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(54) **FIREPROOF WALL**

(57) A fireproof wall (100), comprising sandwich panels (1) having first and second facings (2, 3) and first and second edges (4, 5) arranged on opposite ends of the sandwich panel (1), a joint (6) in where two sandwich panels (1) are adapted to be connected to each other, and a supporting element (7) adapted to be attached to two sandwich panels (1) in the joint (6). The supporting element (7) is arranged on side of the first facings (2) of said sandwich panels (1). The distance of the edges (4, 5) of the two sandwich panels in the joint (6) is arranged to be less than the corresponding width of the supporting element (7). A resilient fitting plate (8) is attached on the joint (6) on side of the second facings (3) of said sandwich panels (1). The resilient fitting plate (8) comprises a first fitting edge (9) adapted to be attached to a first of said two sandwich panels (1) and a second fitting edge (10) adapted to be attached to a second of said two sandwich panels (1), and at least one bulge (11) arranged between said first and second fitting edges (9, 10) in parallel to the edges of said sandwich panels (1) arranged in the joint (6).

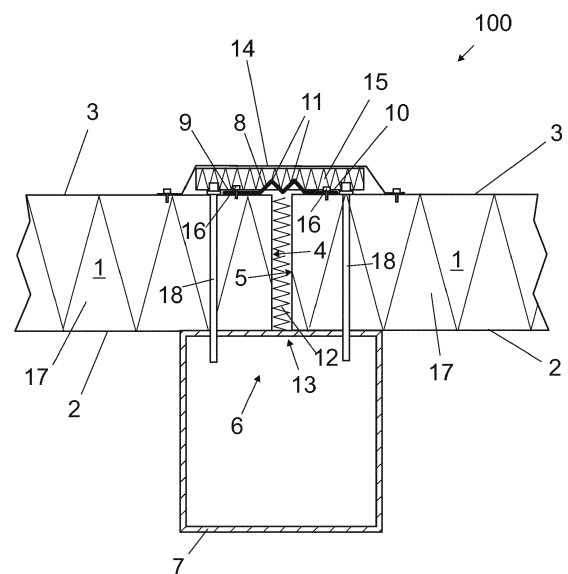


Fig. 1

Description

BACKGROUND

[0001] The invention relates to a fireproof wall, comprising - sandwich panels having first and second facings and first and second edges arranged on opposite ends of the sandwich panel.

[0002] It is known to use sandwich panels in buildings and constructions as a wall element, a partition wall panel element, or a ceiling or roof panel element. In some applications, there is need for fire resistant walls. In order to absorb impact energy due to a falling shelf, for example, the fixing system of the fire resistant walls needs to be flexible. This decreases risk of failures during fire and then decreases also costs affected by fire. The fixing system needs to be also stiff enough for holding the panels in place during normal use.

[0003] A disadvantage of existing sandwich panel wall structures designed to fulfill the requirements of fire wall impact loads usually require rather heavily constructed and complicated fixings and support structures which makes assembly work difficult and time consuming.

BRIEF DESCRIPTION

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

- sandwich panels having first and second facings and first and second edges arranged on opposite ends of the sandwich panel,
- a joint in where two sandwich panels are adapted to be connected to each other,
- a supporting element adapted to be attached to two sandwich panels in the joint, the supporting element adapted to be arranged on side of the first facings of said sandwich panels,
- the distance of the edges of the two sandwich panels in the joint being arranged to be less than the corresponding width of the supporting element, and
- a resilient fitting plate adapted to be attached on the joint on side of the second facings of said sandwich panels,
- the resilient fitting plate comprising
 - a first fitting edge adapted to be attached to a first of said two sandwich panels and a second fitting edge adapted to be attached to a second of said two sandwich panels, and
 - at least one bulge arranged between said first and second fitting edges in parallel to the edges of said sandwich panels arranged in the joint.

[0005] Thereby a fire wall structure having improved impact load resistance performance and maintaining light weight of the wall structure may be achieved.

[0006] The arrangement and the method are charac-

terised by what is stated in the independent claims. 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. The inventive content of the patent application may also be defined in other ways than defined in the following claims. The inventive content may also be formed of several separate inventions, especially if the invention is examined in the light of expressed or implicit sub-tasks or in view of obtained benefits or benefit groups. Some of the definitions contained in the following claims may then be unnecessary in view of the separate inventive ideas. Features of the different embodiments of the invention may, within the scope of the basic inventive idea, be applied to other embodiments.

[0007] In one embodiment, the resilient fitting plate is made of metal. An advantage is that a pliable and flexible but still sturdy resilient fitting plate may be achieved.

[0008] In one embodiment, the resilient fitting plate comprises just one bulge only. An advantage is that the structure is simple.

[0009] In one embodiment, the resilient fitting plate comprises two or more bulges. An advantage is that the resilient character of the resilient fitting plate may be enhanced.

[0010] In one embodiment, the first and the second fitting edges has a thicker structure than the at least one bulge therebetween. An advantage is that attachment of the resilient fitting plate to the sandwich panels may be reinforced, without scarifying resilient characters thereof.

[0011] In one embodiment, the cross-sectional shape of the bulge is selected from sinusoidal shape, wavy shape, arched shape, crested shape, or any of their combination. An advantage is that properties of resiliency may be selected in a broad range.

[0012] In one embodiment, the joint is arranged to have a joint gap between the two sandwich panels being adapted to be connected to each other in said joint. An advantage is that the joint gap provides some play that absorbs dimensional variations that may arise during installation work.

[0013] In one embodiment, the joint gap is adapted to be filled with a filling material. An advantage is that the isolation properties of the joint may be enhanced.

[0014] In one embodiment, a protective element is adapted to be arranged on outer side of the resilient fitting plate. An advantage is that the resilient fitting plate and the joint is protected e.g. against rain.

[0015] In one embodiment, a thermally isolating material is adapted to be arranged between the protective element and the resilient fitting plate. An advantage is that isolation properties of the joint may be enhanced.

[0016] In one embodiment, the supporting element is a metal profile. An advantage is that an essentially totally metallic fireproof wall may be provided.

[0017] In one embodiment, the resilient fitting plate is adapted to be attached to the sandwich panels by fixation means. An advantage is that this is a simple structure

and may be realized with rather light fixation means and tools.

[0018] In one embodiment, the resilient fitting plate is adapted to be attached to the supporting element by fixation elements extending through the composite panel. An advantage is that extra attaching elements are not needed and thus number of components may be reduced.

BRIEF DESCRIPTION OF FIGURES

[0019] Some embodiments illustrating the present disclosure are described in more detail in the attached drawings, in which

Figure 1 is a schematic top view of a fireproof wall in partial cross-section,

Figure 2 is a schematic perspective view of a resilient fitting plate,

Figure 3 is a schematic view of another resilient fitting plate,

Figure 4 is a schematic view of a third resilient fitting plate, and

Figure 5 is a schematic view of a fourth resilient fitting plate.

[0020] 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

[0021] **Figure 1** is a schematic top view of a fireproof wall in partial cross-section and **Figure 2** is a schematic perspective view of a resilient fitting plate shown in Figure 1.

[0022] The fireproof wall 100 comprises two or more sandwich panels 1 having first and second facings 2, 3 and first and second edges 4, 5 that are arranged on opposite ends of the sandwich panel 1.

[0023] In an embodiment, at least one of the first and second facings 2, 3 is sheet of metal, in a further embodiment both first and second facings 2, 3 are sheet of metal. In an embodiment, said metal is steel, such as stainless steel. In some other embodiments, the facing 2, 3 comprises at least one of the following materials: copper, brass, titanzink, aluminium. Typically, the first facing 2 is made of same material as the second facing 3, but not necessarily.

[0024] A core 17 is arranged between said facings 2, 3. The core is e.g. mineral wool, polyisocyanurate (PIR), polyurethane (PUR), or extruded polystyrene (XPS).

[0025] There is a joint 6 in where two sandwich panels 1 are connected to each other. In an embodiment shown

in Figure, there is a clear joint gap 12 between the first and second edges 4, 5 in the joint 6. The joint gap is preferably filled with a filling material 13, such as a fireproof isolation material, e.g. mineral wool.

[0026] A supporting element 7 is adapted to be attached to two, at least, sandwich panels 1 in the joint 6. The supporting element 7 is a part or element of a framework of building. In an embodiment, the supporting element 7 is a part of wall structure of a building.

[0027] The supporting element 7 may be manufactured from metal, concrete, wood etc. In an embodiment, the supporting element 7 is a metal profile made of steel.

[0028] The supporting element 7 is arranged on side of the first facings 2 of the sandwich panels 1. In an embodiment, the wall is an outer wall of a building, and the first facing 2 is arranged inside side of that outer wall. However, in another embodiment, the supporting element 7 is arranged outside the building. In still another embodiment, the wall is a partition wall, and thus both of the facings 2, 3 are inside the building. The distance of the edges 4, 5 of the two sandwich panels in the joint 6 is less than the corresponding width of the supporting element 7.

[0029] A resilient fitting plate 8 is attached on the joint 6 on side of the second facings 3 of the sandwich panels 1. The resilient fitting plate 8 comprises two fitting edges, so that a first fitting edge 9 is attached to a first of said two sandwich panels 1 and a second fitting edge 10 is attached to a second of said two sandwich panels 1.

[0030] The resilient fitting plate 8 is configured to deform, e.g. expand, from its original shape (shown in Figures) into another shape. According to an aspect, the deformation is permanent or at least mainly permanent by its nature. This ability to change shape of the resilient fitting plate 8 enables it to absorb dynamic impact loads or shocks incurred on the sandwich panels 1 and the joint 6. The resilient fitting plate 8 is distributing the energy of the loads or shocks over length of the plate 8 and also over a prolonged period of time. Thus, the resilient fitting plate 8 may prevent the sandwich panels 1 from coming loose from the wall and the supporting element 7.

[0031] In an embodiment, the fitting edges 9, 10 are parallel to the edges 4, 5 of the sandwich panels.

[0032] In an embodiment, the length of the resilient fitting plate 8 is equal or at least substantially equal to the length of the joint 6. In another embodiment, the resilient fitting plate 8 is substantially shorter than the joint 6. In this embodiment, the joint 6 may be covered by using two or even more resilient fitting plates arranged one after another on the joint 6.

[0033] In an embodiment, the resilient fitting plate 8 is made of metal, such as steel. The shape of the fitting plate may be formed by bending and edging or pultrusion, for instance.

[0034] In an embodiment, thickness of the resilient fitting plate 8 is in range of 0,5 mm - 1,5 mm.

[0035] In the resilient fitting plate 8, there is at least one bulge 11 arranged between the first and second fit-

ting edges 9, 10 and in parallel or at least substantially parallel to said edges. In the embodiment shown in Figures 1 and 2, there are two bulges 11 in the resilient fitting plate 8.

[0036] In an embodiment, height of the bulge 11 is in range of 5 mm - 50 mm.

[0037] In an embodiment, a protective element 14 is arranged on outer side of the resilient fitting plate 8. The protective element 14 may be e.g. a metal plate, made of same or different material as the facings 2, 3.

[0038] In an embodiment, the protective element 14 is attached to the panels 1 so that it envelopes both sides of the resilient fitting plate 8.

[0039] In an embodiment, a thermally isolating material 15 is adapted to be arranged between the protective element 14 and the resilient fitting plate 8. The thermally isolating material may be e.g. mineral wool.

[0040] In an embodiment, the resilient fitting plate 8 is attached to the sandwich panels 1 by fixation means 16, such as screws or rivets. The fixation means 16 may be arranged with suitable spacing in the entire length of the fitting plate 8.

[0041] In another embodiment, the resilient fitting plate 8 is attached to the supporting element 7 by fixation elements 18 that extends thereto through the composite panel 100. The fixation element 18 may be e.g. a screw.

[0042] **Figure 3** is a schematic view of another resilient fitting plate. In an embodiment, the first and the second fitting edges 9, 10 of the resilient fitting plate 8 has a thicker structure than rest of the resilient fitting plate or the bulge(s) 11 therebetween. In an embodiment (as in Figure 3), the thicker structure has been made by turning the plate material double on the edges thereof.

[0043] **Figure 4** is a schematic view of a third resilient fitting plate, and **Figure 5** is a schematic view of a fourth resilient fitting plate. In some embodiments, the resilient fitting plate 8 comprises just one bulge 11 only. In another embodiment, the resilient fitting plate 8 comprises at least two bulges 11, for instance two, three or four bulges.

[0044] In an embodiment, the bulge 11 has a sinusoidal shape. In another embodiment, the bulge 11 has a wavy shape. In another embodiment, the bulge 11 has an arched shape. In still another embodiment, the bulge 11 has a crested shape. In an embodiment, the resilient fitting plate 8 comprises bulges 11 having different cross-sectional shapes, for instance any combinations of the shapes mentioned above.

[0045] 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. Within the scope of the inventive concept the attributes of different embodiments and applications can be used in conjunction with or replace the attributes of another embodiment or application.

[0046] 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

[0047]

5	1	sandwich panel
	2	first facing
	3	second facing
	4	first edge
	5	second edge
10	6	joint
	7	supporting element
	8	resilient fitting plate
	9	first fitting edge
	10	second fitting edge
15	11	bulge
	12	joint gap
	13	filling material
	14	protective element
	15	thermally isolating element
20	16	fixation means
	17	core
	18	fixation element
	100	fireproof wall
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Claims

1. A fireproof wall (100), comprising

- 30
- sandwich panels (1) having first and second facings (2, 3) and first and second edges (4, 5) arranged on opposite ends of the sandwich panel (1),
 - 35 - a joint (6) in where two sandwich panels (1) are adapted to be connected to each other,
 - a supporting element (7) adapted to be attached to two sandwich panels (1) in the joint (6), the supporting element (7) adapted to be arranged on side of the first facings (2) of said sandwich panels (1),
 - the distance of the edges (4, 5) of the two sandwich panels in the joint (6) being arranged to be less than the corresponding width of the supporting element (7), and
 - 45 - a resilient fitting plate (8) adapted to be attached on the joint (6) on side of the second facings (3) of said sandwich panels (1),
 - the resilient fitting plate (8) comprising
 - 50 -- a first fitting edge (9) adapted to be attached to a first of said two sandwich panels (1) and a second fitting edge (10) adapted to be attached to a second of said two sandwich panels (1), and
 - 55 -- at least one bulge (11) arranged between said first and second fitting edges (9, 10) in parallel to the edges of said sandwich pan-

- els (1) arranged in the joint (6).
2. The arrangement as claimed in claim 1, wherein the resilient fitting plate (8) is made of metal. 5
 3. The arrangement as claimed in claim 1 or 2, wherein the resilient fitting plate (8) comprises just one bulge (11) only.
 4. The arrangement as claimed in claim 1 or 2, wherein the resilient fitting plate (8) comprises two or more bulges (11) . 10
 5. The arrangement as claimed in any of the preceding claims, wherein the first and the second fitting edges (9, 10) has a thicker structure than the at least one bulge (11) therebetween. 15
 6. The arrangement as claimed in any of the preceding claims, wherein the cross-sectional shape of the bulge (11) is selected from sinusoidal shape, wavy shape, arched shape, crested shape, or any of their combination. 20
 7. The arrangement as claimed in any of the preceding claims, wherein the joint (6) is arranged to have a joint gap (12) between the two sandwich panels (1) being adapted to be connected to each other in said joint (6). 25
 8. The arrangement as claimed in claim 7, wherein the joint gap (12) is adapted to be filled with a filling material (13). 30
 9. The arrangement as claimed in any of the preceding claims, wherein a protective element (14) is adapted to be arranged on outer side of the resilient fitting plate (8). 35
 10. The arrangement as claimed in claim 9, wherein a thermally isolating material (15) is adapted to be arranged between the protective element (14) and the resilient fitting plate (8). 40
 11. The arrangement as claimed in any of the preceding claims, wherein the supporting element (7) is a metal profile. 45
 12. The arrangement as claimed in any of the preceding claims, wherein the resilient fitting plate (8) is adapted to be attached to the sandwich panels (1) by fixation means (16). 50
 13. The arrangement as claimed in any of claims 1 - 11, wherein the resilient fitting plate (8) is adapted to be attached to the supporting element (7) by fixation elements (18) extending through the composite panel (100). 55
 14. The arrangement as claimed in any of the preceding claims, wherein the first and second facings (2, 3) are sheet of metal, and a core (17) is arranged between said facings (2, 3).

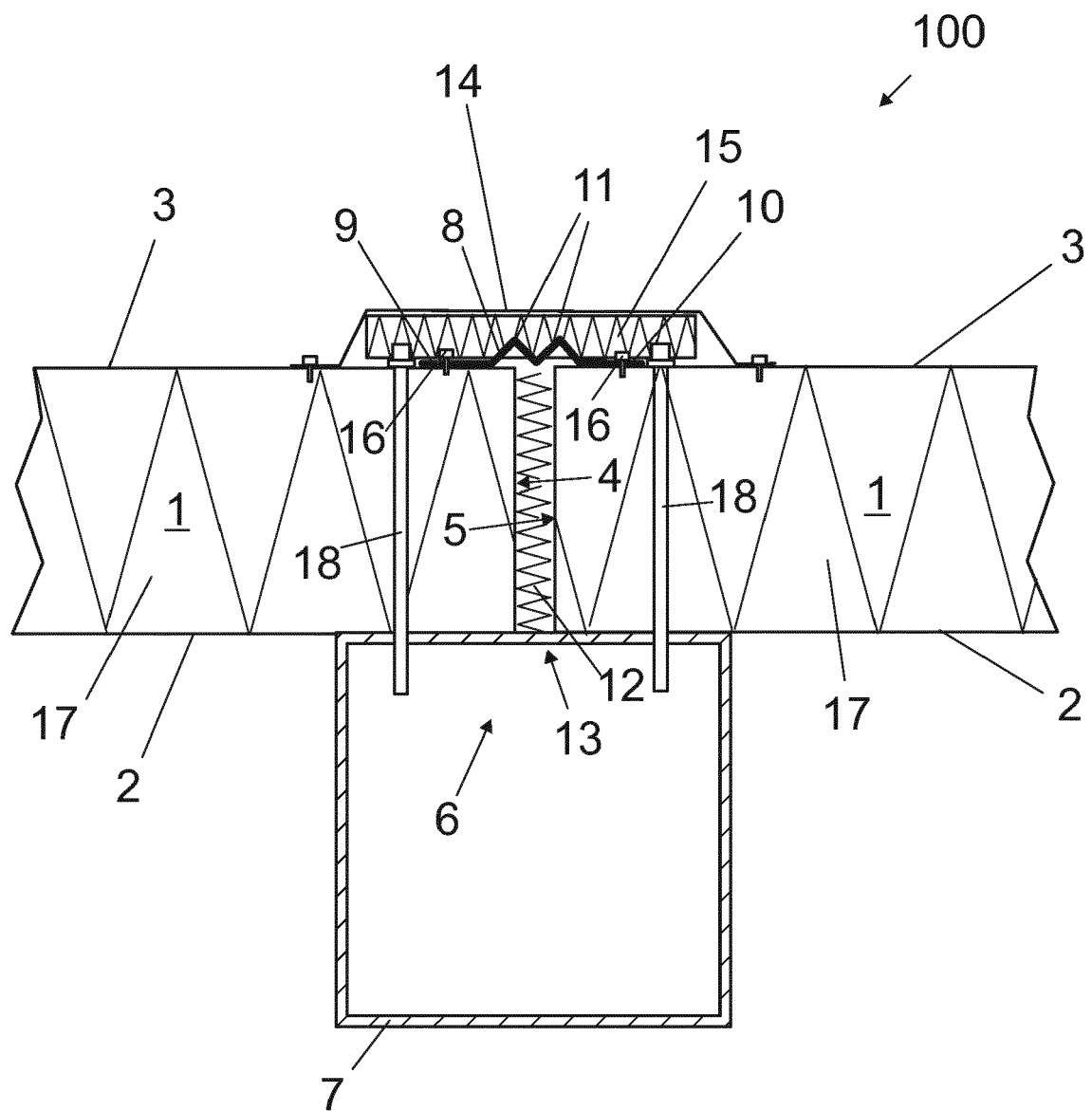


Fig. 1

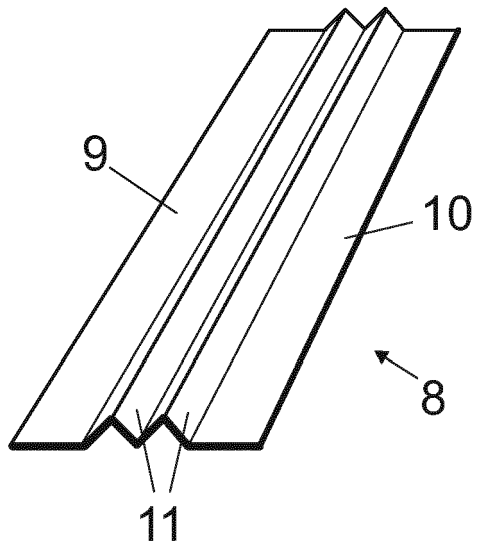


Fig. 2

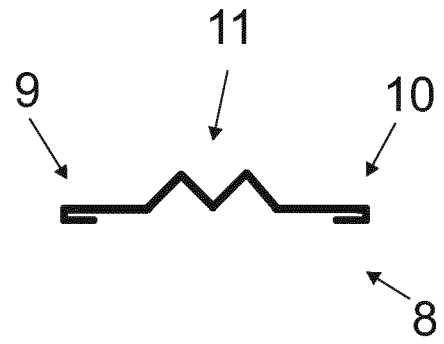


Fig. 3

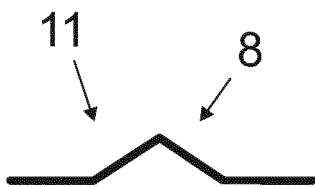


Fig. 4

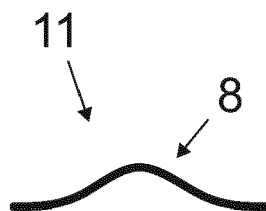


Fig. 5



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 Application Number
 EP 20 15 8233

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EPO FORM 1503 03.82 (P04C01)

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The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 14 August 2020	Examiner Galanti, Flavio
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