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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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*Ex parte* GARY M. LOMASNEY and JOSEPH PARKOS JR.

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Appeal 2015-001128  
Application 11/931,318  
Technology Center 3700

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Before: CHARLES N. GREENHUT, MICHAEL L. HOELTER, and  
ANNETTE R. REIMERS, *Administrative Patent Judges*.

GREENHUT, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

Appellants appeal under 35 U.S.C. § 134 from a rejection of claims 1, 3, 5, 16, 19, 20, 22, and 23. We have jurisdiction under 35 U.S.C. § 6(b).

We affirm.

### CLAIMED SUBJECT MATTER

The claims are directed to an organic matrix composite component, and an engine using such component. Claim 1, reproduced below, is illustrative of the claimed subject matter:

- 1 An organic matrix composite component comprising:
  - a component made of an organic matrix composite;
  - a layer of aluminum applied to the organic matrix composite; and
  - a titanium oxide exterior wear resistant coating applied to the aluminum layer wherein the aluminum directly contacts the organic matrix composite without an intervening layer of adhesive being disposed therebetween.

### REFERENCES

The prior art relied upon by the Examiner in rejecting the claims on appeal is:

Danroc	US 6,159,618	Dec. 12, 2000
Bernard	US 2006/0275626 A1	Dec. 7, 2006
Ghasripor	US 2008/0145554 A1	June 19, 2008

### REJECTION

Claims 1, 3, 5, 16, 19, 20, 22, and 23 are rejected under 35 U.S.C. § 103(a) as unpatentable over Bernard, Ghasripor, and Danroc.

### OPINION

Appellants argue the rejection of claims 1, 3, 5, 16, 19, 20, 22, and 23 under 35 U.S.C. § 103(a) as a group. App. Br. 2–4. We select claim 1 as the representative claim, and claims 3, 5, 16, 19, 20, 22, and 23 will stand or fall with claim 1. 37 C.F.R. § 41.31(c)(1)(iv).

*The Applied Prior Art*

With regard to claim 1, 3 the Examiner finds that Bernard discloses a means for protecting the leading edges of blades or vanes of gas turbine engine components, “especially when the blade is formed of an organic matrix composite (OMC), see paragraph [0011], where the component comprises an organic matrix composite layer 1a, [and] a layer of aluminum alloy 5 applied to the organic matrix composite.” Final Act. 3. The Examiner further finds that “Gashripor teaches a wear resistant coating where an example of a wear resistant coating includes titanium oxide. *See Paragraph [0027]*. Gashripor further states ‘the wear-resistant coating is particularly useful as a coating for . . . turbomachine component[s].’ *See paragraph [0053]*.” *Id.* The Examiner additionally finds that “Danroc teaches that the deposition of a single layer of titanium may use the chemical vapor deposition to deposit the layer. *See column 7, lines 17-29*. The use of chemical vapor deposition would result in an aluminum layer that directly contacts the OMC layer without an intervening adhesive layer.” *Id.* at 4. The Examiner concludes that it would have been obvious to one of ordinary skill in the art at the time of the invention “to provide a wear resistant coating comprising titanium oxide to the blade, vane or strut of Bernard as taught by Gashripor” (*Id.*) and “to use chemical vapor deposition as taught by Danroc to apply the aluminum layer to the organic matrix composite of Bernard because Bernard specifically contemplates adhesive techniques known in the art for securing titanium. *See paragraph [0011] of Bernard disclosure.*” *Id.*

*Teaching Away*

Appellants contend that “an object of Bernard is to create light weight parts that are lighter than prior art parts made of titanium. (Bernard [0006]).” App. Br. 3. As such, according to Appellants, “Bernard teaches away from using titanium because titanium increases the weight of the part. (Bernard [0005]). Instead, Bernard reinforces aluminum with SiC particles in order to eliminate the use of titanium to reduce weight. (Bernard [0017]).” *Id.*; see also Reply Br. 1, 2.

“Whether a reference teaches away from a claimed invention [is a] question of fact.” *In re Harris*, 409 F.3d 1339, 1341 (Fed. Cir. 2005). Our reviewing court has required the presence of disparaging or criticizing statements to find a teaching away. *In re Fulton*, 391 F.3d 1195, 1201 (Fed. Cir. 2004). Our reviewing court also has consistently held that prior art references must be considered *as a whole*. *W.L. Gore & Assoc., Inc. v. Garlock, Inc.*, 721 F.2d 1540, 1550 (Fed. Cir. 1983). Considering a reference as a whole includes consideration of *the reasons why* a particular combination is discouraged. Where those reasons might not be a concern to those skilled in the art, a reference will not lead one skilled in the art away from a particular combination. See, e.g., *In re Nehrenberg*, 280 F.2d 161, 164 (CCPA 1960):

[The prior art] has considered the use of the amount of carbon set forth in appellant’s claims, but regards it as undesirable for his particular purpose of making a steel of high toughness . . . . [The prior art still] suggest[s] to those skilled in the art [the] carbon content [according to the claims] . . . if extreme toughness were

not desired . . . . A disclosure of a composition of matter in a reference may be anticipatory even though the reference indicates that such composition is not preferred or even that it is unsatisfactory for the intended purpose.

In this regard, the Examiner asserts: “since the only concern with the use of Titanium Oxide instead of Silicon Carbide would be weight, where weight was not an issue, an ordinary skilled worker would not be deterred from using Titanium Oxide instead of Silicon Carbide since Titanium Oxide was known to protect against wear” (Ans. 4) and “the use of Titanium Oxide on the blade of Bernard in an industrial gas turbine engine would provide the same benefit as that of the Bernard aircraft engine but would be less subject to weight issues.” *Id.*

The independent claims on appeal do not specify that the organic matrix composite component (claim 1) or the gas turbine engine (claim 16) are to be used in environments where weight is a design factor, e.g., in aviation applications. Indeed, the Specification expresses no intent to limit the invention to such environments. (“[T]here is no intention to limit the concepts described herein to use with turbofans as use with other types of gas turbine engines and other applications that may not involve gas turbine engines are contemplated.”) Spec. 3. Therefore, where weight is not a concern – and it is not a concern in independent claim 1 (or independent claim 16) – the Bernard reference does not lead one away from the claimed invention. Even if weight is a viable concern, Appellants do not apprise us of any evidence to show that the Ghasripoor coating of *Titanium Oxide* has similar weight characteristics to the layer of a *TA6V titanium alloy* Bernard seeks to replace for aviation applications.

Moreover, although Bernard teaches that aluminum alloy reinforced with silicon carbide (SiC) is lighter than titanium alloys (Bernard ¶ 8), according to Bernard “[u]ntil now, such protection parts have been made of titanium alloy of the TA6V type. [TA6V] is technically viable, since the alloy presents good resistance to erosion and to impacts.” Bernard ¶ 5. With that as context, the Examiner asserts that a person of ordinary skill in the art “could physically replace Silicon Carbide with Titanium Oxide, i.e. such replacement was not impossible/impracticable; the use of Titanium Oxide instead of Silicon Carbide would perform the same function as separately taught because both Silicon Carbide and Titanium Oxide were known to protect against wear.” Ans. 3–4. We agree with the Examiner’s finding that a coating of titanium oxide would have been reasonably expected to serve the desired protective function. *See* Ghasripoor ¶¶ 27, 53, 54.

*Change in Principle of Operation and Unsuitability for Intended Purpose*

As noted above, an object of the Bernard reference is to create lighter weight parts than parts made of titanium alloy. Bernard ¶ 6. Appellants contend that using titanium-based materials as protective coverings for parts of machines such as gas turbine engines adds undesirable weight to the parts, thereby changing the principle of operation of Bernard and rendering Bernard unsuitable for its intended purpose. App. Br. 3–4; Reply Br. 1. However, as also noted above, the Specification expresses no intent to limit the purpose of the invention set forth in claim 1 (or claim 16) to use in environments where weight is a design factor, e.g., in aviation applications.

Moreover, the principle of operation of aircraft gas turbine engines (where weight is a factor) and industrial gas turbine engines (where weight is not a factor) are quite similar despite differences in purpose. According to the Examiner

Both aircraft gas turbines and industrial power generating gas turbines function on the same basic principle, i.e. the Brayton cycle, where the largest difference is the purpose of the engine. Namely, aircraft engines were used to produce thrust to propel an aircraft and industrial engines were used to produce electricity. Thus, benefits and improvements made to one engine were often applicable to another, unless the improvement was drawn to thrust production. Among those improvements useful in both engines would be wear coatings for blades, vanes, buckets, etc.

Ans. 4.

Still further, we are not aware, nor have Appellants apprised us, that a coating of Titanium Oxide as compared to, for example, a coating of Silicon Carbide significantly negatively impacts weight. However, even if some benefit is lost in terms of using a coating of Titanium Oxide as opposed to Silicon Carbide, we must consider the record as a whole while guarding against the introduction of hindsight. *See, e.g., In re Fritch*, 972 F.2d 1260, 1265-66, n.12 (Fed. Cir. 1992) (*quoting In re Gordon*, 733 F.2d 900 (Fed. Cir. 1984) (“This court has previously found a proposed modification inappropriate for an obviousness inquiry when the modification rendered the prior art reference inoperable for its intended purpose.”)). Here, however, the Ghasripoor Titanium Oxide coating will operate on the same principles as before to resist wear of surfaces coated thereby and will not render the Bernard component inoperable for its intended purpose as a turbine engine. There are no per-se rules of obviousness. *In re Ochiai*, 71 F.3d 1565, 1571

(Fed. Cir. 1995) As is the case here, when considering the prior art as a whole, a simple substitution may still be *obvious to a skilled artisan* even if it involves omitting what *Bernard* regarded as his contribution to the art along with the advantages it might provide. *See, e.g., In re Umbarger*, 407 F.2d 425, 430-31 (CCPA 1969).

Accordingly, based on the record presented, and for reasons discussed above, we sustain the rejection of claims 1, 3, 5, 16, 19, 20, 22, and 23 under 35 U.S.C. § 103(a) as unpatentable over *Bernard*, *Ghasripoor*, and *Danroc*.

#### DECISION

The Examiner's rejection of claims 1, 3, 5, 16, 19, 20, 22, and 23 is affirmed.

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