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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte ROMAN DRACHEV, MARK LOBODA,
DARREN HANSEN, and EDWARD SANCHEZ

Appeal 2016-000240
Application 14/058,167
Technology Center 1700

Before KAREN M. HASTINGS, GEORGE C. BEST, and
N. WHITNEY WILSON, *Administrative Patent Judges*.

WILSON, *Administrative Patent Judge*.

DECISION ON APPEAL

Appellants¹ appeal under 35 U.S.C. § 134 from the September 11, 2014 decision of the Examiner finally rejecting claims 1–4 and 6–10. We have jurisdiction over the appeal under 35 U.S.C. § 6(b).

We affirm.

¹ Appellants identify the real party in interest as Dow Corning Corporation (Br. 3).

CLAIMED SUBJECT MATTER

Appellants' invention is directed to a method for growing a silicon carbide crystalline semiconductor material by vapor deposition onto a seed crystal, which is provided on a supporting shelf (Spec. ¶¶ 3, 27, 30; Title). Independent claim 1 is representative of the claims on appeal, and is reproduced below from the Claims Appendix to the Brief (*key claim limitations shown in italics*):

1. A method of forming an SiC crystal by vapor transport onto a seed crystal, the method comprising:
 - a. placing a source of silicon and carbon atoms in a graphite container, wherein the source of silicon and carbon atoms is for transport to the seed crystal to grow the SiC crystal;
 - b. *placing the seed crystal in the graphite container, and supporting the seed crystal on a shelf within the graphite container without physically attaching the seed crystal to any part of the graphite container;*
 - c. *placing a lid over the container such that the lid does not contact the seed crystal, and without physically attaching the seed to the lid, so as to allow free movement of the seed in the horizontal direction such that the seed is free to expand and contract upon heating and cooling, and placing the graphite container in a vacuum furnace;*
 - d. evacuating the furnace and establishing a flow of inert gas, and controlling the pressure at a value >600 [T]orr[;]
 - e. heating the furnace to a temperature from $2,000^{\circ}\text{C}$ to about $2,500^{\circ}\text{C}$;
 - f. evacuating the furnace to a pressure from 10 Torr to about 100 Torr;
 - g. controlling the pressure from 0.1 and 100 [T]orr[;]

h. maintaining the furnace to support crystal growth to thereby form the SiC crystal, while *preventing the seed from contacting the lid throughout the crystal growth process.*

(Br. 17; Claims App.)

REJECTIONS

(1) Claims 1–4 and 6–9 are provisionally rejected on the grounds of nonstatutory obviousness-type double patenting (OTDP) over claims 1–7 of copending Application No. 13/963,989 (hereinafter “the ’989 Application”).

(2) Claims 1 and 2 are rejected under 35 U.S.C. § 103(a) as unpatentable over Fujimoto² in view of Kondo.³

(3) Claim 3 is rejected under 35 U.S.C. § 103(a) as unpatentable over Fujimoto in view of Kondo, and further in view of Kinoshita.⁴

(4) Claim 4 is rejected under 35 U.S.C. § 103(a) as unpatentable over Fujimoto in view of Kondo, and further in view of Kinoshita and Leonard.⁵

(5) Claims 6–10 are rejected under 35 U.S.C. § 103(a) as unpatentable over Fujimoto in view of Kondo, and further in view of Vodakov.⁶

² Fujimoto et al., U.S. Patent Pub. No. 2010/0080956 A1, published Apr. 1, 2010.

³ Kondo et al., U.S. Patent Pub. No. 2002/0083892 A1, published July 4, 2002.

⁴ Kinoshita et al., U.S. Patent Pub. No. 2007/0176531 A1, published Aug. 2, 2007.

⁵ Leonard et al., U.S. Patent Pub. No. 2008/0008641 A1, published Jan. 10, 2008.

⁶ Vodakov et al., U.S. Patent No. 6,534,026 B2, issued Mar. 18, 2003.

We exercise our discretion not to review the Examiner’s provisional rejection of claims 1–4 and 6–9 for OTDP. *See Ex parte Jerg*, 2012 WL 1375142 at *3 (BPAI 2012) (informative) (“Panels have the flexibility to reach or not reach provisional obviousness-type double-patenting rejections.” (citing *Ex parte Moncla*, 95 USPQ2d 1884 (BPAI 2010) (precedential))). While we do not affirm the Examiner’s provisional OTDP rejection, should any claims issue from the ’989 Application, the Examiner remains free to assert a non-provisional OTDP rejection based on any such issued claims.

Appellants do not make separate substantive arguments in support of patentability of any of the claims (*see generally* Br. 10–16). Accordingly, our discussion will focus on the obviousness rejection of independent claim 1.

DISCUSSION

The Examiner finds that Fujimoto’s method of forming an SiC crystal teaches the elements of the claimed method except that

Fujimoto does not explicitly teach that the seed crystal is supported on a shelf within the graphite container without physically attaching the seed crystal to any part of the graphite container, that the lid is placed over the container without physically attaching the seed to the lid so as to allow free movement of the seed in the horizontal direction such that the seed is free to expand and contract upon heating and cooling, and that the seed is prevented from contacting the lid throughout the crystal growth process.

(Final Act. 6–7). The Examiner finds, however, that Kondo “teaches an embodiment of a seed holder wherein three hook-shaped members (7) are utilized to support a hexagonal-shaped seed crystal (3) at three corners such that the back surface of the seed (3) does not contact the lid member (1c).”

(Ans. 7 (citing Kondo Figs. 3A–B; ¶¶ 51–53)). The Examiner further finds that “seed (3) is not physically attached to the lid member (1c) and unconstrained corners of the seed crystal (3) are free to expand as a result of thermal expansion” (Ans. 7; *see* Kondo Figs. 3A–B). The Examiner concludes these figures “may be interpreted to read upon the corresponding limitations recited in claim 1” (Ans. 7).

The Examiner further finds that Figures 6A–B suggest that seed (3) is able to move freely in the horizontal direction during thermal expansion, unhindered by the internal diameter of shelf (1d), because the two halves of lid (1b) are pressed together (Final Act. 7 (citing Kondo Figs. 6A–B; ¶¶ 60–63)).

Appellants make the following principal arguments urging reversal of the obviousness Rejection (2): (a) in the applied prior art, the seed is attached to the lid, but claim 1 requires that the seed is attached to a shelf within the graphite container (Br. 10–13); and (b) the two halves of lid (1b) as found in Kondo’s Figures 6A–B do not and should not separate during the crystal growth process to avoid undesirable flow of Si and C source material therebetween (*id.* at 11–15). Appellants’ arguments are not persuasive.

With regard to argument (a), the Examiner interprets the limitation “a shelf of an insulated graphite container” to merely require that the shelf is present within the graphite container, rather than an extension of the graphite container itself (Ans. 2). The Examiner provides a detailed and supported explanation of why the claim, as so interpreted, reads on the cited art (*id.*). Appellants do not specifically challenge these findings. We determine that, based on the preponderance of the evidence of record, Appellants have not

shown reversible error in the Examiner's interpretation of the term at issue in claim 1.

Regarding argument (b), Appellants' assertions are incomplete because they do not address all of the Examiner's findings with respect to Kondo's teachings (*see, e.g.*, Ans. 3, 7). Even assuming that the Examiner's findings with respect to Kondo's Figures 6A–B are inaccurate, the Examiner has provided a detailed explanation of why a person of skill in the art would have identified Kondo's teachings in Figures 3A–B as beneficial and would have been motivated to use three hook-shaped members to support a hexagonal-shaped seed crystal at three corners (Ans. 3, 7). Implementation of such a structure, as the Examiner finds (*id.*; *see* Kondo Figs. 3A–B)), would have facilitated a method of forming an SiC crystal in which free movement of the seed is allowed in the horizontal direction while preventing the seed from contacting the lid throughout the crystal growth process. Appellants have not persuasively refuted the Examiner's explanation of why the combination of references would have been obvious, particularly with respect to Kondo's teachings in Figures 3A–B. Thus, we are not persuaded by Appellants' argument (b).

Accordingly, we determine that Appellants have not shown reversible error in the obviousness rejection over Fujimoto and Kondo, and we affirm Rejection (2). Moreover, Appellants have not offered separate substantive arguments regarding error in the rejections of dependent claims 3, 4, and 6–10 (Br. 15–16). Therefore, we also affirm Rejections (3), (4), and (5).

CONCLUSION

We AFFIRM the rejection of claims 1 and 2 under 35 U.S.C. § 103(a) as unpatentable over Fujimoto in view of Kondo.

We AFFIRM the rejection of claim 3 under 35 U.S.C. § 103(a) as unpatentable over Fujimoto in view of Kondo, and further in view of Kinoshita.

We AFFIRM the rejection of claim 4 under 35 U.S.C. § 103(a) as unpatentable over Fujimoto in view of Kondo, Kinoshita, and further in view of Leonard.

We AFFIRM the rejection of claims 6–10 under 35 U.S.C. § 103(a) as unpatentable over Fujimoto in view of Kondo, and further view of Vodakov.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a). *See* 37 C.F.R. § 1.136(a)(1)(iv).

AFFIRMED