

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.

IPR2023-00538
Patent 9,365,223 B2

Before JAMES P. CALVE, KEVIN W. CHERRY, and MICHAEL L. WOODS,
Administrative Patent Judges.

CHERRY, *Administrative Patent Judge.*

PRELIMINARY GUIDANCE
PATENT OWNER'S MOTION TO AMEND

I. INTRODUCTION

On August 11, 2023, we instituted trial as to claims 1–10, 13–18, and 20–32 of U.S. Patent No. 9,365,223 B2 (“the ’223 patent”). Paper 15. After institution, Patent Owner filed a Motion to Amend that is contingent on the patentability of claims 1–10, 13–18, and 20–32. Paper 21 (“Motion” or “Mot.”). Petitioner filed an Opposition on January 26, 2024. Paper 28 (“Opposition” or “Opp.”).

In the Motion, Patent Owner requested that we provide preliminary guidance concerning the Motion in accordance with the Board’s pilot program concerning motion to amend practice and procedures. Mot. 1; *see also Notice Regarding a New Pilot Program Concerning Motion to Amend Practice and Procedures in Trial Proceedings under the America Invents Act before the Patent Trial and Appeal Board*, 84 Fed. Reg. 9,497 (Mar. 15, 2019) (providing a patent owner with the option to receive preliminary guidance from the Board on its motion to amend) (“Notice”). We have considered Patent Owner’s Motion and Petitioner’s Opposition.

In this Preliminary Guidance, we provide information indicating our initial, preliminary, non-binding views on whether Patent Owner has shown a reasonable likelihood that it has satisfied the statutory and regulatory requirements associated with filing a motion to amend in an *inter partes* review and whether Petitioner (or the record) establishes a reasonable likelihood that the substitute claims are unpatentable. *See* Notice, 84 Fed. Reg. at 9,497 (“The preliminary guidance . . . provides preliminary, non-binding guidance from the Board to the parties about the [motion to amend]”); *see also* 35 U.S.C. § 316(d) (statutory requirements for a motion to amend); 37 C.F.R. § 42.121 (regulatory requirements and burdens for a motion to amend); *Lectrosonics, Inc. v Zaxcom, Inc.*, IPR2018-

01129, Paper 15 (PTAB Feb. 25, 2019) (precedential) (providing information and guidance regarding motions to amend).

For purposes of this Preliminary Guidance, we focus on the proposed substitute claims, and specifically on the amendments proposed in the Motion. *See* Notice, 84 Fed. Reg. at 9,497. We do not address the patentability of the originally challenged claims. *Id.* Moreover, in formulating our preliminary views on the Motion and Opposition, we have not considered the parties' other substantive papers on the underlying merits of Petitioner's challenges. We emphasize that the views expressed in this Preliminary Guidance are subject to change upon consideration of the complete record, including any revision to the Motion filed by Patent Owner. Thus, this Preliminary Guidance is not binding on the Board when rendering a final written decision. *See id.* at 9,500.

II. PRELIMINARY GUIDANCE

A. Statutory and Regulatory Requirements

For the reasons discussed below, at this stage of the proceeding, and based on the current record, it appears that Patent Owner has not shown a reasonable likelihood that it has satisfied the statutory and regulatory requirements associated with filing a motion to amend.

1. Reasonable Number of Substitute Claims

Does Patent Owner propose a reasonable number of substitute claims? (35 U.S.C. § 316(d)(1)(B))
Yes, Patent Owner proposes no more than 1 substitute claim for each challenged claim. Patent Owner proposes to substitute claims 1–10, 13–18, and 20–32 (twenty-nine claims) with claims 33–61 (twenty-nine claims). Petitioner does not argue otherwise.

2. Respond to Ground of Unpatentability

Does the Motion respond to a ground of unpatentability involved in the trial? (37 C.F.R. § 42.121(a)(2)(i))

Yes. Patent Owner responds to the grounds of unpatentability at Motion 4. At least one amendment presented is responsive to a ground of unpatentability. Petitioner does not argue otherwise.

3. Scope of Amended Claims

Does the amendment seek to enlarge the scope of the claims? (35 U.S.C. § 316(d)(3); 37 C.F.R. § 42.121(a)(2)(ii))

No. Each of the proposed substitute claims includes narrowing limitations. For example, independent claim 33 further defines the probe as having a probe head that includes four additional limitations. Independent claim 34 includes a previously unrecited accelerometer for obtaining data, and also adds comparing a calculated numeric value with a plurality of severity levels. Petitioner does not argue otherwise.

4. New Matter

Does the amendment seek to add new subject matter? (35 U.S.C. § 316(d)(3); 37 C.F.R. § 42.121(a)(2)(ii))

Yes. On this record, we find Patent Owner has not set forth sufficient written description support at Motion 4–15 for the proposed amendments in substitute claims 34–58,¹ as discussed in more detail below.²

Claim 34

Petitioner takes issue with several limitations from claim 34 and first asserts that limitation 34(a), “mounted to a sidewall of a bearing adapter,” is not supported. Opp. 3.³

As support for limitation 34(a), Patent Owner cites to portions of the ’223 patent specification that describe that sensor 20 in Figures 1 and 2 can be a temperature sensor, an accelerometer, and other types of sensors, and that a temperature sensing mote is mounted to a bearing adapter in Figures 3 and 3A to measure the temperature of a wheel bearing of a railcar. Mot. 8 (citing Ex. 1001, 3:50–54, 4:43–48, 5:30–34, Figs. 1, 2, 3, 3A; Ex. 1013 ¶¶ 109–119, Figs. 9, 10a);⁴ *see also id.* at 23–24.

According to Petitioner, the ’223 patent only discloses mounting a temperature sensor, not an accelerometer. Opp. 3–5. In particular, Petitioner contends that “[t]he specific embodiment Amsted now claims—a mote comprising an **accelerometer** mounted to the **sidewall** of a bearing adapter—is disclosed nowhere in the specification.” *Id.* at 3. Petitioner

¹ As Petitioner notes (Opp. 1), there are differences between the amendments in Claims Appendix A and the amendments discussed on pages 6–20 of the Motion, at least for proposed substitute claims 34, 37, and 42. Patent Owner should address these differences in any Revised Motion to Amend, or clarify which version it is referring to as part of any arguments in reply to Petitioner’s Opposition.

² We find that Patent Owner has shown a reasonable likelihood that there is written description support for claims 33 and 59–61, which Petitioner does not appear to dispute at this time.

³ We refer to Petitioner’s nomenclature for consistency. *See* Opp. Listing of Claims, ii.

⁴ Any citations for written description support by Patent Owner that are repeated for a particular claim limitation (such as these citations for limitation 34(a)) are not reiterated below for the sake of brevity. Patent Owner cites to disclosures in the ’223 patent specification (Ex. 1001) and Provisional application No. 61/661, 661 (Ex. 1013 (“the priority application”)); *see* Ex. 1001, code (60)).

asserts, “[n]othing in the specification, however, connects the listed sensors to the specific mounting location required by claim 34 (the sidewall of a bearing adapter).” *Id.* Petitioner asserts that the description of an accelerometer in a list of different sensor types does not connect the accelerometer to the specific mounting *location* claimed. *Id.* Petitioner contends that the embodiment of Figures 3 and 3A depicts a *temperature* sensor mounted to a sidewall of a bearing adapter, but it does not describe an accelerometer. Petitioner argues that the disclosure of an “adapter mounted accelerometer” in the table spanning columns 7–12 does not describe an accelerometer mounted to the *sidewall* of a bearing adapter as claimed. *Id.* at 4. Petitioner asserts that a skilled artisan would know that different types of sensors require different housing configurations and mounting locations and the ’223 patent discloses, “[a]s one of ordinary skill would recognize, *the configuration of the mote 10 with respect to the sensor 20 is dependent upon the type of sensor and the type of data desired.*” *Id.* at 3–4 (quoting Ex. 1001, 4:50–52 (emphasis added)).

On this record, we find that Patent Owner has not shown a reasonable likelihood that the original disclosure supports this claimed subject matter. To provide written description support, the originally filed specification “must do more than merely disclose that which would render the claimed invention obvious.” *ICU Med., Inc. v. Alaris Med. Sys., Inc.*, 558 F.3d 1368, 1377 (Fed. Cir. 2009). In addition, a “written description sufficient to satisfy the requirement of the law requires a statement of an invention, not an invitation to go on a hunting expedition to patch together after the fact a synthetic definition of an invention.” *Indivior UK Ltd. v. Dr. Reddy’s Labs. S.A.*, 18 F.4th 1323, 1329 (Fed. Cir. 2021) (quoting *Brenner v. Manson*, 383 U.S. 519, 536 (1966)). “[A] patent is not a hunting license. It is not a reward for the search, but compensation for its successful conclusion.” *Id.* Patent Owner has not explained how a description of temperature sensing mote 10 mounted to a sidewall of bearing adapter 12 of a railcar wheel in Figures 3 and 3A provides a description of an accelerometer sensing unit “mounted on a sidewall of a bearing adapter” in limitation 34(a) or how a general description that sensors may include accelerometers, without any configurations, describes this subject matter. “FIGS. 3 and 3A show a *temperature* sensing mote.” Ex. 1001, 5:31–32 (emphasis added). Temperature sensing mote 10 includes temperature sensor 20a thermally coupled to a brass plug heat transfer element 22 that contacts the surface on which mote 10 is attached and brass plug 22 is in

thermal communication with the portion of the rail car for which a temperature reading is desired. *Id.* at 4:26–34. We have no evidence that an accelerometer would be placed in the same location that is used to sense the temperature of a bearing. The ’223 patent suggests otherwise as discussed above by disclosing that the configuration of sensing nodes depends on the type of sensor and the type of data desired. *Id.* at 4:39–42.

Petitioner next asserts that there is no disclosure of multiple sensors, and no embodiments that “include both a temperature sensor and an accelerometer as required by claim 34.” Opp. 5. According to Petitioner, “nothing in the specification states, or even suggests, that a single ‘sensor unit’ may include multiple sensors.” *Id.* We agree.

Limitation 34(c) recites “a temperature sensor in thermal communication with the sidewall of the bearing adapter” and “at least one accelerometer configured to sample dynamic vibration data corresponding to accelerations of one or more components of the railcar.” Opp. Listing of Claims, ii. Patent Owner again cites to portions of the ’223 patent specification that describe that sensor 20 in Figures 1 and 2 can be a temperature sensor, an accelerometer, and other types of sensors, and a temperature sensing node is mounted to a bearing adapter in Figures 3 and 3A to measure the temperature of a wheel bearing of a railcar. Mot. 8 (citing Ex. 1001, 3:50–54, 4:43–48, 5:30–34, Figs. 1, 2, 3, 3A; Ex. 1013 ¶¶ 109–119, Figs. 9, 10a); *see also id.* at 23–24.

On this record, we find that Patent Owner has not shown a reasonable likelihood that the original disclosure supports this claimed subject matter. Patent Owner has not explained how a description of single temperature sensor 20 in Figures 1 and 2 provides a description of a plurality of sensors including a temperature sensor and an accelerometer in limitation 34(c) or how a general description that sensors may include accelerometers, without any configurations, describes this subject matter. Although the priority document application discloses “a plurality of sensors 5,” and Figure 3 of the priority application depicts six sensors 5, the corresponding disclosure is not in the ’223 patent, and is not in an embodiment with a housing. A broad disclosure that “many different types of sensors” can be used, including temperature and acceleration is not the same as these sensors being used together in a single embodiment. Patent Owner has not shown a reasonable likelihood of possession of both a temperature sensor and an accelerometer in the same device.

Petitioner next asserts that there is no disclosure of a housing comprised of a “non-flexible durable material.” Opp. 5.

Limitation 34(b) recites, “a housing comprising a non-flexible durable material for protecting components positioned therein.” Opp. Listing of Claims, ii. In support of this limitation, Patent Owner cites to portions of the Specification that describes housing sections 16 and 18. Mot. 8 (citing Ex. 1001, 4:5–10, Figs. 1, 1; Ex. 1013 ¶ 109, Figs. 8, 8A).

On this record, we find that Patent Owner has not shown a reasonable likelihood that the original disclosure supports this claimed subject matter. Patent Owner has not explained how a description of the housing as a “hard plastic” that is “resistant to environmental damage” and that is “weatherproof” is the same as “non-flexible” and “durable.” Ex. 1001, 4:7–10. One of ordinary skill in the art would reasonably consider a hard plastic sheet as being flexible. Similarly, although a hard plastic material may be resistant to environmental damage and be weatherproof for several years, it is not apparent whether that is considered “durable.” Compared to, for example, stainless steel, which would endure the same conditions for decades, a hard plastic may not be considered a *durable* material. Absent specifics as to characteristics of the material such as the shape and thickness of the material and a standard for assessing “durable,” Patent Owner has not shown a reasonable likelihood that it was in possession of a non-flexible durable housing.

Petitioner’s last issue with claim 34 is with the terms “calculated numeric value” and “a plurality of defined parameter value ranges associated with the bearing.” Opp. 6. According to Petitioner, “[n]either of these terms is used in the specification, and it is unclear how each term corresponds to the language used in the original disclosure,” because “the specification does not clearly disclose either of these concepts with respect to collected *acceleration* data as required by claim 34.” *Id.*

Limitation 34(e) recites, “wherein said information comprises a calculated numeric value based on the dynamic vibration data sampled by the at least one accelerometer and representing a condition of a bearing” and Limitation 34 (g) recites, in part, “a plurality of defined parameter value ranges associated with the bearing.” Opp. Listing of Claims, ii–iii. Patent Owner relies at least on the Table spanning columns 7–12 of the ’223 patent. Mot. 9. There, the ’223 patent discloses that for “Bearing Temp.: Adapter temperature is correlated to bearing cup temperature using

empirical data.” (Ex. 1001, col. 8), “Bearing Fault: An adapter mounted accelerometer can be used to sample dynamic bearing data. Kurtosis can be computed as an indicator of bearing damage. Kurtosis is measured in the time domain and requires computation of a probability density function.” (*id.* at cols. 9–10), and “Bearing Fault: Sampled acoustic data can be used for either an acoustic noise response or Acoustic Emission which is ring-down counts and amplitude. Empirical data from defective bearings is needed.” (*id.* at cols. 9–10). Mot. 9 (citing Ex. 1001, table spanning cols. 7–12, 11:39–47; Ex. 1013 ¶¶ 64–76). For the plurality of defined parameter value ranges, Patent Owner relies on portions of the specification disclosing “alert messages” that require action “based on the severity of the alert.” Mot. 10 (citing Ex. 1001, 11:63–12:31; Ex. 1013 ¶¶ 121–122).

At this juncture of the proceeding, we are persuaded by Petitioner’s argument that Patent Owner has not shown a reasonable likelihood that the original disclosure supports the “value” limitations in limitations 34(e) and 34(g), as these values relate to acceleration data. The measurement of Kurtosis in the time domain by computing a probability density function does not disclose any of the values. Ex. 1001, cols. 9–10. Nor has Patent Owner explained how these disclosures support the claimed values. *See* Mot. 9–10. Moreover, the only disclosure of “various levels of alarms” is with respect to a “Bearing Temp Alarm.” Ex. 1001, 13:3–15:17. Patent Owner does not explain how accelerometer alarm levels are determined, and whether they are sent in conjunction with temperature alarms or as an alternative thereto, and which is controlling. On this record, Patent Owner has not shown a reasonable likelihood that the original disclosure supports the “value” limitations of 34(e) and 34(g).

Claim 42

Petitioner makes similar contentions for claim 42 that the limitations “mounted to a sidewall of a bearing adapter,” “dynamic vibration data sampled by the accelerometer,” “calculated numeric value,” and “a plurality of defined parameter value ranges associated with the bearing” recite new matter. Opp. 6. For the same reasons discussed above for claim 34, we find that Patent Owner has not shown a reasonable likelihood that the original disclosure supports this claimed subject matter.

B. Patentability

For the reasons discussed below, at this stage of the proceeding, and based on the current record,⁵ it appears that Petitioner (or the record) has shown a reasonable likelihood that proposed substitute claims 34–58 are unpatentable, but has not shown a reasonable likelihood that proposed substitute claims 33 and 59–61 are unpatentable.

Does the record establish a reasonable likelihood that the proposed substitute claims are unpatentable?

Yes, as to claims 34–58. On this record, it appears that Petitioner (or the record) has shown a reasonable likelihood that claims 34–41 are indefinite, that claims 34–58 fail to comply with the written description and enablement requirements, and that claims 34–58 are unpatentable as obvious.

No, as to claims 33 and 59–61. On this record, it appears that Petitioner (or the record) has not shown a reasonable likelihood that claims 33 and 59–61 are unpatentable as obvious.

<u>Indefiniteness:</u>

Petitioner asserts that the terms “calculated numeric value” and “a plurality of defined parameter value ranges associated with the bearing” in claims 34 and 42 “do not appear in the specification, and it is unclear how each term relates to the disclosed embodiments.” Opp. 7–8.
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At this juncture of the proceeding, we are persuaded that Petitioner has established a reasonable likelihood of showing that the lack of clarity as to what the above-recited terms represent or how they relate to one another renders claims 34 and 42 indefinite. <i>See, e.g., Nautilus, Inc. v. Biosig Instruments, Inc.</i> , 572 U.S. 898, 901 (2014) (holding a patent claim is indefinite if, when read in light of the specification and its prosecution history,

⁵ We express no view on the patentability of original claims 1–10, 13–18, and 20–32 in this Preliminary Guidance. Instead, we focus on limitations added to those claims in the Patent Owner’s Motion to Amend.

the claim fails to inform with reasonable certainty, those skilled in the art about the scope of the invention); *Pacific Coast Bldg. Prods., Inc. v. CertainTeed Gypsum, Inc.*, 816 F. App'x 454, 459, 461 (Fed. Cir. 2020) (finding the claim indefinite where the claims and specification failed to provide guidance to a skilled artisan for how to measure or calculate the newly coined characteristic “scored flexural strength” with reasonable certainty); *Dow Chem. Co. v. Nova Chems. Corp. (Canada)*, 803 F.3d 620, 633–35 (Fed. Cir. 2015) (the claimed term “slope of strain hardening coefficient” was indefinite where the patent failed to disclose with reasonable certainty where and how the “slope of strain hardening” should be measured and multiple different methods could be used to calculate this coefficient with each leading to different results without any guidance in the claims or specification as to which method should be used or whether other methods could be used); *Teva Pharm. USA, Inc. v Sandoz, Inc.*, 789 F.3d 1335, 1345 (Fed. Cir. 2015) (limitation “molecular weight” rendered claim indefinite where there were three relevant measures for molecular weight calculated in different ways for different values, and a skilled artisan could not determine from the claims and specification which measurement to use so the claim failed to inform with reasonable certainty those skilled in the art about the scope of the invention); *Interval Licensing LLC v AOL, Inc.*, 766 F.3d 1364, 1371 (Fed. Cir. 2014) (holding that the claims when read in light of the specification and prosecution history must provide objective boundaries for those of skill in the art).

Claim 34 also recites “a non-flexible durable material.” Petitioner asserts that because the term “non-flexible durable material” is not used in the specification, the specification does not define how “non-flexible” a material must be to satisfy this limitation, or under what conditions the flexibility should be tested. Opp. 7 (citing Ex. 1030 ¶ 29). Petitioner also asserts that because the specification “fails to define how ‘durable’ a material must be, or how its ‘durability’ is to be measured,” an ordinary artisan “cannot determine with reasonable certainty which materials fall within the scope of this limitation.” *Id.* We agree. As noted above in our “new matter” discussion, we stated that the shape, thickness, and arrangement of the housing will affect its flexibility. As also noted, durability is a relative term, and the specification has not provided guidance on how to determine whether a material is durable.

Limitation 34(e) recites, “wherein said information comprises a calculated numeric value,” and Petitioner asserts “it is not clear whether ‘said information’ refers to ‘electrical circuitry in communication with said

temperature sensor for obtaining information’ or to ‘a communication device capable of broadcasting information.’” Opp. 7. We disagree. Both of the above limitations refer to the same information. Specifically, limitation 34(d) recites “electrical circuitry in communication with said temperature sensor for obtaining *information regarding the temperature and the accelerations*,” and also recites “broadcasting *information regarding the temperature and the accelerations*.” Given that the same information is recited, namely, information regarding temperature and accelerations, an ordinary artisan would understand with reasonable certainty the information to which “said information” refers.

Written Description:

Based on the current record, it appears that the original disclosure of the ’223 patent does not provide sufficient written description support for the added limitations 34(a)–34(c), 34(e) and 34(g) and corresponding limitations as recited in proposed substitute claim 42 for the reasons previously described in Section II.A.4 of this Preliminary Guidance.

Enablement:

As discussed above, Petitioner asserts claims 34 and 42 lack written description support because of certain claim terms. In particular, Petitioner asserts that the specification does not disclose “defined parameter values” or “calculated numeric values” that could be used to monitor acceleration as required by claims 34 and 42. Opp. 1–2, 6. Petitioner asserts that the specification provides examples of *temperature* monitoring not acceleration monitoring and thus fails to enable the claimed methods of monitoring *acceleration*. *Id.* The specification and evidence of record do not appear to disclose a range of temperature and acceleration values, as required by claims 34 and 42 such that a skilled artisan could determine such claimed values without undue experimentation. Consequently, at this juncture of the proceeding, we find that Petitioner has shown a reasonable likelihood that claims 34 and 42 fail to comply with the enablement requirement.

Obviousness:

Petitioner asserts that proposed substitute claims 33–61 would have been obvious based on the following grounds. Opp. 8–9.

Ground 1: Claim 34–58 Based on Armitage,⁶ LeFebvre,⁷ Barone,⁸ Moretti,⁹ and Brandmeier.¹⁰

Ground 2: Claims 34–58 Based on LeFebvre, Armitage, Barone, Moretti, and Brandmeier.

Ground 3: Claims 33, 59–61 Based on Armitage, LeFebvre, Denny,¹¹ Provasnik,¹² and Culbertson.¹³

Ground 4: Claims 33, 59–61 Based on LeFebvre, Denny, Provasnik, and Culbertson. Armitage, Barone, LeFebvre, Denny, and Provasnik were cited previously as discussed below.

Moretti, Brandmeier, and Culbertson are newly cited references as further discussed below.

Claims 33, 34, 42, and 59 are independent. Mot. Listing of Claims, i, ii, iv, viii.

As to Grounds 1 and 2, in the Opposition, Petitioner addresses new limitations of claims 34–58 not previously addressed for claims 2–10, 13–18, 20–22, and 26–32 below. Opp. 9–20.

Claim 34

Limitation 34(a): “mounted on a sidewall of a bearing adapter”

As to this limitation, Petitioner asserts that it would have been obvious to mount Armitage’s sensor node to the sidewall of a bearing adapter because Armitage discloses its sensors are “attached or coupled to the associated undercarriage element” that may be a “bearing or bearing box.” Opp. 10–11 (citing Ex. 1006 ¶¶ 13–15, 34). Petitioner asserts Barone discloses a sensor node such as an accelerometer being mounted on the sidewall of a bearing adapter. *Id.* at 11 (citing Ex. 1007 ¶¶ 289–293, Figs. 11–13). Petitioner asserts Moretti discloses mounting a vibration sensor on the bearing housing “at a position vertically aligned with the axis of rotation of the bearing, where the vibrations are more intense.” *Id.* (citing Ex. 1028, 3:22–28; Ex. 1030 ¶ 47).

⁶ US 2011/028540 A1, published Nov. 17, 2011 (Ex. 1006, “Armitage”).

⁷ US 2007/0152107 A1, published July 5, 2007 (Ex. 1005, “LeFebvre”).

⁸ US 2007/0208841 A1, published Sept. 6, 2007 (Ex. 1007, “Barone”).

⁹ US 6,672,681 B1, issued Jan. 6, 2004 (Ex. 1028, “Moretti”).

¹⁰ US 2008/0072670 A1, published Mar. 7, 2008 (Ex. 1031, “Brandmeier”).

¹¹ US 5,633,628, issued May 27, 1997 (Ex. 1008, “Denny”).

¹² US 4,282,754, issued Aug. 11, 1981 (Ex. 1009, Provasnik”).

¹³ US 7,665,890 B2, issued Feb. 23, 2010 (Ex. 1032, “Culbertson”).

Petitioner asserts that it would have been obvious to mount a sensor node on the sidewall of a bearing adapter, which is an easily accessible and non-rotating surface that transmits vibration from the bearing. *Id.* (citing Ex. 1030 ¶ 48).

Alternatively, Petitioner asserts that it would have been obvious to mount LeFebvre's sensor unit to the sidewall of a bearing adapter because the shape and size, or location of the housing could be changed without affecting operation of the sensor. Opp. 11–12 (citing Ex. 1005 ¶ 59; Ex. 1030 ¶ 49; Ex. 1007 ¶¶ 289–293, Figs. 11–13; Ex. 1030 ¶ 50).

At this preliminary stage of the proceeding, we agree with Petitioner. At least Barone discloses and depicts an accelerometer mounted on a sidewall of a bearing adapter. Ex. 1007 ¶¶ 289–293, Figs. 11–13.

Limitation 34(b): “a housing comprising a non-flexible durable material”

As to this limitation, Petitioner asserts that using rigid materials to protect sensitive electronic components was known and that “Brandmeier provides an example that illustrates this well-known concept: a sensor device housing made from a rigid material that is designed to be mounted on a surface of a motor vehicle.” Opp. 12 (citing Ex. 1031, code (57), ¶ 27, claims 11–12; Ex. 1030 ¶ 52). At this preliminary stage of the proceeding, we agree with Petitioner that a housing made from a rigid (non-flexible) material is known to protect sensors. Ex. 1031 ¶ 27.

Limitation 34(c): “at least one accelerometer configured to sample dynamic vibration data corresponding to accelerations of one or more components of the railcar”

As to this limitation, Petitioner asserts “Armitage, LeFebvre, Barone, and Moretti each disclose sensor nodes for monitoring wheel bearings that may include accelerometers, either alone or in combination with temperature sensors.” Ex. 1006 ¶¶ 13–15, 25, 27; Ex. 1005, claims 12, 21; Ex. 1007 ¶ 45; Ex. 1028, 3:57–62. At this preliminary stage of the proceeding, we agree with Petitioner. At least Barone measures vibration data using an accelerometer and allows “continuous monitoring and true trending data analysis.” Ex. 1007 ¶¶ 35, 45.

Limitation 34(e): “said information comprises a calculated numeric value based on the dynamic vibration data sampled by the at least one accelerometer and representing a condition of a bearing”

As to this limitation, Petitioner asserts “LeFebvre and Armitage perform calculations (or ‘heuristics’) on collected sensor data, which naturally results in

‘calculated numeric values’ which represent the operational state of the bearing.” Opp. 14 (citing Ex. 1005, claims 9 and 12; Ex. 1006 ¶ 45; Ex. 1030 ¶ 56; Corr. Pet., 19–27, 56–64; Ex. 1003 ¶¶ 74–106, 251–275). At this preliminary stage of the proceeding, we agree with Petitioner. At least Armitage monitors and analyzes accelerometer data to determine a condition of a bearing. Ex. 1006 ¶¶ 44–45.

Limitation 34(f) “a land-based remote station”

Petitioner asserts that Armitage discloses that the control node wirelessly transmits information “to a collection node in a remote (i.e., off-train, land-based) location.” Opp. 16–17 (citing Ex. 1006 ¶¶ 19, 39; Ex. 1030 ¶ 63). Alternatively, Petitioner asserts “LeFebvre discloses that its data control unit may communicate with a remote (off-train, land-based) base unit via, for example, ‘a cellular or satellite radio system.’” *Id.* at 17 (citing Ex. 1005 ¶¶ 25, 38, 52; Ex. 1030 ¶ 64). At this preliminary stage of the proceeding, we agree with Petitioner. At least LeFebvre discloses a remote cellular station. Ex. 1005 ¶ 25.

Limitation 34(g): “comparing the calculated numeric value with a plurality of defined parameter value ranges associated with the bearing, each of which represents one of a plurality of severity levels and from which a severity of the condition of the bearing can be determined.”

Patent Owner asserts, “LeFebvre does not disclose comparing a calculated value against defined value ranges to determine a severity of the condition of the bearing” and because “Armitage does not disclose comparing such a calculated value against defined value ranges to determine a severity of the condition of the bearing,” thus, “Armitage fails to cure the deficiencies of LeFebvre.” Mot. 24 (citing Ex. 1005 ¶ 59; Ex. 1006 ¶¶ 30, 45; Ex. 2158 ¶¶ 30–31).

As to this limitation, Petitioner asserts that at least Moretti “discloses comparing a measured acceleration value with a predetermined reference value.” Opp. 15–16 (citing Ex. 1028, 3:57–62, 4:8–12). According to Petitioner, threshold-based comparisons are simple, straightforward to implement, and effective. *Id.* Petitioner asserts, moreover, that “Armitage, for example, uses a color-coded system (corresponding to a ‘plurality of severity levels’) to indicate the severity of the fault.” *Id.* at 18 (citing Ex. 1006 ¶ 44 (“The event ranking could include a ‘yellow’ condition which indicates that a railway car requires service, and a ‘red’ condition which indicates that a sensor has detected a serious deviation . . . that requires immediate service.”)).

Petitioner asserts that “LeFebvre also discloses the use of bearing temperature ‘alarm levels.’” *Id.* (citing Ex. 1005 ¶ 58).

The “event” to which Armitage refers is based on a “collection of measurements over a period of time, [which] provides a baseline” and the “degree to which any specific sensor deviates from this [baseline] is indicative of the severity of the mechanical condition of the component.” Ex. 1006 ¶ 43. Thus, the newly cited portions of Armitage and Lefebvre, in conjunction with the disclosure of newly cited Moretti, appear to disclose this limitation.

Dependent Claims 35–41

Petitioner asserts that the limitations added by dependent claims 35–41 are disclosed by Armitage and LeFebvre, or LeFebvre alone. Opp. 18–19.

Independent Claim 42

Petitioner asserts that the limitations added by independent claim 42 correspond to those of claim 34 and are disclosed Armitage and LeFebvre. Opp. 19.

Dependent Claims 43–58

Petitioner asserts that the limitations added by dependent claims 43–58 are disclosed by Armitage and LeFebvre, or LeFebvre and Barone. Opp. 20.

At this juncture of the proceeding, we are persuaded that Petitioner has shown a reasonable likelihood that claims 34–58 are unpatentable over Armitage, LeFebvre, Barone, Moretti, and Brandmeier or over Armitage, Barone, Moretti, and Brandmeier.

As to Grounds 3 and 4, in the Opposition, Petitioner addresses new limitations of claims 33 and 59–61 not previously addressed for claims 1 and 23–25 below. Opp. 20–25.

Claim 33

Limitations 33(a) and 33(e)i, ii: “a housing providing a first piece” and “a probe providing a second piece external to and separated from the first piece [that] includes a sensor probe head ... body formed of heat conductive material”

As to these limitations, Petitioner asserts “there are only two possible locations for a temperature sensor—inside the housing, or outside the housing” and because “sensitive electronic components should not be directly exposed to high temperatures,” it would be “advantageous to locate the temperature sensor

outside the housing.” Opp. 21–22. According to Petitioner, Denny and Culbertson disclose external temperature sensors that are “suitable for use in harsh environments including, for example, high vibration and temperature.” *Id.* at 22 (citing Ex. 1008, 2:24–27, Abstract; Ex. 1032, Abstract, 4:13–35, 10:37–56, Fig. 1; Ex. 1030 ¶¶ 89–90. Petitioner asserts that Culbertson’s “temperature probe 12 includes a probe head (tip cap 14) that is preferably a metal alloy.” *Id.* at 23 (citing Ex. 1032, 4:15–18). At this preliminary stage of the proceeding, we agree with Petitioner. At least Culbertson discloses housing 28 with external temperature probe 12 having a head 14 that is a metal alloy, which appears to be heat conductive. Ex. 1032, 4:15–18, Fig. 1.

Limitation 33(e)iii: the probe head “has a connector electrically interfaced with said temperature sensor and configured to connect to a corresponding electrical connector at the distal end of the cable”

As to this limitation, Petitioner asserts that Culbertson’s temperature sensor has a pair of lead wires 26 each have a proximal end disposed within housing 28 and a distal end that leads to probe 12, external to the housing, and including transition component 22 with connectors that terminate conductors of temperature probe 12 to the distal end of lead wires 26, and housing 28 includes an input portion 36 for receiving the proximal end of the lead wires 26. Opp. 23 (citing Ex. 1032, 4:13–35, Fig. 1). At this preliminary stage of the proceeding, we agree with Petitioner. At least Culbertson discloses that external temperature probe 12 is connected by a connector. Ex. 1032, 4:21–26.

Limitation 33(e)iv: the probe head “has a magnet positioned in the body adjacent to a portion of the connector extending inside the body, the magnet configured to magnetically attract the part of the railcar against which the sensor probe head will be placed”

Petitioner asserts that “Culbertson’s external temperature sensor includes a mounting connector 18 that is ‘is adapted for securing the temperature probe 12 to a mounting assembly in an operating environment,’” and that “the mounting method ‘can be as simple as a hanger or can include a nut, flange, rotatable connector, or other device,’ but does not expressly disclose a magnet.” Opp. 23–24 (citing Ex. 1032, 4:46–50). According to Petitioner, “a magnet could be used to attach a temperature sensor,” consistent with the teachings of Provasnik that a magnet “permits a sensor to be readily attached to, and removed from a metallic substrate.” *Id.* at 24 (citing Ex. 1009, 1:8–15, 1:38–44, 4:65–68; Ex. 1030 ¶ 94). Petitioner thus asserts that because magnets

are common, well-understood technology, a magnet could be used “to attach Culbertson’s temperature probe to a desired location (e.g., mounting connector 18) with a reasonable expectation of success.” *Id.*

At this stage of the proceeding, we do not find Petitioner has sufficiently established that the addition of Culbertson is sufficient to show a reasonable likelihood that Armitage, LeFebvre, Denny, Provasnik, and Culbertson render obvious claim 33 or that LeFebvre, Denny, Provasnik, and Culbertson render obvious claim 33. Even if one were to use a magnet, it is not apparent that Petitioner has explained how it would meet the claim 33(e) requirements. We reproduce below, Figure 1 of Culbertson.

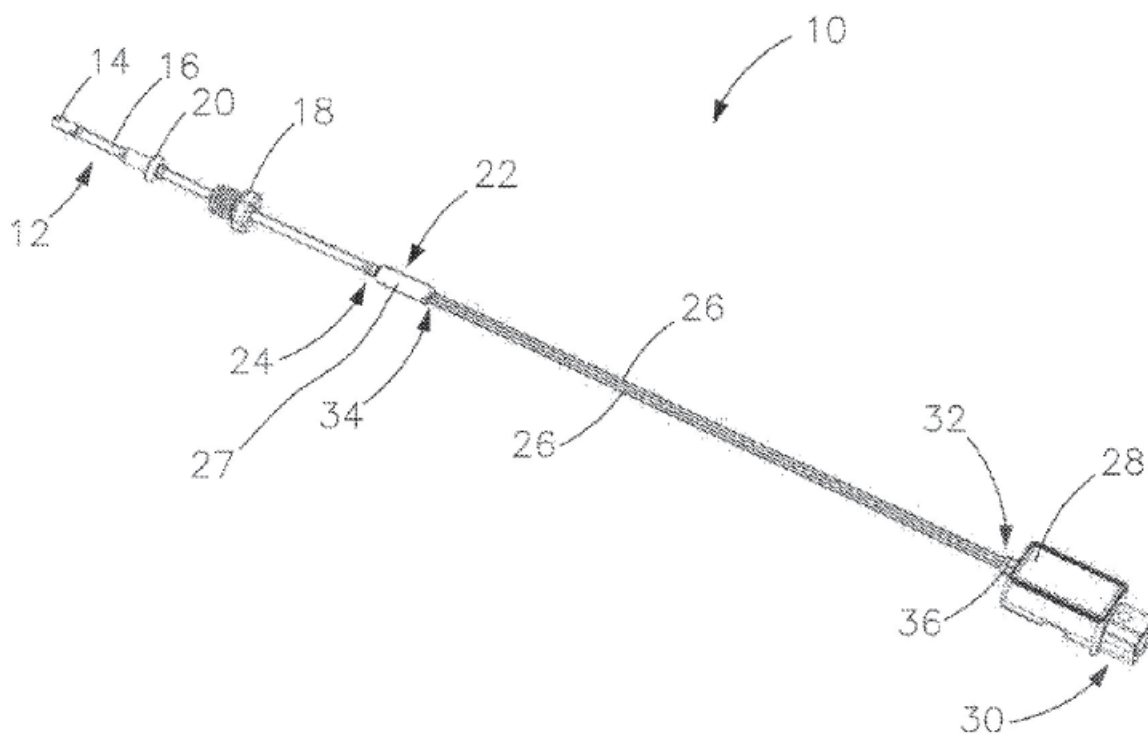


Figure 1 of Culbertson depicts an elongate temperature sensor assembly 10. Ex. 1032, 4:13–15. Temperature assembly 10 includes temperature probe 12 having a tip cap 14. *Id.* at 4:15–17. Petitioner relies on tip cap 14, which is depicted at the far left or distal end of Figure 1 as being the sensor body that is heat conductive material. Opp. 23. Petitioner then appears to rely on transition component 22 that encloses connectors for the claimed “connector electrically interfaced with said temperature sensor.” *Id.* Petitioner also relies on Culbertson’s mounting connect 18 to secure probe 12 to its operating environment, and suggests that a magnet could be used to attach the probe 12. *Id.* at 23–24. Limitation 33(e)iv, however, requires a magnet positioned in the

body. Given that Petitioner relies on tip cap 14 as the body, it is not apparent how the magnet could be mounted therein, and Petitioner does not address this inconsistency. Limitation 33(e)iv also requires that the magnet is adjacent to a portion of the connector extending inside the body. As depicted in Culbertson's Figure 1, neither connector 22 nor connector 18 are inside the body (tip cap 14). Petitioner appears to suggest a modification of connector 18 to include a magnet, but it is not apparent how a magnet at this location would be configured to magnetically attract the part of the railcar against which the *sensor probe head* will be placed, as further recited. Based on these gaps and inconsistencies, Petitioner has not shown a reasonable likelihood that Armitage, LeFebvre, Denny, Provasnik, and Culbertson render obvious claim 33 or that LeFebvre, Denny, Provasnik, and Culbertson render obvious claim 33.

Claims 59–61

Petitioner asserts that “[t]he new limitations of claim 59 are substantially the same as the limitations of claim 33, and are obvious for the same reasons.” Opp. 25.

Independent claim 59 is broader than claim 33 because it does not require a magnet, but does include some similar limitations, which we address below for completeness.

Limitation 59(b): “the temperature sensor positioned within a probe head and interfaced with an electrical connector, the probe head configured to receive a cable having a corresponding electrical connector”

Petitioner asserts that Culbertson's “temperature probe 12 includes a probe head (tip cap 14).” Opp. 23. Petitioner, however, does not explain how Culbertson meets the sensor “within a probe head” limitation. That is, we understand limitation 59(b) to have two elements, a probe head and a sensor positioned within the probe head. Moreover, Culbertson's probe head 14 is not configured to receive a cable having a corresponding electrical connector. The connector upon which Petitioner relies appears to be connector 22 (*see* Opp. 23), which is spaced from probe head 14, as seen in Figure 1 of Culbertson. At this stage of the proceeding, we do not find Petitioner has shown a reasonable likelihood that Armitage, LeFebvre, Denny, Provasnik, and Culbertson render obvious claim 59 or that LeFebvre, Denny, Provasnik, and Culbertson render obvious claim 59. Claims 60 and 61 depend from claim 59. Mot. Claims App. A, xii.

We acknowledge that Patent Owner has not yet had the opportunity to address Petitioner's contentions in regards to proposed substitute claims 33–61. In particular Patent Owner has not had the opportunity to address Moretti, Brandmeier, or Culberson, or the Reply Declaration of Mr. Ricca in support of Petitioner's Opposition (Ex. 1030), which were filed with and relied on in Petitioner's Opposition. Opp. 3–25. Patent Owner will have the opportunity to do so in its Reply to Petitioner's Opposition (or in a revised motion to amend) in this proceeding.

III. CONCLUSION

This concludes the Preliminary Guidance, which is Patent Owner's first option under the Board's pilot program. Notice, 84 Fed. Reg. at 9,497. Patent Owner has an additional option under the Board's pilot program to file a revised MTA by DUE DATE 3. Paper 16.

In addition to those two options under the Board's pilot program, Patent Owner is reminded that amendments of the challenged claims may also be pursued in a separate reissue or reexamination proceeding before, during, or after an AIA trial proceeding, including subsequent to the issuance of the Final Written Decision. We draw Patent Owner's attention to the April 2019 *Notice Regarding Options for Amendments by Patent Owner Through Reissue or Reexamination During a Pending AIA Trial Proceeding*. See 84 Fed. Reg. 16,654 (Apr. 22, 2019). If Patent Owner chooses to file a reissue application or a request for reexamination of the challenged patent, we remind Patent Owner of its continuing obligation to notify the Board of any such related matters in updated mandatory notices. See 37 C.F.R. § 42.8(a)(3), (b)(2).

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