

CLAIMS

1. An inner ring for holding a substrate, comprising:
an annular body having an inner surface configured to circumferentially surround the edge of a substrate to retain the substrate during polishing, an annular lower surface configured to be brought into contact with a polishing pad, an annular upper surface, and an outer surface,
wherein the inner surface includes a lower region adjacent to the lower surface that is a vertical cylindrical surface and an upper region that is a vertical cylindrical surface and has an inner radial diameter greater than the lower region of the inner surface, and
wherein the outer surface includes a lower region adjacent to the lower surface that is a vertical cylindrical surface, an upper region that is a vertical cylindrical surface and has a greater outer radial diameter than the lower region of the outer surface, an outwardly projecting lip between the lower region and the upper region of the outer surface, the lip including a horizontal lower surface, and a sloped area connecting the lower portion of the outer surface to the horizontal lower surface of the lip.
2. The inner ring of claim 1, wherein the annular body comprises an upper portion between the upper region of the inner surface and the upper region of the outer surface and a lower portion between the lower region of the inner surface and the lower region of the outer surface.
3. The inner ring of claim 2, wherein the upper portion is wider than the lower portion.
4. The inner ring of claim 2, wherein a width between the lower region of the inner surface and the lower surface is between 0.04 and 0.20 inches.
5. The inner ring of claim 4, wherein the width is between 0.05 and 0.15 inches.
6. The inner ring of claim 2, wherein the upper portion is formed of a material that is more rigid than the lower portion.

7. The inner ring of claim 1, wherein the upper surface includes two annular concentric recesses in the annular upper surface, and a plurality of cylindrical recesses, each cylindrical recess positioned between the two annular concentric recesses.

8. An outer ring for lateral referencing of a retaining ring, comprising:
an annular body having an inner surface, an annular lower surface configured to be brought into contact with a polishing pad, an annular upper surface, and an outer surface,
wherein the inner surface includes a lower region adjacent to the lower surface that is a vertical cylindrical surface configured to circumferentially surround the inner ring and an upper region extending between the lower region and that is sloped such that an inner radial diameter of the upper region is greater at a top of the upper region than at a bottom of the upper region, and

wherein the outer surface includes a lower region adjacent to the lower surface that is a vertical cylindrical surface, an upper region that is a vertical cylindrical surface and has a greater outer radial diameter than the lower region of the outer surface, a horizontal lower surface extending inwardly from the vertical cylindrical surface of the upper region, and a sloped area connecting the lower portion of the outer surface to the horizontal lower surface.

9. The outer ring of claim 8, wherein the annular body comprises an upper portion between the upper region of the inner surface and the upper region of the outer surface and a lower portion between the lower region of the inner surface and the lower region of the outer surface.

10. The outer ring of claim 9, wherein a width between the lower region of the inner surface and the lower surface is between 0.04 and 1.0 inches.

11. The outer ring of claim 9, wherein the upper portion is formed of a material that is more rigid than the lower portion.

12. The outer ring of claim 11, wherein the lower portion is a plastic and the upper portion is a metal.

13. The outer ring of claim 8, wherein the upper surface includes a plurality of holes to receive fasteners.

14. The outer ring of claim 13, wherein the holes are positioned such that they do not extend over the horizontal lower surface.

Claims

1. An inner ring for holding a substrate, comprising:
an annular body having an inner surface configured to circumferentially surround the edge of a substrate to retain the substrate during polishing, an annular lower surface configured to be brought into contact with a polishing pad, an annular upper surface, and an outer surface,
wherein the inner surface includes a lower region adjacent to the lower surface that is a vertical cylindrical surface and an upper region that is a vertical cylindrical surface and has an inner radial diameter greater than the lower region of the inner surface, and
wherein the outer surface includes a lower region adjacent to the lower surface that is a vertical cylindrical surface to be circumferentially surrounded by an outer ring, an upper region that is a vertical cylindrical surface and has a greater outer radial diameter than the lower region of the outer surface, an outwardly projecting lip between the lower region and the upper region of the outer surface, the lip including a horizontal lower surface, and a sloped area connecting the lower portion of the outer surface to the horizontal lower surface of the lip.
2. The inner ring of claim 1, wherein the annular body comprises an upper portion between the upper region of the inner surface and the upper region of the outer surface and a lower portion between the lower region of the inner surface and the lower region of the outer surface.
3. The inner ring of claim 2, wherein the upper portion is wider than the lower portion.
4. The inner ring of claim 2, wherein a width between the lower region of the inner surface and the lower region of the outer surface is between 0.04 and 0.20 inches.
5. The inner ring of claim 4, wherein the width is between 0.05 and 0.15 inches.
6. The inner ring of claim 2, wherein the upper portion is formed of a material that is more rigid than the lower portion.
7. The inner ring of claim 1, wherein the inner surface includes a tapered region connecting the lower region and the upper region.
8. The inner ring of claim 1, wherein the upper surface includes two annular concentric recesses in the annular upper surface, and a plurality of cylindrical recesses, each cylindrical recess positioned between the two annular concentric recesses.
9. An outer ring for lateral referencing of a inner ring, comprising:
an annular body having an inner surface, an annular lower surface configured to be brought into contact with a polishing pad, an annular upper surface, and an outer surface,

wherein the inner surface includes a lower region adjacent to the lower surface that is a vertical cylindrical surface configured to circumferentially surround the inner ring and an upper region extending between the lower region and that is sloped such that an inner radial diameter of the upper region is greater at a top of the upper region than at a bottom of the upper region, and the slope has the same inclination as a sloped area of the outer surface of the inner ring, and

wherein the outer surface includes a lower region adjacent to the lower surface that is a vertical cylindrical surface, an upper region that is a vertical cylindrical surface and has a greater outer radial diameter than the lower region of the outer surface, a horizontal lower surface extending inwardly from the vertical cylindrical surface of the upper region, and a sloped area connecting the lower portion of the outer surface to the horizontal lower surface.

10. The outer ring of claim 9, wherein the annular body comprises an upper portion between the upper region of the inner surface and the upper region of the outer surface and a lower portion between the lower region of the inner surface and the lower region of the outer surface.

11. The outer ring of claim 10, wherein a width between the lower region of the inner surface and the lower region of the outer surface is between 0.04 and 1.0 inches.

12. The outer ring of claim 10, wherein the upper portion is formed of a material that is more rigid than the lower portion.

13. The outer ring of claim 12, wherein the lower portion is a plastic and the upper portion is a metal.

14. The outer ring of claim 9, wherein the upper surface includes a plurality of holes to receive fasteners.

15. The outer ring of claim 14, wherein the holes are positioned such that they do not extend over the horizontal lower surface.