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(54) **FIRE PROTECTION WALL**

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EP 1 682 394 B1

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Description

[0001] The invention relates to a fire protection wall, having a front side expected to be exposed to a fire and an opposite back side, comprising a wall element having wall edges framed by a frame element, wherein a gap exists between the wall edge and the frame element. The invention further relates to a rail vehicle comprising said fire protection wall, and to a process for the manufacture of a fire protection wall. The invention also relates to a frame assembly, framed windows and doors that can be used to manufacture the fire protection wall.

[0002] Fire protection is a very important issue in all compartments occupied by people, in particular in compartments where they cannot escape from a fire, such as in transport compartments. For example, in rail vehicles fireproof walls are required to protect the passengers or the driver of the train from a fire in an adjacent compartment. Such fire protection walls are not only required to be fire-resistant; they also have to prevent leakage of smoke into the adjacent compartment. Smoke poses a risk because it can spread the fire to the other compartments but, more importantly, smoke is dangerous because inhalation can lead to poisoning, suffocation and death. It is particularly difficult to make walls fireproof at the wall edges, where connections must be made to other structural components, for instance windows, doors or other walls.

[0003] In EP 0534932 B1, a fireproof wall is described, wherein the gaps between the various structural components are provided with intumescent material. An intumescent material is a material that expands on exposure to heat. In said patent, the wall elements are, however, not provided with frame elements. Instead, the structural components, for example the windows, are connected directly, inside a U-shaped recess, to the wall parts with elastic material to seal the gaps. Underneath the elastic material, intumescent material is provided. The problem of this connection is that it does not sufficiently protect against leakage of smoke on exposure to a fire. It was found that, on exposure to fire, the entire wall significantly deforms, mainly by bulging out towards the fire. This deformation creates gaps, especially in those places where connections are made between different materials, for instance between a glass pane and a wall part. The prior art sealing is inadequate to accommodate the deformation and deformation forces occurring at high temperatures, especially since the material quickly loses its adhesive and elastic properties at such temperatures. There is, therefore, a need for an improved fireproof wall.

[0004] In US 6327826 B1, a doorframe assembly is described. However, this doorframe assembly does not provide long resistance against fire and leakage of smoke.

[0005] The invention also relates to a frame assembly for the manufacture of a fire protection wall according to claim 1. Preferably, the frame assembly also comprises an extension covering the front wall part and an isolation

element separating the elastic sealing and covering strip from the wall part.

[0006] Further, the invention relates to a framed window or door, comprising a window or door framed along the edges with a frame assembly according to the invention. All the improvement features of the fire protection wall described hereafter correspondingly apply to the frame assembly and the framed window and door, as well as to the process for the manufacture thereof as described hereafter.

[0007] According to the invention, there is provided a fire protection wall, having a front side expected to be exposed to a fire and an opposite back side, comprising a wall element having wall edges framed by a frame element, wherein a gap exists between the wall edge and the frame element, in which gap there is provided along the wall edges an intumescent material at the front side of the fire protection wall and an elastic sealing material at a position nearer to the back side of the fire protection wall.

[0008] In the fire protection wall according to the invention the wall element and frame element are preferably connected by a back connection element at the back side of the fire protection wall. The advantage of this is that, on deformation of the fire protection wall, the gap is forced to maintain a V shape for much longer, hence securing the sealing properties of the elastic sealing material for much longer. The back connection element is a covering strip connecting the wall element and frame element and covering the gap between the wall element and the frame element, providing even better and longer protection against leakage of smoke through the gap.

In a preferred embodiment, the back connection element is a strip extending from the frame element, preferably as integral part of the frame element.

[0009] Preferably, the wall element and the frame element are of a fire-resistant material. Optionally, the frame element or wall element can be provided with additional means known in the art to improve fire resistance thereof, for instance water-containing filling materials. It was found that the fire protection wall according to the invention is capable of accommodating deformation of the fire protection wall occurring when exposed to a fire and provides better protection against leakage of smoke through the gaps between connected structural components, "better" meaning for a longer time and/or at higher temperatures.

[0010] It was found that, when the protection wall is exposed to a fire at its front side, it bulges towards the fire, causing the gap between the wall element and the frame element to become V-shaped. The elastic sealing material at a position near the back side of the fire protection wall seals the gap at its smaller end and, hence, can seal the opening gap for a longer time and, being more remote from the heat, also retains its elastic properties for a longer time and at higher temperatures. Preferably, the temperature at which the intumescent material starts to expand (hereinafter referred to as the ex-

sealing ribbon and the back connection element.

[0017] The fire protection wall as described above is designed for protecting against the threat of a fire at one side only. In many cases a threat exists on both sides of the fire protection wall. The invention hence also relates to a dual fire protection wall comprising two fire protection walls as described above with the front side facing outward. In another embodiment of the dual fire protection wall, the two fire protection walls are merged to one wall, for example with a structure essentially mirror symmetric with respect to a plan parallel plane through the elastic sealing.

[0018] The invention further relates to a rail vehicle comprising a fire protection wall as described above.

[0019] The invention further relates to a process for the manufacture of a fireproof wall, comprising providing a wall element comprising wall edges, framing the wall edges with a frame element leaving a gap between the wall edge and the frame element, providing along the wall edges an intumescent material at a position near the front side of the fire protection wall and providing along the wall edges an elastic sealing material near the back side of the fire protection wall.

[0020] A further preferred process provides an extension along the frame edges at the front side covering the gap and part of the front side wall element and covering strip rigidly connecting wall element and frame element at the back side only, covering the gap along the wall edge.

[0021] The fire protection wall of the present invention will now be described, by way of example only, with reference to the accompanying drawings, in which:

Figure 1 is a front view of a fire protection wall in a train compartment;

Figure 2 is a cross-sectional view of the connection between a wall element and a frame element connecting to a window pane;

Figure 3 is a cross-sectional view of the fire protection wall showing the connection of a wall element over a frame element to a door; and

Figure 4 shows in cross-sectional view the connection between the outer edge of the fire protection wall to another wall.

[0022] Throughout this document, the expression "elastic sealing ribbon" is used to designate an elastic sealing ribbon, an elastic sealing or sealing profiles. The expression "elastic sealing material" is used to designate an elastic sealing material, an elastic sealant, an elastic material or a sealant. The wording "heat insulation element" can designate a heat insulation element or a heat insulation frame.

[0023] The fire protection wall as shown in Figure 1 is arranged as a combination of wall elements (9) and win-

dow frame elements (7) as well as door frame elements (11) with fireproof glass panels (8). The outside edges of the fire protection wall are connected by wall connection means (13) to the walls of a rail vehicle compartment.

[0024] As can be seen in Figures 2 and 3, on the side expected to be exposed to a fire (indicated by an X), sealing strips of intumescent material (6) are provided in the gap between the wall element (9) and the frame element (7). In the gap, sufficiently distant from the exposed side, an elastic sealing ribbon (2) is provided, held in a fixed position by the pressure plate (4). The elastic sealing ribbon (2) is a compressed elastic hollow profile. In addition, the pressure plate (4) is sealed with fire-inhibiting elastic sealing material (3) against the contact strips (10) and the frame elements (7). An angle profile (1) is provided of the front side extending with one side into the gap and one side covering the gap as well as part of the wall part. In order to stabilize and secure, in case of a fire, the position of the gaps to be bridged by the elastic sealing ribbon (2) and the elastic sealing material (3) up to the defined temperature, the frame element (7) and the doorframe profiles (11) are connected by covering strip (5) at the back side only.

[0025] Furthermore, Figure 4 shows wall connection means for connecting the fire protection wall to the compartment wall, comprising heat insulation element (12) and a sealing featuring intumescent material (6) on the exposed side and fire-inhibiting elastic sealing material (3) in an area sufficiently distant from the exposed side. Further, it is shown that the wall element (9) is attached to the compartment wall (15) by a bridge element (14) connected to the heat insulation element (12), again using an intumescent material (6) and the elastic sealing material (3) to protect this connection.

[0026] In case of a fire, as soon as a defined temperature has been reached, the sealing of the gap between the angle profile (1) and the wall element (9) is achieved by the expansion of the intumescent material (6). In areas sufficiently distant from the exposed side, protection against the release of hot smoke gas is ensured by the arrangement of the elastic sealing ribbon (2) and fire-inhibiting elastic sealing material (3) as well as by fixing and securing the position of the gaps to be bridged by the elastic sealing ribbon (2) and the elastic sealing material (3) up to the defined temperature by covering strip (5).

Claims

1. Frame assembly for the manufacture of a fire protection wall comprising a frame element (7, 11), intumescent material (6) along the length of the frame element (7, 11) at a front side expected to be exposed to a fire and a compressed elastic sealing ribbon (2) nearer to the back side **characterized in that** it further comprises a covering strip (5) for connecting a wall element and the frame element (7, 11)

- at the back side only, the covering strip (5) is suitable for covering the gap between the wall element (9) and the frame element (7, 11).
2. Framed window or door, comprising a window or door framed along the edges with a frame assembly according to claim 1.
 3. Fire protection wall, having a front side (X) expected to be exposed to a fire and an opposite back side, comprising a wall element (9) having wall edges framed by a frame element (7, 11), wherein a gap exists between the wall edge and the frame element (7, 11), in which gap there is provided along the wall edges an intumescent material (6) at the front side (X) and elastic sealing material (3) at a position nearer to the back side of the fire protection wall **characterized in that** the wall element (9) and frame element (7, 11) are connected by a covering strip (5) at the back side of the fire protection wall, the covering strip (5) connecting the wall element (9) and frame element (7, 11) and covering the gap between the wall element (9) and the frame element (7, 11).
 4. Fire protection wall according to claim 3, wherein the elastic sealing material (3) is a compressed elastic sealing ribbon (2) positioned along the wall edges.
 5. Fire protection wall according to claim 3 or 4, wherein the covering strip (5) is an extension of the frame element (7, 11).
 6. Fire protection wall according to claims 3 or 4, wherein between the wall element (9) and the covering strip (5) a heat-isolation element (10) is provided and wherein the covering strip (5) is connected only to the heat-isolation element (10).
 7. Fire protection wall according to claims 4 to 6, wherein the heat-isolation element (10) is provided to separate the wall (9) element and the elastic sealing material (3).
 8. Fire protection wall according to any one of claims 3 to 7, wherein the frame element (7, 11) comprises, at the front side (X) along the length of the frame element (7, 11) an extension strip covering the front side wall element and the gap.
 9. Fire protection wall according to any one of claims 3 to 7, further comprising at the front side (X) along the wall edge an angle profile (1) with one side extending into the gap between the wall element (9) and the frame element (7, 11) and with the other side covering the front side wall element and wherein intumescent material (6) is positioned between the wall edge and the angle profile (1).
 10. Fire protection wall according to any one of claims 3 to 9, wherein the intumescent material (6) is positioned in a recess in the frame element (7, 11)
 11. Fire protection wall according to claim 4 and claim 10, wherein the compressed elastic sealing ribbon (2) is pre-compressed by a pressure plate (4).
 12. Fire protection wall according to any one of claims 3 to 11, comprising an outer wall edge and, along said edge, wall connection means (13), for connecting to another wall (15), comprising an isolation frame (12) connected to the wall element (9) and having, between the wall element (9) and the isolation frame (12), an intumescent material (6) positioned nearer to the front side (X) and an elastic sealing material (3) nearer to the back side of the fire protection wall.
 13. Fire protection wall according to any one of claim 12, wherein the wall connection means (13) comprises a bridge element (14) to connect the isolation frame (12) to the other wall (15) with a gap between the fire protection wall and the other wall.
 14. Fire protection wall according to any one of claim 13, wherein, between the isolation frame (6) and the bridge element (14), an intumescent material (6) is positioned near the front side (X) and an elastic sealing material (3) near the back side of the fire protection wall.
 15. Rail vehicle comprising a fire protection wall according to any one of claims 3 to 14.
 16. Process for manufacture of a fire protection wall comprising a front side (X) and a back side, the process comprising:
 - providing a wall element (9) comprising wall edges;
 - framing the wall edges with a frame element (7, 11) leaving a gap between the wall edge and the frame element (7, 11);
 - providing in said gap all along the wall edges an intumescent material (6) at the front side (X) of the fire protection wall; and
 - providing along the wall edges an elastic sealing material (3) nearer to the back side of the fire protection wall;
 - providing an extension strip to the front side (X) of the frame element (7, 11) covering the gap and part of the front side (X) of the wall element (9); and
 - providing a covering strip (5) connecting the wall element (9) and frame element (7, 11) and covering the gap between the wall element (9) and frame element (7, 11) for rigidly connecting

wall element (9) and frame element (7, 11) at the back side only.

vorgesehen ist und bei welcher der Abdeckstreifen (5) nur mit dem Wärmedämmungselement (10) verbunden ist.

Patentansprüche

1. Rahmenanordnung für die Herstellung einer Brandschutzwand, umfassend ein Rahmenelement (7, 11), intumeszentes Material (6) entlang der Länge des Rahmenelements (7, 11) an einer Vorderseite, von der erwartet wird, dass sie einem Brand ausgesetzt wird, und ein zusammengedrücktes elastisches Dichtungsband (2) näher an der Rückseite, **dadurch gekennzeichnet, dass** sie ferner einen Abdeckstreifen (5) zum Verbinden eines Wandelements und des Rahmenelements (7, 11) nur an der Rückseite umfasst, wobei der Abdeckstreifen (5) zum Abdecken des Spalts zwischen dem Wandelement (9) und dem Rahmenelement (7, 11) geeignet ist.
2. Eingerahmte/s Fenster oder Tür, umfassend ein Fenster oder eine Tür, das/die an den Rändern entlang von einer Rahmenanordnung nach Anspruch 1 umrahmt ist.
3. Brandschutzwand mit einer Vorderseite (X), von der erwartet wird, dass sie einem Brand ausgesetzt wird, und einer entgegengesetzten Rückseite, umfassend ein Wandelement (9) mit Wandrändern, die von einem Rahmenelement (7, 11) umrahmt sind, wobei zwischen dem Wandrand und dem Rahmenelement (7, 11) ein Spalt besteht, wobei in diesem Spalt entlang den Wandrändern ein intumeszentes Material (6) an der Vorderseite (X) und elastisches Dichtungsmaterial (3) an einer Position näher an der Rückseite der Brandschutzwand vorgesehen ist, **dadurch gekennzeichnet, dass** das Wandelement (9) und das Rahmenelement (7, 11) durch einen Abdeckstreifen (5) an der Rückseite der Brandschutzwand verbunden sind, wobei der Abdeckstreifen (5) das Wandelement (9) und das Rahmenelement (7, 11) verbindet und den Spalt zwischen dem Wandelement (9) und dem Rahmenelement (7, 11) abdeckt.
4. Brandschutzwand nach Anspruch 3, bei welcher das elastische Dichtungsmaterial (3) ein zusammengedrücktes elastisches Dichtungsband (2) ist, das an den Wandrändern entlang positioniert ist.
5. Brandschutzwand nach Anspruch 3 oder 4, bei welcher der Abdeckstreifen (5) eine Verlängerung des Rahmenelements (7, 11) ist.
6. Brandschutzwand nach Anspruch 3 oder 4, bei welcher zwischen dem Wandelement (9) und dem Abdeckstreifen (5) ein Wärmedämmungselement (10) vorgesehen ist und bei welcher der Abdeckstreifen (5) nur mit dem Wärmedämmungselement (10) verbunden ist.
7. Brandschutzwand nach Anspruch 4 bis 6, bei welcher das Wärmedämmungselement (10) zum Trennen des Wandelements (9) und des elastischen Dichtungsmaterials (3) bereitgestellt ist.
8. Brandschutzwand nach einem der Ansprüche 3 bis 7, bei welcher das Rahmenelement (7, 11) an der Vorderseite (X) entlang der Länge des Rahmenelements (7, 11) einen Verlängerungsstreifen aufweist, der das vorderseitige Wandelement und den Spalt abdeckt.
9. Brandschutzwand nach einem der Ansprüche 3 bis 7, ferner umfassend ein Winkelprofil (1) an der Vorderseite (X) am Wandrand entlang, das sich mit der einen Seite in den Spalt zwischen dem Wandelement (9) und dem Rahmenelement (7, 11) erstreckt und mit der anderen Seite das vorderseitige Wandelement abdeckt, und bei welcher zwischen dem Wandrand und dem Winkelprofil (1) intumeszentes Material (6) angeordnet ist.
10. Brandschutzwand nach einem der Ansprüche 3 bis 9, bei welcher das intumeszente Material (6) in einer Ausnehmung im Rahmenelement (7, 11) positioniert ist.
11. Brandschutzwand nach Anspruch 4 und Anspruch 10, bei welcher das zusammengedrückte elastische Dichtungsband (2) von einer Druckplatte (4) vorgepresst wird.
12. Brandschutzwand nach einem der Ansprüche 3 bis 11, umfassend einen äußeren Wandrand und entlang dem genannten Rand Wandverbindungsmittel (13) zum Verbinden mit einer weiteren Wand (15), umfassend einen Isolationsrahmen (12), der mit dem Wandelement (9) verbunden ist und zwischen dem Wandelement (9) und dem Isolationsrahmen (12) ein intumeszentes Material (6) aufweist, das sich näher an der Vorderseite (X) befindet, und ein elastisches Dichtungsmaterial (3) näher an der Rückseite der Brandschutzwand aufweist.
13. Brandschutzwand nach Anspruch 12, bei welcher das Wandverbindungsmittel (13) ein Brückenelement (14) zum Verbinden des Isolationsrahmens (12) mit der anderen Wand (15) mit einem Spalt zwischen der Brandschutzwand und der anderen Wand aufweist.
14. Brandschutzwand nach Anspruch 13, bei welcher sich zwischen dem Isolationsrahmen (12) und dem Brückenelement (14) ein intumeszentes Material (6)

nahe der Vorderseite (X) und ein elastisches Dichtungsmaterial (3) nahe der Rückseite der Brandschutzwand befindet.

15. Schienenfahrzeug, das eine Brandschutzwand nach einem der Ansprüche 3 bis 14 aufweist. 5
16. Verfahren zur Herstellung einer Brandschutzwand, umfassend eine Vorderseite (X) und eine Rückseite, wobei das Verfahren Folgendes umfasst: 10
- Bereitstellen eines Wandelements (9), das Wandränder aufweist,
 - Umrahmen der Wandränder mit einem Rahmenelement (7, 11), wobei zwischen dem Wandrand und dem Rahmenelement (7, 11) ein Spalt belassen wird, 15
 - Bereitstellen eines intumeszenten Materials (6) in dem genannten Spalt an den gesamten Wandrändern entlang an der Vorderseite (X) der Brandschutzwand und 20
 - Bereitstellen eines elastischen Dichtungsmaterials (3) an den Wandrändern entlang näher an der Rückseite der Brandschutzwand,
 - Bereitstellen eines Verlängerungsstreifens an der Vorderseite (X) des Rahmenelements (7, 11), der den Spalt und einen Teil der Vorderseite (X) des Wandelements (9) abdeckt, und 25
 - Bereitstellen eines Abdeckstreifens (5), der das Wandelement (9) und das Rahmenelement (7, 11) verbindet und den Spalt zwischen dem Wandelement (9) und dem Rahmenelement (7, 11) abdeckt, zum starren Verbinden von Wandelement (9) und Rahmenelement (7, 11) nur auf der Rückseite. 30

Revendications

1. Ensemble d'ossature pour la fabrication d'une paroi de protection contre l'incendie comprenant un élément d'ossature (7, 11), un matériau intumescent (6) sur la longueur de l'élément d'ossature (7, 11) sur un côté avant supposé être exposé à un incendie et un ruban d'étanchéité élastique comprimé (2) près du côté arrière **caractérisé en ce qu'**elle comprend en outre une bande de recouvrement (5) permettant de raccorder un élément de paroi et l'élément d'ossature (7, 11) uniquement sur le côté arrière, la bande de recouvrement (5) recouvrant l'interstice entre l'élément de paroi (9) et l'élément d'ossature (7, 11). 40
2. Fenêtre ou porte à ossature, comprenant une fenêtre ou une porte ayant une ossature le long des bords avec un ensemble d'ossature selon la revendication 1. 45
3. Paroi de protection contre l'incendie ayant un côté 50

avant (X) supposé être exposé à un incendie et un côté arrière opposé, comprenant un élément de paroi (9) ayant des bords de paroi munis d'une ossature consistant en un élément d'ossature (7, 11), dans laquelle un interstice existe entre le bord de paroi et l'élément d'ossature (7, 11), dans lequel interstice est fourni le long des bords de paroi un matériau intumescent (6) sur le côté avant (X), et un matériau d'étanchéité élastique (3) dans une position proche du côté arrière de la paroi de protection contre l'incendie **caractérisée en ce que** l'élément de paroi (9) et l'élément d'ossature (7, 11) sont raccordés par une bande de recouvrement (5) sur le côté arrière de la paroi de protection contre l'incendie, la bande de recouvrement (5) raccordant l'élément de paroi (9) et l'élément d'ossature (7, 11) et recouvrant l'interstice entre l'élément de paroi (9) et l'élément d'ossature (7, 11). 55

4. Paroi de protection contre l'incendie selon la revendication 3, dans laquelle le matériau d'étanchéité élastique (3) est un ruban d'étanchéité élastique comprimé (2) placé le long des bords de paroi. 60
5. Paroi de protection contre l'incendie selon l'une quelconque des revendications 3 ou 4, dans laquelle la bande de recouvrement (5) est un prolongement de l'élément d'ossature (7, 11). 65
6. Paroi de protection contre l'incendie selon l'une quelconque des revendications 3 ou 4, dans laquelle un élément d'isolation thermique (10) est fourni entre l'élément de paroi (9) et la bande de recouvrement (5), et dans laquelle la bande de recouvrement (5) est raccordée uniquement à l'élément d'isolation thermique (10). 70
7. Paroi de protection contre l'incendie selon l'une quelconque des revendications 4 à 6, dans laquelle l'élément d'isolation thermique (10) est fourni pour séparer l'élément de paroi (9) et le matériau d'étanchéité élastique (3). 75
8. Paroi de protection contre l'incendie selon l'une quelconque des revendications 3 à 7, dans laquelle l'élément d'ossature (7, 11) comprend, sur le côté avant (X) sur toute la longueur de l'élément de paroi (7, 11) une bande d'extension recouvrant l'élément de paroi du côté avant et l'interstice. 80
9. Paroi de protection contre l'incendie selon l'une quelconque des revendications 3 à 7, comprenant en outre sur le côté avant (X), le long du bord de paroi, un profilé en cornière (1) dont un côté s'étend dans l'interstice entre l'élément de paroi (9) et l'élément d'ossature (7, 11) et l'autre côté recouvrant l'élément de paroi du côté avant et dans lequel le matériau intumescent (6) est placé entre le bord de paroi et 85

- le profilé en cornière (1).
- 10.** Paroi de protection contre l'incendie selon l'une quelconque des revendications 3 à 9, dans laquelle le matériau intumescent (6) est placé dans un évidement pratiqué dans l'élément de paroi (9). 5
- 11.** Paroi de protection contre l'incendie selon la revendication 4 et la revendication 10, dans laquelle le ruban d'étanchéité élastique comprimé (2) est pré-comprimé par un plateau de pression (4). 10
- 12.** Paroi de protection contre l'incendie selon l'une quelconque des revendications 3 à 11, comprenant un bord de paroi extérieur et, le long dudit bord, un moyen de raccordement de paroi (13) permettant le raccordement à une autre paroi (15), comprenant une ossature isolante (12) raccordée à l'élément de paroi (9) et ayant, entre l'élément de paroi (9) et l'ossature isolante (12), un matériau intumescent (6) placé près du côté avant (X) et l'ossature isolante (12) et un matériau d'étanchéité élastique (3) près du côté arrière de la paroi de protection contre l'incendie. 15
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- 13.** Paroi de protection contre l'incendie selon la revendication 12, dans laquelle le moyen de raccordement (13) comprend un élément formant pont (14) permettant de raccorder l'ossature isolante (12) avec l'autre paroi (15) avec un interstice entre la paroi de protection contre l'incendie et l'autre paroi. 25
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- 14.** Paroi de protection contre l'incendie selon la revendication 13, dans laquelle, entre l'ossature isolante (12) et l'élément formant pont (14), un matériau intumescent (6) est placé près du côté avant (X) et un matériau d'étanchéité élastique (3) près du côté arrière de la paroi de protection contre l'incendie. 35
- 15.** Véhicule ferroviaire comprenant une paroi de protection contre l'incendie selon l'une quelconque des revendications 3 à 14. 40
- 16.** Procédé de fabrication d'une paroi de protection contre l'incendie comprenant un côté avant (X) et un côté arrière, le procédé comprenant : 45
- la fourniture d'un élément de paroi (9) comprenant des bords de paroi ;
 - la pose d'une ossature sur les bords de paroi consistant en un élément d'ossature (7, 11) laissant un espace entre le bord de paroi et l'élément d'ossature (7, 11) ; 50
 - la fourniture dans ledit espace situé tout le long des bords de paroi d'un matériau intumescent (6) sur le côté avant (X) de la paroi de protection contre l'incendie ; et 55
 - la fourniture tout le long des bords de paroi d'un matériau d'étanchéité élastique (3) près du

côté arrière de la paroi de protection contre l'incendie ;

- la fourniture d'une bande extensible sur le côté avant (X) de l'élément d'ossature (7, 11) recouvrant l'interstice et une partie du côté avant (X) de l'élément de paroi (9), et

- la fourniture d'une bande de recouvrement (5) raccordant l'élément de paroi (9) et un élément d'ossature (7, 11) et recouvrant l'interstice entre l'élément de paroi (9) et l'élément d'ossature (7, 11) afin de raccorder solidement l'élément de paroi (9) et l'élément d'ossature (7, 11) uniquement sur le côté arrière.

Fig. 1

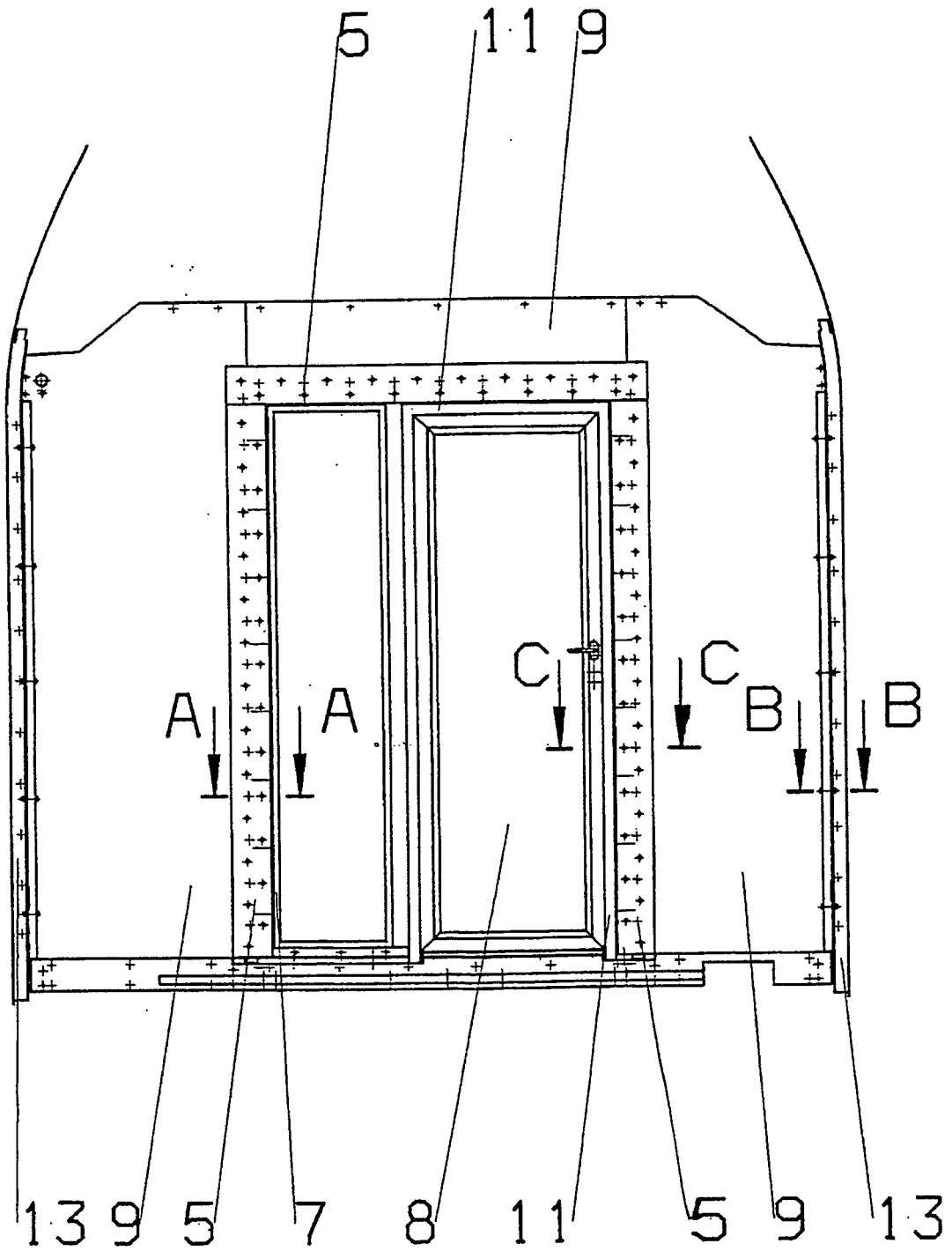


Fig. 2

A-A

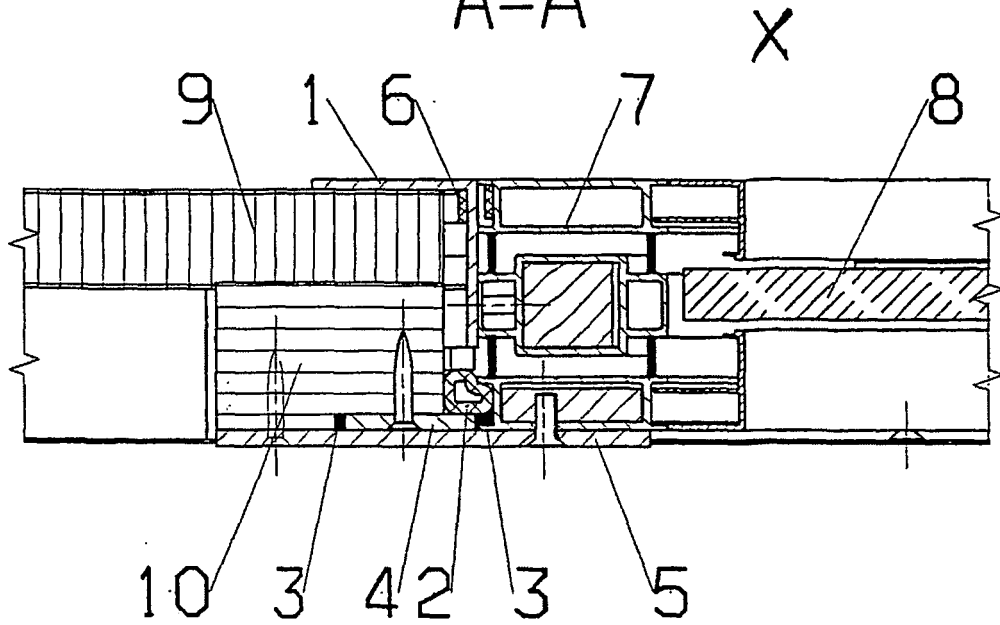


Fig. 3

C-C

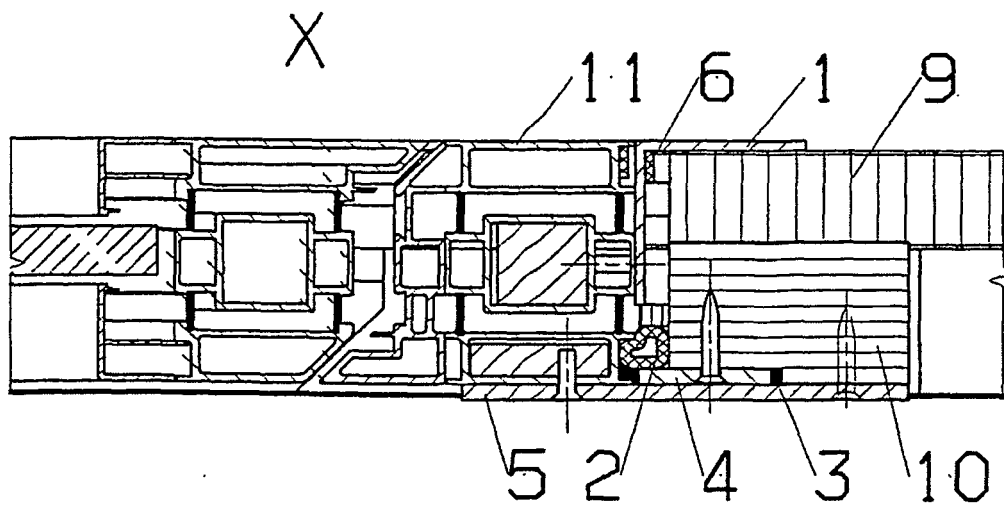
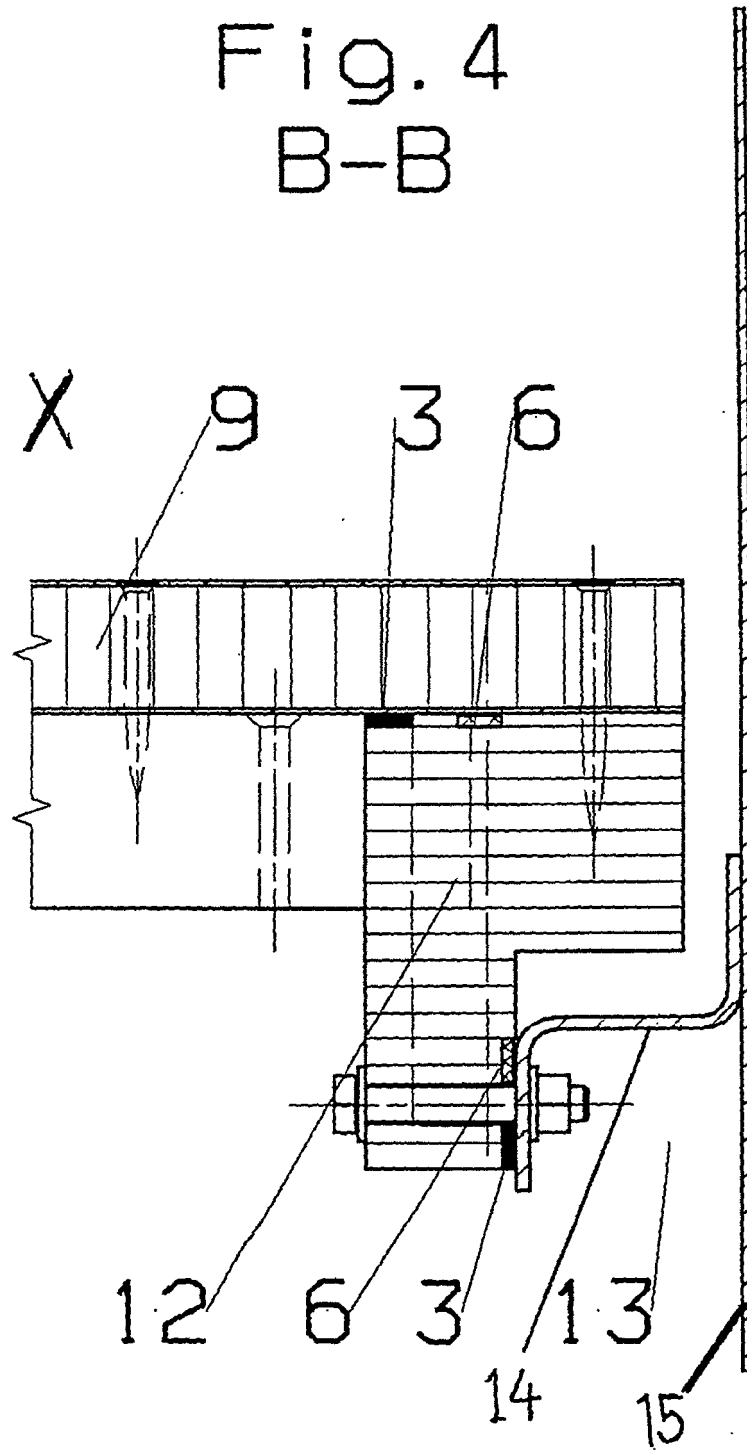


Fig. 4
B-B



REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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