

DESCRIPTION

Title of Invention: Boarding Bridge

Technical Field

[0001] The present invention relates to a boarding bridge. Especially, the present invention relates to the improvement of a structure for connecting a boarding bridge and an entrance of a movable body (for example, an aircraft).

Background Art

[0002] Boarding bridges are known as equipment used by passengers to get on and off an aircraft from and to a terminal building of an airport. By connecting the boarding bridge to the entrance of the aircraft, a passage to the aircraft is formed by using the boarding bridge. With this, the passengers can directly get on and off the aircraft from and to the terminal building.

[0003] Here, the position of a lower end portion of a door of the entrance of the aircraft is lower than the position of a floor portion of the entrance of the aircraft. Therefore, if the difference in level between the floor portion of the entrance and the boarding bridge is eliminated, the door contacts the boarding bridge, so that it becomes difficult to open and close the door.

[0004] On this account, the position of the boarding bridge needs to be lower than the position of the floor portion of the entrance by, for example, about a hundred and several tens of millimeters. However, in this case, the difference in level between the floor portion of the entrance and the passage of the boarding bridge may become an obstacle when the passengers get on and off the aircraft. For example, by such difference in level, a passenger on a wheelchair cannot easily get on the aircraft from the terminal.

[0005] Here, it has already been proposed that a lifting passage is provided at a tip end of the boarding bridge separately from a fixed passage of the boarding bridge, and a structure capable of lifting up and down the lifting passage is provided (see PTL 1).

[0006] In accordance with the boarding bridge of PTL 1, a tip end portion of the boarding bridge can be connected to the aircraft in a state where the position of the lifting passage of the boarding bridge is lower than the position of the floor portion of the entrance. With this, it is possible to open and close the door of the entrance of the aircraft. Then, after the door completely opens, the lifting passage of the boarding bridge is lifted up to be substantially the same in height as the floor portion of the entrance. Thus, the difference in level between the floor portion of the entrance and the lifting passage of the boarding bridge is eliminated. Therefore, the passengers (for example, the passenger on the wheelchair) can get off the aircraft to the lifting passage. Next, the lifting passage of the boarding bridge is lifted down to be the same in height as the fixed passage of the boarding bridge. Thus, the difference in level between the fixed passage of the boarding bridge and the lifting passage of the boarding bridge is eliminated. Therefore, the passengers can easily move through the passage of the boarding bridge to the terminal.

Citation List

Patent Literature

[0007] PTL 1: Japanese Laid-Open Patent Application Publication No. 2004-155257

Summary of Invention

Technical Problem

[0008] However, in accordance with the boarding bridge of PTL 1, the lifting passage

needs to be lifted up and down each time the passengers get on or off the aircraft, so that the passengers cannot smoothly get on and off the aircraft. Therefore, in the technology described in PTL 1, there is still room for improvement in terms of smooth getting on and off of the passengers.

[0009] Embodiments of the present invention provide a boarding bridge capable of eliminating the difference in level between the boarding bridge and the entrance of the movable body and allowing the passengers to smoothly get on and off the movable body from and to the terminal.

Solution to Problem

[0010] According to a first aspect, there is provided a boarding bridge comprising: a walking passage; a lifting deck provided in a plane of the walking passage in plan view and used for connection with an entrance of a movable body; a lifting mechanism configured to lift up and down the lifting deck; and a driven slope including a fixed end portion and a free end portion, the fixed end portion being coupled to the lifting

deck by using a coupling swing shaft, the free end portion being supported on or above the walking passage, wherein the driven slope forms a slope way between the lifting deck and the walking passage by rotation of the driven slope around the coupling swing shaft, the driven slope being rotated when the lifting deck is lifted up and down while maintaining a substantially horizontal state.

[0010a] According to a second aspect, there is provided a boarding bridge comprising: a walking passage; a lifting deck provided in a plane of the walking passage in plan view and used for connection with an entrance of a movable body; a lifting mechanism configured to lift up and down the lifting deck; and a driven slope including a fixed end portion and a free end portion, the fixed end portion being coupled to the lifting deck by using a coupling swing shaft, the free end portion being supported on or above the walking passage, wherein the walking passage includes: an inclined floor configured to adjust inclination of the lifting deck and the driven slope in a width direction; and an inclining mechanism configured to be able to incline the inclined floor in the width direction, the driven slope forms a slope way between the lifting deck and the walking passage by rotation of the driven slope around the coupling swing shaft, the driven slope being rotated in accordance with movements of the lifting deck, and when the inclined floor is viewed in plan view, the lifting deck and the driven slope are attached in a plane of the inclined floor.

[0010b] According to a third aspect, there is provided a boarding bridge comprising: a walking passage; a lifting deck provided in a plane of the walking passage in plan view and used for connection with an entrance of a movable body; a lifting mechanism configured to lift up and down the lifting deck; and a driven slope including a fixed end portion and a free end portion, the fixed end portion being coupled to the lifting deck by

using a coupling swing shaft, the free end portion being supported on or above the walking passage, wherein: the lifting deck includes a floor panel connected to the driven slope by using the coupling swing shaft, a damper connected to the floor panel via a rotating shaft, and an elastic plate provided to spread over the floor panel and the damper; the driven slope forms a slope way between the lifting deck and the walking passage by rotation of the driven slope around the coupling swing shaft, the driven slope being rotated in accordance with movements of the lifting deck; one end portion of the elastic plate is fixed to the damper, and the other end portion of the elastic plate is fixed to the floor panel; and the elastic plate is inclined in a width direction of the lifting deck by rotation of the damper about the rotating shaft.

[0011] With this, the difference in level between the boarding bridge and the entrance of the movable body can be eliminated. In addition, for example, since it is unnecessary to lift up and down the lifting deck each time a passenger on a wheelchair gets on and off the aircraft, the passengers can smoothly get on and off the movable body from and to the terminal.

[0012] Moreover, in accordance with the above boarding bridge, the height of the lifting deck can be adjusted by the simple lifting movement of the lifting deck. Therefore, the floor of the lifting deck is not inclined and can be maintained substantially horizontally. On this account, it is advantageous in that the positioning between the lifting deck and the floor portion of the entrance is easy.

[0013] Moreover, in an embodiment of the boarding bridge of the present invention, the lifting deck may include a sliding mechanism configured to slide in a people's walking direction. Then, the lifting deck may be configured to move to the same height as a floor portion of the entrance by the lifting mechanism and contact the entrance by the sliding mechanism.

[0014] With this configuration, even in a case where there is a small gap between the lifting deck and the entrance (outer wall) of the movable body, the lifting deck can slide by the sliding mechanism to contact the entrance. Therefore, such gap can be eliminated in addition to the difference in level therebetween.

[0015] Moreover, in an embodiment of the boarding bridge of the present invention, the sliding mechanism may be configured to be able to bias the lifting deck against the entrance at a position where the lifting deck contacts the entrance.

[0016] With the above configuration, in accordance with the boarding bridge of the present invention, even in a case where the gap between the lifting deck and the entrance (outer wall) of the movable body changes by ups and downs of the movable body due to the getting on and off of the passengers, the lifting deck can be caused to follow the ups and downs of the movable body in the front-rear direction by the biasing actions of the sliding mechanism. Therefore, the generation of the gap can be appropriately prevented.

[0017] Moreover, in an embodiment of the boarding bridge of the present invention, the walking passage may include: an inclined floor configured to adjust inclination of the lifting deck and the

driven slope in a width direction; and an inclining mechanism configured to be able to incline the inclined floor in the width direction. Then, when the inclined floor is viewed in plan view, the lifting deck and the driven slope may be attached in a plane of the inclined floor.

[0018] With this, in a case where an edge of the floor of the lifting deck and an edge of the floor portion of the entrance of the movable body are not parallel to each other, they can be caused to be parallel to each other by using the inclined floor.

[0019] Especially, in accordance with an embodiment of the boarding bridge of the present invention, the lifting deck and the entrance can be adjusted by the inclined floor to be parallel to each other even in the middle of the movement of the drive columns of the boarding bridge. Therefore, the operation of connecting the lifting deck to the entrance can be efficiently performed.

[0020] Moreover, in an embodiment of the boarding bridge of the present invention, the lifting deck may include a floor panel connected to the driven slope by using the coupling swing shaft, a damper connected to the floor panel via a rotating shaft, and an elastic plate provided to spread over the floor panel and the damper. Then, one end portion of the elastic plate may be fixed to the damper, the other end portion of the elastic plate may be fixed to the floor panel, and the elastic plate may be inclined in a width direction of the lifting deck by rotation of the damper about the rotating shaft.

[0021] With this, in a case where the edge of the floor of the lifting deck and the edge of the floor portion of the entrance of the movable body are not parallel to each other, the displacement therebetween can be absorbed in a simplified manner using the elastic plate.

[0022] Moreover, in an embodiment of the boarding bridge of the present invention, the lifting deck may include a floor panel connected to the driven slope by using the coupling swing shaft and

a slide floor supported by the floor panel and configured to slide in a people's walking direction. Then, the slide floor may contact the entrance.

[0023] With this configuration, even in a case where there is a small gap between the lifting deck and the entrance (outer wall) of the movable body, the slide floor can slide to contact the entrance. Therefore, such gap can be eliminated. In addition, since the driven slope does not have to greatly slide in accordance with the sliding operation of the slide floor, the structure of supporting the free end portion of the driven slope and the sliding structure can be simplified.

[0024] The above aspects, features and advantages of the present invention will be made clear by the following detailed explanation of preferred embodiments with reference to the attached drawings.

Advantageous Effects of Invention

[0025] In accordance with the embodiments of the present invention, it is possible to obtain the boarding bridge by which the difference in level between the boarding bridge and the entrance of the movable body can be eliminated, and the passengers can smoothly get on and off the movable body from and to the terminal.

Brief Description of Drawings

[0026] [Fig. 1] Fig. 1 is a layout chart showing one example of a boarding bridge system including a boarding bridge of Embodiment of the present invention.

[Fig. 2] Fig. 2 is a diagram showing an entire configuration of the boarding bridge of Embodiment of the present invention.

[Fig. 3] Fig. 3 is a diagram schematically showing one configuration example of a cab used for the boarding bridge of Embodiment of the present invention.

[Fig. 4] Fig. 4 is a diagram taken along line IV-IV of Fig. 3 and shows one configuration example of an adjustment passage and its peripheral structure.

[Fig. 5] Fig. 5 is a diagram showing one configuration example of a spherical slide bearing of Fig. 3.

[Fig. 6] Fig. 6 is a diagram taken along line VI-VI of Fig. 3 and shows one configuration example of an adjustment passage and its peripheral structure.

[Fig. 7] Fig. 7 is a diagram taken along line VII-VII of Fig. 6 and shows one configuration example of the peripheral structure of the adjustment passage.

[Fig. 8] Fig. 8 is a diagram used to explain an example of connecting the boarding bridge of Embodiment of the present invention to an entrance of an aircraft.

[Fig. 9] Fig. 9 is a diagram used to explain an example of connecting the boarding bridge of Embodiment of the present invention to the entrance of the aircraft.

[Fig. 10] Fig. 10 is a diagram schematically showing one configuration example of the cab used for the boarding bridge of Modification Example 1 of the present invention.

[Fig. 11] Fig. 11 is a diagram schematically showing one configuration example of a lifting deck used for the boarding bridge of Modification Example 2 of the present invention.

[Fig. 12] Fig. 12 is a diagram schematically showing one configuration example of the lifting deck used for the boarding bridge of Modification Example 3 of the present invention.

Description of Embodiments

[0027] Hereinafter, one embodiment of the present invention will be explained in reference to the drawings.

In the drawings, the same reference signs are used for the same or corresponding components, and a repetition of the same explanation may be omitted.

[0028] Moreover, the present invention is not limited to Embodiment below. To be specific, the following specific explanation just exemplifies the features of the "boarding bridge" of the present invention. Therefore, when explaining the following specific example by attaching suitable reference signs to terms corresponding to components specifying the "boarding bridge" of the present invention, the specific device is one example of the corresponding component of the "boarding bridge" of the present invention.

[0029] For example, an "aircraft 11" described below is just one example of a "movable body" that is one component of the present invention. Therefore, the specific example of the "movable body" is not limited to the aircraft but may be, for example, a "cruise ship".

Embodiment

Fig. 1 is a layout chart showing one example of a boarding bridge system including a boarding bridge of Embodiment of the present invention.

[0030] As shown in Fig. 1, a boarding bridge system 1 for air travelers includes an air traveler boarding bridge 20 (hereinafter abbreviated as a "boarding bridge 20") connected to an entrance of a terminal building 10 of an airport. Passengers may efficiently get on and off an aircraft 11 by using the boarding bridge 20.

[0031] Fig. 2 is a diagram showing an entire configuration of the boarding bridge of Embodiment of the present invention.

[0032] In Fig. 2, for convenience sake, the aircraft 11 side of the boarding bridge 20 is referred to as a "front" side, and the terminal building 10 side of the boarding bridge 20 is referred to as a "rear" side (the same is true for Figs. 3, 4, 6, 7, 8, 9, and 10.). A width

direction 300 of the boarding bridge 20 is left and right of the boarding bridge 20. In the following explanation, a front-rear direction 200 of the boarding bridge 20 may be referred to as a passersby's (passengers') "walking direction 200".

[0033] As shown in Fig. 2, the boarding bridge 20 includes: a rotunda (rear circular chamber) 24 connected to an entrance 10A of the terminal building 10; a tunnel portion 25 connected to the rotunda 24; a cab (front circular chamber) 26 provided at a front end of the tunnel portion 25; and an auxiliary stairs 23 provided at a side wall of the tunnel portion 25 in the vicinity of the cab 26.

[0034] The rotunda 24 is rotatably provided at a rear end of the tunnel portion 25 such that the tunnel portion 25 can swing around a shaft 24A (hereinafter, such shaft is referred to as a "vertical shaft") extending in a vertical direction (vertical direction with respect to the plane of the paper of Fig. 2). Thus, the rotunda 24 can serve as a joint between the terminal building 10 and the tunnel portion 25.

[0035] The cab 26 is rotatably provided at a front end portion of the tunnel portion 25 such that a front end portion of the cab 26 can swing to the left and the right by the turning of the cab 26 itself around a vertical shaft 26A.

In the cab 26, a control panel 30 (see Fig. 3) is provided. An operator can use a joystick (not shown) of the control panel 30 to operate various devices (for example, drive columns) of the boarding bridge 20.

[0036] The auxiliary stairs 23 is provided adjacent to the tunnel portion 25 to connect an inside of the tunnel portion 25 and the ground (apron). The auxiliary stairs 23 is used when, for example, the operator get in and out of the cab 26.

[0037] The tunnel portion 25 corresponds to a box-shaped passage member which forms a passenger passage between the terminal building 10 and an entrance 11A of the aircraft 11. As shown in Fig. 2, the tunnel portion 25 includes a pair of (adjacent)

nested first and second tunnels 25A and 25B and a pair of (adjacent) nested second and third tunnels 25B and 25C. To be specific, the first tunnel 25A, the second tunnel 25B, and the third tunnel 25C are the same in shape and formed as boxes (rectangular solids), but cross-sectional dimensions thereof are different from one another. The first tunnel 25A, the second tunnel 25B, and the third tunnel 25C are telescopically incorporated in this order.

[0038] The tunnel portion 25 includes a known slide structure, not shown. With this, the first, second, and third tunnels 25A, 25B, and 25C are maintained in an overlapping state and relatively slide along a longitudinal direction (front-rear direction) of the tunnel portion 25. Thus, the tunnel portion 25 can lengthen and shorten.

[0039] Moreover, known drive columns, not shown, are coupled to appropriate portions (specifically, portions on a front end side of the tunnel portion 25) of the tunnel portion 25 so as to sandwich the tunnel portion 25. Therefore, when driving wheels of lower end portions of the drive columns run on the apron, power for a lengthening and shortening movement (sliding operation) in the front-rear direction is applied to the tunnel portion 25. Further, the drive columns are configured to be able to lengthen and shorten in the upper-lower direction. By the lengthening and shortening movements of the drive columns, the tunnel portion 25 and the cab 26 can swing in the upper-lower direction by using the rotunda 24 as a base end.

[0040] Next, the configuration of the cab 26 of the boarding bridge 20 as one feature of the present embodiment will be explained in detail in reference to the drawings.

[0041] Fig. 3 is a diagram schematically showing one configuration example of the cab used for the boarding bridge of Embodiment of the present invention.

[0042] As shown in Fig. 3, the cab 26 and the passage of the tunnel portion 25 form a walking passage 31 through which the passengers can move along the walking direction

200 between the terminal 10 and the aircraft 11.

[0043] The walking passage 31 includes: a fixed passage 32 integral with the passage of the tunnel portion 25; and an adjustment passage 33 used to adjust the connection with the entrance 11A of the aircraft 11.

[0044] As described above, the vertical shaft 26A is provided at a substantially center of the fixed passage 32 in the width direction 300. With this, the front end portion of the cab 26 swings to the left and the right by the turning of the fixed passage 32 around the vertical shaft 26A.

[0045] The adjustment passage 33 includes a width-direction inclined floor 34 (hereinafter abbreviated as the "inclined floor 34"), a coupling floor 39, a lifting deck 35, and a driven slope 36.

[0046] As shown in Fig. 3, a substantially rectangular opening 34A having a long side extending in the walking direction 200 is provided at a right-side portion of the inclined floor 34. When the inclined floor 34 is viewed from the vertical direction, the lifting deck 35 and the driven slope 36, each having a rectangular shape, are provided in the plane of the inclined floor 34 (to be specific, in the plane of the walking passage 31) so as to cover the opening 34A substantially entirely.

[0047] In accordance with the boarding bridge 20 of the present embodiment, various structures can access a rear surface of the lifting deck 35 through the opening 34A from a lower side. Therefore, a lifting driving force or slide driving force to the lifting deck 35 can be easily applied to the lifting deck 35. Details will be described later.

Configuration of Inclined Floor 34 and Inclining Mechanism

First, the configuration of the inclined floor 34 and an inclining mechanism of the inclined floor 34 will be described in detail.

[0048] As shown in Fig. 3, the coupling floor 39 that is a substantially right angled

triangle is coupled to the fixed passage 32 via a first coupling hinge 37 and is also coupled to the inclined floor 34 via a second coupling hinge 38. On this account, the inclined floor 34 is coupled (connected) to the fixed passage 32 by using the coupling floor 39.

[0049] The second coupling hinge 38 linearly extends from the vicinity of a spherical slide bearing 42 (rod end 42; details will be described later) up to a right end of the cab 26 in a direction (width direction 300) substantially perpendicular to the walking direction 200. The first coupling hinge 37 linearly extends from the vicinity of the rod end 42 up to a right end of the cab 26 in a direction which makes a predetermined acute angle θ to the walking direction 200. To be specific, a region sandwiched between the first coupling hinge 37 and the second coupling hinge 38 is the coupling floor 39.

[0050] As shown in Fig. 3, a threaded shaft of a first electric-powered cylinder 43 (threaded cylinder) is fixed to a right end portion of the inclined floor 34. With this, by lengthening and shortening a stroke of the threaded shaft of the first electric-powered cylinder 43 in the vertical direction, the right end portion of the inclined floor 34 can be moved upward and downward.

[0051] Fig. 4 is a diagram taken along line IV-IV of Fig. 3 and shows one configuration example of the adjustment passage and its peripheral structure. Fig. 5 is a diagram showing one configuration example of the spherical slide bearing of Fig. 3.

[0052] As shown in Fig. 4, the inclined floor 34 includes a damper 40 made of synthetic rubber. The damper 40 is attached to an entire front end portion of the inclined floor 34 in the width direction 300. To be specific, the damper 40 extends in a direction parallel to the second coupling hinge 38.

[0053] With this, the damper 40 cushions the shock when the boarding bridge 20 contacts the aircraft 11, and maintains the space between a front end portion of the

adjustment passage 33 and the entrance 11A of the aircraft 11.

[0054] As shown in Fig. 4, a support roller 41 (cam follower 41) is attached to a housing 40A of the damper 40, and a roller holder 41A configured to hold a head of the cam follower 41 from an upper side and a lower side is coupled to the fixed passage 32 via a coupling member, not shown. With this, by using the cam follower 41, the inclined floor 34 can slide with respect to the fixed passage 32 in parallel with a main surface of the inclined floor 34.

[0055] As shown in Fig. 5, a housing of the rod end 42 is fixed to a frame 32A of the fixed passage 32, and a rod 42B penetrating through a ball 42A of the rod end 42 is coupled to the inclined floor 34 via a plate member, not shown. With this, since the rod 42B can move at various angles by spherical sliding of the ball 42A, the inclined floor 34 can freely swing with respect to the fixed passage 32 by using the rod end 42.

[0056] With this configuration, when the right end portion of the inclined floor 34 is moved upward and downward by the driving force of the first electric-powered cylinder 43, the front end portion of the inclined floor 34 swings about the first coupling hinge 37 and also swings about the second coupling hinge 38. As a result, the inclined floor 34 can be inclined in the width direction 300. To be specific, the inclined floor 34 can perform a seesaw movement about a virtual straight line 400 connecting the cam follower 41 and the rod end 42.

[0057] At this time, by the sliding movement of the cam follower 41 and the free swinging movement of the rod end 42 in the plane of the inclined floor 34, the straight line 400 is translated, and the coupling floor 39 swings upward and downward. Therefore, in the boarding bridge 20 of the present embodiment, the seesaw movement of the inclined floor 34 can be performed smoothly.

[0058] With this, in a case where an edge of the inclined floor 34 (to be specific, an

edge of a floor of the lifting deck 35 described below) and an edge of a floor portion 11B of the entrance 11A of the aircraft 11 are not parallel to each other, they can be caused to be parallel to each other by using the inclined floor 34. For example, the height of the entrance 11A of the aircraft 11 changes variously depending on the size of the aircraft 11. To deal with the change in height, the tunnel portion 25 may be inclined such that front and rear portions thereof are different in height from each other. In this state, when the fixed passage 32 turns around the vertical shaft 26A, the adjustment passage 33 simultaneously swings to the left and the right. Therefore, the edge of the floor of the lifting deck 35 and the edge of the floor portion 11B of the entrance 11A of the aircraft 11 may not be parallel to each other. In this case, the seesaw movement of the inclined floor 34 functions effectively.

[0059] Next, one example of the lifting deck 35, the driven slope 36, and their peripheral structures will be explained.

[0060] Fig. 6 is a diagram taken along line VI-VI of Fig. 3 and shows one configuration example of the adjustment passage and its peripheral structure. Fig. 7 is a diagram taken along line VII-VII of Fig. 6 shows one configuration example of the adjustment passage and its peripheral structure.

[0061] As shown in Figs. 6 and 7, a lifting mechanism configured to lift up and down the lifting deck 35, a swinging mechanism configured to swing the driven slope 36, and a sliding mechanism configured to slide the lifting deck 35 in the walking direction 200 are incorporated in the vicinity of the opening 34A of the inclined floor 34 in the adjustment passage 33 of the boarding bridge 20 of the present embodiment.

Lifting Mechanism for Lifting Deck 35

Hereinafter, the lifting mechanism for the lifting deck 35 will be described in detail.

[0062] As shown in Fig. 6, the lifting mechanism for the lifting deck 35 includes a second electric-powered cylinder 70 (threaded cylinder); and a bracket plate 60 having a substantially C shape in plan view (to be precise, a shape similar to a semicircle and including two bent portions).

[0063] A tip end of a threaded shaft 70A of the second electric-powered cylinder 70 is coupled to one end portion of the bracket plate 60 via a first rotation support point 61. Moreover, a main body 70B of the second electric-powered cylinder 70 is coupled to a support bracket 71 via a fourth rotation support point 72, and the support bracket 71 is fixed to the inclined floor 34 by using suitable fixing means (a supporting member, a bolt, and the like, not shown). Moreover, a pair of frames 73A and 73B are coupled to a bent portion 60A of the bracket plate 60 via a second rotation support point 62 (also see Fig. 7), and the frames 73A and 73B are fixed to the inclined floor 34 by using suitable fixing means (a supporting member, a bolt, and the like, not shown). Further, a pair of first and second coupling members 64A and 64B are coupled to the other end portion of the bracket plate 60 via a third rotation support point 63, and the first coupling member 64A is coupled to the second coupling member 64B by using a pin 64C so as to be able to swing, the pin 64C passing through an elongated hole.

[0064] Moreover, as shown in Fig. 6 (also see Fig. 7), the lifting mechanism for the lifting deck 35 includes a support frame 65, a pair of first and second linear guides 68A and 68B, and a coupling frame 69 extending in a left-right direction. Each of the first and second linear guides 68A and 68B includes a table 66 and a rail 67 extending in the upper-lower direction. Herein, the support frame 65 has a substantially rectangular and annular shape and includes a pair of first and second frames 65A and 65B extending in the left-right direction and a pair of third and fourth frames 65C and 65D extending in the upper-lower direction. However, the support frame 65 is not limited to this. For

example, the support frame 65 may be formed in a parallel-cross shape.

[0065] The second coupling member 64B is connected to a portion of the second frame 65B of the support frame 65 by using suitable fixing means (for example, a bolt), the portion being located at a substantially center in the left-right direction. Moreover, the rail 67 of the first linear guide 68A and the rail 67 of the second linear guide 68B are respectively fixed to the third and fourth frames 65C and 65D of the support frame 65 by using suitable fixing means (for example, a bolt). Further, the table 66 of the first linear guide 68A and the table 66 of the second linear guide 68B are respectively fixed to right and left suitable portions of the coupling frame 69 by using suitable fixing means (a supporting member, a bolt, and the like). Then, the coupling frame 69 is fixed to the inclined floor 34 by using suitable fixing means (a supporting member, a bolt, and the like, not shown).

[0066] The lifting deck 35 is supported by the first frame 65A of the support frame 65 via the sliding mechanism (details will be described later). Details of a supporting structure for the lifting deck 35 will be described later.

[0067] With this configuration, when the stroke of the threaded shaft 70A of the second electric-powered cylinder 70 lengthens, the first rotation support point 61 located at one end portion of the bracket plate 60 having a substantially C shape is pushed by the driving force of the second electric-powered cylinder 70 in a front and obliquely downward direction (see a dotted arrow 500 in Fig. 6). Then, the entire bracket plate 60 rotates about the second rotation support point 62 located at the bent portion of the bracket plate 60 (see a dotted arrow 501 in Fig. 6). Thus, the third rotation support point 63 located at the other end portion of the bracket plate 60 moves upward (see a dotted arrow 502 in Fig. 6).

[0068] By the rotation of the entire bracket plate 60, the third rotation support point 63

slightly moves forward. This forward movement of the third rotation support point 63 is performed by the swinging of the first coupling member 64A about the pin 64C (see Fig. 8).

[0069] With this, when the third rotation support point 63 of the bracket plate 60 moves upward, the entire support frame 65 slides upward via the first and second linear guides 68A and 68B. Therefore, the lifting deck 35 can be lifted up (see a chain double-dashed arrow 503 in Fig. 6).

[0070] The support frame 65 and the lifting deck 35 can be lifted down by shortening the stroke of the threaded shaft 70A of the second electric-powered cylinder 70 after the lifting deck 35 is lifted up. Movements of the respective portions of the lifting mechanism in this case can be readily understood in reference to the above explanation. Therefore, herein, the explanation of the movement of the lifting mechanism when lifting down the lifting deck 35 is omitted.

[0071] Thus, the boarding bridge 20 of the present embodiment is configured such that the lifting deck 35 is appropriately lifted up and down by using the lifting mechanism for the lifting deck 35.

Swinging Mechanism of Driven Slope 36

Next, the swinging mechanism of the driven slope 36 will be described in detail.

[0072] As shown in Figs. 3 and 6, a front end portion (fixed end portion) of the driven slope 36 having a plate shape is coupled to a rear end portion of the lifting deck 35 via a third coupling hinge portion 50 (coupling swing shaft) so as to be able to swing. Here, the third coupling hinge portion 50 linearly extends in a direction intersecting with (herein, substantially perpendicular to) the walking direction 200 up to both left and right ends of the lifting deck 35 (driven slope 36).

[0073] Moreover, as shown in a partial view 6A of Fig. 6, a rear end portion (free end

portion) of the driven slope 36 is disposed on the inclined floor 34 in a free state by the action of gravity (own weight) of the driven slope 36. Therefore, the driven slope 36 can swing about the third coupling hinge portion 50 relatively with respect to the lifting deck 35.

[0074] With this, when the lifting deck 35 is lifted up (see the chain double-dashed arrow 503 in Fig. 6), the third coupling hinge portion 50 is also lifted up. Thus, an inclination angle ϕ of the driven slope 36 continuously becomes large, the inclination angle ϕ corresponding to an angle between a main surface of the lifting deck 35 and a main surface of the driven slope 36. Simultaneously, as shown in the partial view 6A of Fig. 6, the rear end portion of the driven slope 36 moves forward while sliding on the inclined floor 34 (see a chain double-dashed arrow 504 in the partial view 6A).

[0075] In contrast, when the lifting deck 35 is lifted down after the lifting deck 35 is lifted up, the third coupling hinge portion 50 is also lifted down. Thus, the inclination angle ϕ of the driven slope 36 continuously becomes small. Simultaneously, the rear end portion of the driven slope 36 moves backward while sliding on the inclined floor 34.

[0076] Thus, the boarding bridge 20 of the present embodiment is configured such that: the inclination angle ϕ of the driven slope 36 changes by lifting up and down the lifting deck 35 (in other words, the driven slope 36 swings relatively with respect to the lifting deck 35); and the rear end portion of the driven slope 36 moves (swings) linearly in the front-rear direction. With this, the driven slope 36 forms a slope way between the lifting deck 35 and the inclined floor 34 (walking passage 31).

Sliding Mechanism for Lifting Deck 35

Next, the sliding mechanism for the lifting deck 35 will be described in detail.

[0077] As shown in Figs. 6 and 7, the sliding mechanism for the lifting deck 35

includes a third linear guide 83 and a pair of first and second biasing mechanisms 86A and 86B. The third linear guide 83 includes a table 80 and a rail 81 extending in the front-rear direction, and the first and second biasing mechanisms 86A and 86B are supported by the table 80 of the third linear guide 83.

[0078] A cutout portion 80A (see Fig. 7) is formed at a central rear end portion of the table 80 to prevent the contact and interference with the bracket plate 60.

[0079] The rail 81 of the third linear guide 83 is fixed to the first frame 65A of the support frame 65 by using suitable fixing means (a supporting member, a bolt, and the like, not shown).

[0080] Each of the first and second biasing mechanisms 86A and 86B includes: a columnar spring shaft 85 extending in the front-rear direction; a spring 84 (elastic body) fitted around the spring shaft 85; and a pair of stopper members 87 and 88 respectively contacting ends of the spring 84.

[0081] Both end portions of the spring shaft 85 are externally threaded, and suitable fixing means (a nut and the like) are threadedly engaged with both end portions. Thus, the movements of the stopper members 87 and 88 in the front-rear direction are restricted.

[0082] The stopper member 88 located on a rear end side of the spring 84 is fixed to the table 80 of the third linear guide 83 by using suitable fixing means (a bolt and the like). The stopper member 87 located at a front end portion of the spring 84 is fixed to a rear surface of the lifting deck 35 by using suitable fixing means (a supporting member, a bolt, and the like).

[0083] To be specific, the lifting deck 35 is disposed on the table 80 via the first and second biasing mechanisms 86A and 86B. With this, the lifting deck 35 (and the driven slope 36 coupled to the lifting deck 35) can side in the front-rear direction by the sliding

of the table 80 in the front-rear direction. The biasing actions of the first and second biasing mechanisms 86A and 86B will be described later.

[0084] The sliding mechanism for the lifting deck 35 includes a drive mechanism capable of applying the slide driving force to the table 80 in the front-rear direction.

[0085] Specifically, as shown in Fig. 7, the drive mechanism includes a motor 89A and a rack-pinion mechanism. The rack-pinion mechanism includes a pinion gear (not shown) coupled to a rotating shaft of the motor 89A and a rack 89B fixed to the table 80.

[0086] By using the rack-pinion mechanism, the rotational force of the motor 89A is converted into the straight movement force of the table 80 in the front-rear direction. As a result, the slide driving force in the front-rear direction is applied to the table 80.

[0087] As shown in Fig. 7, the sliding mechanism for the lifting deck 35 includes a pair of fourth and fifth linear guides 92A and 92B. Each of the fourth and fifth linear guides 92A and 92B includes a table 90 and a rail 91 extending in the front-rear direction.

[0088] The fourth linear guide 92A is provided in the vicinity of the third frame 65C of the support frame 65, and the rail 91 of the fourth linear guide 92A is fixed to the third frame 65C by using suitable fixing means (a frame and the like). Moreover, the fifth linear guide 92B is provided in the vicinity of the fourth frame 65D of the support frame 65, and the rail 91 of the fifth linear guide 92B is fixed to the fourth frame 65D by using suitable fixing means (a frame and the like). Further, the lifting deck 35 is supported by the tables 90 of the fourth and fifth linear guides 92A and 92B.

[0089] With this configuration, the slide movement of the lifting deck 35 in the front-rear direction is stably performed while the lifting deck 35 is being supported appropriately.

[0090] Thus, the boarding bridge 20 of the present embodiment is configured such that the lifting deck 35 can slide in the front-rear direction by using the sliding mechanism for

the lifting deck 35, and the lifting deck 35 can be supported by the support frame 65 via the sliding mechanism.

Example of Connecting Boarding Bridge 20 to Entrance 11A of Aircraft 11

Next, one example of connecting the boarding bridge 20 of the present embodiment to the entrance 11A of the aircraft 11 will be explained.

[0091] Each of Figs. 8 and 9 is a diagram used to explain an example of connecting the boarding bridge of Embodiment of the present invention to the entrance of the aircraft. Fig. 8 shows a state where the lifting deck 35 is in the middle of being connected to the entrance 11A of the aircraft 11, and Fig. 9 shows a state where the connection of the lifting deck 35 to the entrance 11A of the aircraft 11 is completed.

[0092] The operation of connecting the boarding bridge 20 of the present embodiment to the entrance 11A of the aircraft 11 will be performed in the following manner.

[0093] First, the cab 26 (fixed passage 32) is turned around the vertical shaft 26A. With this, the adjustment passage 33 swings to the left and the right at the same time.

[0094] Next, the boarding bridge 20 is moved closer to the aircraft 11 by moving the drive columns such that the damper 40 of the boarding bridge 20 contacts the aircraft 11. At this time, in a case where the edge of the floor of the lifting deck 35 and the edge of the floor portion 11B of the entrance 11A of the aircraft 11 are not parallel to each other, they can be caused to be parallel to each other by using the inclined floor 34.

[0095] Then, at this stage, the position of the lifting deck 35 of the boarding bridge 20 is lower than the position of the floor portion of the entrance 11A, so that it is possible to open the door of the entrance 11A of the aircraft 11.

[0096] As shown in Figs. 8 and 9, after the door of the entrance 11A of the aircraft 11 opens, the lifting deck 35 is moved (rises; is lifted up) to the same height as the floor portion 11B of the entrance 11A of the aircraft 11 by the lifting mechanism for the lifting

deck 35, and a damper 51 made of synthetic rubber is caused to contact the floor portion 11B of the entrance 11A of the aircraft 11 by the sliding mechanism for the lifting deck 35.

[0097] As shown in Fig. 3, the lifting deck 35 includes the damper 51. The damper 51 is attached to an entire front end portion of the lifting deck 35 in the width direction 300. Thus, the damper 51 can cushion the shock when the lifting deck 35 contacts the entrance 11A of the aircraft 11. At this time, as the third coupling hinge portion 50 is lifted up in accordance with the movement of the lifting deck 35, the inclination angle ϕ of the driven slope 36 automatically changes and the rear end portion of the driven slope 36 slides on the inclined floor 34 to move forward by the action of gravity (own weight) of the driven slope 36 (see Fig. 6).

[0098] As above, the boarding bridge 20 of the present embodiment includes: the walking passage 31; the lifting deck 35 provided in the plane of the walking passage 31 in plan view and used for the connection with the entrance 11A of the aircraft 11; the lifting mechanism configured to lift up and down the lifting deck 35; and the driven slope 36 including the fixed end portion coupled to the lifting deck 35 by using the third coupling hinge 50 and the free end portion supported on the walking passage 31. The driven slope 36 is rotated around a shaft of the third coupling hinge 50 by the movement of the lifting deck 35 to form a continuous slope way between the lifting deck 35 and the walking passage 31 (inclined floor 34).

[0099] With this configuration, the difference in level between the floor portion 11B of the entrance 11A and the lifting deck 35 of the boarding bridge is eliminated, so that a continuous passage can be formed therebetween.

[0100] Therefore, in accordance with the boarding bridge 20 of the present embodiment, the difference in level between the entrance 11A of the aircraft 11 and the boarding

bridge 20 can be eliminated. In addition, for example, since it is unnecessary to lift up and down the lifting deck 35 each time the passenger on the wheelchair gets on and off the aircraft 11, the passengers can smoothly get on and off the aircraft 11 from and to the terminal 10.

[0101] Especially, in accordance with the boarding bridge 20 of the present embodiment, the height of the lifting deck 35 can be adjusted by the simple lifting movement of the lifting deck 35. Therefore, the floor of the lifting deck 35 is not inclined and can be maintained substantially horizontally. On this account, it is advantageous in that the positioning between the lifting deck 35 and the floor portion 11B of the entrance 11A is easy.

[0102] Moreover, in the boarding bridge 20 of the present embodiment, the lifting deck 35 includes the sliding mechanism configured to slide in the people's walking direction. The lifting deck 35 moves to the same height as the floor portion 11B of the entrance 11A by the lifting mechanism and contacts the entrance 11A by the sliding mechanism.

[0103] With this configuration, even in a case where there is a small gap between the lifting deck 35 and the entrance 11A of the aircraft 11, the lifting deck 35 can slide by the sliding mechanism to contact the entrance 11A. Therefore, such gap can be eliminated in addition to the difference in level therebetween.

[0104] In the boarding bridge 20 of the present embodiment, the walking passage 31 includes: the inclined floor 34 configured to adjust the width-direction inclination of the lifting deck 35 and the driven slope 36; and the inclining mechanism capable of inclining the inclined floor 34 in the width direction 300. When the inclined floor 34 is viewed in plan view, the lifting deck 35 and the driven slope 36 are attached in the plane of the inclined floor 34.

[0105] As above, in a case where the edge of the floor of the lifting deck 35 and the

edge of the floor portion 11B of the entrance 11A of the aircraft 11 are not parallel to each other, they can be caused to be parallel to each other by using the inclined floor 34. Especially, in accordance with the boarding bridge 20 of the present embodiment, the lifting deck 35 and the entrance 11A can be adjusted by the inclined floor 34 to be parallel to each other even in the middle of the movement of the drive columns of the boarding bridge 20. Therefore, the operation of connecting the lifting deck 35 to the entrance 11 can be efficiently performed.

[0106] In accordance with the boarding bridge 20 of the present embodiment, from a position where the damper 51 of the lifting deck 35 contacts the entrance 11A, the table 80 is caused to further slide by using the first and second biasing mechanisms 86A and 86B of the sliding mechanism such that the lifting deck 35 is pressed against the entrance 11A. Thus, the biasing force of the lifting deck 35 (damper 51) to the aircraft 11 is generated. To be specific, when the table 80 is caused to slide from the above contact position such that the lifting deck 35 is pressed against the entrance 11A, as shown in Figs. 8 and 9, the stopper member 88 moves forward along the spring shaft 85 against the reaction force of the spring 84. Then, the spring 84 is compressed by the stopper members 87 and 88, and the biasing force of the lifting deck 35 (damper 51) to the aircraft 11 is generated based on the reaction force of the spring 84, the reaction force being generated by the above compression of the spring 84.

[0107] With the above configuration, in accordance with the boarding bridge 20 of the present embodiment, even in a case where the gap between the lifting deck 35 (damper 51) and the entrance 11A (outer wall) of the aircraft 11 changes by ups and downs of the aircraft 11 due to the getting on and off of the passengers, the lifting deck 35 (the damper 51) can be caused to follow the ups and downs of the aircraft 11 in the front-rear direction by the actions of the first and second biasing mechanisms 86A and 86B of the

sliding mechanism. Therefore, the generation of the gap can be appropriately prevented.

[0108] From the foregoing explanation, many modifications and other embodiments of the present invention are obvious to one skilled in the art. Therefore, the foregoing explanation should be interpreted only as an example and is provided for the purpose of teaching a preferred mode for carrying out the present invention to one skilled in the art. The structures and/or functional details may be substantially modified within the spirit of the present invention.

[0109] Hereinafter, Modification Examples 1, 2, and 3 of Embodiment of the present invention will be exemplified.

Modification Example 1

In the boarding bridge 20 of the present embodiment, as shown in Fig. 3, the second coupling hinge 38 linearly extends up to the right end of the cab 26 in a direction (width direction 300) substantially perpendicular to the walking direction 200. However, the direction in which the second coupling hinge 38 extends does not have to be perpendicular to the walking direction 200.

[0110] For example, as shown by a cab 126 in Fig. 10, even if a right end portion of a second coupling hinge 138 is moved forward (even if the direction in which the second coupling hinge 138 extends is not perpendicular to the walking direction 200), the inclined floor 34 can be appropriately inclined in the width direction 300.

[0111] However, in a case where the direction in which the second coupling hinge 38 extends is perpendicular to the walking direction 200 as in the boarding bridge 20 (Fig. 3) of the present embodiment, the rear end portion of the driven slope 36 can be adequately moved backward. This is advantageous in that the inclination of the driven slope 36 can be made small when connecting the lifting deck 35 and the entrance 11A of

the aircraft 11.

Modification Example 2

The boarding bridge 20 of the present embodiment includes the inclined floor 34 configured to adjust the inclination of the lifting deck 35 and the driven slope 36 in the width direction 300. However, means for adjusting the inclination of the lifting deck 35 and the entrance 11A such that these become parallel to each other is not limited to this, and the other means may be used.

[0112] For example, as shown in Fig. 11, the lifting deck 135 may be configured such that a damper 151 and a floor panel 101 are connected to each other via a rotating shaft 100. A rear end portion of the floor panel 101 is connected to a driven slope 136 by using a third coupling hinge 150. Moreover, as shown in Fig. 11, the rotating shaft 100 of the damper 151 is connected to a side end portion of the floor panel 101.

[0113] Further, in the lifting deck 135, a rubber plate 400 (elastic plate) is disposed on the damper 151 and the floor panel 101 so as to spread over the damper 151 and the floor panel 101 and cover the floor panel 101 substantially entirely. A fastening region 401A is provided at a front end portion of the rubber plate 400 in the width direction 300 and is fixed to the damper 151 by using a suitable fastening member or adhesive. In addition, a fastening region 401B is provided at a rear end portion of the rubber plate 400 in the width direction 300 and is fixed to the floor panel 101 by using a suitable fastening member or adhesive.

[0114] With this configuration, when the damper 151 rotates upward about the rotating shaft 100 based on the driving force of a driving device (not shown), such as a motor, the rubber plate 400 can be moderately inclined from its rear end portion to its front end portion in the width direction 300 by the elastic action of the rubber plate 400. Thus, the displacement between the lifting deck 35 and the entrance 11A which are not parallel

to each other can be absorbed in a simplified manner.

Modification Example 3

The boarding bridge 20 of the present embodiment is configured such that both the lifting deck 35 and the driven slope 36 slide in the walking direction 200. However, the present embodiment is not limited to this, and the other method may be used.

[0115] For example, as shown in Fig. 12, a lifting deck 235 may include: a floor panel 201 connected to a driven slope 236 by using a third coupling hinge 250; a slide floor 110 supported by the floor panel 201 and configured to slide in the walking direction 200; and a damper 111 located at a front end portion of the slide floor 110.

[0116] With this, only the slide floor 110 (damper 111) can slide in the walking direction 200 by a sliding device (not shown), such as a linear guide, so as to contact the entrance 11A. Therefore, since the driven slope 236 does not have to greatly slide in accordance with the sliding operation of the slide floor 110, the structure of supporting the free end portion of the driven slope 236 by the inclined floor 34 and the sliding structure can be simplified.

[0117] Moreover, instead of the slide floor 110, a rotatable rotating plate may be provided on the floor panel 201. Specifically, a rotating plate is provided at a front upper portion of the floor panel 201 such that one end thereof is coupled to the front upper portion by using a coupling swing shaft, such as a hinge, extending in the width direction 300. When the lifting deck 235 is not connected to the entrance 11A, the rotating plate is folded and disposed on the floor panel 201. When the lifting deck 235 is connected to the entrance 11A, the rotating plate is unfolded such that the other end thereof reaches the floor portion 11B of the entrance 11A.

[0118] With this, even if the slide floor and the sliding mechanism are not provided, the gap between the lifting deck 235 and the entrance 11A can be easily eliminated.

Industrial Applicability

[0119] In accordance with the boarding bridge of the present invention, the difference in level between the boarding bridge and the entrance of the movable body can be eliminated, and the passengers can smoothly get on and off the movable body from and to the terminal. Therefore, the present invention can be utilized as, for example, an air traveler boarding bridge.

Reference Signs List

- [0120] 1 boarding bridge system
- 10 terminal building
 - 11 aircraft (movable body)
 - 20 boarding bridge
 - 23 auxiliary stairs
 - 24 rotunda
 - 24A shaft of rotunda
 - 25 tunnel portion
 - 25A first tunnel
 - 25B second tunnel
 - 25C third tunnel
 - 26 cab
 - 26A vertical shaft of cab
 - 30 control panel
 - 31 walking passage
 - 32 fixed passage

- 32A frame of fixed passage
- 33 adjustment passage
- 34 inclined floor
- 35, 135, 235 lifting deck
- 36, 136, 236 driven slope
- 37 first coupling hinge
- 38, 138 second coupling hinge
- 39 coupling floor
- 40, 51, 111, 151 damper
- 40A housing of damper
- 41 cam follower
- 41A roller holder
- 42 rod end
- 42A ball
- 42B rod
- 43 first electric-powered cylinder
- 50, 150, 250 third coupling hinge
- 60 bracket plate
- 60A bent portion of bracket plate
- 61 first rotation support point
- 62 second rotation support point
- 63 third rotation support point
- 64A first coupling member
- 64B second coupling member
- 64C pin

- 65 support frame
- 65A first frame
- 65B second frame
- 65C third frame
- 65D fourth frame
- 66 table
- 67 rail
- 68A first linear guide
- 68B second linear guide
- 69 coupling frame
- 70 second electric-powered cylinder
- 70A threaded shaft of second electric-powered cylinder
- 70B main body of second electric-powered cylinder
- 71 support bracket
- 72 fourth rotation support point
- 73A, 73B frame
- 80 table
- 80A cutout portion
- 81 rail
- 83 third linear guide
- 84 spring
- 85 spring shaft
- 86A first biasing mechanism
- 86B second biasing mechanism
- 87, 88 stopper member

89A motor
89B rack
92A fourth linear guide
92B fifth linear guide
101, 201 floor panel
110 slide floor

CLAIMS

- [1] A boarding bridge comprising:
- a walking passage;
 - a lifting deck provided in a plane of the walking passage in plan view and used for connection with an entrance of a movable body;
 - a lifting mechanism configured to lift up and down the lifting deck; and
 - a driven slope including a fixed end portion and a free end portion, the fixed end portion being coupled to the lifting deck by using a coupling swing shaft, the free end portion being supported on or above the walking passage, wherein
- the driven slope forms a slope way between the lifting deck and the walking passage by rotation of the driven slope around the coupling swing shaft, the driven slope being rotated when the lifting deck is lifted up and down while maintaining a substantially horizontal state.
- [2] The boarding bridge according to claim 1, wherein:
- the lifting deck includes a sliding mechanism configured to slide in a people's walking direction; and
 - the lifting deck is configured to move to the same height as a floor portion of the entrance by the lifting mechanism and contact the entrance by the sliding mechanism.
- [3] The boarding bridge according to claim 2, wherein the sliding mechanism is configured to be able to bias the lifting deck against the entrance at a position where the lifting deck contacts the entrance.

[4] A boarding bridge comprising:

a walking passage;

a lifting deck provided in a plane of the walking passage in plan view and used for connection with an entrance of a movable body;

a lifting mechanism configured to lift up and down the lifting deck; and

a driven slope including a fixed end portion and a free end portion, the fixed end portion being coupled to the lifting deck by using a coupling swing shaft, the free end portion being supported on or above the walking passage, wherein

the walking passage includes: an inclined floor configured to adjust inclination of the lifting deck and the driven slope in a width direction; and an inclining mechanism configured to be able to incline the inclined floor in the width direction,

the driven slope forms a slope way between the lifting deck and the walking passage by rotation of the driven slope around the coupling swing shaft, the driven slope being rotated in accordance with movements of the lifting deck, and

when the inclined floor is viewed in plan view, the lifting deck and the driven slope are attached in a plane of the inclined floor.

[5] A boarding bridge comprising:

a walking passage;

a lifting deck provided in a plane of the walking passage in plan view and used for connection with an entrance of a movable body;

a lifting mechanism configured to lift up and down the lifting deck; and

a driven slope including a fixed end portion and a free end portion, the fixed end portion being coupled to the lifting deck by using a coupling swing shaft, the free end

portion being supported on or above the walking passage, wherein:

the lifting deck includes a floor panel connected to the driven slope by using the coupling swing shaft, a damper connected to the floor panel via a rotating shaft, and an elastic plate provided to spread over the floor panel and the damper;

the driven slope forms a slope way between the lifting deck and the walking passage by rotation of the driven slope around the coupling swing shaft, the driven slope being rotated in accordance with movements of the lifting deck;

one end portion of the elastic plate is fixed to the damper, and the other end portion of the elastic plate is fixed to the floor panel; and

the elastic plate is inclined in a width direction of the lifting deck by rotation of the damper about the rotating shaft.

[6] The boarding bridge according to claim 1 or 4, wherein:

the lifting deck includes a floor panel connected to the driven slope by using the coupling swing shaft and a slide floor supported by the floor panel and configured to slide in a people's walking direction; and

the slide floor contacts the entrance.

ABSTRACT

A boarding bridge (20) includes: a walking passage (31); a lifting deck (35) provided in a plane of the walking passage (31) in plan view and used for connection with an entrance (11A) of a movable body (11); a lifting mechanism configured to lift up and down the lifting deck (35); and a driven slope (36) including a fixed end portion and a free end portion, the fixed end portion being coupled to the lifting deck (35) by using a coupling swing shaft (50), the free end portion being supported on or above the walking passage (31), and the driven slope (36) is rotated around the coupling swing shaft (50) by the movement of the lifting deck (35) to form a slope way between the lifting deck (35) and the walking passage (31).