

CLAIMS

1. A gripper device that holds an article having a pair of held portions that are provided on a top surface of the article and that are spaced apart in a direction along the top surface, the gripper device comprising:

a pair of engaging portions that are attached to an elevating section capable of lifting and lowering above the article and that respectively engage with the pair of held portions; and

a drive section that moves the pair of engaging portions along the direction, from a standby position where a distance between the pair of engaging portions is shorter than an interval between the pair of held portions to an engaging position where the pair of engaging portions is capable of engaging with the pair of held portions, such that the pair of engaging portions separate from one another, wherein

the gripper device includes a pair of drop preventing sections that are fixed to the elevating section and disposed to be spaced apart in the direction with a longer interval than the interval,

a first gap is formed correspondingly between each of the pair of drop preventing sections and each of the pair of engaging portions located at the standby position, the first gap allowing each of the pair of held portions to vertically pass therethrough, and

a second gap is formed correspondingly between each of the pair of drop preventing sections and each of the pair of engaging portions located at the engaging position, the second gap not allowing each of the pair of held portions to vertically pass therethrough.

2. The gripper device according to claim 1, wherein

the article is provided with at least a pair of columns erected on the top surface of the article and the pair of held portions fixed to the columns, and

each of the pair of engaging portions has a notch that accepts the column when the pair of engaging portions are located in the engaging position.

3. A gripper device that holds an article having a pair of held portions that are provided on a top surface of the article and that are spaced apart in a direction along the top surface, the gripper device comprising:

a pair of engaging portions that are attached to an elevating section capable of lifting and lowering above the article and that respectively engage with the pair of held portions; and

a drive section that moves the pair of engaging portions along the direction, from a standby position where a distance between the pair of engaging portions is shorter than an interval between the pair of held portions to an engaging position where the pair of engaging portions is capable of engaging with the pair of held portions, such that the pair of engaging portions separate from one another, wherein

the article is provided with at least a pair of columns erected on the top surface of the article and the pair of held portions fixed to the columns, and

each of the pair of engaging portions has a notch that accepts the column when the pair of engaging portions are located in the engaging position.

4. The gripper device according to any one of claims 1 to 3, wherein

the drive section has a single link mechanism configured to move the pair of engaging portions.

5. A conveyance vehicle that includes the gripper device according to any one of claims 1 to 4 and travels along a track provided on a ceiling.

5 6. A conveyance method for holding and carrying, with a gripper device, an article with a pair of held portions that are provided on a top surface of the article and spaced apart in a direction along the top surface, wherein

the gripper device includes a pair of engaging portions attached to an elevating section capable of lifting and lowering above the article and that respectively engage with the pair of held portions, and a pair of drop preventing sections that are fixed to the elevating section and disposed to be spaced apart in the direction with a longer interval than an interval between the pair of held portions,

15 the conveyance method comprising:

a lowering step for lowering the elevating section;

a moving step for moving the pair of engaging portions along the direction, from a standby position where a distance between the pair of engaging portions is shorter than the interval to an engaging position where the pair of engaging portions is capable of engaging with the pair of held portions; and

20 a holding step for holding the article by causing the elevating section to lift and causing the pair of engaging portions in the engaging position to engage with the pair of held portions, and wherein

25 in the lowering step, each of the pair of held portions vertically passes through a first gap formed correspondingly between each of the

pair of drop preventing sections and each of the pair of engaging portions located at the standby position, and

in the holding step, each of the pair of held portions is not allowed to vertically pass through a second gap formed correspondingly between each of the pair of drop preventing sections and each of the pair of engaging portions located at the engaging position.

7. A conveyance method for holding and carrying, with a gripper device, an article with a pair of held portions that are provided on a top surface of the article and spaced apart in a direction along the top surface, wherein

the gripper device includes a pair of engaging portions attached to an elevating section capable of lifting and lowering above the article and that respectively engage with the pair of held portions, each of the pair of engaging portions has a notch,

the article is provided with at least a pair of columns erected on the top surface of the article and the pair of held portions fixed to the columns,

the conveyance method comprising:

a lowering step for lowering the elevating section;

a moving step for moving the pair of engaging portions along the direction, from a standby position where a distance between the pair of engaging portions is shorter than an interval between the pair of held portions to an engaging position where the pair of engaging portions is capable of engaging with the pair of held portions; and

a holding step for holding the article by causing the elevating section to lift and causing the pair of engaging portions in the

engaging position to engage with the pair of held portions, and wherein
in the moving step, the notch accepts the column when the pair of
engaging portions are located in the engaging position.