CLAIMS

What is claimed is:

1. A glue-dispensing and attaching apparatus for a workpiece, comprising:

two loading and unloading mechanisms (1), wherein the workpiece is movable between the two loading and unloading mechanisms (1), one of the two loading and unloading mechanisms (1) is configured to load the workpiece to be processed, and another one of the two loading and unloading mechanisms (1) is configured to unload the processed workpiece;

a dual-valve asynchronous glue-dispensing device (2);

a heat dissipation cover attaching device (3); and

a hot pressing device (4),

wherein the dual-valve asynchronous glue-dispensing device (2), the heat dissipation cover attaching device (3), and the hot pressing device (4) are sequentially arranged between the two loading and unloading mechanisms (1) along a movement direction of the workpiece,

wherein the dual-valve asynchronous glue-dispensing device (2) comprises:

a frame (100);

a workpiece conveying device (200) disposed inside the frame (100) and carrying the workpiece thereon;

a height automatic compensation and stable measurement device (300), which comprises a compensation part and a measurement part, the compensation part being disposed below the workpiece, and the measurement part being disposed on the frame (100) and located above the workpiece to measure the workpiece; and

a leveling and adsorption locking fixture (400) disposed on the compensation part of the height automatic compensation and stable measurement device (300), the leveling and adsorption locking fixture (400) being movable upwards under the driving of the compensation part to hold up the workpiece.

2. The glue-dispensing and attaching apparatus for the workpiece according to claim 1,

wherein the workpiece conveying device (200) comprises a workpiece transport device (1c) configured to transport and move the workpiece in an x direction, the workpiece transport device (1c) comprising:

two conveying components, which are a first conveying component and a second conveying component, and are symmetrically arranged about an xz plane, where a z direction is a vertical direction and the x direction is a horizontal direction perpendicular to the z direction;

a plurality of detection optical fibers arranged on the first conveying component and the second conveying component to detect a conveying status of the workpiece; and

a workpiece carrier board (4c) arranged on the two conveying components and carrying the workpiece thereon.

3. The glue-dispensing and attaching apparatus for the workpiece according to claim 2, wherein each of the two conveying components comprises a base plate (10) and a belt drive device (13) disposed on a side of the base plate (10) facing towards the workpiece carrier board (4c).

4. The glue-dispensing and attaching apparatus for the workpiece according to claim 3, wherein the plurality of detection optical fibers comprise a feed entry detection optical fiber (14), a deceleration detection optical fiber (15), an arrival detection optical fiber (18), and a discharge detection optical fiber (111), wherein the feed entry detection optical fiber (14), the deceleration detection optical fiber (15), the arrival detection optical fiber (18), and the discharge detection optical fiber (111) are sequentially arranged on the base plate (10) along the x direction.

5. The glue-dispensing and attaching apparatus for the workpiece according to claim 4, wherein the workpiece transport device (1c) further comprises:

a side pushing component (17) disposed on the base plate (10) and located between the deceleration detection optical fiber (15) and the arrival detection optical fiber (18); and

a blocking device (112) disposed on the base plate (10), a connecting line between the blocking device (112) and the arrival detection optical fiber (18) is parallel to a y axis, where the y direction is perpendicular to the z direction and the x direction.

6. The glue-dispensing and attaching apparatus for the workpiece according to claim 5,

wherein the plurality of detection optical fibers further comprises an feed warpage detection optical fiber (16) and an discharge warpage detection optical fiber (113), wherein the feed warpage detection optical fiber (16) and the discharge warpage detection optical fiber (113) are movably arranged on the base plate (10) along the z direction, and the feed warpage detection optical fiber (16) and the discharge warpage detection optical fiber (113) are located on two sides of the side pushing component (17) respectively.

7. The glue-dispensing and attaching apparatus for the workpiece according to any one of claims 1 to 6, wherein the height automatic compensation and stable measurement device (300) comprises:

a three-dimensional motion platform (1a) disposed above the workpiece conveying device (200), a height measurement device (2a) and a visual recognition device (3a) being provided on the three-dimensional motion platform (1a), wherein the height measurement device (2a) and the visual recognition device (3a) are movable in an xy plane under the driving of the three-dimensional motion platform (1a), where a y direction is perpendicular to the z direction and the x direction; and

a jacking mechanism (5a) disposed below the workpiece, a part of the jacking mechanism (5a) being movable along a z axis to jack up the workpiece.

8. The glue-dispensing and attaching apparatus for the workpiece according to claim 7, wherein the jacking mechanism (5a) comprises:

a jacking substrate (52);

a bearing seat fixing block (55) disposed on the jacking substrate (52);

a jacking plate (54) located above the jacking substrate (52);

an adjustment block (513) disposed on the jacking plate (54); and

a lead screw assembly, wherein a part of the lead screw assembly is connected to the bearing seat fixing block (55), and another part of the lead screw assembly is connected to the adjustment block (513); the lead screw assembly is rotatable to drive the adjustment block (513) and the jacking plate (54) to move along the z axis, where a z-axis direction is a vertical direction.

9. The glue-dispensing and attaching apparatus for the workpiece according to claim 8, wherein the lead screw assembly comprises:

a first screw shaft (510), which is perpendicular to a plane where the jacking plate (54) is located;

a screw support block (511) rotatably sleeved on the first screw shaft (510); and

a screw slider (512) sleeved on the first screw shaft (510), wherein an inner peripheral edge of the screw slider (512) is connected to an outer peripheral edge of the first screw shaft (510) through threads, and an outer peripheral edge of the screw slider (512) is rotatably connected to an inner peripheral edge of the adjustment block (513).

10. The glue-dispensing and attaching apparatus for the workpiece according to any one of claims 7 to 9, wherein the three-dimensional motion platform (1a) comprises:

a y-direction motion mechanism;

an x-direction motion mechanism disposed on the y-direction motion mechanism, wherein the y-direction motion mechanism is configured to drive the x-direction motion mechanism to move along a y axis, and wherein the height measurement device (2a) and the visual recognition device (3a) are arranged on the x-direction motion mechanism;

two z-direction motion mechanisms disposed on the x-direction motion mechanism, wherein the x-direction motion mechanism is configured to drive the two z-direction motion mechanisms to move along an x axis, a fluid dispenser being provided on one of the two z-direction motion mechanisms; and

a y-direction fine adjustment device (1a1) disposed on the other z-direction motion mechanism, wherein the other z-direction motion mechanism is configured to drive the y-direction fine adjustment device (1a1) to move along the y axis, and wherein another fluid dispenser is provided on the y-direction fine adjustment device (1a1), and the y-direction fine adjustment device (1a1) is configured to drive the another fluid dispenser for fine adjustment along the y axis,

wherein the y-direction fine adjustment device (1a1) comprises:

a housing (1a11), a linear guide rail assembly (1a16) being provided outside the housing (1a11);

a first servo motor (1a12) disposed on a side of the housing (1a11);

a second screw shaft (1a13) rotatably disposed inside the housing (1a11) and directly

connected to an output end of the first servo motor (1a12); and

a movable block (1a14), wherein a part of the movable block (1a14) is slidably arranged on the linear guide rail assembly (1a16), and another part of the movable block (1a14) is movably arranged on the second screw shaft (1a13) through a nut slider (1a15), and wherein the another fluid dispenser is provided on the movable block (1a14).

11. The glue-dispensing and attaching apparatus for the workpiece according to any one of claims 1 to 10, wherein the leveling and adsorption locking fixture (400) comprises:

a universal installation adapter plate (141), which is a straight plate member, wherein four leveling bolt components (145) are provided around the universal installation adapter plate (141) and fix the universal installation adapter plate (141) to the jacking mechanism, the four leveling bolt components (145) being twistable to adjust an upper surface of the universal installation adapter plate (141) to be level; and

an adsorption locking fixture (144) disposed on the upper surface of the universal installation adapter plate (141) and carrying the workpiece thereon.

12. The glue-dispensing and attaching apparatus for the workpiece according to claim 11, wherein

the universal installation adapter plate (141) has four fine thread holes (141a) opened along a thickness direction thereof, wherein one end of each of the four leveling bolt components (145) is arranged in a corresponding fine thread hole (141a), and the other end of the leveling bolt component (145) is connected to the jacking mechanism, and wherein the universal installation adapter plate (141) further has four slits (141b) opened along the thickness direction, the slits (141b) being in communication with the fine thread holes (141a); and

four horizontal locking screws (146) are provided around the universal installation adapter plate (141), each of the four horizontal locking screws (146) penetrating through a corresponding slit (141b), wherein the horizontal locking screw (146) is rotatable to adjust a size of the slit (141b), thereby adjusting a size of the fine thread hole (141a), and an axis of the horizontal locking screw (146) is perpendicular to an axis of the leveling bolt component (145).

13. The glue-dispensing and attaching apparatus for the workpiece according to claim

12, wherein the leveling bolt component (145) comprises:

a leveling member (145a), which is cylindrical, an outer peripheral edge of the leveling member (145a) having a fine external thread (145a1), the fine external thread (145a1) being engaged with the fine thread hole (141a), and the leveling member (145a) having a leveling hole penetrating the leveling member (145a) along a thickness direction thereof;

a spherical gasket (145b) disposed between the leveling member (145) and the jacking mechanism; and

a connecting member (145c), one end of the connecting member (145c) passing through the leveling hole and the spherical gasket (145b) to be connected to the jacking mechanism,

wherein an upper part of the leveling hole is a hexagonal countersunk head (145a2), a middle part of the leveling hole is a cylindrical countersunk hole (145a3), and the other end of the connecting member (145c) is clamped inside the cylindrical countersunk hole (145a3).

14. The glue-dispensing and attaching apparatus for the workpiece according to any one of claims 1 to 13, wherein the dual-valve asynchronous glue-dispensing device (2) further comprises:

an automatic weighing and glue-breaking device (400) disposed on the workpiece conveying device (200), wherein the automatic weighing and glue-breaking device (400) comprises:

a weighing windproof device (2b) defining a first accommodating chamber inside;

a weighing device (1b) disposed in the first accommodating chamber;

a fluid segmentation device (4b) disposed above the weighing windproof device (2b) and having a second accommodating chamber, the second accommodating chamber being in communication with the first accommodating chamber; and

a fluid receiving container (3b) disposed in the second accommodating chamber and located above the weighing device (1b), wherein the fluid receiving container (3b) has two states, a glue breaking state and a weighing state, wherein when in the glue breaking state, the fluid receiving container (3b) moves upward to receive a glue, and when in a weighing state, the fluid receiving container (3b) moves downwards to be placed on the

weighing device (1b) to weigh the glue.

15. The glue-dispensing and attaching apparatus for the workpiece according to any one of claims 1 to 14, wherein the loading and unloading mechanism (1) comprises a profile frame (a1), a silo transverse displacing and lifting mechanism (a2), and a workpiece gripping and transport mechanism (a3), wherein

the silo transverse displacing and lifting mechanism (a2) and the workpiece gripping and transport mechanism (a3) are installed inside the profile frame (a1);

the silo transverse displacing and lifting mechanism (a2) is configured to carry a silo (a5) thereon, move the carried silo (a5) up and down and transversely move the carried silo (a5), to place the silo (a5) opposite to the workpiece gripping and transport mechanism (a3);

the workpiece gripping and transport mechanism (a3) is configured to grip the workpiece from a silo (a5) opposite thereto and load it onto a conveyor belt (a340), or push the workpiece on the conveyor belt (a340) into a silo (a5) opposite thereto;

the loading and unloading mechanism (1) further comprises an intermediate partition plate (a4) configured to separate the silo (a5) carried by the silo transverse displacing and lifting mechanism (a2) from the workpiece gripping and transport mechanism (a3), the intermediate partition plate (a4) having a through hole for the workpiece to pass through;

the silo transverse displacing and lifting mechanism (a2) is configured to transversely move the carried silo (a5) and move the carried silo (a5) up and down, to place the silo (a5) opposite to the through hole; and

the workpiece gripping and transport mechanism (a3) is configured to grip the workpiece inside the silo (a5) through the through hole, or push the workpiece into the silo (a5) through the through hole.

16. The glue-dispensing and attaching apparatus for the workpiece according to any one of claims 1 to 15, wherein the heat dissipation cover attaching device (3) comprises a conveyor rail module (b1), an attaching module (b2), a heat dissipation cover loading device (b3), and a locating module, wherein

the conveyor rail module (b1) is configured to convey a carrier board to an assembly station, the carrier board carrying a chip inside;

the heat dissipation cover loading device (b3) is configured to convey a heat

dissipation cover to a suction station;

the locating module is installed at a locating station; and

the attaching module (b2) is configured to move between the suction station, the locating station, and the assembly station, wherein the attaching module (b2) moves to the locating station after absorbing the heat dissipation cover at the suction station, the locating module locates and identifies the heat dissipation cover absorbed by the attaching module (b2), and after the locating module locates and identifies the heat dissipation cover absorbed, the attaching module (b2) moves the heat dissipation cover to the assembly station and assemblies the heat dissipation cover onto the chip inside the carrier board at the assembly station.

17. The glue-dispensing and attaching apparatus for the workpiece according to claim 16, wherein the heat dissipation cover loading device (b3) comprises a loading part (b31), a picking and positioning part (b32), an unloading part (b33), and a first transverse displacement assembly (b34) that spans the loading part (b31), the picking and positioning part (b32), and the unloading part (b33), wherein

after the loading part (b31) jacks up a heat dissipation cover carrier (b35) into position, the first transverse displacement assembly (b34) moves the heat dissipation cover carrier (b35) from the loading part (b31) to the picking and positioning part (b32), the picking and positioning part (b32) positions and fixes the heat dissipation cover carrier (b35), a picking mechanism picks up the heat dissipation cover on the heat dissipation cover carrier (b35), and the first transverse displacement assembly (b34) moves the heat dissipation cover carrier (b35), from which the heat dissipation cover has been picked up, from the picking and positioning part (b32) to the unloading part (b33).

18. The glue-dispensing and attaching apparatus for the workpiece according to any one of claims 1 to 17, wherein the hot pressing device (4) comprises: a detection part, a heating and force maintaining part (c20), and a conveying device (c30), wherein

only one detection part is provided, the detection part being disposed at an upstream workstation or a downstream workstation of the heating and force maintaining part (c20), or

two detection parts are provided, the two detection parts being arranged at the upstream workstation and the downstream workstation of the heating and force maintaining part (c20), respectively, wherein

the conveying device (c30) is configured to convey a load fixture (c40) loaded with the workpiece (c50) to the detection part and the heating and force maintaining part (c20);

the detection part is configured to measure a rated height of the workpiece (c50) at at least one position on the workpiece (c50) and inspect an appearance of the workpiece (c50), wherein the rated height of the workpiece (c50) refers to a height difference between a height at a position on the workpiece (c50) and a height at another position on the load fixture (c40) at a predetermined distance from the position; and

the heating and force maintaining part (c20) is configured to heat and maintain a force on the workpiece (c50) located at the heating and force maintaining part (c20).

19. The glue-dispensing and attaching apparatus for the workpiece according to claim 18, wherein two detection parts are provided, namely a first detection part (c100) located at the upstream workstation of the heating and force maintaining part (c20) and a second detection part (c101) located at the downstream workstation of the heating and force maintaining part (c20), wherein

the first detection part (c100) is configured to measure a rated height of the workpiece (c50) at at least one position on the workpiece (c50) and inspect an appearance of the workpiece (c50) to obtain a first set of detection data;

the second detection part (c101) is configured to measure the rated height of the workpiece (c50) at the at least one position on the workpiece (c50) and inspect the appearance of the workpiece (c50) to obtain a second set of detection data; and

the hot pressing device (4) further comprises a processor electrically connected to the first detection part (c100) and the second detection part (c101), the processor being configured to determine whether a process of heating and maintaining the force on the workpiece (c50) by the heating and force maintaining part (c20) meets requirements based on the first set of detection data and the second set of detection data.