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(54) GLAZED RAILING SYSTEM AND A HORIZONTAL RAIL FOR A GLAZED RAILING SYSTEM

(57) The invention relates to a glazed railing system and a horizontal rail such as a bottom rail or handrail for the glazed railing system. The horizontal rail (DR) comprises a glazing groove (DRG) for a glazing structure. As the fastening structure (FS) for fastening the glazing structure, the horizontal rail (DR) comprises, in the wall (W) of the horizontal rail, surrounding the glazing groove, an integral tightening protrusion (PR) that may be distanced in relation to the wall, and additionally a chamber (THRN) which is the guide of the pushing member placeable in the chamber, said chamber (THRN) being arranged to guide the pushing element placeable in the chamber to push said integral bendable tightening protrusion (PR) from the side towards the glazing groove (DRG).

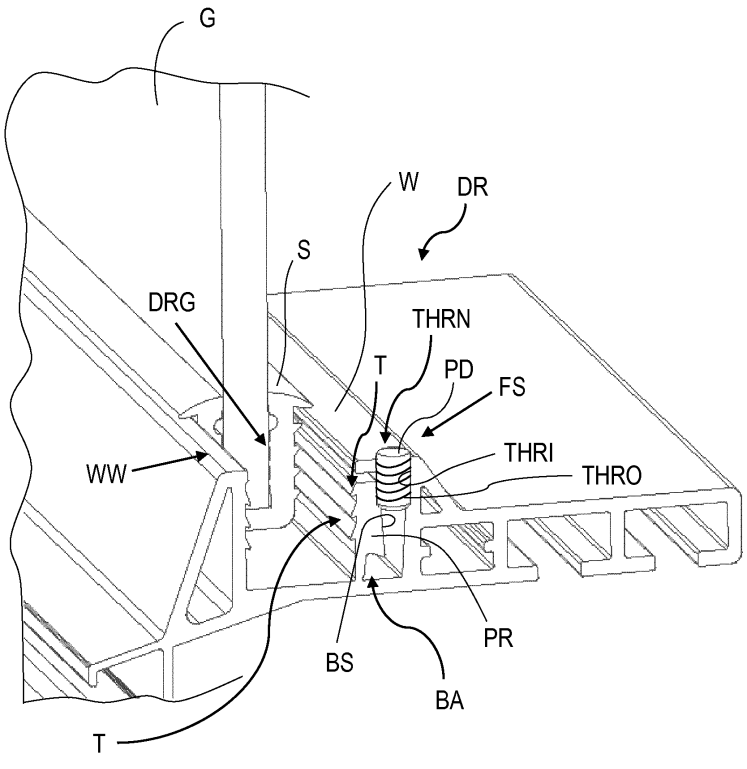

FIG. 2

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Description

Background of the invention

[0001] For the sake of safety of being on a balcony, terrace, or similar space, there is a railing structure at the front edge of such a space, such as a balcony. A railing structure equipped with cover plates also acts as a wind screen and possibly also as a visibility screen.

[0002] The railing structure may be fastened to a side of a balcony slab, i.e. in practice to a front edge of the balcony slab. A second basic way that is also utilised in the present invention is to have the railing structure on the balcony slab. The location of the railing structure is determined by the fastening point of the horizontal lower profile of the railing structure.

[0003] The structure according to the invention is suitable for mounting both on a support such as a slab and to a side, or edge, of a support such as a slab, that is, to the outer edge of a balcony slab.

[0004] For reasons relating to architecture and costs, a railing structure that does not use dedicated vertical posts between the lower profile and upper profile, that is, the handrail, has become more and more popular. This structural principle sets new challenges to the stability and rigidity of the railing structure and thus to the safe usage.

[0005] Postless glazed railing systems have a groove in the top surface of the lower profile for the horizontal lower edge of the glazing, and similarly on top of the glazing in the lower surface of the top rail, that is, in the lower surface of the so-called handrail there is a groove for the horizontal upper edge of the glazing.

[0006] An important detail in railing structures without vertical posts is how the glazing structure, that is, the cover plate elements, are in relation to the horizontal rail / lower profile under the glazing and horizontal top rail, which may be called the handrail of the railing, on top of the glazing,

[0007] A fastening method is known where the glass is glued by its horizontal bottom edge to a glazing groove of the lower profile and glued by its horizontal upper edge to the glazing groove in the lower surface of the handrail.

[0008] A fastening method is also known where the structure, as concerns the lower profile, is such that there are, in a recess at the front edge of a balcony slab, for example, large and robust tightening structures between the slab and the lower profile, by means of which the inner wall defining the glazing groove of the lower profile is pushed, along the entire wall, towards the glazing in glazing groove. Finally, the recess and the large and robust fastening structures at the front edge of the balcony slab are covered by the concrete pouring to be added.

[0009] In the known postless systems the load is received by a railing plate supported by its lower end, only.

[0010] The known solutions are either deficient as to their effect, or cumbersome, large, or heavy either structurally or as regards their implementation.

[0011] Publication US2015197959 discloses a separate swinging tightening protrusion placed in the chamber of a horizontal rail, which is pushed obliquely from the above by a bolt. Publication WO2015145477 discloses a separate wedge in the horizontal rail, which is tightened by a vertical bolt. In these known solutions, the coupling of the tightening protrusion to the horizontal rail is inadequate, which in turn makes the fastening of the glass pane elements worse, which in turn weakens the operation of the railing structure, that is, the glazed railing system.

Brief description of the invention

[0012] It is thus an object of the invention to provide a glazed railing system and horizontal rail in such a manner that the above-mentioned problems can be reduced. The object of the invention is achieved by a glazed railing system and horizontal rail which are characterised by what is disclosed in the independent claims. Preferred embodiments of the invention are disclosed in the dependent claims.

[0013] The invention is based on a new kind of fastening between the glazing and horizontal rail.

[0014] The invention achieves advantages, such a good structure both from the viewpoint of manufacturing and firmness of the fastening, as well as the installation work. The invention reduces or removes prior art disadvantages. The invention makes possible good fastening of the glazing in an advantageous manner and so that the fastenings may play a part in transferring load off from the glazing,

Brief description of the figures

[0015] The invention will now be described in more detail in connection with preferred embodiments and with reference to the accompanying drawings, in which:

Figure 1 shows a glazing fastening system in connection with a bottom rail, as seen from the direction of the bottom rail,

Figure 2 shows the structure somewhat similar to that in Figure 1 as seen slightly obliquely from the front,

Figure 3 is schematic diagram as a vertical section of a glazed railing arrangement on top of a balcony slab, as viewed in the longitudinal direction of the rail.

Figure 4 is a top schematic diagram of a glazed railing system on top of a balcony slab,

Figure 5 is a schematic diagram of a bottom rail and handrail and their glazing grooves,

Figure 6 shows an untempered laminated glazing element,

Figure 7 shows a glazing fastening system in connection with a bottom rail as depicted in Figure 1, but as seen from the opposite direction of the bottom rail,

Figure 8 shows a glazed railing structure equipped with three glazed railing elements straight from the front,

Figure 9 is a simplified front view of glazed railing structures having three glazing elements with their fasteners,

Figure 10 shows the bulging outward of the centre glazing element of Figure 9 as a result of an impact,

Figure 11 show one side of a glazed railing structure, in particular a face side.

Figure 12 shows schematically from the top a glazed railing structure that has a long side and two shorter face sides.

Detailed description of the invention

[0016] An installed entire glazed railing system may be mostly seen in Figures 3, 4 and 8, the details being best seen in Figures 1, 2 and 7.

[0017] With reference to the figures, the target of application is a glazed railing system GA positioned in an embodiment to a balcony 1 with a balcony slab 10, which is a concrete slab 10 of suitable strength, either an element concrete slab or one cast in place.

[0018] The glazed railing system GA comprises lower profile DR on top of the balcony slab, such as a bottom rail DR, that is, a bottom rail DR.

[0019] The structure according to the invention is suitable for mounting/fixing both on a support such as a slab and to a side, or edge, of a support such as a slab, that is, to the outer edge of a balcony slab.

[0020] In addition, the glazed railing system GA comprises a top rail UR, that is, an upper profile 31 such as a top rail 31, which is the handrail of the glazed railing system, against which a user may rest his hand.

[0021] Referring to Figure 8, for example, the glazed railing system GA additionally comprises a glazing structure G consisting of one or more glazing elements G1-G3 and being a cover plate structure protecting the balcony. Each glazing element G1 of the glazing structure is a so-called railing glass or plate.

[0022] The lower profile DR, just like the upper profile UR, too, may be an aluminium strip, such as profile strip, made by extrusion.

[0023] This, then, is a glazed railing system GA which comprises a horizontal bottom rail DR and a handrail HR as a horizontal top rail, as well as a glazing groove DRG, that is, a glass groove in the bottom rail DR and a glazing groove URG, that is, glass groove in the handrail URG, and a glazing structure G comprising one or more glazing elements G1-G3 and being located by means of the glazing grooves DRG, URG between the bottom rail DR and handrail UR.

[0024] Referring to Figures 1-2, the glazed railing arrangement additionally comprises a fastening structure FS for fixing the glazing structure G to the bottom rail and top rail. Both the bottom rail DR and the top rail UR have their own fastening arrangements FS for the glazing G.

[0025] Referring to Figure 8, in particular, when examining even a single horizontal rail such as the bottom rail DR or top rail UR, in an embodiment there is a plurality of fastening structures FS along the reach of the horizontal rail such as DR, UR and they are at a distance from each other. This way, a point-form strong fastening force is created between the glazing G, G1-G3 and the horizontal rail such as DR, UR. The fastening structures FS, FS1-FS5 for fastening the glazing G are in such a manner, for example, that there are 5 fastening arrangements along the 300 cm long bottom rail DR, whereby with an even distribution the distance in between the fastening points FS is approximately 60 cm, if the edge-most fastening arrangements FS1, FS5 are near the ends of the bottom rail DR. The distance in between the locations of the fastening structures FS, FS1-FS5 may also be more or less than the aforementioned 60 cm in the example.

[0026] As relates to the fastening structures FS, it is noted that the fastening structure comprises in the bottom rail DR and/or handrail DR in a wall W bordering the glazing grooved DRG, URG, a flexible tightening protrusion PR which may be distanced from the wall W by bending. In addition, the tightening structure FS comprises in the bottom rail DR and/or bottom rail, that is, handrail UR, a chamber such as a threaded chamber THRN and a pushing member PD, rotatable in relation to the threaded chamber THRN and having a threaded outside, in other words, provided with an external thread THRO. The pushing member PD has in an embodiment a threaded surface, so equipped with an external thread THRO.

[0027] In an embodiment, both the bottom rail DR and the handrail UR have, in the wall W bordering the glazing groove DRG, URG, a plurality of integral tightening protrusions PR, which may be distanced from the wall W by bending.

[0028] Even though the chamber THRN was in the above and will below be treated as a threaded chamber and the pushing member PD as a pushing member with a threaded surface, the invention is to be understood more broadly, so the principle of threads is not a must, albeit found good. The chamber THRN guides the pushing member PD so that the integral tightening protrusion PR on the wall W of the glass groove DRG, URG in the horizontal rail DR, UR is caused into a transverse tightening movement towards the glass groove and glazing or other similar cover plate structure. An integral tightening protrusion PR in the rail UR, DR means that the tightening protrusion PR is of the same integral material piece with the rail and not an added part, and the tightening protrusion PR is so created that in an extruded rail, for example, vertical parallel thin grooves are made to form the flexible tightening protrusion PR. The transverse width of the tightening protrusion PR is consequently determined by the distance between the aforementioned parallel grooves.

[0029] Hence, it may be noted that when examining both the glazed railing system and the horizontal rail, that as the fastening structure FS for fastening the glazing

structure the horizontal rail such as DR comprises, in the wall W of the horizontal rail, surrounding the glazing groove, a tightening protrusion PR that may be distanced from the wall in question, and additionally the chamber THRN which is the guide of the pushing member PD placeable in the chamber, said chamber THRN being arranged to guide the pushing element PD placeable in the chamber to push said tightening protrusion PD from the side towards the glazing groove DRG. The pushing member PD may be seen as a part of the horizontal rail or a part that may be added to it.

[0030] The threaded chamber THRN comprises an internal thread THRI. The external thread THRO comprised by the pushing member PD and the internal thread THRI comprised by the threaded chamber THRN together establish a threaded transmission which is between the pushing member PD and the threaded chamber in the horizontal rail DR.

[0031] As the pushing member PD proceeds in the threaded chamber THRN, it is arranged to push said tightening protrusion PR towards the side surface of the glazing structure G in the glazing groove, on the edge area thereof. On the bottom rail DR side, the edge area of the side surface of the glazing is in the groove DRG for the lowest 25-30 mm of the side area of the glazing, for example.

[0032] The examples of the figures show that there is a seal S between the groove such as URG and the glass G, so in the figure the tightening protrusion PR moves against the seal S when the pushing member PD such as a bolt is rotated forward in the threaded chamber THRN, whereby the pushing member is able to push the back surface BS of the tightening protrusion PR. It is noted that the in the area below the threaded chamber THRN and the bolt-type pushing member PD, the back surface BS of the tightening protrusion extends obliquely in relation to the longitudinal direction of the threaded chamber THRN and pushing member PD, because in such a case the pushing member PD pushes the tightening member PD the more powerfully towards the seal S and glazing groove URG the further the pushing member PD is rotated. The inclined back surface BS of the tightening protrusion PR extends in the bottom rail below the threaded chamber (in the top rail UR, that is, the handrail, on top of the threaded chamber), in other words from the viewpoint of the threaded chamber THRN, on the exit side of the pushing member PD. This achieves the fact that by means of the same threaded chamber and the pushing member PD with a threaded surface settable in it, an adjustable tightening is obtained, because as the pushing member PD is rotated further still, the integral tightening protrusion PR is wedged closer and closer to the seal S and glazing G. The seal S is not obligatory, that is, the tightening protrusion PR may also be in direct contract with the side surface of the glazing element or similar cover plate element at the lower part and/or upper part of the side surface.

[0033] In the figure, the seal S is a U-type seal trough that achieves sealing on both sides and fast installability. The seal S has protrusions SPR towards the glazing G to improve contact. In the bottom rail DR under the seal S at the very bottom of the groove there may be a support piece SP, as shown in Figure 1.

[0034] It is observed that in an embodiment the glazed railing system is such that in addition to the tightening protrusion PR which is on the wall W surrounding the glazing groove such as DRG and which may be distanced in relation to the wall W, also the threaded chamber THRN for the pushing member PD with the threaded surface is on this wall surrounding the glazing groove.

[0035] The horizontal rail such as the bottom rail DR is an integral structural part, extruded, for example, so the tightening protrusion PR is an integral ar-ea/spot/part with the rest of the horizontal rail DR, which also applies to the chamber THRN on the wall W of the horizontal rail DR, such as the threaded chamber machined into the horizontal rail. This way, these structures help make the fastening of the glazing G to the horizontal rail DR fixed, that is, non-floating, and such that it better conveys forces from the glazing to the horizontal rail, which is also helped by the fact that the gripping from the tightening protrusion PR to the glazing is at the side surface of the glazing, by its lower edge (bottom rail DR) and/or the upper edge (top rail DR, that is, handrail). The structure may be similar in the top rail, that is, handrail UR. A postless, stabile glazed railing system is achieved.

[0036] In a postless glazed railing system the rail glasses G, G1, G3 are able to receive the required support forces and forward them, because the fastening arrangement FS, FS1-FS5 of the rail glasses G1-G3 to the bottom rail and handrail is of the type disclosed in the above.

[0037] Referring to Figure 3 in particular and also to 4 and 6, it is observed that by means of the disclosed structure the situation is reached where a force from the balcony side, so as though from the inside, is divided in addition to the direction A also to directions B by means of the glazing element G1 and the foil F therein, whereby impact energy is transferred from the glass pane element to the handrail of the rail and to the adjacent glass pane element/elements.

[0038] Referring in particular to Figure 4, the matter is next discussed in relation to the sides a, b, and c of the railing structure, of which side b is the middlemost, so usually the longest side, and sides a and c are the edge sides. This is related to the transfer of a sideward lateral force of two adjacent separate sides to the other side, whereby a force in the direction of the horizontal profiles DR, UR is received by the glass.

[0039] This way the horizontal forces of the side a in the direction of side b are received by the handrail and the bottom rail UR of side b are immovably fastened to each other.

[0040] Correspondingly, the forces in the direction of the horizontal rails DR, UR of the sides a and/or c of side b are arranged to be received by the ensemble of the side a and/or a and b, that is, by the interconnected en-

semble of the handrail UR and glasses G, G1-G3 and bottom rail, which also has the fastening arrangements FS, FS1-FS5 in the bottom rail (correspondingly in the top rail).

[0041] It may be noted that if an impact is received from the inside on side b, the force is conveyed from the glass G, G1-G3 to the lower profile DR which is fastened to the slab 10, and the force is also conveyed to the handrail DR which is fastened to the wall by fastenings WF. Because the glasses G1-G3 are fastened by fastening arrangements FS, FS1-FS5 by pressing to the horizontal rails DR, UR, in an impact situation the glass to which the impact is targeted bends outward, whereby the horizontal rails such as the handrail UR tends downward or upwards, but because the glasses are fastened to the horizontal rails, they remain to support the movement of the handrail UR so that it does not detach from the glasses and so that the glass that received the impact will not become detached from the rail.

[0042] When an impact from the inside is received at side a in the direction of the arrow C1, the bottom rail DR receives the force from the glass because the bottom rail DR is fastened to the slab 10.

[0043] In Figure 4 because the glasses G1-G3 of side b so the front side so the longest side are properly pressed to the lower and top rails DR, UR, they make sturdier the support of its side c so much that the rail can take an impact from the direction C1.

[0044] In such a case, the handrail UR, UR1, UR2 is a structure firm enough for a balcony glazing to be fastened on top of it.

[0045] To make the railing structure more rigid, the wall fastenings WF of the extremes of the handrail according to Figure 4 are used by bolts, for example.

[0046] The discloses structure is suitable for both straight rails, as well as L-shaped and U-shaped ones.

[0047] In the following, the structure of Figures 9-10 is examined. A postless glazed railing system comprises a handrail 901, bottom rail 902 and glass pane elements G91-G93 as well as fasteners A11-A14, B21-B24, A31-A34, that is the fastening structures (as in the above FS, FS1-FS5) with which the glass pane elements G91-G93 are fastened in a fixed, so non-floating, manner to the handrail 901 and the bottom rail 902. In an embodiment, the glass pane elements G91-G93 are such that they have a laminated structure of 4 mm + 4 mm glasses and a middle foil (such as foil F above). The glazed railing arrangement works so that if, for example, an impact is received in the middle of the glass pane element G92 (by a person on the balcony, for example), the fasteners B21-B24 (their structure as FS, FS1-FS5 in the above) cause the laminated glass pane element G92 bends as in Figure 10 and tries to pull the handrail 901 and bottom rail 902 towards each other. This is possible because the glass pane elements G91-G93 are fastened to the handrail 901 and the bottom rail 902 (by fastening structures of the type of the fastener structures FS, FS1-FS1, so with fasteners A11-A14, B21-B24, A31-A34) so that the glass pane element cannot detach from them in any situation. During an impact incident (force FFF, Figure 12) the glass pane elements G91 and G93 support the handrail 901 and bottom rail 902 in their original position. Therefore the glass pane elements G91 and G93, in a way, from invisible posts or the handrail 901 and bottom rail 902. Because the glass pane element G92 is permanently locked between the rails 901 and 902, the middle foil inside the laminated glass pane element G922 (such as foil F in the above) presents a significant added value for the durability of the whole, because the glass pane elements cannot detach from the handrail (top rail) 901 or the bottom rail 902, and by means of the foil the impact force FFF is transferred to the handrail and bottom rail as well as to adjacent glasses G91, G93. With this structure, it is possible to establish a much sturdier structure than the conventional floating glass pane elements, or alternatively more economical untempered glass can be used, and, above all, an entirely postless railing structure. The inventive structure thus transforms the orthogonal force FFF into a vertical force FU, FD, which is received by the middle foil of the laminated glass pane element G92, from which it is conveyed by fixed fasteners B21-B24 to the handrail 901 and bottom rail 902, and the force is cancelled by the neighbouring glass pane elements G91, G93.

[0048] Referring to Figures 11-12, it is possible that the neighbouring glass pane element may be on the adjacent transverse side, that is, on a transverse face side (such as GG, I) in relation to the long side (such as H). Figure 12 shows schematically a glazed railing structure from the top, that is, a railing structure having sides GG, H and I, of which side H is the middlemost so the long side, and the shorter sides GG and I are face sides. By means of the fastening structure (FS, A11-A14, B21-B24, A31-A34)described in the above, the side of a balcony railing forms a plate-like structural entity (bottom rail - fastening - glass pane element - fastening - handrail), by means of which the forces it receives and distributes to neighbouring sides are much better than in the conventional methods and allow the establishing of a postless but durable glazed railing.

[0049] In Figure 11, the handrail 111 is tied to the bottom rail 112 by means of the glass pane element G11 and fasteners A111-A114 (structures as FS, FS1-FS5). Fasteners A111-A114 keep the glass pane element G11 firmly in place. In such a case, a horizontal force on the handrail 1, for example, is transferred to the bottom rail 112 by means of the glass pane elements and provides a counter-force to the force. The structure may be used to implement a postless railing system of the minimum of two sides. Referring to Figure 12, the force FFF to the balcony side H from the inside (so the balcony side) is distributed on sides GG and I, which support the side H so that the plate-like structure of the sides GG and I helps receive the forces in question.

[0050] The railing structure of both Figures 9-10 and 11-12 is fastened to the wall by the handrail 901, 111.

[0051] In an embodiment, the chamber such as the threaded chamber THRN for the pushing member PD is substantially vertical, the direction being comparable as the transverse direction to the longitudinal direction of the horizontal rail. The installation work is then easy to carry out, and the adjustability of the tightening is easy to implement because the pushing member PD taking a pushing contact to the backside BS of the tightening protrusion is able to push the tightening protrusion to the transverse direction, that is, to the transverse horizontal direction in the figures towards the seal S and glazing G, so the bottom part of the side surface of the glazing in the bottom rail, and top part of the side surface of the glazing in the top tail, that is, handrail.

[0052] By means of some embodiments, the usability and characteristics of the invention may be further improved.

[0053] In an embodiment, the threaded chamber THRN for the pushing member PD is substantially parallel to the depth direction, so vertical direction, of the glazing groove such as DRG. It is additionally so that this threaded chamber for the pushing member is substantially parallel to the longitudinal direction of the tightening protrusion.

[0054] The threaded chamber THRN has a diameter of 8 mm, for example, so it is meant for a pushing member PD with a diameter of 8 mm and having a threaded surface. Obviously, the diameter may be another, for example 6 mm.

[0055] The threaded chamber THRN for the inner pushing member extends at least partly in parallel with the tightening protrusion. In addition, in an embodiment it is so that the tightening protrusion PR is substantially parallel to the depth direction, that is, the vertical direction of the glazing groove DRG, because in such a case the protrusion is in a good place and more easily caused into a tightening motion towards the seal S and glazing G.

[0056] The passing through length of the threaded chamber THRN is 5-20 mm, for example, because this results in a good support for the pushing member PD with a threaded surface, with which the tightening protrusion PR at the edge of the glazing groove DRG is pushed from the side.

[0057] The tightening protrusion PR is an arm bent by the pushing member PD, the structure of which is such that the tightening protrusion PR comprises a free end T and at the opposite edge of the tightening protrusion a base BA of the tightening protrusion. In an embodiment, the free end T of the tightening protrusion PR is further from the bottom of the glazing groove than the base of the tightening protrusion, so the free end T of the tightening protrusion is on the side where the glazing G, G1-G3 enters the groove, so the tightening protrusion PR makes contact with the side surface of the glass in an area from a distance of the horizontal edge of the glass, but close to the horizontal edge.

[0058] It is observed that in an embodiment the tightening protrusion PR extends at least partly in parallel with the glazing groove DRG, in which case the position of the tightening protrusion PR is good and the desired direction of movement is more easily obtainable for it towards the seal S and glazing G, which, as mentioned, are in the groove DRG.

[0059] Regarding the significance of the method of implementation of the tightening arrangements FS, it may be said that the tightening arrangements of the type referred to form a fixed, non-floating fastening for the glazing structure G, G1, G2 with both the bottom rail DR and the handrail UR. Such a fixed, non-floating fastening is thus arranged to shift a load directed at the glazing structure G to both the bottom rail DR and through it to the installation platform 10, such as the balcony slab, of the glazed railing arrangement, and additionally also to the handrail UR and through it and both its ends to the vertical edges of the installation site, such as walls.

[0060] By means of the disclosed structures the use of untempered laminated glass becomes possible (no need for expensive and heavier tempered glass) even when the fastening of the glazing G to the horizontal rails DR, UR is fixed, so non-floating.

[0061] With reference to Figure 6, the glazing structure, that is, its single glazing element in practise, comprises, as mentioned, two untempered glazing parts GLA, GLB laminated to each other through the foil F. Each glazing element, such as G1 and G2, is then a laminated glazing element formed of two glazing parts GLA, GLB, placed against each other, and a middle foil F. The middle foil F has the aforementioned role of transferring the loading sidewards. However, it is such a case at some sites or in some countries that it is desirable or necessary to use glazing elements that have a glass pane element laminated with the aid of the foil F, but the other of its glasses is then tempered and the other one untempered.

[0062] Relating to the work during installation time becoming easier, the depth of the glazing groove DRG in the bottom rail DR is at least 28 mm and the transverse width of the glazing groove DRG is at most 1.5 mm, such as 0.2 mm - 0.8 mm, wider that the thickness of the glazing structure. The thickness of the laminated glazing structure may be, for example, 4 mm + 4 mm, and the width of the glazing groove slightly more.

[0063] The glazing groove such as DRG is deep enough but narrow so that the glass G, G1-G3 stays up for the installation time even without temporary supports, but it is possible that on the bottom rail DR side the tightening arrangements FS, PD, PR of the glass are tightened even before the handrail UR is installed.

[0064] The installation of a glazed railing system GA starts so that at first the bottom rail DR is fixed to the support such as balcony slab 10, then the glazing elements G1-G3 of the glazing structure G are lifted in their place in the groove DRG of the top surface of the bottom rail DR.

[0065] Next the top rail UR, that is, handrail is installed in its place and each tightening arrangement FS in both the bottom rail DR and handrail/top rail UR is tightened

by rotating the pushing members PD in the chambers THRN so far that the tightening protrusion PR by its base BA is wedged by bending more tightly towards the glass G, in Figure 1 through the seal S.

[0066] According to the applicant's observations, a suitable installation order is: first the bottom rail DR, next glazing elements/cover plate elements G1-G3, next top rail, that is, handrail UR, next the fastening of the handrail UR by fasteners WF to the walls, and finally the tightening of the elements G1-G3 to the bottom rail DR and top rail UR by means of the inventive fastening arrangements FS (PR, THRN, PD).

[0067] The tightening arrangements such as FS for the top rail UR are similar to those for the bottom rail DR, and due to the opposite position of the top rail, the mouth of the chamber THRN is at the bottom surface of the rail and the chamber THRN is pointed upward.

[0068] Instead of the upward direction, the chamber THRN may also be horizontal, for example, both in the bottom rail DR and top rail UR.

[0069] The invention is also suitable as a partition of business premises or another space.

[0070] In addition to or instead of an entire glazed railing system GA, the invention may be examined as a horizontal rail. In other words, it is a horizontal rail such a bottom rail DR or handrail UR, that is, top rail UR for a glazed railing system. The horizontal rail such as DR, UR comprises a glazing groove such as DRG, URG for the glazing structure G.

[0071] As was disclosed for the entire glazed railing system GA, as the fastening structure FS for fastening the glazing structure G to the horizontal rail DR, UR, the horizontal rail comprises in a horizontal rail wall W surrounding the glazing groove DRG, URG a tightening protrusion PR that may distanced in relation to the wall W, and additionally a chamber THRN such as a threaded chamber, in particular. Additionally is needed a pushing member that is movable, such as rotatable, in relation to the chamber. The pushing member PD may in an embodiment be provided with a threaded surface, such as a bolt-type or threading tap type pushing member, which is arranged, guided by the chamber THRN, to push said tightening protrusion PR from the side, that is, from the direction of the edge wall W towards the glazing groove DRG, that is, also towards the seal S and glazing G. What is important is the tightening protrusion PR and in its vicinity the chamber THRN, because they make it possible to set the pushing member PD, moving it in relation to the chamber THRN and the tightening protrusion PR and affecting by the pushing member PD to butt the tightening protrusion PR towards the glazing groove and the glazing therein.

[0072] Referring to Figure 7, it is noted that on the front surface of the tightening protrusion PR, so the surface towards the glazing surface DRG, the tightening protrusion comprises a bulge H1, which both improves the fastening of the glasses G1/G3 to the groove, but also as in Figure 7 positions the seal S in its place when the seal has a similar notch or another space. It is observed that the outer wall WW surrounding the glazing groove DRG in the horizontal rail DR comprises a bulge H2, which also positions the seal S and improves fastening to the glass.

[0073] A person skilled in the art will find it obvious that, as technology advances, the basic idea of the invention may be implemented in many different ways. The invention and its embodiments are thus not restricted to the above-described examples but may vary within the scope of the claims.

Claims

1. A glazed railing system which comprises a horizontal bottom rail (DR) and a handrail (UR) as a horizontal top rail, as well as a glazing groove (DRG) in the bottom rail (DR) and a glazing groove (URG) in the handrail, and a glazing structure (G) comprising one or more glazing elements (G1-G3) and, being located by means of the glazing grooves (DRG, URG) between the bottom rail (DR) and handrail (UR), and additionally a fastening structure (FS) for fastening the glazing structure (G), and in that
the fastening structure (FS) comprises in the bottom rail (DR) and/or handrail (UR) a tightening protrusion (PR), and in addition the tightening structure (FS) comprises in the bottom rail (DR) and/or handrail (UR) a chamber (THRN) and a pushing member (PD) which movable in relation to the chamber and arranged to push said tightening protrusion (PR) towards the side surface of the glazing structure (G, G1-G3) in the glazing groove (DRG, URG), on the edge area thereof, **characterised in that** the tightening protrusion (PR) is an integral tightening protrusion (PR) on the wall (W) of the bottom rail (DR) and/or handrail (UR), surrounding the glazing groove (DRG, URG), and which may be distanced in relation to the wall (W) by bending.

2. A glazed railing system as claimed in claim 1, **characterised in that** in addition to the integral tightening protrusion (PR) which is on the wall (W) surrounding the glazing groove (DRG, URG) and which may be distanced from the wall W, also the chamber (THRN) for the pushing member is on this wall surrounding the glazing groove.

3. A glazed railing system as claimed in claim 1 or 2, **characterised in that** the chamber (THRN) for the pushing member (PD) is substantially vertical.

4. A glazed railing system as claimed in any one of the preceding claims, **characterised in that** the chamber (THRN) for the pushing member is substantially parallel to the depth direction of the glazing groove (DRG, URG).

5. A glazed railing system as claimed in any one of the preceding claims, **characterised in that** the chamber (THRN) for the pushing member (PD) is substantially parallel to the longitudinal direction of the tightening protrusion (PR).

6. A glazed railing system as claimed in any one of the preceding claims, **characterised in that** the chamber (THRN) for the pushing member (PD) is extends at least partly in parallel with the tightening protrusion (PR).

7. A glazed railing system as claimed in any one of the preceding claims, **characterised in that** the tightening protrusion (PR) is substantially parallel to the depth direction of the glazing groove (DRG).

8. A glazed railing system as claimed in any one of the preceding claims, **characterised in that** the tightening protrusion (PR) extends at least partly in parallel with the glazing groove (DRG).

9. A glazed railing system as claimed in any one of the preceding claims, **characterised in that** the tightening protrusion (PR) comprises a free end (T) and at the opposite edge of the tightening protrusion a base (BA) of the tightening protrusion, and **in that** the free end (T) of the tightening protrusion is further from the bottom of the glazing groove (DRG) than the base (BA) of the tightening protrusion

10. A glazed railing system as claimed in any one of the preceding claims, **characterised in that** a postless glazed railing system comprises fixed, non-floating fastenings for the glazing structure (G, G1-G3) with both the bottom rail (DR) and the handrail (UR), formed with the tightening arrangements (FS) of the type referred to, and **in that** each fixed non-floating fastening is therefore arranged to shift a load directed at the glazing structure (G, G1-G3) to both the bottom rail (DR) and through it to the installation support of the glazed railing system, such as a balcony slab or other structural slab, and additionally to the handrail (UR) and through the ends of the handrail (UR) to the vertical edges of the installation site, such as balcony walls.

11. A glazed railing system as claimed in any one of the preceding claims, **characterised in that** the glazing structure (G, G1-G3) comprises two glazing parts (GLA, GLB) laminated to each other through the foil (F), at least one of which is untempered.

12. A glazed railing system as claimed in any one of the preceding claims, **characterised in that** in order to provide an adequate support during the installation with the bottom rail (DR), only, the depth of the glazing groove (DRG) in the bottom rail is at least 28 mm and the width of the glazing groove (DRG) is no more than 1.5 mm wider than the thickness of the glazing structure.

13. A glazed railing system as claimed in any one of the preceding claims 1-6, **characterised in that** the chamber (THRN) is a threaded chamber and the pushing member (PD) is provided with a threaded surface.

14. A glazed railing system as claimed in claim 1 or 10, **characterised in that** both the bottom rail (DR) and the handrail (UR) have, in the wall (W) bordering the glazing groove (DRG, URG), a plurality of integral tightening protrusions (PR), which may be distanced in relation to the wall (W) by bending.

15. A horizontal rail such as a bottom rail or a handrail for a glazed railing system, and which horizontal rail (DR, UR) comprises a glazing groove (DRG, URG) for a glazing structure, and
that as the fastening structure (FS) for fastening the glazing structure, the horizontal rail (DR,UR) comprises, in the wall (W) of the horizontal rail, surrounding the glazing groove, a tightening protrusion (PR) that may be distanced in relation to the wall in question, and additionally a chamber (THRN) which is the guide of the pushing member placeable in the chamber, said chamber (THRN) being arranged to guide the pushing element (PD), placeable in the chamber, to push said tightening protrusion (PR) from the side towards the glazing groove (DRG, URG), **characterised in that** the tightening protrusion (PR) is an integral bendable tightening protrusion (PR) on the wall (W) surrounding the glazing groove (DRG, URG) of the horizontal rail (DR, UR) and which may be distanced in relation to the wall (W).

16. A horizontal rail as claimed in claim 15, **characterised in that** in addition to the integral tightening protrusion (PR) which is on the wall (W) surrounding the glazing groove (DRG, URG) and which may be distanced from the wall (W), also the chamber (THRN) for the pushing member (PD) is on this wall (W) surrounding the glazing groove (DRG, URG).

17. A horizontal rail as claimed in any one of the preceding claims 15-16, **characterised in that** the chamber (THRN) for the pushing member (PD) is substantially parallel to the longitudinal direction of the tightening protrusion (PR).

18. A horizontal rail as claimed in claim 13, **characterised in that** the horizontal rail comprises a pushing member (PD) placed in the guiding chamber (THRN) comprised by it.

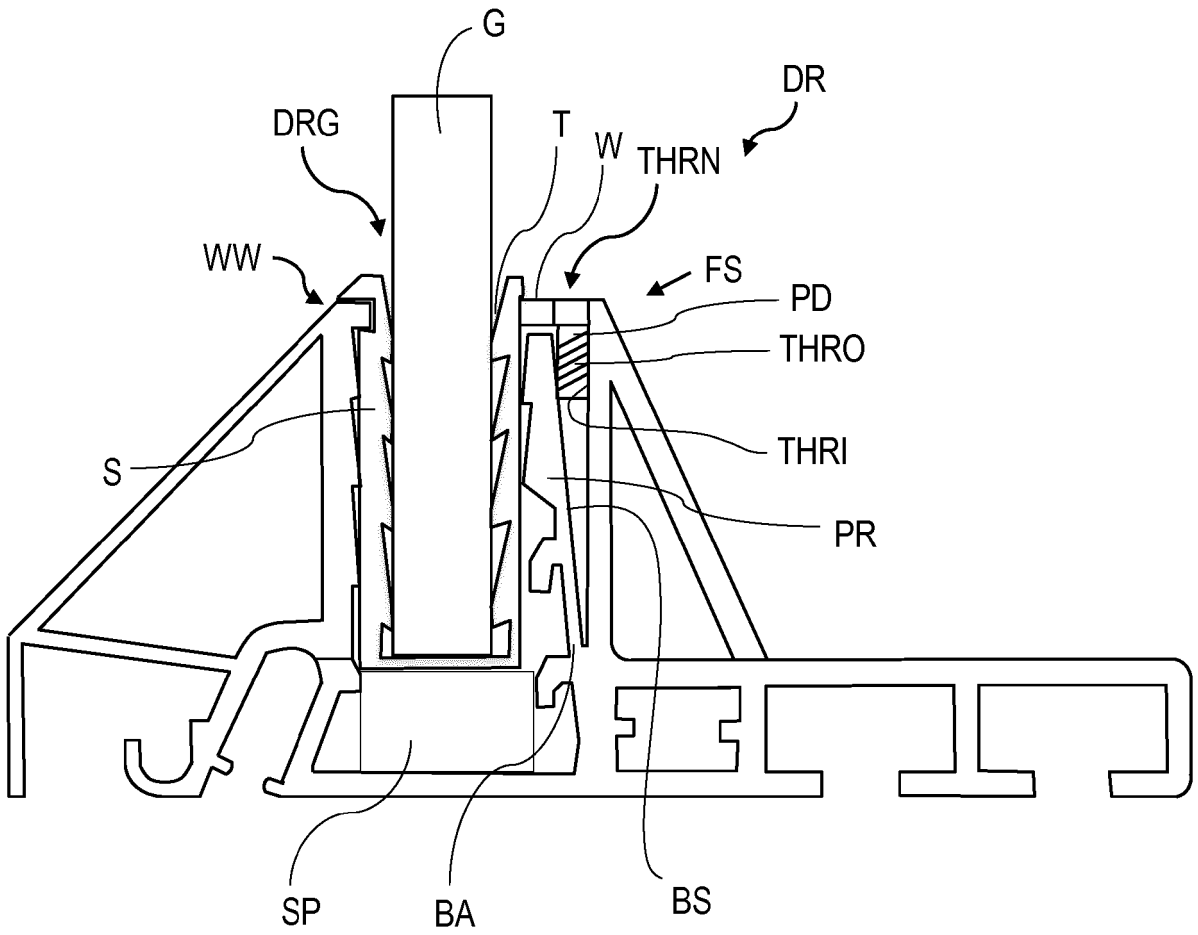

FIG. 1

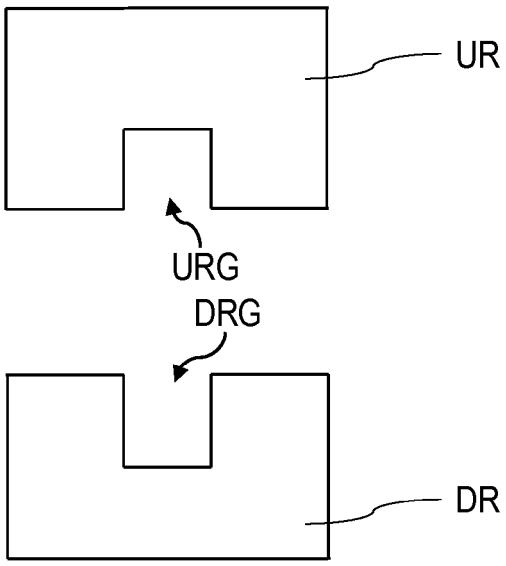

FIG. 5

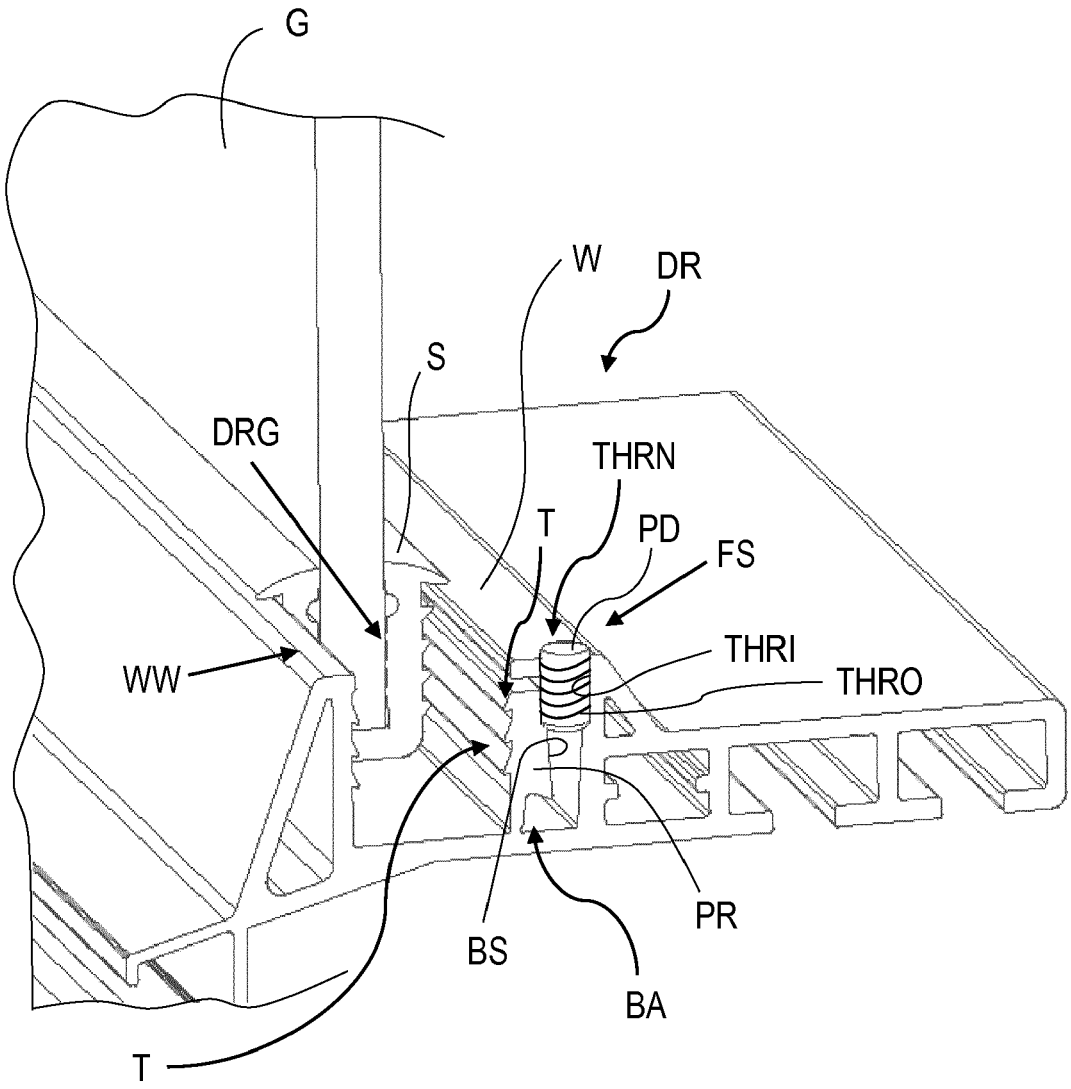

FIG. 2

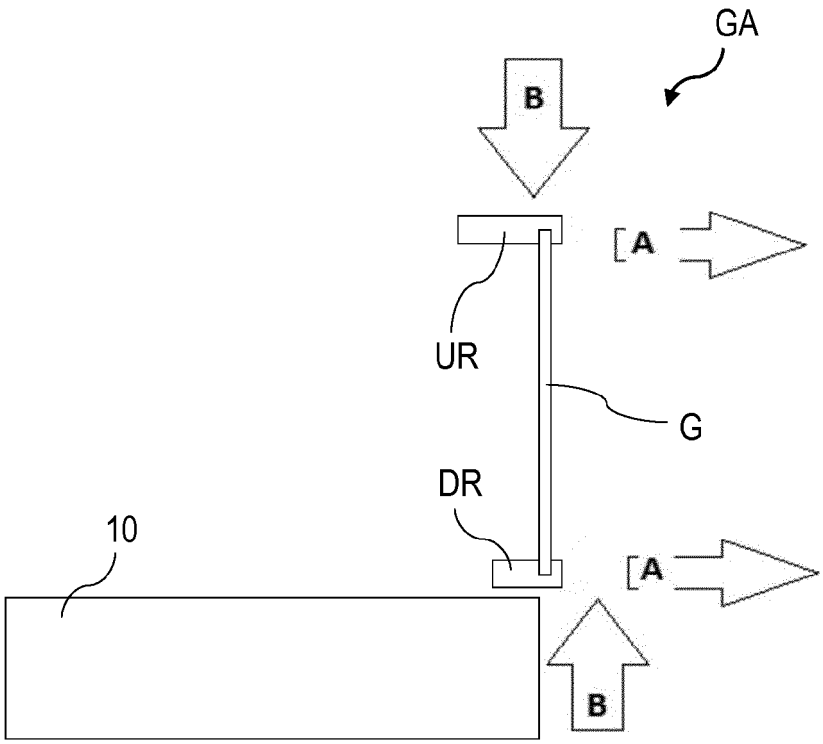

FIG. 3

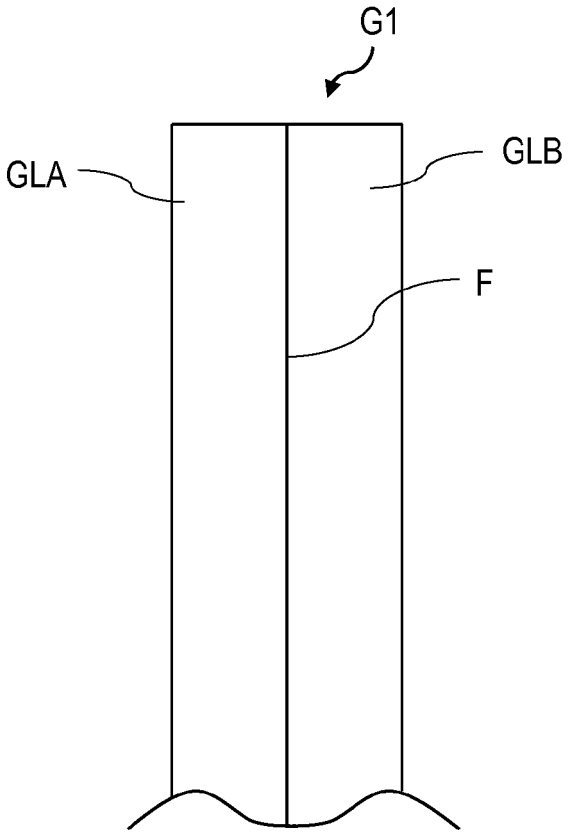

FIG. 6

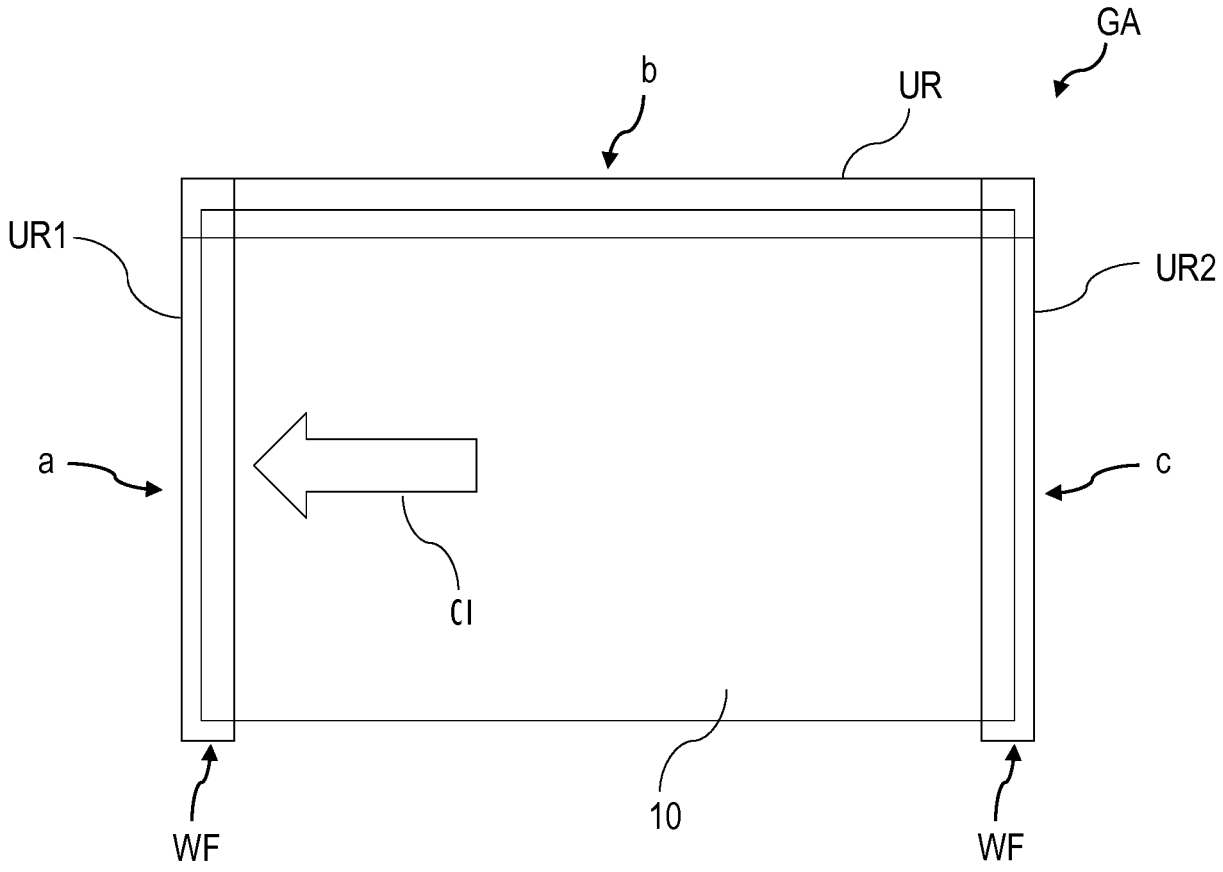
GA
b
UR
UR1
UR2
a
c
CI
WF
10
WF

FIG. 4

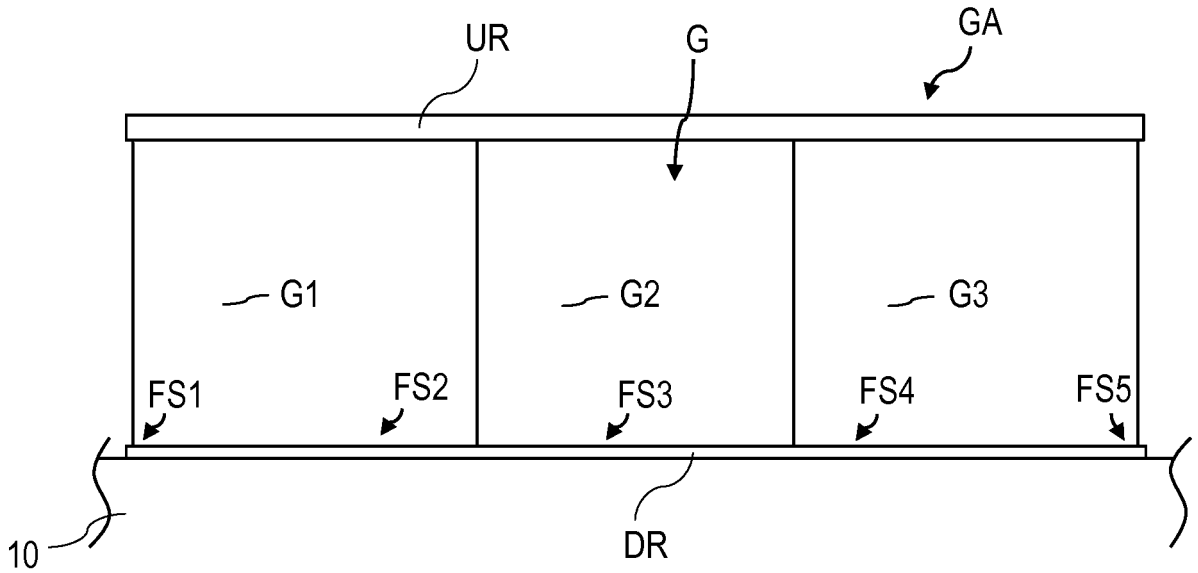
UR
G
GA
G1
G2
G3
FS1
FS2
FS3
FS4
FS5
10
DR

FIG. 8

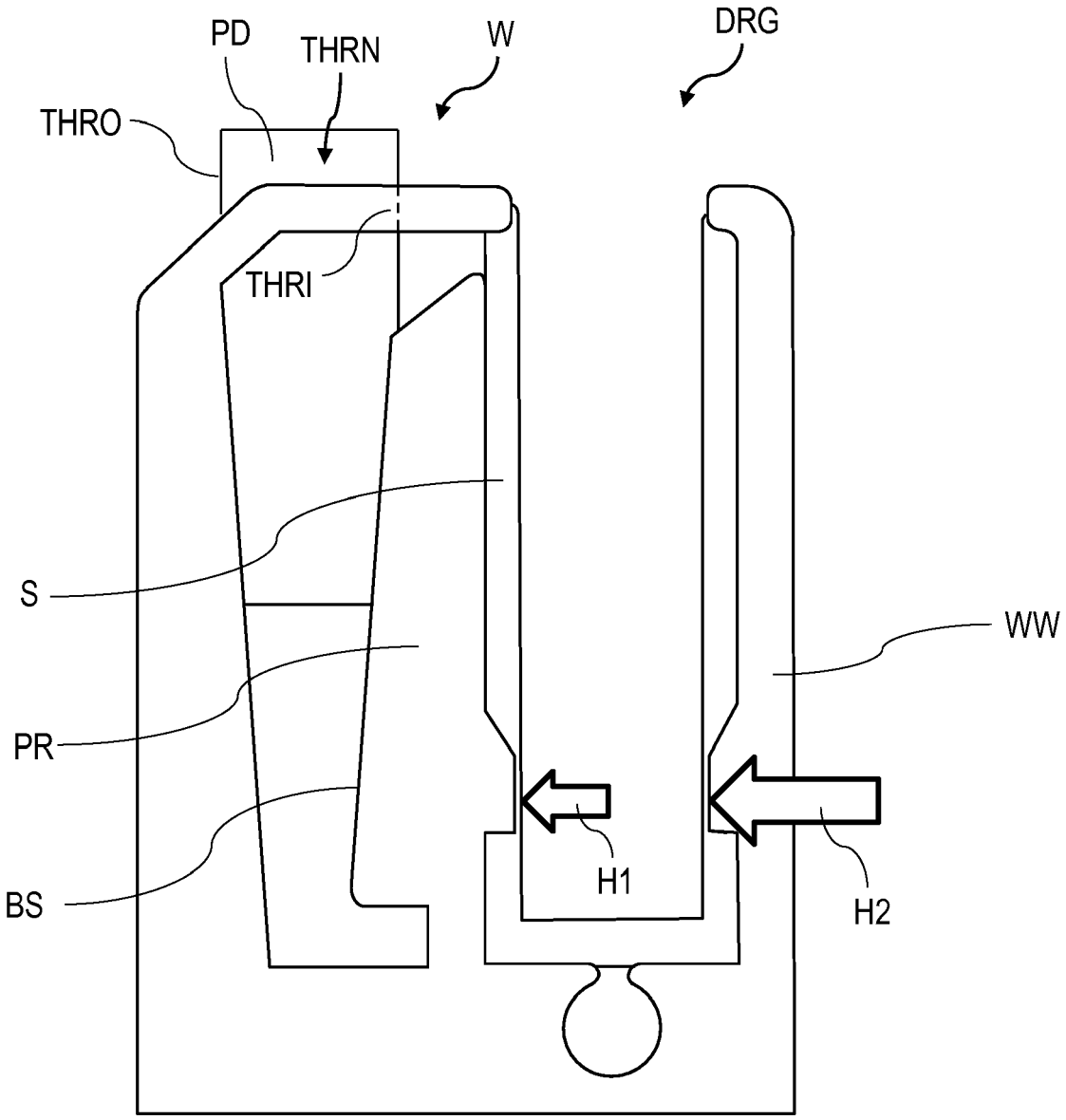

FIG. 7

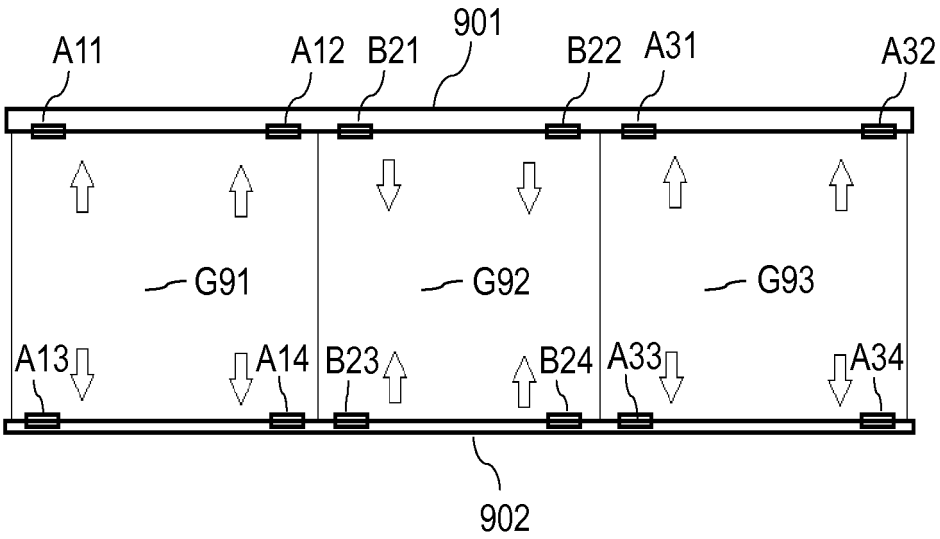

FIG. 9

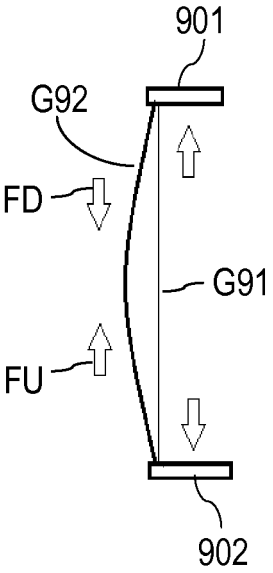

FIG. 10

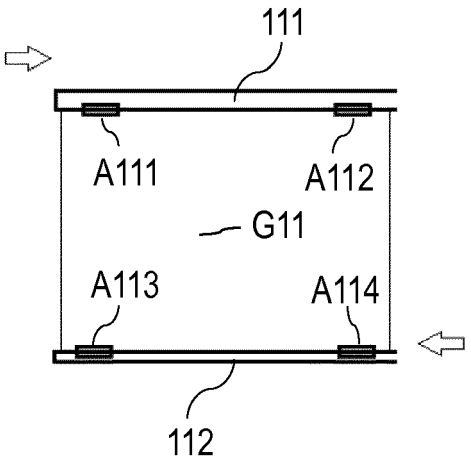

FIG. 11

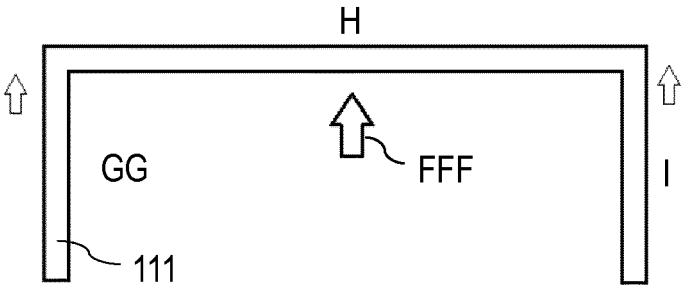

FIG. 12

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EUROPEAN SEARCH REPORT

Application Number
EP 17 19 5705

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X Y	WO 2015/092701 A1 (ANJO KONSULT AB [SE]) 25 June 2015 (2015-06-25) * figures 1-3 * * page 1, line 13 - line 15 * * page 2, line 2 * * page 4, line 10 - line 12 * * page 6, line 17 - line 18 * * page 8, line 22 - line 24 * * page 9, line 29 - line 32 * * page 14, line 13 - line 14 * -----	15-18 1-14	INV. E04F11/18
Y	WO 2015/145373 A1 (SKAALA PARVEKETEKNIIKKA OY [FI]) 1 October 2015 (2015-10-01) * figures 1, 3a * * page 9, line 1 - line 8 * -----	1-14	
Y	WO 2013/064985 A1 (GLASS VICE HOLDINGS LTD [NZ]) 10 May 2013 (2013-05-10) * figures 12-16 * * page 20, line 8 - line 11 * -----	13	
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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	21 March 2018	Estorgues, Marlène

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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21-03-2018

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