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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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*Ex parte* MANOJ PRAKASH GOKHALE and  
MADHURI GANDIKOTA

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Appeal 2017-006029  
Application 12/555,043  
Technology Center 3700

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Before: MICHAEL L. HOELTER, BENJAMIN D. M. WOOD, and  
JEFFREY A. STEPHENS, *Administrative Patent Judges*.

WOOD, *Administrative Patent Judge*.

DECISION ON APPEAL

## STATEMENT OF THE CASE

Appellants appeal under 35 U.S.C. § 134 from a rejection of claims 1, 4–8, 14–20, 23–27, and 33–39. We have jurisdiction under 35 U.S.C. § 6(b).

We affirm-in-part.

## THE INVENTION

The claims are directed to systems and methods for operating a turbocharged engine to avoid compressor surge. Claims 1 and 19 are independent. App. Br. 10–12 (Claims App.). Claim 1, reproduced below, is illustrative of the claimed subject matter:

1. A method of operating a turbocharged engine system via a controller, comprising:
  - determining via the controller a quantity of NO<sub>x</sub> emissions of an engine;
  - determining via the controller an altitude of operation of the turbocharged engine system; and
  - if the altitude of operation of the turbocharged engine system is less than or equal to a predetermined altitude limit, adjusting via the controller exhaust flow through an exhaust gas recirculation system in response to the quantity of NO<sub>x</sub> emissions, wherein adjusting exhaust flow through the exhaust gas recirculation system comprises controlling an exhaust gas recirculation valve, an exhaust gas recirculation cooler, an exhaust gas recirculation pump, or combinations thereof.

## REFERENCES

Brackney	US 2003/0144788 A1	July 31, 2003
Brackney '140	US 2006/0212140 A1	Sept. 21, 2006
Winsor	US 2009/0223218 A1	Sept. 10, 2009
Gudorf	US 7,685,815 B2	Mar. 30, 2010

## REJECTIONS<sup>1</sup>

Claims 19, 20, 23–27, and 33–39 are rejected under 35 U.S.C. § 101 as directed to non-statutory subject matter.

Claims 1, 4–8, 14–20, 23–27, and 33–39 are rejected under pre-AIA, 35 U.S.C. § 112, second paragraph, as indefinite.

Claims 1, 4–7, 19, 20, 23–26, 38, and 39 are rejected under pre-AIA 35 U.S.C. § 103(a) as unpatentable over Brackney.

Claims 8 and 27 are rejected under pre-AIA 35 U.S.C. § 103(a) as unpatentable over Brackney and Winsor.

Claims 14–17 and 33–36 are rejected under pre-AIA 35 U.S.C. § 103(a) as unpatentable over Brackney, Winsor, and Brackney '140.

Claims 18 and 37 are rejected under pre-AIA 35 U.S.C. § 103(a) as unpatentable over Brackney, Winsor, Brackney '140, and Gudorf.

## ANALYSIS

### *Claims 19, 20, 23–27, and 33–39— Rejected as Directed to Non-Statutory Subject Matter*

To determine whether a claim falls within a judicially recognized exception to patent eligibility under 35 U.S.C. § 101, we apply the two-step framework set forth in *Mayo Collaborative Services, v. Prometheus Laboratories, Inc.*, 132 S. Ct. 1289, 1293–94 (2012), and reaffirmed in *Alice Corp. v. CLS Bank International*, 134 S. Ct. 2347, 2355 (2014). For the first step, we determine whether the claims at issue are directed to a patent-

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<sup>1</sup> Because Appellants' application was filed before the effective dates of the amendments to 35 U.S.C. §§ 103 and 112 enacted by the Leahy-Smith America Invents Act (AIA), the pre-AIA versions of these sections apply. See Leahy-Smith America Invents Act (AIA), Pub. L. No. 112–29, §§ 3(n)(1), 4(e), 125 Stat. 284, 293, 297 (2011).

ineligible concept such as an abstract idea, law of nature, or natural phenomenon. *Alice*, 134 S. Ct. at 2355 (citing *Mayo*, 132 S. Ct. at 1296–97). If so, “we consider the elements of each claim both individually and ‘as an ordered combination’ to determine whether the additional elements ‘transform the nature of the claim’ into a patent-eligible application” of the otherwise patent-ineligible concept. *Id.* (quoting *Mayo*, 132 S. Ct. at 1298, 1297). The Court has described this second step “as a search for an inventive concept—i.e., an element or combination of elements that is sufficient to ensure that the patent in practice amounts to significantly more than a patent upon the ineligible concept itself.” *Id.* (citing *Mayo*, 132 S. Ct. at 1294 (internal quotation marks and alterations omitted)). “The second step of the *Alice* test is satisfied when the claim limitations involve more than performance of well-understood, routine, and conventional activities.” *Berkheimer v. HP Inc.*, 881 F.3d 1360, 1367 (Fed. Cir. 2018) (internal citations, quotation marks, and alterations omitted).

Regarding the first step in the *Alice* framework, the Examiner finds that claim 19 “is directed to (includes) determining a quantity of emissions of an engine which, as claimed, is an abstract idea.” Final Act. 5. The Examiner also characterizes claim 19 as “reciting a controller that is configured to ‘determine the quantity of exhaust emissions and maximum in-cylinder pressure . . . [which] is essentially a data comparison that occurs within the controller—it is a step directed to an abstraction.’” Ans. 2.

Regarding the second step, the Examiner finds that “the structures recited in the claim (sensor) are known in the art . . . and there is no structure in the claim that is tied to the controller in such a manner that necessarily achieves any tangible result.” Final Act. 5. The Examiner explains in the

Answer that “the sensors of claim 19 do not serve to transform the claim into something significantly more than the abstract idea, because they are not novel structures and are being employed in a known and conventional manner . . . for the common task of data collection.” Ans. 3. The Examiner further observes that “there is no recitation of any element that the controller controls in claim 19 in order to adjust exhaust flow through the exhaust gas recirculation system and achieve the objective of ‘eliminate compressor surge,’ etc.” *Id.* Therefore, according to the Examiner, the term “a controller configured to” is a “recitation of intended use.” *Id.*

Appellants dispute that claim 19’s “configured to” language is merely a statement of intended use. Reply Br. 2. Appellants also assert that claim 19 does not recite “data comparison” or “data collection.” *Id.* at 1, 2.

“An intended use or purpose usually will not limit the scope of the claim because such statements usually do no more than define a context in which the invention operates.” *Boehringer Ingelheim Vetmedica, Inc. v. Schering-Plough Corp.*, 320 F.3d 1339, 1345 (Fed. Cir. 2003). Because the Examiner characterized the “controller configured to” limitation as a statement of intended use, the Examiner did not address this limitation in the patent-eligibility analysis. We disagree, however, that this claim term is properly considered a statement of intended use.

Claim 19 recites, *inter alia*, a controller coupled to various sensors and “configured to” perform certain functions. We interpret this term to mean that the controller is programmed to perform the functions stated in the claim.<sup>2</sup> *Typhoon Touch Techs., Inc. v. Dell, Inc.*, 659 F.3d 1376, 1380–81

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<sup>2</sup> The Specification describes the controller as “an electronic logic controller that is programmable by a user.” Spec. ¶ 15.

(Fed. Cir. 2011) (*discussing Fantasy Sports Props., Inc. v. Sportsline.com, Inc.*, 287 F.3d 1108, 1117–18 (Fed. Cir. 2002)). A computer programmed to perform particular functions is regarded as structurally different from a computer without that program. *In re Noll*, 545 F.2d 141, 148 (CCPA 1976); *In re Bernhart*, 417 F.2d 1395, 1399–1400 (CCPA 1969). Thus, claim 19’s recitation of a controller “configured to” perform certain functions is not merely a statement of intended use, but connotes structure. Accordingly, the Examiner erred in not considering this limitation in the Examiner’s patent-eligibility analysis.

For example, in step one, claims must be considered “in their entirety to ascertain whether their character as a whole is directed to excluded subject matter.” *Internet Patents Corp. v. Active Network, Inc.*, 790 F.3d 1343, 1346 (Fed. Cir. 2015). The Examiner erred in focusing only on the *sensors* recited in claim 19 without also considering the “controller configured to” limitation. The step-two analysis requires considering the claim limitations even “more microscopically” than in the step-one analysis. *Elec. Power Group, LLC v. Alstom S.A.*, 830 F.3d 1350, 1354 (Fed. Cir. 2016). Claimed components “must involve more than the performance of well-understood, routine, conventional activit[ies] previously known to the industry.” *In re TLI Commc’ns LLC Patent Litig.*, 823 F.3d 607, 613 (Fed. Cir. 2016). The Examiner finds that claim 19’s *sensors* are employed in a “known and conventional manner,” but does not address whether the claimed controller, configured to, e.g., “eliminate compressor surge and reduce specific fuel consumption and exhaust emissions of the engine,” is likewise employed in a known and conventional manner.

Because the Examiner ignored the “controller configured to” limitation in rejecting claims 19, 20, 23–27, and 33–39 as directed to non-patentable subject matter, we do not sustain the rejection of these claims.

*Claims 1, 4–8, 14–20, 23–27, and 33–39—Rejected as Indefinite*

Under 35 U.S.C. § 112, second paragraph, the specification must conclude with “one or more claims particularly pointing out and distinctly claiming the subject matter” regarded as the invention. During prosecution, a claim may be rejected as indefinite “when it contains words or phrases whose meaning is unclear.” MPEP § 2173.05(e).

*Claim 1*

Claim 1 recites “wherein adjusting exhaust flow through the exhaust gas recirculation system comprises controlling . . . an exhaust gas recirculation cooler.” App. Br. 10 (Claims App.). Claims 4–8 and 14–18 ultimately depend from claim 1. *Id.* at 10–11. The Examiner asserts that “[i]t is not clear within the context of the claim how exhaust gas flow can be controlled by an exhaust gas recirculation cooler.” Final Act. 6. Appellants respond that controlling exhaust gas flow by an exhaust gas recirculation cooler “is clear from for example, paragraphs [0017], [0022], and/or [0024].” App. Br. 6; *see also* Reply Br. 3. Appellants also assert that “[i]t appears that the claim is being interpreted as reciting controlling an amount of exhaust flow,” but “no such recitation is made in the claim, and such an interpretation is clearly not within the broadest reasonable interpretation that would be consistent with the specification.” App. Br. 6.

“[W]hen the USPTO has initially issued a well-grounded rejection that identifies ways in which language in a claim is ambiguous, vague, incoherent, opaque, or otherwise unclear in describing and defining the

claimed invention, and thereafter the applicant fails to provide a satisfactory response, the USPTO can properly reject the claim as failing to meet the statutory requirements of § 112(b).” *In re Packard*, 751 F.3d 1307, 1311 (Fed. Cir. 2014). “The satisfactory response by the applicant can take the form of a modification of the language identified as unclear, a separate definition of the unclear language, or, in an appropriate case, a persuasive explanation for the record of why the language at issue is not actually unclear.” *Id.*

The Examiner’s rejection is “well grounded” because the Examiner identifies the specific claim language that the Examiner considers unclear: the requirement that exhaust gas recirculation flow be controlled by controlling, *inter alia*, an exhaust gas recirculation cooler. Thus, Appellants were properly notified of the alleged shortcomings of the claims and were able to respond. *See In re Jung*, 637 F.3d 1356, 1362 (Fed. Cir. 2011) (holding that the USPTO “satisfies its initial burden of production by adequately explaining the shortcomings it perceives so that the applicant is properly notified and able to respond”) (internal quotation marks, alterations, and citation omitted); *Packard*, 751 F.3d at 1312 (stating that the prima-facie-case mechanism is an appropriate approach for addressing question of indefiniteness).

Further, Appellants did not provide a satisfactory response to the Examiner’s well-grounded indefiniteness rejection. Appellants’ citation to paragraphs 17, 22, and 24 of the Specification is not helpful because these

paragraphs do little more than repeat the claim language at issue.<sup>3</sup> As for Appellants’ assertion that the Examiner incorrectly interprets “adjusting exhaust flow” as limited to controlling the amount of flow, we note as an initial matter that at least one of the paragraphs on which Appellants rely—paragraph 17—supports such an interpretation. This paragraph reads in pertinent part:

The controller 42 receives corresponding output signals from the sensors . . . and may be operable to produce an output signal to control the exhaust gas recirculation system 32 provided to recirculate a desired *amount* of the engine exhaust from the exhaust manifold 18 and mix with airflow from the heat exchanger 28. In such an embodiment[], the controller 42 controls the exhaust gas recirculation valve 34, *an exhaust gas recirculation cooler* 36, a pump 38, and an area ratio of the mixer 40, or combinations thereof.

Spec ¶ 17 (emphasis added). In any event, Appellants do not suggest what the correct interpretation of this language should be, or explain how such an interpretation clarifies the meaning of the language that the Examiner deemed indefinite. Thus, Appellants’ suggestion of claim-construction error does not define the language at issue or persuasively explain why it is not unclear. *See Packard, supra*. Because Appellants did not provide a satisfactory response to the Examiner’s well-grounded indefiniteness rejection of claims 1, 4–8, and 14–18, we sustain the rejection.

#### *Claim 19*

The Examiner rejects claim 19 and its dependent claims 20, 23–27, and 33–39 as indefinite under 35 U.S.C. § 112, second paragraph, because,

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<sup>3</sup> Notably, in the “Summary of Claimed Subject Matter” section of the Appeal Brief, Appellants do not refer to any of these paragraphs as providing support for this claim language. App. Br. 2–3.

in the Examiner's view, the term "surge sensor" in claim 19 should be interpreted as a means-plus-function claim term under 35 U.S.C. § 112, sixth paragraph, and the Specification does not clearly set forth the requisite structure that corresponds to the function of "detecting surge." Final Act. 7. The Examiner also asserts that "'surge sensor' is not an art-recognized structure." *Id.* Appellants respond that because "surge sensor" does not contain the word "means," it is presumed that 35 U.S.C. § 112, sixth paragraph does not apply, and the Examiner has failed to rebut that presumption. App. Br. 6. Appellants further contend that "the term 'surge sensor' has a reasonably well understood meaning in the art as the name for structure," and cites to two U.S. patents in support of this contention. *Id.* at 7. In the Answer, the Examiner acknowledges that the two cited patents describe surge sensors of differing structures, notes that three other patents also describe different kinds of surge sensors, but dismisses this evidence because "the prior art is not in agreement as to what specific structure is intended by the term 'surge sensor.'" Ans. 6–7.

In determining whether a term should be construed as a means-plus-function claim term under 35 U.S.C. § 112, sixth paragraph, "the essential inquiry is not merely the presence or absence of the word 'means' but whether the words of the claim are understood by persons of ordinary skill in the art to have a sufficiently definite meaning as the name for structure." *Williamson v. Citrix Online, LLC*, 792 F.3d 1339, 1348 (Fed. Cir. 2015). Here, as noted above, the Examiner and Appellants refer us to five patents that describe surge sensors having various structures. This evidence indicates that one of ordinary skill in the art would understand the term "surge sensor" to connote a number of different structures. Contrary to the

Examiner’s position, however, the term need not bring to mind one specific structure, because in determining whether a term recites sufficient structure, “it is sufficient if the claim term . . . covers a broad class of structures.” *TecSec, Inc. v. Int’l Bus. Machs. Corp.*, 731 F.3d 1336, 1347 (Fed. Cir. 2013). That is the case here. Because we are not persuaded that “surge sensor” is a means-plus-function claim term, we do not sustain the rejection of claims 19, 20, 23–27, and 33–39.

*Claims 1, 4–8, 14–20, 23–27, and 33–39—Rejected as Unpatentable over Brackney alone or combined with Other References*

*Claim 1*

The Examiner finds that Brackney discloses the method of claim 1, except that “Brackney does not explicitly teach, if the altitude of operation of the turbocharged engine system is less than or equal to a predetermined altitude limit, adjusting via the controller exhaust flow through an exhaust gas recirculation system in response to the quantity of NOx.” Final Act. 9 (citing Brackney ¶¶ 2, 5, 31–33). The Examiner asserts, however, that “Brackney teaches that the altitude of operation, the altitude limit, and the quantity of NOx emissions of the turbocharged engine are all results-effective variables for the control of exhaust gas recirculation.” *Id.* (citing Brackney ¶¶ 5, 53). Thus, according to the Examiner, Brackney renders unpatentable claim 1 and its dependent claims despite the missing limitation. *Id.*

Appellants respond that the Examiner fails to establish that the altitude of operation, the altitude limit, and the quantity of NOx emissions are result-effective variables, and even if they were “there is nothing in Brackney et al. of how the affected parameters would change as a result of

the change in either the altitude or the quantity of NO<sub>x</sub> emissions.” Final Act. 7.

“[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation.” *In re Applied Materials*, 692 F.3d 1289, 1295 (Fed. Cir. 2012) (citing *In re Aller*, 220 F.2d 454, 456 (CCPA 1955)). “This rule is limited to cases in which the optimized variable is a ‘result-effective variable.’” *Id.* (citing *In re Antonie*, 559 F.2d 618, 620 (CCPA 1977)). That is, one of ordinary skill in the art must have been aware that the particular variable achieves a recognized result before the determination of the optimum or workable ranges of the variable can be characterized as routine experimentation. *Antonie*, 559 F.2d at 620. Here, however, the Examiner does not identify any specific limitation in claim 1 that is an “optimum or workable range” of any of the variables that the Examiner contends are result-effective. Nor does the Examiner explain how adjusting the maximum allowable exhaust emissions based on a given altitude, which the Examiner asserts Brackney teaches, is necessarily the same as controlling exhaust emissions when the engine is operating below a particular predetermined altitude limit, as claim 1 requires.<sup>4</sup> Thus, we do not sustain the rejection of independent claim 1, or claims 4–7 which depend therefrom.

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<sup>4</sup> We note that, although the adjusting step of claim 1 is conditional, and thus may not be performed under certain conditions, it at least implies determining whether the altitude is less than or equal to a predetermined limit, which is not addressed in the rejection.

*Claim 19*

The Examiner states that claim 19 is “rejected on the same grounds as applied to claim 1 above,” Final Act. 87, which we found to be unpersuasive. The Examiner also states that claim 19 “recites an intended use for a controller and therefore requires that the controller merely be capable of being coupled to the various sensors recited, detecting the various parameters recited, and controlling the exhaust flow through the exhaust gas recirculation system.” *Id.* However, as discussed above, we are not persuaded that the controller limitation is merely a statement of intended use. Further, the Examiner does not address claim 19’s requirement that the controller be configured to, e.g., also eliminate compressor surge and reduce specific fuel consumption while reducing exhaust emissions. Therefore, we are not persuaded that Brackney renders unpatentable claim 19, as well as its dependent claims 20, 23–26, 38, and 39.

*Remaining Rejections*

The remaining rejections rely on the Examiner’s findings with respect to independent claims 1 and 19, which we found to be unpersuasive. The Examiner does not rely on any of the additional references to cure the deficiency of Brackney. Accordingly, for the reasons discussed above, we do not sustain the Examiner’s rejections of claims 8, 14–18, 27, and 33–36.

DECISION

For the above reasons, we: (1) reverse the Examiner’s rejection of claims 19, 20, 23–27, and 33–39 as directed to non-patentable subject matter; (2) affirm the Examiner’s rejection of claims 1, 4–8, and 14–18 as indefinite; (3) reverse the Examiner’s rejection of claims 19, 20, 23–27, and 33–39 as indefinite; and (4) reverse the Examiner’s rejections of claims 1, 4–

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8, 14–20, 23–27, and 33–39 as unpatentable over Brackney alone or Brackney and other references.

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-IN-PART