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UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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*Ex parte* RAMESH CHANDRASEKHARAN, JEREMY TUCKER,  
KARL LEESER, and ALAN SCHOEPP

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Appeal 2018-007412  
Application 13/934,624  
Technology Center 1700

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Before ROMULO H. DELMENDO, BEVERLY A. FRANKLIN, and  
JEFFREY R. SNAY, *Administrative Patent Judges*.

SNAY, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

Pursuant to 35 U.S.C. § 134(a), Appellant<sup>1</sup> appeals from the  
Examiner's decision to reject claims 1, 2, 4, 5, 7, 8, 10, 12, 14, 16, and 18–  
20.<sup>2</sup> We have jurisdiction under 35 U.S.C. § 6(b).

We REVERSE.

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<sup>1</sup> We use the word Appellant to refer to “applicant” as defined in 37 C.F.R. § 1.42(a). Appellant identifies Lam Research Corporation as the real party in interest. Appeal Br. 3.

<sup>2</sup> Claims 9, 11, and 15 are withdrawn. Final Act. 2.

## BACKGROUND

The invention relates to a plasma processing apparatus. Spec. ¶ 1.

Claim 1 reads:

1. A deposition apparatus for processing semiconductor substrates having an isothermal processing zone, comprising:
  - a chemical isolation chamber in which semiconductor substrates are processed;
  - a process gas source in fluid communication with the chemical isolation chamber for supplying a process gas into the chemical isolation chamber;
  - a showerhead module which delivers process gases from the process gas source to the isothermal processing zone wherein the showerhead module includes a faceplate wherein a lower surface of the faceplate forms an upper wall of a cavity defining the isothermal processing zone; a backing plate; an isolation ring which surrounds the faceplate and the backing plate wherein the isolation ring supports the backing plate; a support element which attaches the faceplate to the backing plate; and at least one compression seal which forms an outer perimeter of a central plenum between the faceplate and the backing plate wherein a contact area between the support element and the faceplate is less than 1% of the total surface area of the faceplate, the compression seal comprising an annular lever seal which is compressed between the faceplate and the backing plate;
  - a substrate pedestal module configured to heat and support a semiconductor substrate wherein an upper surface of the pedestal module forms a lower wall of the cavity defining the isothermal processing zone within the chemical isolation chamber,
  - wherein the faceplate is a ceramic faceplate and the deposition apparatus further comprises an annular RF contact made of a metallic strip having at least one bend wherein the RF contact is electrically connected to an RF electrode embedded in the ceramic faceplate and wherein the annular RF contact forms the outer perimeter of an outer gas plenum between the backing plate and the ceramic faceplate;
  - wherein the support element comprises at least one

upwardly extending projection which contacts the ceramic faceplate, wherein the at least one upwardly extending projection is located on an inner annular flange of the isolation ring, wherein the inner annular flange of the isolation ring underlies an outer portion of the ceramic faceplate; and

wherein the at least one compression seal comprises first and second compression seals wherein the first compression seal is a first annular lever seal which is compressed between the faceplate and the backing plate and forms an inner gas plenum between the faceplate and the backing plate and the second compression seal is a second annular lever seal which is compressed between the faceplate and the backing plate wherein the second lever seal surrounds the first lever seal and forms an intermediate gas plenum which surrounds the inner gas plenum, and wherein an outer gas plenum surrounds the intermediate gas plenum.

Appeal Br. 30–31 (Claims Appendix).

Independent claim 12 generally is directed to the showerhead module element recited in claim 1. Each remaining claim on appeal depends from claim 1 or 12.

## REJECTIONS

All claims on appeal stand rejected under 35 U.S.C. § 103 as unpatentable over White,<sup>3</sup> Fischer,<sup>4</sup> Ehrlich,<sup>5</sup> Tomoyasu,<sup>6</sup> and Sabri.<sup>7</sup>

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<sup>3</sup> US 2005/0183827 A1, published August 25, 2005.

<sup>4</sup> US 2008/0242085 A1, published October 2, 2008.

<sup>5</sup> US 2013/0299605 A1, published November 14, 2013.

<sup>6</sup> US 5,900,103, issued May 4, 1999.

<sup>7</sup> US 2012/0222815 A1, published September 6, 2012.

### OPINION

Each independent claim recites “a support element which attaches the faceplate to the backing plate.” Appellant argues, *inter alia*, the Examiner erred in finding White discloses a support element that attaches the faceplate to the backing plate, as claimed. *See e.g.*, Appeal Br. 20 (“[S]howerhead 22 is not ‘attached’ to wall 18.”). We are persuaded the Examiner has not identified evidence sufficient to support the finding that White meets the recited attachment. Accordingly, we do not sustain the rejection for the reasons set forth in Appellant’s briefs. We add the following for emphasis.

Relevant to Appellant’s principal argument on appeal, the Examiner finds that Figures 1, 2, and 5 of White depict a plasma processing apparatus having a showerhead module formed by faceplate 22, backing plate 18, isolation ring 24, and support element 54. Final Act. 3.

White’s Figure 2 is reproduced below.

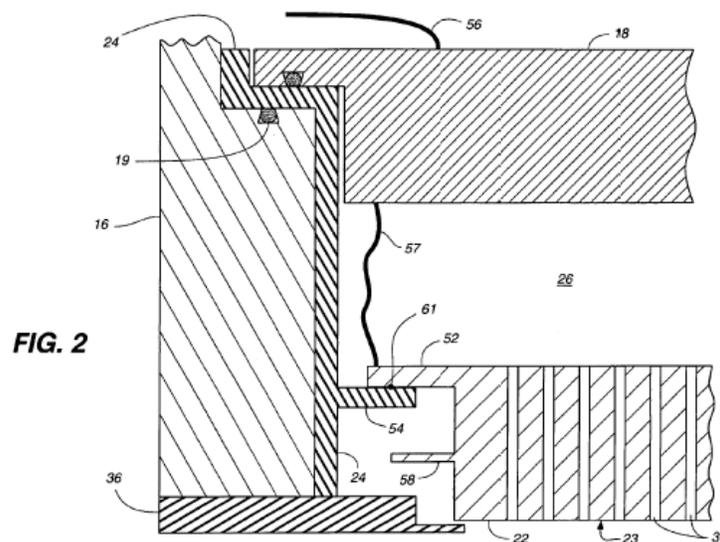


Figure 2 is an expanded sectional view of a shower head module.

As Appellant points out (Appeal Br. 20), White positions faceplate 22 by providing shelf 54 on which faceplate 22 is seated and is free to slide, to

accommodate radial expansion and contraction of the faceplate due to temperature changes. White ¶ 60. Appellant contends that because White's faceplate can freely slide, it is not attached. Appeal Br. 20.

The Examiner responds that "the term 'attach' can simply mean to join or to connect," and that Appellant's claims do not require the faceplate and backing plate to be "directly" attached. Ans. 11. Even accepting the Examiner's stated interpretation of "attach," we are persuaded of reversible error. Particularly, the Examiner fails to provide evidence or reasoning sufficient to show that White's arrangement would meet even an indirect attachment of the depicted faceplate 22 and plate 18. The Examiner identifies White's shelf 54 and dielectric liner 24 as the recited support element. Final Act. 3. However, the Examiner does not explain how these elements in White indirectly attach plates 22 and 18. To the contrary, White expressly requires that plate 22 is "free to slide across the top surface of the shelf" to accommodate thermal expansion and contraction. White ¶ 60. That is, White's faceplate is configured to freely move relative to plate 18. As such, the Examiner's reasoning that White's plates 22 and 18 are joined or connected, such that they are indirectly attached, is not supported by a preponderance of the evidence.

Accordingly, the rejection is not sustained.

#### CONCLUSION

The Examiner's decision rejecting claims 1, 2, 4, 5, 7, 8, 10, 12, 14, 16, and 18–20 is reversed.

DECISION SUMMARY

In summary:

<b>Claim(s) Rejected</b>	<b>35 U.S.C. §</b>	<b>Reference(s)/Basis</b>	<b>Affirmed</b>	<b>Reversed</b>
1, 2, 4, 5, 7, 8, 10, 12, 14, 16, 18– 20	103(a)	White, Fischer, Ehrlich, Tomoyasu, Sabri		1, 2, 4, 5, 7, 8, 10, 12, 14, 16, 18– 20

REVERSED