

WHAT IS CLAIMED IS:

1. A polishing apparatus comprising:

a polishing table configured to support a polishing pad;

a substrate holding device configured to press a substrate against the polishing pad and including an elastic film configured to form a plurality of pressure chambers to press the substrate, a head body to which the elastic film is attached, and a retainer ring disposed to surround the substrate;

a pressure control unit configured to control a pressure of the plurality of pressure chambers,

wherein the pressure control unit includes a first flow path connected to a first pressure chamber which is one of the plurality of pressure chambers, and includes a first pressure regulation mechanism and a second pressure regulation mechanism that are provided, in parallel with each other, in the first flow path, the pressure control unit being configured to control the pressure of the first pressure chamber by performing switching between the first pressure regulation mechanism and the second pressure regulation mechanism,

wherein each of the first pressure regulation mechanism and the second pressure regulation mechanism includes a pressure controller configured to regulate the pressure within the first pressure chamber, and a pressure control range of the pressure controller of the first pressure regulation mechanism is smaller than a pressure control range of the pressure controller of the second pressure regulation mechanism.

2. The polishing apparatus of claim 1, wherein, when a set pressure within the first pressure chamber reaches a first threshold value, the pressure control unit performs a switching from the first pressure regulation mechanism to the second pressure regulation mechanism, and when the set pressure within the first pressure chamber reaches a second threshold value that is lower than the first threshold value, the pressure control unit performs a switching from the second pressure regulation mechanism to the first pressure regulation mechanism.

3. The polishing apparatus of claim 1, wherein the pressure control unit includes a second flow path connected to a second pressure chamber which is one of the plurality of pressure chambers, and a third pressure regulation mechanism and a fourth pressure regulation mechanism that are provided in the second flow path in parallel with each other, and the pressure control unit is configured to control the pressure of the second pressure chamber by performing a switching between the third pressure regulation mechanism and the fourth pressure regulation mechanism.

4. The polishing apparatus of claim 3, wherein the first pressure chamber and the second pressure chamber are located adjacent to each other.

5. The polishing apparatus of claim 1, wherein the elastic film includes a side wall vertically standing up from a peripheral edge of a substrate holding surface that is abutted on the substrate and a first peripheral wall connected to the side wall, and the first pressure chamber is formed by the side wall, the first peripheral wall and the head body.

6. The polishing apparatus of claim 1, wherein the elastic film includes a side wall vertically standing up from a peripheral edge of a substrate holding surface that is abutted on the substrate, a first peripheral wall connected to the side wall, and a second peripheral wall connected to the substrate holding surface inside the first peripheral wall, and the first pressure chamber is formed by the first peripheral wall, the second peripheral wall, and the head body.

7. A method of polishing a substrate, the method comprising:

providing the substrate holding device including an elastic film configured to form a plurality of pressure chambers to press a substrate, and a pressure control unit configured to control a pressure of the plurality of pressure chambers, wherein the substrate is held by the substrate holding device and pressed against a polishing pad, thereby being polished;

controlling, by the pressure control unit, a pressure of a first pressure chamber which is one of the plurality of pressure chambers by performing switching between a first pressure regulation mechanism and a second pressure regulation mechanism which are connected to the first pressure chamber in parallel with each other,

wherein the controlling, by the pressure control unit, the pressure of the first chamber includes:

performing, when a set pressure within the first pressure chamber reaches a first threshold value, a switching from the first pressure regulation mechanism to the second pressure regulation mechanism, and

performing, when the set pressure within the first pressure chamber reaches a second threshold value that is lower than the first threshold value, a switching from the

second pressure regulation mechanism to the first pressure regulation mechanism.