

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 IPR2023-00540

Patent No. 10,137,915

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

Submitted Electronically via P-TACTS

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EX #	Exhibit Description
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2002	<i>Curriculum Vitae</i> for Dr. Michael Shamos
2003	Joint Claim Construction Chart - Amsted Rail Company, Inc., v. Hum Industrial Technology, Inc., et al., Civil Action No. 4:22-cv-00445-AGF (E.D. Mo. March 31, 2023)
2004	U.S. Pat. Pub. No. 2009/0001226 to Haygood (“Haygood”)
2005	U.S. Pat. No. 7,336,156 to Arita et al. (“Arita”)
2006	Expert Declaration of Dr. Michael Shamos In Support of Patent Owner’s Response
2007	Ricca Declaration - Amsted Rail Company, Inc., v. Hum Industrial Technology, Inc., et al., Civil Action No. 4:22-cv-00445-AGF (E.D. Mo. March 31, 2023)
2008	Expert Declaration of Dr. Michael Shamos In Support of Patent Owner’s Motion to Amend
2009	Expert Declaration of Dr. Michael Shamos In Support of Patent Owner’s Revised Motion to Amend
2010	Expert Declaration of Dr. Michael Shamos In Support of Patent Owner’s Revised Motion to Amend Reply
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CLAIMS APPENDIX A¹

Proposed substitute claims are shown in marked-up form below beginning with claim 38. Modifications to the corresponding original claim are shown in the substitute claim by underlining (added material) and strikethrough (deleted material).

Claim 38 (Substitute for claim 1, if found unpatentable)

[[1]]38. A system for detecting operational anomalies on a train consist or railcar, comprising:

(a) one or more communication management units mounted on one or more railcars;

(b) one or more wireless sensor[[s]] nodes located on said one or more railcars and configured to sense an operational parameter of said one or more railcars, said one or more wireless sensor[[s]] nodes being in communication with said one or more communication management units, wherein the one or more wireless sensor[[s]] nodes comprise a tri-axis ~~one or more~~ sensor[[s]] configured to measure accelerations of the railcar along a plurality of axes comprising a first axis extending along a length of the railcar, a second axis extending across a width of the railcar, and a third axis extending along a height of the railcar; and

(c) a plurality of ~~one or more~~ sensor sections that are provided with the one or more wireless sensor nodes and that comprise

(i) a plurality of filters that are each configured to filter at least a portion of the accelerations by receiving an output signal directly from the tri-axis sensor and selecting ones of the accelerations in the output signal that were

¹ Authorized by the Board via email on May 6, 2024. See EX2011.

measured in a dimension represented by a respective axis of the plurality of axes, and

(ii) a plurality of detectors respectively coupled to the plurality of filters, each one of the detectors being configured to detect a respective one of a plurality of different railcar conditions based on ones of the accelerations that are associated with only the respective axis of the plurality of axes;

wherein said communication management units perform the functions of:

(i) collecting, from the one or more wireless sensor nodes, data regarding said ~~one or more railcar~~ operational parameter[[s]] of said one or more railcars;

(ii) analyzing said collected data to detect a[[for]] trend[[s]] or event[[s]] indicative of an anomalous operational condition of said one or more railcars; and

(iii) communicating a message to a remote receiver when said trend or event is detected.

Claim 39 (Substitute for claim 21, if found unpatentable)

[[21]]39. The system of claim 38[[1]], wherein at least one of said communication management units includes at least one ~~of said~~ sensor[[s]] configured to measure accelerations of the railcar.

Claim 40 (Substitute for claim 22, if found unpatentable)

[[22]]40. The system of claim 38[[1]], further comprising a powered wireless gateway configured to control a train-based network that includes said powered wireless gateway and a plurality of said communication management units.

Claim 41 (Substitute for claim 23, if found unpatentable)

[[23]]41. The system of claim 38[[1]], wherein the one or more wireless sensor nodes ~~further~~filters comprise one or more mechanical filters that include a resilient material configured to filter out undesirable accelerations from the accelerations, wherein the one or more mechanical filters are disposed to remove the undesirable accelerations before the undesirable accelerations reach the tri-axis~~one or more~~ sensor[[s]] that is[[are]] configured to measure accelerations.

Claim 42 (Substitute for claim 24, if found unpatentable)

[[24]]42. The system of claim 38[[1]], ~~further comprising one or more wireless sensor nodes in communication with at least one of the communication management units, wherein the one or more sensors form part of the one or more wireless sensor nodes,~~ wherein one or more of the wireless sensor nodes comprise a protective housing, wherein the tri-axis~~one or more~~ sensor[[s]] is[[are]] mounted within the protective housing, wherein the protective housing comprises a potting material configured to tune the wireless sensor nodes by absorbing at least a portion of undesirable accelerations.

Claim 43 (Substitute for claim 25, if found unpatentable)

[[25]]43. The system of claim 38[[1]], ~~further comprising one or more wireless sensor nodes in communication with at least one of the communication management units, wherein the one or more sensors form part of the one or more wireless sensor nodes,~~ wherein one or more of the wireless sensor nodes comprises a microprocessor configured to execute firmware to control operation of the one or more of the wireless sensor nodes, wherein the firmware comprises one or more software filters configured to isolate one or more types of accelerations, and wherein a first one of

the plurality of detectors is always enabled when the railcar is moving, and a second one of the plurality of detectors is enabled when the railcar is traveling faster than a specific speed and is disabled when the railcar is traveling slower than the specific speed.

Claim 44 (Substitute for claim 26, if found unpatentable)

[[26]]44. The system of claim 38[[1]], wherein the one or more wireless sensor nodes~~filters~~ further comprise one or more mechanical filters.

Claim 45 (Substitute for claim 29, if found unpatentable)

[[29]]45. The system of claim 38[[1]], wherein said remote receiver is located off-train.

Claim 46 (Substitute for claim 30, if found unpatentable)

[[30]]46. A method for detecting operational anomalies on a train consist or railcar comprising the steps of:

sensing, by ~~a one or more~~ tri-axis sensor[[s]] of one or more wireless sensor nodes located on one or more railcars, one or more operational parameters of the one or more railcars, wherein the one or more operational parameters comprise one or more accelerations and the tri-axis sensor is configured to measure accelerations of the ~~one or more~~ railcar[[s]] along a plurality of axes comprising a first axis extending along a length of the railcar, a second axis extending across a width of the railcar, and a third axis extending along a height of the railcar;

filtering, by each of a plurality of ~~one or more~~ filters of a plurality of sensor sections that are provided with the one or more wireless sensor nodes, at least a portion of the accelerations by receiving an output signal directly from the tri-axis

sensor and selecting ones of the accelerations in the output signal that were measured in a dimension represented by a respective axis of the plurality of axes;

detecting, by each of a plurality of detectors of the plurality of sensor sections, a respective one of a plurality of different railcar conditions based on ones of the accelerations that are associated with only the respective axis of the plurality of axes;

and

by one or more communication management units associated with the one or more railcars:

collecting, from the one or more wireless sensor nodes, data regarding said
~~one or more railcar~~ operational parameters of said one or more railcars;

analyzing said collected data to detect a~~[[for]]~~ trend~~[[s]]~~ or event~~[[s]]~~
indicative of an anomalous operational condition of said one or more railcars; and

communicating a message to a remote receiver when said trend or event is detected.

Claim 47 (Substitute for claim 36, if found unpatentable)

~~[[36]]~~47. A system for detecting operational anomalies on a railcar that is part of a train consist comprising:

(a) at least one communication management unit (CMU) mounted on the ~~[[a]]~~ railcar in said train consist;

(b) at least two wireless sensor~~[[s]]~~ nodes located on the ~~[[said]]~~ railcar and~~[[for]]~~ configured to sense operational parameters of the railcar, said wireless sensor~~[[s]]~~ nodes being in communication with said communication management unit, wherein the at least two ~~one or more~~ wireless sensor~~[[s]]~~ nodes comprise a tri-axis ~~one or more~~ sensor~~[[s]]~~ configured to measure accelerations of the railcar along a plurality of axes comprising a first axis extending along a length of the railcar, a

second axis extending across a width of the railcar, and a third axis extending along a height of the railcar; and

(c) a plurality of ~~one or more~~ sensor sections that are provided with the one or more wireless sensor nodes and that comprise

a plurality of filters that are each configured to filter at least a portion of the accelerations by receiving an output signal directly from the tri-axis sensor and selecting ones of the accelerations in the output signal that were measured in a dimension represented by a respective axis of the plurality of axes, and

a plurality of detectors respectively coupled to the plurality of filters, each one of the detectors being configured to detect a respective one of a plurality of different railcar conditions based on ones of the accelerations that are associated with only the respective axis of the plurality of axes;

wherein said communication management unit performs the following functions:

- (i) receiving data from said at least two wireless sensor[[s]] nodes;
- (ii) drawing inferences from the data received from at least two wireless ~~of the~~ sensor[[s]] nodes regarding the performance of the railcar; and
- (iii) communicating a message to a remote receiver when an anomaly is detected.

Claim 48 (Substitute for claim 37, if found unpatentable)

[[37]]48. The system of claim 47[[36]],

wherein said tri-axis sensors comprise accelerometers positioned at different locations of the railcar,

wherein said step of drawing inferences comprises the comparison of data from ~~two or more of~~ said accelerometers,

wherein said accelerometers are positioned on the railcar to provide data for carrying out one or more of the following functions:

- i) compare accelerations from one railcar wheel with that of another railcar wheel on the same axle but opposite side of the railcar,
- ii) compare accelerations from one railcar wheel with that of at least one other wheel on the same side of said railcar, and
- iii) compare accelerations from one railcar wheel with that of at least one other railcar wheel on the same side of said one railcar wheel and which other wheel is on another railcar of the same train consist.

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 claim of the ’915 Patent is unpatentable.

I. SUBSTITUTE CLAIMS 38-48 COMPLY WITH §112

Petitioner fails to meet its burden to show that any of the substitute claims do not comply with §112.

A. Substitute Claim 43 Has Written Description

Claim 43 includes two typographical errors, which have been corrected in the Corrected Claim Appendix that is filed with this Reply as authorized by the Board on May 6, 2024. EX2011.

With respect to written description, as an initial matter, Claim 43 depends from Claim 38, which claims “a plurality of sensor sections that are provided with one or more wireless sensor nodes and that comprise...a plurality of detectors respectively coupled to the plurality of filters, each one of the detectors being configured to detect a respective one of the plurality of different railcar conditions.” Petitioner does not contend that Claim 38, including its “plurality of detectors” limitation, lacks written description.

Instead, Petitioner alleges that the ’915 Patent does “not teach a single embodiment comprising two sets of detectors as claimed” in Claim 43. Opp’n, 2. While Petitioner does not explain specifically what it believes is not described, a

review of the '915 Patent shows that the inventors had possession of the invention. Specifically, the RMTA's cited disclosure refers to WSN 104 (Fig. 4), which includes both an accelerometer 404 and a temperature sensor 406. EX1001, 6:28-36; *see also id.*, 5:33-35. The specification further describes the WSN temperature monitoring as only occurring when the railcar is moving (*e.g.* EX1001, Fig. 11, 14:51-56), while other detections are enabled once a critical speed has been reached (*e.g.* EX1001, 10:55-12:51 (referring to Fig. 10)). Cited Fig. 12 depicts "a generalized model for implementation of the data analysis portion of a WSN 104," with multiple sets of detectors. EX1001, 3:1-3, Fig. 12. Thus, Claim 43 has adequate written description to convey to a POSITA that the inventors had possession of the claimed detectors. EX2010, ¶14; *Ariad Pharm., Inc. v. Eli Lilly & Co.*, 598 F.3d 1336, 1351 (Fed. Cir. 2010) (*en banc*).

B. Substitute Claims 38, 43, 46 and 47 Are Not Indefinite

Petitioner's indefiniteness arguments are in tension with its obviousness claims, which demonstrates the weakness of both contentions. As demonstrated below, under the appropriate standard, Claims 38, 43, 46 and 47 are not indefinite.

i. Claims 38, 46 and 47: "one of the accelerations"

Petitioner appears to confuse indefiniteness with written description support by contending that the claim limitation is indefinite because the exact wording does not appear in the specification. *See* Opp'n, 2. The correct focus should be whether

the claims, when “read in light of the specification...and the prosecution history, fail to inform, with reasonably certainty, those skilled in the art about the scope of the invention.” *Nautilus, Inc. v. Biosig Instruments, Inc.*, 572 U.S. 898, 901 (2014).

Each of these claims require tri-axis sensors, which measure accelerations along three axes. *E.g.*, EX1001, 11:28-12:51 (longitudinal, vertical, and lateral). “One of the accelerations” refers to one of the acceleration measurements taken with the tri-axis sensor for one axis. 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. EX2010, ¶16. Indeed, Petitioner’s expert only opines as to what is “unclear” *to him*, not what a POSITA would understand. EX1030, ¶16; *see also* Opp’n, 6 (arguing that a POSITA would understand that a three-dimensional accelerometer “measures accelerations along three perpendicular axes, including along the width, length, and height of the railcar”). To the contrary, these terms and their usage in the claims are straightforward and reasonably convey the scope of the invention to a POSITA. EX2010, ¶¶16-17.

ii. Claims 38, 46 and 47: “a plurality of detectors respectively coupled to the plurality of filters”/“a respective one of a plurality of different railcar conditions”

Again, Petitioner relies on its expert who improperly opines as to what is “unclear” *to him*, not what a POSITA would understand. Opp’n, 3; EX1030, ¶17. Petitioner raises questions in the Opp’n that it asserts would supposedly puzzle a

POSITA, but does not explain why answers to any such questions relating to correlation would be necessary for a POSITA to understand the scope of the invention. Rather, Substitute Claims 38, 46 and 47 include elements that are commonly used and understood by a POSITA. EX2010, ¶18. Figures 12-14, for example, show the relationship between the detectors and the filters. EX1001, 13:11-14:9. These claims are not indefinite.

iii. Claim 43

Petitioner's argument regarding antecedent basis has been obviated by the Corrected Claim Appendix, *supra*.

II. PETITIONER HAS NOT ESTABLISHED THAT SUBSTITUTE CLAIMS 38-48 ARE UNPATENTABLE OVER THE ART OF RECORD

PO has already addressed many of the deficiencies in Lefebvre, Armitage, Barone, Winfree, and Leitel in its Response and this Revised Motion. *See* POR, 5-37; RMTA, 17-24; *see also* Opp'n, 5-24 (citing to Petition for arguments relating to the alleged disclosure of certain claim elements in the prior art and only addressing "new limitations" of the claims "not previously addressed"). For these reasons, and the additional reasons discussed herein, Petitioner's art of record does not render Claims 38-48 obvious.

A. Petitioner Fails To Establish That Winfree Is Analogous Art

“Two separate tests define the scope of analogous prior art: (1) whether the art is from the same field of endeavor, regardless of the problem addressed and, (2) if the reference is not within the field of the inventor’s endeavor, whether the reference still is reasonably pertinent to the particular problem with which the inventor is involved.” *In re Bigio*, 381 F.3d 1320, 1325 (Fed. Cir. 2004). For Winfree, Petitioner merely states in conclusory fashion that a POSITA would understand it to be analogous art because it “teaches a filter for mechanical waves from an accelerometer entering a sensor.” Opp’n, 4-5. While Petitioner concedes that Winfree is not within the same field of endeavor, it offers no explanation as to how the reference is “pertinent to the particular problem with which the inventor is involved,” specifically the use of mechanical filters to remove undesirable accelerations on a railcar in a demanding environment. Winfree uses filters for a different purpose than the ’915 Patent, namely, to protect the sensor from damage (EX1008, 2:30-24) and to eliminate dependence on elastomers (*Id.*, 2:34-26). EX2010, ¶20. Winfree even distinguished prior art mechanical filters for accelerometers as “unsuitable” and “deficient,” recognizing that not all mechanical filters are appropriate for all applications. EX1008, 1:24-2:3. A POSITA would not consider Winfree and Petitioner’s reliance on it is based on hindsight. EX2010, ¶20.

B. Petitioner Fails To Provide A Motivation To Combine

Petitioner fails to adequately support its alleged motivation to combine. It only references an alleged motivation to combine for elements (1) 38(b) (Grounds 5, 6), (2) 38(c)(i) (Grounds 1, 2, 5, 6), and (3) 38(c)(ii) (Grounds 2, 6). Opp’n 7-8, 10-12, 14-15, 17, 19-20. However, these arguments are impermissibly based on hindsight and its expert’s *ipse dixit* opinions. *See Orexo AB v. Actavis Elizabeth LLC*, 903 F.3d 1265, 1271 (Fed. Cir. 2018) (“Judicial hindsight must be avoided. It is inappropriate to use the template provided by the inventor, to render the inventor’s contribution obvious.”) (internal citations omitted).

For Claim Element 38(b), Petitioner’s expert opines that it would be obvious for a POSITA to use a tri-axis accelerometer instead of three single-axis accelerometers, but fails to cite any evidence supporting the alleged price and installation benefits, or provide any discussion of the magnitude thereof. Opp’n, 8; EX1030, ¶34.

For Claim Element 38(c)(i), Petitioner’s claim that it would be an obvious duplication of parts to combine Armitage with the alleged knowledge of a POSITA regarding multiple filters has no merit. Opp’n, 10. The filtering on each axis must be different because each axis detects different events. *E.g.*, EX1001, 11:28-39 (longitudinal impact), 11:52-67 (vertical extreme vehicle dynamics), 12:36-51 (lateral hunting). Thus, this limitation is not a mere duplication of parts for

determining the same condition, but rather three ways to detect different railcar conditions. EX2010, ¶21.

Nor is there any motivation to combine Armitage with Leitel to filter data into three distinct outputs corresponding to each axis, as Petitioner claims. Opp’n, 14-15. Instead, Armitage teaches away from Petitioner’s claimed combination by disclosing monitoring only along the z-axis and “*ignoring*” data from any other axis for best results. EX1006, [0045] (“At high sampling rates of the accelerometer, the sampling only occurs for a portion of a wheel rotation, and radial acceleration or vibration (x-axis or y-axis) data could be ignored. Ignoring radial acceleration can allow for gravity and wheel balance effects to be minimized in the processing of vibration data for the wheel assemblies or wheels.”); EX2010, ¶22. Ignoring complete sets of data is not the same thing as the filtering in Claim 38.

Contrary to Petitioner’s claim (Opp’n, 9), Armitage does discourage filtering along the three axes. Rather, it provides that sampling should only occur for a portion of the wheel and that “[i]gnoring radial acceleration can allow for gravity and wheel balance effects to be minimized.” EX1006, [0045]. Thus, Armitage teaches that more accurate results can be achieved when monitoring is only done along one axis, even if a three-dimensional accelerometer is used. *Id.*; EX2010, ¶23.

Relying solely on the unsupported conclusory argument of its expert, Petitioner further contends that a POSITA would have been motivated to combine Barone's electronic frequency filters with Armitage's system because Barone's filtering system was well-known and would improve the data monitoring. Opp'n, 11; EX1003, ¶¶44-45. Petitioner's argument is pure hindsight. Petitioner fails to explain why Armitage, which post-dates Barone by four years, did not itself utilize Barone's supposedly well-known and superior filtering methods "to remove unwanted data and/or amplify relevant accelerations data to accurately predict anomalous conditions and avoid false or inaccurate data processing." *Id.* The answer is simple: there was no motivation to combine. EX2010, ¶24.

Petitioner's arguments relating to LeFebvre also are unavailing. LeFebvre shares an inventor with the '915 Patent. Petitioner does not explain why it took the inventor nearly ten years to invent the disclosures in the '915 Patent if a POSITA would have been so motivated to combine the allegedly well-known concepts in Petitioner's four other references with LeFebvre. EX2010, ¶25. This fact weighs against a motivation to combine. *See, e.g., Leo Pharm. Prods., Ltd. v. Rea*, 726 F.3d 1346, 1359 (Fed. Cir. 2013) ("The length of the intervening time between the publication dates of the prior art and the claimed invention can also qualify as an objective indicator of nonobviousness"); *see also Volvo Penta of the Ams., LLC v.*

Brunswick Corp., 81 F.4th 1202, 1215 (Fed. Cir. 2023) (finding the Board erred by dismissing the relevance of the time since the issuance of the asserted prior art because it was probative of nonobviousness, particularly when the prior art was owned by one of the parties).

For Claim Limitation 38(b)(ii), Petitioner contends that a POSITA would be motivated to combine Leitel with other existing prior art because they are in the same field and would produce more accurate results. Opp’n, 19-20. Just because art may be analogous does not mean that there is a motivation to combine. *See Sisvel Int’l S.A. v. Sierra Wireless, Inc.*, 82 F.4th 1355, 1364 (Fed. Cir. 2023) (“We agree with the Board that Cross-Appellants’ first, second, and third reasons to combine were merely assertions that the references were analogous art, which, without more, is an insufficient articulation for motivation to combine.”). Further, the only support cited for this alleged motivation for its hindsight-riddled combination is a conclusory statement by Petitioner’s expert. *Id.*; EX1030, ¶66.

C. Petitioner Speculates About What A POSITA Would Have Known

Petitioner’s analysis of Claim 38 is rife with unsupported assumptions about what a POSITA would have known and what would have been obvious to a POSITA. Opp’n, 5-20. For example, Petitioner relies on its expert’s opinion that a POSITA “would have understood that there were compelling reasons to select a triaxial accelerometer (as opposed, for example, to a single-axis accelerometer) for

incorporation into a railcar sensor device” such as LeFebvre, even though (i) Petitioner’s expert cites no support for this opinion, (ii) Petitioner’s expert acknowledges that LeFebvre does not mention a triaxial accelerometer, and (iii) it took the same inventor (LeFebvre) over ten years to invent the technology claimed in the ’915 Patent. Opp’n, 7; EX1030, ¶¶31-32. As another example, Petitioner claims a POSITA “would have understood various considerations impact where filtering occurs in the system, including, for example, reduced data storage and transmission,” but merely cites it its expert’s conclusory testimony. Opp’n 12; EX1030, ¶47.

For Claim 43, Petitioner provides no support for its claims about what would be obvious to a POSITA. Opp’n 21. Instead, Petitioner parrots the language of its expert, whose opinion is not based on any analysis or evidence. EX1030, ¶¶71-72. For example, Petitioner claims it would be obvious to include a detector that is only enabled when the railcar is moving to save power. However, even if the detector was not always enabled, some mechanism would have to be provided to turn the detector on and off, and that mechanism would require power. EX2010, ¶26. Nor does Petitioner explain why detections “when the railcar is stopped or moving at a low speed” are not needed. Indeed, having a sensor that is “always enabled when the railcar is moving” as provided in Claim 43 is contrary to Petitioner’s claim that

detections “when the railcar is ... moving at a lower speed” are not needed. Petitioner’s argument instead suggests that both detectors should have speed thresholds, which would render Claim 43 nonobvious. EX2010, ¶27.

D. Petitioner Fails To Address Any Of The Differences Of Independent Claims 46 and 47

Petitioner does not specifically address any element of independent Claims 46 and 47. Instead, it incorporates by reference its obviousness discussion relating to Claim 38. Petitioner thus fails to address the differences between these claims and how its cited art still applies. Elements (d)(i)-(iii) of Claims 38 and 47 differ with respect to the functions performed by the communication management unit. Petitioner provides no arguments regarding how its cited art applies to Claim 47.

E. Dependent Claims 39-42, 44-45 And 48 Are Not Obvious

Petitioner improperly shifts the burden to PO on dependent claims 39-42, 44-45 and 48, alleging that “PO has not identified any features of these claims that patentably distinguish the prior art.” Opp’n, 23. Yet, the burden of persuasion with respect to patentability of the substitute claims rests with Petitioner. *See Aqua Prods., Inc. v. Matal*, 872 F.3d 1290, 1296 (Fed. Cir. 2017) (en banc); *Bosch Auto. Serv. Sols., LLC v. Matal*, 878 F.3d 1027, 1040 (Fed. Cir. 2017).

Petitioner fails to meet its burden because it does not advance any specific arguments with respect to dependent claims 39-42, 44-45 and 48 beyond what was

previously presented in its Petition and discussed with respect to Claim 38. Thus, for the reasons discussed above, these dependent claims are not obvious. EX2010, ¶29.

III. CONCLUSION

PO has satisfied the requirements of 37 C.F.R. §42.121, and thus, the substitute claims should be entered into the record in this matter contingent upon a finding of unpatentability with respect to the Challenged Claims.

Moreover, for the reasons given, should any Challenged Claim be found unpatentable, the respective substitute claim is patentable. Independent substitute claims 38, 46 and 47—each intended by PO to replace independent Challenged Claims 1, 30 and 36, respectively, should those claims be determined by the Board to be invalid under Ground One of the Petition—include additional limitations not taught by Armitage, LeFebvre, Barone or Winfree. In addition, there is no motivation to combine any of these references. Each substitute claim is therefore patentable over Armitage, LeFebvre, Barone or Winfree, alone or in combination.

Respectfully submitted,

Dated: May 10, 2024

By: / Ryan N. Miller /
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CERTIFICATE OF SERVICE

Pursuant to 37 C.F.R. § 42.6(e), the undersigned certifies that on the 10th day of May 2024 a complete and entire copy of “**PATENT OWNER’S REPLY IN SUPPORT OF REVISED MOTION TO AMEND**” was provided via email to the Petitioner by serving the following email addresses:

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Electronic service was used with Petitioner’s consent (*See* Petition, Paper 1 at 2; Patent Owner’s Mandatory Notice, Paper 5 at 5).

Dated: May 10, 2024

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