

WHAT IS CLAIMED IS:

1. A substrate processing apparatus comprising:
 - a substrate stage configured to hold a substrate on a surface of the substrate stage;
 - a processing head configured to process a surface of the substrate;
 - an indentation detecting system configured to detect a position of an indentation in the substrate;
 - a movement motor configured to move the processing head in a radial direction of the substrate stage; and
 - a rotation motor configured to rotate the substrate stage,wherein the indentation detecting system includes:
 - a fluid injection nozzle having a tip directed vertically downward toward the surface of the substrate stage and configured to inject a fluid to a circumferential edge portion of a top surface of the substrate when the substrate is held on the surface of the substrate stage and rotated using the rotation motor;
 - a fluid meter configured to measure a physical quantity which is pressure or a flow rate of the fluid; and
 - a position detector configured to detect the position of the indentation formed in the circumferential edge portion of the substrate based on a change in the physical quantity;wherein a direction of the tip of the fluid injection nozzle is perpendicular to the holding surface of the stage;
- wherein a first distance is between an axial center of the substrate stage and a

centerline of the fluid injection nozzle and the first distance is smaller than a radius of the substrate.

2. The substrate processing apparatus of claim 1, wherein the position detector compares a difference between a newest measured value and a previously measured value of the physical quantity with a predetermined threshold value, and determines the position of the indentation based on a result of the comparison.

3. The substrate processing apparatus of claim 2, wherein the position detector determines the position of the indentation based on the rotation angle of the substrate stage when the difference reaches the threshold value.

4. The substrate processing apparatus of claim 1, wherein the position detector compares a measured value of the physical quantity with a predetermined threshold value, and determines the position of the indentation based on a result of the comparison.

5. The substrate processing apparatus of claim 4, wherein the position detector determines the position of the indentation based on the rotation angle of the substrate stage when the measured value of the physical quantity reaches the threshold value.

6. The substrate processing apparatus of claim 1, further comprising:
a controller configured to calculate a position of the substrate stage, which is required for a target region on the substrate to reach a processing position of the processing head, based on the detected position of the indentation.

7. The substrate processing apparatus of claim 1, wherein the fluid is any one of

pure water, clean air, and N₂ gas.

8. The substrate processing apparatus of claim 1, wherein the physical quantity is pressure of the fluid, and the fluid measuring device is a pressure sensor.

9. The substrate processing apparatus of claim 1, wherein the physical quantity is a flow rate of the fluid, and the fluid measuring device is a flow rate sensor.

10. The substrate processing apparatus of claim 1, wherein the processing head is a polishing head configured to polish the surface of the substrate.

11. The substrate processing apparatus of claim 1, wherein the processing head is a pencil-type cleaning tool configured to scrub the surface of the substrate.

12. The substrate processing apparatus of claim 1, wherein the first distance between the axial center of the substrate stage and the centerline of the fluid injection nozzle is equal to or greater than a second distance from the axial center of the substrate to an end of an innermost side of the indentation formed in the circumferential edge portion of the substrate.

13. A method of detecting comprising:
holding a substrate on a surface of a substrate stage;
injecting a fluid to a circumferential edge portion of a top surface of the substrate using a fluid injection nozzle having a tip directed vertically downward toward

the surface of the substrate stage while rotating the substrate and the substrate stage using a rotation motor;

measuring a physical quantity which is pressure or a flow rate of the fluid; and

detecting a position of an indentation formed in a circumferential edge portion of the substrate based on a change in the physical quantity;

wherein a direction of the tip of the fluid injection nozzle is perpendicular to the holding surface of the stage;

wherein a first distance is between an axial center of the substrate stage and a centerline of the fluid injection nozzle and the first distance is smaller than a radius of the substrate.

14. The method of claim 13, wherein the detecting the position of the indentation based on the change in the physical quantity includes comparing a difference between a newest measured value and a previously measured value of the physical quantity with a predetermined threshold value, and determining the position of the indentation based on a result of the comparison.

15. The method of claim 14, wherein the determining the position of the indentation based on the comparison result includes determining the position of the indentation based on a rotation angle of the substrate stage when the difference reaches the threshold value.

16. The method of claim 13, wherein the detecting the position of the indentation based on the change in the physical quantity includes comparing a measured value of the physical quantity with a predetermined threshold value, and determining the

position of the indentation based on a result of the comparison.

17. The method of claim 16, wherein the determining the position of the indentation based on the comparison result includes determining the position of the indentation based on a rotation angle of the substrate stage when the measured value of the physical quantity reaches the threshold value.

18. A method of detecting comprising:

holding a substrate on a substrate stage;

injecting a fluid to a circumferential edge portion of the substrate while rotating the substrate and the substrate stage;

measuring a physical quantity which is pressure or a flow rate of the fluid; and
detecting a position of an indentation formed in a circumferential edge portion of the substrate based on a change in physical quantity,

wherein the injecting the fluid to the circumferential edge portion of the substrate while rotating the substrate and the substrate stage includes injecting the fluid to the circumferential edge portion of the substrate while rotating the substrate and the substrate stage in a first direction and a second direction opposite to the first direction, and

the detecting the position of the indentation based on the change in the physical quantity includes detecting a first position of the indentation formed in the

circumferential edge portion of the substrate based on the change in the physical quantity when the substrate and the substrate stage are rotated in the first direction, detecting a second position of the indentation based on the change in the physical quantity when the substrate and the substrate stage are rotated in the second direction, and determining the position of the indentation which is an average of the first position and the second position.