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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/631,803	06/23/2017	Gary M. Lomasney	98271US01; 67036-871PUS1	1568

26096 7590 08/28/2020

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ART UNIT	PAPER NUMBER
1715	

NOTIFICATION DATE	DELIVERY MODE
08/28/2020	ELECTRONIC

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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte GARY M. LOMASNEY, ROBERT BIANCO, MARK R. JAWOROWSKI, and SERGEY MIRONETS

Appeal 2019-006063
Application 15/631,803
Technology Center 1700

Before ROMULO H. DELMENDO, BEVERLY A. FRANKLIN, and JANE E. INGLESE, *Administrative Patent Judges*.

DELMENDO, *Administrative Patent Judge*.

DECISION ON APPEAL

The Appellant[1] appeals under 35 U.S.C. § 134(a) from the Primary Examiner's final decision to reject claims 1–7 and 9–21.[2] We have jurisdiction under 35 U.S.C. § 6(b).

We affirm.

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[1] We use the word "Appellant" to refer to "applicant" as defined in 37 C.F.R. § 1.42—i.e., "Hamilton Sundstrand Corporation" (Application Data Sheet filed June 23, 2017 at 6), which is also identified as the real party in interest (Appeal Brief filed March 18, 2019 ("Appeal Br.") at 1).

[2] *See* Appeal Br. 3–5; Reply Brief filed August 12, 2019 ("Reply Br.") at 1–3; Final Office Action entered September 28, 2018 ("Final Act.") at 2–6; Examiner's Answer entered June 10, 2019 ("Ans.") at 3–7.

I. BACKGROUND

The subject matter on appeal relates to a method for reducing surface roughness of additively manufactured components (Specification filed June 23, 2017 ("Spec.") ¶¶ 1–2). Representative claim 1 is reproduced from the Claims Appendix to the Appeal Brief, as follows:

> 1. A method for reducing surface roughness of a component, comprising:
>
> forming a layer of reactive material on a surface of a component, the surface of the component having at least one partially attached particle, whereby the reactive material substantially covers the at least one partially attached particle;
>
> dissolving the reactive material, wherein dissolving the reactive material covering the partially attached particles causes the partially attached particles to break free from the surface of the component, leaving a new smooth surface; and
>
> forming the component by additive manufacturing, *wherein the at least one partially attached particle is one of a partially melted particle and a partially sintered particle*.

(Appeal Br. 7 (emphasis added)).

II. REJECTIONS ON APPEAL

The claims on appeal stand rejected as follows:

A. Claims 1–7, 9–11, 15–19, and 21 under 35 U.S.C. § 102(a)(1) (AIA) as anticipated by Szuromi et al.[3] ("Szuromi");

B. Claim 12 under 35 U.S.C. § 103 as unpatentable over Szuromi; and

[3] US 2013/0071562 A1, published March 21, 2013.

C. Claims 13, 14, and 20 under 35 U.S.C. § 103 as unpatentable over Szuromi in view of Gorman et al.[4] ("Gorman").

(Ans. 3–7; Final Act. 2–6).

III. DISCUSSION

Rejection A (Anticipation: Claims 1–7, 9–11, 15–19, & 21). With respect to Rejection A, the Appellant provides a separate argument for claim 21, which depends from claim 1, but otherwise argues the other rejected claims together, focusing on independent claims 1 and 15 collectively (Appeal Br. 3–5). Therefore, pursuant to 37 C.F.R. § 41.37(c)(1)(iv), we confine our discussion of the rejection to claim 1, which we select as representative, and separately argued claim 21. By this rule, claims 2–7, 9–11, and 15–19 stand or fall with claim 1.

The Examiner finds that Szuromi describes a method for reducing a manufactured component's surface roughness, wherein the method includes the same steps recited in claim 1 (Ans. 3–4; Final Act. 2–3). According to the Examiner, Szuromi's "component is formed by additive manufacturing and the particle may be a partially melted particle or partially sintered particle" (Ans. 4; Final Act. 3) (citing Szuromi ¶¶ 35, 37).

The Appellant contends that, contrary to the Examiner's finding, Szuromi does not describe the limitation "wherein the at least one partially attached particle is one of a partially melted particle and a partially sintered particle" in claim 1 because "[i]n Szuromi, the random near-surface particles are debris, not partially melted particles or partially sintered particles, as claimed" (Appeal Br. 3). According to the Appellant, "even if Szuromi

[4] US 2005/0118334 A1, published June 2, 2005.

discloses particles that cause surface roughness, those particles cannot constitute the claimed particles because the claimed particles are removed from the surface of the component by the claimed dissolving step" (*id.*).

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 explains (Ans. 6–7), Szuromi explicitly teaches that

> [t]he as-built article (hereinafter referred to as a "first intermediate article") may have significant surface roughness caused, for example, *by partial fusion* or entrainment of metallic powder as the laser starts or stops its traverse or sweep at the edges of the each deposit layer, *and* by contamination, *debris*, oxidation, or the like.

(Szuromi ¶ 30 (emphases added)). According to Szuromi, "the roughness [is] associated with loosely *adhered* particles" (*id.*) (emphasis added). Szuromi explicitly states that the partially fused metallic powder particles (*id.*), "fused sintered powder" (*id.* ¶ 37), or loosely adhered particles (*id.* ¶ 30) are separate from the "debris" upon which the Appellant bases the argument. Therefore, we find no persuasive merit in the Appellant's argument that Szuromi does not disclose the limitation "wherein the at least one partially attached particle is one of a partially melted particle and a partially sintered particle" recited in claim 1.

As for the Appellant's argument that Szuromi's "particles cannot constitute the claimed particles because the claimed particles are removed from the surface of the component by the claimed dissolving step" (Appeal Br. 3), Szuromi explicitly teaches that an aluminum-containing coating material layer is applied over the intermediate product containing surface roughness and then formed into a diffusion coating such that the particles causing the surface roughness are subsequently removed by flushing with a

chemical solvent such as nitric acid—the same solvent that may be used in the claimed invention (Szuromi ¶¶ 48–49, 54–55; Appeal Br. 8 (claim 14)).

With respect to claim 21, which depends from claim 1 and recites "wherein the partially attached particle is an artifact of the additive manufacturing process" (Appeal Br. 10), the Examiner correctly finds that Szuromi's particles, such as the partially fused powder, are formed by the additive manufacturing process (Szuromi ¶ 30). The Appellant does not offer any countervailing evidence indicating that Szuromi's partially fused powder particles are not artifacts of the additive manufacturing process.

For these reasons, we uphold the Examiner's rejection as maintained against claim 1 (and claims 2–7, 9–11, and 15–19 falling therewith).

Rejection B (Obviousness: Claim 12). Claim 12 depends from claim 1 through intervening claim 11 and recites "wherein the gas phase deposition process including flowing gas containing the reactive material in a laminar flow" (Appeal Br. 8). The Examiner acknowledges that Szuromi does not describe the limitations recited in claim 12 but concludes that "it would have been obvious to one of ordinary skill . . . to flow the reactive gas, such as for CVD of Szuromi, through the internal features in a laminar flow in order for the coating material to conform to the features for uniform application" (Ans. 5; Final Act. 4 (citing Szuromi ¶ 48)).

The Appellant's skeletal argument (Appeal Br. 5) does not reveal reversible error in the Examiner's rejection. Szuromi teaches applying the aluminum-containing material layer—i.e., the Appellant's "reactive material"—by known coating techniques such as chemical vapor deposition "such that it conforms or deforms to the contour of the first intermediate article" (Szuromi ¶ 48). Under this circumstance, a person having ordinary

skill in the art would have understood that laminar flow—as opposed to, e.g., turbulent flow—would be an expedient way to achieve a coating that conforms or deforms to the contours of the intermediate article. *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 421 (2007) ("When there is a design need or market pressure to solve a problem and there are a finite number of identified, predictable solutions, a person of ordinary skill has good reason to pursue the known options within his or her technical grasp.").

Therefore, we also uphold the rejection as maintained against claim 12.

Rejection C (Obviousness: Claims 13, 14, & 20). The Appellant does not any argument in support of claims 13, 14, and 20 (Appeal Br. 3–5). Therefore, we sustain Rejection C for the same reasons discussed above for Rejection A.

IV. CONCLUSION

In summary:

Claims Rejected	35 U.S.C. §	Reference(s)/Basis	Affirmed	Reversed
1–7, 9–11, 15–19, 21	102(a)(1)	Szuromi	1–7, 9–11, 15–19, 21	
12	103	Szuromi	12	
13, 14, 20	103	Szuromi, Gorman	13, 14, 20	
Overall Outcome			**1–7, 9–21**	

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