Claims:

1. A method of controlling traveling of a passenger boarding bridge, the passenger boarding bridge including:

a rotunda connected to a terminal building and rotatable in regular and reverse directions about a vertical axis;

a tunnel unit whose proximal end is connected to the rotunda in such a manner that the tunnel unit is liftable and lowerable, the tunnel unit being configured to be extendable and retractable in a longitudinal direction;

a cab rotatably provided at a distal end of the tunnel unit;

a lifting/lowering mechanism mounted to the tunnel unit or the cab and configured to lift and lower the tunnel unit or the cab;

a travel unit mounted below the lifting/lowering mechanism, the travel unit being configured to travel on a ground and rotate in regular and reverse directions about an axis that passes through a center point of the travel unit, such that a travel direction of the travel unit is changeable;

a rotunda angle sensor that detects a rotational angle of the rotunda;

a travel unit angle sensor that detects a rotational angle of the travel unit;

a horizontal distance measurer that measures a horizontal distance from the vertical axis to the center point of the travel unit; and

an inclination angle measurer that measures an inclination angle of the tunnel unit relative to a horizontal plane,

the method comprising, at a time of docking the cab with an entrance of an aircraft:

a step of calculating relative positional information indicating a position of the entrance as seen from the cab when the travel unit is at a movement start position;

a step of calculating positional information of a destination position, the destination position being a position to which the travel unit is moved for docking the cab with the entrance, based on positional information of the travel unit at the movement start position and the relative positional information of the entrance in a case where a distance from the movement start position to the destination position is in a predetermined state in which the distance is less than the horizontal distance from the vertical axis to the center point of the travel unit at the movement start position;

a step of moving the travel unit to a point that is closer to the destination position such that the distance from the movement start position to the destination position becomes the

predetermined state in a case where the distance is not in the predetermined state and calculating positional information of the destination position with the point set as a new movement start position;

a step of calculating a target travel angle that is an angle formed by a direction extending linearly from the movement start position toward the destination position and a particular direction; and

a traveling step of:

causing the travel unit to travel from the movement start position toward the destination position;

calculating, at predetermined time intervals during traveling of the travel unit, a travel angle that is an angle formed by a current travel direction of the travel unit and the particular direction; and

controlling the travel unit by taking only the travel angle into account, such that the travel angle is kept to the target travel angle, wherein

the step of calculating the positional information of the destination position includes calculating positional information of the movement start position based on the horizontal distance from the vertical axis to the center point of the travel unit, the horizontal distance being measured by the horizontal distance measurer, the rotational angle of the rotunda detected by the rotunda angle sensor, and the inclination angle measured by the inclination angle measurer, and

the traveling step includes calculating the travel angle based on the rotational angle of the travel unit detected by the travel unit angle sensor and the rotational angle of the rotunda detected by the rotunda angle sensor.

2. The method of controlling traveling of a passenger boarding bridge according to claim 1, wherein

the destination position is a position of the travel unit when the cab is docked with the entrance.

3. The method of controlling traveling of a passenger boarding bridge according to claim 1 or 2, wherein

the step of calculating the relative positional information includes:

detecting the entrance based on an image of the entrance, the image being captured by a camera mounted to the cab; and

calculating the relative positional information of the detected entrance.

4. The method of controlling traveling of a passenger boarding bridge according to any one of claims 1 to 3, wherein

the travel unit includes two drive wheels that are arranged parallel to each other, with the center point of the travel unit positioned therebetween, the two drive wheels being drivable to rotate independently of each other, and

the traveling step includes controlling the travel unit by adjusting a rotation speed of each of the two drive wheels.

5. The method of controlling traveling of a passenger boarding bridge according to any one of claims 1 to 4, wherein

in the step of calculating the positional information of the destination position, the predetermined state is a state in which the distance from the movement start position to the destination position is less than or equal to a predetermined distance that is less than the horizontal distance from the vertical axis to the center point of the travel unit in a case where the tunnel unit is fully retracted.

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

the distance from the movement start position to the destination position is not greater than one-fifth of the horizontal distance from the vertical axis to the center point of the travel unit at the movement start position.