

Title: Guiding assembly for a sliding door

Description

The invention relates to a guiding assembly for a sliding door, which assembly is fastened at a sub-construction.

5 Such guiding assemblies are well known. Generally, they consist of a substantially circular guiding rail, with a carriage, respectively rollers running on the upper side thereof. The carriage, respectively the rollers are connected to the sliding door via holding elements. Due to
10 structural requirements, these holding elements can be provided only on one side of the guiding rail. This circumstance leads to an off-centred suspension of the sliding door and is therefore unsatisfactory from the technical point of view. In addition, the overall suspension
15 of the sliding door is unsuitable from the visual point of view, as the rollers and the holding elements are visible from the outside and they can only be covered at very significant expense.

An assembly of this species according to the generic part
20 of patent claim 1 is known from DE 299 19 191 U1. The prior art roller rail profile substantially consists of two profiles, which are homogeneously united to an integral profile forming a channel, which enables the rollers of a

carriage to run therein. The running surfaces of the rollers practically form a first undercut of the profile; as the profile is designed to be mounted at a ceiling construction located above the profile, two undercuts are provided, in a side-by-side disposition, above the channel accommodating the
5 carriages, which undercuts accommodate the attachment members for the connection to the ceiling construction. As a prerequisite, the known roller rail profile requires mandatory accessibility from the upper side of the ceiling
10 construction to enable the insertion of the attachment members into the undercuts provided for this purpose.

The document DE 297 02 221 U1 describes a sliding door, which is slidably disposed at a wall of a building. The roller rail for the sliding door is formed as a circular tube, which,
15 in the lower portion thereof, presents a slot for the passage of the carrying members of the sliding door. The circular shape of the guiding rail and an additional joint, disposed between the sliding door and the building wall, on the one hand, should avoid penetration of contaminations into the
20 guiding rail and, on the other hand, achieve sealing of the sliding door in relation to the building wall, and moreover the easiest possible cleaning of the guiding rail.

Therefore, it is an object of the present invention to create a guiding assembly according to the species explained
25 above, which provides a technically and visually appealing

conception for a guiding assembly and is particularly suitable for mounting at a sub-construction, which may consist for example of a glass wall extending parallel to the sliding door.

- 5 This problem is solved with the characteristics specified in patent claim 1. Advantageous further developments result from the dependent claims.

According to the invention, a first undercut, guiding carrying rollers of a carriage, and a second undercut, being
10 disposed off-set by 90°, are disposed at the guiding rail, the guiding rail, in the region of the first undercut, being formed as a profile part having a curved front face, and, in the region of the second undercut, as a profile part having a planar back face, and in that the profile part presenting the
15 first undercut is releasably connected to the profile part presenting the second undercut. Therefore, the sliding door can be suspended in the centre, such that the sliding door and the suspension are not affected by any lateral moment. In addition, the carriage is covered by the guiding rail such
20 that only the guiding rail is perceived from the outside. The latter can be designed visually appealing and thus become an inconspicuous part of the overall impression. The result is a suspension of the sliding door which is satisfactory from the technical, as well as from the aesthetic point of
25 view. The releasability of both profile parts in particular

allows for an installation, for example at a walling, which means a sub-construction, which is inaccessible from the rear side.

With the intention to guarantee a reliable guiding of the carriage in the guiding rail, the channel is provided with an undercut at the open end thereof, oriented to the underside, the undercut forming two lateral running paths for the carriage, which paths are located in the region of the open end. In this way, an additional narrowing of the guiding rail is achieved in the lower portion, such that penetration of contamination into the channel of the guiding rail can be largely avoided.

The guiding rail is formed as a profile part having a planar back face and an arcuate-shaped curved front face. The planar back face of the guiding rail allows for a tight fit at the lateral panels and the rounded front face enhances the visual impression.

One characteristic of independent importance will become apparent through the fact that the carrying rollers of the carriage are supported at an axle, penetrating a cross hole of a carrying body of the carriage, which axle is restrictedly pivotable in vertical direction about an axle which passes through the centre of the carrying body in axial direction of the carriage. A reliable support of respectively both rollers

of a rolling carriage on both guiding paths is achieved with this measure; thereby avoiding an oblique position of the sliding door, if, for example due to construction tolerances, not both rollers of a rolling carriage are permanently
5 supported in the assigned running paths.

In order to be able to reliably attach the guiding rail at the lateral panels, an undercut, extending in the longitudinal direction of the guiding rail, is provided in the back face, which undercut serves to accommodate attachment
10 members for the guiding rail. This undercut allows for the disposition of attachment members at an optional location and thus allows for easy adaptation to structural conditions.

Each attachment member presents a sliding block engaging with play into the undercut, such that tolerances
15 can be easily and quickly compensated.

According to one advantageous embodiment, the sliding block cooperates with an attachment bolt penetrating the lateral panel, which bolt, on the side opposite to the guiding rail, is held in a bearing block sitting close to the lateral
20 panel. This measure allows for a reliable bearing of the guiding rail at the lateral panels, which preferably consist of glass.

With the intention to allow for tolerance compensation in a simple way, advantageously, the attachment bolt is eccentrically disposed or formed as an eccentric.

5 According to an advantageous further development for covering the bearing blocks, a common cover strip is provided for the bearing blocks, which is preferably snapped onto the bearing blocks.

10 To avoid penetration of dirt or other contamination into the open ends of the guiding rail respectively the cover strip, the ends of the guiding rail and of the cover strip can be closed off by profile end caps. The visual impression of the guiding assembly is thus additionally enhanced.

15 The carriage carrying the sliding door advantageously presents two cheeks sitting laterally at the sliding door, which cheeks are penetrated by carrying bolts in the region of both ends of the cheeks. Therefore, a reliable support of the sliding door at the carriage is guaranteed.

20 According to an advantageous embodiment, in the centre region between the cheeks, the carriage presents a carrying body, which accommodates an axle at the ends of which carrying rollers are supported, running on the lateral running paths in the guiding rail. A good and reliable introduction of forces into the guiding rail results from this construction.

The carrying rollers are advantageously seated in apertures of the cheeks and are substantially flush with the exterior surfaces of the cheeks. This allows for a good lateral guidance of the carriage in the guiding rail.

- 5 According to another advantageous further embodiment, the downwards oriented surfaces of the cheeks extend in an arcuate-shaped way to the outside, when seen from the perspective of the carrying roller. It is therefore avoided that, with settling of the overall construction, there might be
10 contact between the carriage and the guiding rail and thus stalling during the translational motion.

According to a preferred further development, the guiding rail is fastened at two lateral panels disposed laterally in the vicinity of the sliding door, which panels are preferably
15 made from the same material as the sliding door, particularly from glass. Especially with a sliding door being part of a glass front, the inventive construction provides a guiding assembly, which positively influences the overall visual impression.

- 20 Further characteristics and advantages of the invention will become apparent from the following description of one preferred embodiment example, in which

- Figure 1: is a view of a glass front comprising a sliding door guided at the inventive guiding assembly,
- 5 Figure 2: is a cross section through the inventive guiding assembly,
- Figure 3: is a perspective view of the guiding rail, which is part of the guiding assembly,
- Figure 4: is a perspective view of the inventive guiding assembly;
- 10 Figure 5: is a perspective view of a bearing block,
- Figure 6: is a perspective view of a cover strip,
- Figure 7 and 8: are perspective views of two profile end caps,
- Figure 9 to 11: are perspective views of the carriage,
- 15 Figure 12: is a perspective view of a stopper,
- Figure 13: is a cross-section through a guiding rail in the region of the stopper, and
- Figure 14: is a view of the sliding door in the region of the carriage,

Figure 15: illustrates an embodiment according to Figure 2 with a guiding rail executed in two pieces,

5 Figure 16: shows the carriage comprising rollers which are restrictedly pivotable in a vertical direction,

Figure 17: is a perspective view of the roller axle, which is restrictedly pivotally supported.

10 The inventive guiding assembly for a sliding door is illustrated in all details in Figures 1 to 17.

15 Figure 1 shows a glass front consisting of two lateral panels 1, 2, an opening, which can be closed by a sliding door 3, and an overpanel 4 provided above the sliding door 3. The sliding door 3 is disposed in a plane in front of the plane of the lateral panels 1, 2, and therefore overlaps the opening. A guiding assembly 5 fastened at both lateral panels 1, 2, and possibly likewise at the overpanel 4 extends above the sliding door.

20 Figure 2 shows a cross-section through the guiding assembly 5 in the region of one of the lateral panels 1, 2, and through the sliding door 3, whereas in Figure 3 a perspective view of a guiding rail 6 is shown. The guiding rail 6 is provided with a channel 7 extending in the

longitudinal direction thereof and open to the underside. In the region of the open side thereof, this channel 7 is provided with undercuts 8 extending laterally into the channel 7, the inner surfaces thereof serving as the guiding paths for the carriages 9 carrying the sliding door 3. The inner surfaces of the guiding paths can be executed even or crowned.

The guiding rail 6 is equipped with a planar back face 10, with which the guiding rail 6 sits close at the lateral panels 1, 2. An undercut 11, into which attachment members 12 are supposed to engage, is provided in the back face 10 and extends in the longitudinal direction of the guiding rail 6. The front face of the guiding rail 6 can be rounded for design reasons and for reducing material.

Figure 4 shows the guiding rail 6 including the associated attachment member 12. In the illustrated embodiment, the attachment member 12 consists of two sliding blocks 13 engaging with lateral play into the undercut 11, of two attachment bolts 14 cooperating with the sliding blocks 13 and penetrating the lateral panels 1, 2, and of a bearing block 15 accommodating the attachment bolt 14, which is illustrated in detail in Figure 5. In the installed condition, the guiding rail 6 is sitting with the back face 10 thereof at one side of the lateral panels 1, 2, whereas the bearing blocks

15 are sitting at the other side of the lateral panels 1, 2, close to them.

The attachment bolts 14 can be disposed eccentrically or they can be provided with an eccentric to compensate
5 tolerances and in order to guarantee a perfect alignment of the guiding rail 6.

Only one attachment member 12 is illustrated in Figure 4, although it is obvious that over the length of the guiding rail 6 several attachment members 12 have to be disposed,
10 spaced apart from each other.

The bearing blocks 15 of all attachment members 12 can be covered by a common cover strip 16, shown in Figure 6, which is preferably snapped onto the bearing blocks 15 (see Figure 2). In addition, the cover strip 16 is penetrated
15 by one of the attachment bolts 14, whereas the other attachment bolt terminates in the bearing block 15.

The attachment bolt 14 penetrating the cover strip 16 is supported in a bushing 17, which itself is supported in the cover strip 16. The bushing 17 is additionally secured by a
20 screw 18, which penetrates the bushing 17 and terminates in the bearing block 15. The attachment bolt 14 penetrating the bushing and the screw 18 are provided with a common decorative cap 19. Furthermore, the attachment member 12 presents spacer sleeves 20 surrounding the attachment

bolts 14. In addition, the open ends of the guiding rail 6 and of the cover strip 16 can be closed off by profile end caps 21, 22, which are illustrated in detail in Figures 7 and 8.

5 Stoppers 23, which will be explained in detail hereinafter in connection with Figures 12 and 13, can be used in the guiding rail 6 for limiting the translational path of the sliding door 3.

10 The carriages 9, carrying the sliding door 3, are guided in the channel 7 of the guiding rail 6. Such carriage 9 is illustrated as a whole in Figure 9 and in details in Figures 10 and 11.

15 The carriage 9 consists of two lateral cheeks 24, 25, which are maintained at a defined distance to each other, corresponding substantially to the thickness of the sliding door 3, by means of a carrying body 26 disposed in the centre of the cheeks 24, 25. The cheeks 24, 25 are provided with boreholes 27 at the end region thereof, which boreholes are penetrated by carrying screws 28 passing likewise through the sliding door 3. The heads of the
20 carrying screws 28 are disposed counter-sunk in the cheeks 24, 25, such that they do not protrude from the exterior side of the cheeks 24, 25.

The carrying body 26, disposed in the centre between both cheeks 24, 25, substantially presents the shape of a semi-

cylinder, the straight side thereof being oriented to the top and the curved side being oriented to the bottom. At the underside, in the region of its vertex, the carrying body 26 is provided with an axle 29 protruding from the carrying
5 body 26 on both sides and extending as far as into the region of the cheeks 24, 25. Carrying rollers 30, located in the apertures 31 in the cheeks 24, 25 and being disposed substantially flush with the exterior surface of the cheeks 24, 25, are supported at the projecting ends of the axle.
10 The carrying rollers 30 protrude from the cheeks 24, 25 at the lower edge, such that they are able to roll on the crowned guiding paths in the channel 7.

When seen from the carrying rollers 30, the lower edges of the cheeks 24, 25 extend in a curve towards the respective
15 ends (see Figures 10 and 11), in order to avoid bottoming of the cheeks 24, 25 on the guiding paths of the undercut 8 during the movement of the sliding door 3.

Figure 12 represents a stopper 23, usable in connection with the guiding rail 6. Figure 13 shows the positioning of
20 the stopper 23 in the guiding rail 6.

The stopper 23 substantially consists of a U-shaped profile, which is open at the underside, into which bottom 32 clamping members 33 are inserted by means of which the stopper 23 can be tightly clamped or blocked within the

guiding rail 6. In the illustrated embodiment example, the clamping members 33 are formed by two nuts, by means of which a clamping part can be pressed against the bottom of channel 7.

- 5 Figure 14 shows a view of the sliding door 3 in the region of the carriage 9. The aperture 34 for the carrying body 26 disposed in the carriage 9 and the through holes 35 for the carrying screws 28 are visible. These through holes 35 are cut out from the sliding door 3 made from glass, they are
10 not drilled.

- According to the embodiment example corresponding to Figure 2, Figure 15 shows the profile parts 39 and 40, releasable by means of a screw connection 41, which parts, after detaching the profile part 39, allow for
15 connecting the guiding rail 6 at a wall which is inaccessible from the rear side.

- Figure 16 shows the carriage according to Figure 9 with a riveted connection 42 between the carrying body 26 and the cheeks 24 and 25, as well as the arrow X indicating the
20 restrictedly pivoting distance of the carrying rollers 30.

Figure 17 shows likewise the restrictedly pivotable support of the axle 29 about the axle 38 passing through the carrying body 26 in the axial direction of the carriage 9.

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It has yet to be pointed out that all members in contact with the glass are not directly sitting on the glass, but that a glass protection 36 is provided between the respective member and the glass.

References

	1	lateral panel
	2	lateral panel
	3	sliding door
5	4	overpanel
	5	guiding assembly
	6	guiding rail
	7	channel
	8	undercut
10	9	carriage
	10	back face
	11	undercut
	12	attachment member
	13	sliding block
15	14	attachment bolt
	15	bearing block
	16	cover strip
	17	bushing
	18	screw
20	19	decorative cap
	20	spacer sleeve
	21	profile end cap
	22	profile end cap
	23	stopper
25	24	cheek

	25	cheek
	26	carrying body
	27	borehole
	28	carrying bolt
5	29	axle
	30	carrying roller
	31	aperture
	32	bottom
	33	clamping member
10	34	aperture
	35	through-hole
	36	glass protection
	37	cross hole
	38	axle
15	39	profile part
	40	profile part
	41	screw connection
	42	riveted connection
20	X	Arrow

Patent claims

1. A guiding assembly for a sliding door fastened at a sub-construction, which assembly presents a guiding rail having a channel oriented to the inside, being open to the underside and extending in the longitudinal direction of the guiding rail, in which channel at least one carriage is guided, the carrying members thereof penetrating a first undercut of the guiding rail, and the guiding rail presents a second undercut for the engagement of an attachment member for the connection to a sub-construction, and that the first undercut (8), guiding the carrying rollers (30) of the carriage (9), and the second undercut (11) are disposed off-set by 90° degrees at the guiding rail (6), that the guiding rail (6), in the region of the first undercut (8), is formed as a profile part (39) with an arcuate-shaped curved front face, and, in the region of the second undercut (11), is formed as a profile part (40) with a planar back face (10), and that the profile part (39) presenting the first undercut (8) is releasably connected to the profile part (40) presenting the second undercut (11), characterized in that the carriage (9) presents two cheeks (24, 25) laterally sitting close to the sliding door (3), which cheeks, in the region of both ends of the cheeks (24, 25), are penetrated by carrying bolts (28), and in that a carrying body (26) is disposed in the centre region between the cheeks (24, 25), which body accommodates an axle (29), at the ends of which carrying rollers (30) are supported running on the running paths in the guiding rail (6).

2. A guiding assembly according to claim 1, characterized in that the carrying rollers (30) of the carriage (9) are supported at an axle (29) passing through a cross hole (37) of a carrying body (26) of the carriage (9), which axle is restrictedly pivotable in vertical direction (arrow X) about an axle (38) passing through the centre of the carrying body (26) in the axial direction of the carriage (9).
3. A guiding assembly according to claim 1 and 2, characterized in that the undercut (11), extending in the back face (10) in the longitudinal direction of the guiding rail (6), serves as accommodation for attachment members (12) for the guiding rail (6), members presenting a sliding block (13) which engages with play in the undercut (11).
4. A guiding assembly according to claim 3, characterized in that the sliding block (13) cooperates with an attachment bolt (14) passing through the lateral panel (1, 2), which bolt, on the side opposite to the guiding rail (6), is held in at least one bearing block (15) sitting close to the lateral panel (1, 2).
5. A guiding assembly according to claim 4, characterized in that the attachment bolt (14) is eccentrically disposed or formed as an eccentric.
6. A guiding assembly according to claim 4, characterized in that the bearing blocks (15) can be covered by a common cover strip (16) which preferably can be snapped onto the bearing blocks (15).

7. A guiding assembly according to any of the preceding claims, characterized in that the ends of the guiding rail (6) and of the cover strip (16) can be closed off by profile end caps (21, 22).
8. A guiding assembly according to claim 1, characterized in that the carrying rollers (30) are located in apertures (31) of the cheeks (24, 25) and are substantially flush with the exteriors surfaces of the cheeks (24, 25).
9. A guiding assembly according to any of the preceding claims, characterized in that the carrying rollers (30) substantially consist of ball bearings the rolling surfaces thereof being provided with a plastic layer.
10. A guiding assembly according to any of the preceding claims, characterized in that, when seen from the carrying rollers (30), the surfaces of the cheeks (24, 25) oriented downwards extend curve-shaped to the outside.
11. A guiding assembly according to any of the preceding claims, characterized in that the guiding rail (6) is fastened at two lateral panels (1, 2) disposed laterally to the sliding door (3), which panels preferably consist of the same material as the sliding door (3).
12. A guiding assembly according to any of the preceding claims, characterized in that the sliding door (3) and the lateral panels (1, 2) consist of glass.