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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte JOSE R. PAULINO and CHRISTOPHER W. STROCK

Appeal 2019-000438
Application 14/812,668
Technology Center 3700

Before MICHAEL L. HOELTER, LEE L. STEPINA, and
ARTHUR M. PESLAK, *Administrative Patent Judges*.

STEPINA, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

Pursuant to 35 U.S.C. § 134(a), Appellant,¹ United Technologies Corporation, appeals from the Examiner's decision to reject claims 1 and 3–23. Final Act. 1. We have jurisdiction under 35 U.S.C. § 6(b).

We REVERSE.

¹ We use the word “Appellant” to refer to “Applicant” as defined in 37 C.F.R. § 1.42(a). Appellant identifies the real party in interest as United Technologies Corporation. Appeal Br. 1.

CLAIMED SUBJECT MATTER

The claims are directed to a ceramic coating system and method. Claims 1, 13, and 19 are independent. Claim 1, reproduced below with emphasis added, is illustrative of the claimed subject matter:

1. A gas turbine engine article comprising:
a substrate;
a bond coating covering at least a portion of the substrate with a step extending to opposing circumferential sides of the article and formed in the bond coating; and
a thermally insulating topcoat disposed on the bond coating, the thermally insulating topcoat includes a first topcoat portion separated by *at least one fault extending through the thermally insulating topcoat from a second topcoat portion.*

Appeal Br. 9 (Claims App.).

REFERENCES

The prior art relied upon by the Examiner is:

Strangman	US 4,764,089	Aug. 16, 1988
Skelly	US 6,503,574 B1	Jan. 7, 2003
Subramanian	US 2016/0369637 A1	Dec. 22, 2016

REJECTIONS

- I. Claims 1, 3, 4, 8–10, and 19 are rejected under 35 U.S.C. § 102(a)(1) as anticipated by Skelly. Final Act. 3.
- II. Claims 1, 3, 4, 8–10, 12–17, 19, and 23 are rejected under 35 U.S.C. § 102(a)(1) as anticipated by Strangman. Final Act. 5.
- III. Claims 5–7, 18, and 20–22 are rejected under 35 U.S.C. § 103 as unpatentable over Strangman. Final Act. 8.
- IV. Claim 11 is rejected under 35 U.S.C. § 103 as being unpatentable over Strangman and Subramanian. Final Act. 10.

OPINION

Rejection I, Skelly

Claims 1, 3, 4, and 8–10

The Examiner finds that Skelly discloses all of the elements recited in claim 1, relying on crack 48 as a disclosure of at least one fault that extends through a thermally insulating topcoat and separates the topcoat into first and second topcoat portions. Final Act. 3–4.

Appellant contends that crack 48 of Skelly does not qualify as the recited fault because “crack 48 does not separate portions of the thermal barrier coating 44.” Appeal Br. 4.

In response, the Examiner takes the position that “a first topcoat portion can be defined on the left of the crack 48 and a second portion of the topcoat on the right of the crack 48.” Ans. 2. Thus, the Examiner finds that crack 48 of Skelly is located between left and right-hand portions of coating 44. The Examiner also finds that the presence irregular ceramic structure 46 of Skelly, shown in Figure 2 on right-hand and left-hand sides of crack 48, makes crack 48 “between” two portions of coating 44. *Id.*

In reply, Appellant states that, rather than extending through coating 44 of Skelly, crack 48 is between coating 44 and bond coat 34. Reply Br. 2. According to Appellant, the Examiner’s findings regarding irregular ceramic structure 46 of Skelly “does not resolve the fact that Skelly does not disclose the crack 48 extending into the thermal barrier coating 44 but [is instead] between the bond coat 34 and the thermal barrier coating 44.” *Id.* at 3. Appellant reiterates “Skelly fails to disclose ‘at least one fault *extending through* the thermally insulating topcoat’ because the crack 48 is located between the bond coat 34 and the thermal barrier 44 such that the crack 48

does not extend through or separate portions of the thermal barrier coating 44.” *Id.* at 2 (emphasis added).

Although we appreciate the Examiner’s position that crack 48 is located between portions of material that make up coating 44 (and irregular ceramic structure 46), we do not agree that crack 48 extends *through* either coating 44 or irregular ceramic structure 46. Rather, we agree with Appellant that crack 48 appears only on the edge of coating 44 and separates coating 44 from bond coat 34. Skelly 7:13–17 (“If, during service, a crack **48** forms in the region between the bond coat **34** and the thermal barrier coating **44**, the crack **48** can propagate only to the extent of one pitch **D** between the grooves **40** before encountering an interface that impedes the propagation of the crack.”). Accordingly, we do not sustain the rejection of claims 1, 3, 4, and 8–10 as anticipated by Skelly.

Claim 19

Claim 19 requires “faults that extend from the step through the thermally insulating topcoat to separate a first topcoat portion from a second topcoat portion.” Appeal Br. 11 (Claims App.). The Examiner relies on the same insufficiently supported findings regarding crack 48 of Skelly as those discussed above regarding claim 1. *See* Final Act. 4–5. Accordingly, we do not sustain the rejection of claim 19 as anticipated by Skelly.

Rejection II, Strangman

Claims 1, 13, and 19 each require a step that extends to opposing circumferential sides of the claimed article. Appeal Br. (Claims App.). The Examiner finds Strangman discloses “a bond coating (8) covering at least a portion of the substrate (Fig. 4) with a *step (3) extending to opposing*

circumferential sides of the article (Fig. 2, 2B) and formed [in] the bond coating (bond coat, Fig. 4).” Final Act. 5 (underlining omitted, emphasis added).

Appellant contends that Strangman fails to disclose the claimed step because Strangman instead discloses a series of steps 3, each bounded by grooves 14 and edges 4.² Appeal Br. 5. Appellant refers to Figures 2 and 2B of Strangman as support for this argument, and we reproduce these figures below.

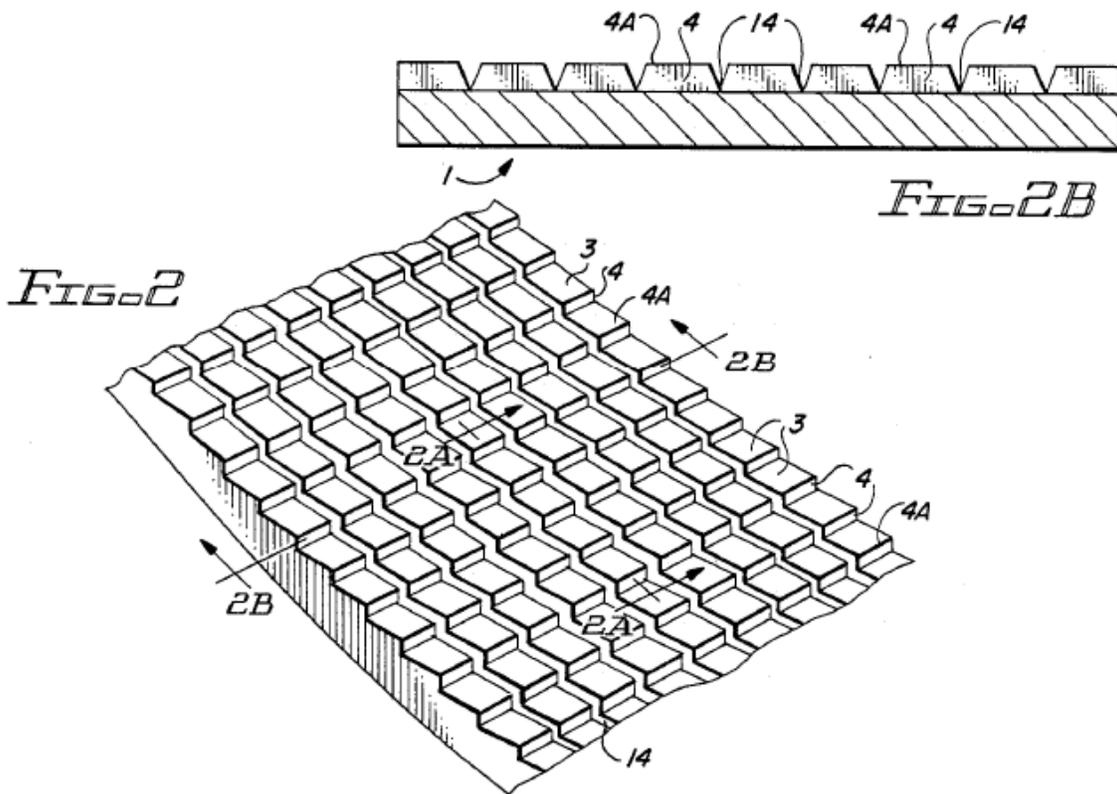


Figure 2 of Strangman is an enlarged perspective view of a shroud substrate that has a pattern of slant-steps 3 and longitudinal isolation grooves

² Appellant also argues that Strangman does not disclose the claimed “circumferential sides.” Based on the result of our discussion below, we do not reach this issue.

14 in its inner surface, and Figure 2B is a section view taken along lines 2B-2B in Figure 2.

In response, the Examiner further states, “the broadest reasonable interpretation of a step includes that a row of slant-steps (3) with grooves (14),” and “[t]he claim does not positively recite that the step has an uninterrupted surface, and [the] specification (see pars. 13, 20, 27) does not set forth that the step cannot have grooves in it.” Ans. 4.

In reply, Appellant reiterates that Strangman discloses that each slant-step 3 is bounded by grooves 14 and edges 4, and, therefore, none of slant-steps 3 can extend to opposing circumferential sides of the article. Reply Br. 5 (citing Strangman 4:6–14).³

Appellant has the better position. We do not agree that the broadest reasonable interpretation of the term “step” in claim 1 includes a series of slant-steps 3 as disclosed by Strangman.⁴ Appellant’s Figure 3 depicts a single vertical “step” 86, which, in Figure 3, extends inward and outward from the page. As this figure is taken in cross-section, what it depicts does not preclude the existence of interruptions in step 86. However, Appellant’s Specification states, “[t]he step 86 extends in a radial and circumferential direction such that multiple BOAS systems 62 arranged together form a circumference around the axis A of the gas turbine engine 20 with the step 86 extending entirely around the circumference.” Spec. ¶ 45. We

³ Appellant also notes that Figures 2 and 2B of Strangman do not depict the bond coating, which is the structure in which the claims require the recited step to be located. Thus, any steps shown in Figures 2 and 2B are not in the bond coating. Reply Br. 5.

⁴ Strangman describes the pertinent structure in Figures 2 and 2B as “a grid of slant-steps 3.” Strangman 4:3–5.

understand this statement to imply that step 86 is uninterrupted because the result of connecting multiple steps 86 is a step extending entirely around the axis of the gas turbine. With respect to the Examiner's position on page 4 of the Answer, ending claim construction with the finding that "[t]he claim does not positively recite that the step has an uninterrupted surface, and specification (see pars. 13, 20, 27) does not set forth that the step cannot have grooves in it," results, on this record, in an unreasonably broad construction of the claims. Our reviewing court has addressed this type of claim construction, stating:

The correct inquiry in giving a claim term its broadest reasonable interpretation in light of the specification is not whether the specification proscribes or precludes some broad reading of the claim term adopted by the examiner. And it is not simply an interpretation that is not inconsistent with the specification. It is an interpretation that corresponds with what and how the inventor describes his invention in the specification, i.e., an interpretation that is "consistent with the specification."

In re Smith Int'l, Inc., 871 F.3d 1375, 1382–83 (Fed. Cir. 2017) (quoting *In re Morris*, 127 F.3d 1048, 1054 (Fed. Cir. 1997)). In any event, grooves 14 do more than merely "interrupt" steps 3. Rather, as shown in Figure 2B of Strangman, grooves 14 extend the *entire height* of steps 3. In light of the Specification, the broadest reasonable interpretation of the term "step" in claim 1, consistent with the Specification, does not allow for the inclusion of grooves, in the step, such as grooves 14⁵ of Strangman. Accordingly, we do

⁵ Depending on the location of the "circumferential sides," the pertinent interruption may be vertical edges 4 rather than grooves 14. See Appeal Br. 5–6; Reply Br. 4–5 (Appellant's argument regarding whether Strangman depicts circumferential sides as claimed).

not sustain the Examiner's rejection of claims 1, 13, and 19 and associated dependent claims 3, 4, 8–10, 12, 14–17, and 23 as anticipated by Strangman.

Rejections III and IV, Strangman and Subramanian

Rejections III and IV rely on the same unreasonably broad interpretation of the term “step” as discussed above regarding Rejection II. *See* Final Act. 8–11. Accordingly, for the same reasons discussed above regarding Rejection II, we do not sustain Rejections III and IV.

DECISION

The Examiner's rejections are reversed. More specifically,

DECISION SUMMARY

Claims Rejected	Basis	Affirmed	Reversed
1, 3, 4, 8–10, and 19	§ 102; Skelly		All
1, 3, 4, 8–10, 12–17, 19, and 23	§ 102; Strangman		All
5–7, 18, and 20–22	§ 103; Strangman		All
11	§ 103; Strangman, Subramanian		All

REVERSED