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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* CLAUS GREWE

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Appeal 2019-000855  
Application 14/376,426  
Technology Center 3700

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Before JENNIFER D. BAHR, DANIEL S. SONG, and  
STEFAN STAICOVICI, *Administrative Patent Judges*.

STAICOVICI, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

Appellant<sup>1</sup> appeals under 35 U.S.C. § 134(a) from the Examiner's decision in the Final Office Action (dated Apr. 13, 2018) rejecting claims 14–17 and 24–34. We have jurisdiction over this Appeal under 35 U.S.C. § 6(b).

SUMMARY OF DECISION

We REVERSE and enter a NEW GROUND of REJECTION pursuant to our authority under 37 C.F.R. § 41.50(b).

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<sup>1</sup> We use the word “Appellant” to refer to “applicant” as defined in 37 C.F.R. § 1.42. Siemens Aktiengesellschaft is identified as the real party in interest in Appellant's Appeal Brief (filed July 18, 2018). Appeal Br. 1.

## INVENTION

Appellant's invention is directed "to a method for avoiding pump surges in a compressor." Spec., para. 2.<sup>2</sup>

Claim 14, the sole independent claim, is representative of the claimed invention and reads as follows:

14. A method for avoiding pump surges in a compressor, comprising:

monitoring a plurality of parameters during an operation of the compressor with a plurality of vibration sensors and predetermining a desired value range for the plurality of parameters,

triggering a reaction that counteracts an imminent pump surge of the compressor if a number of the plurality of parameters exceed or fall below the desired value range for the number of the plurality of parameters,

wherein the plurality of parameters comprises a parameter assigned to rotational noise of the compressor, and

the parameter assigned to the rotational noise of the compressor is a vibration amplitude and/or frequency of at least one component of a fluid-flow machine, and the at least one component comprises a housing of a turbine, and

detecting mechanical vibrations of the at least one component with the plurality of vibration sensors fitted at multiple points on a circumference of the at least one component and not in a flow path of the at least one component.

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<sup>2</sup> Substitute Specification, filed August 3, 2014.

## REJECTIONS

- I. The Examiner rejects claims 14–16, 24, 25, and 27–29 under 35 U.S.C. § 103(a) as being unpatentable over Bonanni,<sup>3</sup> Kinzie,<sup>4</sup> and Hoyte.<sup>5</sup>
- II. The Examiner rejects claims 17 and 30 under 35 U.S.C. § 103(a) as being unpatentable over Bonanni, Kinzie, Hoyte, and Walter.<sup>6</sup>
- III. The Examiner rejects claim 31 under 35 U.S.C. § 103(a) as being unpatentable over Bonanni, Kinzie, Hoyte, Walter, and Stabley.<sup>7</sup>
- IV. The Examiner rejects claim 26 under 35 U.S.C. § 103(a) as being unpatentable over Bonanni, Kinzie, Hoyte, and Bently.<sup>8</sup>
- V. The Examiner rejects claims 32 and 33 under 35 U.S.C. § 103(a) as being unpatentable over Bonanni, Kinzie, Hoyte, and Palin.<sup>9</sup>
- VI. The Examiner rejects claim 34 under 35 U.S.C. § 103(a) as being unpatentable over Bonanni, Kinzie, Hoyte, and Abali.<sup>10</sup>

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<sup>3</sup> Bonanni et al., US 2004/0068387 A1, published Apr. 8, 2004.

<sup>4</sup> Kinzie et al., US 8,074,499 B2, issued Dec. 13, 2011.

<sup>5</sup> Hoyte et al., US 2011/0247418 A1, published Oct. 13, 2011.

<sup>6</sup> Walter et al., US 5,594,665, issued Jan. 14, 1997.

<sup>7</sup> Stabley et al., US 7,905,702 B2, issued Mar. 15, 2011.

<sup>8</sup> Bently, US 6,092,029, issued July 18, 2000.

<sup>9</sup> Palin et al., US 8,091,862 B2, issued Jan. 10, 2012.

<sup>10</sup> Abali et al., US 7,282,873 B2, issued Oct. 16, 2007.

## ANALYSIS

### *Rejection I*

Independent claim 14 requires, *inter alia*, monitoring “vibration amplitude . . . of at least one component of a fluid-flow machine,” wherein “the at least one component comprises a housing of a turbine.” Appeal Br. 10 (Claims App.).

The Examiner finds that Bonanni discloses many of the limitations of independent claim 14, but does not disclose that “the at least one component comprises a housing of a turbine.” Final Act. 2–3 (citing Bonanni, para. 18, Fig. 1). Nonetheless, the Examiner finds that “Hoyte teaches parameter sensors providing measurements of operating parameters of a turbine operating in conjunction with a compressor . . . for monitoring anomalies to avoid damage to the system.” *Id.* at 3. The Examiner explains that Hoyte cures the deficiency of Bonanni, which already teaches the use of vibration sensors in other locations of a gas turbine, because Hoyt “not only teach[es] monitoring many parameters of the turbine, but . . . [also teaches] using those parameters of the turbine to determine the state of the compressor.” Adv. Act. 2.<sup>11</sup> Thus, the Examiner concludes that it would have been obvious to a person of ordinary skill in the art to modify the method of Bonanni to “change the component to comprise a housing of a turbine as taught by Hoyte to avoid damage to the system.” Final Act. 3.

Appellant argues that Bonanni “already teaches avoiding damage to the compressor as a goal, so the [Examiner’s] proposed modification provides no advantage,” and, thus, “does nothing that . . . [Bonanni] doesn’t

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<sup>11</sup> Advisory Action, dated May 17, 2018.

already do.” Appeal Br. 6. Thus, according to Appellant, the Examiner’s rejection is based on impermissible hindsight as it is based on knowledge gleaned from Appellant’s disclosure. *Id.*

The Examiner responds that because “Hoyte teaches measuring compressor vibrations, and explicitly teaches turbine parameters directly associated with vibration (load, speed),” “Hoyte suggests monitoring the turbine for vibrations to indicate the operating state of the compressor.” Ans. 4.<sup>12</sup> According to the Examiner, “Hoyte teaches preventing damage (and this teaching may provide additional reliability or redundancy) to a turbine/compressor system in a different fashion than Bonanni, and one of ordinary skill in the art would be motivated to combine these references to prevent such damage.” *Id.* at 5.

We do not agree with the Examiner’s position because the reason proffered by the Examiner to modify the teachings of Bonanni, according to Hoyte, *i.e.*, “to avoid damage to the system,” is performed adequately by the method of Bonanni. More specifically, Bonanni discloses a method for detecting compressor stall and surge<sup>13</sup> including, *inter alia*, monitoring a compressor parameter, such as force and vibrations acting on a compressor casing, analyzing the monitored parameter, comparing the analyzed compressor parameter with a predetermined baseline, and taking corrective action to prevent compressor damage. *See* Bonanni, paras. 18, 25. The Examiner has not provided any findings or an adequate reasoning establishing a problem with Bonanni’s method for detecting compressor stall

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<sup>12</sup> Supplemental Examiner’s Answer, dated Oct. 25, 2018.

<sup>13</sup> Similar to Appellant’s objective of preventing compressor “rotating stall” and “deep surge.” Spec., para. 3.

and surge to prevent compressor damage. Without a persuasive articulated reasoning based on rational underpinnings for modifying the method of Bonanni, according to Hoyte, the Examiner's rejection appears to be the result of hindsight analysis. *See In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006) (“[R]ejections on obviousness grounds [require] . . . some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness”) (cited with approval in *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 418 (2007)).

Furthermore, we note that Hoyte discloses a method for determining the operational status of a compressor by *combining* the sensor information provided by acoustic energy detectors 24 that monitor compressor 12, parameter sensors 22 that monitor compressor 12 or associated equipment, such as combustor 56 or turbine 58, and input device 54. *See* Hoyt, paras. 21, 25, Fig. 1. Stated differently, Hoyt's determination of the operational status of a compressor is not based *only* on monitoring turbine parameters (i.e., turbine speed, turbine exhaust temperature), but rather on a *combination* of monitored parameters, whereas the monitored parameters of turbine 58, upon which the Examiner relies, are merely one component of the determination process. Hoyte specifically explains that its *improved* method for monitoring compressor anomalies is based on *combining* sensor information from acoustic energy detectors 24, parameter sensors 22, and input device 54. *See id.* at paras. 6, 8.

Accordingly, the Examiner's rejection, which relies on Hoyte's teaching of monitoring parameters of turbine 58, does not take into consideration Hoyte's disclosure that *improving* the determination of the operational status of a compressor requires *more* than just monitoring

turbine parameters, that is, it requires *combining* the information from an acoustic energy parameter *and* at least a turbine parameter. *See* Final Act. 3; Ans. 4 (“Hoyte suggests monitoring the turbine for vibrations to indicate the operating state of the compressor.”). As such, it is not clear how in light of Hoyte, the Examiner’s modification of Bonanni’s process to merely monitor turbine parameters, results in “*additional* reliability or redundancy to a turbine/compressor system,” when Hoyte specifically discloses that *improving* the determination of the operational status of a compressor requires *combining* information from at least a turbine parameter *and* an acoustic energy parameter. Ans. 5 (emphasis added). The Examiner has not provided any findings or technical reasoning to sufficiently show that monitoring turbine parameters, as taught by Hoyte, in the process of Bonanni, will “provide *additional* reliability or redundancy[] to a turbine/compressor system.” *See id.* (emphasis added). Accordingly, the Examiner’s alternate reasoning is not supported by sufficient factual evidence, and thus, cannot stand. *See In re Warner*, 379 F.2d 1011, 1017 (CCPA 1967) (holding that “[t]he legal conclusion of obviousness must be supported by facts. Where the legal conclusion is not supported by facts it cannot stand.”).

Moreover, Appellant is correct, that even assuming *arguendo* that the combined teachings of Bonanni and Hoyte disclose using vibration sensors to monitor force and vibrations acting on a turbine, the Examiner has not adequately explained why a person having ordinary skill in the art would specifically place such vibration sensors on the turbine housing. Reply Br.

8.<sup>14</sup> We agree with Appellant that Hoyte merely discloses monitoring turbine parameters, but does not disclose that such monitoring occurs specifically on the turbine housing. *Id.* Hence, the Examiner has not set forth adequate reasoning to explain why a person having ordinary skill in the art would have been prompted by Hoyte’s teachings to move Bonanni’s sensors from its compressor casing (housing) to the turbine housing to monitor force and vibrations acting on the turbine.

The Examiner’s use of the Kinzie disclosure does not remedy the deficiency of the Examiner’s combination of Bonanni and Hoyte. *See* Final Act. 3. Accordingly, for the foregoing reasons, we do not sustain the rejection under under 35 U.S.C. § 103(a) of claims 14–16, 24, 25, and 27–29 as unpatentable over Bonanni, Kinzie, and Hoyte.

#### *Rejections II–VI*

The Examiner’s use of the Walter, Stabley, Bently, Palin, and Abali disclosures does not remedy the deficiency of the Bonanni, Kinzie, and Hoyte combination discussed *supra*. *See* Final Act. 4–8. Therefore, for the same reasons discussed above we also do not sustain Rejections II–VI.

#### NEW GROUND OF REJECTION

Claims 14, 24, 25, 27, and 28 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Bonanni and Kinzie.

With respect to independent claim 14, we adopt the Examiner’s findings regarding the respective teachings of Bonanni and Kinzie. *See* Final Act. 2–3. We specifically find Bonanni explicitly discloses that “one

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<sup>14</sup> Appellant’s Reply Brief, filed Nov. 20, 2018.

or more sensors **30** are disposed about casing **26** for monitoring compressor parameters such as . . . force and vibrations exerted on compressor casing **26.**” Bonanni, para. 18. We further adopt the Examiner’s conclusion that it would have been obvious to a person of ordinary skill in the art to not position the vibration sensors in the process of Bonanni in “the flow path of the at least one component as taught by Kinzie [in order] to protect the sensors from the extreme conditions in the flow path.” *Id.* at 3.

Furthermore, moving the sensors of Bonanni, as modified by Kinzie, from compressor casing 26 to the turbine housing to monitor force and vibrations acting on the turbine would have been obvious to a skilled artisan as this decision is merely a matter of design choice.

It is well established that changes in the placement of a component that does not result in a different structure and function, and, moreover, does not provide any unexpected results, is an obvious matter of design choice. *See In re Kuhle*, 526 F.2d 553, 555 (CCPA 1975) (a spring-loaded electrical contact was an obvious matter of design choice within the skill in the art where placement of electrical contact provides no novel or unexpected result). Here, Appellant’s Specification states that

the component provided with the appropriate sensors is the shaft *and/or* the housing of the turbine *and/or* of the compressor. By using the housing *and/or* shaft vibrations of turbine *and/or* compressor, the rotational noise can be determined particularly well, in particular with regard to an imminent approach to the pump limit.

Spec., para. 15 (emphasis added).

As such, Appellant’s Specification establishes that there are no benefits to positioning the vibration sensors on the turbine housing *vis a vis* the compressor housing or the shaft. Accordingly, selecting the location of

the turbine housing to position the sensors in the process of Bonanni, as modified by Kinzie, amounts to choosing from a finite number of identified, predictable solutions, with a reasonable expectation of success. *See, e.g., In re Kubin*, 561 F.3d 1351, 1358–60 (discussing “obvious to try” situations in light of *In re O’Farrell*, 853 F.2d 894, 903 (Fed. Cir. 1988); *KSR*, 550 U.S. at 421).

As for claims 24, 25, and 27, Bonanni discloses a gas turbine engine 10 including, *inter alia*, compressor 14 with vibration sensors 30 mounted about compressor housing 26, combustor chamber 18, and turbine rotor 24. Bonanni, paras. 16, 18, Fig. 3. In regards to claim 28, Bonanni discloses establishing the presence of a foreign body in the compressor by monitoring compressor parameters to prevent compressor stall. *Id.*, para. 17.

Although we decline to reject every claim under our discretionary authority under 37 C.F.R. § 41.50(b), we emphasize that our decision does not mean the remaining claims are patentable. Rather, we merely leave the patentability determination of these claims to the Examiner. *See* MPEP § 1213.02.

CONCLUSION

<b>Claims Rejected</b>	<b>35 U.S.C. §</b>	<b>Reference(s)/ Basis</b>	<b>Affirmed</b>	<b>Reversed</b>	<b>New Ground</b>
14–16, 24, 25, 27–29	103(a)	Bonanni, Kinzie, Hoyte		14–16, 24, 25, 27–29	
17, 30	103(a)	Bonanni, Kinzie, Hoyte, Walter		17, 30	
31	103(a)	Bonanni, Kinzie, Hoyte, Walter, Stabley		31	
26	103(a)	Bonanni, Kinzie, Hoyte, Bently		26	
32, 33	103(a)	Bonanni, Kinzie, Hoyte, Palin		32, 33	
34	103(a)	Bonanni, Kinzie, Hoyte, Abali		34	
14, 24, 25, 27, 28	103(a)	Bonanni, Kinzie			14, 24, 25, 27, 28
<b>Overall outcome</b>				14–17, 24–34	14, 24, 25, 27, 28

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

Section 41.50(b) also provides (emphasis added):

When the Board enters such a non-final decision, 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 [E]xaminer, in which event the prosecution will be remanded to the [E]xaminer. 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 [E]xaminer, overcomes the new ground of rejection designated in the decision. Should the [E]xaminer 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.

Further guidance on responding to a new ground of rejection can be found in the Manual of Patent Examining Procedure § 1214.01 (9th ed. 2018).

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  
37 C.F.R. § 41.50(b)