

**United States Court of Appeals
for the Federal Circuit**

AMERICAN NATIONAL MANUFACTURING INC.,
Appellant

v.

**SLEEP NUMBER CORPORATION, FKA SELECT
COMFORT CORPORATION,**
Cross-Appellant

**KATHERINE K. VIDAL, UNDER SECRETARY OF
COMMERCE FOR INTELLECTUAL PROPERTY
AND DIRECTOR OF THE UNITED STATES
PATENT AND TRADEMARK OFFICE,**
Intervenor

2021-1321, 2021-1323, 2021-1379, 2021-1382

Appeals from the United States Patent and Trademark
Office, Patent Trial and Appeal Board in Nos. IPR2019-
00497, IPR2019-00500.

Decided: November 14, 2022

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MO, argued for appellant. Also represented by BRIAN T.
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Washington, DC, argued for cross-appellant. Also represented by ROBERT COURTNEY, MATHIAS WETZSTEIN SAMUEL, Minneapolis, MN; ANDREW S. HANSEN, ELIZABETH A. PATTON, LUKAS D. TOFT, Fox Rothschild LLP, Minneapolis, MN; STEVEN A. MOORE, Moore IP Law PC, San Diego, CA; KECIA JANNELL REYNOLDS, Paul Hastings LLP, Washington, DC.

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Before STOLL, SCHALL, and CUNNINGHAM, *Circuit Judges*.
STOLL, *Circuit Judge*.

American National Manufacturing Inc. and Sleep Number Corp. each appeals the Patent Trial and Appeal Board's final written decisions in two inter partes reviews. The Board issued mixed decisions in those proceedings, determining that some, but not all, of the challenged claims were not unpatentable. These appeals and cross-appeals involve two patents and numerous issues, including two on which the U.S. Patent and Trademark Office has intervened.

Our opinion focuses on four of these issues: (1) whether the Board erred in permitting the patent owner to present proposed amended claims that both responded to a ground of unpatentability and made other wording changes unrelated to the IPR proceedings; (2) whether those proposed amended claims were not enabled because of an alleged error in the specification; (3) whether those proposed amended claims should have been rejected for allegedly raising an inventorship issue; and (4) whether the Board inappropriately considered the

petitioner's sales data in its secondary considerations analysis. For the below reasons, we affirm. Although we have thoroughly considered the other issues raised by both parties, we affirm the Board's determinations regarding those issues without significant discussion.

BACKGROUND

I

Sleep Number owns U.S. Patent Nos. 8,769,747 and 9,737,154. Both patents describe systems and methods that purport to adjust the pressure in an air mattress “in less time and with greater accuracy” than previously known. ’747 patent col. 1 ll. 6–10.¹ Conventional air bed systems have a control panel that allows a user to select a desired inflation setting for each air chamber in the air bed for optimal comfort and to change the inflation setting at any time, allowing for changes in the firmness of the bed. *Id.* at col. 1 ll. 13–25. The air chambers are in fluid communication with an air pump manifold. *Id.* at col. 3 ll. 10–19, 46–51. The patents disclose adjusting pressure in an air bed “in less time and with greater accuracy” by measuring the air pressure inside the valve enclosure assembly instead of in the air chambers themselves, thus “eliminating the need to turn off the pump in order to obtain a substantially accurate approximation of the chamber pressure.” *Id.* at col. 1 ll. 6–10, col. 4 ll. 53–59.

As the patents' shared specification explains, the pressure control system computes and iteratively refines what the patents call “pressure adjustment factors” or “offsets”—the difference between the pressure in the valve enclosure assembly and the pressure in the bed's air chambers. *Id.* at

¹ The ’154 patent is a continuation of the application that matured into the ’747 patent. Because the patents share a common specification, we refer only to the ’747 patent specification unless otherwise specified.

col. 2 ll. 26–31, col. 5 l. 9–col. 6 l. 7. The system then uses the pressure adjustment factor to determine what the “target pressure” in the valve enclosure assembly must be for the air chamber to reach the user’s desired pressure setpoint. *Id.* at col. 7 l. 51–col. 8 l. 59. The system adjusts the valve enclosure assembly pressure until it meets the target pressure, then re-tests the pressure in the air chamber. *Id.* at col. 8 l. 63–col. 9 l. 43. If the air chamber has still not reached the desired pressure setpoint, the system revises its pressure adjustment factor, using what the patents call an “adjustment factor error,” and tries again. *Id.* at col. 2 ll. 28–31, col. 9 l. 44–col. 10 l. 51; *see also id.* Fig. 6 (describing the process in flow diagram form). This process repeats until the air chamber reaches the desired pressure.

The specification further explains that the process for determining the pressure adjustment factor varies depending on whether the system is inflating or deflating the air chamber. To differentiate between the two processes, the patents describe using an additive offset (i.e., an offset that is added to the measured valve enclosure pressure) for inflation and a multiplicative offset (i.e., an offset by which the measured valve enclosure pressure is multiplied) for deflation. *Id.* at col. 8 ll. 14–59, col. 9 ll. 51–61.

Claim 1 of the ’747 patent recites:

1. A method for adjusting pressure within an air bed comprising:

providing or receiving an air bed, the air bed including an air chamber and a pump having a pump housing;

selecting a desired pressure setpoint for the air chamber;

determining an initial pressure within the pump housing;

calculating a pressure target based upon the desired pressure setpoint and a pressure adjustment factor, wherein an inflate pressure adjustment factor is used to calculate the pressure target when the initial pressure within the pump housing is less than the desired pressure setpoint, and wherein a deflate pressure adjustment factor is used to calculate the pressure target when the initial pressure within the pump housing is greater than the desired pressure setpoint;

adjusting pressure within the air chamber until a sensed pressure within the pump housing is substantially equal to the calculated pressure target;

determining an actual chamber pressure within the air chamber;

comparing the actual chamber pressure to the desired pressure setpoint to determine the adjustment factor error; and

modifying the pressure adjustment factor based upon the adjustment factor error.

Id. at col. 12 ll. 43–67. Claim 1 of the '154 patent is similar. *See* '154 patent col. 13 ll. 11–29. Certain dependent claims of both patents require that the pressure adjustment factor be a multiplicative pressure adjustment factor. *See* '747 patent col. 13 ll. 8–13, col. 14 ll. 1–3 (claims 5, 6, and 13); '154 patent col. 13 ll. 39–44, col. 14 ll. 46–49 (claims 5, 6, and 15). Both patents also contain an independent claim requiring, among other things, a “pressure adjustment system for an air bed comprising . . . a pressure sensing means adapted to monitor pressure within the pump manifold.” '747 patent col. 14 ll. 9–43 (claim 16); '154 patent col. 15 l. 16–col. 16 l. 18 (claim 20).

II

American National filed petitions for inter partes review challenging many claims of the '747 and '154 patents. In its petitions, American National asserted that most of the challenged claims would have been obvious over Gifft² in view of Mittal³ and Pillsbury,⁴ and that six of the dependent claims would have been obvious in further view of Ebel.⁵

Gifft is owned by Sleep Number and incorporated by reference in the patents-in-suit. Gifft discloses an air bed system including a sealed valve enclosure assembly with an air pump for inflating and deflating air chambers to a desired pressure. Gifft col. 2 l. 56–col. 3 l. 2. Similar to the patents-in-suit, Gifft discloses monitoring the pressure within the valve enclosure instead of the air chamber itself while the air pump is in operation, which the system equates as being the actual pressure in the air chamber. *Id.* at col. 9 ll. 57–67 (claim 9); '747 patent col. 1 ll. 48–64 (describing prior art).

Mittal describes a system for quickly reaching a desired air pressure in vehicle tires. Mittal Abstract, col. 8 l. 65–col. 9 l. 9. Mittal discloses that there is often a lag between the time tire pressure is monitored and the time the pressure adjustment cycle ends; that is, the tire may reach the desired pressure before the pressure adjustment system detects it has done so. *Id.* at col. 2 ll. 32–47. To resolve this problem, Mittal's system adjusts the desired pressure with additive offsets to compensate for these lags and to avoid "wasteful repeated pressure adjustment cycles." *Id.* at col. 2 ll. 3–9, 16–26, col. 4 ll. 44–49.

² U.S. Patent No. 5,904,172.

³ U.S. Patent No. 5,629,873.

⁴ U.S. Patent No. 5,277,187.

⁵ U.S. Patent Application Pub. No. 2007/0000559.

Pillsbury is directed to an automatic blood pressure cuff that measures a user's blood pressure and employs a filter to "prevent dust, dirt, and other debris from clogging" the cuff's air exit valve. Pillsbury Abstract, col. 8 ll. 25–63. The system detects and records the pressure in the cuff along with other data (including "oscillometric pulse amplitudes" recorded at each cuff pressure as the cuff pressure reduces to zero) to "determine relatively accurately the user's blood pressure." *Id.* at col. 1 ll. 39–48. A data processor adjusts the cuff pressure measurement to compensate for any resistance added by the filter. Specifically, by using an additive offset, Pillsbury explains, its blood pressure cuff can provide an accurate measure of the air pressure inside the cuff while compensating for the added air resistance caused by build-up on the filter. *Id.* at col. 2 ll. 40–54, col. 8 ll. 25–63.

Ebel discloses a method for measuring the pressure inside an air bag while filling or emptying the air bag. Ebel ¶¶ 1, 7. Ebel explains that, because of what it calls "conduit effects," a pressure sensor cannot accurately measure the actual pressure in the air bag during inflation or deflation. *Id.* ¶ 3. Ebel explains that it is "only in the idle state, i.e., after a certain slow-down period[,] that the actual bag pressure can be determined by the pressure sensor." *Id.* To compensate for these effects during inflation and deflation, Ebel proposes mathematical equations for calculating the actual pressure inside the air bag. Those equations use the air bag pressure measured by the pressure sensor as one input parameter and include both additive and multiplicative components. *Id.* ¶¶ 4–7, 28–32.

Before the Board, American National asserted that most of the challenged claims would have been obvious to the ordinarily skilled artisan over a combination of Giff's air bed system, with its measurement of the valve assembly pressure to approximate the air chamber pressure, and Mittal's and Pillsbury's use of additive offsets, or pressure adjustment factors. For the six dependent claims requiring

a multiplicative pressure adjustment factor, American National argued these would have been obvious over a combination of those three references as well as Ebel's use of multiplicative offsets.

In opposition, Sleep Number argued that: (1) evidence of industry praise and commercial success strongly supported that the claims would not have been obvious; (2) American National had not adequately explained how and why the skilled artisan would have combined the asserted references to meet the claim limitations; and (3) American National had not proposed a construction for the means-plus-function term "pressure sensing means" in violation of the Board's rules.

For industry praise, Sleep Number relied on two American National internal business documents that Sleep Number asserted praised Sleep Number's patents. The Board determined that one of these documents weighed "slightly in favor" of industry praise but that the other did not.

For commercial success, Sleep Number relied on the commercial success not of its own products, but of American National's products—specifically, the products that Sleep Number had accused of infringement in a parallel district court proceeding. *See* J.A. 3647–49; *see also* First Am. Compl., *Sleep No. Corp. v. Am. Nat'l Mfg., Inc.*, No. 5:18-cv-00357 (C.D. Cal. Mar. 23, 2018). To support its arguments, Sleep Number sought discovery before the Board on American National's sales of products sold with and without certain versions of source code that allegedly infringed claim 1. *See* J.A. 3004–05, 3050–55. The Board granted this motion, explaining that the evidence could help illuminate issues of nonobviousness, assuming Sleep Number could show a nexus between the relevant American National products and the challenged patents. J.A. 3356–59. In its order, the Board noted that Sleep Number was not "seeking any admission of infringement,"

because its request simply sought a list of “products that include the allegedly infringing source code[] and those that do not.” J.A. 3359.

In its Patent Owner Response, Sleep Number asserted American National products were coextensive with the challenged claims based in part on the testimony of Sleep Number’s experts, Drs. John Abraham and George Edwards. J.A. 3648; *see also* J.A. 4634–35 ¶ 29 (Dr. Abraham testifying that American National’s products “read on” the challenged claims); J.A. 4725–26 ¶ 41 (Dr. Edwards testifying the same).

Based in part on this expert testimony, the Board found that Sleep Number had demonstrated a nexus between American National’s increased sales numbers and its adoption of technology that “reads on” the challenged patents.⁶ *See Am. Nat’l Mfg. Inc. v. Sleep No. Corp.*, No. IPR2019-00497, Paper 114, at 91–92 (P.T.A.B. Sept. 30, 2020) (*’747 Decision*); *Am. Nat’l Mfg. Inc. v. Sleep No. Corp.*, No. IPR2019-00500, Paper 114, at 92–93 (P.T.A.B. Sept. 30, 2020) (*’154 Decision*).⁷ Nevertheless, the Board determined that the evidence did not show that

⁶ The Board’s original final written decisions stated that American National “does not refute the testimonies of Dr. Abraham and Dr. Edwards that” certain versions of the source code “fall within the claims of the [challenged] patent[s] such that [American National]’s products using these versions *infringe* the claims.” *’747 Decision* at 91 (emphasis added); *’154 Decision* at 92. After American National sought rehearing, the Board modified its final written decisions, changing the word “infringe” to “read on.” J.A. 143–44, 294–95.

⁷ Although the Board issued separate final written decisions in these proceedings, the decisions are largely identical for many of the issues on appeal. In this opinion, we cite primarily to the *’747 Decision*.

American National's products "were commercially successful because of the merits of the claimed invention," and not, for example, because of increased advertising, consumer recognition, or lowered price. *'747 Decision* at 94. Thus, the Board gave Sleep Number's evidence of commercial success "minimal probative weight." *Id.*

The Board ultimately resolved the proceedings with split decisions. For the six dependent claims requiring a multiplicative pressure adjustment offset, the Board determined that American National had failed to establish unpatentability. *See '747 Decision* at 139–40; *'154 Decision* at 145–50. Although the Board found that Ebel taught the use of multiplicative offsets, it also found that American National had not adequately shown why the skilled artisan would have applied Ebel's multiplicative factors to the pressure targeting methods disclosed in Giffit as modified by Mittal and Pillsbury. *See '747 Decision* at 81–84. Because American National had not sufficiently articulated why the skilled artisan would have combined Ebel with the remaining references, the Board found American National had not established that the claims requiring multiplicative pressure adjustment factors were unpatentable as obvious.

For the remaining claims, the Board found that American National had proven they were unpatentable as obvious. *See id.* at 140. For these claims, the Board credited American National's expert, who testified that the ordinarily skilled artisan, presented with Giffit's air bed pressure adjustment system, would have understood that by "improving the accuracy of [Giffit's] pressure adjust cycles on an ongoing basis, the number of pressure adjustments necessary to reach a target pressure could be reduced." *See id.* at 45 (citing J.A. 1148 ¶ 101). The Board rejected Sleep Number's assertion that American National had failed to explain how or why a skilled artisan would combine the asserted references and instead found that the skilled artisan would have a motivation to increase both speed and

accuracy in Giff's system—and would have looked to techniques disclosed in other pneumatic systems references, such as Mittal and Pillsbury, to achieve these goals. *See id.* at 50–51. The Board therefore found that all claims not requiring a multiplicative pressure adjustment offset were unpatentable as obvious. *See id.* at 140.

Finally, the Board rejected Sleep Number's assertion that American National violated 37 C.F.R. § 42.104(b)(3), governing the contents of petitions, because American National's petitions did not provide a sufficient construction for the means-plus-function term “pressure sensing means.” Although the Board acknowledged in both proceedings that American National's petitions did not “explicitly state” how the means-plus-function term should be construed, it nonetheless determined that the petitions “fairly me[t] the requirements of” the regulation. *'747 Decision* at 24–25; *'154 Decision* at 23–25.

In each proceeding, Sleep Number filed a motion to amend contingent on a finding that the challenged claims were unpatentable. *'747 Decision* at 104. Each of the proposed claims added the requirement of a multiplicative pressure adjustment factor, *id.* at 105–07, matching the claims that the Board had determined were not proven unpatentable. The proposed amended claims also included other non-substantive amendments, described by Sleep Number as made “for consistency with terms used in the industry and in related patents.” J.A. 3470; *see also* J.A. 3473–77. These non-substantive amendments included, for example, changing the term “pump housing” to “valve enclosure” and the term “chamber” to “bladder.” J.A. 3474, 3504–05.

American National challenged the proposed amended claims. Among other things, it argued that: the proposed amendments did not respond to a ground of unpatentability and thus were legally inappropriate; the relevant specification contained an error that rendered the claims

nonenabled; and the proposed amended claims lacked written description support and were indefinite.

The Board rejected American National's challenges to the proposed amended claims, finding that the amendments—which added the substantive limitation requiring a multiplicative pressure adjustment factor—responded to a ground of unpatentability in the proceedings. *'747 Decision* at 107–10. The Board also determined that the proposed amended claims were not unpatentable under 35 U.S.C. § 112. *Id.* at 110–16. The Board thus granted Sleep Number's contingent motions to amend. *Id.* at 120.

American National appeals, and Sleep Number cross-appeals, from both final written decisions. We have jurisdiction under 35 U.S.C. § 1295(a)(4)(A).

DISCUSSION

We review the Board's legal conclusions de novo and its factual findings for substantial evidence. *Univ. of Strathclyde v. Clear-Vu Lighting LLC*, 17 F.4th 155, 160 (Fed. Cir. 2021). Obviousness is a legal question based on underlying findings of fact, including the existence of and weight assigned to any objective indicia of nonobviousness. *Adapt Pharma Operations Ltd. v. Teva Pharms. USA, Inc.*, 25 F.4th 1354, 1364 (Fed. Cir. 2022). “The substantial evidence standard asks ‘whether a reasonable fact finder could have arrived at the agency’s decision,’ and ‘involves examination of the record as a whole, taking into account evidence that both justifies and detracts from the agency’s decision.’” *OSI Pharms., LLC v. Apotex, Inc.*, 939 F.3d 1375, 1381–82 (Fed. Cir. 2019) (quoting *In re Gartside*, 203 F.3d 1305, 1312 (Fed. Cir. 2000)). We review statutory and constitutional issues de novo. *MCM Portfolio LLC v. Hewlett-Packard Co.*, 812 F.3d 1284, 1287 (Fed. Cir. 2015). But “[d]ecisions related to compliance with the Board’s procedures are reviewed for an abuse of discretion.” *Ericsson Inc. v. Intell. Ventures I LLC*, 901 F.3d 1374, 1379 (Fed. Cir. 2018).

I

We turn first to American National’s argument that the Board erred in permitting Sleep Number to present proposed amended claims that both responded to a ground of unpatentability involved in the proceedings and made other changes not responsive to an unpatentability ground. In its motion to amend, Sleep Number stated that some of its proposed amendments (like changing the phrase “pump housing” to “valve enclosure”) were made “to achieve consistency and accuracy in terminology and phrasing” throughout the patent family. J.A. 3474, 3504–05. Because this purpose was not directly “aimed at responding to a ground of unpatentability at issue in” the IPR proceeding, as required by 37 C.F.R. § 42.121, American National argues on appeal, as it did below, that these proposed amendments were improper.

In considering this issue, the Board has previously determined that § 42.121 “does not require . . . that every word added to or removed from a claim in a motion to amend be solely for the purpose of overcoming an instituted ground.” *Lectrosonics, Inc. v. Zaxcom, Inc.*, No. IPR2018-01129, 2019 WL 1118864, at *2 (P.T.A.B. Feb. 25, 2019) (precedential). Instead, “once a proposed claim includes amendments to address a prior art ground in the trial, a patent owner also may include additional limitations to address potential § 101 or § 112 issues, if necessary.” *Id.* Allowing these amendments, the Board has explained, “serves the public interest by helping to ensure the patentability of amended claims” and “helps ensure a ‘just’ resolution of the proceedings and fairness to all parties.” *Id.* (quoting 37 C.F.R. § 42.1(b)).

We agree with the Board’s thoughtful analysis of this issue in *Lectrosonics*. Indeed, nothing in the America Invents Act (AIA) or the Board’s regulations precludes a patent owner from amending a claim to both overcome an instituted ground and correct other perceived issues in the

claim. The AIA explicitly restricts patent owner amendments in only two ways: amendments may not enlarge the scope of the claims or introduce new matter. 35 U.S.C. § 316(d)(3). The Board's regulations add another restriction: amendments must respond to a ground of unpatentability involved in the proceeding. 37 C.F.R. § 42.121(a)(2)(i). As we have previously explained, the Director introduced this regulation “merely to ensure that the proposed amendment had a minimal level of relevancy to the IPR.” *Aqua Prods., Inc. v. Matal*, 872 F.3d 1290, 1317 (Fed. Cir. 2017) (en banc) (plurality opinion) (citing *Changes to Implement Inter Partes Review Proceedings*, 77 Fed. Reg. 48,680, 48,705 (Aug. 14, 2012)). Thus, so long as a proposed claim amendment does not enlarge the scope of the claims, does not add new matter, and responds to a ground of unpatentability in the proceeding, the patent owner may also make additional amendments to a claim without running afoul of the relevant statutes and regulation.

American National argues that allowing a patent owner to refine claims or correct potential § 112 errors “invites a violation of due process and the Administrative Procedure Act, by allowing the patent owner and the Board to address concerns that may be proper for [an] examination or reexamination proceeding, but that were never germane to an IPR process.” Appellant's Br. 69–70. Specifically, according to American National, because a petition cannot challenge claims under § 112, it would be “asymmetr[ical]” and “unfair” to allow the patent owner to amend its claims to address § 112 concerns. We are not convinced. As we have previously explained, the petitioner can challenge the proposed amended claims on grounds beyond §§ 102 and 103, including under § 112. See *Uniloc 2017 LLC v. Hulu, Inc.*, 966 F.3d 1295, 1305–07 (Fed. Cir. 2020) (holding that petitioners may challenge proposed substitute claims outside of §§ 102 and 103); *Samsung Elecs. Am. v. Prisua Eng'g Corp.*, 948 F.3d 1342, 1352 (Fed. Cir. 2020) (“[T]he

Board’s authority with respect to new and amended claims necessarily extends to other possible grounds of unpatentability, in particular, a failure to comply with section 112.”). Indeed, American National did so in its oppositions to Sleep Number’s motions to amend in these IPRs. Accordingly, we discern no unfairness or asymmetry in the Board’s granting of the motion to amend.

In this case, each of Sleep Number’s proposed substitute claims included an amendment responsive to a ground of unpatentability raised in the proceedings. Specifically, each proposed substitute claim added a limitation requiring a multiplicative pressure adjustment factor—mirroring the claims that the Board had determined were not unpatentable. ’747 *Decision* at 105–07 (proposed substitute claims); *see also* J.A. 3474–77, 3504–08. Because each proposed substitute claim included at least one responsive narrowing limitation, Sleep Number was free to include other amendments, including any addressing perceived §§ 101 and 112 issues. American National was free to challenge these proposed claims, as it did in both proceedings. And the Board was free to determine whether the proposed claims were unpatentable under §§ 101, 102, 103, and 112. We thus see no error in the Board’s decision to consider Sleep Number’s proposed substitute claims.

II

We turn next to American National’s enablement argument. Section 112(a) requires, among other things, that the specification enable a skilled artisan to make and use the claimed invention. *In re Wands*, 858 F.2d 731, 735 (Fed. Cir. 1988). “Whether a claim satisfies the enablement requirement of 35 U.S.C. § 112 is a question of law that we review without deference, although the determination may be based on underlying factual findings, which we review for clear error.” *Amgen Inc. v. Sanofi, Aventisub LLC*, 987 F.3d 1080, 1084 (Fed. Cir. 2021) (citing *Alcon Rsch. Ltd. v. Barr Lab’s Inc.*, 745 F.3d 1180, 1188

(Fed. Cir. 2014)). American National argues that an admitted error in the specification of the application to which the '747 and '154 patents claim priority necessarily means that the proposed amended claims are not enabled. Appellant's Br. 70–71. We disagree.

There is undisputedly an error in the specification of the challenged patents. '747 *Decision* at 113–14. The specification states:

Updated Inflate Adjustment Factor = (Manifold Pressure from Step **168**) – (Pressure Setpoint from Step 106)

Id. at 114 (citing J.A. 10163 ¶ 67) (emphasis added to erroneous portion). Both parties agree this equation should instead read:

Updated Inflate Adjustment Factor = (Manifold Pressure from Step **~~168~~ 176**) – (Pressure Setpoint from Step 106)

Id. (citing J.A. 10085 ¶ 20) (emphasis added to corrected portion). Sleep Number's expert testified that the skilled artisan would understand that this “is a typographical error inconsistent with the remainder of the disclosure” in the specification. *Id.* (citing J.A. 10085 ¶ 20). This testimony is supported by the specification. For example, immediately before the equation, the specification correctly explains that the “manifold pressure sampled in step 176” is compared to the “setpoint pressure” of step 106. J.A. 10162 ¶ 63; *see also, e.g.*, '747 patent col. 9 ll. 33–38 (discussing the “manifold pressure sampled in step 176”). On this record, the Board reasonably found that the error was a “mistake or typographical error,” '747 *Decision* at 114, and thus that American National had not shown the proposed claims were unpatentable for lack of enablement, *id.* at 115.

In an analogous case, we affirmed a district court's finding that a patent was enabled, despite a calculation

error in the specification. *PPG Indus. v. Guardian Indus. Corp.*, 75 F.3d 1558 (Fed. Cir. 1996). In *PPG Industries*, the specification described how to make the patented “solar control” glass composition but included test results and calculations rendered “artificially high” by a software error. *Id.* at 1563–64. The district court had found that the error was “easily detectable by anyone who was skilled in the art.” *Id.* at 1564. And, we explained, the remainder of the specification described the process with sufficient detail to “indicate[] to one skilled in the art how” to make such a glass composition. *Id.* at 1565. We affirmed the district court’s finding that the patent was enabled, despite the error, because the skilled artisan would, “[i]n light of the guidance provided by the specification” as a whole, be enabled to make and use the claimed invention. *Id.* at 1564–65. The same rationale and conclusion apply here.

American National nonetheless argues that this error was not obvious because it was not noted during the original examination process. And because the equation in the specification, as erroneously written, would not work, American National argues that the proposed amended claims are not enabled. Appellant’s Br. 70 (citing *In re Wands*, 858 F.2d at 737). We are not persuaded.

In this case, regardless of whether the error was first discovered during examination or afterward, the specification itself makes clear that the reference to step 168 instead of step 176 is an obvious error. Indeed, the remainder of the specification consistently and correctly describes that the “manifold pressure [is] sampled in step 176.” J.A. 10162 ¶ 63; *see also* J.A. 10177, Fig. 6 (showing step 176 as “Sample Manifold Pressure”); J.A. 10178, Fig. 7 (showing same). This conclusion is further supported by Sleep Number’s expert, who opined that a skilled artisan, reading the specification in its entirety, would view the reference to step 168 as an obvious typographical error and substitute the correct step—step 176—in its place. J.A. 10085 ¶ 20. We thus conclude that the

Board did not err in determining that the proposed amended claims were enabled, despite an admitted error in the specification, because that error and its correction would have been obvious to a person of ordinary skill in the art.

III

We now turn to American National's argument that the Board should have denied the motion to amend because adding the term "valve enclosure" injected an inventorship issue into the patents. We review the Board's decision to grant a motion to amend under the Administrative Procedure Act, and we may set aside the Board's action if it is "arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with law." 5 U.S.C. § 706(2)(A); *Bosch Auto. Serv. Sols., LLC v. Matal*, 878 F.3d 1027, 1039 (Fed. Cir. 2017). Inventorship is a question of law based on underlying findings of fact. *Duncan Parking Techs., Inc. v. IPS Grp., Inc.*, 914 F.3d 1347, 1357 (Fed. Cir. 2019) (citing *Gen. Elec. Co. v. Wilkins*, 750 F.3d 1324, 1329 (Fed. Cir. 2014)).

According to American National, the term "valve enclosure" is used in related patents owned by Sleep Number, including the Giff patent, which name different inventors than the '747 and '154 patents. For example, the Giff patent lists James Giff as an inventor while the '747 and '154 patents do not. American National argues that amending the claims to use the term "valve enclosure" without adding James Giff as an inventor renders the amendments "facially invalid." Appellant's Br. 72–73. We disagree.

The '747 and '154 patents incorporate the prior art Giff patent by reference. '747 patent, col. 1 ll. 18–25; '154 patent, col. 1 ll. 28–35. That is, the patents themselves make clear that valve enclosures were well known in the art and incorporated into the patent specification. Sleep Number's choice to recite these well-known structures in its amended claims does not make James Giff an

inventor of the '747 and '154 patents. *See Trovan, Ltd. v. Sokymat SA*, 299 F.3d 1292, 1302 (Fed. Cir. 2002) (“[T]he basic exercise of ordinary skill in the art . . . does not make one a joint inventor.”); *see also Fina Oil & Chem. Co. v. Ewen*, 123 F.3d 1466, 1473 (Fed. Cir. 1997) (“[A] person will not be a co-inventor if he or she does no more than explain to the real inventors concepts that are well known and the current state of the art.”). Accordingly, for at least this reason,⁸ we reject American National’s argument that the Board should have rejected Sleep Number’s motion to amend because of an alleged inventorship issue.

IV

Next, we address American National’s argument that the Board violated due process and the APA when analyzing Sleep Number’s evidence of commercial success. Addressing nexus, the Board stated that American National “does not refute the testimonies of Dr. Abraham and Dr. Edwards that these versions of the source code fall within the claims of the '747 patent such that ANM’s products using these versions read on the claims.” Based on this sentence, American National argues that the Board inappropriately resolved infringement in violation of either

⁸ There may well be additional reasons why this argument fails. For example, it is unclear whether the Board is authorized to address inventorship in the context of a motion to amend. *Cf.* 35 U.S.C. § 116(c) (providing that, outside the IPR context, “the Director may permit the application to be amended” to fix inventorship errors). Further, even if the proposed amended claims in this case did inject an inventorship issue, American National identifies no statutory or regulatory prohibition on patent owners making such amendments. *See* 35 U.S.C. § 316(d)(3); 37 C.F.R. § 42.121. In any event, because American National has not shown that James Giffit is an inventor of the patents-in-suit, we do not address this issue further.

or both of the Constitution or the APA. Appellant's Br. 55–61. We disagree and note that the Board itself made clear that it was not resolving infringement issues by, among other things, changing the wording from “infringe” to “read on” in its final written decisions.

We decline to address this argument further because American National does not challenge the Board's finding that Sleep Number's evidence of commercial success “has minimal probative weight.” *'747 Decision* at 94. Accordingly, American National's argument would not change the Board's patentability determination on appeal. Indeed, American National concedes that its challenge to the Board's “read on” finding “would not change the patentability determinations.” Appellant's Br. 59.

In *SkyHawke Technologies, LLC v. DECA International Corp.*, we dismissed the appeal of a patent owner in an analogous situation. 828 F.3d 1373, 1375 (Fed. Cir. 2016). There, the patent owner sought only to “correct” the Board's claim construction underlying its patentability determination, not to alter the Board's patentability determination itself. *Id.* We reasoned that SkyHawke was merely trying to preempt the possibility that the district court would adopt the Board's construction. *Id.* at 1375–78; *see also, e.g., Pirlott v. NLRB*, 522 F.3d 423, 433 (D.C. Cir. 2008) (“Where . . . a judgment gives a party all the relief requested, an appeal may not be taken simply to challenge the Board's reasoning.”). Here, American National concedes that its challenge to the Board's “read on” decision “would not change the patentability determinations.” Appellant's Br. 59. Like the appellant in *SkyHawke*, American National will have the opportunity to argue infringement in the district court (and, if necessary, on appeal from the district court's judgment).

V

The parties' additional arguments on appeal are unpersuasive. We have considered American National's

challenges to the Board's conclusion that the six dependent claims requiring multiplicative pressure adjustment factors (claims 5, 6, and 13 of the '747 patent and claims 5, 6, and 15 of the '154 patent) would not have been obvious at the time of the invention. We conclude that substantial evidence supports the Board's finding that American National did not meet its burden to show that a skilled artisan would have been motivated to combine Ebel with Gifft in view of Mittal and Pillsbury to satisfy the elements of these claims.

Turning to Sleep Number's cross-appeal, we likewise conclude that substantial evidence supports the Board's finding that a skilled artisan would have been motivated to combine Gifft, Mittal, and Pillsbury. The Board reasonably found that a person of ordinary skill (1) would have been motivated to improve the accuracy and speed of Gifft's pressure adjust cycles; and (2) would have understood from Mittal that dynamic inflation/deflation offset values can be used to achieve that goal. Expert testimony and the references themselves support these findings. While the particular equations in Mittal and Pillsbury might not fit directly into Gifft, the Board's findings are consistent with the Supreme Court's guidance that the "person of ordinary skill is also a person of ordinary creativity, not an automaton." *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 421 (2007); see also *Fleming v. Cirrus Design Corp.*, 28 F.4th 1214, 1223 (Fed. Cir. 2022) (affirming the Board's obviousness determination which was "the result of a faithful application of our law on obviousness, including *KSR*'s directive to consider the creativity of the ordinarily skilled artisan").

Similarly, we are not persuaded to reweigh the Board's assessment of the strength of Sleep Number's evidence of commercial success and industry praise. The Board thoroughly analyzed and considered the parties' evidence, and we cannot say that its findings were unreasonable.

We next consider Sleep Number's argument that the Board misallocated the burden of persuasion. Contrary to Sleep Number's assertion, we do not read the Board's decisions as improperly placing the burden on Sleep Number to prove non-obviousness of its claims. *See* Cross-Appellant's Principal & Resp. Br. 57–64. After reading the decisions as a whole, we are convinced that the Board properly analyzed the obviousness issue, first setting forth its fact findings and reasoning for why it concluded that the claims would have been obvious and then responding to Sleep Number's specific contrary arguments. *See '747 Decision* at 48–68. The portions of the opinion that Sleep Number quotes as allegedly improperly shifting the burden are largely taken from the later sections in the opinion where the Board affirmatively responded to Sleep Number's arguments regarding the proposed combinations. *See id.* at 53–68. Overall, we conclude that the Board's opinion is most fairly read as properly allocating the burden of persuasion.

Finally, we see no abuse of discretion in the Board's conclusion that American National satisfied the requirements of 37 C.F.R. § 42.104. That regulation requires petitioners to, for each means-plus-function term in the challenged claims, “identify the specific portions of the specification that describe the structure . . . corresponding to each claimed function.” *Id.* § 42.104(b)(3). Sleep Number argues that American National did not expressly provide a construction for the claim term “pressure sensing means” and thus did not comport with the Board's rules for petitioners. In both decisions, however, the Board determined that American National sufficiently identified the structure and function of the “pressure sensing means” term. In other words, the Board found that American National had done enough to meet the requirements of this rule. We give deference to the Board's application of its own rules. *See Ericsson*, 901 F.3d at 1379 (citing *Bilstad*

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v. Wakalopoulos, 386 F.3d 1116, 1121 (Fed. Cir. 2004)). Accordingly, we affirm on this issue.

CONCLUSION

For the reasons stated above, we affirm the Board's final written decisions in both proceedings.

AFFIRMED

COSTS

No costs.