

What is claimed is:

1. A polishing method of polishing a substrate by bringing the substrate into sliding contact with a polishing pad while supplying a polishing liquid, which has passed through a filter, onto the polishing pad, comprising:

performing a filter cleaning process of passing the polishing liquid intermittently through the filter when the substrate is not polished; and

after the filter cleaning process, polishing the substrate on the polishing pad while supplying the polishing liquid that has passed through the filter onto the polishing pad, with a physical quantity of the polishing liquid kept constant, the physical quantity being one of flow rate and pressure of the polishing liquid.

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

while performing the filter cleaning process, discharging the polishing liquid that has passed through the filter outside the polishing pad or recovering the polishing liquid that has passed through the filter.

3. The polishing method according to claim 1, further comprising:

while performing the filter cleaning process, supplying the polishing liquid that has passed through the filter onto the polishing pad; and

supplying a cleaning fluid onto the polishing pad to remove the polishing liquid from the polishing pad,

wherein polishing of the substrate is then performed on the polishing pad while supplying the polishing liquid that has passed through the filter onto the polishing pad.

4. The polishing method according to claim 1, wherein in the filter cleaning process, a time interval during which the polishing liquid is supplied is longer than a time interval during which the supply of the polishing liquid is stopped.

5. The polishing method according to claim 1, wherein the filter cleaning process comprises passing the polishing liquid through the filter while switching the physical quantity between a first value and a second value alternately, the second value being larger than the first value, the first value and the second value being changed during the filter cleaning process.

6. The polishing method according to claim 1, further comprising:

after the filter cleaning process, passing the polishing liquid through the filter while increasing the physical quantity of the polishing liquid until the physical quantity reaches a predetermined set value, the physical quantity being one of flow rate and pressure of the polishing liquid,

wherein after the physical quantity has reached the predetermined set value, polishing of the substrate is then performed on the polishing pad while supplying the polishing liquid that has passed through the filter onto the polishing pad, with the physical quantity kept constant.

7. A polishing method of polishing a substrate by bringing the substrate into sliding contact with a polishing pad while supplying a polishing liquid, which has passed through a filter, onto the polishing pad, comprising:

when the substrate is not polished, performing a filter cleaning process of passing the polishing liquid continuously through the filter while keeping a physical quantity of the polishing liquid larger than a predetermined set value corresponding to the physical quantity at which the substrate is to be polished, the physical quantity being one of flow rate and pressure of the polishing liquid; and

after the filter cleaning process, polishing the substrate on the polishing pad while supplying the polishing liquid that has passed through the filter onto the polishing pad, with the physical quantity kept constant at the predetermined set value.

8. The polishing method according to claim 7, further comprising:

while performing the filter cleaning process, discharging the polishing liquid that has passed through the filter outside the polishing pad or recovering the polishing liquid that has passed through the filter.

9. The polishing method according to claim 7, further comprising:

while performing the filter cleaning process, supplying the polishing liquid that has passed through the filter onto the polishing pad; and

supplying a cleaning fluid onto the polishing pad to remove the polishing liquid from the polishing pad,

wherein polishing of the substrate is then performed on the polishing pad while supplying the polishing liquid that has passed through the filter onto the polishing pad.

10. The polishing method according to claim 7, further comprising:

after the filter cleaning process, passing the polishing liquid through the filter while increasing the physical quantity of the polishing liquid until the physical quantity reaches a predetermined set value,

wherein after the physical quantity has reached the predetermined set value, polishing of the substrate is then performed on the polishing pad while supplying the polishing liquid that has passed through the filter onto the polishing pad, with the physical quantity kept constant.

11. The polishing method according to claim 10, wherein after the filter cleaning process, decreasing the physical quantity to a predetermined initial value, and then increasing the physical quantity until the physical quantity reaches the predetermined set value.

12. A polishing apparatus for polishing a substrate by bringing the substrate

into sliding contact with a polishing pad while supplying a polishing liquid onto the polishing pad, comprising:

- a polishing table configured to support the polishing pad;

- a top ring configured to press the substrate against the polishing pad; and

- a polishing-liquid supply structure configured to supply the polishing liquid onto the polishing pad,

- the polishing-liquid supply structure includes:

- a slurry supply nozzle configured to supply the polishing liquid onto the polishing pad;

- a delivery pipe configured to deliver the polishing liquid to the slurry supply nozzle;

- an on-off valve configured to open and close the delivery pipe; and

- a filter coupled to the delivery pipe,

- wherein the polishing-liquid supply structure is configured to perform a filter cleaning process by causing the on-off valve to perform its opening and closing operations predetermined number of times to allow the polishing liquid to pass through the filter intermittently when the substrate is not polished, and

- wherein the polishing-liquid supply structure is further configured to keep a physical quantity of the polishing liquid constant after the filter cleaning process, the physical quantity being one of flow rate and pressure of the polishing liquid.

13. The polishing apparatus according to claim 12, wherein the slurry supply nozzle is configured to discharge the polishing liquid that has intermittently passed through the filter outside the polishing pad.

14. The polishing apparatus according to claim 12, further comprising a pad cleaning structure configured to supply a cleaning fluid onto the polishing pad,

- the slurry supply nozzle is configured to supply the polishing liquid that has

intermittently passed through the filter onto the polishing pad, and

the pad cleaning structure is configured to supply the cleaning fluid onto the polishing pad to remove the polishing liquid from the polishing pad.

15. The polishing apparatus according to claim 12, wherein in the filter cleaning process, a time interval during which the polishing liquid is supplied is longer than a time interval during which the supply of the polishing liquid is stopped.

16. The polishing apparatus according to claim 12, wherein the filter cleaning process comprises passing the polishing liquid through the filter while switching the physical quantity between a first value and a second value alternately, the second value being larger than the first value, and

wherein the polishing-liquid supply structure is configured to change the first value and the second value during the filter cleaning process.

17. The polishing apparatus according to claim 12, wherein:

the polishing-liquid supply structure further includes a regulator configured to regulate the physical quantity of the polishing liquid that is to pass through the filter, the physical quantity being one of flow rate and pressure of the polishing liquid; and

the regulator is configured to increase the physical quantity until the physical quantity reaches a predetermined set value after the on-off valve has performed the opening and closing operations the predetermined number of times, and to keep the physical quantity constant after the physical quantity has reached the predetermined set value.

18. A polishing apparatus for polishing a substrate by bringing the substrate into sliding contact with a polishing pad while supplying a polishing liquid onto the polishing pad, comprising:

a polishing table configured to support the polishing pad;
a top ring configured to press the substrate against the polishing pad; and
a polishing-liquid supply structure configured to supply the polishing liquid onto the polishing pad,

the polishing-liquid supply structure includes:

a slurry supply nozzle configured to supply the polishing liquid onto the polishing pad;

a filter coupled to the slurry supply nozzle; and

a regulator configured to regulate a physical quantity of the polishing liquid that is to pass through the filter, the physical quantity being one of flow rate and pressure of the polishing liquid, the polishing-liquid supply structure being configured to perform, when the substrate is not polished, a filter cleaning process of passing the polishing liquid continuously through the filter while keeping the physical quantity larger than a predetermined set value corresponding to the physical quantity at which the substrate is to be polished, and to keep the physical quantity constant at the predetermined set value after the filter cleaning process.

19. The polishing apparatus according to claim 18, wherein the slurry supply nozzle is configured to discharge the polishing liquid that has passed through the filter outside the polishing pad when the filter cleaning process is performed.

20. The polishing apparatus according to claim 18, further comprising a pad cleaning structure configured to supply a cleaning fluid onto the polishing pad,

the slurry supply nozzle is configured to supply the polishing liquid that has passed through the filter onto the polishing pad when the filter cleaning process is performed, and

the pad cleaning structure is configured to supply the cleaning fluid onto the polishing pad to remove the polishing liquid from the polishing pad.

21. The polishing apparatus according to claim 18, wherein the regulator is configured to increase the physical quantity after the filter cleaning process until the physical quantity reaches a predetermined set value, and to keep the physical quantity constant after the physical quantity has reached the predetermined set value.

22. The polishing apparatus according to claim 21, wherein the regulator is configured to, after the filter cleaning process, decrease the physical quantity to a predetermined initial value, and then increase the physical quantity until the physical quantity reaches the predetermined set value.