

What is claimed is:

1. A semiconductor strip sawing apparatus comprising:

an on-loading part configured to provide a semiconductor package in a state in which the semiconductor package is placed
5 in a magazine;

a pusher or a drawer configured to draw the semiconductor package from the magazine to the outside of the on-loading part;

an inlet rail on which the semiconductor package drawn from the pusher or the drawer is placed;

10 a strip picker configured to suck the semiconductor package placed on the inlet rail, and transfer the semiconductor package to a chuck table in a state in which a mold surface of the semiconductor package faces downward;

15 a sawing device configured to receive the semiconductor package from the strip picker, saw the semiconductor package on the chuck table into a plurality of semiconductor packages, and clean top surfaces of the plurality of semiconductor package with cleaning water;

20 a unit picker configured to simultaneously suck the plurality of semiconductor packages sawn by the sawing device and the top surfaces of which are cleaned, and to transfer the sucked semiconductor packages to a drying device via a cleaning device;

the cleaning device configured to clean bottom surfaces of the semiconductor packages in a state in which the semiconductor packages are sucked by the unit picker;

the drying device including a sucking plate configured to
5 suck the semiconductor packages cleaned by the cleaning device and transferred by the unit picker, wherein the sucking plate is movable on an XY plane in an X-axis direction or a Y-axis direction and is rotatable with respect to a Y-axis on the XY plane according to a method of storing the semiconductor package;

10 a first vision unit disposed in a movement path of the sucking plate of the drying device, and configured to be moved within the XY plane in a predetermined direction perpendicular to a moving direction of the sucking plate and to test the semiconductor packages;

15 a first arrangement table and a second arrangement table in which loading grooves in which the semiconductor packages sucked on the sucking plate are loaded and non-groove portions in which the semiconductor packages are not loaded are alternately formed in the X-axis direction and the Y-axis direction, and configured
20 to transfer and load the semiconductor packages sucked on the sucking plate in the loading grooves and to be independently transferred in the Y-axis direction;

a second vision unit configured to test the semiconductor package loaded in the loading grooves in the first arrangement table and the second arrangement table; and

a sorting device configured to transfer the semiconductor packages in the X-axis direction, and sort out and store the semiconductor packages based on results of testing the semiconductor packages and

wherein the drying device comprises:

a movement frame mounted to be movable along an axis and to which the sucking plate is rotatably coupled;

a heater mounted in the sucking plate, and configured to dry the semiconductor packages sucked on the sucking plate by heating the semiconductor packages; and

a blower configured to remove moisture on the top surface of the sucking plate or the top or side surfaces of the semiconductor package by blowing a gas onto the semiconductor packages sucked on the sucking plate.

2. The semiconductor strip sawing apparatus according to claim 1, wherein the sucking plate of the drying device is rotated by 180° with respect to the Y-axis on the XY plane to flip the semiconductor packages, which are sucked on the sucking plate and dried, upside-down by moving the semiconductor packages

relative to a Z-axis direction to be transferred into the loading grooves in the first arrangement table or the second arrangement table.

5 3. The semiconductor strip sawing apparatus according to claim 2, wherein the sucking plate comprises:

 a base member including a first pneumatic line and a second pneumatic line for selectively applying air pressure to a top surface and a bottom surface of the sucking plate;

10 a first distribution member configured to communicate with a top surface of the sucking plate, and including a distribution channel that communicates with the first pneumatic line of the base member to distribute air pressure; and

 a second distribution member configured to communicate with
15 a bottom surface of the sucking plate, and including a distribution channel that communicates with the second pneumatic line of the base member to distribute air pressure.

 4. The semiconductor strip sawing apparatus according to
20 claim 3, wherein a first sucking part and a second sucking part are disposed on the top surface and the bottom surface of the sucking plate, respectively, wherein sucking ports that suck the semiconductor packages and non-sucking parts that do not suck the

semiconductor packages are formed on each of the first and second sucking parts to be intersected one another in the X-axis and the Y-axis direction, and

the first distribution member communicates with the sucking
5 ports formed on the first sucking part, and the second distribution member communicates with the sucking ports formed on the second sucking part.

5. The semiconductor strip sawing apparatus according to
10 claim 4, wherein some of the semiconductor packages sucked by the unit picker are loaded on the first sucking part, and the other semiconductor packages sucked by the unit picker are sequentially distributed and loaded on the second sucking part by rotating the sucking plate with respect to the Y-axis, and

15 the unit picker comprises:

first sucking ports and second sucking ports that are alternately disposed;

a first pneumatic line configured to communicate with the first sucking ports;

20 a second pneumatic line configured to communicate with the second sucking ports and to be separated from the first pneumatic line; and

a vacuum unit configured to selectively apply vacuum pressure to the first pneumatic line and the second pneumatic line.

5 6. The semiconductor strip sawing apparatus according to claim 4, in order to blow a gas onto the semiconductor packages sucked on the first sucking part and the second sucking part to remove moisture on the semiconductor packages, further comprising:

10 a downward blower mounted toward the first sucking part; and
 an upward blower mounted toward the second sucking part.

 7. The semiconductor strip sawing apparatus according to claim 2, wherein ball surfaces or lead surfaces of the
15 semiconductor packages sucked on the sucking plate are tested by the first vision unit in a state in which the sucking plate of the drying device is rotated by 180° with respect to the Y-axis on the XY plane, and

 the tested semiconductor packages are transferred into the
20 loading grooves in the first arrangement table or the second arrangement table, and mold surfaces of the semiconductor packages loaded in the first arrangement table or the second arrangement table are tested by the second vision unit.

8. The semiconductor strip sawing apparatus according to claim 1, further comprising an arrangement table picker configured to be movable in the X-axis direction or the Y-axis direction, and to pick up the semiconductor packages sucked on the sucking plate of the drying device and load the semiconductor packages in the loading grooves in the first arrangement table or the second arrangement table,

wherein the arrangement table picker simultaneously picks up the semiconductor packages sucked on the sucking plate or divides the semiconductor packages into two parts and sequentially picks up the two parts, and sequentially loads the two parts on the first arrangement table and the second arrangement table.

9. The semiconductor strip sawing apparatus according to claim 8, wherein the arrangement table picker or the sucking plate comprises:

first sucking ports and second sucking ports alternately disposed;

a first pneumatic line configured to communicate with the first sucking ports;

a second pneumatic line configured to communicate with the second sucking ports and be separated from the first pneumatic line; and

a vacuum unit configured to selectively apply vacuum
5 pressure to the first pneumatic line and the second pneumatic line.

10. The semiconductor strip sawing apparatus according to claim 8, wherein the mold surfaces of the semiconductor packages
10 are tested by the first vision unit in a state in which the semiconductor packages are picked up by the arrangement table picker, and

the tested semiconductor packages are transferred in the loading grooves in the first arrangement table or the second
15 arrangement table, and ball surfaces or lead surfaces of the semiconductor packages loaded in the first arrangement table or the second arrangement table are tested by the second vision unit.

11. The semiconductor strip sawing apparatus according to
20 claim 8, wherein ball surfaces or lead surfaces of the semiconductor packages sucked on the sucking plate are tested by the first vision unit in a state in which the sucking plate of

the drying device is rotated by 180° with respect to the Y-axis on the XY plane, and

after the sucking plate is rotated again by 180° with respect to the Y-axis on the XY plane, the tested semiconductor packages are picked up by the arrangement table picker and mold surfaces of the semiconductor packages are tested by the first vision unit.

12. The semiconductor strip sawing apparatus according to claim 8, wherein the arrangement table picker comprises:

a guide frame mounted along an axis; and

an arrangement table picker driving unit coupled to a top surface of the guide frame to be detachable from the guide frame, and configured to move the arrangement table picker,

wherein one side of the drying device is coupled to a first transfer rail engaged with a lower portion of the guide frame and another side of the drying device is coupled to a second transfer rail to prevent an interference or a collision between the arrangement table picker driving unit and a drying device driving unit.

13. The semiconductor strip sawing apparatus according to claim 3, wherein a first sucking part on which sucking ports

sucking the semiconductor packages are arranged in a matrix in the X-axis direction and the Y-axis direction is formed on the top surface of the sucking plate, and

5 a vacuum-blocking unit is formed on the bottom surface of the sucking plate to block the second pneumatic line or the second distribution member.

14. The semiconductor strip sawing apparatus according to claim 13, wherein the first sucking part comprises:

10 first sucking ports and second sucking ports alternately disposed; and

a vacuum unit configured to communicate with the first sucking ports and the second sucking ports separately to selectively apply vacuum pressure to the first sucking ports and
15 the second sucking ports,

wherein the vacuum unit applies vacuum pressure to the first distribution member via the first pneumatic line.

15 15. The semiconductor strip sawing apparatus according to claim 13, wherein the vacuum-blocking unit is a locking member or a plate type blocking member.

16. The semiconductor strip sawing apparatus according to claim 1, wherein the first vision unit is an upwardly directed vision unit configured to test the top or bottom surfaces of the semiconductor packages, and disposed below the semiconductor packages to test the semiconductor packages in an up-direction, and

the second vision unit is a downwardly directed vision unit configured to test the other top or bottom surfaces of the semiconductor package, and disposed above the semiconductor packages loaded in the arrangement table to test the semiconductor packages in a down-direction.

17. The semiconductor strip sawing apparatus according to claim 1, wherein the sorting device comprises:

at least one sorting picker configured to individually pick up the semiconductor packages loaded in the first arrangement table or the second arrangement table, and sequentially sort out and transfer the semiconductor packages based on the results of testing the semiconductor packages;

a tray which have a plurality of loading grooves in which the semiconductor packages picked up by the sorting picker and sorted out based on the results of testing the semiconductor packages are stored; and

configured to be movable in a predetermined direction.

18. The semiconductor strip sawing apparatus according to claim 17, wherein the semiconductor packages loaded in the first arrangement table and the second arrangement table are picked up
5 by the sorting picker, one surface of each of the semiconductor packages is tested by the first vision unit, and the semiconductor packages are sorted out based on a testing result of the surface of each of the semiconductor packages and are
10 stored on the tray.

19. The semiconductor strip sawing apparatus according to claim 17, wherein the semiconductor packages or a test jig is loaded in at least two loading grooves among loading grooves in
15 the tray, the first vision unit is moved to, images of the semiconductor packages or an image of the test jig is photographed by the first vision unit in a state in which the sorting picker picks up the semiconductor packages or the test jig, and location values of the loading grooves in the tray are
20 precisely calculated by comparing previously input pitch information with an actual moving distance.

20. The semiconductor strip sawing apparatus according to claim 12, wherein the sorting device comprises:

a tray including a plurality of loading grooves in which the semiconductor packages are sorted out based on the results of testing the semiconductor packages and are stored; and

a tray picker configured to pick up and discharge the tray, wherein a tray picker driving unit and the arrangement table picker driving unit are mounted on the same guide frame.

21. A semiconductor strip sawing apparatus comprising:

a sawing device configured to provide a semiconductor strip, saw the semiconductor strip on a chuck table into on a plurality of semiconductor packages, and clean top surfaces of the plurality of semiconductor packages with cleaning water;

a unit picker configured to simultaneously suck plurality of semiconductor packages sawn by the sawing device and the top surfaces of which are cleaned, and to transfer the sucked semiconductor packages to a drying device via a cleaning device;

the cleaning device configured to clean bottom surfaces of the semiconductor packages in a state in which the semiconductor packages are sucked by the unit picker;

the drying device including a sucking plate configured to suck the semiconductor packages cleaned by the cleaning device

and transferred by the unit picker, wherein the sucking plate is movable on an XY plane in an X-axis direction or a Y-axis direction and is rotatable with respect to an Y-axis on the XY plane;

5 a first vision unit disposed in a movement path of the sucking plate of the drying device, and configured to be movable within the XY plane in a predetermined direction perpendicular to a moving direction of the sucking plate and to test the semiconductor packages;

10 an arrangement table picker configured to pick up the semiconductor packages sucked on the sucking plate, and to be movable in the X-axis direction or the Y-axis direction;

 an arrangement table configured to be movable in the Y-axis direction, wherein the arrangement table comprises;

15 a first loading unit on which loading grooves in which the semiconductor packages sucked on the sucking plate are loaded and non-groove portions in which the semiconductor packages are not loaded are formed to be intersected one another in the X-axis direction and the Y-axis direction; and

20 a second loading unit formed to be symmetrical with respect to the first loading unit;

a second vision unit configured to test the semiconductor packages loaded in the loading grooves in the arrangement table; and

a sorting device configured to transfer the semiconductor packages in the X-axis direction and sort out and store the semiconductor packages based on results of testing the semiconductor packages,

wherein a rotation function of the drying device is performed to flip the semiconductor packages upside-down according to a method of storing the semiconductor package,

wherein when the rotation function of the drying device is performed, the semiconductor packages sucked on the sucking plate and dried are moved relative to the Z-axis direction to be loaded in the loading grooves in the arrangement table in a state in which the sucking plate of the drying device is rotated by 180° with respect to the Y-axis on the XY plane, and

when the rotation function of the drying device is not performed, the semiconductor packages sucked on the sucking plate and dried are picked up by the arrangement table picker and loaded in the loading grooves in the arrangement table.