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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte DAVID ALLAN FOLLOWELL, ERIC LEE NICKS, and
JAVIER CORTEZ

Appeal 2019-000431
Application 14/510,305
Technology Center 1700

Before BEVERLY A. FRANKLIN, LINDA M. GAUDETTE, and
N. WHITNEY WILSON, *Administrative Patent Judges*.

WILSON, *Administrative Patent Judge*.

DECISION ON APPEAL

Appellant¹ appeals under 35 U.S.C. § 134(a) from the Examiner's February 21, 2018 decision rejecting claims 1–11 and 17–20 (“Non-Final Act.”).² We have jurisdiction over the appeal under 35 U.S.C. § 6(b).

We affirm-in-part.

¹ We use the word “Appellant” to refer to “applicant” as defined in 37 C.F.R. § 1.42. Appellant identifies The Boeing Company as the real party in interest (Appeal Br. 5).

² Claims 12–16 were withdrawn from consideration (Appeal Br. 5).

CLAIMED SUBJECT MATTER

Appellant's disclosure relates to a system including an air treatment assembly configured to deliver treated air to an enclosed space within a vehicle, at least one upstream sensor upstream from the air treatment assembly, and at least one downstream sensor downstream from the air treatment assembly (Abstract). The upstream sensors and the downstream sensors are configured to detect at least one attribute of air, such as air pressure (*id.*). An air treatment monitoring system is in communication with the sensors and receives one or more sensor signals from the sensors, and calculates an attribute differential (such as a pressure differential) based on the one or more signals (*id.*). Details of the claimed invention are set forth in independent claims 1 and 17, which are reproduced below from the Claims Appendix to the Appeal Brief:

1. A system comprising:

at least one air treatment assembly configured to deliver treated air to an enclosed space within a vehicle;

at least one upstream sensor upstream from the at least one air treatment assembly;

at least one downstream sensor downstream from the at least one air treatment assembly, wherein the at least one upstream sensor and the at least one downstream sensor are configured to detect at least one attribute of air; and

an air treatment monitoring system in communication with the at least one upstream sensor and the at least one downstream sensor, wherein the air treatment monitoring system is configured to receive one or more sensor signals from the at least one upstream sensor and the at least one downstream sensor, and wherein the air treatment monitoring system is configured to calculate an attribute differential based on the one or more sensor signals.

17. An air treatment monitoring system configured to monitor an operative state of an air treatment assembly within a vehicle, the air monitoring system comprising:

a pressure differential calculation unit that is configured to calculate a pressure differential between a first sensor signal received from a first sensor that is upstream in relation to the air treatment assembly and a second sensor signal received from a second sensor that is downstream in relation to the air treatment assembly;

a parameter compensation factor determination unit that is configured to determine one or more parameter compensation factors related to the vehicle; and

a compensated pressure calculation unit that is configured to calculate a compensated pressure differential based on the pressure differential and the one or more compensation factors.

REJECTION

I. Claims 1–11 and 17–20³ are rejected under 35 U.S.C. § 101 on the grounds that the claimed invention is directed to a judicial exception, without significantly more.

II. Claims 1–3, 5–9, 11, and 17–19 are rejected under 35 U.S.C. § 103(a) as unpatentable over Verdegan⁴ in view of Troxell.⁵

³ The statement of the rejection indicates that claims 1–20 are rejected under § 101 (Non-Final Act. 3). However, as indicated above, claims 12–16 have been withdrawn from consideration and are not currently appealed.

⁴ Verdegan et al., US 7,922,914 B1, issued April 12, 2011.

⁵ Troxell, US 2013/0239802 A1, published September 19, 2013.

III. Claims 4, 10, and 20 are rejected under 35 U.S.C. §103(a) as unpatentable over Verdegan in view of Troxell, and further in view of Hamann.⁶

DISCUSSION

Rejection I - Rejection under §101

Legal background. An invention is patent-eligible if it claims a “new and useful process, machine, manufacture, or composition of matter.” 35 U.S.C. § 101. However, the Supreme Court has interpreted § 101 to include implicit exceptions: “[l]aws of nature, natural phenomena, and abstract ideas” are not patentable. *E.g.*, *Alice Corp. v. CLS Bank Int’l*, 573 U.S. 208, 216 (2014).

In determining whether a claim falls within an excluded category, the Supreme Court’s two-step framework, described in *Mayo* and *Alice* guides our analysis. *Id.* at 217–18 (citing *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 566 U.S. 66, 75–77 (2012)). In accordance with that framework, we first determine what concept the claim is “directed to.” *See Alice*, 573 U.S. at 219 (“On their face, the claims before us are drawn to the concept of intermediated settlement, *i.e.*, the use of a third party to mitigate settlement risk.”); *see also Bilski v. Kappos*, 130 S. Ct. 3218 (2010) (“Claims 1 and 4 in petitioners’ application explain the basic concept of hedging, or protecting against risk.”).

⁶ Hamann et al., US 2014/0283682 A1, published September 25, 2014.

Concepts determined to be abstract ideas, and thus patent ineligible, include certain methods of organizing human activity, such as fundamental economic practices (*Alice*, 573 U.S. at 219–20; *Bilski*, 130 S. Ct. 3218 (2010)); mathematical formulas (*Parker v. Flook*, 437 U.S. 584, 594–95 (1978)); and mental processes (*Gottschalk v. Benson*, 409 U.S. 63, 67 (1972)). Concepts determined to be patent eligible include physical and chemical processes, such as “molding rubber products” (*Diamond v. Diehr*, 450 U.S. 175, 191 (1981)); “tanning, dyeing, making water-proof cloth, vulcanizing India rubber, smelting ores” (*id.* at 182 n.7 (quoting *Corning v. Burden*, 56 U.S. 252, 267–68 (1854))); and manufacturing flour (*Benson*, 409 U.S. at 69 (citing *Cochrane v. Deener*, 94 U.S. 780, 785 (1876))).

In *Diehr*, the claim at issue recited a mathematical formula, but the Supreme Court held that “[a] claim drawn to subject matter otherwise statutory does not become nonstatutory simply because it uses a mathematical formula.” *Diehr*, 450 U.S. at 187; *see also id.* at 191 (“We view respondents’ claims as nothing more than a process for molding rubber products and not as an attempt to patent a mathematical formula.”). Having said that, the Supreme Court also indicated that a claim “seeking patent protection for that formula in the abstract . . . is not accorded the protection of our patent laws, . . . and this principle cannot be circumvented by attempting to limit the use of the formula to a particular technological environment.” *Id.* (citing *Benson* and *Flook*); *see, e.g., id.* at 187 (“It is now commonplace that an *application* of a law of nature or mathematical formula to a known structure or process may well be deserving of patent protection.”).

If the claim is “directed to” an abstract idea, the analysis moves to the second step of the *Alice* and *Mayo* framework, where “we must examine the elements of the claim to determine whether it contains an ‘inventive concept’ sufficient to ‘transform’ the claimed abstract idea into a patent-eligible application.” *Alice*, 573 U.S. at 221 (quotation marks omitted). “A claim that recites an abstract idea must include ‘additional features’ to ensure ‘that the [claim] is more than a drafting effort designed to monopolize the [abstract idea].’” *Id.* (alterations in original) (quoting *Mayo*, 566 U.S. at 77). “[M]erely requir[ing] generic computer implementation[] fail[s] to transform that abstract idea into a patent-eligible invention.” *Id.*

The PTO has published revised guidance on the application of § 101. *2019 Revised Patent Subject Matter Eligibility Guidance*, 84 Fed. Reg. 50 (Jan. 7, 2019) (“Guidance”). Under the Guidance, we first look to whether the claim recites:

(1) any judicial exceptions, including certain groupings of abstract ideas (i.e., mathematical concepts, certain methods of organizing human activity such as a fundamental economic practice, or mental processes); and

(2) additional elements that integrate the judicial exception into a practical application (*see* MPEP §§ 2106.05(a)–(c), (e)–(h)).

Only if a claim (1) recites a judicial exception and (2) does not integrate that exception into a practical application, do we then look to whether the claim:

(3) adds a specific limitation beyond the judicial exception that is not “well-understood, routine, conventional” in the field (*see* MPEP § 2106.05(d)); or

(4) simply appends well-understood, routine, conventional activities previously known to the industry, specified at a high level of generality, to the judicial exception.

See Guidance 84 Fed. Reg. at 54–56.

We address claims 1–11 and claims 17–20 separately. We will address individual claims as necessary.

Claims 1–11

Guidance Step 1

There is no dispute that claims 1–11 fall within a statutory category, as these claims each recite a system.

Guidance Step 2A, Prong 1

Under Step 2A of the Guidance, we first consider whether the claims recite a judicial exception. Claim 1 recites one limitation, which involves a step reciting a mathematical calculation based on data: “wherein the air treatment monitoring system is configured to calculate an attribute differential based on the one or more sensor signals.” Because this limitation recites mathematical manipulation of data, we conclude that claim 1 recites mathematical concepts, which are identified in the Guidance as an abstract idea.

Guidance Step 2A, Prong 2

Having determined that the claims recite a judicial exception, our analysis under the Guidance turns to determining whether there are additional elements that integrate the exception into a practical application. *See* MPEP § 2106.05(a)–(c), (e)–(h). The additional elements in claim 1 include: (1) at least one air treatment assembly configured to deliver treated air to an enclosed space within a vehicle;” (2) “at least one upstream sensor upstream from the . . . air treatment assembly;” (3) “at least one downstream sensor downstream from the . . . air treatment assembly;” where (4) [the upstream and downstream sensors] are configured to detect at least one

attribute of air; and (5) “an air treatment monitoring system in communication with [the upstream and downstream sensors], wherein the air treatment monitoring system is configured to receive one or more sensor signals from [the upstream and downstream sensors.]”

Claim 1 represents a system containing four separate physical elements, designed to take measurements of air passing into and out of an air treatment assembly. One of the physical elements (the air treatment monitoring system), performs a calculation using data gathered using the other components of the system. Thus, the judicial exception (the mathematical manipulation of the gathered data) is integrated into a practical application, which is a system which measures at least one attribute of air flowing through an air-treatment assembly which delivers air to an enclosed space within a vehicle.

The analysis in this situation is similar to the analysis in *Diehr*, 450 U.S. 175. In that case, the claim at issue related to a process for “molding raw, uncured synthetic rubber into cured precision products” based on the mold’s temperature. *Id.* at 177. The claim recited a number of different, manipulative steps to which the rubber was subjected, and the process “lessen[ed] the possibility of ‘overcuring’ or ‘undercuring’” common in the art. *Id.* at 187. Likewise, in this case, the claim is directed to a larger system which uses data gathered by the system to perform a calculation which can be used to determine the efficiency with which one component of the system is operating. That is, the additional elements use the judicial exception in conjunction with a particular machine or device that is integral to the claims. Guidance 84 Fed. Reg. at 55.

Accordingly, we conclude that claim 1, and the claims which depend from it, are not directed to an abstract idea and describe patent eligible subject matter.

Claims 17–20

Guidance Step 1

There is no dispute that claims 17–20 fall within a statutory category, as these claims each recite a system.

Guidance Step 2A, Prong 1

Under Step 2A of the Guidance, we first consider whether the claims recite a judicial exception. Claim 17 recites several limitations which involve steps reciting mathematical calculations based on data, including: (1) “calculate a pressure differential; and (2) “calculate a compensated pressure differential.” Because these limitations recite mathematical manipulation of data, we may conclude that claim 1 recites mathematical concepts, which are identified in the Guidance as an abstract idea.

Guidance Step 2A, Prong 2

Having determined that the claims recite a judicial exception, our analysis under the Guidance turns to determining whether there are additional elements that integrate the exception into a practical application. See MPEP § 2106.05(a)–(c), (e)–(h). The additional elements in claim 17 include: (1) “a pressure differential calculation unit;” (2) “an air treatment assembly;” (3) “a first sensor that is upstream in relation to the air treatment assembly;” (4) “a second sensor that is downstream in relation to the air treatment assembly;” and (5) “a parameter compensation factor determination unit.”

Claim 17 represents a system containing five separate physical elements, designed to take measurements of air passing into and out of an air treatment assembly, determining a parameter compensation factor, and then calculating a compensated pressure differential for air coming into and going out of the air treatment assembly. Some of the physical elements (the pressure differential calculation unit, the parameter compensation factor determination unit, and the compensated pressure calculation unit), perform calculations using data gathered using the other components of the system. Thus, the judicial exception (the mathematical manipulation of the gathered data) is integrated into a practical application, which is a system which measures at pressure differentials for air flowing through an air-treatment assembly within a vehicle.

The analysis in this situation is similar to the analysis in *Diehr*, 450 U.S. 175. In that case, the claim at issue related to a process for “molding raw, uncured synthetic rubber into cured precision products” based on the mold’s temperature. *Id.* at 177. The claim recited a number of different, manipulative steps to which the rubber was subjected, and the process “lessen[ed] the possibility of ‘overcuring’ or ‘undercuring’” common in the art. *Id.* at 187. Likewise, in this case, the claim is directed to a larger system which uses data gathered by the system to perform a calculation which can be used to determine the efficiency with which one component of the system is operating. That is, the additional elements use the judicial exception in conjunction with a particular machine or device that is integral to the claims. Guidance 84 Fed. Reg. at 55.

Accordingly, we conclude that claim 17, and the claims which depend from it, are not directed to an abstract idea and describe patent eligible subject matter.

Rejections II and III – Obviousness

We address each of the claims specifically argued by Appellant. The remaining claims stand or fall with claim 1.

Claims 1 and 17. The Examiner finds that Verdegan discloses a system including a filter “that can be considered an air treatment assembly capable of delivering treated air to an enclosed space within a vehicle” (Non-Final Act. 6, citing Verdegan, Fig. 1). The Examiner further finds that while Verdegan discloses a differential pressure sensor that measures a pressure differential over the filter, Verdegan does not disclose an upstream sensor upstream from the filter and a downstream sensor downstream from the filter (*id.*). However, the Examiner also finds that Troxell shows that it was known in the art to use upstream and downstream pressure sensors to determine a pressure differential, and that it would have been obvious to substitute the differential pressure sensor of Verdegan with upstream and downstream pressure sensors as both were known equivalents for measuring a pressure differential (*id.*).

Appellant argues that Verdegan is directed to a fuel filtration system and does not disclose “an air treatment assembly configured to deliver treated air to an enclosed space within a vehicle” (Appeal Br. 21, citing Verdegan, 1:22-24). However, as found by the Examiner (Ans. 8), Verdegan explicitly states that its system may be used “in a wide variety of applications having a fluid flow path for . . . air” (Verdegan 1:59–61). The Examiner further states that “Verdegan discloses a filter than can be used

with air in a vehicle, and thus can be considered at least one air treatment assembly capable of delivering treated air to an enclosed space within a vehicle” (Ans. 8). According to the Examiner, the limitation “configured to” as used in the second paragraph of claim 1, has substantially the same meaning as “capable of” when used in connection with a physical structure, such as the claimed air treatment assembly, and Verdegan’s device is capable of being used in that fashion (*id.*).

We agree with the Examiner on this issue. The broadest reasonable interpretation of a structure “configured to” be used in a particular application, in this specific instance, as suggested by the Examiner, is that the structure is “capable” of being used for that application. Claim 1 does not positively recite a vehicle. Thus, if a structure is capable of delivering treated air to an enclosed space within a vehicle, it can be fairly described as being configured to do so.

Appellant argues that the Federal Circuit has held the term “configured to” has a narrower meaning than “capable of” (Appeal Br. 22, citing *In re Gianelli*, 739 F.3d 1375 (Fed. Cir. 2014)). However, Appellant overstates the holding in *Gianelli*. The court in that case specifically stated that the phrase “adapted to” (or “configured to”) can also mean “‘capable of or ‘suitable for,’” although in that particular patent application, it had a narrower meaning because of the manner in which it was used in the written description. 739 F.3d at 1379). In this instance, Appellant has not persuasively explained why the term “configured to” should be narrowly construed.

Appellant makes the same arguments in connection with claim 17, and they are unpersuasive for the same reason.

Accordingly, we affirm the rejection of claims 1 and 17.

Claims 8 and 18. Claim 8 depends from claim 7 – which recites the air treatment monitoring system of claim 1 which includes, inter alia, a parameter compensation factor determination unit that is configured to determine one or more parameter compensation factors related to the vehicle – and recites that “the parameter compensation factors relate to altitude, speed, ambient temperature, fan state, fan door position, and position of the vehicle.” Claim 18 recites similar limitations.

The Examiner finds that the specific parameter compensation factors recited in claim 8 “do[] not affect the structure of the parameter compensation factor determination unit or the compensated pressure calculation unit” and therefore, we presume, are not of patentable significance (Non-Final Act. 8). While it might be possible to install software and/or hardware that would permit determination of “parameter compensation factors relate to altitude, speed, ambient temperature, fan state, fan door position, and position of the vehicle” as required in claim 8, the “configured to” language in this instance requires that the prior art structure be capable of performing the function without further programming. *Typhoon Touch Techs., Inc. v. Dell, Inc.*, 659 F.3d 1376, 1380 (Fed. Cir. 2011) (discussing *Microprocessor Enhancement Corp. v. Texas Instruments, Inc.*, 520 F.3d 1367 (Fed. Cir. 2008)). However, the Examiner has not made any findings that either Verdegan or Troxell teaches or suggests using each of those compensation factors, which are required by

each of claims 8 and 18. Accordingly, we reverse the rejection of claims 8 and 18.

Claims 9 and 19. We agree with Appellant that the preponderance of the evidence of record does not support the Examiner’s findings that Verdegan suggests a diagnostic unit that sends an alert signal to cause a visual alert that is shown on a display, which is recited in each of claims 9 and 19. Verdegan is simply silent in this regard. That it might be capable of sending such an alert is not sufficient to sustain the rejection of those claims.

Claims 10 and 20. These claims recite that the “the air treatment monitoring system further comprises a prediction unit that is configured to predict a failure date of the air treatment assembly by detecting a trend in stored compensated pressure differentials over time.” Appellant argues, inter alia, that Verdegan does not disclose this feature. However, the Examiner’s findings in this regard are based on the disclosure of Hamann (Non-Final Act. 11–12). Appellant does not challenge the findings based on Hamann and, therefore, fails to show reversible error in them.

CONCLUSION

In summary:

Claims Rejected	Basis	Affirmed	Reversed
1–11 and 17–20	§ 101		1–11 and 17–20
1–3, 5–9, 11, and 17–19	§ 103(a) Verdegan and Troxell	1–3, 5–7, 11, and 17	8, 9, 18, and 19

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Claims Rejected	Basis	Affirmed	Reversed
4, 10, and 20	§ 103(a) Verdegan, Troxell, and Hamann	4, 10, and 20	
Overall Outcome		1-7, 10, 11, 17, and 20	8, 9, 18, and 19

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a).

AFFIRMED-IN-PART