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(71) Applicant: **Oy Steelpro Ltd**
01750 Vantaa (FI)

(72) Inventor: **Rahikka, Jouko**
FI-04350 Tuusula (FI)

(74) Representative: **Berggren Oy Ab**
P.O. Box 16
Eteläinen Rautatiekatu 10A
00101 Helsinki (FI)

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(54) **METHOD AND FASTENER FOR FASTENING A RAIL**

(57) A method of fastening a rail, in which method the rail is fastened by the base part (31) of the rail, wherein the base part (31) of the rail is fastened to a structure of a building by at least one fastening surface (6) provided on a fastener (1), the position of the fastening surface

relative the rest of the fastener being fine-adjustable to achieve the vertical straightness of the rail being fastened. The invention also relates to such fastener (1) and the use thereof for fastening a glass rail.

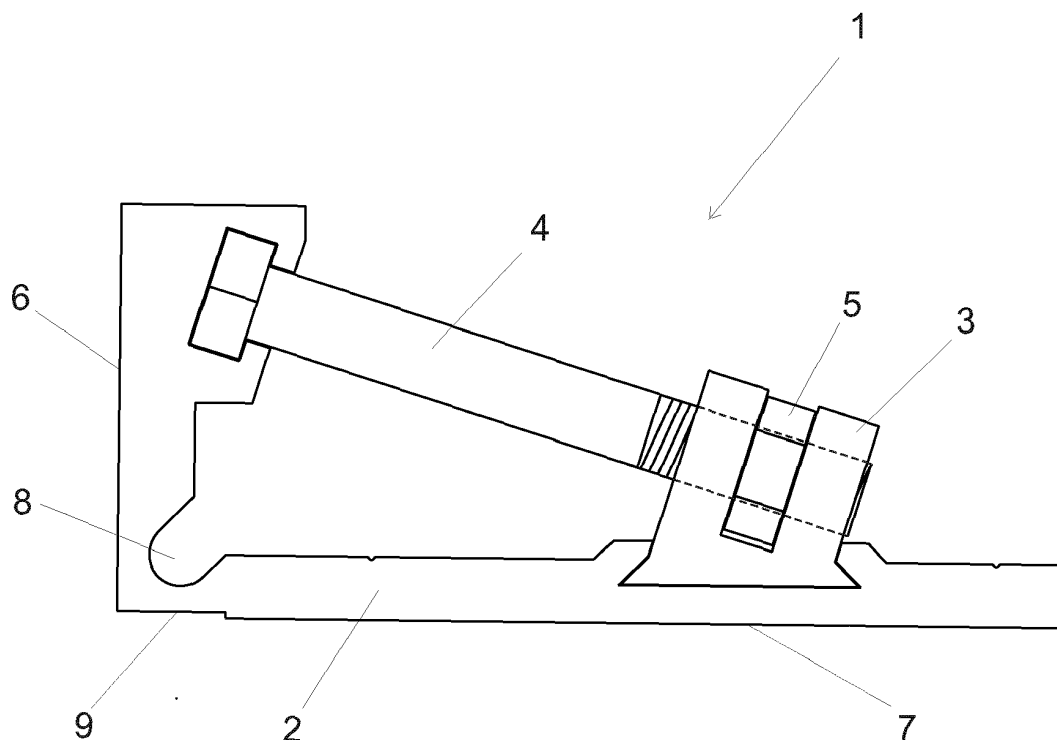


FIG. 1

Description

[0001] The invention relates to the fastening of rails and rail sections used in buildings. More particularly, the invention relates to a method and a fastener for fastening a rail by the base part of the rail.

[0002] Glass rails used in buildings typically comprise a base part used for fastening the rail, a rail part to be received by the base part, as well as a hand support, i. e. a hand railing, which typically is secured to the upper edge, or the area of the upper edge, of the glass rail.

[0003] It is typically difficult to adjust the vertical straightness of the solid rail part of these kinds of rails, such as, and especially, glass rails, that are fastened at their base parts. The vertical straightness of the rail part is largely determined by the position of the base part receiving it, and the vertical or horizontal straightness of the fastening surfaces of the building used to fasten the base part may vary to a great extent. Generally, different kinds of filler plates are used between the fastening surface of the building and the base part to correct the position of the base part and to thereby achieve the vertical straightness of the base part. However, the use of these filler plates is often laborious and slows down the installation of the glass rail.

[0004] An alternative solution for achieving and adjusting the vertical straightness of the rail part received by the base part is that a suitable adjustment mechanism is provided inside the base part to adjust the vertical straightness of the rail part relative the base part. A known solution intended for a glass rail and for adjusting the vertical straightness of the rail part of glass is that the lower edge of the rail part of glass is supported against the bottom of the interior of the base part and that vertically movable support members are provided in the area of the upper edge of the interior of the base part, on both sides of the rail part of glass. These support members are vertically moved, on both sides of the rail part of glass, by screws provided at the upper face of the base part. By moving the base part support members to vertically different positions it is possible to incline the rail part of glass relative the base part and to thereby adjust the straightness of the rail part of glass after the installation of the glass rail. However, in the installation step, it is time consuming to adjust the glass rail at its base part, and, depending on the solution used, it can also be difficult if adjustment is needed on both sides of the rail.

[0005] According to the solution of this invention, the base part of a rail is fastened to a suitable structure of a building by at least one intermediate member, the intermediate member providing an adjustable fastening surface for adjusting the vertical straightness of the base part of the rail.

[0006] The solution of the invention makes the actual rail installation process considerably faster and simpler since the straightness of the fastening surfaces of the base part of the rail, and thus the straightness of the base part itself, can be adjusted before the installation of the

rail.

[0007] In the method of the invention, in which a rail is fastened by the base part of the rail, at least one fastener is used to fasten the base part, the position of the base part fastening surface of the fastener being fine-adjustable relative to the rest of the fastener to achieve the vertical straightness of the rail.

[0008] In this invention, fine-adjustability refers to an adjustment of the fastening surface by a few millimeters one way or the other, such as to a maximum margin of displacement of ± 5 mm, preferably ± 3 mm, for the edge of the fastening surface. This margin of displacement enables the upper edge of the rail to move a couple of centimeters and allows any positional errors of the fastener to be sufficiently corrected.

[0009] In the method of the invention, the rail to be fastened is preferably a glass rail which is installed by fastening its base part to the fastening surface of said at least one fastener, by receiving the rail's rail part of glass by the base part and by securing the rail part of glass into the base part by wedging it there.

[0010] The fastener used in the method of the invention preferably comprises two surfaces substantially perpendicular to each other, of which one surface is a rail base-part fastening surface, while the other surface is a fastener fastening surface, and the substantially right angle between these two surfaces is fine-adjusted by at least one threaded pin or bolt.

[0011] The fastener of the invention comprises a rail base-part fastening surface and a fastener fastening surface, the rail base-part fastening surface being substantially perpendicular to the fastener fastening surface. In addition, the fastener comprises at least one adjustment member for fine-adjusting the substantially right angle between said fastening surfaces.

[0012] The base-part fastening surface and the fastener fastening surface of the fastener according to the invention are preferably provided on the same integral body.

[0013] The fastener of the invention is also advantageously formed as an L-shaped piece, said fastening surfaces being provided on its outer side and said at least one adjustment member connecting the furthest portions of the legs of the piece to each other.

[0014] Preferably, the adjustment member of the fastener according to the invention comprises at least one threaded pin or bolt. Preferably, the adjustment member consists of two bolts supported in the fastener at their heads and of an adjustment sleeve connecting the bolts to each other and provided with matching, internal threads. Alternatively, the adjustment member can consist of a bolt supported in the fastener at its head and of a nut supported in the fastener.

[0015] The fastener of the invention, except for the adjustment member, is preferably made of aluminum.

[0016] The fastener of the invention is preferably used for fastening glass rails.

[0017] The features of the method of the invention are

described in more detail in claim 1, the features of the fastener of the invention are described in more detail in claim 4, and the use of the fastener of the invention is described in claim 11.

[0018] In the following, the invention will be described by way of example with reference to the accompanying drawings wherein

Figure 1 is a schematic view of a rail fastener according to the invention,

Figure 2 is a schematic view of an alternative rail fastener according to the invention, and

Figures 3A and 3B show alternative positions of the fastener of Figure 1 for fastening the base part of a rail.

[0019] The fastener 1 shown schematically in Figure 1 comprises a substantially L-shaped frame member 2, a support member 3 received by a groove in the furthest portion of the longer leg of the frame member, a bolt 4 connecting the other leg of the frame member and the support member to each other, as well as a nut 5 securing the threaded end of the bolt to the support member.

[0020] In this embodiment, the substantially L-shaped frame member 2 defines, on the outer side of the shorter leg, a fastening surface 6 for the base part of the rail to be fastened, and, on the outer side of the longer leg, a fastening surface 7 of the fastener 1.

[0021] The substantially L-shaped frame member 2 is preferably made of extruded aluminum profile and comprises, at the junction of its legs, a relieving portion 8 to contribute to the bendability feature of the aluminum profile without breaking. In addition, a small cut 9 is made into the outer face of the junction of the frame member 2, allowing, while the angle between the fastening surfaces 6 and 7 is fine-adjusted, the bending to move the corner towards the fastening surface 7 of the fastener 1.

[0022] The support member 3 is seated in the frame member 2 by means of a groove made in the inner face of the longer leg, in the furthest portion of this leg. It is preferable that the support member 3 also is made of aluminum profile and extends, along the width of the fastener 1, i.e. in a perpendicular direction from the plane of the figure, over the entire width of the frame member 2 of the fastener.

[0023] The support member 3 is provided with a groove for a nut 5, and, at the nut, and a hole is drilled in the support member for the threaded end of the bolt 4. The head of the bolt 4 is inserted into a groove made in the inner face of the outer end of the shorter leg of the frame member 2.

[0024] Since, in the embodiment of Figure 1, the adjustment member of the fastener 1 consists of the bolt 4 and the nut 5, the location and position of the outer face of the shorter leg of the frame member 2, forming the rail base-part fastening surface 6, is adjusted relative the

support member fastening surface 7 by rotating the nut in the groove provided in the support member 3, as a result of which the bolt 4 moves relative the support member and forces the shorter leg of the frame member to bend relative the longer leg thereof.

[0025] Figure 2 is a schematic view of an alternative embodiment of the fastener 1 according to the invention of this application.

[0026] The embodiment of the fastener 1 shown in Figure 2 is substantially identical to the embodiment of Figure 1 but the support member 3 is replaced with an integrated projection 10 of the frame member 2 and the adjustment member consists of two bolts 11, 11' as well as of an adjustment sleeve 12 connecting these bolts to each other. In addition, although the fastener 1 of Figure 2 does not show the cut 9, it is preferable to include it in this embodiment as well.

[0027] The heads of the bolts 11, 11' of the fastener of Figure 2 are seated in grooves provided in the inner faces of the furthest portions of the legs of the substantially L-shaped frame member 2 made of aluminum profile, the grooves being preferably formed by using material layer thickenings or projections, such as the projection 10. The threaded portions of the bolts 11, 11' are connected to each other at their ends by the adjustment sleeve 12, and the adjustment sleeve 12 is provided with matching, internal threads so as to bring the heads of the bolts 11, 11' either nearer each other, or farther away from each other, by rotating the sleeve. This embodiment requires matching threads, i.e. threads of different handedness, on the bolts 11 and 11', in order to work.

[0028] Figures 3A and 3B illustrate the use of the fastener 1 according to the invention in different positions.

[0029] In the position of use shown in Figure 3A, the fastening surface of the fastener 1 is substantially horizontal while the fastening surface of the base part 31 of the rail is substantially vertical. Hence, the base part 31 is secured to the fastener 1 at a lateral face thereof. This position of use also allows the fastener 1 to be hidden in the final floor structure, by covering it by the filler and putty used, for instance.

[0030] In the position of use shown in Figure 3B, the fastening surface of the fastener 1 is substantially vertical while the fastening surface of the base part 31 of the rail is substantially horizontal. Hence, the rail structure lies, partly or wholly, on top of the fastener. This position of use allows the fasteners 1 to be hidden, if needed, by encapsulating, for instance.

[0031] It should be noted that the embodiments shown in the figures and explained above are not intended to pose any restriction to the invention. A person skilled in the art knows how to modify, and is capable of modifying, the embodiments in many obvious ways. Therefore, the scope of the invention is solely defined by the accompanying claims.

Claims

1. A method of fastening a rail, in which method the rail is fastened by the base part (31) of the rail, **characterized in that** the base part (31) of the rail is fastened to a structure of a building by at least one fastening surface (6) provided by a fastener (1), wherein the position of the fastening surface relative the rest of the fastener is fine-adjustable to achieve the vertical straightness of the rail being fastened.
2. A method as defined in claim 1, **characterized in that** the rail is a glass rail to be fastened by securing the base part (31) to the fastening surface (6) of said at least one fastener (1) by receiving the rail part of glass of the glass rail by the base part and by securing the rail part of glass into the base part by wedging it there.
3. A method as defined in claim 1 or 2, **characterized in that** said at least one fastener (1) comprises two surfaces (6, 7) substantially perpendicular to each other, of which one surface one is a rail base-part fastening surface (6), while the other surface is a fastener fastening surface (7), the substantially right angle between these two surfaces being fine-adjusted by at least one threaded pin or bolt (4, 11, 11').
4. A fastener (1) for fastening a rail, the fastening comprising a fastening surface (6) of the base part (31) of the rail and a fastening surface (7) of the fastener, **characterized in that** the fastening surface (6) of the base part (31) is substantially perpendicular to the fastening surface (7) of the fastener (1), and **in that** the fastener comprises at least one adjustment member for fine-adjusting the substantially right angle between said fastening surfaces.
5. A fastener (1) as defined in claim 4, **characterized in that** the fastening surface (6) of the base part (31) and the fastening surface (7) of the fastener (1) are provided on the same integral fastener.
6. A fastener (1) as defined in claim 4 or 5, **characterized in that** the fastener (1) is a substantially L-shaped piece (2) having said fastening surfaces (6, 7) on its outer side, and wherein said at least one adjustment member connects the furthest portions of the legs of the piece to each other.
7. A fastener (1) as defined in any of claims 4 to 6, **characterized in that** said at least one adjustment member comprises at least one threaded pin or bolt (4, 11, 11').
8. A fastener (1) as defined in claim 7, **characterized in that** said at least one adjustment member consists of two bolts (11, 11') supported in the fastener (1) at their heads and of an adjustment sleeve (12) connecting the bolts to each other and provided with matching, internal threads.
9. A fastener (1) as defined in claim 7, **characterized in that** said at least one adjustment member consists of a bolt (4) supported in the fastener (1) at its head and of a nut (5) supported in the fastener.
10. A fastener (1) as defined in any of claims 4 to 9, **characterized in that** the piece (2) or pieces comprising said fastening surfaces (6, 7) are made of aluminum.
11. The use of a fastener as defined in any of claims 4 to 10 for fastening a glass rail.

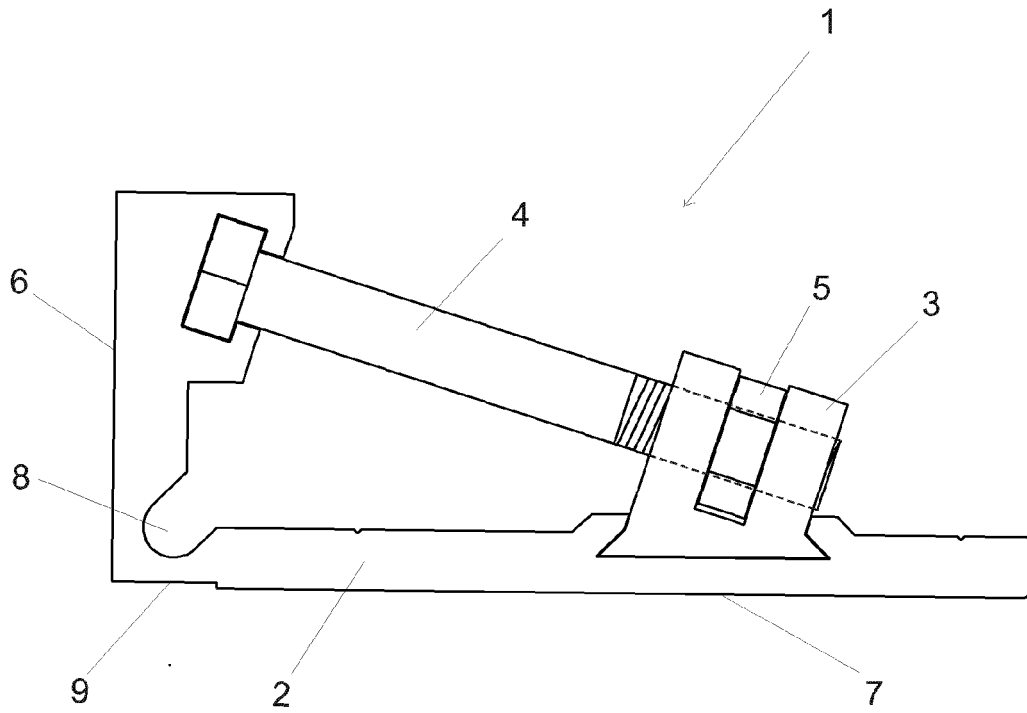


FIG. 1

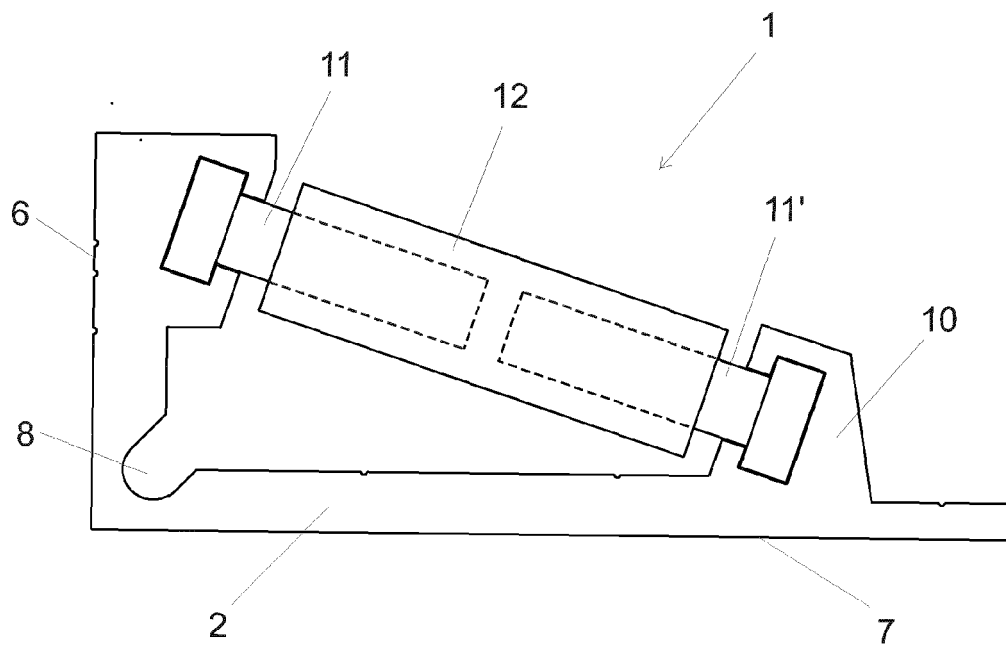


FIG. 2

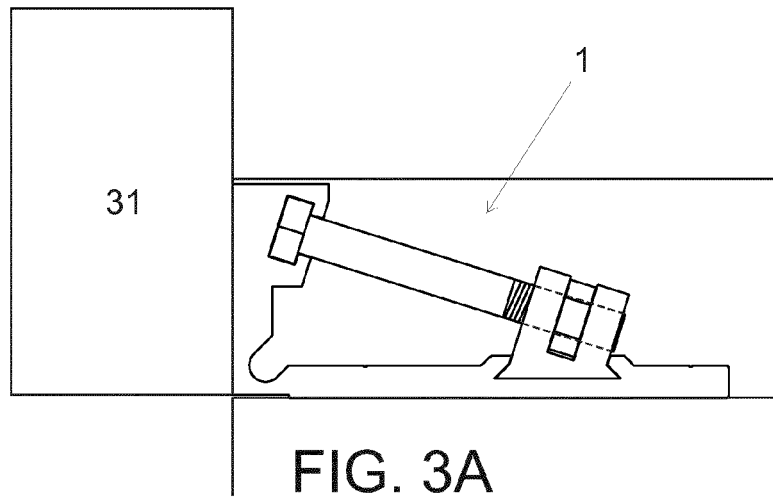


FIG. 3A

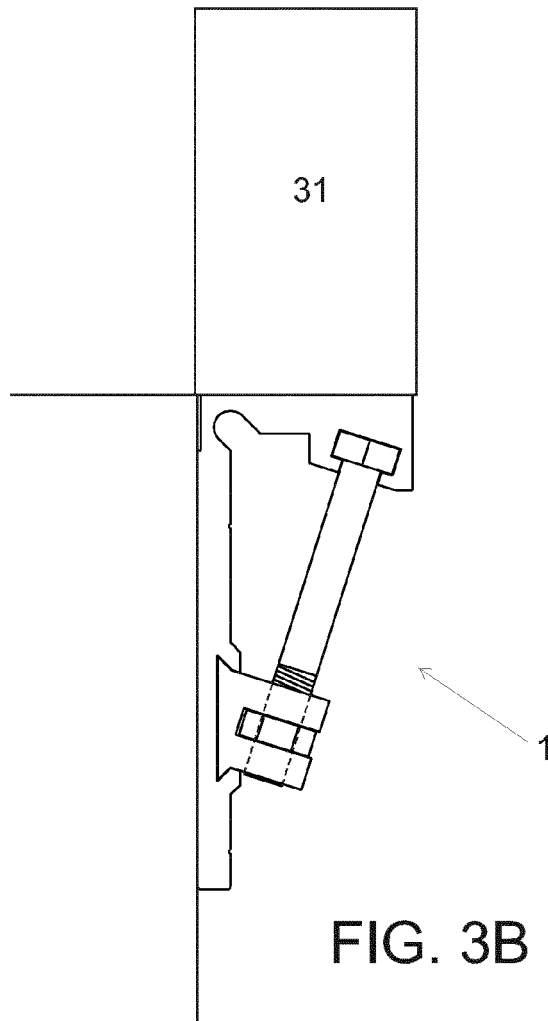


FIG. 3B



EUROPEAN SEARCH REPORT

Application Number
EP 15 16 6207

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The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 4 September 2015	Examiner Arsac England, Sally
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EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
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EP 15 16 6207

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