

[54] **GLASS WALL CONSTRUCTION
CONSISTING OF A PLURALITY OF
GLASS ELEMENTS OF
SUBSTANTIALLY U-SHAPED CROSS-
SECTION**

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[56] **References Cited**

FOREIGN PATENTS OR APPLICATIONS

683,423 3/1964 Canada.....52/400

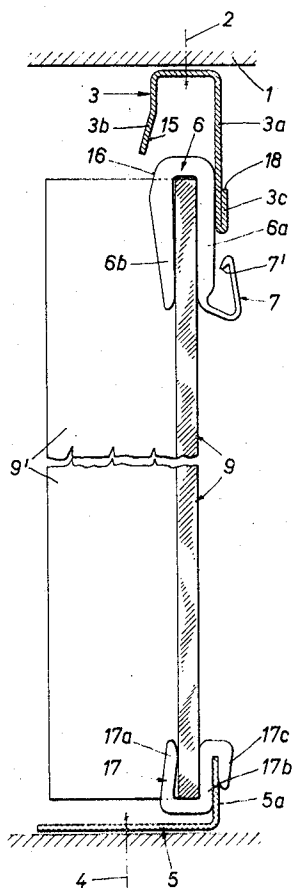
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[57] **ABSTRACT**

A glass wall construction composed of a plurality of glass elements, each possessing a substantially U-shaped cross-sectional configuration, and intended to be secured within a mounting which can be fixed into the opening of a structure, such as a building wall. This mounting embodies at least an upper rail member and a lower rail member. The leg portions of the glass elements are adhesively bonded in abutting relationship with respect to one another such that the sheet-like webs of all of the glass elements forming the glass wall are disposed in a given plane, which is preferably vertically oriented. Attachment elements, in the form of sliders, serve for resiliently guiding the glass elements with respect to the upper rail member of said mounting at least at the upper region of such glass elements. Each of the sliders is formed as a resilient element which is displaceable with respect to the glass elements and leg members of the mounting. These displaceable slider elements have at least a pair of depending leg portions, and projection means provided at one of said leg portions of each said slider element for partially encompassing a leg of the mounting, and wherein the leg portions of said mounting are configured or accommodated to the shape of the slider elements.

8 Claims, 8 Drawing Figures



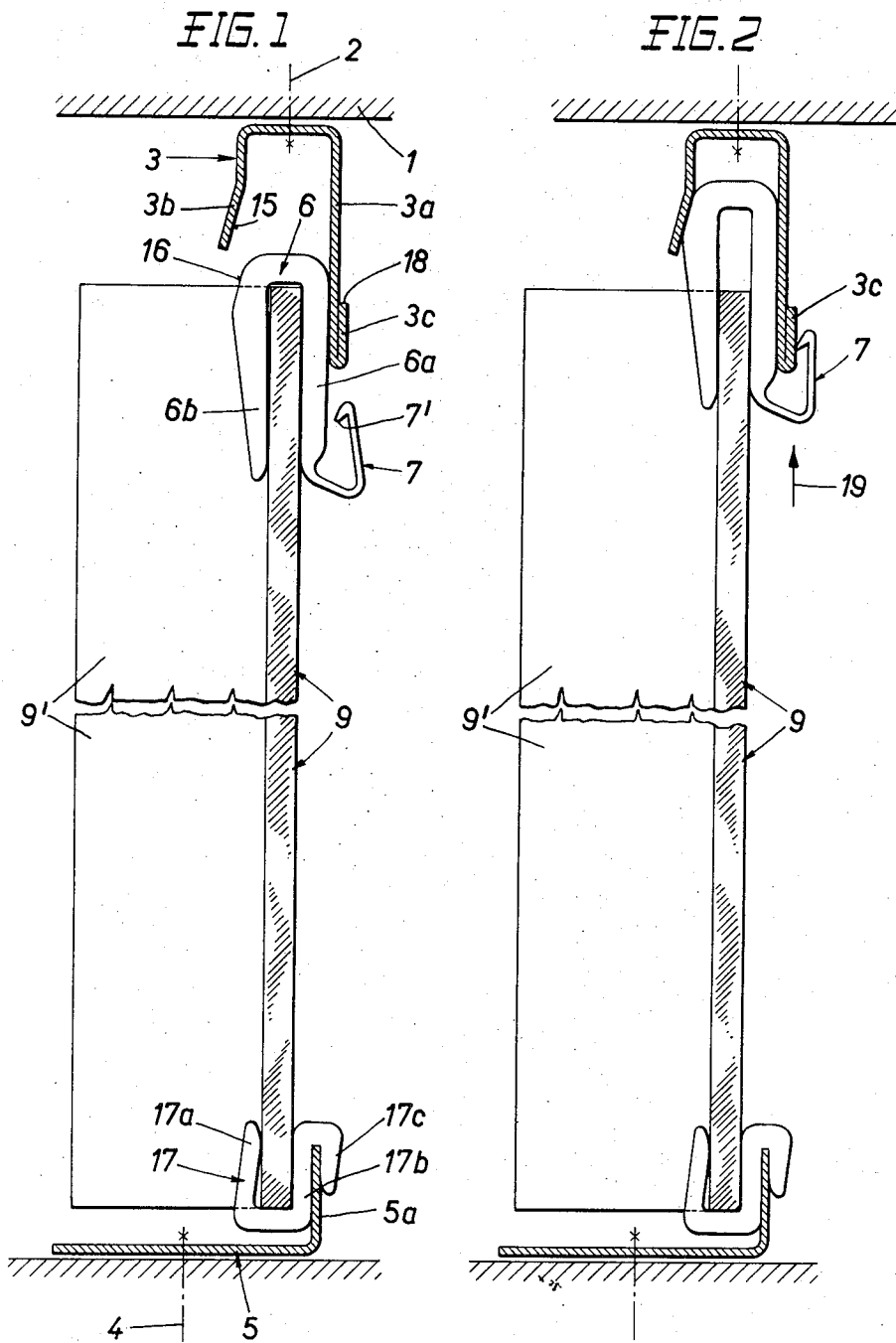
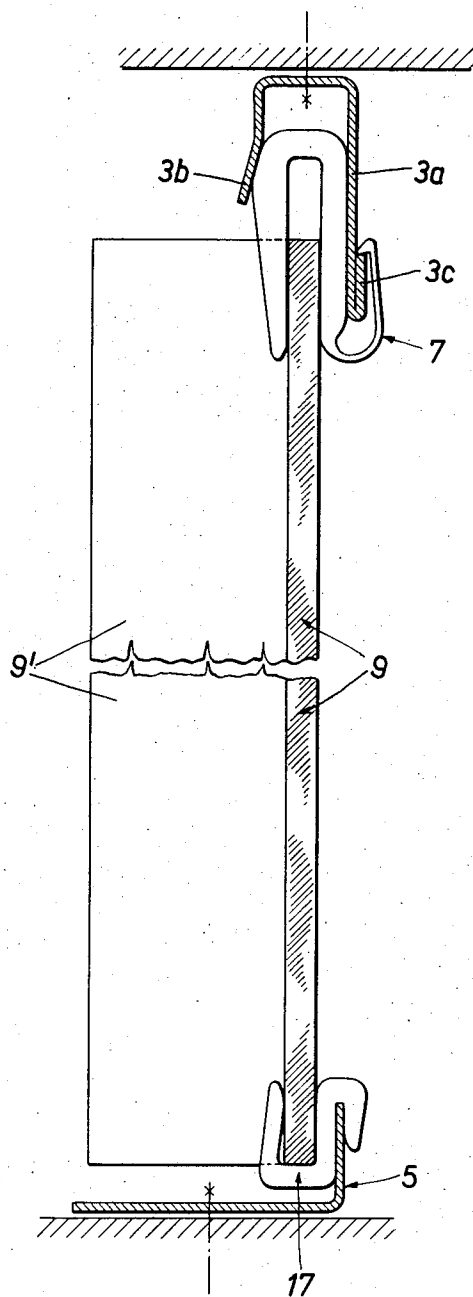
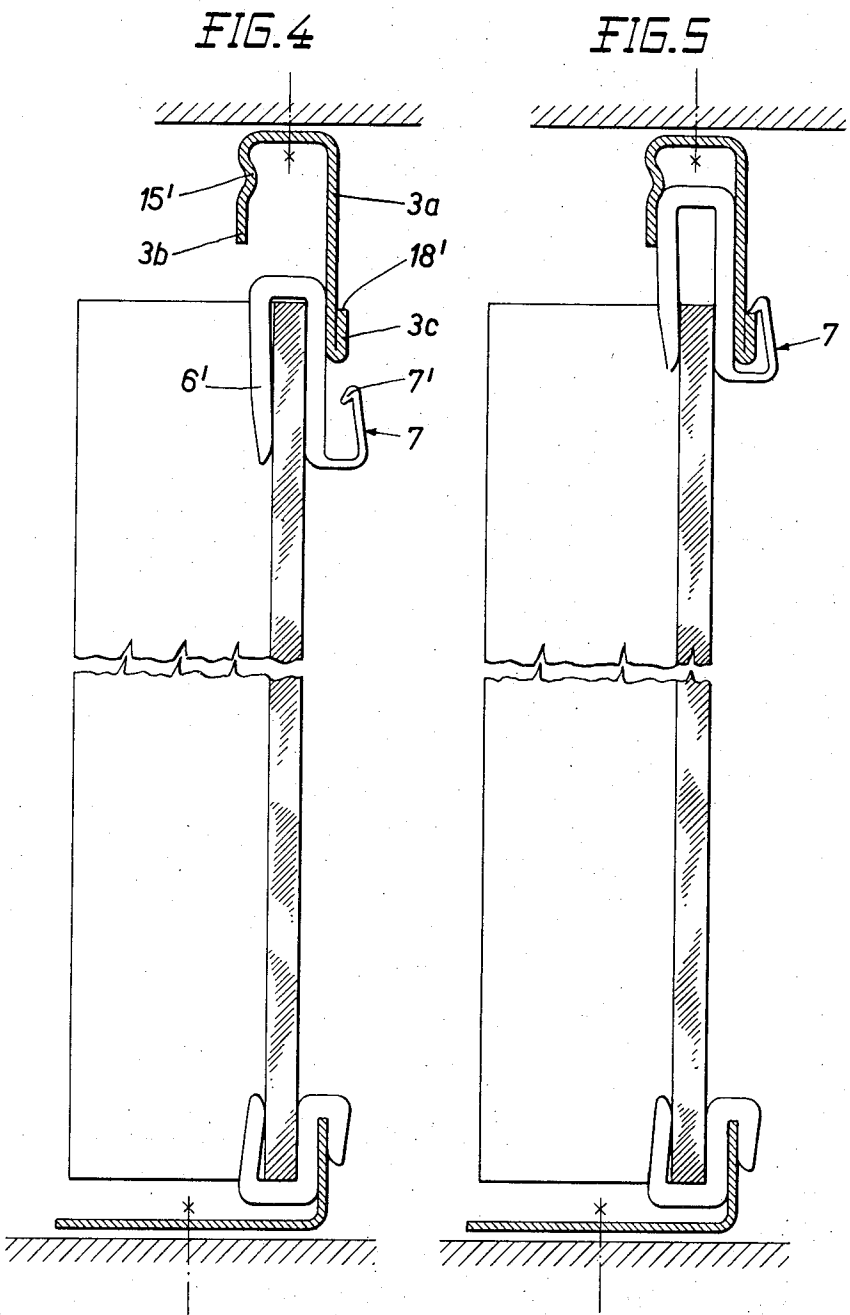
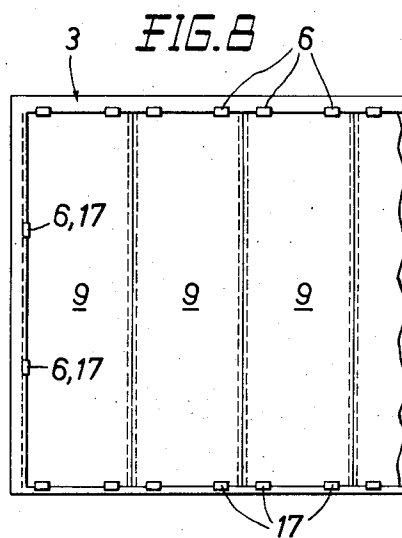
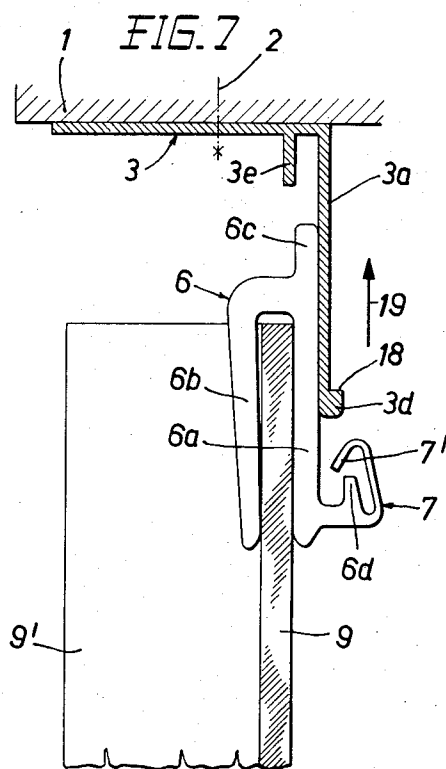
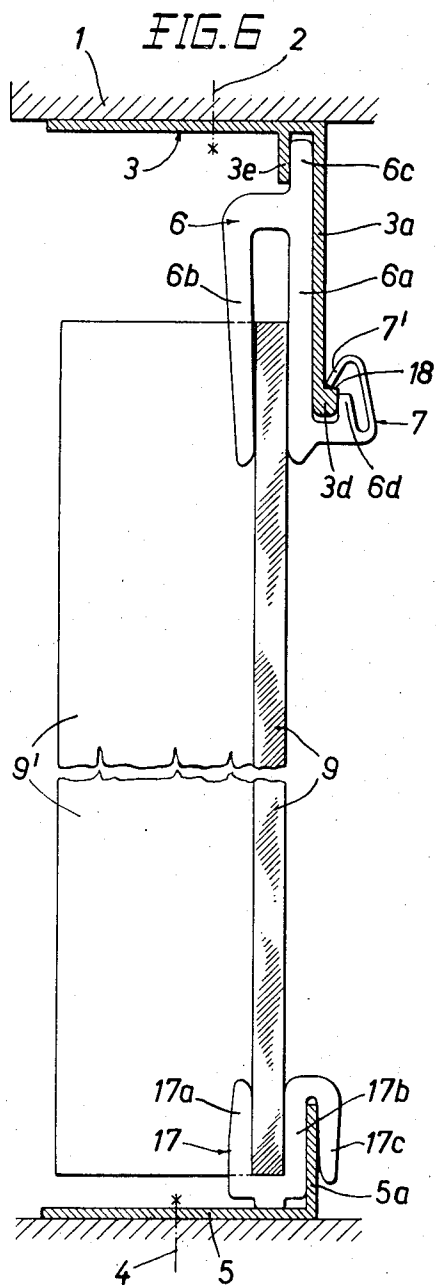


FIG. 3







GLASS WALL CONSTRUCTION CONSISTING OF A PLURALITY OF GLASS ELEMENTS OF SUBSTANTIALLY U-SHAPED CROSS-SECTION

BACKGROUND OF THE INVENTION

The present invention relates to a new and improved construction of glass wall consisting of a number of glass elements possessing a substantially U-shaped cross-sectional configuration, the glass wall being sealingly arranged within a mounting or support which can be fixed in an opening of the wall, such mounting embodying at least an upper and a lower rail member. The legs of the glass elements forming the glass wall are adhesively bonded to one another in abutting relationship such that the webs of all of the glass elements are preferably located in a vertical plane, and the glass elements are resiliently guided with respect to the upper rail member of the mounting or support at least at their uppermost region by means of sliders or attachment elements. Glass walls of this general type are already known to the art, as evidenced for instance by U.S. Pat. No. 3,412,510, granted Nov. 26, 1968, of the inventor of this application, and entitled: **FIXTURE WITH AT LEAST ONE INSTALLATION UNIT FORMED OF GLASS ELEMENTS**.

Even though the glass walls of known construction have proven themselves, and the transportation of glass walls consisting of glass elements is relatively simple, and glass elements which have become damaged or destroyed can be easily exchanged through other glass elements, still they have not yet proven themselves to be completely satisfactory, because it has been found that installation is time-consuming and requires a relatively large amount of material.

SUMMARY OF THE INVENTION

Accordingly, it will be seen that a real need still exists in the art for a glass wall construction of the aforementioned type which is not associated with these particular disadvantages. Hence, a primary object of the present invention is to provide a novel glass wall construction which effectively and reliably overcomes the aforementioned drawbacks of the prior art and fulfills the need still existing in the art.

Still a further and extremely significant object of this invention is directed to a construction of the previously known glass walls and the means serving for the attachment thereof in such a manner that the installation time is considerably shortened and there is a significant saving in the materials used for installation purposes.

Now, in order to implement these and still further objects of the invention, which will become more readily apparent as the description proceeds, the invention starts from the known construction of glass walls and contemplates constructing the sliders or riders, in other words the attachment elements, in the form of resilient components which can be displaced with respect to the glass elements and the legs of the mounting fixture or support. Further, these sliders are each equipped at one of their legs with a projection serving to partially encompass or surround a leg of the mounting fixture, the legs of the mounting fixture being accommodated to the shape of the sliders. Owing to these measures, there is achieved a result that the glass walls formed of the glass elements possessing the U-shaped profile are only fixed by means of the sliders with respect to the mount-

ing fixture or support, in other words no further means are required.

It is advantageous to ensure that at least the sliders or riders associated with the upper region of the glass wall are equipped with a projection having a nose-shaped end which is constructed to engage behind a transverse surface of a leg of the upper rail of the mounting fixture. In this way there can be effectively prevented with the use of the most simple means any unintentional displacement of the sliders or attachment elements. The end surfaces of the nose-shaped terminal portion or end of each projection and also the transverse surfaces of the upper rails can extend at an inclination with respect to the legs and in their secured position also extend essentially parallel to one another.

The spacing of the ends of the legs of the sliders from one another should be less than the thickness of the glass sheet, and the spacing of the ends of each projection from the next situated leg of the slider should be less than the thickness of the corresponding leg of the mounting fixture. In this way there is guaranteed guiding of the glass wall free of jarring or movement.

If the upper rail member is equipped with a stop or impact surface, such as a transverse- or inclined surface, then it is recommended to dimension the sliders such that after their nose-shaped end engages behind a transverse surface of the upper rail such slider is also fixed free of jarring or shaking movement in horizontal direction by the stop or impact surface of the upper rail or by another portion of the mounting fixture. This is then particularly advantageous if wind forces of considerable strength can act from the outside upon the glass wall.

Even though this solution during prolonged trials has proven to be quite good, it is not completely satisfactory because the upper rail of the mounting fixture, viewed in the direction of its width, is relatively small, namely hardly wider than the slider, so that it can tilt or shift in the presence of considerable wind pressure forces. Quite apart from the foregoing it is practically impossible to fix, especially the upper rail, with the brickwork by means of a bolt driving device, because the upper rail previously possessed an essentially U-shaped cross-section, and it was not possible to introduce the bolt driving device between the legs thereof. It was possible to use a sheet metal member of larger width, in order to prevent tilting, especially of the upper rail, and to pleat or fold such sheet metal member in such a way that in the plane of the web of the U-shaped profile there existed an extension. Yet, this technique required an increased amount of material and a relatively large amount of time in order to produce the mounting fixture or support, especially the upper rail. As a practical matter it seemed advisable to no longer form of sheet metal, especially the upper rail, rather from a profiled member formed of steel or aluminum. If this modification is made, then it is necessary to consider how to select the cross-section of the profile, and further it must be determined whether the sliders, especially those sliders which fix the upper region of the glass wall with respect to the mounting fixture, are capable of withstanding the possibly occurring pressure- and suction forces, quite apart from the fact that it is necessary to arrange in exactly reverse position the legs of the glass elements possessing the U-

shaped cross-section from the position of the state-of-the-art glass construction exemplified by U.S. Pat. No. 3,412,510 previously mentioned, in other words, the ends of the legs of the individual glass elements of the glass wall now extend towards the outside.

If, as proposed hereinafter in accordance with the teachings of this invention, there is arranged between the leg of each slider at which there is provided the projection equipped with the nose-like end and such projection a stop member, the spacing from the leg corresponds to the thickness of the end of a leg of the upper rail formed of a profile member, then the above indicated solution is advantageously further constructed, that is, a tilting, especially of the upper rail of the mounting, is precluded. In particular, the upper rail can be fixed by means of a bolt driving device and each slider securely fixedly retains the glass wall with respect to the mounting.

It is advantageous to extend the leg equipped with the projection past the web of the slider and thereby ensure that the stop of the upper rail possesses the same spacing from its leg which corresponds to the thickness of the extension of the leg of the slider. In this manner it is possible to maintain at a relatively small dimension the cross-section of the upper rail and also the cross-section of the slider, without disadvantages arising.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention will be better understood and objects other than those set forth above will become apparent when consideration is given to the following detailed description thereof. Such description makes reference to the annexed drawings, wherein:

FIG. 1 is a vertical sectional view through the opening of a wall or brickwork in which there is arranged a glass wall designed according to the inventive teachings and wherein the glass elements possessing a substantially U-shaped cross-section have the web thereof partially straddled or enclosed by sliders prior to fixing this glass wall with respect to the upper rail;

FIG. 2 illustrates the arrangement of FIG. 1 after the upper sliders have been upwardly displaced;

FIG. 3 illustrates the arrangement of FIG. 1 with the upper sliders fixed in position at the upper rail;

FIG. 4 is a sectional view similar to the arrangement of FIG. 1 of a second embodiment of this invention in which the upper sliders are located in a position corresponding to that shown with the embodiment of FIG. 1;

FIG. 5 is a cross-sectional view of the arrangement of FIG. 4 with the upper sliders in a position where they are fixed at the upper rail;

FIG. 6 is a cross-sectional view of a third embodiment of the invention taken through the mounting fixture or support of the glass wall, showing the position of the sliders where the latter positively fix the glass wall with respect to the mounting fixture;

FIG. 7 is a fragmentary sectional view, corresponding to the arrangement of FIG. 6, but prior to fixing the upper region of the glass wall with respect to the upper rail; and

FIG. 8 is a front view of the glass wall which has been fixed by means of sliders or attachment elements with respect to the mounting fixture or support, as viewed from the area of the room or the like where the glass

wall is erected, this room or area being closed towards the outside by such glass wall.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Describing now the drawings, it will be recognized that in the illustrated embodiments a continuous and essentially U-shaped upper rail 3 is rigidly fixed in position, by schematically illustrated screws 2, or the like, at the underside of a slab 1 of an opening of a building or structure which is to be closed by a glass wall. This U-shaped upper rail 3 has downwardly depending leg members 3a and 3b. The shorter leg member 3b is slightly flexed and forms an inclined surface 15. At the lower bounding surface of the building opening there is fixed, for instance also by schematically indicated screws 4 or the like, a lower rail 5. In the exemplary embodiments under consideration this lower rail 5 is in the form of a L-shaped profile member, the shorter leg 5a of which extends vertically. This lower rail 5 can also be formed as a U-shaped or T-shaped profile member. Irrespective of the particular shape of these rail members it is here mentioned that the upper rail member 3 and the lower rail member 5 can constitute components of a frame or mounting arranged in the opening of the building or, however, can be constructed as independent structural elements.

Now it is contemplated to mount a glass wall at this mounting frame or support. This glass wall consists of a number of individual glass elements 9 which, in horizontal section, possess a substantially U-shaped cross-sectional configuration, and wherein the legs 9' of the glass elements are arranged tightly in abutting fashion against one another for the purpose of forming a flat glass wall and wherein, in each instance, the outside faces of the confronting and abutting legs 9' are appropriately fixedly connected with one another by a suitable adhesive or the like. Naturally the unit which is to be installed could also consist of only one glass element which then is adhesively bonded to other glass elements at the situs of installation.

Continuing, it should be understood that a number of attachment elements, referred to as sliders or riders 17 are placed upon the leg 5a of the lower rail member 5. Each of these riders or sliders 17 will be seen to have leg portions or legs 17a and 17b which receive therebetween the web or sheet of each associated glass element 9 in such a manner that each glass element is guided free of jarring movement or free of shaking movement at the sliders 17. Furthermore, a projection 17c provided for each slider 17 fixedly positions the latter at the upstanding leg 5a of the lower rail member 5. Now, at the upper region of each structural element, namely each glass element 9, there is inserted thereon at least one slider or rider 16 in such a fashion that its legs 6a and 6b straddle the web or sheet of the associated glass element 9 and, just as was the case for the lower slider 17, here also ensure that the sheet of glass is held so as to be free of jarring or shaking movements between these components 6a and 6b.

It is here mentioned that each of these sliders 6, which possess essentially a U-shaped cross-sectional configuration, is constructed such that its legs or leg members 6a and 6b are spaced from one another corresponding to the thickness of the sheet or pane of the

glass element 9, and furthermore, each such slider 6 is equipped with a projection or shoulder 7 arranged at the end of the leg 6a and constructed such that it can be outwardly deformed from the position imparted to it during manufacture. Furthermore, in this context it is mentioned that it is advantageous to provide this projection or shoulder 7 with a nose-like or nose-shaped terminal portion or end 7', as shown. Apart from the foregoing structure each of the sliders 6 will be seen to be equipped at the upper region of its leg 6b with an inclined surface 16 which is complimentary to the inclined surface 15 of the upper rail member 3. The leg 3a of the upper rail member 3 is flexed through an angle of 180°, and the end surface of the flexed end 3c of this leg 3a is constructed as a transverse extending surface 18 to form a type of locking or engagement location for the nose-like end 7' of the projection 7 discussed above.

Now if the components associated with the glass wall are located in the position depicted in FIG. 1, then it is only necessary to upwardly displace the slider 6 in the direction of the upper rail member 3 in order to fixedly position or fix the installed unit with respect to the upper rail member 3. The inclined surfaces 15 and 16 contact one another and thereby retain the installed units and the sliders 6 fixed in position. In so doing the legs 3a and 3b of the rail member 3 snugly contact, in the position of the components depicted in FIG. 2, against the associated surfaces of the relevant slider or in fact are even slightly deformed towards the outside. The nose-shaped or noselike end 7' of the projection 7 is still located at the outside surface of the upwardly turned or flexed end 3c of the leg 3a of the upper rail member 3. By deforming the projection 7, the cross-section of which is considerably less than the cross-section of the legs 6a and 6b of the slider 6, in the direction of the arrow 19 of FIG. 2, it is possible to secure each slider 6 with respect to the upper rail member 3 in that the nose-like end 7' comes to bear upon the transverse surface 18 of the flexed end 3c. This condition has been depicted in FIG. 3. Now a thus mounted slider 3 can only be removed from its position as shown in FIG. 3 if the projection 7 is brought out of engagement with the upper rail member 3.

The embodiment of FIGS. 4 and 5 of the drawings corresponds in principle to the embodiment of FIGS. 1 to 3. Here, however, instead of providing an inclined surface 15 which is arranged at the leg 3b of the upper rail member 3, there is provided a type of bead or undulation 15' at such rail leg member 3b. Furthermore, it will be seen that the slider 6', in this case, is not provided with any inclined surface, such as the inclined surface 16 of the rider 6 of the arrangement of FIGS. 1 to 3. The flexed end 3c is here also provided with a transverse surface 18' and the nose-like end 7' is provided with a surface corresponding to the surface 18'. Still, even with this modified construction each installed unit can be fixedly mounted free of shaking or jarring with respect to the upper- and lower rail members 3 and 5 respectively, since each of these sliders is formed of an elastically deformable material, such as plastic.

Owing to such constructional manifestation of the invention not only is there brought about a considerable reduction in the amount of material which is used, but also the mounting time is considerably shortened.

Finally, in FIGS. 6 to 8 there is illustrated a third and further development of an exemplary embodiment of this invention. It will be seen that at the lower face of a slab 1 of a building opening which is to be closed by a glass wall there is rigidly fixed, by means of bolt members 2 or the like, a profiled upper rail member 3 having a downwardly depending leg 3a. Similarly, at the lower bounding surface of the building opening there is fixed, again by bolts 4 or the like, a lower rail member 5 having a leg 5a which extends vertically. The lower rail member 5 can be formed of a U-shaped or T-shaped profile member, it is only of importance that also this rail member can be fixed in position by means of a bolt driving device and by means of bolts or other suitable fastening expedients. Also, in this case the upper rail member and the lower rail member can be components of a mounting frame inserted in the building opening, or also can be separate or individual structural elements.

Now a number of glass elements 9 possessing, in horizontal section, a substantially U-shaped cross-section are advantageously adhesively bonded in adjacent relationship with respect to one another and arranged such that their legs 9' abut one another and their sheet or pane outside surfaces are disposed in the same plane, which is preferably vertically arranged.

A number of sliders or riders 17, in other words the attachment elements, are placed upon the leg 5a of the lower rail member 5. The legs 17a and 17b of each of these sliders 17 receive therebetween the sheet of the associated glass element 9 in such a manner that each glass element and the glass wall is guided free of jarring or shaking movement by the group of sliders 17. Further, a projection or shoulder 17c provided at each slider 17 serves to positionally fix each such slider 17 at the upstanding leg 5a of the lower rail member 5. At the upper region of the glass element 9 there is inserted onto such glass element 9 at least one slider or rider 6 in such a fashion that its legs 6a and 6b straddle the sheet or pane of the glass structural element and likewise retain such structural element free of jarring or shaking movement between these components or legs 6a and 6b. Each of the sliders 6 is constructed such that its legs 6a and 6b are spaced from one another a distance corresponding to the thickness of the sheet or web of the associated glass element 9. Furthermore, each slider 6 is provided with a projection or shoulder 7 which transforms into a nose-like or nose-shaped end 7'. A stop 6d is provided between the leg 6a and the projection 7, as shown clearly by referring to FIG. 6, and the spacing of stop 6d from the leg 6a corresponds to the thickness of the end 3d of the downwardly depending leg 3a of the upper rail member 3.

Since the projection 7 is configured and designed such that its nose-like end 7' strives to come to rest as near as possible at the leg 6a of the slider 6, during movement of the slider 6 in the direction of the arrow 19, this end 7' engages behind the enlarged end 3d of the upper rail member 3 upon the transverse surface 18 and therefore fixes the relevant slider 6 positively with respect to the upper rail member 3. Since the legs 9' of the glass elements 9 are directed outwardly towards the outside, the glass wall cannot be removed from the outside, release of the sliders must occur from the inside, namely by deforming the projection 7 and lowering the slider 6 opposite to the direction of the arrow 19.

Now, in order to be able to fix in position each slider 6 at the upper region with respect to the upper rail member 3, as was also previously the case, or to be able to fix such slider 6 with respect to another rail or support the leg 6a of each slider 6 is provided with an extension 6c which extends past the sheet or pane of the glass. The upper rail 3 is then equipped with a stop or impact surface 3e, which is spaced from the confronting leg 3a of the upper rail member 3 a distance corresponding to the thickness of the just considered extension 6c. Hence, now if the slider 6 is displaced out of its position shown in FIG. 7 into the position of FIG. 6, then also the upper region of each slider 6 is fixedly positioned in positive fashion with respect to the associated upper rail member 3.

While there is shown and described present preferred embodiments of the invention, it is to be distinctly understood that the invention is not limited thereto but may be otherwise variously embodied and practiced within the scope of the following claims. ACCORDINGLY,

What is claimed is:

1. A glass wall construction composed of a plurality of glass elements, each possessing a substantially U-shaped configuration in cross-section and defined by leg members interconnected by a sheet-like web portion, a mounting intended to be secured into the opening of a structure, within which mounting said glass elements are intended to be sealingly arranged, said mounting embodying at least an upper rail member and a lower rail member, said rail members having legs, the leg members of said glass elements being connected in abutting relationship with respect to one another such that the sheet-like webs of all of the glass elements forming the glass wall are disposed in a given plane, and slider means for resiliently guiding said glass elements with respect to said upper rail member of said mounting at least at the upper region of the glass elements, each of said slider means being formed as a resilient slider element which is displaceable with respect to the glass elements and legs of said mounting, each said displaceable slider element having at least a pair of depending leg portions, projection means provided at one of said leg portions of said slider element for partially encompassing a leg of said mounting, and wherein said legs of said mounting are accommodated to the shape of said slider elements.

2. The glass wall construction as defined in claim 1, wherein at least said slider means associated with the

upper region of the glass wall construction is equipped with a nose-shaped end portion at said projection means, said upper rail member having means defining a transverse surface, said nose-shaped end portion of said projection means engaging behind said transverse surface of the upper rail member of said mounting.

3. The glass wall construction as defined in claim 2, wherein said nose-shaped end portion of each projection means has an end surface inclined with respect to said leg portions of said slider means, said transverse surface of the upper rail member similarly having a surface inclined with respect to the leg portions of said slider means, and wherein said inclined surfaces of both said nose-shaped end portion and said transverse surface in the engaged condition thereof extend substantially parallel to one another.

4. The glass wall construction as defined in claim 1, wherein the spacing of the ends of the leg portions of said slider means from one another is less than the thickness of the associated glass element and the spacing of the end of each projection from the next closest situated leg portion of said slider means is less than the thickness of the associated leg of said mounting.

5. The glass wall construction as defined in claim 2, wherein between said leg portion of the slider means at which there is provided said projection means having the nose-shaped end portion and said projection means there is provided stop means, and wherein the spacing of said stop means from said last-mentioned leg portion corresponds to the thickness of the end of the one leg of said upper rail member formed as a profile member.

6. The glass wall construction as defined in claim 5, wherein said slider means has a web interconnecting said leg portions, said leg portion of said slider means provided with said projection means extending past said web of said slider means to define an extended portion, and wherein said upper rail member has a stop portion which is spaced from a leg of the upper rail member at a distance which substantially corresponds to the thickness of said extended portion of said slider means.

7. The glass wall construction as defined in claim 1, wherein said given plane in which said glass elements are disposed extends substantially in vertical direction.

8. The glass wall construction as defined in claim 1, wherein said leg members of said glass elements are connected in abutting relationship through adhesive bonding with one another.

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