TITLE OF INVENTION: ESCALATOR RIDING POSITION DESIGNATION METHOD AND ESCALATOR SYSTEM

TECHNICAL FIELD

[0001]

Embodiments of the present invention relate to an escalator riding position designation method and an escalator system.

BACKGROUND

[0002]

In a two-person escalator on which riding is possible in two rows on the right and left, it has become an established practice for users to stand on one side and leave the other side open in order for those in a hurry to walk up or down the escalator. Accidents such as collisions with other users or falls may occur when walking up or down the steps on the escalator.

[0003]

There is a known system for restricting walking on an escalator in which users who are walking are detected on the basis of the degree of walking of the users by using image analysis of a camera installed in the ceiling, and a light emitter that is provided on the balustrade blinks on and off.

SUMMARY

[0004]

Although the above system encourages users to stop when using an escalator, this rule is not being followed by users at present.

[0005]

Further, cameras cannot be installed in the ceiling in some cases, and thus there has been a need for an effective method to designate an escalator riding position and a method to restrict walking.

[0006]

An object of the present invention is to provide an escalator riding position designation method and an escalator system that are capable of encouraging riding in a correct position and restricting walking on the escalator to thereby promote safe usage of the escalator.

[0007]

An escalator riding position designation method in accordance with some

embodiments includes: providing, in each step of a two-person escalator on which riding is possible in two rows on the right and left, a riding position mark enabling a user to see a riding position for the user and including a light emitter capable of blinking on and off; detecting riding of the user by means of a load detector installed in each of the steps; and upon determination from a result of detecting the riding of the user that the user is riding in a position other than the riding position indicated by the riding position mark, issuing an alert that the position of the user is not a correct riding position at least either by blinking the riding position mark or by sounding an alarm installed in each of the steps.

[0008]

An escalator system in accordance with some embodiments includes: a riding position mark provided in each step of a two-person escalator on which riding is possible in two rows on the right and left, the riding position mark enabling a user to see a riding position for the user and including a light emitter capable of blinking on and off; a load detector installed in each of the steps and configured to detect a position of a step where the user is riding; a riding position determination unit configured to determine a riding position of the user based on a detection signal input from the load detector; and an attention alert unit configured to, upon detection from a result of determination by the riding position determination unit that the user is riding in a position other than the riding position mark, issue an alert that the position of the user is not a correct riding position at least either by blinking the riding position mark or by sounding an alarm installed in each of the steps.

[0009]

The above configuration makes it possible to encourage riding in a correct position and restrict walking on an escalator to thereby promote safe usage of the escalator.

BRIEF DESCRIPTION OF THE DRAWINGS

[0010]

FIG. 1 is a block diagram illustrating a control configuration of an escalator system according to an embodiment.

FIG. 2 is an explanatory diagram illustrating an overall configuration of the escalator system according to the embodiment.

FIG. 3 is an explanatory diagram illustrating the steps of the escalator system according to the embodiment.

FIG. 4 is a flowchart illustrating processing for detecting use of the escalator system other than in a designated riding position, from among the processing procedures of the escalator system according to the embodiment.

FIG. 5 is a flowchart illustrating processing for detecting a user who is walking, from among the processing procedures of the escalator system according to the embodiment.

FIG. 6 is an explanatory diagram illustrating another example of a configuration of the steps of the escalator system according to the embodiment.

DETAILED DESCRIPTION

[0011]

Description will be hereinbelow provided for an apparatus and a method according to embodiments by referring to the drawings.

[0012]

<First embodiment>

(Configuration of first embodiment)

FIG. 1 is a block diagram illustrating a control configuration of an escalator system 1 according to an embodiment. FIG. 2 is an explanatory diagram illustrating an overall configuration of the escalator system 1 according to the embodiment. FIG. 3 is an explanatory diagram illustrating the steps of the escalator system 1 according to the embodiment.

[0013]

The configuration of the embodiment will be described with reference to FIG. 2 and FIG. 3.

[0014]

The escalator system 1 includes steps 3 (31, 32, …) that circulate together with handrail belts 2. The escalator system 1 carries a user 5 who travels from a boarding/alighting gateway 4 on the boarding side to a boarding/alighting gateway 4 on the alighting side. A load detector 6 (61, 62, ...) is installed in each of the steps 3 to detect the load of the user 5. The load detector 6 is, for example, powered by electromagnetic induction due to the tread pressure when the user 5 rides on one of the steps 3.

[0015]

As illustrated in FIG. 3, a light emitter 7 (71, 72, ...) is installed in the tread of each of the steps 3. A buzzer 8 (81, 82, ...) is installed in each of the steps 3.

[0016]

The light emitter 7 is formed, for example, by attaching a light emitting sheet having a footmark to the tread of the step 3, and functions as a riding position mark. That is, the light emitter 7 is a mark used for informing the user 5 of a step position where

the user 5 should ride (enabling the user 5 to visually see a riding position for the user 5 in advance), and is provided in a right and left alternating manner in each of the steps 3 in a zigzag manner. This is to encourage users to ride in a right and left alternating manner on both sides, instead of the conventional habitual way of using an escalator of standing in a line on one side and leaving the other side open.

[0017]

An escalator controller 100 includes a riding position determination unit 101, a determination condition setting unit 102, an attention alert unit 103, and an attention alert condition setting unit 104.

[0018]

The riding position determination unit 101 determine the riding position of the user 5 based on a detection signal input from the load detector 6.

[0019]

The determination condition setting unit 102 sets a determination condition for the riding position determination unit 101. The determination condition setting unit 102 can set a determination condition appropriately such that the determination of a riding position is paused for a while, for example, during the midnight hours or during unoccupied hours.

[0020]

When the riding position determination unit 101 has determined that the user 5 is riding in a position other than the riding position mark, the attention alert unit 103 calls attention to the fact that the position of the user 5 is not the correct riding position (also referred to as "riding position" as appropriate) at least either by blinking the light emitter 7 (riding position mark) or by sounding the buzzer 8.

[0021]

The attention alert condition setting unit 104 can set an attention alert condition as necessary regarding whether to limit the blinking of the light emitter 7 and the sounding of the buzzer 8 even when use other than in the riding position is detected, according to the installation location or the purpose of use of the escalator. For example, an attention alert condition such as "near a boarding/alighting gateway" is set, that is, it is assumed that the user 5 will walk on the first three steps 3 from a boarding/alighting gateway and on the last three steps 3 up to a boarding/alighting gateway, and thus the light emitter 7 does not blink even when the user 5 rides on a position other than the light emitter 7 or walks.

[0022]

<Processing procedure according to embodiment (riding position designation method)>

(Processing for detecting use other than in designated riding position)

FIG. 4 is a flowchart illustrating the processing for detecting use other than in a designated riding position.

[0023]

While the escalator is running, the load of the user 5 is detected by the load detector 6 installed in the step 3 (step S1). When use of the step 3 which is not designated is detected as a result of the load detection (YES in step S2), it is determined whether the detected load exceeds a prescribed limit (step S3). When the load exceeds the limit (YES in step S3) and the step 3 is not near a boarding/alighting gateway 4 (NO in step S4), the light emitter 7 blinks and the buzzer 8 sounds (step S5).

[0024]

When the load exceeds the limit (YES in step S3) and the step 3 is near a boarding/alighting gateway 4 (YES in step S4), the light emitter 7 does not blink and the buzzer 8 does not sound. This is because the first three steps 3 near a boarding/alighting gateway 4 on which the user 5 is walking constitutes a period of time until he/she reaches the designated riding position, and thus there is no need to alert the user 5.

[0025]

The light emitter 7 blinks and the buzzer 8 sounds continuously until the user 5 moves to the position of the light emitter 7 (riding position mark) (NO in step S6).

[0026]

When the user 5 has noticed that the he/she is riding in a position other than the designated riding position and has therefore moved to the designated riding position (YES in step S6), the light emitter 7 stops blinking and the buzzer 8 stops sounding (step S7).

[0027]

Accordingly, in the present embodiment, the light emitter 7 that is installed in the step 3 blinks and the buzzer 8 that is installed in the step 3 sounds when use other than in the designated riding position is detected, and thus it is possible to encourage the user 5 to move to the designated riding position.

[0028]

In order to move to the designated riding position from a boarding/alighting gateway 4, the user 5 may walk thereto. Therefore, even when the user 5 is detected, the light emitter 7 stops blinking and the buzzer 8 stops sounding, thus making it possible to suppress deterioration in the service to the user 5.

[0029]

The light emitter 7 (riding position mark) indicating a visible riding position on the step 3 is installed in one side of a two-person escalator and is arranged in a right and

left alternating manner in each of the steps 3, and this makes it possible to encourage users 5 to ride in a right and left alternating manner and also restrict the users 5 from walking on the escalator.

[0030]

(Processing for detecting a user who is walking)

FIG. 5 is a flowchart illustrating processing for detecting a user who is walking.

[0031]

While the escalator is running, the load of the user 5 is detected by the load detector 6 installed in the step 3 (step S11).

[0032]

As a result of the above load detection, in a case where the feet of the user 5 have immediately moved away from the step 3 and therefore measurement is not possible (YES in step S12), the user 5 is recognized as a user who is walking on the step 3 (step S13). When the step 3 is not near the boarding/alighting gateway 4 (NO in step S14), the light emitter 7 blinks and the buzzer 8 sounds (step S15). This encourages the user 5 to stop walking.

[0033]

When the user 5 has stopped walking (YES in step S16), the light emitter stops blinking and the buzzer 8 stops sounding (step S17).

[0034]

Even when the user 5 is recognized as a user who is walking on the step 3 (step S13), in a case where the step 3 is near a boarding/alighting gateway 4 (YES in step S14), the light emitter 7 does not blink and the buzzer 8 does not sound. This is because the first three steps 3 near a boarding/alighting gateway 4 on which the user 5 is walking constitutes a period of time until he/she reaches the designated riding position, and thus there is no need to alert the user 5.

[0035]

Accordingly, in the present embodiment, when walking of the user 5 is detected, the light emitter 7 that is installed in each of the steps 3 blinks and the buzzer 8 that is installed in each of the steps 3 sounds in such a way as to be synchronized with the walking of the user 5, thus making it possible to restrict the user 5 from walking.

[0036]

<Other Embodiments>

When use other than in the designated riding position is detected, the sound (types, tones, etc.) of the buzzer 8 may be altered or changed depending on the detected step 3, allowing passengers around the buzzer 8 to know which buzzer 8 is sounding.

This makes it possible to further restrict users 5 from walking.

[0037]

A restriction may be set on the basis of a determination condition of the determination condition setting unit 102 or an attention alert condition of the attention alert condition setting unit 104 such that the light emitter 7 does not blink and the buzzer 8 does not sound even when use other than in the designated riding position is detected, according to the installation location or the purpose of use of the escalator.

[0038]

As illustrated in FIG. 6, each of the steps 3 (31 and 32) may be divided into a plurality of areas, such as left side areas 31L and 32L and right side areas 31R and 32R, and the areas may be provided with left-side load detectors 61L and 62L, right-side load detectors 61R and 62R, light emitters 71 and 72, left-side buzzers 81L and 82L, and right-side buzzers 81R and 82R. This makes it possible to detect the riding position of a user more precisely and improve the reliability of the escalator riding position designation method.

[0039]

As described above, the escalator system 1 of the embodiment encourages the user 5 to stop when using the escalator by designating the riding position for the user 5 on the step 3. In addition, for a user 5 who is not following the rules for riding the escalator, the light emitter 7 keeps blinking and the buzzer 8 keeps sounding. This makes it possible to inform the passengers around the user 5 that the user 5 is not following the riding rules, thus preventing the occurrence of an accident such as a collision or a fall while the user 5 is walking.

[0040]

While certain embodiments have been described, these embodiments have been presented by way of example only, and are not intended to limit the scope of the inventions. Indeed, the novel embodiments described herein may be embodied in a variety of other forms; furthermore, various omissions, substitutions and changes in the form of the embodiments described herein may be made without departing from the spirit of the inventions. The accompanying claims and their equivalents are intended to cover such forms or modifications as would fall within the scope and spirit of the inventions.

What is claimed is:

1. An escalator riding position designation method comprising:

providing, in each step of a two-person escalator on which riding is possible in two rows on the right and left, a riding position mark enabling a user to see a riding position for the user and including a light emitter capable of blinking on and off;

detecting riding of the user by means of a load detector installed in each of the steps; and

upon determination from a result of detecting the riding of the user that the user is riding in a position other than the riding position indicated by the riding position mark, issuing an alert that the position of the user is not a correct riding position at least either by blinking the riding position mark or by sounding an alarm installed in each of the steps.

2. The escalator riding position designation method according to claim 1, further comprising: upon detection of the user becoming impossible within a prescribed time after detection of the riding of the user by means of the load detector, determining that the user is walking and issuing an alert for the user to stop walking at least either by blinking the riding position mark or by sounding the alarm.

3. The escalator riding position designation method according to claim 1 or 2, further comprising: not issuing the alert at a designated step near a boarding/alighting gateway from among the steps.

4. The escalator riding position designation method according to claim 1 or 2, wherein the riding position indicated by the riding position mark is provided on one side of each of the steps of the two-person escalator and is arranged in a right and left alternating manner in each of the steps.

5. The escalator riding position designation method according to claim 1 or 2, further comprising: enabling a setting where the alert is not issued in consideration of a usage time and a usage condition of the two-person escalator.

6. The escalator riding position designation method according to claim 1 or 2, wherein issuing the alert by sounding the alarm includes changing a sound of the alarm for each of the steps.

7. An escalator system comprising:

a riding position mark provided in each step of a two-person escalator on which riding is possible in two rows on the right and left, the riding position mark enabling a user to see a riding position for the user and including a light emitter capable of blinking on and off;

a load detector installed in each of the steps and configured to detect a position of a step where the user is riding;

a riding position determination unit configured to determine a riding position of the user based on a detection signal input from the load detector; and

an attention alert unit configured to, upon detection from a result of determination by the riding position determination unit that the user is riding in a position other than the riding position mark, issue an alert that the position of the user is not a correct riding position at least either by blinking the riding position mark or by sounding an alarm installed in each of the steps.

8. The escalator system according to claim 7, wherein

the riding position determination unit is configured to determine that the user is walking upon detection of the user becoming impossible within a prescribed time after detection of the riding of the user by means of the load detector, and

upon determination that the user is walking, the attention alert unit is configured to issue an alert for the user to stop walking at least either by blinking the riding position mark or by sounding the alarm.

9. The escalator system according to claim 8, wherein, upon determination by the riding position determination unit that the user is riding in a position other than a designated riding position or that the user is walking, the attention alert unit is configured to continuously perform at least either blinking of the light emitter or sounding of the alarm until determination by the riding position determination unit that the user is no longer riding in the position other than the designated riding position or that the user is no longer walking.