CLAIMS

1. A bottom ring configured to support a moveable edge ring, wherein the edge ring is configured to be raised and lowered relative to a substrate support, the bottom ring comprising:

an upper surface;

an annular inner diameter;

an annular outer diameter;

a lower surface; and

a plurality of vertical guide channels configured to receive respective lift pins for raising and lowering the edge ring, wherein

the guide channels extend from the lower surface to the upper surface of the bottom ring,

each of the guide channels includes a narrow region having a smaller diameter than the guide channel,

each of the guide channels has a cavity on the lower surface having a greater diameter than the guide channel, and

the bottom ring is integrally formed.

2. The bottom ring of claim 1, wherein transitions between the guide channels and the cavities are chamfered.

3. The bottom ring of claim 2, wherein the chamfered transitions have a height and width between 0.020” and 0.035” and an angle between 40° and 50°.

4. The bottom ring of claim 1, wherein a cross section of the bottom ring has an inverted “L” shape.

5. The bottom ring of claim 4, wherein the guide channels are arranged in a portion of the inverted “L” shape that extends radially inward.

6. The bottom ring of claim 1, wherein the upper surface is stepped.

7. The bottom ring of claim 1, wherein an outer corner of the bottom ring is chamfered.

8. The bottom ring of claim 1, wherein the upper surface includes at least two changes in direction.

9. The bottom ring of claim 1, wherein the bottom ring has a first outer diameter and a second outer diameter greater than the first outer diameter.

10. The bottom ring of claim 1, wherein the lower surface includes a plurality of cavities configured to be aligned with bolt holes in a baseplate of the substrate support.