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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte NICHOLAS EDWARD ANTOLINO and
GLEN HAROLD KIRBY

Appeal 2020-000189
Application 15/076,825
Technology Center 1700

Before ADRIENE LEPIANE HANLON, JEFFREY B. ROBERTSON, 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), Appellant¹ appeals from the Examiner's decision to reject claims 24, 25, and 32–34. 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. Appellant identifies General Electric Company as the real party in interest. Appeal Br. 2.

BACKGROUND

The invention relates to stacked up structures. Spec. ¶ 1. According to the Specification, a stacked up structure may include first and second environmental barrier coatings (EBCs). *Id.* ¶ 3. An interfacial layer may be provided for improved bonding of the first and second EBCs. *Id.* Claim 32 is the sole independent claim on appeal and reads as follows:

32. A method comprising:
- forming a first layer comprised of rare earth disilicate on a surface wherein the forming of the first layer includes applying a slurry to the surface;
 - forming a bond surface on the first layer wherein the bond surface includes an interfacial material; and
 - forming a second layer comprised of rare earth disilicate on the bond surface, wherein the forming of the second layer includes using an air plasma spray (APS) process; and wherein the bond surface is formed by spraying a slurry that includes interfacial material onto the first layer so that a discontinuous layer having voids is formed on the first layer.

Appeal Br. 7 (Claims Appendix).

REJECTIONS

- I. Claims 25, 32, and 33 stand rejected under 35 U.S.C. § 103 as unpatentable over Lee3,² Lee2,³ and Hazel.⁴
- II. Claim 24 stands rejected under 35 U.S.C. § 103 as unpatentable over Lee3, Lee2, Hazel, and Kirby.⁵

² US 2010/0129673 A1, published May 27, 2010 (“Lee3”).

³ US 2010/0255260 A1, published October 7, 2010 (“Lee2”).

⁴ US 2006/0280953 A1, published December 14, 2006 (“Hazel”).

⁵ US 2011/0027484 A1, published February 3, 2011 (“Kirby”).

III. Claim 34 stands rejected under 35 U.S.C. § 103 as unpatentable over Lee3, Lee2, Hazel, and Huang.⁶

OPINION

Rejection I: obviousness over Lee3, Lee2, and Hazel

With regard to the Examiner's rejection of claims 25, 32, and 33 in Rejection I, Appellant argues only claim 32. *See* Appeal Br. 3–5. We address Appellant's arguments regarding claim 32 below. Claims 25 and 33 stand or fall with claim 32.

Relevant to Appellant's arguments on appeal, the Examiner finds Lee3 discloses forming EBCs as well as thermal barrier coatings (TBCs) using a process that includes forming a first oxide layer comprising rare earth disilicate, a discontinuous reinforced layer, and a second oxide layer comprising rare earth disilicate. Final Act. 3–4. The Examiner finds Lee3 discloses forming the reinforced layer as a slurry, but does not teach spraying the slurry. *Id.* at 4–5. The Examiner also finds Lee3 discloses forming the second oxide layer by plasma spraying, but does not specify air plasma spraying. *Id.* at 5. The Examiner finds Lee2 identifies slurry spraying as a suitable technique for applying a slurry in an EBC, and finds Hazel identifies air plasma spraying as a suitable plasma spray technique for forming EBCs. *Id.*

Appellant's arguments focus on Lee2 and Hazel. In fact, Appellant does not address Lee3—the principal reference on which the Examiner bases the rejection of claim 32. Particularly, Appellant argues Lee2 discloses

⁶ US 2012/0171039 A1, published July 5, 2012 (“Huang”).

forming a first disilicate coating by plasma spray, whereas claim 32 requires forming such coating by applying a slurry. Appeal Br. 3. Appellant further argues Lee2 teaches depositing a second disilicate coating from a slurry, whereas claim 32 requires an air plasma spray process. *Id.* Appellant additionally argues that, although Lee2 discloses depositing a first coating from a slurry and a second coating by plasma spraying, Appellant contends those disclosures in Lee2 concern an embodiment in which rare earth disilicates are not included. *Id.* at 4. Appellant also argues Lee2 does not disclose an intermediate layer comprising interfacial material. *Id.* With regard to Hazel, Appellant argues Hazel does not disclose rare earth disilicate layers, and does not disclose forming a discontinuous second layer. *Id.* at 5.

“Non-obviousness cannot be established by attacking references individually where the rejection is based upon the teachings of a combination of references.” *In re Merck & Co.*, 800 F.2d 1091, 1097 (Fed. Cir. 1986) (citing *In re Keller*, 642 F.2d 413, 425 (CCPA 1981) (“[T]he test [for obviousness] is what the combined teachings of the references would have suggested to those of ordinary skill in the art.”)). Here, all of the features Appellant contends are missing from Lee2 and Hazel are features the Examiner finds are taught in the principal reference, Lee3. For example, the Examiner finds Lee3 teaches forming a first disilicate coating by applying a slurry, and forming a second disilicate coating by plasma spraying. Final Act. 4. *See* Lee3 ¶ 53 (stating the first and second oxide

layers can be formed from a slurry or by plasma spraying); *see also id.* ¶ 5 (identifying air plasma spraying as a known technique for applying TBCs).⁷

For the foregoing reasons, Appellant's arguments regarding Lee2 and Hazel are not persuasive of reversible error in the Examiner's rejection of claim 32 based on the combined teachings of Lee3, Lee2, and Hazel. Accordingly, we sustain the Examiner's rejection of claims 25, 32, and 33.

Rejections II and III

Appellant does not separately argue either Rejection II or Rejection III. As such, Appellant does not identify reversible error. Accordingly, we also sustain the Examiner's rejection of claims 24 and 34.

CONCLUSION

The Examiner's decision rejecting claims 24, 25, and 32–34 is affirmed.

⁷ Because Lee3 teaches air plasma spraying, the Examiner's additional reliance on Hazel for that teaching is cumulative.

DECISION SUMMARY

In summary:

Claim(s) Rejected	35 U.S.C. §	Reference(s)/Basis	Affirmed	Reversed
25, 32, 33	103	Lee3, Lee2, Hazel	25, 32, 33	
24	103	Lee3, Lee2, Hazel	24	
34	103	Lee3, Lee2, Hazel	34	
Overall outcome			24, 25, 32– 34	

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