CLAIMS

[Claim 1] A substrate holding apparatus comprising:

a polishing head body;

a drive ring disposed below the polishing head body; and

a retainer ring fixed to the drive ring,

wherein the drive ring has an annular contact surface that contacts the retainer ring,

the contact surface has a flatness of not more than 4.6 μm in a circumferential direction of the contact surface, and

the flatness represents a difference in a height between a highest position and a lowest position of the contact surface in an entire circumference of the contact surface, and the height of the contact surface is defined as a height from a virtual reference plane extending in an entire circumference of the drive ring.

[Claim 2] The substrate holding apparatus according to claim 1, wherein an inner area of the contact surface has a flatness of not more than 4.6 μm in the circumferential direction of the contact surface, and the inner area is an area including an innermost edge of the contact surface.

[Claim 3] The substrate holding apparatus according to claim 1 or 2, wherein an outer area of the contact surface has a flatness of not more than 4.6 μm in the circumferential direction of the contact surface, and the outer area is an area including an outermost edge of the contact surface.

[Claim 4] The substrate holding apparatus according to any one of claims 1 to 3, wherein an intermediate area of the contact surface has a flatness of not more than 4.6 μm in the circumferential direction of the contact surface, and the intermediate area is located radially outwardly of an innermost edge of the contact surface and radially inwardly of an

outermost edge of the contact surface.

[Claim 5] The substrate holding apparatus according to any one of claims 1 to 4, further comprising reinforcing pins inserted into the retainer ring and fixed to a lower portion of the drive ring, the reinforcing pins being arranged apart from each other along the circumferential direction.

[Claim 6] The substrate holding apparatus according to any one of claims 1 to 5, further comprising spherical bearing configured to tiltably support the drive ring and the retainer ring.

[Claim 7] The substrate holding apparatus according to any one of claims 1 to 6, wherein a rigidity of the drive ring is greater than a rigidity of the retainer ring.

[Claim 8] The substrate holding apparatus according to claim 1, wherein the contact surface has an inner area, an outer area, and an intermediate area which are arranged concentrically, and each area has a flatness of not more than 4.6 μm in the circumferential direction of the contact surface.

[Claim 9] A method of manufacturing a drive ring used in a substrate holding apparatus configured to press a substrate against a polishing pad, comprising:

polishing a contact surface of the drive ring such that a flatness of the contact surface in a circumferential direction is not more than 4.6 μm,

wherein the contact surface is an annular contact surface that contacts the retainer ring used in the substrate holding apparatus, and

the flatness represents a difference in a height between a highest position and a lowest position of the contact surface in an entire circumference of the contact surface, and the height of the contact surface is defined as a height from a virtual reference plane

extending in an entire circumference of the drive ring.

[Claim 10] The method according to claim 9, wherein polishing the contact surface such that the flatness is not more than 4.6 μm comprises:

grinding the contact surface of the drive ring; and then

polishing the contact surface until the flatness becomes 4.6 μm or less by relatively moving the drive ring and a polishing tool while pressing the contact surface against the polishing tool in the presence of abrasive grains between the drive ring and the polishing tool.