[0029] The first carrier plate 12 and the second carrier plate 13 are oppositely arranged inside the chamber body 11, and the first carrier plate 12 and the second carrier plate 13 are configured to carry a wafer 20.

[0030] The driving mechanism 14 is connected to the second carrier plate 13 and is configured to drive the second carrier plate 13 to move toward or away from the first carrier plate 12.

[0031] During a process in which the second carrier plate 13 moves toward the first carrier plate 12, the first carrier plate 12 and the second carrier plate 13 are configured to clamp the wafer 20 to a calibration position.

[0032] In the load lock 10 provided by the embodiment of the present disclosure, the driving mechanism 14 drives the second carrier plate 13 to move toward or away from the first carrier plate 12, such that when the second carrier plate 13 is away from the first carrier plate 12, the first carrier plate 12 and the second carrier plate 13 are suitable for placing the wafer 20 thereon, and when the second carrier plate 13 approaches the first carrier plate 12, the first carrier plate 12 and the second carrier plate 13 may clamp the carried wafer 20 to the calibration position, thereby achieving position calibration of the wafer 20. In view of this, position calibration may be performed on the wafer 20 inside the chamber body 11 of the load lock 10, so as to ensure that the wafer 20 is moved out of the load lock 10 from the calibration position, which is beneficial to reducing calibration time consumption of the wafer 20 during a subsequent transfer process, thereby improving transfer efficiency.

[0033] For example, when the driving mechanism 14 drives the second carrier plate 13 to move toward a direction away from the first carrier plate 12, the distance between the first carrier plate 12 and the second carrier plate 13 increases, and the area of a region enclosed by the first carrier plate 12 and the second carrier plate 13 increases, such that the wafer 20 is easily placed on the

[0035] During a process in which the second carrier plate 13 moves toward the first carrier plate 12, there may be various ways to stop the second carrier plate 13 at a position where the wafer 20 is clamped to the calibration position. For example, the stroke of the second carrier plate 13 may be controlled through the driving mechanism, or a movement end position of the second carrier plate 13 may be controlled through a position sensor. Further, the second carrier plate 13 may also be prevented from continuing to move through a mechanical structure, so as to stop the second carrier plate 13 at the position where the wafer 20 is clamped to the calibration position.

[0036] In some embodiments, there may be various mechanical structures for implementing the above functions. For example, the load lock 10 further includes a stop member 15, and the stop member 15 is located between the first carrier plate 12 and the second carrier plate 13 and is configured to abut against the second carrier plate 13 when the second carrier plate 13 moves toward the first carrier plate 12 until the first carrier plate 12 and the second carrier plate 13 clamp the wafer 20 to the calibration position. Exemplarily, the stop member 15 is further arranged at the bottom of the chamber body 11, and when the second carrier plate 13 moves toward the first carrier plate 12 until the first carrier plate 12 and the second carrier plate 13 clamp the wafer 20 to the calibration position, the bottom of the second carrier plate 13 abuts against the stop member 15.

[0037] Exemplarily, when the driving mechanism 14 drives the second carrier plate 13 to move toward a direction away from the first carrier plate 12, the distance between the first carrier plate 12 and the second carrier plate 13 increases, and the area of a region enclosed by the first carrier plate 12 and the second carrier plate 13 increases, such that the wafer 20 is easily placed on the first carrier plate 12 and the second carrier plate 13. When the driving mechanism 14 drives the

surface A, and thus reducing particles generated due to friction between the wafer 20 and the annular bearing surface A.

[0042] In one embodiment, as shown in FIG. 2A and FIG. 2B, there are a plurality of first carrier plates 12 and a plurality of second carrier plates 13, the plurality of first carrier plates 12 and the plurality of second carrier plates 13 are spaced apart along the vertical direction, and the plurality of first carrier plates 12 and the plurality of second carrier plates 13 are arranged in one-to-one correspondence and are configured to carry a plurality of wafers 20.

[0043] Exemplarily, a first support part 122 is arranged at the bottom of the first carrier plate 12, a plurality of first support parts 122 are stacked along the vertical direction and connected to the bottom of the chamber body 11 through first fastener 16 passing through the plurality of first support parts 122, so that the plurality of first carrier plates 12 may be spaced apart along the vertical direction. On the basis of supporting and fixing the first carrier plates 12, the first support parts 122 may further maintain a certain distance between two adjacent first carrier plates 12, so as to facilitate wafer loading and unloading operations. A second support part 132 is arranged at the bottom of the second carrier plate 13, a plurality of second support parts 132 are stacked along the vertical direction and connected to each other through second fastener 17 passing through the plurality of second support parts 132, so that the plurality of second carrier plates 13 may be spaced apart along the vertical direction. On the basis of supporting and fixing the second carrier plates 13, the second support parts 132 may further maintain a certain distance between two adjacent second carrier plates 13, so as to facilitate wafer loading and unloading operations. The first fastener 16 and the second fastener 17 include, but are not limited to, screws. The plurality of first carrier plates 12 and the plurality of second carrier plates 13 are in one-to-one correspondence, so that a plurality of wafers 20 may be simultaneously placed inside

[0046] In some other embodiments, the driving mechanism 14 includes a motor and a motor shaft (not shown in the drawings). A first end of the motor shaft is connected to the motor, and a second end of the motor shaft is connected to the second carrier plate 13. The motor drives the motor shaft to extend and retract so as to drive the second carrier plate 13 to move.

[0047] Exemplarily, the motor may be arranged at an outer side wall of the chamber body 11 adjacent to the second carrier plate 13, the first end of the motor shaft is connected to a side of the motor facing the chamber body 11, and the second end of the motor shaft passes through the outer side wall and is connected to the second carrier plate 13. The motor drives the motor shaft to extend and retract so as to drive the second carrier plate 13 to move. The principle of the motor driving the motor shaft to extend and retract is the same as the principle of the cylinder 141 driving the telescopic rod 142 to extend and retract, and details are not described herein again.

[0048] It should be noted that arrangement positions of the cylinder 141 and the motor may also be selected and adjusted according to actual needs, and the embodiments of the present disclosure are not limited thereto.

[0049] In the related art, in order to improve wafer transfer efficiency, two load locks are usually connected between the Equipment Front-End Module and the transport chamber, two bases are arranged inside the process chamber, and a vacuum manipulator may take out one wafer from each of the two load locks at one time, such that the vacuum manipulator may simultaneously transfer the two wafers onto the two bases inside the process chamber. For example, as shown in FIG. 3, the vacuum manipulator 50A is usually a single-layer dual-arm manipulator, and two lifting mechanisms (not shown in the drawings) inside the process chamber 50 lift two groups of thimbles 52 to different heights (operation S1), so as to ensure that there are different height

load lock 10B have calibration functions, after the two wafers 20 undergo position calibration through the first load lock 10A and the second load lock 10B, the relative positional relationship between the two wafers 20 may be calibrated in advance, such that the relative positional relationship between the two wafers 20 is adapted to the relative positional relationship between any two adjacent bases 51 inside the process chamber 50. For example, the distance between the two wafers 20 is equal to the distance between any two adjacent bases 51, which is equivalent to replacing part of the calibration function of the process chamber 50 in the related art. In this way, when the vacuum manipulator 50A simultaneously moves the two wafers 20 into the process chamber 50, only one wafer 20 needs to undergo position calibration to ensure that the two wafers 20 are aligned one-to-one with any two adjacent bases 51, such that the calibration function of the process chamber 50 may be achieved without relying on the two lifting mechanisms to lift the two groups of thimbles 52 to different heights. For example, the calibration function of the process chamber 50 may also be achieved when the two lifting mechanisms lift the two groups of thimbles 52 to the same height. This is also beneficial to shortening the stroke of the vacuum manipulator 50A for calibrating and placing the wafers 20, thereby enabling the valve height of the process chamber 50 to be set relatively lower and reducing the design difficulty of the calibration function inside the process chamber 50.

[0054] In one example, as shown in FIG. 5, the second carrier plate 13 and the driving mechanism 14 of the first load lock 10A are both located at a side of the first load lock 10A away from the second load lock 10B, and the second carrier plate 13 and the driving mechanism 14 of the second load lock 10B are both located at a side of the second load lock 10B away from the first load lock 10A. Such an arrangement manner enables sides of the first load lock 10A and the