

What is claimed is:

1. A polishing apparatus comprising:

a polishing table having a polishing surface;

5 a top ring having a substrate holding surface to hold a back surface of a substrate and a retaining ring to retain the substrate on the substrate holding surface, the top ring being configured to hold the substrate and to press the substrate against the polishing surface;

an imaging device configured to image an inner circumferential surface of the retaining ring; and

10 an image processor configured to process an image obtained by the imaging device to judge whether there is a foreign matter on the inner circumferential surface of the retaining ring.

2. The polishing apparatus according to claim 1, further comprising:

15 a lighting configured to emit a light to the inner circumferential surface of the retaining ring.

3. The polishing apparatus according to claim 2, wherein the lighting is turned on at the time of imaging by the imaging device, and is turned off after the imaging.

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4. The polishing apparatus according to ~~any one of claims 1 to 3~~, wherein the imaging device is arranged at a location where the imaging device images the inner circumferential surface of the retaining ring from obliquely below.

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5. The polishing apparatus according to ~~any one of claims 1 to 4~~, wherein the top ring is supported by a top ring head shaft through a top ring head so as to be oscillatable between a substrate transfer position for transferring the substrate to and from the top ring and a substrate polishing position above the polishing surface; and

the imaging device is provided at a location adjacent to the top ring head shaft.

5 6. The polishing apparatus according to claim 5, wherein the imaging device images the inner circumferential surface of the retaining ring when the top ring is located at the substrate transfer position.

10 7. The polishing apparatus according to ~~any one of claims 1 to 6~~, wherein the imaging device images the inner circumferential surface of the retaining ring when the top ring does not hold the substrate.

15 8. The polishing apparatus according to claim 7, wherein the retaining ring and the substrate holding surface are movable relative to each other in a vertical direction; and the imaging device images the inner circumferential surface of the retaining ring after a lower surface of the retaining ring is positioned lower than the substrate holding surface.

20 9. The polishing apparatus according to claim 8, wherein the top ring comprises a membrane which is an elastic membrane configured to define a plurality of pressure chambers into which a pressurized fluid is supplied, and the top ring is configured to press the substrate against the polishing surface with a fluid pressure by supplying the pressurized fluid into the plurality of pressure chambers; and

the lower surface of the retaining ring is positioned lower than the substrate holding surface by lifting the membrane constituting the substrate holding surface relative to the retaining ring.

25 10. The polishing apparatus according to claim 9, wherein the top ring comprises a carrier configured to hold the membrane and a pressure chamber formed above the carrier; and

the carrier is lifted to lift the membrane by creating a vacuum in the pressure chamber formed above the carrier.

11. The polishing apparatus according to claim 8, wherein the top ring
5 comprises a pressure chamber formed above the retaining ring; and

the retaining ring is lowered to position the lower surface of the retaining ring lower than the substrate holding surface by allowing a pressure of the pressure chamber formed above the retaining ring to be atmospheric pressure.

10 | 12. The polishing apparatus according to ~~any one of claims 1 to 11~~, wherein the imaging device comprises a CCD camera.

| 13. The polishing apparatus according to ~~any one of claims 1 to 12~~, wherein the foreign matter comprises a fragment of the substrate.

15 | 14. The polishing apparatus according to ~~any one of claims 1 to 13~~, wherein the imaging device and the image processor are incorporated in the polishing apparatus, or are capable of being incorporated in an existing polishing apparatus.