

WAFER POLISHING SYSTEM

Technical Field

[0001] The present invention belongs to the technical field of fabrication of semiconductor integrated circuit chips, and particularly relates to wafer polishing system.

Description of Related Art

[0002] A chemical mechanical planarization (CMP) device typically includes a semiconductor equipment front-end module (EFEM), a cleaning unit and a polishing unit. The EFEM mainly includes a cassette for storing wafers, a robotic arm for transferring wafers and an air purification system. The cleaning unit mainly includes a varied number of megasonic cleaning components, roller brush cleaning components, drying components, and devices for transferring wafers between the components. The polishing unit typically includes a workbench, a polishing disk, a polishing head, a polishing arm, a trimming device and a polishing liquid arm, and each component is arranged on the workbench according to its process position. A wafer from the EFEM is transferred to the polishing unit by means of a series of transfer systems, to be subjected to CMP; the wafer, after being polished, is transferred into a cleaning region by means of a series of transfer systems; and after impurities on the surface of the wafer are removed, the wafer is finally transferred into the cassette, for storing the wafer, of the EFEM.

[0003] Because different processes are performed on wafers on different stations in the CMP device, transfer of the wafer in the device is of great importance and has a great influence on the output of device and the yield of wafers, and a transfer system is required to transfer wafers quickly, stably and accurately.

[0004] The difficulties in the transfer layout of existing CMP devices are as follows: 1) the available space is limited, the wafer transfer system is often required to have the capacity to implement complex actions, and most existing devices adopt dedicated robotic arms, leading to a high cost, poor maintainability and expandability and limitations caused by the functions of the

robotic arms; 2) the transfer efficiency is low, and one transfer component generally needs to successively implement multiple wafer transfer actions, so it takes a long time to complete one cycle of actions, leading to low transfer efficiency of wafers between stations, which is not beneficial to the increase in output of the devices; 3) the compatibility is poor, which is not beneficial to the expansion of devices and processes.

BRIEF SUMMARY OF THE INVENTION

[0005] To overcome the defects in the prior art, the present invention provides a wafer polishing system, which completes complex wafer transfer actions in a narrow space, has a high transfer speed and improves transfer efficiency.

[0006] The technical solution adopted by the present invention to solve the aforesaid technical problems is as follows: a wafer polishing system includes:

- a front-end module;

- a wafer polishing unit, including a polishing transfer mechanism;

- a wafer cleaning unit; and

- a wafer transfer passage, extending at least in the wafer cleaning unit; wherein:

- a first transfer station, a second transfer station, a third transfer station, a first transfer device and a second transfer device are arranged in the wafer transfer passage;

- the first transfer device is configured to implement wafer transfer between the first transfer station and the second transfer station;

- the second transfer device is configured to implement wafer transfer between the second transfer station and the third transfer station;

- the third transfer station is configured to implement wafer transfer between the wafer cleaning unit and the wafer polishing unit.

[0007] Further, the third transfer station has at least two working heights and is provided with a third transfer platform;

at a first working height, wafer transfer between the second transfer station and the third transfer station is implemented;

at a second working height, the third transfer platform receives a wafer transferred from the polishing transfer mechanism.

[0008] Further, the first transfer device transfers a wafer by horizontally moving the wafer, or by flipping the wafer, or by both horizontally moving and flipping the wafer;

the second transfer device transfers the wafer by horizontally moving the wafer, or by flipping the wafer, or by both horizontally moving and flipping the wafer.

[0009] Further, the first transfer device and the second transfer device are located on a same side of the first transfer station; or, the first transfer device and the second transfer device are located on opposite sides of the first transfer station; or, the first transfer device and the second transfer device are located between the first transfer station and the second transfer station; or, the first transfer device and the second transfer device are located between the second transfer station and the third transfer station.

[0010] Further, the first transfer device and/or the second transfer device includes a slide extending along the wafer transfer passage and a wafer holder capable of moving horizontally along the slide, and the wafer holder is configured to support the wafer to implement horizontal transfer of a wafer.

[0011] Further, the first transfer device and/or the second transfer device includes a rotating body capable of rotating around a central axis of itself, an extension arm connected to the rotating body and a transfer stand connected to the extension arm, and the extension arm swings with the rotating body to drive a wafer on the transfer stand to be transferred along an arc trajectory.

[0012] Further, the extension arm includes a plurality of folding arm bodies which are movably connected.

[0013] Further, the first transfer device or the second transfer device includes a flipping shaft and a clamping arm connected to the flipping shaft, and the clamping arm is configured to

clamp a wafer and moves with the flipping shaft to drive the wafer to flip.

[0014] Further, the first transfer device or the second transfer device includes a horizontal shaft, a vertical shaft capable of moving along the horizontal shaft, a base capable of moving along the vertical shaft, and a claw for clamping a wafer.

[0015] Further, the first transfer device or the second transfer device further includes a flipping body movably connected to the base, the claw is arranged on the flipping body, and the flipping body drives the claw to flip to turn over the wafer.

[0016] Further, the first transfer device or the second transfer device includes a pedestal, a lifting mechanism movably connected to the pedestal, at least one link connected to the lifting mechanism, a finger driving box, and a finger for clamping or adsorbing a wafer.

[0017] Further, the front-end module, the wafer cleaning unit and the wafer polishing unit are arranged sequentially and adjacently, the wafer cleaning unit includes a first cleaning region and a second cleaning region which are located on two sides of the wafer transfer passage, and the first cleaning region and the second cleaning region each include a plurality of cleaning tanks.

[0018] Further, a temporary storage box is arranged in the wafer cleaning unit or the wafer polishing unit, and the third transfer station is arranged corresponding to the temporary storage box.

[0019] Further, the front-end module includes a front-end transfer mechanism configured to implement wafer transfer between the front-end module and the first transfer station.

[0020] The present invention has the following beneficial effects: 1) the wafer transfer process in the wafer transfer passage is divided into two stages, which are respectively completed by the first transfer device and the second transfer device, such that the size of the first transfer device and the size of the second transfer device are reduced, the first transfer device and the second transfer device may implement complex actions in a narrow space, and the transfer speed is higher; 2) the process is flexible, and more processes such as single-surface polishing and double-surface polishing may be implemented by means of different transfer forms (such as

flipping of wafers and horizontal movement of wafers); 3) the transfer efficiency is improved, more wafers are transferred at the same time, the idle time of the transfer stations is shortened, and the wafer transfer capacity of a transfer system is improved; 4) the layout is more reasonable, the space utilization rate is high, wafer transfer between the second transfer station and the third transfer station is implemented by the second transfer device, and a more reasonable logic for transferring wafers into and out of the wafer polishing unit is realized; 5) the structure is simple, transfer is more stable, only simple actions such as horizontal movement or flipping are performed between the transfer stations, the requirements for the hardware structure are low, and the stability of equipment is improved; 6) the third transfer station transfers a polished wafer and a non-polished wafer at different heights, such that cross-contamination of the polished wafer and the non-polished wafer is avoided; 7) the expandability and compatibility of equipment are higher, and different equipment or process requirements may be satisfied merely by transforming a specific transfer step; 8) the transfer efficiency is high, the first transfer device and the second transfer device respectively implement specific actions, and each action is implemented in a specific space, such that mutual interference between the actions is reduced.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWINGS

[0021] FIG. 1 is a top view of the layout of a wafer polishing system according to the present invention.

[0022] FIG. 2 is a schematic structural diagram of cooperation between a first transfer device, a third transfer platform and a polishing transfer mechanism according to Embodiment 1 of the present invention.

[0023] FIG. 3 is a schematic structural diagram of a first transfer device or a second transfer device according to Embodiment 2 of the present invention.

[0024] FIG. 4 is a schematic structural diagram of a first transfer device or a second transfer device according to Embodiment 3 of the present invention.

[0025] FIG. 5 is a schematic structural diagram of a first transfer device or a second transfer device according to Embodiment 4 of the present invention.

[0026] FIG. 6 is a schematic structural diagram of a first transfer device or a second transfer device according to Embodiment 5 of the present invention.

[0027] FIG. 7 is a schematic structural diagram of a first transfer device or a second transfer device according to Embodiment 6 of the present invention.

[0028] FIG. 8 is a schematic structural diagram of a temporary storage box according to the present invention.

[0029] Wherein: 1, front-end module; 11, front-end transfer mechanism; 2, wafer polishing unit; 21, polishing transfer mechanism; 3, wafer cleaning unit; 31, first cleaning region; 32, second cleaning region; 33, cleaning tank; 34, temporary storage box; 341, water sprayer; 35, cleaning robotic arm; 36, drying oven; 4, wafer transfer passage; 51, first transfer station; 52, second transfer station; 53, third transfer station; 531, third transfer platform; 61, first transfer device; 62, second transfer device; 631, slide; 632, wafer holder; 641, rotating body; 642, extension arm; 643, transfer stand; 651, flipping shaft; 652, clamping arm; 661, horizontal shaft; 662, vertical shaft; 663, base; 664, claw; 665, flipping body; 671, pedestal; 672, lifting mechanism; 673, link; 674, finger driving box; 675, finger; 7, wafer.

DETAILED DESCRIPTION OF THE INVENTION

[0030] To allow those skilled in the art to gain a better understanding of the technical solutions of the present invention, the technical solutions in the embodiments of the present invention will be clearly and completely described below in conjunction with accompanying drawings of these embodiments. Obviously, the embodiments described below are merely illustrative ones, and are not all possible ones of the present invention. All other embodiments obtained by those ordinarily skilled in the art based on the following ones without creative labor should also fall within the protection scope of the present invention.

[0031] As shown in FIG. 1, a wafer polishing system includes a front-end module 1, a wafer polishing unit 2, a wafer cleaning unit 3 and a wafer transfer passage 4. The wafer transfer passage 4 extends at least in the wafer cleaning unit 3. The wafer polishing unit 2 includes a polishing transfer mechanism 21. The front-end module 1 includes a front-end transfer mechanism 11. A cleaning robotic arm 35 is arranged in the wafer cleaning unit 3. A temporary storage box 34 is arranged in the wafer cleaning unit 3 or the wafer polishing unit 2.

[0032] In this embodiment, the front-end module 1, the wafer cleaning unit 3 and the wafer polishing unit 2 are arranged sequentially and adjacently. The wafer cleaning unit 3 includes a first cleaning region 31 and a second cleaning region 32, which are located on two sides of the wafer transfer passage 4. The first cleaning region 31 and the second cleaning region 32 each include a plurality of cleaning tanks 33. The first cleaning region 31 and the second cleaning region 32 may be arranged symmetrically or differentially, and different combinations and sequences are configured according to actual conditions of equipment. Drying ovens 36 may be arranged at ends, close to the front-end module 1, of the first cleaning region 31 and the second cleaning region 32 respectively.

[0033] A first transfer station 51, a second transfer station 52, a third transfer station 53, a first transfer device 61 and a second transfer device 62 are arranged in the wafer transfer passage 4.

[0034] The first transfer device 61 is configured to implement wafer transfer between the first transfer station 51 and the second transfer station 52, and the second transfer device 62 is configured to implement wafer transfer between the second transfer station 52 and the third transfer station 53. The third transfer station 53 is configured to implement wafer transfer between the wafer cleaning unit 3 and the wafer polishing unit 2.

[0035] The first transfer device 61 transfers a wafer 7 by horizontally moving the wafer, or by flipping the wafer (i.e., turning over the wafer), or by both horizontally moving the wafer and flipping the wafer.

[0036] Similarly, the second transfer device 62 transfers the wafer 7 by horizontally moving the wafer, or by flipping the wafer (i.e., turning over the wafer), or by both horizontally moving the wafer and flipping the wafer.

[0037] The relative positional relationship of the first transfer device 61 and the second transfer device 62 with the first transfer station 51, the second transfer station 52 and the third transfer station 53 and the positional relationship of the first transfer device 61 and the second transfer device 62 with the wafer transfer passage 4 are specifically as follows: the first transfer device 61 and the second transfer device 62 may be located on the same side of the first transfer station 51; or, the first transfer device 61 and the second transfer device 62 may be located on opposite sides of the first transfer station 51; in both cases, the first transfer device 61 and the second transfer device 62 are located on opposite edges of the wafer transfer passage 4.

[0038] Or, the first transfer device 61 and the second transfer device 62 may be located between the first transfer station 51 and the second transfer station 52; or, the first transfer device 61 and the second transfer device 62 may be located between the second transfer station 52 and the third transfer station 53; in both cases, the first transfer device 61 and the second transfer device 62 are located in the mid-portion of the wafer transfer passage 4.

[0039] In this embodiment, the first transfer station 51, the second transfer station 52 and the third transfer station 53 may be virtual working positions. That is, the transfer station is a concept of the stereoscopic space, which has a fixed projection in a vertical direction and extends upwards or downwards in the vertical direction. The transfer station is not defined as a specific point. In other words, the transfer station is stereoscopic in the Z-axis direction, and the position of the transfer station in the X-axis direction and the position of the transfer station in the Y-axis direction are fixed relatively. Of course, the transfer station may also be a solid workbench structure.

[0040] The third transfer station 53 is arranged corresponding to the temporary storage box 34, that is, in a case where the temporary boxes 34 are symmetrically arranged in the first

cleaning region 31 and the second cleaning region 32, the third transfer station 53 is arranged between the two temporary storage boxes 34.

[0041] The third transfer station 53 has at least two working heights, and the third transfer station 53 is provided with a third transfer platform 531, that is, the third transfer station 53 is a solid workbench structure.

[0042] At a first working height, wafer transfer between the second transfer station 52 and the third transfer station 53 is implemented; at a second working height, the third transfer platform 531 receives the wafer 7 transferred from the polishing transfer mechanism 21.

[0043] In the present invention, the front-end module 1 is configured to store the wafer and place the wafer on the first transfer station 51 to provide a non-polished wafer for the wafer polishing system, and the front end-end transfer mechanism 11 is configured to implement wafer transfer between the front-end module 1 and the first transfer station 51. That is, the front-end transfer mechanism 11 is configured to transfer the wafer to be polished onto the first transfer station 51 and transfer cleaned and polished wafers out of the drying ovens 36.

[0044] The temporary storage box 34 receives the polished wafer transferred from the third transfer station 53 and makes preparation for cleaning the wafer in the wafer cleaning unit 3. The cleaning robotic arm 35 is configured to transfer the wafer 7 between the plurality of cleaning tanks 33 in the wafer cleaning unit 3. The polishing transfer mechanism 21 is configured to transfer the wafer into and out of the wafer polishing unit 2 and is able to move along the wafer transfer passage 4, and in this case, the wafer transfer passage 4 not only extends in the wafer cleaning unit 3, but also extends in the wafer polishing unit 2.

[0045] The third transfer station 53 is configured to receive a polished wafer from the wafer polishing unit 2, the second transfer station 52 is configured to receive a non-polished wafer from the first transfer station 51 and move to a position above the third transfer station 53 together with the non-polished wafer, and then, the wafer is transferred by the polishing transfer mechanism 21 into a polishing region of the wafer polishing unit 2.

[0046] Embodiment 1

[0047] As shown in FIG. 2, the first transfer device 61 includes a slide 631 extending along the wafer transfer passage 4 and a wafer holder 632 capable of moving horizontally along the slide 631. The wafer holder 632 is configured to support the wafer 7. Specifically, the wafer holder 632 horizontally supports the wafer 7 to implement horizontal transfer of the wafer 7. That is, the wafer 7 may be horizontally transferred from the first transfer station 51 to the second transfer station 52.

[0048] In this embodiment, the first transfer device 61 transfers the wafer 7 by horizontally moving the wafer rather than flipping the wafer.

[0049] The structure of the second transfer device 62 may be the same as or different from that of the first transfer device 61.

[0050] In a case where the structure of the second transfer device 62 is the same as that of the first transfer device 61, the wafer transfer process of the present invention is as follows: the front-end transfer mechanism 11 transfers a non-polished wafer to the first transfer station 51, the first transfer device 61 transfers the wafer 7 from the first transfer station 51 to the second transfer station 52, that is, the wafer horizontally moves to the second transfer station along the slide, the second transfer device 62 transfers the wafer 7 from the second transfer station 52 to the third transfer station 53, that is, another wafer holder 632 horizontally moves to the third transfer station 53 along the slide 631, and at this moment, the third transfer station 53 is located at the first working height.

[0051] The polishing transfer mechanism 21 may move to a position above the third transfer station 53 and then descend to take the non-polished wafer on the wafer holder 632. This function belongs to the prior art and will not be repeated here.

[0052] The non-polished wafer is transferred by the polishing transfer mechanism 21 into the polishing region of the wafer polishing unit 2 to be polished; the wafer holder 632 moves horizontally along the slide to return to the second transfer station 52 and waits for another non-

polished wafer transferred from the front-end module 1; at this moment, a way is given to allow the polishing transfer mechanism 21 to place a polished wafer on the third transfer platform 531.

[0053] After the wafer 7 is polished, the polishing transfer mechanism 21 clamps the polished wafer, moves to a position above the third transfer station 53 and descends to place the wafer on the third transfer platform 531, and at this moment, the third transfer platform 531 is located at the second working height.

[0054] The wafer on the third transfer platform 531 is then transferred into the temporary storage box 34, and the state of the wafer 7 in the temporary storage box 34 is shown in FIG. 8. To keep the wafer wet and wash away part of residual polishing liquid, a plurality of water sprayers 341 are arranged in the temporary storage box 34.

[0055] The cleaning robotic arm 35 transfers the wafer 7 between the plurality of cleaning tanks 33 in a specific sequence and finally transfers the wafer 7 to the corresponding drying oven 36, and after being dried, the wafer is transferred to a designated place by the front-end transfer mechanism 11.

[0056] Embodiment 2

[0057] As shown in FIG. 3, the first transfer device 61 includes a rotating body 641 capable of rotating around a central axis of itself, an extension arm 642 connected to the rotating body 641, and a transfer stand 643 connected to the extension arm 642. The rotating body 641 is fixedly mounted in the wafer transfer passage 4 and may be a motor or a rotary cylinder. The extension arm 642 swings with the rotating body 641 to transfer the wafer 7 on the transfer stand 643 from the first transfer station 51 to the second transfer station 52 along an arc trajectory.

[0058] In this embodiment, the first transfer device 61 transfers the wafer 7 by horizontally moving the wafer rather than flipping the wafer.

[0059] To improve the flexibility and the adaptivity to the working condition, the extension arm 642 may include a plurality of folding arm bodies which are movably connected, and every two adjacent folding arm bodies are connected rotatably.

[0060] The structure of the second transfer device 62 may be the same as or different from that of the first transfer device 61.

[0061] Embodiment 3

[0062] As shown in FIG. 4, the first transfer device 61 includes a flipping shaft 651 and a clamping arm 652 connected to the flipping shaft 651, the flipping shaft 651 extends in a width direction of the wafer transfer passage 4, and an end of the flipping shaft 651 may be rotatably connected to any position. Of course, the flipping shaft 651 may be a motor or a rotary cylinder. The clamping arm 652 is configured to clamp the wafer 7 and moves with the flipping shaft 651 to drive the wafer 7 to flip, that is, the wafer 7 is turned over. In other words, the rotation angle of the flipping shaft 651 is 180°.

[0063] In this embodiment, the first transfer device 61 transfers the wafer 7 by flipping the wafer rather than horizontally moving the wafer.

[0064] The structure of the second transfer device 61 may be the same as or different from that of the first transfer device 61.

[0065] Embodiment 4

[0066] As shown in FIG. 5, the first transfer device 61 includes a horizontal shaft 661 extending along the wafer transfer passage 4, a vertical shaft 662 capable of moving along the horizontal shaft 661, a base 663 capable of moving along the vertical shaft 662, a flipping body 665 movably connected to the base 663, and a claw 664 for clamping the wafer 7. The claw 664 is arranged on the flipping body 665, such that the flipping body 665 drive the claw 664 to flip to turn over the wafer 7. Here, the claw 664 clamps the wafer 7 in a horizontal state, and the flipping axis of the flipping body 665 is perpendicular to an extension direction of the horizontal shaft 661.

[0067] In this embodiment, the first transfer device 61 transfers the wafer 7 by horizontally moving and flipping of the wafer.

[0068] The structure of the second transfer structure 62 may be the same as or different from that of the first transfer device 61.

[0069] In this embodiment, the first transfer device 61 is compatible with two motions, which respectively correspond to turning over the wafer and not turning over the wafer. After a first surface of the wafer is polished, the wafer may be transferred again; in the second transfer process, the first transfer device 61 transfers the wafer according to another embodiment, such that the state of the wafer on the second transfer station 52 is opposite to the state of the wafer on the second transfer station 52 in the first transfer process; if the subsequent motion in the second transfer process is the same as that in the first transfer processor, a second surface of the wafer will be polished.

[0070] In this embodiment, the first transfer device 61 is compatible with two motions. Of course, two surfaces of the wafer may be polished when any one of the front-end transfer mechanism 11, the first transfer device 61 and the second transfer device 62 is compatible with two motions.

[0071] Embodiment 5

[0072] As shown in FIG. 6, this embodiment is different from Embodiment 4 in that the base 663 is movably connected to the vertical shaft 662 directly. In this case, the flipping body 665 is not configured, the claw 664 cannot turn, the base 663 ascends and descends along the vertical shaft 662, and the vertical shaft 662 moves leftwards and rightwards along the horizontal shaft 661.

[0073] In this embodiment, the first transfer device 61 transfers the wafer 7 by horizontally moving the wafer rather than flipping the wafer.

[0074] The structure of the second transfer device 62 may be the same as or different from that of the first transfer device 61.

[0075] Embodiment 6

[0076] As shown in FIG. 7, the first transfer device 61 includes a pedestal 671, a lifting mechanism 672 movably connected to the pedestal 671, at least one link 673 connected to the lifting mechanism 672, a finger driving box 674, and a finger 675 for clamping or adsorbing the

wafer 7.

[0077] To improve the flexibility and the adaptability to the working condition, two or more links 673 are configured, and every two adjacent links 673 are connected rotatably.

[0078] The finger 675 is connected to the finger driving box 674. A cylinder or a negative-pressure element is arranged in the finger driving box 674, such that the finger 675 may carry the wafer by clamping or adsorption. A rotary cylinder, a rack, a motor or other devices may be arranged in the finger driving box 674 to endow the finger 675 with a rotating function. The finger driving box 674 is connected to the link 673. Belts, gears or other mechanisms may be arranged between the finger driving box 674 and the link 673, between adjacent links 673 as well as between the link 673 and the lifting mechanism 672 to realize relative rotation between these components to form a telescopic mechanism. An air cylinder, a lead screw or a rack may be arranged between the lifting mechanism 672 and the pedestal 671 to allow the lifting mechanism 672 to ascend and descend with respect to the pedestal 671 and allow the whole lifting mechanism 672 to rotate with respect to the pedestal 671.

[0079] In this embodiment, the first transfer device 61 transfers the wafer 7 by horizontally moving and flipping the wafer 7.

[0080] The structure of the second transfer device 62 may be the same as or different from that of the first transfer device 61.

[0081] **Embodiment 7**

[0082] The wafer 7 is in the vertical state when located in the cleaning tank 33. The state of the wafer 7 in the drying oven 36 is related to a specific drying method selected, and the wafer may be in the horizontal or vertical state. When located at the first transfer station 51, the second transfer station 52 and the third transfer station 53, the wafer 7 is in the horizontal state.

[0083] Because the front side of the wafer faces upwards and the back side of the wafer faces downwards when the wafer is located in the front-end transfer mechanism 11 while the front side of the wafer is required to face downwards and the back side of the wafer is required to face

upwards when the wafer is polished in the polishing region of the polishing unit 2, the wafer needs to be turned over.

[0084] Therefore, in this embodiment, the first transfer device 61 adopts the specific structure in Embodiment 1 and the second transfer device 62 adopts the specific structure in Embodiment 4 to transfer and turn over the wafer.

[0085] Embodiment 8

[0086] Of course, the wafer may not be turned over, that is, the first transfer device 61 and the second transfer device 62 only horizontally transfer the wafer.

[0087] In this embodiment, the first transfer device 61 adopts the specific structure in Embodiment 1 and the second transfer device 62 adopts the specific structure in Embodiment 5 to implement wafer transfer.

[0088] Embodiment 9

[0089] In this embodiment, the first transfer device 61 adopts any one of the structures Embodiment 1, Embodiment 2 and Embodiment 5, and the second transfer device 62 adopts any one of the structures in Embodiment 3, Embodiment 4 and Embodiment 6.

[0090] The above specific embodiments are used for explaining the present invention rather than limiting the present invention. Any modifications and transformations made to the present invention based on the spirit and protection scope of the claims should also fall within the protection scope of the present invention.

CLAIMS

1. A wafer polishing system, comprising:
a front-end module (1);
a wafer polishing unit (2), comprising a polishing transfer mechanism (21);
a wafer cleaning unit (3); and
a wafer transfer passage (4), extending at least in the wafer cleaning unit (3);
characterized in that:

a first transfer station (51), a second transfer station (52), a third transfer station (53),
a first transfer device (61) and a second transfer device (62) are arranged in the wafer
transfer passage (4);

the first transfer device (61) is configured to implement wafer transfer between the first
transfer station (51) and the second transfer station (52);

the second transfer device (62) is configured to implement wafer transfer between the
second transfer station (52) and the third transfer station (53);

the third transfer station (53) is configured to implement wafer transfer between the
wafer cleaning unit (3) and the wafer polishing unit (2).

2. The wafer polishing system according to claim 1, characterized in that:

the third transfer station (53) has at least two working heights and is provided with a
third transfer platform (531);

at a first working height, wafer transfer between the second transfer station (52) and
the third transfer station (53) is implemented;

at a second working height, the third transfer platform (531) receives a wafer (7)
transferred from the polishing transfer mechanism (21).

3. The wafer polishing system according to claim 1, characterized in that:

the first transfer device (61) transfers a wafer (7) by horizontally moving the wafer, or
by flipping the wafer, or by both horizontally moving and flipping the wafer;

the second transfer device (62) transfers the wafer (7) by horizontally moving the wafer, or by flipping the wafer, or by both horizontally moving and flipping the wafer.

4.The wafer polishing system according to claim 1, characterized in that the first transfer device (61) and the second transfer device (62) are located on a same side of the first transfer station (51); or, the first transfer device (61) and the second transfer device (62) are located on opposite sides of the first transfer station (51); or, the first transfer device (61) and the second transfer device (62) are located between the first transfer station (51) and the second transfer station (52); or, the first transfer device (61) and the second transfer device (62) are located between the second transfer station (52) and the third transfer station (53).

5.The wafer polishing system according to claim 1, characterized in that the first transfer device (61) and/or the second transfer device (62) comprises a slide (631) extending along the wafer transfer passage (4) and a wafer holder (632) capable of moving horizontally along the slide (631), and the wafer holder (632) is configured to support a wafer (7) to implement horizontal transfer of the wafer (7).

6.The wafer polishing system according to claim 1, characterized in that the first transfer device (61) and/or the second transfer device (62) comprises a rotating body (641) capable of rotating around a central axis of itself, an extension arm (642) connected to the rotating body (641) and a transfer stand (643) connected to the extension arm (642), and the extension arm (642) swings with the rotating body (641) to drive a wafer (7) on the transfer stand (643) to be transferred along an arc trajectory.

7.The wafer polishing system according to claim 6, characterized in that the extension arm (642) comprises a plurality of folding arm bodies which are movably connected.

8.The wafer polishing system according to claim 1, characterized in that the first transfer device (61) or the second transfer device (62) comprises a flipping shaft (651) and a clamping arm (652) connected to the flipping shaft (651), and the clamping arm (652) is configured to clamp a wafer (7) and moves with the flipping shaft (651) to drive the wafer

(7) to flip.

9.The wafer polishing system according to claim 1, characterized in that the first transfer device (61) or the second transfer device (62) comprises a horizontal shaft (661), a vertical shaft (662) capable of moving along the horizontal shaft (661), a base (663) capable of moving along the vertical shaft (662), and a claw (664) for clamping a wafer (7).

10.The wafer polishing system according to claim 9, characterized in that the first transfer device (61) or the second transfer device (62) further comprises a flipping body (665) movably connected to the base (663), the claw (664) is arranged on the flipping body (665), and the flipping body (665) drives the claw (664) to flip to turn over the wafer (7).

11.The wafer polishing system according to claim 1, characterized in that the first transfer device (61) or the second transfer device (62) comprises a pedestal (671), a lifting mechanism (672) movably connected to the pedestal (671), at least one link (673) connected to the lifting mechanism (672), a finger driving box (674), and a finger (675) for clamping or adsorbing a wafer (7).

12.The wafer polishing system according to claim 1, characterized in that the front-end module (1), the wafer cleaning unit (3) and the wafer polishing unit (2) are arranged sequentially and adjacently, the wafer cleaning unit (3) comprises a first cleaning region (31) and a second cleaning region (32) which are located on two sides of the wafer transfer passage (4), and the first cleaning region (31) and the second cleaning region (32) each comprise a plurality of cleaning tanks (33).

13.The wafer polishing system according to claim 1, characterized in that a temporary storage box (34) is arranged in the wafer cleaning unit (3) or the wafer polishing unit (2), and the third transfer station (53) is arranged corresponding to the temporary storage box (34).

14.The wafer polishing system according to claim 1, characterized in that the front-end module (1) comprises a front-end transfer mechanism (11) configured to implement wafer

transfer between the front-end module (1) and the first transfer station (51).