What is claimed is:

1. An apparatus for regulating a surface temperature of a polishing pad, comprising:

a heat exchanger for performing heat exchange with a surface of the polishing pad, the heat exchanger having a heating flow passage and a cooling flow passage formed therein;

a heating-liquid supply pipe coupled to the heating flow passage;

a cooling-liquid supply pipe coupled to the cooling flow passage;

a first flow control valve attached to the heating-liquid supply pipe;

a second flow control valve attached to the cooling-liquid supply pipe;

a pad-temperature measuring device configured to measure a surface temperature of the polishing pad; and

a valve controller configured to operate the first flow control valve and the second flow control valve based on the surface temperature of the polishing pad,

wherein the heating flow passage and the cooling flow passage extend adjacent to each other and extend in a spiral shape,

the heating flow passage and the cooling flow passage are arranged alternately along a direction from a center to a periphery of the heat exchanger,

the heating flow passage includes first arc-shaped flow passages and first oblique flow passages, the first oblique passages extending linearly and coupling the first arc-shaped flow passages to each other, and

the cooling flow passage includes second arc-shaped flow passages and second oblique flow passages, the second oblique passages extending linearly and coupling the second arc-shaped flow passages to each other.

2. The apparatus according to claim 1, wherein the heating flow passage and the cooling flow passage are point-symmetrical.

3. The apparatus according to claim 1, wherein the heating flow passage and the cooling flow passage are arranged along a circumferential direction of the polishing pad.

4. The apparatus according to claim 1, wherein the heating flow passage and the cooling flow passage are symmetrical with respect to a radial direction of the polishing pad.

5. The apparatus according to claim 1, wherein the valve controller is configured to determine a manipulated variable for the first flow control valve and a

manipulated variable for the second flow control valve which are necessary to eliminate a difference between a target temperature and the surface temperature of the polishing pad.

6. The apparatus according to claim 1, wherein where a manipulated variable for the first flow control valve and a manipulated variable for the second flow control valve are each expressed as a numerical value ranging from 0% to 100%, the valve controller is configured to determine the manipulated variable for one of the first flow control valve and the second flow control valve by subtracting the manipulated variable for the other one of the first flow control valve and the second flow control valve from 100%.

7. A method of regulating a surface temperature of a polishing pad, comprising:

supplying a heating liquid and a cooling liquid simultaneously to a heat exchanger through a heating-liquid supply pipe and a cooling-liquid supply pipe, separately, which are independent pipes that prevent mixture of the heating liquid and the cooling liquid,

passing the heating liquid and the cooling liquid simultaneously through a heating flow passage and a cooling flow passage, respectively, of the heat exchanger to perform heat exchange between the heat exchanger and a surface of the polishing pad, the heating flow passage and the cooling flow passage being formed in the heat exchanger; and

controlling a flow rate of the heating liquid and a flow rate of the cooling liquid independently based on a surface temperature of the polishing pad.

8. The method according to claim 7, wherein the sum of the flow rate of the heating liquid and the flow rate of the cooling liquid is kept constant.

9. The method according to claim 7, wherein the heating flow passage and the cooling flow passage extend adjacent to each other and extend in a spiral shape.

10. An apparatus for regulating a surface temperature of a polishing pad, comprising:

a heat exchanger for performing heat exchange with a surface of the polishing pad, the heat exchanger having a heating flow passage and a cooling flow passage formed therein;

a heating-liquid supply pipe extending to the heating flow passage;

a cooling-liquid supply pipe extending to the cooling flow passage, the cooling-liquid supply pipe being separated from the heating-liquid supply pipe;

a first flow control valve attached to the heating-liquid supply pipe;

a second flow control valve attached to the cooling-liquid supply pipe;

a pad-temperature measuring device configured to measure a surface temperature of the polishing pad; and

a valve controller configured to operate the first flow control valve and the second flow control valve based on the surface temperature of the polishing pad.

11. A polishing apparatus comprising:

a polishing table for supporting a polishing pad thereon;

a polishing-liquid supply nozzle for supplying a polishing liquid onto a central area of the polishing pad;

a heat exchanger for performing heat exchange with a surface of the polishing pad, the heat exchanger having a heating flow passage and a cooling flow passage formed therein;

a heating-liquid supply pipe extending to the heating flow passage; and

a cooling-liquid supply pipe extending to the cooling flow passage,

wherein the heating flow passage has a first inlet located at a peripheral portion of the heat exchanger,

the cooling flow passage has a second inlet located at a peripheral portion of the heat exchanger,

the heating flow passage has a first outlet located at a central portion of the heat exchanger,

the cooling flow passage has a second outlet located at a central portion of the heat exchanger, and

the first inlet is located more inwardly in a radial direction of the polishing pad than the second inlet.