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UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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*Ex parte* DMITRI NOVIKOV, DAVID ULRICH FURRER,  
and SERGEI F. BURLATSKY

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Appeal 2019-002397<sup>1</sup>  
Application 14/732,905<sup>2</sup>  
Technology Center 3700

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Before ANTON W. FETTING, KENNETH G. SCHOPFER, and  
AMEE A. SHAH, *Administrative Patent Judges*.

SCHOPFER, *Administrative Patent Judge*.

DECISION ON APPEAL

This is an appeal under 35 U.S.C. § 134 from the rejection of  
claims 1, 3–10, 17, and 19. We have jurisdiction under 35 U.S.C. § 6(b).

We AFFIRM.

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<sup>1</sup> Our decision references the Appeal Brief (“Appeal Br.,” filed Aug. 17, 2018), the Reply Brief (“Reply Br.,” filed Jan. 28, 2019), the Examiner’s Answer (“Ans.,” mailed Nov. 28, 2018), and the Final Office Action (“Final Act.,” mailed Mar. 19, 2018).

<sup>2</sup> According to Appellants, the real party in interest is United Technologies Corporation. Appeal Br. 2.

## BACKGROUND

The Specification discloses that “[t]he present disclosure relates to components for a gas turbine engine and, more particularly, to a stiffness controlled abradable seal system therefor.” Spec. ¶ 2.

## CLAIMS

Claims 1 and 10 are the independent claims on appeal. Claim 1 is illustrative of the appealed claims and recites:

1. A stiffness controlled abradable seal system for a gas turbine engine, comprising:

a solid lubricant material comprising at least one metal combined with at least one member of a class of ternary compounds, said at least one metal combined with said at least one member of a class of ternary compounds is defined by the general composition  $M_{n+1}AX_n$ , wherein M is an early transition metal selected from groups IIIB, IVB, VB, and VIB, A is an element selected from groups IIIA, IVA, VA, VIA, and VIIA, X is either carbon or nitrogen, and n is an integer between 1 and 3 to minimize a friction coefficient.<sup>3</sup>

Appeal Br. 16.

## REJECTIONS<sup>4</sup>

1. The Examiner provisionally rejects claims 1, 3–10, and 17 on the ground of nonstatutory double patenting as being unpatentable over claims 1 and 6–10 of co-pending Application No. 14/731,743.
2. The Examiner rejects claims 1, 3–5, 10, and 19 under 35 U.S.C. § 102(a)(1) as anticipated by Strock.<sup>5</sup>

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<sup>3</sup> The relevant groupings of elements are depicted in Figure 9.

<sup>4</sup> The Examiner has withdrawn the rejections under 35 U.S.C. § 112. *See* Ans. 9.

<sup>5</sup> Strock, US 8,017,240 B2, iss. Sept. 13, 2011.

3. The Examiner rejects claim 17 under 35 U.S.C. § 103 as unpatentable over Strock.
4. The Examiner rejects claims 1 and 6 under 35 U.S.C. § 103 as unpatentable over Glahn<sup>6</sup> in view of Strock.
5. The Examiner rejects claims 1 and 7–9 under 35 U.S.C. § 103 as unpatentable over Alvanos<sup>7</sup> in view of Strock.

## DISCUSSION

### *Rejection 1*

Appellants do not present arguments regarding the double patenting rejection. *See* Appeal Br. 10. Accordingly, we summarily sustain this rejection.

### *Rejection 2*

With respect to claims 1 and 10, the Examiner finds that Strock discloses a solid lubricant material as claimed, and in particular, the Examiner notes that “Strock discloses the composition as MXZ instead of MAX but these two are equivalents.” Final Act. 6–7 (citing Strock col. 2, ll. 19–54). Appellants argue that the claim is not anticipated because Strock discloses MXZ rather than MAX and Strock does not recite carbon or nitrogen. *See* Appeal Br. 10–12. We are not persuaded of error. Strock discloses “[a]n example of a particularly suitable metallic matrix composite is Ti<sub>3</sub>SiC<sub>2</sub>.” Strock col. 2, ll. 43–44. Thus, Strock plainly discloses a material with the claimed formula M<sub>n+1</sub>AX<sub>n</sub>, regardless of whether it is labeled as MXZ or MAX, because Ti is a transition metal in group IVB, Si is

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<sup>6</sup> Glahn et al., US 8,109,717 B2, iss. Feb. 7, 2012.

<sup>7</sup> Alvanos et al., US 2007/0059158 A1, pub. Mar. 15, 2007.

in group IVA, and carbon is disclosed. Accordingly, Appellants have not identified any error in this rejection, and thus, we sustain the rejection of claims 1 and 10 as anticipated. We also sustain the rejection of dependent claims 3–5, and 19, for which Appellants do not provide separate arguments.

*Rejection 3*

With respect to claim 17, the Examiner acknowledges that Strock does not teach a solid lubricant material that “includes an about 25% volume fraction of MAX phase content material.” Final Act. 8. The Examiner finds that Strock discloses “a volume fraction range of approximately 30% to approximately 50% of MAX phase content material” and thus, the Examiner determines that it would have been obvious to include “an about 25% volume fraction of a MAX content material because a prima facie case of obviousness exists where the claimed ranges or amounts do not overlap with the prior art range but are merely close.” *Id.*

We are persuaded of error in this rejection because the Examiner has not sufficiently supported the determination that the claimed range of about 25% would have been obvious in view of the prior art’s disclosure of a range of 30% to 50%. The Examiner is correct in stating that a prima facie case of obviousness exists where the claimed ranges or amounts do not overlap with the prior art but are merely close. *Titanium Metals Corp. of America v. Banner*, 778 F.2d 775, 783, (Fed. Cir. 1985). However, this is because, where the claimed amount and prior art amount are sufficiently close, “one skilled in the art would have expected them to have the same properties.” *Id.* Here, we find that the Examiner has not explained adequately why the claimed percentage and the prior art range are not patentably distinct. In particular, the Examiner does not provide evidence or explanation showing

why one of ordinary skill in the art would consider these percentages to be “merely close” such that one of ordinary skill in the art would expect them to exhibit the same or similar properties. For this reason, we find reversible error in the rejection, and thus, we do not sustain the rejection of claim 17.

*Rejection 4*

With respect to claim 1, the Examiner finds:

Glahn teaches a stiffness controlled abradable seal system for a gas turbine engine (Fig.1 ), comprising: a static seal surface (Fig.5, 170) in contact with a rotating seal surface (Fig.5, 182/184) at a seal interface; and a cantilevered arm that supports one of said rotating seal surface (Fig.5, 186) and said static seal surface.

Final Act. 9. The Examiner acknowledges that Glahn does not teach a lubricant material with the chemical formula claimed, but the Examiner relies on Strock, as discussed above, regarding this material. *Id.* The Examiner concludes that it would have been obvious to modify Glahn’s seal system with a lubricant as taught by Strock

to minimize a friction coefficient as taught by Strock because said material composition lowers the rub forces in gas turbine engines and the clearance between the abradable seal and the rotating element, and provides both metallic and ceramic characteristics to the abradable seal, balancing the need for erosion control and abradability.

*Id.* at 10. The Examiner also finds that using this material would increase “the overall efficiency of the gas turbine engine.” Ans. 13 (citing Strock col. 4, ll. 26–35).

Appellants argue that the rejection provides “no teaching, suggestion, motivation, or reason to modify Glahn in view of Strock as proposed.”

Appeal Br. 13. We are not persuaded of error. The Examiner points to evidence in Strock regarding the use of Strock’s matrix material to reduce

the weight of the abradable seal, increase its durability, lower the rub forces in a gas turbine engine, and increase the overall efficiency of the engine. Ans. 13 (citing Strock col. 4, ll. 21–29). Appellants do not adequately explain why this evidence does not support the Examiner’s reasoning for providing the proposed combination. Thus, we are unpersuaded of error and we sustain the rejection of claim 1 here. We also sustain the rejection of dependent claim 6, for which Appellants do not provide separate arguments.

*Rejection 5*

With respect to this rejection, Appellants argue only that the Examiner erred because “Strock does not disclose an equivalent chemical formula for a solid lubricant, as discussed above.” Appeal Br. 14. However, because we found no error above in the Examiner’s finding that Strock does disclose the claimed chemical formula, we are not persuaded of error by this argument here. Accordingly, we sustain the rejection of claims 1 and 7–9 as obvious over Alvanos in view of Strock.

CONCLUSION

We AFFIRM the provisional rejection of claims 1, 3–10, and 17 on the ground of nonstatutory double patenting as being unpatentable over claims 1, 6, 7, 8, 9, and 10 of copending Application No. 14/731,743.

We AFFIRM the rejection of claims 1, 3–5, 10, and 19 under 35 U.S.C. § 102(a)(1) as anticipated by Strock.

We REVERSE the rejection of claim 17 under 35 U.S.C. § 103 as unpatentable over Strock.

We AFFIRM the rejection of claims 1 and 6 under 35 U.S.C. § 103 as unpatentable over Glahn in view of Strock.

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Application 14/732,905

We AFFIRM the rejection of claims 1 and 7–9 under 35 U.S.C. § 103 as unpatentable over Alvanos in view of Strock.

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