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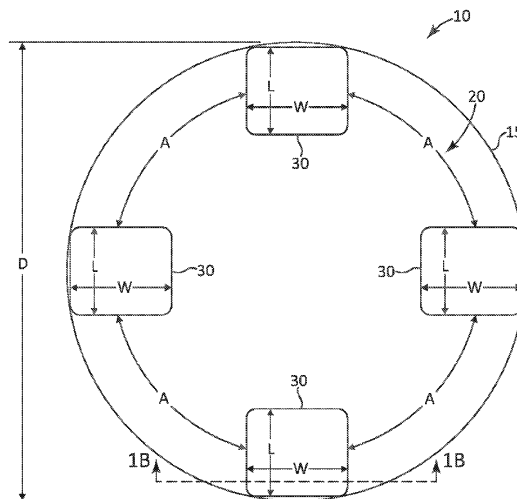


Figure 1A

(57) **Abstract:** A pad conditioner and chemical mechanical planarization (CMP) pad conditioner assembly for a CMP assembly are disclosed. The pad conditioner includes a substrate having a first surface and a second surface opposite the first surface. A plurality of protrusions protrude away from the first surface in a direction that is normal to the first surface. The plurality of protrusions are arranged in a plurality of rows. A first row of the plurality of rows is offset from a second row of the plurality of rows.

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