Claims

1. A passenger boarding bridge comprising:

a rotunda connected to a terminal building ~~and supported such that the rotunda is rotatable horizontally~~;

a tunnel unit whose proximal end is connected to the rotunda, the tunnel unit being extendable and retractable, the tunnel unit being rotatable about the rotunda;

a cab provided at a distal end of the tunnel unit, the cab being configured to be docked with an aircraft;

a travel device that supports the tunnel unit and includes travel wheels configured to travel forward and backward, the travel device being configured such that a direction of forward travel of the travel wheels and a direction of backward travel of the travel wheels are changeable;

an operating device that is operated to input an operation command to the travel device; and

a determiner configured to repeatedly perform determination whether or not the current direction of the forward travel of the travel wheels is a direction within a forward-only travel docking enabling range during a period from when the cab starts being moved from a predetermined position until the cab is docked with the aircraft, the cab being moved through an operation of the operating device to cause the travel wheels to travel.

2. The passenger boarding bridge according to claim 1, wherein

in a case where,

in a plan view, an angle formed by a direction from a left side to a right side of the tunnel unit along a tunnel orthogonal line and the direction of the forward travel of the travel wheels, the tunnel orthogonal line being a straight line orthogonal to a center line of the tunnel unit, the angle being calculated with respect to the tunnel orthogonal line while defining a counterclockwise direction as a positive direction, is an angle θw, and

in the plan view, an angle formed by the direction from the left side to the right side of the tunnel unit along the tunnel orthogonal line and a direction from a front to a back of the aircraft along a fuselage guide line on an apron, the angle being calculated with respect to the tunnel orthogonal line while defining the counterclockwise direction as the positive direction, is an angle θt,

the determiner is configured to perform the determination whether or not the direction of the forward travel of the travel wheels is a direction within the forward-only travel docking enabling range based on whether or not the angle θw is an angle within a range that is

set, based on restricting condition information, within a range that is greater than the angle θt and less than an angle obtained by adding 180 degrees to the angle θt.

3. The passenger boarding bridge according to claim 1, wherein

in a case where,

in a plan view, an angle formed by a direction from a left side to a right side of the tunnel unit along a tunnel orthogonal line and the direction of the forward travel of the travel wheels, the tunnel orthogonal line being a straight line orthogonal to a center line of the tunnel unit, the angle being calculated with respect to the tunnel orthogonal line while defining a counterclockwise direction as a positive direction, is an angle θw, and

in the plan view, an angle formed by the direction from the left side to the right side of the tunnel unit along the tunnel orthogonal line and a direction from a front to a back of the aircraft along an aircraft axis line of the aircraft, the angle being calculated with respect to the tunnel orthogonal line while defining the counterclockwise direction as the positive direction, is an angle θt1,

the determiner is configured to perform the determination whether or not the direction of the forward travel of the travel wheels is a direction within the forward-only travel docking enabling range based on whether or not the angle θw is an angle within a range that is set, based on restricting condition information, within a range that is greater than the angle θt1 and less than an angle obtained by adding 180 degrees to the angle θt1.

4. The passenger boarding bridge according to claim 1, wherein

in a case where,

in a plan view, an angle formed by a direction from a left side to a right side of the tunnel unit along a tunnel orthogonal line and the direction of the forward travel of the travel wheels, the tunnel orthogonal line being a straight line orthogonal to a center line of the tunnel unit, the angle being calculated with respect to the tunnel orthogonal line while defining a counterclockwise direction as a positive direction, is an angle θw, and

in the plan view, an angle formed by the direction from the left side to the right side of the tunnel unit along the tunnel orthogonal line and a direction from a front to a back of the aircraft along a tangent line, the tangent line extending horizontally and touching a cab-docked part of the aircraft, the angle being calculated with respect to the tunnel orthogonal line while defining the counterclockwise direction as the positive direction, is an angle θt2,

the determiner is configured to perform the determination whether or not the

direction of the forward travel of the travel wheels is a direction within the forward-only travel docking enabling range based on whether or not the angle θw is an angle within a range that is set, based on restricting condition information, within a range that is greater than the angle θt2 and less than an angle obtained by adding 180 degrees to the angle θt2.

5. The passenger boarding bridge according to claim 1, wherein

a direction within the forward-only travel docking enabling range is defined as a direction in which when the travel wheels travel forward, in a plan view, the travel wheels come closer to one of a fuselage guide line on an apron, an aircraft axis line of the aircraft, or a tangent line extending horizontally and touching a cab-docked part of the aircraft.

6. The passenger boarding bridge according to any one of claims 1 to 5, wherein

the determiner is configured to perform the determination when a distance between the cab and the aircraft is a predetermined distance or less.

7. The passenger boarding bridge according to any one of claims 1 to 6, further comprising a warning unit configured to perform warning if an operation command to cause the travel device to travel backward is inputted from the operating device in a case where a result of the determination performed by the determiner indicates that the current direction of the forward travel of the travel wheels is not a direction within the forward-only travel docking enabling range.

8. The passenger boarding bridge according to any one of claims 1 to 7, wherein

the passenger boarding bridge is configured to prohibit backward travel of the travel wheels if an operation command to cause the travel device to travel backward is inputted from the operating device in a case where a result of the determination performed by the determiner indicates that the current direction of the forward travel of the travel wheels is not a direction within the forward-only travel docking enabling range.

9. The passenger boarding bridge according to any one of claims 1 to 6, further comprising a controller configured to, in a case where a result of the determination performed by the determiner indicates that the current direction of the forward travel of the travel wheels is not a direction within the forward-only travel docking enabling range, control the travel device such that the direction of the forward travel of the travel wheels becomes a direction within the

forward-only travel docking enabling range.

10. The passenger boarding bridge according to any one of claims 1 to 6, further comprising a controller configured to, if an operation command to cause the travel device to travel backward is inputted from the operating device in a case where a result of the determination performed by the determiner indicates that the current direction of the forward travel of the travel wheels is not a direction within the forward-only travel docking enabling range, control the travel device such that the direction of the forward travel of the travel wheels becomes a direction within the forward-only travel docking enabling range.