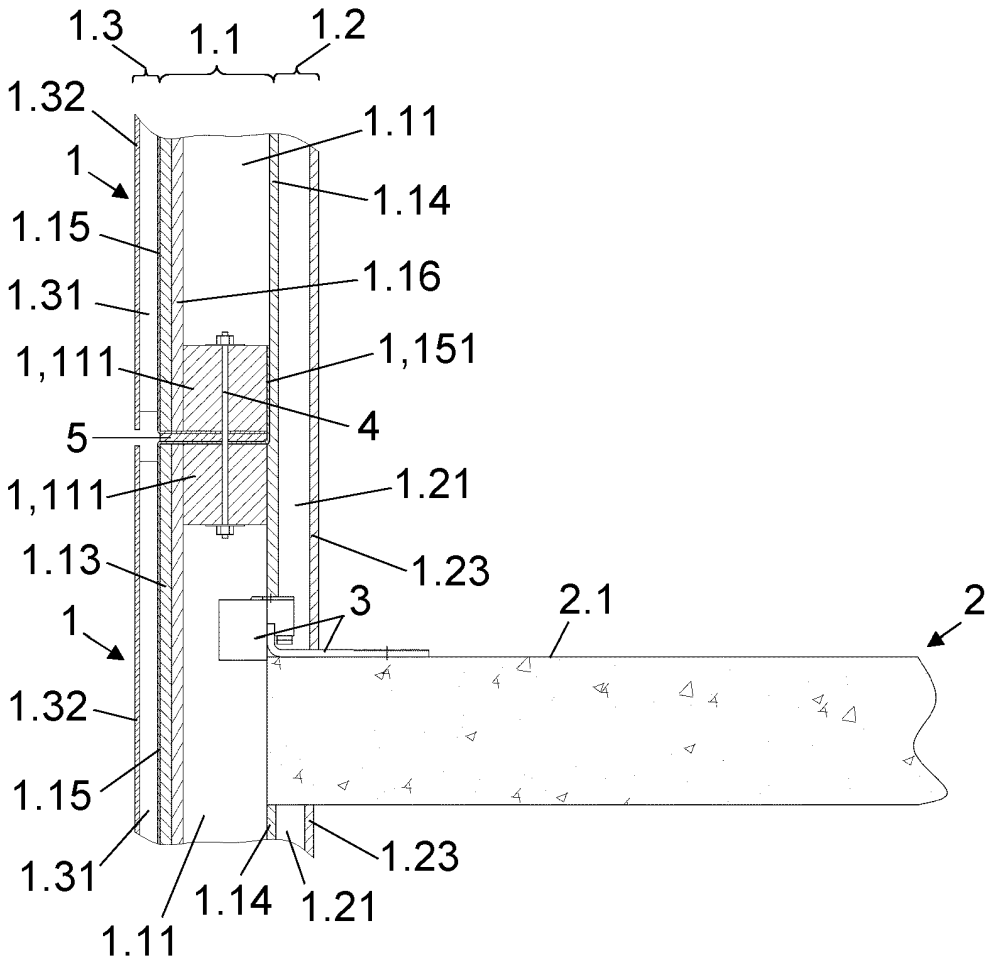
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Fig. 4

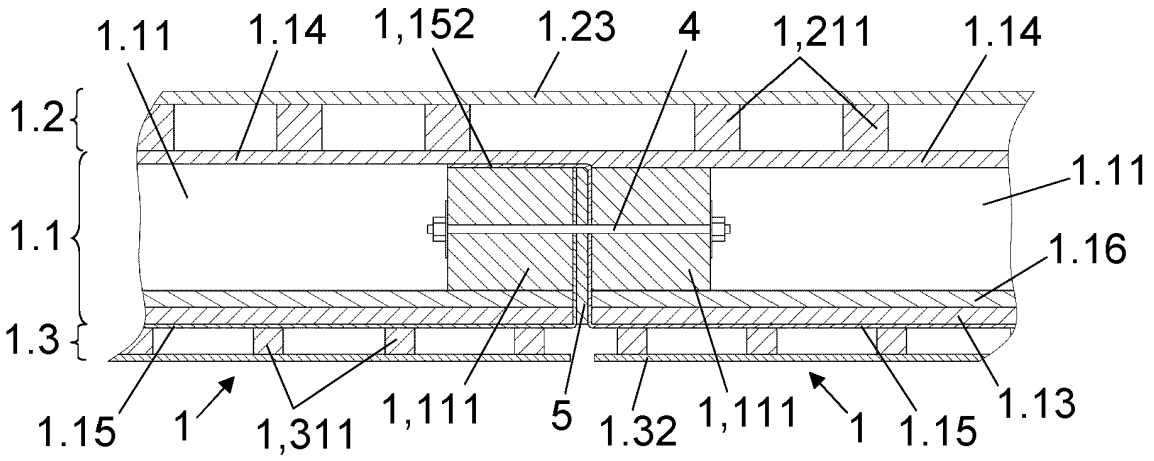
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Fig. 5

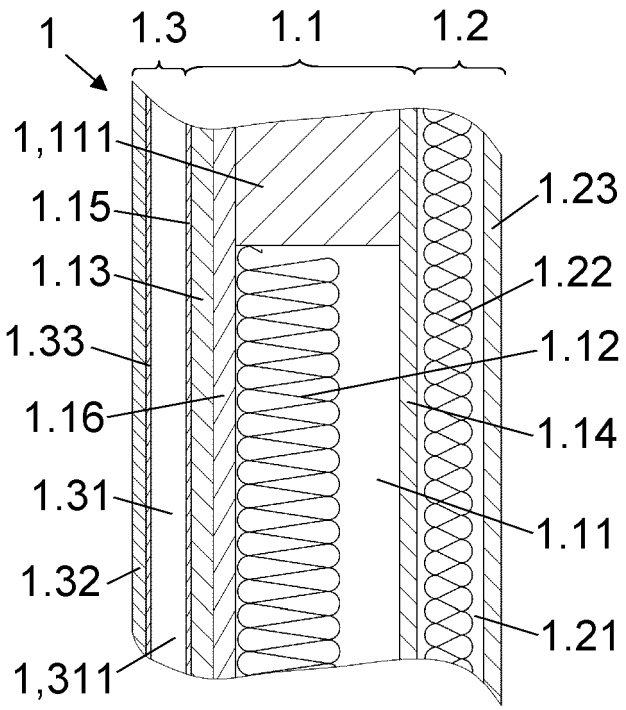
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Fig. 6

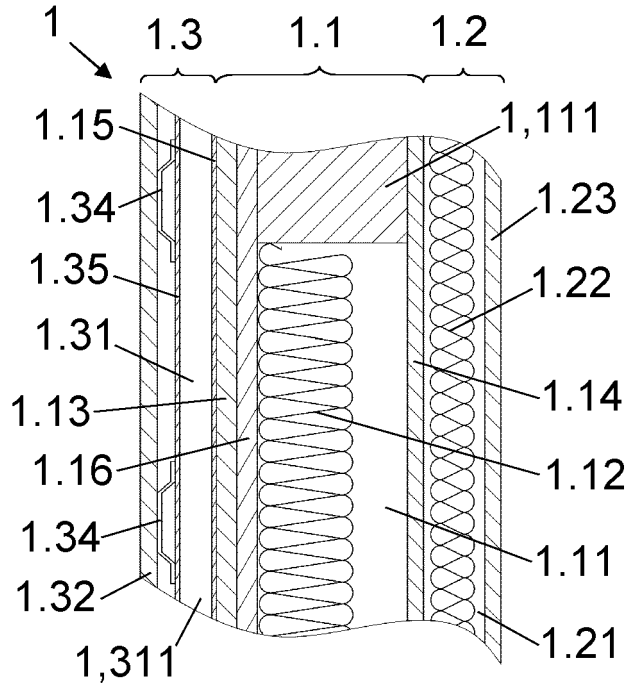
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Fig. 7

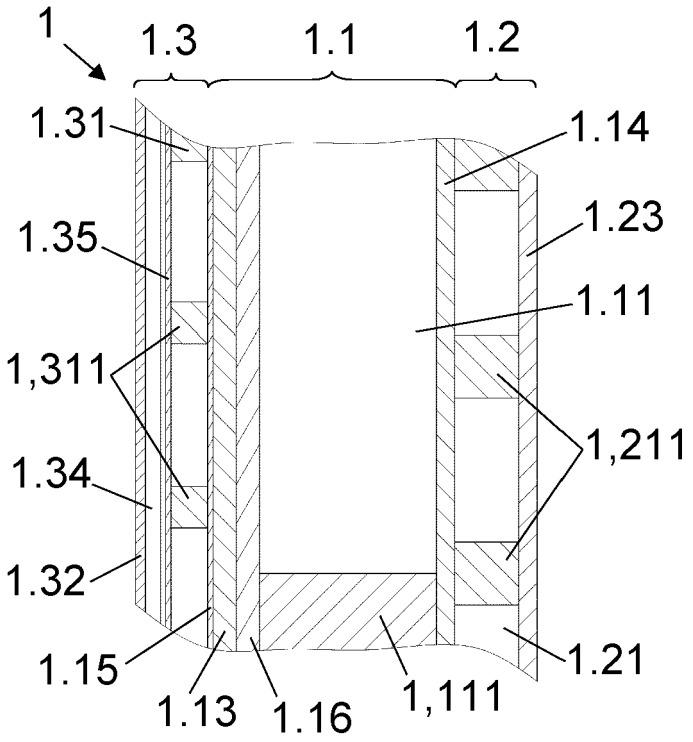
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Fig.8

REFERENCES CITED IN THE DESCRIPTION

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