CLAIMS

1. A substrate processing apparatus comprising:

a table for supporting a substrate;

a pad holder for holding a polishing pad for polishing the substrate supported by the table;

an elevating mechanism for elevating the pad holder with respect to the substrate; and

at least three centering mechanisms for pushing the substrate supported by the table in a center direction of the table to position the substrate, wherein

the at least three centering mechanisms each include a rotation shaft arranged in a peripheral area of the table and a centering member mounted to the rotation shaft, and

the centering member includes a first contact portion configured to contact the substrate when the rotation shaft rotates in a first direction and a second contact portion configured to contact the substrate when the rotation shaft rotates in a second direction opposite to the first direction.

2. The substrate processing apparatus according to claim 1, further comprising

a controller configured to perform a first positioning by rotating the rotation shafts in the first direction to push the substrate with the first contact portions, and subsequently perform a second positioning by rotating the rotation shafts in the second direction to push the substrate with the second contact portions.

3. The substrate processing apparatus according to claim 2, wherein

the controller is configured to determine a success or failure of the positioning based on rotation angles of the rotation shafts when performing the first positioning and rotation angles of the rotation shafts when performing the second positioning.

4. The substrate processing apparatus according to claim 3, wherein

the controller is configured to compare first rotation angles from initial positions of the rotation shafts when performing the first positioning with second rotation angles from the initial positions of the rotation shafts when performing the second positioning, so as to

determine that the positioning has succeeded when the first rotation angles and the second rotation angles are equal or when the second rotation angle is smaller than the first rotation angle.

5. The substrate processing apparatus according to claim 3~~ or 4~~, wherein

the controller is configured such that the controller determines that the positioning has failed and performs the first positioning again when the second rotation angle is larger than the first rotation angle.

6. The substrate processing apparatus according to claim 2~~any one of claims 2 to 5~~, wherein

the controller is configured to calculate a diameter of the substrate based on the rotation angles of the rotation shafts when performing the first positioning and the rotation angles of the rotation shafts when performing the second positioning.

7. The substrate processing apparatus according to claim 6, wherein

the controller includes a reference table for associating the rotation angles from the initial positions of the rotation shafts with the diameter of the substrate, and

the controller is configured to calculate the diameter of the substrate based on the first rotation angles from the initial positions of the rotation shafts when performing the first positioning, the second rotation angles from the initial positions of the rotation shafts when performing the second positioning, and the reference table.

8. The substrate processing apparatus according to claim 7, wherein

the controller is configured to calculate a first diameter based on the first rotation angles and the reference table, calculate a second diameter based on the second rotation angles and the reference table, compare the first diameter with the second diameter, and calculate either the first diameter or the second diameter as the diameter of the substrate when the first diameter and the second diameter are equal.

9. The substrate processing apparatus according to claim 8, wherein

the controller is configured such that the controller calculates the second diameter as the diameter of the substrate when the second diameter is larger than the first diameter.

10. The substrate processing apparatus according to claim 8 ~~or 9~~, wherein

the controller is configured such that the controller calculates the first diameter as the diameter of the substrate and performs the first positioning again when the second diameter is smaller than the first diameter.

11. A substrate processing method comprising:

an installing step of installing a substrate on a table; and

a positioning step of positioning the substrate installed on the table by pushing the substrate in a center direction of the table, wherein

the positioning step is performed using at least three centering mechanisms that each include a rotation shaft arranged in a peripheral area of the table and a centering member mounted to the rotation shaft, and

the positioning step includes:

a first positioning step of rotating the rotation shafts in a first direction to push the substrate with first contact portions of the centering members; and

a second positioning step of rotating the rotation shafts in a second direction opposite to the first direction to push the substrate with second contact portions of the centering members after the first positioning step.

12. The method according to claim 11, further comprising

a determining step of determining a success or failure of the positioning based on rotation angles of the rotation shafts when performing the first positioning and rotation angles of the rotation shafts when performing the second positioning.

13. The method according to claim 12, further comprising

a step of detecting first rotation angles from initial positions of the rotation shafts when performing the first positioning; and

a step of detecting second rotation angles from the initial positions of the rotation shafts when performing the second positioning, wherein

the determining step includes comparing the first rotation angles with the second rotation angles and determining that the positioning has succeed when the first rotation

angles and the second rotation angles are equal or when the second rotation angle is smaller than the first rotation angle.

14. The method according to claim 12~~ or 13~~, wherein

the determining step includes determining that the positioning has failed and performing the first positioning step again when the second rotation angle is larger than the first rotation angle.

15. The method according to claim 11~~any one of claims 11 to 14~~, further comprising

a diameter calculating step of calculating a diameter of the substrate based on the rotation angles of the rotation shafts when performing the first positioning step and the rotation angles of the rotation shafts when performing the second positioning step.

16. The method according to claim 15, further comprising

a step of detecting the first rotation angles from the initial positions of the rotation shafts when performing the first positioning; and

a step of detecting the second rotation angles from the initial positions of the rotation shafts when performing the second positioning, wherein

the diameter calculating step includes calculating the diameter of the substrate based on the first rotation angles, the second rotation angles, and a reference table for associating the rotation angles from the initial positions of the rotation shafts with the diameter of the substrate.

17. The method according to claim 16, wherein

the diameter calculating step includes a step of calculating a first diameter based on the first rotation angles and the reference table and a step of calculating a second diameter based on the second rotation angles and the reference table, and

the diameter calculating step includes comparing the first diameter with the second diameter and calculating either the first diameter or the second diameter as the diameter of the substrate when the first diameter and the second diameter are equal.

18. The method according to claim 17, wherein

the diameter calculating step includes calculating the second diameter as the diameter of the substrate when the second diameter is larger than the first diameter.

19. The method according to claim 17~~ or 18~~, wherein

the diameter calculating step includes calculating the first diameter as the diameter of the substrate and performing the first positioning step again when the second diameter is smaller than the first diameter.