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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte NICHOLAS AIELLO and JOHN C. DUONG

Appeal 2019-004957
Application 14/787,013
Technology Center 3700

Before BENJAMIN D. M. WOOD, FREDERICK C. LANEY, and BRENT M. DOUGAL, *Administrative Patent Judges*.

WOOD, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

Pursuant to 35 U.S.C. § 134(a), Appellant[1] appeals from the Examiner's decision to reject claims 1–20. *See* Final Act. 1. We have jurisdiction under 35 U.S.C. § 6(b).

We REVERSE.

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[1] "Appellant" refers to the applicant as defined by 37 C.F.R. § 1.42. Appellant identifies the real party in interest as United Technologies Corp. Appeal Br. 2.

CLAIMED SUBJECT MATTER

The claims are directed to the root portion of a gas-turbine airfoil blade. Spec. ¶ 2, 6. Claims 1, 10, and 16 are independent. Appeal Br. 24–26 (claims app.). Claim 1, reproduced below, is illustrative of the claimed subject matter:

> 1. An airfoil of a gas turbine engine having a platform and a root extending from the platform, the root comprising:
> a first portion having a generally cylindrical shape; and
> a second portion extending from the first portion to the platform, the second portion having a circumference larger than a circumference of the first portion, wherein the first portion and the second portion are formed as one piece with the platform and the airfoil.

REFERENCES

Name	Reference	Date
Wilkes	US 2,912,222	Nov. 10, 1959
Selby	US 2002/0106279 A1	Aug. 8, 2002

REJECTION

Claims Rejected	35 U.S.C. §	Reference(s)/Basis
1–20	103	Selby, Wilkes

OPINION

Independent claim 1 recites, *inter alia*, that the first portion and the second portion of the airfoil's root be "formed as one piece with the platform and the airfoil." Appeal Br. 24 (claims app.). Independent claims 10 and 16 contain similar limitations. *Id.* at 25–26. The Examiner relies on Selby's locking device 36 as corresponding to the claimed airfoil root, with inner shank 60 of grub screw 52 corresponding to the claimed first portion of the root, and second portion 40 of body member 37 corresponding to the

claimed second portion of the root. Final Act. 4–5 (citing Selby ¶¶ 30, 33, Fig. 3). The Examiner acknowledges, however, that Selby "fails to specifically describe wherein the first portion and the second portion are formed as one piece with the platform and airfoil." Final Act. 4. The Examiner therefore relies on Wilkes for the missing limitation. *Id.* The Examiner finds that Wilkes teaches "turbomachine blading and a method of assembly" in which "a locking portion of a blade member (13 and 14) is welded (15) to a root of the blade member (12a)." *Id.* (citing Wilkes, 1:15–43, 2:1–22); *see* Wilkes, Figs. 1–4. The Examiner determines that "[i]t would have been obvious to one having ordinary skill in the art before the effective filing date of the claimed invention to have utilized the welding of Wilkes . . . to join the components of Selby, including first and second portions, for the advantage of filling gaps between parts left for manufacturing tolerances." *Id.* at 4–5 (citing Wilkes, 2:21–22).

Appellant responds, *inter alia*, that locking device 36 is designed to be removable, and "if the alleged first and second components of Selby are welded to the airfoil and platform as in the present application the grub screws 52 of Selby would not be accessible and thus the locking device of Selby cannot be removable." Appeal Br. 7, 8 (citing Selby ¶ 38, Fig. 2).

The Examiner counters that "[b]y welding the lock of Selby 36 to the blade of Selby 22 one would still be able to access the screw 52 because the screw head of a positioned lock is still exposed," thus, "disassembly of a welded blade and lock would still be possible by loosening the screw 52 and then sliding the blade and lock out together along the track." Ans. 4 (citing Selby ¶ 38, Figs. 2, 4); *see also* Ans. 5 (depicting Selby Fig. 2, as modified by the Examiner to show "exposed screw head of positioned lock").

"[R]ejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness." *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)). Here, the Examiner's reason to utilize the welding of Wilkes to join the alleged first and second portions of Selby lacks a rational underpinning. Essentially, the Examiner has not identified any "gaps left for manufacturing tolerances" between the asserted first and second portions of Selby; the gap that the Examiner proposes be filled by welding is a design feature, the purpose of which would be defeated by the proposed welding.

Selby "relates to locking devices for locking rotary compressor blades to the rotary discs upon which the blades are mounted." Selby ¶ 1. Compressor blades 22 are placed in and held by groove 24 of rotary disc 22. *Id.* ¶ 28, Fig. 2. Two or more locking devices 36—the structure on which the Examiner relies as corresponding to the claimed root portions—are spaced at intervals around the groove to prevent the compressor blades from moving circumferentially around the groove. *Id.* ¶ 30, Fig. 2. The locking devices are designed to be removable to allow dismantling the compressor. *Id.* ¶ 38. Normally this is accomplished by loosening grub screw 52. *Id.* ¶ 38, Fig. 3. But "conditions during use of the compressor 14 frequently cause the grub screws 52 to seize to the inner wall of the bore 42 at threads 50, 54 so that they cannot be removed." *Id.* Therefore, the locking device is designed with annular gap 62 between screw shank 60 and second portion 40 of body member 37, which results in "weakened region 66" between outer end region 48 of bore 42 and annular gap 62. When screw 52 is

turned, first portion 38 shears relative to second portion 40 at weakened region 66, causing second portion 40 to break away from first portion 38 and fall into groove 24. *Id.* According to Selby, "gap 62 is large enough to allow the second portion 40 of the body member to fall away from the first portion 38 without hindrance when breakage occurs between the first and second portions 38 and 40." *Id.* ¶¶ 33, 38. Joining shank 60 to second portion 40 by welding would at least partially fill annular gap 62 with weld material, thus inhibiting the designed breakage. The Examiner has not explained why one of ordinary skill in the art would have nonetheless have filled this gap.

In the Answer the Examiner proposes, instead, welding locking device 36 to an adjacent blade 22 "for the benefit of filling gaps left between parts." Ans. 4 (citing Wilkes, 2:21–22). To the extent that the Examiner no longer proposes welding shank 60 (the asserted root first portion) to second portion 40 (the asserted root second portion), the Examiner does not explain how the resulting structure would satisfy the claim requirement that "the first portion and the second portion are formed as one piece with the platform and the airfoil." Also in the Answer the Examiner points to an "additional benefit" of welding Selby's components in view of Wilkes: to "improve fatigue strength." Ans. 4 (citing Wilkes, 2:18–20). But the teaching on which the Examiner relies to support this contention is not referring to Wilkes' welds 15, but rather to silver brazing 16 at a different location. Wilkes, 2:18–21, Fig. 3. Thus, this teaching does not support the Examiner's finding that one of ordinary skill in the art would have been motivated to weld Selby's components in accordance with Wilkes' teachings.

Because we are not persuaded that one of ordinary skill in the art would have had reason to modify Selby as the Examiner proposes, we do not sustain the Examiner's rejection of independent claims 1, 10, and 16, and their dependent claims 2–9, 11–15, and 17–20.

CONCLUSION

The Examiner's rejection is reversed.

DECISION SUMMARY

Claims Rejected	**35 U.S.C. §**	**Reference(s)/Basis**	**Affirmed**	**Reversed**
1–20	103	Selby, Wilkes		1–20

REVERSED