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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte ALEXANDER KNAFL, PHILLIPP HENSCHEN, PAUL HAGL,
HEIDI GRUBER, and MARKUS BAUER

Appeal 2019-006748
Application 14/649,499
Technology Center 2800

Before BEVERLY A. FRANKLIN, KAREN M. HASTINGS, and
JAMES C. HOUSEL, *Administrative Patent Judges*.

HOUSEL, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

Pursuant to 35 U.S.C. § 134(a), Appellant¹ appeals from the Examiner's decision to reject claims 9–17. We have jurisdiction under 35 U.S.C. § 6(b).

We AFFIRM.²

¹ We use the word Appellant to refer to “applicant” as defined in 37 C.F.R. § 1.42. Appellant identifies the real party in interest as MAN Diesel & Turbo SE. Appeal Brief (“Appeal Br.”) filed June 10, 2019, at 1.

² This Decision also cites to the Specification (“Spec.”) filed June 3, 2015, the Final Office Action (“Final Act.”) dated December 12, 2018, the

CLAIMED SUBJECT MATTER

The invention relates to a method for determining a cylinder pressure-crankshaft position association for an internal combustion engine. Spec. 1, Field of the Invention.

Claim 9, reproduced below from the Claims Appendix to the Appeal Brief, is illustrative of the claimed subject matter:

9. A method for operating an internal combustion engine, comprising:

metrological detection of a crankshaft angle;

metrological detection of a cylinder pressure;

calculating a cylinder volume based at least in part on the crankshaft angle;

determining a curve for a logarithmic cylinder pressure over a logarithmic cylinder volume based at least in part on the crankshaft angle;

determining an offset value for the crankshaft angle for determining a temporally exact cylinder pressure-crankshaft position association from the curve;

concluding that a cylinder pressure signal is retarded in relation to a crankshaft angle signal when an intersection of curve segments of the curve is determined in a region of a cylinder reversal point;

determining a surface area between the curve segments of the curve in the region of the cylinder reversal point;

determining an offset value for compensating displacement as a function of the surface area between the

curve segments of the curve in the region of the cylinder reversal point; and

operating the internal combustion engine based at least in part on the temporal association of the cylinder pressure with a crankshaft position and the offset to minimize the offset and increase operating efficiency of the internal combustion engine.

REJECTIONS

The Examiner maintains, and Appellant requests our review of, the following rejections:

1. Claims 9–17 under 35 U.S.C. § 112 (pre-AIA), first paragraph, as failing to comply with the written description requirement; and
2. Claims 9–17 under 35 U.S.C. § 112 (pre-AIA), second paragraph, as indefinite.

OPINION

After review of the Examiner's and Appellant's opposing positions, Appellant's claims and Specification disclosures, we determine that Appellant's arguments are insufficient to identify reversible error in the Examiner's rejections. *In re Jung*, 637 F.3d 1356, 1365 (Fed. Cir. 2011). Accordingly, we affirm the stated written description and indefiniteness rejections of claims 9–17 for substantially the reasons set forth in the Final Office Action and the Examiner's Answer. We add the following primarily for emphasis.

Rejection 1: Written Description

The Examiner finds that the Specification fails to provide written description support for how one would perform four steps of the method of claim 9. Final Act. 10–11. These four steps are: 1) determining an offset value for the crankshaft angle for determining a temporally exact cylinder

pressure-crankshaft position association from the curve; 2) concluding that a cylinder pressure signal is retarded in relation to a crankshaft angle signal when an intersection of curve segments of the curve is determined in a region of a cylinder reversal point; 3) determining an offset value for compensating displacement as a function of the surface area between the curve segments of the curve in the region of the cylinder reversal point; and 4) operating the internal combustion engine based at least in part on the temporal association of the cylinder pressure with a crankshaft position and the offset. *Id.* at 11. The Examiner finds that the Specification lacks

algorithms or equations or description of the hardware and/or software and/or the method steps that [Appellant] has used to practice the claimed invention, including, specifically, any details of the structure used to allegedly control the internal combustion engine, as well as any method steps or algorithms for controlling the internal combustion engine.

Id. Moreover, the Examiner finds that the Specification fails to describe how the method is practiced using the temporal association between cylinder pressure and crankshaft position to operate the internal combustion engine to increase operating efficiency of the engine. *Id.* In particular, the Examiner finds that the Specification fails to disclose any means or method steps for controlling the engine, how such control would minimize “offset,” and how minimizing “offset” results in improved operating engine efficiency. *Id.* With regard to dependent claims 10–17, the Examiner finds that these claims similarly recite analyzing and determining steps “for which there is no corresponding written description in the Specification for how to perform the steps.” *Id.*

Appellant argues that the Examiner failed to show that a person of ordinary skill in the art could not practice the invention without undue or unreasonable experimentation. Appeal Br. 4. Appellant asserts that the Specification describes a method for automatically determining a cylinder pressure-crankshaft position association for the cylinders of an internal combustion engine. *Id.* Appellant also asserts that the Examiner agrees that an operator “could certainly look at the curves in the Figures and determine that which [Appellant] claims is determined.” *Id.*, citing the Advisory Action (“Adv. Act.”) dated April 5, 2019, at 3. In addition, Appellant asserts that the Specification states that it is “advantageous” to know an exact temporal association of the cylinder pressure (“P”) and crankshaft position or angle. *Id.*, citing Spec. ¶ 3; *see also* Reply Br. 1–3.

Appellant further asserts that the Specification describes determining a curve for logarithmic (“log”) cylinder P over log cylinder volume (“V”) from a detected cylinder pressure and a calculated cylinder V calculated from a detected crankshaft angle, analyzing this curve at the region of a bottom or top cylinder reversal point and determining an offset value for the crankshaft angle from the curve for determining the temporally exact cylinder P-crankshaft position association. Appeal Br. 4–5. Appellant then asserts that the offset is determined from the graphs (curves) of log P over log V by determining the surface area between two curve segments 11, 12 in the region of reversal point 13, wherein “[t]he efficiency is increased by minimizing the offset.” *Id.* at 5. Therefore, Appellant further contends that those skilled in the art would reasonably conclude that Appellant possessed the claimed invention on the basis of these descriptions, which is further “buttressed by the maturity and predictability of the art.” *Id.* at 6.

The test for sufficiency of a written description is whether the disclosure of the application relied upon “reasonably conveys to those skilled in the art that the inventor had possession of the claimed subject matter as of the filing date.” *Ariad Pharms., Inc. v. Eli Lilly & Co.*, 598 F.3d 1336, 1351 (Fed. Cir. 2010) (en banc). Possession means “possession as shown in the disclosure” and “requires an objective inquiry into the four corners of the specification from the perspective of a person of ordinary skill in the art.” *Id.*

Written description under the first paragraph of 35 U.S.C. § 112 does not require literal support for the claimed invention. *Purdue Pharma L.P. v. Faulding, Inc.*, 230 F.3d 1320, 1323 (Fed. Cir. 2000) (“In order to satisfy the written description requirement, the disclosure as originally filed does not have to provide *in haec verba* support for the claimed subject matter at issue.”); *In re Herschler*, 591 F.2d 693, 701 (CCPA 1979); *In re Edwards*, 568 F.2d 1349, 1351–52 (CCPA 1978); *In re Wertheim*, 541 F.2d 257, 262 (CCPA 1976). Neither does appearance of a claim *ipsis verbis* in the specification guarantee that the written description requirement is satisfied, *see, e.g., Enzo Biochem, Inc. v. Gen-Probe Inc.*, 323 F.3d 956, 968 (Fed. Cir. 2002). In addition, the written description requirement does not demand either examples or an actual reduction to practice. *Ariad*, 598 F.3d at 1352. Nonetheless, the disclosure must convey with reasonable clarity to those skilled in the art that the inventor was in possession of the invention. *Carnegie Mellon Univ. v. Hoffmann-La Roche Inc.*, 541 F.3d 1115, 1122 (Fed. Cir. 2008).

Appellant’s arguments are unpersuasive of reversible error in the Examiner’s finding that the claims fail to comply with the written

description requirement of 35 U.S.C. § 112, first paragraph. To begin, the Examiner correctly notes, and Appellant fails to contest, that Appellant improperly conflate the enablement standard (undue experimentation) with the written description standard (reasonably conveys possession). Ans. 7. In this regard, as the Examiner further notes, maturity of the art and predictability of the art are factors primarily relevant to enablement, rather than written description. *Id.* Moreover, Appellant does not direct our attention to evidentiary support for any level of maturity and predictability of the art, nor does Appellant explain in any detail how such factors favor a conclusion that the Specification reasonably conveys the Inventors' possession of the claimed invention.

Claim 9 recites determining two offset values, a first offset value for the crankshaft angle for determining a temporally exact cylinder P-crankshaft position association, and a second offset value for compensating displacement as a function of the surface area between the curve segments of the curve in the region of the cylinder reversal point. The Specification teaches that an offset value is obtained by analyzing the log P over log V curve, preferably in the region of a cylinder reversal point, and, depending on this analysis, this offset value is determined. Spec. 2:5–12; 3:17–30. The Specification explains how the curve is analyzed: when curve segments in the region of the cylinder reversal point intersect, it is concluded that the cylinder P signal is retarded relative to the crankshaft angle signal, whereas when the curve segments do not intersect (non-intersection), it is concluded that the cylinder P signal is premature relative to the crankshaft angle signal. *Id.* at 2:13–22; 4:12–18. The Specification further explains that an offset value for compensating this displacement is determined as a function of the

surface area between the curve segments in the region of the cylinder reversal point. *Id.* at 2:13–22; 4:19–22.

Given this disclosure, if two offset values are determined as recited in claim 9, the Specification only describes how the second offset value is determined, i.e., determining the surface area between the curve segments in the region of the cylinder bottom reversal point. Although the Specification recites an offset value for the crankshaft angle for determining a temporally exact cylinder pressure-crankshaft position association that is determined from the curve, Appellant fails to direct our attention to any description for the determination of this offset value that is different from the determination of the second offset value recited in claim 9.

Moreover, although automatic calculation of the surface area between two curve segments might be possible, Appellant does not define with any specificity “the region of the cylinder reversal point.” In other words, Appellant does not define this region other than it is at the cylinder reversal point. One would have to speculate as to how far up curve segments 11, 12 the region is supposed to be. To add further difficulty to determining this offset value, we note that Figure 2b, which is supposed to show retarded cylinder P signal relative to the crankshaft angle signal does not appear to have any surface area between curve segments 11, 12 for a significant portion of their length in the vicinity of bottom reversal point 13.

Turning next to the step of determining an offset value for compensating displacement as a function of the surface area between the curve segments in the region of the cylinder reversal point, as the Examiner correctly finds, the Specification fails to describe how this offset value is actually determined. Ans. 5–6. The only disclosed relationship between the

calculated surface area between the curve segments and this offset value is that “[t]he larger this surface area, the larger the resulting offset value.” Spec. 4:22–23. However, knowing that two values are proportional does not adequately describe their relationship in a manner that those skilled in the art would recognize how to derive one (the offset value) from the other (the surface area).

Finally, with regard to the step of operating the internal combustion engine based at least in part on the temporal association of the cylinder P-crankshaft position and the offset to minimize the offset and increase the engine’s operating efficiency, the Examiner finds that the Specification is silent as to how the engine is controlled using the offset value, and how such control minimizes the offset and improves the engine’s operating efficiency. Ans. 6. Appellant fails to rebut or otherwise address these findings. In addition, we note that the Specification fails to identify any engine operating parameter that can be controlled based at least in part on the offset value or the temporal association of the cylinder P with crankshaft position, or so as to alter the offset value or the surface area between the curve segments in the region of the cylinder reversal point, or to improve engine operating efficiency.

Accordingly, we agree with the Examiner that the Specification, as originally filed, fails to reasonably convey to those skilled in the art that the Inventors possessed the invention of claim 9. Further, Appellant fails to rebut or otherwise address the Examiner’s finding that the Specification likewise fails to reasonably convey to those skilled in the art that the Inventors possessed the invention of dependent claims 10–17.

Rejection 2: Indefiniteness

The Examiner determines that claim 9 is indefinite because it is not clear how the four steps discussed above would be performed because neither the Specification nor claim 9 sets forth any structure or steps sufficient to enable control of the operation of an internal combustion engine. Final Act. 12–13; *see also* Ans. 7–8. Appellant merely contends that “the claims are indeed definite at least because the claimed method is clearly disclosed as discussed above [in response to the written description rejection].” Appeal Br. 6; *see also* Reply Br. 4.

“[W]e apply the approach for assessing indefiniteness approved by the Federal Circuit in *Packard*, i.e., ‘[a] claim is indefinite when it contains words or phrases whose meaning is unclear.’” *Ex parte McAward*, No. 2015-006416, 2017 WL 3669566, at *5 (PTAB Aug. 25, 2017) (precedential) (quoting *In re Packard*, 751 F.3d 1307, 1310, 1314 (Fed. Cir. 2014)). The language in 35 U.S.C. § 112, second paragraph, “of ‘particular[ity]’ and ‘distinct[ness]’ indicates[] claims are required to be cast in clear—as opposed to ambiguous, vague, indefinite—terms.” *Packard*, 751 F.3d at 1313 (alterations in original). Although exact precision is not required, the claim language must be as reasonably precise as the subject matter permits. *Id.*; *see also In re Moore*, 439 F.2d 1232, 1235 (CCPA 1971) (The first inquiry “is merely to determine whether the claims do, in fact, set out and circumscribe a particular area with a reasonable degree of precision and particularity.”).

Appellant’s contention fails to address the Examiner’s rejection with any specificity. To the extent that Appellant relies on the arguments raised against the Examiner’s written description rejection, we note that these

arguments were not persuasive of reversible error as set forth above. Further, we are in complete agreement with the Examiner that claim 9 is indefinite because it fails to recite how the engine is to be operated to minimize offset and improve engine efficiency, i.e., it fails to identify any engine operating parameter that can be controlled based at least in part on the offset value or the temporal association of the cylinder P with crankshaft position, or so as to alter the offset value or the surface area between the curve segments in the region of the cylinder reversal point, or to improve engine operating efficiency.

CONCLUSION

Upon consideration of the record and for the reasons set forth above and in the Final Office Action and the Examiner's Answer, the Examiner's decision to reject claims 9–17 under 35 U.S.C. § 112 (pre-AIA), first paragraph, as failing to comply with the written description requirement, and second paragraph, as indefinite.

DECISION SUMMARY

In summary:

Claims Rejected	35 U.S.C. §	Reference(s)/Basis	Affirmed	Reversed
9–17	112, 1 st ¶	Written Description	9–17	
9–17	112, 2 nd ¶	Indefinite	9–17	
Overall Outcome			9–17	

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TIME PERIOD FOR RESPONSE

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a). *See* 37 C.F.R. § 1.136(a)(1)(iv).

AFFIRMED