

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

HUM INDUSTRIAL TECHNOLOGY, INC.

Petitioner

v.

AMSTED RAIL COMPANY, INC.

Patent Owner

Case IPR2023-00538

Patent No. 9,365,223

**PATENT OWNER'S REPLY IN SUPPORT OF
REVISED MOTION TO AMEND**

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2172	Expert Declaration of Dr. Michael Shamos in support of Patent Owner's Revised Motion to Amend Reply

Patent Owner Amsted Rail Company, Inc. (“PO”) submits this Reply in support of its Revised Motion to Amend (“RMTA”). Petitioner has failed to establish by a preponderance of the evidence that any Substitute Claim is unpatentable.

I. SUBSTITUTE CLAIMS 34-58 HAVE WRITTEN DESCRIPTION SUPPORT

Petitioner applies an incorrect written description standard that conflicts with controlling case law and with its own statements regarding the claimed technology.

A. Petitioner Applies an Overly Restrictive Standard

A claimed invention satisfies the written description requirement when “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 Pharm., Inc. v. Eli Lilly & Co.*, 598 F.3d 1336, 1351 (Fed. Cir. 2010) (en banc). *In haec verba* disclosures using the same language of the claim are not required. *Id.* at 1352. Moreover, the application “does not have to describe exactly the subject matter claimed.” *Vas-Cath Inc. v. Mahurkar*, 935 F.2d 1555, 1563-64 (Fed. Cir. 2000). Indeed, specific examples of every claimed embodiment are not required and a patentee may rely on information that is “well-known in the art.” *Falko-Gunter Falkner v. Inglis*, 448 F.3d 1357, 1366 (Fed. Cir. 2006). Furthermore, “the level of detail required to satisfy the written description requirement varies depending on the nature and scope of the claims and on the complexity and

predictability of the relevant technology.” *Ariad*, 598 F.3d at 1351. Written description is satisfied if a POSITA would find it is “reasonably clear what the invention is and that the patent specification conveys that meaning.” *All Dental Prodx, L.L.C. v. Advantage Dental Prods., Inc.*, 309 F.3d 774, 779 (Fed. Cir. 2002). The analysis requires an “objective inquiry into the four corners of the specification from the perspective of a [POSITA].” *Ariad*, 598 F.3d at 1351.

B. Under the Proper Standard, Compliance with the Written Description Requirement is Evident

Petitioner does not engage in anything close to an “objective inquiry.” Rather, Petitioner simply takes words in the claim, searches for those words in the specification, and declares the claim unpatentable with very little consideration of the evidence provided by PO in the RMTA. *See generally* Opp’n at 2-7.

1. Claims 34, 42: “mounted to a sidewall of a bearing adapter”

It is black letter law that the “absence of embodiments” in the specification of the exact configuration claimed “[does] not preclude written description” when a POSITA “would reasonably conclude, based on the patent’s disclosures and the knowledge of a person skilled in the art, that the applicant possessed” that claimed limitation. *Medtronic, Inc. v. Teleflex Innovations S.a.r.l.*, 69 F.4th 1341, 1354 (Fed. Cir. 2023). As in *Medtronic*, the inventors of the ’223 Patent are “free to draft the claims broadly” to include the full scope of the disclosed sensor system. *Id.*

More importantly, the '223 Patent **does** disclose an adapter mounted sensor unit and the sidewall is an adapter mounting location expressly disclosed in the specification. *See* EX1001, Fig. 3, 4:39-48; 4:66-5:7; 5:11-23; 5:30-46; 8:7-10, Table spanning cols. 7-12; EX2172, ¶¶12-14; EX2171, ¶¶13-15; RMTA, 10-11. Figures 3 and 3A, when viewed on their own, do not in any way limit the sensor device to only a temperature sensor. *See Vas-Cath*, 935 F.2d at 1565-67 (noting that “drawings alone may provide a ‘written description’ of an invention”); *Hologic, Inc. v. Smith & Nephew, Inc.*, No. 2016-006894, 2016 WL 6216657, at *9 (P.T.A.B. Oct. 21, 2016) (“*Hologic I*”), *aff’d*, 884 F.3d 1357, 1364 (Fed. Cir. 2018) (“*Hologic II*”); *Falko-Gunter*, 448 F.3d at 1366; EX2172, ¶¶14-15. Mote 10, which is shown in Figures 3 and 3A, is described as a self-contained housing with a sensor 20, which can be any type of sensor. EX1001, 3:60-64, 4:42-47. The description of Figures 3 and 3A using a temperature sensor is “an example” of this broader disclosure. EX1001, 5:30-34. This disclosure sufficiently “identifies the claimed invention” and does so “in a definite way.” *Centrak, Inc. v. Sonitor Techs., Inc.*, 915 F.3d 1360, 1367 (Fed. Cir. 2019) (“[A] specification’s focus on one particular embodiment or purpose cannot limit the described invention where that specification expressly contemplates other embodiments or purposes.”).

The case law Petitioner sites is inapposite. *See Hyatt v. Dudas*, 492 F.3d 1365, 1369 (Fed. Cir. 2007) (addressing “whether the PTO must do more than what MPEP

§2163.04(I)(B) provides to establish a prima facie case of lack of written description in this and every other such case”); *Purdue Pharma L.P. v. Faulding Inc.*, 230 F.3d 1320, 1326-27 (Fed. Cir. 2000) (a genus/species case addressing a specific formulation of morphine that had a claimed property that was not reasonably conveyed to a POSITA by the specification). The specification reasonably conveys to a POSITA that the inventors had possession of the claimed sensor units. EX2172, ¶15. That is all that is required to satisfy written description.

Original claims 17 and 32 of the '223 Patent's application clearly contemplate a sensing unit, mounted on a railcar, having sensors other than a temperature sensor. *See* EX1002 at 31-32, 34. Petitioner's expert claims in conclusory fashion that some sensors would serve no purpose if mounted on a bearing adapter but provides no citations or explanation to support this *ipse dixit*. EX1035, ¶18.

Finally, Petitioner's conflicting arguments demonstrate the weakness of its § 112 arguments. Where Petitioner claims that the attachment arrangement is mechanically simple and predictable and that a sidewall is “a common, obvious mounting location,” it cannot also argue in good faith that the embodiments described are so complex that a POSITA would require detailed explanations for attaching these supposedly “predictable...simple mechanical components” to the sidewall as depicted in Fig. 3. *Compare* EX1003, ¶¶72, 250 and EX1035, ¶19, with *Opp'n*, 2-4. Based on Petitioner's admissions regarding the technology, the written

description requirement is satisfied. *See Ariad*, 598 F.3d at 1351 (“[T]he level of detail required to satisfy the written description requirement varies depending on the nature and scope of the claims and on the complexity and predictability of the relevant technology.”).

2. **Claims 34, 42: “numeric values derived from the data”/“numeric values based on the collected data”**

Petitioner again demands *in haec verba* support for the claimed limitation. *See* Opp’n, 4-5. Under the appropriate standard, PO’s citations provide more than adequate written description support. EX2172, ¶16. The specification discloses that “heuristics may be applied [to sensed data] to determine potential failures based on statistical models and empirical data.” EX1001 at 2:60-62. Among the heuristics taught by the specification are two bearing fault indicators, one using fast Fourier transforms (FFTs) to isolate dominant modes and shifting or relative amplification of the accelerometer data, and the other calculating kurtosis and calculating a probability density function. *See* EX1001, Table spanning cols. 7-12; RMTA, 16 (bearing fault indicators); EX2172, ¶16. A POSITA would understand that both FFTs and kurtosis (as well as statistical models) involve the calculation of numeric values derived from the data received from the sensors. EX2172, ¶16. The specification sufficiently conveys to a POSITA that the inventors were in possession of this limitation of the claims. *Id.*

3. **Claims 34, 42: “land-based remote station”/“land-based remote unit”**

Petitioner’s argument regarding these claim limitations ignores the specification’s explicit disclosure that the CMU “is capable of wirelessly collecting data from each of the motes and performing higher-level analysis of the data ...[d]uring such data analysis, heuristics may be applied” and that “CMU 32 ... communicates data and alarms to a remote location, either a mobile base station 42 located on the train ... or to a stationary, land-based station, 44, or both.” EX1001 at 2:55-3:7, 8:5-7, 11:28-32, 11:39-45. Claims 34 and 42 have adequate written description. EX2172, ¶17.

4. **Claim 34: “a housing comprising a non-flexible material that is resistant to environmental damage”**

Petitioner again improperly demands *in haec verba* support for the claimed limitation. *See* Opp’n, 6. The specification sufficiently discloses that the housing is preferably made of a “hard plastic resistant to environmental damage” and then provides examples (“e.g.”) of such material. EX1001 at 4:5-10, Figs. 1-2. This limitation of claim 34 has adequate written description given the field, predictability, and the disclosure. EX2172, ¶18; *see also Ariad*, 598 F. 3d at 1351; *Juno Therapeutics, Inc. v. Kite Pharma, Inc.*, 10 F.4th 1330, 1335 (Fed. Cir. 2021); *In re Global IP Holdings LLC*, 927 F.3d 1373, 1377 (Fed. Cir. 2019).

5. **Dependent Claims 35-41 and 43-58**

Claims 35-41 and 43-58 satisfy the written description requirement for the reasons discussed above for independent claims 34 and 42.

For dependent claims 45 and 46, Petitioner incorrectly argues that the specification lacks written description relating to a “vibration sensor or accelerometer configured to sample dynamic vibration data.” Opp’n at 6-7. Petitioner ignores that originally filed claim 32 disclosed “vibration sensors” and “acceleration sensors.” EX1002 at 31-32, 34, 563; *see also* RMTA, 16 (accelerometer disclosure). A POSITA would understand from the disclosure that a vibration or accelerometer sensor could be placed on the side wall, as shown in Figure 3 and 3A. EX2164, ¶19-20; §I.B.1, *supra* (incorporated here).

For dependent claim 48, Petitioner again improperly requires *in haec verba* support for the claimed limitation. Opp’n at 7. Petitioner fails to address any of PO’s cited disclosures, including written description regarding the temperature and alarm thresholds, which are defined parameter value ranges associated with a bearing. EX1001 4:66-5:7, 6:1-7, 6:35-38, 11:61-12:38, 13:23-24, 13:41-42. Dependent claims 35-41 and 43-58 are adequately supported. EX2164, ¶21.

II. SUBSTITUTE CLAIMS 34-58 OTHERWISE COMPLY WITH §112

A. Definiteness

1. Claims 34 and 42: “one or more numeric values derived from the data”/“one or more numeric values based on the collected data”

Petitioner appears to confuse indefiniteness with written description support. *See* Opp’n, 7. As demonstrated in the RMTA and above, there are ample disclosures in the specification that provide written description support for these claim terms and it is of no moment that the terms are not used *in haec verba* in the specification. *See* RMTA, 11-12, 15, 17; §I.B.2, *supra* (incorporated here). In any case, that is not the standard for indefiniteness. Neither Petitioner nor its expert explain in any way how a POSITA would not understand with reasonable certainty what is meant by these claim terms. EX2172, ¶22. Indeed, Petitioner’s expert only opines as to what is “unclear” *to him*, not what a POSITA would understand. EX1035, ¶¶ 22, 28. To the contrary, these terms and their usage in claims 34 and 42 are straightforward and reasonably convey the scope of the respective claims to a POSITA. EX2172, ¶22.

2. **Claim 34: “a non-flexible material that is resistant to environmental damage”**

Claim 34 includes claim elements that are commonly used and understood by a POSITA. EX2172, ¶23. The specification uses the terminology “flexible” throughout to describe two materials, demonstrating the understanding of the concept of flexibility to a POSITA. *E.g.*, EX1001, 4:20-22, 6:29-33. The ’223 Patent also explains the “demanding environment in which railroad trains operate,” which reasonably informs a POSITA as to the type of environmental damage the material must be resistant to. EX1001, 2:36-38, 4:14-19 (“harsh railroad environment”

includes “harsh weather, UV exposure, humidity, vibration, mechanical impact, thermal shock, and abrasion”). Claim 34 is definite. EX2172, ¶23.

3. Dependent Claims 35-41 and 43-58

Because Petitioner presents no specific arguments for these dependent claims, and because claims 34 and 42 are definite, the above dependent claims are as well. *See* §I.B.5, *supra*; §II.A.1-2, *supra* (both incorporated here).

B. Enablement

Petitioner again bases its argument on an incorrect standard. “The scope of enablement, ... is that which is disclosed in the specification ***plus the scope of what would be known*** to [a POSITA] without undue experimentation.” *Invitrogen Corp. v. Clontech Lab’ys, Inc.*, 429 F.3d 1052, 1070-71 (Fed. Cir. 2005). Claims must merely have “a reasonable correlation to the scope of enablement provided by the specification to persons of ordinary skill in the art.” *Id.* The “enablement requirement is met if the description enables ***any*** mode of making and using the invention.” *Johns Hopkins Univ. v. CellPro, Inc.*, 152 F.3d 1342, 1361 (Fed. Cir. 1998).

1. Claims 34, 42: “correlate one or more numeric values derived from the data to the condition of the bearing,” “determine a severity of the condition of the bearing”

Petitioner claims that the ’223 Patent does not disclose any temperature correlations to enable a POSITA to practice these claim limitations. Opp’n, 8-10. However, the specification discloses numerous heuristics that a POSITA would be

able to implement without undue experimentation, including temperature and vibration. *See* EX1001, Table spanning cols. 7-12; EX2171, ¶18; EX2172, ¶24. To establish lack of enablement, Petitioner “must show that each disclosed embodiment in the patents was impossible or not enabled.” *EMI Grp. N. Am., Inc. v. Cypress Semiconductor Corp.*, 268 F.3d 1342, 1349 (Fed. Cir. 2001). Petitioner has made no such showing. Implementing these heuristics would require merely routine experimentation. EX2172, ¶24; *see also Johns Hopkins*, 152 F.3d at 1360 (“routine experimentation does not constitute undue experimentation”). The UTGRV researchers, operating at the direction of the inventors, engaged in precisely the normal experimentation that would be expected of a POSITA.

2. Dependent Claims 35-41 and 43-58

Because Petitioner presents no specific arguments for these dependent claims, and because claims 34 and 42 are enabled, the above dependent claims are as well. *See* §II.B.1, *supra* (incorporated here).

III. PETITIONER HAS NOT ESTABLISHED THAT SUBSTITUTE CLAIMS 33-61 ARE UNPATENTABLE OVER THE ART OF RECORD

It is contradictory for Petitioner to argue that claims 34 and 42 are invalid for indefiniteness, yet are so completely understandable to a POSITA that they are obvious. EX2172, ¶25. Petitioner’s obviousness arguments also fail on the merits.

First, PO already addressed the many deficiencies in Armitage, LeFebvre,

Barone, Denny, and Provasnik in its Response. *See* POR, 4-24, 52-64. PO also addressed Petitioner's failure to provide a motivation to combine for Denny, Culbertson, and Provasnik in this Renewed Motion. RMTA, 22-25. In response, Petitioner offers only conclusory statements about what a POSITA would have done or would have known at least 16 times. Opp'n, 10-25. Many parts of Petitioner's obviousness argument are word for word the same as its expert report. *E.g., compare* Opp'n 15-16 (Limitation 34(h)), *with* EX1035, ¶¶54-55. Petitioner's response is impermissible hindsight and insufficient to meet its burden.

Second, for claims 34-58, Petitioner attempts to cure the deficiencies in its prior asserted grounds by adding two more references: Moretti and Brandmeier. Although Petitioner claims in conclusory fashion that both Moretti and Brandmeier are analogous art, it provides no evidence of a motivation to combine any of the five asserted references, let alone all of them. Petitioner also fails to explain how Brandmeier, which is directed to a sensor for a motor vehicle, is analogous art when it is from a different field. *See Airbus S.A.A. v. Firepass Corp.*, 941 F.3d 1374, 1382 (Fed. Cir. 2019) (requiring evidence that a POSITA "would reasonably have consulted those references and applied their teachings in seeking a solution to the problem"); EX2172, ¶26. Brandmeier is not reasonably pertinent because it utilizes a structure-borne noise sensor in a two-piece housing (jacket and cover) in a car engine to trigger a passenger protection system. EX1031, [0002-0003, 0027].

Monitoring railcars, as claimed in the '223 Patent, differs because, among other things, railcars are serially connected and move consecutively along a track in a “demanding environment,” which necessitates the monitoring of every car for prompt and accurate prediction and identification of any cars that “can damage the track infrastructure and lead to derailments.” EX1001, 1:26-29, 1:39-44, 2:36-44, 4:14-19; EX2172, ¶27. Petitioner provides no explanation, beyond hindsight, for why a POSITA would consider the internal car sensor housing from Brandmeier for a railcar bearing adapter sensor housing that needs to be resistant to environmental damage and withstand the railway’s “demanding environment.”

Petitioner’s hindsight combination does not render the claims obvious. Moretti employs a railway axle hub monitoring system distinct from the claims here, with sensor body 3 on a sealing insert 2 inside a housing 1. EX1028, 3:6-28, Fig. 1, 3. The '223 Patent, on the other hand, has a sensor within a housing 14 attached to the sidewall of a bearing adapter 12. EX1001, Fig. 3. Brandmeier discloses a two-piece housing with “a housing jacket formed of a rigid material,” preferably metal, and “a housing cover formed of plastic material,” wherein the purpose of the rigidity of the housing to ensure a rigid connection to the mounting surface for undistorted sound wave propagation. EX1031, [0027-0029]. No disclosure is made of a non-flexible housing that is resistant to environmental damage, as in the '223 Patent.

Patent Owner’s Revised Motion to Amend should be granted.

Respectfully submitted,

Dated: May 10, 2024

By: /Ryan N. Miller/
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Amsted Rail Company, Inc.

CERTIFICATION

Patent Owner's Reply in Support of Revised Motion to Amend, excluding the caption, Table of Contents, Table of Authorities, Table of Exhibits, and this Certification contains XXXX words as measured by the word processing software used to prepare the document, in compliance with 37 C.F.R. § 42.24(d).

Respectfully submitted,

By: / Ryan N. Miller /

Dated: May 10, 2024

Ryan N. Miller
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CERTIFICATE OF SERVICE

Pursuant to 37 C.F.R. §42.6(e), I certify that on this 10th day of May, 2024, a copy of PATENT OWNER'S REPLY IN SUPPORT OF REVISED MOTION TO AMEND under 37 C.F.R. §42.107 was served by electronic mail on Petitioner's counsel, lead and back-up, as follows:

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Counsel for Petitioner has consented to service of all documents via electronic email. *See* Petition, Paper 1 at 2.

Dated: May 10, 2024

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