CLAIMS

1. An end effector device comprising:

a hand having a storing space; and

a plurality of holding portions provided to the hand and configured to hold parts of each of a plurality of plate members so as to hold the plurality of plate members respectively, the parts being different from each other in a peripheral direction of a peripheral edge portion of each plate member respectively,

wherein each of the holding portions includes a plurality of receiving portions which respectively receive peripheral edge portions of the plurality of plate members so that the plurality of plate members are arranged substantially parallel with one plane and at an interval or intervals mutually in a first direction which is substantially perpendicular to the one plane, and a pitch changing mechanism configured to linearly move the plurality of receiving portions in the first direction respectively so as to change the interval or intervals,

wherein a plurality of linearly moving portions configured to respectively move linearly integrally with the plurality of receiving portions of the pitch changing mechanism are provided to the hand so as to be exposed outside of the hand, and

wherein a plurality of drive portions configured to drive the plurality of linearly moving portions of the pitch changing mechanism respectively are stored in the storing space of the hand.

2. The end effector device according to claim 1, wherein the hand includes a hollow body portion formed so as to extend in a second direction substantially parallel with the one plane, and a hollow movable portion connected to a proximal end portion of the body portion so as to be capable of advancing and retreating in the second direction, and

wherein the plurality of holding portions include first holding portions provided to a distal end portion of the body portion and second holding portions provided to the movable portion.

3. The end effector device according to claim 2, wherein the end effector device is configured so that the peripheral edge portions of the plurality of plate members are held by being gripped by the first holding portions and the second holding portions when the movable portion advances, and the peripheral edge portions of the plurality of plate members are released from the second holding portions when the movable portion retreats.

4. The end effector device according claim 3, wherein the first holding portions and the second holding portions respectively include a plurality of linearly moving bodies which have distal end portions in the first direction forming the receiving portions and remaining portions constituting the linearly moving portions,

wherein the drive portion corresponding the linearly moving portion includes a first slider configured to linearly move in the second direction and a link mechanism configured to connect the first slider and the linearly moving body to each other so as to change a linear movement of the first slider into a linear movement in the first direction, and

wherein the link mechanism is configured to linearly move the linearly moving body only by a linear movement distance corresponding to an arrangement order position in the first direction of the plate member to be received by the receiving portion.

5. The end effector device according claim 2, wherein the first holding portions and the second holding portions respectively include a plurality of linearly moving bodies which have distal end portions in the first direction forming the receiving portions and remaining portions constituting the linearly moving portions,

wherein the drive portion corresponding the linearly moving portion includes a first slider configured to linearly move in the second direction and a link mechanism configured to connect the first slider and the linearly moving body to each other so as to

change a linear movement of the first slider into a linear movement in the first direction, and

wherein the link mechanism is configured to linearly move the linearly moving body only by a linear movement distance corresponding to an arrangement order position in the first direction of the plate member to be received by the receiving portion.

6. The end effector device according claim 1, wherein the first holding portions and the second holding portions respectively include a plurality of linearly moving bodies which have distal end portions in the first direction forming the receiving portions and remaining portions constituting the linearly moving portions,

wherein the drive portion corresponding the linearly moving portion includes a first slider configured to linearly move in the second direction and a link mechanism configured to connect the first slider and the linearly moving body to each other so as to change a linear movement of the first slider into a linear movement in the first direction, and

wherein the link mechanism is configured to linearly move the linearly moving body only by a linear movement distance corresponding to an arrangement order position in the first direction of the plate member to be received by the receiving portion.

7. The end effector device according claim 6, wherein the link mechanism comprises:

a first link member having a proximal end portion which is connected to the first slider so as to be rotatable about a first axis line perpendicular to the first direction;

a second link member having a proximal end portion which is connected to the first link member so as to be rotatable about a second axis line parallel with the first axis line; and

a second slider configured to be slidable in the first direction along a slide surface parallel with the first direction, a distal end of the second link member being

connected to the second slider so as to be rotatable about a third axis line parallel with the first axis line, and a lower end portion of the linearly moving body being connected to the second slider,

wherein the plurality of link mechanisms of each of the holding portions are configured so that, under a state in which the first link member is perpendicular to the first direction, a sum of a first distance between the first axis line and the second axis line and a second distance between the second axis line and the third axis line is a given distance which is identical to one another among the plurality of link mechanisms, respectively, and due to a linear movement of the first slider, under a state in which the first link member has rotated about the first axis line, a ratio of the second distance to the given distance is different from one another among the plurality of link mechanisms according to the linear movement distance.

8. The end effector device according claim 7, further comprising: a biasing mechanism configured to bias the first link member to a direction opposite to a dead point of the first link member and the second link member.

9. The end effector device according claim 8, wherein the link mechanism is provided with a cylinder configured to drive the first slider, the first link member, or the second slider.

10. The end effector device according claim 7, wherein the link mechanism is provided with a cylinder configured to drive the first slider, the first link member, or the second slider.