a swing cleaning member that swings between a first peripheral position and a second peripheral position of the substrate while passing a center portion of the substrate to clean a front surface of the substrate; an elongated supporting member that extends long from a third peripheral position and a fourth peripheral position of the substrate so as to pass the center portion of the substrate and supports the rear surface of the rotating substrate; and a control portion that controls a pressing force by the swing cleaning member on the substrate depending on an area of the swing cleaning member that contacts with the substrate to make constant pressure by the swing cleaning member on the substrate when the swing cleaning member protrudes from the outer circumference of the substrate, wherein at least one of the first peripheral position and the second peripheral position is disposed between a position of an outer circumference supporting member closest to the third peripheral position and the third peripheral position, or between a position of an outer circumference supporting member closest to the fourth peripheral position and the fourth peripheral position.

[0010]

A substrate cleaning apparatus of another embodiment includes a plurality of outer circumference supporting members that support outer circumference of a substrate; a swing cleaning member that swings between a first peripheral position and a second peripheral position of the substrate while passing a center portion of the substrate to clean a front surface of the substrate; and an elongated supporting member that extends long from a third peripheral position and a fourth peripheral position of the substrate so as to pass the center portion of the substrate and supports the rear surface of the rotating substrate, wherein at least one of the first peripheral position and the second peripheral position

is disposed between a position of an outer circumference supporting member closest to the third peripheral position and the third peripheral position, or between a position of an outer circumference supporting member closest to the fourth peripheral position and the fourth peripheral position, the swing cleaning member is a pencil scrub cleaning member, the pencil scrub cleaning member comprises a cleaning sponge that contacts with the front surface of the substrate and a holding member that holds the cleaning sponge, the cleaning sponge comprises a body portion whose lower surface contacts with the front surface of the substrate and a neck portion that is provided to stand on an upper surface of the body portion and is held by the holding member, and in a root end portion of the neck portion where the neck portion is connected to the body portion, a recess is provided, and in the upper surface of the body portion, a concave portion or a convex portion is provided.

[0011]

BRIEF DESCRIPTION OF THE DRAWINGS

[0012]

FIG. 1 is a plan view of a substrate processing apparatus including a substrate cleaning apparatus (cleaning unit) in one embodiment;

[0013]

FIG. 2 is a perspective view of the substrate cleaning apparatus (cleaning unit) in the one embodiment;

[0014]

CLAIMS

1. A substrate cleaning apparatus, comprising:

a plurality of outer circumference supporting members that support outer circumference of a substrate;

a swing cleaning member that swings between a first peripheral position and a second peripheral position of the substrate while passing a center portion of the substrate to clean a front surface of the substrate;

an elongated supporting member that extends long from a third peripheral position and a fourth peripheral position of the substrate so as to pass the center portion of the substrate and supports the rear surface of the rotating substrate; and

a control portion that controls a pressing force by the swing cleaning member on the substrate depending on an area of the swing cleaning member that contacts with the substrate to make constant pressure by the swing cleaning member on the substrate when the swing cleaning member protrudes from the outer circumference of the substrate, wherein

at least one of the first peripheral position and the second peripheral position is disposed between a position of an outer circumference supporting member closest to the third peripheral position and the third peripheral position, or between a position of an outer

circumference supporting member closest to the fourth peripheral position and the fourth peripheral position.

2. The substrate cleaning apparatus according to claim 1, wherein

the swinging cleaning member comprises a flat bottom face configured to clean a surface of the substrate, and

the controller is configured to control the pressing force by the swinging cleaning member on the substrate depending on an area of the swing cleaning member that contacts with the substrate when the swinging cleaning member locates at the first and the second peripheral positions and a portion of the flat bottom face protrudes from the outer circumference of the substrate.

3. The substrate cleaning apparatus according to claim 1 or 2, wherein

the swing cleaning member is a pencil scrub cleaning member, and

the pencil scrub cleaning member comprises a cleaning sponge that contacts with the front surface of the substrate and a holding member that holds the cleaning sponge, wherein

the cleaning sponge comprises a body portion whose lower surface contacts with the front surface of the substrate and a neck portion that is provided to stand on

an upper surface of the body portion and is held by the holding member, and

in the upper surface of the body portion, a concave portion or a convex portion is provided.

4. A substrate cleaning apparatus, comprising:

a plurality of outer circumference supporting members that support outer circumference of a substrate;

a swing cleaning member that swings between a first peripheral position and a second peripheral position of the substrate while passing a center portion of the substrate to clean a front surface of the substrate; and

an elongated supporting member that extends long from a third peripheral position and a fourth peripheral position of the substrate so as to pass the center portion of the substrate and supports the rear surface of the rotating substrate, wherein

at least one of the first peripheral position and the second peripheral position is disposed between a position of an outer circumference supporting member closest to the third peripheral position and the third peripheral position, or between a position of an outer circumference supporting member closest to the fourth peripheral position and the fourth peripheral position,

the swing cleaning member is a pencil scrub cleaning member,

the pencil scrub cleaning member comprises a cleaning sponge that contacts with the front surface of the substrate and a holding member that holds the cleaning sponge,

the cleaning sponge comprises a body portion whose lower surface contacts with the front surface of the substrate and a neck portion that is provided to stand on an upper surface of the body portion and is held by the holding member, and

in a root end portion of the neck portion where the neck portion is connected to the body portion, a recess is provided, and in the upper surface of the body portion, a concave portion or a convex portion is provided.

5. The substrate cleaning apparatus according to one of claims 1-4, wherein

an angle formed between a line segment AB connecting a center position A and a first peripheral position B of the substrate and a line segment AC connecting the center position A and a third peripheral position C of the substrate is set to be not greater than an angle formed between a line segment AD connecting the center position A of the substrate and a position D of the outer circumference supporting member and closest to the third peripheral position and the line segment AC connecting the center position A and the third peripheral position C of the substrate.

6. The substrate cleaning apparatus according to one of claims 1-5, wherein

the elongated supporting member is a roll member, and

in a front surface of the roll member, a plurality of convex portions are provided, wherein

an outermost convex portion of the plurality of convex portions is situated on the inside of an outer circumferential portion of the substrate.

7. The substrate cleaning apparatus according to one of claims 1-6, wherein

the elongated supporting member comprises a first rotary roll member from the center portion to the third peripheral position of the substrate and a second rotary roll member from the center portion to the fourth peripheral position of the substrate, wherein

a rotation direction of the first rotary roll member and a rotation direction of the second rotary roll member are set to be the same direction as a rotation direction of the substrate.