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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte JENNIFER Y. SUN and SUMANTH BANDA

Appeal 2019-005593
Application 13/988,656
Technology Center 1700

Before ROMULO H. DELMENDO, KAREN M. HASTINGS, and
JAMES C. HOUSEL, *Administrative Patent Judges*.

DELMENDO, *Administrative Patent Judge*.

DECISION ON APPEAL

The Appellant¹ appeals under 35 U.S.C. § 134(a) from the Primary Examiner’s final decision to reject claims 9–11, 14, and 16–19.² We have jurisdiction under 35 U.S.C. § 6(b).

We affirm.

¹ We use the word “Appellant” to refer to “applicant” as defined in 37 C.F.R. § 1.42—i.e., the Inventors (Application Data Sheet filed May 21, 2013 at 1). The Appellant identifies “Applied Materials, Inc.” as the real party in interest (Appeal Brief filed January 28, 2019 (“Appeal Br.”) at 3).

² See Appeal Br. 10–11; Reply Brief filed July 9, 2019 (“Reply Br.”) at 2–3; Final Office Action entered July 13, 2018 (“Final Act.”) at 2–5; Advisory Action entered October 19, 2018 (“Adv. Act.”) at 1–4; Examiner’s Answer entered May 16, 2019 (“Ans.”) at 3–4.

I. BACKGROUND

The subject matter on appeal relates to a semiconductor process chamber component in which first and second surfaces are joined by an adhesive material having a Young's modulus lower than 300 psi (Specification filed May 21, 2013 ("Spec.") ¶¶ 5–6). Representative claim 9 is reproduced from the Claims Appendix to the Appeal Brief, as follows:

9. A semiconductor chamber component, comprising:
 - a first surface disposed adjacent a second surface, *wherein the first surface is a gas distribution plate and the second surface is a base plate*; and
 - an adhesive material coupling the first surface to the second surface, wherein the adhesive material has a Young's modulus lower than 300 psi, wherein *the adhesive material is a disk shape perforated sheet* having an elongation greater than 150 percent, wherein the perforated sheet includes a plurality of pre-formed apertures which are located to align with apertures of the gas distribution plate and apertures of the base plate, wherein the adhesive material is fabricated from a material selected from the group consisting of acrylic and silicone based compounds, *wherein the perforated sheet comprises apertures in a grid, polar array or radial pattern.*

(Appeal Br. 13 (emphases added)).

II. REJECTION ON APPEAL

On appeal, claims 9–11, 14, and 16–19 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Fujii,³ Gaynes et al.⁴ ("Gaynes"), and Kanno et al.⁵ ("Kanno") (Ans. 3–4; Adv. Act. 1–4 (entering an Amendment filed

³ US 6,831,307 B2, issued December 14, 2004.

⁴ US 2003/0128518 A1, published July 10, 2003.

⁵ US 2006/0291132 A1, published December 28, 2006.

September 24, 2018, in which, *inter alia*, claim 9 was revised and claim 12 was canceled); Final Act. 2–5).⁶

III. DISCUSSION

1. *Grouping of Claims*

The Appellant argues claims 9–11, 14, and 16–19 together under a single heading (Appeal Br. 10–11). Therefore, we decide this appeal on the basis of claim 9, which we designate as representative pursuant to 37 C.F.R. § 41.37(c)(1)(iv). Claims 10, 11, 14, and 16–19 stand or fall with claim 9.

2. *The Examiner’s Position*

The Examiner finds that Fujii describes a semiconductor processing chamber in which an adhesive layer with a Young’s modulus of less than 100 MPa and an elongation of not lower than 100 percent is used to join a metal layer to a ceramic layer, wherein a hole in the adhesive layer has a diameter that is substantially similar to the diameters in the holes in the metal and ceramic layers (Final Act. 4). The Examiner relies on Gaynes to establish that a person having ordinary skill in the art would have been led to use a silicone-based adhesive in Fujii to reduce thermal distortion (Final Act. 4). The Examiner acknowledges that Fujii, as modified in view of Gaynes, does not disclose an adhesive layer that has apertures or holes in “a grid, polar array or radial pattern,” as recited in claim 9, but relies on Kanno’s Figure 11 for this limitation (Ans. 4; Final Act. 4–5). Specifically, the Examiner concludes that “[i]t . . . would have been obvious to have placed

⁶ In the Final Action (Final Act. 2–3), the claims were also rejected under 35 U.S.C. § 112, ¶ 1, as lacking enablement. That rejection is not before us because it has been withdrawn (Ans. 3).

the cooling holes of Fujii in view of Gaynes . . . in a radial pattern in order to insure good gas flow because of the teachings of Kanno” (Final Act. 5).

3. *The Appellant’s Contentions*

The Appellant does not dispute the Examiner’s articulated reason for combining Fujii and Gaynes—i.e., that a person having ordinary skill in the art would have been prompted to substitute Fujii’s acrylic adhesive, which falls within the scope of claim 9, with Gaynes’s silicone adhesive, which also falls within the scope of claim 9 (Appeal Br. 10). Rather, the Appellant contends that: Fujii’s adhesive sheet does not have apertures aligned with apertures from a gas distribution plate and apertures of a base plate in the manner as required by claim 9; and neither Gaynes nor Kanno makes up for this alleged deficiency in Fujii (*id.* at 10–11). Specifically, the Appellant argues that Fujii does not have apertures in a “grid, polar array or radial pattern” (*id.* at 10) and that Fujii’s adhesive sheet is used in a substrate support assembly (i.e., an electrostatic chuck (ESC) used to support a substrate)—not between “a gas distribution plate” (made of, e.g., ceramic as specified in dependent claim 11) and “a base plate” (made of, e.g., metallic material as specified in dependent claim 11) (*id.*).

4. *Opinion*

The Appellant’s arguments fail to identify reversible error in the Examiner’s rejection. *In re Jung*, 637 F.3d 1356, 1365 (Fed. Cir. 2011).

As the Examiner correctly finds (Final Act. 4; Ans. 4), Fujii describes a semiconductor processing system (e.g., CVD system), which would necessarily include a processing chamber, comprising, *inter alia*, an electrostatic chuck (semiconductor mounting member 1) including a ceramic substrate 2 that is joined to a metal member 7 via an adhesive sheet 4

(preferably based on a flexible acrylic or epoxy resin) having a Young's modulus of less than 100 MPa and an elongation not lower than (i.e., equal to or greater than) 100 percent, more preferably not lower than 150 percent (Fujii col. 2, ll. 3–8; col. 3, l. 28–col. 4, l. 18; Fig. 3). Fujii discloses a first gas supply hole **18a** in the ceramic substrate **2**, a second gas supply hole **18b** in the metal member **7**, and a hole having the same or similar diameter as **18a**, **18b** in adhesive sheet **4** in order to supply back side gas through the metal member **7** for cooling the semiconductor wafer that would be mounted on adsorption face **2a** of the ceramic substrate **2** (*id.* at col. 3, ll. 39–47; Fig 3).

Thus, contrary to the Appellant's belief, the limitations "gas distribution plate" and "base plate" in claim 9, which may be made from a ceramic and metal, respectively (claim 11), fail to distinguish the claimed subject matter over Fujii's ceramic substrate **2** and metal member **7**, which is also designed to supply or distribute cooling gas. That is, we have not been directed to any language in claim 9 that would preclude the specified "gas distribution plate" and "base plate" from being parts of an electrostatic chuck assembly as in Fujii. *See In re Hiniker Co.*, 150 F.3d 1362, 1369 (Fed. Cir. 1998) (The "name of the game is the claim" and unclaimed features cannot impart patentability to claims); *In re Self*, 671 F.2d 1344, 1348 (CCPA 1982) ("[The A]ppellant's arguments fail from the outset because . . . they are not based on limitations appearing in the claims.").

Although the Appellant is correct that Fujii does not disclose the adhesive sheet **4** as having "apertures in a grid, polar array or radial pattern," as recited in claim 9, we discern no reversible error in the Examiner's determination that Kanno would have provided the requisite motivation or

suggestion for a person having ordinary skill in the art to provide “apertures in a grid, polar array or radial pattern” in Fujii’s system. Specifically, Kanno teaches providing through holes **30** both in the center of an electrostatic chuck **8** and near the outer circumference thereof to introduce cooling gas **18** (Kanno ¶ 32; Fig. 11). Kanno states:

As a result of this, an unnecessary temperature rise of the wafer is suppressed by ensuring the thermal conductivity between the wafer and the ceramics film. Incidentally, though not described in detail in this embodiment, the groove pattern of the surface of the electrostatic chuck **8** is optimized so that the helium gas introduced from the center spread thoroughly to the outer circumference of the wafer while minimizing pressure losses.

Hence, Kanno would have provided ample motivation for a person having ordinary skill in the art to modify Fujii in the manner claimed by the Appellant to suppress any unnecessary temperature rise of the wafer and to optimize the distribution of the cooling gas thoroughly to the outer circumference of the wafer while minimizing pressure losses. *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 417 (2007) (“[I]f a technique has been used to improve one device, and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way, using the technique is obvious unless its actual application is beyond his or her skill.”).

The Appellant’s arguments directed to Gaynes and Kanno amount to an attack against these references individually rather than an argument based on what the collective teachings in all three references would have suggested to a person having ordinary skill in the art. Therefore, they are ineffective. *In re Keller*, 642 F.2d 413, 426 (CCPA 1981) (“[O]ne cannot show non-obviousness by attacking references individually where, as here, the rejections are based on combinations of references.”).

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For these reasons, and those well-stated by the Examiner, we uphold the Examiner's rejection.

IV. CONCLUSION

In summary:

Claims Rejected	35 U.S.C. §	Reference(s)/Basis	Affirmed	Reversed
9-11, 14, 16-19	103(a)	Fujii, Gaynes, Kanno	9-11, 14, 16-19	

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a).

AFFIRMED