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(54) **A HINGING DEVICE FOR A GLAZING SYSTEM**

GELENKVORRICHTUNG FÜR EIN VERGLASUNGSSYSTEM

DISPOSITIF CHARNIERE POUR SYSTEME DE VITRAGE

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Description

[0001] The invention relates to a hinging device according to the preamble of claim 1. The invention also relates to a frame part of a hinging arrangement for a glazing system according to the preamble of claim 15. A hinging device and a frame part as in the preambles of Claims 1 and 15, respectively is known from WO 92/17673. In the construction of new buildings and in building renovation, glazing systems of prior art are installed in connection with balconies, said glazing systems being called for example balcony glazings. The systems typically comprise an upper profile and a lower profile inside which necessary guide members are placed, single glass panes being suspended between said guide members. The profiles typically extend horizontally and they are fastened to the structures of the building. By means of guide members it is possible to open and close individual glass panes, typically around a vertical axis of rotation, and they can also be transferred aside along the profiles, wherein several glass panes form a vertical stack, and the balcony is completely open.

[0002] Known balcony glazings are disclosed in patent publication FI 84645, application publication EP 1 085 153 A2, and in patent publication FI 92517 and application publication WO 92/17673. The publications also disclose shaft journals to which control wheels are attached that move inside the lower profile or the upper profile. The shaft journals are also attached to a profile or fillet to which the glass pane is mounted. The shaft journal and control wheels support the glass pane.

[0003] According to the patent publication FI 84645 the guide members comprise a hinging and locking piece for each glass pane, by means of which the glass panes that have been turned aside are interlocked. The pieces are positioned against each other and locked when the glass panes are turned and taken close to each other. Said pieces are positioned at a distance from each other when the glass panes extend straight up, wherein the glass panes form a continuous wall, and the distance of the pieces corresponds to the width of the glass panes.

[0004] Application publication EP 1 085 156 A1 discloses a known method for locking the hinging piece and the pivoted glass pane in their places, but there is, however, such a problem that the hinging piece must be fixed precisely at the location of the locking piece, said locking pieces being located only within a fixed minimum distance from each other. In the system it is not possible to lock the glass pane steplessly to any position in relation to the profile, and the use of glass panes also requires special attention because the pieces must be positioned with respect to each other to enable the locking. Furthermore, it should be noted that the tongues that function as locking devices must be positioned accurately and in a stationary manner to a predetermined position.

[0005] In the solution disclosed in the patent publication FI 84645 the glass pane does not have to be positioned in relation to the profile in connection with the lock-

ing, wherein it is sufficient that the glass panes, and at the same time the locking pieces are pressed against each other. Furthermore, the locking piece guides itself to the correct position inside the profile, wherein it is not necessary to fix the locking piece to a predetermined position, wherein it can rotate freely. The structure of the locking piece is, however, problematic in view of the torque forces, wherein bending forces are exerted thereon that are caused by the weight of the glass panes that hang on the support of a hinge pin. This restricts the selection of materials and the forces may force the locking piece for example due to deformation to a position in which the locking cannot be performed successfully or the locking piece is not capable of easily moving inside the profile.

[0006] It is an aim of the invention to eliminate the aforementioned problems by introducing a hinge pin of a new type. The hinging piece according to the invention is presented in claim 1. The frame part of a hinging arrangement for a glazing system is presented in claim 15.

[0007] By means of the invention it is possible to avoid torque forces and other force effects exerted on the locking piece that result for example from the weight of glass panes and the handling and moving of the same. By means of the invention the locking piece can be suspended from the hinge pin in such a manner that it is capable of hanging freely. The hinge pin according to the invention carries the entire weight of the glass panes, and the weight is not transmitted to the locking piece, to the locking means or through them to the guide. In connection with the locking it is not necessary to apply any more force that is necessary to turn the glass pane, and the locking does not require accurate positioning with respect to the profile. The way in which the locking piece is attached enables the use of quite different locking pieces, and their easy replacement, and it is not even necessary to install the locking pieces to the hinging piece, if locking is not necessary. The locking piece does, however, contain the necessary locking means, wherein it is especially easy to add the locking at a later stage. When the locking is added, it is not necessary to change the profile or attach additional parts.

[0008] The hinging piece according to the invention contains a set of wheels and locking means as well as fastening means for the glass panes arranged in the same piece that pivots around a rotating axis in the Y direction and supports the glass panes. The locking means are intended to function together with the locking piece that is fastened to the adjacent hinging piece.

[0009] In the following, the invention will be illustrated in more detail by means of a preferred embodiment, wherein reference is at the same time made to the appended drawings, in which

Fig. 1 shows a cross-section of a glazing system of related art, said glazing system being a balcony glazing,

- Fig. 2 shows a perspective view of two locking pieces of related art that are positioned successively, the glass panes being suspended on their support,
- Fig. 3 shows in a perspective view a locking piece according to a preferred embodiment of the invention,
- Fig. 4 shows the locking piece of Fig. 3 in the Z direction, cut from the point C-C,
- Fig. 5 shows the guide members and the hinge pin according to a preferred embodiment of the invention in a cross-section seen in the X direction,
- Fig. 6 shows the hinge pin according to Fig. 5 seen from below in the Y direction, cut from the point D - D of Fig. 5,
- Fig. 7 shows the frame part of the hinge pin according to Fig. 5, seen from the side in the Z direction, and
- Fig. 8 shows the frame part of the hinge pin according to Fig. 5 in a perspective view.

[0010] According to Fig. 1, a glazing system that has been installed in its place typically comprises several successive glass panes 1 that can be moved. Typically the glass panes 1 have a rectangular form, and they are positioned in the X and Y direction, wherein they are in an upright position, forming a closed wall when placed one after the other. They can be transferred in the X direction that is typically the horizontal direction. The glass panes 1 can be opened into a position in which they extend in the Y and Z direction, said position being perpendicular to the closed position. In this position the glass panes 1 can be moved aside in such a manner that they are positioned side by side close to each other, wherein they are stored on one side of an opening 3 in a building 2. The upper profile 4 and the lower profile 5 are positioned in parallel to the X direction and each one of them comprises the necessary guide members 6 and 7 to which the glass panes 1 are fastened both from above and below.

[0011] Fig. 2 shows in more detail a locking piece 8 of related art that belongs to the necessary guide members and is placed especially in the upper profile 4. The piece 8 comprises rolls 9, on the support of which the glass panes 1 of Fig. 1 hang from the upper profile, and a hinge pin 10 that constitutes the necessary hinging piece and is fastened pivotably to the piece 8 and via which the glass pane is fastened to the piece 8. The locking piece 14 shown in Fig. 3 is constructed according to the aforementioned principle. When the pieces 8 of Fig. 2 move in the X direction, the hinge pin 10 extends in parallel to

the Y direction. The lateral direction, i.e. the Z direction is perpendicular both to the X direction and to the Y direction, wherein an orthogonal system of coordinates is formed at the same time.

[0012] The piece 8 contains a rear end 82 that comprises fitting means 83 for fastening the hinge pin 10, the hinge pin 10 also pivoting in said fitting means, being at the same time arranged in said guide members. The piece 8 also contains a front end 81 comprising locking means 84 for locking the hinge pin 10 in a determined rotating position. The hinge pin 10 that can be locked is fastened to a preceding similar piece. The pieces 8 are typically identical, wherein the structure and the dimensions are similar. The pieces 8 are typically also symmetrical in relation to such a plane that coincides with the X and Y directions and is located on the central line of the piece. The front end 81 and the rear end 82 comprise an upper surface and a lower surface each, said surfaces being planar in the X and Z directions.

[0013] The locking prevents the divergence of the pieces 8 in the X direction. For the locking the pieces 8 are transferred against each other, and the hinge pin 10 must be positioned in a locking gap 85. The width of the hinge pin 10 in the first rotating position A is smaller than in its predetermined second rotating position B. In the position A it has access to and away from the locking gap 85, but not in the position B. The aperture 86 of the locking gap 85 controls the access inside and outside. The glass panes typically also contain a fillet or a profile 12 to which the hinge pin 10 is fastened by means of a groove 13.

[0014] Fig. 3 shows a locking piece 14 according to a preferred embodiment that is utilized in the invention. The piece 14 also contains a rear end 142 comprising fitting means 143 for fastening the hinge pin 10 (not shown in the drawing). The means 143 comprise at least an opening 146 that extends through the rear end 142 in the vertical direction and a recess 147 surrounding the opening 146, which recess is shown in the side projection of Fig. 4 (cross-section C - C) and in the position of Fig. 3 underneath the rear end 142. The hinge pin rotates in the opening 146 and the collar in the hinge pin is positioned in the recess 147, wherein the piece 14 can at the same time hang on the support of the hinge pin, wherein it is not necessary for the piece 14 to slide along the upper profile, wherein it does not support the glass panes on the upper profile. If necessary, it is possible to arrange a separate, preferably replaceable plate part of plastic material underneath the piece 14, which plate part slides well when needed. The structures inside the profile control the position of the piece 14 at least in the Z direction, if necessary.

[0015] The piece 14 also contains a front end 141 comprising locking members 144 in whose locking gap 144a the hinge pin is positioned. The dimensioning of the aperture 144b of the locking gap 144a is adapted to allow the passage of the hinge pin in the position A of Fig. 2, but not in the position B. The front end 141 is positioned underneath the rear end of the preceding piece and the

rear end 142 is positioned underneath the front end of the next piece. Because of the step-shaped structure of the piece 14, the front and rear ends of the other pieces are positioned on different sides of the piece 14. The locking means 144 form a bifurcate fork 144c, 144d. The locking gap 144a is positioned between the branches 144c, 144d.

[0016] Figure 5 shows a hinging piece 15 according to a preferred embodiment of the invention. The hinging piece 15 is placed together with the locking piece 14 inside a profile functioning as an upper profile. The hinging piece 15 can be connected especially to a locking piece 14 according to Fig. 3, wherein they form the necessary guide members for the glazing system. The guide members are shown in Fig. 5 in a cross-section in the Y direction at the location of rotation axis 19, when positioned inside a profile 16 that is parallel to the X direction.

[0017] The hinging piece 15 comprises two wheels 17 and 18 positioned in the horizontal plane on top of each other, said wheels forming a set of wheels on the same axis of rotation and symmetry 19 in the Y direction. The glass panes that are attached to a fillet 29 rest on the support of the wheels 17, 18, which, in turn, rest on the projections 20, 21 inside the upper profile 16 by means of their conical side surface. The projections 20 and 21 extend to opposite directions and they are positioned on different sides of the axis 19. Each wheel 17, 18 rests on the support of only one projection 20 or 21, along which the wheel rolls, wherein the wheels 17, 18 are capable of rotating around the rotation axis 19, wherein the glass panes and the guide members move by rolling along the profile 16 in the X direction. There are preferably at least two wheels. The wheels 17, 18 are fastened on top of the frame part 22 of the hinge pin by means of a screw (shown with a broken line) and for that purpose the frame part 22 is equipped with a threaded recess 30 extending in the Y direction. Each wheel 17, 18 comprises a hub part 24 or 25 that is typically made of metal, and a ring part 26 or 27 that is typically made of plastic material. The hub parts 24, 25 are locked in fixed manner, but the ring part 26, 27 is allowed to rotate centrally around the axis 19 and freely around the hub part 24, 25. If necessary, intermediate rings 28 of metal must be placed between the hub parts 24, 25, wherein the height of the hub part 24, 25 is arranged to be greater than the height of the ring part 26, 27, so that the ring part would rotate freely. The hub part 24, 25 also contains at least one horizontal shoulder whose surface is directed downward, and a corresponding shoulder in the ring part 26, 27 is pressed against said horizontal shoulder. The hub parts 24 and 25, the ring parts 26 and 27, the screw 23 and the intermediate rings 28 are rotationally symmetrical in relation to the axis 19.

[0018] A corresponding hinging piece 15 is placed inside the lower profile, but it is positioned upside down, and for example wheels 17 and 18 are not typically fastened thereto, wherein it does not contain a bearing part 31 and the narrowing of the frame part 22 extends all the

way to the end. Thus, also the screw 23 and the recess 30 are missing, wherein the purpose of the frame part 22 is to connect the glass panes to the lower profile and to prevent the movement in the Z direction. In the piece 15 inside the lower profile the parts 34, 35 are also higher, because the distance between the window pane and the lower profile is typically greater than in the upper profile.

[0019] The frame part is preferably placed symmetrically and centrally on the axis 19. The frame part is also shown in Fig. 8. The bearing means on top of the frame part 22 comprise a bearing part 31 that extends on a higher level than the locking piece 14, wherein the height of the piece 14 in the Y direction is smaller by the recess 147 than the height of the narrow collar i.e. the section 311 of the bearing part 31. Thus, the piece 14 is capable of rotating freely, if necessary, even if there was an intermediate ring 32 between the hub part 25 and the frame part 22. The hub part 25 can also be pressed directly against the frame part 22, wherein they are interlocked by means of a screw 23. The piece 14 must, however, be capable of pivoting freely, if necessary. Thus, the piece 14 can move to a suitable position inside the profile 16, under the guidance of its various projections. The bearing part 31 also comprises a wide collar, i.e. a section 312 that is placed in the recess 147 of the piece 14, wherein the piece 14 rests on the support of the upper surface of the section 312, wherein the section 312 is preferably horizontal and its upper surface is directed upward. The height of the section 312 is smaller or equally great than the height of the recess 147, wherein the second locking piece moving underneath the rear end 142 of the piece 14 does not cling to the section 312.

[0020] The frame part 22 extends downward in the Y direction and its diameter is preferably equal to the diameter of the section 312. The locking means formed in the frame part 22 comprise a locking part 33 that is intended to function together with the locking gap 144 of the locking piece 14 in the manner disclosed hereinabove and in connection with Fig. 2 as well. According to Fig. 6, the horizontal cross-section of the locking part 33 follows the shape of a rectangular in such a manner that the distance between the short sides is greater than the distance between the long sides. The sides are preferably located symmetrically in relation to the axis 19, and the long sides are parallel to each other and extend vertically in the Y direction.

[0021] With reference to Fig. 5, there is a bearing part 34 in the frame part 22, underneath the locking part 33, said bearing part being circular in relation to the axis 19, and a ring part 35 that is typically made of plastic is installed centrally around said bearing part as a bearing. The ring part 35 is capable of rotating freely around the rotation axis 19 and the bearing part 34, and it rests on the inner edges of the gap of the profile 16. The gap extending in the X direction is located on the lower surface of the profile 16. The diameter of the ring part 35 corresponds to the width of the gap, and thus it is possible to utilize the same to remove the clearance in the Z di-

rection and to position the hinge pin 15 to the desired point, typically in the middle of the gap. The diameter of the ring part 35 can also be slightly larger than the width of the gap, wherein symmetrical narrowings must be made on the opposite sides of the ring part 35, the distance between the narrowings complying with the width of the gap. The diameter of the bearing part 34 is preferably slightly smaller than the greatest diameter of the locking part 33, wherein the ring part 35 rests against the shoulder between the locking part 33 and the bearing part 34. The ring part 35 also rests against the shoulder of the foot part 36, thus remaining by the gap in the profile 16. The bearing part 34 and the ring part 35 form the necessary sliding means by means of which the hinging part slides along the profile 19.

[0022] The clearance between the ring part 35 and the bearing part 34 is arranged in such a manner that when the ring part 35 is pressed at the location of the narrowing in the bearing part 34, the ring part 35 yields, and it can be lifted up past the shoulder. The narrowings are arranged on opposite sides of the bearing part 34 and symmetrically in relation to the rotation axis 19. The narrowings are parallel to the narrowings in the locking part 33. The diameter of the section 312 must also be smaller than the inner diameter of the ring part 35. The widest part of the frame part 22 is located by the section 312.

[0023] The hinge pin 15 is fastened to the fillet 29 by means of the foot part 36 that is presented in more detail also in Fig. 7, wherein the glass panes are mounted underneath the piece 15 in the Y direction. The fillet 29 contains a gap extending in the X direction, said gap being narrower than the space inside the fillet 29 in which the foot part 36 is positioned. In the upper part of the foot part 36 there is a symmetrical narrowing 361 whose horizontal cross-section follows the shape of a rectangular in such a manner that the distance between the long sides equals the width of the gap. The long sides and their surfaces are parallel to the other narrowing surfaces of the frame part 22. In the lower part of the foot part 36 there is a symmetrical widening 362 whose width is greater than the width of the gap in the fillet 29 and it complies with the width of the free inner space of the fillet 29, wherein the foot part 36 and its widening 362 support the fillet 29. The widening 362 has preferably a substantially rectangular cross-section, but it can also be partly circular. On at least one side of the widening 362 there is an extension that extends in the X direction and whose width is greater than the width of the gap in the fillet 29. The width of the extension 363 preferably complies with the width of the widening 362 and on top of the extension there is a gap 37 that is open at least upward, preferably also to the sides in the Z direction.

[0024] In the X direction of the fillet 29 the recess 37 is lined on one hand by the widening 362 and on the other hand by the end of the extension 363. It is possible to place a nut 38 in the recess 37, the outer appearance of said nut being such that its rotation in the recess 37 around the Y direction is prevented. The nut 38 is wider

than the gap in the fillet 29, wherein it is possible to utilize said nut to fasten the foot part 36 and the fillet 29 together in a stationary manner, if a threaded screw 39 (shown by broken lines) is placed and tightened in the nut from above. The threaded screw 39 on one hand lifts up the nut 38 against the inner upper surface of the fillet 29, and on the other hand presses the foot part 36 against the inner lower surface of the fillet 29, wherein the hinge pin 15 and its frame part 22 are locked in their place in the X direction. The foot part 36, the nut 38 and the threaded screw 39 constitute the means intended for fastening of the glass panes, when the glass panes also comprise a fillet 29.

[0025] When the guide members are in the Y direction positioned on top of each other in the manner disclosed hereinabove, a compact structure is attained, by means of which it is possible to achieve the advantages mentioned hereinabove. The way in which the set of wheels 17, 18 is fastened and suspended compensates forces in different directions, and horizontal sliding surfaces are large, wherein the wearing effect is less significant. By means of the structure both the wheels 17, 18 and the frame part 22 are capable of easily rotating with respect to each other. The wearing of wheels changes the position of the hinge pin 15 in the vertical direction, but this can be easily taken into account by means of sufficient clearances. The structure is as short as possible both in the X direction and in the Y direction, and only vertical forces are transmitted in the frame part 22, and said forces are not transmitted to the locking piece 14.

[0026] The invention is not restricted solely to the advantageous embodiment presented above, but it may vary according to the appended claims.

Claims

1. A hinging piece (15) of a glazing system, which, when installed in its place, is intended movable in the X direction when it is arranged in a guide profile (16) of the glazing system, to which the glass panes (1) of the glazing system are intended to be suspended by means of said hinging piece (15), said piece comprising:

- a horizontal set of wheels (17, 18) that is arranged on a rotation axis (19) extending in the Y direction and intended to support the hinging piece (15) on the guide profile (16), and
- a frame part (22) that is arranged to rotate around said rotating axis (19) with the glass panes,

characterized in that the frame part (22) comprises at least:

- fastening means (36) for suspending the glass panes to the hinging piece (15),

- locking means (33) that are arranged for locking the hinging piece (15) to a locking piece when the frame part (22) is in a predetermined rotating position, said locking piece being attached to the adjacent hinging piece when two hinging pieces (15) are positioned successively, wherein the locking prevents the divergence of adjacent hinging pieces (15) from each other in the X direction, and
- bearing means (31) that are arranged for fastening a locking piece (14) to the frame part (22) in such a manner that the frame part (22) is capable of pivoting around said rotation axis (19) in relation to the locking piece (14).
2. The hinging piece according to claim 1, **characterized in that** the overall width of the locking means (33) in the Z direction is smaller in the first rotating position (A) than in the predetermined second rotating position (B).
 3. The hinging piece according to claim 1 or 2, **characterized in that** the bearing means (31) comprise a first collar (311) and a second collar (312) whose diameter is larger than that of the first collar (311) and that is positioned underneath the first collar (311), wherein the locking piece (14) is arranged to rest on the support of the second collar (312) in such a manner that its rotation on the rotating axis (19) is allowed.
 4. The hinging piece according to any of the claims 1 to 3, **characterized in that** the set of wheels (17, 18) intended for moving the hinging piece (15) comprises at least one wheel (17, 18) that is arranged to rotate around the rotating axis (19) extending in the Y direction, wherein the frame part (22) is suspended underneath the set of wheels (17, 18).
 5. The hinging piece according to claim 4, **characterized in that** the wheel (17, 18) comprises a hub part (24, 25) via which the wheel is attached to the frame part (22), and a ring part (26, 27) arranged to pivot around the hub part (24, 25) and the rotating axis (19).
 6. The hinging piece according to any of the claims 1 to 5, **characterized in that** it also comprises sliding means (34, 35) that are arranged to be positioned against the guide profile, when the hinging piece (15) moves in the X direction and to support the hinging piece in its place in the Z direction, said sliding means comprising a ring (35) that is locked around the frame part (22), the rotation of said ring part around the rotating axis (19) being allowed.
 7. The hinging piece according to any of the claims 1 to 5, **characterized in that** the fastening means (36) comprise a widening (362) that is arranged to be positioned inside a fillet (29), to which fillet, in turn, the glass is attached, and a narrowing (361) that is intended to be positioned in a gap in the fillet (29), and an extension (363) to the widening (362) extending in the X direction in such a manner that the combination of a nut and a screw can be placed between the fillet (29) and the extension (363) inside the fillet (29), said combination tightening and locking the extension (363) against the fillet (29).
 8. The hinging piece according to any of the claims 1 to 7, **characterized in that** the hinging piece (15) is arranged to pivot to a first rotating position (A) that corresponds to the position of the glass pane in which its surface coincides with the X and Y directions, and at least to a second rotating position (B) that corresponds to the position of the glass pane in which its surface coincides with the Y and Z directions, wherein the X direction and the Z direction are substantially horizontal directions, and the Y direction is a substantially vertical direction.
 9. The hinging piece according to any of the claims 1 to 8, **characterized in that** the locking piece (14) comprises:
 - a rear end (142) comprising fitting means (143) for fastening the hinging piece (15), in which the hinging piece (15) supporting the glass pane and extending substantially in the Y direction is intended to pivot, and
 - a front end (141) comprising locking means (144) for locking the locking piece (14) to the adjacent hinging piece in a predetermined rotating position of the frame part (22), when two hinging pieces (15) are positioned successively in the X direction, wherein the locking prevents the divergence of adjacent hinging pieces (15) from each other.
 10. The hinging piece according to claim 9, **characterized in that** the front end (141) is arranged to be positioned underneath the rear end of the adjacent locking piece in the Y direction, and that the rear end (142) is arranged to be positioned underneath the front end of the second adjacent locking piece in the Y direction, wherein the front end (141) is also arranged to be positioned on a different side of the piece than the rear end (142).
 11. The hinging piece according to claim 9 or 10, **characterized in that** the locking means (144) of the locking piece (14) comprise a locking gap (144a) extending through the front end (141) in the Y direction and opening towards the adjacent locking piece in the X direction, said locking gap being arranged to receive the hinging piece of the preceding locking

piece, wherein the aperture (144b) of the locking gap (144a) is arranged to allow the access of said hinge pin inside, when it is in a predetermined rotating position (A) and to prevent the access of said hinge pin outside when it is in a second predetermined position (B).

12. The hinging piece according to claim 11, **characterized in that** the locking means (144) comprise a bifurcate fork that is arranged for guiding the hinging piece to the locking gap (144a) positioned between the branches.

13. The hinging piece according to any of the claims 9 to 12, **characterized in that** the overall width of the locking means of the hinging piece (15) in the Z direction in the first rotating position (A) is smaller than in the predetermined second rotating position (B), and that the overall width of the aperture of the locking gap in the Z direction is smaller than the overall width of the locking means in the second rotating position (B) and larger than the overall width of the locking means in the first rotating position (A).

14. The hinging piece according to any of the claims 9 to 13, **characterized in that** the fitting means of the locking piece (14) comprise at least an opening (146) extending in the Y direction and through the rear end, and a recess (147) surrounding the opening, which is located between the rear end (142) and the front end of the next piece.

15. A frame part (22) for a hinging piece of a glazing system, which, when installed in its place, is intended movable in the X direction when it is arranged in a guide profile (16) of the glazing system, wherein the glass panes (1) of the glazing system are intended to be suspended or connected by means of said frame part (22) of the hinging piece (15) that is arranged to rotate with the glass panes around a rotating axis (A) extending in the Y direction, **characterized in that** the frame part (22) comprises at least:

- fastening means (36) for suspending the glass panes to the frame part (22),
- locking means (33) that are arranged for locking the frame part (22) to a locking piece when the frame part (22) is in a predetermined rotating position, said locking piece being attached to the adjacent frame part of the hinging arrangement when two frame parts (22) are positioned successively, wherein the locking prevents the divergence of adjacent frame parts (22) from each other in the X direction.

16. The frame part (22) according to claim 15, **characterized in that** it also comprises sliding means (34,

35) that are arranged to be positioned against the guide profile, when the frame part (22) moves in the X direction and to support the hinging piece in its place in the Z direction, said sliding means comprising a ring (35) that is locked around the frame part (22), the rotation of said ring part around the rotating axis (19) being allowed.

17. The frame part (22) according to claim 15 or 16, **characterized in that** it also comprises bearing means (31) that are arranged for fastening a locking piece (14) to the frame part (22) in such a manner that the frame part (22) is capable of rotating around said rotation axis (19) in relation to the locking piece (14).

Patentansprüche

1. Gelenkstück (15) eines Verglasungssystems, welches, wenn es an seinem Platz eingebaut ist, in X-Richtung beweglich vorgesehen ist, wenn es in einem Führungsprofil (16) des Verglasungssystems angeordnet ist, an welchem die Glasscheiben (1) des Verglasungssystems mittels des Gelenkstücks (15) aufgehängt vorgesehen sind, wobei das Stück Folgendes umfasst:

- einen horizontalen Satz Räder (17, 18), der an einer in Y-Richtung verlaufenden Rotationsachse (19) angeordnet und zum Halten des Gelenkstücks (15) am Führungsprofil (16) vorgesehen ist, und
- ein Rahmenteil (22), das derart angeordnet ist, dass es sich mit den Glasscheiben um die Rotationsachse (19) dreht,

dadurch gekennzeichnet, dass das Rahmenteil (22) zumindest Folgendes umfasst:

- Befestigungsmittel (36) zum Aufhängen der Glasscheiben am Gelenkstück (15),
- Arretiermittel (33), die zum Arretieren des Gelenkstücks (15) an einem Arretierstück angeordnet sind, wenn sich das Rahmenteil (22) in einer vorbestimmten Drehstellung befindet, wobei das Arretierstück an dem benachbarten Gelenkstück angebracht ist, wenn zwei Gelenkstücke (15) hintereinander positioniert sind, wobei das Arretieren die Auseinanderbewegung benachbarter Gelenkstücke (15) in X-Richtung verhindert, und
- Lagermittel (31), die derart zum Befestigen eines Arretierstücks (14) am Rahmenteil (22) angeordnet sind, dass das Rahmenteil (22) relativ zum Arretierstück (14) um die Rotationsachse (19) schwenken kann.

2. Gelenkstück nach Anspruch 1, **dadurch gekenn-**

- zeichnet, dass** die Gesamtbreite der Arretiermittel (33) in Z-Richtung in der ersten Drehstellung (A) kleiner ist als in der vorbestimmten zweiten Drehstellung (B).
3. Gelenkstück nach Anspruch 1 oder 2, **dadurch gekennzeichnet, dass** die Lagermittel (31) einen ersten Bund (311) und einen zweiten Bund (312), dessen Durchmesser größer als der des ersten Bundes (311) ist und der unter dem ersten Bund (311) positioniert ist, umfassen, wobei das Arretierstück (14) derart angeordnet ist, dass es auf der Abstützung des zweiten Bundes (312) in einer solchen Weise ruht, dass seine Drehung um die Rotationsachse (19) erlaubt ist.
4. Gelenkstück nach irgendeinem der Ansprüche 1 bis 3, **dadurch gekennzeichnet, dass** der zum Bewegen des Gelenkstücks (15) vorgesehene Satz Räder (17, 18) mindestens ein Rad (17, 18) umfasst, das derart angeordnet ist, dass es sich um die in Y-Richtung verlaufende Rotationsachse (19) dreht, wobei das Rahmenteil (22) unter dem Satz Räder (17, 18) aufgehängt ist.
5. Gelenkstück nach Anspruch 4, **dadurch gekennzeichnet, dass** das Rad (17, 18) ein Nabenteil (24, 25), über welches das Rad am Rahmenteil (22) angebracht ist, und ein Ringteil (26, 27) umfasst, das derart angeordnet ist, dass es um das Nabenteil (24, 25) und die Rotationsachse (19) schwenkt.
6. Gelenkstück nach irgendeinem der Ansprüche 1 bis 5, **dadurch gekennzeichnet, dass** es ferner Gleitmittel (34, 35) umfasst, die derart angeordnet sind, dass sie an dem Führungsprofil positioniert sind, wenn sich das Gelenkstück (15) in X-Richtung bewegt, und dass sie das Gelenkstück in Z-Richtung an seinem Platz halten, wobei die Gleitmittel einen Ring (35) umfassen, der rings um das Rahmenteil (22) arretiert ist, wobei die Drehung des Ringteils um die Rotationsachse (19) erlaubt ist.
7. Gelenkstück nach irgendeinem der Ansprüche 1 bis 5, **dadurch gekennzeichnet, dass** die Befestigungsmittel (36) Folgendes umfassen: eine Verbreiterung (362), die derart angeordnet ist, dass sie in einer Scheibenleiste (29) positioniert ist, an welcher wiederum das Glas angebracht ist; und eine Verengung (361), die in einem Zwischenraum in der Scheibenleiste (29) positioniert vorgesehen ist; und eine Verlängerung (363) der Verbreiterung (362), die in einer solchen Weise in X-Richtung verläuft, dass die Kombination aus einer Mutter und einer Schraube zwischen der Scheibenleiste (29) und der Verlängerung (363) in der Scheibenleiste (29) positioniert werden kann, wobei die Kombination die Verlängerung (363) an der Scheibenleiste (29) festdreht und
- arretiert.
8. Gelenkstück nach irgendeinem der Ansprüche 1 bis 7, **dadurch gekennzeichnet, dass** das Gelenkstück (15) derart angeordnet ist, dass es zu einer ersten Drehstellung (A) schwenkt, die der Stellung der Glasscheibe entspricht, in welcher deren Oberfläche mit der X- und Y-Richtung zusammenfällt, und zumindest zu einer zweiten Drehstellung (B) schwenkt, die der Stellung der Glasscheibe entspricht, in welcher deren Oberfläche mit der Y- und Z-Richtung zusammenfällt, wobei die X-Richtung und die Z-Richtung im Wesentlichen horizontale Richtungen sind und die Y-Richtung eine im Wesentlichen vertikale Richtung ist.
9. Gelenkstück nach irgendeinem der Ansprüche 1 bis 8, **dadurch gekennzeichnet, dass** das Arretierstück (14) Folgendes umfasst:
- ein hinteres Ende (142), das Passmittel (143) zum Befestigen des Gelenkstücks (15) umfasst, in welchen das die Glasscheibe haltende und im Wesentlichen in Y-Richtung verlaufende Gelenkstück (15) zum Schwenken vorgesehen ist, und
 - ein vorderes Ende (141), das Arretiermittel (144) zum Arretieren des Arretierstücks (14) an dem benachbarten Gelenkstück in einer vorbestimmten Drehstellung des Rahmentails (22) umfasst, wenn zwei Gelenkstücke (15) hintereinander in X-Richtung positioniert sind, wobei das Arretieren die Auseinanderbewegung benachbarter Gelenkstücke (15) verhindert.
10. Gelenkstück nach Anspruch 9, **dadurch gekennzeichnet, dass** das vordere Ende (141) derart angeordnet ist, dass es in Y-Richtung unter dem hinteren Ende des benachbarten Arretierstücks positioniert ist; und dass das hintere Ende (142) derart angeordnet ist, dass es in Y-Richtung unter dem vorderen Ende des zweiten benachbarten Arretierstücks positioniert ist, wobei das vordere Ende (141) auch derart angeordnet ist, dass es an einer anderen Seite des Stücks als das hintere Ende (142) positioniert ist.
11. Gelenkstück nach Anspruch 9 oder 10, **dadurch gekennzeichnet, dass** die Arretiermittel (144) des Arretierstücks (14) einen Arretierzwischenraum (144a) umfassen, der in Y-Richtung durch das vordere Ende (141) hindurch verläuft und sich in X-Richtung zum benachbarten Arretierstück hin öffnet, wobei der Arretierzwischenraum derart angeordnet ist, dass er das Gelenkstück des vorhergehenden Arretierstücks aufnimmt, wobei die Öffnung (144b) des Arretierzwischenraums (144a) derart angeordnet ist, dass sie die Einwärtsbewegung des Gelenkzap-

fens erlaubt, wenn er sich in einer vorbestimmten Drehstellung (A) befindet, und dass sie die Auswärtsbewegung des Gelenkzapfens verhindert, wenn er sich in einer zweiten vorbestimmten Stellung (B) befindet.

12. Gelenkstück nach Anspruch 11, **dadurch gekennzeichnet, dass** die Arretiermittel (144) eine Gabel umfassen, die zum Führen des Gelenkstücks zu dem Arretierzischenraum (144a) angeordnet ist, der sich zwischen den Gabelschenkeln befindet. 10
13. Gelenkstück nach irgendeinem der Ansprüche 9 bis 12, **dadurch gekennzeichnet, dass** die Gesamtbreite der Arretiermittel des Gelenkstücks (15) in Z-Richtung in der ersten Drehstellung (A) kleiner ist als in der vorbestimmten zweiten Drehstellung (B), und dass die Gesamtbreite der Öffnung des Arretierzischenraums in Z-Richtung kleiner als die Gesamtbreite der Arretiermittel in der zweiten Drehstellung (B) und größer als die Gesamtbreite der Arretiermittel in der ersten Drehstellung (A) ist. 20
14. Gelenkstück nach irgendeinem der Ansprüche 9 bis 13, **dadurch gekennzeichnet, dass** die Passmittel des Arretierstücks (14) mindestens eine in Y-Richtung und durch das hintere Ende hindurch verlaufende Öffnung (146) sowie eine die Öffnung umgebende Aussparung (147) umfassen, die zwischen dem hinteren Ende (142) und dem vorderen Ende des nächsten Stücks angeordnet ist. 25 30
15. Rahmenteil (22) für ein Gelenkstück eines Verglasungssystems, welches, wenn es an seinem Platz eingebaut ist, in X-Richtung beweglich vorgesehen ist, wenn es in einem Führungsprofil (16) des Verglasungssystems angeordnet ist, wobei die Glasscheiben (1) des Verglasungssystems mittels des Rahmenteils (22) des Gelenkstücks (15) aufgehängt oder verbunden vorgesehen sind, das derart angeordnet ist, dass es sich mit den Glasscheiben um eine in Y-Richtung verlaufende Rotationsachse (A) dreht, 35 40
- dadurch gekennzeichnet, dass** das Rahmenteil (22) zumindest Folgendes umfasst: 45
- Befestigungsmittel (36) zum Aufhängen der Glasscheiben am Rahmenteil (22),
 - Arretiermittel (33), die zum Arretieren des Rahmenteils (22) an einem Arretierstück angeordnet sind, wenn sich das Rahmenteil (22) in einer vorbestimmten Drehstellung befindet, wobei das Arretierstück an dem benachbarten Rahmenteil der Gelenkvorrichtung angebracht ist, wenn zwei Rahmenteile (22) hintereinander positioniert sind, wobei das Arretieren die Auseinanderbewegung benachbarter Rahmenteile (22) in X-Richtung verhindert. 50 55

16. Rahmenteil (22) nach Anspruch 15, **dadurch gekennzeichnet, dass** es ferner Gleitmittel (34, 35) umfasst, die derart angeordnet sind, dass sie an dem Führungsprofil positioniert sind, wenn sich das Rahmenteil (22) in X-Richtung bewegt, und dass sie das Gelenkstück in Z-Richtung an seinem Platz halten, wobei die Gleitmittel einen Ring (35) umfassen, der rings um das Rahmenteil (22) arretiert ist, wobei die Drehung des Ringteils um die Rotationsachse (19) erlaubt ist. 5

17. Rahmenteil (22) nach Anspruch 15 oder 16, **dadurch gekennzeichnet, dass** es ferner Lagermittel (31) umfasst, die derart zum Befestigen eines Arretierstücks (14) am Rahmenteil (22) angeordnet sind, dass sich das Rahmenteil (22) relativ zum Arretierstück (14) um die Rotationsachse (19) drehen kann. 15

Revendications 20

1. Pièce charnière (15) pour système de vitrage, qui, lorsqu'elle est posée dans sa place, est censée être déplaçable dans la direction X lorsqu'elle est disposée dans un profilé de guidage (16) du système de vitrage, à laquelle les vitres (1) du système de vitrage sont censées être suspendues au moyen de ladite pièce charnière (15), ladite pièce comprenant :

- un jeu de roues horizontal (17, 18) qui est disposé sur un axe de rotation (19) s'étendant dans la direction Y et censé supporter la pièce charnière (15) sur le profilé de guidage (16), et
- une partie de châssis (22) qui est disposée afin de tourner autour dudit axe de rotation (19) avec les vitres,

caractérisée en ce que la partie de châssis (22) comprend au moins :

- des moyens de fixation (36) pour suspendre les vitres à la pièce charnière (15),
- des moyen de verrouillage (33) qui sont disposés afin de verrouiller la pièce charnière (15) à une pièce de verrouillage lorsque la partie de châssis (22) se trouve dans une position de rotation prédéterminée, ladite pièce de verrouillage étant attachée à la pièce charnière adjacente lorsque deux pièces charnière (15) sont positionnées l'une à la suite de l'autre, dans laquelle le verrouillage empêche la divergence de pièces charnière (15) adjacentes l'une par rapport à l'autre dans la direction X, et
- de moyens de support (31) qui sont disposés afin de fixer une pièce de verrouillage (14) sur la partie de châssis (22) de sorte que la partie de châssis (22) puisse pivoter autour dudit axe de rotation (19) relativement à la pièce de ver-

rouillage (14).

2. Pièce charnière selon la revendication 1, **caractérisée en ce que** la largeur hors-tout des moyens de verrouillage (33) dans la direction Z est plus petite dans la première position de rotation (A) que dans la seconde position de rotation (B) prédéterminée. 5
3. Pièce charnière selon la revendication 1 ou 2, **caractérisé en ce que** les moyens de support (31) comprennent un premier collier (311) et un second collier (312) dont le diamètre est supérieur à celui du premier collier (311) et qui est positionné sous le premier collier (311), dans laquelle la pièce de verrouillage (14) est disposée afin de reposer sur le support du second collier (312) de sorte que sa rotation sur l'axe de rotation (19) soit permise. 10 15
4. Pièce charnière selon l'une quelconque des revendications 1 à 3, **caractérisée en ce que** le jeu de roues (17, 18) censé assurer le déplacement de la pièce charnière (15) comprend au moins une roue (17, 18) qui est disposée afin de tourner autour de l'axe de rotation (19) s'étendant dans la direction Y, dans laquelle la partie de châssis (22) est suspendue sous le jeu de roues (17, 18). 20 25
5. Pièce charnière selon la revendication 4, **caractérisée en ce que** la roue (17, 18) comprend une partie de moyeu (24, 25) via laquelle la roue est attachée à la partie de châssis (22) et une partie annulaire (26, 27) disposée afin de pivoter autour de la partie de moyeu (24, 25) et de l'axe de rotation (19). 30
6. Pièce charnière selon l'une quelconque des revendications 1 à 5, **caractérisée en ce qu'elle** comprend également des moyens de coulissage (34, 35) qui sont disposés afin d'être positionnés contre le profilé de guidage, lorsque la pièce charnière (15) se déplace dans la direction X et de supporter la pièce charnière en place dans la direction Z, lesdits moyens de coulissage comprenant un anneau (35) qui est verrouillé autour de la partie de châssis (22), la rotation dudit anneau autour de l'axe de rotation (19) étant permise. 35 40 45
7. Pièce charnière selon l'une quelconque des revendications 1 à 5, **caractérisée en ce que** les moyens de fixation (36) comprennent un élargissement (362) qui est disposé afin d'être positionné à l'intérieur d'un filet (29), auquel filet le verre est à son tour attaché, et un rétrécissement (361) qui est censé être positionné dans un vide du filet (29), et une extension (363) de l'élargissement (362) s'étendant dans la direction X de sorte que la combinaison d'un écrou et d'une vis peut être placée entre le filet (29) et l'extension (363) à l'intérieur du filet (29), ladite combinaison serrant et verrouillant l'extension (363) contre 50 55

le filet (29).

8. Pièce charnière selon l'une quelconque des revendications 1 à 7, **caractérisée en ce que** la pièce charnière (15) est disposée afin de pivoter vers une première position de rotation (A) qui correspond à la position de la vitre dans laquelle sa surface coïncide avec les directions X et Y, et au moins vers une seconde position de rotation (B) qui correspond à la position de la vitre dans laquelle sa surface coïncide avec les directions Y et Z, dans laquelle la direction X et la direction Z sont des directions essentiellement horizontales et la direction Y est une direction essentiellement verticale.
9. Pièce charnière selon l'une quelconque des revendications 1 à 8, **caractérisée en ce que** la pièce charnière (14) comprend :
 - une extrémité arrière (142) comprenant des moyens d'adaptation (143) pour fixer la pièce charnière (15), dans laquelle la pièce charnière (15) qui supporte la vitre et s'étendant essentiellement dans la direction Y est censée pivoter, et
 - une extrémité avant (141) comprenant des moyens de verrouillage (144) pour verrouiller la pièce charnière (14) à la pièce charnière adjacente dans une position de rotation prédéterminée de la partie de châssis (22), lorsque deux pièces charnières (15) sont successivement positionnées dans la direction X, dans laquelle le verrouillage empêche la divergence de pièces charnières adjacentes (15) l'une par rapport à l'autre.
10. Pièce charnière selon la revendication 9, **caractérisée en ce que** l'extrémité avant (141) est disposée afin d'être positionnée sous l'extrémité arrière de la pièce de verrouillage adjacente dans la direction Y, et **en ce que** l'extrémité arrière (142) est disposée afin d'être positionnée sous l'extrémité avant de la seconde pièce de verrouillage adjacente dans la direction Y, dans laquelle l'extrémité avant (141) est également disposée afin d'être positionnée sur un autre côté de la pièce que l'extrémité arrière (142).
11. Pièce charnière selon la revendication 9 ou 10, **caractérisée en ce que** les moyens de verrouillage (144) de la pièce de verrouillage (14) comprennent un vide de verrouillage (144a) s'étendant au travers de l'extrémité avant (141) dans la direction Y et s'ouvrant en direction de la pièce de verrouillage adjacente dans la direction X, ledit vide de verrouillage étant disposé afin de recevoir la pièce charnière de la pièce de verrouillage précédente, dans laquelle l'ouverture (144b) du vide de verrouillage (144a) est disposé afin de permettre l'accès dudit axe de char-

nière à l'intérieur lorsqu'il se trouve dans une position de rotation (A) prédéterminée et d'empêcher l'accès dudit axe de charnière à l'extérieur lorsqu'il se trouve dans une seconde position (B) prédéterminée.

12. Pièce de verrouillage selon la revendication 11, **caractérisée en ce que** les moyens de verrouillage (144) comprennent une fourche de bifurcation disposée afin de guider la pièce de charnière vers le vide de verrouillage (144a) positionné entre les branches. 10
13. Pièce de charnière selon l'une quelconque des revendications 9 à 12, **caractérisée en ce que** la largeur hors-tout des moyens de verrouillage de la pièce de charnière (15) dans la direction Z dans la première position de rotation (A) est inférieure à celle dans la seconde position de rotation prédéterminée (B), et **en ce que** la largeur hors-tout de l'ouverture du vide de verrouillage dans la direction Z est inférieure à la largeur hors-tout des moyens de verrouillage dans la seconde position de rotation (B) et supérieure à la largeur hors-tout des moyens de verrouillage dans la première position de rotation (A). 20
14. Pièce de charnière selon l'une quelconque des revendications 9 à 13, **caractérisée en ce que** les moyens d'adaptation de la pièce de charnière (14) comprennent au moins une ouverture (146) s'étendant dans la direction Y et au travers de l'extrémité arrière, ainsi qu'un retrait (147) entourant l'ouverture qui est situé entre l'extrémité arrière (142) et l'extrémité avant de la pièce suivante. 30
15. Partie de châssis (22) pour pièce de charnière d'un système de vitrage, qui, lorsqu'elle est posée dans sa place, est censée être déplaçable dans la direction X lorsqu'elle est disposée dans un profilé de guidage (16) du système de vitrage, dans laquelle les vitres (1) du système de vitrage sont censées être suspendues ou reliées au moyen de ladite partie de châssis (22) de la pièce de charnière (15) qui est disposée afin de tourner avec les vitres autour d'un axe de rotation (A) s'étendant dans la direction Y, **caractérisée en ce que** la partie de châssis (22) comprend au moins: 35
 - des moyens de fixation (36) pour suspendre les vitres à la pièce charnière (22),
 - des moyens de verrouillage (33) qui sont disposés afin de verrouiller la pièce charnière (22) à une pièce de verrouillage lorsque la partie de châssis (22) se trouve dans une position de rotation prédéterminée, ladite pièce de verrouillage étant attachée à la partie de châssis adjacente du dispositif charnière lorsque deux pièces de châssis (22) sont positionnées l'une à la suite de l'autre, dans laquelle le verrouillage em- 50

pêche la divergence de pièces charnière (22) adjacentes l'une par rapport à l'autre dans la direction X.

16. Partie de châssis (22) selon la revendication 15, **caractérisée en ce qu'elle** comprend également des moyens de coulissage (34, 35) qui sont disposés afin d'être positionnés contre le profilé de guidage, lorsque la partie de châssis (22) se déplace dans la direction X et de supporter la pièce charnière en place dans la direction Z, lesdits moyens de coulissage comprenant un anneau (35) qui est verrouillé autour de la partie de châssis (22), la rotation dudit anneau autour de l'axe de rotation (19) étant permise. 10
17. Partie de châssis (22) selon la revendication 15 ou 16, **caractérisée en ce qu'elle** comprend également des moyens de support (31) qui sont disposés afin de fixer une pièce de verrouillage (14) sur la partie de châssis (22) de sorte que la partie de châssis (22) puisse pivoter autour dudit axe de rotation (19) relativement à la pièce de verrouillage (14). 20

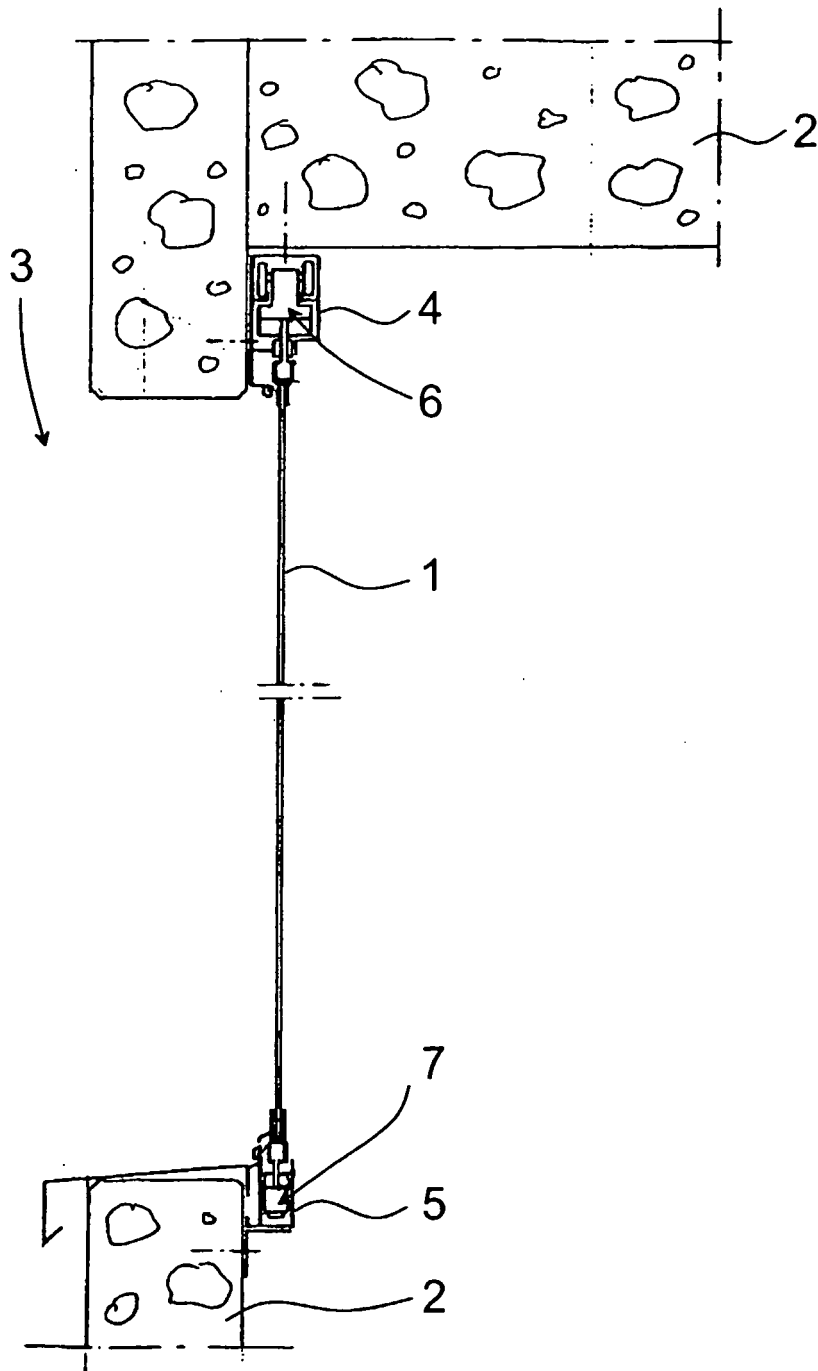


Fig. 1

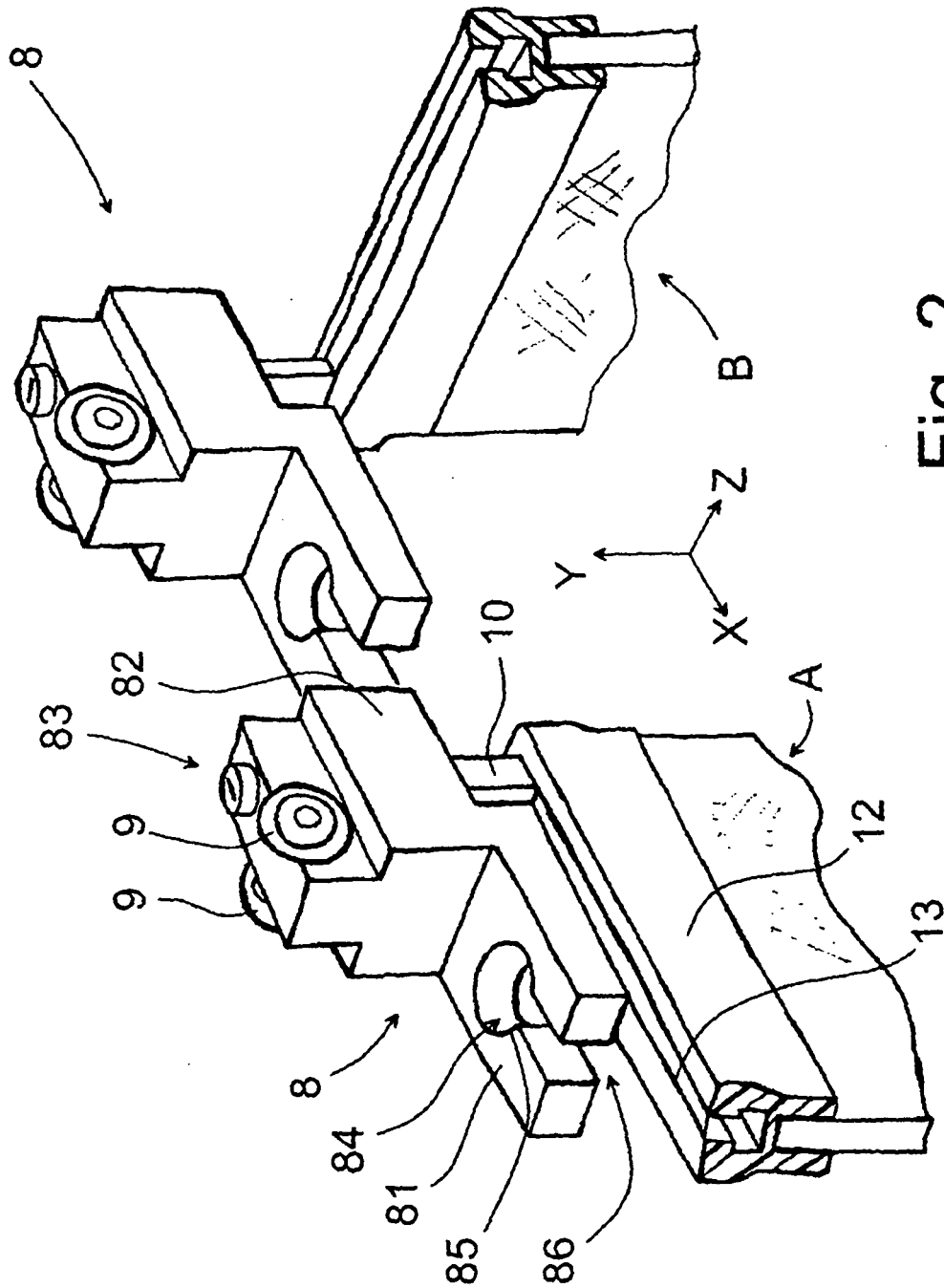


Fig. 2
- PRIOR ART -

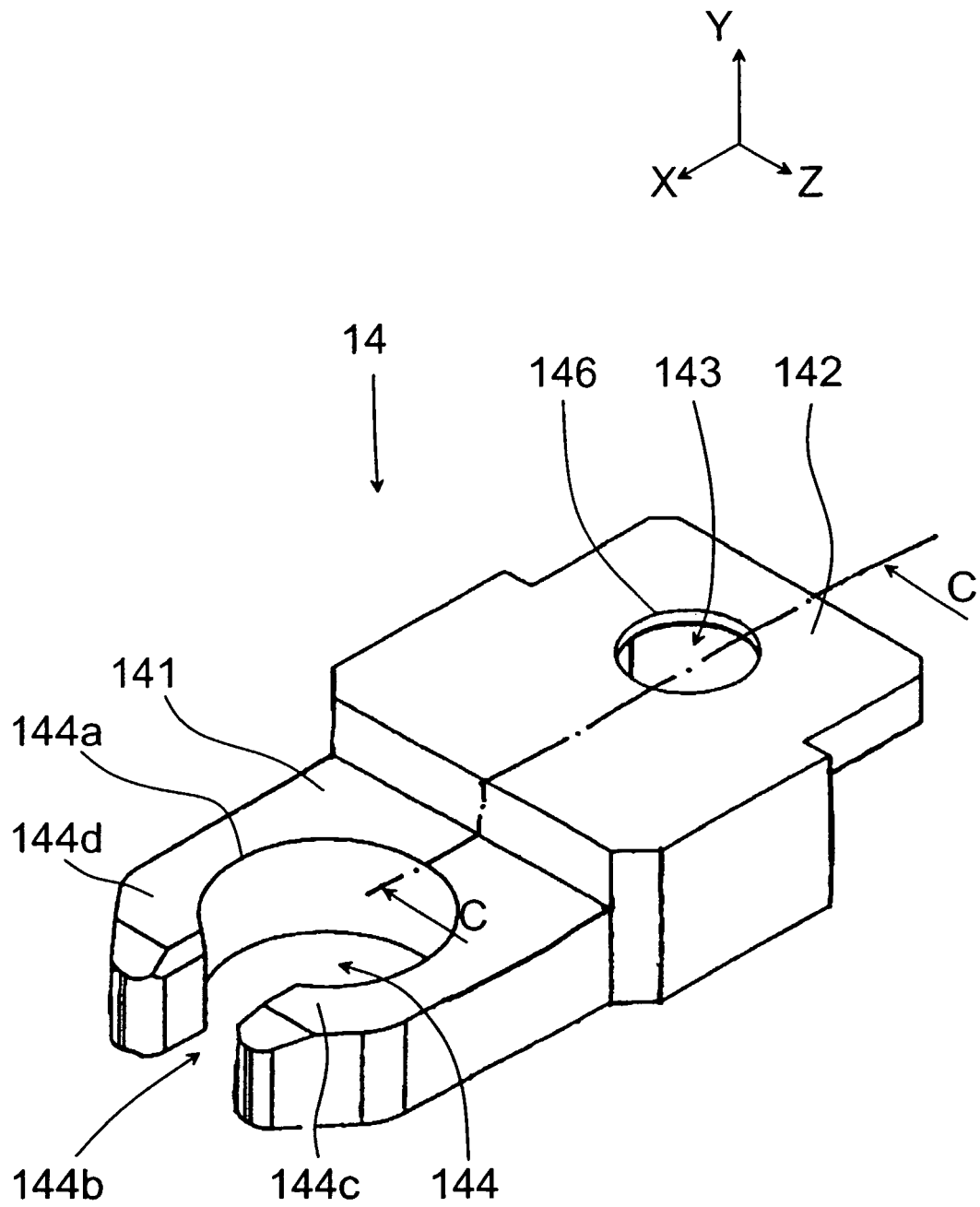


Fig. 3

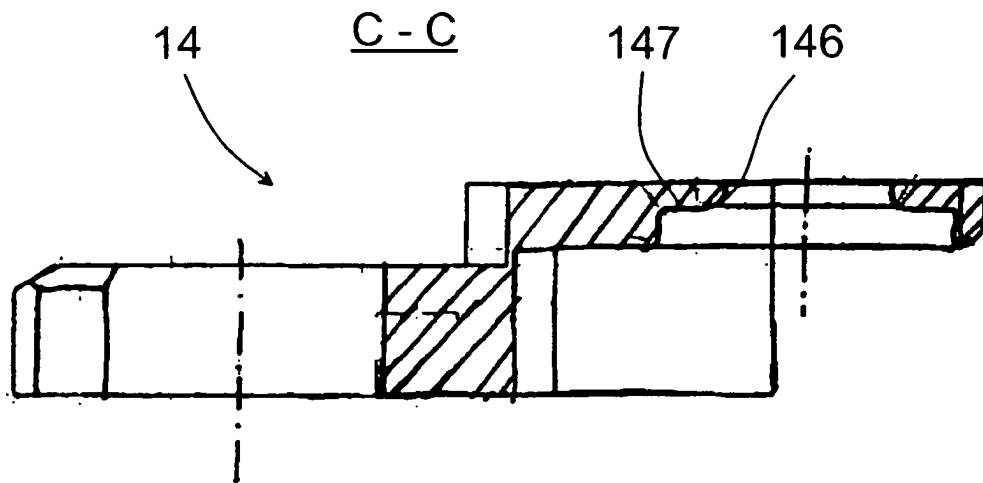


Fig. 4

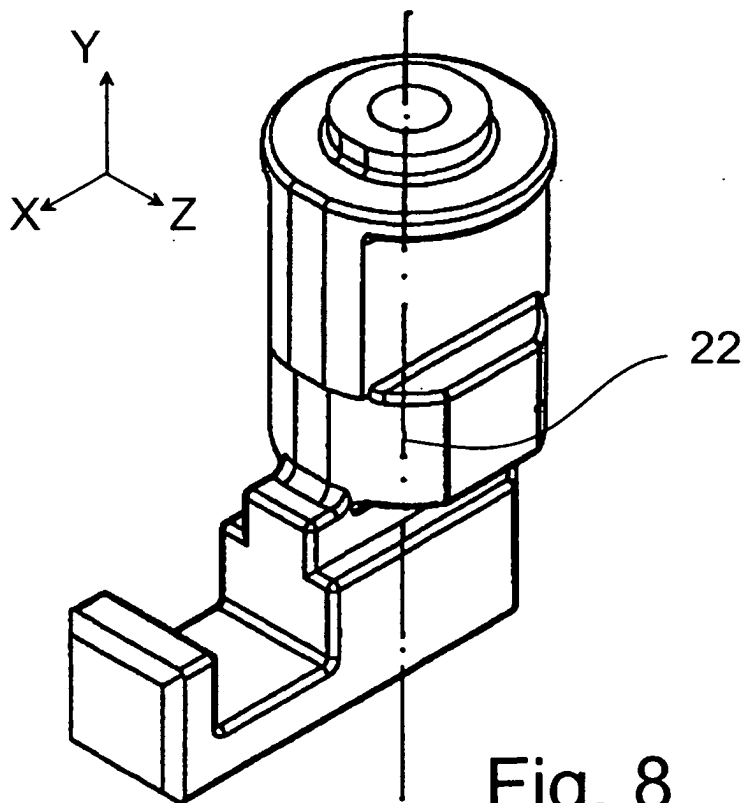


Fig. 8

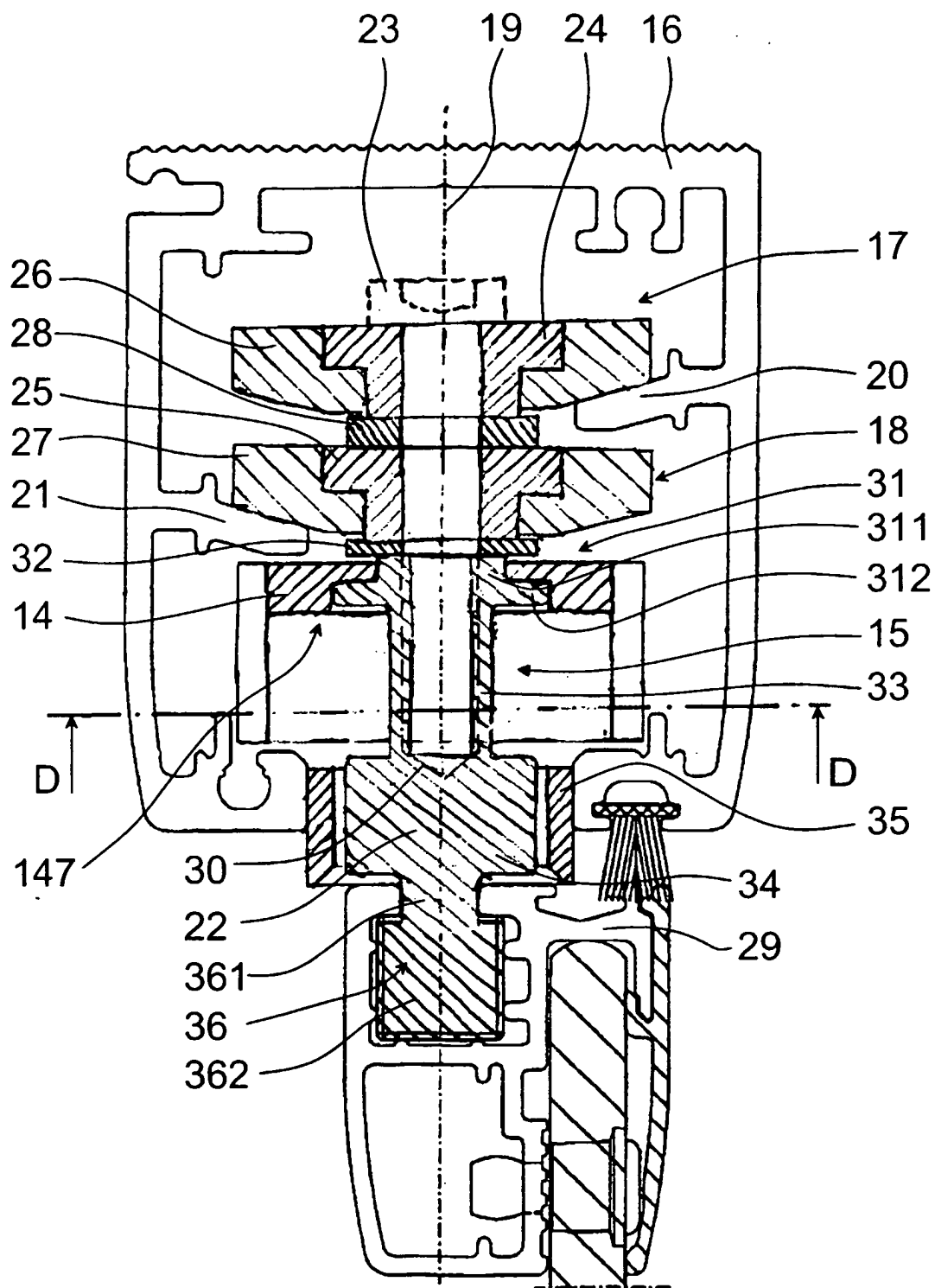


Fig. 5

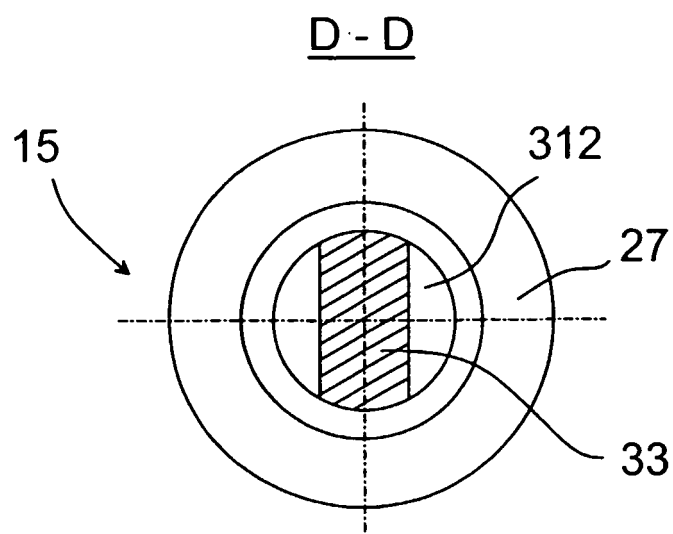


Fig. 6

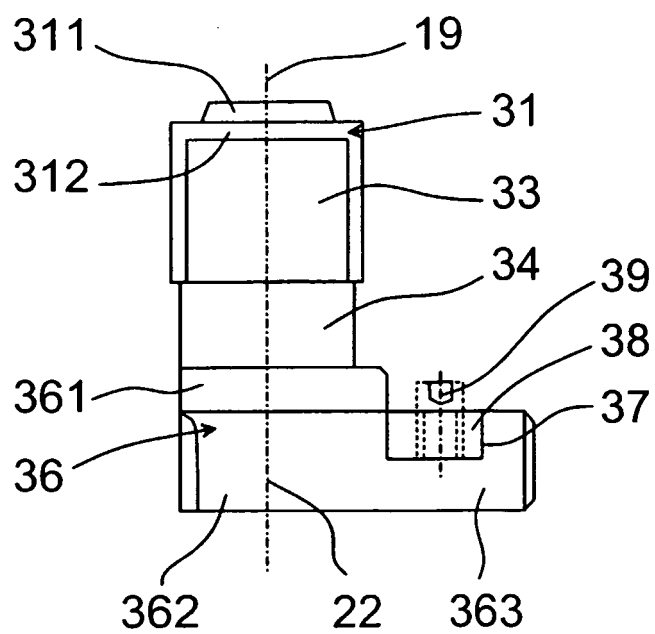


Fig. 7

REFERENCES CITED IN THE DESCRIPTION

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