

ILLUMINATION DEVICE IN AN ELEVATOR CAGE

BACKGROUND OF THE INVENTION

The present invention relates to an illumination
5 device in an elevator cage provided on the ceiling of the
elevator cage.

A conventional illumination device in an elevator
cage is disclosed in FIG. 1. In the figure, numeral 1
denotes a cage of an elevator, 2 side plates of the cage
1, 3 an entrance of the cage 1, and 4 a ceiling of the
10 cage 1. An illumination device 5 is provided on the
ceiling 4 of the cage 1.

The illumination device 5 comprises lighting
fixtures 6, a lighting frame 7 and lighting panels 8.
15 The lighting fixtures 6 are generally fluorescent lamps
which are mounted on the under surface of the ceiling 4
at a predetermined interval.

The lighting frame 7 comprises hanging members 7a
which are hung from the under surface of the ceiling 4 in
20 the manner that they shield an entrance side and opposite
side of the lamps 6, frame member 7b provided at the
center of the under ends of the hanging members 7a and 7a
for dividing in a matrix shape of the under opening of
the hanging members 7a and 7a, covering members 7c and 7c
25 which holds the hanging member 7b and respectively covers
side openings of the hanging members 7a and 7a. The
frame member 7b is horizontally located at the underside
of the lighting fixtures 6 and forms a plurality of
openings between the hanging members 7a. The lighting
30 panels 8 are formed by a transparent plate such as an
acrylic resin board having patterns and designs printed
by a silk screen printing. The panels 8 are put through
the frame member 7b on the flanges of the hanging members
7a in the manner that each panel 8 covers each opening of
35 the matrix of the frame member 7b from the upper side.

However, the conventional illumination device 5 in
an elevator cage has the problems described below. As

the lighting panels 8 are fixed to the hanging and frame members 7a and 7b, an expert worker must change the panels 8, so that it is impossible for a user to properly change a mood in the cage 1 by changing the panels 8 or the like. For example, designs of the panels 8 are not changed. Furthermore, it is impossible to simply change and properly regulate the brightness and light in the cage 1 when it is too light and bright in the cage 1 because of the painted colors of the walls in the cage 1.

10 SUMMARY OF THE INVENTION

In view of the above-mentioned problems, a primary object of the present invention is to provide an illumination device which is capable of regulating a brightness in a cage of an elevator by properly increasing and decreasing the luminous intensity illuminating a floor from the lighting fixtures which are provided on the ceiling of the cage.

A secondary object of the present invention is to provide an illumination device which is capable of changing a mood in the cage and a visual impression when looking up at the ceiling, by freely changing and regulating the brightness and light.

In order to achieve the above objects, an illumination device according to the present invention comprises a lighting fixture provided on a ceiling of an elevator cage, a lighting frame hanging and being fixed from and to the ceiling in the manner of shielding the lamp and having an opening at the under portion thereof, a blind horizontally mounted at the opening and having a plurality of slats capable of changing a gradient thereof, and a manipulating mechanism for changing the gradient of the slats constructing the blind.

In the illumination device in the elevator cage having the above construction, if users manipulate the manipulating mechanism such as a cord of the blind, the plurality of the slats for shielding can have the degree of inclination to the standing or toppled state, thereby

shielding or opening a portion of the opening at the under portion of the frame, so that it is possible to regulate an illumination intensity in the elevator cage. Accordingly, if a lighting panel is provided at the under
5 portion of the device, a design of the panel can be changed visually so as to change a lighting degree in the elevator cage. As a result, it is possible to easily and properly change a mood in the elevator cage.

As the present invention is constructed by the above
10 mentioned illumination device, users of the elevator can change the illumination via the lighting panel simply and properly, thereby changing the visual design of the cage and increasing and decreasing the illumination intensity in the cage, so that the present invention has the effect
15 of being capable of easily changing the atmosphere in the cage.

BRIEF DESCRIPTION OF THE DRAWINGS

In the accompanying drawings:

FIG. 1 is a perspective view having a cutting
20 portion and showing the state of looking up at a ceiling of an elevator cage for describing a conventional illumination device in the elevator cage;

FIG. 2 is a perspective view having a cutting
25 portion and showing the state of looking up at a ceiling of an elevator cage for describing an illumination device of a first embodiment according to the present invention;

FIG. 3 is a cutting view of a main portion showing the illumination device from a side view of the elevator cage as shown in FIG. 2;

30 FIG. 4 is a cutting view of the main portion showing the same illumination device of the first embodiment from an entrance side;

FIG. 5 is a perspective view showing top and bottom frames for holding lighting panels of the same embodiment
35 of the present invention;

FIG. 6 is an enlarged perspective view showing a main portion of slats and a manipulating mechanism of the illumination device of the same embodiment;

FIG. 7 is a further enlarged perspective view showing a main portion of the manipulating mechanism of the same embodiment;

FIG. 8 is a schematic cutting view showing the state of looking up the ceiling of the elevator cage according to a second embodiment of the present invention; and

FIGS. 9 and 10 are schematic views respectively showing a roll-up mechanism of the blind for describing an illumination device of an elevator cage according to a second embodiment of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

There will now be described in detail a first embodiment of the present invention with reference to FIGS. 2 to 8. An illumination device 15 of the first embodiment has the same construction as the conventional device shown in FIG. 1, such as an elevator cage 1, side plates 2, an entrance 3, and a ceiling 4 of the cage 1.

The illumination device 15 is provided on the ceiling 4 of the cage 1, and comprises a lighting fixture 16, a lighting frame 17, lighting panels 18, upper surface protection panels 19, and a blind 20.

The fixture 16 uses several fluorescent lamps the same as in the conventional device. As in a conventional device, the fixtures 16 are provided on the under surface of the ceiling 4 of the cage 1 at predetermined intervals.

The lighting frame 17 comprises, as shown in detail in FIG. 5, hanging members 17a hung from the under surface of the ceiling 4 in the manner of surrounding the lighting fixture 16, a bottom stage frame member 17b provided at the bottom end of the hanging members 17a, and a middle stage frame member 17c having a matrix shape and provided at the position slightly higher than the bottom stage frame member 17b. Namely, the frame members

17b and 17c form a double suspended ceiling. Two members 17a of one set of the hanging members 17a opposing each other, have top flanges 17_{a1} and bottom flanges 17_{a2}, respectively, which are bent in the outer direction.

5 Another two members 17a of another set of hanging members 17a opposing each other, have top flanges 17_{a1} and bottom curled portions 17_{a3}, respectively, both the flanges 17_{a1} of which are bent in the outer direction, and both the curled portions 17_{a3} of which are curled into the inner

10 direction. Both the top and bottom frame members 17b and 17c are maintained in a horizontal position under the lighting fixture 16. The members 17b and 17c have a plurality of beams and crosspieces, respectively, thereby dividing and forming a plurality of openings 21A and 21B,

15 as shown in FIG. 5, which are positioned in parallel in the right and left directions.

The lighting panels 18 are transparent and made from an acrylic resin board having patterns and designs printed by silk screen printing. The panels 18 are put

20 on the top frame member 17c of the lighting frame 17 in the manner that each panel 18 covers each opening 21A and 21B of the matrix of the frame member 17c from the upper side.

The surface protection panels 19 are made from a

25 transparent glass plate. The panels 19 are put on the bottom frame member 17b of the lighting frame 17 in the manner that each panel 19 covers each opening 21A or 21B of the matrix of the frame member 17b from the upper side.

30 The blind 20, as shown in FIG. 7, has the same construction as a sunshade blind (Venetian blind) of the shutter-shape generally used in the manner of hanging at a window for shading from the sun or shutting out the sunlight. The blind 20 comprises a plurality of slats

35 (an armor plate) 20a disposed in the orders at an equal distance and having characteristics of shielding the light, and rudder cords 20b for fastening the slats 20a

at both the right and left ends and both top and bottom positions. In this embodiment, two blinds 20 are applied between the frame members 17b and 17c, and each of the blinds 20 are arranged in parallel and orthogonal to the openings 21A and 21B. Namely, the blinds 20 are arranged at the right and left positions in view from the entrance 3 in the manner that it is possible to open and close the lighting panels 18. Furthermore, the surface protection panels 19 such as the glass plate prevents the right and left blinds 20 from falling through the openings 21A and 21B.

The blinds 20 each have a manipulation mechanism 22 including the rudder cords 20b for changing a slant angle of the slats 20a for shielding the light. The manipulation mechanism 22 is provided at the rear wall of the hanging member 17a of the lighting frame 17 in the manner that users can manipulate the mechanism 22 by their hands. The extended portion of the mechanism 22 is hidden behind the bottom flange 17_{a2} in order to prevent it spoiling the appearance of the cage 1.

The manipulation mechanism 22 comprises, as shown in FIG. 7, a casing box 22a fixed to the side wall of the hanging member 17a, a regulating plate 22b for fastening the ends of rudder cords 20b and regulating the slant angle of the slats 20a, a shaft 22c fixed to the plate 22b and supporting the plate 22b to be rotatable, two bearings 22d provided both opposing side wall of the box 22a for supporting the shaft 22c, and a grip 22e for changing the slant angle of the plate 22b so as to regulate the slat angle.

The mechanism 22 further comprises a hexagonal catch portion 22f fixed to the end of the shaft 22c opposing to the end having the grip 22e, and a clutch rod 22g rotatably attached to the side wall by a pivot and for fixing the shaft 22c from a rotation. The catch portion 22f and the clutch rod 22g form a stopper of the plate 22b to the predetermined slant angle.

In the illumination device in the elevator cage having the above construction, when users manipulate the manipulating mechanism 22 of the blind 20, it is possible to simply change the slant angle of the blind 20 in the manner of causing the plurality of the slats 20a to fall down or stand, thereby causing both the right and left lighting panels 18 to be covered by the shielding slats 20a or opened. An appearance of the lighting panels 18 can be changed so as to increase and decrease the light intensity in the cage 1 irradiated from the lighting fixture 16, so that it is possible to properly and easily change a mood in the cage.

As will be described in detail, when a user rotates the grip 22e of the manipulating mechanism 22 in one direction such as the left direction, the plurality of slats 20a fall down, and two adjacent slats overlap each other with their lids so as to completely close the openings 21A and 21B. The fallen slats 20a shut the light from the lighting fixture 16. Accordingly, it is possible to obtain the appearance of the armor plate ceiling so that the mood of a dark room can be obtained by reducing the light intensity.

On the contrary, when the grip 22e fixed to the plate 22b is rotated into another direction opposite to the above direction such as the right direction, all slats 20a stand so as to make spaces between each standing slat. The designs printed on the panels 18 can be seen through the spaces by looking up at the ceiling, so that it is possible to obtain another appearance of louver type. Accordingly, the light of the lighting fixture 16 passes through the spaces and the transparent panels 18 to reach inside the cage 1, thereby brightening the room.

The blinds 20 are capable of completely standing or falling down by each blind or both the blinds. Accordingly, the designs and the lighting positions can be varied in several variations. The blind 20 can

properly regulate the light intensity through the panels 18 by selecting the slant angle of the slats 20a for interrupting the light.

Accordingly, even though it is too bright or dark in the cage 1 because of influence of the painted color of the wall, it is possible to easily regulate the light intensity to the most suitable state. Furthermore, users can use the cage 1 for an office elevator by brightening the cage in the daytime, and use the cage 1 for a restaurant by darkening the cage to make a romantic mood after it gets dark, thereby using the elevator cage easily and fully. It is useful to fully open all of the slats 20a of the blinds 20 when cleaning the cage.

Though the first embodiment is described to provide respective two openings 21A and 21B in the frame members 17b and 17c, the present invention is not limited in the construction. For example, a lighting device of a second embodiment comprises, as shown in FIG. 8, four openings 21A to 21D and two small blind 20 provided at the openings 21C and 21D. In contrast to the first embodiment, the openings 21A and 21B are provided at the center portion and the openings 21C and 21D are positioned at both sides of the ceiling of the cage 1 in the second embodiment. Each opening 21A, 21B, 21C or 21D has a lighting panel 18 and a protecting panel 19, respectively. As shown in FIG. 8, designs 23 such as stars and a guide display 24 for floor information, for example, "2F TOYS", are displayed on the lighting panel 18.

In the second embodiment, features reside in that the frame members 17b and 17c have a different matrix shape from that of the first embodiment, and that two blinds 20 are disposed at both sides corresponding to the openings 21C and 21D. Accordingly, if all the slats are made to stand so in the daytime, the guide information can be well seen by looking up at the ceiling of the cage 1. On the contrary, when the lighting intensity needs to

decrease such as at night, users shut all slats, as shown in the left side in FIG. 8, thereby hiding the designs 23 and the guide display 24. As a result, consumers can recognize that the floor is open or closed.

5 Even though both the design 23 and display 24 are painted on the lighting panels 18, this information 23 and 24 may be painted to the slats 20a of the blind 20 regardless of the panel 18. Accordingly, users can recognize the information 23 and 24 when the blind 20 is
10 shut down, by the contrast in the second embodiment.

Though the blind 20 is disposed with the corresponding panel 18 from the undersurface of the panels 18 of the left and right openings 21C and 21D, the device of the invention may comprise the blinds 20
15 corresponding to the openings 21A and 21B. Also, all of openings 21A to 21D may be covered with the blinds 20. Furthermore, the blind 20 may be disposed over the lighting panels 18, thereby obtaining the same effect as the first and second embodiments. In this case, it is
20 possible to eliminate the surface protecting panels 19.

Furthermore, though the first and second embodiments do not have a folding mechanism, the device of the present invention may comprise a folding mechanism (not shown) having the same construction as a folding
25 mechanism having a lifting cord of the ordinary Venetian blind, thereby folding the slats to one side of the lighting frame 17 in addition to the change of the slant angle of the slats.

Though the devices of the first and second
30 embodiments have the folding mechanism such as the lifting cord, respectively, the present invention is not limited to such construction. For example, a folding mechanism according to a third embodiment may be applied for storing the slats of the blind.

35 FIGS. 9 and 20 show an illumination device according to the third embodiment of the present invention, especially show a folding mechanism 30. Other

construction of the third embodiment is the same as that of the first or second embodiments as shown in FIGS. 2 to 8, so that the duplicate description will be omitted.

In FIG. 9, the folding mechanism 30 comprises a sliding rod 31 for fixing and supporting guide reels 25 and 25 which are surrounded by rudder cords 20b for supporting between the hanging members 17a and 17a, one of which has the slant angle manipulating mechanism 22, the other of which opposes thereto, a toothed belt 32 having tooth portions 32a on one face thereof and being fixed to the sliding rod 31 at one of its turning ends, guide rails 33 for engaging engaged portions 31a and 31a provided at both ends of the sliding rod 31 and for slidably supporting both the ends of rod 31, a reel 34 having a shaft 34a and a pinion 34b for supporting the other of the turning ends of the toothed belt 32 and for rotating the belt 32 by the pinion 34b, a compact motor provided at one end of the shaft 34a for rotating the reel 34 by the shaft 34a as its output shaft, and a supporting stand 36 provided for supporting the reel 34 and motor 35 and having a switch 37 for switching over a start/stop of rotation of the motor 35 and a direction switch 38 for switching over the rotating direction of the motor. The toothed belt 32 is stretched between the pinion 34b of the shaft 34 and a supporting pinion 39 arranged and fixed between the guide rod 31 and the hanging member 17a of the frame 17 (not shown in FIG. 9). The belt 32 engages with the pinion 39, as shown in detail in FIG. 10.

On the basis of the above construction, when the direction switch 38 is changed over a winding side W and the switch 37 turned on, the motor 35 starts to rotate in the ordinary direction so that the pinion 34b winds the toothed belt 32 for sliding the rod 31 in the direction of the mechanism 30 along the guide rail 33. In contrast, when the slats 20a of the blind 20 need to be arranged between the whole interval stretched with the

belt 32, the direction switch 38 is set to the return side R and the main switch 37 is turned on, thereby rotating the motor 35 in the direction opposing to the winding direction to move the sliding rod 31 to the
5 position immediately before the other of the hanging members 17a. As a result, the slats 20a are equally engaged between the stretched interval of the pinions 34b and 39 with equivalent spaces.

As the other operation such as a regulation of the
10 slant angle of the slats is the substantial same as that of the first or second embodiment, a duplicated description will be omitted.

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CLAIMS:

1. An illumination device having a lighting fixture (16) mounted on a ceiling (4) of an elevator cage (1), and a lighting frame (17) provided on the ceiling by hanging and positioning below the fixture, comprising
a blind (20) having a plurality of slats (20a) which are horizontally arranged at a position for shielding a light from the lighting fixture (16) to the lighting frame (17), and which have a changeable slant angle; and
a manipulating mechanism (22) for manipulating the slats (20a) to change the slant angle thereof.
2. An illumination device according to claim 1, wherein
said lighting frame (17) comprises a hanging member (17a) hung from the ceiling (4) of the elevator cage (1), middle and lower horizontal frame members (17b, 17e) respectively forming horizontally projecting flanges at middle and lower stages of the hanging member, and a lighting panel (18) supported by any of said middle and lower horizontal frame members (17b, 17e).
3. An illumination device according to claim 2, wherein
said blind (20) is arranged under the lighting panel (18) mounted on the projecting flange of said middle horizontal frame member (17e).
4. An illumination device according to claim 3, further comprising a surface protecting panel (19) mounted on the flange of said lower horizontal frame member (17b) for protecting the undersurface of said lighting frame (17).
5. An illumination device according to claim 3, wherein



said lighting panel ~~(18)~~ has a floor guide ~~(24)~~ displayed for guiding users in a building provided by the elevator cage ~~(1)~~, and pictures ~~(23)~~ for producing a desired mood in said elevator cage ~~(1)~~.

6. An illumination device according to claim 1, wherein

said manipulating mechanism ~~(22)~~ comprises a pair of rudder cords ~~(20b)~~ fixed to both ends of said slats ~~(20a)~~, respectively, and each of which turns around a guide reel ~~(25)~~ to change stretched directions and is engaged to higher and lower portions of each slat ~~(20a)~~, regulating plates each of which is fixed by both ends of each of said rudder cords ~~(20b)~~ and for regulating all over a slant angle of said slats ~~(20a)~~ in the same angle, a rotation shaft ~~(22c)~~ for supporting said regulating plate ~~(22b)~~, and a grip ~~(22e)~~ fixed to one end of said shaft ~~(22c)~~ for regulating the slant angle of said regulating plate ~~(22b)~~ so as to control the slant angle of said plural slats ~~(20a)~~.

7. An illumination device according to claim 6, wherein

said manipulating mechanism ~~(22)~~ further comprises a casing box ~~(22a)~~ for storing said regulating plate ~~(22b)~~ and rotation shaft ~~(22c)~~ and rotatably supporting both ends of said shaft ~~(22c)~~, and a stopper ~~(22f, 22g)~~ provided at another side of a grip fixed side of said box ~~(22a)~~, and a stopper ~~(22f, 22g)~~ for fixing said slant angle of said regulating plate in a predetermined angle.

8. An illumination device according to claim 1, further comprising a folding mechanism ~~(30)~~ for folding said plural slats ~~(20a)~~ of said blind ~~(20)~~ in the direction of a side providing said manipulating mechanism ~~(22)~~.



9. An illumination device according to claim 8, wherein said folding mechanism comprises a sliding rod supporting a guide reel, a guide rail for slidably guiding said sliding rod, an endless toothed belt stretched between two opposite hanging members of said lighting frame through each slat and fixed to said sliding rod at a predetermined portion thereof, a drive pinion rotatably fixed to said hanging member at one side of said lighting frame for supporting said belt, a supporting pinion fixed to another side and engaging the teeth of the belt, a drive motor for rotating said drive pinion changeably in the ordinary and opposite directions, and an operational device for operating said motor to start and stop the rotation thereof and to change over the rotational direction.

10. An illumination device substantially as hereinbefore described with reference to Figures 2 to 7 inclusive, or Figure 8, or Figures 9 and 10 or the accompanying drawings.

11. An elevator fitted with an illumination device according to any one of the preceding claims.

