What is claimed is:

1. A polishing apparatus comprising:

a polishing table having a polishing surface;

a top ring having a top ring body and a retainer ring provided at an outer circumferential portion of the top ring body, and configured to hold a substrate to be polished and to press the substrate against the polishing surface;

a cleaning mechanism provided at a substrate transfer position for transferring the substrate to the top ring or receiving the substrate from the top ring, and having a cleaning nozzle configured to eject a cleaning liquid toward the top ring;

wherein the top ring body has a membrane configured to cover a lower surface and an outer circumferential surface of the top ring body and to hold the substrate, and the membrane has an inverted U-shaped folded-back portion at an upper end thereof and the folded-back portion is coupled to the retainer ring so that the retainer ring is vertically movable with respect to the top ring body;

wherein the retainer ring has a recess formed over an entire circumference of an inner circumferential surface of the retainer ring at a position above the lower surface of the retainer ring; and

wherein when the top ring is located at the substrate transfer position, the retainer ring is lowered downwardly with respect to the top ring body so that the lower end of the recess of the retainer ring is located at a position below the lower surface of the substrate held by the top ring, and the cleaning liquid is ejected from the cleaning nozzle toward the recess of the retainer ring in a state where the retainer ring is lowered downwardly.

2. The polishing apparatus according to claim 1, wherein the cleaning mechanism further comprises a substrate release nozzle configured to eject a fluid when the substrate is released from the top ring body.

3. The polishing apparatus according to claim 1 or 2, wherein the cleaning mechanism comprises a plurality of cleaning units provided at intervals in a circumferential direction so as to surround the top ring, and each cleaning unit has the cleaning nozzle; and

wherein the cleaning nozzle is configured to eject the cleaning liquid toward the recess of the retainer ring to clean the recess of the retainer ring while the top ring is rotated.

4. The polishing apparatus according to any one of claims 1 to 3, wherein the cleaning mechanism doubles as a support member configured to receive the substrate from the top ring.

5. The polishing apparatus according to any one of claims 1 to 4, wherein the retainer ring has a hydrophobic surface on an inner circumferential surface below the recess.

6. The polishing apparatus according to any one of claims 1 to 5, wherein the top ring body has a hydrophobic surface at least below the surface facing the recess.

7. The polishing apparatus according to any one of claims 1 to 6, wherein the recess of the retainer ring has a cross-sectional shape which is curved in a substantially arcuate shape whose curvature in a lower part or a central part is larger than that in an upper part.

8. The polishing apparatus according to any one of claims 1 to 6, wherein the recess of the retainer ring has a cross-sectional shape formed by a straight line extending obliquely upward from a lower part of the inner circumferential surface of the retainer ring and a straight line extending obliquely downward from an upper part of the inner circumferential surface of the retainer ring, the two straight lines intersecting at an obtuse angle.

9. The polishing apparatus according to any one of claims 1 to 8, wherein the cleaning nozzle is set such that an inclined angle with respect to a horizontal plane is in the range of 20° to 80°.

10. The polishing apparatus according to any one of claims 1 to 9, wherein the cleaning nozzle is provided to be inclined at a predetermined angle toward an upstream side of rotation direction of the retainer ring with respect to a vertical plane.

11. The polishing apparatus according to any one of claims 2 to 10, wherein the cleaning mechanism has a push-up mechanism configured to push up the retainer ring when the substrate is released from the top ring body.

12. The polishing apparatus according to any one of claims 1 to 11, wherein the cleaning nozzle is capable of ejecting a gas.

13. The polishing apparatus according to any one of claims 1 to 12, wherein the cleaning mechanism has another cleaning nozzle configured to clean a lower surface and/or an outer circumferential surface of the retainer ring.