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(54) **An outer frame element, a set of parts, a wall construction and a method for mounting the wall construction**

Außenrahmenelement, Bauteilsatz, eine Wandkonstruktion und Verfahren zur Montage der Wandkonstruktion

Élément de cadre externe, ensemble de pièces, structure de mur et procédé pour monter la structure de la paroi

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(56) References cited:  
**US-A- 3 129 792**      **US-A- 5 913 788**  
**US-B2- 8 056 293**      **US-B2- 8 793 947**

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**Description**Field

**[0001]** The present invention relates in a first aspect to a set of parts comprising a fire-shielding U-shaped outer frame element, in a second aspect to a wall construction comprising such set of parts, and in a third aspect to a method for mounting such wall construction.

Background

**[0002]** The need for a good and reliable fire protection system in commercial buildings and office complexes has gained significant importance in recent years. Fire and fire-related hazards can cause heavy loss to life, property and critical data.

**[0003]** Modern technology permits the use of glass in walls without compromising fire safety standards, since incorporation of fire-rated glass is possible. Fire-rated glass is suitable for use for example in stairwells, computer rooms, evacuation routes in large office buildings, hospitals, shopping centres and other fire sensitive areas. Such glass walls help to prevent flames, smoke and hot gases from spreading.

**[0004]** When wall elements, such as glass wall elements, are assembled to form a wall construction, including partition walls, folding partitions, panel walls etc., an outer frame is used to support the wall elements, the frame being connected to the adjacent floor, ceiling and/or walls, and sometimes to each other. The outer frame may consist of a variety of materials, most common are aluminum, stainless steel or wood, depending on the desired properties of the frame.

**[0005]** The document US 8 056 293 B2 discloses a set of parts having all the features of the preamble of claim 1.

**[0006]** Unfortunately the above prior art frame elements have a number of drawbacks. During a fire these outer frames can act as a thermal bridge allowing heat to quickly spread to the other side of the wall construction potentially starting a fire on the other side of the wall, even when the wall elements are constituted by fire-rated glass. Further, heat from the fire may result in deformation of the frames and the entire wall construction may become unstable with a risk of collapsing.

**[0007]** Especially when it comes to the joining of the different wall elements to each other, different initiatives have been taken to try to obtain a higher fire-shielding effect. This often results in bulky and un-aesthetic solutions, which are undesirable, particularly in glass wall constructions, which are often chosen for their aesthetic properties. Further these solutions are often very complex and therefore expensive to manufacture and/or difficult to install.

**[0008]** Thus, it remains a problem to provide a good and reliable fire protection system for wall constructions that has improved fire-shielding properties and which is suitable for use in glass walls.

Summary of the invention

**[0009]** With the first aspect of the invention this object is met by providing a set of parts according to claim 1 and comprising a fire-shielding U-shaped outer frame element adapted for supporting a side of at least one wall element in a wall construction, said outer frame element being elongate and comprising a bottom part and a first side flange and a second side flange extending at an angle to the bottom part, an interior surface of the first side flange being adapted for extending along a first exterior surface of the wall element and an interior surface of the second side flange being adapted for extending along a second exterior surface opposite the first exterior surface of the wall element in a mounted condition of the outer frame element so as to hold the wall element to form said wall construction, wherein the outer frame element comprises a first elongate strip and a plurality of perforations in the bottom part, first side flange and/or second side flange, said first strip comprising a material having thermal shielding properties and being arranged on an interior and/or exterior surface of the first side flange and/or second side flange of the outer frame element so as to shield the wall element from heat from a fire.

**[0010]** By providing a U-shaped outer frame element comprising a plurality of perforations, the outer frame element has a smaller heat transfer surface than if it was made without perforations, whereby less heat from a fire will be transferred both from one side of the wall to the other, but also from the outer frame element to the wall element itself.

**[0011]** Further, the plurality of perforations can absorb deformations occurring in the outer frame element during a fire. This is advantageously because the side of the outer frame element facing the fire, also referred to as the hot side, will deform more than the side of the outer frame element being farthest from the fire, also referred to as the cold side. When the outer frame element is able to absorb such deformations, the wall construction is less likely to become unstable and collapse.

**[0012]** The plurality of perforations may be of any desirable shape such as for example circular, rectangular, trapezoid or parallelogram. The perforations may be elongate in the longitudinal direction of the outer frame element, thereby providing a good balance between the amount of material available for heat transfer and the strength and stiffness of the outer frame element. The plurality of perforations may be arranged in at least two rows extending in a longitudinal direction of the outer frame element, perforations of one row being staggered with respect to adjacent perforations of another row. By placing the perforations of one row staggered with respect to the adjacent rows, and so on for each row, the heat from the fire has a longer route from one side of the outer frame element to the other. Thereby the time period until the heat reaches the other side of the wall is prolonged. Likewise, sound will have a longer route from one side to the other of the outer frame element.

**[0013]** The outer frame element may be made from a material chosen from the group consisting of aluminum, steel, alloys, composites, carbon fiber and/or glass fiber or made from a combination of such materials, but any material having a high strength and a high melting point may in principle be used. The use of materials having a low thermal conductivity may also be advantageous.

**[0014]** The dimensions of the outer frame element may vary according to the type of cover profiles and wall elements to be used in the wall construction. Different types of fire-rated glass used in the wall element will work differently, which may be adjusted for in the outer frame elements. The outer frame element may have a length of 0.75 to 1.25 m, preferably 0.90 to 1.10 m, more preferred approximately 1 m. The material thickness will typically be approximately 0,5-5 mm depending on the material used, typically approximately 1 mm when using steel. The height of the first and second side flanges in the direction perpendicular to the longitudinal direction, i.e. in the direction away from the bottom part will typically be approximately 10-50 mm, preferably approximately 15-30 mm. The distance between the side flanges will correspond substantially to the width of the wall elements, typically 5-100 mm and more specifically 16-50 mm.

**[0015]** The outer frame element may be attached to adjacent walls, ceilings and/or floors by fastening means, such as nails, screws, staples, adhesive, etc.

**[0016]** One outer frame element may be in contact with two or more wall elements at the same time, covering the gaps between the wall elements. The U-shaped outer frame element may further comprise a second elongate strip comprising a material having thermal shielding properties, the second strip being arranged on an interior and/or exterior surface of the bottom part of the outer frame element so as to shield the wall element from heat from a fire.

**[0017]** By providing an outer frame element comprising a first elongate strip and/or a second elongate strip, a desirable heat-shielding barrier is obtained, further preventing heat from the fire from spreading from one side of the wall element to the other side, and also from the outer frame element to a side of the wall element. As used herein the terms "prevent/preventing" and "shield/shielding" is intended to refer to the effect of acting as a barrier that postpones the heat from transferring from one side to another or from one element to another.

**[0018]** The delay in the spreading of heat/fire will depend on the material of the strips. The first and/or second elongate strip are made from a material having thermal shielding properties, such as magnesium silicate, and/or intumescent properties, such as ammonium phosphate, including mixtures thereof. The first and/or second strip may comprise additional materials such as adhesives for attaching the strip to the outer frame element or interconnecting different layers of material.

**[0019]** As used herein the term "intumescent" is intended to refer to the effect of swelling up when heated, thus

protecting the material underneath or sealing a gap in the event of a fire.

**[0020]** By providing a second strip having intumescent properties on the interior and/or exterior surface of the bottom part, any gap between the outer frame element and an adjacent floor, wall or ceiling and/or between the outer frame element and the wall element(s) will be sealed during a fire. This will shield the outer frame element and help in preventing heat from the fire from reaching from one side of the wall construction to the other side.

**[0021]** Thermal shielding properties of the first and/or second strip may arise from a cooling effect caused primarily by the materials emission of water vapour during high temperatures.

**[0022]** The type of material chosen for the first and/or second strip and the position of the strip(s) will also depend on the type of material used in the wall element, since for example some types of glass may have a build-in intumescent effect in the glass edge.

**[0023]** The first and/or second strip may be attached to the outer frame element by means of mechanical means, such as screws, nails, staples or the like, and/or a high-temperature adhesive. By using a high-temperature resistant adhesive, the adhesive may also function as a heat-shield thereby improving the total heat-shielding properties of the strip. Further, the use of high-temperature resistant adhesive and/or mechanical means will ensure that the strip stays attached to the outer frame element during a fire.

**[0024]** The first strip may extend over substantially the entire interior and/or exterior surface of the first side flange and/or the second side flange of the outer frame element. By providing a strip that covers an entire surface of a side element, the heat-shielding properties of the entire outer frame element is improved.

**[0025]** By positioning the outer frame element comprising the first and/or second strip at desired positions, extra protections can be provided at specific areas where this protection is desired, such as corners, openings and/or wall transitions. A similar effect may also be achieved by using outer frame element(s) extending substantially along the entire side of a wall element and arranging the first and/or second strip(s) only at positions, where protection is most needed. A finishing element, such as a facing profile or list, may be arranged on the first strip and/or the exterior surface of the side flange. The finishing element may have a variety of different shapes to give the finished wall construction different expressions depending on customer desire. The invention involves a set of parts according to claim 1 having fire-shielding properties for assembly of a first and a second wall element into a wall construction, bringing the set of parts from an inactive supply condition to an active mounted condition, the set of parts comprising: a fire-shielding U-shaped outer frame element as described above, the outer frame element being adapted for supporting a side of the first and/or second wall element, and a fastening means adapted for being arranged between the first and

second wall elements, so as to hold the first and second elements together to form said wall construction.

**[0026]** As used herein the term "inactive condition" refers to the state where the different elements are un-assembled. The term "active (mounted) condition" refers to the assembled state of the different elements.

**[0027]** By providing fastening means for establishing support between the first and second wall elements together with the outer frame element, an even more stable wall construction is obtained, where the fastening means may provide further improved safety with regards to the heat from the fire being transferred from one side of the wall construction to the other side. The fastening means is a material having fire-shielding properties, such as an adhesive or like bonding compound, including silicone, but the fastening means may also comprise a second fire-shielding material, such as a band of magnesium silicate.

**[0028]** By providing the fastening means with fire-shielding materials, the fire-shielding properties of the fastening means and thereby the set of parts is increased. The fire-shielding fastening means comprises a fastening element comprising: an elongate base part having a first end and a second end, a holding part connected to the first end of the base part, a fixation part connected to the second end of the base part, the fixation part comprising a first fixation arm and a second fixation arm, the base part and the fixation part extending, in the inactive condition, in the same plane, wherein the fastening element is adapted for being arranged in said active mounted condition with the base part positioned between the first and second wall elements, the holding part extending at an angle to the base part and extending along first exterior surfaces of the first and/or second wall elements, the first and second fixation arms extending at an angle to the base part and extending along a second exterior surface of the first and/or second wall element, so as to hold the first and second wall elements together to form said wall construction.

**[0029]** As used herein the term "extending along" is to be understood as objects being in planes that are substantially parallel and close to each other.

**[0030]** The base part is to be understood as the part of the fastening element that in the active mounted condition is positioned between the wall elements. An elongate slit in the fixation part may separate the fixation part into the first and the second fixation arms. The slit may continue into the base part and/or extend all the way from the fixation part to the holding part.

**[0031]** In some embodiments, in the inactive condition, the holding part is U-shaped comprising a head part and two arms, the head part being connected to the first end of the base part and the two arms extending along opposite sides of the base part in a longitudinal direction of the base part.

**[0032]** In the active mounted condition, the holding part and the base part may extend in respective planes forming a mutual angle of 80° to 100°, preferable 85 to 95°,

more preferred approximately 90°, and/or the first fixation arm and the base part may extend in respective planes forming a mutual angle of 80° to 100°, preferable 85° to 95°, more preferred approximately 90°, and/or the second fixation arm and the base part may extend in respective planes forming a mutual angle of 80° to 100°, preferable 85° to 95°, more preferred approximately 90°, and/or the holding part and the first and second fixation arms may extend in parallel planes.

**[0033]** The fastening element being in its inactive condition may for example be made by a process of punching one single work-piece out from a single sheet of plate metal (or like material) and then folding and/or bending the work-piece into the active mounted condition of the fastening element. Hereby, a time-consuming process of assembling several parts to form the fastening element is avoided. It should be noted that it is alternatively possible to for example cast or mould the fastening element in one integral piece to avoid assembly or reshaping of the fastening element.

**[0034]** A bendable fastening element may be made from any suitable material, with any suitable thickness as long as the material is deformable and maintains the desired strength to hold the wall elements in place. For example the fastening element may substantially be constituted by sheet metal, preferably sheet steel, but other materials having similar cold deformation properties and a high melting point may also be used.

**[0035]** In order to make the gap between the wall elements as small as possible and to reduce the amount of material, which may lead heat from one side of the wall to the other, the fastening element is preferably of a very slim construction, preferably plate shaped. When using steel the fastening element may be provided with a thickness of 0.3 to 11 mm, preferably 0.5 to 0.9 mm, more preferred 0.7 mm. This can also be a positive quality with regards to sound isolation. The dimensions of the fastening element may also vary according to the type of cover profiles and wall elements used.

**[0036]** The fastening element may also be provided with pre-tensioned fixation arms being able to snap into place when the fastening element is mounted.

**[0037]** The holding part of the fastening element may be provided with a rounded head resembling the head of a nail in order to allow a good load distribution on the surface(s) it abuts on. The holding part may, however, also be in the form of one of more flanges, which may possibly be bent in situ in connection with the mounting of the fastening member.

**[0038]** In the active mounted condition the first fixation arm and the second fixation arm may extend in mutually opposite directions in order to achieve a particularly stable connection and distribute pressure. In the active mounted condition of the fastening element, the first and second fixation arms will usually extend in the same plane.

**[0039]** In some embodiments the fastening means further comprises: a first and a second cover profile each

comprising at least one longitudinal elongate slot, the first cover profile being adapted for extending along the first exterior surfaces of each of the first and second wall elements at the joint between them in a mounted condition, the second cover profile being adapted for extending along the second exterior surfaces opposite the first exterior surfaces of each of the first and second wall elements at the joint between them in a mounted condition, where the first end of the base part extending through the at least one slot of the first cover profile and the second end of the base part extending through the at least one slot of the second cover profile, the holding part extending at an angle to the base part and extending along an exterior surface of the first cover profile, and the first and second fixations arms extending at an angle to the base part and extending along an exterior surface of the second cover profile, so as to hold the first and second cover profiles and first and second wall elements together to form said wall construction.

**[0040]** By providing the cover profiles between the fastening element(s) and the wall elements a more uniform load distribution will be applied to the wall elements, thereby creating a stable wall construction with improved fire-shielding properties with a minimal use of material.

**[0041]** When the cover profiles cover a substantial part of the gap between neighbouring wall elements, heat is further prevented from reaching from one side of the wall construction to the other during a fire. This can also be a positive quality with regards to sound isolation.

**[0042]** The dimensions of the slots of the cover profiles may vary according to the size and shape of the different parts of the fastening element. By providing slots that are wider than the width of the base part of the fastening element, it is possible for the cover profile to absorb deformation of the connection and widening of the fastening element that may occur during a fire.

**[0043]** The cover profiles may have corner flanges which are extending at approximately 90° towards the exterior surfaces of the wall elements in the mounted condition. Thereby the cover profiles can hold a fire-shielding material between an interior surface of the cover profile and the exterior surface of the wall elements. The corner flanges may abut the exterior surface of the wall elements.

**[0044]** A finishing element, such as a facing profile, may be provided for covering the fastening means including the cover profiles if any. The finishing element may have a variety of different shapes to give the finished wall construction different expressions depending on customer desire.

**[0045]** In a second aspect the invention involves a wall construction according to claim 7 having fire-shielding properties and comprising a set of parts according to the first aspect, the wall construction further comprising at least two wall elements assembled to form a wall construction by means of the set of parts, said wall elements being held in place by the set of parts. In some embodiments the wall construction comprises at least two fas-

tening elements mounted such that the holding part of a first fastening element is located on one side of the wall elements and the holding part of the second fastening element is located on the opposite side of the wall elements.

**[0046]** By providing at least two fastening elements, a more stable wall construction is obtained, the fastening elements providing a more equal pressure to the wall elements and cover profiles, if any. Having the holding parts of different fastenings elements on opposite sides of the wall construction provides symmetry to the wall construction, so that both sides of the wall construction will react substantially in the same way to a fire.

**[0047]** In some embodiments the wall construction comprises at least a first, a second and a third cover profile, the first and third cover profiles extending along the first exterior surfaces of the wall elements, and the second cover profile extending along the second exterior surfaces opposite the first exterior surfaces of the wall elements, the at least three cover profiles being arranged such that a first fastening element connects to the first and second cover profiles and a second fastening element connects to the second and third cover profiles.

**[0048]** By providing at least three cover profiles, which are staggered in relation to each other, extra stability of the wall construction is provided.

**[0049]** The dimensions of the cover profiles element may vary according to the type of fastening elements and wall elements. The cover profile may be provided with a length corresponding to 0.75 to 1.25 m, preferably 0.90 to 1.10 m, more preferred 1 m. Their width will depend on the size of the wall elements and the fastening means used, but will typically be 15-50 mm, preferably 25-30 mm.

**[0050]** Cover profiles and U-shaped outer frame elements arranged on the same side of the wall elements may be arranged at a distance from each other in the active mounted condition, so that the profiles/elements will be able to expand and to absorb the expansion of the glass, which might curve outwards during a fire putting extra pressure on the profiles and/or elements. Further, the heat transfer from one profile/element to another will be significantly reduced. When using metal profiles/element said distance may be 1 to 10 mm, preferably 3 to 7 mm, more preferred approximately 5 mm.

**[0051]** Alternatively, the cover profiles and/or U-shaped outer frame elements may be mounted with an overlap between edges of adjacent profiles/elements, the overlapping sections possibly having reduced thickness.

**[0052]** In some embodiments the wall elements are made from glass, preferably fire-rated glass. Hereby the entire thermal bridging effect of the wall construction is minimized.

**[0053]** In a third aspect the invention involves a method according to claim 11 for mounting a wall construction having fire-shielding properties comprising the steps of:

providing a set of parts as described above for assembly of a first and a second wall element into a wall construction,  
 arranging the U-shaped outer frame element on a side of the first and/or second wall element,  
 positioning the fastening element being in its inactive condition such that the base part is positioned between the first and second wall elements,  
 arranging the holding part such that it extends along a first exterior surface of each of the first and second wall elements, and  
 bending the first and second fixations arms, so that the first and second fixations arms extend along a second exterior surface opposite the first exterior surface of each of the first and second wall elements, so as to hold the wall elements together to form said wall construction.

**[0054]** In some embodiments the method further comprising the steps of:

arranging a first cover profile such that it extends along the first exterior surface of each of the first and second wall elements,  
 arranging the second cover profile such that it extends along the second exterior surface of each of the first and second wall elements,  
 positioning the fastening element being in its inactive condition such that the first end of the base part extends through the slot of the first cover profile and the second end extends through the slot of the second cover profile and the base part being positioned between the first and second wall elements,  
 arranging the holding part such that it extends along an exterior surface of the first cover profile, and  
 bending the first and second fixations arms, so that the first and second fixations arms extend along the exterior surface of the second cover profile, so as to hold the first and second cover profiles and wall elements together to form said wall construction.

**[0055]** The different aspects of the present invention can be implemented in different ways, each yielding one or more of the benefits and advantages described in connection with at least one of the aspects described above, and each having one or more preferred embodiments, including the embodiments described in connection with at least one of the aspects above and/or disclosed in the dependent claims.

#### Brief description of the drawings

**[0056]** Objects, features and advantages of the present invention will be further outlined by the following illustrative and non-limiting detailed description of embodiments or parts of embodiments of the present invention, with reference to the appended drawings, wherein:

Figure 1 a shows a perspective view of an outer frame element without fire-shielding strips,  
 Figure 1b shows a perspective view of an outer frame element,

Figure 1c shows an end view of an outer frame element with only a second fire-shielding strip,

Figure 2 shows a top view of a cover profile,

Figure 3a shows a top view of a fastening element in inactive condition,

Figure 3b shows a perspective view a fastening element in active condition,

Figure 3c shows a schematic view of a fastening element as in Fig. 3b from a different angle,

Figure 4 shows a horizontal sectional view of a set of parts in an active mounted condition,

Figure 5 shows a perspective sketch of another set of parts according to the first aspect of the invention, and

Figure 6 shows a perspective view of U-shaped outer frame elements of a wall construction.

#### Detailed description

**[0057]** In the following description reference is made to the accompanying figures, which show by way of illustration how the invention may be practiced. Note that for illustrative purposes the dimensions, especially thicknesses, of the different elements shown may be exaggerated.

**[0058]** Figure 1 a shows a fire-shielding U-shaped outer frame element 1 adapted for supporting a side of at least one wall element in a wall construction. The outer frame element 1 comprising a bottom part 12, a first side flange 13 and a second side flange 14. The first side flange 13 and the second side flange 14 extending at an angle to the bottom part 12.

**[0059]** The first side flange 13 comprises an interior 131 and an exterior 132 surface and the second side flange 14 comprises an interior 141 and an exterior 142 surface, the interior surfaces 131, 141 being arranged opposite each other. The outer frame element 1 is elongate and the side flanges extend in a longitudinal direction A of the outer frame element along the longest side of the bottom part 12. The interior surfaces 131, 141 of the side flanges 13, 14 are adapted for extending along opposite exterior surfaces of the wall element(s) (not shown) in a mounted condition of the outer frame element 1.

**[0060]** The first side flange 13 and the bottom part 12 extend in respective planes forming a mutual angle of approximately 90° and the same applies to the second side flange 14 with respect to the bottom part. Here the first side flange 13 and second side flange 14 extends in parallel planes, but the side flanges may also the extend at an angle of less than approximately 90° to the bottom part in an inactive condition so as to project towards each other. If the opening between the side flanges has a width smaller than the thickness of the wall element, the side

flanges will be forced away from each other during mounting of the wall construction, preferably to extend at an angle of approximately 90° with the bottom part in an active mounted condition. This will result in the side flanges applying pressure on the wall element(s) in the mounted condition, whereby the outer frame element may fixate itself to the wall element(s).

**[0061]** The outer frame element 1 comprises a plurality of perforations 15 arranged in a plurality of rows extending in the longitudinal direction A of the outer frame element 1. The perforations of one row, exemplified by perforation 151, being staggered with respect to the perforations of the adjacent row, exemplified by perforation 152.

**[0062]** In this outer frame element the perforations 15 are elongate and having rounded shapes, but it will be understood that other shapes are also possible. Likewise, the perforations need not be evenly distributed over the entire outer frame element, but may, for example, be left in the bottom part or in one or both of the first and second side flanges. Moreover, the outer frame element may include perforations of different sizes and/or shapes.

**[0063]** Figure 1b shows fire-shielding U-shaped outer frame element 1 as described with reference to figure 1 a where the outer frame element 1 comprises two first elongate strips 16a, 16b.

**[0064]** The first strips 16a, 16b are arranged on the exterior surfaces 132,142 of the first side flange 13 and the second side flange 14, respectively. The first strips 16a, 16b shield the wall element from heat from a fire.

**[0065]** In figure 1b an end of the outer frame element is shown without the strips, but it will be understood that the first strips 16a, 16b may extend over substantially an entirety of the exterior surfaces 132,142 of the side flanges 13,14.

**[0066]** Figure 1c shows the fire-shielding U-shaped outer frame element 1 as described with reference to figure 1 a where the outer frame element 1 comprises a second elongate strip 17.

**[0067]** The bottom part 12 comprising an interior surface 121 and an exterior surface 122, the second strip 17 being arranged on the interior surface 121 of the bottom part 12 to shield the wall element (not shown) from heat from a fire.

**[0068]** Here the second strip 17 is arranged with a small distance to the side flanges 13, 14, but it may also be arranged so that it abuts the interior surfaces 131,141 of the side flanges.

**[0069]** As described with reference to the first strips 16a, 16b, the second strip 17 may extend over substantially the entire length of the bottom part 12.

**[0070]** First and the second strips may be arranged at varying positions on the outer frame element, also in combination with each other. For example, the second strip 17 may be arranged on the exterior surface of the bottom part 12, possibly formed in one with the first strips 16a, 16b, or the first strips may be arranged on the interior sides of the side flanges 13, 14.

**[0071]** Here the first and second strips 16a, 16b, 17 are attached to the outer frame element 1 by means of a high-temperature resistant adhesive (not shown), but the strips may also be attached to the outer frame element 1 by mechanical means such as screws, nails, rivets, studs, staples or the like.

**[0072]** The first and second strips 16a, 16b, 17 preferably comprise material having thermal shielding properties, such as magnesium silicate, and/or intumescent properties, such as ammonium phosphate.

**[0073]** Figure 3a shows a top view of a fastening element 4 in an inactive condition. The fastening element comprises an elongate base part 41 having a first end 411 and a second end 412 and two opposite sides 413, 414 extending in the longitudinal direction B.

**[0074]** The fastening element 4 further comprises a holding part 42 comprising a head part 421 and two arms 422, 423 extending in the same plane as the base part 41. The head part 421 is connected to the first end 411 of the base part 41. The one arm 422 extends along one side 413. The other arm 423 extends along the other side 414.

**[0075]** The fastening element 4 further comprises an elongate fixation part 43 connected to the second end 412 of the base part 41. The fixation part 43 comprises an elongate slot defining a first fixation arm 431 and a second fixation arm 432, said fixation arms extending in the same plane and in the longitudinal direction B. Here the length of the first 431 and second 432 fixation arms are the same, but the length may be different from each other.

**[0076]** In this fastening element the base part 41, the U-shaped holding part 42 and the fixation part 43 extends in the same plane in order to be obtainable by a process of punching one single work-piece 4 out from a single sheet of plate metal. The work-piece 4 is subsequently folded or bent into the active mounted condition of the fastening element 4 shown in figure 3b. The folding lines a and b are perpendicular to the longitudinal direction B as shown with dashed lines. All foldings are by approximately 90°. The folding line b defines the transition between the base part and the fixation part. The elongate slot of the fixation part may extend to into the base part or extend all the way from the fixation part to the holding part.

**[0077]** The distance between the folding line a and folding line b corresponds approximately to the wall thickness of the wall elements. The fold lines a and/or b may be indicated by means, such as colouring or mechanical marking, to indicate when the fastening element has pushed far enough through the gap between the wall elements. A weakening of the material at the folding line b may be applied to make the bending easier, said weakening potentially also serving as a bending indication.

**[0078]** Figures 3b and 3c show fastening elements 4, 8 in an active condition. The holding parts 42, 82 and the base parts 41, 81 extend in respective planes forming a mutual angle of approximately 90°. The first fixation arms

431, 831, 432, 832 and the base part 41, 81 extend in respective planes forming mutual angles of approximately 90°. The first 431, 831 and second 432, 832 fixations arms extend in opposite directions in the same plane. The holding part 42, 82 and the first 431, 831 and second 432, 832 fixations arms extend in parallel planes.

**[0079]** Figure 2 shows a top view of a cover profile 2 comprising an interior surface 23 (not visible) and an exterior surface 22 and at least one longitudinal elongate slot 21, which is wider than the fixation part and base part of the fastening element. The cover profile 2 is adapted for extending along a first exterior surface of each of the first and second wall elements in a mounted condition.

**[0080]** Figure 4 shows a horizontal sectional view of a fire-shielding fastening means 200 in an active mounted condition. The fastening means 200 comprises a first 2 and a second 3 cover profile as described with reference to Fig. 2 and a fastening element 4 as described with reference to Figs 3a-3c. The fastening means 200 is arranged between a first 6 and a second 7 wall element, so as to hold the first 6 and second 7 elements together.

**[0081]** The first cover profile 2 extends along a first exterior surface 61, 71 of each of the first 6 and second 7 wall elements. The second cover profile 3 extends along a second exterior surface 62, 72 opposite the first exterior surface 61, 71 of each of the first 6 and second 7 wall elements.

**[0082]** A first fire-shielding material 10 is positioned between the first and second cover profiles 2, 3 and the wall elements 6, 7. The fire-shielding material 10 is abutting the interior surfaces 23, 33 of the cover profiles 2, 3 and the exterior surfaces 61, 71, 62, 72 of the first 6 and second 7 wall elements.

**[0083]** The base part 41 of the fastening element is positioned between the first 6 and second 7 wall elements. The first end 411 extends through a slot 21 in the first cover profile 2 and the second end 412 extends through a corresponding slot 31 in the second cover profile 3. The holding part 42 is bent approximately 90° with regards to the base part 41 and abuts an exterior surface 22 of the first cover profile 2.

**[0084]** The first 431 and second 432 fixations arms are bent approximately 90° with regards to the base part 41. The fixations arms 431, 432 extend in opposite directions away from the base part 41 and abut an exterior surface 32 of the second cover profile 3.

**[0085]** A second fire-shielding material 11 is positioned between the wall elements 6, 7 and the base part 41.

**[0086]** The purpose of both the first fire-shielding material 10 and the second fire-shielding material 11 is to prevent fire from spreading via the gap between the wall elements 6, 7 and to protect the edges of the wall elements in the same way as the fire-shielding strips attached to the outer frame element(s) as described above. The first and second fire-shielding material 10, 11 can be made from the same material(s) as the fire-shielding strips 16a, 16b, 17 on the outer frame element(s).

**[0087]** First and second fire-shielding materials may

be provided in varying combinations between and/or on the wall elements and cover profiles.

**[0088]** Figure 5 shows a perspective sketch of a wall construction made with a set of parts 100 in an active mounted condition. The set of parts 100 comprises a first fire-shielding U-shaped outer frame element 1 and a second outer frame element 5 supporting a side of the second wall element 7, and a fire-shielding fastening means 200 arranged between the first 6 and second 7 wall elements, so as to hold the first 6 and second 7 elements together.

**[0089]** An interior surface 131 of the first side flange 13 of the first outer frame element 1 abuts a first exterior surface 71 of the second wall element 7, and an interior surface 141 of the second side flange 14 abuts a second exterior surface 72 opposite the first exterior surface 71 of the second wall element 7. The same applies to the second outer frame element 5.

**[0090]** Cover profiles 2, 3 extend along the exterior surfaces 61, 71, 62, 72 of the first 6 and second 7 wall elements in the same way as described with reference to Fig. 4.

**[0091]** First 4 and second 8 fastening elements are mounted between the first 6 and second 7 wall elements and interconnecting covering profiles 2, 3, 9 in the way described with reference to Fig. 4. Holding parts 42 of first fastening elements 4 abut a first cover profile 2 and fixation parts (not shown) of the first fastening elements 4 abut a second cover profile 3. Holding parts (not shown) of second fastening elements 8 abut the second cover profile 3 and fixation parts 83 of the second fastening elements 8 abut a third cover profile 9 arranged in continuation of the first cover profile 2 along the first exterior surfaces 61, 71 of the wall elements 6, 7.

**[0092]** Here the first cover profile 2 and the third cover profile 9 are mounted at a distance from each, said distance being approximately 5 mm, in order to allow thermal expansion of the cover profiles but alternatively they might overlap. The first 1 and second 5 outer frame elements are arranged with a similar distance for the same purpose.

**[0093]** The staggered position of the cover profiles contributes to a wall construction which is both very stable and with excellent fire-shielding properties due to the absence of parallel horizontal joints between the cover profiles on the two sides of the wall.

**[0094]** The fastening elements 4, 8 may be positioned in any desired direction, so that the holding parts 42, 82 and fixation parts 43, 83 abut either of the at least three cover profiles 2, 3, 9, but arranging the holding parts on opposite sides of the wall contributes to a symmetrical and hence stable wall construction.

**[0095]** Figure 6 shows a perspective view of a wall construction 300 mounted by means of U-shaped outer frame elements 1.

**[0096]** Finishing elements 18 are mounted on the exterior sides of the outer frame elements 1 to give a pleasing aesthetic look. The finishing elements may be of any



design and any materials, such as aluminium or polymers. The finishing elements may be mounted with any non-fire-resistant fastening means, so that they will fall off during a fire. Similar finishing elements may be provided on the cover profiles described with reference to Figs 4 and 5.

**[0097]** The wall elements 6, 7 shown in Figs 4-6 are made from fire-rated glass, but the invention also applies to wall constructions with other types of wall elements.

**[0098]** Although some embodiments have been described and shown in detail herein, the invention is not restricted to them, but may also be embodied in other ways within the scope of the subject matter defined in the following claims. In particular, it is to be understood that other embodiments may be utilised and structural and functional modifications may be made without departing from the scope of the present invention.

**[0099]** In device claims enumerating several means, several of these means can be embodied by one and the same item of hardware. The mere fact that certain measures are recited in mutually different dependent claims or described in different embodiments does not indicate that a combination of these measures cannot be used to advantage.

**[0100]** It should be emphasized that the term "comprises/comprising" when used in this specification is taken to specify the presence of stated features, integers, steps or components but does not preclude the presence or addition of one or more other features, integers, steps, components or groups thereof.

## Claims

1. A set of parts (100) having fire-shielding properties for assembly of a first and a second wall element into a wall construction, the set of parts (100) comprising:

a fire-shielding U-shaped outer frame element (1) adapted for supporting a side of at least one wall element in a wall construction, said outer frame element (1) being elongate and comprising a bottom part (12) and a first side flange (13) and a second side flange (14), the first and second side flanges extending away from the bottom part (12), an interior surface (131) of the first side flange (13) being adapted for extending along a first exterior surface of the wall element and an interior surface (141) of the second side flange (14) being adapted for extending along a second exterior surface opposite the first exterior surface of the wall element in a mounted condition of the outer frame element (1) so as to hold the wall element to form said wall construction, wherein the outer frame element (1) comprises a first elongate strip (16) and a plurality of perforations (15) in the bottom part, the

first side flange and/or the second side flange, said first strip (16) comprising a material having thermal shielding properties and being arranged on an interior (131, 141) and/or exterior (132, 142) surface of the first side flange (13) and/or second side flange (14) of the outer frame element (1), wherein the outer frame element (1) being adapted for supporting a side of the first and/or second wall element when in an active mounted condition,

**characterized in that** the set of parts further comprises

a fire-shielding fastening means (200) adapted for being arranged between the first and second wall elements, so as to hold the first and second elements together, wherein the fire-shielding fastening means (200) comprises a fastening element (4) comprising:

- an elongate base part (41),
- a holding part (42) connected to a first end (411) of the base part (41),

wherein the fastening element (4) is adapted for being arranged in said active mounted condition with

- the base part (41) positioned between the first and second wall elements,

the holding part (42) extending at an angle to the base part (41) and extending along first exterior surfaces (61, 71) of the first (6) and/or second (7) wall elements, wherein the fastening element (4) further comprises:

- a fixation part (43) connected to a second end (412) of the base part (41), the fixation part (43) comprising a first fixation arm (431) and a second fixation arm (432),
- where the base part (41) and the fixation part (43) extend in the same plane when in an inactive condition, and

the fastening element (4) is adapted for being arranged in said active mounted condition with the first (431) and second (432) fixation arms extending at an angle to the base part (41) and extending along a second exterior surface (62, 72) of the first (6) and/or second (7) wall element, so as to hold the first (6) and second (7) wall elements together.

2. A set of parts (100) according to claim 1, wherein the fire-shielding fastening means (200) further comprises:

- a first (2) and a second (3) cover profile each comprising at least one longitudinal elongate slot (21, 31), the first cover profile (2) being adapted for extending along the first exterior surfaces (61, 71) of each of the first (6) and second (7) wall elements at the joint between them in a mounted condition, the second cover profile (3) being adapted for extending along the second exterior surfaces (62, 72) opposite the first exterior surface of each of the first (6) and second (7) wall elements at the joint between them in a mounted condition, where the first end (411) of the base part is adapted for extending through the at least one slot (21) of the first cover profile (2) and the second end (412) of the base part is adapted for extending through the at least one slot (31) of the second cover profile (3), so that in the mounted condition the holding part (42) is extending at an angle to the base part (41) and extending along an exterior surface (22) of the first cover profile (2), and the first (431) and second (432) fixations arms are extending at an angle to the base part (41) and extending along an exterior surface (32) of the second cover profile (3), so as to hold the first (2) and second (3) cover profiles and first and second wall elements together.
3. A set of parts (100) according to any one of claims 1-2, comprising at least two U-shaped outer frame elements (1, 5), the outer frame elements (1, 5) being adapted for being arranged in the active mounted condition at a distance from each other at a side of the first and/or second wall element, said distance being 1 to 10 mm, preferably 3 to 7 mm, more preferred approximately 5 mm.
  4. A set of parts (100) according to any one of claims 1 to 3, wherein in the active mounted condition the first (431) and second (432) fixations arms extend in opposite directions in the same plane.
  5. A set of parts (100) according to any one of the previous claims, wherein in the inactive condition the holding part (42) is U-shaped comprising a head part (421) and two arms (422, 423), the head part (421) being connected to the first end (411) of the base part (41) and the two arms (422, 423) extending along opposite sides (413, 414) of the base part (41) in a longitudinal direction (B) of the base part (41).
  6. A set of parts (100) according to any one of the previous claims, wherein the fastening element (4) in its inactive condition is a single work-piece punched out from a single sheet of plate metal and adapted for being brought into the active mounted condition by folding and/or bending.
  7. A wall construction (300) having fire-shielding properties and comprising a set of parts (100) according to any one of the claims 1 to 6, the wall construction (300) further comprising:
    - at least two wall elements (6, 7) assembled by means of the set of parts (100), said wall elements (6, 7) being held in place by the set of parts (100).
  8. A wall construction (300) according to claim 7, comprising at least two fastening elements (4, 8) mounted such that a holding part (42) of a first fastening element (4) is located on one side of the wall elements (6, 7) and a holding part (82) of the second fastening element (8) is located on the opposite side of the wall elements (6, 7).
  9. A wall construction (300) according to claim 7 or 8, comprising at least a first (2), a second (3) and a third (9) cover profile, the first (2) and third (9) cover profiles extending along the first exterior surfaces (61, 71) of the wall elements (6, 7), and the second cover profile (3) extending along the second exterior surfaces (62, 72) of the wall elements (6, 7) opposite the first exterior surfaces (61, 71), the at least three cover profiles (2, 3, 9) being arranged such that a first fastening element (4) connects to the first (2) and second (3) cover profiles and a second fastening element (8) connects to the second (3) and third (9) cover profiles.
  10. A wall construction (300) according to any one of claims 7 to 9, wherein the wall elements (6, 7) is made substantially from glass, preferably fire-rated glass.
  11. A method for mounting a wall construction (300) having fire-shielding properties comprising the steps of:
    - providing a set of parts (100) according to any one of claims 1 to 6 for assembly of a first (6) and a second (7) wall element into a wall construction (300)
    - arranging the U-shaped outer frame element (1) on a side of the first (6) and/or second (7) wall element,
    - positioning the fastening element (4) being in its inactive condition with the base part (42) between the first (6) and second (7) wall elements, arranging the holding part (41) such that it extends along a first exterior surface (61, 71) of each of the first (6) and second (7) wall elements, and
    - bending the first (431) and second (432) fixations arms, so that the first (431) and second (432) fixations arms extend along a second exterior surface (62, 72) opposite the first exterior

surface (61, 71) of each of the first (6) and second (7) wall elements, so as to hold the wall elements (6, 7) together.

12. A method for mounting a wall construction (300) according to claim 11, the method further comprising the steps of:

arranging a first cover profile (2) such that it extends along the first exterior surface (61, 71) of each of the first (6) and second (7) wall elements, arranging the second (3) cover profile such that it extends along the second exterior surface (62, 72) of each of the first (6) and second (7) wall elements,

positioning the fastening element (4) being in its inactive condition such that the first end (411) of the base part (41) extends through a slot (21) in the first cover profile (2) and the second end (412) extends through a slot (31) in the second cover profile (3) and the base part is positioned between the first (6) and second (7) wall elements,

arranging the holding part (41) such that it extends along an exterior surface (22) of the first cover profile (2), and

bending the first (431) and second (432) fixations arms, so that the first (431) and second (432) fixations arms extend along the exterior surface (32) of the second cover profile (3), so as to hold the first (2) and second (3) cover profiles and the wall elements (6, 7) together.

### Patentansprüche

1. Teilesatz (100) mit feuerabschirmenden Eigenschaften zum Einbauen eines ersten und eines zweiten Wandelements in eine Wandkonstruktion, wobei der Teilesatz (100) umfasst:

ein feuerabschirmendes U-förmiges äußeres Rahmenelement (1), angepasst zum Abstützen einer Seite wenigstens eines Wandelements in einer Wandkonstruktion, wobei das äußere Rahmenelement (1) länglich ist und einen unteren Teil (12) und eine erste Seitenwange (13) und eine zweite Seitenwange (14) umfasst, wobei sich die erste und die zweite Seitenwange vom unteren Teil (12) weg erstrecken, wobei im montierten Zustand des äußeren Rahmenelements (1) eine innere Fläche (131) der ersten Seitenwange (13) so angepasst ist, dass sie sich entlang einer ersten äußeren Fläche des Wandelements erstreckt, und eine innere Fläche (141) der zweiten Seitenwange (14) so angepasst ist, dass sie sich entlang einer zweiten äußeren Fläche erstreckt, die der ersten äußeren

Fläche des Wandelements entgegengesetzt ist, um das Wandelement so zu halten, dass es die Wandkonstruktion ausbildet, wobei das äußere Rahmenelement (1) einen ersten länglichen Streifen (16) und mehrere Perforationen (15) im unteren Teil, in der ersten Seitenwange und/oder der zweiten Seitenwange umfasst, wobei der erste Streifen (16) ein Material mit thermischen Abschirmungseigenschaften umfasst und an einer inneren (131, 141) und/oder äußeren (132, 142) Fläche der ersten Seitenwange (13) und/oder zweiten Seitenwange (14) des äußeren Rahmenelements (1) angeordnet ist, wobei das äußere Rahmenelement (1) so angepasst ist, dass es in einem aktiven montierten Zustand eine Seite des ersten und/oder zweiten Wandelements abstützt,

**dadurch gekennzeichnet, dass** der Teilesatz ferner umfasst:

ein feuerabschirmendes Befestigungsmittel (200) so angepasst, dass es zwischen dem ersten und dem zweiten Wandelement angeordnet wird, um das erste und zweite Element zusammenzuhalten, wobei das feuerabschirmende Befestigungsmittel (200) ein Befestigungselement (4) umfasst, welches umfasst:

- einen länglichen Basisteil (41),
- einen Halterungsteil (42), der mit einem ersten Ende (411) des Basisteils (41) verbunden ist,

wobei das Befestigungselement (4) so angepasst ist, dass es im aktiven montierten Zustand so angeordnet ist, dass

- der Basisteil (41) zwischen dem ersten und zweiten Wandelement positioniert ist,

der Halterungsteil (42) sich abgewinkelt zum Basisteil (41) erstreckt und entlang erster äußerer Flächen (61, 71) des ersten (6) und/oder zweiten (7) Wandelements verläuft, wobei das Befestigungselement (4) ferner umfasst:

- einen Befestigungsteil (43), der mit einem zweiten Ende (412) des Basisteils (41) verbunden ist, wobei der Befestigungsteil (43) einen ersten Befestigungsarm (431) und einen zweiten Befestigungsarm (432) umfasst,
- wobei der Basisteil (41) und der Befestigungsteil (43) sich in einem inaktiven Zustand in der gleichen Ebene erstrecken und

das Befestigungselement (4) so angepasst ist,

- dass es im aktiven montierten Zustand so angeordnet ist, dass der erste (431) und der zweite (432) Befestigungsarm sich abgewinkelt zum Basisteil (41) erstrecken und entlang einer zweiten äußeren Fläche (62, 72) des ersten (6) und/oder zweiten (7) Wandelements verlaufen, um das erste (6) und das zweite (7) Wandelement zusammenzuhalten.
2. Teilesatz (100) nach Anspruch 1, wobei das feuerabschirmende Befestigungsmittel (200) ferner umfasst:
- ein erstes Abdeckprofil (2) und ein zweites Abdeckprofil (3), die jeweils wenigstens einen länglichen Schlitz (21, 31) umfassen, wobei das erste Abdeckprofil (2) so angepasst ist, dass es sich in einem montierten Zustand entlang der ersten äußeren Flächen (61, 71) des ersten (6) sowie zweiten (7) Wandelements an deren Verbindungsstelle erstreckt, wobei das zweite Abdeckprofil (3) so angepasst ist, dass es sich in einem montierten Zustand entlang der zweiten äußeren Flächen (62, 72) entgegengesetzt zu den ersten äußeren Flächen des ersten (6) sowie zweiten (7) Wandelements an deren Verbindungsstelle erstreckt, wobei das erste Ende (411) des Basisteils so angepasst ist, dass es sich durch den wenigstens einen Schlitz (21) des ersten Abdeckprofils (2) erstreckt, und das zweite Ende (412) des Basisteils so angepasst ist, dass es sich durch den wenigstens einen Schlitz (31) des zweiten Abdeckprofils (3) erstreckt, so dass im montierten Zustand der Halterungsteil (42) sich abgewinkelt zum Basisteil (41) erstreckt und entlang einer äußeren Fläche (22) des ersten Abdeckprofils (2) verläuft und der erste (431) und der zweite (432) Befestigungsarm sich abgewinkelt zum Basisteil (41) erstrecken und entlang einer äußeren Fläche (32) des zweiten Abdeckprofils (3) verlaufen, um so das erste (2) und das zweite (3) Abdeckprofil und das erste und zweite Wandelement zusammenzuhalten.
3. Teilesatz (100) nach einem der Ansprüche 1 bis 2, umfassend wenigstens zwei U-förmige äußere Rahmenelemente (1, 5), wobei die äußeren Rahmenelemente (1, 5) so angepasst sind, dass sie im aktiven montierten Zustand in einem Abstand zueinander an einer Seite des ersten und/oder zweiten Wandelements angeordnet sind, wobei der Abstand 1 bis 10 mm, bevorzugt 3 bis 7 mm, bevorzugter ca. 5 mm beträgt.
4. Teilesatz (100) nach einem der Ansprüche 1 bis 3,
- wobei im aktiven montierten Zustand sich der erste (431) und der zweite (432) Befestigungsarm in entgegengesetzten Richtungen in der gleichen Ebene erstrecken.
5. Teilesatz (100) nach einem der vorhergehenden Ansprüche, wobei im inaktiven Zustand der Halterungsteil (42) U-förmig ist und einen Kopfteil (421) und zwei Arme (422, 423) umfasst, wobei der Kopfteil (421) mit dem ersten Ende (411) des Basisteils (41) verbunden ist und die beiden Arme (422, 423) sich an entgegengesetzten Seiten (413, 414) des Basisteils (41) in einer Längsrichtung (B) des Basisteils (41) erstrecken.
6. Teilesatz (100) nach einem der vorhergehenden Ansprüche, wobei das Befestigungselement (4) in seinem inaktiven Zustand ein einzelnes Werkstück ist, das aus einem einzelnen Metallblech ausgestanzt wird und so angepasst ist, dass es durch Falzen und/oder Biegen in den aktiven montierten Zustand gebracht wird.
7. Wandkonstruktion (300), die feuerabschirmende Eigenschaften aufweist und einen Teilesatz (100) nach einem der Ansprüche 1 bis 6 umfasst, wobei die Wandkonstruktion (300) ferner umfasst:
- wenigstens zwei Wandelemente (6, 7), die mittels des Teilesatzes (100) zusammengebaut sind, wobei die Wandelemente (6, 7) durch den Teilesatz (100) ortsfest gehalten werden.
8. Wandkonstruktion (300) nach Anspruch 7, umfassend wenigstens zwei Befestigungselemente (4, 8), die so montiert sind, dass ein Halterungsteil (42) eines ersten Befestigungselements (4) sich an der einen Seite der Wandelemente (6, 7) befindet und ein Halterungsteil (82) des zweiten Befestigungselements (8) sich an der entgegengesetzten Seite der Wandelemente (6, 7) befindet.
9. Wandkonstruktion (300) nach Anspruch 7 oder 8, umfassend wenigstens ein erstes (2), ein zweites (3) und ein drittes (9) Abdeckprofil, wobei das erste (2) und das dritte (9) Abdeckprofil sich entlang der ersten äußeren Flächen (61, 71) der Wandelemente (6, 7) erstrecken und das zweite Abdeckprofil (3) sich entlang der zweiten äußeren Flächen (62, 72) der Wandelemente (6, 7) entgegengesetzt zu den ersten äußeren Flächen (61, 71) erstreckt, wobei die wenigstens drei Abdeckprofile (2, 3, 9) so angeordnet sind, dass ein erstes Befestigungselement (4) das erste (2) und zweite (3) Abdeckprofil verbindet und ein zweites Befestigungselement (8) das zweite (3) und dritte (9) Abdeckprofil verbindet.
10. Wandaufbau (300) nach einem der Ansprüche 7 bis

9, wobei die Wandelemente (6, 7) im Wesentlichen aus Glas, vorzugsweise aus Brandschutzglas, hergestellt sind.

11. Verfahren zum Montieren einer Wandkonstruktion (300) mit feuerabschirmenden Eigenschaften, umfassend die Schritte:

Bereitstellen eines Teilesatzes (100) nach einem der Ansprüche 1 bis 6 zum Einbauen eines ersten (6) und eines zweiten (7) Wandelements in eine Wandkonstruktion (300),  
Anordnen des U-förmigen äußeren Rahmenelements (1) an einer Seite des ersten (6) und/oder zweiten (7) Wandelements,  
Positionieren des in seinem inaktiven Zustand befindlichen Befestigungselements (4) dergestalt, dass sich das Basisteil (42) zwischen dem ersten (6) und dem zweiten (7) Wandelement befindet,  
Anordnen des Halterungsteils (41) dergestalt, dass es sich entlang einer ersten äußeren Fläche (61, 71) des ersten (6) sowie zweiten (7) Wandelements erstreckt, und  
Biegen des ersten (431) und des zweiten (432) Befestigungsarms dergestalt, dass sich der erste (431) und der zweite (432) Befestigungsarm entlang einer zweiten äußeren Fläche (62, 72) entgegengesetzt zur ersten äußeren Fläche (61, 71) des ersten (6) sowie zweiten (7) Wandelements erstrecken, um so die Wandelemente (6, 7) zusammenzuhalten.

12. Verfahren zum Montieren einer Wandkonstruktion (300) nach Anspruch 11, wobei das Verfahren ferner die Schritte umfasst:

Anordnen eines ersten Abdeckprofils (2) dergestalt, dass es sich entlang der ersten äußeren Fläche (61, 71) des ersten (6) sowie zweiten (7) Wandelements erstreckt,  
Anordnen des zweiten (3) Abdeckprofils dergestalt, dass es sich entlang der zweiten äußeren Fläche (62, 72) des ersten (6) sowie zweiten (7) Wandelements erstreckt,  
Positionieren des in seinem inaktiven Zustand befindlichen Befestigungselements (4) dergestalt, dass sich das erste Ende (411) des Basisteils (41) durch einen Schlitz (21) im ersten Abdeckprofil (2) erstreckt und sich das zweite Ende (412) durch einen Schlitz (31) im zweiten Abdeckprofil (3) erstreckt und der Basisteil zwischen dem ersten (6) und dem zweiten (7) Wandelement positioniert ist,  
Anordnen des Halterungsteils (41) dergestalt, dass es sich entlang einer äußeren Fläche (22) des ersten Abdeckprofils (2) erstreckt, und  
Biegen des ersten (431) und des zweiten (432)

Befestigungsarms dergestalt, dass der erste (431) und der zweite (432) Befestigungsarm sich entlang der äußeren Fläche (32) des zweiten Abdeckprofils (3) erstrecken, um das erste (2) und das zweite (3) Abdeckprofil und die Wandelemente (6, 7) zusammenzuhalten.

## Revendications

1. Ensemble de pièces (100) ayant des propriétés de protection contre l'incendie pour l'assemblage d'un premier et d'un second élément mural dans une structure murale, l'ensemble de pièces (100) comprenant :

un élément de cadre extérieur de protection contre l'incendie en forme de U (1) destiné à supporter un côté d'au moins un élément mural d'une structure murale, ledit élément de cadre extérieur (1) étant de forme allongée et comprenant une pièce inférieure (12) et une première bride latérale (13) et une seconde bride latérale (14), les première et seconde brides latérales s'écartant de la pièce inférieure (12), une surface intérieure (131) de la première bride latérale (13) étant destinée à s'étendre le long d'une première surface extérieure de l'élément mural et une surface intérieure (141) de la seconde bride latérale (14) étant destinée à s'étendre le long d'une seconde surface extérieure, opposée à la première surface extérieure de l'élément mural dans un état de montage de l'élément de cadre extérieur (1) de manière à maintenir l'élément mural de façon à former ladite structure murale, dans lequel l'élément de cadre extérieur (1) comprend une première bande de forme allongée (16) et une pluralité de perforations (15) dans la pièce inférieure, la première bride latérale et/ou la seconde bride latérale, ladite première bande (16) comprenant un matériau ayant des propriétés de protection thermique et étant disposée sur une surface intérieure (131, 141) et/ou extérieure (132, 142) de la première bride latérale (13) et/ou de la seconde bride latérale (14) de l'élément de cadre extérieur (1), dans lequel l'élément de cadre extérieur (1) est destiné à supporter un côté du premier et/ou du second élément mural lorsqu'il se trouve dans un état de montage actif,

**caractérisé en ce que** l'ensemble de pièces comprend en outre un moyen d'attache (200) ayant des propriétés de protection contre l'incendie destiné à être disposé entre le premier et le second élément mural, de manière à maintenir ensemble le premier et le second élément, dans lequel le moyen d'attache (200) ayant des propriétés de protection contre l'incendie com-

prend un élément d'attache (4) comprenant :

- une pièce de base de forme allongée (41),
- une pièce de maintien (42) reliée à une première extrémité (411) de la pièce de base (41),

dans lequel l'élément d'attache (4) est destiné à être disposé dans ledit état de montage actif avec

- la pièce de base (41) positionnée entre le premier et le second élément mural, la pièce de maintien (42) formant un certain angle par rapport à la pièce de base (41) et s'étendant le long des premières surfaces extérieures (61, 71) du premier (6) et/ou du second (7) élément mural, l'élément d'attache (4) comprenant en outre :
- une pièce de fixation (43) reliée à une seconde extrémité (412) de la pièce de base (41), la pièce de fixation (43) comprenant un premier bras de fixation (431) et un second bras de fixation (432),
- où la pièce de base (41) et la pièce de fixation (43) s'étendent dans le même plan lorsqu'elles se trouvent dans un état inactif, et

l'élément d'attache (4) est destiné à être disposé dans ledit état de montage actif, le premier (431) et le second (432) bras de fixation formant un certain angle par rapport à la pièce de base (41) et s'étendant le long d'une seconde surface extérieure (62, 72) du premier (6) et/ou du second (7) élément mural, de façon à maintenir ensemble le premier (6) et le second (7) élément mural.

2. Ensemble de pièces (100) selon la revendication 1, dans lequel le moyen d'attache (200) ayant des propriétés de protection contre l'incendie comprend en outre :

un premier (2) et un second (3) profil de recouvrement comprenant chacun au moins une fente longitudinale de forme allongée (21, 31), le premier profil de recouvrement (2) étant destiné à s'étendre le long des premières surfaces extérieures (61, 71) de chacun des premier (6) et second (7) éléments muraux au point où ils sont unis entre eux dans un état de montage, le second profil de recouvrement (3) étant destiné à s'étendre le long des secondes surfaces extérieures (62, 72) faisant face à la première surface extérieure de chacun des premier (6) et second (7) éléments muraux au point où ils sont unis entre eux dans un état de montage, où la première extrémité (411) de la pièce de base

est destinée à s'étendre à travers l'au moins une fente (21) du premier profil de recouvrement (2) et la seconde extrémité (412) de la pièce de base est destinée à s'étendre à travers l'au moins une fente (31) du second profil de recouvrement (3) de façon que, dans l'état de montage, la pièce de maintien (42) forme un certain angle par rapport à la pièce de base (41) et s'étende le long d'une surface extérieure (22) du premier profil de recouvrement (2), et les premier (431) et second (432) bras de fixation forment un certain angle par rapport à la pièce de base (41) et s'étendent le long d'une surface extérieure (32) du second profil de recouvrement (3), de façon à maintenir ensemble le premier (2) et le second (3) profil de recouvrement et le premier et le second élément mural.

3. Ensemble de pièces (100) selon l'une quelconque des revendications 1 et 2, comprenant au moins deux éléments de cadre extérieurs en forme de U (1, 5), les éléments de cadre extérieurs (1, 5) étant destinés à être disposés dans l'état de montage actif à une certaine distance l'un de l'autre sur un côté du premier et/ou du second élément mural, ladite distance étant comprise entre 1 et 10 mm, de préférence entre 3 et 7 mm, et étant de façon particulièrement préférable égale à environ 5 mm.
4. Ensemble de pièces (100) selon l'une quelconque des revendications 1 à 3, dans lequel, dans l'état de montage actif, le premier (431) et le second (432) bras de fixation s'étendent dans des directions opposées dans le même plan.
5. Ensemble de pièces (100) selon l'une quelconque des revendications précédentes, dans lequel, dans l'état inactif, la pièce de maintien (42) présente la forme d'un U comprenant une pièce de tête (421) et deux bras (422, 423), la pièce de tête (421) étant connectée à la première extrémité (411) de la pièce de base (41) et les deux bras (422, 423) s'étendant le long de côtés opposés (413, 414) de la pièce de base (41) dans une direction longitudinale (B) de la pièce de base (41).
6. Ensemble de pièces (100) selon l'une quelconque des revendications précédentes, dans lequel l'élément d'attache (4) dans son état inactif est une pièce unique découpée à partir d'une seule feuille de plaque métallique et destinée à être amenée dans l'état de montage actif par pliage et/ou courbure.
7. Structure murale (300) ayant des propriétés de protection contre l'incendie et comprenant un ensemble de pièces (100) selon l'une quelconque des revendications 1 à 6, la structure murale (300) comprenant

en outre :

au moins deux éléments muraux (6, 7) assemblés au moyen de l'ensemble de pièces (100), lesdits éléments muraux (6, 7) étant maintenus en place par l'ensemble de pièces (100). 5

8. Structure murale (300) selon la revendication 7, comprenant au moins deux éléments d'attache (4, 8) montés de sorte qu'une pièce de maintien (42) d'un premier élément d'attache (4) soit située sur un côté des éléments muraux (6, 7) et une pièce de maintien (82) du second élément d'attache (8) soit située sur le côté opposé des éléments muraux (6, 7). 10 15

9. Structure murale (300) selon la revendication 7 ou 8, comprenant au moins un premier (2), un second (3) et un troisième (9) profil de recouvrement, le premier (2) et le troisième (9) profil de recouvrement s'étendant le long des premières surfaces extérieures (61, 71) des éléments muraux (6, 7) et le second profil de recouvrement (3) s'étendant le long des secondes surfaces extérieures (62, 72) des éléments muraux (6, 7), faisant face aux premières surfaces extérieures (61, 71), les au moins trois profils de recouvrement (2, 3, 9) étant disposés de sorte qu'un premier élément d'attache (4) se connecte au premier (2) et au second (3) profil de recouvrement et un second élément d'attache (8) se connecte au second (3) et au troisième (9) profil de recouvrement. 20 25 30

10. Structure murale (300) selon l'une quelconque des revendications 7 à 9, dans laquelle les éléments muraux (6, 7) sont fabriqués essentiellement en verre, de préférence en verre ayant des propriétés de résistance au feu. 35

11. Procédé de montage d'une structure murale (300) ayant des propriétés de protection contre l'incendie comprenant les étapes suivantes : 40

fourniture d'un ensemble de pièces (100) selon l'une quelconque des revendications 1 à 6 pour assembler un premier (6) et un second (7) élément mural dans une structure murale (300), disposition de l'élément de cadre extérieur en forme de U (1) sur un côté du premier (6) et/ou du second (7) élément mural, positionnement de l'élément d'attache (4) dans son état inactif où la pièce de base (42) est disposée entre les premier (6) et second (7) éléments muraux, disposition de la pièce de maintien (41) de sorte qu'elle s'étende le long d'une première surface extérieure (61, 71) de chacun des premier (6) et second (7) éléments muraux, et courbure des premier (431) et second (432) bras 45 50 55

de fixation, de sorte que les premier (431) et second (432) bras de fixation s'étendent le long d'une seconde surface extérieure (62, 72) faisant face à la première surface extérieure (61, 71) de chacun des premier (6) et second (7) éléments muraux, afin de maintenir ensemble les éléments muraux (6, 7).

12. Procédé de montage d'une structure murale (300) selon la revendication 11, le procédé comprenant en outre les étapes suivantes :

disposition d'un premier profil de recouvrement (2) de sorte qu'il s'étende le long de la première surface extérieure (61, 71) de chacun des premier (6) et second (7) éléments muraux, disposition du second profil de recouvrement (3) de sorte qu'il s'étende le long de la seconde surface extérieure (62, 72) de chacun des premier (6) et second (7) éléments muraux, positionnement de l'élément d'attache (4) dans son état inactif de sorte que la première extrémité (411) de la pièce de base (41) s'étende à travers une fente (21) du premier profil de recouvrement (2) et la seconde extrémité (412) s'étende à travers une fente (31) du second profil de recouvrement (3) et que la pièce de base soit positionnée entre les premier (6) et second (7) éléments muraux, disposition de la pièce de maintien (41) de sorte qu'elle s'étende le long d'une surface extérieure (22) du premier profil de recouvrement (2), et courbure des premier (431) et second (432) bras de fixation, de sorte que les premier (431) et second (432) bras de fixation s'étendent le long de la surface extérieure (32) du second profil de recouvrement (3), de façon à maintenir ensemble le premier (2) et le second (3) profils de recouvrement et les éléments muraux (6, 7). 55

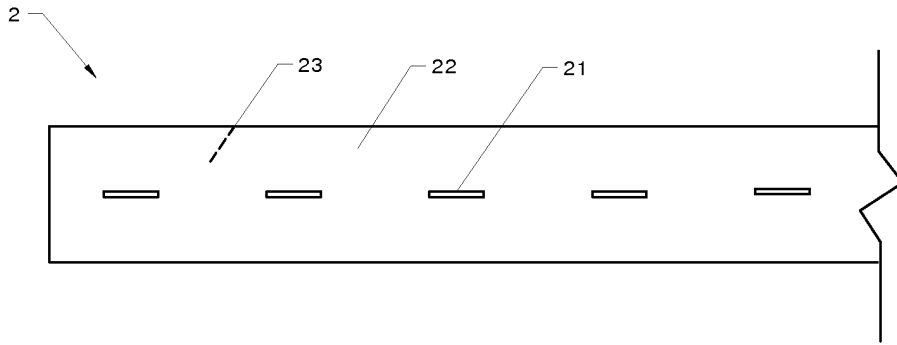


Fig. 2

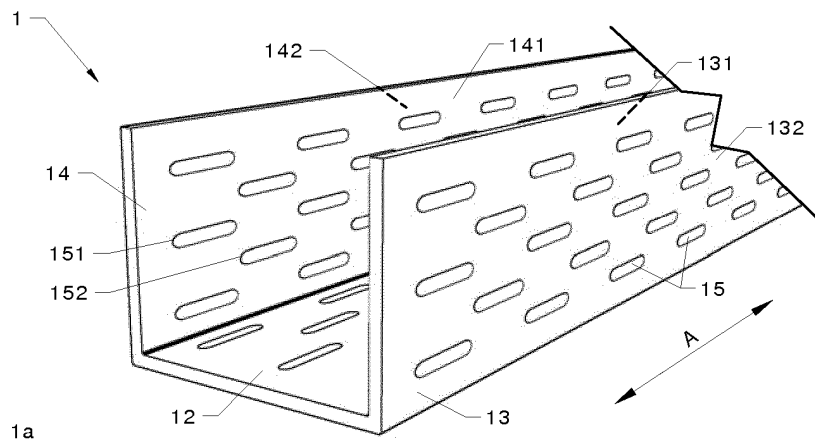


Fig. 1a

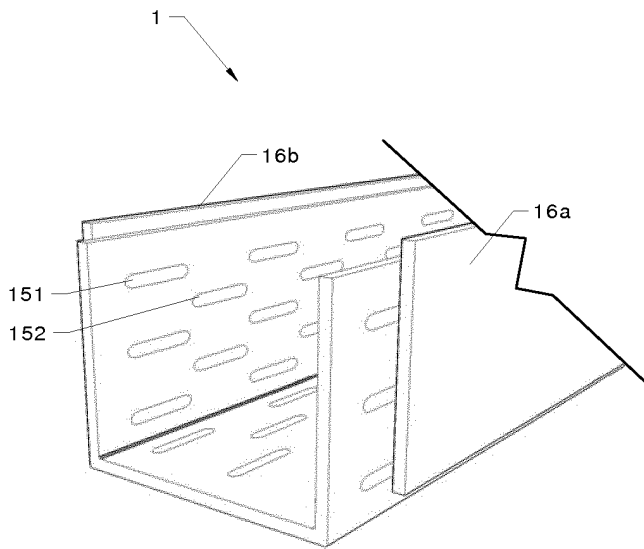


Fig. 1b

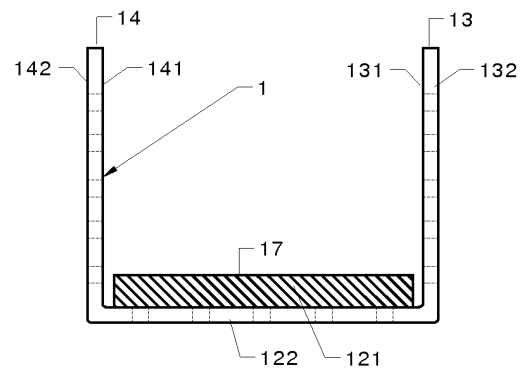


Fig. 1c



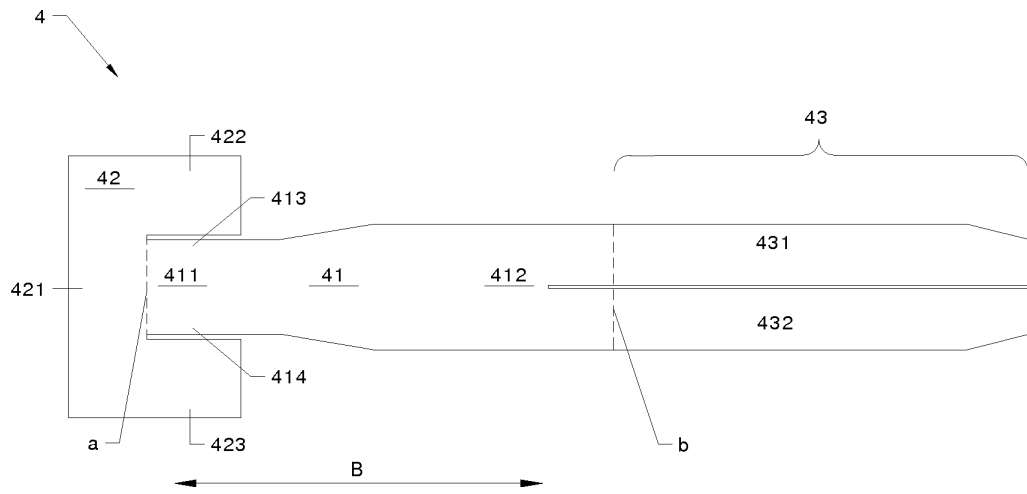


Fig. 3a

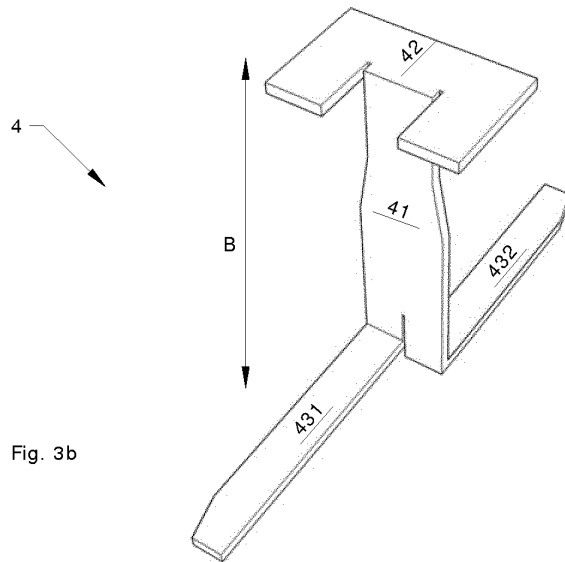


Fig. 3b

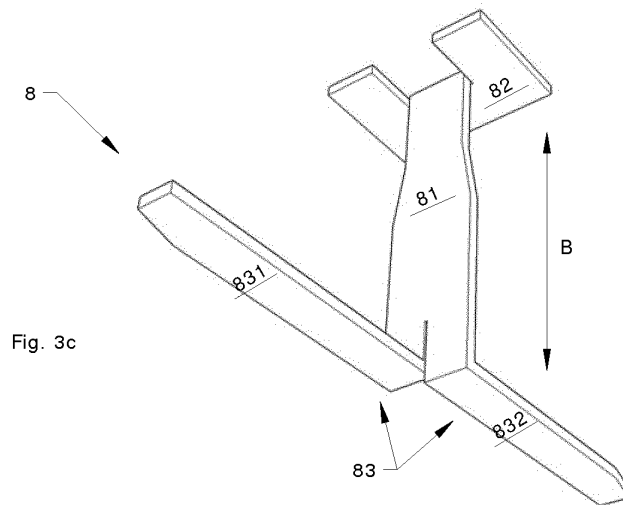


Fig. 3c

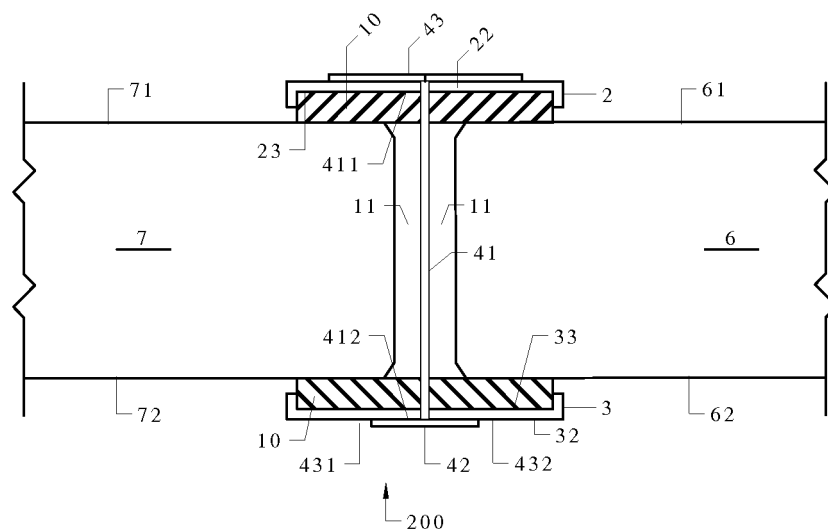


Fig. 4

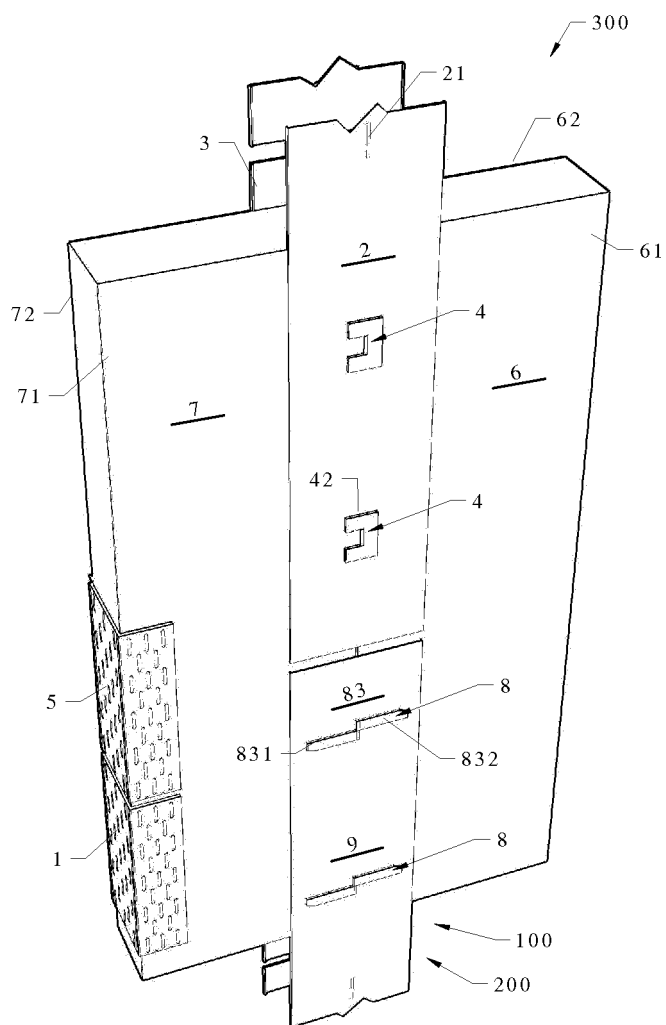


Fig. 5

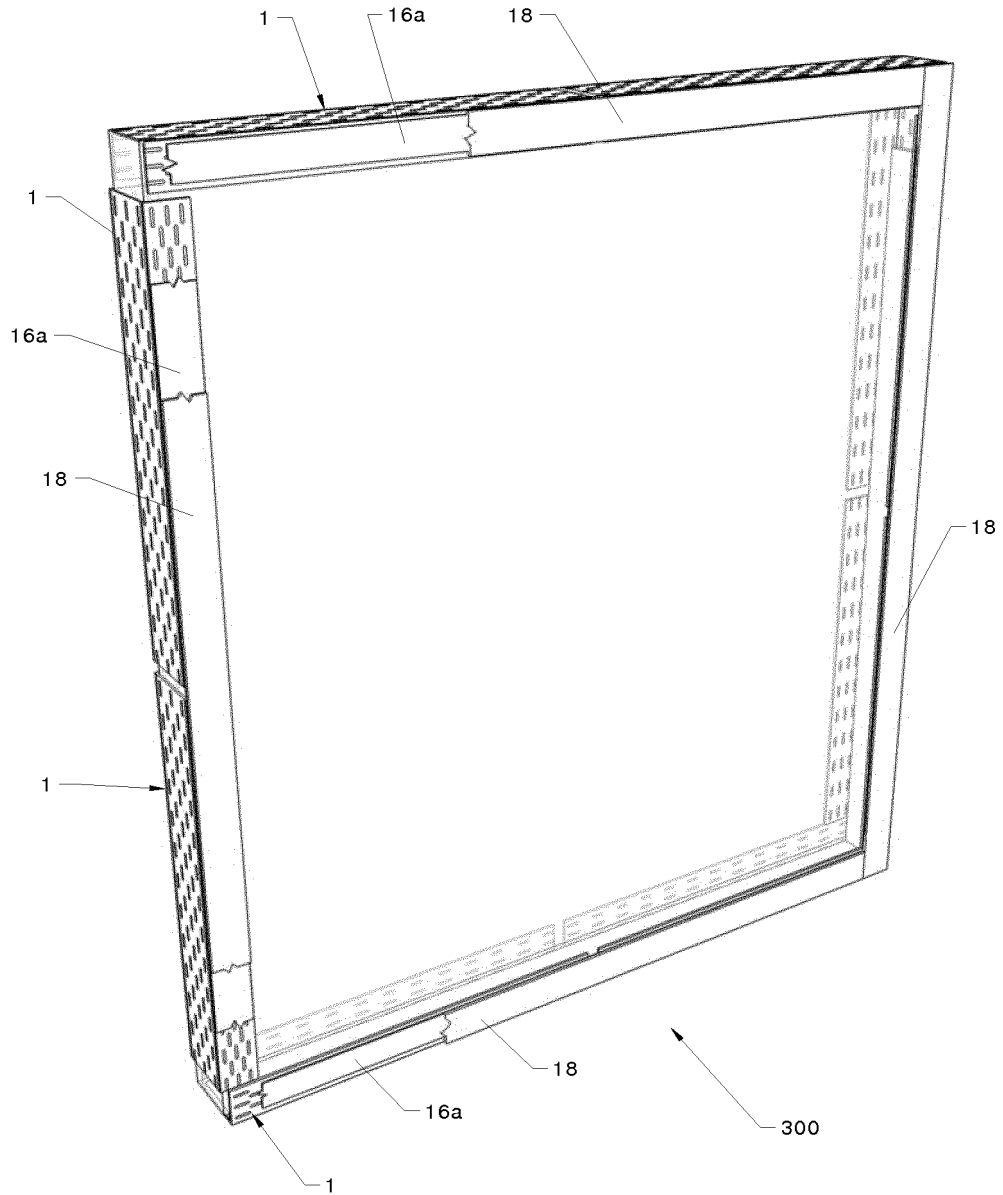


Fig. 6

**REFERENCES CITED IN THE DESCRIPTION**

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**Patent documents cited in the description**

- US 8056293 B2 [0005]