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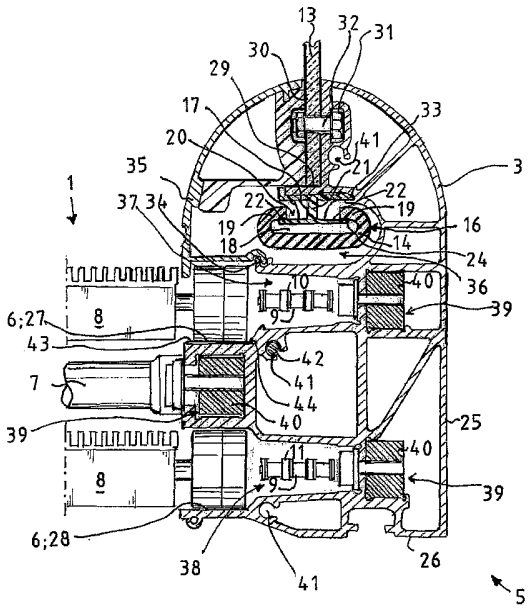
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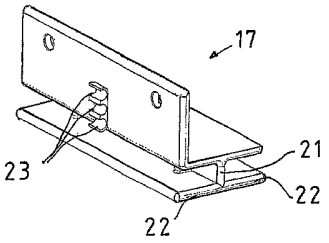
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(54) Title: TRAVELATOR, MOVING RAMP OR ESCALATOR





(57) Abstract: A travelator, moving ramp or escalator for transporting passengers, comprising a conveyor (1); a frame (2; 4, 5) supported on a fixed structure, on which frame the conveyor is mounted; and a handrail (12), which comprises a handrail frame (13) and an endless handrail belt (14) mounted on the handrail frame and arranged as a loop having an upper handhold portion (15) that the passenger can grip with a hand for support and a lower return portion (16) disposed inside the frame (2; 4, 5) . The travelator, moving ramp or escalator comprises a number of suspenders (17) fastened to the frame (2) at a distance from each other to support the return portion (16) of the handrail belt (14).

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TRAVELATOR, MOVING RAMP OR ESCALATOR

FIELD OF THE INVENTION

The present invention relates to a travelator, moving ramp or escalator as defined in the preamble of claim 1.

BACKGROUND OF THE INVENTION

In prior art, a travelator, moving ramp or escalator is known whereby people are transported on a conveyor in a horizontal direction or at an upward/downward angle. The conveyor is mounted on a frame which again is secured to a fixed structure, such as a floor in the case of a travelator, or to different floor levels in the case of a moving ramp or escalator. A handrail is provided at the side of the conveyor. The handrail comprises a handrail frame and an endless handrail belt supported on the handrail frame and arranged as a loop. A passenger on the conveyor can grip the upper handhold portion of the handrail belt for support. The lower return portion of the handrail belt is disposed inside the frame. The return portion of the handrail belt is usually guided by rollers supporting the handrail belt, so that a rolling contact exists between the rollers and the outer surface of the belt.

A problem with the prior-art arrangement for guiding the return portion of the handrail belt is that the rollers cause wear of the outer surface of the belt, which even otherwise is exposed to wear. The problem is therefore a short service life of the handrail belt. The handrail belt is an expensive part that has to be replaced at regular intervals. In addition, the rollers take up plenty of space in the frame. The present kind of solution for supporting the return portion is not suited for use in travelators, moving

ramps or escalators that have a frame intended to be of as low a construction as possible and that have been designed to be mounted on a fixed base without forming a pit in the fixed base.

OBJECT OF THE INVENTION

The object of the present invention is to overcome the above-mentioned drawbacks.

A specific object of the invention is to disclose a travelator, moving ramp or escalator in which the suspension of the return portion of the handrail belt is implemented in a manner as effective as possible in respect of cost and space utilization and so that it does not cause wear of the outer surface of the handrail belt.

A further object of the invention is to disclose a travelator, moving ramp or escalator with a handrail belt having an extended service life.

An additional object of the invention is to disclose a travelator, moving ramp or escalator in which the solution for guiding the return portion of the handrail belt allows the use of a frame structure of as low a construction as possible that is suited for installation upon a fixed base without requiring a pit to be made in the fixed base.

BRIEF DESCRIPTION OF THE INVENTION

The travelator, moving ramp or escalator of the invention is characterized by what is disclosed in claim 1. Other embodiments of the invention are characterized by what is disclosed in the other claims. Inventive embodiments are also presented in the description part and drawings of the present application. The inventive

content disclosed in the application can also be defined in other ways than is done in the claims below. The inventive content may also consist of several separate inventions, especially if the invention is considered in the light of explicit or implicit sub-tasks or in respect of advantages or sets of advantages achieved. In this case, some of the attributes contained in the claims below may be superfluous from the point of view of separate inventive concepts. Within the framework of the basic concept of the invention, features of different embodiments of the invention can be applied in conjunction with other embodiments.

According to the invention, the travelator, moving ramp or escalator comprises a number of suspenders fastened to the frame at a distance from each other to support the return portion of the handrail belt.

The invention has the advantage that the suspender is cheap and allows the handrail belt guiding system to be accommodated in a small space in the frame. As the handrail belt is supported by suspenders, its outer surface is not subjected to wear, the service life of the handrail belt being thus extended. Moreover, it is also possible to integrate other functions in the suspender.

In an embodiment of the invention, the handrail belt is in cross-section a substantially C-shaped profile, defining inside it an interior groove which in the return portion of the handrail belt opens upwards and which groove has at its edges edge flanges directed towards each other, with a gap between them; and that the suspender comprises a web extending through the gap of the handrail belt into the interior groove and suspension flanges extending on either side of the web under the edge flanges to support the handrail belt.

In an embodiment of the invention, the suspender comprises one or more coupling elements for securing a conductor.

In an embodiment of the invention, the suspender has been formed from a material that has a substantially low friction coefficient.

In an embodiment of the invention, the contact surfaces of the edge flanges of the handrail belt that come into contact with the suspension flanges are coated with a material that has a substantially low friction coefficient.

In an embodiment of the invention, the frame comprises two elongated frame parts provided with guide tracks for guiding the conveyor and consisting of mutually identical profiled metallic bodies joined together end to end one after the other, which profiled metallic bodies contain coupling, supporting and/or guide elements integrated in one profiled metallic body of solid material; and a number of transverse cross members extending transversely between the frame parts to hold them parallel to each other at a distance from each other.

In an embodiment of the invention, the profiled metallic body consists of one or more profiles extruded from a light alloy, such as aluminum or an aluminum alloy.

In an embodiment of the invention, the conveyor is a pallet conveyor comprising a number of successive pallets and a drive element, such as a link chain or belt, to which the pallets are connected to move the

pallets, said drive element being arranged as an endless loop having an upper portion and a lower portion.

In an embodiment of the invention, one profiled metallic body of continuous material contains one or more items of the following group integrated in it:

- a wall forming the outwardly visible outer surface of the frame part,
- a bottom fitted to be resting against a fixed base,
- first stop faces for forming a guide surface for supporting and guiding the pallets,
- second stop faces, against which the handrail frame can be supported,
- a mounting slot for a fastening element for securing the handrail frame,
- a first coupling element for securing the suspender,
- a second coupling element for coupling a second profiled body, such as a profiled body forming an interior wall, from a lateral direction,
- a first space, which has been fitted to receive inside it the return portion of the handrail belt,
- a second space, which has been fitted to receive inside it the upper portion of the drive element,
- a third space, which has been fitted to receive inside it the lower portion of the drive element,
- a fourth space, which has been fitted to receive inside it an extension joint element for joining the profiled metallic bodies end to end one after the other,
- a fifth space, which has been fitted to receive inside it an alignment pin for butt alignment of the profiled metallic bodies.

In an embodiment of the invention, the travelator, moving ramp or escalator is a travelator, moving ramp or escalator of low construction designed to be mounted on a fixed base, such as a floor or other support.

LIST OF FIGURES

In the following, the invention will be described in detail with reference to an example and the attached drawing, wherein

Fig. 1 presents a diagrammatic side view of an embodiment of the travelator of the invention,

Fig. 2 presents the travelator of Fig. 1 as seen from direction II-II,

Fig. 3 presents a cross-sectional view of a part of the travelator in Fig. 1,

Fig. 4 presents the profile of the frame part in Fig. 3 and a covering profile that can be attached to it,

Fig. 5 presents a suspender that can be joined to the profile of the frame part 3 in Fig. 3, and

Fig. 6 presents an axonometric view of the suspender in Fig. 5.

DETAILED DESCRIPTION OF THE INVENTION

Figures 1 and 2 present a travelator of low construction, designed to be mounted on a fixed base, such as a floor or other support, which means that no pit needs to be made in the fixed base for the travelator machinery. In the following description of an example,

the invention is described with reference to a horizontal travelator, but it is obvious that corresponding principles of the invention can also be applied to moving ramps and escalators.

The travelator comprises a conveyor 1, which may be e.g. a pallet conveyor or a belt conveyor, which is supported on a frame 2. The entire length of the frame 2 rests on a floor base. As shown in Fig. 2, the frame 2 comprises two elongated frame parts 4, 5, which are connected together by a number of transverse cross members 7 extending transversely between the frame parts 4, 5 to hold them parallel to each other at a distance from each other. The frame parts 4, 5 are composed of mutually identical profiled metallic bodies 3 joined together end to end one after the other, which contain guide elements 6 integrated in one profile of solid material for guiding the coupling, supporting and/or moving parts of the conveyor, as will be described later on with reference to Fig. 3 and 4.

As is further shown in Fig. 1 and 2, the travelator comprises two handrails 12, one on either side of the conveyor 1. The handrails 12 comprise a handrail frame 13, which is secured to the profiled metallic bodies 3 serving as frame parts 4, 5. Mounted on the handrail frame 13 is an endless handrail belt 14, which has been arranged as a loop having an upper handhold portion 15 that the passenger can grip with a hand for support and a lower return portion 16 disposed inside the frame part 4, 5.

Fig. 3 is a diagrammatic view of one side of the conveyor 1. The other side, which is not shown in the figures, is identical but reversed like a mirror image. It can be seen from the figure that the conveyor 1 is a pallet conveyor comprising a number of pallets

8 arranged one after the other. In this case, the drive element 9 used to move the pallets is a link chain, to which the pallets 8 are secured to move them. The drive element 9 has been implemented as an endless loop, which extends perpendicularly to the plane of the figure and of which the figure shows the upper portion 10 and the lower portion 11. The pallet 8 shown at a higher level is a pallet moving in the transport direction. The pallet 8 shown at a lower level is a pallet moving in the opposite direction, returning to the beginning of the conveyor track.

The profiled metallic body 3, of which the frame parts 4 and 5 are composed, consists of a profile extruded from a light metal, preferably aluminum or an aluminum alloy, containing many functions integrated in one body.

As shown in Fig. 3, the handrail belt 14 is supported by suspenders 17, one of which is seen in the figure, which are fastened to the profiled metallic body 3 at a distance from each other to support the return portion 16 of the handrail belt 14. The handrail belt 14 is a substantially C-shaped profile in cross-section such that it defines inside it an interior groove 18 which, in the return portion 16 of the handrail belt, opens upwards. At the edges of the interior groove 18 are edge flanges 19 directed towards each other, with a gap 20 between them.

It can be seen from the Fig. 3 that the web 21 of the suspender 17 extends through the gap 20 of the handrail belt into the interior groove 18. The suspension flanges 22 extend under the edge flanges 22 on either side of the web 21, thus supporting the handrail belt 14.

From Fig. 5 and 6 we can see that the suspender 17 comprises a vertical mounting flange whereby the suspender 17 can be fastened with a screw joint to the profiled body 3. The mounting flange has three snap-on coupling elements 23 formed on it for the attachment of conductors. The suspender 17 is preferably a single solid piece extruded from plastic. To allow the handrail belt to slide with low friction on the suspenders, the suspender 17 is formed from a plastic material having a substantially low friction coefficient. Similarly, the contact surfaces 24 of the edge flanges 19 of the handrail belt 14 that come into contact with the suspension flanges 22 may be coated with a material having a substantially low friction coefficient.

As can be seen from Fig. 3 and 4, integrated in the single profiled metallic body of solid material is a wall 25 forming the outwardly visible outer surface of the frame part 4, 5 and a bottom 26 fitted to be resting against a fixed base. Further, the profiled body 3 has first stop faces 27, 28 for forming a guide track 6 for supporting and guiding the pallets 8. The upper stop face 27 supports the wheels of loaded pallets 8. The whole or part of the length of the upper stop face 27 can be covered with a wearing plate 43, such as a sheet steel plate, which can be fastened in place in a groove 44 formed in the profiled metallic body. Such a sheet steel plate 43 is preferably provided at least at the joints between profiled metallic bodies 3 to eliminate any discontinuities of the stop face that may arise due to inaccurate alignment. Further, integrated in the profiled metallic body 3 are second stop faces 29, 30, which are a horizontal stop face 29, on which the edge of the handrail frame plate 13 can be supported, and a vertical stop face 30, against which the edge of the handrail frame plate 13 can be rested. Formed in the profiled body 3 is also a mounting slot

31 for a retaining bolt 32 used to secure the handrail frame 13, which slot can receive the head of the bolt 32 inside it. The profiled metallic body 3 further has a groove integrated in it as a coupling element 33 for fastening the suspender 17. In addition, it has a second coupling element 34 for joining a second profiled body 35 forming an interior wall to the profiled metallic body 3 from a lateral direction. Further, the profiled metallic body 3 contains a first space 36, which has been fitted to receive the return portion 16 of the handrail belt 14 inside it. Moreover, the profiled metallic body 3 contains a second space 37, which has been fitted to receive the upper portion 10 of the drive element 9 inside it. A third space 38 has been fitted to receive the lower portion 11 of the drive element 9 inside it. Furthermore, the profiled metallic body 3 contains three fourth spaces 39, which have been fitted to receive inside them a bar-like extension joint element 40 for joining the profiled metallic bodies 3 end to end one after the other. In addition, the profiled metallic body 3 contains three fifth spaces 41, which have been fitted to receive inside them round alignment pins 42, by means of which the profiled metallic bodies 3 can be accurately aligned relative to each other.

The invention is not limited to the embodiment examples described above; instead, many variations are possible within the scope of the inventive concept defined in the claims.

List of reference numbers:

conveyor (1)
frame (2)
profiled metallic bodies (3)
frame parts (4 5)
guide tracks (6)
transverse member (7)
pallets (8)
drive element (9)
upper portion (10)
lower portion (11)
handrail (12)
handrail frame (13)
handrail belt (14)
upper handhold portion (15)
lower return portion (16)
suspender (17)
interior groove (18)
edge flanges (19)
gap (20)
web (21)
suspension flanges (22)
coupling elements (23)
contact surfaces (24)
wall (25)
bottom (26)
first stop faces (27 28)
second stop faces (29 30)
mounting slot (31)
fastening element (32)
first coupling element (33)
second coupling element (34)
profiled body (35)
first space (36)
second space (37)
third space (38)

fourth space (39)
extension joint element (40)
fifth space (41)
alignment pin (42)
third coupling element (44)
wearing plate (43)

CLAIMS

1. A travelator, moving ramp or escalator for transporting passengers, comprising

- a conveyor (1);
- a frame (2; 4, 5) supported on a fixed structure, on which frame the conveyor is mounted and which frame (2) comprises two elongated frame parts (4, 5), which are provided with guide tracks (6) for guiding the conveyor (1)
- a handrail (12), which comprises a handrail frame (13) and an endless handrail belt (14) mounted on the handrail frame and arranged as a loop having an upper handhold portion (15) that the passenger can grip with a hand for support and a lower return portion (16) disposed inside the frame (2; 4, 5),

characterized in that
the frame parts (4, 5) are composed of profiled metallic bodies (3) of solid material joined together end to end one after the other, which profiled metallic bodies (3) consist of one or more extruded profiles,
and the travelator, moving ramp or escalator comprises a number of suspenders (17) fastened to the frame (2) at a distance from each other to support the return portion (16) of the handrail belt (14) inside the profiled metallic bodies (3).

2. A travelator, moving ramp or escalator according to claim 1, characterized in that in cross-section the handrail belt (14) is a substantially C-shaped profile, defining inside it an interior groove (18), which in the return portion (16) of the handrail belt opens upwards and which groove has at its edges edge flanges (19) directed towards each other, with a gap (20) between them; and that the suspender (17) comprises a web (21) extending through the gap (20) of

the handrail belt into the interior groove (18) and suspension flanges (22) extending on either side of the web (21) under the edge flanges (22) to support the handrail belt.

3. A travelator, moving ramp or escalator according to claim 2, characterized in that the suspender (17) comprises one or more coupling elements (23) for securing a conductor.

4. A travelator, moving ramp or escalator according to any one of claims 1 - 3, characterized in that the suspender (17) has been formed from a material having a substantially low friction coefficient.

5. A travelator, moving ramp or escalator according to any one of claims 7 - 9, characterized in that the contact surfaces (24) of the edge flanges (19) of the handrail belt (14) that come into contact with the suspension flanges (22) are coated with a material having a substantially low friction coefficient.

6. A travelator, moving ramp or escalator according to any one of claims 1 - 5, characterized in that the frame (2) comprises two elongated frame parts (4, 5) which are provided with guide tracks (6) for guiding the conveyor (1) and which frame parts (4, 5) are composed of mutually identical profiled metallic bodies (3) joined together end to end one after the other, which profiled metallic bodies contain coupling, supporting and/or guide elements integrated in one profiled metallic body of solid material; and a number of transverse members (7) extending transversely between the frame parts (4, 5) to hold them parallel to each other at a distance from each other.

7. A travelator, moving ramp or escalator according to claim 6, characterized in that the profiled metallic body (3) consists of one or more profiles extruded from a light metal, such as aluminum or an aluminum alloy.

8. A travelator, moving ramp or escalator according to any one of claims 1 - 7, characterized in that the conveyor (1) is a pallet conveyor comprising a number of successive pallets (8) and a drive element (9), such as a link chain or belt, to which the pallets are connected to move the pallets, said drive element (9) being arranged as an endless loop having an upper portion (10) and a lower portion (11).

9. A travelator, moving ramp or escalator according to any one of claims 6 - 8, characterized in that one profiled metallic body (3) of continuous material contains one or more items of the following group integrated in it:

- a wall (25) forming the outwardly visible outer surface of the frame part (4, 5),
- a bottom (26) fitted to be resting against a fixed base,
- first stop faces (27, 28) for forming a guide track (6) for supporting and guiding the pallets (8),
- second stop faces (29, 30), against which the handrail frame (13) can be supported,
- a mounting slot (31) for a fastening element (32) for securing the handrail frame (13),
- a first coupling element (33) for securing the suspender (17),
- a second coupling element (34) for joining a second profiled body (35), such as a profiled body forming an interior wall, from a lateral direction,

- a third coupling element (44) for fastening a wearing plate (43) on the stop face (27, 28),

- a first space (36), which has been fitted to receive inside it the return portion (16) of the handrail belt (14),

- a second space (37), which has been fitted to receive inside it the upper portion (10) of the drive element (9),

- a third space (38), which has been fitted to receive inside it the lower portion (11) of the drive element (9),

- a fourth space (39), which has been fitted to receive inside it an extension joint element (40) for joining the profiled metallic bodies (3) end to end one after the other,

- a fifth space (41), which has been fitted to receive inside it an alignment pin (42) for butt alignment of the profiled metallic bodies (3).

10. A travelator, moving ramp or escalator according to any one of claims 1 - 9, characterized in that the travelator, moving ramp or escalator is a travelator, moving ramp or escalator of low construction designed to be mounted upon a fixed base, such as a floor or other support.

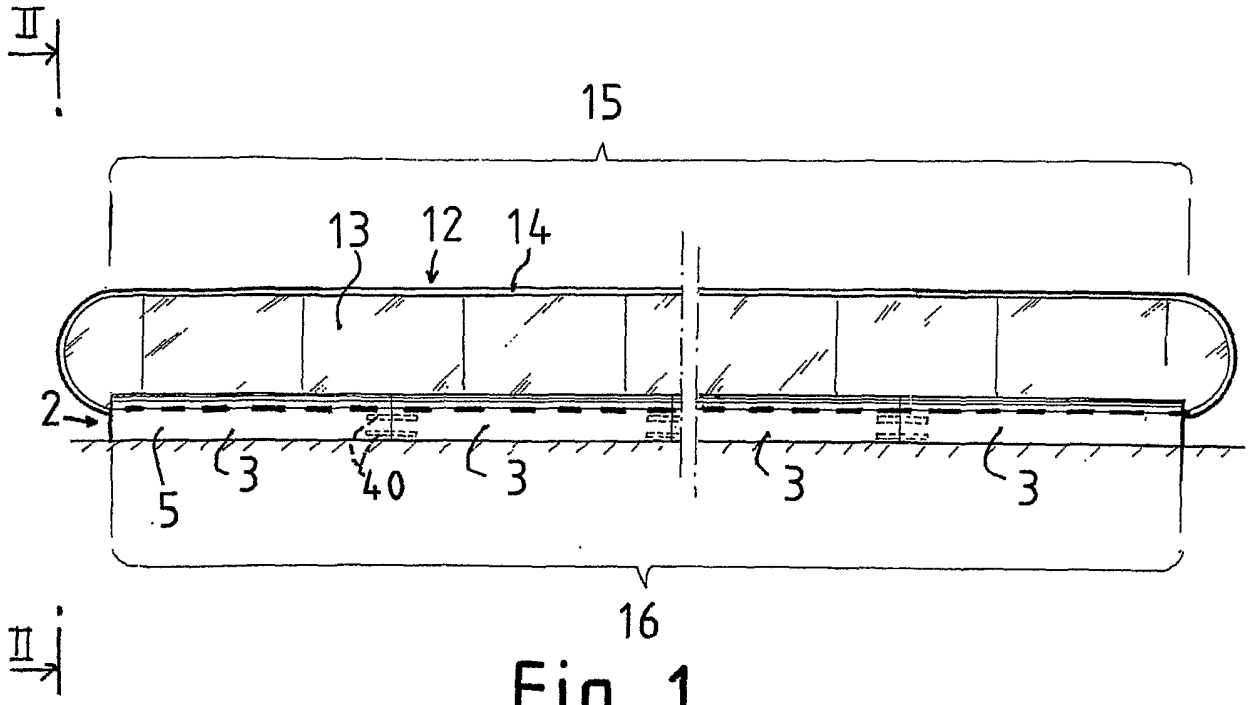


Fig 1

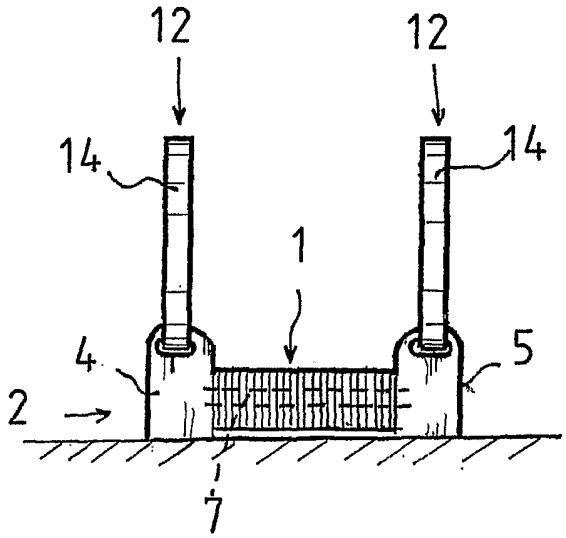


Fig 2

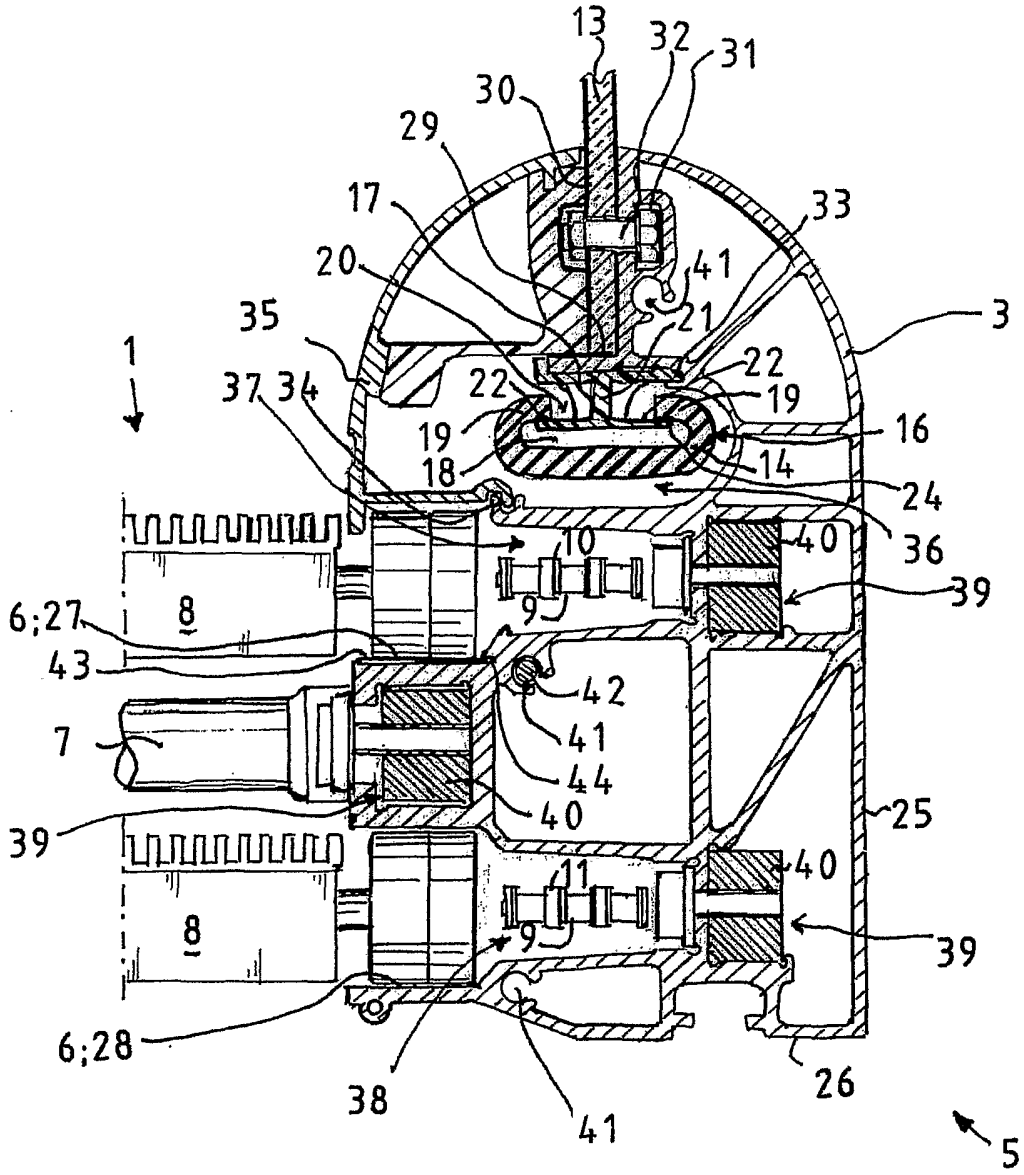

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Fig 3

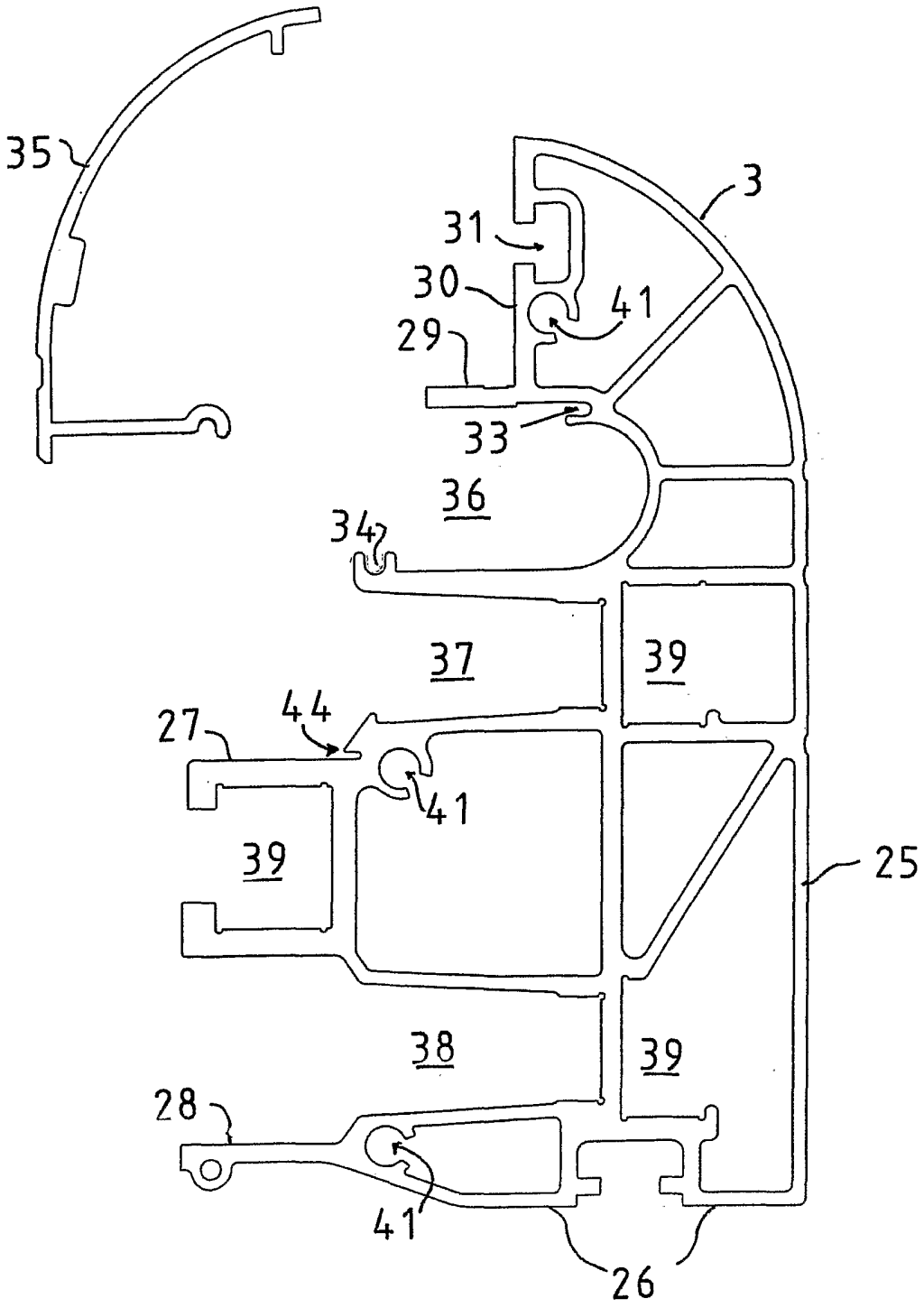


Fig 4

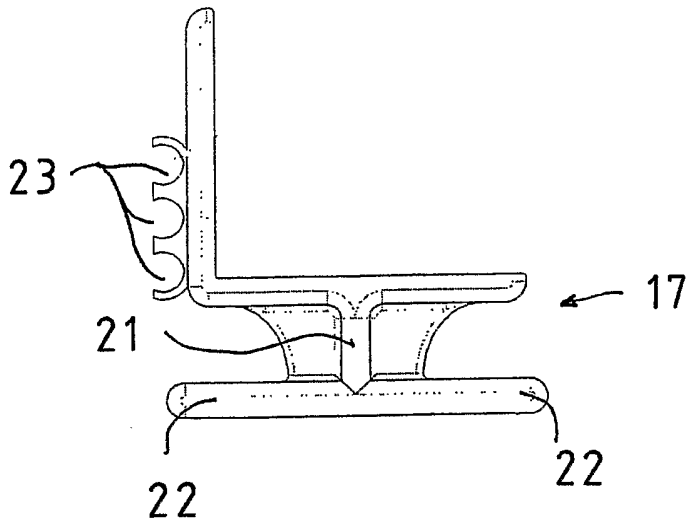


Fig 5

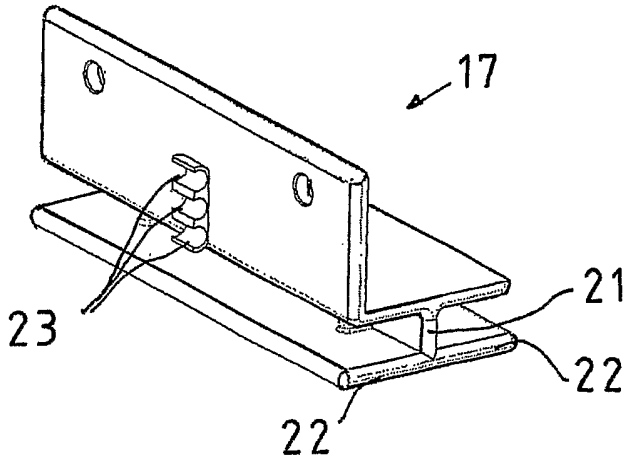


Fig 6