

## ELEVATOR

### FIELD

Embodiments described herein relate generally to an elevator in which a camera is installed at a car to perform an imaging operation in a range from a doorway of the car to a hall.

### BACKGROUND

An elevator is provided with various sensors which detect a passenger or passengers who will get into/off the elevator. For example, it is being contemplated that as a sensor, a camera is installed above a door apparatus to perform an imaging operation in a range covering both the inside of a car and a hall. For example, from video obtained by the imaging operation of the camera, if a person being getting near a door of the elevator is detected during closing of the door, the closing of the door is stopped, and the door is opened. On the other hand, from video of the door, if it is detected during opening of the door that a hand or finger of a passenger is caught in a door pocket, the opening of the door is stopped.

In general, in view of the above case, it is conceivable that a camera is installed at a center portion of a modesty panel of a car in order that both a hall and the inside of the car be imaged in a wide range.

However, in the case where the camera is installed at the center portion of the modesty panel, if a door apparatus of an elevator is a one-way door, it is located in front of the camera when reaching the center of the doorway of the door apparatus, as a result of which a hall side cannot be imaged by the imaging operation of the camera.

Furthermore, in order that an imaging direction in which the camera performs an imaging operation be changed in accordance with the type of an elevator to be applied, it is necessary to change a fixing member for fixing the camera, in accordance with the imaging direction. Accordingly, it is necessary to prepare different kind of fixing members, and as a result the

number of parts is increased. Also, in order for the camera be fixed, it is necessary to select a proper one of the fixing members, and a work for fixing the camera is complicated, thus increasing labor and time required for fixing it.

The embodiments aim at providing an elevator which enables a camera to perform an imaging operation with a simple structure immediately before a door apparatus is completely closed.

#### SUMMARY

According to an aspect, there is provided an elevator characterized by comprising: a modesty panel provided at an upper portion of a door apparatus of a car, and including a window portion which includes an opening formed in an outer plate facing a hall and a bottom plate; a camera set above the window portion, the camera having an angle of view to perform an imaging operation in a range from an inside of the car to the hall, with the door apparatus being in opened state; and a fixing member fixing the camera such that a center line of the angle of view is inclined toward the hall. The door apparatus is a one-way door; the window portion is located closer to a doorstep for the door apparatus than to a center portion of the modesty panel in a width direction thereof, and is separated from the doorstep in a direction in which the door apparatus is opened; and a line connecting the camera and a corner portion of a vertical frame of a jamb provided in the hall is located outward of a flow line of movement of a passenger in the hall which will get into the elevator, the corner portion being located close to the doorstep.

By virtue of the above structural features, with a simple structure, the camera can be caused to perform an imaging operation immediately before the door apparatus is completely closed.

#### BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view illustrating an elevator according to each of embodiments.

FIG. 2 is a front view illustrating a car of the

elevator.

FIG. 3 is a perspective view illustrating the car.

FIG. 4 is a perspective view illustrating a modesty panel of the car.

5 FIG. 5 is a front view illustrating the modesty panel.

FIG. 6 is a cross-sectional view of the camera and the modesty panel, which is taken along line F6-F6 in FIG. 5.

10 FIG. 7 is a cross-sectional view illustrating the modesty panel and the camera.

FIG. 8 is an exploded perspective view illustrating the modesty panel and the camera.

15 FIG. 9 is a cross-sectional view illustrating a door apparatus of the elevator.

FIG. 10 is a plan view illustrating the door apparatus of the elevator.

FIG. 11 is a perspective view illustrating the car.

20 FIG. 12 is an exploded perspective view illustrating a camera and a modesty panel in a second embodiment.

FIG. 13 is a cross-sectional view illustrating the modesty panel and the camera.

25 FIG. 14 is an exploded perspective view illustrating a camera and a modesty panel in a third embodiment.

#### DETAILED DESCRIPTION

30 Embodiments will be described with reference to the accompanying drawings.

(First embodiment)

35 FIG. 1 is a perspective view illustrating an open state of a door of a car 12 which arrives at an arbitrary floor. At this time, the inside of the car 12 communicates with the hall 14. In the following, an elevator 10 is explained on the premise that a direction from the inside of the car 12 toward the hall

14 is a forward direction, and the opposite direction to the forward direction is a backward direction; and the right and left are set with respect to a line extending along the forward or backward direction (i.e., a horizontal direction). Also, a direction in which gravity acts is a downward direction, and the opposite direction to the downward direction is an upward direction; and a direction from the outside of the car 12 toward the center of the car 12 is an inward direction, and a direction from the center of the car 12 toward the outside of the car 12 is an outward direction. Furthermore, each of a rightward direction and a leftward direction will also be referred to as a width direction, and each of the upward and downward directions will also be referred to as a vertical direction.

FIGS. 2 and 3 are views illustrating the inside of the car 12. The car 12 comprises a car floor 20, left and right side walls 22, a ceiling board 24 and a rear wall 26. In a forward area of the car 12, a car door 28 of a door apparatus, a jamb 29, a car-door modesty panel 30 (hereinafter referred to as the modesty panel 30), a switch portion 32 and a sensor portion 34 are provided.

The car door 28 includes a high-speed car door 28a and a low-speed car door 28b. The car door 28 is a one-way door which is closed when the high-speed car door 28a and the low-speed car door 28b is moved to the left as shown in FIGS. 2 and 3. The jamb 29 includes the modesty panel 30 and a vertical frame 25. The modesty panel 30 is provided between the left and right side walls 22. The modesty panel 30 covers space between the ceiling board 24 and the car door 28. The switch portion 32 is attached to the vertical frame 25 of the jamb 29 of the car 12, which is located on a door-pocket side. On a side of the jamb 29 on which the door is located when closed, a door stop post 31 is

provided as a door stop portion (see FIG. 10). When the car door 28 is closed, a door end of the car door 28 hits against the door stop post 31.

5 In the hall 14, as illustrated in FIG. 1, a hall door 40 (see FIGS. 9 and 10) of the door apparatus, a jamb 42, a switch portion 44 and a hall floor 46 are provided. The jamb 42 includes a hall-side modesty panel 42a and left and right vertical frames 42b. The switch portion 44 is provided at one of the vertical  
10 frames 42b. The hall door 40, as illustrated in FIG. 9, includes a high-speed hall door 40a and a low-speed hall door 40b. The hall door 40 is a one-way door as well as the car door 28. To be more specific, the hall door 40 provided at each of floors is operated  
15 in interlock with the car door 28 of the car 12 when the car 12 arrives at each floor. A combination of the car door 28 and the hall door 40 is also referred to as the door apparatus. The sensor portion 34 is provided at the modesty panel 30.

20 Next, the sensor portion 34 will be described. The sensor portion 34, as illustrated in FIG. 6, comprises a camera 36, a transparent member 38, a fixing member 48 and a cover 50. The sensor portion 34 is provided at a window portion 58.

25 The modesty panel 30 will be described with reference to FIGS. 4 and 5. FIG. 4 is a perspective view illustrating a state of the modesty panel 30 as seen obliquely from below. FIG. 5 is a front view illustrating the front of the modesty panel 30, i.e.,  
30 illustrating the modesty panel 30 as seen from a hall side where the hall 14 is located.

The modesty panel 30 includes an outer plate 52 facing the hall 14, an inner plate 54 facing the inside of the car 12 and a bottom plate 56 connecting the  
35 outer plate 52 and the inner plate 54. The inner plate 54 and the bottom plate 56 are part of a fancy member which can be seen from the inside of the car 12. In

the bottom plate 56, a step is formed in accordance with the shapes of the high-speed car door 28a and the low-speed car door 28b of the car door 28 which are taken when these doors are in closed state.

5           The outer plate 52 is formed upright at an end portion of the bottom plate 56 which is located on the hall side, in accordance with the step formed in the bottom plate 56. At the inner plate 54, as the case may be, a display device is provided which indicates a  
10 floor at which the car 12 arrives, the traveling direction of the car 12, information relevant to each floor, etc., is provided.

          The window portion 58 is a rectangular opening portion, and penetrates the modesty panel 30 between  
15 the front and back thereof. The window portion 58 is formed continuously from the outer plate 52 to the bottom plate 56. The window portion 58, as illustrated in FIG. 5, which is a front view, is located on the right side of the modesty panel 30. For example, in  
20 the case where the modesty panel 30 has a breadth of 800 mm, the window portion 58 is separated from a right end R of the modesty panel 30 toward the center thereof by 150 mm. It should be noted that the position of the window portion 58 is not limited to this.

25           In the inner plate 54, a stud bolt 55 (see FIG. 6) is provided in accordance with the position of the window portion 58 of the modesty panel 30. To the window portion 58, the transparent member 38 is attached.

30           The transparent member 38 is formed of a material having a light transmittivity. The transparent member 38 is a plate-like member, and is L-shaped (see FIGS. 6 and 8). The transparent member 38 includes a main body portion 39 and a flange 41. The main body portion 39  
35 is formed along the outer plate 52 and the bottom plate 56, and has substantially the same shape as the window portion 58. The flange 41 is provided at an outer

periphery of the main body portion 39.

When the transparent member 38 is attached to the window portion 58 from above, the main body portion 39 is fitted in the window portion 58. Furthermore, when  
5 the flange 41 is brought into contact with an inner surface of the modesty panel 30, the transparent member 38 is held by the window portion 58. Also, the transparent member 38 has a thickness such that when  
10 the transparent member 38 is attached to the window portion 58 from above, an outer surface of the transparent member 38 is substantially flush with an outer surface of the modesty panel 30, i.e., an outer surface of the outer plate 52 which faces the hall 14 and a lower surface of the bottom plate 56.

15 It should be noted that the flange 41 need not always to be provided on the entire outer periphery of the transparent member 38. The flange 41 may be provided on part of the outer periphery of the transparent member 38 as long as it can hold the  
20 transparent member 38. Also, the transparent member 38 may be colored if it does not affect an imaging operation of the camera 36. Furthermore, the transparent member 38 may include a light-transmission-variable film having a variable light transmissivity,  
25 or the like, which is located in the transparent member 38 or on an outer surface thereof, or in an intermediate layer of a lamination member. Thereby, the intensity of light passing through the transparent member 38 is adjusted by the light-transmission-  
30 variable film or the like. The fixing member 48 is provided inward of the transparent member 38 to fix the camera 36.

The fixing member 48, as illustrated in FIGS. 6 and 8, includes a support 49 and an inclined wall 51.  
35 The inclined wall 51 is connected to the support 49 by a predetermined angle. The fixing member 48 is formed by bending, for example, a metal plate by an acute

angle. In the support 49, screw holes 47 (see FIG. 4) are formed. The screw holes 47 are provided in such a way as to correspond in position to stud bolts 55 joined to the inner plate 54, respectively. In the inclined wall 51, through holes are provided in such a way as to correspond in position screw holes 53 (see FIG. 7) of the camera 36.

The support 49, as illustrated in FIG. 6, is fixed to the stud bolts 55 joined to the inner plate 54 by nuts. It should be noted that the support 49 may be bonded to the modesty panel 30 by an adhesive agent or may be fixed to the modesty panel 30 by brazing, instead of using the stud bolts. Alternatively, a reinforcement member may be provided between the support 49 and the inclined wall 51 to prevent the inclined wall 51 from being vibrated with respect to the support 49. To the inclined wall 51, the camera 36 is attached. It should be noted that to an elevator provided with a double-leaf door, the fixing member 48 can also be applied in the same manner as described above.

The camera 36, as illustrated in FIGS. 6 to 8, includes a cylindrical lens barrel portion 35 and a square seat portion 37. The lens barrel portion 35 is a light receiving portion of the camera 36. As illustrated in FIG. 6, the camera 36 has an angle V of view in an imaging operation. Also, a center line A of the angle V of view extends as illustrated. The seat portion 37 is larger than the lens barrel portion 35 in their radius direction, and screw holes 53 are provided in four corners of the seat portion 37. Bolts are passed through the through holes of the inclined wall 51, and are then screwed into the screw holes 53 of the seat portion 37, thereby fixing the camera 36 to the inclined wall 51. It should be noted that the camera 36 may be bonded to the inclined wall 51 by an adhesive agent or may be fixed to the inclined wall 51 by

brazing, instead of using the bolts.

As illustrated in FIGS. 6 and 7, when the transparent member 38 is set in the window portion 58, the support 49 of the fixing member 48 is attached to the inner plate 54 of the modesty panel 30 by the stud bolts 55. To the inclined wall 51 of the fixing member 48, the camera 36 is fixed. In the case where the inclined wall 51 is inclined with respect to the support 49 at, for example,  $60^\circ$ , the camera 36 is fixed to the modesty panel 30 while also inclined at  $60^\circ$ .

Therefore, the camera 36 is fixed such that the center line A of the angle V of view of the camera 36 is inclined at  $60^\circ$  with respect to the hall floor 46 as illustrated in FIG. 9. The center line A is included in a plane passing through the camera 36 and perpendicular to the hall floor 46 and the jamb 42. FIG. 9 is a schematic cross-sectional view of the elevator 10 and the hall 14, which is taken along the forward or backward direction, i.e., the horizontal direction.

It is assumed that the angle V of view of the camera 36 is, for example,  $72^\circ$  in the vertical direction. In this case, an imaging range of the camera 36, as indicated by dotted lines in FIG. 9, covers an area of the hall floor 46 which is located at a front of the car 12 and a peripheral area of a doorway of the car 12, which is located in the inside of the car 12. Furthermore, the imaging range of the camera 36 in the leftward and rightward directions is set such that the imaging operation can be performed on the car door 28 from one end of the car door 28 to the other end thereof in the width direction. It should be noted that the inclination angle of the camera 36 is not limited to the above. The cover 50 is provided around the camera 36.

The cover 50, as illustrated in FIGS. 6 to 8, includes a front plate 72, a ceiling plate 74, left and

right side plates 76 and leg portions 78. The cover 50 is formed in the shape of a box which is longitudinal in the width direction. The cover 50 has a size such that it can be provided between the outer plate 52 and the inner plate 54 of the modesty panel 30, with proper gaps provided between the cover 50 and these plates.

The front plate 72 of the cover 50 is provided to face the outer plate 52. The ceiling plate 74 is provided above the camera 36. The side plates 76 are located to extend in the forward or backward direction (horizontal direction). The side plates 76 are located on both the left and right sides of each of the front plate 72 and the ceiling plate 74 such that they are continuous with the front plate 72 and the ceiling plate 74. The leg portions 78 are provided at lower ends of the side plates 76.

The cover 50 has an opening formed in an area of the cover 50 which faces the window portion 58, i.e., which faces a lower area and the outer plate 52. Also, the cover 50 has an opening in an area of the cover 50 which faces the inner plate 54, i.e., which is located on the car side. Between the outer plate 52 and the inner plate 54 of the modesty panel 30, stud bolts 57 are passed through screw holes 79 (see FIG. 8) provided in the leg portions 78, and nuts are screwed on the stud bolts 57, thereby fixing the cover 50 to the bottom plate 56. The screw holes 79 are elongated in the forward or backward direction (horizontal direction).

When the cover 50 is fixed to the modesty panel 30, it covers the window portion 58 and the light receiving portion, which is a distal end portion of the lens barrel portion 35 of the camera 36. Furthermore, the cover 50, as illustrated in FIGS. 6 and 7, is fixed to the modesty panel 30, with the transparent member 38 interposed between the cover 50 and the inner plate 54. The flange 41 of the transparent member 38 is in

contact with an edge of the window portion 58 which is located closer to the outer plate 52 of the modesty panel 30. The flange 41 is pressed against an inner surface of the outer plate 52 of the modesty panel 30 by the front plate 72 of the cover 50, thereby fixing the transparent member 38 to the modesty panel 30. It should be noted that the transparent member 38 may be fixed to the modesty panel 30 by a caulking agent or an adhesive agent applied to the flange 41.

Next, it will be explained in what state the camera 36 performs an imaging operation on the elevator 10.

As illustrated in FIG. 1, the camera 36 is attached to the modesty panel 30, and separated from the door stop post 31 by a predetermined distance in the opening direction of the door apparatus. The camera 36 performs an imaging operation from the window portion 58 through the transparent member 38. When the hall door 40 and the car door 28 are in closed state, the camera 36 performs an imaging operation to obtain images of the inside of the car 12. When the hall door 40 and the car door 28 are in open state, the camera 36 performs an imaging operation to obtain images of the inside of the car 12 and the hall 14.

The camera 36 has an imaging range as illustrated in FIGS. 9 and 10. FIG. 10 is a schematic plan view of the elevator 10 and the hall 14, i.e., a view illustrating them as viewed from above. The center line A of the angle V of view of the camera 36, as illustrated in FIG. 10, extends along the forward or backward direction (horizontal direction) from the sensor portion 34, which is separated from the door stop post 31 by a predetermined distance (150 mm) as seen in plan view. Also, the center line A, as illustrated in FIG. 9, is inclined downwardly toward the hall 14.

The camera 36 performs an imaging operation in a

range from the inside of the car 12 to the hall 14 as indicated by dotted lines in FIG. 9, with the hall door 40 and the car door 28 being in open state.

Furthermore, the angle V of view of the camera 36 is

5 set such that the imaging operation thereof is performed to obtain an image of an area in the inside of the car 12 and an area in the hall 14 which is larger than the area in the inside of the car 12. The imaging range of the camera 36 is set such that the  
10 imaging operation is performed in a range between the following locations: a location which is separated from the car door 28 toward the inside of the car 12 by the length of an area in which a single person can stand; and a location which is separated from the hall door 40  
15 toward the hall 14 by a distance corresponding to five or six steps which an ordinary person can take.

Furthermore, as illustrated in FIG. 10, in a left area of the hall 14, the imaging range of the camera 36 includes an area extending rightwardly from line C  
20 extending from the camera 36 through one of corner portions of a vertical frame 42b of the jamb 42 in the hall 14, which are located on the hall side. Since the camera 36 has such an imaging range, it can perform an imaging operation in a range sufficiently covering a  
25 flow line of movement of a passenger who will get into the elevator 10.

A controller of the elevator 10 determines whether a person in the hall 14 who will get into the elevator 10 is present close thereto based on video obtained by  
30 the imaging operation of the camera 36 or not, to control the car door 28. For example, when the controller detects from the video a person who will get into the elevator 10 during closing of the doors (the hall door 40 and the car door 28) of the door  
35 apparatus, it stops the closing of the doors, and causes the doors to be opened.

The camera 36, as illustrated in FIG. 11, performs

an imaging operation to obtain images of the hall 14 until the car door 28 reaches a position which is located in front of the sensor portion 34. Therefore, the elevator 10 is properly controlled just immediately before the doors are completely closed.

Also, the imaging range of the camera 36 covers the entire car door 28 of the car 12. When the controller determines that there is a risk that the hand or finger of a passenger will be caught in a door pocket, for example, during opening of the car door 28, it stops the opening of the car door 28, and/or alerts the passenger to the risk. This can prevent an accident from occurring in the elevator 10.

In the elevator 10 according to the first embodiment, the camera 36 performs an imaging operation to obtain images of the hall 14 in a wide range. Also, the camera 36 performs an imaging operation to obtain images of the entire car door 28 of the car 12. To be more specific, until just before completely closing of the hall door 40, which is a one-way door, the camera 36 performs an imaging operation to obtain images of the hall 14. Thus, the elevator 10 can be safely operated.

Even in the case where the door of the elevator 10 is a double-leaf door, the above fixing member 48 can be used, i.e., another type of fixing member does not need to be prepared. Therefore, the number of parts is not increased, the work for fixing parts is not complicated, and labor is not increased.

The camera 36 is fixed to the modesty panel 30 by the fixing member 48. Thereby, the camera 36 can be easily and accurately installed at an inner part of the modesty panel 30, and the angle  $V$  of view can be set with a high accuracy.

The transparent member 38 is pressed against the window portion 58 by the cover 50, which surrounds the camera 36. Thus, even if an object carried by a

passenger in the elevator 10 or the like comes into contact with the transparent member 38, the transparent member 38 is prevented from being floated, and the camera 36 can thus be protected. The structure for  
5 installing the camera 36 at the modesty panel 30 is simple. Therefore, even in the case where the camera 36 is installed in the actual place, it can be easily achieved.

(Second embodiment)

10 The elevator 10 according to the second embodiment will be described with reference to FIGS. 12 and 13. In an elevator 10 according to the second embodiment, a fixing member for fixing a camera 36 is formed continuous with a cover, and the fixing member and the  
15 cover form a housing 102. The other structural features are the same as those of the elevator 10 according to the first embodiment. With respect to the second embodiment, structural elements having the same functions as those in the elevator 10 according to the  
20 first embodiment will be denoted by the same reference numerals as in the first embodiment, and their detailed explanations are also the same as those made with respect to the first embodiment.

FIG. 12 is an exploded perspective view  
25 illustrating that the housing 102, the camera 36 and the transparent member 38 are upwardly detached from the modesty panel 30, and located above the bottom plate 56. FIG. 12 illustrates the camera 36, the housing 102, etc., as seen from below on a hall side  
30 where a hall 14 is located.

The housing 102 includes a front plate 72, a ceiling plate 74, left and right side plates 76, a rear plate 104, an inclined wall 106 and leg portions 78. The housing 102 is formed in the shape of a box which  
35 is longitudinal in the width direction. The housing 102 has a size such that it can be provided between an outer plate 52 and an inner plate 54 of the modesty

panel 30, with proper gaps provided between the housing 102 and these plates. The housing 102 is formed by bending, for example, a sheet metal, as in the first embodiment.

5           The rear plate 104 is provided between the left and right side plates 76. Incisions are formed in the rear plate 104, and part of the rear plate 104 is bent forwards to form the inclined wall 106. In the inclined wall 106, a through hole 107 is provided. The inclined wall 106 is inclined at a predetermined angle with respect to the rear plate 104 or the like as well as the inclined wall 51 of the first embodiment. It is preferable that a distal end of the inclined wall 106 be in contact with a corner portion between the front plate 72 and the ceiling plate 74.

15           Bolts provided through holes 107 of the inclined wall 106 are screwed into screw holes 53, thereby fixing the camera 36 to the inclined wall 106. The housing 102 is fixed to the bottom plate 56 of the modesty panel 30 by fixing the leg portions 78 thereto. In this case also, the camera 36 can be reliably fixed to the modesty panel 30, and send video obtained by performing an imaging operation in a predetermined range to a controller.

25           The distal end of the inclined wall 106 is in contact with inner part of a corner portion of the housing 102. Thereby, the inclined wall 106 is reliably held. Furthermore, the stiffness of the housing 102 itself is improved. Therefore, the camera 36 is more reliably fixed.

30           The elevator 10 according to the second embodiment obtains the same advantage as that according to the first embodiment. The camera 36 is reliably fixed above the window portion 58. The housing 102 is fixed to the bottom plate 56 of the modesty panel 30, whereby the camera 36 can be set at the modesty panel 30. Therefore, even in the case where an assembling work is

conducted in the actual place, the camera 36 can be easily set at the modesty panel 30.

(Third embodiment)

5 An elevator 10 according to the third embodiment will be described with reference to FIG. 14. In the elevator 10 according to the third embodiment, a fixing member for fixing a camera 36 is formed continuous with a cover, and the fixing member and the cover form a housing 110. The other structural features are the same as those of the elevator 10 according to the first embodiment. With respect to the third embodiment, structural elements having the same functions as those in the elevator 10 according to the first embodiment will be denoted by the same reference numerals as in the first embodiment, and their detailed explanations are also the same as those made with respect to the first embodiment.

FIG. 14 is an exploded perspective view illustrating that a camera 36, a transparent member 38 and a housing 110 are upwardly detached from a modesty panel 30, and located above a bottom plate 56. FIG. 14 illustrates the housing 110, etc., as seen from an upper left region on a car side where a car 12 is located. In FIG. 14, part of the modesty panel 30 which is located outward of the housing 110 in the width direction is omitted.

In the third embodiment, the housing 110, as illustrated in FIG. 14, includes a front plate 72, a ceiling plate 112, left and right side plates 114, a rear plate 116 and leg portions 78. The housing 110 is formed in the shape of a box which is longitudinal in the width direction. The housing 110 has a size such that it can be provided between an outer plate 52 and an inner plate 54 of a modesty panel 30, with proper gaps provided between the housing 110 and these plates. The housing 110 is formed by bending, for example, a sheet metal, as in the first and second embodiments.

The ceiling plate 112 is inclined with respect to a rear plate 116 or the like as well as inclined walls 51 and 106. The left and right side plates 114 and the rear plate 116 are formed in accordance with the inclination of the ceiling plate 112. The housing 110 is formed in the shape of a trapezoid box which has a long side on the hall side and a short side on the car side.

In the ceiling plate 112, through holes 107 and an insertion hole 120 are formed. The insertion hole 120 has a diameter which is set such that a lens barrel portion 35 of the camera 36 can be passed through the insertion hole 120. The ceiling plate 112 has a function equivalent to that of the inclined wall 51 according to the first embodiment.

The lens barrel portion 35 of the camera 36 is obliquely moved from above and inserted into a through hole 120 formed in the ceiling plate 112; and bolts are passed through the through holes 107, and screwed into screw holes 53. As a result, the camera 36 is fixed to the housing 110. As in the first and second embodiments, stud bolts 57 at the bottom plate 56 of the modesty plate 30 are passed through screw holes 79 of the leg portions 78, and nuts are screwed on them, thereby fixing the housing 110 to the modesty panel 30. When the housing 110 is fixed to the bottom plate 56 of the modesty panel 30, it reliably fixes the transparent member 38 to the modesty panel 30. It should be noted that a combination of the screw holes and the bolts is not limited to the above.

The elevator 10 according to the third embodiment obtains the same advantage as those according to the first and second embodiments. The camera 36 can be fixed from above to the housing 110. Therefore, the camera 36 can be installed after setting the transparent member 38 and the housing 110 at the modesty panel 30. Therefore, in an assembling work in

the actual place, the camera 36 and lines for the camera 36 can be more flexibly set. Furthermore, in the case where the camera 36 and lines for the camera 36 are set at the modesty panel 30 in a factory, it can be easily achieved. In addition, even if it becomes necessary to replace the camera 36 set at the modesty panel 30 with a new one, the set camera 36 can be easily removed.

It should be noted that although the cover 50 and the housing 102 or 110 are formed by bending a metal sheet, they may be formed by injection-molding synthetic resin.

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.

For example, an insertion hole 120 may be provided in the inclined wall 51 of the fixing member 48 of the first embodiment. If so, as in the third embodiment, the camera 36 can be set from above with respect to the inclined wall 51.

Furthermore, the fixing member 48 of the first embodiment may be fixed to the outer plate 52. In this case, the inclined wall 51 is formed to downwardly extend from an upper end of the support 49 toward the car side. At this time, a cut is formed in the cover 50 such that the fixing member 48 fits in the cut.

Furthermore, in the case where as in the third embodiment, the camera 36 is set from above in the

housing 102 of the second embodiment, an opening  
portion which allows the seat 37 of the camera 36 to  
pass through the opening portion is provided in the  
housing 110. The housing 102 is sufficiently larger  
5 than the camera 36 in the width direction. Thus, the  
inclined wall 106 is continuous with the side plates 76  
at both side portions of the opening portion.

WHAT IS CLAIMED IS:

1. An elevator characterized by comprising:  
a modesty panel provided at an upper portion of a  
5 door apparatus of a car, and including a window portion  
which includes an opening formed in an outer plate  
facing a hall and a bottom plate;  
a camera set above the window portion, the camera  
having an angle of view to perform an imaging operation  
10 in a range from an inside of the car to the hall, with  
the door apparatus being in opened state; and  
a fixing member fixing the camera such that a  
center line of the angle of view is inclined toward the  
hall, and  
15 characterized in that:  
the door apparatus is a one-way door;  
the window portion is located closer to a doorstep  
for the door apparatus than to a center portion of the  
modesty panel in a width direction thereof, and is  
20 separated from the doorstep in a direction in which the  
door apparatus is opened; and  
a line connecting the camera and a corner portion  
of a vertical frame of a jamb provided in the hall is  
located outward of a flow line of movement of a  
25 passenger in the hall which will get into the elevator,  
the corner portion being located close to the doorstep.
2. The elevator of Claim 1, characterized in that  
the fixing member is set such that as seen in plan  
view, a center line of the angle of view is  
30 perpendicular to a direction in which the door  
apparatus is opened or closed.
3. The elevator of Claim 2, characterized in that  
the window portion is located such that the angle of  
view is set to cover space between a car door and a  
35 door pocket for the car door when the door apparatus is  
closed.
4. The elevator of Claim 1, characterized by

further comprising a cover which is attached to an upper surface of the bottom plate of the modesty panel, and covers the window portion and at least a light receiving portion of the camera, and

5           characterized in that the cover is formed continuous with the fixing member.

5. The elevator of Claim 1, characterized in that in the window portion, a transparent member is fitted.