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(54) **ARCHED ROOF DEVICE AND METHOD FOR PLACING THEREOF**

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**WO-A1-03/106780 AT-A4- 506 626
FR-A1- 2 948 953**

EP 3 284 875 B1

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Description

[0001] The present invention relates to an arched roof device intended for placing between two upstands, and particularly to roof constructions for use in barrel vault skylights and the like.

[0002] FR 2 948 953 in the name of Domeca SA describes an arched roof construction with a grid which is intended to prevent the covering of the roof construction being able to fall down in the case of an impact or in the case of fire.

[0003] AT 506626 A4 further discloses another arched roof device.

[0004] The Belgian patent with publication number BE 1017118 and the Belgian patents with application numbers BE 2012/0438 and BE 2013/0865 in the name of the Applicant further describe roof devices of the type stated in the preamble.

[0005] The present invention has for its object to propose an improved arched roof device which can be placed in simple manner, and is particularly suitable for longer roof constructions and provides protection against persons falling through.

[0006] The present invention provides for this purpose an arched roof device according to claim 1, intended for placing between a first and a second upstand, which comprises a first and a second receiving structure, a first and second transverse arch lying therebetween, a first wire grid and a covering. The first and second receiving structure extend in a longitudinal direction to respectively the first and second upstand. The first and second transverse arches, oriented in a transverse direction, are each provided with an arched wire receiving channel extending in the transverse direction. The first wire grid has a first transverse wire which is slid in the wire receiving channel of the first transverse arch and a second transverse wire which is slid in the wire receiving channel of the second transverse arch. The covering is arranged above the first wire grid.

[0007] By making use of a wire grid which is slidable with its transverse edges in a first and second wire receiving channel of first and second transverse arches the roof construction can be assembled in simple manner, also for long constructions in which two and more grids and three and more transverse arches can then be used.

[0008] In an advantageous embodiment at least two wire grids (comprising said first wire grid) are arranged adjacently of each other as seen in the longitudinal direction. In such an embodiment at least three transverse arches (comprising said first and second transverse arch) are provided. Each wire grid is then provided with a first transverse wire which is slid in the wire receiving channel of a first transverse arch and a second transverse wire which is slid in the wire receiving channel of a second transverse arch. In such an embodiment the transverse arches are preferably provided with two wire receiving channels for receiving a transverse wire of a first wire grid and a transverse wire of a second grid situated ad-

jacently thereof.

[0009] Each wire grid comprises a plurality of transverse wires and a plurality of longitudinal wires attached thereto. The first and second wire receiving channel are then preferably provided with an arched slot, oriented in the transverse direction, through which the plurality of longitudinal wires protrude outward, wherein the height of the slot is greater than the thickness of a longitudinal wire and smaller than the sum of the thickness of the longitudinal wire and the transverse wire. A transverse wire is in this way anchored in the wire receiving channel.

[0010] The first and second wire receiving channel are preferably each formed with a hook-like element which extends partially over the first and second transverse wire such that the first and second transverse wire remain anchored in the first and second wire receiving channel in the case of an impact on the covering. The hook-like element preferably adjoins the slot. The hook-like element is for instance formed by an upright wall which is directed inward on an upper end, over the first/second transverse wire present in the first/second wire receiving channel.

[0011] In an embodiment a transverse arch is provided with a separating part between mutually adjacent transverse edges of mutually adjacent plates forming the covering. A wire receiving channel can be provided on either side of the separating part for the purpose of receiving mutually adjacent transverse wires of mutually adjacent wire grids.

[0012] In an embodiment the covering has a first and a second longitudinal edge which are attached in or to respectively the first and second receiving structure. The first wire grid can further comprise a first and second longitudinal wire which are received in respectively the first and second receiving structure.

[0013] In an embodiment each receiving structure is formed as a longitudinal profile with a support flange which supports on the respective upstand, a longitudinal channel for receiving the respective longitudinal edge of the covering, and with a connecting flange between the support flange and the longitudinal channel for the purpose of forming an intermediate space in which the respective outer end of each transverse arch is received. Such a receiving structure has the advantage that a good anchoring of the different roof elements is possible on the upstand.

[0014] In an embodiment the covering comprises at least a first and a second plate, preferably a plastic plate, arranged mutually adjacently in the longitudinal direction, and an elongate sealing profile is provided for sealing a space between a transverse edge of the first plate and a transverse edge of the second plate. The sealing profile is formed with an elongate upper flange which extends over the space between said transverse edge of the first plate and said transverse edge of the second plate. A first outer end of the sealing profile is attached to the first receiving structure and a second outer end of the sealing profile is attached to the second receiving structure. In

this way a good seal is obtained and the plates are further secured between the first and second receiving structure. Further advantageous embodiments are described in the dependent claims.

[0015] According to a second aspect of the invention, a method according to claim 13 is provided for placing an arched roof device between a first and a second upstand. The method comprises the following steps. An elongate first receiving structure is mounted on a first upstand and, parallel thereto, an elongate second receiving structure is mounted on a second upstand. At least a first and second transverse arch, oriented in a transverse direction, are provided between the first and the second receiving structure, wherein each transverse arch comprises a transversely extending arched wire receiving channel. A first transverse wire of a first wire grid is slid in the wire receiving channel of the first transverse arch and a second transverse wire of the first wire grid is slid in the wire receiving channel of the second transverse arch. A covering is arranged over the first wire grid.

[0016] In an embodiment at least two wire grids (comprising the first wire grid) are arranged mutually adjacently as seen in the longitudinal direction. At least three transverse arches (comprising the first and the second transverse arch) are provided between the first and the second receiving structure, and for each wire grid a first transverse wire thereof is slid in the wire receiving channel of a transverse arch of the at least three transverse arches, and a second transverse wire is slid in a wire receiving channel of another transverse arch of the at least three transverse arches.

[0017] A first longitudinal edge of the covering is preferably attached in or to the first receiving structure and a second longitudinal edge thereof in or to the second receiving structure. Arranging of the covering preferably comprises of: arranging a first plate in an arc between the first and the second upstand, wherein a first longitudinal edge of the first plate is arranged in the first receiving structure and a second longitudinal edge of the first plate is arranged in the second receiving structure; arranging a second plate in an arc between the first and the second upstand, wherein a first longitudinal edge of the second plate is arranged in the first receiving structure and a second longitudinal edge of the second plate is arranged in the second receiving structure; arranging an elongate sealing profile for the purpose of sealing a space between a transverse edge of the first plate and an adjacent transverse edge of the second plate, wherein the sealing profile is formed with an elongate upper flange which is arranged over the space between said transverse edges; and attaching a first outer end of the sealing profile to the first receiving structure and a second outer end of the sealing profile to the second receiving structure.

[0018] The present invention will be further elucidated on the basis of a number of non-limitative exemplary embodiments of an arched roof construction according to the invention with reference to the accompanying drawings, in which:

Figure 1 illustrates a cut-away perspective view of an embodiment of an arched roof device;

Figure 2 illustrates a cross-section of an embodiment of a transverse arch of an arched roof device;

Figure 2A shows a detail view of figure 2;

Figure 3 illustrates a cross-section of an embodiment of a receiving structure of an arched roof device;

Figure 3A shows a detail view of figure 3;

Figure 4 illustrates a cross-section of an embodiment of a transverse arch with covering; and

Figure 5 illustrates a cross-section of an embodiment of a transverse arch with bracket.

[0019] Figure 1 illustrates an embodiment of a part of an arched roof device between a first upstand O and a second upstand (not shown, but similar to the upstand O). The roof device comprises a first receiving structure, oriented in a longitudinal direction L, in the form of a first longitudinal profile 400 on the first upstand O, a second receiving structure, oriented in the longitudinal direction L, in the form of a second longitudinal profile on the second upstand (not shown), a plurality of transverse arches 200 (only one of which is shown in figure 1) oriented in a transverse direction D, a first and second grid 100 and a covering 300. Covering 300 extends in an arc between the first upstand O and the second upstand.

[0020] The transverse arch shown in figure 1 extends between the first and the second receiving structure. Transverse arch 200 is provided on either side with a transversely extending arched wire receiving channel 210, see also figure 2. Each wire grid 100 has on a first transverse edge a first transverse wire 110 which is slid in a corresponding wire receiving channel 210 of a first transverse arch 200 and on a second transverse edge a second transverse wire which is slid in a wire receiving channel of a second transverse arch (not shown).

[0021] Although figure 1 shows only one transverse arch 200, the skilled person will appreciate that three transverse arches 200 are preferably provided for two wire grids 100. The skilled person will further appreciate that transverse arches can be provided on either side with a transversely extending arched wire receiving channel 210, but that it is also possible to provide a wire receiving channel 210 on one side only. This latter is particularly the case for transverse arches situated at an end of the roof device, where only one transverse wire 110 need be received. Instead of one transverse arch 200 with two wire receiving channels 210, it is however also possible to provide two transverse arches 200, each with one receiving channel 210, between two adjacent wire grids 100 in figure 1.

[0022] Wire grid 100 comprises a plurality of transverse wires 110, 111 and a plurality of longitudinal wires 120, 121 attached thereto. In the shown example the plurality of longitudinal wires 120, 121 lie above the plurality of transverse wires 110, 111, and these wires 110, 111, 120, 121 are welded to each other at the intersections between the longitudinal and transverse wires. The wires

of the wire grids are preferably manufactured from metal, such as steel, still more preferably from stainless steel.

[0023] Transverse arch 200 is shown in more detail in figure 2 and figure 2A. Transverse arch 200 comprises a middle part 220 which is provided on the underside with a left-hand and right-hand wire receiving channel 210 in which is received a transverse wire 110 of respectively a left-hand and right-hand wire grid 100, these arranged adjacently of each other. Wire receiving channel 210 is here a substantially U-shaped channel with a first side wall 211 which is attached to middle part 220, a lower wall 212 and a second side wall 213. Wire receiving channel 210 is delimited on the upper side by an upper wall 214 which forms part of middle part 220. Extending between upper wall 214 and second side wall 213 is an arched slot 216, oriented in the transverse direction, through which the plurality of longitudinal wires 120, 121 protrude outward. The height h of slot 216 is greater than the thickness d_1 of a longitudinal wire and is smaller than the sum of the thickness of the longitudinal wire d_1 and the thickness of the transverse wire d_g . Transverse wire 110 is in this way anchored in wire receiving channel 210. Wire receiving channel 210 is further formed with a hook-like element 213, 215 which extends partially over transverse wire 110 such that transverse wire 110 remains anchored in wire receiving channel 210 in the case of an impact on the covering. The hook-like element is formed by the side wall 213 which is directed inward at an upper end 215, over the transverse wire 110 present in wire receiving channel 210.

[0024] Transverse arch 200 is further provided with a separating part 230 which extends upward from middle part 220 and is intended to form a separation between adjacent transverse edges 310 of a first and second plate 300, wherein these plates 300 form the covering. Plates 300 are typically plastic plates, and for instance multi-walled plastic plates. Plates 300 are preferably manufactured from a material from the group of: polycarbonate, acrylate and other thermoplastics. The plates are preferably flexible such that they can be bent in the transverse direction into a radius of curvature of at least 10 metres.

[0025] An elongate sealing profile 500 is provided for sealing a space between a transverse edge 310 of first plate 300 and a transverse edge 310 of second plate 300. Sealing profile 500 is formed with an elongate upper flange 510 which extends over the space between the transverse edge 310 of first plate 300 and the transverse edge 310 of second plate 300. A first outer end of sealing profile 500 is attached to the first longitudinal profile 400 and a second outer end of sealing profile 500 is attached to the second longitudinal profile. Provided for this purpose on the underside of upper flange 510 is a screw channel 560 in which a bolt 610, which runs through an opening in longitudinal profile 400, is tightened on both outer ends, see figure 3. Sealing profile 500 can in this way be tensioned in an arc between the first upstand and the second upstand.

[0026] Separating part 230 of transverse arch 200 is

here formed by two upright walls 231, 232 and screw channel 560 is dimensioned so as to be receivable between upright walls 231, 232. A good positioning of sealing profile 500 is ensured in this way.

[0027] Middle part 220 of transverse arch 200 is provided on its underside with a transversely running screw channel 260 in which a bolt 620, which runs through an opening in longitudinal profile 400, is tightened on both outer ends, see figure 3. Transverse arch 200 can in this way be further secured between the first upstand and the second upstand. These bolts 620 are optional.

[0028] Other possible embodiments of sealing profiles 500 are described in the Belgian patent application BE 2016/5060. The sealing profile can more particularly be an elongate profile manufactured from plastic. The sealing profile can for instance be formed with an elongate upper flange, an elongate lower flange, a connecting flange and an elongate screw receiving channel. The elongate upper flange extends over the space between the edges of the plates and co-acts in sealing manner with an upper side of the first plate and an upper side of the second plate. The upper flange can comprise close to a first edge and close to a second edge sealing strips configured to co-act in sealing manner with the upper side of the first and second plates. In an advantageous embodiment the sealing profile is manufactured from the same material as the plates such that the coefficients of expansion of the plates and of the sealing profile are the same. The plates and the sealing profile can thus for instance both be manufactured by extrusion from a polycarbonate material. The sealing strips can then be coextruded, wherein a well sealing material is chosen for the sealing strips, preferably a soft plastic such as a thermoplastic elastomer (TPE).

[0029] The first longitudinal profile 400 is intended for the purpose of receiving a first longitudinal edge 320 of a plate 300 and of receiving a longitudinal edge formed by the first longitudinal wire 120 of grid 100. The second receiving profile (not shown) is similarly intended for the purpose of receiving a second longitudinal edge of the plate and of receiving a second longitudinal wire of the grid. Longitudinal profile 400 is here an extrusion profile which is formed with a longitudinal channel 420 with an upper wall 421, a lower wall 422 and a side wall 423. These walls are dimensioned such that a longitudinal edge 320 of a plate 300 fits between upper wall 421 and lower wall 422, see also figure 3A. An outer end of screw channel 560 further also fits in this longitudinal channel 420, and bolt 610 protrudes through an opening in side wall 423. A longitudinal edge 320 of a plate 300 can thus be firmly secured in the longitudinal channel 420 of longitudinal profile 400. The longitudinal profile further comprises a longitudinally running support flange 430 which supports on the upstand O. The outer ends of transverse arches 200 are supported on this support flange 430. Provided between support flange 430 and longitudinal channel 420 is an intermediate space 450 for longitudinal wires 120 and the outer ends of transverse arches 200.

Support flange 430 is connected to longitudinal channel 420 by means of a connecting flange 460. The outer end of screw channel 260 is situated in intermediate space 450 and the optional bolt 620 protrudes through an opening in connecting flange 460.

[0030] Figure 4 illustrates a further embodiment of a transverse arch 200. The transverse arch comprises a middle part 220 which is provided on the upper side with a left-hand and right-hand wire receiving channel 210 in which is received a transverse wire 110 of respectively a left-hand and right-hand wire grid 100. Wire receiving channel 210 is here a substantially U-shaped channel with a first side wall 211 which is attached to middle part 220, an upper wall 212 and a second side wall 213. Wire receiving channel 210 is delimited on the underside by a lower wall 214 which forms part of middle part 220. Extending between lower wall 214 and second side wall 213 is an arched slot 216, oriented in the transverse direction, through which the plurality of longitudinal wires 120, 121 protrude outward. Just as in the variant of figure 2A, the height of slot 216 is greater than the thickness of a longitudinal wire and smaller than the sum of the thickness of the longitudinal wire and the thickness of the transverse wire. Wire receiving channel 210 can optionally be formed with a hook-like element (not shown) which extends partially over the transverse wire such that the transverse wire remains anchored in the wire receiving channel in the case of an impact on the covering. Middle part 220 of transverse arch 200 is further provided on its upper side with a transversely running screw channel 260 in which a bolt, which runs through an opening in the longitudinal profile 400, can be tightened on both outer ends in a manner similar to the manner described above with reference to figure 3. Transverse arch 200 can in this way be further secured between the first upstand and the second upstand.

[0031] The variant of figure 4 further comprises an elongate sealing profile 500 for the purpose of sealing a space between a first transverse edge 310 of a first plate 300 and a transverse edge 310 of a second plate 300. Sealing profile 500 is formed with an elongate upper flange 510 which extends over the space between transverse edge 310 of the first plate 300 and transverse edge 310 of the second plate 300. A first outer end of sealing profile 500 is attached to first longitudinal profile 400 and a second outer end of sealing profile 500 is attached to the second longitudinal profile. Provided for this purpose on the upper side of upper flange 510 is a screw channel 560 in which a bolt, which runs through an opening in longitudinal profile 400, can be tightened on both outer ends in a manner similar to the manner illustrated with reference to figure 3. Sealing profile 500 can in this way be tensioned in an arc between the first upstand and the second upstand. The elongate upper flange 510 is further provided on the underside thereof, substantially in the centre, with a downward directed dividing wall 530, on the outer end of which a support flange 540 is provided. A transverse edge 310 can in this way be received be-

tween the elongate upper flange 510 and the elongate support flange 540. For a good sealing the upper flange 510 can be provided on the underside with elongate sealing strips 511, which can optionally be formed by co-extrusion. Support flange 540 can be provided in similar manner with sealing strips 541, which are configured to engage against the underside of the first and second plate 300.

[0032] Figure 5 illustrates a cross-section of a transverse arch 200 which is similar to the transverse arch 200 shown in figure 2A, with the difference that a bracket 700 is provided around wire receiving channel 210. Such brackets 700 can be provided at different positions as seen in the transverse direction D. These brackets 700 provide for an additional strengthening and can prevent wire receiving channels 210 from opening by bending in the case of an impact. Brackets 700 can for instance be secured with screws 710 for the purpose of attaching brackets 700 to the side wall 211 of wire receiving channel 210.

[0033] Embodiments of the invention are typically used in so-called barrel vault skylights, wherein a number of multi-walled plastic plates can be arranged mutually adjacently in transverse direction between a first and a second upstand. Several layers of plates are herein often arranged one above the other, and the covering can for instance also comprise an arched plate manufactured from a composite material. The skilled person will appreciate that the invention is not limited to the above described exemplary embodiments and that many modifications and equivalent embodiments are possible within the scope of the invention, which is defined solely by the following claims.

Claims

1. Arched roof device intended for placing between a first and a second upstand (O), comprising:
 - an elongate first receiving structure (400), oriented in a longitudinal direction (L), on the first upstand;
 - an elongate second receiving structure, oriented in the longitudinal direction, on the second upstand;
 - at least a first and second transverse arch (200), oriented in a transverse direction (D), between the first and the second receiving structure (400), wherein each transverse arch (200) is provided with an arched wire receiving channel (210) extending in the transverse direction;
 - at least a first wire grid (100) with a first transverse wire (110) which is slid in the wire receiving channel (210) of the first transverse arch (200) and a second transverse wire which is slid in the wire receiving channel of the second transverse arch;

- a covering (300) arranged above the first wire grid (100).
2. Arched roof device according to claim 1, wherein at least two wire grids (100), comprising the first wire grid, are arranged adjacently of each other as seen in the longitudinal direction; wherein at least three transverse arches (200), comprising the first and the second transverse arch, are provided; and wherein each wire grid (100) of at least two wire grids is provided with a first transverse wire (110) which is slid in the wire receiving channel (210) of a transverse arch (200) of the at least three transverse arches and a second transverse wire (110) which is slid in the second wire receiving channel (210) of a transverse arch (200) of the at least three transverse arches.
 3. Arched roof device according to the foregoing claim, wherein a transverse arch (200) of the at least three transverse arches is provided with a separating part (230) and wherein a wire receiving channel (210) is provided on either side of the separating part (230) for the purpose of receiving mutually adjacent transverse wires (110) of mutually adjacent wire grids (100) of the at least two wire grids.
 4. Arched roof device according to the foregoing claim, wherein the covering comprises at least two plates (300) lying mutually adjacently in a longitudinal direction, and wherein the separating part (230) lies between mutually adjacent transverse edges of two mutually adjacent plates.
 5. Arched roof device according to any of the foregoing claims, wherein each wire grid (100) comprises a plurality of transverse wires (110, 111) and a plurality of longitudinal wires (120, 121) attached thereto; and wherein the first and second wire receiving channel (210) are provided with an arched slot (216), oriented in the transverse direction, through which the plurality of longitudinal wires (120, 121) protrude outward, wherein the height (h) of the slot (216) is greater than the thickness of a longitudinal wire (d_1) and is smaller than the sum of the thickness of the longitudinal wire (d_1) and the transverse wire (d_2).
 6. Arched roof device according to any of the foregoing claims, wherein the first and second wire receiving channel (210) are each formed with a hook-like element (213, 215) which extends partially over the first and second transverse wire (110) such that the first and second transverse wire (110) remain anchored in the first and second wire receiving channel (210) in the case of an impact on the covering.
 7. Arched roof device according to claim 5 and 6, wherein the hook-like element (213, 215) is adjacent to the slot (216).
 8. Arched roof device according to claim 6 or 7, wherein each hook-like element (213, 215) is formed by an upright wall (213) which is directed inward on an upper end (215), over the first/second transverse wire (110) present in the first/second wire receiving channel (210).
 9. Arched roof device according to any of the foregoing claims, wherein the covering (300) has a first and a second longitudinal edge (320) which are attached in or to respectively the first and second receiving structure; and/or wherein the first wire grid (100) comprises a first and second longitudinal wire (120, 121) which are received in the first and second receiving structure (400).
 10. Arched roof device according to the foregoing claim, wherein the first and second receiving structure (400) are formed as a first and second longitudinal profile, each with a support flange (430) which supports on respectively the first and second upstand, a longitudinal channel (420) for receiving respectively a first and second longitudinal edge (320) of the covering, and with a connecting flange (460) between the support flange (430) and the longitudinal channel (420) for the purpose of forming an intermediate space (450) in which respectively a first and second outer end of each transverse arch (200) is received.
 11. Arched roof device according to any of the foregoing claims, wherein the covering comprises at least a first and a second plate (300), arranged mutually adjacently in the longitudinal direction, and an elongate sealing profile (500) is provided for sealing a space between a transverse edge (310) of the first plate (300) and a transverse edge of the second plate; which sealing profile (500) is formed with an elongate upper flange (510) which extends over the space between said transverse edge (310) of the first plate and said transverse edge (310) of the second plate; and wherein a first outer end of the sealing profile (500) is attached to the first receiving structure (400) and a second outer end of the sealing profile (500) is attached to the second receiving structure.
 12. Arched roof device according to any of the foregoing claims, **characterized in that** the wire grid (100) is manufactured from metal, preferably steel, still more preferably stainless steel; and/or that the covering (300) comprises a multi-walled plastic plate; and/or that the covering is manufactured from a material from the group of: polycarbonate, acrylate and other thermoplastics; and/or that the covering is flexible such that it can be bent in the transverse direction into a radius of curvature of at least 10 metres.

13. Method for placing an arched roof device between a first and a second upstand (O), comprising of:

- arranging an elongate first receiving structure (400), on the first upstand (O) and, parallel thereto, an elongate second receiving structure on the second upstand; 5
- providing at least a first and second transverse arch (200), oriented in a transverse direction (D), between the first and the second receiving structure (400), wherein each transverse arch (200) is provided with a transversely extending arched wire receiving channel (210); 10
- sliding a first transverse wire (110) of a first wire grid (100) in the wire receiving channel (210) of the first transverse arch (200) and a second transverse wire (110) of the first wire grid (100) in the wire receiving channel (210) of the second transverse arch; 15
- arranging a covering (300) over the first wire grid (100). 20

14. Method according to the foregoing claim, wherein at least two wire grids, comprising the first wire grid, are arranged mutually adjacently as seen in the longitudinal direction (L); wherein at least three transverse arches (200), comprising the first and the second transverse arch, are provided between the first and the second receiving structure; and wherein for each wire grid (100) of the at least two wire grids a first transverse wire (110) is slid in a wire receiving channel (210) of a transverse arch (200) of the at least three transverse arches, and a second transverse wire is slid in a wire receiving channel of another transverse arch of the at least three transverse arches; and/or wherein a first longitudinal edge (320) of the covering (300) is preferably attached in or to the first receiving structure (400) and a second longitudinal edge (320) thereof is attached in or to the second receiving structure. 25 30 35 40

15. Method according to the foregoing claim, wherein arranging of the covering comprises of:

- arranging a first plate (300) in an arc between the first and the second upstand, wherein a first longitudinal edge (320) of the first plate is arranged in the first receiving structure (400) and a second longitudinal edge of the first plate is arranged in the second receiving structure; 45 50
- arranging a second plate (300) in an arc between the first and the second upstand, wherein a first longitudinal edge (320) of the second plate is arranged in the first receiving structure (400) and a second longitudinal edge (320) of the second plate is arranged in the second receiving structure; 55
- arranging an elongate sealing profile (500) for

the purpose of sealing a space between a transverse edge (310) of the first plate and an adjacent transverse edge (310) of the second plate, wherein the sealing profile (500) is formed with an elongate upper flange (510) which is arranged over the space between said transverse edges;

- attaching a first outer end of the sealing profile (500) to the first receiving structure (400) and a second outer end of the sealing profile (500) to the second receiving structure.

Patentansprüche

1. Gewölbte Dachvorrichtung, die für die Anordnung zwischen einer ersten und einer zweiten Aufkantung (O) gedacht ist, die aufweist:

- eine längliche erste Aufnahmestruktur (400), die in einer Längsrichtung (L) auf der ersten Aufkantung orientiert ist;
- eine längliche zweite Aufnahmestruktur, die in der Längsrichtung auf der zweiten Aufkantung orientiert ist;
- wenigstens einen ersten und zweiten Querriegel (200), die in einer Querrichtung (D) zwischen der ersten und der zweiten Aufnahmestruktur (400) orientiert sind, wobei jeder Querriegel (200) mit einem Bogendrahtaufnahmekanal (210) versehen ist, der sich in der Querrichtung erstreckt;
- wenigstens ein erstes Drahtgitter (100) mit einem ersten Querdraht (110), der in dem Drahtaufnahmekanal (210) des ersten Querriegels (200) verschoben wird, und einem zweiten Querdraht, der in dem Drahtaufnahmekanal des zweiten Querriegels verschoben wird;
- eine Abdeckung (300), die über dem ersten Drahtgitter (100) angeordnet ist.

2. Gewölbte Dachvorrichtung nach Anspruch 1, wobei wenigstens zwei Drahtgitter (100), die das erste Drahtgitter aufweisen, in der Längsrichtung gesehen benachbart zueinander angeordnet sind, wobei wenigstens drei Querriegel (200), die den ersten und den zweiten Querriegel aufweisen, bereitgestellt sind; und wobei jedes Drahtgitter (100) der wenigstens zwei Drahtgitter mit einem ersten Querdraht (110), der in dem Drahtaufnahmekanal (210) eines Querriegels (200) der wenigstens drei Querriegel verschoben wird, und einem zweiten Querdraht (110) versehen ist, der in dem zweiten Drahtaufnahmekanal (210) eines Querriegels (200) der wenigstens drei Querriegel verschoben wird.
3. Gewölbte Dachvorrichtung nach dem vorhergehenden Anspruch, wobei der Querriegel (200) der we-

- nigstens drei Querriegel mit einem Trennteil (230) versehen ist, und wobei ein Drahtaufnahmekanal (210) auf beiden Seiten des Trennteils (230) zu dem Zweck bereitgestellt ist, wechselseitig benachbarte Querdrähte (110) von wechselseitig benachbarten Drahtgittern (100) der wenigstens zwei Drahtgitter aufzunehmen.
4. Gewölbte Dachvorrichtung nach dem vorhergehenden Anspruch, wobei die Abdeckung wenigstens zwei Platten (300) aufweist, die in einer Längsrichtung wechselseitig benachbart liegen, und wobei der Trennteil (230) zwischen wechselseitig benachbarten Querrändern wechselseitig benachbarter Platten liegt.
 5. Gewölbte Dachvorrichtung nach einem der vorhergehenden Ansprüche, wobei jedes Drahtgitter (100) mehrere Querdrähte (110, 111) und mehrere daran befestigte Längsdrähte (120, 121) aufweist; und wobei der erste und der zweite Drahtaufnahmekanal (210) mit einem in der Querrichtung orientierten gewölbten Schlitz (216) versehen sind, durch den die mehreren Längsdrähte (120, 112) nach außen vorstehen, wobei die Höhe (h) des Schlitzes (216) größer als die Dicke eines Längsdrahts (d_1) ist und kleiner als die Summe der Dicke des Längsdrahts (d_1) und des Querdrahts (d_d) ist.
 6. Gewölbte Dachvorrichtung nach einem der vorhergehenden Ansprüche, wobei der erste und der zweite Drahtaufnahmekanal (210) jeweils mit einem hakenartigen Element (213, 215) ausgebildet sind, das sich teilweise über den ersten und zweiten Querdraht (110) erstreckt, so dass der erste und der zweite Querdraht (110) in dem Fall eines Aufpralls auf die Abdeckung in dem ersten und zweiten Drahtaufnahmekanal (210) verankert bleiben.
 7. Gewölbte Dachvorrichtung nach Anspruch 5 und 6, wobei das hakenartige Element (213, 215) benachbart zu dem Schlitz (216) ist.
 8. Gewölbte Dachvorrichtung nach Anspruch 6 oder 7, wobei jedes hakenartige Element (213, 215) durch eine aufrechte Wand (213), die auf einem oberen Ende (215) über den ersten/zweiten Querdraht (110), der in dem ersten/zweiten Drahtaufnahmekanal (210) vorhanden ist, einwärts gerichtet ist.
 9. Gewölbte Dachvorrichtung nach einem der vorhergehenden Ansprüche, wobei die Abdeckung (300) einen ersten und einen zweiten Längsrand (320) hat, die jeweils in oder an der ersten und zweiten Aufnahmestruktur befestigt sind; und/oder wobei das erste Drahtgitter (100) einen ersten und zweiten Längsdraht (120, 121), die in der ersten und zweiten Aufnahmestruktur (400) aufgenommen sind, aufweist.
 10. Gewölbte Dachvorrichtung nach dem vorhergehenden Anspruch, wobei die erste und zweite Aufnahmestruktur (400) ausgebildet sind als ein erstes und zweites Längsprofil jeweils mit einem Trägerflansch (430), der jeweils auf der ersten und zweiten Aufkantung lagert, ein Längskanal (420) zum jeweiligen Aufnehmen eines ersten und zweiten Längsrandes (320) der Abdeckung und mit einem Verbindungsflansch (460) zwischen dem Trägerflansch (430) und dem Längskanal (420) zu dem Zweck des Ausbildens eines Zwischenraums (450), in dem jeweils ein erstes und zweites äußeres Ende jedes Querriegels (200) aufgenommen wird.
 11. Gewölbte Dachvorrichtung nach einem der vorhergehenden Ansprüche, wobei die Abdeckung wenigstens eine erste und eine zweite Platte (300), die in der Längsrichtung wechselseitig benachbart angeordnet sind, aufweist, und wobei ein längliches Dichtungsprofil (500) zum Abdichten eines Raums zwischen einem Querrand (310) der ersten Platte (300) und einem Querrand der zweiten Platte bereitgestellt ist; wobei das Dichtungsprofil (500) mit einem länglichen oberen Flansch (510) ausgebildet ist, der sich über den Raum zwischen dem Querrand (310) der ersten Platte und dem Querrand (310) der zweiten Platte erstreckt; und wobei ein erstes äußeres Ende des Dichtungsprofils (500) an der ersten Aufnahmestruktur (400) befestigt ist, und ein zweites äußeres Ende des Dichtungsprofils (500) an der zweiten Aufnahmestruktur befestigt ist.
 12. Gewölbte Dachvorrichtung nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** das Drahtgitter (100) aus Metall, vorzugsweise Stahl, noch bevorzugter nichtrostendem Stahl, hergestellt ist; und/oder dass die Abdeckung (300) eine mehrwandige Kunststoffplatte aufweist; und/oder dass die Abdeckung aus einem Material aus der Gruppe von Polycarbonat, Acrylat und anderen Thermoplasten hergestellt ist; und/oder dass die Abdeckung flexibel ist, so dass sie in der Querrichtung in einen Krümmungsradius von wenigstens 10 Metern gekrümmt werden kann.
 13. Verfahren zum Anordnen einer gewölbten Dachvorrichtung zwischen einer ersten und einer zweiten Aufkantung (O), das aufweist:
 - Einrichten einer länglichen ersten Aufnahmestruktur (400) auf der ersten Aufkantung (O) und parallel dazu einer länglichen zweiten Aufnahmestruktur auf der zweiten Aufkantung;
 - Bereitstellen wenigstens eines ersten und zweiten Querriegels (200), die in einer Querrichtung (D) orientiert sind, zwischen der ersten und

der zweiten Aufnahmestruktur (400), wobei jeder Querriegel (200) mit einem sich quer erstreckenden Bogendrahtaufnahmekanal (210) versehen ist;

- Verschieben eines ersten Querdrahts (110) eines ersten Drahtgitters (100) in dem Drahtaufnahmekanal (210) des ersten Querriegels (200) und eines zweiten Querdrahts (110) des ersten Drahtgitters (100) in dem Drahtaufnahmekanal (210) des zweiten Querriegels;

- Einrichten einer Abdeckung (300) über dem ersten Drahtgitter (100).

14. Verfahren nach dem vorhergehenden Anspruch, wobei wenigstens zwei Drahtgitter, die das erste Drahtgitter aufweisen, in der Längsrichtung (L) gesehen wechselseitig benachbart eingerichtet sind, wobei wenigstens drei Querriegel (200), die den ersten und den zweiten Querriegel aufweisen, zwischen der ersten und der zweiten Aufnahmestruktur bereitgestellt sind; und wobei für jedes Drahtgitter (100) der wenigstens zwei Drahtgitter ein erster Querdraht (110) in einem Drahtaufnahmekanal (210) eines Querriegels (200) der wenigstens drei Querriegel verschoben wird, und ein zweiter Querdraht in einem Drahtaufnahmekanal eines anderen Querriegels der wenigstens drei Querriegel verschoben wird; und/oder wobei ein erster Längsrand (320) der Abdeckung (300) vorzugsweise in oder an der ersten Aufnahmestruktur (400) befestigt ist und ihr zweiter Längsrand (320) in oder an der zweiten Aufnahmestruktur befestigt ist.

15. Verfahren nach dem vorhergehenden Anspruch, wobei das Anordnen der Abdeckung aufweist:

- Einrichten einer ersten Platte (300) in einer Wölbung zwischen der ersten und der zweiten Aufkantung, wobei ein erster Längsrand (320) der ersten Platte in der ersten Aufnahmestruktur (400) angeordnet ist, und ein zweiter Längsrand der ersten Platte in der zweiten Aufnahmestruktur eingerichtet ist;

- Einrichten einer zweiten Platte (300) in einer Wölbung zwischen der ersten und der zweiten Aufkantung, wobei ein erster Längsrand (320) der zweiten Platte in der ersten Aufnahmestruktur (400) eingerichtet ist und ein zweiter Längsrand (320) der zweiten Platte in der zweiten Aufnahmestruktur eingerichtet ist;

- Einrichten eines länglichen Dichtungsprofils (500) zu dem Zweck, einen Raum zwischen einem Querrand (310) der ersten Platte und einem benachbarten Querrand (310) der zweiten Platte abzudichten, wobei das Dichtungsprofil (500) mit einem länglichen oberen Flansch (510) ausgebildet ist, der sich über den Raum zwischen den Querrändern erstreckt;

- Befestigen eines ersten äußeren Endes des Dichtungsprofils (500) an der ersten Aufnahmestruktur (400) und eines zweiten äußeren Endes des Dichtungsprofils (500) an der zweiten Aufnahmestruktur.

Revendications

1. Dispositif de toit arqué destiné à être placé entre des premier et second montants (O), comprenant :

- une première structure de réception allongée (400), orientée dans une direction longitudinale (L), sur le premier montant ;

- une seconde structure de réception allongée, orientée dans la direction longitudinale, sur le second montant ;

- au moins des premier et deuxième arcs-doubleaux (200), orientés dans une direction transversale (D), entre la première et la seconde structures de réception (400), dans lequel chaque arc-doubleau (200) est doté d'un canal de réception de fil métallique arqué (210) s'étendant dans la direction transversale ;

- au moins une première grille métallique (100) avec un premier fil métallique transversal (110) qui est glissé dans le canal de réception de fil métallique (210) du premier arc-doubleau (200) et un second fil métallique transversal qui est glissé dans le canal de réception de fil métallique du second arc-doubleau ;

- une protection (300) agencée au-dessus de la première grille métallique (100).

2. Dispositif de toit arqué selon la revendication 1, dans lequel au moins deux grilles métalliques (100), comprenant la première grille métallique, sont agencées de manière adjacente l'une par rapport à l'autre tel qu'observé dans la direction longitudinale ; dans lequel au moins trois arcs-doubleaux (200), comprenant le premier et le deuxième arcs-doubleaux, sont fournis ; et dans lequel chaque grille métallique (100) d'au moins deux grilles métalliques est dotée d'un premier fil métallique transversal (110) qui est glissé dans le canal de réception de fil métallique (210) d'un arc-doubleau (200) des au moins trois arcs-doubleaux et d'un second fil métallique transversal (110) qui est glissé dans le second canal de réception de fil métallique (210) d'un arc-doubleau (200) des au moins trois arcs-doubleaux.

3. Dispositif de toit arqué selon la revendication précédente, dans lequel un arc-doubleau (200) des au moins trois arcs-doubleaux est doté d'une partie de séparation (230) et dans lequel un canal de réception de fil métallique (210) est fourni de chaque côté de la partie de séparation (230) à des fins de réception

de fils métalliques transversaux mutuellement adjacents (110) de grilles métalliques mutuellement adjacentes (100) des au moins deux grilles métalliques.

4. Dispositif de toit arqué selon la revendication précédente, dans lequel la protection comprend au moins deux plaques (300) reposant de manière mutuellement adjacente dans une direction longitudinale, et dans lequel la partie de séparation (230) repose entre des bords transversaux mutuellement adjacents de deux plaques mutuellement adjacentes. 5 10
5. Dispositif de toit arqué selon l'une quelconque des revendications précédentes, dans lequel chaque grille métallique (100) comprend une pluralité de fils métalliques transversaux (110, 111) et une pluralité de fils métalliques longitudinaux (120, 121) fixés à celle-ci ; et dans lequel les premier et second canaux de réception de fil métallique (210) sont dotés d'une fente arquée (216), orientée dans la direction transversale, à travers laquelle la pluralité de fils métalliques longitudinaux (120, 121) font saillie vers l'extérieur, dans lequel la hauteur (h) de la fente (216) est supérieure à l'épaisseur d'un fil métallique longitudinal (d_1) et est inférieure à la somme de l'épaisseur du fil métallique longitudinal (d_1) et du fil métallique transversal (d_0). 15 20 25
6. Dispositif de toit arqué selon l'une quelconque des revendications précédentes, dans lequel les premier et second canaux de réception de fil métallique (210) sont chacun formé d'un élément de type crochet (213, 215) qui s'étend partiellement sur les premier et second fils métalliques transversaux (110) de sorte que les premier et second fils métalliques transversaux (110) restent ancrés dans les premier et second canaux de réception de fil métallique (210) en cas d'impact sur la protection. 30 35
7. Dispositif de toit arqué selon la revendication 5 et 6, dans lequel l'élément de type crochet (213, 215) est adjacent à la fente (216). 40
8. Dispositif de toit arqué selon la revendication 6 ou 7, dans lequel chaque élément de type crochet (213, 215) est formé par une paroi verticale (213) qui est dirigée vers l'intérieur sur une extrémité supérieure (215), sur le premier/second fil métallique transversal (110) présent dans le premier/second canal de réception de fil métallique (210). 45 50
9. Dispositif de toit arqué selon l'une quelconque des revendications précédentes, dans lequel la protection (300) a des premier et second bords longitudinaux (320) qui sont fixés respectivement dans les ou aux première et seconde structures de réception ; et/ou dans lequel la première grille métallique (100) comprend des premier et second fils métalliques lon-

gitudinaux (120, 121) qui sont reçus dans les première et seconde structures de réception (400).

10. Dispositif de toit arqué selon la revendication précédente, dans lequel les première et seconde structures de réception (400) sont formées en tant que premier et second profils longitudinaux, chacun avec un rebord de support (430) qui supporte respectivement les premier et second montants, un canal longitudinal (420) pour recevoir respectivement des premier et second bords longitudinaux (320) de la protection, et avec un rebord de liaison (460) entre le rebord de support (430) et le canal longitudinal (420) à des fins de formation d'un espace intermédiaire (450) dans lequel respectivement des première et seconde extrémités externes de chaque arc-doubleau (200) sont reçues. 5 10 15 20 25
11. Dispositif de toit arqué selon l'une quelconque des revendications précédentes, dans lequel la protection comprend au moins une première et une seconde plaques (300), agencées de manière mutuellement adjacente dans la direction longitudinale, et un profil d'étanchéité allongé (500) est fourni pour étanchéifier un espace entre un bord transversal (310) de la première plaque (300) et un bord transversal de la seconde plaque ; lequel profil d'étanchéité (500) est formé d'un rebord supérieur allongé (510) qui s'étend sur l'espace entre ledit bord transversal (310) de la première plaque et ledit bord transversal (310) de la seconde plaque ; et dans lequel une première extrémité externe dudit profil d'étanchéité (500) est fixée à la première structure de réception (400) et une seconde extrémité externe du profil d'étanchéité (500) est fixée à la seconde structure de réception. 30 35 40 45 50
12. Dispositif de toit arqué selon l'une quelconque des revendications précédentes, **caractérisé en ce que** la grille métallique (100) est fabriquée à partir de métal, de préférence de l'acier, idéalement de l'acier inoxydable ; et/ou **en ce que** la protection (300) comprend une plaque en plastique à parois multiples ; et/ou **en ce que** la protection est fabriquée à partir d'un matériau parmi le groupe des : polycarbonate, acrylate et autres thermoplastiques ; et/ou **en ce que** la protection est flexible de sorte qu'elle puisse être courbée dans la direction transversale en un rayon de courbure d'au moins 10 mètres. 5 10 15 20 25 30 35 40 45 50
13. Procédé pour placer un dispositif de toit arqué entre des premier et second montants (O), comprenant :
 - l'agencement d'une première structure de réception allongée (400) sur le premier montant (O) et, parallèle à celle-ci, une seconde structure de réception allongée sur le second montant ;
 - la fourniture d'au moins des premier et deuxiè-

me arcs-doubleaux (200), orientés dans une direction transversale (D), entre les première et seconde structures de réception (400), dans lequel chaque arc-doubleau (200) est doté d'un canal de réception de fil métallique arqué s'étendant transversalement (210) ;

- le glissement d'un premier film métallique transversal (110) d'une première grille métallique (100) dans le canal de réception de fil métallique (210) du premier arc-doubleau (200) et d'un second fil métallique transversal (110) de la première grille métallique (100) dans le canal de réception de fil métallique (210) du deuxième arc-doubleau ;
- l'agencement d'une protection (300) sur la première grille métallique (100).

14. Procédé selon la revendication précédente, dans lequel au moins deux grilles métalliques, comprenant la première grille métallique, sont agencées de manière mutuellement adjacente tel qu'observé dans la direction longitudinale (L) ; dans lequel au moins trois arcs-doubleaux (200), comprenant les premier et deuxième arcs-doubleaux, sont fournis entre la première et la seconde structures de réception ; et dans lequel pour chaque grille métallique (100) des au moins deux grilles métalliques, un premier film métallique transversal (110) est glissé dans un canal de réception de fil métallique (210) d'un arc-doubleau (200) des au moins trois arcs-doubleaux, et un second fil métallique transversal est glissé dans un canal de réception de fil métallique d'un autre arc-doubleau des au moins trois arcs-doubleaux ; et/ou dans lequel un premier bord longitudinal (320) de la protection (300) est de préférence fixé dans ou à la première structure de réception (400) et un second bord longitudinal (320) de celle-ci est fixé dans ou à la seconde structure de réception.

15. Procédé selon la revendication précédente, dans lequel l'agencement de la protection comprend :

- l'agencement d'une première plaque (300) en un arc entre le premier et le second montants, dans lequel un premier bord longitudinal (320) de la première plaque est agencé dans la première structure de réception (400) et un second bord longitudinal de la première plaque est agencé dans la seconde structure de réception ;
- l'agencement d'une seconde plaque (300) en un arc entre le premier et le second montants, dans lequel un premier bord longitudinal (320) de la seconde plaque est agencé dans la première structure de réception (400) et un second bord longitudinal (320) de la seconde plaque est agencé dans la seconde structure de réception ;
- l'agencement d'un profil d'étanchéité allongé (500) à des fins d'étanchéification d'un espace

entre un bord transversal (310) de la première plaque et un bord transversal adjacent (310) de la seconde plaque, dans lequel le profil d'étanchéité (500) est formé d'un rebord supérieur allongé (510) qui est agencé sur l'espace entre lesdits bords transversaux ;

- la fixation d'une première extrémité externe du profil d'étanchéité (500) à la première structure de réception (400) et d'une seconde extrémité externe du profil d'étanchéité (500) à la seconde structure de réception.

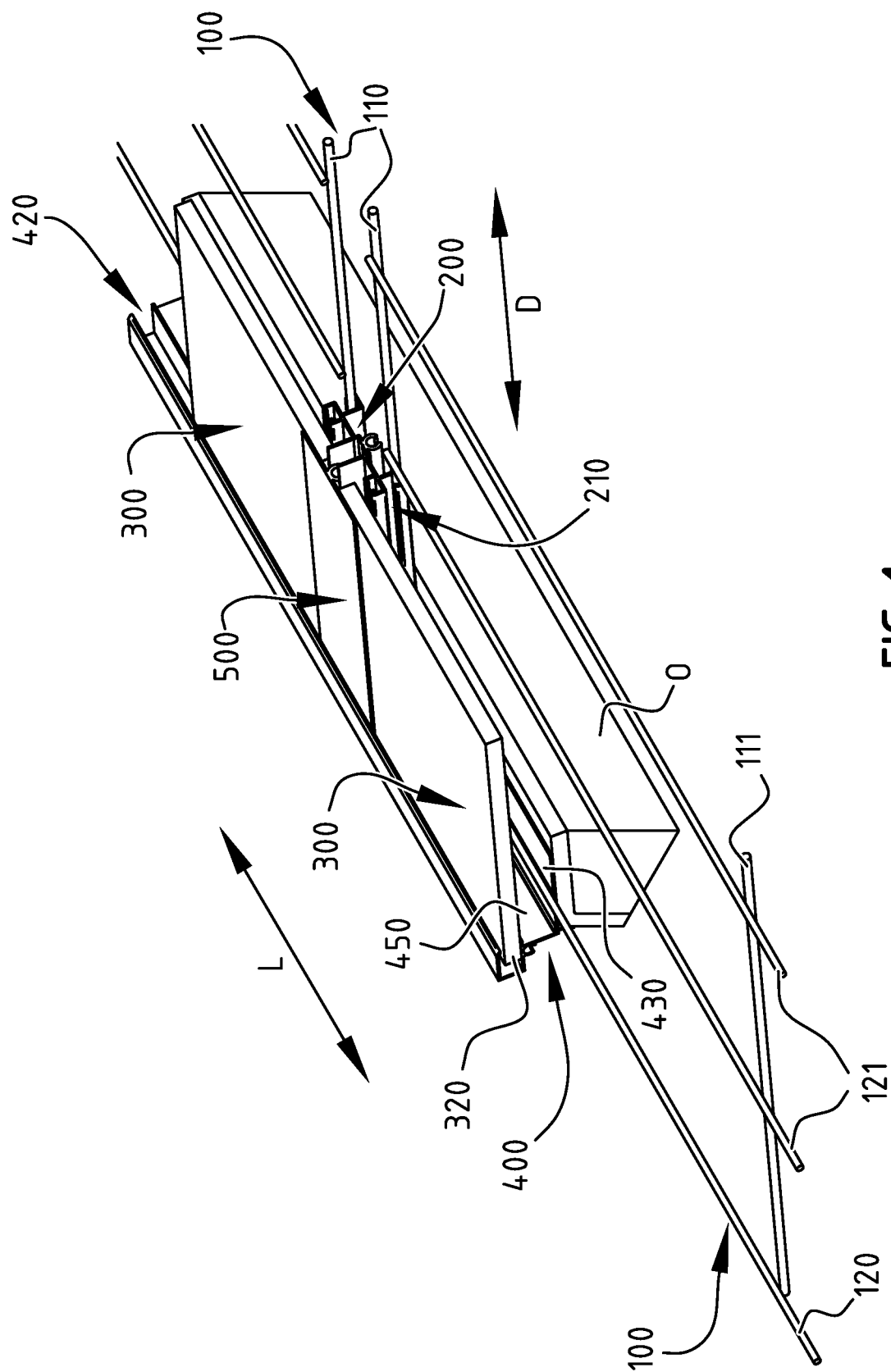


FIG. 1

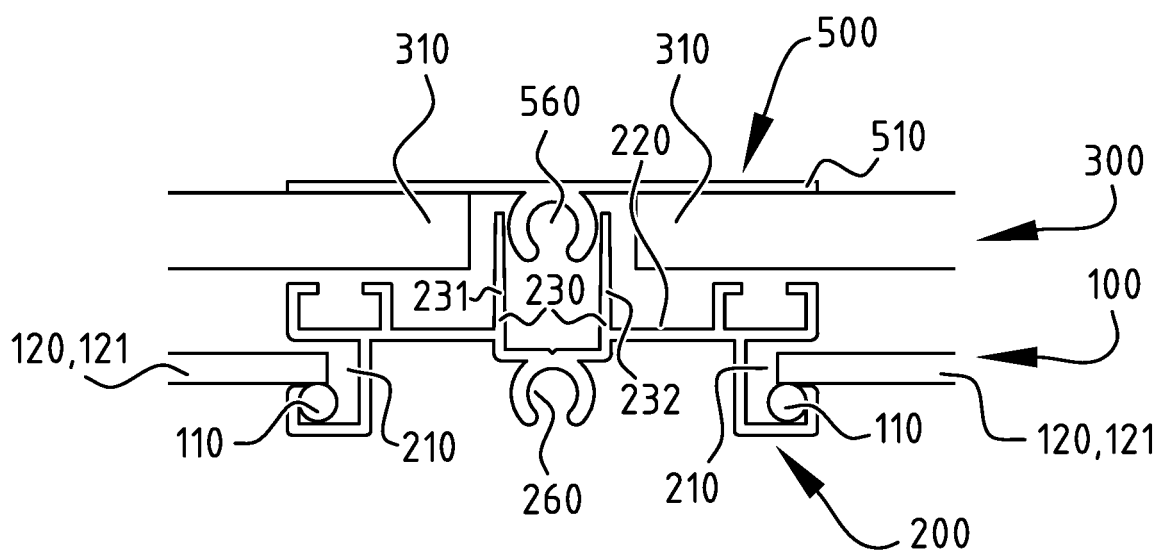


FIG. 2

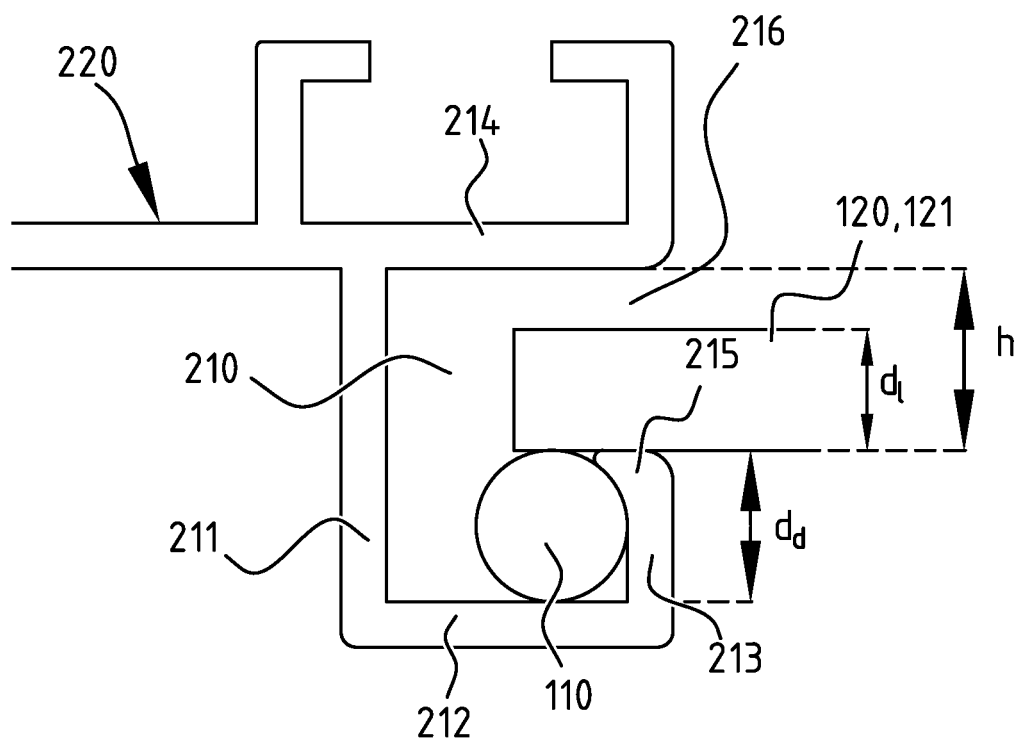
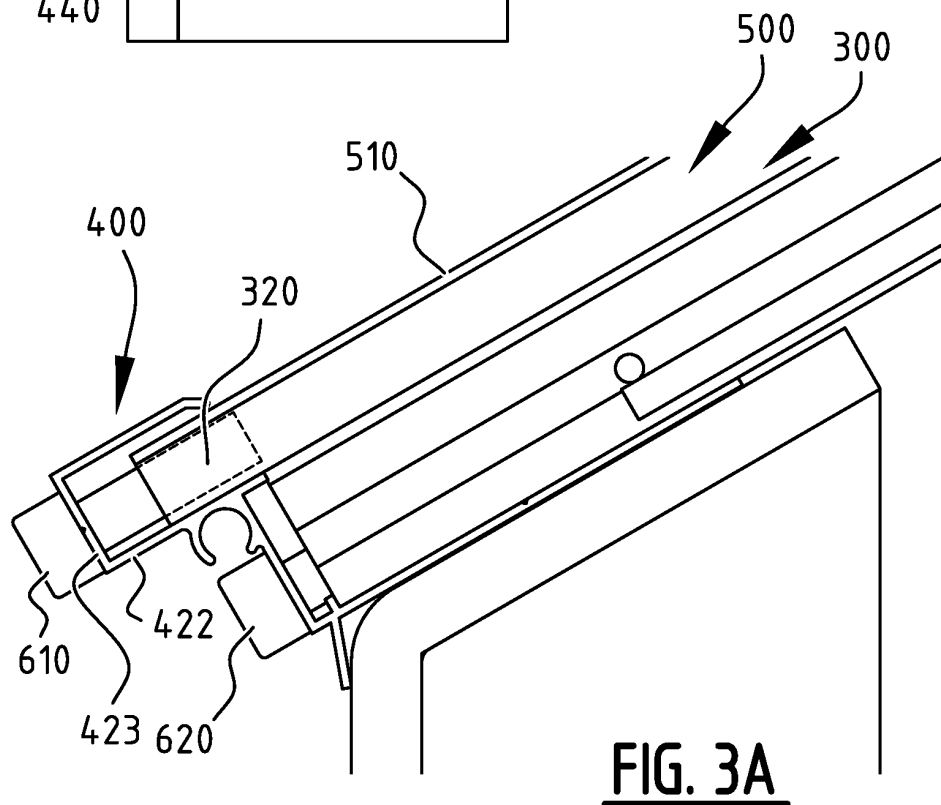
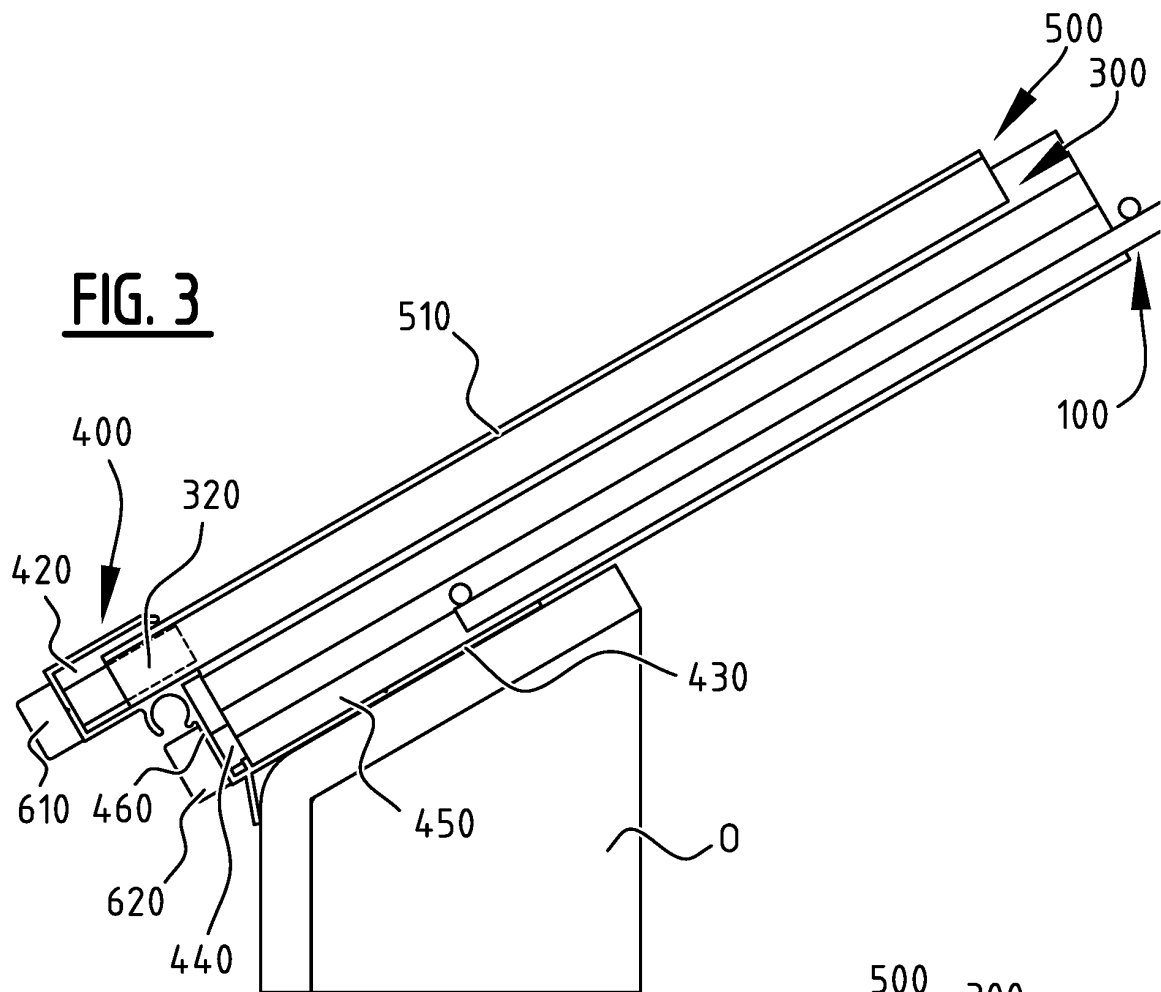


FIG. 2A



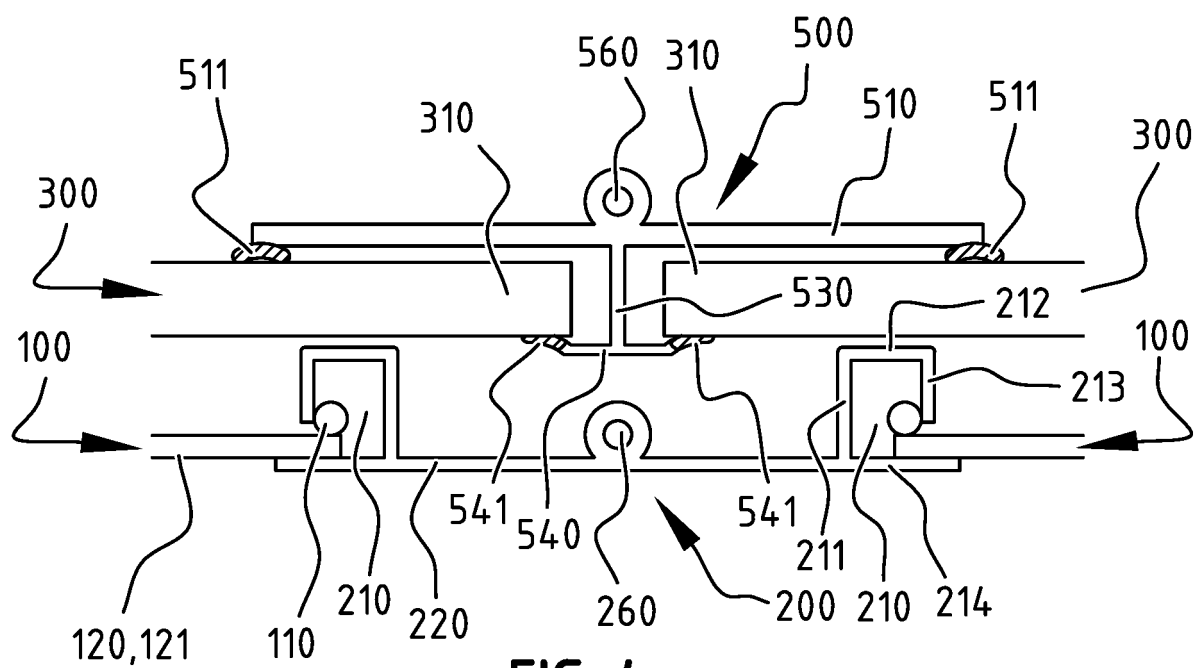


FIG. 4

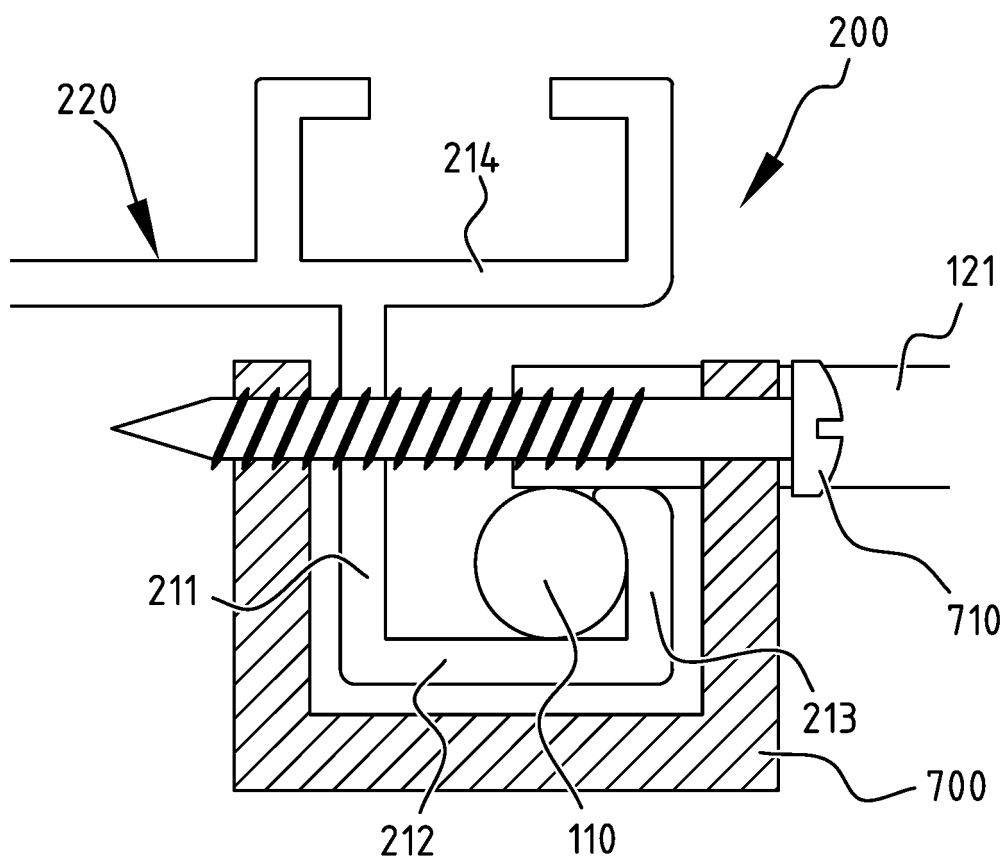


FIG. 5

REFERENCES CITED IN THE DESCRIPTION

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