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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte JAMES M. KOONANKEIL

Appeal 2019-003272
Application 14/610,001
Technology Center 1700

Before JEFFREY B. ROBERTSON, CHRISTOPHER C. KENNEDY, and
MONTÉ T. SQUIRE, *Administrative Patent Judges*.

SQUIRE, *Administrative Patent Judge*.

DECISION ON APPEAL¹

Appellant² appeals under 35 U.S.C. § 134(a) from the Examiner’s
decision rejecting claims 1, 2, 4, 6–12, 14, and 15.³ We have jurisdiction
under 35 U.S.C. § 6(b).

¹ In this Decision, we refer to the Specification filed Jan. 30, 2015 (“Spec.”); Final Office Action dated Jan. 23, 2018 (“Final Act.”); Advisory Action dated May 30, 2018 (“Adv. Act.”); Appeal Brief filed Sept. 19, 2018 (“Appeal Br.”); Examiner’s Answer dated Jan. 23, 2019 (“Ans.”); and Reply Brief filed Mar. 22, 2019 (“Reply Brief”).

² We use the word “Appellant” to refer to “Applicant” as defined in 37 C.F.R. § 1.42(a). Appellant identifies United Technologies Corporation as the real party in interest. Appeal Br. 2.

³ Claims 3, 5, and 13 are canceled and claims 16–20 are withdrawn. Appeal Br. 4.

For the reasons set forth below, we REVERSE and enter a NEW GROUND OF REJECTION.

CLAIMED SUBJECT MATTER

Appellant's disclosure relates to a method for disposing blocking material into a component having internal passages, and more particularly to a method for disposing laser blocking material within an interior of an airfoil. Spec. ¶¶ 1, 6; Abstract.

Claim 1 is illustrative of the claimed subject matter on appeal and is reproduced below from the Claims Appendix to the Appeal Brief:

1. A method for disposing a blocking material within an interior of a component, the method comprising:

forming at least one aperture of a multiple of apertures in communication with a cavity within a component via a first process; and

filling the cavity with a blocking material subsequent to forming the at least one aperture formed via the first process and prior to forming the remainder of the multiple of apertures via a second process different than the first process, wherein the second process is a laser drilling process and the at least one aperture allows a route for entrapped gasses from the blocking material to escape the cavity.

Appeal Br. 11 (key disputed claim language italicized and bolded).

REFERENCES

The Examiner relies on the following prior art references as evidence in rejecting the claims on appeal:

Name	Reference	Date
Flis et al. ("Flis")	US 5,928,534	July 27, 1999
Lee	US 7,186,085 B2	Mar. 6, 2007

REJECTIONS

On appeal, the Examiner maintains (Ans. 3) the following rejections:

1. Claims 1, 2, 4, 6–12, and 14 are rejected under 35 U.S.C. § 102(a)(1) as being anticipated by Flis (“Rejection 1”). Ans. 3.
2. Claim 15 is rejected under 35 U.S.C. § 103 as being unpatentable over Flis in view of Lee (“Rejection 2”). *Id.* at 5.

OPINION

Rejection 1

The Examiner rejects claims 1, 2, 4, 6–12, and 14 under § 102(a)(1) as anticipated by Flis (Ans. 3–5), which we refer to as Rejection 1. In response to the Examiner’s rejection, Appellant presents argument for the patentability of the claims based primarily on two claim elements, each of which we address in turn below.

1. “a second process different than the first process”

First, Appellant argues the Examiner’s rejection should be reversed because Flis does not disclose “forming the remainder of the multiple of apertures via a second process different than the first process,” as recited in claim 1. Appeal Br. 8; Reply Br. 1–2. Appellant contends that because the claimed method requires the “second process” to be “different than the first process,” and Flis discloses only a single, laser drilling process, the reference does not anticipate the claim. Appeal Br. 8.

Appellant’s argument is persuasive because the Examiner has not established by a preponderance of the evidence that Flis discloses “a second process different than the first process,” as required by claim 1. To serve as an anticipatory reference, “the reference must disclose each and every

element of the claimed invention.” *In re Gleave*, 560 F.3d 1331, 1334 (Fed. Cir. 2009).

None of the portions of Flis the Examiner cites and relies upon in the rejection discloses the “second process different than the first process” element of the claim. *See* Ans. 3–4. Although Flis teaches forming cooling air holes 42 via laser drilling (Flis 5:22–26) and forming impingement holes 56 (Flis 4:41–43, 4:59–62, 5:58–62), Flis does not disclose forming the holes via a process other than laser drilling. As the Examiner acknowledges (Ans. 6), Flis does not disclose how the impingement holes 56 are formed and, as Appellant correctly points out (Appeal Br. 8), laser drilling is the only process explicitly disclosed or discussed in the reference for forming holes of any kind.

The Examiner also does not identify sufficient evidence or provide an adequate factual basis to establish that the laser drilling process Flis discloses for forming the cooling holes 42 is inherently different than the process for forming the impingement holes 56. For a claim limitation to be found inherently present in the cited prior art reference, the limitation must be either (a) necessarily present, or (b) the natural result of the combination of elements explicitly disclosed by the prior art. *Par Pharmaceutical, Inc. v. TWI Pharmaceuticals, Inc.*, 773 F.3d 1186, 1195–96 (Fed. Cir. 2014). “Inherency . . . may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient.” *In re Oelrich*, 666 F.2d 578, 581 (CCPA 1981) (quoting *Hansgirk v. Kemmer*, 102 F.2d 212, 214 (CCPA 1939)).

Contrary to what the Examiner’s comments at pages 4–5 of the Answer seem to imply, the fact that Flis discusses laser drilling with respect

to how the cooling holes 42 are formed, without more, does not teach or suggest that the process used to form cooling holes 42 is necessarily different than the process used to form impingement holes 56 or the natural result of the combination of elements explicitly disclosed by the reference. The mere possibility that the laser drilling process Flis discloses for forming cooling holes 42 might be different than the process used to form impingement holes 56, without more, is insufficient to support a finding that Flis inherently discloses the “second process different than the first process” element of the claim.

The Examiner’s assertion that “laser drilling is not how the hole 56 could be made internally in the blade . . . anyone having ordinary skill in the art would see that” (Ans. 4) is equally unpersuasive because it is conclusory and, without more, insufficient to sustain the Examiner’s rejection. *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006) (holding “rejections . . . cannot be sustained by mere conclusory statements”).

We, therefore, cannot sustain the Examiner’s rejection of claim 1 because the Examiner has not established by a preponderance of the evidence that Flis discloses the “second process different than the first process” recitation of the claim. Because claims 2, 4, and 6–8 depend from claim 1, we also cannot sustain the Examiner’s rejection of these claims.

2. *“filling the cavity with a blocking material subsequent to forming the at least one aperture formed”*

Second, Appellant argues the Examiner’s rejection should be reversed because the Examiner has not adequately established that Flis discloses the “order of steps as recited and claimed.” Appeal Br. 8–9. Appellant contends that, in making the rejection, although the Examiner blanketly

asserts that the order of steps is disclosed throughout the disclosure of Flis (Ans. 3), “the Examiner does not specifically substantiate this assertion.” Appeal Br. 8–9. In essence, Appellant argues the Examiner has failed to establish by a preponderance of the evidence Flis discloses that the filling the cavity with a blocking material step occurs “subsequent to” the forming at least one aperture step, as recited in the claim.

We agree with Appellant’s argument in this regard. That is, on the record before us, we are not persuaded the Examiner has established by a preponderance of the evidence that Flis discloses “filling the cavity with a blocking material subsequent to forming the at least one aperture formed via the first process,” as claimed.

The Examiner has not provided a sufficient evidentiary basis to support the finding that Flis discloses the recitation “filling the cavity with a blocking material subsequent to forming the at least one aperture formed via the first process” in the order and manner claimed. Although the Examiner finds Flis discloses forming impingement hole 56, which is in communication with passage 38 that has a region 46 and that a blocking material 64 is filled in the region 46, as the Examiner acknowledges (Ans. 6), Flis does not disclose how the impingement holes 56 are actually formed or specify exactly when during the manufacturing process the holes are made.

Additionally, although the Examiner asserts the “blocking material 64 is filled in the region 46 after hole 56 is made and before holes 42 are made” (Ans. 3) and the “order of steps is disclosed throughout the disclosure of Flis” (*id.*), the Examiner does not direct us to any teaching or specific disclosure in Flis to support such finding or evidence sufficient to establish

Flis discloses, either explicitly or inherently, the “filling the cavity with a blocking material subsequent to forming the at least one aperture formed via the first process” element of the claim. *Kahn*, 441 F.3d at 988.

We, therefore, cannot sustain the Examiner rejection of claim 1 for the additional reason that the Examiner has not established by a preponderance of the evidence that Flis discloses the “filling the cavity with a blocking material subsequent to forming the at least one aperture formed” recitation of the claim.

Because claims 1, 2, 4, 6–8 depend from claim 1 and claims 9–12 and 14 include a “filling the . . . cavity with a blocking material subsequent to forming the at least one aperture formed” recitation similar to claim 1, we also cannot sustain the Examiner’s rejection of these claims.

Accordingly, we reverse the Examiner’s rejection of claims 1, 2, 4, 6–12, and 14 under 35 U.S.C. § 102(a)(1) as being anticipated by Flis.

Rejection 2

The Examiner rejects claim 15 under § 103 as obvious over the combination of Flis and Lee (Ans. 5–6), which we refer to as Rejection 2. Claim 15 depends from claim 9 and further recites “wherein forming one of the multiple of apertures is formed via the first process via an EDM process.” Appeal Br. 13 (Claims Appendix).

The foregoing deficiencies in the Examiner’s findings and analysis regarding the Flis reference discussed above in reversing the Examiner’s Rejection 1, including the absence of evidence that the recited steps would have been suggested to one of ordinary skill in the art in the order claimed, are not remedied by the Examiner’s findings regarding the additional Lee

reference or combination of Lee and Flis cited in support of the second ground of rejection.

Accordingly, for principally the same reasons stated above for reversing Rejection 1, we reverse the Examiner's rejection of claim 15 under § 103 as obvious over the combination of Flis and Lee.

NEW GROUND OF REJECTION

Under the provisions of 37 C.F.R. § 41.50(b), we enter the following new ground of rejection: claims 1, 2, 4, 9, 11, and 15 are rejected under 35 U.S.C. § 103 as being unpatentable over Flis in view of Lee.

We find that the combination of Flis and Lee suggests a method satisfying of all of the limitations of independent claims 1 and 9. Flis is directed to a method for disposing a blocking material in a cavity for blocking a laser beam (“method for disposing a blocking material within an interior of a component”). Flis, Abstract, 1:5–12. Flis teaches forming at least one impingement hole 56 which is in communication with passage 38 that has a region 46 via a first process for forming holes (“forming at least one aperture of a multiple of apertures in communication with a cavity within a component via a first process”). *Id.* at 4:26–36, 4:37–43, 4:59–62.

Flis further teaches forming cooling air holes 42 in communication with region 46, wherein the cooling holes 42 are formed via a laser drilling process (“forming the remainder of the multiple of apertures via a second process . . . wherein the second process is a laser drilling process”). *Id.* at 4:26–36, 5:23–29, 5:44–47. Flis also teaches filling the region 46 with blocking material 64 and that the purpose of the blocking material is to

mitigate damage to the blade during formation of cooling holes 42 formed via the laser drilling process. *Id.* at 1:5–8, 2:62–65, 5:28–33.

Flis teaches that filling the region 46 with blocking material 64 occurs after impingement hole 56 is formed and prior to forming cooling holes 42 via the laser drilling process because the reference teaches that the purpose of the blocking material is to mitigate damage to the blade during formation of the cooling holes (“filling the cavity with a blocking material subsequent to forming the at least one aperture formed via the first process and prior to forming the remainder of the multiple of apertures via a second process”). Flis 1:5–8, 2:62–65, 5:28–33. Flis also teaches that impingement hole 56 assists gas to escape from passage 38 (“at least one aperture allows a route for entrapped gasses from the blocking material to escape the cavity”). *Id.* at 5:58–62.

Flis does not teach that the laser drilling process for forming cooling holes 42 is different than the process for forming impingement hole 56 (“forming the remainder of the multiple of apertures via a second process different than the first process”).

Lee, however, is in the same field of endeavor as Flis and teaches forming different-shaped cooling holes within an airfoil component via both laser drilling and EDM drilling processes. Lee, Abstract, 1:5–6, 6:7–30. Lee further teaches that the two types of holes formed may be conventionally manufactured using less expensive laser-drilling for the cylindrical holes and more expensive EDM machining for shaped diffusion holes, and that the diffusion holes may be alternated with the less expensive laser drilled holes for reducing cost of the airfoil, as well as enhancing performance if the pressurized cooling air discharged. *Id.* at 6:7–18.

Based on the above findings, we conclude that, at the time of the invention, it would have been obvious to one of ordinary skill in the art to have used Lee's EDM drilling process as a first process in combination with Flis' laser drilling method as a second process for forming cooling holes in Flis' airfoil in order to reduce the cost of the airfoil, as well as for enhancing performance if the pressurized cooling air discharged. *See* Lee 6:7–18.

Regarding the order of the steps, we conclude it would have been obvious to one of ordinary skill in the art at the time of the invention to have performed the steps of (1) forming at least one aperture of a multiple of apertures in communication with a cavity within a component via a first process (EDM drilling), (2) filling the cavity with a blocking material subsequent to forming the at least one aperture formed via the first process and prior to forming the remainder of the multiple of apertures via a second process (laser drilling) in the order and manner claimed because Lee teaches using both EDM and laser drilling process for forming holes and that alternating the EDM-formed holes with the laser-drilled holes was known in the art, and would have been advantageous for reducing cost of the airfoil (Lee 6:7–30); and selection of any order of performing process steps is *prima facie* obvious in the absence of new or unexpected results.

CONCLUSION

In summary:

Claim(s) Rejected	35 U.S.C. §	Reference(s)/Basis	Affirmed	Reversed	New Ground
1, 2, 4, 6–12, 14	§ 102(a)(1)	Flis		1, 2, 4, 6–12, 14	
15	§ 103	Flis, Lee		15	
1, 2, 4, 6–12, 14	§ 103	Flis, Lee			1, 2, 4, 9, 11, 15
Overall Outcome				1, 2, 4, 6–12, 14, 15	1, 2, 4, 9, 11, 15

This decision contains a new ground of rejection pursuant to 37 C.F.R. § 41.50(b). 37 C.F.R. § 41.50(b) provides “[a] new ground of rejection pursuant to this paragraph shall not be considered final for judicial review.”

37 C.F.R. § 41.50(b) also provides that the appellant, WITHIN TWO MONTHS FROM THE DATE OF THE DECISION, must exercise one of the following two options with respect to the new ground of rejection to avoid termination of the appeal as to the rejected claims:

(1) Reopen prosecution. Submit an appropriate amendment of the claims so rejected or new evidence relating to the claims so rejected, or both, and have the matter reconsidered by the examiner, in which event the prosecution will be remanded to the examiner. The new ground of rejection is binding upon the examiner unless an amendment or new evidence not previously of record is made which, in the opinion of the examiner, overcomes the new ground of rejection designated in the decision. Should

the examiner reject the claims, appellant may again appeal to the Board pursuant to this subpart.

(2) Request rehearing. Request that the proceeding be reheard under § 41.52 by the Board upon the same record. The request for rehearing must address any new ground of rejection and state with particularity the points believed to have been misapprehended or overlooked in entering the new ground of rejection and also state all other grounds upon which rehearing is sought.

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).

REVERSED AND NEW GROUND OF REJECTION ENTERED
PURSUANT TO 37 C.F.R. § 41.50(b)