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(54) **SUPPORT FRAME FOR CARRYING GLASS PLATE AND GLASS TRANSPORT FRAME**
TRAGRAHMEN ZUM TRANSPORT VON GLASPLATTEN UND GLASTRANSPORTRAHMEN
BÂTI DE SUPPORT POUR PORTER UNE PLAQUE DE VERRE ET BÂTI DE TRANSPORT DE VERRE

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Description**FIELD**

5 **[0001]** The present disclosure relates to support frames of glass plates and glass transport frames, and more particularly to a support frame for carrying a glass plate and a glass transport frame.

BACKGROUND

10 **[0002]** Glass plates, such as vehicle glass and architectural glass etc., due to their fragile and easily scratched properties, need to be fixed in glass transport frames when being transported to users. A patent of Publication No.CN201634106 discloses a glass transport frame including a main body frame, a rack bracket fixed to a bottom frame and a turning rod fixed to a side frame, and a glass being vertically placed in the transport frame, with a bottom side of the glass fixed in a groove in the rack bracket, and lateral sides of the glass pressed and fixed by the turning rod from side directions.

15 **[0003]** These glass transport frames generally have complicated structure, and it is required to place a glass plate in a specific position when the glass plate is assembled into a transport frame, thus the packing efficiency is low. In addition, these glass transport frames are usually bulky, and it takes up plenty of transportation resources in transporting empty glass transport frames back to glass manufacturers, which results in higher transportation cost. US2013/0270134 discloses another example of a glass transport frame.

SUMMARY

25 **[0004]** In view of the problems of the glass transport frames in a conventional technology, a support frame for carrying a glass plate and a glass transport frame including the support frame are provided in the present disclosure.

30 **[0005]** According to an aspect of the present disclosure, a support frame for carrying a glass plate is provided, wherein the glass plate has a first longitudinal side, a second longitudinal side opposite to the first longitudinal side along a lateral direction, a first lateral side and a second lateral side opposite to the first lateral side along a longitudinal direction, and the first longitudinal side has a length smaller than a length of the second longitudinal side, characterized in that: the support frame has a first concave and a second concave, wherein the first concave matches with a shape of the glass plate when the glass plate is placed in a first orientation along the lateral direction, the second concave matches with a shape of the glass plate when the glass plate is placed in a second orientation opposite to the first orientation along the lateral direction, and the first concave and the second concave are at least partially overlapped.

35 **[0006]** A basic idea is that, since the first concave and the second concave of the support frame are respectively adapted to carry the glass plate placed in the first orientation and the glass plate placed in the second orientation, there is no need to distinguish orientation of the glass plate intentionally when the glass plate is loaded into the support frame. This is particularly useful for glass plates having directivity and heavy weight. For example, an upper side and a lower side of a windshield glass have a different length. When glass plates are assembled to the glass transport frames in the conventional technology, it is necessary to pay special attention to orientation of the glass plates. The glass plates need to be corrected when the glass plates are placed in wrong orientations. However, due to large weight of the windshield glass, corrective processes result in wasted manpower and reduced efficiency. In contrast, the first concave and the second concave of the support frame according to one aspect of the present disclosure are respectively adapted to carry the glass plate placed in the first orientation and the glass plate placed in the second orientation, when workers assemble the glass plate into the support frame, there is no need to pay special attention to the orientation of the glass plate and also no problem of a wrong orientation, therefore, the support frame can improve the assembling efficiency of workers. Further, the support frame according to one aspect of the present disclosure has a simple structure and low cost. In addition, according to one aspect of the present disclosure, when one concave of the support frame is damaged, the other concave is still usable, thus the support frame has a long service life.

40 **[0007]** In one embodiment, the support frame has a first longitudinal end portion extending along the longitudinal direction and a second longitudinal end portion which is opposite to the first longitudinal end portion along the lateral direction and separated from the first longitudinal end portion. Wherein the first concave includes a first longitudinal groove and a second longitudinal groove, the first longitudinal groove is located on the first longitudinal end portion and matches with a shape of the first longitudinal side of the glass plate being placed in the first orientation, and the second longitudinal groove is located on the second longitudinal end portion and matches with a shape of the second longitudinal side of the glass plate being placed in the first orientation; and wherein the second concave includes a third longitudinal groove and a fourth longitudinal groove, the third longitudinal groove is located on the first longitudinal end portion and matches with a shape of the second longitudinal side of the glass plate being placed in the second orientation, and the fourth longitudinal groove is located on the second longitudinal end portion and matches with a shape of the first longitudinal side of the glass plate being placed in the second orientation.

tudinal side of the glass plate being placed in the second orientation. The width of the support frame thus arranged can be adjusted to accommodate glass plates of different width dimensions.

[0008] In addition, the first longitudinal end portion and the second longitudinal end portion may be identical, and thus there is no need to pay special attention to the placement when the first longitudinal end portion and the second longitudinal end portion are being placed.

[0009] In one embodiment, the support frame includes a first lateral end portion extending along the lateral direction and a second lateral end portion which is opposite to the first lateral end portion along the longitudinal direction and separated from the first lateral end portion. Wherein the first concave includes a first lateral groove and a second lateral groove, the first lateral groove is located on the first lateral end portion and matches with a shape of the first lateral side of the glass plate being placed in the first orientation, and the second lateral groove is located on the second lateral end portion and matches with a shape of the second lateral side of the glass plate being placed in the first orientation; and wherein the second concave includes a third lateral groove and a fourth lateral groove, the third lateral groove is located on the first lateral end portion and matches with a shape of the second lateral side of the glass plate being placed in the second orientation, and the fourth lateral groove is located on the second lateral end portion and matches with a shape of the first lateral side of the glass plate being placed in the second orientation. The length of the support frame thus arranged can be adjusted to accommodate glass plates of different length dimensions.

[0010] In addition, the first lateral end portion and the second lateral end portion may be identical, and thus there is no need to pay special attention to the placement when the first lateral end portion and the second lateral end portion are being placed.

[0011] In one embodiment, the support frame has four corner portions which are separated from each other and are respectively located on four corners of the support frame. Wherein the four corner portions have a first groove, a second groove, a third groove and a fourth groove, respectively, when the glass plate is placed in the first orientation, the first groove matches with an intersection portion of the first longitudinal side and the first lateral side of the glass plate, the second groove matches with an intersection portion of the first longitudinal side and the second lateral side of the glass plate, the third groove matches with an intersection portion of the second longitudinal side and the first lateral side of the glass plate, the fourth groove matches with an intersection portion of the second longitudinal side and the second lateral side of the glass plate, and the first groove, the second groove, the third groove and the fourth groove form the first concave together; and wherein the four corner portions have a fifth groove, a sixth groove, a seventh groove and an eighth groove, respectively, when the glass plate is placed in the second orientation, the fifth groove matches with an intersection portion of the second longitudinal side and the second lateral side of the glass plate, the sixth groove matches with an intersection portion of the second longitudinal side and the first lateral side of the glass plate, the seventh groove matches with an intersection portion of the first longitudinal side and the second lateral side of the glass plate, the eighth groove matches with an intersection portion of the first longitudinal side and the first lateral side of the glass plate, and the fifth groove, the sixth groove, the seventh groove and the eighth groove form the second concave together. The length and width of the support frame thus arranged can be adjusted to accommodate glass plates of different length and width dimensions.

[0012] Further, the four corner portions may be identical, and thus there is no need to pay special attention to the placement when the four corner portions are being placed.

[0013] In one embodiment, the support frame further includes a bump located on a front side of the support frame and a slot located on a back side of the support frame, wherein a position of the bump corresponds to a position of the slot along the longitudinal direction and the lateral direction. The bump cooperates with the slot to fix piled support frames.

[0014] In one embodiment, the support frame further includes a buffer block located on a rear side of the support frame, wherein the buffer block has a height smaller than both a depth of the first concave and a depth of the second concave. The buffer block serves to assist the fixing of the glass plate, and can prevent the glass plate from vibrating up and down during transportation.

[0015] In one embodiment, the support frame further includes a through hole, wherein the through hole is located on a position corresponding to a position of a pin on the glass plate. The glass plate is sometimes provided with pins fixed on it for mounting the glass plate to a building or a vehicle body, and the through hole provides accommodation space for the pins.

[0016] In one embodiment, the support frame further includes an opening, wherein the opening is located on an edge of the support frame and communicates with the first concave and/or the second concave. It is convenient for workers to put their hand into the bottom of the glass plate through the opening in processes of loading and unloading the glass plate, and thus it is convenient for the workers to lift the glass plate up or put the glass plate down.

[0017] In one embodiment, a material of the support frame includes expandable polystyrene, expandable polyethylene, expandable polypropylene, polystyrene and polyethylene mixed polyfoam, elastomeric polyurethane, ethylene-vinyl acetate copolymer, honeycomb board material or pulp board material.

[0018] In one embodiment, the glass plate has a symmetry axis along the lateral direction, wherein the first lateral side and the second lateral side are symmetric with respect to the symmetry axis.

[0019] In one embodiment, the glass plate is a piece of vehicle skylight glass or a piece of vehicle windshield glass.

[0020] According to another aspect of the present disclosure, a glass transport frame is provided. The glass transport frame includes a plurality of support frames according to the support frame according to one aspect of the present disclosure, wherein the plurality of support frames are piled one above another. Since the first concave and the second concave of the support frame are respectively adapted to carry the glass plate placed in the first orientation and the glass plate placed in the second orientation, there is no need to intentionally distinguished orientation of the glass plate when the glass plate is loaded into the glass transport frame. This is particularly useful for glass plates having directivity and heavy weight. Therefore the glass transport frame can improve the assembling efficiency of workers. Further, the glass transport frame has a simple structure and low cost.

BRIEF DESCRIPTION OF THE DRAWINGS

[0021]

Figure 1 schematically illustrates a plan view of a support frame for carrying a glass plate according to an embodiment of the present disclosure;

Figure 2a schematically illustrates a front perspective view of a variant of the support frame in Figure 1;

Figure 2b schematically illustrates a rear perspective view of a variant of the support frame in Figure 1;

Figure 3 schematically illustrates a plan view of a support frame for carrying a glass plate according to another embodiment of the present disclosure;

Figure 4 schematically illustrates a plan view of a support frame for carrying a glass plate according to another embodiment of the present disclosure;

Figure 5 schematically illustrates a plan view of a support frame for carrying a glass plate according to another embodiment of the present disclosure; and

Figure 6 schematically illustrates a plan view of a support frame for carrying a glass plate according to another embodiment of the present disclosure.

DETAILED DESCRIPTION OF EMBODIMENTS

Referring to Figure 1, Figure 1 schematically illustrates a plan view of a support frame for carrying a glass plate according to an embodiment of the present disclosure.

[0023] The support frame 100 is adapted to carry a glass plate 200. Referring to a lateral direction and a longitudinal direction shown in Figure 1, the glass plate 200 has a first longitudinal side 211, a second longitudinal side 212 opposite to the first longitudinal side 211 along a lateral direction, a first lateral side 221 and a second lateral side 222 opposite to the first lateral side 221 along a longitudinal direction. Wherein the first longitudinal side 211 has a length smaller than a length of the second longitudinal side 212, i.e. the glass plate 200 has directivity. Such glass plates are very common in vehicle glass such as vehicle skylight glass and vehicle windshield glass.

[0024] The support frame 100 has a first concave 110 and a second concave 120, wherein the first concave 110 matches with a shape of the glass plate 200 when the glass plate 200 is placed in a first orientation (as shown in Fig. 1) along the lateral direction, the second concave 120 matches with a shape of the glass plate 200 when the glass plate 200 is placed in a second orientation (as shown in Fig. 1) opposite to the first orientation. Referring specifically to Fig. 1, the glass plate 200 placed along the first orientation is rotated 180 degrees in the plane of Fig 1 to obtain the glass plate 200 placed in the second orientation.

[0025] When placing the glass plate 200, workers do not need to pay special attention to orientation of the glass plate 200. Specifically, when the workers lift the glass plate 200 up in the first orientation, the glass plate 200 can be placed in the first concave 110, and when the workers lift the glass plate 200 up in the second orientation, the glass plate 200 can be placed in the second concave 120, which improves the assembly efficiency of the glass plate 200 and overcomes the disadvantages of the glass transport frames in the convention technology being adapted only for accommodating the glass plate in a specific orientation. The support frame 100 is particularly suitable when the glass plate 200 is bulky and heavier in weight. For the glass transport frames in the convention technology, there is a need to flip the glass plate to a specific orientation to fit in the glass transport frames, which results in waste of manpower and time, whereas for the support frame 100, there is no need to pay special attention to the orientation of the glass plate, which saves time and effort in an assembly process. In addition, the other concave of the support frame 100 can still be used when one concave is damaged, thus the service life of the support frame 100 is long.

[0026] In addition, the first concave 110 and the second concave 120 are at least partially overlapped. As shown in Fig. 1, intermediate portions of the first concave 110 and the second concave 120 are overlapped. A majority of intermediate portions of the glass plate 200 can be accommodated in the overlapped regions of the first concave 110 and the second concave 120 regardless that the glass plate 200 is placed in the first orientation or the second orientation.

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The first concave 110 and the second concave 120 are arranged with the intermediate portions being overlapped, which can reduce the area of the support frame 100.

[0027] A material of the support frame 100 may be any material having better compression stiffness, higher toughness, better cushion, and better dimensional stability. The material includes, for example, expandable polystyrene, expandable polyethylene, expandable polypropylene, polystyrene and polyethylene mixed polyfoam, elastomeric polyurethane, ethylene-vinyl acetate copolymer, honeycomb board material or pulp board material. Table 1 shows performance reference for these materials, each performance scores from 1 to 5, wherein 5 represents the best. The overall performance can be considered according to a usage requirement, in order to select the desired materials.

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Table 1. Performance References for Materials Applied to Manufacture Support Frame

	Expandable Polystyrene (EPS)	Expandable Polyethylene (EPE)	Expandable Polypropylene (EPP)	Polystyrene and Polyethylene Mixed Polyfoam (EPO)	Elastomeric Polyurethane (EPU)	Ethylene-Vinyl Acetate Copolymer (EVA)	Honeycomb Board Material	Pulp Board Material
Cushion Performance	3	4	4	4	5	4	1	1
Drop Performance	3	4	5	4	5	4	1	2
Compression Stiffness	4	2	3	4	1	3	5	3
Tear Strength	2	3	4	4	3	5	1	2
Toughness	2	3	4	4	3	5	3	3
Dimensional Stability	3	4	5	4	4	5	2	2
Molding Efficiency	5	3	5	5	5	4	1	5
Complex Shape	5	3	5	5	4	4	1	5
Recyclability	2	3	3	2	3	3	4	3
Cost	5	3	3	3	1	3	4	4

[0028] Fig. 2a schematically illustrates a front perspective view of a variant of the support frame in Fig. 1, and Fig. 2b schematically illustrates a rear perspective view of the variant. The variant will be described in detail with reference to Figs. 2a and 2b.

[0029] A support frame 100 may also include a bump 161 located on a front side of the support frame 100 as shown in Fig. 2a and a slot 162 located on a back side of the support frame 100 as shown in Fig. 2b, wherein a position of the bump 161 corresponds to a position of the slot 162 along the longitudinal direction and the lateral direction shown in Fig. 1. When a plurality of support frames 100 are piled one above another, a bump 161 of a lower support frame 100 is fixed in a slot 162 of an upper support frame 100, thus the plurality of support frames 100 are fixed to each other in the lateral direction and the longitudinal direction.

[0030] The support frame 100 may further include a through hole 170. Since the glass plate 200 (referring to Fig. 1) is usually provided with pins for fixing the glass plate 200 to a building or a vehicle body, the through hole 170 provides accommodating space for the glass plate 200.

[0031] The support frame 100 may further include an opening 180 located on an edge of the support frame 100 and communicates with the first concave 110 and/or the second concave 120. Workers can stretch their hand into the bottom of the glass plate 200 through the opening 180, thus it is convenient for loading and unloading the glass plate.

[0032] The support frame 100 may further include a buffer block 190 located on a rear side of the support frame 100, wherein the buffer block 190 has a height smaller than both a depth of the first concave 110 and a depth of the second concave 120. The buffer block 190 may be made of an existing cushioning material, such as rubber. The buffer block 190 can prevent the glass plate 200 from going up and down during transport.

[0033] The aforementioned bump 161 and buffer blocks 190 may form a one-piece component with the support frame 100, or may be fixed to the support frame 100 after being molded independently.

[0034] Fig. 3 schematic illustrates a plan view of a support frame for carrying a glass plate according to another embodiment of the present disclosure.

[0035] The support frame 100 has a first longitudinal end portion 131 extending along a longitudinal direction and a second longitudinal end portion 132 which is opposite to the first longitudinal end portion 131 along the lateral direction and separated from the first longitudinal end portion 131. Wherein the first concave 110 (referring to Fig. 1) includes a first longitudinal groove 111 and a second longitudinal groove 112, the first longitudinal groove 111 is located on the first longitudinal end portion 131 and matches with a shape of the first longitudinal side 211 of the glass plate being placed in the first orientation, and the second longitudinal groove 112 is located on the second longitudinal end portion 132 and matches with a shape of the second longitudinal side 212 of the glass plate being placed in the first orientation; and wherein the second concave 120 (referring to Fig. 1) includes a third longitudinal groove 121 and a fourth longitudinal groove 122, the third longitudinal groove 121 is located on the first longitudinal end portion 131 and matches with a shape of the second longitudinal side 212 of the glass plate being placed in the second orientation, and the fourth longitudinal groove 122 is located on the second longitudinal end portion 132 and matches with a shape of the first longitudinal side 211 of the glass plate being placed in the second orientation. The width of the support frame 100 thus arranged can be adjusted to accommodate the glass plate 200 of different width dimensions (referring to Fig. 1).

[0036] Most of the vehicle glass has a symmetry axis in the lateral direction, thus the first longitudinal end portion 131 and the second longitudinal end portion 132 may be identical, so that there is no need to pay special attention to placement when the first longitudinal end portion 131 and the second longitudinal end portion 132 are being placed, and the first longitudinal end portion 131 and the second longitudinal end portion 132 can be obtained by one mould.

[0037] Fig. 4 schematically illustrates a plan view of a support frame for carrying a glass plate according to another embodiment of the present disclosure.

[0038] A support frame 100 has a first lateral end portion 141 extending along a lateral direction and a second lateral end portion 142 which is opposite to the first lateral end portion 141 along a longitudinal direction and separated from the first lateral end portion 141. Wherein the first concave 110 includes a first lateral groove 411 and a second lateral groove 412, the first lateral groove 411 is located on the first lateral end portion 141 and matches with a shape of the first lateral side 221 of the glass plate being placed in a first orientation, and the second lateral groove 412 is located on the second lateral end portion 142 and matches with a shape of the second lateral side 222 of the glass plate being placed in the first orientation; and wherein the second concave 120 includes a third lateral groove 421 and a fourth lateral groove 422, the third lateral groove 421 is located on the first lateral end portion 141 and matches with a shape of the second lateral side 222 of the glass plate being placed in a second orientation, and the fourth lateral groove 422 is located on the second lateral end portion 142 and matches with a shape of the first lateral side 221 of the glass plate being placed in the second orientation. The length of the support frame 100 thus arranged can be adjusted to accommodate the glass plates 200 of different length dimensions.

[0039] Most of the vehicle glass has a symmetry axis along the lateral direction, thus the first lateral end portion 141 and the second lateral end portion 142 may be identical. There is no need to pay special attention to the placement when the first lateral end portion 141 and the second lateral end portion 142 are being placed, and the first lateral end portion 141 and the second lateral end portion 142 can be obtained by one mould.

[0040] An additional advantage of the support frame in Fig. 4, compared with the support frame in Fig. 3 is that, the material is more economical, and it is generally along the lateral direction of the glass plate when the glass plate is placed or taken, thus it is more convenient for the support frame in Fig. 4 to perform the placing and taking operation.

[0041] Figure 5 schematically illustrates a plan view of a support frame for carrying a glass plate according to another embodiment of the present disclosure.

[0042] The support frame 100 has four corner portions 151, 152, 153, 154 which are separated from each other and are respectively located at four corners of the support frame 100. When the glass plate is placed in a first orientation, the corner portion 151 has a first groove 511 which matches with an intersection portion of the first longitudinal side 211 and the first lateral side 221 of the glass plate, the corner portion 152 has a second groove 512 which matches with an intersection portion of the first longitudinal side 211 and the second lateral side 222 of the glass plate, the corner portion 153 has a third groove 513 which matches with an intersection portion of the second longitudinal side 212 and the first lateral side 221 of the glass plate, the corner portion 154 has a fourth groove 514 which matches with an intersection portion of the second longitudinal side 212 and the second lateral side 222 of the glass plate, and the first groove 511, the second groove 512, the third groove 513 and the fourth groove 514 form the first concave 110 together.

[0043] When the glass plate is placed in a second orientation, the corner portion 151 has a fifth groove 521 which matches with an intersection portion of the second longitudinal side 212 and the second lateral side 222 of the glass plate, the corner portion 152 has a sixth groove 522 which matches with an intersection portion of the second longitudinal side 212 and the first lateral side 221 of the glass plate, the corner portion 153 has a seventh groove 523 which matches with an intersection portion of the first longitudinal side 211 and the second lateral side 222 of the glass plate, the corner portion 154 has an eighth groove 524 which matches with an intersection portion of the first longitudinal side 211 and the first lateral side 221 of the glass plate, and the fifth groove 521, the sixth groove 522, the seventh groove 523 and the eighth groove 524 form the second concave 120 together.

[0044] The length and width of the support frame 100 thus arranged can be adjusted to accommodate glass plate 200 of different length and width dimensions.

[0045] Most of the vehicle glass has a symmetry axis along the lateral direction, and thus the four corner portions can be the identical. There is no need to pay special attention to orientation when the four corner portions are being placed, and the four corner portions can be made by one mould.

[0046] It should be noted that, the aforementioned embodiments can be combined with each other, for example, the support frame 100 may include one longitudinal end portion 131 and two corner portions 151, the support frame 100 may include a lateral end portion 141 and two corner portions 151, and the support frame 100 in Figs 3, 4, or 5 may include the through hole 170, the bump 161, the slot 162, the opening 180, or the buffer block 190 shown in Fig. 2.

[0047] It should be further noted that, the portion where the first concave 110 and the second concave 120 of the support frame 100 are partially overlapped may be adjusted, for example, Figure 6 schematically illustrates a layout adjusted on the basis of Fig. 1. Figure 6 shows a plan view of a support frame for carrying a glass plate according to another embodiment of the present disclosure. Intermediate portions of a first concave 110 and a second concave 120 are still overlapped.

[0048] According to another aspect of the present disclosure, a glass transport frame is also provided. The glass transport frame includes a plurality of support frames 100 according to the support frame according to any of the embodiments in the present disclosure, wherein the plurality of support frames 100 are piled one above another. Since the first concave 110 and the second concave 120 of the support frame 100 are respectively adapted to carry the glass plate 200 placed in the first orientation and the glass plate 200 placed in the second orientation. It is not necessary to intentionally distinguish orientation of the glass plate 200 when the glass plate 200 is loaded into the support frame 100. This is particularly useful for glass plates having directivity and heavy weight. The glass transport frame can improve the assembly efficiency of workers. In addition, the glass transport frame has simple structure and low cost.

[0049] In one example, the glass transport frame further includes a container in which a plurality of support frames 100 are placed. The container may be a cubic structure including a bottom surface, a top surface, and four side surfaces. One of the side surfaces is hinged to the bottom surface, the hinged side surface is opened when the support frame 100 is loaded or unloaded, and the hinged side surface and the top of the container are closed when the support frame 100 is transported. The container may further include a forklift ring, for convenience of the forklift operation.

[0050] Although the present disclosure has been described above, the present disclosure is not limited thereto. It should be understood by those skilled in the art that various changes and modifications may be made within the scope of protection of the invention as defined by the claims.

Claims

1. A support frame (100) for carrying a glass plate (200), wherein the glass plate (200) has a first longitudinal side (211), a second longitudinal side (212) opposite to the first longitudinal side (211) along a lateral direction, a first

lateral side (221) and a second lateral side (222) opposite to the first lateral side (221) along a longitudinal direction, and the first longitudinal side (211) has a length smaller than a length of the second longitudinal side (212), **characterized in that:**

the support frame (100) has a first concave (110) and a second concave (120), wherein the first concave (110) matches with a shape of the glass plate (200) when the glass plate (200) is placed in a first orientation along the lateral direction, the second concave (120) matches with a shape of the glass plate (200) when the glass plate (200) is placed in a second orientation opposite to the first orientation along the lateral direction, and the first concave (110) and the second concave (120) are at least partially overlapped.

2. The support frame (100) according to claim 1, **characterized in that**, the support frame (100) has a first longitudinal end portion (131) extending along the longitudinal direction and a second longitudinal end portion (132) which is opposite to the first longitudinal end portion (131) along the lateral direction and separated from the first longitudinal end portion (131);

wherein the first concave (110) comprises a first longitudinal groove (111) and a second longitudinal groove (112), the first longitudinal groove (111) is located on the first longitudinal end portion (131) and matches with a shape of the first longitudinal side (211) of the glass plate (200) being placed in the first orientation, and the second longitudinal groove (112) is located on the second longitudinal end portion (132) and matches with a shape of the second longitudinal side (212) of the glass plate (200) being placed in the first orientation; and wherein the second concave (120) comprises a third longitudinal groove (121) and a fourth longitudinal groove (122), the third longitudinal groove (121) is located on the first longitudinal end portion (131) and matches with a shape of the second longitudinal side (212) of the glass plate (200) being placed in the second orientation, and the fourth longitudinal groove (122) is located on the second longitudinal end portion (132) and matches with a shape of the first longitudinal side (211) of the glass plate (200) being placed in the second orientation.

3. The support frame (100) according to claim 2, **characterized in that**, the first longitudinal end portion (131) and the second longitudinal end portion (132) are identical.

4. The support frame (100) according to claim 1, **characterized in that**, the support frame (100) comprises a first lateral end portion (141) extending along the lateral direction and a second lateral end portion (142) which is opposite to the first lateral end portion (141) along the longitudinal direction and separated from the first lateral end portion (141);

wherein the first concave (110) comprises a first lateral groove (411) and a second lateral groove (412), the first lateral groove (411) is located on the first lateral end portion (141) and matches with a shape of the first lateral side (221) of the glass plate (200) being placed in the first orientation, and the second lateral groove (412) is located on the second lateral end portion (142) and matches with a shape of the second lateral side (222) of the glass plate (200) being placed in the first orientation; and wherein the second concave (120) comprises a third lateral groove (421) and a fourth lateral groove (422), the third lateral groove (421) is located on the first lateral end portion (141) and matches with a shape of the second lateral side (222) of the glass plate (200) being placed in the second orientation, and the fourth lateral groove (422) is located on the second lateral end portion (142) and matches with a shape of the first lateral side (221) of the glass plate (200) being placed in the second orientation.

5. The support frame (100) according to claim 4, **characterized in that**, the first lateral end portion (141) and the second lateral end portion (142) are identical.

6. The support frame (100) according to claim 1, **characterized in that**, the support frame (100) has four corner portions (151, 152, 153, 154) which are separated from each other and are respectively located at four corners of the support frame (100);

wherein the four corner portions (151, 152, 153, 154) have a first groove (511), a second groove (512), a third groove (513) and a fourth groove (514), respectively, when the glass plate (200) is placed in the first orientation, the first groove (511) matches with an intersection portion of the first longitudinal side (211) and the first lateral side (221) of the glass plate (200), the second groove (512) matches with an intersection portion of the first longitudinal side (211) and the second lateral side (222) of the glass plate (200), the third groove (513) matches with an intersection portion of the second longitudinal side (212) and the first lateral side (221) of the glass plate (200), the fourth groove (514) matches with an intersection portion of the second longitudinal side (212) and the second lateral side (222) of the glass plate (200), and the first groove (511), the second groove (512), the

third groove (513) and the fourth groove (514) form the first concave (110); and wherein the four corner portions (151, 152, 153, 154) have a fifth groove (521), a sixth groove (522), a seventh groove (523) and an eighth groove (524), respectively, when the glass plate (200) is placed in the second orientation, the fifth groove (521) matches with an intersection portion of the second longitudinal side (212) and the second lateral side (222) of the glass plate (200), the sixth groove (522) matches with an intersection portion of the second longitudinal side (212) and the first lateral side (221) of the glass plate (200), the seventh groove (523) matches with an intersection portion of the first longitudinal side (211) and the second lateral side (222) of the glass plate (200), the eighth groove (524) matches with an intersection portion of the first longitudinal side (211) and the first lateral side (221) of the glass plate (200), and the fifth groove (521), the sixth groove (522), the seventh groove (523) and the eighth groove (524) form the second concave (120).

7. The support frame (100) according to claim 6, **characterized in that**, the four corner portions (151, 152, 153, 154) are identical.

8. The support frame (100) according to claim 1, **characterized by** further comprising a bump (161) located on a front side of the support frame (100) and a slot (162) located on a back side of the support frame (100), wherein a position of the bump (161) corresponds to a position of the slot (162) along the longitudinal direction and the lateral direction.

9. The support frame (100) according to claim 1, **characterized by** further comprising a buffer block (190) located on a rear side of the support frame (100), wherein the buffer block (190) has a height smaller than both a depth of the first concave (110) and a depth of the second concave (120).

10. The support frame (100) according to claim 1, **characterized by** further comprising a through hole (170), wherein the through hole (170) is located on the back side of the support frame (100), which position is adapted to correspond to a position of a pin on the glass plate (200).

11. The support frame (100) according to claim 1, **characterized by** further comprising an opening (180), wherein the opening (180) is located on an edge of the support frame (100) and communicates with the first concave (110) and/or the second concave (120).

12. The support frame (100) according to claim 1, **characterized in that**, a material of the support frame (100) comprises expandable polystyrene, expandable polyethylene, expandable polypropylene, polystyrene and polyethylene mixed polyfoam, elastomeric polyurethane, ethylene-vinyl acetate copolymer, honeycomb board material or pulp board material.

13. The support frame (100) according to claim 1, **characterized in that**, the glass plate (200) has a symmetry axis along the lateral direction, wherein the first lateral side (221) and the second lateral side (222) are symmetric with respect to the symmetry axis.

14. The support frame (100) according to claim 1, **characterized in that**, the glass plate (200) is a piece of vehicle skylight glass or a piece of vehicle windshield glass.

15. A glass transport frame, **characterized by** comprising a plurality of support frames according to the support frame (100) of any one of claims 1-14, wherein the plurality of support frames are piled one above another.

16. The glass transport frame according to claim 15, **characterized by** further comprising a container, wherein the plurality of support frames is placed in the container.

17. Set comprising:

- a support frame according to any of claims 1 to 14, and
- a glass plate (200) having a first longitudinal side (211), a second longitudinal side (212) opposite to the first longitudinal side (211) along a lateral direction, a first lateral side (221) and a second lateral side (222) opposite to the first lateral side (221) along a longitudinal direction, the first longitudinal side (211) having a length smaller than a length of the second longitudinal side (212), the glass plate (200) having preferentially a symmetry axis along the lateral direction wherein the first lateral side (221) and the second lateral side (222) are symmetric with respect to the symmetry axis.

Patentansprüche

1. Tragrahmen (100) zum Tragen einer Glasplatte (200), wobei die Glasplatte (200) eine erste Längsseite (211), eine zweite Längsseite (212), die der ersten Längsseite (211) entlang einer Querrichtung gegenüberliegt, eine erste Querseite (221) und eine zweite Querseite (222), die der ersten Querseite (221) entlang einer Längsrichtung gegenüberliegt, aufweist, und die erste Längsseite (211) eine Länge aufweist, die kleiner ist als eine Länge der zweiten Längsseite (212), **dadurch gekennzeichnet, dass:**

der Tragrahmen (100) eine erste Vertiefung (110) und eine zweite Vertiefung (120) aufweist, wobei die erste Vertiefung (110) mit einer Form der Glasplatte (200) übereinstimmt, wenn die Glasplatte (200) in einer ersten Ausrichtung entlang der Querrichtung platziert ist, die zweite Vertiefung (120) mit einer Form der Glasplatte (200) übereinstimmt, wenn die Glasplatte (200) in einer zweiten Ausrichtung entgegengesetzt zu der ersten Ausrichtung entlang der Querrichtung platziert ist, und die erste Vertiefung (110) und die zweite Vertiefung (120) sich mindestens teilweise überlappen.

2. Tragrahmen (100) nach Anspruch 1, **dadurch gekennzeichnet, dass** der Tragrahmen (100) einen ersten länglichen Endabschnitt (131), der sich in Längsrichtung erstreckt, und einen zweiten länglichen Endabschnitt (132) aufweist, der dem ersten länglichen Endabschnitt (131) in Querrichtung gegenüberliegt und von dem ersten länglichen Endabschnitt (131) getrennt ist;

wobei die erste Vertiefung (110) eine erste Längsnut (111) und eine zweite Längsnut (112) umfasst, wobei sich die erste Längsnut (111) an dem ersten länglichen Endabschnitt (131) befindet und mit einer Form der ersten Längsseite (211) der Glasplatte (200) übereinstimmt, die in der ersten Ausrichtung angeordnet ist, und wobei sich die zweite Längsnut (112) an dem zweiten länglichen Endabschnitt (132) befindet und mit einer Form der zweiten Längsseite (212) der Glasplatte (200) übereinstimmt, die in der ersten Ausrichtung angeordnet ist; und wobei die zweite Vertiefung (120) eine dritte Längsnut (121) und eine vierte Längsnut (122) umfasst, wobei sich die dritte Längsnut (121) auf dem ersten länglichen Endabschnitt (131) befindet und mit einer Form der zweiten Längsseite (212) der Glasplatte (200) übereinstimmt, die in der zweiten Ausrichtung angeordnet ist, und wobei sich die vierte Längsnut (122) auf dem zweiten länglichen Endabschnitt (132) befindet und mit einer Form der ersten Längsseite (211) der Glasplatte (200) übereinstimmt, die in der zweiten Ausrichtung angeordnet ist.

3. Tragrahmen (100) nach Anspruch 2, **dadurch gekennzeichnet, dass** der erste längliche Endabschnitt (131) und der zweite längliche Endabschnitt (132) identisch sind.

4. Tragrahmen (100) nach Anspruch 1, **dadurch gekennzeichnet, dass** der Tragrahmen (100) einen ersten seitlichen Endabschnitt (141), der sich entlang der Querrichtung erstreckt, und einen zweiten seitlichen Endabschnitt (142) umfasst, der dem ersten seitlichen Endabschnitt (141) entlang der Längsrichtung gegenüberliegt und von dem ersten seitlichen Endabschnitt (141) getrennt ist;

wobei die erste Vertiefung (110) eine erste seitliche Nut (411) und eine zweite seitliche Nut (412) umfasst, wobei sich die erste seitliche Nut (411) auf dem ersten seitlichen Endabschnitt (141) befindet und mit einer Form der ersten Querseite (221) der Glasplatte (200) übereinstimmt, die in der ersten Ausrichtung angeordnet ist, und wobei sich die zweite seitliche Nut (412) auf dem zweiten seitlichen Endabschnitt (142) befindet und mit einer Form der zweiten Querseite (222) der Glasplatte (200) übereinstimmt, die in der ersten Ausrichtung angeordnet ist; und

wobei die zweite Vertiefung (120) eine dritte seitliche Nut (421) und eine vierte seitliche Nut (422) umfasst, wobei sich die dritte seitliche Nut (421) auf dem ersten seitlichen Abschnitt (141) befindet und mit einer Form der zweiten Längsseite (222) der Glasplatte (200) übereinstimmt, die in der zweiten Ausrichtung angeordnet ist, und wobei sich die vierte seitliche Nut (422) auf dem zweiten seitlichen Abschnitt (142) befindet und mit einer Form der ersten Querseite (221) der Glasplatte (200) übereinstimmt, die in der zweiten Ausrichtung angeordnet ist.

5. Tragrahmen (100) nach Anspruch 4, **dadurch gekennzeichnet, dass** der erste seitliche Endabschnitt (141) und der zweite seitliche Endabschnitt (142) identisch sind.

6. Tragrahmen (100) nach Anspruch 1, **dadurch gekennzeichnet, dass** der Tragrahmen (100) vier voneinander getrennte Eckabschnitte (151, 152, 153, 154) aufweist, die sich jeweils an vier Ecken des Tragrahmens (100) befinden;

wobei die vier Eckabschnitte (151, 152, 153, 154) jeweils eine erste Nut (511), eine zweite Nut (512), eine dritte Nut (513) und eine vierte Nut (514) aufweisen, wenn die Glasplatte (200) in der ersten Ausrichtung angeordnet ist, die erste Nut (511) mit einem Abschnitt der ersten Längsseite (211) und der ersten Querseite (221) der Glasplatte (200) übereinstimmt, die zweite Nut (512) mit einem Abschnitt der ersten Längsseite (211) und der zweiten Querseite (222) der Glasplatte (200) übereinstimmt, die dritte Nut (513) mit einem Abschnitt der zweiten Längsseite (212) und der ersten Querseite (221) der Glasplatte (200) übereinstimmt, die vierte Nut (514) mit einem Abschnitt der zweiten Längsseite (212) und der zweiten Querseite (222) der Glasplatte (200) übereinstimmt, und die erste Nut (511), die zweite Nut (512), die dritte Nut (513) und die vierte Nut (514) die erste Vertiefung (110) bilden; und

wobei die vier Eckabschnitte (151, 152, 153, 154) jeweils eine fünfte Nut (521), eine sechste Nut (522), eine siebte Nut (523) und eine achte Nut (524) aufweisen, wenn die Glasplatte (200) in der zweiten Ausrichtung angeordnet ist, die fünfte Nut (521) mit einem Abschnitt der zweiten Längsseite (212) und der zweiten Querseite (222) der Glasplatte (200) übereinstimmt, die sechste Nut (522) mit einem Abschnitt der zweiten Längsseite (212) und der ersten Querseite (221) der Glasplatte (200) übereinstimmt, die siebte Nut (523) mit einem Abschnitt der ersten Längsseite (211) und der zweiten Querseite (222) der Glasplatte (200) übereinstimmt, die achte Nut (524) mit einem Abschnitt der ersten Längsseite (211) und der ersten Querseite (221) der Glasplatte (200) übereinstimmt, und die fünfte Nut (521), die sechste Nut (522), die siebte Nut (523) und die achte Nut (524) die zweite Vertiefung (120) bilden.

7. Tragrahmen (100) nach Anspruch 6, **dadurch gekennzeichnet, dass** die vier Eckabschnitte (151, 152, 153, 154) identisch sind.
8. Tragrahmen (100) nach Anspruch 1, **dadurch gekennzeichnet, dass** er ferner eine Erhebung (161), die sich auf einer Vorderseite des Tragrahmens (100) befindet, und einen Schlitz (162) umfasst, der sich auf einer Rückseite des Tragrahmens (100) befindet, wobei eine Position der Erhebung (161) einer Position des Schlitzes (162) entlang der Längsrichtung und der Querrichtung entspricht.
9. Tragrahmen (100) nach Anspruch 1, **dadurch gekennzeichnet, dass** er ferner einen Pufferblock (190) umfasst, der sich auf einer Rückseite des Tragrahmens (100) befindet, wobei der Pufferblock (190) eine Höhe aufweist, die kleiner ist als sowohl eine Tiefe der ersten Vertiefung (110) als auch eine Tiefe der zweiten Vertiefung (120).
10. Tragrahmen (100) nach Anspruch 1, **dadurch gekennzeichnet, dass** er ferner ein Durchgangsloch (170) umfasst, wobei sich das Durchgangsloch (170) auf der Rückseite des Tragrahmens (100) befindet, wobei die Position angepasst ist, um einer Position eines Stifts auf der Glasplatte (200) zu entsprechen.
11. Tragrahmen (100) nach Anspruch 1, **dadurch gekennzeichnet, dass** er ferner eine Öffnung (180) umfasst, wobei sich die Öffnung (180) an einer Kante des Tragrahmens (100) befindet und mit der ersten Vertiefung (110) und/oder der zweiten Vertiefung (120) in Verbindung steht.
12. Tragrahmen (100) nach Anspruch 1, **dadurch gekennzeichnet, dass** ein Material des Tragrahmens (100) expandierbares Polystyrol, expandierbares Polyethylen, expandierbares Polypropylen, Mischpolyschaum aus Polystyrol und Polyethylen, elastomeres Polyurethan, Ethylen-Vinylacetat-Copolymer, Wabenplattenmaterial oder Zellstoffplattenmaterial umfasst.
13. Tragrahmen (100) nach Anspruch 1, **dadurch gekennzeichnet, dass** die Glasplatte (200) eine Symmetrieachse entlang der Querrichtung aufweist, wobei die erste Längsseite (221) und die zweite Längsseite (222) symmetrisch in Bezug auf die Symmetrieachse sind.
14. Tragrahmen (100) nach Anspruch 1, **dadurch gekennzeichnet, dass** die Glasplatte (200) ein Fahrzeugdachfenster oder eine Fahrzeugwindschutzscheibe ist.
15. Glastransportrahmen, **dadurch gekennzeichnet, dass** er eine Vielzahl von Tragrahmen gemäß dem Tragrahmen (100) nach einem der Ansprüche 1-14 umfasst, wobei die Vielzahl von Tragrahmen übereinander gestapelt ist.
16. Glastransportrahmen nach Anspruch 15, **dadurch gekennzeichnet, dass** er ferner einen Behälter umfasst, wobei die Vielzahl von Tragrahmen in dem Behälter angeordnet ist.
17. Zusammenstellung umfassend:

- einen Tragrahmen nach einem der Ansprüche 1 bis 14, und
- eine Glasplatte (200), die eine erste Längsseite (211), eine zweite Längsseite (212) gegenüber der ersten Längsseite (211) entlang einer Querrichtung, eine erste Längsseite (221) und eine zweite Längsseite (222) aufweist, die der ersten Längsseite (221) entlang einer Längsrichtung gegenüberliegt, wobei die erste Längsseite (211) eine Länge aufweist, die kleiner ist als eine Länge der zweiten Längsseite (212), wobei die Glasplatte (200) vorzugsweise eine Symmetrieachse entlang der Querrichtung aufweist, wobei die erste Querseite (221) und die zweite Querseite (222) in Bezug auf die Symmetrieachse symmetrisch sind.

Revendications

1. Cadre de support (100) pour porter une plaque de verre (200), dans lequel la plaque de verre (200) a un premier côté longitudinal (211), un deuxième côté longitudinal (212) opposé au premier côté longitudinal (211) le long une direction latérale, un premier côté latéral (221) et un deuxième côté latéral (222) opposé au premier côté latéral (221) le long d'une direction longitudinale, et le premier côté longitudinal (211) a une longueur inférieure à une longueur de la deuxième côté longitudinal (212), **caractérisé en ce que** :

le cadre de support (100) a une première concavité (110) et une deuxième concavité (120), dans lequel la première concavité (110) correspond à une forme de la plaque de verre (200) lorsque la plaque de verre (200) est placée dans un première orientation le long de la direction latérale, la deuxième concavité (120) la deuxième concavité (120) correspond à une forme de la plaque de verre (200) lorsque la plaque de verre (200) est placée dans une deuxième orientation opposée à la première orientation le long de la direction latérale, et la première concavité (110) et la deuxième concavité (120) la deuxième concavité (120) se chevauchent au moins partiellement.

2. Cadre de support (100) selon la revendication 1, **caractérisé en ce que**, le cadre de support (100) a une première portion d'extrémité longitudinale (131) s'étendant selon la direction longitudinale et une deuxième portion d'extrémité longitudinale (132) qui est opposée à la première portion d'extrémité longitudinale (131) le long de la direction latérale et séparée de la première portion d'extrémité longitudinale (131);

dans lequel la première concavité (110) comprend une première rainure longitudinale (111) et une seconde rainure longitudinale (112), la première rainure longitudinale (111) est située sur la première partie d'extrémité longitudinale (131) et correspond à une forme du premier côté longitudinal (211) de la plaque de verre (200) étant placé dans la première orientation, et la deuxième rainure longitudinale (112) est située sur la deuxième partie d'extrémité longitudinale (132) et correspond à une forme du deuxième côté longitudinal (212) de la plaque de verre (200) étant placée dans la première orientation ; et

dans lequel la deuxième concavité (120) la deuxième concavité (120) comprend une troisième rainure longitudinale (121) et une quatrième rainure longitudinale (122), la troisième rainure longitudinale (121) est située sur la première partie d'extrémité longitudinale (131) et correspond à une forme du deuxième côté longitudinal (212) de la plaque de verre (200) étant placé dans la deuxième orientation, et la quatrième rainure longitudinale (122) est située sur la deuxième partie d'extrémité longitudinale (132) et correspond à une forme du premier côté longitudinal (211) de la plaque de verre (200) étant placée dans la deuxième orientation.

3. Cadre de support (100) selon la revendication 2, **caractérisé en ce que**, la première portion d'extrémité longitudinale (131) et la deuxième portion d'extrémité longitudinale (132) sont identiques.

4. Cadre de support (100) selon la revendication 1, **caractérisé en ce que**, le cadre de support (100) comprend une première portion d'extrémité latérale (141) s'étendant selon la direction latérale et une deuxième portion d'extrémité latérale (142) qui est opposée à la première portion d'extrémité latérale (141) le long de la direction longitudinale et séparée de la première portion d'extrémité latérale (141);

dans lequel la première concavité (110) comprend une première rainure latérale (411) et une seconde rainure latérale (412), la première rainure latérale (411) est située sur la première partie d'extrémité latérale (141) et correspond à une forme du premier côté latéral (221) de la plaque de verre (200) étant placé dans la première orientation, et la deuxième rainure latérale (412) est située sur la deuxième partie d'extrémité latérale (142) et correspond à une forme du deuxième côté latéral (222) de la plaque de verre (200) étant placée dans la première orientation ; et

dans lequel la deuxième concavité (120) la deuxième concavité (120) comprend une troisième rainure latérale (421) et une quatrième rainure latérale (422), la troisième rainure latérale (421) est située sur la première partie d'extrémité latérale (141) et correspond à une forme du deuxième côté latéral (222) de la plaque de verre (200)

étant placé dans la deuxième orientation, et la quatrième rainure latérale (422) est située sur la deuxième partie d'extrémité latérale (142) et correspond à une forme du premier côté latéral (221) de la plaque de verre (200) étant placée dans la deuxième orientation.

5 5. Cadre de support (100) selon la revendication 4, **caractérisé en ce que**, la première portion d'extrémité latérale (141) et la deuxième portion d'extrémité latérale (142) sont identiques.

6. Cadre de support (100) selon la revendication 1, **caractérisé en ce que**, le cadre de support (100) comporte quatre parties de coin (151, 152, 153, 154) qui sont séparées les unes des autres et sont respectivement situées aux quatre coins de le cadre de support (100);

dans lequel les quatre parties de coin (151, 152, 153, 154) ont une première rainure (511), une deuxième rainure (512), une troisième rainure (513) et une quatrième rainure (514), respectivement, lorsque la plaque de verre (200) est placé dans la première orientation, la première rainure (511) correspond à une partie d'intersection du premier côté longitudinal (211) et du premier côté latéral (221) de la plaque de verre (200), la deuxième rainure (512) correspond à une portion d'intersection du premier côté longitudinal (211) et du deuxième côté latéral (222) de la plaque de verre (200), la troisième rainure (513) correspond à une portion d'intersection du deuxième côté longitudinal (212) et de la premier côté latéral (221) de la plaque de verre (200), la quatrième rainure (514) correspond à une partie d'intersection du deuxième côté longitudinal (212) et du deuxième côté latéral (222) de la plaque de verre (200), et la première rainure (511), la deuxième rainure (512), la troisième rainure (513) et la quatrième rainure (514) forment le premier concave (110); et

dans lequel les quatre parties de coin (151, 152, 153, 154) ont une cinquième rainure (521), une sixième rainure (522), une septième rainure (523) et une huitième rainure (524), respectivement, lorsque la plaque de verre (200) est placé dans la deuxième orientation, la cinquième rainure (521) correspond à une partie d'intersection du deuxième côté longitudinal (212) et du deuxième côté latéral (222) de la plaque de verre (200), la sixième rainure (522) correspond à une partie d'intersection du deuxième côté longitudinal (212) et du premier côté latéral (221) de la plaque de verre (200), la septième rainure (523) correspond à une partie d'intersection du premier côté longitudinal (211) et de la deuxième côté latéral (222) de la plaque de verre (200), la huitième rainure (524) correspond à une partie d'intersection du premier côté longitudinal (211) et du premier côté latéral (221) de la plaque de verre (200), et la cinquième rainure (521), la sixième rainure (522), la septième rainure (523) et la huitième rainure (524) forment la deuxième concavité (120).

7. Cadre de support (100) selon la revendication 6, **caractérisé en ce que**, les quatre parties de coin (151, 152, 153, 154) sont identiques.

8. Cadre de support (100) selon la revendication 1, **caractérisé en ce qu'il** comprend en outre une bosse (161) située sur une face avant du cadre support (100) et une fente (162) située sur une face arrière du cadre support (100), dans lequel une position de la bosse (161) correspond à une position de la fente (162) le long de la direction longitudinale et de la direction latérale.

9. Cadre de support (100) selon la revendication 1, **caractérisé en ce qu'il** comprend en outre un bloc tampon (190) situé sur une face arrière du cadre support (100), dans lequel le bloc tampon (190) a une hauteur inférieure à la fois à une profondeur de la première concavité (110) et une profondeur de la deuxième concavité (120).

10. Cadre de support (100) selon la revendication 1, **caractérisé en ce qu'il** comprend en outre un trou traversant (170), dans lequel le trou traversant (170) est situé sur la face arrière du cadre de support (100), laquelle position est adaptée pour correspondre à une position d'un ergot sur la plaque de verre (200).

11. Cadre de support (100) selon la revendication 1, **caractérisé en ce qu'il** comprend en outre une ouverture (180), dans laquelle l'ouverture (180) est située sur un bord du cadre support (100) et communique avec la première concavité (110) et/ou la deuxième concavité (120).

12. Cadre de support (100) selon la revendication 1, **caractérisé en ce qu'un** matériau du cadre de support (100) comprend du polystyrène expansible, du polyéthylène expansible, du polypropylène expansible, du polystyrène et du polyéthylène mixte polyfoam, du polyuréthane élastomère, du copolymère éthylène-acétate de vinyle, matériau de panneau en nid d'abeille ou matériau de panneau de pulpe.

13. Cadre de support (100) selon la revendication 1, **caractérisé en ce que**, la plaque de verre (200) a un axe de

symétrie selon la direction latérale, dans lequel le premier côté latéral (221) et le deuxième côté latéral (222) sont symétriques par rapport à l'axe de symétrie.

5 14. Cadre de support (100) selon la revendication 1, **caractérisé en ce que** la plaque de verre (200) est une pièce de toit de véhicule ou une pièce de pare-brise de véhicule.

10 15. Cadre de transport de verre, **caractérisé en ce qu'il** comprend une pluralité de cadres de support selon le cadre de support (100) de l'une quelconque des revendications 1 à 14, dans lequel la pluralité de cadres de support sont empilés les uns au-dessus des autres.

16. Cadre de transport de verre selon la revendication 15, **caractérisé en ce qu'il** comprend en outre un conteneur, dans lequel la pluralité de cadres de support est placée dans le conteneur.

15 17. Ensemble comprenant :

- un cadre de support selon l'une quelconque des revendications 1 à 14, et
- une plaque de verre (200) ayant un premier côté longitudinal (211), un deuxième côté longitudinal (212) opposé au premier côté longitudinal (211) selon une direction latérale, un premier côté latéral (221) et un deuxième côté latéral (222) opposé au premier côté latéral (221) selon une direction longitudinale, le premier côté longitudinal (211) ayant une longueur inférieure à une longueur du deuxième côté longitudinal (212), la plaque de verre (200) ayant préférentiellement un axe de symétrie le long de la direction latérale dans laquelle le premier côté latéral (221) et le deuxième côté latéral (222) sont symétriques par rapport à l'axe de symétrie.

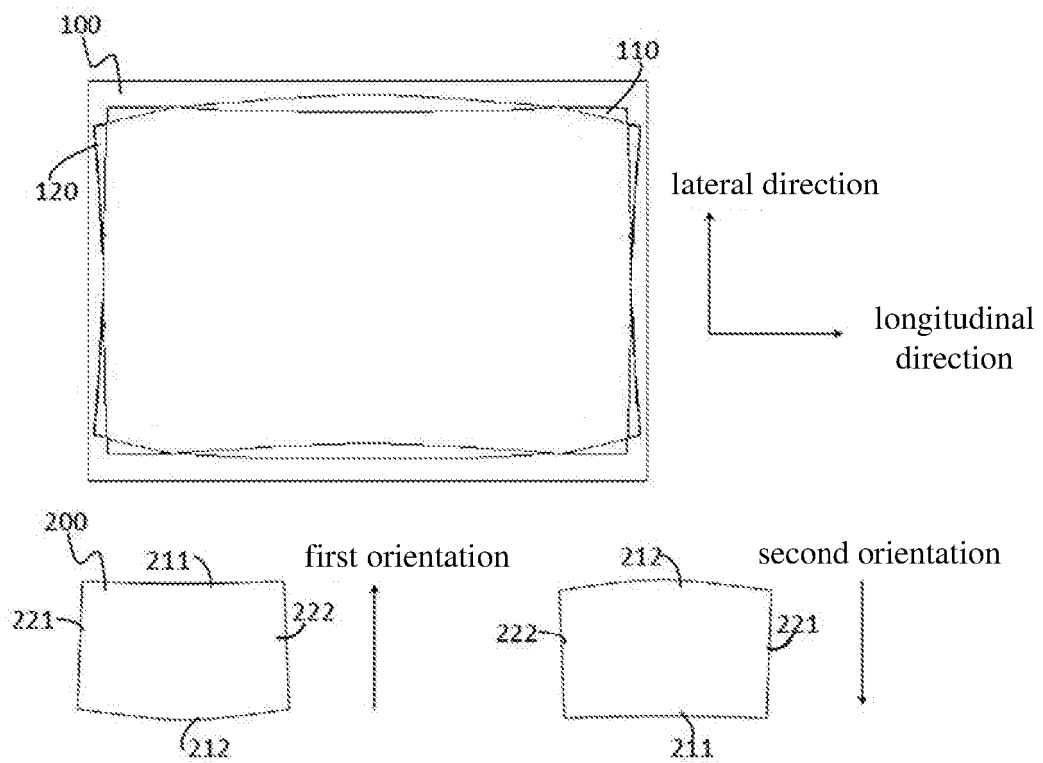


Figure 1

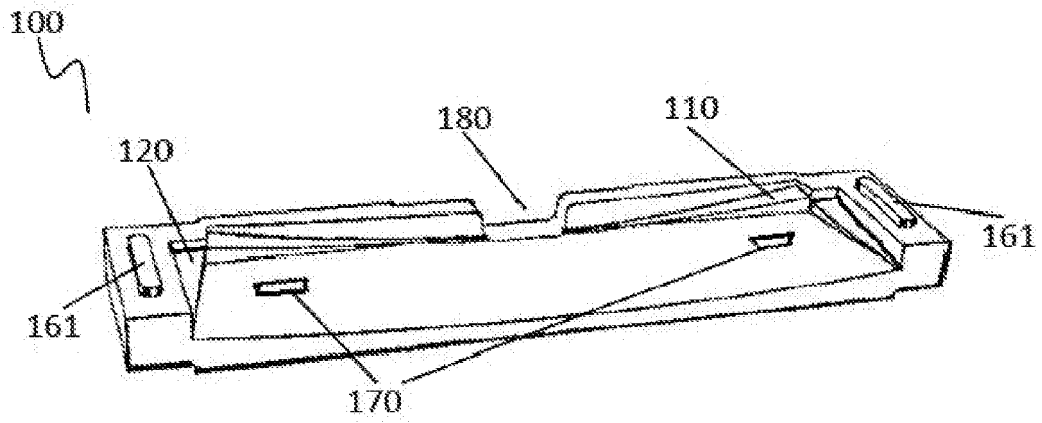


Figure 2a

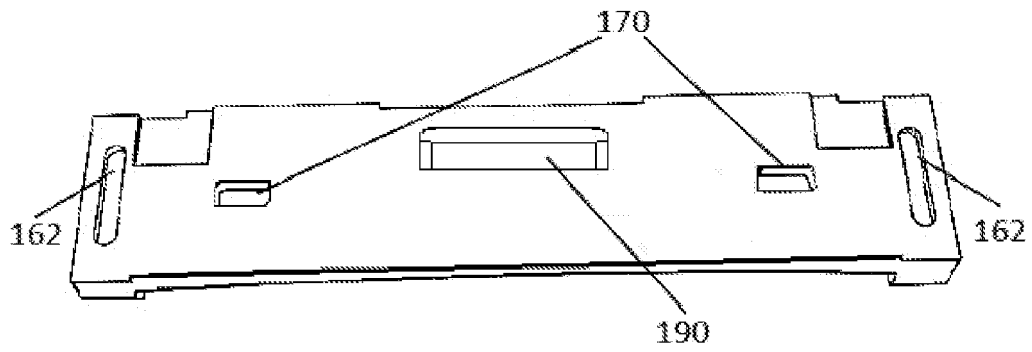


Figure 2b

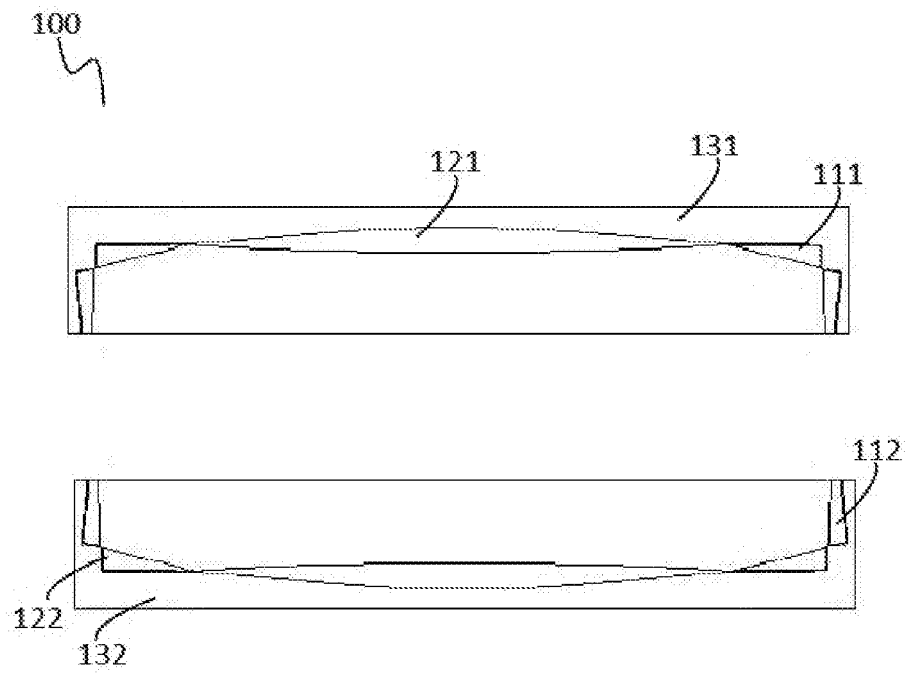


Figure 3

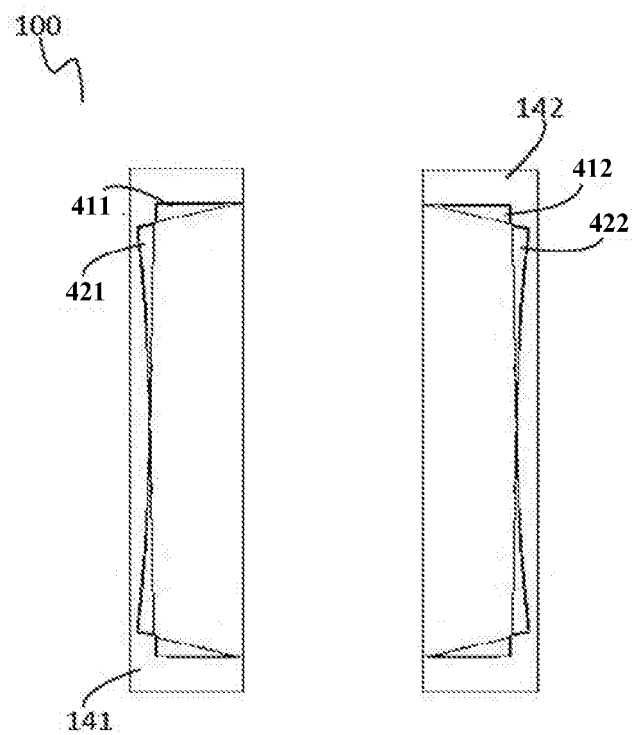


Figure 4

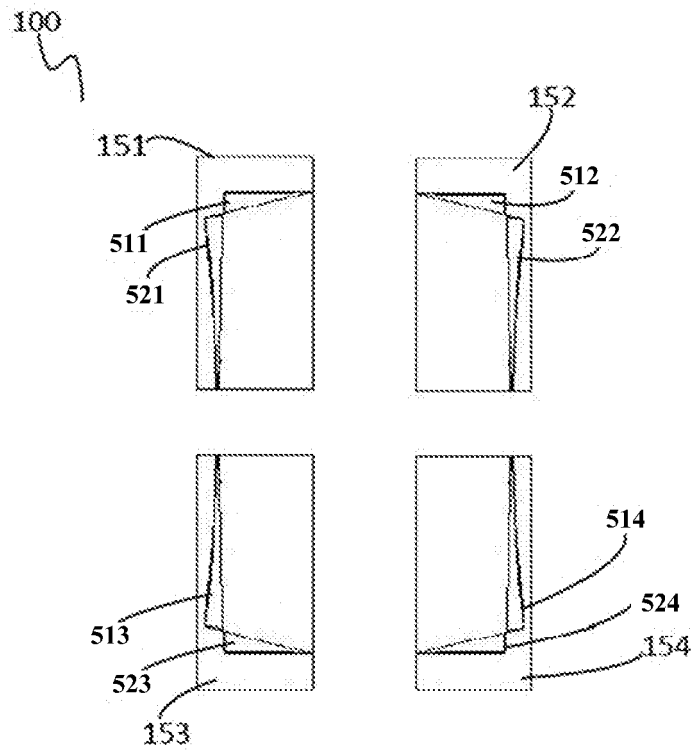


Figure 5

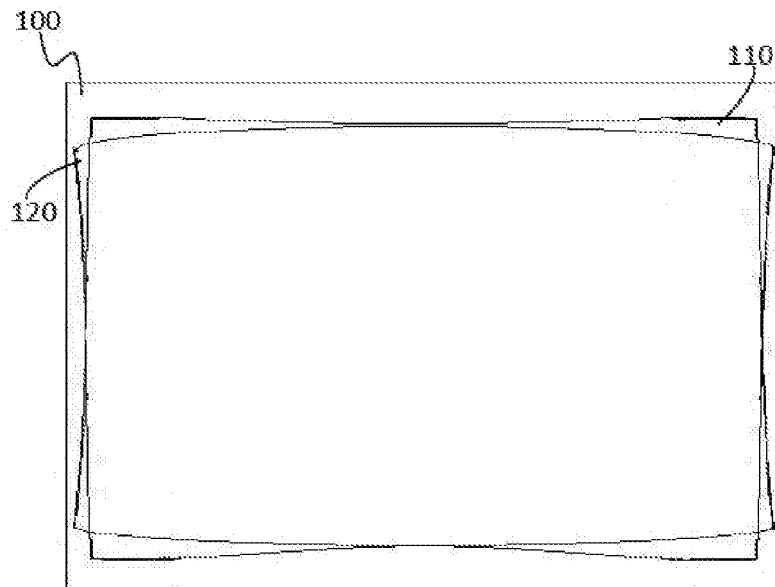


Figure 6

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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