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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte ROBERT K. MASSE,
SILVANO R. SARETTO, and JUNLI LIU BOTHELL¹

Appeal 2017-004909
Application 13/151,155
Technology Center 3700

Before KEN B. BARRETT, JAMES P. CALVE, and
FREDERICK C. LANEY, *Administrative Patent Judges*.

CALVE, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

Appellants appeal under 35 U.S.C. § 134(a) from the Final Office Action rejecting claims 1–5, 7–12, and 14–24. Appeal Br. 1–4. Claims 6, 13, and 25 have been cancelled. Amendment – Request for Reconsideration, filed July 29, 2015, 2–5. We have jurisdiction under 35 U.S.C. § 6(b).

We AFFIRM.

¹ Aerojet Rocketdyne, Inc., which is a wholly-owned subsidiary of Aerojet Rocketdyne Holdings, Inc., is identified as the real party in interest. Appeal Br. 1.

CLAIMED SUBJECT MATTER

Claims 1, 9, and 21 are independent. Claim 1 is shown below.

1. A gas generator, comprising:
a hot isostatic pressed carrier having a theoretical density of at least 97%, the carrier comprising hafnia and up to an equal part zirconia by weight, wherein the combined hafnia and zirconia, when present, comprise at least 50% of the carrier by weight; and
an active metal on a surface of the carrier.

Appeal Br. 5 (Claims Appendix).

REJECTIONS

Claims 9, 17, and 21–24 are rejected under 35 U.S.C. § 103(a) as unpatentable over Fokema (US 2007/0184971 A1, pub. Aug. 9, 2007), Alexander (US 2,984,576, iss. May 16, 1961), and Clarence (US 3,375,127, iss. Mar. 26, 1968).²

Claims 1–5, 7, 8, 10–12, 14–16, 18, and 19 are rejected under 35 U.S.C. § 103(a) as unpatentable over Fokema, Alexander, Clarence, Shen (US 2007/0093587 A1, pub. Apr. 26, 2007), and Wang (WO 97/05057, pub. Feb. 13, 1997).³

Claim 20 is rejected under 35 U.S.C. § 103(a) as unpatentable over Fokema, Alexander, Clarence, Ito (US 6,033,500, iss. Mar. 7, 2000), Yamazaki (US 2006/0137786 A1, pub. June 29, 2006), and Cavalleri (US 7,685,940 B1, pub. Mar. 30, 2010).

² We understand claim 25 to be cancelled and the Final Action's listing of claim 25 in the caption (Final Act. 2) to be a typographical error.

³ We understand claim 6 to be cancelled and the Final Action's listing of claim 6 in the caption (Final Act. 5) to be a typographical error.

ANALYSIS

*Claims 9, 17, and 21–24
Rejected Over Fokema, Alexander, and Clarence*

Appellants argue claims 9, 17, and 21–24 as a group. Appeal Br. 2–3. We select claim 9 as representative, with claims 17 and 21–24 standing or falling with claim 9. 37 C.F.R. § 41.37(c)(1)(iv).

The Examiner finds that Fokema teaches a gas generator as recited in claim 9 except for the carrier having a theoretical density of at least 97%. Final Act. 2–3. The Examiner finds that Alexander teaches a carrier density ranging from 1% to 100% of hafnia and zirconia that overlaps the claimed theoretical density rendering it obvious. *Id.* at 3. The Examiner determines a skilled artisan would have been motivated to use hafnia and zirconia with a theoretical density of at least 97% as Alexander teaches in Fokema’s catalyst so the carrier can withstand high temperatures as Clarence teaches. *Id.*

Appellants argue that Alexander teaches ceramic powders for coating metal surfaces, and it is unreasonable to use such powders as a catalyst support. Appeal Br. 2. Appellants also argue that coating the surface of Fokema’s metal catalyst with Alexander’s ceramic powder would prevent Fokema’s catalyst from functioning by covering the catalyst. *Id.*

This argument is not persuasive because the Examiner is not coating Fokema’s catalyst with Alexander’s ceramic powders. The Examiner relies on Fokema to teach a catalyst carrier made of hafnia. Final Act. 2–3 (citing Fokema, claim 4). The Examiner relies on Alexander to teach a catalyst carrier made of hafnia or zirconia and also the claimed density. *Id.* at 3 (citing Alexander, 15:5–30). The Examiner modifies Fokema’s catalyst carrier to have the claimed density, as Alexander teaches. *Id.*; Ans. 2.

Appellants argue that even if Alexander's hafnia ceramic powder was used as Fokema's carrier, the combination would not provide a carrier with a theoretical density of at least 97% via hot isostatic pressing. Appeal Br. 3. This argument also is unpersuasive of error in the Examiner's finding that Alexander teaches catalyst carriers made of hafnia or zirconia with a density range of 1% to 100% that encompasses the claimed density and renders it *prima facie* obvious. Final Act. 3; Ans. 2. Appellants have not shown error in the Examiner's findings that Alexander teaches such densities for hafnia and zirconia. Appeal Br. 2–3; Reply Br. 1. Nor have Appellants established criticality or unexpected results for the claimed density of at least 97%. Spec. 5:8–10 (“In *some* applications, the catalyst performance *improves* as density *approaches* the theoretical maximum, wherein a theoretical density of the carrier of at least 97% is *preferred*.”) (emphasis added).

The Examiner correctly interprets the “hot isostatic pressed carrier” as a product-by-process limitation that does not distinguish the claimed gas generator because Alexander discloses a carrier with the same density made by other processes. Final Act. 2; Ans. 3. The assertion that the teachings of Fokema and Alexander would not yield a carrier with a theoretical density of at least 97% via a hot isostatic pressing method (Appeal Br. 3; Reply Br. 1) does not apprise us of error in the Examiner's finding that Alexander teaches the claimed density (Final Act. 3; Ans. 2). *See In re Jung*, 637 F.3d 1356, 1365 (Fed. Cir. 2011) (approving of Board's practice as set forth in *Ex Parte Frye* of requiring appellants to identify error in a rejection); *Ex Parte Frye*, 94 USPQ 2d 1072, 1075–76 (BPAI 2010) (precedential) (a panel reviews rejections for error based on the issues identified by an appellant).

Appellants do not address the Examiner's reliance on Example 13 of Alexander, which teaches a catalyst *carrier* of hafnia or zirconia. *See* Reply Br. 1–2 (“It would not have been obvious to coat Fokema’s metal catalyst with Alexander’s powder as it would preclude the catalyst from acting as a catalyst.”). Alexander also uses the hafnia and zirconia powder sols taught therein to make crucibles, rods, and other well-*sintered*, compact products by methods that use very high temperatures and pressures like the claimed hot isostatic pressing. Alexander, 10:58–11:21. Appellants disclose that known hot isostatic pressing or *sintering* methods can be used to achieve a high theoretical density. Spec. 6:4–12 (incorporating hot isostatic pressing methods disclosed in U.S. Patent Nos. 4,952,353 and 5,080,841 and noting that sintering is an alternate method to make a hafnia carrier from powdered materials). Alexander teaches examples where the use of sintering and hot isostatic (high heat and pressure) methods produces products with high strength, good thermal shock resistance, and excellent stability toward moisture. Alexander, 10:58–11:21. Alexander teaches that these methods produce zirconia and hafnia rods of greater strength than sintered rods made from commercial zirconia and hafnia. *Id.* at 10:74–11:5. In view of the foregoing, Appellants’ attorney arguments, which are not evidence, do not persuade us that Alexander’s process does not teach or suggest a hafnia carrier with a theoretical density of at least 97% as claimed.⁴

Thus, we sustain the rejection of claims 9, 17, and 21–24.

⁴ In view of Alexander’s teachings of methods of making hafnia and zirconia products similar to methods that Appellants disclose as yielding such high theoretical densities, the Examiner had a sound basis to find that Alexander and Fokema render obvious a carrier with such a theoretical density, and Appellants’ conclusory, attorney arguments do not persuade us otherwise.

*Claims 1–5, 7, 8, 10–12, 14–16, 18, and 19
Rejected Over Fokema, Alexander, Clarence, Shen, and Wang*

Appellants argue claims 1–5, 7, 8, 10–12, 14–16, 18, and 19 as a group. Appeal Br. 3. We select claim 1 as representative, with claims 2–5, 7, 8, 10–12, 14–16, 18, and 19 standing or falling with claim 1.

The Examiner relies on Fokema and Alexander to teach a carrier with a theoretical density of at least 97% as claimed. Final Act. 5. The Examiner relies on Shen and Wang to teach carriers of equal parts zirconia and hafnia. *Id.* Appellants argue that applying Alexander’s ceramic powder as a catalyst support would destroy Fokema by coating the metal surface of the catalyst and would not provide the claimed theoretical density. Appeal Br. 3. These arguments are not persuasive for the same reasons as claim 9. Thus, we sustain the rejection of claims 1–5, 7, 8, 10–12, 14–16, 18, and 19.

*Claim 20
Rejected Over Fokema, Alexander,
Clarence, Ito, Yamazaki, and Cavalleri*

Appellants argue that nothing in Clarence, Ito, Yamazaki, or Cavalleri cures the shortcomings of Fokema and Alexander as to claim 9 from which claim 20 depends. Appeal Br. 4. Because we sustain the rejection of claim 9, this argument is not persuasive, and we sustain the rejection of claim 20.

DECISION

We affirm the rejections of claims 1–5, 7–12, and 14–24.

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

AFFIRMED