

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

PRECISION PLANTING, LLC and AGCO CORP.,
Petitioner,

v.

DEERE & COMPANY,
Patent Owner.

IPR2019-01054
Patent 10,004,173 B2

Before BARRY L. GROSSMAN, JAMES A. TARTAL and
TIMOTHY J. GOODSON, *Administrative Patent Judges*.

TARTAL, *Administrative Patent Judge*.

JUDGMENT

Final Written Decision

Determining No Challenged Claims Unpatentable

Denying in Part and Dismissing in Part Petitioner's Motion to Exclude

Dismissing Patent Owner's Motion to Exclude

35 U.S.C. § 318(a)

We have jurisdiction to conduct this *inter partes* review under 35 U.S.C. § 6. This Final Written Decision is issued pursuant to 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73 (2018). For the reasons discussed below, we determine that a preponderance of the evidence fails to show that any of claims 1–4, 6–9, or 11–20 (the “Challenged Claims”) of U.S. Patent No. 10,004, 173 B2 (Ex. 1001, “the ’173 patent”) are unpatentable.

I. INTRODUCTION

A. *Summary of Procedural History*

Precision Planting, LLC and AGCO Corp. (collectively, “Petitioner”)¹ filed a Petition (Paper 4, “Pet.”) requesting *inter partes* review of the Challenged Claims. We instituted *inter partes* review of the Challenged Claims on the single ground of unpatentability asserted in the Petition. Paper 20. Deere & Company (“Patent Owner”) filed a Patent Owner Response. Paper 36 (“PO Resp.”). Petitioner filed a Reply to the Patent Owner Response. Papers 58 (“Reply”) (under seal), 59 (publically accessible with redactions). Patent Owner filed a Sur-reply to Petitioner’s Reply. Paper 64 (“Sur-reply”).

Petitioner bears the burden of proving unpatentability of the Challenged Claims by a preponderance of the evidence, and the burden of persuasion never shifts to Patent Owner. *See* 35 U.S.C. § 316(e) (2012); 37 C.F.R. § 42.1(d) (2017); *Dynamic Drinkware, LLC v. Nat’l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015). Oral argument was held and a transcript of the hearing appears in the record. Paper 89 (“Tr.”).

¹ Petitioner identifies Monsanto Co. and Bayer AG as additional real parties in interest. Pet. 6.

IPR2019-01054
Patent 10,004,173 B2

Additionally, Petitioner and Patent Owner each filed a motion to exclude opposed by the other, which we address below in Section II.

B. Related Proceedings

The '173 patent is a subject of *Deere & Company v. AGCO Corporation and Precision Planting LLC*, Civil Action No. 1:18-cv-00827-CFC (D. Del.). *See* Pet. 6; Paper 5, 1; Ex. 2005, 1.² Petitioner also identifies the following proceedings at the Board as related matters:

Case No.	Challenged Patent
IPR2019-01044	U.S. Patent No. 8,813,663
IPR2019-01046	U.S. Patent No. 9,480,199
IPR2019-01047	U.S. Patent No. 9,510,502
IPR2019-01048	U.S. Patent No. 9,686,906
IPR2019-01050	U.S. Patent No. 9,807,922
IPR2019-01051	U.S. Patent No. 9,807,924
IPR2019-01052	U.S. Patent No. 9,820,429
IPR2019-01053	U.S. Patent No. 9,861,031
IPR2019-01055	U.S. Patent No. 9,699,955

Pet. 6.

C. The '173 Patent

The '173 patent, titled “Seeding Machine with Seed Delivery System,” issued on June 26, 2018, from an application filed on August 10, 2017. Ex. 1001, codes (22), (45), (54). The '173 patent states it is a

² An action by Patent Owner asserting the '173 patent against Precision Planting LLC in *Deere & Company v. Precision Planting LLC*, Civil Action No. 1:18-cv-00828-CFC was consolidated with the co-pending District of Delaware case against AGCO Corporation. *See* Ex. 2005.

continuation of Application No. 14/616,877, filed on February 9, 2015, a continuation of Application No. 14/504,801, filed on October 2, 2014, and a continuation of Application No. 12/364,010, filed on February 2, 2009. *Id.* at code (63). The '173 patent “relates to a seeding machine having a seed metering system and a seed delivery system for delivering seed from the meter to the ground.” *Id.* at 1:18–20.

The '173 patent explains, as background of the invention, that the “seed metering system receives the seeds in a bulk manner from the seed hopper carried by the planter frame or by the row unit,” and that the “seeds are singulated and discharged at a predetermined rate to the seed placement or delivery system.” *Id.* at 1:42–55. The '173 patent further describes the “most common seed delivery system” as a “gravity drop system” whereby “singulated seeds from the seed metering system merely drop into the seed tube and fall via gravitational force from a discharge end thereof into the seed trench.” *Id.* at 1:56–62. Although the seed tube in prior systems may have a “rearward curvature to reduce bouncing of the seed as it strikes the bottom of the seed trench and to impart a horizontal velocity to the seed in order to reduce the relative velocity between the seed and the ground,” according to the '173 patent “differences in how individual seeds exit the metering system and drop through the seed tube” cause undesirable variation in seed spacing. *Id.* at 1:62–2:2.

The '173 patent describes that its seed delivery system reduces seed spacing variability by capturing the seed from the seed meter, moving the seed down to a lower discharge point, and then accelerating the seed “rearward to a horizontal velocity approximately equal to the forward travel speed of the seeding machine such that the seed, when discharged, has a low or zero horizontal velocity relative to the ground.” *Id.* at 2:28–43.

Figures 2 and 3 of the '173 patent are reproduced below.

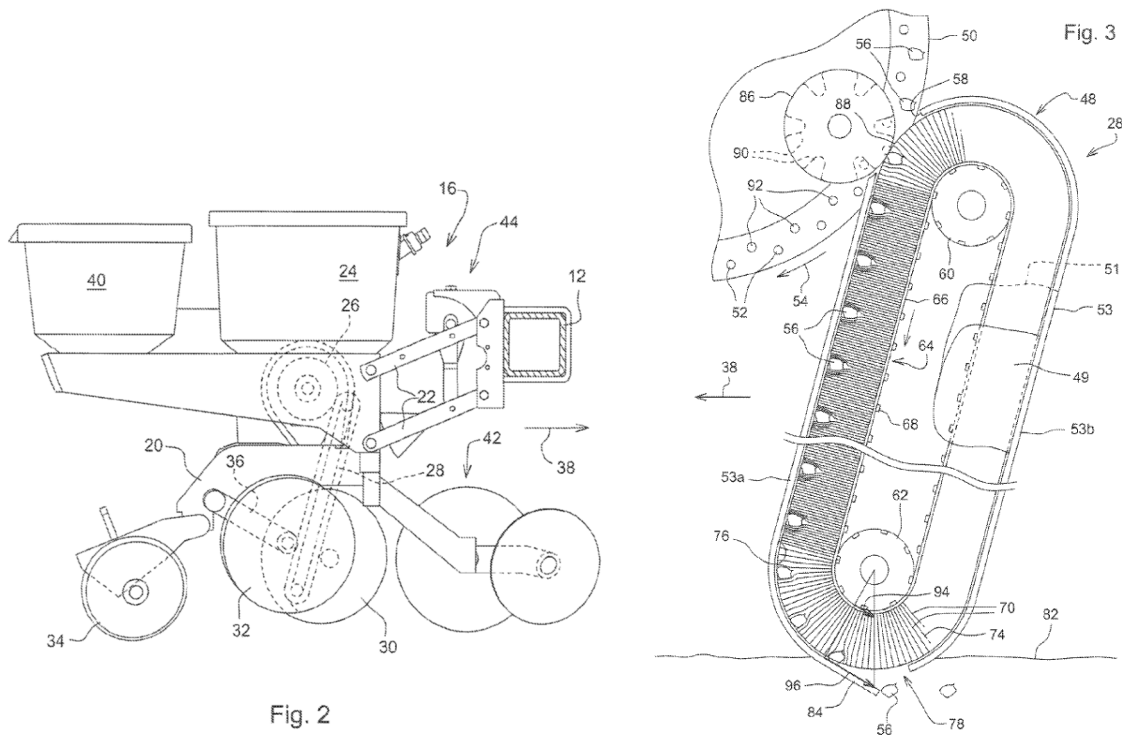


Figure 2 illustrates a side view of row unit 16 of a seeding machine, including seed hopper 24, seed meter 26, and seed delivery system 28 (shown in more detail in Figure 3). *Id.* at 2:49–52, 3:16–29. Seed stored in seed hopper 24 is provided to seed meter 26 and carried by delivery system 28 into a planting furrow or trench first formed by furrow openers 30 and then closed over the seed by closing wheels 34. *Id.* at 3:23–30.

Figure 3 illustrates an enlarged side view of seed delivery system 28, including housing 48 adjacent to seed disk 50. Ex. 1001, 2:51–52, 3:42–53.

Seed disk 50 is generally flat with a plurality of apertures 52 that collect seeds 56 from a seed pool, which “adhere to the disk by air pressure differential on the opposite sides of the disk 50 in a known manner.” *Id.* at 3:45–49. Seed from seed disk 50 is admitted to seed delivery housing 48 through upper opening 58. *Id.* at 3:56–57.

Within housing 48, belt 64 with bristles 70 is supported by pulleys 60, 62, one of which is a drive pulley. *Id.* at 3:58–61. In operation, belt 64 rotates counterclockwise around the pulleys, causing distal ends 74 of bristles 70 to separate from one another as the belt curves around the pulleys. *Id.* at 4:19–24. Loading wheel 86 adjacent upper opening 58 is positioned such that the path of the seeds on disk 50 brings the seeds into nip 88 formed between the loading wheel and distal ends 74 of bristles 70. *Id.* at 4:5–10. As the path of belt 64 around the pulley ends, the bristle ends close upon themselves and capture the seeds. *Id.* at 4:32–36. Side wall 53 of housing 48 works together with bristles 70 to hold the seed as it is moved to ramp 84 near lower opening 78 from which the seed is discharged into the seed trench. *Id.* at 3:66–4:4, 4:36–40, 4:45–48. The ’173 patent explains as follows:

As a result of the long bristles and the seed loading point being at the end of the curved path of the brush around the pulley 60 results in the seeds being loaded into the belt while the bristles have slowed down in speed. The bristle speed at loading is thus slower than the bristle speed at the discharge opening as the belt travels around the pulley 62. This allows in the seed to be loaded into the belt at a relatively lower speed while the seed is discharged at the lower end at a desired higher speed.

Id. at 4:55–64. The ’173 patent further states that “[w]hile brush bristles are the preferred embodiment . . . other material types can be used to grip the

seed such as a foam pad, expanded foam pad, mesh pad or fiber pad.”

Id. at 7:46–50.

D. Illustrative Claims

Challenged claims 1 and 17 are independent, challenged claims 2–4, 6–9, and 11–16 depend from claim 1, and claims 18–20 depend from claim 17. Claims 1 and 17, reproduced below, are illustrative of the claimed subject matter.

1. A seeding machine, comprising:
 - a seed metering system;
 - a seed transfer device positioned adjacent to the seed metering system;
 - a seed delivery system comprising a housing having a first opening and a second opening, the first opening located proximal to the seed transfer device through which seed is transferred from the seed metering system into the seed delivery system, and the second opening located distal of the seed transfer device through which seed is discharged from the seed delivery system; and
 - an endless member of the seed delivery system movable within the housing to receive the seed at the first opening and transport the seed to the second opening;wherein the seed transfer device transfers seed from the seed metering system to the seed delivery system through the first opening of the seed delivery system.

Ex. 1001 at 7:57–8:6.

17. A row unit of a planter configured to move in a travel direction while planting seed, comprising:
 - a seed hopper for holding a plurality of seeds;
 - a seed metering system including a seed metering device for receiving seed from the seed hopper;
 - a seed delivery system comprising a housing defining a first opening and a second opening, the first opening located proximal to the seed metering system through which seed is transferred into the seed delivery system, and the second opening located distal of the seed metering system through

which seed is discharged from the seed delivery system for planting in a furrow;
an endless member of the seed delivery system movable within the housing to receive the seed at the first opening and transport the seed to the second opening; and
a seed transfer device disposed adjacent to the first opening for transferring seed from the seed metering system to the seed delivery system through the first opening of the seed delivery system.

Id. at 9:1–9:23.

E. Asserted Ground of Unpatentability

Petitioner contends that the Challenged Claims would have been obvious under 35 U.S.C. § 103 over the combination of Hedderwick,³ Koning,⁴ and Benac.⁵ Pet. 8–9. Petitioner supports its challenge with expert testimony by Douglas S. Prairie. Ex. 1002 (Declaration); Ex. 1135 (Reply Declaration). Mr. Prairie earned a B.S. in Agricultural Engineering, and an M.S. in Mechanical Engineering. Ex. 1002 ¶ 2. He is a registered Professional Engineer in Idaho. *Id.* He also has approximately twenty years of experience in the agricultural and mechanical engineering industry, working primarily on the development of precision seeding technology. *Id.* ¶¶ 3–11. Mr. Prairie is an Instructor in the Agriculture and Biosystems Engineering Department at South Dakota State University. *Id.* ¶ 13. He is a named inventor on multiple U.S. patents and applications relating to seeding and planting technology. *Id.* ¶ 14.

³ GB 2,057,835 A, published April 8, 1981 (Ex. 1003).

⁴ US 4,193,523, issued March 18, 1980 (Ex. 1004).

⁵ FR 2,414,288, published August 10, 1979 (Ex. 1005 (English translation of French application (Ex. 1006))).

In opposition, Patent Owner relies on the testimony of Dr. James L. Glancey. Ex. 2203. Dr. Glancey earned degrees in Agricultural and Biological Engineering, culminating in a Doctor of Philosophy in Engineering with an emphasis in Mechanical Engineering and concentrations in Civil Engineering, Agricultural and Biological Engineering, and Applied Mathematics. *Id.* ¶ 3. Currently, he holds a dual appointment at the University of Delaware as a Professor of Machine Design and Development in Mechanical Engineering and a Professor in the College of Agriculture and Natural Resources. *Id.* ¶ 4. He is an inventor on one U.S. patent related to harvesting, and three U.S. patents related to the composite material manufacturing and automation. *Id.* ¶ 6. Dr. Glancey is a Registered Professional Engineer in Delaware. *Id.* ¶ 11.

Petitioner argues that Dr. Glancey's testimony is unreliable because he is "a professional expert witness" who has served as an expert in 144 matters regarding a range of technologies, but has never served as an expert in seed planting technologies; because his opinions have been excluded by courts on three occasions; because he holds four patents that do not relate to seed planting technologies; because he allegedly "conceded that he does not understand what the test for obviousness of a patent was in 2003 or in 2009;" and because his answers at his deposition were allegedly inadequate in various ways. Reply 2–4.

Patent Owner responds that Dr. Glancey is a mechanical engineering professor and registered professional engineer who has "extensive personal and professional experience with farming and seed planting equipment," and that the three instances in which his testimony was excluded were personal injury matters unrelated to seed-planting equipment. Sur-reply 33–35.

Patent Owner, in turn, attacks Mr. Prairie as having "never been qualified as

an expert,” for performing “no engineering analysis,” and because his answers at his deposition were allegedly inadequate in various ways. *Id.* at 34–35.

Petitioner did not move to exclude the declaration testimony of Dr. Glancey and Patent Owner did not move to exclude the declaration testimony of Mr. Prairie. We have considered the arguments of the parties in assessing the weight to be given to each declarant’s testimony.⁶

II. MOTIONS TO EXCLUDE

The party moving to exclude evidence bears the burden of proving that it is entitled to the relief requested—namely, that the material sought to be excluded is inadmissible under the Federal Rules of Evidence (“FRE”). *See* 37 C.F.R. §§ 42.20(c), 42.62(a) (2019). In an *inter partes* review in which we both decide admissibility and serve as the fact-finder, we are well-positioned to determine and assign appropriate weight to evidence presented, and we recognize that a complete record of the evidence is preferable to facilitate public access as well as appellate review. *See, e.g., Sony Computer Entm’t Am. LLC v. Game Controller Tech. LLC*, IPR2013-00634, Paper 32 at 31 (PTAB Apr. 14, 2015); *see also Gnosis S.p.A. v. S. Alabama Med. Sci. Found.*, IPR2013-00118, Paper 64 at 43 (PTAB June 20, 2014) (citing *Donnelly Garment Co. v. NLRB*, 123 F.2d 215, 224 (8th Cir. 1941) (“If the record on review contains not only all evidence which was clearly admissible, but also all evidence of doubtful admissibility, the court which is called upon to review the case can usually make an end of it, whereas if

⁶ The record also includes testimony we considered from several witnesses that we do not rely upon on topics relating to objective indicia of nonobviousness or other matters. *See* Exs. 2025, 2031–2033.

evidence was excluded which that court regards as having been admissible, a new trial or rehearing cannot be avoided.”)). For the reasons provided below, we deny-in-part and dismiss-in-part Petitioner’s Motion to Exclude and dismiss Patent Owner’s Motion to Exclude.

A. Petitioner’s Motion to Exclude

Petitioner moves to exclude Exhibits 2141–2143, 2186, 2187, and 2198 based on FRE 901 as lacking authentication, portions of Dr. Glancey’s declaration that rely on those exhibits, portions of Dr. Glancey’s deposition testimony purportedly “resulting from leading questions,” and Exhibits 2249 and 2257 as “untimely.” Paper 72, 1; *see also* Paper 82 (Petitioner’s Reply in support of its motion to exclude). Patent Owner opposes Petitioner’s Motion to Exclude. Paper 73.

1. Exhibits 2141–2143, 2186, 2187, and 2198, and portions of Dr. Glancey’s Declaration Relying on those Exhibits

Exhibits 2141–2143, 2186, 2187, and 2198 are videos and photographs of brush belts. Petitioner argues that these videos and photographs are unreliable and should be excluded, because Patent Owner has not provided sufficient information about the brush belt that is the subject of the videos and photographs and the circumstances in which the videos and photographs were made. Paper 72, 4–9; Paper 82, 1–5. Petitioner further argues that Dr. Glancey’s testimony does not authenticate the videos because he did not create them and was unable to answer certain questions about the brush belts’ characteristics during his deposition. Paper 72, 9–10. Petitioner also argues that certain paragraphs of Dr. Glancey’s declaration should be excluded because they “purport to rely on the unauthenticated exhibits.” *Id.* at 10 (citing Ex. 2203 ¶¶ 165–167, 169, 170, 222–224).

Petitioner's arguments do not persuade us that Patent Owner's showing is insufficient under FRE 901. A proponent's "burden of proof for authentication is slight." *Lexington Insurance Co. v. Western Pennsylvania Hospital*, 423 F.3d 318, 328 (3rd Cir. 2015). Under FRE 901, the proponent must make a showing "sufficient to support a finding that the item is what the proponent claims it is." Fed. R. Evid. 901(a); *see also United States v. Coohy*, 11 F.3d 97, 99 (8th Cir. 1993) ("To meet this standard, the proponent need only demonstrate a rational basis for its claim that the evidence is what the proponent asserts it to be."). Once that threshold is satisfied, "the evidence goes to the [fact-finder] and it is the [fact-finder] who will ultimately determine the authenticity of the evidence."

Threadgill v. Armstrong World Indus., Inc., 928 F.2d 1366, 1375 (3rd Cir. 1991). Here, Dr. Glancey's testimony is adequate to support a finding that these videos and photographs are what Patent Owner claims they are, i.e., brush belts being operated in various ways. *See* Ex. 1114, 133:14–134:2; Ex. 2203 ¶¶ 163–170, 222–225. Petitioner's criticisms of the videos and photographs go to the weight that should be assigned to the videos and photographs, and Dr. Glancey's testimony about them, and we have considered Petitioner's arguments in assessing the weight those materials should carry. Thus, Petitioner's motion to exclude Exhibits 2141–2143, 2186, 2187, and 2198, and Dr. Glancey's testimony about those exhibits is denied.

2. Portions of Dr. Glancey's Deposition Testimony

Petitioner argues that Dr. Glancey's testimony in response to leading questions should be excluded. Paper 72, 12–13; Paper 82, 5. The portions of Dr. Glancey's deposition testimony that Petitioner argues should be excluded are his responses during redirect at Exhibit 1115, pages 267–68.

See id. We do not rely on those portions of Dr. Glancey's testimony, so we dismiss as moot this aspect of Petitioner's motion.

3. Exhibits 2249 and 2257

Petitioner argues that Exhibits 2249 and 2257 were submitted by Patent Owner with its Sur-reply and should be excluded as untimely. Paper 72, 13–14; Paper 82, 5. Because we do not rely on either of those exhibits in our analysis, we dismiss as moot Petitioner's motion to exclude them.

4. Conclusion

For the reasons provided above, Petitioner's motion to exclude is denied as to Exhibits 2141–2143, 2186, 2187, and 2198 and the portions of Dr. Glancey's declaration that rely on those exhibits, and dismissed as moot as to the testimony of Dr. Glancey in response to allegedly leading questions and as to Exhibits 2249 and 2257.

B. Patent Owner's Motion to Exclude

Patent Owner moves to exclude Exhibits 1049, 1050, 1052, 1054, 1068, 1073, 1077, 1078, 1086, 1087, 1089, 1091, 1092, 1103, 1104, 1113–15, 1123, 1131–33, and 1135. Papers 69 (under seal), 70 (publically accessible with redactions); *see also* Papers 79 (under seal), 80 (publically accessible with redactions) (Patent Owner's Reply in support of its motion to exclude). Petitioner opposes Patent Owner's Motion to Exclude. Papers 75 (under seal), 76 (publically accessible with redactions).

Exhibits 1049, 1050, 1052, 1054, 1068, 1131, 1132, 1073, 1077, 1103, and 1104, as well as the portions of Exhibit 1135 Patent Owner seeks to exclude, all relate to arguments concerning objective indicia of nonobviousness, which is an issue we do not reach. *See* Paper 69, 1–15; Paper 79, 1–5. Exhibits 1078, 1086, 1087, and 1123 are documents

introduced during depositions by Petitioner not otherwise cited in briefing. Paper 69, 8. Exhibits 1089, 1091, and 1092 relate to court orders or opinions purportedly excluding Dr. Glancey's opinions as unreliable in other proceedings concerning different technologies than at issue in this case. Paper 69, 9; Paper 79, 3. Exhibits 1113, 1114, 1115, and 1133 are transcripts from Dr. Glancey's depositions. However, Patent Owner does not actually seek exclusion of those exhibits, only consideration of errata sheets that Dr. Glancey prepared for those transcripts, which Patent Owner filed as Exhibits 2266–2269. Paper 69, 10. Because we do not rely on the materials that Patent Owner seeks to exclude, and also because we would ultimately find for Patent Owner even without excluding these exhibits, we dismiss as moot Patent Owner's motion to exclude.

III. ANALYSIS

A. *Legal Standard for Obviousness*

In *Graham v. John Deere Co.*, 383 U.S. 1 (1966), the Supreme Court set out a framework for assessing obviousness under § 103⁷ that requires consideration of four factors: (1) the “level of ordinary skill in the pertinent art,” (2) the “scope and content of the prior art,” (3) the “differences between the prior art and the claims at issue,” and (4) “secondary considerations” of nonobviousness such as “commercial success, long felt but unsolved needs, failure of others, etc.” *Id.* at 17–18; *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 407 (2007). When a combination of references together discloses all of

⁷ The relevant sections of the Leahy-Smith America Invents Act (“AIA”), Pub. L. No. 112–29, took effect on March 16, 2013. Because the application that issued as the '173 patent states that it is a continuation of an application filed before March 16, 2013, we apply the pre-AIA versions of these statutes. *See* 35 U.S.C. § 100(i).

the limitations in a claim, the Board “must determine whether there was an ‘apparent reason to combine the known elements in the fashion claimed by the patent at issue,’ and whether a person of skill in the art at the time of the invention would have had a ‘reasonable expectation of success’ in pursuing that combination.” *Los Angeles Biomedical Research Institute v. Eli Lilly & Co.*, 849 F.3d 1049, 1064 (Fed. Cir. 2017) (quoting *KSR*, 550 U.S. at 406 and *Genzyme Therapeutic Prods. Ltd. v. Biomarin Pharm. Inc.*, 825 F.3d 1360, 1373 (Fed. Cir. 2016) (citations omitted).

B. Level of Ordinary Skill in the Art

Factors pertinent to a determination of the level of ordinary skill in the art include: (1) educational level of the inventor; (2) type of problems encountered in the art; (3) prior art solutions to those problems; (4) rapidity with which innovations are made; (5) sophistication of the technology; and (6) educational level of workers active in the field. *Env’t'l. Designs, Ltd. v. Union Oil Co.*, 713 F.2d 693, 696–697 (Fed. Cir. 1983) (citing *Orthopedic Equip. Co. v. All Orthopedic Appliances, Inc.*, 707 F.2d 1376, 1381–82 (Fed. Cir. 1983)). Not all such factors may be present in every case, and one or more of these or other factors may predominate in a particular case. *Id.* Moreover, these factors are not exhaustive but are merely a guide to determining the level of ordinary skill in the art. *Daiichi Sankyo Co. v. Apotex, Inc.*, 501 F.3d 1254, 1256 (Fed. Cir. 2007). In determining a level of ordinary skill, we also may look to the prior art, which may reflect an appropriate skill level. *Okajima*, 261 F.3d at 1355. Additionally, “[a] person of ordinary skill is also a person of ordinary creativity, not an automaton.” *KSR*, 550 U.S. at 421.

Petitioner asserts that a person of ordinary skill in the art “would have had either: (1) a bachelor’s degree plus four years of experience in

mechanical engineering, agricultural engineering, or a related field; or (2) a master's degree plus two years of experience in mechanical engineering, agricultural engineering, or a related field.” Pet. 39 (citing Ex. 1002 ¶¶ 21, 22). Mr. Prairie opines this same level of ordinary skill, but adds the additional sentence that such an “ordinary artisan would have been familiar with the mechanics and design of agricultural planters.” Ex. 1002 ¶ 22. Mr. Prairie does not disclose the underlying facts or data on which his opinion is based. *See* 37 C.F.R. § 42.65(a) (“Expert testimony that does not disclose the underlying facts or data on which the opinion is based is entitled to little or no weight.”); *TQ Delta, LLC v. Cisco Sys., Inc.*, 942 F.3d 1352, 1358 (Fed. Cir. 2019) (“Conclusory expert testimony does not qualify as substantial evidence.”) (citations omitted).

According to Patent Owner, a person of ordinary skill in the art would have had an undergraduate degree in mechanical engineering, agricultural engineering, or closely related field, and “about two years of experience designing agricultural products or related machinery in industry or academia,” or, alternatively, “about five years of experience designing agricultural products or related machinery, without a four-year undergraduate engineering degree.” PO Resp. 2–3 (citing Ex. 2203 ¶¶ 47–52). Patent Owner adds that “[s]uch a person would typically have experience designing projects on a component or small sub-system-level rather than redesigning a larger planting system.” *Id.*

In support of Patent Owner, Dr. Glancey states that Petitioner's proposed level of ordinary skill is “too restrictive and sets the level of ordinary skill in the art of the '173 [p]atent too high.” Ex. 2203 ¶ 49. Dr. Glancey provided the following reasons: (1) undergraduate engineering curriculums in place in February 2009 focused on design at the freshman

level and continued this focus throughout the student's degree program, thus avoiding the need for significant post-graduate design experience; (2) masters programs in engineering focus on research for publication in peer-reviewed journals, rather than designing products for industry; and (3) engineering technicians, who may not have formal engineering degrees, "often have years' worth of relevant hands-on experience" that corresponds to a person of ordinary skill in the art. *Id.* ¶¶ 50–52.

Based on the evidence and arguments of record prior art, we determine that a person of ordinary skill in the art would have had an undergraduate degree in mechanical engineering, agricultural engineering, or similar field, and two years of experience designing agricultural products or related machinery, or five years of experience designing agricultural products or related machinery, without a four-year undergraduate engineering degree. To the extent there is any inconsistency, we credit the testimony of Dr. Glancey over Mr. Prairie because Dr. Glancey's opinion was more supported with more persuasive analysis and reasoning, as summarized above. However, we note that the differences between the parties' proposed definition of the level of ordinary skill in the art are not determinative. The analysis below would be materially the same under either party's proposed definition.

C. Claim Construction

"In an *inter partes* review proceeding, a claim of a patent . . . shall be construed using the same claim construction standard that would be used to construe the claim in a civil action under 35 U.S.C. 282(b)." *See* Changes to the Claim Construction Standard for Interpreting Claims in Trial Proceedings Before the Patent Trial and Appeal Board, 83 Fed. Reg. 51,340

(Oct. 11, 2018) (codified at 37 C.F.R. § 42.100(b) (2019)) (amending 37 C.F.R. § 42.100(b) effective November 13, 2018). That standard “includ[es] construing the claim in accordance with the ordinary and customary meaning of such claim as understood by one of ordinary skill in the art and the prosecution history pertaining to the patent.” *Id.*; *see also Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc).

Petitioner asserts that the claim terms “seed transfer device,” “seed metering system,” and “seed metering device” may each be construed to be means-plus-function claim terms and, therefore, proposes constructions. Pet. 36–39. However, Petitioner further asserts that “Benac discloses a seed transfer device under any construction,” and that “under any construction,” Hedderwick “discloses a seed metering system” and “discloses a seed metering device.” *Id.* at 36 n.8, 37 n.9, 39 n.10. Petitioner also provides a lengthy footnote providing an analysis of the claim term “endless member.” *See id.* at 32 n.7.

Patent Owner states that in the Delaware Case the court construed “endless member” to mean “a continuous conveyor forming a loop, such as a belt or a chain,” and construed “seed delivery apparatus” to mean an “apparatus that removes seed from the seed meter by capturing the seed and then delivers it to a discharge position.” PO Resp. 3 (citing Ex. 1038). Patent Owner also argues that, because Petitioner contends the asserted references disclose the terms “seed transfer device,” “seed metering system,” and “seed metering device” under any construction, an express construction is not necessary. PO Resp. 3–4.

We determine that no terms require express construction to resolve the parties’ dispute. *See Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999) (holding that only claim terms that are in

controversy need to be construed and “only to the extent necessary to resolve the controversy”); *see also Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (applying *Vivid Techs.* in the context of an *inter partes* review).

D. Scope and Content of the Prior Art

1. Summary of Hedderwick

Hedderwick, titled “Precision Seeder,” describes “a seeding device able to deposit single seeds at predetermined spacings.” Ex. 1003, code (54), 1:5–8. The seeder includes a seed hopper that transfers seed to a rotating vacuum disc, which has orifices around its periphery that receive and retain seeds by pressure differential. *Id.* at 3:46–52.

Figure 2 is reproduced below:

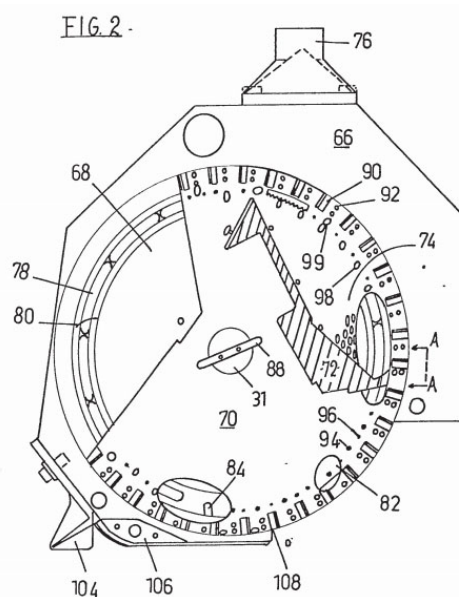


Figure 2 illustrates a “side elevational view of a seeder casing with the disc in place and with surface portion broken away . . . to illustrate the operation of the seeder.” *Id.* at 1:100–101. The vacuum disc rotates in a counterclockwise direction, past various devices, to ensure that a single seed is retained by the orifice, and continues to rotate until the “seeds have passed

the end of vacuum inlet 78 at about 7 o'clock.” *Id.* at 3:45–61. When the seeds’ “associated vacuum holes 94 are in register with recess 84 in the wear plate 80,” the seeds drop into a cell bounded by fins 90. *Id.* at 3:55–63. The seed fall from the cell when it reaches drop off lip 108, which is positioned slightly past bottom dead center. *Id.* at 3:66–73.

Hedderwick describes a second embodiment for use when “the vertical distance to be travelled by the seeds is greater.” *Id.* at 4:2–5.

Figure 4 is reproduced below:

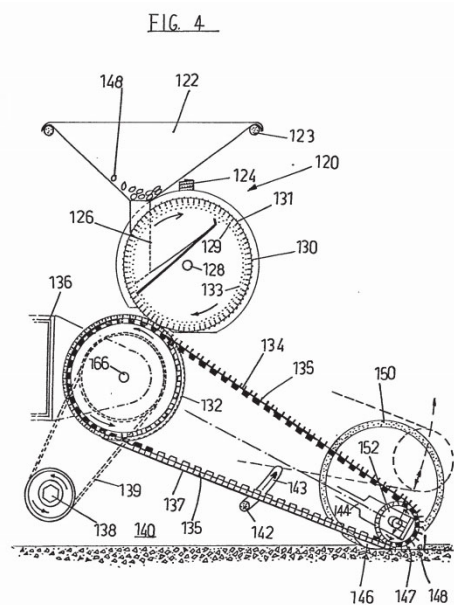


Figure 4 illustrates a side elevational view of a seeder with parts broken away. *Id.* at 1:108–109. Disc 130 of the second embodiment can have the same construction as disc 70 shown in Figure 2, although disc 130 rotates in a clockwise direction in Figure 4. *Id.* at 4:10–13, 5:51–53. “The major change in the seeder is the provision of an endless belt 134 which has a series of fins 135 projecting upwardly therefrom.” *Id.* at 4:23–25. Fins 135, together with casing 137 and belt 134, define a series of moving cells. *Id.* at 4:23–28; Fig. 4. These “cells are synchronised to align with orifices 129 of disc 130,” such that when disc 130 releases a seed it is released into a cell

and each cell carries a seed. *Id.* at 4:28–5:5. Belt 134 passes over idler sprocket 152 and driven sprocket 132, which drives the belt and thus seeds 148 in the cells, to an end of casing 137 where the seed is discharged. *Id.* at 5:6–7, 74–78; Fig. 4.

2. Summary of Koning

Koning, titled “Planting Machine for Potatoes, Bulbs or Similar Seed Crop,” and describes a planting machine “comprising a hopper and a conveying and distributing device . . . for feeding the potatoes or the like to the planting foot.” Ex. 1004, code (54), 1:5–6. Figure 4 is reproduced below:

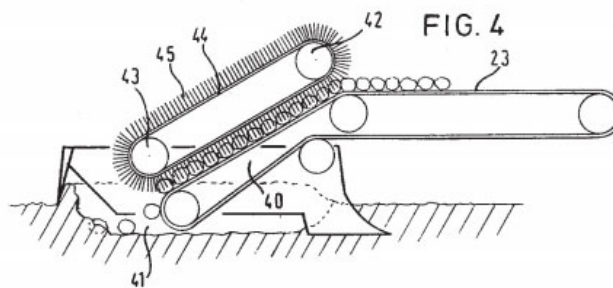


Figure 4 illustrates an “end part of a planting machine schematically in a side view.” *Id.* at 3:32–33. The planting machine includes conveying member 23 having part 40 that extends in a backward direction to a point in furrow 41. *Id.* at 5:3–6. Belt 44 with brush hairs 45 is above part 40 and is guided around rollers 42 and 43. *Id.* at 5:6–8. Brush hairs 45 of belt 44 hold the seed crop on part 40 of belt or conveying member 23 so that the seed crop delivered by the conveying members are delivered at “the same distance in relation to each other in the furrow 41.” *Id.* at 5:8–14.

Specifically, “the brush hairs hold the potatoes or the like lying on the conveying surface till the moment that they leave the belt.” *Id.* at 3:16–18.

Thus, in Koning, it is the combination of two belts or conveying members, belt 44 with brush hairs 45, and belt 23 that function together to convey

seeds to furrow 41. *Id.* at 5:11–14. By holding the potatoes or the like “till the very last moment . . . the velocity of the potatoes in relation to each other is completely defined. Under all circumstances a regular distribution of the potatoes in the furrow is obtained.” *Id.* at 3:18–22.

3. Summary of Benac

Benac, titled “Vacuum seed spreader with separate mechanical dispensing,” relates to a vacuum seed spreader. Ex. 1005, code (54), 1:1–19. Benac discloses a “vacuum seed spreader comprising, as is known, a rotary vertical disk 1 forming a partition between a seed chamber 2 and a vacuum chamber 3, generally of annular form.” *Id.* at 3:15–18. As seen in Figure 1, reproduced below, disk 1 “is pierced with orifices 4 evenly distributed over a circle concentric to the disk.” *Id.* at 3:20–21.

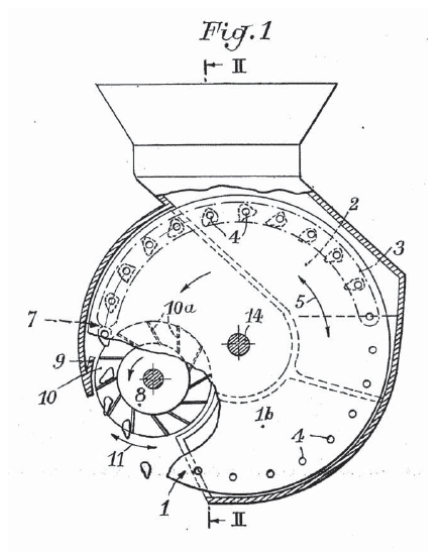


Figure 1 illustrates a cross-sectional view of a seed spreader. *Id.* at 3:1.

Suction from the vacuum chamber draws seeds against the orifices so that the seeds rotate with the disk. *Id.* at 3:29–31. “A paddle wheel 8 is adjacent to the first face 1a of the disk and determines, with this face 1a and with a casing 9 that is adjacent and concentric to the paddle wheel, sealed cells 10 for the seeds.” *Id.* at 4:6–9. The bottom of casing 9 opens to dropping

zone 11 in which the seeds are dropped or projected toward the ground. *Id.* at 4:11–13. Cells 10 of the paddle wheel “transport, one by one, the seeds released from the vacuum in the zone 7 just into the dropping zone 11.” *Id.* at 4:13–15. Specifically, “paddles 10a of the paddle wheel 8 sweep the orifices 4 of the disk between the release zone 7 and the dropping zone 11, such that the seeds are necessarily extracted from the orifices 4 upstream of the dropping zone.” *Id.* at 5:4–8.

E. Alleged Obviousness Over Hedderwick, Koning, and Benac

Petitioner contends that claims 1–4, 6–9, and 11–20 of the ’173 patent would have been obvious over Hedderwick, Koning, and Benac. Pet. 39–101; Reply 4–35. Petitioner’s contentions are supported by Mr. Prairie. Ex. 1002 ¶¶ 66–176; Ex. 1135 ¶¶ 16–133. Patent Owner disputes these contentions, particularly with regard to the sufficiency of the reasons purportedly supporting the asserted combination. PO Resp. 6–58; Sur-reply 12–30. We find that Petitioner has not shown by a preponderance of the evidence a sufficient rationale for the combination. Our discussion below is primarily focused on that dispositive issue as it applies to all Challenged Claims.

1. Petitioner Contends that Hedderwick, Koning, and Benac Teach or Suggest Each Limitation of Independent Claim 1

Petitioner provides a detailed explanation showing how Hedderwick, Koning, and Benac teach or suggest each limitation of claim 1, which we summarize below. Pet. 40–65.

A seeding machine, comprising:

Petitioner shows that Hedderwick teaches a “precision seeder” that delivers seeds to the ground. Pet. 40–41 (citing, *e.g.*, Ex. 1003, Abstract, Fig. 4, 1:97–109).

a seed metering system;

Petitioner shows that Hedderwick teaches a seed metering system that includes seed metering disc 70 with orifices 94 to retrieve seeds from a hopper by use of a vacuum. *Id.* at 41–45 (citing, *e.g.*, Ex. 1003, 1:25–31, 3:20–65, 4:6–22, 5:49–60, Figs. 2, 4).

a seed transfer device positioned adjacent to the seed metering system;

a seed delivery system comprising a housing having a first opening and a second opening, the first opening located proximal to the seed transfer device through which seed is transferred from the seed metering system into the seed delivery system, and the second opening located distal of the seed transfer device through which seed is discharged from the seed delivery system;

Petitioner contends that a “seed transfer device” in accordance with the ’173 patent transfers “seeds from the seed metering system to the seed delivery system through the first opening of the seed delivery system.”

Pet. 45. Petitioner relies on Benac as teaching paddle wheel 8 with paddles 10a corresponding to the claimed “seed transfer device” in combination with being positioned adjacent the seed metering system of Hedderwick’s seed metering disc 70. *Id.* at 46–49 (citing, *e.g.*, Ex. 1005, 1:1–19, 2:8–23, 3:15–31, 4:6–15, 5:4–8, Figs. 1, 2).

Petitioner also contends that Hedderwick in combination with Koning teaches the claimed “seed delivery system,” with casing 137 of Hedderwick corresponding to the claimed “housing,” including orifice 141 (a “first opening”) and a discharge opening at the lower portion of casing 137 through which seed exits (a “second opening”). *Id.* at 50–53 (citing Ex. 1003, 1:58–90, 4:25–28, 5:26–31, 5:53–60, 5:72–81, Figs. 4, 5).

Petitioner explains its combination of elements from the asserted prior art as follows:

Hedderwick in combination with Benac and Koning discloses that the first opening (Hedderwick's orifice 141, intake opening) is located proximal to the seed transfer device (Benac's paddle wheel) through which seed is transferred directly from the seed metering system (Hedderwick's seed meter disk) into the seed delivery system (Koning's brush belt with Hedderwick's casing)."

Id. at 55–56 (citing Ex. 1002 ¶ 113). Petitioner also explains that in its proposed combination of teachings "the second opening (Hedderwick's discharge opening) is located distal of the seed transfer device (Benac's paddle wheel) through which seed is discharged from the seed delivery system (Koning's brush belt within Hedderwick's casing)." Pet. 59–60 (citing Ex. 1002 ¶ 117).

Patent Owner argues that because Petitioner's proposed combination "locates Benac's paddle wheel *past* where seeds have been released from Hedderwick's disc, . . . the paddle wheel would not remove seed from the seed meter and transfer it into an endless member, and thus could not be a 'seed transfer device.'" *Id.* at 48. Patent Owner, however, identifies no persuasive evidence in support of its assertion that a "seed transfer device" must "remove seed from the seed meter." *See id.* Petitioner counters that Benac's paddle wheel "would assist in transferring or inserting seeds thorough orifice 141 into Koning's brush belt." Reply 29 (citing Ex. 1003, 4:23–28, 5:56–60; Ex. 1113, 289:22–290:7, 292:5–19; Ex. 1133, 88:7–90, 93:16–22). Patent Owner also argues that a person of ordinary skill in the art "would have understood that Petitioners' proposal would not engender any expectation of achieving a 'seed transfer device' or a 'seed delivery system,' as claimed." PO Resp. 47.

In summary, Petitioner has shown how Benac's paddle wheel operates as a "seed transfer device" in Benac, but Patent Owner has drawn into doubt whether that teaching, as applied to the combination of Hedderwick and Koning asserted by Petitioner, is sufficient to show that the combination of teachings corresponds to the recited limitation. We need not resolve this issue because we find that even if Petitioner has shown that the asserted combination of references teaches every limitation of claim 1, whether there is a sufficient rationale for the asserted combination of references is dispositive, as addressed below.

an endless member of the seed delivery system movable within the housing to receive the seed at the first opening and transport the seed to the second opening;

As part of the claimed "seed delivery system," Petitioner shows that Koning's belt 44 with bristles correspond to the "endless member" in place of Hedderwick's endless belt. Pet. 53–55, 62–65 (citing, e.g., Ex. 1004, 1:5–13, 3:12–22, 5:8–14, Fig. 4).

wherein the seed transfer device transfers seed from the seed metering system to the seed delivery system through the first opening of the seed delivery system.

Petitioner explains that in accordance with its proposed combination of features from the prior art, "the seed transfer device (Benac's paddle wheel) transfers seed directly from the seed metering system (Hedderwick's seed meter disk) to the seed delivery system (Koning's brush belt with Hedderwick's casing) through the first opening (Hedderwick's intake opening/orifice 141) of the seed delivery system." Pet. 65.

2. *Petitioner Fails to Show by a Preponderance of the Evidence a Sufficient Rationale to Support the Asserted Combination of Hedderwick, Koning, and Benac as Applied to Independent Claim 1*

Petitioner addresses at length in the Petition the reasons it contends a person of ordinary skill in the art would have been motivated to combine Hedderwick, Koning, and Benac in the manner proposed by Petitioner. Pet. 25–31. To assess Petitioner’s reasoning, we first consider how Petitioner proposes combining the teachings of the asserted references and then turn to the evidence offered by Petitioner in support and by Patent Owner in opposition. Because it is dispositive, our analysis is focused on Petitioner’s rationale for combining Hedderwick and Koning.⁸

⁸ Petitioner provides separate reasons in support of combining Benac and Hedderwick, arguing that both references “disclose vacuum seed meters that adhere individual seeds on apertures of a seed metering disk,” and that a person of ordinary skill would have been motivated to apply Benac’s “paddle wheel that transfers seeds from the seed metering disk, ensuring their reliable release and improving seed spacing accuracy” to Hedderwick. Pet. 26–27; *see also id.* at 49 (asserting that a person of ordinary skill “would have been motivated to incorporate Benac’s paddle when into Hedderwick’s seed metering system to ensure reliable transfer of seeds stuck on Hedderwick’s disk”). Because we find Petitioner’s rationale in support of combining elements of Koning with Hedderwick unsupported by a preponderance of the evidence we do not reach the issue of whether Petitioner’s rationale for including Benac is sufficient. We note, however, that Petitioner’s arguments in support of combining features of Benac with Hedderwick appear to mirror arguments made in a related proceeding found unsupported by a preponderance of the evidence by the Board. *See Precision Planting, LLC, and AGCO Corp. v. Deere & Company*, IPR2019-01044, Paper 94 (PTAB Nov. 30, 2020) (final written decision finding no challenged claims unpatentable as obvious over combination of Hedderwick, Koning, and Benac).

To show unpatentability of claim 1, Petitioner relies on a combination of “Koning’s brush belt with bristles (for gripping seeds and controlling their movement from the seed meter to the ground) with Hedderwick (a precision seeder with seed metering system and endless belt in a housing with upper and lower openings).” *Id.* at 25; *see also id.* at 53 (Petitioner stating that it “[does] not rely on Hedderwick alone for the seed delivery apparatus because [Hedderwick] allows gravity to impact seed movement”).

According to Petitioner, the asserted combination would function as follows:

“Hedderwick’s seed meter disk would transfer seeds to the point where the disk ‘mates with’ the first opening (intake opening or orifice 141) in the casing,” and “[a]t this mating point, Koning’s brush belt would, in turn, receive the seeds directly from Hedderwick’s seed meter disk and hold them as it moves the seed toward the second, discharge opening.” Pet. 55 (citations omitted). Thus, Petitioner proposes applying Koning’s teaching of the use of generally downward facing bristles of a brush belt that control the spacing and descent of potatoes on a conveyor below to Hedderwick’s system to instead use generally upward facing bristles of Koning’s brush belt to receive seeds transferred from a seed meter disc above the bristles to be conveyed by the bristles to the ground.⁹ *Id.*

⁹ Although the parties, and thus the Board, focus on whether it would have been obvious to modify Hedderwick with the brush belt of Koning, the challenged claims do *not* include the term “brush belt.” We do not hold, and this Decision should not be understood to suggest, that the “endless member” claim term in the ’173 patent requires a brush belt. The challenge Petitioner asserts, however, is to replace the endless belt of Hedderwick with Koning’s brush belt, so that is the challenge we must evaluate. *See SAS Inst., Inc. v. Iancu*, 138 S. Ct. 1348, 1356 (2018) (“the petitioner’s petition . . . is supposed to guide the life of the litigation,” and it would “not be proper for the Board to deviate from the grounds in the petition and raise

Petitioner chose to frame the proposed combination to include the receipt of seeds from above onto the moving brush belt of Koning's "delivery system," such that it is incumbent on Petitioner to show that an ordinarily skilled artisan would have had reason to combine the references in that proposed manner and would have reasonably expected success in doing so. *See, e.g.*, Pet. 29 (stating that the "combination would replace Hedderwick's endless belt with Koning's brush belt") (citing Ex. 1003, 4:23–5:7, Fig. 4; Ex. 1004, 5:3–14, Fig. 4); *see also* Ex. 1002 ¶ 113 (Mr. Prairie explaining that in the asserted combination "seed is transferred directly from the seed metering system (Hedderwick's seed meter disk) into the seed delivery system (Koning's brush belt with Hedderwick's casing)").

To be clear, we recognize that "[t]he test for obviousness is what the combined teachings of the references would have suggested to one of ordinary skill in the art, not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference." *Hologic, Inc. v. Minerva Surgical, Inc.*, 764 Fed. Appx. 873, 880 (Fed. Cir. 2019) (quoting *In re Mouttet*, 686 F.3d 1322, 1332 (Fed. Cir. 2012)). Nonetheless, a satisfactory explanation of "*how* the combination of the . . . references [is] supposed to work" is necessary to support "a conclusion that a relevant skilled artisan would have been motivated to make the combination and reasonably expect success in doing so." *Personal Web Techs., LLC v. Apple, Inc.*, 848 F.3d 987, 994 (Fed. Cir. 2017) (emphasis in original); *see also Adidas AG v. Nike, Inc.*, 963 F.3d 1355, 1359–60 (Fed.

its own obviousness theory."); *Koninklijke Philips N.V. v. Google LLC*, 948 F.3d 1330, 1336 (Fed. Cir. 2020) (quoting *SAS*, 138 S. Ct. at 1356) ("the Board does not 'enjoy[] a license to depart from the petition and institute a *different* inter partes review of [its] own design.'").

Cir. 2020) (affirming Board’s determination that claims were not shown to be obvious because the petitioner had not demonstrated that an ordinarily skilled artisan would have been motivated to combine the references); *Samsung Electronics Co. v. Elm 3DS Innovations, LLC*, 925 F.3d 1373, 1382–83 (Fed. Cir. 2019) (determining that it unnecessary to reach other issues when reasonable expectation of success is dispositive).

In support of combining Hedderwick and Koning, Petitioner contends that both are in the field of “agricultural seed planting” and address the same problem of “suboptimal seed spacing” by “using systems to control the movement of seeds to the ground.” Pet. 25–26. Petitioner states that Hedderwick’s endless belt “does not completely define the velocity of the seeds relative to one another or ‘hold’ the seeds throughout their descent until ‘the moment that they leave the belt.’” *Id.* at 28. Koning achieves finer seed spacing, Petitioner asserts, because its “brush belt ensures that the ‘velocity’ of the seeds ‘in relation to each other is completely defined.’” *Id.* (quoting Ex. 1004, 3:12–22). Thus, Petitioner reasons that an ordinarily skilled artisan would have been motivated to rely on Koning’s brush belt with bristles in place of Hedderwick’s endless belt with fins to “achieve the disclosed benefits of more uniform seed spacing.” Pet. 54–55 (citing Ex. 1002 ¶ 111); *see also id.* at 29 (asserting that a person of ordinary skill “desiring finer seed spacing would have been motivated to combine the teachings of Koning’s brush belt with the system of Hedderwick to achieve

finer seed control) (citing Ex. 1002 ¶ 73; Ex. 1004, 3:12–22, 5:8–14).

Petitioner further contends as follow:

Incorporating the teaching of Koning’s brush belt would have been simple for a [person of ordinary skill in the art] to implement and there would have been a reasonable expectation of success, because such a combination would have applied a known technique—using a brush belt with bristles (taught by Koning)—to a known device—a seeding machine that would benefit from Koning’s brush belt.”

Pet. 29. Mr. Prairie supports Petitioner’s asserted rationale for substantially the same reasons identified in the Petition. *See* Ex. 1002 ¶¶ 66–76; *see also* Ex. 1135.

Patent Owner disputes the sufficiency of Petitioner’s rationale supporting the combination of Hedderwick and Koning. Patent Owner argues that Petitioner relies on hindsight and that an ordinarily skilled artisan would not have been motivated to combine Koning’s belt with Hedderwick, and would not have expected that combination to succeed. PO Resp. 16–31; Sur-reply 12–18.¹⁰

Based on the full record before us, we conclude that Petitioner has not met its burden of showing that a person of ordinary skill in the art at the time of the invention would have been motivated to, or would have had reason to, selectively apply a portion of Koning’s “delivery system,” and, specifically, Koning’s brush belt, but not conveying member 23, to the system of Hedderwick. As Patent Owner points out, the function that the brush belt serves in Petitioner’s proposed combination is different from its function in

¹⁰ Patent Owner also argues that Koning does not qualify as analogous art and, relatedly, that judicial estoppel bars Petitioner from contending otherwise. PO Resp. 6–16; Sur-reply 10–11, 31–33.

Koning. *See* PO Resp. 17–19. In Koning, the brush hairs of the belt hold potatoes “lying on the conveying surface” so as to maintain the speed and relative position of potatoes as they are moved by the conveyor to the furrow. Ex. 1004, 3:12–22, 5:3–14, Fig. 4; *see also* Pet. 24–25 (similarly describing Koning). Koning does not teach a system, as proposed by Petitioner, in which seeds are transferred from above into a moving brush belt. Petitioner provides insufficient persuasive evidence that a person of ordinary skill in the art would have had reason to use the brush belt of Koning in an undisclosed manner to receive seed into brush hairs 45 from Hedderwick’s seed meter disc located above the bristles, rather than to use brush hairs 45 to control the movement of a seed crop against conveyor 23 as disclosed by Koning’s delivery system, or that such a person would have reasonably expected success in in doing so.

Petitioner argues that “using a brush belt with bristles,” as taught by Koning, was “a known technique” that “would have been simple” for a person of ordinary skill to implement to a known device, such as Hedderwick’s seeding machine with “a reasonable expectation of success.” Pet. 29; *see also* Ex. 1002 ¶ 74 (Mr. Prairie stating the same in support of Petitioner); Ex. 1135 ¶ 53 (Mr. Prairie testifying in Reply declaration that “[a] person of ordinary skill in the art would have known how to fine tune the brush belt taught by Koning to work in Hedderwick’s system”). Petitioner further asserts that a person of ordinary skill in the art would have had a reasonable expectation of success, because Koning shows “that the brush belt receives the seeds as its bristles are rotating around upper roller 42 while the bristles are flexed in an open configuration,” such that an ordinarily skilled artisan “would have understood to incorporate Koning’s brush belt into Hedderwick such that it receives seeds as the belt curves

around Hedderwick's driven sprocket 132 as its bristles are flexed open.

Pet. 29; *see also* Ex. 1002 ¶ 74 (Mr. Prairie stating the same in support of Petitioner).

Critically, neither Petitioner nor Mr. Prairie acknowledge, much less bridge, the gap between Koning's use of a brush belt with bristles generally facing downward to hold potatoes from above as they lie on a conveying surface, versus the brush belt's use in the proposed combination to receive seeds that are deposited onto or into the bristles from above. In short, what Petitioner casually calls a "known technique" was not taught or suggested by Koning. Patent Owner explains this issue as follows:

Koning does not suggest using a brush-belt for retaining and conveying seeds without a separate conveying member to bear their weight. A [person of ordinary skill in the art] would not predict that Koning's brush-belt could be used successfully for that purpose because, *inter alia*, a [person of ordinary skill in the art] would not predict that Koning's belt would successfully receive, retain or convey small seeds on its own due to the unique and unpredictable dynamics of such a belt. Ex. 2203, ¶¶ 136–138, 164–167. Fundamentally, Koning's belt, which is intended to steady potatoes while they are conveyed, is not a conveyor belt. Instead, it is a moving belt positioned over top of the potatoes; not intended to support their weight. Petitioners are thus not suggesting using a "familiar element according to known methods" to "yield predictable results." *Cf. KSR*, 550 U.S. at 401.

PO Resp. 18. Petitioner argues in reply that Koning's use of a conveyor to transport potatoes held in place by a brush belt means Koning's brush belt conveys seeds "just as in the '173 patent," because "[t]he brush belt of the '173 patent also works with a housing surface to hold the seed." Pet.

Reply 12–13 (citing Ex. 1001, 4:29–31, 4:38–39, Fig. 3; Ex. 1002 ¶¶ 48, 49, 74; Ex. 1135 ¶ 54). In this regard, the '173 patent states that "side wall 53 of

the housing cooperates with the bristles 70 to hold the seed in the brush bristles as the seed is moved to the lower opening.” Ex. 1001, 4:38–40. Petitioner’s attempt to equate a stationary side wall taught by the ’173 patent to the moving conveyor 23 of Koning is not persuasive or credible because they clearly function in different ways and serve different purposes. As Patent Owner shows, Koning makes clear that the potatoes are delivered by conveying members 23, not Koning’s brush belt, which instead relies on brush hairs to hold the potatoes on the conveying members 23. Sur-reply 13 (citing Ex. 1004, 5:8–14).

The persuasiveness of Petitioner’s argument and Mr. Prairie’s testimony—i.e., that it would have been simple for an ordinarily skilled artisan to adapt Koning’s brush belt for use in the proposed combination, where seeds are released from above for capture by the brush belt—is further undermined by Mr. Prairie’s testimony that he “can’t recall a time where I’ve seen a seed being dropped into a brush belt.” Ex. 2193, 113:5–9; *see also* Ex. 2263, 81:2–12 (“Q. And you never attempted to drop a seed onto a moving brush belt to see whether that would be inserted into the brush belt, correct? A. As I stated, for the purposes of this case, I did not do any physical experimentation with a moving brush belt as I didn’t feel it was necessary. The prior art discloses sufficient information.”) (objection omitted). Mr. Prairie has “had some industrial design projects where we’ve had to utilize brushes for various applications,” but he “ha[s] not used a brush belt to convey seed.” Ex. 2194, 297:6–16. Mr. Prairie testified that “prior to writing this declaration, brush belt technology was not a specific area that I study, that I was researching.” Ex. 2263, 79:6–9.

The basis for Mr. Prairie’s opinion, that a seed would be captured by a moving brush belt in the proposed combination, appears to only be the prior

art references themselves. Ex. 2193, 214:6–14, 118:7–23. Mr. Prairie testified that he “did not operate a brush belt for this declaration because [he] didn’t feel it was necessary to make my assessments” and he “did not do study or experimentation on a brush belt as I did not feel it was necessary.” Ex. 2263, 79:17–19, 80:2–4. Mr. Prairie’s reliance on the prior art to support his conclusions is unpersuasive because Mr. Prairie does not account for the differences discussed above between the cited references’ usage of brush belts compared to the way it is used in the proposed combination. In particular, as relevant to the discussion here, Koning does not teach using a brush belt to capture seeds that have been released from above. Mr. Prairie does not account for that difference by explaining why an ordinarily skilled artisan would expect Koning’s brush belt to effectively capture and carry seeds released from above, as in the proposed combination.

With regard to fundamental differences between how Koning transfers potatoes to the ground, versus the manner in which Petitioner proposes using Koning’s brush belt to carry seed, during his deposition Mr. Prairie resisted agreeing that the potatoes are lying on the conveyor in Koning, testifying that he takes from Koning’s description that “they are captured by that belt with brush hairs” (Ex. 2193, 99:21–22) and that “there is some weight that’s along the conveying member 23” (*id.* at 98:16–17). Mr. Prairie testified that he “do[es]n’t believe the brush hairs support the full weight of the potatoes,” but that Koning did not provide him sufficient information to answer whether the conveying member supports the majority of the weight of the potatoes. *Id.* at 106:22–107:21.

In our view, it is clear from Koning’s description that the potatoes lie on the conveyor and the purpose of the brush belt is to maintain their position relative to each other while they are moved by the conveyor.

Ex. 1004, 3:16–24, 5:3–14, Fig. 4; *see also* Ex. 2203 ¶¶ 139–140

(Dr. Glancey testifying that a simple mechanical analysis shows that in Koning, about 87% of the potatoes’ weight is supported by the conveying member). Mr. Prairie’s seeming reluctance to acknowledge the differences between the brush belt’s function in Koning versus the proposed combination undermines the persuasiveness of his testimony that the proposed combination would have been a simple application of a known technique to a known device.

By contrast, Dr. Glancey persuasively testifies that a person of ordinary skill “reviewing Koning’s disclosed assembly of using a belt with brush hairs to cover and hold potatoes when used in combination with a conveyor with a separate covering surface could not predict that such a belt would successfully receive, retain or convey small seeds on its own as would be required in Petitioners’ proposed combination.” Ex. 2203 ¶ 138; *see also id.* ¶ 136 (Dr. Glancey testifying that the brush belt of Koning “was not—and was not taught as being—a modular ‘off the shelf’ component with predictable uses”).

Dr. Glancey provides an analysis of why he reaches this conclusion as follows:

the properties of brush belts, especially belts moving at speeds corresponding to seed dispensing rates common for such small seeds, make it unlikely that seeds will enter the belt in the absence of a loading surface especially adapted to insert the seeds into the belt, and nothing in Koning’s disclosure suggests using a belt with brush hairs to support the entire weight of the seeds or to convey them without the presence of a separate conveying member.

Id. ¶ 138. Dr. Glancey also concludes that a person of ordinary skill “would not have been motivated to isolate Koning’s belt with brush hairs, remove it

from Koning’s planting machine, adapt it for use in completely different system, and repurpose it to perform a new and undisclosed function (as a conveyor), as proposed by Petitioners.” *Id.* ¶ 141. Dr. Glancey testifies as follows:

A device such as Koning’s belt that *covers* from above relatively massive seed objects such as potatoes is not the same as a device such as Hedderwick’s finned belt which alone *carries* smaller seeds. The only evidence I have seen to suggest that a [person of ordinary skill in the art] would use a brush belt for carrying seeds rather than covering them is the ’173 Patent.

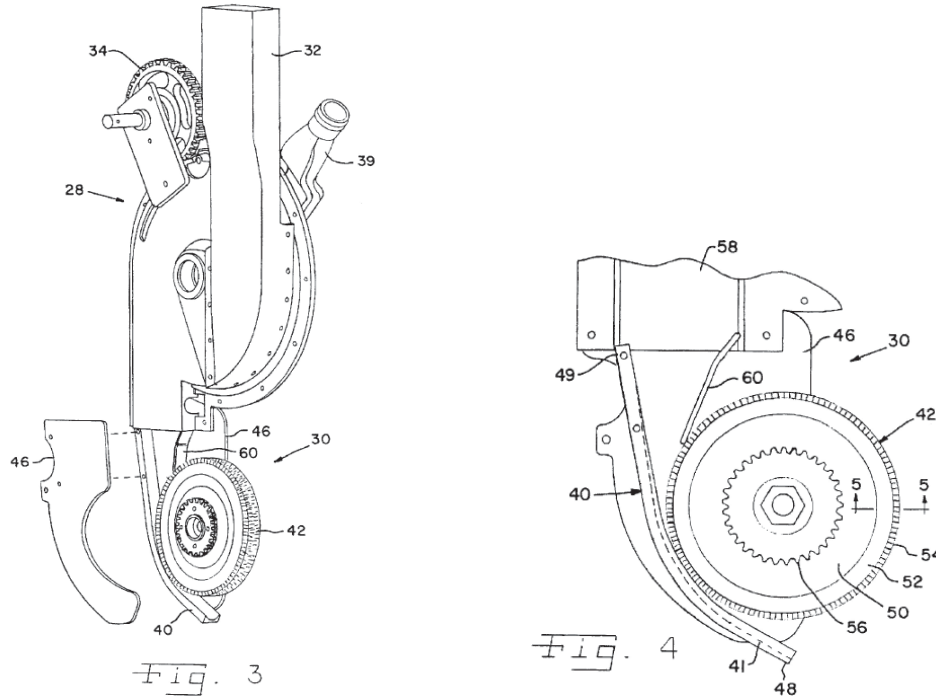
Id. ¶ 147.

In its Reply, Petitioner argues that “brush belts were well-known and used in many aspects of planting so a [person of ordinary skill in the art] would have had the knowledge necessary to make a brush belt work in Hedderwick’s system without undue experimentation.” Reply 7–8. To support this argument, Petitioner cites Koning and two other references: Thiemke¹¹ and Gould.¹² *See id.* at 7–10. In his declaration accompanying Petitioner’s Reply, Mr. Prairie discusses those same references. *See* Ex. 1135 ¶¶ 41, 42. But these two additional references do little to aid Petitioner’s case because neither Thiemke nor Gould discloses a moving brush belt that captures seeds directed directly into it from above, as Petitioner proposes in its combination.

¹¹ U.S. Patent No. 6,651,570 B1, issued November 25, 2003 (Ex. 1015, “Thiemke”).

¹² U.S. Patent No. 1,376,933 issued May 3, 1921 (Ex. 1030, “Gould”).

Figures 3 and 4 of Thiemke are reproduced below.



Figures 3 and 4 are perspective and side views, respectively, of a seed placement system. Ex. 1015, 3:5–9. Thiemke explains that seeds discharged from seed metering system 28 are guided by deflector 60 into a nip area between wheel 42 and seed slide 40. *Id.* at 5:47–54. Thiemke teaches that a “gap of approximately one millimeter between the circumferential periphery of wheel 42 and seed slide 40 ensures that the seed is gripped by gripping outside layer 54,” which can be formed of nylon bristles. *Id.* at 5:54–57, 5:1–10. Thiemke does not suggest that brush belts can capture seeds released into the brush hairs; indeed, deflector 60 prevents seed from dropping onto the top of wheel 42 in a manner that would be comparable to how Petitioner proposes seed would be captured by Koning’s brush belt in the proposed combination.

Gould describes a machine “for taking an individual plant from a quantity, depositing it positively in the ground and properly covering it, and

of operating with great rapidity.” Ex. 1030, 1:25–30. Figure 4 of Gould is reproduced below:

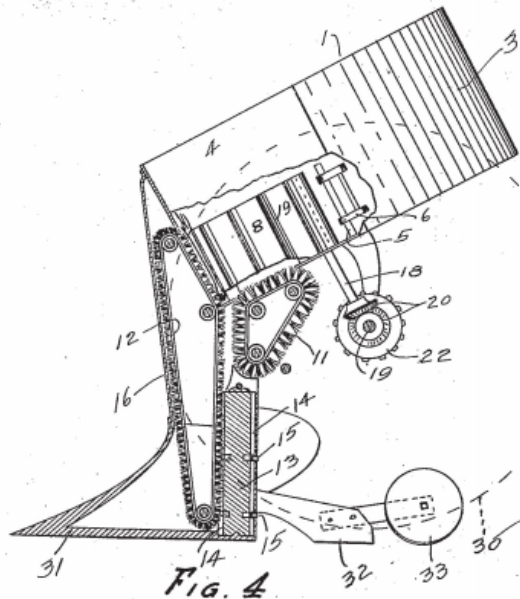


Figure 4 shows a sectional side elevation view of Gould’s plant-setting machine. *Id.* at 1:38. Gould explains that brush belt 11 operates beneath hopper 1 and “travels vertically downward . . . and cooperates with a second brush belt 12 to move the plant from the hopper.” *Id.* at 1:75–82. In considering Gould’s teaching of two vertically oriented and opposed brush belts that cooperate to move plants from a hopper, we see little relevance to Petitioner’s proposal to load seeds into a brush belt by releasing them directly into the bristles.

Petitioner additionally contends that Patent Owner’s arguments are based on the erroneous premise that an ordinarily skilled artisan must be able to physically combine the references. *See* Reply 6–7 (citing *Moultet*, 686 F.3d at 1332–33). We disagree. Patent Owner’s arguments, summarized above, simply point out that an ordinarily skilled artisan would not have expected success in combining the references’ teachings in the way Petitioner proposes. Motivation to combine and reasonable expectation of

success are properly assessed with reference to the combination as Petitioner has framed it. The Federal Circuit has explained that doing so is not inconsistent with *Mouttet*. See *Samsung*, 925 F.3d at 1382–83 (“We will not fault the Board for analyzing Petitioners’ obviousness grounds in the way presented in the Petition.”).

Petitioner also argues in its Reply that the ’173 patent does not require operation of an endless member at “any particular speed” and does not “address the purported difficulties of using a brush belt or provide any explanation of how to overcome such problems (e.g., bristle stiffness or density).” Reply 7. We agree that the ’173 patent is generic in its description of the brush belt’s characteristics. See Ex. 1001, 7:43–50 (describing that “brush bristles are the preferred embodiment, and may be natural or synthetic” but other material types can also be used); see also *id.* at 4:55 (stating that “[t]he belt shown in FIG. 3 has relatively long bristles.”); *id.* at 5:3–4 (stating that “a short bristle brush can be used as well.”). But, critically, the ’173 patent explains that a seed can be inserted into a moving brush belt by using the outer surface of a loading wheel to pinch seeds off the seed disk into the bristles of the brush belt. Ex. 1001, 4:19–40, Fig. 3; see Ex. 2203 ¶ 43. Petitioner does not point to any prior art that teaches such a solution.

It is Petitioner’s burden to establish that a person of ordinary skill would have been motivated to combine the references in the proposed manner and would have reasonably expect success in doing so. See 35 U.S.C. § 316(e); *In re Magnum Oil Tools Int’l, Ltd.*, 829 F.3d 1364, 1376 (Fed. Cir. 2016). Petitioner’s arguments and evidence do not carry that burden. Neither the references, other evidence, nor Mr. Prairie provide sufficiently persuasive evidence, even in combination, to establish why a

person of ordinary skill would have modified Hedderwick by (1) selectively gleaned only a *portion* of Koning's conveying system, i.e., belt 44 with bristles 45, (2) selectively excluding Koning's conveyor 23, and then (3) modifying Koning's brush belt by reversing its orientation so that it *carries* seeds deposited into the bristles, as in the '173 patent, rather than *covering and guiding* seeds carried by a separate and distinct conveyor, as in Koning. *See WBIP, LLC v. Kohler Co.*, 829 F.3d 1317, 1327 (Fed. Cir. 2016) (finding an absence of a motivation to reverse parts to an orientation that was "totally backwards" from what one of skill in the art would even attempt). Petitioner's arguments do not acknowledge the different function of Koning's brush belt, or explain why a person of ordinary skill would have had reason to adapt Koning's brush belt to such a use with a reasonable expectation of success in doing so.

3. Petitioner Fails to Show by a Preponderance of the Evidence a Sufficient Rationale to Support the Asserted Combination of Hedderwick, Koning, and Benac as Applied to Independent Claim 17

Independent claim 17 is directed to a "row unit of a planter," much like claim 1 which is directed to a "seed delivery apparatus." Ex. 1001, 7:56–8:6, 9:1–23. Independent claim 8, like claim 1, requires a "seed metering system," a "seed delivery system," an "endless member," and a "seed transfer device." *Id.* Petitioner does not direct us to any persuasive evidence of any substantive differences between claims 1 and 17 that would cause a different analysis or conclusion for claim 17 from the conclusion reached for claim 1. *See* Pet. 25–31 (addressing the motivation to combine asserted by Petitioner as to all Challenged Claims). Accordingly, based on the analysis and evidence discussed above for claim 1, we determine that Petitioner fails to show by a preponderance of the evidence a sufficient

rationale to support the asserted combination of Hedderwick, Koning, and Benac as applied to independent claim 17 for the same reasons discussed above with respect to claim 1.

4. Petitioner Fails to Show by a Preponderance of the Evidence a Sufficient Rationale to Support the Asserted Combination of Hedderwick, Koning, and Benac as Applied to Dependent Claims 2–4, 6–9, 11–16, and 18–20

Dependent claims 2–4, 6–9, 11–16 depend from claim 1, and dependent claims 18–20 depend from claim 17. Petitioner does not direct us to any persuasive evidence of any substantive differences between claims 2–4, 6–9, 11–16, and 18–20 and the claims from which they depend that would cause a different analysis or conclusion for claims 2–4, 6–9, 11–16, and 18–20 from the conclusion reached for the claims from which they depend. *See* Pet. 25–31 (addressing the motivation to combine asserted by Petitioner as to all Challenged Claims). Accordingly, based on the analysis and evidence discussed above for claim 1, we determine that Petitioner fails to show by a preponderance of the evidence a sufficient rationale to support the asserted combination of Hedderwick and Koning as applied to dependent claims 2–4, 6–9, 11–16, and 18–20 for the same reasons discussed above with respect to the claims from which they depend.

5. Petitioner Fails to Show by a Preponderance of the Evidence that any of the Challenged Claims Would Have Been Obvious Over Hedderwick, Koning, and Benac

The existence of common elements found in both the challenged claims and the references relied on by Petitioner does not establish that the challenged claims would have been obvious. “[A] patent composed of several elements is not proved obvious merely by demonstrating that each of its elements was, independently, known in the prior art.” *KSR*, 550 U.S.

at 418. “[I]nventions in most, if not all, instances rely upon building blocks long since uncovered, and claimed discoveries almost of necessity will be combinations of what, in some sense, is already known.” *Id.* at 418–419.

Petitioner fails to meet its burden of providing a sufficiently persuasive explanation or reason for concluding that one of skill in the art would have had reasons or been motivated to combine Hedderwick, Koning, and Benac in a manner that corresponds to any of the Challenged Claims. “Without any explanation as to how or why the references would be combined to arrive at the claimed invention, we are left with only hindsight bias.” *Metalcraft of Mayville, Inc. v. The Toro Company*, 848 F.3d 1354, 1367 (Fed. Cir. 2017). “[W]e cannot allow hindsight bias to be the thread that stitches together prior art patches into something that is the claimed invention.” *Id.* *KSR* cautions a factfinder to be aware of the “distortion caused by hindsight bias” and to be “cautious of arguments reliant upon ex post reasoning. *KSR*, 550 U.S. at 421 (emphasis omitted). Petitioner’s proposed combination of the cited references does not meet its burden of providing a sufficiently persuasive evidence-based reason why a person of ordinary skill would have selectively gleaned isolated elements from Koning, modified their operation, and then combined them with Hedderwick to arrive at the invention recited in independent claim 1, or any other of the Challenged Claims. Based on the Petition and the evidence of record, we determine that Petitioner has not established by a preponderance of the evidence that any of the Challenged Claims would have been unpatentable over the asserted combination of Hedderwick, Koning, and Benac.

IV. CONSTITUTIONAL CHALLENGE

In a single sentence, Patent Owner states it “challenges the constitutionality of, and the panel’s authority to adjudicate, this proceeding under *Arthrex, Inc. v. Smith & Nephew Inc.*, 941 F.3d 1320 (Fed. Cir. 2019).” PO Resp. 95.¹³ No additional argument or explanation of Patent Owner’s challenge is presented.

This constitutional issue has been addressed by the Federal Circuit’s decision in *Arthrex*, 941 F.3d at 1337 (“This as-applied severance . . . cures the constitutional violation.”); *see also Arthrex, Inc. v. Smith & Nephew, Inc.*, 953 F.3d 760, 764 (Fed. Cir. 2020) (Moore, J., concurring in denial of rehearing) (“Because the APJs were constitutionally appointed as of the implementation of the severance, *inter partes* review decisions going forward were no longer rendered by unconstitutional panels.”). Accordingly, we do not consider this issue any further for this Decision.

V. CONCLUSION

The outcome for the Challenged Claims in this proceeding is set forth below. In summary:

Claims	35 U.S.C. §	References/Basis	Claims Shown Unpatentable	Claims Not Shown Unpatentable
1–4, 6–9, 11–20	103	Hedderwick, Koning, Benac		1–4, 6–9, 11–20

¹³ We note that the Supreme Court has accepted this case for review. *Arthrex, Inc. v. Smith & Nephew, Inc.*, 941 F.3d 1320 (Fed. Cir. 2019), *cert. granted sub nom. United States v. Arthrex, Inc.*, 2020 WL 6037206 (Oct. 13, 2020).

VI. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that claims 1–4, 6–9, 11–20 of U.S. Patent No. 10,004,173 B2 have not been proven by a preponderance of the evidence to be unpatentable;

FURTHER ORDERED that Petitioner’s Motion to Exclude is denied in part and dismissed in part;

FURTHER ORDERED that Patent Owner’s Motion to Exclude is dismissed; and

FURTHER ORDERED that, because this is a final written decision, parties to this proceeding seeking judicial review of our Decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.

IPR2019-01054
Patent 10,004,173 B2

For PETITIONER:

Grant K. Rowan
Mary V. Sooter
Natalie Pous
WILMER, CUTLER, PICKERING, HALE,
& DORR, LLP
grant.rowan@wilmerhale.com
mindy.sooter@wilmerhale.com
natalie.pous@wilmerhale.com

For PATENT OWNER:

Jay I. Alexander
Peter P. Chen
Rajesh D. Paul
Nicholas L. Evoy
Richard L. Rainey
COVINGTON & BURLING LLP
jalexander@cov.com
pchen@cov.com
rpaul@cov.com
nevoy@cov.com
rrrainey@cov.com