

Barrier for an escalator or a moving walkway

The invention relates to a barrier which serves as fall protection for users of a transport device, and to a transport device with such a barrier.

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In the sense of the present document, transport devices are escalators and moving walkways with a conveyor belt that has a large number of steps or pallets. The steps or pallets form a conveying surface which serves to convey users and/or other loads, such as hand luggage or shopping carts.

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Balustrades are usually arranged to the sides of the steps or pallets of the transport devices. Below the balustrades is a supporting structure to which the balustrades are attached. The supporting structure is covered at the top by a cover assembly and laterally by side paneling. The cover assembly and the side paneling are usually attached to the supporting structure by means of attachment means, which are also designed for this purpose.

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For transport devices, building regulations and standards apply, such as EN-115, regarding their balustrade height (starting from their conveying surface) or the height at which the handrail is arranged. These building regulations are intended to ensure the safe use of the escalator or moving walkway and must be strictly adhered to by the operators or building owners.

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Since the balustrades of conventional transport devices extend only to the height of the handrail, there are certain risks associated with improper use. As a result, users sometimes deliberately jump over the balustrade, or users are involuntarily pushed over the balustrade. This happens, for example, in soccer stadiums when hooligans jump off a transport device or push other users off a transport device. Other deplorable customs include “surfing” on the handrails or holding onto the handrails with one’s hands while the body hangs freely outside the transport device. Users can also become trapped if the transport device passes another, intersecting transport device or passes through a narrow floor opening. Such situations are dangerous for the users of the transport devices and also for the people located under the transport devices and must therefore be avoided at all costs.

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For example, WO 2020/114846A1 discloses a balustrade for an escalator in which first panels are arranged below the handrail, and, as an additional barrier, second panels are arranged laterally offset from the handrail and projecting above the handrail. Such a barrier effectively reduces the risk of falls. It moreover extends over the entire length of the balustrade to prevent users from “surfing” on the handrail or “pulling themselves” along the barrier. This barrier leads to significantly higher manufacturing, transport, and installation costs and, due to its high mass, puts a strain on the supporting structure of the escalator or moving walkway.

Against this background, it is an object of the present invention to provide a barrier that is as lightweight and inexpensive as possible. In particular, the aim is to create a barrier that is easy and quick to install, visually appealing, and serves as fall protection. Furthermore, it should be possible to easily retrofit transport devices with such a barrier.

This object is achieved by a barrier to protect users from falling out of a transport device that is configured as an escalator or moving walkway. The barrier is configured to be installed on the transport device next to a circulating, movable handrail of the balustrade of the transport device, wherein, in the installed state, the barrier extends parallel to the handrail and projects in height beyond the balustrade or the handrail. Furthermore, the barrier has a deflector and a panel region, with at least one barrier panel, adjoining this deflector. The deflector prevents people from pulling themselves along the outside of the transport device beyond this point in order to climb over the barrier and handrail in the ascending region and thus access the escalator or moving walkway from the side. The deflector allows the barrier to be kept shorter and does not need to be extended to the handrail return curve, as disclosed in WO 2020/114846A1, to prevent the aforementioned problem. Furthermore, the deflector serves as a post and attaching element at the transport device for the adjoining panel region.

The barrier has, in addition to the at least one barrier panel, a clamping profile with a V-shaped groove that extends into the clamping profile in the longitudinal direction thereof, wherein the V-shaped groove is bounded by a groove base and two groove surfaces, and the groove surfaces are arranged at an opening angle to each other from the groove base towards a groove opening. The clamping profile can be made from an extruded or pressed profile bar. The clamping profile can be made from an aluminum extrusion profile or an extruded plastic profile. Its ends can, for example, be covered with an end cap or lead into

the deflector. Since the barrier panel is a plate-shaped structure, it comprises at least two parallel side surfaces and, with regard to its intended installation position, a lower edge. The barrier panel is positioned with its lower edge in the V-shaped groove.

5 Another component of the barrier is an L-shaped wedge insert with a wedge leg and a base leg. The wedge leg has a wedge-shaped cross section and is arranged between the first side surface of the barrier panel and the first groove surface. The base leg is arranged between the lower edge of the barrier panel and the groove base.

10 In addition, the barrier has a clamping wedge that is wedge-shaped in cross section and arranged between the second side surface of the barrier panel and the second groove surface. It is not necessary in this case for the wedge insert and the clamping wedge to extend continuously in the V-shaped groove or for their length to be matched to the length of the barrier panel.

15 For reasons of cost, manufacturing, and installation, the wedge insert and the clamping wedge are configured to be significantly shorter than a barrier panel so that they can also be used in curved sections of the clamping profile without having to be bent in the longitudinal extension of the clamping profile. Preferably, the wedge insert and the
20 clamping wedge are arranged opposite each other in the V-shaped groove and are not offset from each other in the longitudinal direction in order to avoid additional bending moments on the barrier panel as a result of the clamping force generated by the driven-in clamping wedge. A plurality of wedge inserts and clamping wedges can be provided per barrier panel, whereby a distance can be provided between two pairs of wedge
25 inserts/clamping wedges that is greater than the length of a wedge insert or a clamping wedge.

The L-shaped wedge insert provides a component that is per se dimensionally stable enough to withstand the forces of the barrier panel when inserted into the V-shaped
30 groove. Furthermore, the barrier panel is precisely positioned in the V-shaped groove by the wedge insert so that a plurality of barrier panels arranged next to each other in series can be precisely positioned relative to each other without effort. In addition, the wedge insert, which is preferably made of a polymer material such as acrylonitrile butadiene styrene copolymer (ABS), polyethylene terephthalate (PET), polyamide (PA), and the

like, offers very good shock absorption, so that the risk of breakage of the barrier panel is significantly reduced, and its thickness can therefore be kept comparatively low.

5 In one embodiment of the barrier, the deflector comprises a support plate, with a foot attachment region, and a panel connection region. The deflector is configured such that, when the barrier is installed on the transport device, its support plate extends in the same vertical spatial plane as the at least one barrier panel of the adjoining panel region. A deflector plate is arranged on the support plate in a plane parallel to the support plate and spaced apart therefrom at a distance. The deflector plate has smooth edges and surfaces
10 that offer no grip for a hand or foot. Preferably, the distance to the support plate is chosen such that the deflector plate is flush with a vertical side paneling of the transport device when the barrier is in the installed state. Moreover, the edges of the deflector plate create pressure points on the body during climbing attempts, resulting in an unpleasant sensation, so that in most cases the climbing attempt is aborted and abandoned.

15 In one embodiment, the deflector plate is attached to the support plate by a recessed connecting piece. This prevents the formation of horizontal surfaces that could be used as climbing aids.

20 In another embodiment of the barrier, a connection point matching the panel connection region is formed on an edge region of the at least one barrier panel. In other words, the connection point and the panel connection region are matched with one another such that the support plate and the barrier panel can be firmly connected with minimal effort using fasteners such as screws, clamps, connecting strips, adhesives, and the like. The
25 connection point and the panel connection region can be configured to overlap one another, contain bores, have suitably prepared adhesive surfaces, etc.

In another embodiment, a vertical deflector edge is formed on the at least one barrier panel with respect to the intended installation position of the barrier. This deflector edge
30 projects beyond an upper edge of the barrier panel and is equipped with a cylindrical deflector profile. The barrier panel equipped with a deflector profile is used where the transport device passes close to an intersecting transport device or passes through a narrow floor opening. Without the deflector edge, the upper edge of the barrier panel and the underside of the intersecting transport device or the underside of the ceiling in the

region of the floor opening form a wedge-shaped gap in which, for example, outstretched arms can get trapped. The vertical deflector profile effectively mitigates this danger zone.

5 The barrier panel (whether with or without a deflector edge) is preferably made of transparent material. This can be single-pane safety glass, laminated safety glass, a PMMA sheet, a polycarbonate sheet, and the like. The barrier panel can also be made of opaque material such as wood, composite material, metal, or opaque polymer materials.

10 In another embodiment, a connection point to a safety device of the structure is formed on the deflector and/or on the clamping profile and/or on a support of the barrier described below. The safety device can be a structural lattice balustrade, a barrier panel, or the like.

15 In another embodiment, an attachment region for an end face of the clamping profile is formed in the panel connection region of the deflector. This gives the combination of deflector and barrier panel additional strength.

20 In another embodiment of the barrier, the V-shaped groove on the first groove surface provided for the wedge insert has a projection that narrows the groove opening. The projection, together with the groove base and the first groove surface, forms a kind of lateral pocket into which the wedge leg of the wedge insert can be placed. The projection fixes the wedge insert in the V-shaped groove during installation and removal of the barrier panel so that it remains at the provided location in the groove. This significantly further simplifies the installation work and allows it to be carried out even by less qualified assembly personnel.

25 In another embodiment of the barrier, an elastic element is arranged on the wedge leg of the wedge insert. When a wedge insert is inserted into the V-shaped groove, the elastic element clamps the wedge leg of the wedge insert between the projection and the groove base. The elastic element accordingly fixes the wedge insert even better in the V-shaped groove, in particular against displacements in its longitudinal direction. This is particularly advantageous in the inclined part of escalators, so that the wedge insert does not slip “downhill.”

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In another embodiment of the barrier, attachment structures for an elastic sealing profile are formed on both sides at the groove opening of the V-shaped groove. The sealing profiles arranged on both sides prevent dirt and water from penetrating the V-shaped groove and give the transition from the clamping profile to the barrier panel an aesthetic appearance.

In another embodiment of the barrier, a T-shaped groove is formed on a side, facing away from the V-shaped groove, of the clamping profile and is provided to accommodate attachment means. This allows the clamping profile to be attached to suitable structural parts of the transport device or, via adapter parts, to the transport device. Furthermore, clamping profiles divided into a plurality of sections can be firmly connected to each other at the end face by means of connecting tongues inserted into the T-groove.

In another embodiment of the barrier, it has a support which is provided at one end with a foot attachment region and, at the other end, with a head attachment region. The head attachment region is connected to the clamping profile by means of attachment means arranged in the T-shaped groove of the clamping profile. The T-shaped groove in the longitudinal direction of the clamping profile allows the position of the support on the clamping profile to be freely selected. The foot attachment region is provided to be attached to a bearing structure of a transport device - for example, to its supporting structure.

In one possible embodiment of the support, a telescopic device is arranged between the head attachment region and the foot attachment region. This allows a support distance between the head attachment region and the foot attachment region to be fixably adjusted.

In another embodiment of the barrier, it has a connecting element. The connecting element is connected at one end to the clamping profile or to the support and, at the other end, is configured in such a way that it can be attached to a handrail guide profile of a transport device. By means of this connection of the balustrade and barrier, they support each other orthogonally to the longitudinal direction of the clamping profile so that both the balustrade as well as the barrier can be configured and built with reduced material thicknesses.

Depending upon its location in a building, the transport device, configured as an escalator or moving walkway, can be equipped with a barrier on one or both sides. Such transport devices typically have a circulating conveyor belt and, on both sides of the conveyor belt, a balustrade with a circulating, movable handrail. The barrier according to the invention is installed next to the circulating, movable handrail on the transport device, wherein the barrier is arranged on the side, facing away from the conveyor belt, of the handrail. In an installed state, the barrier extends parallel to the balustrade and projects in height beyond the balustrade or its handrail.

Preferred exemplary embodiments of the invention are explained in greater detail in the following description with reference to the accompanying drawings; identical elements are provided with the same reference signs in all figures. Neither the drawings nor the description are to be interpreted as limiting the invention. In the figures:

Figure 1 shows a three-dimensional view of a transport device configured as an escalator with glass balustrades and two laterally arranged barriers to protect users from falling out of it;

Figure 2 shows a side view of two intersecting transport devices with fixed directions of travel, wherein both transport devices have barriers and the barrier of the upward-conveying transport device has a barrier panel with a deflector edge;

Figure 3 shows an enlarged representation of a cross section through the barrier panel shown in Figure 2 in the specified section plane A-A;

Figure 4 shows an enlarged representation of a cross section through a clamping profile of the barrier shown in Figure 1; and

Figure 5 shows a cross section through the entire barrier and the glass balustrade of the transport device shown in Figure 1.

Figure 1 shows a three-dimensional representation of a transport device 1 configured as an escalator, as it is installed in a structure 3 (represented by dash-dot lines). The transport device 1 has a circulating, movable conveyor belt 5 with steps 7. A balustrade 9 with glass panels 11 extends along each side of the conveyor belt 5. Transport devices 1

with such glass balustrades are used, for example, in department stores and shopping malls. A handrail guide profile 13 (see Figure 5) with a circulating, movable handrail 15 is arranged at the edge of each balustrade 9. The handrails 15 are moved synchronously with the conveyor belt 5. The balustrade height H_B of the balustrade 9 is adapted in such a way that its handrail 15 can be comfortably grasped by an adult person of average height, but is also easily reachable for smaller children. For example, EN-115 specifies a balustrade height H_B of 900 cm to 1,100 cm depending upon the location of use.

Since there is no wall extending on any side of the transport device 1, users could fall over the balustrade 9 and tumble down the side of the transport device 1 during the improper use mentioned above. To avoid this, a barrier 31 is installed on both sides of the handrail 15 on the transport device 1. As can be seen from Figure 1, the barrier 31 extends parallel to the balustrade 9. Its barrier panels 45 project in height H_A beyond the balustrade height H_B or the handrail 15. To enable users to hold onto the handrail 15, the barrier 31 is arranged on the side, facing away from the conveyor belt 5, of the handrail 15.

In order to show various embodiments of the barrier 31, the barrier panel 45 installed on the right barrier 31 is made in one piece. As shown by the left barrier 31, the barrier 31 can also have several barrier panels 45. In this case, the barrier 31 can have panel connectors 145 to connect the individual barrier panels 45 to one another.

Furthermore, each barrier 31 has at least one deflector 29, wherein it depends on the intended directions of travel L and the building structure whether one or two deflectors 29 are to be provided per barrier 31. The transport device 1 shown in Figure 1 can be operated in upward conveying and downward conveying modes, as indicated by the double arrow of the direction of travel L . Accordingly, two deflectors 29 are provided at the ends of the barrier 31, wherein the deflector 29 is arranged in the upper plane of the structure 3 in front of a safety device 4 of the structure 3 such as the depicted lattice balustrade. The panel region 22 with the barrier panels 45 extends between the two deflectors 29, thus adjoining them. The deflector 29 prevents persons from pulling themselves along the outside of the transport device 1 beyond this point in order to climb the transport device 1 in the ascending region. As can be seen in Figure 1, a connection point 28 to the safety device 4 of the structure 3 is formed on a support 75 of the barrier 31. The connection point 28 provides mutual support between the barrier 31 and

the safety device 4 against laterally acting forces. Alternatively or additionally, a connection point 28 can also be formed on the deflector 29 (see Figure 2) and/or on the clamping profile 33 described below.

5 The deflector 29 moreover serves as a dimensionally stable post to attach the barrier panels 45 of the adjoining panel region 22 to the transport device 1. For this purpose, the deflector 29 comprises a support plate 25 with a foot attachment region 26 and a panel connection region 27. The support plate 25 extends in the same vertical spatial plane as the at least one barrier panel 45 of the adjoining panel region 22. The foot attachment
10 region 26 is configured such that it can be firmly connected to load-bearing components, for example by clamps, screws, rivets, gluing, and the like. Examples of such load-bearing components are the supporting structure 101 shown in Figure 5 or the balustrade clamp 103 attached thereto.

15 In the present exemplary embodiment, the adjoining barrier panel 45 is firmly connected to the support plate 25 by a panel connector 145. A deflector plate 23 is arranged on the support plate 25 in a plane parallel to the support plate 25 and spaced apart therefrom at a distance X. The deflector plate 23 has smooth edges and surfaces that offer no grip for a hand or foot. Preferably, the distance X to the support plate 25 is selected such that the
20 deflector plate 23 is arranged flush with a vertical side paneling 6 of the transport device 1. The deflector plate 23 is attached to the support plate 25 by a recessed connecting piece 24. This prevents the formation of horizontal surfaces that could be used as climbing aids.

25 Figure 2 shows, in side view, two closely adjacent, intersecting transport devices 1 with fixed directions of travel L. Both transport devices 1 also have barriers 31, the deflectors 29 of which are arranged according to the direction of travel L. To limit the fall height of rejected users, the elevation Y of the foot attachment region 26 relative to a floor 2 of the structure 3 is specified by the standards. The elevation Y also determines
30 how much shorter the barrier 31 can be compared to a conventional barrier. The barrier 31 of the upward conveying transport device 1 moreover has a barrier panel 45A with a vertical deflector edge 44. This deflector edge 44 projects beyond an upper edge 88 of the barrier panel 45A and is provided with a cylindrical deflector profile 42 so that, for example, no clothing of the users gets caught at the deflector edge 44.

As can be seen in Figure 2, if the deflector edge 44 is missing, the upper edge 88 of the barrier panel 45 and an underside 87 of the intersecting transport device 1 or an underside of the ceiling 86 of the structure 3 in the region of the floor opening 89 form a wedge-shaped gap in which, for example, outstretched arms could be trapped. By providing a vertical deflector edge 44, the wedge shape of the gap is effectively mitigated, and the addition of the cylindrical deflector profile 42 completely prevents clothing from being caught in this gap. The barrier panel 45A equipped with a deflector profile 42 is therefore used where the transport device 1 passes close to an intersecting transport device 1 in relation to its intended direction of travel L and/or passes through a narrow floor opening 89.

Figure 3 shows an enlarged representation of a cross section through the barrier panel 45A shown in Figure 2 in the specified section plane A-A to illustrate the cylindrical configuration of the deflector profile 42. Moreover, the barrier panel 45A, which is provided with a deflector edge 44, has a molded attachment flange 84 with bores 83 in order to attach it additionally to the underside 87 of the intersecting transport device 1. The barrier panels 45, 45A are preferably made of transparent material. This can be single-pane safety glass, laminated safety glass, a PMMA sheet, a polycarbonate sheet, and the like. However, the barrier panels 45, 45A can also be made of opaque material such as wood, composite material, metal, or opaque polymer materials.

Figure 4 schematically shows an enlarged representation of a cross section through the barrier 31 shown in Figure 1. The barrier 31 has a clamping profile 33 with a V-shaped groove 35, wherein, when the barrier 31 is in the installed state, the clamping profile 33 extends in the direction of travel L (see Figure 1) of the transport device 1. The V-shaped groove 35 is bounded by a groove base 37 and two groove surfaces 39, 41. In this case, the groove surfaces 39, 41 are arranged opening at an angle to each other, proceeding from the groove base 37 to a groove opening 43. In other words, the width of the V-shaped groove 35 increases towards the groove opening 43. The clamping profile 33 can, for example, be made from an aluminum extrusion profile or an extruded plastic profile, the end of which can be firmly connected, for example, with the adjacent deflector 29 (see Figures 1 and 2). For this purpose, an attachment region 54 for an end face of the clamping profile 33 is provided in the panel connection region 27 of the deflector 29.

The barrier 31 also has a barrier panel 45, 45A which has two parallel side surfaces 47, 49 and in the region of its lower edge 51 is arranged in the V-shaped groove 35. As already mentioned above, the barrier panel 45 can be made of transparent material such as single-pane safety glass, laminated safety glass, a PMMA sheet, a polycarbonate sheet, and the like. The barrier panel 45 can also be made of opaque material such as wood, composite material, metal, or opaque polymer materials.

Another component of the barrier 31 is an L-shaped wedge insert 53 with a wedge leg 55 and a base leg 57. The wedge leg 55 has a wedge-shaped cross section and is arranged between the first side surface 47 of the barrier panel 45 and the first groove surface 39. The base leg 57 of the wedge insert 53 is arranged between the lower edge 51 of the barrier panel 45, 45A and the groove base 37. In addition, a channel 58 is also formed in the base leg 57 and extends parallel to the V-shaped groove 35. The formation of a channel 58 in the base leg 57 has the advantage that, for example, a lighting means 151 can be laid within the clamping profile 31 or in the V-shaped groove 35 with a constant cross section without interrupting it. All known light-emitting devices such as light-emitting diodes, fluorescent tubes, OLED films, and the like, can be used as lighting means 151. The channel 58 also allows for easily laying electrical conductors such as signal lines 157 and power supply lines 155 in the V-shaped groove 35. In order to connect the electrical conductors, they can be guided through cavities of the deflector 29 (not shown) into the interior of the transport device 1.

In order to be able to firmly anchor the wedge insert 53 and the barrier panel 45 in the clamping profile 33, the barrier 31 has a clamping wedge 59 with a wedge-shaped cross section that is inserted between the second side surface 49 of the barrier panel 45 and the second groove surface 41. To ensure a secure and permanent clamping of the barrier panel 45 in the V-shaped groove 35, the wedge angle α of the wedge leg 55 and the wedge angle β of the clamping wedge 59 must be smaller than the angle of a friction cone which is present between the first groove surface 39 and the wedge leg 55 or the second groove surface 41 and the clamping wedge 59. The angle of the friction cone, which is another way of describing the coefficient of friction between these components, depends upon the surface roughness and the materials used for the clamping profile 33, the wedge insert 53, and the clamping wedge 59. In case of barriers 31 with several barrier panels 45, wedge inserts 53 and clamping wedges 59 are preferably arranged in the clamping profile 33 such as to overlap two adjacent barrier panels 45.

The V-shaped groove 35 also has, on the first groove surface 39 provided for the wedge insert 53, a projection 61 narrowing the groove opening 43. This projection 61 gives the wedge insert 53 a better hold in the V-shaped groove 35 so that it does not slip when the barrier panel 45 is inserted. To further improve this hold, on the wedge leg 55 of the wedge insert 53, an elastic element 63 can be arranged which, when the wedge insert 53 is inserted into the V-shaped groove 35, clamps its wedge leg 55 between the projection 61 and the groove base 37.

To prevent the V-shaped groove 35 from filling with water and dirt, sealing profiles 65, 67 of elastomer material such as rubber, nitrile rubber, and the like are arranged at the groove opening 43 on both sides of the barrier panel 45. In order to enable the sealing profiles 65, 67 to be installed, attachment structures 69 are formed on both sides at the groove opening 43 of the V-shaped groove 35. The attachment structures 69 (shown is a tongue-and-groove connection) correspond to corresponding formations on the sealing profile 65, 67. The tongue-and-groove attachment structure 69 shown in Figure 4 is only one of the countless possible designs for attaching the sealing profile 65, 67 in the groove opening 43 and is therefore not to be understood as reduced to this one representation.

In order to be able to attach the barrier 31 to the transport device 1, a T-shaped groove 71 is formed on one side, facing away from the V-shaped groove 35, of the clamping profile 33. Attachment means 73, such as square or hexagonal screw heads, can be arranged therein, wherein their position in the longitudinal direction L of the clamping profile 33 is freely selectable. This simple and robust construction allows the clamping profile 33 to be attached, for example, to a support 75 as shown in Figures 1 and 2, and/or to the deflector 29. Of course, other structures such as bores with internal threads, clampable projections, and the like can also be formed on the clamping profile 33 in order to connect it to the transport device 1.

Figure 5 shows a cross section through the entire barrier 31 and the balustrade 9 of the transport device 1 shown in Figure 1. The barrier 31 has, in addition to the clamping profile 33, the barrier panel 45, the wedge insert 53, and the clamping wedge 59, a support 75 which is provided at one end with a foot attachment region 77 and at the other end with a head attachment region 79. The head attachment region 79 is connected to the clamping profile 33 by means of attaching elements 73 arranged in the T-shaped

groove 71 of the clamping profile 33. The foot attachment region 77 of the support 75 is screwed to a balustrade clamp 103 of the transport device 1, and the balustrade clamp 103 is attached to a supporting structure 101 (only its upper chord is shown) of the transport device 1. The supporting structure 101 is the load-bearing structure that accommodates all components of the transport device 1 and supports the mass thereof and its own mass in the structure 3. A glass panel 11 of the balustrade 9 is clamped in the clamping device 103 of the balustrade clamp.

To enable the support 75 to be manufactured in large series rather than for a specific contract, a telescopic device 81 is arranged between the head attachment region 79 and the foot attachment region 77. The telescopic device 81 is realized by a two-part support tube, wherein the two parts of the support tube are connected to each other by a thread 82 and allow an adjustment in axial direction B. By means of the telescopic device 81, a support distance Z between the head attachment region 79 and the foot attachment region 77 can be fixedly adjusted so that, on the one hand, manufacturing tolerances of the supporting structure 101 can be compensated for, and on the other, the desired height H_A of the barrier panels 45 can be adjusted in accordance with the deflector 29 (see Figure 1).

The barrier 31 also has a connecting element 85, which is connected at one end to the support 75. The other end of the connecting element 85 is attached to the handrail guide profile 13 of the transport device 1. This stabilizes the support 75 and the balustrade 9 of the transport device 1 against the forces acting transversely to the longitudinal direction L (see also Figure 1) of the barrier 31 upon the balustrade 9 and the barrier 31.

Although transport devices 1 clearly configured as escalators are shown in Figures 1 and 2, it is obvious that the barrier 31 can also be used for moving walkways.

Finally, it should be noted that terms such as “having,” “comprising,” etc., do not preclude other elements or steps, and terms such as “a” or “one” do not preclude a plurality. Furthermore, it should be noted that features or steps which have been described with reference to one of the above exemplary embodiments may also be used in combination with other features or steps of other exemplary embodiments described above. Reference signs in the claims should not be considered to be limiting.

Claims

1. A barrier (31) to protect users from falling out of a transport device (1) that is configured as an escalator or moving walkway, which barrier (31) is configured to be installed on the transport device (1) next to a circulating, movable handrail (15) on a balustrade (9) of the transport device (1), wherein, in the installed state, the barrier (31) extends parallel to the handrail (15) and projects at a height (H_A) beyond the balustrade (9) or the handrail (15), wherein the barrier (31) has a deflector (29) and a panel region (22) adjoining this deflector (29) with at least one barrier panel (45, 45A), which barrier panel (45, 45A) comprises two parallel side surfaces (47, 49) and a lower edge (51), **characterized in that** the barrier further has (31):

- a clamping profile (33) with a V-shaped groove (35) that extends therein in the longitudinal direction (L) of the clamping profile (33), wherein the V-shaped groove (35) is bounded by a groove base (37) and two groove surfaces (39, 41), and the groove surfaces (39, 41) are arranged at an opening angle to each other from the groove base (37) towards a groove opening (43), wherein the barrier panel (45, 45A) is arranged with its lower edge (51) in the V-shaped groove (35);
- an L-shaped wedge insert (53) with a wedge leg (55) and with a base leg (57), wherein the wedge leg (55) has a wedge-shaped cross section and is arranged between the first side surface (47) of the barrier panel (45, 45A) and the first groove surface (39), and the base leg (57) is arranged between the lower edge (51) of the barrier panel (45, 45A) and the groove base (37); and
- a clamping wedge (59) configured with a wedge-shaped cross section and arranged between the second side surface (49) of the barrier panel (45, 45A) and the second groove surface (41).

2. The barrier (31) according to claim 1, wherein the deflector (29) comprises a support plate (25) with a foot attachment region (26) and a panel connection region (27), wherein the deflector (29) is configured such that, when the barrier (31) is in the installed state, the support plate (25) extends in the same vertical spatial plane as the at least one barrier panel (45, 45A) of the adjoining panel region (22), and a deflector plate (23) is arranged in a plane parallel to the support plate (25) and spaced apart therefrom at a distance (X).

3. The barrier (31) according to claim 2, wherein the deflector plate (23) is attached to the support plate (25) by a recessed connecting piece (24).

4. The barrier (31) according to any of claims 1 to 3, wherein a connection point matching the panel connection region (27) is formed in an edge region of the at least one barrier panel (45, 45A).

5. The barrier (31) according to any of claims 1 to 4, wherein a vertical deflector edge (44) is formed on the at least one barrier panel (45A) with respect to the intended installation position of the barrier (31), which deflector edge projects beyond an upper edge (88) of the barrier panel (45A) and is provided with a cylindrical deflector profile (42).

6. The barrier (31) according to any of claims 1 to 5, wherein a connection point (28) to a safety device (4) of the structure (3) is formed on the deflector (29) and/or on the clamping profile (33) and/or on a support (75) of the barrier (31).

7. The barrier (31) according to any of claims 1 to 6, wherein an attachment region (54) for an end face of the clamping profile (33) is formed in the panel connection region (27) of the deflector (29).

8. The barrier (31) according to any of claims 1 to 7, wherein the V-shaped groove (35) has, on the first groove surface (39) provided for the wedge insert (53), a projection (61) narrowing the groove opening (43).

9. The barrier (31) according to claim 8, wherein, on the wedge leg (55) of the wedge insert (53), an elastic element (63) is arranged which, when the wedge insert (53) is inserted into the V-shaped groove (35), clamps the wedge leg (55) of the wedge insert (53) between the projection (61) and the groove base (37).

10. The barrier (31) according to any of claims 1 to 9, wherein attachment structures (69) for an elastic sealing profile (65) are formed on both sides at the groove opening (43) of the V-shaped groove (35).

11. The barrier (31) according to any of claims 1 to 10, wherein a T-shaped groove (71) is formed in a side, facing away from the V-shaped groove (35), of the clamping profile (33) and which is provided to accommodate attachment means (73).

5 12. The barrier (31) according to claim 11, wherein it has a support (75) which is provided at one end with a foot attachment region (77) and at the other end with a head attachment region (79), wherein the head attachment region (79) is connected to the clamping profile (33) by means of attachment means (73) arranged in the T-shaped groove (71) of the clamping profile (33), and the foot attachment region (77) is provided
10 to be attached to a supporting structure (101) of a transport device (1).

13. The barrier (31) according to claim 12, wherein a telescopic device (81) is arranged between the head attachment region (79) and the foot attachment region (77), by means of which telescopic device (81) a support distance (Z) can be fixedly adjusted
15 between the head attachment region (79) and the foot attachment region (77).

14. The barrier (31) according to any of claims 6 to 13, wherein it has a connecting element (85), which connecting element (85) is connected at one end to the clamping profile (33) or to the support (75) and is configured at the other end to be attached to a
20 handrail guide profile (13) of a transport device (1).

15. A transport device (1) that is configured as an escalator or moving walkway, with a circulating conveyor belt (5), **characterized by** at least one barrier (31) according to any of claims 1 to 14, which barrier (31) is installed on the transport device (1) next to a
25 circulating, movable handrail (15) on a balustrade (9) of the transport device (1), wherein, in the installed state, the barrier (31) extends parallel to the balustrade (9) and projects at a height (H_A) beyond the balustrade (9) or the handrail (15), and wherein the barrier (31) is arranged on the side, facing away from the conveyor belt (5), of the handrail (15).