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(54) MOVABLE WALL SYSTEM

BEWEGLICHES WANDSYSTEM

SYSTÈME DE PAROI MOBILE

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(73) Proprietor: **Veijalainen, Panu**
02330 Espoo (FI)

(72) Inventor: **Veijalainen, Panu**
02330 Espoo (FI)

(74) Representative: **Papula Oy**
P.O. Box 981
00101 Helsinki (FI)

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Description

FIELD OF THE INVENTION

[0001] The invention relates to a movable wall system as defined in the preamble of claim 1.

BACKGROUND OF THE INVENTION

[0002] Systems according to the preamble are previously known for example from publications DE 103 33 612 A1 and DE 100 02 214 A1.

[0003] A suchlike typical movable wall system comprises a number of wall elements. Mounted to the fixed structure of the building is an upper guide by which the wall elements are movable in its guidance and can be turned about a vertical axis to be opened. The upper guide comprises a support or pair of supports. A vertical shaft is mounted at the lower end to the upper edge of a wall element, and a wheel or a pair of wheels is fitted with a bearing to the shaft and arranged to be supported by the support or pair of supports and to move in the guidance of the support or pair of supports, constituting the wheel or pair of wheels on the hinge side of the wall element.

[0004] To hinge the wall element, a hinge device is arranged to lock the wheel or pair of wheels in place immovably relative to the upper guide for turning of the wall element so that the wall element may be turned about the vertical central axis of the shaft. The hinge device comprises a hinging part mounted to the upper guide and typically comprising a cavity with a concave round first surface. A counterpart is mounted to the shaft on the same plane with the hinging part. The counterpart comprises a convex round second outer surface so that when aligned with the hinging part as the wall element is being turned, the second surface of the counterpart is able to turn inside the first surface of the cavity to lock the wall element in place.

[0005] In the known solutions, the concave first surface and the matching convex second surface are cylinder surfaces.

[0006] The problem is that in top-hung heavy movable wall systems in which the lower end of a wall element is not supported by any guide in the lateral direction, such wall element may be in a slightly tilted position relative to the vertical plane when it is being opened, so that said cylinder surfaces are not parallel and instead form a point- or line-type contact to each other. In this case, the surface pressure of their contact is applied over a small area which increases the friction that resists the turning action, making the opening of the wall element more difficult and wearing the parts of the hinge device. Further, the vertical cylinder surfaces do not support hinging in the vertical direction. In addition, the edge of the cylindrical counterpart easily collides with the hinging part because the entire height of the cylinder surface must be caught at once in the cavity of the hinging part. Therefore, the cylinder edge must often be beveled, which requires larger opening angle before the wall element is "under control".

OBJECTIVE OF THE INVENTION

[0007] The objective of the invention is to eliminate the drawbacks referred to above.

SUMMARY OF THE INVENTION

[0008] The movable wall system according to the invention is characterized by what has been presented in claim 1.

[0009] The movable wall system according to the invention comprises

- wall elements,
- an upper guide mounted to the fixed structure of the building, so that the wall elements are movable by the upper guide in its guidance and can be turned about a vertical axis to be opened, the upper guide comprising a support or pair of supports,
- a substantially vertical shaft mounted at the lower end to the upper edge of a wall element,
- a wheel or pair of wheels fitted with a bearing to the shaft and arranged to be supported by the support or pair of supports to move in the guidance of the support or pair of supports, constituting the wheel or pair of wheels on the hinge side of a wall element, and
- a hinge device for locking the wheel or pair of wheels in place immovably relative to the upper guide for turning a wall element so that it may be turned about the vertical central axis of the shaft, the hinge device comprising

    -- a hinging part mounted to the upper guide and comprising a cavity with a concave round first surface, and

    -- a counterpart mounted to the shaft on the same plane with the hinging part and comprising a convex round second surface, so that when the counterpart is aligned with the hinging part as a wall element is being turned, the second surface of the counterpart is able to turn inside the first surface of the cavity to lock the wall element in place.

[0010] According to the invention, the first surface and the second surface consist of parts of a spherical surface having their center of curvature on the central axis.

[0011] The advantage of the invention is that in cooperating with each other said spherical surfaces center each other efficiently and provide good support for turning the wall element right from the beginning of the turning action.

[0012] In one embodiment of the system, the first surface and the second surface are spherical calotte sur-

faces.

[0013] In one embodiment of the system, the first surface and/or the second surface is a hemispheric surface.

[0014] In one embodiment of the system, the system comprises a second wheel or pair of wheels connected to the upper edge of a wall element at a distance from the first wheel or pair of wheels, constituting the wheel or pair of wheels on the opening side of the wall element so that when the wall element is being moved by the upper guide in its guidance, the second wheel or pair of wheels is supported by the upper guide and when the wall element is being opened the wheel or pair of wheels can be withdrawn from the support of the upper guide, and a second support or pair of supports in parallel with the first support or pair of supports, arranged below the first support or pair of supports, so that the second wheel or pair of wheels is arranged to move as supported by the support or pair of supports. The hinging part is mounted to the upper guide in said space in which the second wheel or pair of wheels has been arranged to move.

[0015] In one embodiment of the system, the upper guide is a substantially hollow box-shaped light metal profile wherein the interior space is limited in the lateral direction by vertical side walls. The first pair of supports is formed by two flanges extending towards each other from the side walls in the interior space of the upper guide profile and comprising round rolling surfaces for the first wheel or pair of wheels, with a first gap through which the shaft extends down provided between the flanges. The second pair of supports is formed by two flanges extending towards each other at the lower edge of the upper guide profile and comprising round rolling surfaces for the second wheel or pair of wheels, with a second gap aligned with the first gap provided between the flanges, through which second gap the shaft extends down and out from the interior space of the upper guide profile.

[0016] In one embodiment of the system, the center of curvature of the rolling surfaces of the flanges in the first pair of supports is provided on the central axis.

[0017] In one embodiment of the system, the center of curvature of the rolling surfaces of the flanges in the second pair of supports is provided on the central axis.

LIST OF FIGURES

[0018] In the following section, the invention will be described in detail with examples of its embodiments and with reference to the accompanying drawing in which

Fig. 1 presents a side view of a first embodiment of the movable wall system according to the invention in a closed position,
Fig. 2 presents a side view of the movable wall system of Fig. 1 in an opened position,
Fig. 3 shows section III-III of Fig. 1,
Fig. 4 shows section IV-IV of Fig. 1,
Fig. 5 illustrates a situation corresponding to Fig. 3 where a wall element has been turned for 90°,
Fig. 6 shows section VI-VI of Fig. 3,
Fig. 7, analogous to Fig. 6, illustrates the turning of a wall element towards the position of Fig. 5 and 8, and
Fig. 8 shows section VIII-VIII of Fig. 5.

DETAILED DESCRIPTION OF THE INVENTION

[0019] Fig. 1 illustrates a movable wall system comprising a number of wall elements 1, there being four of them in the illustrated example. The movable wall system of Fig. 1 is in a closed position in which the wall elements are disposed successively on the same vertical plane forming a partition. In Fig. 2 the movable wall system is in an opened position in which the wall elements 1 have been moved side by side and turned into a position perpendicular to the image plane.

[0020] The system is a so-called top-hung system, therefore comprising an upper guide 2 mounted to the fixed structure of the building so that wall elements 1 can be moved by the upper guide in its guidance. The entire weight of the wall elements 1 is laid on the upper guide 2. Illustrated in Fig. 1 is a straight upper guide 2, but also angles, curves and other forms apart from straight may be provided in the upper guide 2. In addition, the wall elements 1 may be turned about a vertical axis to open the wall, as will be described in more detail in connection with Fig. 2.

[0021] In this example, the wall elements 1 are glass elements, each comprising a rectangular glass pane 17 and a frame profile 18 mounted to the horizontal upper edge of the glass pane 13. Also the lower edge comprises a corresponding frame profile. The vertical side edges of the glass pane 17 are preferably frameless.

[0022] The upper guide 2 comprises a first support flange 3 or pair of flanges 3^1, 3^2 which is substantially continuous for its entire length, and below a parallel second support flange 13 or pair of flanges 13^1, 13^2 which is interrupted by an opening 19.

[0023] As also seen from Fig. 2 and 3, each movable element 1 comprises two wheels or pairs of wheels wherein the first wheel 5 or pair of wheels 5^1, 5^2 moves by the upper first support flange 3 or pair of support flanges 3^1, 3^2 on the so-called hinge side.

[0024] The first wheel 5 or pair of wheels 5^1, 5^2 is fitted with a bearing to a vertical shaft 4 to rotate about a substantially horizontal axis. The shaft 4 is mounted at the lower end to the upper edge of a wall element 1. The wheel or pair of wheels 5^1, 5^2 has been arranged to be supported by the support or pair of supports 3; 3^1, 3^2.

[0025] As seen from Fig. 1 and 4, the system comprises a second wheel or pair of wheels 12; 12^1, 12^2 connected to the upper edge of the wall element 1 at a distance from the first wheel or pair of wheels 5; 5^1, 5^2. The second wheel or pair of wheels 12; 12^1, 12^2 constitutes the wheel or pair of wheels on the opening side of the wall element 1, so that when the wall element is moved by the upper guide in its guidance, the wheel or pair of wheels is sup-

ported by the upper guide and when the wall element is being opened they may be withdrawn from the support of the upper guide 2 and extracted through an opening 19. The second support or pair of supports 13; 13^1, 13^2 is parallel with the first support or pair of supports 3; 3^1, 3^2 and arranged below the first support or pair of supports. The second wheel or pair of wheels has been arranged to move as supported by the second support or pair of supports.

[0026] As seen from Fig. 1 and 4, a substantially vertical second shaft 20 which is shorter than the first shaft 4 is mounted at the lower end to the frame profile 18 to a distance from the first shaft 4. Fitted with a bearing to the upper end of the second shaft 20 is said second wheel 12 or pair of wheels 12^1, 12^2 on the opening side to rotate about a horizontal axis. The second wheel 12 or pair of wheels 12^1, 12^2 on the opening side moves as supported by the second support 13 or pair of supports 13^1, 13^2. The side wall 14 of the upper guide profile 2 comprises an opening 19 which interrupts the flange 13^2 of the second pair of supports, the opening being wider in the longitudinal direction of the upper guide profile 2 than the second wheel 12 or the wheels 12^1, 12^2 of the second pair of wheels. The opening 19 extends from the lower edge of the upper guide profile 2 to a point below the flanges 3^1, 3^2 of the first pair of supports so that the second pair of wheels 12^1, 12^2 can be withdrawn from the interior space of the upper guide profile 2 and extracted through the opening 19 when the wall element 1 is being opened. In different wall elements, the distance between the first shaft 4 and the second shaft 20 is adapted so that when moved to a hinging site the second wheel 12 or pair of wheels 12^1, 12^2 in a movable element 1 is always caught at the opening 20 to be extracted.

[0027] As seen from Fig. 3 and 6 to 8, to lock the first wheel or pair of wheels 5; 5^1, 5^2 in place immovably relative to the upper guide 2 for turning the wall element 1, a hinge device 6 is provided. The hinge device 6 allows turning of the wall element 1 about the vertical central axis L of the shaft 4. The hinge device 6 comprises a hinging part 7 mounted to the upper guide 2. The hinging part comprises a cup-shaped cavity 8 with a concave round first inner surface 9. This concave first surface 9 is substantially in the form of a hemisphere or spherical calotte. Mounted to the shaft 4 is a counterpart 10 on the same plane with the hinging part 7. The counterpart 10 comprises a convex round second outer surface 11 in the form of a hemisphere or spherical calotte so that when the counterpart is aligned with the hinging part as the wall element is being turned, the second surface 11 of the counterpart 10 is able to turn inside the first surface 9 of the cavity to lock the wall element 1 in place to form a hinge. The center of curvature of the first surface 9 and the second surface 11 is provided on the central axis L about which the turning action is performed.

[0028] As seen from Fig. 6, the spherical first surface 9 and second surface 11 provide right from the beginning of the turning of a wall element 1 good support for guiding the turning action. Even if the wall element 1 would be slightly tilted relative to the vertical plane in the beginning of the turning action, the hinge device 6 directs the wall element 1 to be parallel with the vertical plane.

[0029] Still referring to Fig. 3, the hinging part 7 is mounted to the upper guide 2 in a space between the first support 3 and the second support 13 where the second wheel or pair of wheels 12; 12^1, 12^2 has been arranged to move.

[0030] As seen from Fig. 3 to 4, the upper guide 2 is a substantially hollow box-shaped light metal profile wherein the interior space is limited in the lateral direction by vertical side walls 14. The first pair of supports 3^1, 3^2 is formed by two flanges 3^1 and 3^2 extending towards each other from the side walls 14 in the interior space of the upper guide profile and comprising round rolling surfaces for the first wheel or pair of wheels 5; 5^1, 5^2, with a first gap 15 through which the shaft 4 extends down provided between the flanges. The second pair of supports 13^1, 13^2 is formed by two flanges 13^1, 13^2 extending towards each other at the lower edge of the upper guide profile 2 and similarly comprising round rolling surfaces for the second wheel or pair of wheels 12; 12^1, 12^2. Provided between the flanges 13^1, 13^2 is a second gap 16 aligned with the first gap 15, through which second gap the shaft 4 extends down and out from the interior space of the upper guide profile 2.

[0031] Fig. 3 and 5 illustrate yet another preferred feature of the system, i.e. the wheels 5^1, 5^2 of the first pair of wheels being shaped so as to have their outer surfaces on a spherical surface with a center of the radius on the vertical central axis L of the shaft 4, about which axis the wall element 1 turns at the hinging site. Similarly, the center of curvature of the flanges 3^1, 3^2 in the first pair of supports is provided on said central axis on the same horizontal line with the center of the radius of the wheels 5^1, 5^2 so that the wheels 5^1, 5^2 of the first pair of wheels can be easily turned about the central axis L inside the upper guide 2 between the positions of Fig. 3 and 5. The wheels constituted by the first pair of wheels 5^1, 5^2 are preferably similar to the wheels constituted by the second pair of wheels 12^1 and 12^2.

[0032] The invention is not limited merely to the examples of its embodiments referred to above; instead, many variations are possible within the scope of the inventive idea defined by the claims.

Claims

1. A movable wall system comprising

- wall elements (1),
- an upper guide (2) mounted to the fixed structure of the building, so that the wall elements can be moved by the upper guide in its guidance and turned about a vertical axis to be opened, the upper guide (2) comprising a support or pair

of supports (3; 3^1, 3^2),
- a substantially vertical shaft (4) mounted at the lower end to the upper edge of a wall element (1),
- a wheel or pair of wheels (5; 5^1, 5^2) fitted with a bearing to the shaft (4) and arranged to be moved as supported by the support or pair of supports (3; 3^1, 3^2) in the guidance of the support or pair of supports, constituting the wheel or pair of wheels on the hinge side of a wall element (1), and
- a hinge device (6) for locking the wheel or pair of wheels (5; 5^1, 5^2) in place immovably relative to the upper guide (2) for turning the wall element (1), so that the wall element (1) may be turned about the vertical central axis (L) of the shaft (4), the hinge device comprising

-- a hinging part (7) mounted to the upper guide (2) and comprising a cavity (8) with a concave round first surface (9), and
-- a counterpart (10) mounted to the shaft (4) on the same plane with the hinging part (7) and comprising a convex round second surface (11) so that when the counterpart is aligned with the hinging part as the wall element is being turned, the second surface (11) of the counterpart is able to turn inside the first surface (9) of the cavity to lock the wall element (1) in place, **characterized in that** the first surface (9) and the second surface (11) consist of parts of a spherical surface having their the center of curvature on the central axis (L).

2. The system according to claim 1, **characterized in that** the first surface (9) and the second surface (11) are spherical calotte surfaces.

3. The system according to claim 1 or 2, **characterized in that** the first surface (9) and/or the second surface (11) is a hemispheric surface.

4. The system according to any one of claims 1 to 3, **characterized in that** the system comprises a second wheel or pair of wheels (12; 12^1, 12^2) connected to the upper edge of the wall element (1) at a distance from the first wheel or pair of wheels (5; 5^1, 5^2) and constituting the wheel or pair of wheels (5; 5^1, 5^2) on the opening side of the wall element, so that when the wall element is being moved by the upper guide (2) in its guidance the wheel or pair of wheels (5; 5^1, 5^2) is supported by the upper guide (2) and when the wall element (1) is being opened the wheel or pair of wheels (5; 5^1, 5^2) can be withdrawn from the support of the upper guide, and a second support or pair of supports (13; 13^1, 13^2) in parallel with the first support or pair of supports (3; 3^1, 3^2) and arranged below the first support or pair of supports, the second wheel or pair of wheels (12; 12^1, 12^2) being arranged to move as supported by the support or pair of supports, and that the hinging part (7) is mounted to the upper guide (2) in said space where the second wheel or pair of wheels (12; 12^1, 12^2) is arranged to move.

5. The system according to any one of claims 1 to 4, **characterized in that** the upper guide (2) is a substantially hollow box-shaped light metal profile wherein the interior space is limited in the lateral direction by vertical side walls (14),
that the first pair of supports is formed by two flanges (3^1 and 3^2) extending towards each other from the side walls (14) in the interior space of the upper guide profile and comprising round rolling surfaces for the first wheel or pair of wheels (5; 5^1, 5^2) with a first gap (15) through which the shaft (4) extends down provided between the flanges,
that the second pair of supports (13^1, 13^2) is formed by two flanges (13^1, 13^2) extending towards each other at the lower edge of the upper guide profile (2) and comprising round rolling surfaces for the second wheel or pair of wheels (12; 12^1, 12^2), with a second gap (16) aligned with the first gap (15) provided between the flanges, through which second gap (16) the shaft (4) extends down and out from the interior space of the upper guide profile.

Patentansprüche

1. Bewegbares Wandsystem, umfassend:

- Wandelemente (1);
- eine obere Führungsschiene (2), die an dem festen Aufbau des Gebäudes angebracht wird, so dass die Wandelemente durch die obere Führungsschiene in ihrer Führung bewegt und um eine vertikale Achse gedreht werden können, um geöffnet zu werden, wobei die obere Führungsschiene (2) eine Halterung oder ein Paar von Halterungen (3; 3^1, 3^2) aufweist;
- eine im Wesentlichen vertikale Welle (4), die am unteren Ende an der oberen Kante eines Wandelements (1) angebracht ist;
- ein Rad oder Paar von Rädern (5; 5^1, 5^2), die mit einem Lager für die Welle (4) ausgerüstet und eingerichtet sind, um bei Lagerung durch die Halterung oder ein Paar von Halterungen (3; 3^1, 3^2) in der Führung der Halterung oder eines Paars von Halterungen bewegt zu werden, und das Rad oder Paar von Rädern auf der Anschlagseite eines Wandelements (1) bilden; und
- eine Gelenkvorrichtung (6) zum Festklemmen des Rades oder Paars von Rädern (5; 5^1, 5^2), unbeweglich relativ zu der oberen Führungsschiene (2) zum Drehen des Wandelements (1),

so dass das Wandelement (1) um die vertikale mittlere Achse (L) der Welle (4) gedreht werden kann, wobei die Gelenkvorrichtung umfasst:

- - ein gelenkig drehendes Stück (7), das an der oberen Führungsschiene (2) angebracht ist und einen Hohlraum (8) mit einer nach innen gewölbten, kreisrunden ersten Fläche (9) aufweist; und
- - ein Gegenstück (10), das an der Welle (4) auf der gleichen Ebene mit dem gelenkig drehenden Stück (7) angebracht ist und eine nach außen gewölbte, kreisrunde zweite Fläche (11) aufweist, so dass die zweite Fläche (11) des Gegenstücks, wenn das Gegenstück mit dem gelenkig drehenden Stück bei Drehung des Wandelements fluchtet, sich im Innern der ersten Fläche (9) des Hohlraums drehen kann, um das Wandelement (1) festzuklemmen, **dadurch gekennzeichnet, dass** die erste Fläche (9) und die zweite Fläche (11) aus Teilen einer Kugelfläche bestehen, die den Krümmungsmittelpunkt auf der mittleren Achse (L) aufweist.

2. System nach Anspruch 1, **dadurch gekennzeichnet, dass** die erste Fläche (9) und die zweite Fläche (11) kugelförmige Kalottenflächen sind.

3. System nach Anspruch 1 oder 2, **dadurch gekennzeichnet, dass** die erste Fläche (9) und/oder die zweite Fläche (11) eine halbkugelförmige Fläche ist.

4. System nach einem der Ansprüche 1 bis 3, **dadurch gekennzeichnet, dass** das System ein zweites Rad oder Paar von Rädern (12; 12^1, 12^2) aufweist, die mit der oberen Kante des Wandelements (1) in einem Abstand von dem ersten Rad oder Paar von Rädern (5; 5^1, 5^2) verbunden sind und das Rad oder Paar von Rädern (5; 5^1, 5^2) auf der Öffnungsseite des Wandelements bilden, so dass das Rad oder Paar von Rädern (5; 5^1, 5^2), wenn das Wandelement durch die obere Führungsschiene (2) in ihrer Führung bewegt wird, durch die obere Führungsschiene (2) gelagert werden, und wenn das Wandelement (1) geöffnet wird, das Rad oder Paar von Rädern (5; 5^1, 5^2) von der Halterung der oberen Führungsschiene und einer zweiten Halterung oder Paar von Halterungen (13; 13^1, 13^2), parallel zu der ersten Halterung oder einem Paar von Halterungen (3; 3^1, 3^2) und unterhalb der ersten Halterung oder dem Paar von Halterungen angeordnet, zurückgezogen werden kann, wobei das zweite Rad oder Paar von Rädern (12; 12^1, 12^2) angeordnet sind, um sich bei Unterstützung durch die Halterung oder das Paar von Halterungen zu bewegen; und dass das gelenkig drehende Stück (7) an der oberen Führungsschiene (2) in dem Raum angebracht ist, in dem das zweite Rad oder Paar von Rädern (12; 12^1, 12^2) angeordnet sind, um sich zu bewegen.

5. System nach einem der Ansprüche 1 bis 4, **dadurch gekennzeichnet, dass** die obere Führungsschiene (2) ein im Wesentlichen kastenförmiges Hohlprofil aus Leichtmetall ist, bei dem der innen gelegene Raum in der Querrichtung durch vertikale Seitenwände (14) begrenzt ist,
dass das erste Paar von Halterungen durch zwei Flansche (3^1 und 3^2) gebildet wird, die sich zueinander von den Seitenwänden (14) in dem innen gelegenen Raum des oberen Führungsschienenprofils erstrecken und kreisrunde Rollflächen für das erste Rad oder Paar von Rädern (5; 5^1, 5^2) aufweisen, wobei ein erster Spalt (15), durch den sich die Welle (4) nach unten erstreckt, zwischen den Flanschen vorgesehen ist,
dass das zweite Paar von Halterungen (13^1, 13^2) durch zwei Flansche (13^1, 13^2) gebildet wird, die sich zueinander an der unteren Kante des oberen Führungsschienenprofils (2) erstrecken und kreisrunde Rollflächen für das zweite Rad oder Paar von Rädern (12; 12^1, 12^2) aufweisen, wobei ein zweiter Spalt (16) mit dem zwischen den Flanschen vorgesehenen ersten Spalt (15) fluchtet, wobei sich durch den zweiten Spalt die Welle (4) nach unten und aus dem innen gelegenen Raum des oberen Führungsschienenprofils heraus erstreckt.

Revendications

1. Système de paroi amovible comprenant

- des éléments de paroi (1),
- un guide supérieur (2) monté sur la structure fixe du bâtiment, de sorte que les éléments de paroi puissent être déplacés par le guide supérieur dans son guidage et tournés autour d'un axe vertical pour être ouverts, le guide supérieur (2) comprenant un support ou une paire de supports (3 ; 3^1, 3^2),
- un arbre sensiblement vertical (4) monté à l'extrémité inférieure sur le bord supérieur d'un élément de paroi (1),
- une roue ou une paire de roues (5 ; 5^1, 5^2) équipées d'un palier sur l'arbre (4) et agencées pour être déplacées et supportées par le support ou la paire de supports (3 ; 3^1 ; 3^2) dans le guidage du support ou de la paire de supports, constituant la roue ou la paire de roues sur le côté charnière d'un élément de paroi (1), et
- un dispositif de charnière (6) permettant de verrouiller la roue ou la paire de roues (5 ; 5^1 ; 5^2) en place de manière inamovible par rapport au guide supérieur (2) pour tourner l'élément de pa-

roi (1), de sorte que l'élément de paroi (1) puisse être tourné autour de l'axe central vertical (L) de l'arbre (4), le dispositif de charnière comprenant

-- une partie de montage en charnière (7) montée sur le guide supérieur (2) et comprenant une cavité (8) avec une première surface ronde concave (9), et

-- une pièce complémentaire (10) montée sur l'arbre (4) sur le même plan avec la partie de montage en charnière (7) comprenant une seconde surface ronde convexe (11) de sorte que lorsque la pièce complémentaire est alignée avec la partie de montage en charnière à mesure que l'élément de paroi est tourné, la seconde surface (11) de la pièce complémentaire soit apte à tourner à l'intérieur de la première surface (9) de la cavité pour verrouiller l'élément de paroi (1) en place, **caractérisé en ce que** la première surface (9) et la seconde surface (11) consistent en des pièces d'une surface sphérique ayant leur centre de courbure sur l'axe central (L).

2. Système selon la revendication 1, **caractérisé en ce que** la première surface (9) et la seconde surface (11) sont des surfaces de calotte sphérique.

3. Système selon la revendication 1 ou 2, **caractérisé en ce que** la première surface (9) et/ou la seconde surface (11) est une surface hémisphérique.

4. Système selon l'une quelconque des revendications 1 à 3, **caractérisé en ce que** le système comprend une seconde roue ou une seconde paire de roues (12 ; 12^1, 12^2) reliées au bord supérieur de l'élément de paroi (1) à une distance de la première roue ou de la première paire de roues (5 ; 5^1, 5^2) et constituant la roue ou la paire de roues (5 ; 5^1, 5^2) sur le côté ouverture de l'élément de paroi, de sorte que l'élément de paroi est déplacé par le guide supérieur (2) dans son guidage, la roue ou la paire de roues (5 ; 5^1, 5^2) est supportée par le guide supérieur (2) et lorsque l'élément de paroi (1) est ouvert, la roue ou la paire de roues (5 ; 5^1, 5^2) peuvent être retirées du support du guide supérieur, et un second support ou une seconde paire de supports (13 ; 13^1, 13^2) en parallèle avec le premier support ou la première paire de supports (3 ; 3^1, 3^2) et agencé en dessous du premier support ou de la première paire de supports, la seconde roue ou la seconde paire de roues (12 ; 12^1, 12^2) étant agencée pour se déplacer en étant supportée par le support ou la paire de supports, et **en ce que** la partie de montage en charnière (7) est montée sur le guide supérieur (2) dans ledit espace où la seconde roue ou la seconde paire de roues (12 ; 12^1, 12^2) est agencée pour se déplacer.

5. Système selon l'une quelconque des revendications 1 à 4, **caractérisé en ce que** le guide supérieur (2) est un profilé de métal léger sous forme de boîte sensiblement creuse dans lequel l'espace intérieur est limité dans la direction latérale par des parois de côté verticales (14),
en ce que la première paire de supports est formée par deux brides (3^1 et 3^2) s'étendant l'une vers l'autre depuis les parois de côté (14) dans l'espace intérieur du profilé de guide supérieur et comprenant des surfaces de roulement rondes pour la première roue ou la première paire de roues (5 ; 5^1, 5^2) avec un premier écartement (15) à travers lequel l'arbre (4) s'étend vers le bas, ménagé entre les brides,
en ce que la seconde paire de supports (13^1, 13^2) est formée par deux brides (13^1, 13^2) s'étendant l'une vers l'autre au niveau du bord inférieur du profilé de guide supérieur (2) et comprenant des surfaces de roulement rondes pour la seconde roue ou la seconde paire de roues (12 ; 12^1, 12^2), avec un second écartement (16) aligné avec le premier écartement (15) ménagé entre les brides, un second écartement (16) à travers lequel l'arbre (4) s'étend vers le bas et vers l'extérieur de l'espace intérieur du profilé de guide supérieur.

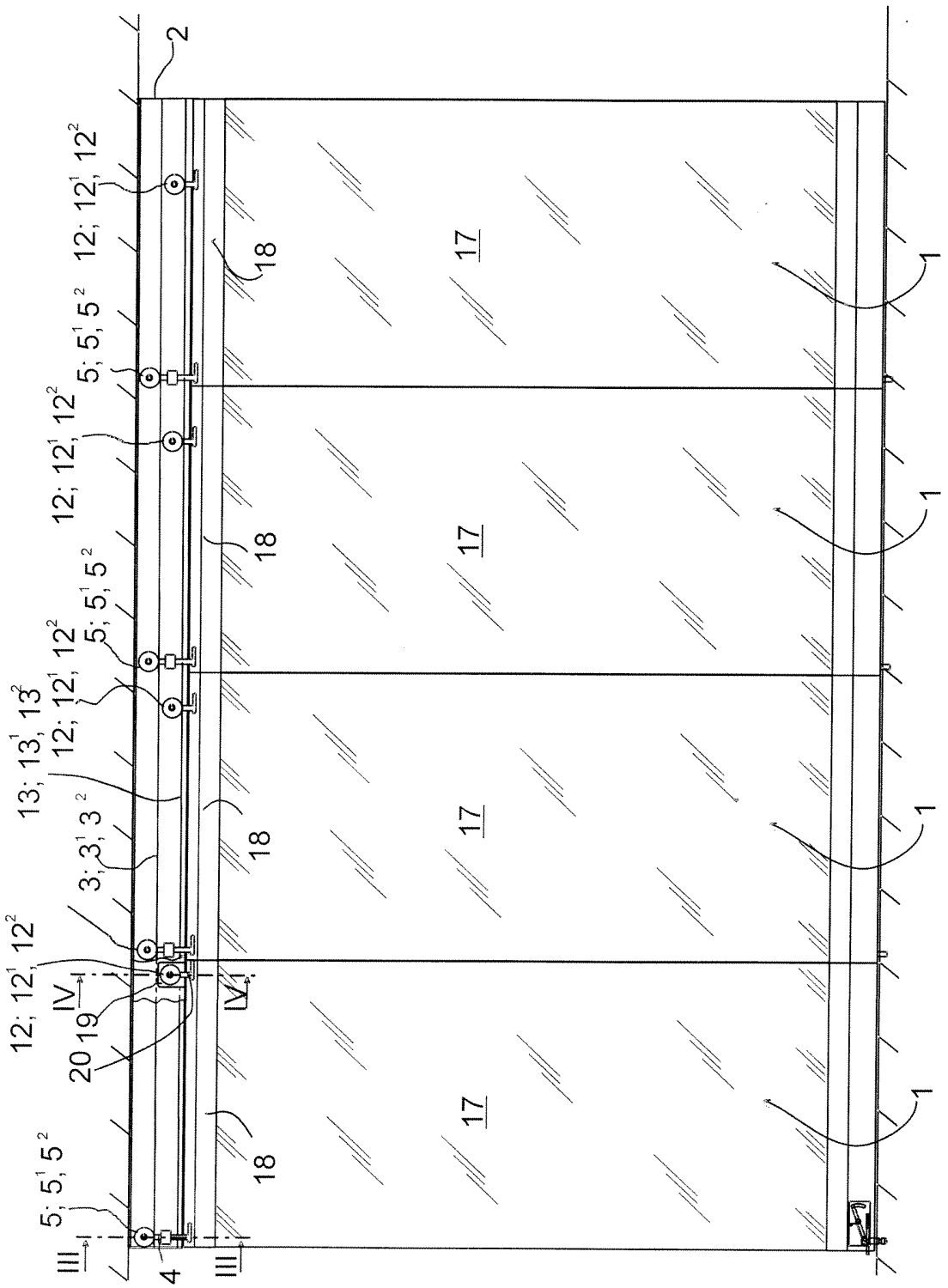

2
12; 12¹, 12²
5; 5¹, 5²
12; 12¹, 12²
5; 5¹, 5²
12; 12¹, 12²
13; 13¹, 13²
3; 3¹, 3²
12; 12¹, 12²
IV
IV
19
20
III
III
4
18
17
1

Fig. 1

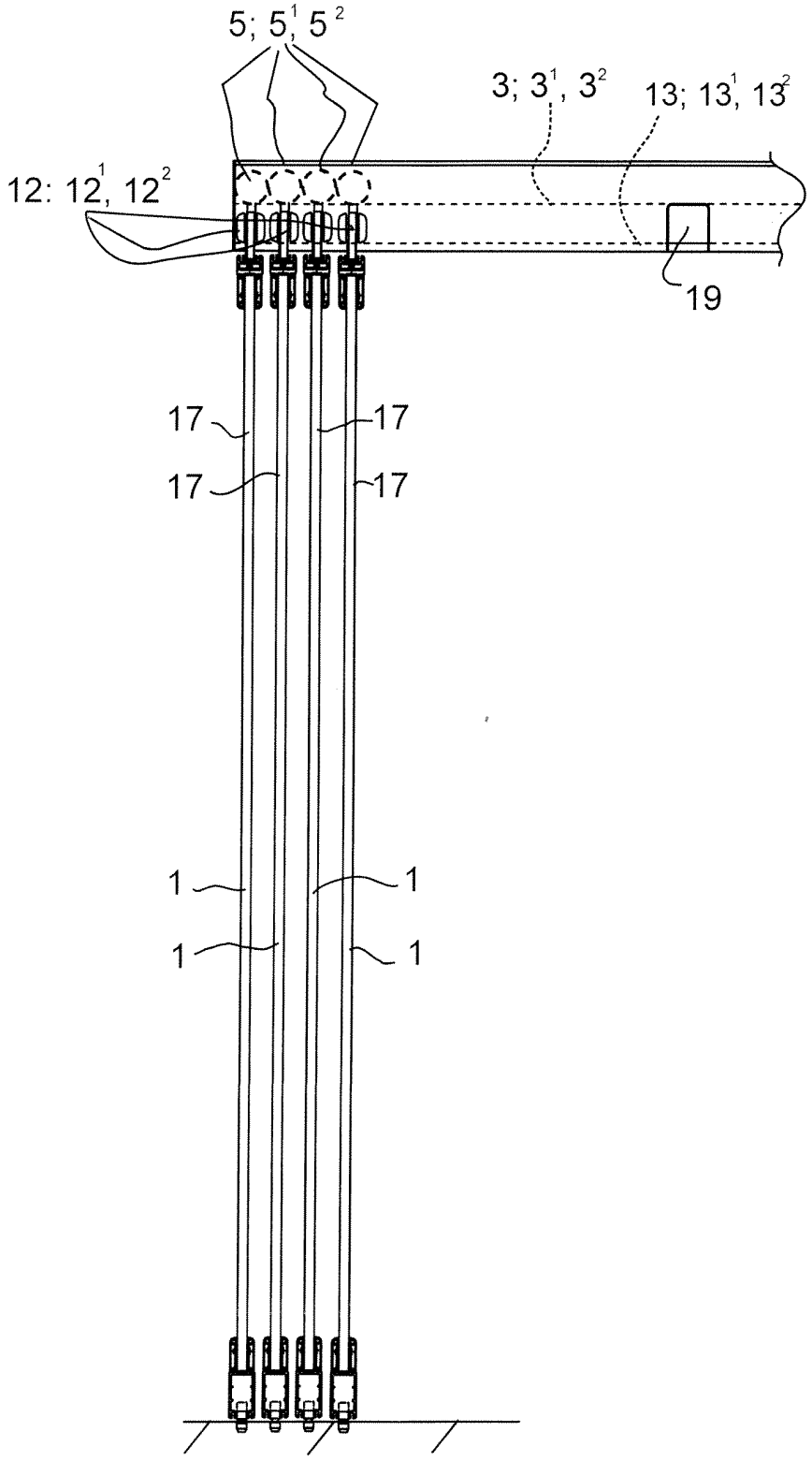


Fig. 2

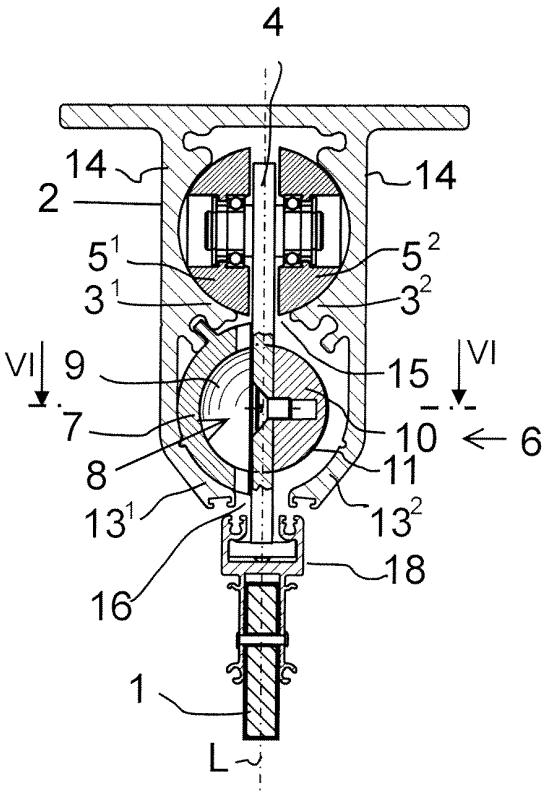


Fig. 3

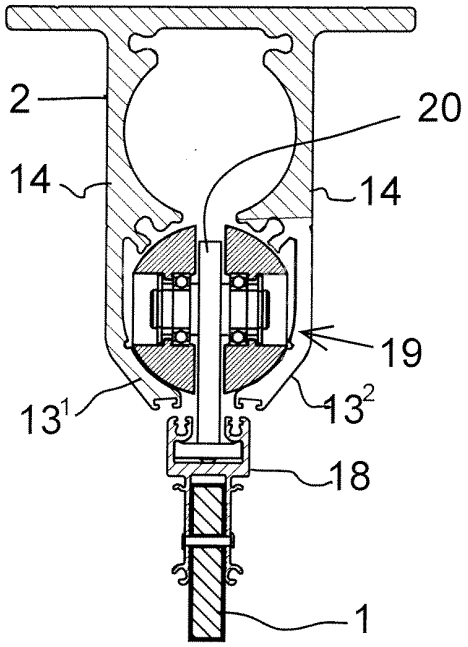


Fig. 4

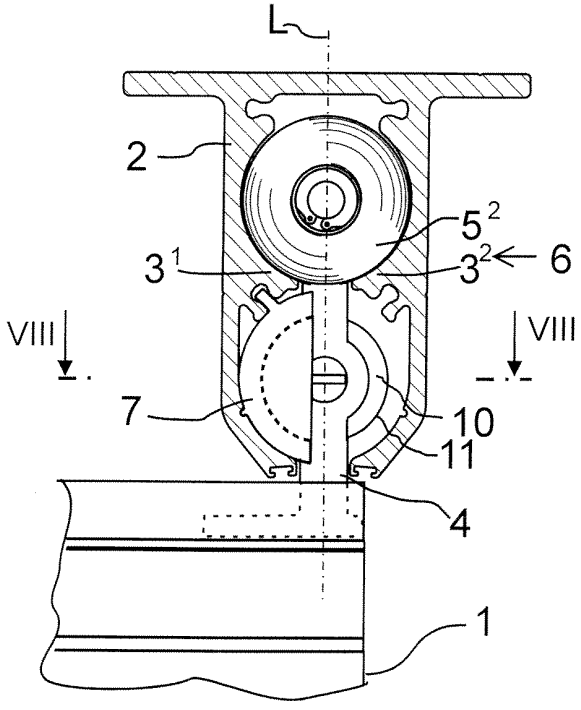


Fig. 5

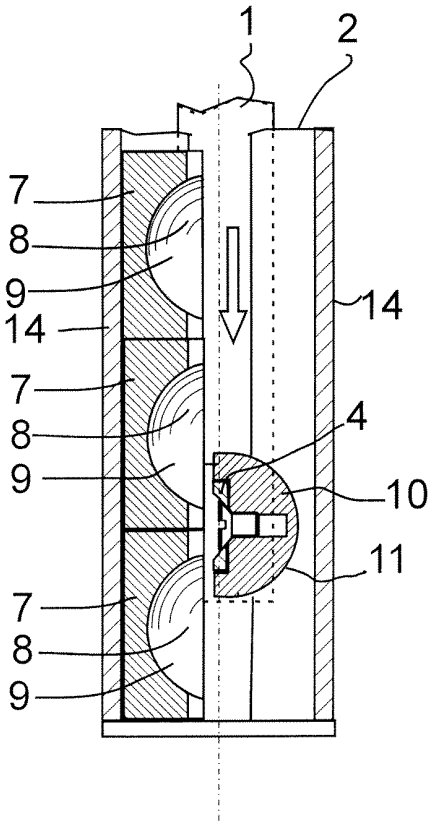


Fig. 6

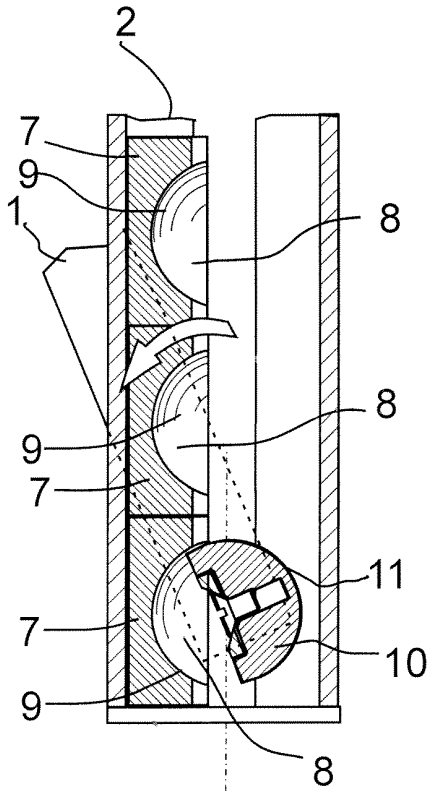


Fig. 7

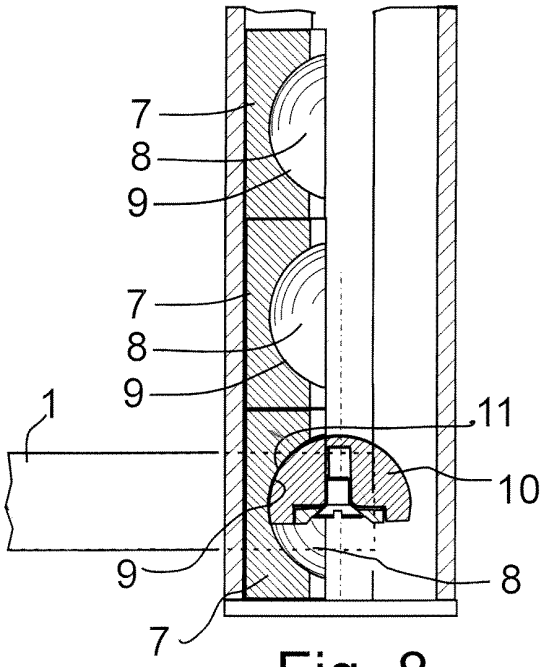


Fig. 8

REFERENCES CITED IN THE DESCRIPTION

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