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Table with 5 columns: APPLICATION NO., FILING DATE, FIRST NAMED INVENTOR, ATTORNEY DOCKET NO., CONFIRMATION NO.
14/033,966 09/23/2013 Giridhari L. Agrawal 4525-0039-1 9394

35301 7590 07/17/2017
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EXAMINER

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ART UNIT PAPER NUMBER

2831

NOTIFICATION DATE DELIVERY MODE

07/17/2017

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UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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*Ex parte* GIRIDHARI L. AGRAWAL and  
CHARLES W. BUCKLEY

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Appeal 2016-008288  
Application 14/033,966  
Technology Center 2800

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Before ROMULO H. DELMENDO, KAREN M. HASTINGS, and  
JAMES C. HOUSEL, *Administrative Patent Judges*.

PER CURIAM.

DECISION ON APPEAL

Appellants<sup>1</sup> seek our review under 35 U.S.C. § 134(a) of the Examiner's decision rejecting claims 1–3, 6–8, and 12–17.

We have jurisdiction over the appeal under 35 U.S.C. § 6(b).

We AFFIRM.

Independent claim 1 is illustrative of the subject matter on appeal (emphases added):

1. A turbomachine for extracting energy from a process gas, said turbomachine comprising:

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<sup>1</sup> Appellants state the real party in interest is R&D Dynamics Corporation (Appeal Br. 3).

a turbine comprising a turbine impeller rotatably housed in a turbine housing for processing process gas flowing between an inlet and an outlet of the turbine housing, said turbine impeller being mounted on a rotating turbine shaft disposed within the turbine housing for rotation about a central longitudinal axis, *wherein the rotating turbine shaft is radially supported by a pair of journal bearings and is axially supported by a pair of thrust bearings that support opposite axial faces of a thrust runner disposed on the rotating turbine shaft within the turbine housing;*

a generator device housed in a generator housing, said generator device including a stator assembly fixedly mounted in the generator housing and a rotor assembly mounted on a rotating generator shaft within the generator housing for rotation relative to the stator assembly; and

a gear assembly that is mounted into an adapter housing connected between the turbine housing and the generator housing and that operatively connects the turbine rotating shaft to the rotor assembly of the generator device to transfer torque from the turbine to the generator device.

The Examiner maintains the following rejections under 35 U.S.C.

§ 103(a):

(a) claims 1–3, 6, 12, 13, 15, and 16 as unpatentable over Hoffman (US 3,185,854, issued May 25, 1965) (“Hoffman”) in view of Agrawal et al. (US 7,948,105 B2, issued May 24, 2011) (“Agrawal”); and

(b) claims 7, 8, 14, and 17 as unpatentable over Hoffman in view of Agrawal and further in view of Ganev et al. (US 2005/0206166 A1, published Sept. 22, 2005) (“Ganev”).

## ANALYSIS

Upon consideration of the evidence relied upon in this appeal and each of Appellants’ contentions, we find that the preponderance of evidence

supports the Examiner's conclusion that the subject matter of Appellants' claims 1–3, 6–8, and 12–17 are unpatentable over the applied prior art. We sustain the Examiner's § 103 rejections essentially for the reasons set out by the Examiner in the Answer.

We add the following primarily for emphasis.

*The § 103 Rejection based on Hoffman in view of Agrawal*

Appellants' principal argument regarding claim 1 in the Appeal Brief is that it would not have been obvious to modify Hoffman in view of Agrawal to provide a turbomachine comprising, among other things, a turbine including a turbine impeller housed in a turbine housing and mounted on a rotating turbine shaft disposed within the turbine housing, wherein the shaft "is axially supported by a pair of thrust bearings that support opposite axial faces of a thrust runner disposed on the rotating turbine shaft within the turbine housing," as recited in claim 1 (Appeal Br. 10–14; Reply Br. 2–4).

Specifically, Appellants contend Hoffman discloses an arrangement in which a single thrust bearing for the shaft of a high speed turbine-generator is located within a gear housing to improve alignment of reduction gears and to ease lubrication of the bearing (Appeal Br. 11). Appellants state "Agrawal teaches thrust bearings that are within a turbine housing so as to enable lubrication of the thrust bearings by a process gas" (*id.* at 12).<sup>2</sup> Appellants argue the bearing of Agrawal would undergo thermal expansion

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<sup>2</sup> Appellants further argue "Agrawal, however, does neither teach nor suggest a reduction gear set" (Appeal Br. 12). As the Examiner states at page 2 of the Examiner's Answer, the Examiner finds Hoffman discloses a reduction gear set and does not rely upon Agrawal for such a disclosure.

due to the process gas that flows through the turbine and thus would detract from Hoffman's purpose of using a single bearing set to align a reduction gear set and a turbine (*id.* at 12). Appellants assert that: Agrawal does not disclose the alignment of a reduction gear set and a turbine by a single thrust bearing within a turbine housing; the Examiner has not demonstrated that Hoffman can be modified in view of Agrawal without detracting from its intended purpose of alignment; one of ordinary skill in the art would not have modified Hoffman in view of Agrawal because such a modification would render Hoffman's device unsatisfactory for its intended purpose; and the Examiner has relied upon impermissible hindsight in the rejection over Hoffman and Agrawal (Appeal Br. 12–13; Reply Br. 3–4).<sup>3</sup>

As noted above, Appellants state the thrust bearings of Agrawal are located within a turbine housing (Appeal Br. 12). Therefore, Appellants do not dispute the Examiner's finding that Agrawal discloses thrust bearings located within a turbine housing (Final Act. 4).

Appellants' arguments, which focus on whether there would have been a reason to modify Hoffman in view of Agrawal and whether the Examiner provided a sufficient rationale to do so, do not identify a reversible error. The Examiner set forth a sufficient reason to modify Hoffman in view of Agrawal by concluding it would have been obvious to support a turbine shaft with the thrust bearings of Agrawal "to provide a small, high

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<sup>3</sup> Appellants also cite *In re Omeprazole Patent Litigation*, 536 F.3d 1361 (Fed. Cir. 2008) in support of their arguments for a lack of reason to combine (Reply Br. 3). This argument is also unpersuasive because, unlike the patentee in *In re Omeprazole Patent Litigation*, Appellants have not recognized a flaw in prior turbine-generators that prompted the combination of known elements that, without recognition of the flaw, one of ordinary skill in the art otherwise would not have had a reason to combine.

efficiency, oil-free turbine-driven alternator suitable for conversion of stored energy in a process gas to electrical power, facilitating recapture of energy during operation that would otherwise be wasted,” citing the abstract of Agrawal (Final Act. 4). The disclosure of Agrawal further supports the Examiner’s reason to combine by teaching that its air foil thrust bearing advantageously provides oil-free operation, higher reliability, no requirement for scheduled maintenance, durability, high speed operation, and both low and high temperature capabilities (Agrawal col. 2, l. 44, to col. 3, l. 9; col. 7, ll. 24–32). Therefore, the Examiner’s rejection includes articulated reasoning with a rational underpinning to explain why one of ordinary skill in the art would have modified Hoffman in view of Agrawal.

Moreover, Appellants argue Agrawal is not directed to the alignment of a turbine-generator, like Hoffman, and argue the location of Agrawal’s thrust bearing would detrimentally affect the alignment of Hoffman’s turbine-generator. Appellants, however, do not present any evidence that a modification of Hoffman in view of Agrawal would have been beyond the capabilities of a person of ordinary skill in the art. *See KSR Int’l Co. v. Teleflex, Inc.*, 550 U.S. 398, 417 (2007) (“if a technique has been used to improve one device, and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way, using the technique is obvious unless its actual application is beyond his or her skill”).

In addition, Appellants’ arguments are directed to the notion that the modification of Hoffman in view of Agrawal would have detrimentally affected the turbine-generator of Hoffman or detracted from its intended purpose, not that the modification would have rendered the turbine-generator inoperable or truly unsatisfactory (Appeal Br. 12–13). To the extent there

would have been some loss of advantageous alignment in the turbine-generator of Hoffman when modified in view of Agrawal, but not to an extent that renders the turbine-generator inoperable or undesirable, this alone is insufficient to demonstrate a lack of reason to combine. One of ordinary skill in the art may be motivated to pursue the desirable properties taught by one reference, even if that means foregoing the benefit taught by another reference. *In re Urbanski*, 809 F.3d 1237, 1244 (Fed. Cir. 2016). *See also Winner Int'l Royalty Corp. v. Wang*, 202 F.3d 1340, 1349 n.8 (Fed. Cir. 2000) (“The fact that the motivating benefit comes at the expense of another benefit, however, should not nullify its use as a basis to modify the disclosure of one reference with the teachings of another. Instead, the benefits, both lost and gained, should be weighed against one another.”).

Appellants’ arguments that modifying Hoffman in view of Agrawal would detrimentally affect the turbine-generator of Hoffman or detract from its intended purpose focus upon the possible removal of the benefit disclosed by Hoffman without consideration of what the combination of the applied references, as a whole,<sup>4</sup> would have suggested to one of ordinary skill in the art. Here, the Examiner finds that Agrawal discloses several benefits for its thrust bearing, which provide, on the balance, a preponderance of evidence for the obviousness of the claimed turbomachine.

Further, changing the location of a thrust bearing from the gear housing of a turbine-generator to within the turbine housing of the turbine generator would not appear to change the function of the thrust bearing for

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<sup>4</sup> “[T]he test for combining references is not what the individual references themselves suggest but rather what the combination of disclosures taken as a whole would suggest to one of ordinary skill in the art.” *In re McLaughlin*, 443 F.2d 1392, 1395 (CCPA 1971).

fixing the axial position of a shaft. Therefore, any difference between the location of Hoffman's thrust bearing and the thrust bearing of Agrawal would have been an obvious rearrangement of parts. *See In re Japikse*, 181 F.2d 1019 (CCPA 1950) (claims to a hydraulic power press which read on the prior art except with regard to the position of the starting switch were held unpatentable because shifting the position of the starting switch would not have modified the operation of the device).<sup>5</sup>

Appellants do not argue independent claim 12 and dependent claims 2, 3, 6, 13, 15, and 16 separately from claim 1 (Appeal Br. 14–15). Accordingly, we sustain the § 103 rejection of claims 1–3, 6, 12, 13, 15, and 16.

*The § 103 Rejection based on Hoffman in view of Agrawal and further in view of Ganev*

For the rejection of claims 7, 8, and 14, Appellants argue Ganev does not provide a reason to combine Hoffman and Agrawal to provide the turbomachines of claims 1 and 12. Appeal Br. 15. Appellants' arguments do not identify a reversible error in the Examiner's rejection of claims 1 and 12. Therefore, for the reasons set forth above, we sustain the § 103 rejection of claims 7, 8, and 14.

DECISION

The Examiner's § 103 rejections of claims 1–3, 6–8, and 12–17 are affirmed.

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<sup>5</sup> Moreover, the turboalternator depicted in Figure 2 of Agrawal appears to demonstrate the obviousness of using a single, overall housing for the various components of a turbine-generator, including its thrust bearings.



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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).

AFFIRMED