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(54) **Window system**

(57) The invention relates to a window system for a terrace or similar space, and a structural element of the window system. The window elements (121 - 124) are placed between a top rail (130) and a bottom rail (140). Each window element (121 - 124) comprises a sash strip (121a, 122a, 123a, 124a) at its bottom edge, in order to be supported by the bottom rail (140). The structural el-

element (150) is fixed to the sash strip (121a- 124a), and it extends between ridges (141 - 144) in the bottom rail (140). The structural element (150) and at least two ridges (141 - 144) on both sides of the structural element (150) in the bottom rail (140) jointly prevent the rise of said structural element (150) from between said ridges (141 - 144).

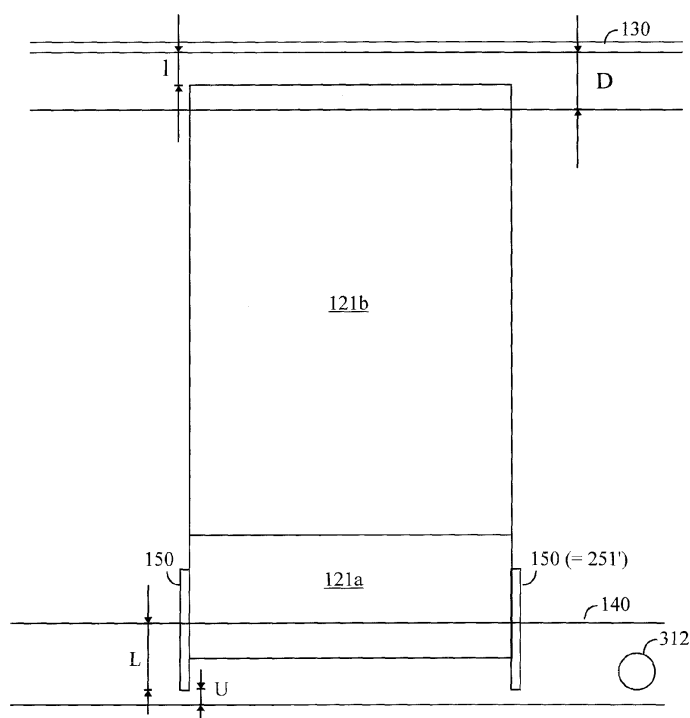


FIG. 3

Description

Field

[0001] The invention relates to a window system for a balcony, terrace, or similar space, comprising windowpanes which are positioned between a top rail and a bottom rail at least partly in parallel, and which may be moved along the top rail and the bottom rail.

Background

[0002] It is not desirable on a balcony or terrace to have walls that obstruct the view, but an open balcony or terrace, on the other hand, is windy and potentially cold as well. Visibility, protection from the wind, and the choice for openness may, however, be implemented by means of a window system comprised of a plurality of sliding windowpanes. The bottom edges of the windowpanes have strip structures each of which resembles a U profile that opens downwards. There is usually a roll at the bottom of the groove in the U profile in the strip structure. The window system additionally includes top and bottom rails which are either directly or indirectly fixed to the balcony structures or other building structures. The usual shape of the top rail is a long structure comprised of several U profiles and having its open section facing down. The top part of each windowpane is placed in one of these U grooves. The bottom rail is like the top rail, a straight structure comprising several U profiles and having its open section facing up. Each windowpane is placed between the top rail and the bottom rail in such a manner that the top part of the windowpane is lifted, in the top rail U groove meant for it, so high that the roll in the bottom strip structure of the windowpane may be lowered on top of an elevated ridge in the U groove of the bottom rail. The fact that the bottom strip structure is placed on a ridge in the bottom rail allows the windowpanes to be moved in the direction of the top and bottom rails, but prevents the windowpanes from moving in the lateral direction.

[0003] It is possible to place sliding windowpanes in parallel whereby they act as a protecting wall on the side of a balcony or terrace otherwise open. Sliding windowpanes are usually of glass. A sliding window system may also be opened, if so desired, which may be carried out by moving the sliding window elements aside along the top and bottom rails.

[0004] Such sliding window systems are, however, associated with problems. When windowpanes are subjected to forces which try to lift the windowpanes up, a windowpane may rise to such an extent that its bottom strip structure is lifted entirely out of its place, on top of the bottom rail. Such an event, which is the opposite of the installation procedure, is possible when the coupling elements between the windowpanes run into each other at an adequate force as the windows are moved, bumped into, or during high winds. The consequences of losing

the support of the windowpane to the bottom rail may be that the windowpane falls on the terrace or falls on the balcony or off the balcony. The falling alone may break the window element, break objects left under the window element, and/or even cause serious personal injury. A window element falling off a balcony is life-threatening to people and animals, and destructive for objects left under it.

[0005] Therefore, the need exists to develop the window system.

Brief description

[0006] It is an object of the invention to provide an improved window system. This is achieved with the window system according to claim 1.

[0007] A further object of the invention is the structural element of claim 13.

[0008] Preferred embodiments of the invention are disclosed in the dependent claims. The preferred embodiments enhance the advantages of the basic invention.

[0009] By the solution according to the invention, the window elements cannot move from between the top and bottom rails and fall out of place as a result of a force targeted on the window elements, irrespective of the direction of the force.

List of figures

[0010] The invention will now be described in greater detail in connection with preferred embodiments and with reference to the accompanying drawings, in which

Figures 1A- 1D show examples of a window system, Figure 2 shows an example of a top rail, Figure 3 shows an example of a structural element and its length, Figures 4 and 5 show examples of a locking structure, Figure 6A shows an example of fixing the structural element to the bottom edge of a window element, Figure 6B shows an example of a structural element that comprises an expansion for gripping and moving the window elements, Figure 7 shows an example of coupling window elements to each other by means of a structural element, Figure 8 shows an example of adding an expansion to window sashes or a structural element, and Figure 9 shows an example of fixing a connecting member to the lateral surface of the bottom sash strip, in the area of the end section of the bottom sash strip, that is, its end.

Description of embodiments

[0011] The following embodiments are presented by way of example. Even though the description may refer

to "a", "one", or "some" embodiment at different points, this does not necessarily mean that each such reference refers to the same embodiment or embodiments or that the feature only applies to one embodiment. Individual features of different embodiments may also be combined to make other embodiments possible.

[0012] The disclosed window system is suitable for a door or window of any building. The disclosed window system is suitable, for example, for a space protruding from the wall of a building, in which access is through a door. Such a space may be a balcony, terrace, or similar space. A balcony can be defined as a space that extends outside the wall of a building, has a floor and is bounded by a railing, and a door may open thereto from the building. A terrace is a similar space, but it may be thought to be on ground plane, so a separate floor is not necessarily included in a terrace.

[0013] Next, an example of a window system according to Figures 1A, 1B, 1C, and 1D will be examined. The window system comprises at least one window element 121, 122, 123, 124. Often, however, there are at least two window elements 121 - 124. Each window element 121 - 124 has a translucent or opaque sheet, that is, pane 121 b, 122b, 123b, 124b. The opaque sheet 121 b - 124b may act as a protecting wall. A window element may pass light according to the production material. The light transmission may, if required, be set to the desired amount in the desired manner. The sheet may comprise agents absorbing and/or scattering optical radiation at a desired band (approximately 10 nm to 500 μ m). This way, the windowpane may be resistant to ultraviolet radiation, for example. Similarly, the permeation of infrared and thermal radiation may be adjusted in the windowpane. The windowpane may also be coloured, in which case its light transmission at different wavelengths is not the same. When the windowpane comprises scattering particles, its colour, diffused or undiffused permeation may be controlled with the size and number of particles in a desired manner.

[0014] The sheet 121b - 124b may be of glass and/or plastic. The sheet 121 b - 124b may be uniform, solid material or the sheet 121b - 124b may be meshy, such as a mosquito net. The thickness of the sheet 121b-124b may be a few millimetres. The thickness of the windowpane may be approximately 5 mm - 10 mm, for example. There may or may not be a strip at the top edge of the sheet 121 b - 124b. The strip may be of plastic and it protects the top edge of the sheet such as a glass window. The area of each sheet 121b - 124b may be from approximately one square metre up to several square metres. At the bottom part of the sheet 121 b - 124b there may be, as the horizontal sash, a bottom strip 121 a, 122a, 123a, 124a, which may also be called a bottom sash. The bottom strip 121a - 124a may be an aluminium strip made by extrusion, such as profile strip, for example. More commonly, the bottom strip 121a - 124a may be of another metal or plastic, for example, and may be made by another method than extrusion. The examples in the

Figures do not show the top horizontal strip in the window elements, that is, the top horizontal sash, but if required, one may or may not exist.

[0015] Each window element 121 - 124 is between the top rail 130 and the bottom rail 140. Between the window element and the bottom rail 140 there may be a slide block or roll structure (Figure 4, reference number 400). The rails 130, 140 may be of metal, for example. The rails 130, 140 may be made of aluminium by extrusion, for example.

[0016] The bottom rail 140 forms a long shape that is nearly a multiple U profile in cross-section, with the open section upward. In a multiple U profile, the different grooves of the shape of the letter U are in parallel, making it possible to position the window elements in parallel with respect to each other.

[0017] For the multiple U profile, the bottom rail 140 may comprise parallel, elevated ridges 141 - 144 for the bottom strips 121a - 124a of the window elements 121 - 124. The ridges 141 - 144 are protrusions resembling a wall, between which there are grooves 146. The support for the window elements 121 - 124 takes place from below their bottom strip and the movement control from the ridges 141 - 143 comprised by the bottom rail 140.

[0018] The bottom rail 130, the principle of which is shown in the example of Figure 2, also forms a long shape that is mainly a multiple U profile in cross-section, with the open section downward. In a multiple U profile, the different grooves 202 of the shape of the letter U are in parallel, with each U profile forming out of parallel, elevated ridges 200 and the grooves 202 between them.

[0019] Such structures of the top and bottom rails 130, 140 allow the parallel positioning of the window elements 121 - 124 in relation to each other and their moving between the top and bottom rails 130, 140. Each window element 121 - 124 may be in different grooves 202 of the top rail 130 and on a different ridge 141 - 144 or in a different groove 146 of the bottom rail 140. The window elements 121 - 124 are also able to move vertically for a distance which is the difference between the height of the window element and the distance between the top and bottom rails. This distance is big enough to allow the window elements 121 - 124 to be installed between the top and bottom rails 130, 140. This additionally makes it possible to intentionally remove the window elements 121 - 124 and/or their uncontrolled leaving from between the rails.

[0020] The window elements 121 - 124 may, by means of said clearance, be placed between the top rail 130 and the bottom rail 140 by pushing the top part of the window element 121 - 124 in the grooves 202 between the ridges 200 on the U profile of the top rail 130, and by lifting the window element in the groove 202 of the U profile so high that the bottom edge of the window elements 121 - 124 is above the bottom rail 140. After this, the lifted window element 121 - 124 may be placed on top of the desired ridge of the bottom rail 140. The depth of the groove 202 in the U profile of the top rail 130 is D, where D may be

a few centimetres. The gap between the top part of a window element 121 - 124 installed in place and the top part of the groove 202 in the top rail 130 may be l , where l is smaller than depth D , but may be a few centimetres, at most. Depth D is required because the top and bottom rails 130, 140 cannot usually, due to the structures in a building being not being aligned, be installed vertically parallel. In such a case, the window structure 121 - 124 may be at different distances from the top part of the groove 202 in the top rail 130 at different moments of time as it is sliding along the bottom rail 140.

[0021] Window elements 121 - 124 that are installed in place may be moved back and forth along the top and bottom rails 130, 140. When the aim is to protect a space protruding from a wall of a building, as shown in Figures 1A and 1B, the window elements 121 - 124 are moved in adjacent positions in relation to each other whereby they block the side of the protruding space, which would otherwise be open. In such a case, for example, the line N in the direction of the normal of a window element surface, running in the middle of said window element, does not hit other window elements. As shown in Figure 1D, the window elements 121 - 124 may also be gathered at the right of left edge of the rails 130, 140 so that they are one after the other whereby the line N in the direction of the normal 200, drawn approximately in the middle of the surface on a window element 121 - 124 passes through all the window elements 121 - 124

[0022] Therefore the window system is comprised of sliding window elements 121 - 124, placed from a parallel position to be extensions to one another, and being in a slightly different line in relation to each other, between the top rail 130 and bottom rail 140.

[0023] As the window system closes the space protruding from the wall of a building, as shown by Figures 1A, 1B, and 1C, the window elements 121 - 124 may be at least partly overlapping, in other words, slightly parallel on their vertical ends. In the position according to Figure 1, there is more overlap, that is, parallelism, because all the window elements 121 - 124 are in parallel, that is, the window structure is in the open position, in which case the space protruding from a building wall is open.

[0024] In an embodiment, the window elements 121 - 124 comprise connecting members 121i, 121j, 122h, 122i, 122j, 122k, 123h, 123i, 123j, 123k, 124h, 124k, by means of which the movement of a window element may be conveyed to another window element when the connecting members of different window elements 121 - 124 meet and grip each other. A connecting member may be directly or indirectly fixed to the transverse end in the sash strip 122a, 123a in the horizontal edge of the window element, and/or on the side of the sash strip on the final section preceding the transverse end of the sash strip.

[0025] As the window elements 121 - 124 are being moved along the top and bottom rails 130, 140, the window elements 121 - 124 may jump upwards when the connecting members 121 i, 121j, 122h, 122i, 122j, 122k, 123h, 123i, 123j, 123k, 124h, 124k hit each other and

convey force between the window elements 121 - 124. In this case, one or more window element 121 - 124 may be able to move away from the area between the top rail 130 and the bottom rail 140, which may lead to the falling of the window element 121 - 124 in the case of a terrace, or the falling off of the window element 121 - 124 in the case of a balcony. In a way, the jumping and shifting of the window element 121 - 124 are a backward chain of events in relation to installing the window element 121 - 124 in place. The window elements 121 - 124 may also bend and rise due to wind, which may also lead to the window element 121 - 124 shifting away from the area between the top rail 130 and bottom rail 140. In addition, the window element 121 - 124 may escape from between the top and bottom rails 130, 140 if an object, animal, or a person bumps into the window element 121 - 124, or for another reason. If the window element 121 - 124 uncontrollably finds its way away from between the top and bottom rails 130, 140, it is dangerous and may result in a serious accident.

[0026] The upward rise of each window element 121 - 124, after their installation in place, may be restricted by a structural element 150, which may be fixed to the sash strip 121a - 124a. When the structural element 150 is being fixed, the window elements 121 - 124 may already be in place between the top rail 130 and the bottom rail 140. Usually, at least the bottom rail 140 is already in place, fixed to the structures of a building. The top rail 130 may be fixed after fixing the bottom rail 140 and after placing the window elements 121 - 124 in the bottom rail 140. The structural element 150 may be fixed to the sash strip 121a - 124a by a mechanical fixing method, for example. For example, by at least one of the following: a screw, rivet, quick fastening mechanism, glue. Other fixing methods may also be used.

[0027] Each structural element 150 reaches, when fixed to the sash strip 121a- 124a, between the ridges 141 - 144 of the bottom rail 140. Each structural element 150 and the at least two ridges 141 - 144 on both sides of the structural element 150 in the bottom rail 140 jointly prevent the rise of said structural element 150 from between the ridges 141 - 144 to keep the window element 121 - 124 between the top rail 130 and the bottom rail 140. It is also conceivable that since the top rail 130 allows, for structural reasons of the top rail 130, only a limited upward rise for the window element 121 - 124, and the structural element 150 together with the bottom rail 140 prevent the window element 121 - 124 from rising from the bottom rail 140, even though the top rail 130 would as such allow the rise of the window element 121 - 124 from the bottom rail 140, the cooperation based on the structural features by the bottom rail 140 and the structural element 150 also extends to the top rail 130.

[0028] Said ridges 141 - 144 may be two ridges directly adjacent to each other, between which there is one groove, only. Alternatively, said ridges may be further away from each other, in which case there is at least one ridge and at least two grooves between them. By pre-

venting the rise of the structural element 150 from between any two ridges in the bottom rail 140, it is possible to prevent the coming out of the window element 121 - 124 from between the top and bottom rail 130, 140 and an accident and/or damage being caused.

[0029] In an embodiment, shown by Figure 3, the structural element 150 fixed in place extends further into between the ridges 141 - 144 of the bottom rail 140 than what the possible and restricted rise of the window element 121 - 124 is towards the top rail 140 between the top rail 140 and bottom rail 130. A gap U may be left between the structural element 150 and the bottom of the groove 146 in the bottom rail 140. The gap U may be, for example, from zero to a few millimetres. In such a case, the structural element 150 extends for the length L between the ridges 141 - 144. The possible and restricted rise of the window element 121 - 124, for its part, is I. The rise of the window element 121 - 124 is restricted by depth D of the grooves 202 between the ridges 200 in the U profile of the top rail 130. So, the structural element 150, in cooperation with the ridges 141 - 144 in the bottom rail 140, keeps the window element 121 - 124 between the top rail 130 and bottom rail 140. The structural element 150 may be installed at both edges or just one edge of the window element 121 - 124. The structural element 150 may also be installed on the window element 121 - 124 after the window element 121 - 124 is installed in place between the top and bottom rails 130, 140 at the desired installation location in an outdoor space associated with building.

[0030] In an embodiment, shown by Figures 4 and 5, the structural element 150 comprises a first part 154, 158 of a locking structure 152, the shape of the first part 154, 158 being arranged in a second part 156, 160 of the locking structure 152 comprised by the bottom rail 140. The second part of the locking structure 152 may be of the length of the entire bottom rail 140, or almost the length of the bottom rail 140. The first part and second part of the locking structure 152 jointly prevent the rise of said structural element 150 from between the ridges 141 - 144.

[0031] In an embodiment, the first part of the structural element 150 may be at least one structural element recess 154, which fits into at least one other part in the ridges 141 - 144 of the bottom rail 140. This other part may be an elevation 156. In an embodiment, the elevation 156 may continue for the entire length of the bottom rail 140. In an embodiment, there may be separate elevations 156 in the bottom rail 140 more frequently than the width of the window element 121 - 124. In an embodiment, the elevations 156 may be on both sides of at least one ridge 141 - 144. In such a case, the structural element recesses 154 of the structural element 150 are arranged in the two-sided elevations 156 of the ridges 141 - 144.

[0032] In an embodiment, the first part of the locking structure 152 may be at least one structural element protrusion 158, which fits into the second part of the locking structure 152 in the ridge 141 - 144 of the bottom rail 140. This second part may be at least one groove 160. The

groove 160 meant for the structural protrusion 158 may be in the ridge 141 - 144 under the structural protrusion 158, or in the adjacent ridge 141 - 144. With the locking structure 152, the upward rise of the window elements may be sturdily restricted. The possible vertical movement of the window element may be millimetres, or even less than a millimetre. This way the window elements may effectively be made to stay between the top and bottom rails even in difficult circumstances.

[0033] In an embodiment, shown by Figure 3, the sash strip 121 a, 122a, 123a, 124a located on the horizontal edge of the window element 121 - 124, may be a profile strip. In such a case, the structural element 150 may act as a cover part 251 - 254, 251', 263 for the end opening of the profile strip. This way, savings in material costs may be achieved.

[0034] In an embodiment, the structural element 150 may be of the same molded piece, workpiece, or otherwise an integral piece with the cover part 251 - 254, 251', 263 of the end opening in the sash strip 121a, 122a, 123a, 124a. Here, being integral means that the structural element 150 and the cover part 251 - 154, 151', 263 cannot be separated, and are not meant to be separated, from each other. So, the structural element 150 and the cover part 251 - 154, 151', 263 in this embodiment constitute one structural and functional part. This makes the structure and assembling the window system simpler.

[0035] In an embodiment, shown by Figure 6A, the structural element 150 is arranged to be fixed in the cover part 251 - 254, 223 of the end opening in the profile strip. The fixing may be carried out by means of one or more of the following: screw, rivet, glue. There may be a structural element 150 only at one end of the window element 121 - 124, or alternatively at both ends.

[0036] In an embodiment, the structural element 150 acting as the cover part 251-254, 251', 263 comprises a connecting member 121i, 121j, 122h, 122i, 122j, 122k, 123h, 123i, 123j, 123k, 124h, 124k, which in each window element 121 - 124 may be directed at another window element in order to assign the movement of the window element 121 - 124 at the other window element. The connecting member of the outermost window elements 121 - 124, in particular, is usually directed only in one direction at the side of the window element (parallel to the line N in the direction of the normal of the window element), in other words, the outermost window elements become either right-handed or left-handed. In such a case, window elements in a prior art case, in which each connecting member is fixed or is structurally connected to the window element, need to be accurately organised according to their handedness for the installation location. By installing the structural element 150 only at the location where the window elements are first installed between the top and bottom rail 130, 140 and only then the structural elements 150, the handedness problem of the window elements is avoided, and all the required window elements may be packed and brought along without a separate window element selection process.

[0037] In an embodiment, the connecting member 121 i, 121j, 122h, 122i, 122j, 122k, 123h, 123i, 123j, 123k, 124h, 124k is of the same molded piece, workpiece, or otherwise an integral item with the structural element 150.

[0038] In an embodiment, the structure is such that the window element 121 has connecting members 121 i, 121j, the window element 122 has connecting members 122h, 122i, 122j, 122k, the window element 123 has connecting members 123h, 123i, 123j, 123k, and the window element 124 has connecting members 124h, 124k .

[0039] A window element does not necessarily have to have all two or all four connecting members.

[0040] In an embodiment it is so that both ends of the bottom sash strip, such as 122a and 123a, at the bottom horizontal edge of a window element, such as 122, have a connecting member, that is, there are connecting members 122i, 122j and 123h, 123k to enable two-way connecting movement with the previous or subsequent element, that is, it is possible to shift both from the closed position or a partly open position according to Figures 1A - 1C to the open position according to Figure 1D and also vice versa, that is, from the state of Figure 1D to the state of Figures 1A - 1C.

[0041] In an embodiment, the bottom sash strip, such as 122a, 123a, have connecting members as examined in the transverse direction for both sides of the window element in order to establish movement coupling to two other window elements on different sides of the window element. So, in the centremost two window elements, such as the element 122, have connecting members 122h, 122i for the different sides and also connecting members 122j, 122k for the different sides, and correspondingly the element 123 has connecting members 123h, 123i for the different sides and connecting members 123j, 123k for the different sides.

[0042] A connecting member, such as 122j, 122k, 123h, 123i, is directly or indirectly fixed to the sliding window element, such as 122, 123, to the transverse end of the sash strip 122a, 123a at the horizontal edge. The connecting members are referred to by reference numbers 191 - 193 in Figure 1C, and reference numbers 192 - 194 in Figure 1A. The other fixing location, that is, the end of the sash strip, is shown in Figure 9, with reference number 222 representing a connecting member.

[0043] In a preferred embodiment, the sash strip 121 a, 122a, 123a, 124a at the bottom horizontal edge of the sliding window element 121 - 124 is a profile strip, and the connecting member is in the cover part 251 - 254 of the end opening of the profile strip.

[0044] The connecting members are protrusions that extend in the transverse direction of the bottom strip further than the bottom strip itself. A suitable reach is, for example, approximately 5 mm wider than the bottom strip.

[0045] In an embodiment, shown by Figure 6B, the structural element 150 comprises an expansion 650 for gripping and moving the window elements. The expan-

sion 650 may be placed on the outermost window elements 121, 124 and the user may grip the expansions 650 and move the window elements 121 - 124 along the top and bottom rails 130, 140 to the desired places. The expansions 650 may also be present on all the window elements 121 - 124. The expansion 650 may be of the same molded piece, workpiece, or otherwise an integral piece with the structural element 150. In an embodiment where the structural element 150 and the cover part 251-254, 251', 263 of the end opening are different parts, the cover part 251-254, 251', 263 of the end opening may comprise the expansion 650.

[0046] In an embodiment, shown by Figure 7, the structural element 150 may extend from a window element 121 - 124 all the way to a second window element 121 - 124. The structural element 150 may be at least slightly of the shape of the letter L, as in the case of Figure 5. In such a case, the structural element 150 associated with one window element 121 - 124 extends under the bottom edge of a second, subsequently adjacent window element 121 - 124. In such a case, the structural element 150 usually extends under the sash strip 121a - 124a of a second, subsequently adjacent window element 121 - 124. If in such a case an attempt is made to lift the window element 121, for example, the structural element 150 will hit the bottom surface in the sash strip 122a of the subsequent window element 122, and the lifting force will then be directed at both window elements 121 and 122. In such a case, the lifting of one window element 121 suddenly requires a force that could lift two window elements. However, the window elements 121 - 124 are so heavy that one person or a gust of wind will probably not be strong enough to lift two windows up from the bottom rail 140, even if one window element 121 - 124 would rise. To prevent the window elements 121 - 124 from rising, the window element 123 may similarly, through the structural element 150 of the window element 122, be there to add to the mass to be lifted. The mass of three window elements 121 - 124 is already so big that it is most unlikely that such forces would be directed at the window elements 121 - 124 that would be strong enough to lift all three window elements at the same time up from the bottom rail 140.

[0047] The rise of the window element 124 may be prevented in the same manner as in the case of the other window elements. In an embodiment, the outermost window element 124 comprises a structural element 150 which extends under the bottom edge of the sash strip 123a of a second, subsequent adjacent window element 123. In this case, it may also be under the structural element 150 of the window element 123. In an embodiment, the rise of at least two adjacent window elements 121 - 124 is prevented by structural elements 150 that are directed towards each other and out of which one extends under the other.

[0048] In an embodiment, the rise of the outermost window element 124 may be prevented by the structural element 150 so that the structural element 150 may extend

from the window element 124 to a groove 700 in the ridge 145, which is similar to the groove 160 in Figure 5. In such a case, the ridge 145 does not, however, support the window element 124 but is next to the ridge 144 that supports the window element 124.

[0049] This principle allows such a situation to develop where each window element is coupled, through the structural element 150, to at least one other window element 121 - 124, which adds to the mass to be lifted and consequently makes it more difficult for the window elements 121 - 124 to rise out of the bottom rail 140.

[0050] In an embodiment, shown by Figure 8, a solution is put forth in which an opening 800 - 806 has been formed through the ridges 141 - 144 at the grooves in the ridges 141 - 144. Correspondingly, an opening 808 - 820 has been formed in the sash strips 121a - 124a or structural elements 150 of the window elements 121 - 124. A protrusion 822 may be placed in the openings 808 - 820 in the sash strips 121a - 124a or in the structural elements 150 of each window element, extending so deep in the groove 824 in the ridge 141 - 144 that as the window element 121 - 124 is being lifted, the protrusion 822 hits the edge of the groove 824, which prevents the window element from rising any higher. The protrusion 822 may be placed in the sash strips 121a - 124a or in the ridge part 150 on one side of the ridge 141 - 144 or on both sides of the ridge 141 - 144. The opening 800 - 806 in the ridge 141 - 144 may be used to pass the bit part of a tool, such as a screwdriver or similar, from the edge of the bottom rail 140 all the way to where the protrusion 822 is to be fixed to the openings 800 - 806 in the sash strips 121a - 124a or the structural elements 150. The protrusion 822 may be a screw or a rivet, without being restricted thereto. In some cases, in which the protrusion 822 is on one side of the ridge 141 - 144, only, the opening is only needed in one edge ridge 141 - 144 of the bottom rail 140. In such a case, the opening 800, for example, is not necessarily needed.

[0051] So, in accordance with the embodiment shown by Figure 8, there is a groove 824 on at least one side of the ridges 141 - 144 of the bottom rail 140, at which there is the opening 800 - 806 in the ridge 141 - 144. The structural elements 150 have openings 808 - 820, aligned with the holes 800 - 806 in the ridge. At least one ridge 822 may be fixed to at least one opening 808 - 820 in the structural element 150 in such a manner that it extends all the way to the groove 824 to prevent the window element from rising off the bottom rail 140.

[0052] Figure 9 shows how a connecting member, referred to by 224, is fixed by a fixing member 222 to the lateral surface of the bottom sash strip 221a in the area of the end section, that is, its end. In Figure 9, the connecting member 224 is fixed to the side of the bottom sash strip 221a, on the end section of the bottom sash strip preceding the transverse end of the bottom sash strip. An end section refers to the area at the end of the side of the bottom strip, that is, the outermost 10 % section of the length of the bottom strip. The closer to the

actual transverse end of the bottom strip the connecting member is, the less the window elements need to stay in the partly overlapping position, in particular in the closed position according to Figures 1A- 1C. Excessive overlapping requires extra horizontal reach, so to speak, of the glass and bottom strip, in other words, length of the bottom strip and width of the glass. In an embodiment, the connecting member 224 may be at a distance of approximately 2 cm, for example, from the end of the 40 - 70 cm long bottom sash strip 221a. The bottom sash strip may be, for example, 300 - 1400 mm wide. In the example of Figure 9, the connecting member 224 may be of the same or different piece with the cover plate 223 of the end opening of the bottom sash strip.

[0053] In an embodiment, the vertical ends 500, 600 of the window structure frame have a sealing structure (the small, black balls in Figure 1A serving as an example), which provide a good sealing. The seals at the ends also act as an impact absorber as the window elements 121 - 124 bump into the end 500, 600.

[0054] In an embodiment, the connecting member, such as 122h, may be of the same molded piece, work-piece, or otherwise an integral piece with the cover part 252 of end opening in the bottom sash strip of the profile strip type, such as 122a. The connecting member 122i extending in the opposite direction is also of the same integral piece in an embodiment. In such a case, the window elements 121 - 124 have to be correctly selected already before installation, so that the connecting members will be of the correct type at the planned installation site. Nevertheless, the uncontrolled rise of the window elements 121 - 124 out of place may be prevented by means of the structural elements 150.

[0055] In an embodiment, a locking pin 312 passes through the bottom rail 140. In such a case, the structural element 150 of Figure 6A extending under the bottom edge of the bottom sash strip 221a - 224a cannot pass the locking pin 312. This way, the window elements 121 - 124 may be moved on rails 130, 140 to one edge, as shown in Figure 1C, and locked immovable on the rails 130, 140 by means of the locking pin 312. In principle, by means of a plurality of locking pins 312, the window elements 121 - 124 may be locked at any position desired.

[0056] It is obvious to a person skilled in the art 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 examples described above but may vary within the scope of the claims.

Claims

1. A window system which is for a balcony, terrace, or similar space, and comprises window elements (121 - 124), which are placeable between a top rail (130) and a bottom rail (140), where each window element (121 - 124) comprises a sash strip (121a, 122a,

123a, 124a) at its bottom edge in order to be supported by the bottom rail (140), **characterised in that**

the window system comprises at least one structural element (150), out of which each is arranged to be fixed to the sash strip (121a - 124a) of the window element (121 - 124) ; and

each structural element (150) is, as fixed to the sash strip (121a-124a), arranged to extend further into between ridges (141 - 144) in the bottom rail (140) than what the possible rise of the window element (121 - 124) is towards the top rail (140) between the top rail (140) and the bottom rail (130), and each structural element (150) and at least two ridges (141 - 144) on both sides of the structural element (150) of the bottom rail (140) are jointly arranged to prevent the rise of said structural element (150) from between the ridges (141 - 144) to keep the window element (121 - 124) between the top rail (130) and the bottom rail (140).

2. A window system as claimed in claim 1, **characterised in that** the structural element (150) comprises a first part (154, 158) of a locking structure (152) and the bottom rail (140) comprises a second part (156, 160) of the locking structure (152), where the first part (154, 158) and the second part (156, 160) are, as regards their shape, arranged into each other in such a manner that the first part (154, 158) and the second part (156, 160) of the locking structure (152) are jointly arranged to prevent the rise of said structural element (150) from between the ridges (141 - 144).
3. A window system as claimed in claim 1, **characterised in that** the structural element (150) comprises at least one structural element protrusion (158), which is arranged to fit into at least one groove (160) in the ridge (141 - 144) of the bottom rail 140.
4. A window system as claimed in claim 1, **characterised in that** the structural element (150) comprises at least one structural element recess (154), which is arranged to fit into at least one elevation (156) in the ridge (141 - 144) of the bottom rail 140.
5. A window system as claimed in claim 1, **characterised in that** in case the sash strip (121 a, 122a, 123a, 124a), which is at the horizontal edge of the window element (121 - 124), is a profile strip, the structural element (150) acts as a cover part (251 - 254, 251', 263) of the end opening of the profile strip.
6. A window system as claimed in claim 5, **characterised in that** the structural element 150 is of the same molded piece, workpiece, or otherwise an integral piece with the cover part (251 - 254, 251', 263) of the end opening in the sash strip (121 a, 122a, 123a,

124a).

7. A window system as claimed in claim 5, **characterised in that** in case the sash strip (121 a, 122a, 123a, 124a) at the horizontal edge of the window element (121 - 124) is a profile strip, the structural element (150) acting as the cover part (251-254, 251', 263) comprises a connecting member (121i, 121j, 122h, 122i, 122j, 122k, 123h, 123i, 123j, 123k, 124h, 124k), which in each window element may be aligned towards another window element in order to direct the movement of a window element to another window element.
8. A window system as claimed in claim 7, **characterised in that** the connecting member (121 i, 121j, 122h, 122i, 122j, 122k, 123h, 123i, 123j, 123k, 124h, 124k) is of the same molded piece, workpiece, or otherwise an integral piece with the structural element (150).
9. A window system as claimed in claim 1, **characterised in that** the structural element (150) is arranged to be fixed to the cover part (251 - 254, 251', 263) of the end opening of the profile strip.
10. A window system as claimed in claim 1, **characterised in that** the structural element (150) is arranged to be fixed to the sash strip (121 a - 124a) of the window element (121 - 124) when the window element (121 - 124) is in place between the top rail (130) and the bottom rail (140).
11. A window system as claimed in claim 1, **characterised in that** the structural element (150) of one window element (121 - 124) is arranged to extend under the bottom part of another window element (121 - 124).
12. A window system as claimed in claim 1, **characterised in that** the ridges (141 - 144) of the bottom rail (140) have, at least on one side, a groove (824) at which there is an opening (800 - 806) in the ridge (141 - 144), and the structural element (150) has openings (808 - 820) which are aligned with the openings in the ridge, and at least one protrusion (822) is arranged to be fixed to at least one opening (808 - 820) in the structural element (150) in such a manner that it reaches the groove (824).
13. A structural element for a window system where the window system is for a balcony, terrace, or similar space, the window system comprising window elements (121 - 124), which are placeable between a top rail (130) and a bottom rail (140), where each window element (121 - 124) comprises a sash strip (121 a, 122a, 123a, 124a) at its bottom edge in order to be supported by the bottom rail (140), **character-**

ised in that

the structural element (150) is arranged to be fixed to the sash strip (121a - 124a) of the window element (121 - 124); and

the structural element (150) is, as fixed to the sash strip (121a-124a), arranged to extend further into between ridges (141 - 144) in the bottom rail (140) than what the possible rise of the window element (121 - 124) is towards the top rail (140) between the top rail (140) and the bottom rail (130), and each structural element (150) and at least two ridges (141 - 144) on both sides of the structural element (150) of the bottom rail (140) are jointly arranged to prevent the rise of said structural element (150) from between the ridges (141 - 144) to keep the window element (121 - 124) between the top rail (130) and the bottom rail (140).

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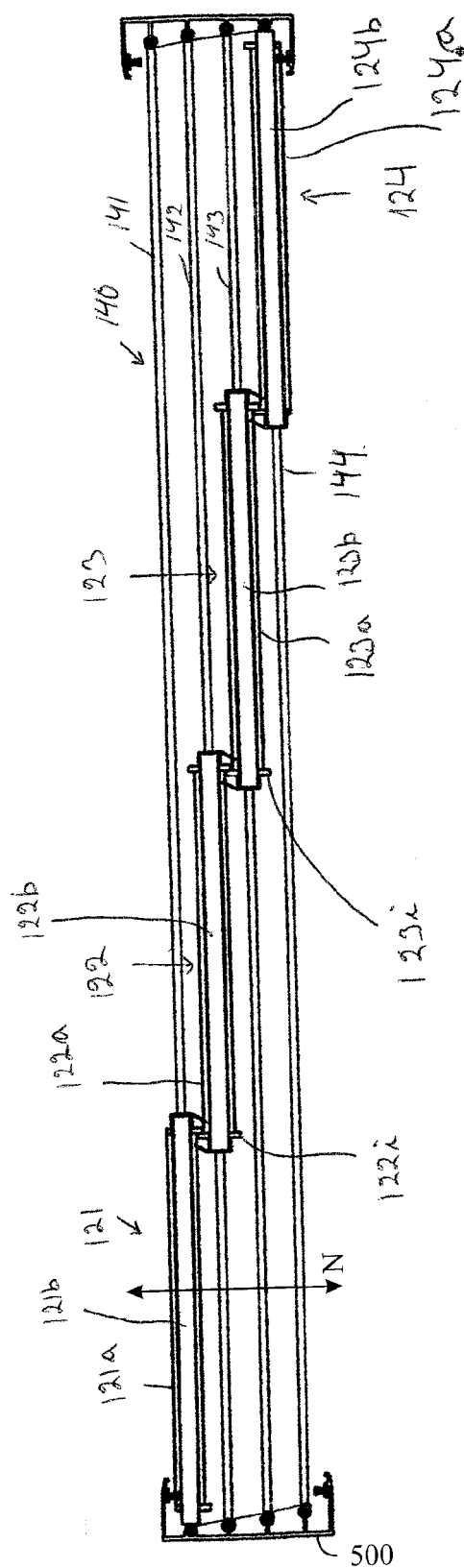


FIG. 1A

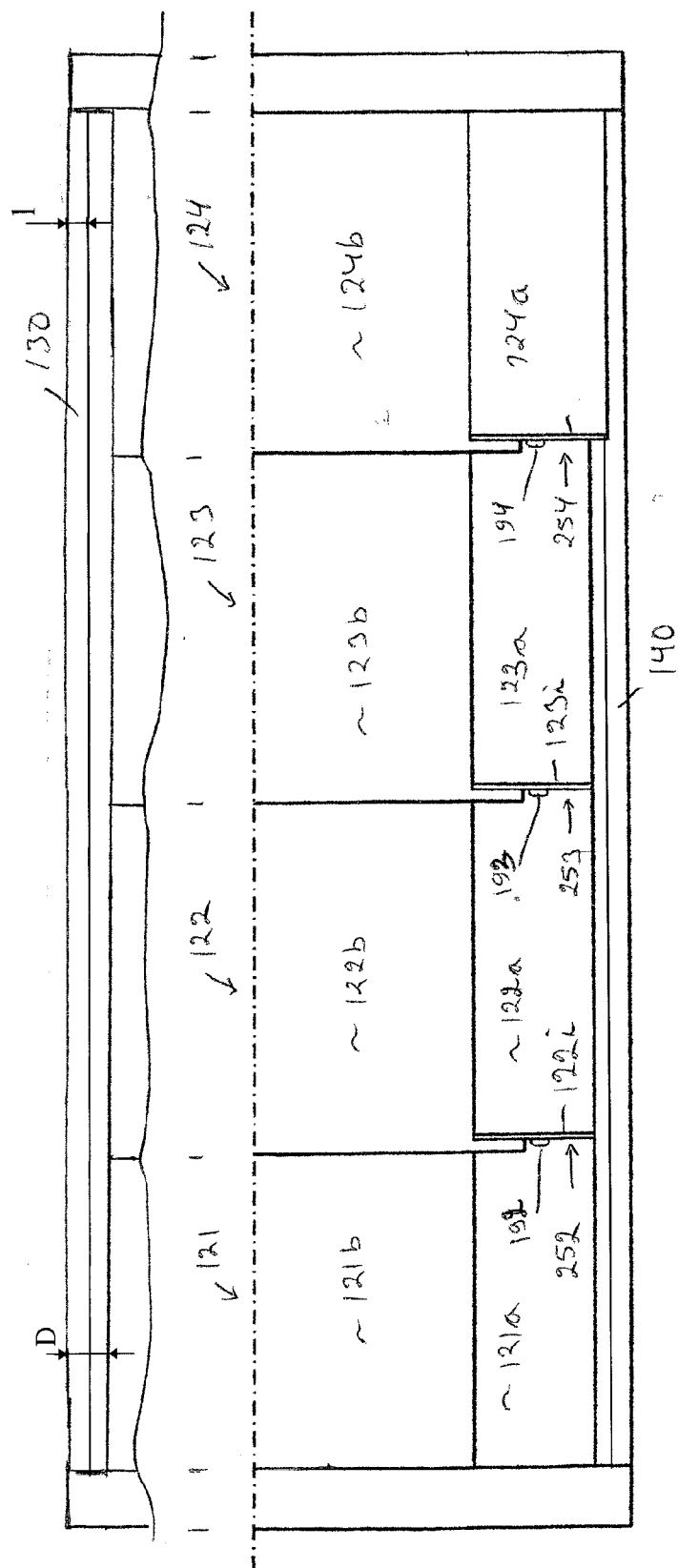


FIG. 1B

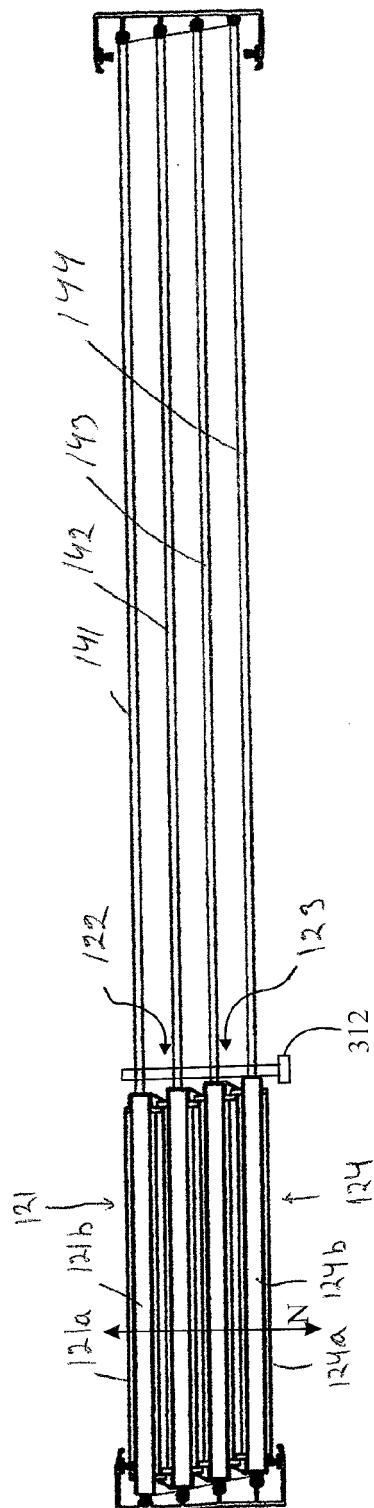


FIG. 1C

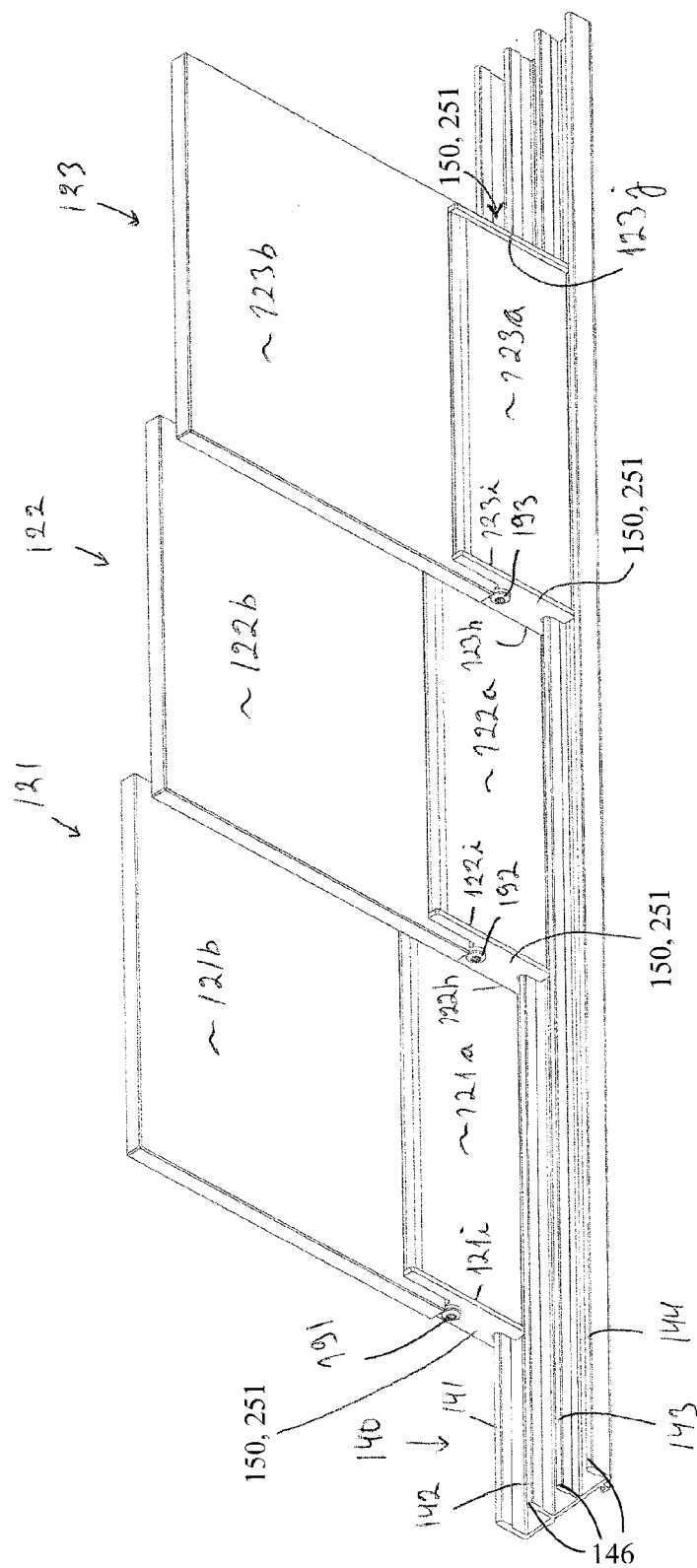


FIG. 1D

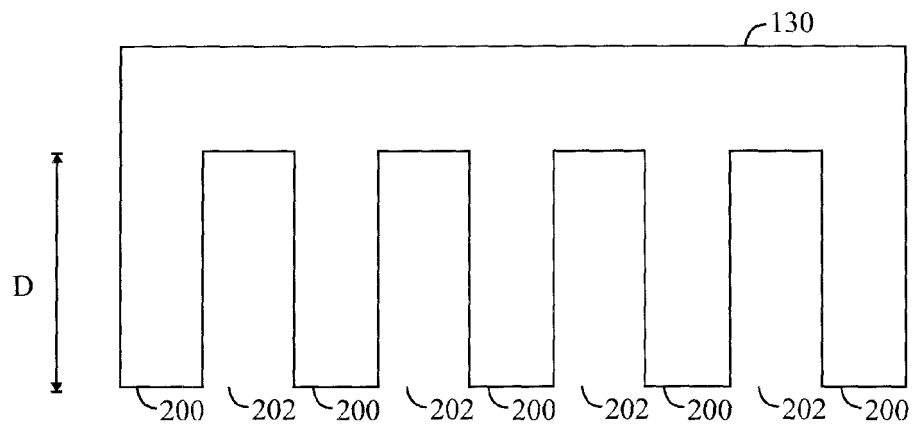


FIG. 2

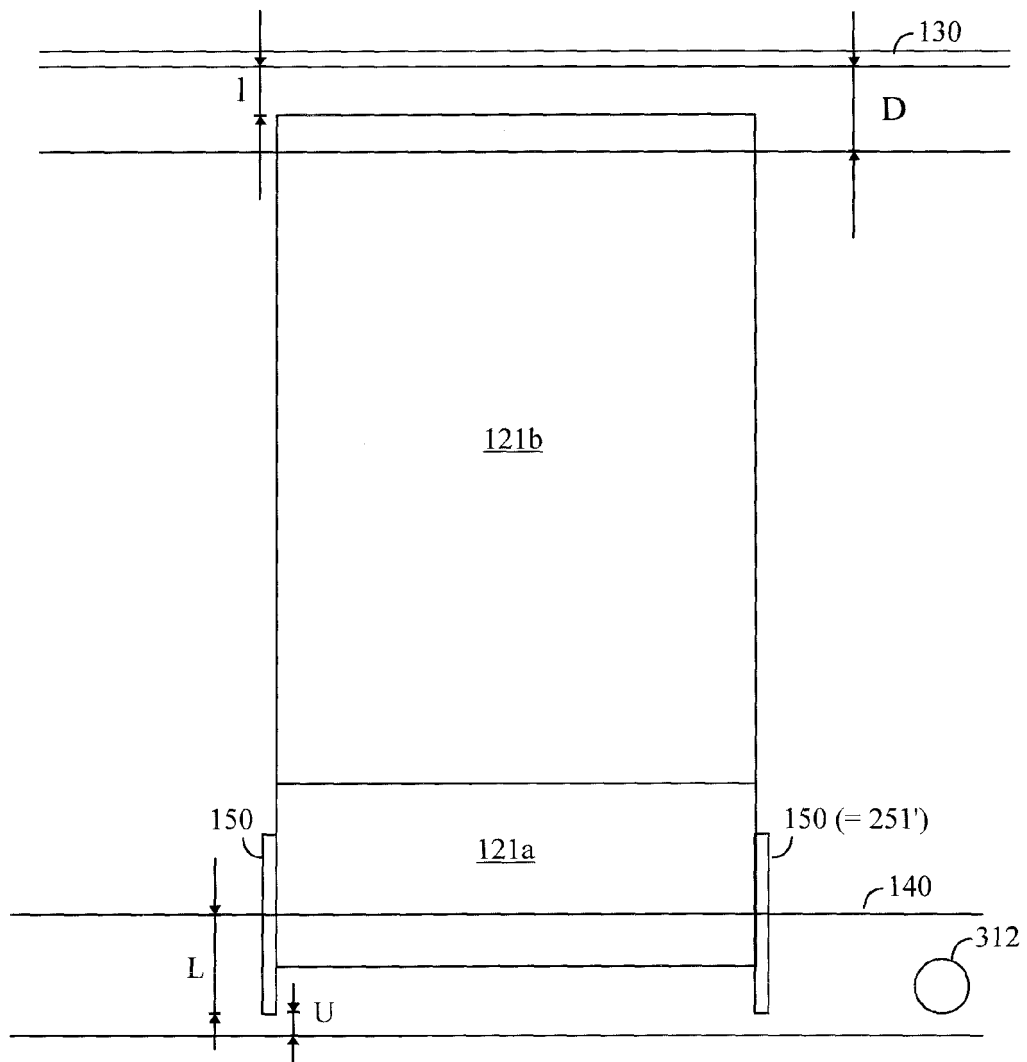


FIG. 3

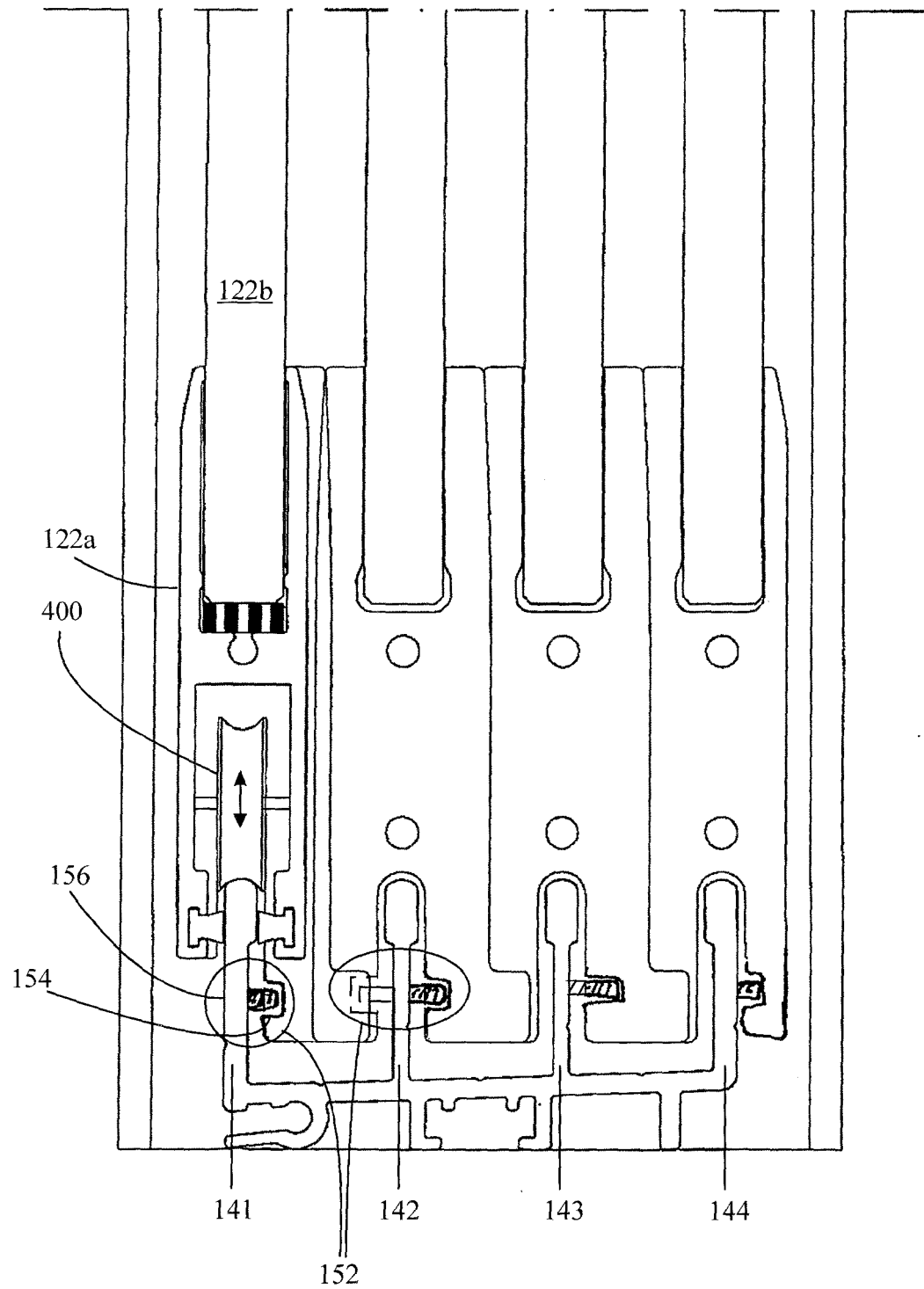


FIG. 4

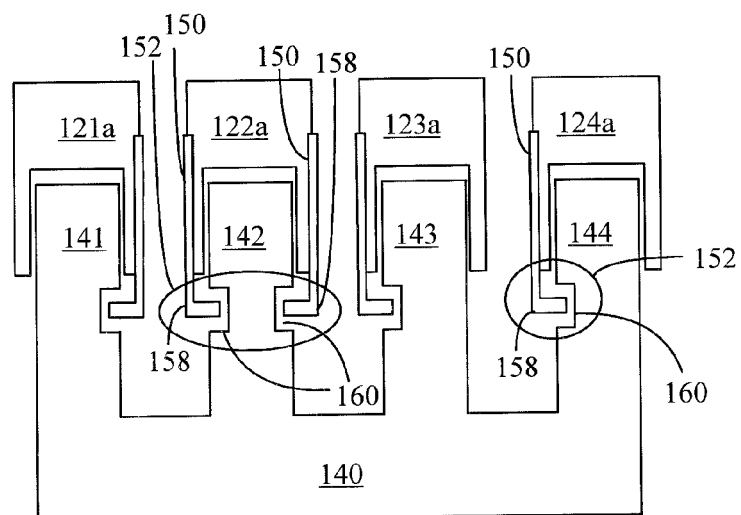


FIG. 5

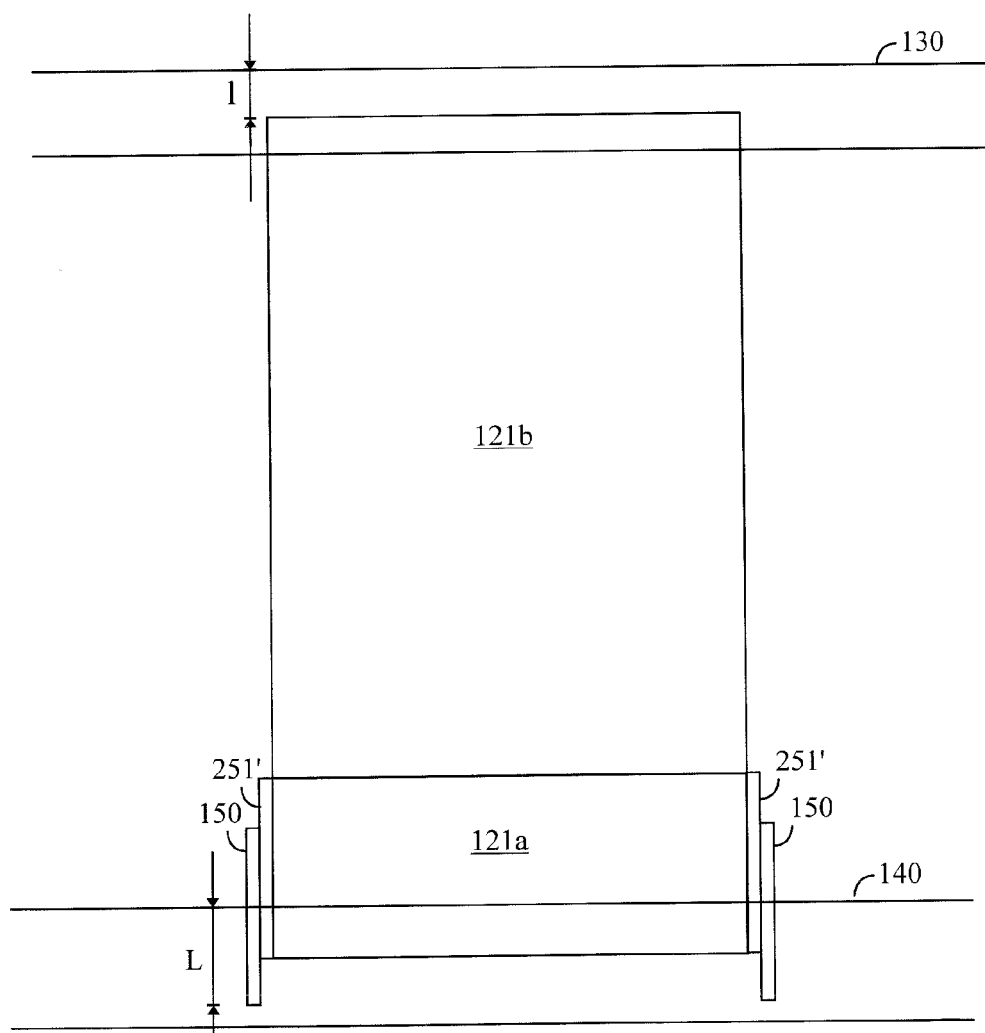


FIG. 6A

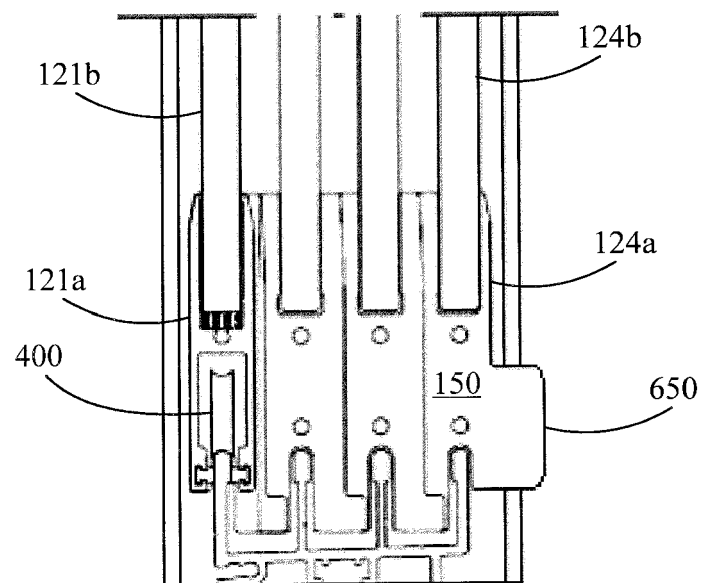


FIG. 6B

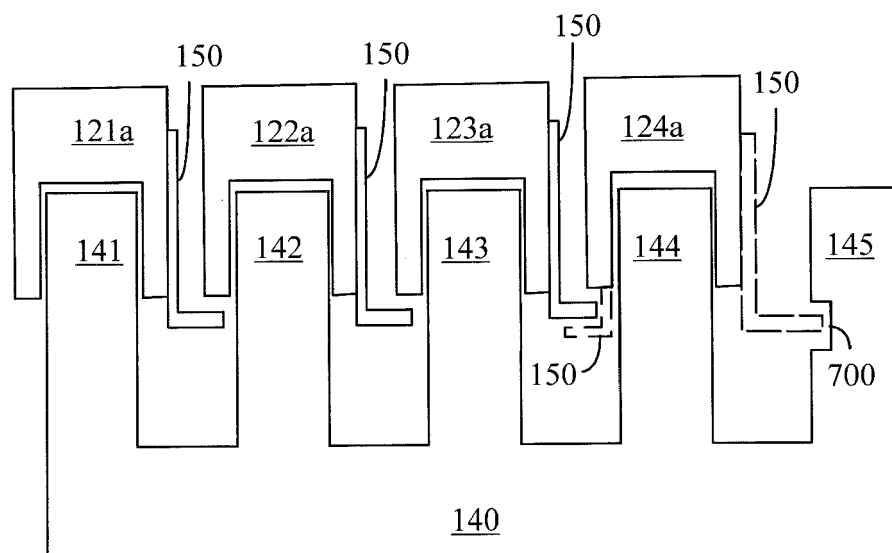


FIG. 7

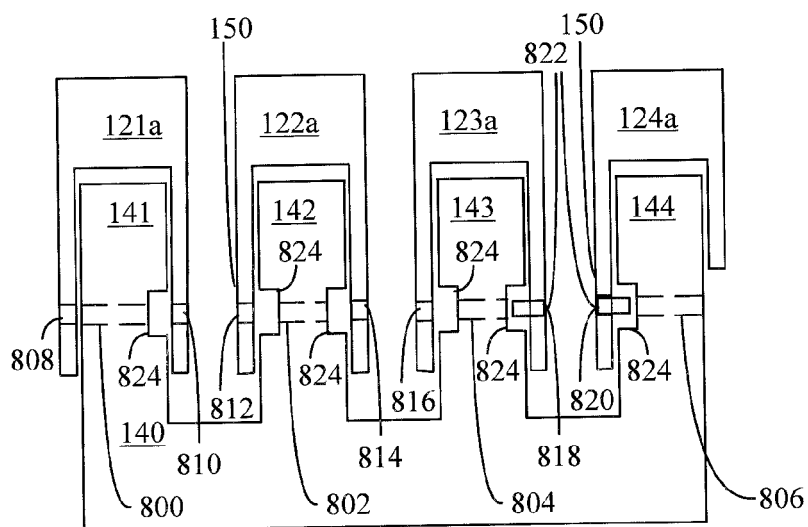


FIG. 8

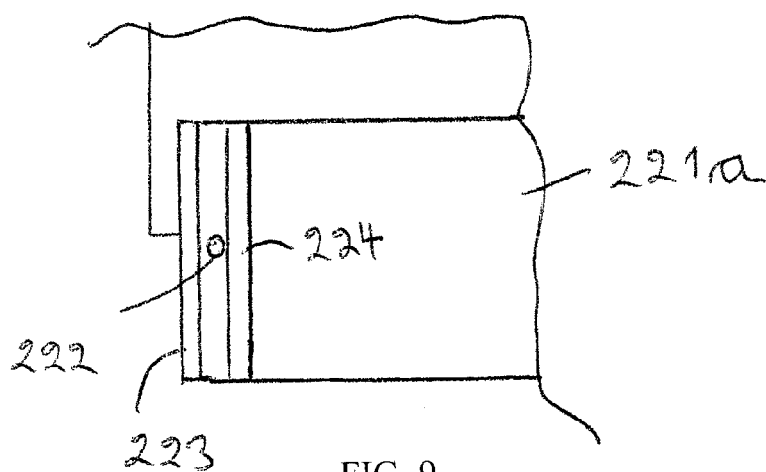


FIG. 9



EUROPEAN SEARCH REPORT

Application Number
EP 14 16 4850

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 6 434 789 B1 (KRUSE FREDERICK W [US]) 20 August 2002 (2002-08-20)	1-4,9, 10,13	INV. E05D15/06
Y	* column 3, line 66 - column 4, line 39 *	6	
A	* figures 11-22 *	8,12	
X	EP 2 476 840 A1 (SUNFLEX ALUMINIUMSYSTEME GMBH [DE]) 18 July 2012 (2012-07-18) * paragraph [0027] - paragraph [0029] * * figures 1,7 *	1-5,7, 9-11,13	TECHNICAL FIELDS SEARCHED (IPC)
X	EP 0 195 721 A1 (KRIEG & ZIVY IND [FR]) 24 September 1986 (1986-09-24) * column 3, line 22 - line 47 * * figures 1,3 *	1-3,5, 10,11,13	
Y	WO 2005/098180 A2 (DECEUNINCK NORTH AMERICA LLC [US]; JAY F HALSEY [US]; MAKSIM GRINCHENK) 20 October 2005 (2005-10-20) * page 11, line 29 - page 13, line 28 * * figures 5-6 *	6	
A	US 5 148 630 A (LLORENS MARIO [US]) 22 September 1992 (1992-09-22) * figures 1-4 *	12	E05D
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 17 July 2014	Examiner Prieto, Daniel
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

EPO FORM 1503 03/82 (P04/C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 14 16 4850

5

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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Patent document cited in search report		Publication date	Patent family member(s)		Publication date
US 6434789	B1	20-08-2002	NONE		

EP 2476840	A1	18-07-2012	NONE		

EP 0195721	A1	24-09-1986	DE	195721 T1	15-01-1987
			EP	0195721 A1	24-09-1986
			ES	293279 U	16-08-1986
			FR	2579262 A1	26-09-1986

WO 2005098180	A2	20-10-2005	US	2005217182 A1	06-10-2005
			WO	2005098180 A2	20-10-2005

US 5148630	A	22-09-1992	NONE		

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82