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*[Continued on next page]*

**(54) Title:** METHODS AND APPARATUS FOR THERMAL BASED SUBSTRATE PROCESSING WITH VARIABLE TEMPERATURE CAPABILITY

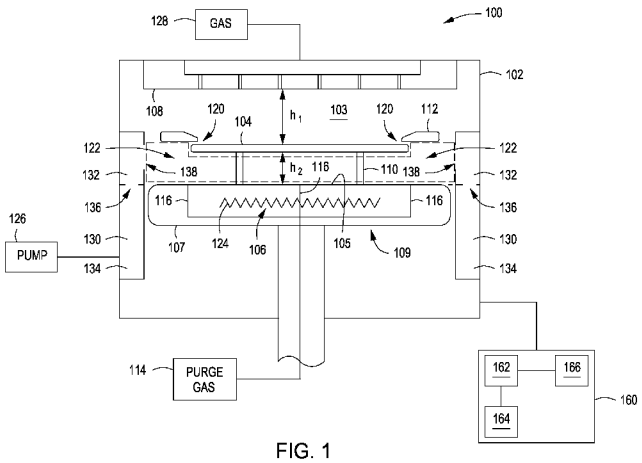


FIG. 1

**(57) Abstract: A** substrate support may include a body; an inner ring disposed about the body; an outer ring disposed about the inner ring forming a first opening therebetween; a first seal ring disposed above the first opening; a shadow ring disposed above the inner ring, extending inward from the outer ring and forming a second opening between the shadow and outer rings; a second seal ring disposed above the second opening; a space at least partially defined by the body and the inner, outer, first, second, and shadow rings; a first gap defined between a processing surface of a substrate when present and the shadow ring; and a plurality of second gaps fluidly coupled to the space; wherein the first gap and the plurality of second gaps are configured such that, when a substrate is present, a gas provided to the space flows out of the space through the first gap.

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**B. FIELDS SEARCHED**

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eKOMPASS(KIPO internal) & Keywords: substrate, variable, temperature, ring, inner, outer, seal, shadow, focus, body, gap, heater, control.

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

| Category* | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
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| A | US 2008-0210379 A1 (MIYAGAWA MASAAKI et al.) 04 September 2008<br>See abstract, claims 1,7 and figures 1-3. | 1-15 |
| A | US 2007-0169891 A1 (AKIRA K0SHIISHI et al.) 26 July 2007<br>See abstract, claim 1 and figures 1,2,10. | 1-15 |
| A | US 2003-0062128 A1 (KAZUKI DENPOH) 03 April 2003<br>See abstract, claim 1 and figures 1,2. | 1-15 |

☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

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