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(54) PRE-ASSEMBLED ESCALATOR MODULE COMPRISING A MULTIFUNCTIONAL CONNECTING BRACKET AND ESCALATOR

(57) The invention provides a pre-assembled escalator module and an escalator, wherein the pre-assembled escalator module comprises: a module side plate; a multifunctional connecting bracket connected to the module side plate; and a functional component which is connected to the multifunctional connecting bracket so as to be connected to the module side plate, and the functional component comprises at least one of a comb plate, a skirt plate, a cover plate or an entrance panel.

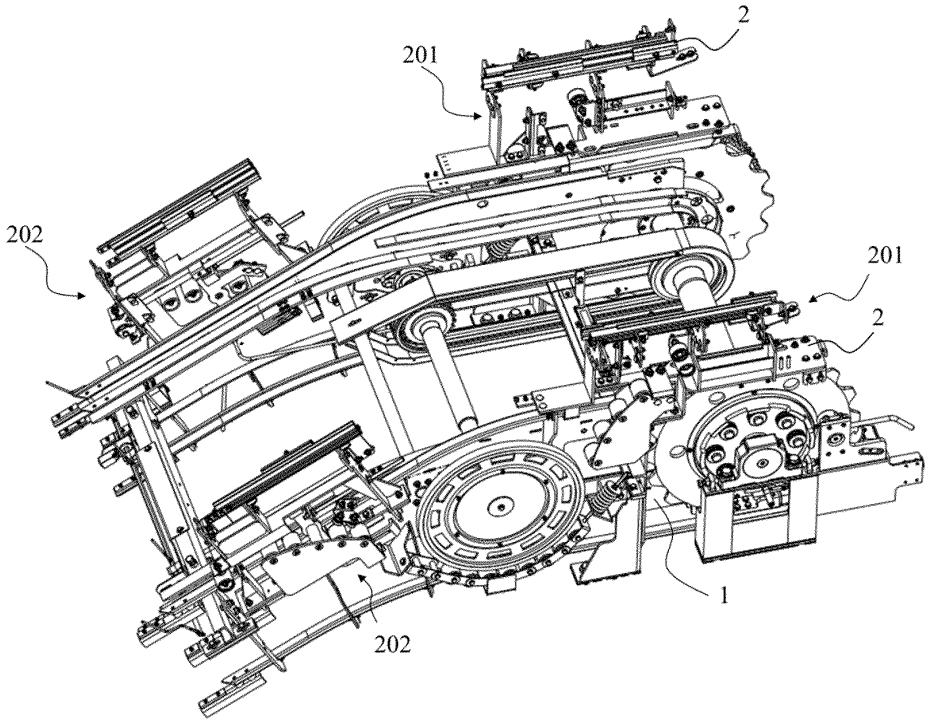

Fig. 2

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Description

TECHNICAL FIELD

[0001] The invention relates to a pre-assembled escalator module and an escalator comprising the pre-assembled escalator module.

BACKGROUND

[0002] Escalator has become a necessary transportation equipment for different floors in modern city life. With the update and development of escalator technology, the old escalator needs to be eliminated and the modern escalator solution should be used.

[0003] Usually, when the old escalator is renovated, the old escalator parts are removed, but the truss of the escalator is kept. Then, the technicians install new escalator components on site, such as the upper escalator module and the lower escalator module.

[0004] However, because the space frame of the place where the escalator was originally installed has been limited, the escalator reconstruction and its equipment installation are inevitably limited. The solution in the prior art is to disassemble the elevator module into a plurality of small parts, bring these disassembled small parts to the reconstruction site, and assemble them on site, which is time-consuming and costly.

[0005] Therefore, in practice, it is expected to provide a pre-assembled escalator module, which can integrate functional components on the escalator module in advance, without disassembling the module into parts first and then bringing them to the site for reassembly, thus saving installation time and installation cost and ensuring good accuracy of elevator components.

SUMMARY

[0006] In view of the above-mentioned problems and demands, the present invention proposes a pre-assembled escalator module and an escalator including the same, which solve the above-mentioned problems and bring other technical effects by adopting the following technical features.

[0007] According to one aspect of the present disclosure, there is provided a pre-assembled escalator module, including: a module side plate; a multifunctional connecting bracket connected to the module side plate; and a functional component which is connected to the multifunctional connecting bracket so as to be connected to the module side plate, and the functional component comprises at least one of a comb plate, a skirt plate, a cover plate or an entrance panel.

[0008] In some examples, the multifunctional connecting bracket includes a support plate provided with a plurality of mounting interfaces for mounting functional component.

[0009] In some examples, the functional component includes a comb plate connected to the support plate through an adjusting screw assembly.

[0010] In some examples, the multifunctional connecting bracket further comprises a threaded plate connected with the adjusting screw, and the support plate is arranged between the comb plate and the threaded plate.

[0011] In some examples, the adjusting screw assembly includes a long screw and an adjusting screw, wherein the adjusting screw has a through hole and an external thread, the adjusting screw is connected to the comb plate through the external thread, and the long screw is threaded with the threaded plate through the through hole.

[0012] In some examples, a gasket is provided between the support plate and the threaded plate.

[0013] In some examples, the functional component includes a skirt plate comprising a first profile piece arranged on the side, and the multifunctional connecting bracket further includes a plurality of C-shaped plates connected to the support plate, and the C-shaped plates are connected to the first profile piece of the skirt plate, thereby connecting the skirt plate to the module side plate.

[0014] In some examples, the functional component includes a cover plate, and the multifunctional connecting bracket further includes a second profile piece connected with the plurality of C-shaped plates, and the cover plate is connected to the second profile piece through a connector, thereby connecting the cover plate to the module side plate.

[0015] In some examples, the multifunctional connecting bracket includes a first bracket along the horizontal direction and a second bracket inclined relative to the horizontal direction, and the skirt plate and/or the cover plate are both connected to the first bracket and the second bracket.

[0016] In some examples, the functional component includes an entrance panel, and the multifunctional connecting bracket further includes a connecting bracket connected with the support plate, and the entrance panel is connected to the connecting bracket, thereby connecting the entrance panel to the module side plate.

[0017] In some examples, the pre-assembled escalator module is an upper escalator module and/or a lower escalator module of an escalator.

[0018] In some examples, the pre-assembled escalator module further comprises a truss interface arranged at an end of the pre-assembled escalator module for connecting the pre-assembled escalator module to a truss.

[0019] On the other hand, the present disclosure provides an escalator, which comprises a truss and a pre-assembled escalator module as mentioned above, wherein the pre-assembled escalator module is connected to the truss.

[0020] According to the technical scheme of the present disclosure, the functional components such as comb frame, skirt plate, cover plate and entrance panel are pre-assembled to the escalator module in advance, so as to

significantly reduce the time and process of on-site installation, which is beneficial to reducing product cost and shortening delivery time.

BRIEF DESCRIPTION OF DRAWINGS

[0021]

Fig. 1 shows a perspective view of a pre-assembled escalator module according to at least one embodiment of the present disclosure;
Fig. 2 shows another perspective view of a pre-assembled escalator module according to at least one embodiment of the present disclosure, in which functional components are omitted to show module side plates and multifunctional connecting brackets;
Fig. 3 shows a schematic diagram of a comb plate installed to a pre-assembled escalator module according to at least one embodiment of the present disclosure;
Fig. 4 shows a partial enlarged view of the portion of fig. 3, which shows the multifunctional connecting bracket and the comb plate connected therewith;
Fig. 5 is a side view of fig. 4;
Fig. 6 shows a partial enlarged view of a section taken along line A-A in fig. 4;
Fig. 7 shows a sectional view taken along line B-B in fig. 5;
Fig. 8 shows a schematic diagram of a skirt plate mounted to a pre-assembled escalator module according to at least one embodiment of the present disclosure;
Fig. 9 shows a schematic diagram of a skirt plate according to at least one embodiment of the present disclosure;
Fig. 10 shows a partial enlarged view of the portion of fig. 8, which shows the connection between the multifunctional connecting bracket and the skirt plate;
Fig. 11 shows a schematic view of an entrance panel installed to a pre-assembled escalator module according to at least one embodiment of the present disclosure;
Fig. 12 shows a partial enlarged view of the portion of fig. 11, which shows the connection between the multifunctional connecting bracket and the entrance panel;
Fig. 13 shows a schematic diagram of a cover plate installed to a pre-assembled escalator module according to at least one embodiment of the present disclosure;
Fig. 14 shows a partial enlarged view of the portion of fig. 13, which shows the connection between the multifunctional connecting bracket and the cover plate;
Fig. 15 shows a schematic view of a first bracket according to at least one embodiment of the present disclosure;
Fig. 16 shows a schematic view of a second bracket according to at least one embodiment of the present disclosure.

DETAILED DESCRIPTION

[0022] In order to make the purpose, technical scheme and advantages of the technical scheme of the present disclosure more clear, the technical scheme of the embodiment of the present disclosure will be described clearly and completely with the drawings of specific embodiments of the present disclosure. Like reference numerals in the drawings represent like parts. It should be noted that the described embodiment is a part of the embodiment of the present disclosure, not the whole embodiment. Based on the described embodiments of the present disclosure, all other embodiments obtained by ordinary people in the field without creative labor belong to the scope of protection of the present disclosure.

[0023] Unless otherwise defined, technical terms or scientific terms used herein shall have their ordinary meanings as understood by people with ordinary skills in the field to which this disclosure belongs. The words "first", "second" and similar words used in the specification and claims of the patent application of this disclosure do not indicate any order, quantity or importance, but are only used to distinguish different components. Similarly, similar words such as "a" or "an" do not necessarily mean quantitative restrictions. Similar words such as "including" or "containing" mean that the elements or objects appearing before the word cover the elements or objects listed after the word and their equivalents, without excluding other elements or objects. Similar words such as "connected" or "connected" are not limited to physical or mechanical connection, but can include electrical connection, whether direct or indirect. "Up", "Down", "Left" and "Right" are only used to indicate the relative positional relationship. When the absolute position of the described object changes, the relative positional relationship may also change accordingly.

[0024] The escalator is provided with a circulating ladder path to transport people. In recent years, according to the needs of development, escalators in shopping malls, stations and airports are being reformed in terms of escalator performance and energy saving, and the old escalators are renovated. Usually, when the old escalator is renovated, the old escalator parts are removed, but the truss of the escalator is kept. Then, the technicians install new escalator components, such as the upper escalator module and the lower escalator module, on site.

[0025] For modern escalators, trusses and escalator modules are usually assembled in advance in the factory and installed directly at the site. However, for the old elevator reconstruction project, because the space frame of the original escalator installation site has been limited, new escalator modules can only be installed on the existing truss. The solution in the prior art is to disas-

semble the elevator module into a plurality of small parts, bring these disassembled small parts to the reconstruction site, and assemble them on site, which is time-consuming and costly to install and debug.

[0026] Multifunctional connecting bracket, also known as multifunctional connecting plate or multifunctional interface plate, usually needs to be connected with the truss in the prior art for connecting functional components (such as comb plate, skirt plate, cover plate or entrance panel) to the truss.

[0027] Aiming at the defects of the prior art, the present disclosure provides a pre-assembled escalator module and an escalator including the pre-assembled escalator module. Next, a pre-assembled escalator module and a preferred embodiment of an escalator according to the present disclosure will be described in detail with reference to the drawings.

[0028] Compared with the embodiment shown in the drawings, the feasible embodiments within the protection scope of this disclosure may have fewer components, other components not shown in the drawings, different components, components arranged differently or components connected differently, etc. Furthermore, two or more components in the drawings may be implemented in a single component or a single component shown in the drawings may be implemented as a plurality of separate components without departing from the concept of the present disclosure.

[0029] It should be noted that in order to simplify the description, the embodiment of this disclosure will highlight the main components of the pre-assembled escalator module, and omit the description of other conventional components in the escalator, including but not limited to: truss, step ladder path, spindle drive assembly, handrail belt drive wheel assembly, guide wheel assembly, etc.

[0030] A pre-assembled escalator module according to at least one embodiment of the present disclosure will be described with reference to the drawings. It should be noted that the pre-assembled escalator module proposed in this disclosure can be the upper escalator module and/or the lower escalator module of an escalator. For the sake of simplicity, the embodiment of this disclosure will be described below mainly by taking the upper escalator module as an example. Those skilled in the art can refer to the characteristics of the upper escalator module and apply similar or identical features to the lower escalator module.

[0031] As shown in fig. 1, a pre-assembled escalator module 10 according to at least one embodiment of the present disclosure includes a module side plate 1, a truss interface 101, a multifunctional connecting bracket 2, a comb plate 3, a skirt plate 4, a cover plate 5 and an entrance panel 6. The comb plate 3, skirt plate 4, cover plate 5 and entrance panel 6 can be collectively referred to as functional components, which are used to realize some functions of the escalator or for decoration. For the purpose of this disclosure, the multifunctional connecting bracket 2 is connected to the module side plate 1, and functional components are connected to the module side plate 1 through the multifunctional connecting bracket 2. This is different from the traditional multifunctional connecting bracket, which needs to be connected to the truss. However, in the modernization of the old escalator, the truss is located at the site, so the multifunctional connecting bracket can only be installed at the site, and then the functional components can be connected to the multifunctional connecting bracket.

[0032] On the other hand, in the technical scheme disclosed in this disclosure, the multifunctional connecting bracket 2 is connected with the module side plate 1, and thus functional components can be connected with the module side plate 1 by connecting to the multifunctional connecting bracket 2, which allows for greatly improving the integration of the escalator module, realizing the pre-assembly of the escalator module in the factory, saving the time-consuming of on-site installation and debugging, reducing the installation error caused by on-site installation and improving the assembly accuracy.

[0033] In addition, fig. 1 also shows a truss interface 101 arranged at an end of the pre-assembled escalator module 10 for connecting the pre-assembled escalator module 10 to the truss. As shown in fig. 1, truss interfaces 101 can be provided at four locations along both ends in the horizontal direction and two sides in the lateral direction, which are used for hoisting the pre-assembled escalator module 10 to the truss on site and then installing and connecting it to the truss.

[0034] Fig. 2 shows a perspective view of a pre-assembled escalator module 10 with functional components omitted, which shows a module side plate 1 and a multifunctional connecting bracket 2. As shown in figs. 15 and 16, the multifunctional connecting bracket 2 may include a first bracket 201 along the horizontal direction and a second bracket 202 inclined relative to the horizontal direction, and the skirt plate 4 and/or the cover plate 5 are both connected to the first bracket 201 and the second bracket 202. The comb plate 3 and the entrance panel 6 may be connected to the first bracket 201. For the upper escalator module, it is necessary to connect the guide wheel assembly of the handrail belt and guide the handrail belt horizontally and obliquely, so it is necessary to provide two brackets. For the lower escalator module, only one bracket is needed.

[0035] Illustratively, figs. 3 to 7 show the connection of the comb plate 3 to the pre-assembled escalator module 10 according to at least one embodiment of the present disclosure. As shown in figs. 3 and 4, and with additional reference to fig. 15, the multifunctional connecting bracket 2 may include a support plate 21, on which a plurality of mounting interfaces for mounting functional components, such as a plurality of C-shaped plates 23, a second profile piece 24 and a connecting bracket 25 connected with the support plate 21, are provided. In addition, the multifunctional connecting bracket 2 may further include a threaded plate 22 for mounting the comb plate 3.

[0036] Illustratively, figs. 5 to 7 specifically show the connection between the comb plate 3 and the support plate 21. The comb plate 3 is connected to the support plate 21 through the adjusting screw assembly 7, and the threaded plate 22 is connected with the adjusting screw, and the support plate 21 is arranged between the comb plate 3 and the threaded plate 22.

[0037] The adjusting screw assembly 7 may specifically include a long screw 71 and an adjusting screw 72, wherein the adjusting screw 72 has a through hole and an external thread, and the adjusting screw 72 is connected to the comb plate 3 through the external thread, and the long screw 71 is threaded with the threaded plate 22 through the through hole. A gasket 8 may also be provided between the support plate 21 and the threaded plate 22.

[0038] The adjustment of the installation height of the comb plate 3 is important, which is related to the tightness between the steps and the comb plate 3. Therefore, it is necessary to provide components that can adjust the installation height of the comb plate 3.

[0039] The length of the adjusting screw 72 can be customized, for example, there can be a plurality of adjusting screws 72 with different lengths. One end of the adjusting screw 72 supports the nut of the long screw 71, and the other end directly abuts against the gasket 8. The installation height of the comb plate 3 can be adjusted by adjusting screws 72 and gaskets 8 with different lengths. It is only necessary to replace the adjusting screws 72 with different lengths or the thickness and quantity of gaskets 8, without replacing the new comb plate 3 or the support plate 21. Thus the installation and debugging process is simple.

[0040] Alternatively, the end of the adjusting screw 72 may be directly abutted against the support plate 21 without providing the gasket 8.

[0041] Illustratively, figs. 8 to 10 show the connection of the skirt plate 4 to the pre-assembled escalator module 10 according to at least one embodiment of the present disclosure.

[0042] The skirt plate 4 includes a first profile piece 41 arranged on the side, as shown in fig. 9. The first profile piece 41 may be, for example, an aluminum profile, which includes a groove. A plurality of C-shaped plates 23 of the multifunctional connecting bracket 2 are connected to the first profile piece 41 of the skirt plate 4, thereby connecting the skirt plate 4 to the module side plate 1.

[0043] Illustratively, as shown in fig. 10, a plurality of C-shaped plates 23 have two mounting holes in the vertical direction, which respectively correspond to the grooves of two first profile pieces 41 which are parallel in the up-down direction, and the C-shaped plates 23 and the first profile pieces 41 can be fixedly connected by screws.

[0044] Illustratively, figs. 13 and 14 show the connection of the cover plate 5 to the pre-assembled escalator module 10 according to at least one embodiment of the present disclosure. The cover plate 5 may include an inner cover plate and an outer cover plate. The cover plate 5 is connected to the second profile piece 24 through the connector 9, thereby connecting the cover plate 5 to the module side plate 1.

[0045] The second profile piece 24 may be, for example, an aluminum profile, which includes a groove. The connector 9 is, for example, an angle iron, and both surfaces of the connector 9 are fixedly connected to the second profile piece 24 and the cover plate 5 by bolts respectively.

[0046] In addition, both the first bracket 201 and the second bracket 202 may include a second profile piece 24, and both of them are connected with the skirt plate 4 and the cover plate 5.

[0047] Illustratively, figs. 11 and 12 show the connection of the entrance panel 6 to the pre-assembled escalator module 10 according to at least one embodiment of the present disclosure. The entrance panel 6, also called the handrail belt entrance panel, has an opening to allow the handrail belt to pass through. As shown in figs. 11 and 12, the entrance panel 6 is connected to the connecting bracket 25, thereby connecting the entrance panel 6 to the module side panel 1. The entrance panels 6 can be two halves, which are respectively installed on both sides of the handrail belt and enclose to form an opening.

[0048] As shown in fig. 12, only one of the two entrance panels is shown in fig. 12, and the other one can also be connected in a similar way, which is not repeated here. The connecting bracket 25 can be, for example, an angle iron, one surface of which is connected to the second profile piece 24 and the other surface is connected to the entrance panel 6, thereby fixedly connecting the entrance panel 6 and the second profile piece 24.

[0049] On the other hand, the present disclosure also proposes an escalator, which comprises a truss and the pre-assembled escalator module 10 as mentioned above, and the pre-assembled escalator module 10 is connected to the truss, for example, the truss interface 101 of the pre-assembled escalator module 10 is connected to the truss. The escalator can be, for example, an escalator modernized from an old escalator.

[0050] In this paper, the pre-assembled escalator module and the exemplary embodiment of the escalator of the present invention are described in detail with reference to preferred embodiments. However, those skilled in the art can understand that various variations and modifications can be made to the above specific embodiments without departing from the concept of the present invention, and various technical features and structures proposed by the present invention can be combined in various ways without exceeding the protection scope of the present invention, which is determined by the appended claims.

Claims

1. A pre-assembled escalator module (10), wherein the pre-assembled escalator module (10) comprises:

a module side plate (1);
a multifunctional connecting bracket (2) connected to the module side plate (1); and
a functional component connected to the multifunctional connecting bracket (2) so as to be connected to the module side plate (1), the functional component comprising at least one of a comb plate (3), a skirt plate (4), a cover plate (5) or an entrance panel (6).

2. The pre-assembled escalator module (10) according to claim 1, wherein the multifunctional connecting bracket (2) comprises a support plate (21) provided with a plurality of mounting interfaces for mounting functional component.

3. The pre-assembled escalator module (10) according to claim 2, wherein the functional component comprises a comb plate (3) connected to the support plate (21) through an adjusting screw assembly (7).

4. The pre-assembled escalator module (10) according to claim 3, wherein the adjusting screw assembly (7) comprises a long screw (71) and an adjusting screw (72), wherein the adjusting screw (72) has a through hole and an external thread, and the adjusting screw (72) is connected to the comb plate (3) through the external thread, and the long screw (71) is in threaded connection with the threaded plate (22) through the through hole.

5. The pre-assembled escalator module (10) according to claim 4, wherein the multifunctional connecting bracket (2) further comprises a threaded plate (22) connected with the adjusting screw (72), and the support plate (21) is arranged between the comb plate (3) and the threaded plate (22).

6. The pre-assembled escalator module (10) according to claim 5, wherein a gasket (8) is arranged between the support plate (21) and the threaded plate (22).

7. The pre-assembled escalator module (10) according to claim 2, wherein,

the functional component comprises a skirt plate (4) comprising a first profile piece (41) arranged on the side,
wherein the multifunctional connecting bracket (2) further comprises a plurality of C-shaped plates (23) connected with the support plate (21), and the plurality of C-shaped plates (23) are connected to the first profile piece (41) of the skirt plate (4), thereby connecting the skirt plate (4) to the module side plate (1).

8. The pre-assembled escalator module (10) according to claim 7, wherein,

the functional component comprises a cover plate (5),
wherein the multifunctional connecting bracket (2) further comprises a second profile piece (24) connected with the plurality of C-shaped plates (23), and the cover plate (5) is connected to the second profile piece (24) through a connector (9), thereby connecting the cover plate (5) to the module side plate (1).

9. The pre-assembled escalator module (10) according to claim 8, wherein,
the multifunctional connecting bracket (2) comprises a first bracket (201) along the horizontal direction and a second bracket (202) inclined relative to the horizontal direction, and the skirt plate (4) and/or the cover plate (5) are both connected to the first bracket (201) and the second bracket (202).

10. The pre-assembled escalator module (10) according to claim 2, wherein,

the functional component comprises an entrance panel (6),
wherein the multifunctional connecting bracket (2) further comprises a connecting bracket (25) connected with the support plate (21), and the entrance panel (6) is connected to the connecting bracket (25), thereby connecting the entrance panel (6) to the module side plate (1).

11. The pre-assembled escalator module (10) according to claim 1, wherein the pre-assembled escalator module (10) is an upper escalator module and/or a lower escalator module of an escalator.

12. The pre-assembled escalator module (10) according to any one of claims 1 to 11, wherein the pre-assembled escalator module (10) further comprises:
a truss interface (101) arranged at an end of the pre-assembled escalator module (10) for connecting the pre-assembled escalator module (10) to a truss.

13. An escalator comprising a truss and the pre-assembled escalator module (10) according to any one of claims 1 to 12, wherein the pre-assembled escalator module (10) is connected to the truss.

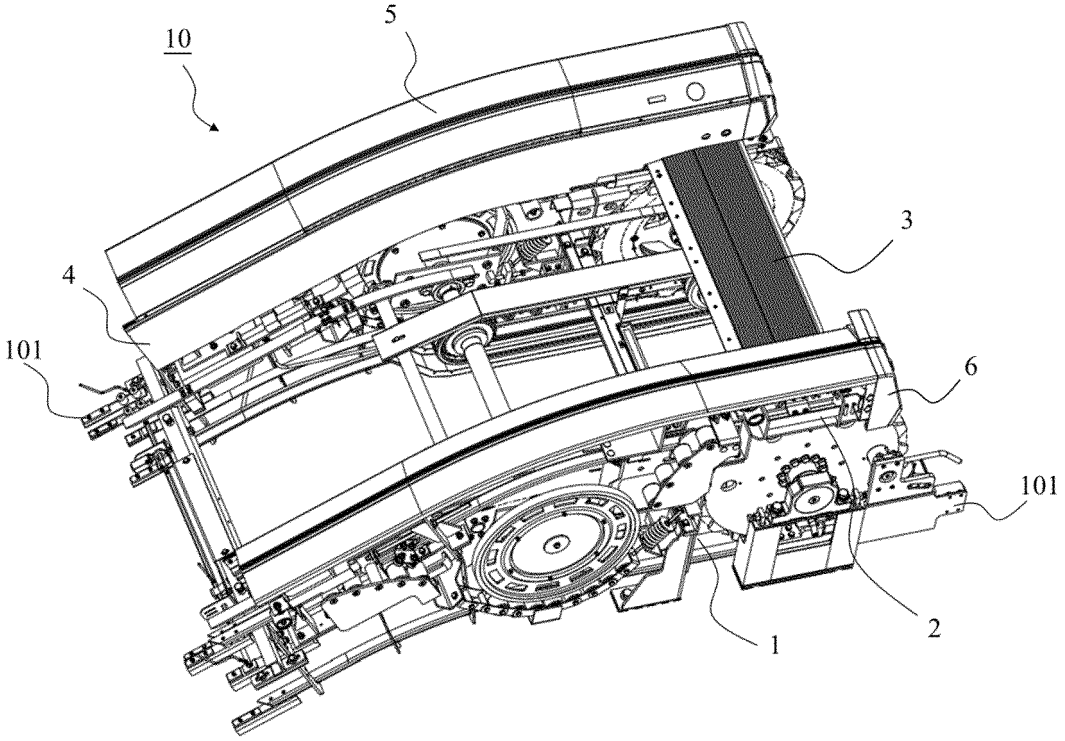

Fig. 1

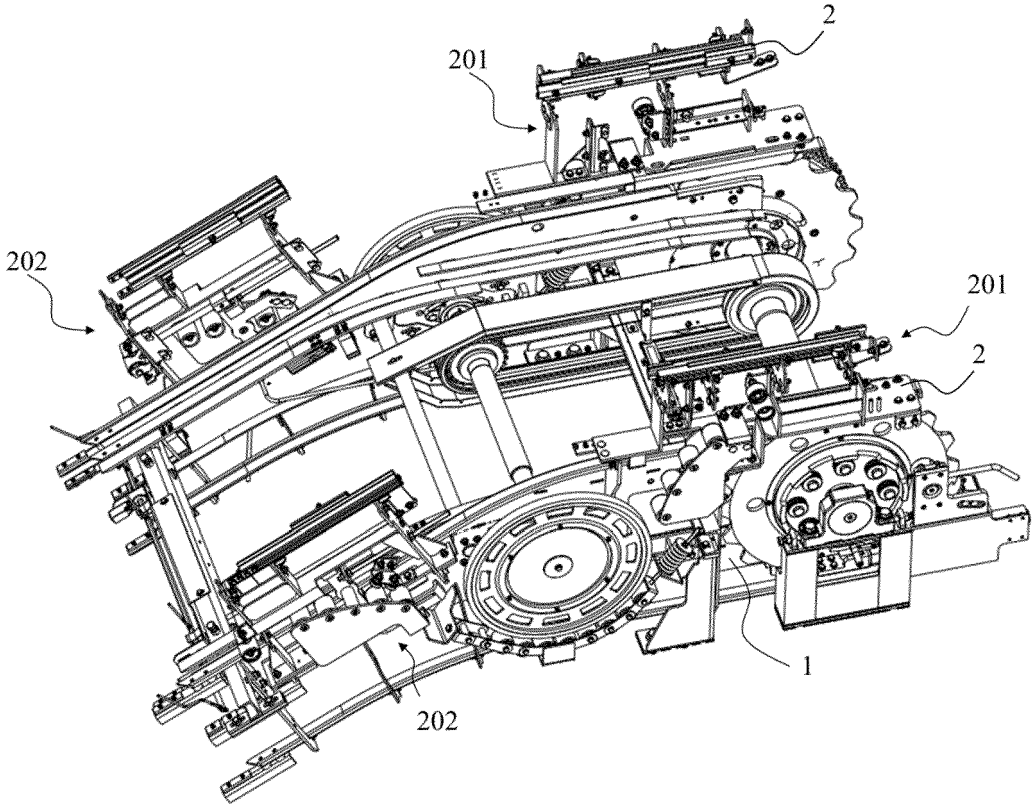

Fig. 2

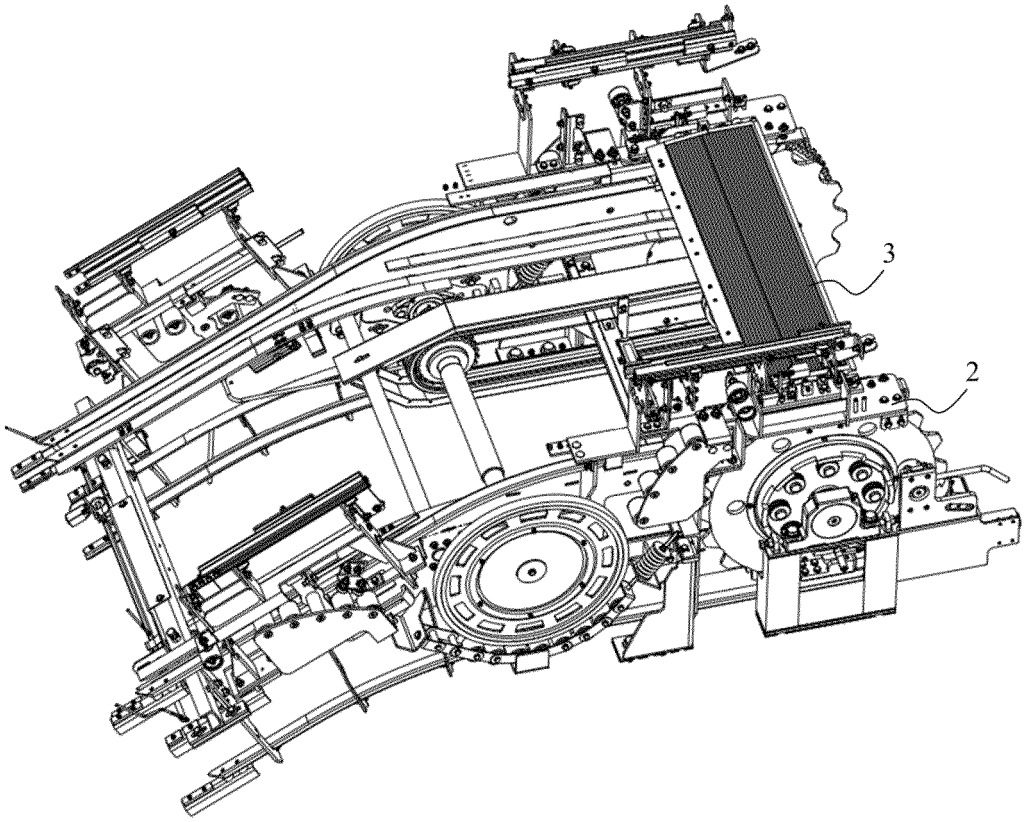

Fig. 3

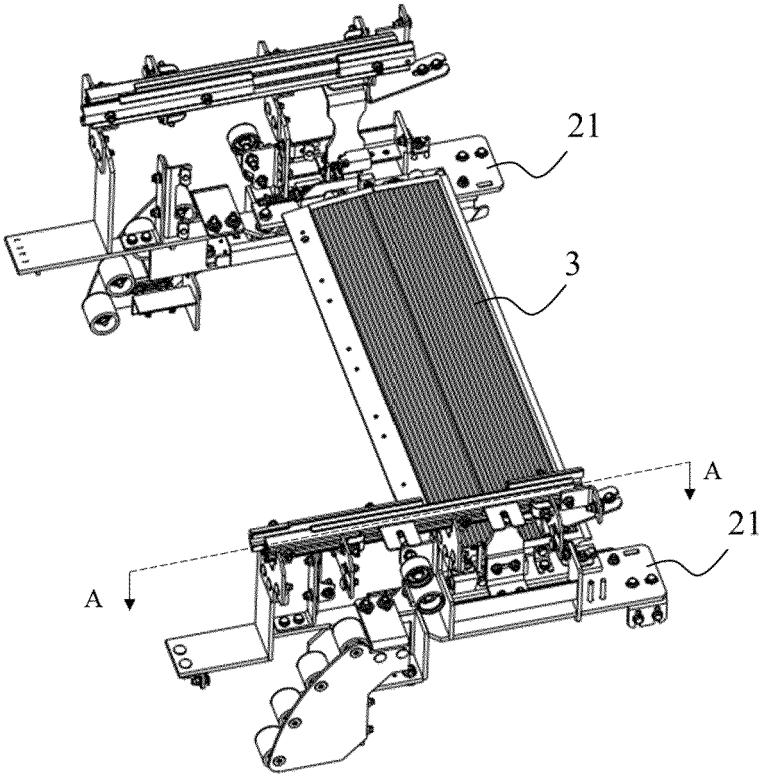

Fig. 4

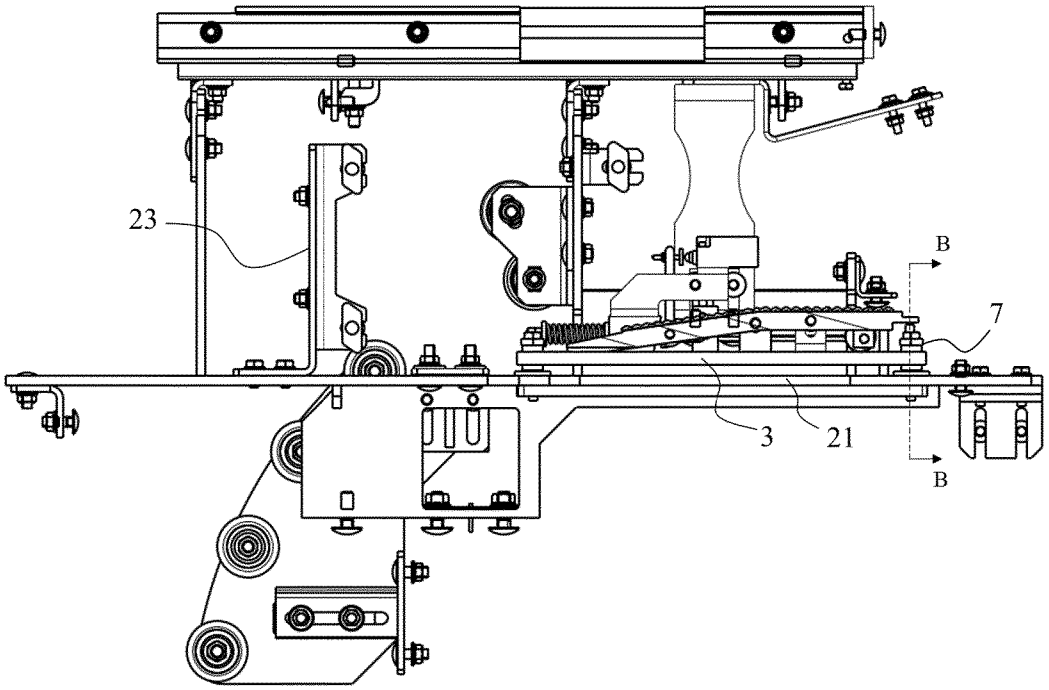

Fig. 5

A-A

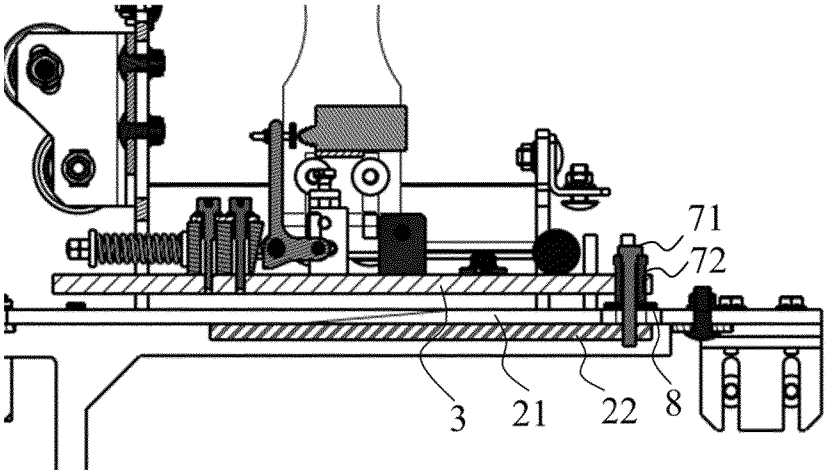

Fig. 6

B-B

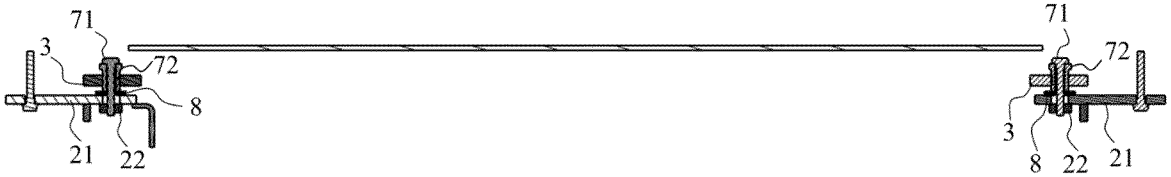

Fig. 7

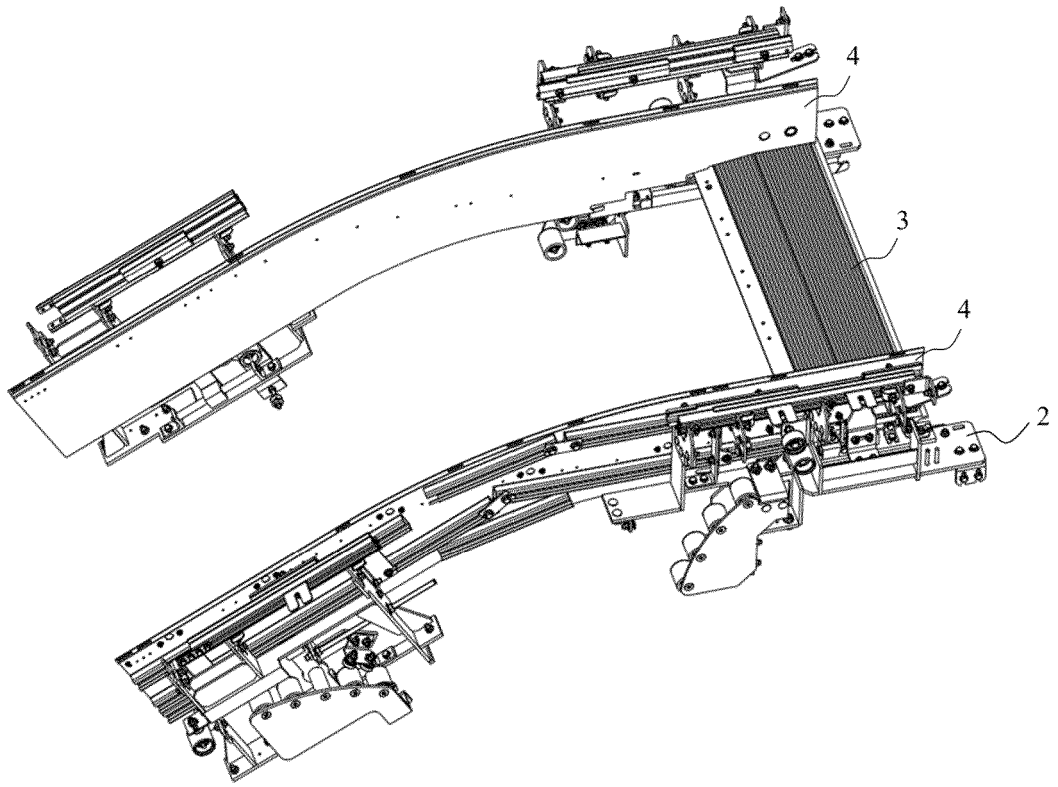

Fig. 8

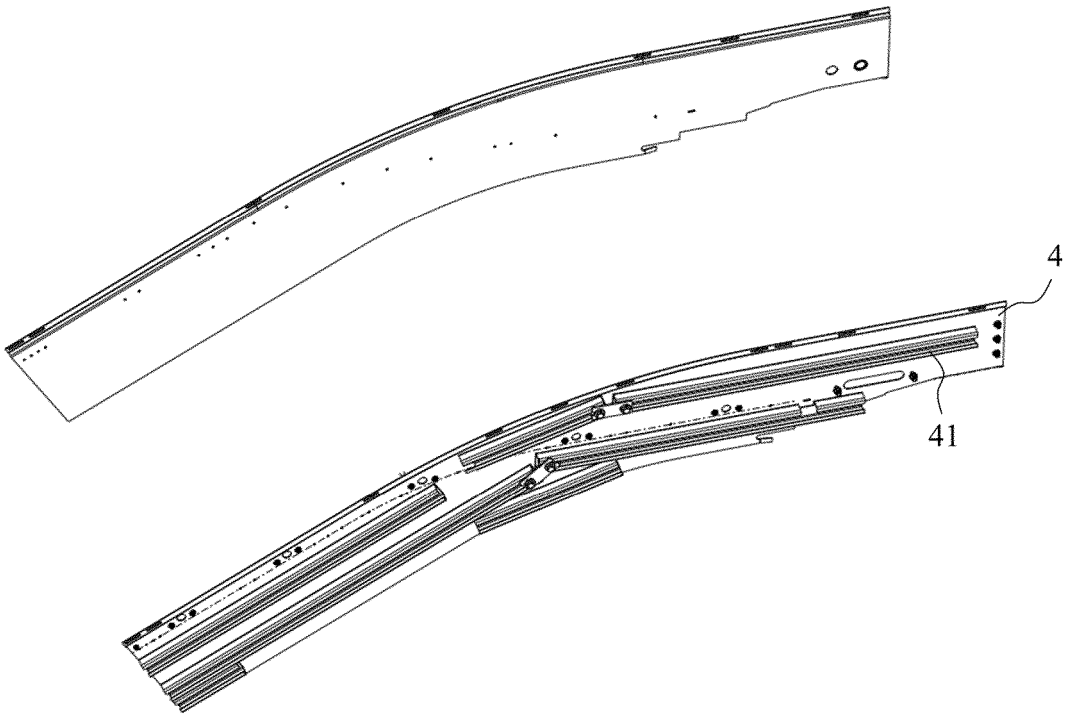

Fig. 9

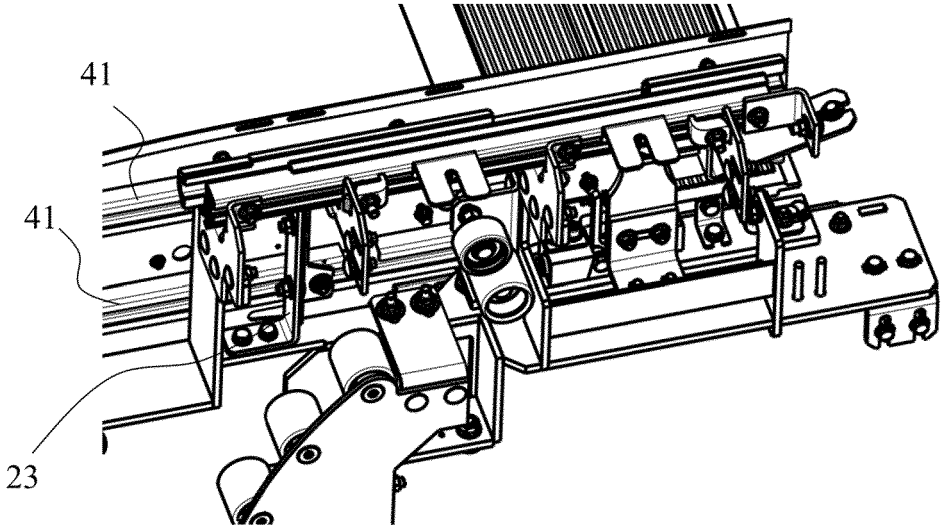

Fig. 10

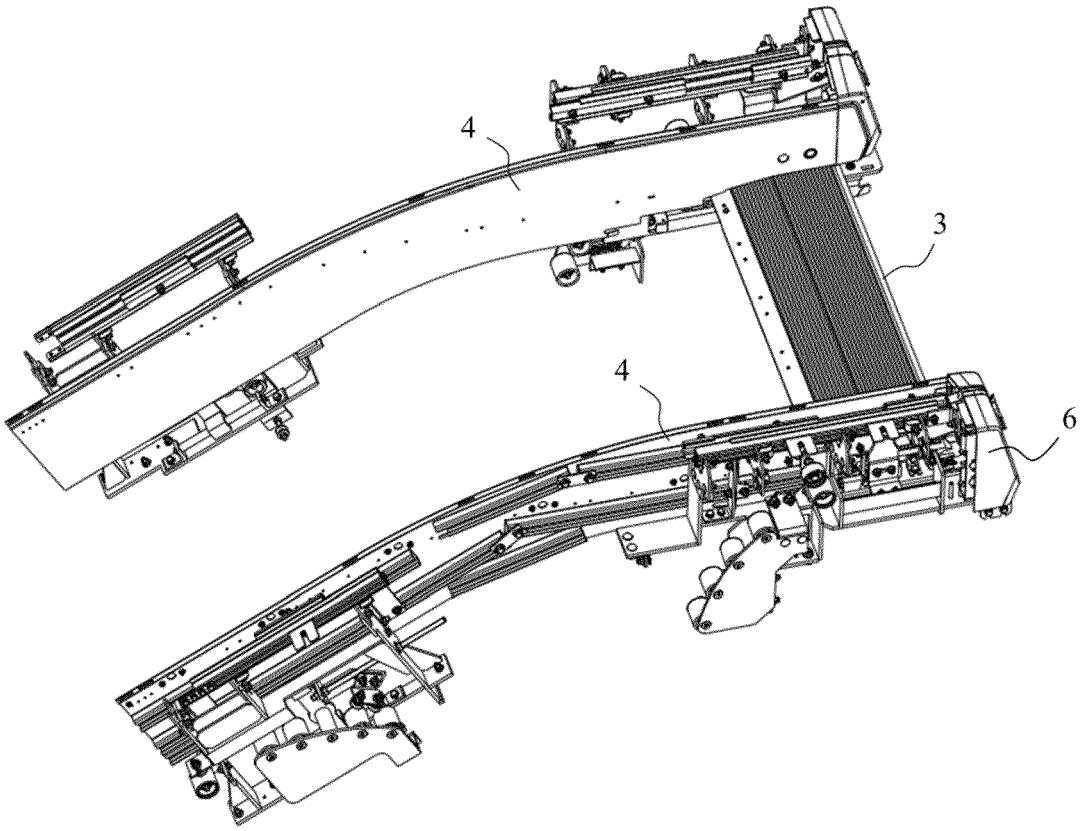

Fig. 11

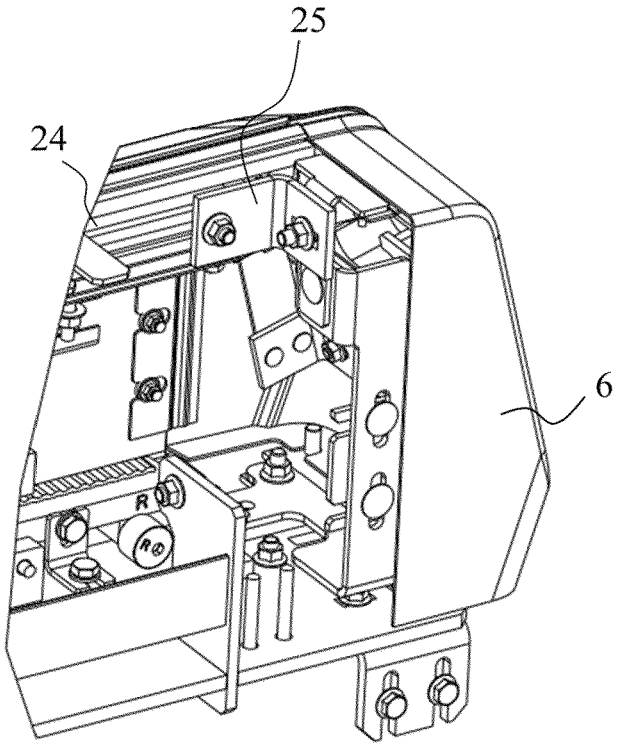

Fig. 12

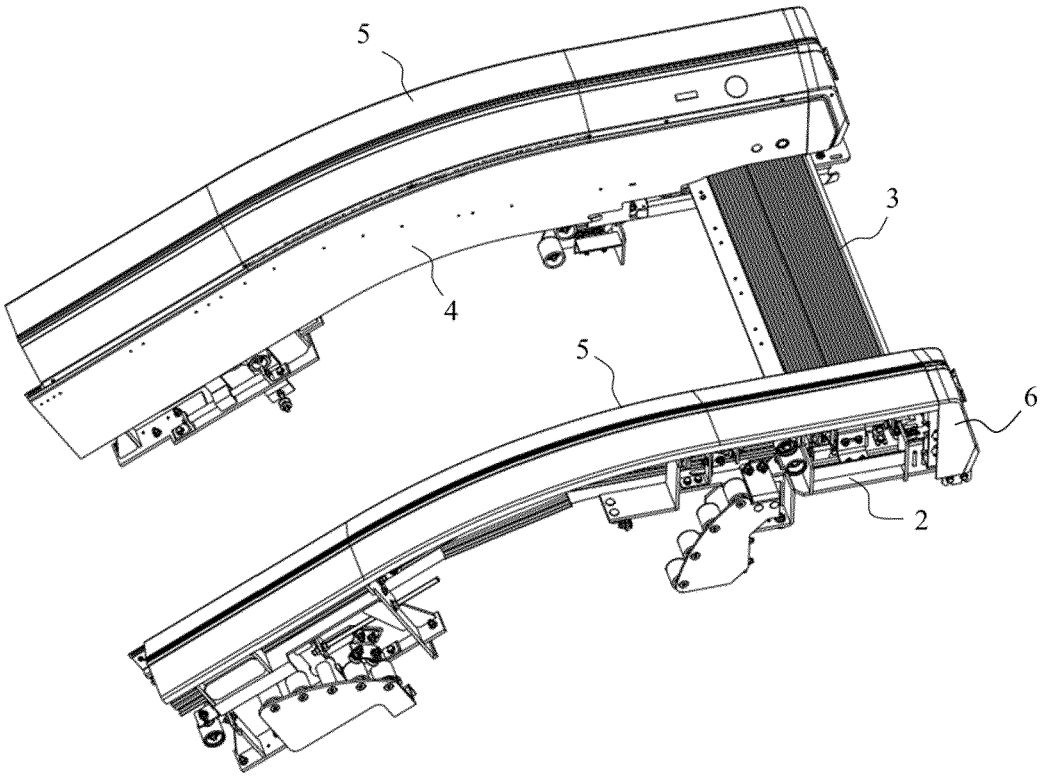

Fig. 13

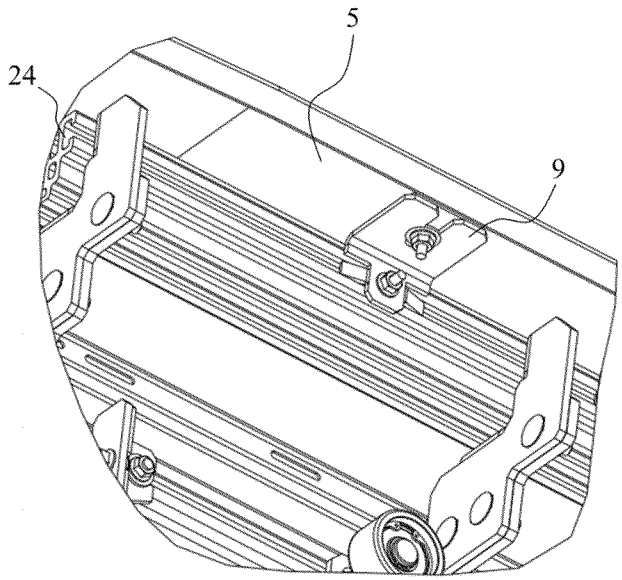

Fig. 14

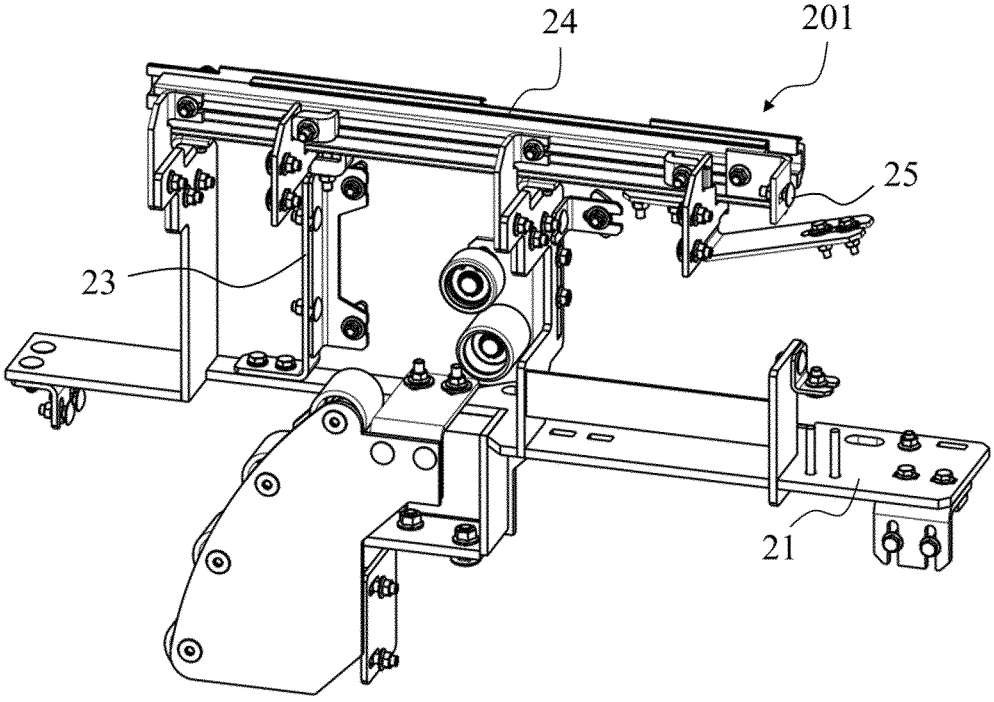

Fig. 15

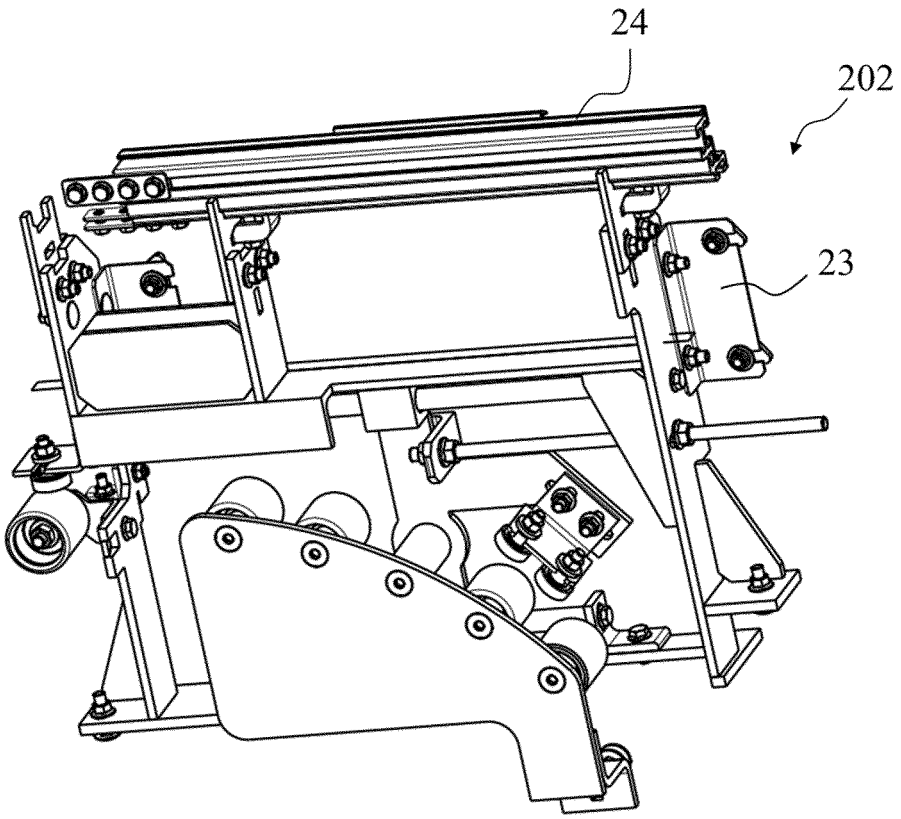

Fig. 16

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Application Number
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Place of search	Date of completion of the search	Examiner
The Hague	21 October 2024	Dijoux, Adrien

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