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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte GARY D. ROBERGE

Appeal 2018-005497[1]
Application 14/797,264[2]
Technology Center 3700

Before MICHAEL C. ASTORINO, KENNETH G. SCHOPFER, and AMEE A. SHAH, *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 1–17. We have jurisdiction under 35 U.S.C. § 6(b).

We AFFIRM.

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[1] Our decision references the Appeal Brief ("Appeal Br.," filed Jan. 22, 2018), the Reply Brief ("Reply Br.," filed May 7, 2018), the Examiner's Answer ("Ans.," mailed Mar. 7, 2018), and the Final Office Action ("Final Act.," mailed Sept. 13, 2017).

[2] According to Appellant, the real party in interest is United Technologies Corp. Appeal Br. 1.

BACKGROUND

"The present disclosure relates generally to gas turbines, and more particular[ly] to vaneless turbine section configurations for the same." Spec. ¶ 1.

CLAIMS

Claims 1 and 9 are the independent claims. Claim 1 is illustrative of the appealed claims and recites:

> 1. A gas turbine engine comprising:
>
> a compressor section including a first compressor portion and a second compressor portion;
>
> a combustor fluidly connected to the compressor section via a primary flowpath;
>
> a turbine section fluidly connected to the combustor via the primary flowpath, wherein the turbine section includes at least a first turbine portion and a second turbine portion connected to the first turbine portion via a transition duct, fluid in the second turbine portion having a lower pressure than fluid in the first turbine portion, and wherein the first turbine portion and the second turbine portion are counter-rotating turbine portions;
>
> a first shaft connecting the first turbine portion to the second compressor portion;
>
> a second shaft connecting the second turbine portion to the first compressor portion;
>
> wherein the second turbine portion includes at least three turbine stages and a static support structure, the static support structure being connected to the second shaft via a bearing;
>
> wherein the transition duct is vaneless; and
>
> wherein the first turbine portion and the second turbine portion are counter rotating turbine portions.

Appeal Br. 8.

REJECTIONS

1. The Examiner rejects claims 1, 5, and 6, under 35 U.S.C. § 102(a)(1) as anticipated by Krebs.[3]
2. The Examiner rejects claims 1–4 and 7–17, under 35 U.S.C. § 103 as unpatentable over Krebs in view of Petrie.[4]

DISCUSSION

Anticipation

With respect to this rejection, Appellant argues the claims as a single group. *See* Appeal Br. 4. We select claim 1 as representative of this group, and the remaining claims stand or fall with claim 1.

With respect to claim 1, the Examiner finds that Krebs discloses a gas turbine engine including, in relevant part, a second turbine portion 32 including a static support structure 95 that is connected to the second shaft 34 through bearing 80. Final Act. 2–3.[5] As discussed below, Appellant's arguments do not apprise us of error in the Examiner's findings.

Appellant argues only that "[t]he alleged static support structure 95 of Krebs is not included within the second turbine portion, and would not read on the claimed features." Appeal Br. 4. Claim 1 requires a second turbine portion that includes "a static support structure" that is "connected to the second shaft via a bearing." *Id.* at 8. Krebs describes element 95 as "a circumferential row of turbine outlet guide vanes [that] function as structural

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[3] Krebs et al., US 3,703,081, iss. Nov. 21, 1972.
[4] Petrie, US 3,307,775, iss. Mar. 7, 1967.
[5] The Final Action lacks page numbers. We designate the page titled "Office Action Summary" as page 1 and number the remaining pages consecutively therefrom

members." Krebs col. 6, ll. 2–6. Appellant does not explain why these guide vanes may not be considered a part of the second turbine portion or how the claimed support structure would not read on element 95, and we find that the cited portion of Krebs supports the Examiner's findings.

Accordingly, we sustain the rejection of claim 1 as anticipated by Krebs. We also sustain the rejection of claims 5 and 6, for which Appellant did not present separate arguments.

Obviousness

With respect to this rejection, Appellant argues the claims as a single group. *See* Appeal Br. 4–7. We select claim 1 as representative of this group, and the remaining claims stand or fall with claim 1.

Here, with respect to claim 1, the Examiner relies on a different element in Krebs as the static support structure, i.e., the "vane between first and second turbine rows 40 of second turbine portion in figure 3," and the Examiner acknowledges that this support structure is not connected to the second shaft via bearing. Final Act. 3. The Examiner finds that Petrie teaches connecting a static support structure to a shaft via a bearing in a compressor, and the Examiner concludes that modifying Krebs to include a bearing as in Petrie would have been obvious in order to strengthen "the rotor section with as little weight penalty as possible." *Id.* at 3–4 (citing Petri col. 3, ll. 39–41).

As discussed below, we are not persuaded of error in the rejection by Appellant's arguments.

Appellant first argues that "the proposed combination would not have been obvious to one of skill in the art at least because the alleged 'benefit' . . . would not be applicable to Krebs." Appeal Br. 4. Appellant asserts that

there is no indication that strengthening the rotor section of Krebs would be desirable and that Petrie only teaches strengthening the blades and vanes of a compressor against impact from ingested birds and other debris. *Id.* at 4–5. Appellant further asserts that "[i]ngested debris is not a problem" with respect to turbine sections, and thus, there would be "no reason to attempt to strengthen the turbine vanes" as proposed by the Examiner. *Id.* at 5. We are not persuaded of error by this argument. Petrie discloses that the specific design features "described have been intended to strengthen the compressor with as little weight penalty as possible." Petrie col. 3, ll. 39–41. Petrie also specifically discloses that the relationship between the blades and the bearing is designed in order to reduce the stress on the blades and reduce the risk of blade fracture. *Id.* at col. 3, ll. 23–34. Although Petrie discloses these advantages in the context of stress created by the ingestion of bird parts or other debris, we find that this disclosure sufficiently supports the Examiner's conclusion that one of ordinary skill in the art would recognize that using a bearing as in Petrie would reduce stress on and strengthen "the turbine section [of Krebs, which] will increase the operable life and the durability of the turbine section." Ans. 2–3.

Appellant also argues that "the resultant structure of the combination would not read on the rejected claims." Appeal Br. 5. In particular, Appellant asserts that "the alleged static support structure of Krebs (the vane between the first and second blade 40 of the turbine section of Krebs) is not a static support structure at all. While the vane is fixedly mounted to the outer casing, the vane is not connected to the second shaft." *Id.* at 6. Appellant asserts that "the contact between the alleged static support and the shaft [is] a knife edge seal, the connection is incapable of providing static

support, and cannot read on the claimed static support structure." *Id.* Appellant alleges that the "knife edge seal" is merely a contact point that does not achieve the function of the connection required by the claims. *Id.* at 6–7.

We are not persuaded of error for the reasons provided by the Examiner. *See* Ans. 3. Most importantly, we note that Appellant's argument against Krebs individually does not explain why the proposed combination would lack a static support structure as required by the claim. The rejection relies on the combination of Krebs and Petrie and specifically contemplates including a bearing as in Petrie as the connection between the static support structure and the shaft in Krebs. Appellant does not explain why the combination would not include a connection between the static support structure and the shaft as claimed.

Further, we agree with the Examiner that the knife edge seal provides a connection between the static support structure and the shaft in Krebs. *See* Ans. 3. Although Appellant argues that "a knife seal contact is not consistent with Appellant's usage of 'connect' . . . throughout Appellant's specification," Appellant does not explain, such as by way of examples from the Specification, why that is the case. We agree with the Examiner that the claims do not indicate the degree of "static support" required, and we also find that the claim does not suggest the degree of "connection" required between the shaft and the static support structure. We note that although Appellant argues that the Specification requires a specific interpretation of what is required by "static support" and/or a "connection," Appellant has not identified any portion of the Specification in support of these arguments. *See* Appeal Br. 7; Reply Br. 4. Further, the Specification does not appear to

use these terms in a manner that is inconsistent with the elements of Krebs relied upon by the Examiner. *See, e.g.,* Spec. ¶ 9 (stating that "the static support structure is connected to a second shaft via a bearing" without further explanation); ¶ 40 (explaining that the specific connection between rotors in the second portion of the turbine to each other are "via mechanically fastened or bonded joints in disk arms," but stating only that the second turbine portion is "connected to a second shaft" without further description of what is required by this connection.).

Based on the foregoing, we are not persuaded of error and we sustain the rejection of claim 1 as obvious. As noted above, claims 2–4 and 7–17 fall with claim 1, and thus, we also sustain the rejection of those claims as obvious.

CONCLUSION

We AFFIRM the rejections of claims 1–17.

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