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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte DAMIEN REVEILLON and LAURENT BIANCHI

Appeal 2017-011535¹
Application 14/315,088²
Technology Center 3700

Before NINA L. MEDLOCK, CYNTHIA L. MURPHY, and
KENNETH G. SCHOPFER, *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 1–20. We have jurisdiction under 35 U.S.C. § 6(b).

We AFFIRM-IN-PART.

¹ Our decision references the Appeal Brief (“Appeal Br.,” filed May 30, 2017), the Reply Brief (“Reply Br.,” filed Sept. 13, 2017), the Examiner’s Answer (“Ans.,” mailed July 14, 2017), and the Final Office Action (“Final Act.,” mailed Dec. 30, 2016).

² According to Appellants, the real party in interest is Airbus Helicopters. Appeal Br. 1.

BACKGROUND

The Specification discloses that “[t]he present invention relates to a blade with reduced torsional rigidity intended for a rotor, and to a rotor equipped with such a blade. More specifically, this blade is intended for an aircraft propeller, or for a tail rotor of a rotary-wing aircraft.” Spec. ¶ 2.

CLAIMS

Claims 1, 15, and 20 are the independent claims on appeal. Claim 1 is illustrative of the appealed claims and recites:

1. Rotor blade with reduced torsional rigidity, including:
 - an outer covering extending along a pitch-variation axis of a first extremal area to a second extremal area, with the outer covering including an extrados skin and an intrados skin;
 - structural means linking the blade to a hub of the rotor; and
 - a cavity defined by the outer covering, with the cavity being filled by a filling material;wherein the filling material includes at least one partition parallel to a chord of the blade and at least two independent blocks made of filling material filling the cavity along a span of the blade.

Appeal Br., Claims App. 1.

REJECTIONS

1. The Examiner rejects claims 11 and 15–19³ under 35 U.S.C. § 112(b) as indefinite.

³ The Examiner lists independent claim 20 in the first paragraph for this rejection. *See* Final Act. 8. However, the Examiner does not otherwise discuss this claim in the body of the rejection. Thus, we consider the listing of this claim in this rejection to be a typographical error.

2. The Examiner rejects claims 1, 6–13, 15, 16, and 18–20 under 35 U.S.C. § 103 as unpatentable over Bianchi⁴ in view of Zuardy.⁵
3. The Examiner rejects claims 2–5 and 17 under 35 U.S.C. § 103 as unpatentable over Bianchi in view of Zuardy and Brunken.⁶
4. The Examiner rejects claim 14 under 35 U.S.C. § 103 as unpatentable over Bianchi in view of Zuardy and Brogdon.⁷

DISCUSSION

Rejection 1

Claim 11

With respect to claim 11, the Examiner interprets the term “active twisting means” as a means-plus-function limitation under 35 U.S.C. § 112(f) (Final Act. 6), and Appellants do not “object” to this interpretation (Reply Br. 2). As such, if the Specification failed to disclose a corresponding structure for performing this active-twisting function, the Examiner would be correct that claim 11 is indefinite. *See* Final Action 5–6. However, the Specification discloses that the active-twisting function can be performed by “one or more movable flaps” that are “added locally to the extension of the trailing edge of the blade,” by “[p]iezoelectric fibers” that are “incorporated into the extrados skin and/or the intrados skin of the blade,” or by making “extrados and intrados skins of the blade” (at least locally) “of anisotropic composite materials.” Spec. ¶ 20. Thus, the Specification sufficiently describes at least one specific structure for

⁴ Bianchi et al., US 2011/0211959 A1, pub. Sept. 1, 2011.

⁵ Zuardy et al., US 2012/0020801 A1, pub. Jan. 26, 2012.

⁶ Brunken, JR., US 2013/0089422 A1, pub. Apr. 11, 2013.

⁷ Brogdon et al., US 4,306,837, iss. Dec. 22, 1981.

performing the active-twisting function of the means-plus-function limitation recited in claim 11.

Based on the foregoing, we do not sustain the rejection of claim 11 here.

Claims 15–19

The Examiner determines that claim 15 is indefinite based on the recitation of “reduced torsional rigidity” and “the same density.” Final Act. 8. In particular, the Examiner finds that “reduced torsional rigidity” is a relative term and the Specification does not provide a standard for it such that “one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.” *Id.* The Examiner also finds that the recitation of “the same density” lacks antecedent basis. *Id.* The Examiner rejects claims 16–19 based on their dependency from claim 15. *Id.*

We do not sustain this rejection. First, we find that one of ordinary skill in the art would understand the recitation of “a reduced torsional rigidity” in the context of the claim such that the blocks and partitions are configured in a way that provides reduced torsional rigidity over other configurations. The Specification provides that “the number of partitions in the filling material of the blade directly affects the torsional rigidity of the blade” and that “[a]s the number of partitions increases, the torsional rigidity of the blade is further reduced.” Spec. ¶ 55. Thus, one of ordinary skill in the art would understand that a configuration in which no partitions are provided would provide for the maximum torsional rigidity, thereby setting the standard of rigidity.

We also find that one of ordinary skill in the art would readily understand that “the same density” refers to the density of “the at least two

blocks” recited in the claim. One would understand that the blocks necessarily have “a density” and that the limitation at issue merely requires that this density be the same for “the at least two blocks.”

Based on the foregoing, we do not sustain the rejection of claims 15–19 here.

Rejection 2

Claims 1 and 6–13

The Examiner finds that Bianchi discloses a rotor blade as claimed, except that Bianchi does not disclose that the cavity of the blade “is filled with a filling material wherein the filling material includes at least one partition parallel to a chord of the [] blade and at least two independent blocks made of filling material filling the cavity.” Final Act. 9 (citing Bianchi Fig. 1; ¶¶ 3, 53, 53, 92, 98). However, the Examiner finds that Zuardy “teaches a structural element for an aircraft provided with a variable material density core” having at least one partition as claimed. *Id.* at 10 (citing Zuardy Fig. 5; ¶¶ 32, 33). The Examiner concludes that it would have been obvious to modify Bianchi in view of Zuardy such that Bianchi includes a filling material with partitions as claimed “because this configuration allows for the optimization of the natural vibration behavior and the dynamic properties of the blade.” *Id.* (citing Zuardy ¶ 33).

Appellants argue only that one of ordinary skill “would not combine Bianchi and Zuardy to provide a rotor blade with reduced torsional rigidity as required by claim[] 1 . . . with the partitions positioned spanwise to control and reduce torsional rigidity.” Appeal Br. 8–9. We are not persuaded because, as explained below, we do not construe claim 1 as

requiring any specific structure for reducing the torsional rigidity of the rotor blade.

“[A] claim preamble has the import that the claim as a whole suggests for it.” *Bell Communications Research, Inc. v. Vitalink Communications Corp.*, 55 F.3d 615, 620 (Fed. Cir. 1995). “If the claim preamble, when read in the context of the entire claim, recites limitations of the claim, or, if the claim preamble is ‘necessary to give life, meaning, and vitality’ to the claim, then the claim preamble should be construed as if in the balance of the claim.” *Pitney Bowes, Inc. v. Hewlett-Packard Co.*, 182 F.3d 1298, 1305 (Fed. Cir. 1999). Here, claim 1 recites a “[r]otor blade with reduced torsional rigidity” in the claim preamble, but the body of the claim does not recite structure that is tied to the preamble limitation of “reduced torsional rigidity.” This recitation is not tied to any specific structure claimed and is not necessary to give life to the claim because the claim recites a complete structure without it. *See* Ans. 8.

Thus, we find that Appellants’ arguments regarding torsional rigidity do not persuade us of reversible error with respect to the rejection of claim 1. Accordingly, we sustain this rejection. We also sustain the rejection of dependent claims 6–13, for which Appellants do not present separate arguments.

Claims 15, 16, 18, and 19

We are persuaded of error in the rejection of claim 15 because this claim specifically requires structure that is configured “to provide a reduced torsional rigidity for the blade” and the Examiner has not explained adequately that the combination of art includes such a configuration or that such a configuration would have been obvious in view of the art.

With respect to this claim, the Examiner relies on Bianchi and Zuardy in substantially the same manner as with respect to claim 1. Final Act. 12–13. With respect to the specific recitation in claim 15 that at least two blocks and at least one partition are “configured to provide a reduced torsional rigidity for the blade,” the Examiner finds that “the blade disclosed by the combination of [Bianchi] and [Zuardy] is capable of being configured to provide a reduced torsional rigidity for the rotor blade.” *Id.* at 13. In the Answer, the Examiner also finds that Bianchi discloses optimizing the twist of the blade and using a filling material that does not impede twisting of the blade and possibly enhances it. Ans. 7–8 (citing Bianchi ¶¶ 64, 72). The Examiner further finds that “[s]ince the same structural limitations are disclosed by the combination of Bianchi and Zuardy, the structure disclosed is capable of performing the functional limitations recited.” *Id.* at 8.

We find error in the Examiner’s interpretation of the claim as requiring only structure that is merely capable of providing reduced torsional rigidity. Claim 15 specifically requires that “the at least two blocks and the at least one partition [are] configured to provide a reduced torsional rigidity for the blade.” Further, the Specification makes clear that the blade is specifically designed with partitions to control torsional rigidity. The Specification is concerned with limiting detachment of airflows in the lead edge or trailing edge profile of a blade by “allowing the blade to twist geometrically in relation to itself.” Spec. ¶ 8. The Specification discloses that the goal of the invention is to provide a blade in which the torsional rigidity of the blade is separated “from its other mechanical characteristics, so as to obtain reduced torsional rigidity of the blade about its longitudinal axis without significantly modifying its other mechanical characteristics.”

Id. at 26. The Specification describes that, “in an unexpected way, the presence of one or more transverse partitions in the filling material of the blade . . . makes it possible to reduce the torsional rigidity of the blade, ” which “makes it possible to retain this concept of controlling the twisting of the blade,” and “because the filling material is not a structural element of the blade, the primary mechanical characteristics of the blade (apart from its torsional rigidity) are not affected by the presence of these partitions.” *Id.* at ¶¶ 41–43. Thus, the Specification makes clear that it is the specific placement of partitions in the filling material of the blade that provides the ability to control torsional rigidity of the blade without affecting other mechanical properties of the blade.

Thus, when we construe this claim language in light of the Specification, claim 15 requires more than a filling material capable of providing reduced torsional rigidity; claim 15 requires that the blocks and partition are specifically designed to accomplish this function. *See Aspek Eyewear, Inc. v. Marchon Eyewear, Inc.*, 672 F.3d. 1335, 1349 (Fed. Cir. 2012) (noting that claim language “configured to” is construed more narrowly than “capable of” and holding that where claim language including the phrase “adapted to” is to be construed consisted with “configured to” language it requires that the structure must be “designed or configured to accomplish the specified objective, not simply that [it] can be made to serve that purpose.”) Thus, to the extent the Examiner simply relies on Zuardy’s disclosure of multiple blocks and partitions as being capable of providing reduced torsional rigidity, the Examiner has not set forth a sufficient showing that Zuardy teaches blocks and partitions configured as claimed.

Further, although the Examiner indicates that Bianchi provides teaching regarding reduced rigidity, the Examiner does not explain why these teachings would have led one of ordinary skill in the art to modify Bianchi in view of Zuardy such that Bianchi's device includes at least two blocks and at least one partition configured as claimed.

Based on the foregoing, we are persuaded of error in the rejection of claim 15. Accordingly, we do not sustain this rejection. We also do not sustain the rejection of dependent claims 16, 18, and 19 for the same reasons.

Claim 20

Claim 20 requires a series of blocks and a series of partitions that "are positioned spanwise to control torsional rigidity for the blade." Appeal Br. Claims App. 4. Although claim 20 does not use the same "configured to" language as claim 15, we determine that the rejection of this claim includes reversible error for similar reasons. In particular, although the "configured to" language is absent from claim 20, the claim nonetheless requires that the partitions are placed in positioned "to control" rigidity. We find this language requires more than the mere capability of partitions affecting torsional rigidity, and one of ordinary skill in the art would understand that the partitions are placed in the cavity in order to specifically alter the torsional rigidity of the blade. As above, when we construe the claim language in light of the Specification, claim 20 requires more than the mere capability of providing torsional rigidity; claim 20 requires a series of blocks and partitions that are specifically designed to control torsional rigidity.

Accordingly, we do not sustain the rejection of claim 20.

Rejection 3

Claims 2–5 and 17

We are persuaded of reversible error in the rejection of claims 2–5 and 17. These claims each includes a requirement that at least one strip is inserted between two adjacent blocks of the filling material. *See* Appeal Br. Claims App. 1, 3. We determine that the Examiner has not provided an adequate reason to support the conclusion of obviousness.

With respect to claim 2, for example, the Examiner acknowledges that Bianchi and Zuardy do not teach a strip inserted into each partition to separate adjacent blocks as claimed. Final Act. 15. The Examiner relies on Brunken to fill this deficiency. The Examiner finds that Brunken “teaches inserting a thin layer of material between a lower skin adapter . . . and a nose cap” in order to “minimize frictional resistance and wear between the lower skin adapter and the nose cap.” *Id.* at 16 (citing Brunken Fig. 4, ¶ 18). The Examiner determines it would have been obvious to insert a thin layer between the partitions in Zuardy’s core “because this configuration minimizes frictional resistance and wear between two core segments that may slide and contact with one another.” *Id.*

We determine that the Examiner reasoning for the proposed combination is not supported adequately. *See KSR Int’l. Co. v. Teleflex, Inc.*, 550 U.S. 398, 418 (2007) (quoting *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006)) (An obviousness rejection must be based on “some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.”) Given the purpose of selecting the particular core material in Zuardy, the Examiner has not established that one of ordinary skill in the art would have found it beneficial to include a strip between core segments as

the Examiner proposes. As Appellants note, Zuardy is concerned with providing a structural element that

has a mass distribution within the structural element by means of the varying material density of the core, in such a way that a predetermined natural vibration frequency of the structural element is ensured in order to optimise the natural vibration behaviour thereof, whereby the aeroelastic and/or structural dynamic properties of the structural element can advantageously be influenced.

Zuardy ¶ 14. To this end, Zuardy discloses that “the mass distribution within the structural element **1** is configured by means of the varying material density of the core **2** in such a way that a natural vibration frequency of the structural element **1** is reduced.” *Id.* at ¶ 33. The Examiner does not explain how the “natural vibration frequency” of the core would be affected by the inclusion of strips as proposed. Further, we find merit in Appellants’ argument that “[b]y decoupling or separating the adjacent segments of Zuardy, a discontinuity would be created in the core material” that would likely alter the vibration frequency and negatively affect control of the vibration frequency. The Examiner does not explain adequately why one of ordinary skill in the art would have found it obvious to include strips between the sections of the core in light of the effect that such strips are likely to have on the ability to control the vibration frequency. Accordingly, we are persuaded of error by Appellants’ arguments. Thus, we do not sustain the rejection of claims 2–5 and 17 for this reason.

Rejection 4

With respect to the rejection of claim 14, Appellants argue only that Brogdon does not cure the alleged deficiency in the rejection of claim 1. *See*

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Appeal Br. 13. However we found no such deficiency in the rejection of claim 1, and thus, we also sustain the rejection of claim 14.

CONCLUSION

We REVERSE the rejection of claims 11 and 15–19 under 35 U.S.C. § 112(b).

We AFFIRM the rejection of claims 1 and 6–14 under 35 U.S.C. § 103.

We REVERSE the rejection of claims 2–5 and 15–20 under 35 U.S.C. § 103.

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-IN-PART