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(54) **Fire wall**

(57) The invention relates to a firewall (1), comprising a steel-structured frame type body component which is attachable to load-bearing structures (10) in a building. The body component consists of horizontal bottom and top profiles (8) as well as vertical profiles (5) connecting the same, said vertical profiles (5) opening towards a middle part of the body component. The body component

is fitted with a corrugated panel member (7), which covers essentially completely an opening established in the middle of said body component and which extends partially to within said vertical profiles (5). On either side of the corrugated panel member, the body component has fire-resistant elements (2, 3) mounted thereon, comprising a core portion (4) of mineral wool and metal plates (2a, 2b; 3a, 3b) affixed to both of its main surfaces.

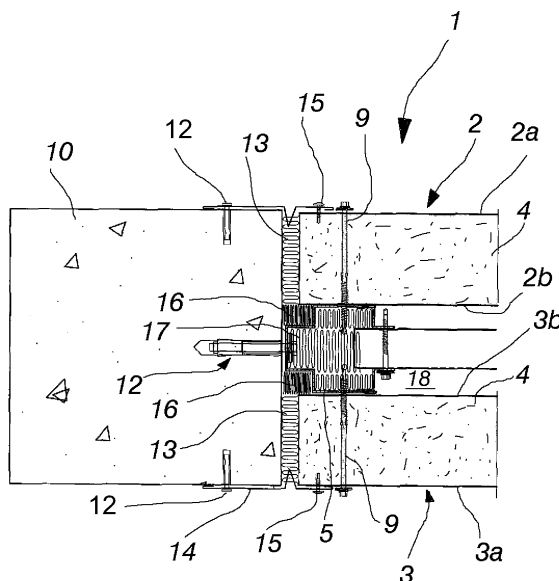


Fig. 1

Description

[0001] The present invention relates to a firewall, comprising a steel-frame type body component which is attachable to load-bearing structures in a building, said body component consisting of horizontal bottom and top profiles as well as vertical profiles connecting the same, said vertical profiles opening towards a middle part of the body component.

[0002] The function of a firewall is to prevent the spread of fire to the other side thereof and to prevent the collapse of an adjoining building or a part of such building and impacts caused by the collapse. The firewall structure is subject to certain official regulations in terms of its fire resistance, e.g. pursuant to the National Building Code of Finland, Part E1. In order to meet these regulations, the firewall structures are required to pass certain tests. One such test is the one set forth in standard EN 1363-2: 1999.

[0003] At present, firewalls are often constructed in concrete, necessitating heavy-duty foundations and not enabling a displacement of firewalls, e.g. upon an alteration of use or expansion of the building.

[0004] It is an objective of the present invention to provide a relatively light-structured firewall solution, which meets official regulations, preferably at least the classification regulation E1-M60 of the National Building Code of Finland.

[0005] In order to achieve this objective, a firewall according to the invention is **characterized in that** the body component is fitted with a corrugated panel member, which covers essentially completely an opening established in a middle part of the body component and which extends partially to within said vertical profiles, and that, on either side of the corrugated panel member, the body component has elements mounted thereon, comprising a core portion of mineral wool and metal plates affixed to both of its main surfaces. The corrugated panel reflects thermal radiation on the fire-facing side, thus having a lower temperature on its other side. In addition, the corrugated panel permits fire-induced movements of heat without structural breakdown. The corrugated panel takes up impact loads, whereby the vertical profiles give in and contribute to the damping of impact action.

[0006] With a firewall structure of the invention, the resistance time of 90 minutes has been reached in a fire test with a mineral wool layer of 100 mm in the elements. Proceeding to a higher mineral wool layer thickness readily enables reaching a longer resistance time.

[0007] The invention will now be described more closely with reference to the accompanying drawings, in which:

Fig. 1 shows in a schematic cross-sectional view one vertical edge of a firewall according to the invention,

fig. 2 shows the firewall of fig. 1 in a schematic vertical section in a floor level area, and

fig. 3 shows in a schematic cross-section one vertical profile apt for use in a firewall structure of the invention.

[0008] In reference to figs. 1 and 2, the firewall according to the invention comprises upright vertical profiles 5 present at the opposite ends of the firewall (the region of just one of the vertical profiles is depicted in fig. 1), which are attached with fastening means 12, such as e.g. with screw anchors, to a load-bearing structure 10 of the building. The vertical profile 5 is shaped for a cross-section that enables its function as a flexible mounting between the firewall members attachable thereto and the load-bearing structure 10. Fig. 3 illustrates one implementation of the vertical profile 5, wherein the vertical profile is substantially cruciform in cross-section with one 6a, 6b of its arms opening towards a middle part. The vertical profile can be made up from one or more members. In the exemplary embodiment shown in fig. 3, the members 6a, 6b, constituting an opening arm, are attached by welding to a remainder of the vertical profile. On either side of the vertical profile 5 are mounted horizontal U-profiles 8 along a bottom edge and a top edge of the firewall structure, whereby the vertical profiles, present at the opposite ends, and the horizontal profiles of the top and bottom edges jointly make up a frame type body component. The U-profiles 8 are secured to load-bearing structures of the building e.g. with fastening means 12 similar to those used for the vertical profiles 5. On either side of the vertical profiles, between the U-profiles 8 present along the top and bottom edges, is placed each time a respective element 2, 3, consisting each time of a core portion 4 of mineral wool and sheet metal covers 2a, 2b and 3a, 3b, respectively, affixed to both main surfaces thereof.

[0009] The firewall solution according to the invention further includes, as an essential element thereof, a corrugated panel 7 disposed within the arm 6a, 6b of the vertical profile 5 opening towards a middle part, said panel being attached to the vertical profile with fastening means 11, e.g. with self-boring screws. The corrugated panel positions itself by its bottom and top edge in an intermediate space provided by the U-profiles 8 present on the opposite sides of the vertical profile. The elements 2 and 3 are secured to the vertical profile 5 with fastening means 9, which may also be self-boring screws. The elements 2, 3 position themselves at a distance from the opposite side face of the corrugated panel 7, establishing a void 18 on either side of the corrugated panel. The vertical profile 5 has its interior filled with mineral wool and outside of the vertical profile, within a space between the load-bearing structure 10 and the elements 2, 3, is also provided a mineral wool layer 16. Between the elements 2, 3 and the load-bearing structure 10 are also disposed sealing layers 13 of mineral wool. The sealing layers 13 are concealed by cover strips 14, which are fixed to the elements 2, 3 e.g. with fastening screws 15, as well as to the load-bearing structure 10 with fastening

means 12, e.g. screw anchors. Mineral wool is also provided in a space between the adjacent U-profiles 8 all the way along the bottom edge and top edge of the corrugated panel 7, whereby the void 18 established between the corrugated panel 7 and the elements 2, 3 becomes encircled essentially all the way by the sealing material.

[0010] The mineral wool core 4 of the elements 2, 3 is preferably not less than 80 mm in thickness. Elements with a higher thickness provide a longer fire resistance time.

[0011] The vertical profile 5 used in a firewall of the invention establishes a flexible mounting between the load-bearing structure 10 and firewall sections attached to the vertical profile, which improves a load resistance of the firewall structure in a fire situation.

Claims

1. A firewall (1), comprising a steel-structured frame type body component which is attachable to load-bearing structures (10) in a building, said body component consisting of horizontal bottom and top profiles (8) as well as vertical profiles (5) connecting the same, said vertical profiles (5) opening towards a middle part of the body component, **characterized in that** the body component is fitted with a corrugated panel member (7), which covers essentially completely an opening established in the middle of said body component and which extends partially to within said vertical profiles (5), and that, on either side of the corrugated panel member, the body component has fire-resistant elements (2, 3) mounted thereon, comprising a core portion (4) of mineral wool and metal plates (2a, 2b; 3a, 3b) affixed to both of its main surfaces. 25
2. A firewall according to claim 1 or 2, **characterized in that** the vertical profiles (5) are shaped so as to enable mounting of the corrugated panel member (7) and the elements (2, 3) on the frame structures of a building in a flexible manner. 40
3. A firewall according to claim 2, **characterized in that** the vertical profile (5) is cruciform in its cross-section, one arm (6a, 6b) of said cross being open towards a middle part of the body component, allowing for an installation of the corrugated panel member (7) within the vertical profile. 50
4. A firewall according to any of the preceding claims, **characterized in that** each vertical profile (5) has its interior filled with mineral wool and that between respective load-bearing structures for the top and bottom edges of the corrugated panel (7) is disposed mineral wool, such that a void space (18) established between the corrugated panel member (7) and the 55

elements (2, 3) becomes completely encircled.

5. A firewall according to any of claims 1-4, **characterized in that** the horizontal profiles (8) are U-shaped in cross-section and disposed on either side of the vertical profiles (5) at the top and bottom edges of the vertical profiles. 5
6. A firewall according to any of the preceding claims, **characterized in that** the element's (2, 3) core portion (4) of mineral wool has a thickness of not less than 80 mm. 10
7. A profile member for use in a firewall that features a frame type body component made up of steel sections, **characterized in that** the profile member (5) is adapted to function as a flexible mounting element between structural members (2, 3, 7), to be attached thereto and making up a firewall structure, and a load-bearing component (10) of the building. 15
8. A profile member according to claim 7, **characterized in that** the profile member (5) is substantially cruciform in its cross-section, one arm (6a, 6b) of said cross opening towards a middle part of the frame type body component. 20

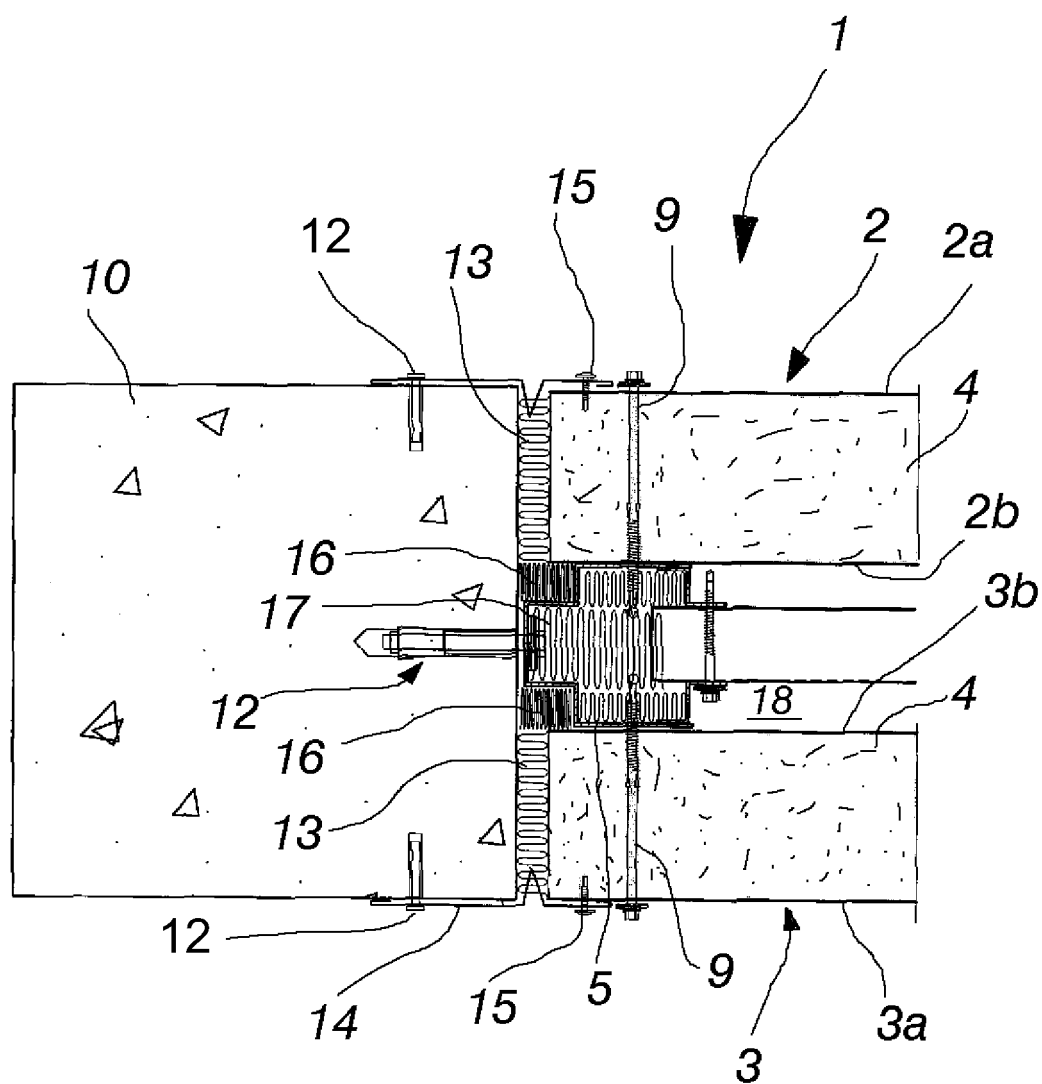


Fig. 1

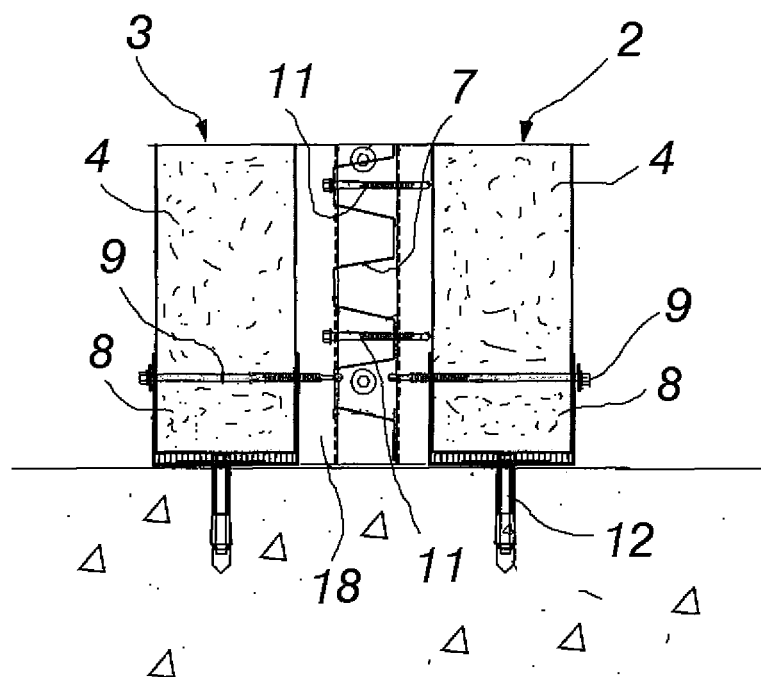


Fig. 2

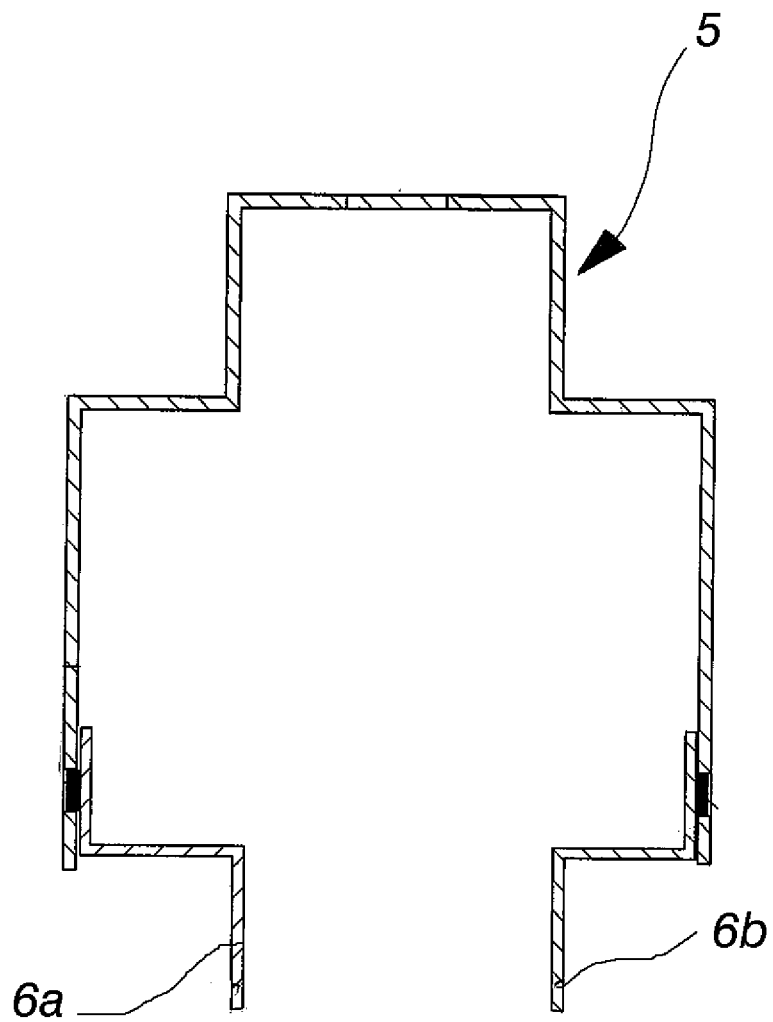


Fig. 3