



(11) **EP 4 389 674 A1**

(12) **EUROPEAN PATENT APPLICATION**
published in accordance with Art. 153(4) EPC

(43) Date of publication:
26.06.2024 Bulletin 2024/26

(51) International Patent Classification (IPC):
B66B 21/02 ^(2006.01) **B66B 23/22** ^(2006.01)
B66B 23/00 ^(2006.01)

(21) Application number: **22857723.5**

(86) International application number:
PCT/CN2022/112364

(22) Date of filing: **15.08.2022**

(87) International publication number:
WO 2023/020411 (23.02.2023 Gazette 2023/08)

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME
Designated Validation States:
KH MA MD TN

• **KONE Elevators Co., Ltd.**
Kunshan, Jiangsu 215300 (CN)

(72) Inventor: **FAN, Jinquan**
Kunshan, Jiangsu 215300 (CN)

(74) Representative: **Kolster Oy Ab**
Salmisaarenaukio 1
P.O. Box 204
00181 Helsinki (FI)

(30) Priority: **20.08.2021 CN 202110959209**

(71) Applicants:
• **KONE Corporation**
00330 Helsinki (FI)

(54) **MONITORING SYSTEM FOR PERSONNEL DELIVERY EQUIPMENT, AND PERSONNEL DELIVERY EQUIPMENT**

(57) A monitoring system for personnel delivery equipment, and the personnel delivery equipment. The monitoring system comprises: a support member (1), disposed in the vicinity of the personnel delivery equipment and/or on the personnel delivery equipment, at least a part of the support member (1) being located above a personnel delivery unit of the personnel delivery equip-

ment; and a detection device, disposed in the at least a part of the support member (1) above the personnel delivery unit, so that the detection device is located above the personnel delivery unit to obtain detection information on the personnel delivery unit of the personnel delivery equipment.

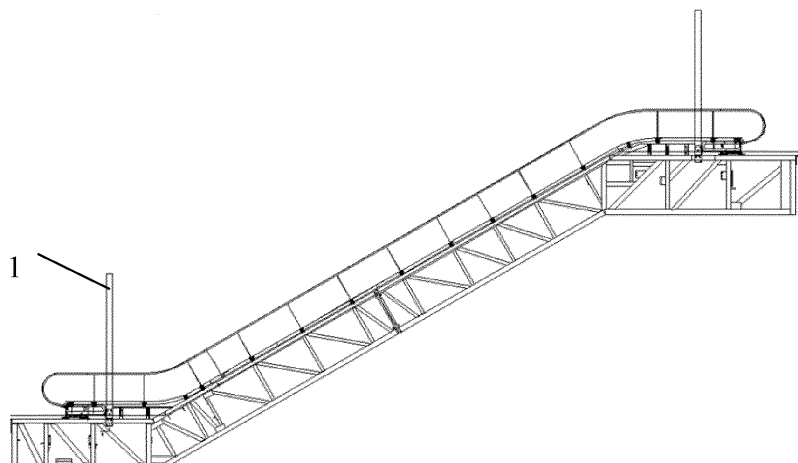


Fig. 1

Description

CROSS-REFERENCE TO RELATED APPLICATION

[0001] The present application claims the priority to Chinese Patent Application No. CN202110959290.0, filed in China National Intellectual Property Administration on August 20, 2021.

TECHNICAL FIELD

[0002] The present disclosure relates to a monitoring system for personnel delivery equipment and personnel delivery equipment.

BACKGROUND

[0003] In personnel delivery equipment, such as escalators and moving sidewalks, it is necessary to set up a monitoring system to monitor the status of personnel delivery equipment. Generally speaking, the monitoring system includes a camera, and the position of the camera is greatly influenced by the building where the personnel delivery equipment is located, so it is often impossible for the camera to obtain the image of the personnel delivery equipment stably.

SUMMARY

[0004] Therefore, the present disclosure provides a monitoring system for a personnel delivery equipment, including: a support member, arranged close to and/or on the personnel delivery equipment, wherein at least a part of the support member is located above a personnel delivery unit of the personnel delivery equipment; a detection device, arranged in the at least a part of the support member above the personnel delivery unit so that the detection device is located above the personnel delivery unit to obtain detection information on the personnel delivery unit of the personnel delivery equipment.

[0005] Advantageously, the support member is arranged between a guardrail of the personnel delivery equipment and an outer edge of the personnel delivery equipment.

[0006] Advantageously, the detection device includes a camera, and a center line of the camera coincides with a center line of the personnel delivery unit.

[0007] Advantageously, the monitoring system includes a plurality of support members, and the plurality of support members are arranged so that detection devices of the plurality of support members are arranged along a straight line parallel to a running direction of the personnel delivery equipment, so as to cover a whole running area of the personnel delivery equipment.

[0008] Advantageously, the monitoring system includes a plurality of support members, and the plurality of support members are arranged at a platform section and an inclined section of the personnel delivery equip-

ment.

[0009] Advantageously, the support member is L-shaped, and includes a first part and a second part extending transversely and perpendicular to the first part, wherein the first part is arranged on the personnel delivery equipment, the second part is located above the personnel delivery unit, and the detection device is arranged in the second part.

[0010] Advantageously, the support is inverted U-shaped, and includes two first parts arranged on both sides of the personnel delivery equipment and a second part connecting the two first parts, wherein the first parts are arranged on the personnel delivery equipment, the second part is located above the personnel delivery unit, and the detection device is arranged in the second part.

[0011] Advantageously, the first part of the support member includes a rectangular cross section.

[0012] Advantageously, the first part of the support member is laterally spaced apart from the guardrail at a handrail belt by a predetermined distance, and an outer surface of the first part away from the guardrail is flush with the outer edge of the personnel delivery system.

[0013] Advantageously, the monitoring system further includes a light source arranged on the support member.

[0014] Advantageously, the monitoring system further includes a voice device arranged on the support member.

[0015] Advantageously, the monitoring system further includes an artificial intelligence module arranged on the support member.

[0016] Advantageously, in a case that two personnel delivery equipment are arranged side by side, first part of the L-shaped support members of the monitoring system of the two personnel delivery equipment is common, and second parts extend above personnel delivery units of the two personnel delivery equipment respectively, so that the two L-shaped support members form a T-shaped configuration.

[0017] Advantageously, in a case that two personnel delivery equipment are arranged side by side, second parts of the L-shaped support members of the monitoring system of the two personnel delivery equipment are in contact with each other, so that the two L-shaped supports form an inverted U-shaped configuration.

[0018] The present disclosure further provides a personnel delivery equipment, including the abovementioned monitoring system.

BRIEF DESCRIPTION OF DRAWINGS

[0019] The advantages and objectives of the present disclosure can be better understood in the following detailed description of preferred embodiments of the present disclosure with reference to the accompanying drawings. The drawings are not drawn to scale in order to better show the relationship between the components in the drawings. In the accompanying drawings:

Fig. 1 shows a side view in which a monitoring sys-

tem for a personnel delivery equipment according to the present disclosure is installed to the personnel delivery equipment, which takes an escalator as an example.

Fig. 2 shows a front view in which a monitoring system for a personnel delivery equipment according to the present disclosure is installed to the personnel delivery equipment.

Fig. 3 shows an enlarged view of a part A in Fig. 2.

Fig. 4 shows a perspective view of a support member of a monitoring system.

Fig. 5 shows a front view of a support member of a monitoring system.

Fig. 6 shows a bottom view of a support member of a monitoring system.

Fig. 7 shows a side view of a support member of a monitoring system.

Fig. 8 shows a support member forming an inverted U-shaped configuration upon two personnel delivery equipment being arranged side by side.

Fig. 9 shows a support member forming a T-shaped configuration upon two personnel delivery equipment being arranged side by side.

Fig. 10 shows a support member provided at a platform section and an inclined section of a personnel delivery equipment.

Fig. 11 shows a support member provided at a moving sidewalk.

DETAILED DESCRIPTION

[0020] Various embodiments according to the present disclosure will be described in detail with reference to the accompanying drawings. Herein, it should be noted that in the drawings, the same reference numerals are given to components having basically the same or similar structures and functions, and repeated descriptions about them will be omitted. The term "including A, B, C, etc. in sequence" only indicates the arrangement order of included components A, B, C, etc., and does not exclude the possibility of including other components between A and B and/or between B and C.

[0021] The drawings in this specification are schematic diagrams to help explain the concept of the present disclosure, and schematically show the shapes of various parts and their relationships.

[0022] Hereinafter, with reference to Figs. 1 to 11, preferred embodiments according to the present disclosure will be described in detail.

[0023] The monitoring system according to the present disclosure is used for monitoring a personnel delivery equipment. In the following description, an escalator is taken as an example to describe the monitoring system, but those skilled in the art will understand that the monitoring system of the present disclosure can also be applied to other personnel delivery equipment, such as a moving sidewalk.

[0024] As illustrated by Figs. 1 and 2, the monitoring

system includes a support member 1 and a detection device, the support member is arranged close to and/or on the personnel delivery equipment, preferably between a guardrail 2 of an escalator and an outer edge 3 of the personnel delivery equipment. At least a part of the support member is arranged above a personnel delivery unit (such as a step or a pedal), and the detection device is arranged in the part of the support member located above the step to obtain detection information (such as image information, etc.) on the step. The detection device includes a camera, and a center line of the camera is preferably aligned with a center line of the step S of the escalator (as shown by "L" in Fig. 6), so that the detection information can be obtained more accurately. The "Above" in the present disclosure should be understood as an projection of the detection device on the personnel delivery equipment is within the range of the personnel delivery equipment, that is, the detection device does not exceed the range of the personnel delivery equipment.

[0025] In one example, the support member includes an L-shaped configuration, which includes a first part arranged on the personnel delivery equipment and a second part extending transversely and perpendicular to the first part, and the detection device is arranged in the second part. In another example, the support member includes an inverted U-shaped configuration, which includes two first parts arranged on both sides of the escalator and a second part connecting the two first parts, the second part is located above the step and the detection device is arranged in the second part. Although the present disclosure is described with the support members with an L-shaped configuration and an inverted U-shaped configuration, it should be understood by those skilled in the art that the support member is not limited to the L-shaped configuration and the inverted U-shaped configuration, as long as the purpose of the present disclosure can be achieved. Preferably, a plurality of support members can be provided, are arranged along a running direction of the escalator, and can be arranged at the platform section and the inclined section of the escalator, for example, as illustrated by Fig. 10. In the case that a plurality of support members are provided, it is advantageous that the detection devices of the plurality of support members are arranged in a straight line parallel to the running direction of the escalator, so that the detection devices can cover the whole running area of the escalator. In the case that a plurality of support members are provided, a part of the support members can be arranged close to the escalator (such as the ground) and the other part of the support members can be arranged on the escalator. Of course, all the support members can only be arranged close to the escalator or on the escalator.

[0026] The following description is only for a L-shaped support member, and those skilled in the art will understand that such description is also applicable to support members with other shapes.

[0027] As illustrated by Figs. 4 to 7, each L-shaped support member includes a first part 11 and a second

part 12 extending from the first part, which enables the first part 11 to be fixed between the guardrail of the escalator and the outer edge of the escalator, and the second part 12 is located above the step of the escalator. The first part includes a rectangular cross section. Advantageously, a short edge of the rectangular cross section is perpendicular to the guardrail of the escalator, and a long edge of the rectangular cross section is parallel to the guardrail. The first part is installed to be laterally spaced apart from the guardrail 2 at the handrail belt by a predetermined distance (as illustrated by Fig. 3). Through the rectangular cross section, the distance between the first part and the guardrail of the handrail belt can be controlled more conveniently, so that the distance meets the standard and passengers can be prevented from pinching their hands when using the handrail. At the same time, the outer surface of the first part away from the guardrail is flush with the outer edge 3 of the escalator, thus achieving a better appearance of the escalator.

[0028] The detection device 13 is installed in the second part of the support member so that the camera is located above the step, preferably directly above the step. The light source, voice device and artificial intelligence module are arranged on the support member, advantageously, the light source and the voice device are arranged on the second part, and the artificial intelligence module is arranged on the first part. In this way, the image or video of the escalator is obtained by the detection device, and the analysis result is output to the voice device through the analysis of the image or video by the artificial intelligence module, so as to remind the user of the situation of the escalator.

[0029] In the case that two escalators are arranged side by side, the first part of the L-shaped support members of their respective monitoring systems can be common, and the two second parts respectively extend above the steps of their respective escalators, so that the two L-shaped support members form a T-shaped configuration, as illustrated by Fig. 8. In this case, the two L-shaped support members can be integrated or separated from each other.

[0030] Alternatively, in the case that two escalators are arranged side by side, the second parts of the L-shaped support members of their respective monitoring systems contact each other, so that the two L-shaped support members form an inverted U-shaped configuration, as illustrated by Fig. 9. In this case, the two L-shaped support members can be integrated or separated from each other.

[0031] Fig. 11 exemplarily shows a case of a moving sidewalk, and a plurality of supports are arranged close to or on the moving sidewalk.

[0032] By arranging the support member of the monitoring system on the escalator and arranging the detection device in the part of the support member located above the step, the detection device can stably obtain the image of the personnel delivery equipment.

[0033] The above description is only an explanation of

the present disclosure, which enables those skilled in the art to fully implement the scheme, but it is not a limitation of the present disclosure. The technical features disclosed above are not limited to the combination with other features, and those skilled in the art can also combine other technical features according to the purpose of the present disclosure, so as to achieve the purpose of the present disclosure.

Claims

1. A monitoring system for a personnel delivery equipment, which is **characterized in that**, the monitoring system comprises:

a support member, arranged close to and/or on the personnel delivery equipment, wherein at least a part of the support member is located above a personnel delivery unit of the personnel delivery equipment;

a detection device, arranged in the at least a part of the support member above the personnel delivery unit so that the detection device is located above the personnel delivery unit to obtain detection information on the personnel delivery unit of the personnel delivery equipment.

2. The monitoring system according to claim 1, which is **characterized in that** the support member is arranged between a guardrail of the personnel delivery equipment and an outer edge of the personnel delivery equipment.

3. The monitoring system according to claim 1, which is **characterized in that** the detection device comprises a camera, and a center line of the camera coincides with a center line of the personnel delivery unit.

4. The monitoring system according to claim 1, which is **characterized in that** the monitoring system comprises a plurality of support members, and the plurality of support members are arranged so that detection devices of the plurality of support members are arranged along a straight line parallel to a running direction of the personnel delivery equipment, so as to cover a whole running area of the personnel delivery equipment.

5. The monitoring system according to claim 1, which is **characterized in that** the monitoring system comprises a plurality of support members, and the plurality of support members are arranged at a platform section and an inclined section of the personnel delivery equipment.

6. The monitoring system according to claim 1, which

is **characterized in that** the support member is L-shaped, and comprises a first part and a second part extending transversely and perpendicular to the first part, wherein the first part is arranged on the personnel delivery equipment, the second part is located above the personnel delivery unit, and the detection device is arranged in the second part.

7. The monitoring system according to claim 1, which is **characterized in that** the support is inverted U-shaped, and comprises two first parts arranged on both sides of the personnel delivery equipment and a second part connecting the two first parts, wherein the first parts are arranged on the personnel delivery equipment, the second part is located above the personnel delivery unit, and the detection device is arranged in the second part.
8. The monitoring system according to claim 6, which is **characterized in that** the first part of the support member comprises a rectangular cross section.
9. The monitoring system according to claim 2, which is **characterized in that** the first part of the support member is laterally spaced apart from the guardrail at a handrail belt by a predetermined distance, and an outer surface of the first part away from the guardrail is flush with the outer edge of the personnel delivery system.
10. The monitoring system according to any one of claims 1 to 7, which is **characterized in that** the monitoring system further comprises a light source arranged on the support member.
11. The monitoring system according to any one of claims 1 to 7, which is **characterized in that** the monitoring system further comprises a voice device arranged on the support member.
12. The monitoring system according to any one of claims 1 to 7, which is **characterized in that** the monitoring system further comprises an artificial intelligence module arranged on the support member.
13. The monitoring system according to claim 6, which is **characterized in that**, in a case that two personnel delivery equipment are arranged side by side, the first part of the L-shaped support members of the monitoring system of the two personnel delivery equipment is common, and second parts extend above personnel delivery units of the two personnel delivery equipment respectively, so that the two L-shaped support members form a T-shaped configuration.
14. The monitoring system according to claim 6, which is **characterized in that**, in a case that two personnel

delivery equipment are arranged side by side, second parts of the L-shaped support members of the monitoring system of the two personnel delivery equipment are in contact with each other, so that the two L-shaped supports form an inverted U-shaped configuration.

15. A personnel delivery equipment, which is **characterized in that** the personnel delivery equipment comprises the monitoring system according to claim 1.

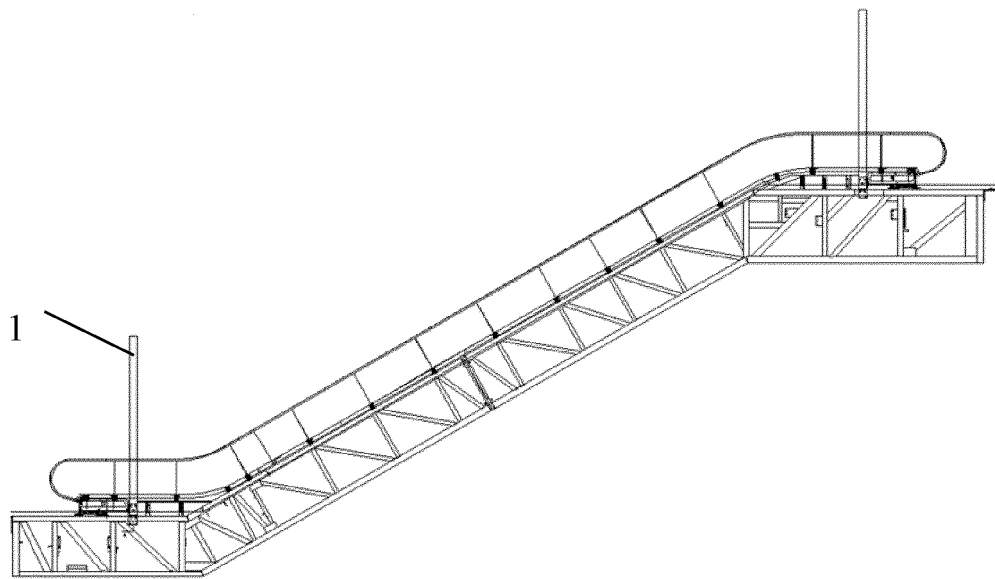


Fig. 1

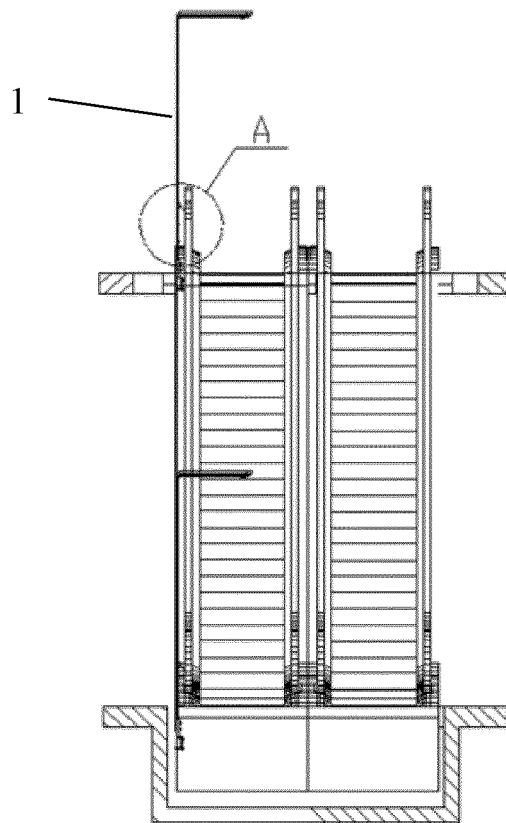


Fig. 2

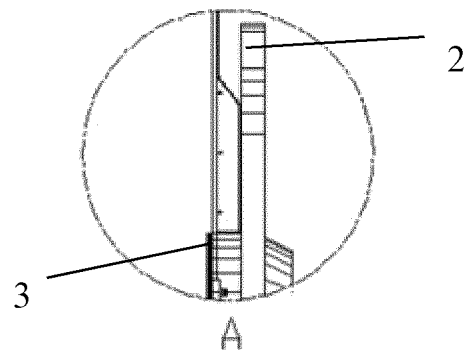


Fig. 3

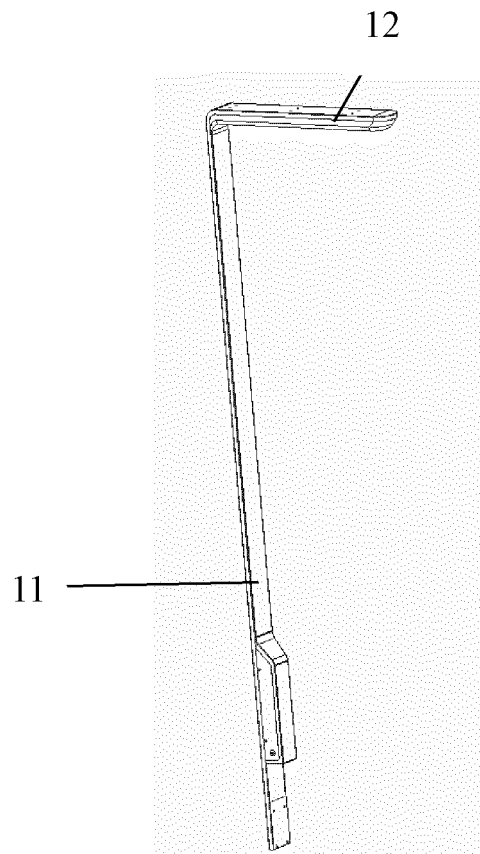


Fig. 4

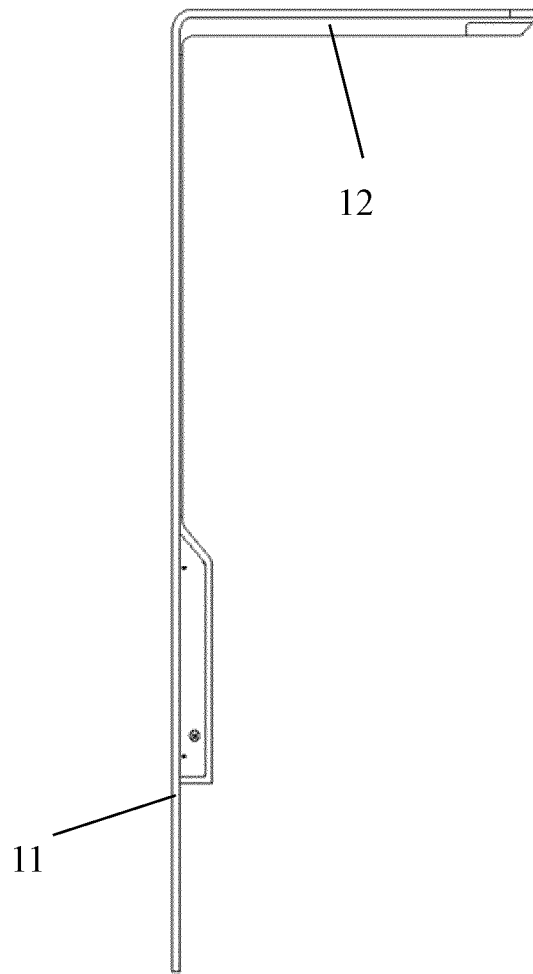


Fig. 5

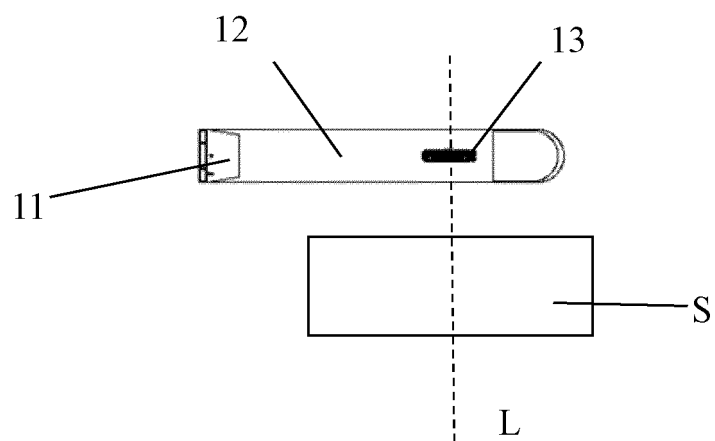


Fig. 6

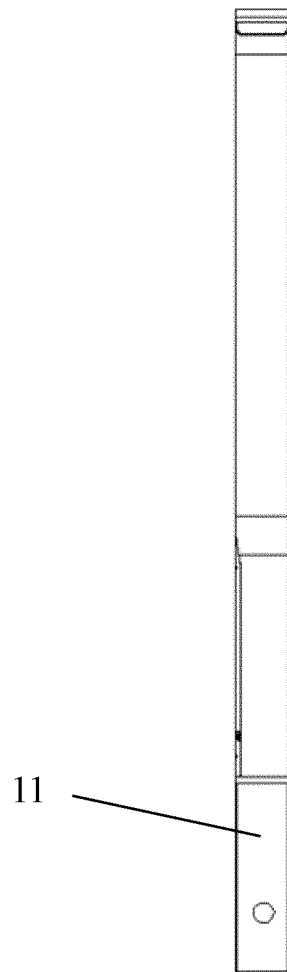


Fig. 7

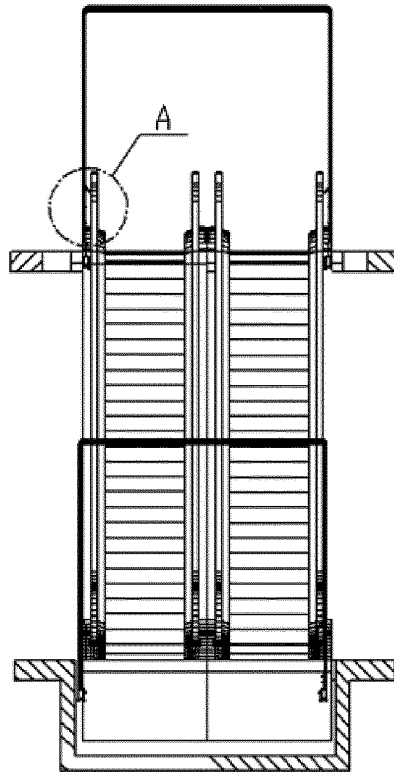


Fig. 8

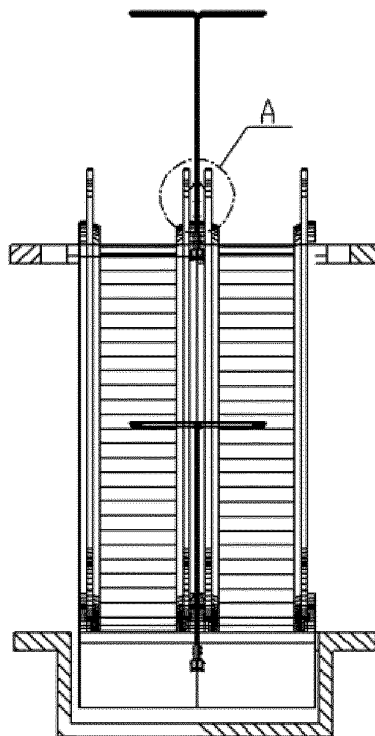


Fig. 9

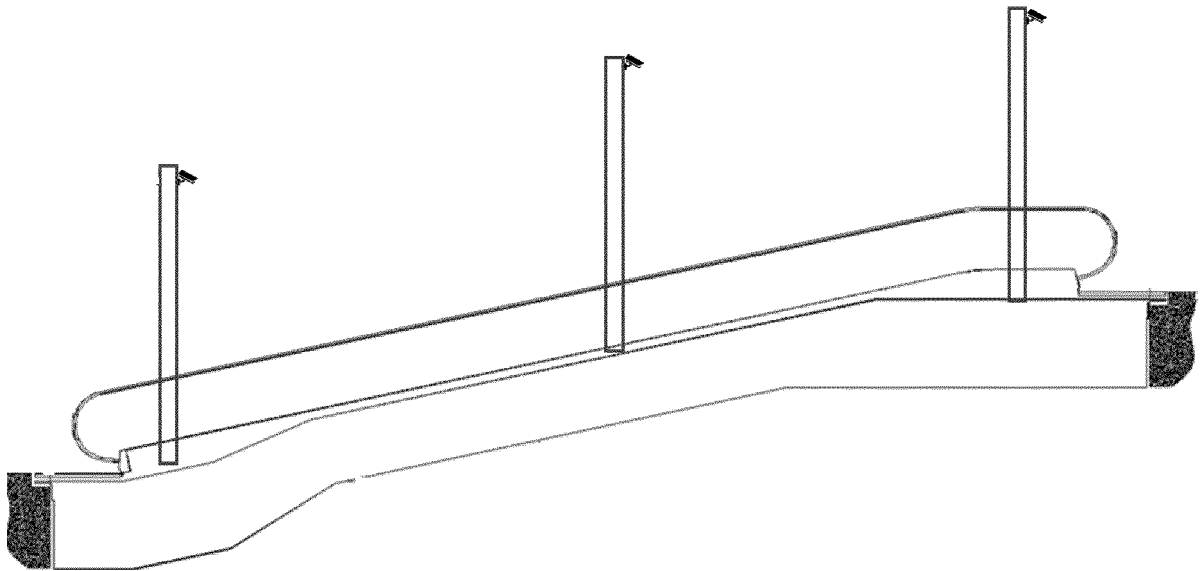


Fig. 10

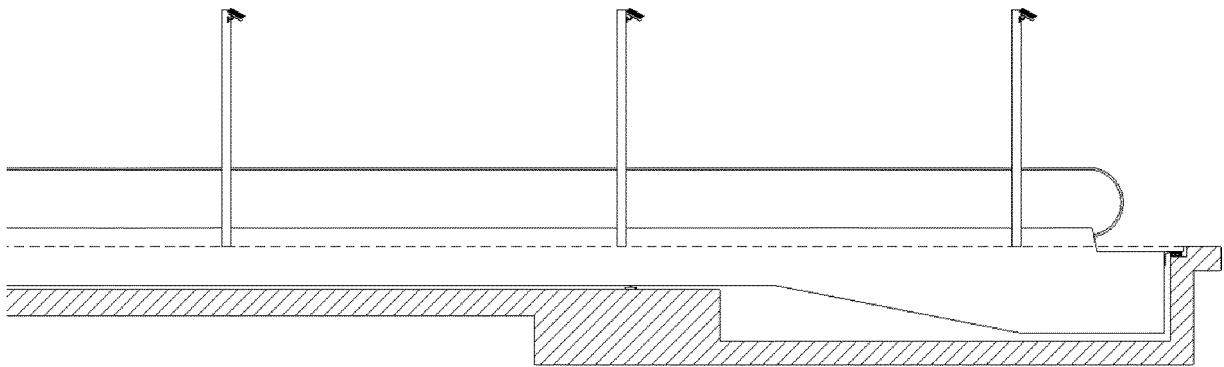


Fig. 11

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2022/112364

A. CLASSIFICATION OF SUBJECT MATTER

B66B 21/02(2006.01)i; B66B 23/22(2006.01)i; B66B 23/00(2006.01)i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

B66B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

CNABS: CNTXT; CNKI; VEN; USTXT; EPTXT; WOTXT: 检测, 监测, 摄像, 拍摄, 照相, 相机, 照片, 视频, 支架, 支撑, 固定, 杆, monitor, test, camera, picture, detect, video

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
PX	CN 113636437 A (KONE ELEVATORS CO., LTD. et al.) 12 November 2021 (2021-11-12) claims 1-15	1-15
X	CN 103863934 A (HITACHI ELEVATOR GUANGZHOU ESCALATOR CO., LTD.) 18 June 2014 (2014-06-18) description, paragraphs 14-41, and figures 1-6	1-15
A	JP H11349269 A (HITACHI LTD.) 21 December 1999 (1999-12-21) entire document	1-15
A	CN 211812976 U (SHANDONG POLYTECHNIC) 30 October 2020 (2020-10-30) entire document	1-15

☐ Further documents are listed in the continuation of Box C.
 ☒ See patent family annex.

* Special categories of cited documents:	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A" document defining the general state of the art which is not considered to be of particular relevance	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"E" earlier application or patent but published on or after the international filing date	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"&" document member of the same patent family
"O" document referring to an oral disclosure, use, exhibition or other means	
"P" document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search

24 August 2022

Date of mailing of the international search report

10 October 2022

Name and mailing address of the ISA/CN

China National Intellectual Property Administration (ISA/
CN)
No. 6, Xitucheng Road, Jimenqiao, Haidian District, Beijing
100088, China

Authorized officer

Facsimile No. (86-10)62019451

Telephone No.

Form PCT/ISA/210 (second sheet) (January 2015)

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.

PCT/CN2022/112364

Patent document cited in search report	Publication date (day/month/year)	Patent family member(s)	Publication date (day/month/year)
CN 113636437 A	12 November 2021	CN 216235540 U	08 April 2022
CN 103863934 A	18 June 2014	CN 103863934 B	03 February 2016
JP H11349269 A	21 December 1999	None	
CN 211812976 U	30 October 2020	None	

Form PCT/ISA/210 (patent family annex) (January 2015)

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- CN 202110959290 [0001]