CLAIMS

1. A semiconductor die pick-up apparatus for picking up a semiconductor die that is applied to a front surface of a dicing sheet, the apparatus comprising:

a stage having a suction surface that includes a first suction portion as an opening for suctioning a back surface of the dicing sheet, and a second suction portion formed on an outer periphery of the first suction portion, capable of suctioning the back surface of the dicing sheet with independently of the first suction portion;

a stepped-surface forming mechanism configured to form a stepped surface for the suction surface, the stepped-surface forming mechanism having a plurality of moving elements disposed in the opening provided in the suction surface of the stage, the moving elements being movable between a first position and a second position, the first position being a position at which tip end surfaces of the moving elements are higher than the suction surface, the second position being a position at which the tip end surfaces of the moving elements are lower than the first position; and

an opening pressure switch mechanism configured to switch an opening pressure of the opening between a first pressure that is near vacuum and a second pressure that is near an atmospheric pressure, wherein

when the semiconductor die is picked up, at least one of the moving elements is moved from the first position to the second position every time the opening pressure is switched from the first pressure to the second pressure.

each of the plated moving elements includes an inclined surface that is in contact with the slider, and with which corresponding one of the plated moving elements moves between the first position and the second position based on movement of the slider, and

the inclined surfaces of the plated moving elements are arranged in a displaced manner in the moving direction of the slider so that the corresponding plated moving elements sequentially move from the first position to the second position along the moving direction of the slider.

14. A semiconductor die pick-up method for picking up a semiconductor die that is applied to a front surface of a dicing sheet, the method comprising:

a step of preparing a semiconductor die pick-up apparatus including: a stage having a suction surface that includes a first suction portion as an opening for suctioning a back surface of the dicing sheet, and a second suction portion formed on an outer periphery of the first suction portion, capable of suctioning the back surface of the dicing sheet with independently of the first suction portion; a stepped-surface forming mechanism configured to form a stepped surface for the suction surface, the stepped-surface forming mechanism having a plurality of moving elements disposed in the opening provided in the suction surface of the stage, the moving elements being movable between a first position and a second position, the first position being a position at which tip end surfaces of the moving elements are higher than the suction surface, the second position being a position at which the tip end surfaces of the moving elements are lower than the first

which the suction pressure is maintained at the third pressure, the portion of the semiconductor die facing against the tip end surface of the at least one moving element.

15. A semiconductor die pick-up method for picking up a semiconductor die that is applied to a front surface of a dicing sheet, the method comprising:

a step of preparing a semiconductor die pick-up apparatus including: a stage having a suction surface that includes a first suction portion as an opening for suctioning a back surface of the dicing sheet, and a second suction portion formed on an outer periphery of the first suction portion, capable of suctioning the back surface of the dicing sheet with independently of the first suction portion; a stepped-surface forming mechanism configured to form a stepped surface for the suction surface, the stepped-surface forming mechanism having a plurality of moving elements disposed in the opening provided in the suction surface of the stage, the moving elements being movable between a first position and a second position, the first position being a position at which tip end surfaces of the moving elements are higher than the suction surface, the second position being a position at which the tip end surfaces of the moving elements are lower than the first position; an opening pressure switch mechanism configured to switch an opening pressure of the opening between a first pressure that is near vacuum and a second pressure that is near an atmospheric pressure; and a suction pressure switch mechanism configured to switch a suction pressure of the suction surface between a third pressure that is near vacuum and a fourth pressure that is near the atmospheric pressure;