

CONFIDENTIAL – PROTECTIVE ORDER MATERIAL

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ENVIROTAINER AB,
Petitioner,

v.

DOUBLEDAY ACQUISITIONS, LLC,
Patent Owner.

IPR2022-00292
Patent 7,263,855 B2

Before KEN B. BARRETT, ERIC C. JESCHKE, and
RICHARD H. MARSCHALL, *Administrative Patent Judges*.

MARSCHALL, *Administrative Patent Judge*.

JUDGMENT
Final Written Decision
Determining Some Challenged Claims Unpatentable
Denying Patent Owner's and Petitioner's Motions to Exclude
35 U.S.C. § 318(a)

Petitioner Envirotainer AB challenges claims 19–21, 23, 26–31, 33, 35–37, and 41 of U.S. Patent No. 7,263,855 B2 (Ex. 1001, “the ’855 patent”), which is assigned to Patent Owner DoubleDay Acquisitions, LLC. We have jurisdiction under 35 U.S.C. § 6, and we issue this Final Written Decision pursuant to 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73 (2022). For the reasons set forth below, we determine that Petitioner has shown that claims 19–21, 28, and 31 are unpatentable and has not shown that any of the challenged claims 23, 26, 27, 29, 30, 33, 35–37, and 41 of the ’855 patent are unpatentable.

BACKGROUND

A. Procedural History

Petitioner filed a Petition requesting *inter partes* review of the challenged claims. Paper 2 (“Pet.”). Patent Owner filed a Preliminary Response. Paper 5 (“Prelim. Resp.”). Pursuant to 35 U.S.C. § 314, we instituted an *inter partes* review as to all challenged claims and all grounds raised in the Petition. Paper 8 (“Institution Decision” or “Inst. Dec.”).

After institution, Patent Owner filed a Response (Paper 16, “PO Resp.”), Petitioner filed a Reply (Paper 47, “Pet. Reply”), and Patent Owner filed a Sur-reply (Paper 57, “PO Sur-reply”). Patent Owner filed a Motion to Exclude (Paper 63), Petitioner filed an Opposition to that Motion (Paper 66), and Patent Owner filed a related Reply (Paper 69). Petitioner also filed a Motion to Exclude (Paper 64), Patent Owner filed an Opposition to that Motion (Paper 65), and Petitioner filed a related Reply (Paper 68). An oral hearing in this proceeding was held on June 14, 2023, and a transcript of the hearing is included in the record (Paper 78, “Tr.”).

B. Related Proceedings

The parties identify a proceeding in the U.S. District Court for the Northern District of Georgia involving the '855 patent: *DoubleDay Acquisitions LLC d/b/a CSafe Global v. Envirotainer AB*, No. 1-21-cv-03749 (N.D. Ga.), filed Sept. 10, 2021 (the "Georgia Litigation"). Pet. 100; Paper 3 (Patent Owner's Mandatory Notice) at 2. The Georgia Litigation also involves U.S. Patent No. 7,913,511 B2 ("the '511 patent"). Pet. 100; Paper 3 at 2. Petitioner also filed a petition for *inter partes* review of claims 1–5, 7–36, 40, and 41 of the '855 patent in IPR2022-00864. *See* IPR2022-00864, Paper 2; *see also* IPR2022-00292, Paper 7 (Patent Owner Updated Mandatory Notices) at 1 (listing same).

Petitioner also filed two petitions for *inter partes* review challenging certain claims of the '511 patent. In IPR2022-00293, Petitioner challenges claims 1, 2, 7–11, 30, and 31 of the '511 patent. *See* IPR2022-00293, Paper 2; *see also* IPR2022-00292, Paper 7 (Patent Owner Updated Mandatory Notices) at 1 (listing same). In IPR2022-00851, Petitioner challenges claims 1–19, 39, and 40 of the '511 patent. *See* IPR2022-00851, Paper 2; *see also* IPR2022-00292, Paper 7 (Patent Owner Updated Mandatory Notices) at 1 (listing same).

1. The '855 Patent

The '855 patent relates to cargo containers for transporting temperature-sensitive cargo. Ex. 1001, codes (54), (57). Figure 2 is reproduced below:

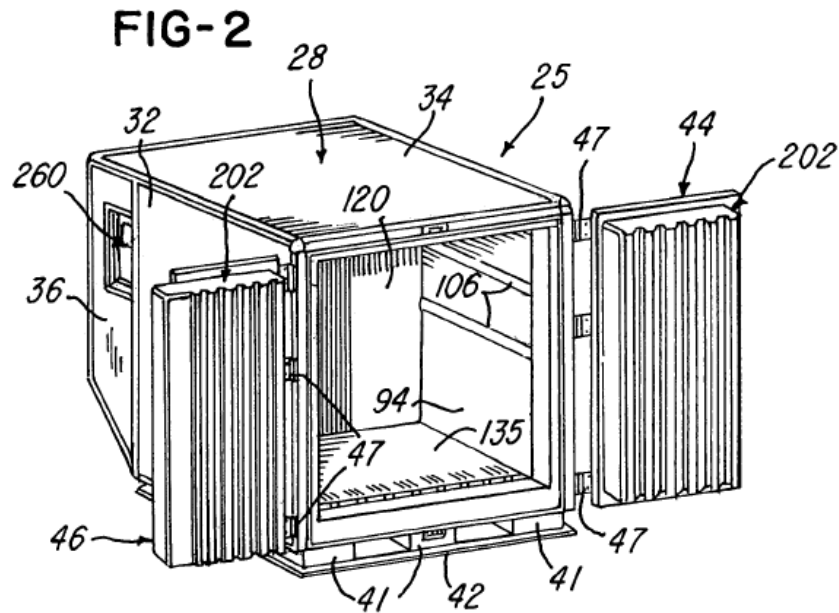


Figure 2 is a perspective view of a cargo container with the doors in their open positions. Ex. 1001, 2:41–45. Cargo container 25 in Figure 2 includes shell-sub-assembly 50 as well as outer housing 28, which is “formed of sheet aluminum and aluminum corner trim and sometimes referred to as a ‘can.’” *Id.* at 3:14–16. Outer housing 28 “includes opposite side walls 32, a removable top wall 34, a rear wall enclosure 36 and a bottom wall 38,” shown in Figure 3.¹ *Id.* at 3:16–19. In addition, outer housing 28 is supported by hollow aluminum supports or legs 41, connected to aluminum base plate 42, that are arranged to allow container 25 to be raised with a forklift. *Id.* at 3:19–22. Outer housing 28 also supports swinging door units or assemblies 44/46, each of which are supported by hinges 47. *Id.* at 3:25–28.

¹ In this Decision, we omit emphasis on reference numerals and claim numbers in quotations from the ’855 patent and prior art references.

Figure 6 is reproduced below:

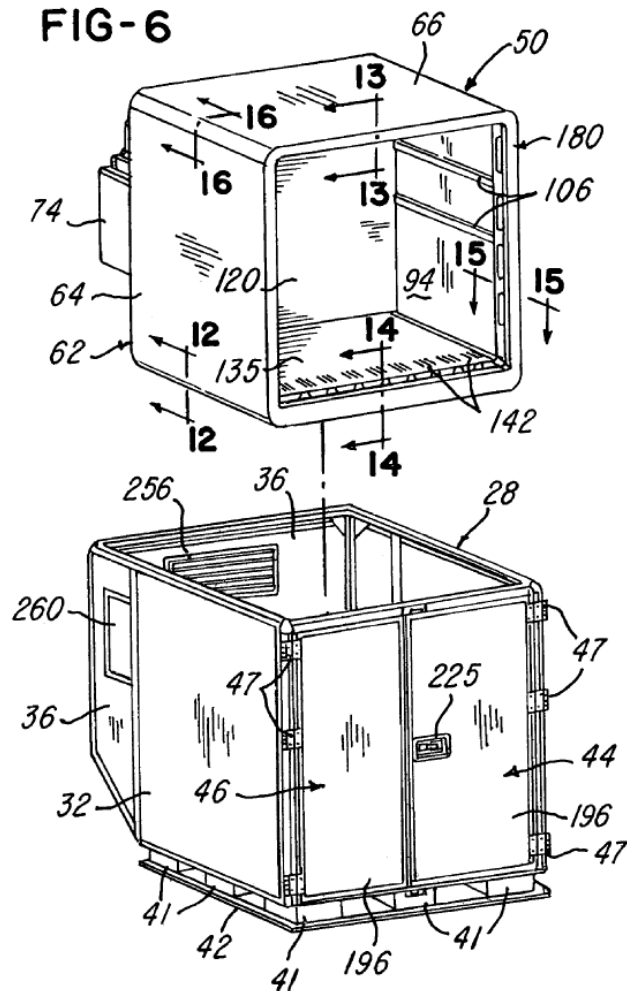


Figure 6 “is an exploded perspective view of the shell sub-assembly before being inserted into the outer housing assembly.” Ex. 1001, 2:53–55.

Referring to Figure 6, the ’855 patent discloses that

before the top wall 34 of the housing is installed, the housing 28 receives a shell sub-assembly 50[,] which includes a molded composite box-like outer shell 54 (FIGS. 5 & 6) and a molded composite box-like inner shell 56, shown exploded in FIG. 5.

Ex. 1001, 3:29–33.

Figure 5 is reproduced below:

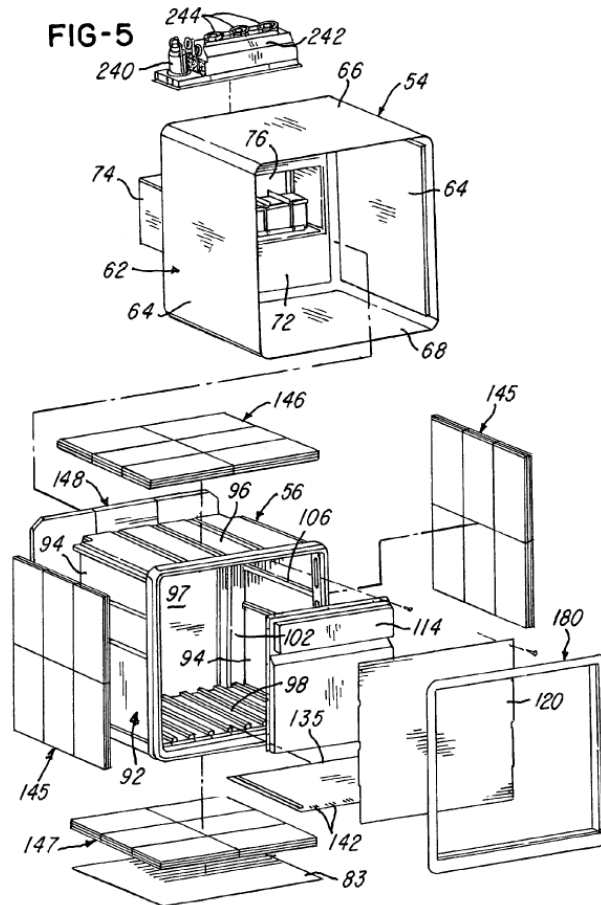
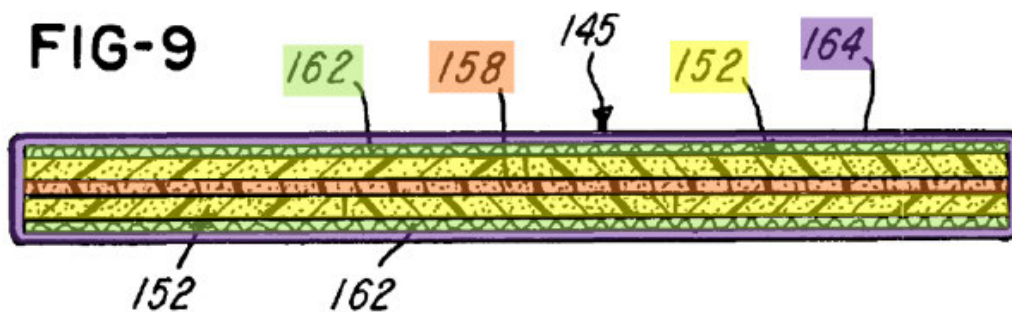


Figure 5 is an exploded view of a shell sub-assembly that is inserted into the outer housing assembly. See Ex. 1001, 2:50–52. Figure 5 shows molded composite box-like outer shell 54, which supports refrigeration compressor 240 and condenser 242 with a housing supporting fans 244. See *id.* at 3:29–33, 6:38–42. In addition, Figure 5 shows flat panel thermal insulation cartridges or cassettes 145–148, which “are confined or sandwiched” between the walls of outer shell 54 and inner shell 56. *Id.* at 4:48–51.

Figure 9 is reproduced below, with highlighting added by Petitioner:



Pet. 6. Figure 9 depicts a cross-section of an assembled insulation cartridge or cassette used in the walls of the shell sub-assembly. Ex. 1001, 2:58–62.

In the annotated version of Figure 9, Petitioner added (1) orange highlighting to sheet 158 of expanded polystyrene foam, (2) yellow highlighting to two layers 152 of vacuum insulated panels, (3) green highlighting to two outer sheets 162 of extruded corrugated plastic, and (4) purple highlighting to flexible film 164 of fire-retardant plastic material. See *id.* at 4:62–5:4.

D. Challenged Claims

Petitioner challenges claims 19–21, 23, 26–31, 33, 35–37, and 41, of which claims 19 and 35 are independent. Claims 20, 21, 23, 26–31, and 33 ultimately depend from claim 19, and claims 36, 37, and 41 ultimately depend from claim 35. Independent claim 19 is reproduced below, with alphanumeric designations to identify each clause:

19. [19.Pre] A cargo container assembly adapted for transporting a temperature sensitive cargo supported by a pallet, [19.A] said assembly comprising a box-like composite outer shell having side, top and bottom walls of resin impregnated fibers and having a front opening and a moveable door assembly for closing said front opening, [19.B] a box-like composite inner shell within said outer shell and having side, top and bottom walls disposed inwardly from the corresponding said walls of

said outer shell and defining a cargo receiving chamber, [19.C] vacuum insulated panel assemblies confined between the corresponding said side, top and bottom walls of said inner and outer shells, and [19.D] a refrigeration system connected to cool said chamber.

Ex. 1001, 9:44–56.²

E. Asserted Grounds of Unpatentability

Petitioner challenges claims 19–21, 23, 26–31, 33, 35–37, and 41 on the following grounds:

Claim(s) Challenged	35 U.S.C. §³	Reference(s)/Basis
19, 20, 23, 28	102(a)	Kuhn ⁴
19–21, 23, 26–30	103(a)	Kuhn, Loeffler ⁵
19–21, 23, 26–28, 31, 33, 35–37, 41	103(a)	Sinclair, ⁶ Kuhn
19–21, 28, 31, 35–37	103(a)	Ekerot, ⁷ Cur ⁸

² We adopt Petitioner’s designations for the elements of the challenged claims. *See, e.g.*, Pet. 13–19 (showing alphanumeric designations for the language in the challenged claims). We apply these designations below.

³ The Leahy-Smith America Invents Act (“AIA”) included revisions to 35 U.S.C. §§ 102, 103 that became effective on March 16, 2013. Pub. L. No. 112-29, §§ 3(b)–3(c), 3(n)(1), 125 Stat. 284, 285–87, 293 (2011). Because there is no dispute that the challenged claims of the ’855 patent have an effective filing date before March 16, 2013, we apply the pre-AIA versions of these statutes.

⁴ International Publication No. WO 2004/104498 A2, published December 2, 2004 (Ex. 1005, “Kuhn”).

⁵ International Publication No. WO 2004/045987 A2, published June 3, 2004 (Ex. 1006, “Loeffler”).

⁶ GB 1,117,899, published June 26, 1968 (Ex. 1007, “Sinclair”).

⁷ US 2003/0019870 A1, published January 30, 2003 (Ex. 1008, “Ekerot”).

⁸ US 5,082,335, issued January 21, 1992 (Ex. 1009, “Cur”).

Claim(s) Challenged	35 U.S.C. §³	Reference(s)/Basis
19–21, 29–31	103(a)	Broussard, ⁹ Cur

Petitioner supports its challenges with the Declarations from Michael Jobin (Exs. 1003, 1049), Dan Mattsson (Ex. 1050), and Lauren Kindler (Ex. 1051). Patent Owner relies on the Declarations of Nicholas Wynne (a named inventor on the '855 patent) (Exs. 2001, 2019), Sam Rowles (Ex. 2020), Pamela S. Jones (Ex. 2021), Jonathan Neeld (Ex. 2022), Dr. Kimberly K. Cameron (Ex. 2023), Melissa A. Bennis (Ex. 2024), Jennifer Bush (Ex. 2026), and Jeff Sitzlar (Ex. 2162).

ANALYSIS

A. Legal Standards

To prevail in its challenges, Petitioner must prove unpatentability by a preponderance of the evidence. 35 U.S.C. § 316(e) (2018); 37 C.F.R. § 42.1(d). “In an [*inter partes* review], the petitioner has the burden from the onset to show with particularity why the patent it challenges is unpatentable.” *Harmonic Inc. v. Avid Tech., Inc.*, 815 F.3d 1356, 1363 (Fed. Cir. 2016) (citing 35 U.S.C. § 312(a)(3) (requiring *inter partes* review petitions to identify “with particularity . . . the evidence that supports the grounds for the challenge to each claim”)). This burden of persuasion never shifts to Patent Owner. *See Dynamic Drinkware, LLC v. Nat’l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015) (discussing the burdens of proof in an *inter partes* review).

⁹ US 2004/0226309 A1, published November 18, 2004 (Ex. 1012, “Broussard”).

Petitioner relies on both anticipation and obviousness in its challenges. To anticipate a claim under 35 U.S.C. § 102, “a single prior art reference must expressly or inherently disclose each claim limitation.” *Finisar Corp. v. DirectTV Group, Inc.*, 523 F.3d 1323, 1334 (Fed. Cir. 2008). That “single reference must describe the claimed invention with sufficient precision and detail to establish that the subject matter existed in the prior art.” *Verve, LLC v. Crane Cams, Inc.*, 311 F.3d 1116, 1120 (Fed. Cir. 2002).

A claim is unpatentable as obvious under 35 U.S.C. § 103 if the differences between the claimed subject matter and the prior art are such that the subject matter, as a whole, would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations, including: (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of skill in the art; and (4) where in evidence, so-called secondary considerations, also known as objective indicia of nonobviousness. *Graham v. John Deere Co. of Kansas City*, 383 U.S. 1, 17–18 (1966).

An obviousness analysis must include a reason, based upon rational underpinnings, why a person of ordinary skill would have been motivated to modify the prior art to achieve the claimed invention. *In re Magnum Oil Tools Int’l, Ltd.*, 829 F.3d 1364, 1380 (Fed. Cir. 2016) (“To satisfy its burden of proving obviousness, a petitioner . . . must . . . articulate specific reasoning, based on evidence of record, to support the legal conclusion of

obviousness.” (citing *KSR*, 550 U.S. at 418)). The requirement of a reason to combine is a safeguard against hindsight bias, which is characterized by the “temptation to read into the prior art the teachings of the invention in issue.” *KSR*, 550 U.S. at 421 (quoting *Graham*, 383 U.S. at 36).

Objective evidence of nonobviousness “play[s] an important role as a guard against the statutorily proscribed hindsight reasoning in the obviousness analysis.” *WBIP, LLC v. Kohler Co.*, 829 F.3d 1317, 1328–30 (Fed. Cir. 2016). The objective indicia “may often be the most probative and cogent evidence in the record,” and “must be considered in *every* case.” *Id.* at 1328 (quotation omitted).

In order to accord substantial weight to objective indicia of nonobviousness, “the evidence of secondary considerations must have a ‘nexus’ to the claims, *i.e.*, there must be ‘a legally and factually sufficient connection’ between the evidence and the patented invention.” *Henny Penny Corp. v. Frymaster LLC*, 938 F.3d 1324, 1332 (Fed. Cir. 2019) (quoting *Demaco Corp. v. F. Von Langsdorff Licensing Ltd.*, 851 F.2d 1387, 1392 (Fed. Cir. 1988)). Patent Owner bears the burden of establishing a nexus between the objective indicia and the claimed invention. *See Fox Factory, Inc. v. SRAM, LLC*, 944 F.3d 1366, 1373 (Fed. Cir. 2019). “[A] patentee is entitled to a rebuttable presumption of nexus between the asserted evidence of secondary considerations and a patent claim if the patentee shows that the asserted evidence is tied to a specific product and that the product ‘*is* the invention disclosed and claimed.’” *Id.* (quoting *Demaco Corp.*, 851 F.2d 1387 at 1392). Even absent a presumption of nexus, a nexus still exists between the objective indicia and the claimed invention when “the evidence of secondary considerations is the ‘direct

result of the unique characteristics of the claimed invention.” *Id.* at 1373–74; *see also Lectrosonics, Inc. v. Zaxcom, Inc.*, IPR2018-01129, Paper 33 at 32–33 (PTAB Jan. 24, 2020) (precedential) (absent a presumption, the patent owner can still “prove nexus by showing that the evidence of secondary considerations is the direct result of the unique characteristics of the claimed invention” (citations omitted)), *aff’d, Zaxcom, Inc. v. Lectrosonics, Inc.*, Appeal Nos. 2020-1921, -1922, -1943, -1944, 2022 WL 499848 (Fed. Cir. Feb. 18, 2022). Although consideration of the “unique characteristics of the claimed invention” plays a part in the analysis, “[w]here the allegedly obvious patent claim is a combination of prior art elements, . . . the patent owner can show that it is the claimed combination as a whole that serves as a nexus for the objective evidence; proof of nexus is not limited to only when objective evidence is tied to the supposedly ‘new’ feature(s).” *WBIP*, 829 F.3d at 1330.

B. The Level of Ordinary Skill in the Art

The level of ordinary skill in the art is “a prism or lens” through which we view the prior art and the claimed invention. *Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001). The person of ordinary skill in the art is a hypothetical person presumed to have known the relevant art at the time of the invention. *In re GPAC Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995). In determining the level of ordinary skill in the art, we may consider certain factors, including the “type of problems encountered in the art; prior art solutions to those problems; rapidity with which innovations are made; sophistication of the technology; and educational level of active workers in the field.” *Id.*

Petitioner contends that a person having ordinary skill in the art (“PHOSITA” or “POSITA”) would have had “at least a Bachelor’s degree in mechanical or structural engineering, or a related field, and two years of experience designing structures with comparable mechanical and/or structural elements to the subject matter of the ’855 Patent.” Pet. 10 (citing Ex. 1003 ¶¶ 22–25). Petitioner adds that “[a]dditional experience may compensate for less education. *Id.* Patent Owner does not dispute Petitioner’s proposed definition of the level of ordinary skill in the art or offer an alternative proposal. *See generally* PO Resp.

We adopt the definition of the level of ordinary skill in the art proposed by Petitioner because it appears consistent with the record, including the prior art. *See In re GPAC*, 57 F.3d at 1579.

C. Claim Construction

In *inter partes* reviews, the Board interprets claim language using the same claim construction standard that would be used in a civil action under 35 U.S.C. § 282(b), as described in *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc). *See* 37 C.F.R. § 42.100(b). Under that standard, we generally give claim terms their ordinary and customary meaning, as would be understood by a person of ordinary skill in the art at the time of the invention, in light of the language of the claims, the specification, and the prosecution history. *See Phillips*, 415 F.3d at 1313–14. Although extrinsic evidence, when available, may also be useful when construing claim terms under this standard, extrinsic evidence should be considered in the context of the intrinsic evidence. *See id.* at 1317–19. We need not construe explicitly any claim terms that would not change the outcome of the analysis below. *See Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d

1013, 1017 (Fed. Cir. 2017) (stating that “we need only construe terms ‘that are in controversy, and only to the extent necessary to resolve the controversy’” (quoting *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999))).

1. Refrigeration System

“Refrigeration system” appears in independent claim 19. Petitioner did not propose any express constructions in the Petition and asserted that the claims should be “interpreted with their ordinary and customary meaning as understood from the perspective of PHOSITA.” Pet. 8. Prior to institution, Patent Owner did not propose any formal claim constructions and, based on that record, we determined in our Institution Decision that we did not need to construe any claim terms. *See* Inst. Dec. 14–15. We did note, however, that in the context of Petitioner’s challenge to claim 19 based on Kuhn, Patent Owner argued that “Kuhn does not satisfy the ‘refrigeration system’ limitation because Kuhn teaches a ‘passive’ cooling system rather than an ‘active’ cooling system, as required by claim 19.” *Id.* at 19 (citing Prelim. Resp. 11–14). We determined that “[a]lthough the parties have not fully discussed this issue (and have not discussed the claim language or the prosecution history),” based on the current record at the institution stage, we agreed with Patent Owner that the specification focuses on active systems driven by electrical power. *Id.* at 20.

After institution, both parties addressed the scope of “refrigeration system.” Patent Owner argues that a person of ordinary skill in the art “would understand the term ‘refrigeration system’ to mean ‘a powered compressor based active cooling system.’” PO Resp. 16. Patent Owner acknowledges that its construction differs “slightly” from the construction it

originally proposed in the Georgia Litigation, and asserts that its current construction “is the correct one because it ‘stays true to the claim language and most naturally aligns with the patent’s description of the invention.’” *Id.* (quoting *Phillips*, 415 F.3d at 1316) (citing Ex. 2023 ¶ 26). Patent Owner argues that its “construction relies on this extensive intrinsic record and comports with the plain meaning of ‘refrigeration system’” and that the “specification *exclusively* discusses powered, compressor based active cooling systems, as Jobin confirmed.” *Id.* at 16–17 (citing Ex. 2023 ¶¶ 27–32; Ex. 2025, 66:14–67:2, 69:25–71:16, 72:20–73:8, 74:7–77:11, 78:7–16; Inst. Dec. 20).

Petitioner argues that the intrinsic record does not support Patent Owner’s construction because it includes three references incorporated by reference by the ’855 patent that “collectively characterize *passive* cooling as ‘refrigerating unit[s]’ that provide ‘refrigeration.’” Pet. Reply 1–2 (citing Ex. 1012 ¶ 8; Ex. 1031, code (57), 1:21–30; Ex. 1049 ¶¶ 287–292; Ex. 1062, 540:4–545:10; Ex. 1064, 8:1–16; Ex. 2025, 49:1–23, 78:17–81:16). Petitioner contends that Patent Owner admitted that one of these references, “Broussard, is *intrinsic*” and that another of the incorporated references, “Broussard’s provisional, included two named inventors.” *Id.* at 2 (citing Ex. 1064, 4; Ex. 1068, 2). Petitioner argues that “the intrinsic record does not equate ‘refrigeration’ with active cooling, much less affirmatively *exclude* ‘desirable’ passive cooling.” *Id.* Petitioner also argues that others in the industry use the terms “refrigeration” and “refrigerant” in the passive cooling context, “confirming” a PHOSITA’s understanding of the term that encompasses passive cooling. *Id.* (citing Ex. 1045; Ex. 1046 4–6, 27; Ex. 1047 § 5.1.2; Ex. 1049 ¶¶ 293–300; Ex. 1066, code (57), Figs. 1–4,

1:34–55; Ex. 1067, code (57), Fig. 2, 4:13–38, 6:57–66). Petitioner further argues that “Dr. Cameron acknowledged ‘passive refrigeration’ exists: her unsupported belief is only that ‘active and passive’ is specified before ‘refrigeration’ when referring to both.” *Id.* (citing Ex. 2023 ¶ 30). Finally, Petitioner argues that when Patent Owner “sought to specify compressor-based active systems, it did so explicitly” in claims 10, 27, 35. *Id.* at 3 (citing Ex. 1001, claims 10, 27, 35).

In its Sur-reply, Patent Owner describes the references incorporated by reference into the ’855 patent as “irrelevant” because “the patent generically describes [the references] as known cooling or heating means, not as ‘refrigeration systems.’” PO Sur-reply 1 (citing Ex. 1001, 1:6–58). Patent Owner also argues that “Petitioner’s new *extrinsic* ‘evidence’ consistently adds the term ‘passive’ to refer to passive systems and is equally unpersuasive.” *Id.* at 1–2 (citing Ex. 1045, 2; Ex. 1046 ¶ 4; Ex. 1047, 28; Ex. 1062, 593:8–597:4; Ex. 1067, 2:26–33; Ex. 2184, 31:14–32:9; Ex. 2186). Patent Owner further contends that Petitioner’s claim differentiation cases support Patent Owner’s construction because they adopted narrower constructions and “the dependent claims cited here include additional words beyond the proposed construction.” *Id.* at 2 (citing Pet. Reply 3).

We begin our analysis with the claim language. Here, “refrigeration system” in claim 19 does not include any modifiers that suggest we should limit the scope of the language to “passive” or “active” refrigeration, much less “a powered compressor based active cooling system” as Patent Owner proposes in its construction. *See* PO Resp. 16. On its face, the claim language strongly supports Petitioner’s position.

The language of other claims also supports Petitioner’s position, as Petitioner notes, because other claims specifically claim the “compressor” that Patent Owner seeks to add via the construction of “refrigeration system.” *See* Pet. Reply 3 (citing Ex. 1001, claims 10, 27, 35). For example, claim 27, which ultimately depends from claim 19, requires a “refrigeration compressor,” while independent claim 35 requires a “power operated refrigeration unit with an evaporator within the inner shell and connected to a motor driven compressor.” Ex. 1001, claims 27, 35. These other claims do not *require* that we reject Patent Owner’s construction, but they do suggest that when Patent Owner sought to limit its claims to “a powered compressor based active cooling system” it knew how to do so, and the absence of that language in claim 19’s broad reference to a “refrigeration system” suggests that we should not read the “compressor based” language into claim 19. *See, e.g., Phillips*, 415 F.3d at 1315 (“[T]he presence of a dependent claim that adds a particular limitation gives rise to a presumption that the limitation in question is not present in the independent claim.”).

We next address the specification. Patent Owner does not argue that the specification of the ’855 patent expressly defines “refrigeration systems” or expressly distinguishes active, compressor-based systems from passive systems in a manner that would suggest “refrigeration system” in claim 19 must be read to exclude passive systems. *See* PO Resp. 16–17. Instead, Patent Owner argues that consistent usage of “refrigeration system” language to refer to “a powered compressor based active cooling system” within the specification of the ’855 patent supports its construction. *See id.* We agree with Patent Owner that “refrigeration system” as used in the specification of the ’855 patent generally refers to compressor-based, active

systems. *See* Ex. 1001, 6:38–43. Nevertheless, the specification also incorporates by reference several patents and publications, and Patent Owner does not dispute that those incorporated documents are also part of the intrinsic record. *See* Ex. 1001, 1:6–30 (incorporating several patents and applications by reference). The documents the ’855 patent incorporates by reference are “effectively part of” the ’855 patent as if they “were explicitly contained therein.” *X2Y Attenuators, LLC v. Int’l Trade Comm’n*, 757 F.3d 1358, 1362–63 (Fed. Cir. 2014) (citations omitted); *see also Palo Alto Networks, Inc. v. Finjan, Inc.*, 777 F. App’x 501, 507 (Fed. Cir. 2019) (affirming construction that relied on broader disclosure in incorporated by reference material).

Patent Owner does not dispute that several of the documents the specification incorporates by reference disclose passive refrigeration systems. *See* Ex. 1012 ¶ 8 (describing “refrigerated shipping containers” that “provide refrigeration” using, for example, dry ice and “conduction or convection”); Ex. 1031, code (57) (describing “refrigeration unit” that provides refrigeration by employing an airflow path around an icebox), 1:21–30. Although those references do not use the precise claim language “refrigeration system” in the context of describing passive refrigeration, they undoubtedly disclose *systems* that provide *refrigeration* passively. *See* Ex. 1031, code (57); Ex. 1012 ¶ 8. The ’855 patent, rather than criticize these passive approaches, refers generally to the incorporated documents as disclosing “desirable” cargo containers that include cooling means to maintain temperatures. *See* Ex. 1001, 1:13–30. Moreover, the incorporated references do not routinely add the word “passive” every time they describe the systems, as Patent Owner suggests and which might support the

argument that “refrigeration system” without a “passive” modifier must refer to only active systems. *See* PO Sur-reply 1–2; Ex. 1012 ¶ 8 (describing passive refrigeration as “refrigeration” without using the word “passive”); Ex. 1031, code (57) (same). The incorporated documents generally support Petitioner’s argument that we should not limit “refrigeration system” to compressor-based, active systems when the intrinsic record also discloses passive systems that the ’855 patent itself refers to positively. *See* Pet. Reply 1–3; Ex. 1001, 1:13–30. We also find the testimony of Petitioner’s expert on these points credible because it finds support in the intrinsic record and other literature describing both active and passive “refrigeration systems.” *See* Ex. 1049 ¶¶ 287–300; *see also id.* ¶ 291 (“[T]he intrinsic record refers to ‘refrigeration’ as both active and passive cooling. It never expressly excludes ‘desirable’ passive cooling from refrigeration.”).

The passive refrigeration approaches described in the intrinsic record undermine Patent Owner’s assertion that “refrigeration system” in claim 19 must refer to only “a powered compressor based active cooling system.” When read in light of the broader claim language in claim 19 and specific references to compressor-based systems in other claims, the specification does not mandate Patent Owner’s narrow reading of the term. Based on the foregoing, we decline to limit “refrigeration system” in claim 19 to “a powered compressor based active cooling system” as Patent Owner argues. Instead, we give “refrigeration system” its ordinary meaning, which includes passive refrigeration systems.

2. *Insulation Cassette*

Dependent claims 21, 28, 37¹⁰ include the term “insulated cassette” or “insulation cassettes.” *See* Ex. 1001, claims 21, 28, 37. Patent Owner argues that we should construe “insulation cassette” to mean “at least two VIP¹¹ layers that each have multiple VIPs, separated by a plastic sheet or foam layer and sandwiched between two outer plastic sheets all wrapped in a flexible plastic material.” PO Resp. 19 (citing Ex. 2023 ¶¶ 33–35). Patent Owner relies on the specification of the ’855 patent for its construction. *Id.* at 17–18. According to Patent Owner, “[e]very time the patent describes an ‘insulation cassette,’ it comprises multiple VIP layers (e.g., 152), each with multiple VIP panels (e.g., 155), VIP layers separated by a flat sheet of plastic or foam (e.g., 158) and sandwiched between two outer plastic sheets (e.g., 162) with the entire structure wrapped with a plastic film.” *Id.* at 17–18 (citing Ex. 1001, 2:15–21, 4:48–5:1). Patent Owner also refers to colorized versions of Figures 8 and 9 and contends that Petitioner’s expert “described the cassettes in the same manner using” colored Figs. 8 and 9, but did not construe the term. *Id.* at 19 (citing Ex. 1003 ¶¶ 79–81; Ex. 2025, 85:9–14, 85:23–86:15, 87:3–91:10).

Petitioner takes issue with Patent Owner’s argument that “every time” the ’855 patent describes insulation cassettes, the cassettes have the same

¹⁰ Patent Owner does not refer to specific claim numbers in its claim construction arguments or note that claims 21 and 37 require an “insulated cassette” while claim 28 requires “insulation cassettes,” but Patent Owner appears to argue that its construction applies equally to all claims referring to a “cassette or “cassettes.” *See* PO Sur-reply 27 (referring to “the insulation cassette elements in claims 28 (and 21 for Grounds 2–3)”). Our discussion applies to all claims using these terms.

¹¹ “VIP” refers to a vacuum insulated panel. Pet. 2; PO Resp. 2.

structure as “Figures 8–9’s multi-layer structure.” Pet. Reply 3 (citing PO Resp. 17–18). According to Petitioner, Patent Owner ignores that the ’855 patent merely states that the insulation cassettes “may” have the described structure. *Id.* (citing Ex. 1001, 2:17–21). Petitioner also argues that “these cassettes were obvious” irrespective of how we construe the limitation. *Id.*

We first consider the language of the claims. The claims at issue here not only refer to “insulated cassette” or “insulation cassettes,” but also refer to specific structures required in the cassettes. For example, claim 21 depends from claim 20, which requires VIP assemblies comprising “parallel substantially flat insulation layers each having a plurality of vacuum insulated panels, and each of said panels including a core of porous material confined within an evacuated sealed bag of flexible gas impermeable film.” Ex. 1001, claim 20. Claim 21 further requires “wherein said layers of vacuum insulated panels are separated by an insulation panel, and said layers and insulation panel are surrounded by a flexible film of plastics material to form a vacuum insulated cassette.” *Id.* at claim 21. Dependent claims 36 and 37 are method claims that generally track claims 20 and 21. *See id.* at claims 36–37. Claim 28, which depends directly from claim 19, requires “insulation cassettes between corresponding said walls, and each said cassette including a plurality of insulation layers each having a plurality of vacuum insulated panels each including a core of porous material confined within an evacuated sealed bag of flexible gas impermeable film.” *Id.* at claim 28.

Patent Owner’s proposed construction includes some limitations already found in the claims as well as other requirements that may go beyond the claim requirements, but Patent Owner does not address any of

this additional language in its analysis. PO Resp. 17–19. Without addressing the proposed construction in that context, it remains unclear what further limitations Patent Owner proposes to add to the claims and the basis for adding them. For example, Patent Owner’s proposed construction refers to “at least two VIP layers that each have multiple VIPs,” but the claims already require multiple layers that each have multiple VIPs. *See* Ex. 1001, claims 20–21, 28, 36–37. It remains unclear whether this aspect of Patent Owner’s proposed construction adds anything to the existing claim language. Patent Owner’s proposed construction also requires VIPs “separated by a plastic sheet or foam layer and sandwiched between two outer plastic sheets all wrapped in a flexible plastic material,” but at least claims 21 and 37 appear to have similar limitations. PO Resp. 19; Ex. 1001, claims 21, 37. To the extent Patent Owner’s proposal goes further than the existing claim requirements, or seeks to add some of those requirements to claim 28, Patent Owner does not explain adequately the distinctions between its proposal and existing claim limitations and the basis for adding further requirements to the claims.

Turning to the specification, we agree with Patent Owner that Figures 8 and 9 appear to disclose insulation cassettes that contain all of the requirements found in Patent Owner’s proposed construction. *See* PO Resp. 18; Ex. 1001, Figs. 8–9. Nevertheless, Patent Owner does not point us to any portion of the specification that would lead us to conclude that the embodiments shown are anything more than merely exemplary or preferred embodiments. *See* PO Resp. 18–19. In addition, Petitioner points out that the specification appears to describe certain aspects of the cassette as merely optional, a point that Patent Owner did not address in its Sur-reply, which

did not address the “insulation cassette” construction issue directly. *See* Pet. Reply 3; PO Sur-reply 1–2; Ex. 1001, 2:17–21 (“Each cassette includes two or more layers of vacuum insulation panels which *may be* separated by a foam insulation sheet and sandwiched between corrugated protective plastic sheets, all of which are wrapped within a plastic film.” (emphasis added)). We agree with Petitioner that the specification does not support Patent Owner’s argument that every detail shown in Figures 8 and 9 must be read into any claim referring to an “insulated cassette” or “insulation cassettes.”

Based on the foregoing, we find Patent Owner’s arguments unpersuasive. Patent Owner does not address adequately the distinctions between its proposed construction and existing limitations of the claims, or the basis for adding any further limitations. In addition, even if Patent Owner properly identified those distinctions, we would be reluctant to adopt a construction that removed the distinctions via a narrow construction, while the claims already require specific structures within the insulation cassettes and vary the insulation cassette structures required from claim to claim. Accordingly, we decline to adopt Patent Owner’s proposed construction for “insulation cassette” and instead give the term its ordinary meaning. Although we do not adopt Patent Owner’s construction, we note that several aspects of the construction are already required by the express language of the claims.

D. Patent Owner’s Alleged Prior Invention to Antedate Kuhn and Broussard

In grounds 1–3 and 5 of its Petition, Petitioner relies on Kuhn and Broussard as prior art references under pre-AIA 35 U.S.C. § 102(a). *See* Pet. 1–2, 9–10. Patent Owner contends that grounds 1–3 and 5 are defective because neither Kuhn nor Broussard qualifies as prior art under § 102(a) for

many of the challenged claims. *See* PO Resp. 19. Patent Owner further argues that claims 19, 20, 23, 31, 33, 35, 36, and 41¹² were conceived before the publication of Broussard on November 18, 2004, and diligently reduced to practice thereafter. *Id.* at 26–27. Patent Owner also asserts that an April 2004 prototype constitutes an actual reduction to practice of claim 19 of the '855 patent prior to the publication of Kuhn and Broussard (the earlier of which occurred on November 18, 2004). *Id.* at 23–26; *see also* PO Resp. 6–7 (addressing 2004 prototype); Ex. 2004 (showing pictures of 2004 prototype).

1. Legal Background Applicable to Priority Issues

a. Priority Disputes under Pre-AIA § 102(a)

A patent owner may remove a reference as pre-AIA 35 U.S.C. § 102(a) prior art by establishing that the inventor either (1) reduced the invention to practice before the publication of the reference, or (2) conceived of the invention before the publication of the reference and was reasonably diligent in the inventor's efforts to reduce the invention to practice thereafter. *Purdue Pharma L.P. v. Boehringer Ingelheim GmbH*, 237 F.3d 1359, 1365 (Fed. Cir. 2001); *Taurus IP, LLC v. DaimlerChrysler Corp.*, 726 F.3d 1306, 1322–23 (Fed. Cir. 2013).

¹² Patent Owner does not contend that the inventors of the '855 patent conceived of and reduced to practice challenged claims 21, 26–30, and 37 before the publication of Kuhn and Broussard. We assess priority on a claim by claim basis. *See Santarus, Inc. v. Par Pharm., Inc.*, 694 F.3d 1344, 1352 (Fed. Cir. 2012) (noting that the scope and content of the prior art applicable to each claim differs depending on the claim's priority date). As a result, Kuhn and Broussard remain prior art under § 102(a) with respect to those claims.

A reduction to practice can be either a constructive reduction to practice, which occurs when a patent application is filed, or an actual reduction to practice. *Cooper v. Goldfarb*, 154 F.3d 1321, 1327 (Fed. Cir. 1998). In order to establish an actual reduction to practice, a patent owner must establish three things: (1) construction of an embodiment or performance of a process that meets all the limitations of the claim at issue; (2) determination that the invention would work for its intended purpose; and (3) the existence of sufficient evidence to corroborate inventor testimony regarding these events. *Medichem, S.A. v. Rolabo, S.L.*, 437 F.3d 1157, 1169 (Fed. Cir. 2006).

“Conception is ‘the formation, in the mind of the inventor of a definite and permanent idea of the complete and operative invention, as it is thereafter to be applied in practice.’” *REG Synthetic Fuels, LLC v. Nestle Oil Oyj*, 841 F.3d 954, 962 (Fed. Cir. 2016) (emphasis omitted) (quoting *Coleman v. Dines*, 754 F.2d 353, 359 (Fed. Cir. 1985)). “The idea must be ‘so clearly defined in the inventor’s mind that only ordinary skill would be necessary to reduce the invention to practice, without extensive research or experimentation.’” *Mahurkar v. C.R. Bard, Inc.*, 79 F.3d 1572, 1577 (Fed. Cir. 1996) (quoting *Burroughs Wellcome Co. v. Barr Labs., Inc.*, 40 F.3d 1223, 1228 (Fed. Cir. 1994)). As a result, the idea “must include every feature or limitation of the claimed invention.” *REG*, 841 F.3d at 962 (quoting *Davis v. Reddy*, 620 F.3d 885, 889 (CCPA 1978)).

“To establish diligence in reduction to practice, the ‘basic inquiry is whether . . . there was reasonably continuing activity to reduce the invention to practice.’” *Tyco Healthcare Grp. LP v. Ethicon Endo-Surgery, Inc.*, 774 F.3d 968, 975 (Fed. Cir. 2014) (quoting *Brown v. Barbacid*, 436 F.3d 1376,

1380 (Fed. Cir. 2006)). “Reasonable diligence must be shown throughout the entire critical period, which begins just prior to the competing reference’s effective date and ends on the date of the invention’s reduction to practice.” *Perfect Surgical Techniques, Inc. v. Olympus Am., Inc.*, 841 F.3d 1004, 1007 (Fed. Cir. 2016). Diligence “need not be perfectly continuous—only *reasonably* continuous.” *Arctic Cat Inc. v. GEP Power Prods., Inc.*, 919 F.3d 1320, 1331 (Fed. Cir. 2019). Thus, “periods of inactivity within the critical period do not automatically vanquish a patent owner’s claim of reasonable diligence” and “the point of the diligence analysis is not to scour the patent owner’s corroborating evidence in search of intervals of time where the patent owner has failed to substantiate some sort of activity.” *Perfect Surgical*, 841 F.3d at 1009. “Rather, the adequacy of the reduction to practice is determined by whether, in light of the evidence as a whole, the invention was not abandoned or unreasonably delayed.” *Arctic Cat*, 919 F.3d at 1331 (internal quotation marks omitted) (quoting *Perfect Surgical*, 841 F.3d at 1008).

“There is no rule requiring a specific kind of activity in determining whether the applicant was reasonably diligent in proceeding toward an actual or constructive reduction to practice.” *Brown*, 436 F.3d at 1380. Rather, “[t]he activities that may be considered in a showing of diligence can take a diversity of forms. Precedent illustrates the continuum between, on the one hand, ongoing laboratory experimentation, and on the other hand, pure money-raising activity that is entirely unrelated to practice of the [invention].” *Scott v. Koyama*, 281 F.3d 1243, 1247–49 (Fed. Cir. 2002).

Unlike conception, an inventor need not work on every limitation of the challenged claims to show reasonable diligence: “Diligence is not

negated if the inventor works on improvements and evaluates alternatives while developing an invention.” *ATI Techs. ULC v. Iancu*, 920 F.3d 1362, 1372 (Fed. Cir. 2019) (quoting *In re Jolly*, 308 F.3d 1317, 1328 (Fed. Cir. 2002) (“[W]e decline to adopt a rule that evidence of diligence *must* be excluded if there is any possibility that it could be construed in support of an invention beyond the reach of the count.” (emphasis original))); *see also Naber v. Cricchi*, 567 F.2d 382, 385 (CCPA 1977) (“[W]ork required to develop a first invention in order to develop or reduce to practice a second invention [may satisfy the reasonable diligence requirement.]”); *Bemis Mfg. v. Dornoch Med. Sys., Inc.*, 21 F. App’x 930, 937–38 (Fed. Cir. 2001) (concluding that work on a related embodiment of the same invention may be credited toward reasonable diligence).

b. Burden of Proof

As noted above, the petitioner bears the burden of proving the unpatentability of the challenged claims by a preponderance of the evidence. 35 U.S.C. § 316(e). The burden of proof may be broken into two distinct components: the burden of persuasion and the burden of production. *Dynamic Drinkware, LLC v. Nat’l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015). “The burden of persuasion ‘is the ultimate burden assigned to a party who must prove something to a specified degree of certainty.’” *Id.* (quoting *Tech. Licensing Corp. v. Videotek, Inc.*, 545 F.3d 1316, 1326–27 (Fed. Cir. 2008)). Unlike the burden of persuasion, the “burden of production, or the burden of going forward with evidence, is a shifting burden, ‘the allocation of which depends on where in the process of trial the issue arises.’” *Id.* (quoting *Tech. Licensing*, 545 F.3d at 1327). The invention date of a patented invention is presumed to be its filing date.

Mahurkar, 79 F.3d at 1577. Thus, if a petitioner sets forth a prima facie case of unpatentability based on the filing date of the challenged patent, “the burden of production shifts to the patent owner to produce sufficient rebuttal evidence to prove entitlement to an earlier invention date.” *Taurus*, 726 F.3d at 1322. If the patent owner provides such evidence, petitioner must persuade the Board—by a preponderance of the evidence—that the challenged claims were not invented before the asserted prior art. *See id.*; *Mahurkar*, 79 F.3d at 1577–78; *Dynamic Drinkware*, 800 F.3d at 1379–80. “If [Petitioner] fails to meet this burden, the catalog is not prior art under section 102(a).” *Mahurkar*, 79 F.3d at 1578.

c. Corroboration

A patent owner cannot rely on inventor testimony alone to meet its burden of production; it must sufficiently corroborate inventor testimony of prior invention with independent evidence. *In re NTP, Inc.*, 654 F.3d 1279, 1291 (Fed. Cir. 2011) (“It has long been the case that an inventor’s allegations of earlier invention alone are insufficient.”); *see also Price v. Symsek*, 988 F.2d 1187, 1194 (Fed. Cir. 1993) (“Throughout the history of the determination of patent rights, oral testimony [of an inventor] . . . is regarded with skepticism.”).

Whether a patent owner has sufficiently corroborated inventor testimony with independent evidence is a factual determination guided by the “rule of reason.” *See, e.g., TransWeb, LLC v. 3M Innovative Props. Co.*, 812 F.3d 1295, 1301–02 (Fed. Cir. 2016) (applying rule of reason analysis to decide whether evidence of conception had been sufficiently corroborated); *NTP*, 654 F.3d at 1291 (same for actual reduction to practice); *Perfect Surgical*, 841 F.3d at 1010 (Fed. Cir. 2016) (same for diligence). “This rule-

of-reason analysis does not require every aspect of an inventor's testimony to be explicitly corroborated with a source independent of the inventor." *Mosaic Brands v. Ridge Wallet LLC*, 55 F.4th 1354, 1363–64 (Fed. Cir. 2022). Rather, in "applying the rule of reason test, all pertinent evidence is examined in order to determine whether the inventor's story is credible." *Id.* (quoting *Sandt Tech., Ltd. v. Resco Metal & Plastics Corp.*, 264 F.3d 1334, 1350 (Fed. Cir. 2001)).

"Possible corroborating evidence, from most to least probative, includes documentary and physical evidence created at the time of conception or reduction to practice, circumstantial documentary evidence about the inventive process, and oral testimony by someone other than the inventor." *Id.*; see also *TransWeb*, 812 F.3d at 1302 ("We have generally been most skeptical of oral testimony that is supported only by testimonial evidence of other interested persons. We have repeatedly noted that contemporaneous documentary evidence provides greater corroborative value." (citations omitted)). Additionally, the Federal Circuit has cautioned against allowing an inventor's testimony to be corroborated through documents that themselves require inventor testimony to corroborate. *Aptor Miitors APS v. Kamstrup A/S*, 887 F.3d 1293, 1296–97 (Fed. Cir. 2018). However, "there are no hard and fast rules as to what constitutes sufficient corroboration, and each case must be decided on its own facts." *TransWeb*, 812 F.3d at 1302; see also *Berry v. Webb*, 412 F.2d 261, 266 (CCPA 1969) ("[T]here is no final single formula that must be followed in proving corroboration.").

2. *The Parties' Arguments*

To meet its burden of production, Patent Owner offers inventor testimony of prior invention (PO Resp. 21 (citing Exs. 2001, 2019)), non-inventor testimony (*id.* at 22 (citing Exs. 2020–2022)), and contemporaneous documentation of the invention (*id.* at 22–23 (citing Exs. 2002–2017, 2022, 2027–2105, 2107–2137)).

Patent Owner contends that the testimony of inventor Nicholas Wynne establishes that he and his coinventors conceived of claims 19, 20, 23, 31, 33, 35, 36, and 41 before November 17, 2004, reduced claim 19 to practice prior to November 17, 2004, and exercised reasonable diligence in reducing claims 19, 20, 23, 31, 33, 35, 36, and 41 to practice throughout the critical period, or both. PO Resp. 21; Ex. 2001 ¶¶ 8, 26–31, 35–49; Ex. 2019 ¶¶ 16, 28.

To corroborate Mr. Wynne's testimony, Patent Owner offers the testimony of non-inventor ““over-the-shoulder observers,’ who supported the inventors’ work.” PO Resp. 22; Exs. 2020–2022. Specifically, Patent Owner relies on the testimony of Pamela Jones, “a CSafe¹³ engineer, [who] worked alongside the inventors to, *inter alia*, design and build components for a proof-of-concept prototype”; Sam Rowles, a former employee acting during the relevant time frame as “a CSafe draftsman, [who] created design drawings of the inventors’ concepts at the inventors’ direction”; and

¹³ Patent Owner is doing business as CSafe Global (“CSafe”). Ex. 2001 ¶ 4. The parties and declarants often refer to CSafe and Patent Owner interchangeably. *Id.*; PO Resp. 12.

Jonathan Neeld, “a then-AmSafe¹⁴ engineer, and now CSafe’s VP of Engineering, [who] worked with the inventors on developmental prototypes and certification and commercialization of the invention.” PO Resp. 22–23 (citing Ex. 2020 ¶¶ 1–7; Ex. 2021 ¶¶ 3–10; Ex. 2022 ¶¶ 4–39).

Patent Owner further offers “contemporaneous business records,” including “specification sheets, design documents, meeting minutes, PowerPoint presentations, formal and informal drawings, and photographs of progress and prototypes,” to corroborate Mr. Wynne’s testimony. PO Resp. 22 (citing Exs. 2002–2017, 2027–2105, 2107–2137). Patent Owner contends that file metadata corresponding to these records lends additional support to Mr. Wynne’s invention timeline. *Id.* at 23 (citing Ex. 2026).

Patent Owner then addresses the claims, with citations to each limitation of each claim and the evidence that allegedly shows the conception of those limitations. *See* PO Resp. 23–30. Patent Owner also argues that all of the claims were reduced to practice either in the April 2004 prototype, or later in the April 2005 prototype. *See id.*; *see also id.* at 11–12 (addressing 2005 prototype); Exs. 2099, 2101 (showing pictures of 2005 prototype). According to Patent Owner, it exercised reasonable diligence throughout the relevant time period. *See id.* at 30–33.

Petitioner broadly disputes the adequacy and reliability of Mr. Wynne’s testimony, the non-inventors’ testimony, and the documentation provided by Patent Owner. Pet. Reply 3–5. According to Petitioner, “[n]o

¹⁴ AmSafe Bridport Ltd (“AmSafe”) entered into an agreement with CSafe in late 2004 to assist CSafe with development of a container that would receive FAA approval. Ex. 2022 ¶ 4. AmSafe and CSafe later entered into a joint venture, and CSafe eventually bought AmSafe in 2009, at which point Mr. Neeld officially joined CSafe. *Id.*

witness corroborates” the existence of “the two composite shells key to PO’s ‘invention’” prior to the publication of Kuhn on December 2, 2004. *Id.* at 3 (emphasis omitted) (citing Ex. 1049 ¶¶ 77–81). Petitioner highlights Mr. “Wynne[’s] trouble remembering precise dates,” the absence of important documents, and “[n]umerous date inconsistencies and metadata concerns.” *Id.* at 4–5 (citing Exs. 1049, 1057, 1059, 1061).

Notwithstanding its contentions over the reliability of the evidence presented by Patent Owner, Petitioner argues that Patent Owner failed to (1) corroborate the conception and actual reduction to practice of the outer composite shell prior to the publication of Kuhn and (2) show continuous and corroborated diligence prior to the publication of Broussard through actual or constructive reduction to practice.¹⁵

Petitioner first argues that Patent Owner fails to show conception or reduction to practice of the outer composite shell before 2005. Pet. Reply 1, 5–16. Petitioner contends that initial design drawings from 2003 created by Rowles cannot corroborate Mr. Wynne’s testimony because the evidence “concern[s] different container projects (including for trucks) that should *not* be combined with Exhibit 2050’s air cargo ‘ULD.’¹⁶” *Id.* at 5 (citing Ex. 1049 ¶¶ 82–110; Ex. 1059, 43:6–44:4, 90:15–91:13, 121:20–124:14; Ex. 2020 ¶ 5; Exs. 2027–2049). Petitioner points to different dimensions

¹⁵ Petitioner also argues that Patent Owner’s products lacked the claimed “cargo receiving chamber” based on Patent Owner’s arguments that Ekerot fails to disclose this limitation. Pet. Reply 17–19. Because we do not adopt Patent Owner’s reading of that limitation, we do not reach the merits of this aspect of Petitioner’s argument.

¹⁶ “ULD” refers to a “unit loading device” typically transported by ship or aircraft rather than over the road. *See* Ex. 1001, 3:23–25.

between the truck and aircraft container projects and the use of the term “pallet shipper” on the documents to support this proposition. *Id.* at 5–6 (citing Ex. 1049 ¶¶ 85–88; Ex. 1061, 289:12–290:8; Ex. 2063, 13). Thus, according to Petitioner, this evidence “cannot corroborate a ‘definite and permanent idea of the complete and operative invention, as it is hereafter to be applied in practice.’” *Id.* at 6–7 (citing *Burroughs Wellcome*, 40 F.3d at 1227–28).

Petitioner further contends that the April 2004 prototype does not constitute an actual reduction to practice, nor does it corroborate the full scope of the disputed claims, because the prototype does not contain an outer composite shell. Pet. Reply 1, 7–10; *see also id.* at 16 (“[The April 2004 prototype] did not reduce the claims to practice because, even under PO’s contorted theory where some aluminum ULD walls (combined with the uncorroborated, undepicted, separate composite back wall) form an outer shell, its side, top, and bottom walls were still metal, not composite.”). According to Petitioner, Patent Owner “fabricat[es] two shells by piecing together an uncorroborated, purportedly composite back wall with the other walls of the separate prefabricated aluminum ULD housing.” *Id.* at 10. In addition to being aluminum and not composite, Petitioner argues, the aluminum ULD housing cannot be considered a “composite outer shell” because the ’855 patent “expressly recite[s] two composite shells in addition to, and *excluding*, the ULD housing.” *Id.* (citing Ex. 1001, code (57), 2:5–14, 2:50–55, 3:14–33, Figs. 5–6, claim 1). Petitioner additionally argues that the photographs of the April 2004 prototype cannot be used to corroborate Mr. Wynne’s testimony because they depend on Mr. Wynne’s

testimony to explain their contents. *Id.* at 8 (citing *Aptor*, 887 F.3d at 1296–97).

Petitioner further contends that Patent Owner’s work after the April 2004 prototype includes a six-month gap of activity, and fails to show work on a second shell. Pet. Reply 10–13. As part of this argument, Petitioner argues that Patent Owner’s reliance on certain exhibits fails to show two box-like shells and instead shows inner and outer sides or “skins,” underscoring the lack of corroboration of a two-shell design. *See id.*

Petitioner also contends that the evidence offered by Patent Owner after the critical date in early December 2004 shows that the inventors did not conceive of the outer composite shell until January 19, 2005. Pet. Reply 13–16. According to Petitioner, a December 2004 memorandum prepared by Neeld contradicts Mr. Wynne’s conception testimony because the document only refers to an “inner moulded shell,” and fails to describe an outer shell—despite Neeld listing every other component. *Id.* at 13 (citing Ex. 2118, 2). Additionally, Petitioner argues that various exhibits produced by Patent Owner suggest that the inventors did not conceive of the outer composite shell until 2005. *Id.* at 15–16 (citing Ex. 1003 ¶¶ 202–03, 219–20; Ex. 1049 ¶¶ 190–94, 196–201, 203–18, 225–79; Ex. 1061, 490:15–492:4, 497:2–498:11, 500:16–501:16, 521:17–22, 577:2–582:5; Ex. 2123, 2; Exs. 2009, 2062, 2082–2086, 2091–2096, 2111, 2122, 2125–2128).

Petitioner argues that, in addition to failing to show conception, Patent Owner failed to show “continuous and corroborated diligence from prior to Broussard (November 18, 2004) until constructive or actual reduction to practice.” Pet. Reply 16 (citing *Aptor*, 887 F.3d at 1295). Petitioner points to a gap in corroborating evidence “between the first, non-practicing

prototype [in April 2004] and Kuhn (December 2, 2004).” *Id.* at 16–17 (citing Ex. 1049 ¶¶ 139–178).

In response, Patent Owner argues that Petitioner applies the wrong legal standard for corroboration of conception, and that the evidence offered by Patent Owner sufficiently corroborates Mr. Wynne’s testimony regarding conception. PO Sur-Reply 3–14. Patent Owner contends that Petitioner “focuses on picking apart individual documents for lacking particular claim elements,” instead of considering the corroborating evidence “as a whole” under the rule of reason. *Id.* at 4 (quoting *Price*, 988 F.2d at 1194). According to Patent Owner, it “established conception through Mr. Wynne’s testimony that the inventors’ early concept carried over their two-composite shell design from prior smaller container projects to a new, larger ULD design.” *Id.* (citing Ex. 1061, 102:19–103:5, 320:14–20; Ex. 2019 ¶¶ 16, 36). Patent Owner also asserts that it sufficiently corroborated the testimony, when viewed under the rule of reason, by the testimony of Ms. Jones and Mr. Rowles, in addition to contemporaneous computer-aided design drawings. *Id.* at 4–5 (citing Ex. 2021 ¶ 6; Ex. 1059, 136:13–137:19, 135:17–19; Exs. 2027–2050).

As to the late 2003 design drawings, Patent Owner disputes Petitioner’s contention that the drawings created by Rowles relate to a different project. PO Sur-Reply 5. Not all of the drawings have dimensions inconsistent with the aircraft ULD project, according to Patent Owner. *See id.* For example, per Patent Owner, Exhibits 2027, 2028, 2030, 2036, and 2037 have “dimensions consistent with the air shipper” and include “fiber reinforced plastic composite . . . for the inner and outer shells and vacuum insulated panels in between.” *Id.* at 5–8. Patent Owner further explains that

Petitioner errs in concluding that the drawings relate to the container for trucks based on the “pallet shipper” identifier because both Mr. Rowles’s and Mr. Wynne’s “testimony explained that CSafe used ‘pallet shipper’ to refer to both road and aircraft containers” *Id.* at 8–9 (citing Ex. 1059, 136:15–139:17; Ex. 1061, 613:8–614:17; Ex. 2063, 1–2, 5, 9). Thus, Patent Owner maintains that the 2003 drawings created by Rowles “demonstrate and corroborate, the two-shell design was conceived by late 2003” and the “fact that the inventors chose to build a one-shell prototype first, takes nothing away from the inventors’ corroborated conception.” *Id.* at 9 (citations omitted); *see also* Ex. 2019 ¶ 29.

Patent Owner additionally disputes Petitioner’s argument that the evidence demonstrates that Patent Owner conceived of the two-shell composite design in 2005. PO Sur-Reply 10–12. Patent Owner points to Neeld’s testimony in which he explains that the term “inner moulded shell” “encompass[ed] the prototype’s entire molded composite insert, including the two-shell, composite-VIP-composite unit.” *Id.* at 10 (citing Ex. 1063, 138:5–17, 157:2–22, 159:2–11). Patent Owner also criticizes Petitioner’s attempt to distinguish between “shells” and walls with “skins” given that both types of walls fall within the scope of the claims, as Petitioner’s unpatentability arguments based on Sinclair show. *Id.* at 13–14.

As to diligence, Patent Owner argues that Petitioner focuses on the wrong period of time and that the evidence offered by Patent Owner shows reasonable diligence during the critical period. PO Sur-Reply 14–15. Patent Owner states, “Petitioner applies the wrong standard to argue that there is an alleged six-month gap from April to October 2004.” *Id.* at 14 (citing Pet. Reply 10–13). Patent Owner argues that the correct critical period for

diligence begins on November 17, 2004, for Broussard and December 1, 2004, for Kuhn, and continues through the filing of the '855 patent on June 7, 2005, at the latest. *Id.* According to Patent Owner, it “offers over 50 documents, including at least 23 non-inventor documents, and testimony from non-inventor Neeld evidencing reasonable diligence during that period.” *Id.* (citing PO Resp. 22–23, 31–32; Exs. 2006–2009, 2011, 2013, 2022, 2063–2064, 2066–2088, 2115–2137).

3. Discussion

a. Prior Actual Reduction to Practice of Claim 19

To antedate Kuhn and Broussard on the basis of prior actual reduction to practice of claim 19, Patent Owner must produce sufficient evidence of the construction of an embodiment containing every limitation in claim 19 before November 18, 2004.

We find that the evidence offered by Patent Owner regarding the April 2004 prototype does not demonstrate the existence of a “composite outer shell having side, top and bottom walls of resin impregnated fibers” as required by claim 19. Mr. Wynne’s testimony concedes that the top, bottom, and side walls of the outer shell of the April 2004 prototype were constructed out of aluminum. *See* Ex. 2001 ¶ 11. That the inventors “intended to introduce the two composite wall structure” in later designs, is irrelevant as to whether the April 2004 prototype had such a wall structure and was an actual reduction to practice of claim 19. A prototype “similar to,” but not containing every limitation of the subject matter of claim 19 does not constitute an actual reduction to practice. *See* Ex. 2023 ¶ 66; *Medichem*, 437 F.3d at 1169.

Consequently, Patent Owner failed to establish actual reduction to practice of claim 19 in April 2004, and may not antedate Kuhn or Broussard on this basis.

b. Prior Conception and Diligent Reduction to Practice of Claims 19, 20, 23, 31, 33, 35, 36, and 41

i. Conception

To antedate Kuhn and Broussard on the basis of prior conception and diligent reduction to practice of claims 19, 20, 23, 31, 33, 35, 36, and 41, Patent Owner must produce sufficient evidence of conception before November 18, 2004, combined with reasonable diligence in reducing the invention to practice starting prior to November 18, 2004, and extending continuously through actual or constructive reduction to practice—the latter of which is evidenced by the June 8, 2005 filing date of the application that led to '855 patent.

Beginning our analysis with conception, Mr. Wynne testifies that he and his coinventors conceived of every limitation of claims 19, 20, 23, 31, 33, 35, 36, and 41 prior to November 18, 2004. *See* Ex. 2001 ¶¶ 31 (claim 19), 36 (claim 20), 38 (claim 23), 44 (claim 31), 45 (claim 33), 46 (claim 35), 49 (claim 41); Ex. 2019 ¶¶ 65 (claim 19), 70 (claim 20), 71 (claim 23), 72 (claim 31), 73 (claim 33), 74 (claim 35), 76 (claim 41). We first address the core dispute between the parties—whether Patent Owner conceived of an inner *and outer shell* prior to the November 18, 2004 critical date, as Mr. Wynne testifies, and whether Patent Owner sufficiently corroborates that testimony. Applying the rule of reason, we consider all evidence provided by Patent Owner to determine whether Mr. Wynne's testimony is credible. We find that the evidence produced by Patent Owner lends credibility to and sufficiently corroborates Mr. Wynne's testimony.

Specifically, we find the drawings at Exhibits 2027–2050 and related testimony from Mr. Rowles attesting to his work on the documents corroborate Mr. Wynne’s testimony that the inventors planned to use fiber reinforced plastic—a composite material—for both the inner and outer shells of the cargo container. *See* Exs. 2027–2050; Ex. 2020 ¶¶ 5–32. Based on our review of both the drawings themselves and the testimony of Mr. Wynne and Mr. Rowles, we find that these exhibits are consistent with the “aircraft ULD” project leading to the ’855 patent, and demonstrate that the inventors conceived of using fiber reinforced plastic composite for the inner and outer shells. *See* Exs. 2028, 2030, 2036–2037; Ex. 1059, 136:15–139:17; Ex. 1061, 613:8–614:17. Petitioner casts some of Patent Owner’s documents as related to a distinct “pallet shipper” project, but we credit Patent Owner’s argument and evidence, including testimony and documents, that the “pallet shipper” project encompassed an over-the-road as well as an aircraft version, and that all of these documents relate to the same general project. *See* PO Sur-reply 8–9 (citing Ex. 1059, 136:15–139:17; Ex. 1061, 613:8–614:17); Ex. 2063, 1–2 (referring to “Thermal Pallet Shipper” as including “Truck Version (OTR)” and “Aircraft Version (LD-3)”); *see also* Ex. 1001, 3:23–25 (stating that transport of the claimed container “may be over the road (OTR) by trucks or rail or may be transported as a unit loading device (ULD) by a ship or aircraft”).

Moreover, the exhibits possesses a last modified date in 2003, *see* Ex. 2026 ¶¶ 4–22, 24–50,¹⁷ and their creator, non-inventor and former employee

¹⁷ One drawing appears to have a lost modified date in November 2004, but that document does not undermine Patent Owner’s overall arguments

Mr. Rowles, testifies that these dates are consistent with his personal recollection, Ex. 2020 ¶ 7. We therefore disagree with Petitioner’s assertion that Patent Owner is stuck in a “catch-22” of corroboration with respect to conception of the composite outer shell because it relies solely on inventor Mr. Wynne’s testimony for corroboration. *Cf. Apator*, 887 F.3d at 1296–97.

We do not find persuasive Petitioner’s argument that Mr. Neeld’s December 2004 memorandum contradicts Mr. Wynne’s testimony regarding conception of the outer composite shell. Mr. Neeld testified that the term “inner moulded shell,” as used in his memorandum, included both the inner and outer composite shells, as those terms are used in the claim language. Ex. 1063, 138:5–17. We do not believe a difference in terminology between Patent Owner’s employees and a third party rebuts Mr. Wynne’s testimony, especially where that discrepancy has been explained through non-inventor testimony. Moreover, even if we did not find Mr. Neeld’s explanation credible, and viewed this December 2004 document as solely describing a container with an inner shell and no outer shell, that would not change our view that Patent Owner sufficiently corroborated conception of a two-shell design in late 2003. The fact that the prototype built in April 2004 and later design work in 2004 did not include what became the outer shell does not negate the earlier conception or diligence in eventually reducing the entire claimed container to practice. *See Naber*, 567 F.2d at 385; *Bemis*, 21 F. App’x at 937–38.

We are similarly unpersuaded by Petitioner’s argument that evidence offered by Patent Owner indicates a 2005 conception date of the outer

and evidence that the 2003 drawings corroborate its conception. *See* Ex. 1046; Ex. 2026 ¶ 23.

composite shell feature. At best, the evidence suggests that the inventors did not return to the effort to reduce the outer composite shell to practice until early 2005. This, however, does not conflict with Mr. Wynne's testimony that the inventors originally conceived of the cargo container with an outer composite shell, but chose to focus on developing other aspects of the cargo container first.

Turning to the remainder of the limitations of independent claims 19 and 35, we find Mr. Wynne's testimony that all of those limitations were conceived by April 2004 sufficiently corroborated as well. *See* PO Resp. 26–30 (citing testimony in Exs. 2001, 2019, 2023 and related exhibits). Petitioner makes a general allegation that details of the April 2004 prototype are uncorroborated, but Petitioner does not argue that Patent Owner's conception allegations fail to address any specific limitation in claims 19 or 35 with the exception of the outer shell limitation discussed above. *See* Pet. Reply 7–8. According to Mr. Wynne, the inventors of the '855 patent constructed a prototype in April 2004 that included each limitation recited by the independent claims, except for the “composite outer shell” that, as we just found, Mr. Wynne already conceived in late 2003. *See* Ex. 2001 ¶¶ 11, 31, 46; Ex. 2019 ¶¶ 29, 65, 74. The photographs taken during development of the April 2004 prototype and testimony of non-inventor Ms. Jones corroborate Mr. Wynne's testimony. Ex. 2001 ¶ 11; Ex. 2004; Ex. 2018 ¶ 6; Ex. 2019 ¶¶ 27–32; Ex. 2021 ¶¶ 5–10; Exs. 2051, 2054–2057; *see also* Exs. 2027–2050 (earlier design drawings). Given the weight accorded to contemporaneous documentary evidence and in view of the non-inventor testimony provided by Patent Owner, we find sufficient evidence exists to

corroborate the conception of each limitation of the independent claims by April 2004 at the latest.

At times in the briefing and during oral arguments, Petitioner appears to conflate the separate requirements of conception and diligence. *See* Tr. 225:8–227:11. Whether the inventors “abandoned” their work on the outer composite shell for a period of time, as Petitioner alleges, does not, by itself, establish a lack of conception or diligence. *See id.* at 226:9–12. Instead, what is required for conception is that the inventors had “the formation, *in the mind[s] of the inventor[s]* of a definite and permanent idea of the complete and operative invention, as it is thereafter to be applied in practice.” *REG*, 841 F.3d at 962 (emphasis added). According to Mr. Wynne, the inventors’ “original design clearly shows using [fiber reinforced plastic] inner and outer layers,” but they chose to “use[] a ULD prefabricated aluminum shipping container outer housing [for the April 2004 prototype] because it was already flight-approved,” thus saving the inventors the time and expense of complying with FAA qualification tests. Ex. 2019 ¶ 29. Mr. Wynne’s credible explanation as to why the inventors chose to focus on the other elements of the invention first does not suggest that they lacked conception of a definite and permanent idea of the invention, and we find that the evidence sufficiently corroborates this narrative.

Based on the foregoing, we find that Patent Owner has offered sufficient evidence to corroborate Mr. Wynne’s testimony that he and his coinventors conceived of each limitation of claims 19 and 35 prior to November 17, 2004.

Petitioner does not separately dispute the adequacy of Patent Owner’s showing regarding conception of the additional limitations of dependent

claims 20, 23, 31, 33, 36, and 41 in its Reply. *See generally* Pet. Reply 1, 3–19. In any case, we find Patent Owner has offered sufficient evidence to corroborate Mr. Wynne’s testimony that he and his coinventors conceived of each limitation of these claims prior to November 17, 2004. *See* PO Resp. 26–30 (citing testimonial Exhibits 2001, 2019, 2023 and related documentary exhibits); Ex. 2001 ¶¶ 36 (claim 20), 38 (claim 23), 44 (claim 31), 45 (claim 33), 49 (claim 41); Ex. 2019 ¶¶ 70 (claim 20), 71 (claim 23), 72 (claim 31), 73 (claim 33), 76 (claim 41).

For these reasons, we determine that Patent Owner has produced sufficient evidence to corroborate the conception of claims 19, 20, 23, 31, 33, 35, 36, and 41 prior to November 18, 2004.

ii. Diligence

According to Petitioner’s proposed diligence timeline, the inventors “restarted [work on their] project” by December 6, 2004, when Neeld was hired. *See* Tr. 200:3–10. Petitioner does not appear to dispute that the inventors were reasonably diligent from this point through the filing of the ’855 patent on June 7, 2005, and we focus our analysis on the November–December 2004 time frame for that reason. *See generally* Pet. Reply 16–17.

We reiterate that to establish diligence, unlike conception, Patent Owner need not show that every limitation of the disputed claims—namely, the composite outer shell—was worked on at the same time during the critical period. An inventor is not expected to work on every aspect of his invention concurrently; it is reasonable for an inventor to focus his efforts on reducing to practice one aspect of the invention. *See, e.g., Naber*, 567 F.2d at 385 (“[W]ork required to develop a first invention in order to develop or reduce to practice a second invention [may satisfy the reasonable diligence

requirement].”); *Bemis*, 21 F. App’x at 937–38. We must determine whether Patent Owner demonstrates reasonably continuous activity to reduce at least some aspect of the invention to practice during the critical period, i.e., the period of time just prior to the publication of Kuhn and Broussard through constructive reduction to practice of the disputed claims (i.e., the November 17, 2004–June 8, 2005 period).

We note that Petitioner begins its diligence argument by stating the relevant critical period but focuses its diligence arguments on an alleged “six-month” “gap” in activity between April 2004 and December 2, 2004, which Petitioner deems “dispositive.” Pet. Reply 16–17 (citing Ex. 1049 ¶¶ 139–178). We agree with Patent Owner that the broadest possible critical period for us to consider begins just prior to the publication of Broussard on November 18, 2004, and extends through the filing date of the ’855 patent on June 8, 2005. *See* PO Sur-Reply 14. Only the last two weeks of the alleged “gap” falls within the critical period. Pet. Reply 16.

We find the evidence offered by Patent Owner demonstrates the inventors’ reasonably continuous activity to reduce the ’855 patent to practice beginning prior to the publication of Broussard on November 18, 2004, through the filing of the patent application on June 8, 2005. First, Mr. Wynne testified that he and his coinventors exercised reasonable diligence in reducing their invention to practice at least prior to November 18, 2004, through June 7, 2005. *See* PO Resp. 30 (citing Ex. 2023 ¶¶ 50–61; Ex. 2019 ¶ 28); Ex. 2019 ¶¶ 34–59, 65, 69–76. Second, Patent Owner provides non-inventor testimony to support its diligence arguments. *See* PO Resp. 8–12 (citing Exs. 2022, 2023); 30 (citing Ex. 2023 ¶¶ 50–61; Ex. 2019 ¶ 28); Ex. 2022. The testimony generally supports Patent Owner’s assertion that

“the inventors worked diligently to test their proof-of-concept prototype, refine their design, order additional components and materials, and build second and third prototypes, referred to as the ‘developmental’ prototypes.” *Id.* at 8 (citing Ex. 2019 ¶¶ 34–63; Ex. 2022 ¶¶ 14–39; Ex. 2023 ¶¶ 66–77); *see also* PO Sur-reply 14.

Third, various contemporaneous documents corroborate Mr. Wynne’s diligence narrative. *See* PO Sur-Reply 14 (citing Exs. 2006–2009, 2011, 2013, 2022, 2063–2064, 2066–2088, 2115–2137). For example, a project chart from February 2005 shows progress on the project from November 8, 2004 onward, including work on “Cooling / Heating System design” started on November 8 and completed on December 27, 2004. Ex. 2006. The chart also shows inner cube manufacturing started on December 6, 2004 and continuing into February 2005, as well as various other tasks performed during this late 2004–early 2005 time frame. *See id.* Other documents from just prior to and during this time frame confirm that Mr. Wynne and his team continued work on the project. *See* Exs. 2006–2008; Ex. 2063, 1–2; Exs. 2064, 2067–2073, 2075, 2087–2088, 2090; *see also* Ex. 2001 ¶¶ 13–16 (addressing October-December 2004 work on project and related exhibits); Ex. 2019 ¶¶ 36–39 (addressing November-December 2004 work on project and related exhibits). Work on the project continued in the first half of 2005, culminating in the development of a second prototype after months of work to refine various components. *See* PO Resp. 8–12. Patent Owner provides voluminous records to corroborate diligent work on the project during this time frame. *See id.* at 8–12, 32–33; PO Sur-reply 14. Petitioner does not directly contest Patent Owner’s diligence in the January-June 2005

time frame, and based on our review, we find that Patent Owner establishes diligence during that time frame.

4. Conclusion

Based on our review of the parties' evidence and arguments, Patent Owner establishes priority of invention over both Kuhn and Broussard and we do not consider either reference as prior art for challenged claims 19, 20, 23, 31, 33, 35, 36, and 41. Because Kuhn and Broussard remain available as prior art to various dependent claims, we still consider challenges to those dependent claims even though Kuhn and Broussard are not available as prior art against the independent claims (claims 19 and 35) from which they depend. *See Santarus, Inc. v. Par Pharm., Inc.*, 694 F.3d 1344, 1352 (Fed. Cir. 2012) (noting that the scope and content of the prior art applicable to each claim differs depending on the claim's priority date). A revised chart showing what remains of Petitioner's challenges after Patent Owner's successful assertion of priority appears below.

Claim(s) Challenged	35 U.S.C. §	Reference(s)/Basis
19, 20, 23 , 28	102(a)	Kuhn
19, 20, 21, 23 , 26–30	103(a)	Kuhn, Loeffler
19, 20, 21, 23, 26–28, 31, 33, 35, 36, 37, 41	103(a)	Sinclair, Kuhn
19–21, 28, 31, 35–37	103(a)	Ekerot, Cur
19, 20, 21, 29, 30, 31	103(a)	Broussard, Cur

E. Obviousness of Claims 19–21, 28, 31, and 35–37 Based on Ekerot and Cur

We first address the ground not impacted by Patent Owner’s claims of priority. *See* PO Resp. 19 (limiting assertions of priority to Kuhn and Broussard at issue in other grounds). Petitioner asserts that claims 19–21, 28, 31, and 35–37 of the ’855 patent would have been obvious under pre-AIA 35 U.S.C. § 103(a) based on Ekerot and Cur. Pet. 2, 57–81. Patent Owner makes a number of arguments against this asserted ground. PO Resp. 52–63. We first summarize aspects of Ekerot and Cur and then turn to the parties’ arguments.

1. Ekerot

Ekerot discloses “freight containers with controlled inner environment for transporting sensitive goods.” Ex. 1008 ¶ 1.

Figures 1 and 2 of Ekerot are reproduced below:

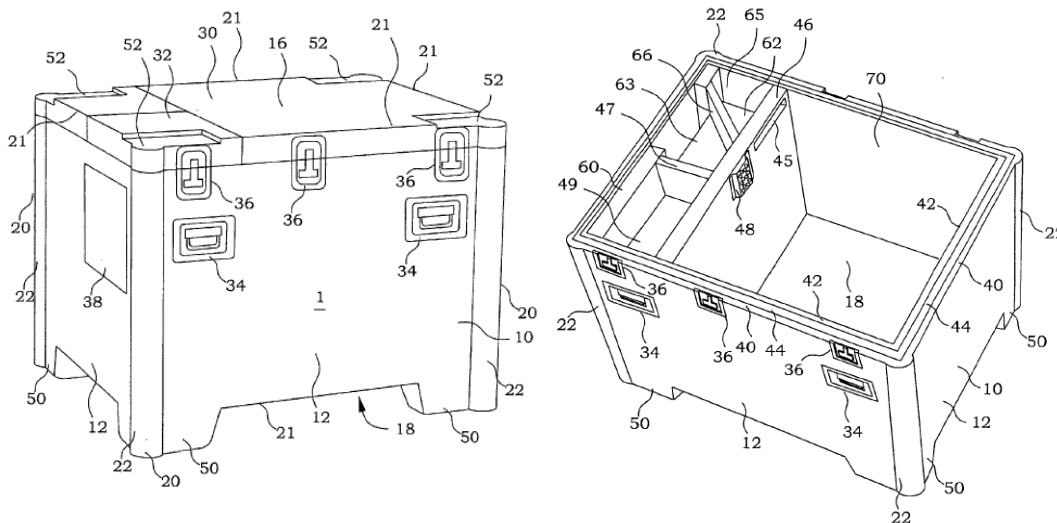


Fig. 1

Fig. 2

Figure 1 depicts a freight container and Figure 2 shows the freight container of Figure 1 with the lid removed. Ex. 1008 ¶¶ 15–16. Both Figures show the outside of container 1, formed by four side walls 12, top

wall 16, and bottom wall 18. *See id.* ¶ 22. These structures form outer shell 40, which Ekerot discloses can “consist[] of vinyl ester reinforced by glass fib[er], kevlar and carbon fib[er].” *See id.* ¶¶ 26–27. Lid 30 in top wall 16 provides access to the inner area of container 1. *See id.* ¶ 22. Ekerot also discloses (and shows in Figure 2) inner shell 42, which “consists of polyester reinforced by glass fib[er] and carbon fib[er].” *Id.* ¶ 27. Between outer shell 40 and inner shell 42 is “interspace 44.” *Id.*

2. *Cur*

Cur discloses vacuum insulated panels for use in “domestic refrigeration appliance[s].” Ex. 1009, 1:6–8.

Figures 3 and 5A of Cur are reproduced below:

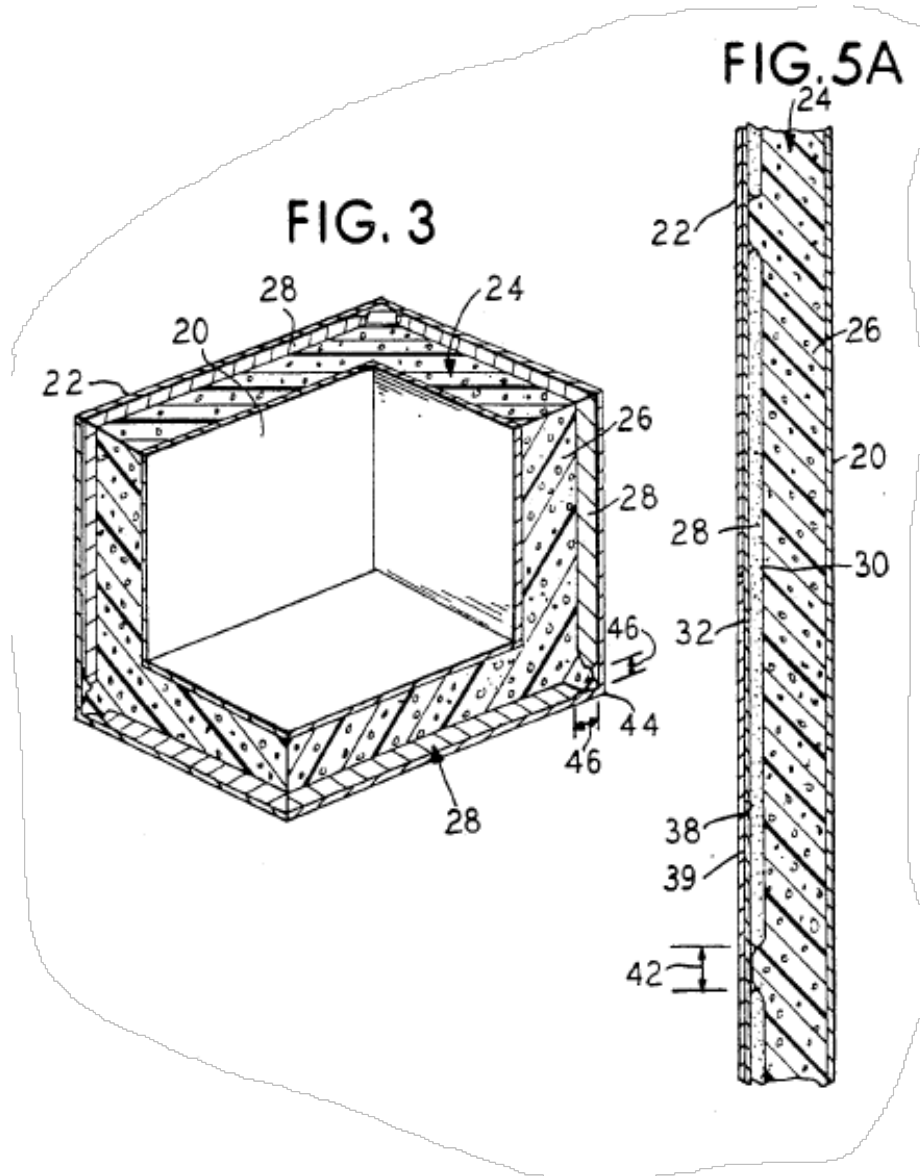


Figure 3 is a perspective sectional view of a corner of a freezer illustrating the insulation system, and Figure 5A is a side sectional view of a wall section of the insulation system. *See* Ex. 1009, 3:27–30, 3:34–36. Both Figures show interior liner wall 20 spaced from exterior outer wrapper 22, with space 24 in between. *See id.* at 4:4–15. Cur discloses that vacuum insulation panels 28 are inserted in space 24 “to enhance the insulation property of the insulation system.” *Id.* at 4:16–22.

Figure 4 is reproduced below:

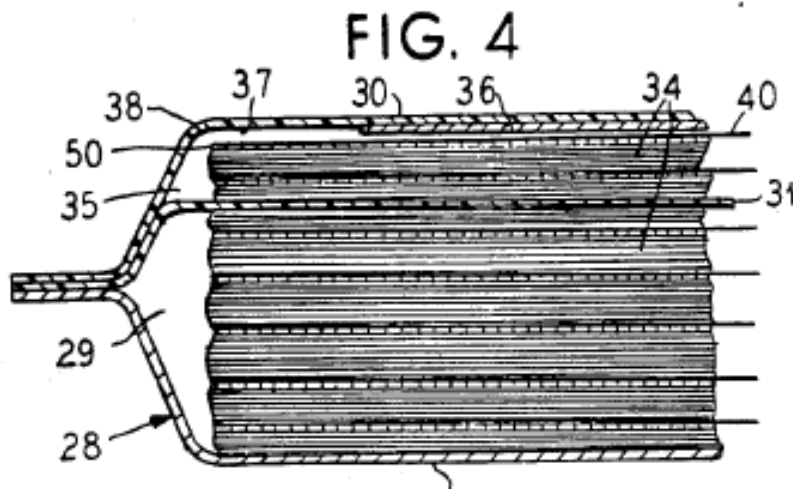


Figure 4 is a side sectional view of a portion of a vacuum insulated panel. Ex. 1009, 3:31–33. Describing Figure 4, Cur discloses that

each of the vacuum insulation panels 28 is preferably constructed with a pair of gas impermeable outer film walls 30, 32 (FIG. 4) and at least one gas impermeable inner wall 31 to form at least two adjacent compartments 29, 35 (FIG. 4) enclosing one or more microporous filler insulation materials 34 that support the barrier film walls 30, 31, 32 of the panel when atmospheric gases are evacuated from the interior compartments 29, 35 of the multicompartent vacuum insulation panels disclosed in the copending patent application.

Ex. 1009, 4:38–48.

3. Independent Claim 19

Petitioner contends that the combination of Ekerot and Cur discloses each limitation in claim 19. Pet. 57–68. Petitioner relies on Ekerot with respect to the limitations requiring a cargo container with composite inner and outer shells made of resin impregnated fibers, and Cur for the use of VIPs between Ekerot's shells. *See id.* at 64–68. Petitioner also provides a number of reasons to combine Ekerot and Cur. *See id.* at 62–64.

Patent Owner argues that (1) Petitioner fails to provide an adequate motivation to combine for a number of reasons, underscored by Cur’s status as non-analogous art; (2) Ekerot does not disclose the claimed cargo receiving chamber; (3) the combination does not disclose the “refrigeration system;” and (4) it would not have been obvious to place Cur’s VIPs between Ekerot’s shells. *See* PO Resp. 52–61. We address the parties’ arguments and evidence in more detail below.

a. Whether Cur Is Analogous Art to the ’855 Patent

In the context of its lack of motivation to combine Ekerot and Cur argument, Patent Owner argues that Cur is non-analogous art because it is not from the same field of endeavor or reasonably pertinent to the problem addressed by the ’855 patent. PO Resp. 53–55. As to the field of endeavor, Patent Owner argues that Cur discloses a home refrigerator/freezer that is fundamentally different from the claimed inventions because home refrigerators “do not carry pallets of cargo, are not moved with forklifts, and are not subject to adverse weather conditions” that can cause Cur’s components, including its VIPs, to fail. *Id.* at 54 (citing Ex. 2023 ¶ 123; Ex. 2025, 321:1–322:9). As to the problem confronting the inventor, Patent Owner contends that the “problem is ‘transporting or shipment of temperature sensitive materials or items’ where the ‘cargo chamber [can] hold a narrow predetermined temperature range for an extended period of time . . . without an external power supply.’” *Id.* at 55 (citing Ex. 1001, 1:6–58). According to Patent Owner, “domestic refrigerators are not pertinent to

shipping pallet-supported cargo, nor the absence of an external power supply.” *Id.* (citing Ex. 2023 ¶¶ 124–125).¹⁸

Petitioner argues that “Cur is in the same field of endeavor and solves analogous problems as the patented invention, i.e., thermal insulation, efficiency, and cooling systems, as shown by its submission as prior art during prosecution of the ’511 Patent.” Pet. Reply 25 (citing Ex. 1049 ¶¶ 355–379); *see also* Pet. 63 (quoting Ex. 1009, 1:60–64) (arguing that “Cur teaches that its VIPs can be used in conjunction with polyurethane foam insulation ‘to maximize the thermal efficiency and structural rigidity of the cabinet’”). Petitioner further contends that Patent Owner “fabricate[s] dissimilarities” when arguing that “its containers require the *absence* of external power, unlike Cur,” because the ’855 patent “use[s] external power.” Pet. Reply 25 (citing PO Resp. 55; Ex. 1001, code (57), 2:28–33, 6:56–7:2). Patent Owner did not address the non-analogous art issue or respond to Petitioner’s Reply arguments in its Sur-reply. *See* PO Sur-reply 22–25.

“Two separate tests define the scope of analogous prior art: (1) whether the art is from the same field of endeavor, regardless of the problem addressed and, (2) if the reference is not within the field of the inventor’s endeavor, whether the reference still is reasonably pertinent to the particular problem with which the inventor is involved.” *In re Bigio*, 381 F.3d 1320,

¹⁸ Patent Owner also argues that Petitioner and Mr. Jobin fail to address the issue adequately at the Petition stage, but a petitioner need not preemptively address non-analogous art arguments in the Petition. *See Sanofi-Aventis Deutschland GmbH v. Mylan Pharms. Inc.*, 66 F.4th 1373, 1379 (Fed. Cir. 2023) (“A petitioner is not required to anticipate and raise analogous art arguments in its petition.”).

1325 (Fed. Cir. 2004), *quoted in Donner Tech., LLC v. Pro Stage Gear, LLC*, 979 F.3d 1353, 1359 (Fed. Cir. 2020) (applying the tests from *In re Bigio* in an appeal from an *inter partes* review); *see also In re Klein*, 647 F.3d 1343, 1348 (Fed. Cir. 2011) (“A reference qualifies as prior art for an obviousness determination under § 103 only when it is analogous *to the claimed invention.*” (emphasis added)).

We agree with Petitioner that Cur is analogous art because it is reasonably pertinent to the problem addressed by the ’855 patent. *See* Pet. Reply 25. Patent Owner attempts to define the problem addressed by the ’855 patent narrowly by confining it to “transporting or shipment of temperature sensitive materials or items . . . without an external power supply” or “shipping pallet-supported cargo, nor the absence of an external power supply.” PO Resp. 55 (citing Ex. 1001, 1:6–58; Ex. 2023 ¶¶ 124–125). Patent Owner’s reference to a lack of an external power source reference conflicts with the ’855 patent because the ’855 patent expressly calls for the use of an external power source in some embodiments. *See* Ex. 1001, code (57), 2:28–33, 6:56–7:2. In addition, the independent claims are broad enough to cover containers that use external power, do not work with “pallet-supported cargo,” and do not involve the transport of goods (that reference only appears in the preambles). *See id.* at claims 1, 19, 35. Instead, consistent with the specification that identifies the goals of the claimed inventions, we view the problem confronted by the ’855 patent as maintaining temperatures within a container using thermal insulation to promote thermal efficiency using a thin wall design that provides rigidity. *See id.* at 1:17–19, 1:32–40, 1:62–2:4, claims 1, 19, 35; *see also* Pet. Reply 25; Ex. 1049 ¶ 367. We find that Cur addresses similar problems by

emphasizing improvements in thermal insulation and efficiency as well as rigidity with its thinner wall design. *See* Ex. 1009, 1:53–2:11 (emphasizing providing high thermal resistance and structural stability with thinner wall design); Pet. 63; Pet. Reply 25; Ex. 1049 ¶¶ 367–371. Accordingly, we determine that Cur is analogous art to the '855 patent.

b. Motivation to Combine Ekerot and Cur

As to the motivation to combine Ekerot and Cur, Petitioner contends that Ekerot discloses “insulating material” between the shells, and describes several types of insulating material including “insulating panels or polyurethane and, in some examples, VIPs.” Pet. 62 (citing Ex. 1008 ¶¶ 3, 26–27, 35, 41). Petitioner states that “Ekerot only explicitly discloses vacuum panels between ‘the ice box opening 49 and the adjacent inner shell 42 wall’ and not specifically in the interspace” between shells. *Id.* at 62–63 (citing Ex. 1008 ¶¶ 27, 35, 41). According to Petitioner, one of ordinary skill in the art, however, “would have had reason to use VIPs as insulating material throughout interspace 44 as taught by Cur.” *Id.* at 63 (citing Ex. 1003 ¶ 274); *see also id.* (“Indeed, Cur teaches that its VIPs can be used in conjunction with polyurethane foam insulation ‘to maximize the thermal efficiency and structural rigidity of the cabinet.’” (quoting Ex. 1009, 1:60–64)). Petitioner states that one of ordinary skill in the art would have “understood Cur’s thinner panels achieve Ekerot’s goals of lighter-weight containers with attenuated heat transfer, which provides further reason to select Cur’s panels” and that “[t]he addition of Cur’s panels to Ekerot’s interspace would improve the thermal efficiency of Ekerot.” Pet. 63 (citing Ex. 1003 ¶ 274; Ex. 1008 ¶¶ 2, 11).

Petitioner adds this discussion of reasons that would have motivated one of ordinary skill in the art to combine Ekerot and Cur:

[A person of ordinary skill in the art would have] also understood that Ekerot's structure would permit Cur's VIPs without the need for foam to secure and protect the panels. Ex. 1003 ¶ 275. Ekerot's composite shells maintain structural rigidity without metal reinforcement. Ex. 1008 [¶ 27]. Locating Cur's panels in the interspace defined by Ekerot would remove the need for insulating foam, as the panels would be buttressed between Ekerot's shells. Ex. 1003, ¶ 275. Without needing foam, [one of ordinary skill in the art] could leverage additional layers of Cur's thin vacuum panel assemblies in the interspace for greater insulation. *Id.*

Pet. 63–64. Petitioner also discusses why one of ordinary skill in the art would have reasonably expected success from the combination. *Id.* (citing Ex. 1003 ¶¶ 273–276; Ex. 1009, 1:6–8).

Patent Owner raises several arguments against the basis for Petitioner's proposed combination of Ekerot and Cur. *See* PO Resp. 56–57, 59–61. First, Patent Owner argues that Petitioner's rationales for the combination are “conclusory” as they fail to “identify any deficiency in Ekerot's insulation.” *Id.* at 56. Patent Owner contends that “Ekerot included VIPs in its design—just not in the walls—and Petitioner offers no reason why [one of ordinary skill in the art] would modify Ekerot to include Cur's VIPs when Ekerot itself chose not to do so (despite being aware of VIPs), nor even a basic explanation *why* [one of ordinary skill in the art] would have been motivated to replace Ekerot's insulating material at all.” *Id.* (citing Ex. 2023 ¶ 127; Ex. 2025, 317:20–318:6). Second, Patent Owner contends that Petitioner relies on hindsight when it cites improved thermal efficiency and thermal insulation as reasons to combine Cur with Ekerot. *See id.* at 56–57 (citing Pet. 62–64; Ex. 1001, 1:62–65). Third, Patent

Owner argues that it would not have been obvious to add Cur’s VIPs between Ekerot’s shells given that Ekerot already employs VIPs on an inner wall that separates cooling components from cargo and an insulating panel between the inner shell and ice box, not between the shells. *Id.* at 59–60 (citing Ex. 1008 ¶¶ 40–41, Figs. 2; Ex. 2023 ¶¶ 133–134; Ex. 2025, 314:13–20, 316:15–318:6, 317:20–318:6).¹⁹ Patent Owner also argues that Cur suggests limiting placement of VIPs to areas with the greatest temperature gradient such as around a freezer rather than between inner and outer shells. *Id.* at 60–61 (citing Ex. 1009, 3:2–12, 4:26–37; Ex. 2023 ¶ 135; Ex. 2025, 336:7–337:22).²⁰

In its Reply, Petitioner argues that Patent Owner “overly adheres to Ekerot” when arguing that it would not have been obvious to place VIPs between Ekerot’s shells, “as opposed to assessing what was obvious to” one of ordinary skill in the art. Pet. Reply 27 (citing Ex. 1049 ¶¶ 385–387). According to Petitioner, Mr. Wynne “testified he previously used VIPs in the walls of a prior art container” and Patent Owner “mischaracterizes that

¹⁹ Although Patent Owner does not group this argument with its other motivation to combine arguments, we view it as a motivation dispute because Patent Owner acknowledges that Petitioner proposes using Cur’s VIPs between Ekerot’s shells, which would meet the limitation. *See* PO Resp. 59.

²⁰ Patent Owner also argues that Petitioner did not provide a proper motivation to add active refrigeration from Cur to Ekerot, which presumes that “refrigeration system” in claim 19 requires a powered compressor-based active cooling system pursuant to Patent Owner’s construction. *See* PO Resp. 53; PO Sur-reply 22–23. Because we do not agree with that construction, and “refrigeration system” encompasses Ekerot’s passive refrigeration system, Petitioner was not required to provide a motivation to add Cur’s active system to Ekerot to meet the “refrigeration system” limitation in claim 19.

Ekerot only taught putting VIPs around a freezer.” *Id.* (citing Ex. 1049 ¶¶ 385–387; Ex. 1061, 63:21–71:22, 481:21–484:13).

Patent Owner responds that Petitioner’s expert admitted that “Ekerot and Cur suggest limiting use and strategic placement of VIPs,” “Ekerot had chosen not to use VIPs in between the walls of its container,” and “he did not identify what VIP assembly of Cur would be used.” PO Sur-reply 24 (citing Ex. 2025, 336:7–337:22, 362:10–19). Patent Owner also contends that adding VIPs between walls “is no easy task” and that Petitioner bases its approach on hindsight, “without any explanation of how this combination would operate or read on the asserted claims.” *Id.* (citing Pet. 62–64).

We find Petitioner’s arguments and evidence as to motivation to combine the references persuasive, and Patent Owner’s counter-arguments unpersuasive. Petitioner provides several credible rationales why one of ordinary skill in the art would have sought to add Cur’s VIPs between Ekerot’s inner and outer shells. *See* Pet. 62–64. For example, Petitioner notes that use of VIPs were already commonly used for insulation, that their thinner profile would have been advantageous in Ekerot’s walls, and the VIPs would improve thermal efficiency while removing the need for Ekerot’s existing insulating foam. *See id.* at 63–64 (citing Ex. 1003 ¶¶ 274–275; Ex. 1008 ¶¶ 2, 11). We do not find Petitioner’s reasoning conclusory or hindsight driven, as Patent Owner contends. *See* PO Resp. 56–57. For example, Petitioner did not rely on hindsight by citing improved thermal efficiency and thermal insulation as reasons to combine Cur with Ekerot, as Patent Owner alleges, given that Cur itself notes these advantages. *See* Ex. 1009, 1:60–2:11; Ex. 1049 ¶ 367 (explaining advantages Cur’s VIPs provide) (citing Ex. 1009, 1:60–2:11); Pet. 63 (citing Ex. 1003 ¶ 274;

Ex. 1009, 1:60–64); Pet. Reply 25 (citing Ex. 1049 ¶¶ 355–379), 27 (citing Ex. 1049 ¶¶ 385–387).

Patent Owner’s remaining arguments do not sufficiently address the advantages of VIPs that Petitioner relies upon for its proposed combination and lack adequate support. For example, Patent Owner argues that Petitioner’s rationales fail to “identify any deficiency in Ekerot’s insulation,” but Petitioner need not identify a deficiency in a prior art reference to support a combination with another reference, and Patent Owner offers no support for such a position. *See* PO Resp. 56. Patent Owner also argues that Ekerot’s use of VIPs in inside the inner shell, but not its walls, shows the lack of motivation to add VIPs in its walls. *See id.* at 56, 59–60. But Ekerot does not teach away from use of VIPs as Petitioner proposes, and Ekerot’s use of VIPs could arguably support their further use in its design. *See* Pet. 62–64; Ex. 1049 ¶¶ 385–387. Finally, Patent Owner argues that Cur’s use of VIPs around its freezer shows that they should not be used in Ekerot’s walls, but Cur does not teach away from wall placement in Ekerot and arguably teaches toward it by placing VIPs in the walls surrounding its freezer. PO Resp. 60–61; Pet. Reply 27 (citing Ex. 1049 ¶¶ 385–387; Ex. 1061, 63:21–71:22, 481:21–484:13); Ex. 1049 ¶ 387 (explaining that “Cur also describes a freezer only embodiment, where even the more limited insulation suggestion would cover the entire container. Exhibit 1009, 1:60-67.”). Patent Owner also argues in its Sur-reply that the modification would be “no easy task” and Petitioner fails to explain “how this combination would operate or read on the asserted claims,” but we view this new argument, not raised in the Patent Owner Response, as both untimely and insufficiently

developed to persuade us that Petitioner’s proposed combination lacks support. *See* PO Sur-reply 24 (citing Ex. 1061, 517:14–518:7).

Based on the foregoing, we find that Petitioner establishes sufficiently that one of ordinary skill in the art would have been motivated to combine Ekerot and Cur in the manner Petitioner proposes.

c. Disclosure of the Limitations of Claim 19

i. Undisputed Limitations

Petitioner contends that the combination of Ekerot and Cur discloses each limitation in claim 19. Pet. 64–68. Petitioner asserts that Ekerot discloses the “cargo container assembly” recited in the preamble to claim 19 (assuming that the preamble limits the claims) as well as limitation 19.A requiring “a box-like composite outer shell having side, top and bottom walls of resin impregnated fibers and having a front opening and a moveable door assembly for closing said front opening.” *See id.* at 64–65 (citing Ex. 1001, 1:19–30; Ex. 1003 ¶¶ 277, 280–282; Ex. 1008 ¶¶ 2, 5, 27, 34, 37, Fig. 2). Patent Owner does not dispute that Ekerot discloses these aspects of claim 19. We find that Petitioner proves by a preponderance of the evidence that Ekerot discloses the preamble (assuming it limits the claim) and limitation 19.A requiring “a box-like composite outer shell” as required by claim 19. *See, e.g.*, Ex. 1008 ¶¶ 27 (describing box-like “outer shell 40” made of “vinyl ester reinforced by glass fibre, kevlar and carbon fibre”), 34, 37 (discussing possible locations of lid on opening for door assembly); Ex. 1003 ¶¶ 280 (discussing Ekerot’s materials as disclosing resin impregnated fibers required by claims), 281 (stating that Ekerot’s disclosure as teaching “a front opening in the outer shell and a door for closing it”); Pet. 64–65.

As to the portion of limitation 19.B requiring “a box-like composite inner shell within said outer shell and having side, top and bottom walls disposed inwardly from the corresponding said walls of said outer shell,” Petitioner argues that Ekerot’s box-like “inner shell 42” made of the same materials as the outer shell discloses these limitations. Pet. 65–66 (citing Ex. 1003 ¶¶ 283–285; Ex. 1008 ¶¶ 27–28, Fig. 2). Patent Owner does not dispute that Ekerot discloses these limitations. We find that Petitioner proves by a preponderance of the evidence that Ekerot discloses “a box-like composite inner shell within said outer shell and having side, top and bottom walls disposed inwardly from the corresponding said walls of said outer shell.” *See* Ex. 1008 ¶¶ 27–28, Fig. 2; *see also* Ex. 1003 ¶¶ 283–285.

As discussed above, Petitioner contends that Cur discloses VIP panels and that it would have been obvious to add those panels to the spaces between Ekerot’s inner and outer shells. *See* Pet. 63–64, 66–67. Petitioner argues that the resulting combination meets limitation 19.C requiring “vacuum insulated panel assemblies confined between the corresponding said side, top and bottom walls of said inner and outer shells.” *Id.* at 66–67 (citing Ex. 1003 ¶¶ 286–288; Ex. 1008 ¶ 26, Fig. 2; Ex. 1009, 4:38–47, claim 1). Although Patent Owner disputes the reasons for the combination, Patent Owner does not argue that once combined, the combination fails to teach this limitation. *See* PO Resp. 52–61. We find that Petitioner proves by a preponderance of the evidence that Petitioner’s proposed combination, based on adding Cur’s VIPs to the space between Ekerot’s inner and outer shells, teaches “vacuum insulated panel assemblies confined between the corresponding said side, top and bottom walls of said inner and outer shells.”

Pet. 66–67; Ex. 1003 ¶¶ 286–288; Ex. 1008 ¶ 26, Fig. 2; Ex. 1009, 4:38–47, claim 1.

ii. Disputed Limitations

Patent Owner argues that Petitioner fails to show that the proposed combination discloses “a box-like composite inner shell . . . *defining a cargo receiving chamber*” or a “refrigeration system.” PO Resp. 57–59. We address each issue in turn below.

As to the aspect of limitation 19.B requiring “a box-like composite inner shell . . . *defining a cargo receiving chamber*,” Petitioner relies on the same aspects of Ekerot’s “inner shell 42” discussed above. *See* Pet. 65–66 (addressing limitation 19.B) (citing Ex. 1003 ¶¶ 283–285; Ex. 1008 ¶¶ 27–28, Fig. 2). We reproduce Petitioner’s annotated version of Ekerot’s Figure 2 below to illustrate Petitioner’s position.

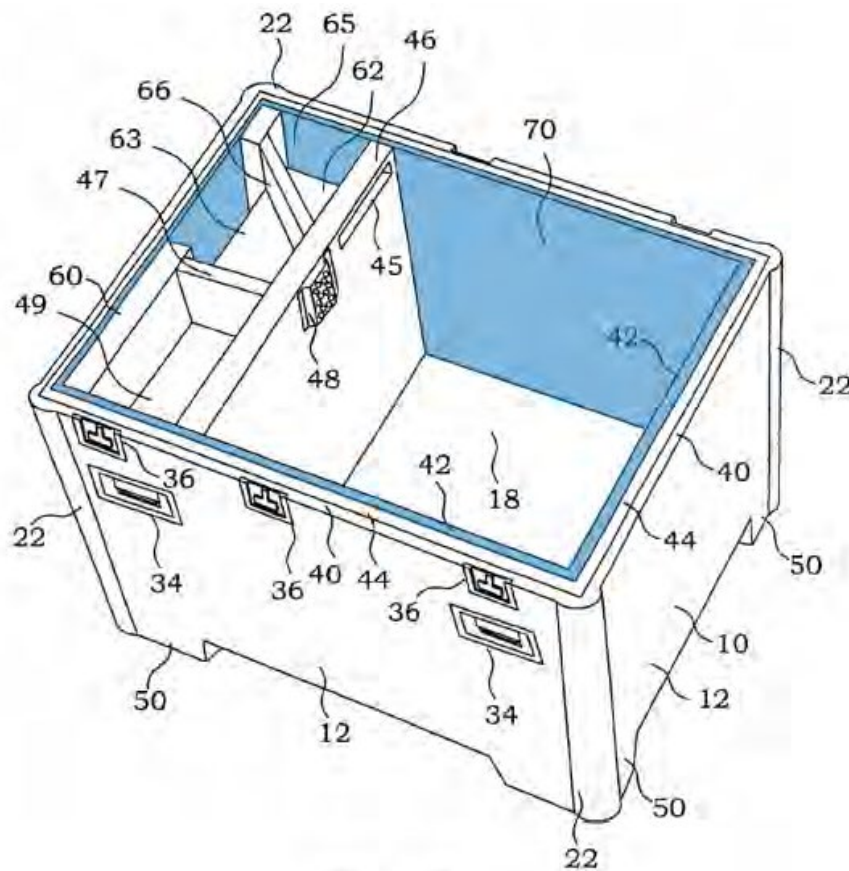


Fig. 2

The annotated version of Ekerot’s Figure 2 shows an embodiment of Ekerot’s container with the lid removed and with inner shell 42 highlighted in blue. Ex. 1008 ¶ 16; Pet. 66.²¹

²¹ Patent Owner notes that neither the Petition nor supporting declaration separately calls out the “cargo receiving chamber” language in its analysis. See PO Resp. 58. Because the section of the Petition addressing limitation 19.B includes the cargo receiving limitation and both the Petition and declaration clearly identify the inner shell that must define the claimed cargo receiving chamber, we do not view Petitioner’s failure to repeat the “cargo receiving chamber” claim language in the body of its argument in the Petition as a fatal omission. See Pet. 65–66 (citing Ex. 1003 ¶¶ 283–285). Petitioner clearly identifies the inner shell that must define that chamber, and given the context of the claim limitation being addressed in this section we

Patent Owner argues that Ekerot does not disclose “the cargo receiving chamber to be defined by an inner composite shell” as required by claim 19. PO Resp. 57–58. According to Patent Owner, Ekerot’s “inner main wall 46” that consists of a vacuum panel “divides a main goods compartment 70 from the cooling arrangements” such that wall 46 “is not part of the inner shell nor a composite of resin impregnated fiber.” *Id.* at 58 (citing Ex. 1008 ¶ 40; Ex. 2025, 314:13–20, 316:2–8). According to Patent Owner, “[a]s a result, the inner shell 42 Petitioner relies upon does not “defin[e] a cargo receiving chamber,” as required by” claim 19. *Id.* (citing Pet. 65–66; Ex. 1003 ¶¶ 283–284, 319–320; Ex. 2023 ¶¶ 129–130; Ex. 2025, 352:6–353:1, 353:21–34).

In its Reply, Petitioner concedes that it did not address Ekerot’s interior main wall 46 within its inner shell, but argues that if such a wall separating cooling components from a compartment with cargo defeats its argument, the presence of a similar “cold wall” in Patent Owner’s own products would prevent Patent Owner from showing it meets the requirements of claim 19, which would defeat Patent Owner’s priority claims. Pet. Reply 26–27. Petitioner asserts that the claims are unpatentable “[e]ither way.” *Id.* at 27. Patent Owner responds that Ekerot’s wall 46 performs a different function than the wall in Patent Owner’s product by

view this assertion as sufficient to put Patent Owner on notice that the identified inner shell in Ekerot meets the “defining a cargo receiving chamber” limitation, and Patent Owner addressed Petitioner’s contention in that manner in its Response. *See id.*; PO Resp. 57–58.

isolating the cargo from cold dry ice that would freeze the cargo. *See* PO Sur-reply 23 (citing Ex. 1008 ¶ 40; Ex. 2184, 129:2–130:15).²²

Based on our review of the parties’ arguments, we find that Petitioner proves by a preponderance of the evidence that Ekerot’s inner shell 42 meets the limitation requiring “a box-like composite inner shell . . . *defining a cargo receiving chamber*” because it includes Ekerot’s main goods compartment within it. *See* Pet. 66 (showing compartment 70 within inner shell 42 in annotated Figure 2); Ex. 1008 ¶¶ 27–28. Importantly, Patent Owner does not dispute that compartment 70 within Ekerot’s inner shell 42 receives cargo. PO Resp. 57–58. Patent Owner’s implicit argument seems to be that in order for the inner shell to define a cargo receiving chamber as claimed, the entire interior shell must include a single chamber that only receives cargo, and Ekerot’s inner shell 42 fails to do so because it includes a wall that separates cooling components from the cargo area. *See id.*

There are three problems with Patent Owner’s argument. First, Patent Owner does not support its implicit argument with adequate reasoning or evidence, whether doing so through an express claim construction argument or some other argument to support such an interpretation of the claim. Second, as Petitioner notes, if Patent Owner made such an argument and we accepted it, that would at least undermine Patent Owner’s reliance on a priority date based on a product that also includes a wall within the inner shell that divides an area that includes cooling components from an area that

²² Petitioner also asserts an alternative obviousness argument, which Patent Owner views as untimely and unsupported. *See* Pet. Reply 27 n.4; PO Sur-reply 23 (citing Ex. 1049 ¶ 380; Ex. 2184, 132:21–133:25). We need not reach Petitioner’s obviousness argument because we find the limitation met by Ekerot’s inner shell 42.

receives cargo. *See* Pet. Reply 26–27. Patent Owner attempts to distinguish between the interior wall in Ekerot and the interior wall within the inner shell of its own product, but without adequate explanation of how to construe the claim to somehow cover Patent Owner’s product without covering Ekerot’s design. *See* PO Sur-reply 23 (citing Ex. 1008 ¶ 40; Ex. 2184, 129:2–130:15). Third, the ’855 patent does not support Patent Owner’s implicit construction of the limitation because it, like Patent Owner’s product, does not disclose an inner shell defining a cargo receiving chamber that includes no dividing wall and only receives cargo. Instead, the ’855 patent discloses an arrangement similar to Ekerot’s, with an inner shell that includes cargo receiving chamber 125 but also includes a wall (flat panel 120) that separates cargo receiving area 125 from certain cooling components within the inner shell, such as evaporator 230. *See* Ex. 1001, 3:57–62, 4:10–24, 6:13–17, Fig. 3 (showing inner shell 56 with back wall 97 that includes flat panel 120 dividing inside of inner shell 56 into area that receives cooling components, such as evaporator 230 and cargo receiving chamber 125).

Based on the foregoing, we determine that the claim limitation requiring “a box-like composite inner shell . . . *defining a cargo receiving chamber*” does not require an inner shell that only receives cargo or lacks a wall or other structure that separates cargo from cooling components. With this view of the claim in mind, we find that Petitioner establishes by a preponderance of the evidence that Ekerot discloses “a box-like composite inner shell . . . *defining a cargo receiving chamber.*” *See* Pet. 65–66; Ex. 1008, Fig. 2.

As to Patent Owner’s argument that the combination fails to teach the “refrigeration system” limitation, Patent Owner relies on its proposed construction for “refrigeration system” that requires “a powered, compressor-driven active cooling system.” PO Resp. 58–59. Patent Owner acknowledges that Ekerot teaches passive refrigeration with an ice box but contends that, given its construction, Ekerot fails to meet the limitation and Petitioner fails to articulate an adequate motivation to add Cur’s active refrigeration to Ekerot. *See id.* Because we do not adopt Patent Owner’s proposed construction for “refrigeration system,” we find Patent Owner’s argument unpersuasive. Instead, we find that Ekerot discloses a passive refrigeration system that satisfies the claim limitation requiring “a refrigeration system connected to cool said chamber” in claim 19. *See* Pet. 67–68 (citing Ex. 1003 ¶ 289; Ex. 1008 ¶¶ 41–42); Ex. 1003 ¶ 289; Ex. 1008 ¶¶ 41–42.

Based on the foregoing, we find that Petitioner establishes by a preponderance of the evidence that the combination of Ekerot and Cur discloses all of the limitations of claim 19.

d. Objective Indicia

i. The Parties’ Positions

Patent Owner asserts that objective indicia, such as commercial success and unexpected results, strongly support nonobviousness of the challenged claims. PO Resp. 69–73. Patent Owner argues that we should presume a nexus exists between the challenged claims and Patent Owner’s commercial products referred to as the RKN and RAP containers. *See id.* at 14–15, 71 (citing nexus argument at PO Resp. 14–15). Patent Owner provides a list of elements of the RKN and RAP cargo containers that

allegedly track the challenged claims. *See id.* at 14–15 (citing Exs. 2022, 2023).

Patent Owner also argues that “the commercial success of Patent Owner’s containers derives directly from the containers’ properties.” PO Resp. 71 (citing Ex. 2024 ¶¶ 47–74). Patent Owner relies on the declaration of its VP of Global Strategic Accounts, Mr. Sitzlar, who opines that Patent Owner’s customers choose to purchase its patented products because the containers offer “superior reliability and performance which derives directly from the container design.” *Id.* at 71–72 (quoting Ex. 2162 ¶ 46) (citing Ex. 2162 ¶¶ 12–46). Patent Owner also relies on an expert, Ms. Bennis, who considered “Patent Owner’s continued investment in the patented VIP/composite technology, and Petitioner’s recent choice to launch a directly competing product, and concludes that these facts show a nexus between the commercial success of CSafe’s RKN and RAP containers and the patented technology.” *Id.* at 72 (citing Ex. 2024 ¶¶ 47–74).

As to commercial success, Patent Owner argues that since its inception in 2008, Patent Owner’s RKN and RAP containers [REDACTED]
[REDACTED]
[REDACTED] PO Resp. 69 (citing Ex. 2024 ¶¶ 33–46). Patent Owner also contends that “from 2015 through 2019, [Patent Owner’s] active revenue growth outpaced the market, demonstrating that its growth was not tied exclusively to overall market growth.” *Id.* at 69–70 (citing Ex. 2024 ¶¶ 44–46). Patent Owner further contends that the quick adoption of its RKN product in the market underscores the commercial success of its product. *Id.* at 70 (citing Ex. 2024 ¶¶ 28–46; Ex. 2162 ¶¶ 55–60).

Patent Owner also contends that its “patented design has been surprisingly and unexpectedly effective, offering significantly longer container lifetimes and performance characteristics than what was expected or typical in the field.” PO Resp. 70 (citing Ex. 2022 ¶¶ 50–56; Ex. 2162 ¶¶ 52–54; PO Resp. 12–14). According to Patent Owner, major companies moved their business to Patent Owner soon after they entered the field due to its superior design, and the fact that containers introduced to [REDACTED] fourteen years ago are still in use today went far beyond expectations. *Id.* at 12–13 (citing Ex. 2022 ¶¶ 51–56; Ex. 2162 ¶¶ 40–43). This led to praise of the design by industry leaders such as [REDACTED]. *Id.* at 70 (citing Ex. 2022 ¶ 57; Ex. 2176).

Petitioner notes that Patent Owner “overlooks” that the district court ruled against Patent Owner as to nexus. Pet. Reply 30 (citing Ex. 1043, 22; Ex. 1058, 20:6–24:6). Petitioner also contends that Mr. Sitzlar’s testimony “is inadmissible hearsay on what customers allegedly told him,” Ms. Bennis’s “testimony is meaningless” because “she repeatedly referred to” Ms. Cameron’s testimony about nexus, yet Ms. Cameron “acknowledged she did not opine on it.” *Id.* (citing Ex. 1058, 57:6–60:1, 66:10–68:3, 202:5–15, 221:4–223:19; Ex. 1062, 149–150). Petitioner also argues that no Patent Owner “witness attempted to discern whether success was due to specific claimed or unclaimed features, including significant variation among the VIP claims.” *Id.* (citing Ex. 1051 ¶¶ 11, 37–52). Petitioner also asserts that Patent Owner “has never practiced its claims” because its products lack the “cargo receiving chamber” and “moveable door assembly” limitations. *Id.* (citing PO Resp. 14–15; Ex. 1049 ¶¶ 416–417; Ex. 1063, 463:13–464:15; Ex. 2122; Ex. 2023 ¶¶ 155–158, 186; Ex. 2143; Ex. 2147; Ex. 2180, 17).

As to commercial success, Petitioner argues that Patent Owner's arguments fail to address why Petitioner's non-infringing containers still have more than █████ Patent Owner's market share after more than fourteen years of direct competition with Patent Owner's patented design. Pet. Reply 29 (citing Ex. 1051 ¶¶ 11.c, 38; Ex. 1056, 174:8–176:15; Ex. 1058, 184:16–190:13, 191:19–197:9). As to the unexpected success of Patent Owner's design, Petitioner argues that the claim lacks a comparison to other containers and that the increased longevity stems from preventative maintenance rather than the patented design. *Id.* (citing Ex. 1056, 131:13–137:2, 186:2–8; Ex. 1058, 227:18–235:15; Ex. 2149, 24). As to industry praise, Petitioner claims that “nobody in this proceeding had even heard of” the award to Patent Owner. *Id.* (citing Ex. 1050 ¶ 9; Ex. 1063, 442:16–22).

In its Sur-reply, Patent Owner argues that the district court's “single sentence analysis should carry no weight” on the nexus issue. PO Sur-reply 29. Patent Owner also argues that the presence of other features that contribute to a product's success does not undermine a finding of nexus, and that nexus should be presumed here, where the product is the invention disclosed and claimed in the patent. *Id.* Patent Owner also faults Petitioner for only making a general reference to preventive maintenance as a driver of the commercial success. *Id.* at 30 (citing Pet. Reply 30; PO Resp. 71–72; Ex. 1051; Ex. 2185, 83:15–85:23). As to commercial success, Patent Owner argues that Petitioner's reference to non-infringing container sales, given Petitioner's larger scale and earlier market entry, do not rebut Patent Owner's showing of commercial success. *Id.* at 28. As to maintenance driving longevity, Patent Owner argues that Petitioner overstates deposition testimony. *Id.* at 28–29 (citing Ex. 1056, 69:3–12). As to industry praise,

Patent Owner argues that Petitioner’s lack of knowledge of the award does not undermine Patent Owner’s evidence. *Id.* at 29.

ii. Discussion

We first address the issue of nexus between the claimed invention and Patent Owner’s objective indicia of nonobviousness and then the strength of Patent Owner’s objective indicia evidence.

As to nexus, Patent Owner provides a list of elements of the RKN and RAP cargo containers that track the limitations of the challenged claims and, on their face, the products appear to practice those claims. *See id.* at 14–15 (citing Exs. 2022, 2023). While Petitioner takes issue with various aspects of Patent Owner’s nexus evidence, including declarant testimony, Petitioner largely ignores Patent Owner’s showing that its products are sufficiently coextensive with its claims that is entitled to a presumption of nexus. *See* Pet. Reply 30 (citing Ex. 1051 ¶¶ 11, 37–52). The single sentence Petitioner devotes to this issue lacks sufficient development and explanation to counter Patent Owner’s presumption of nexus assertion, or rebut the presumption of nexus. *See id.* For example, Petitioner alludes to the success being from unclaimed features and “significant variation among the VIP claims,” but does not specifically identify any of the unclaimed features or “variation” in “VIP claims” or explain their significance in any way. *See id.* To the extent Petitioner relies on unclaimed “preventative maintenance” as the alleged true driver of sales, this assertion, based on a few lines of deposition testimony stating that preventative maintenance merely contributes to the longevity of

Patent Owner's products, lacks weight and fails to rebut Patent Owner's showing. *See id.* at 29 (citing Ex. 1056, 186:2–8).²³

Petitioner also suggests that Patent Owner's containers lack a cargo receiving chamber (*see* Pet. Reply 29), but that argument presumes that we would find Ekerot also fails to disclose a cargo receiving chamber based on Patent Owner's arguments, and we did not find that argument persuasive for the reasons provided above. Finally, Petitioner argues that Patent Owner's products fail to meet the "moveable door assembly" limitations,²⁴ but makes no effort to explain why or to further explain the argument beyond a single-sentence remark. *See id.* Such undeveloped arguments do not defeat or rebut the presumption of nexus here. We find that Patent Owner establishes a presumption of a nexus between the challenged claims and its commercial products.²⁵

As to commercial success, Patent Owner offers some evidence of commercial success, primarily based on an increase in market share from

²³ While we consider the district court's finding that Patent Owner failed to establish a nexus at the preliminary injunction stage in that proceeding, we agree with Patent Owner that the finding has less relevance here given the limited nature of the discussion of nexus and the more complete record before us. *See* PO Sur-reply 29.

²⁴ Claim 19 requires an outer shell "having a front opening and a moveable door assembly for closing said front opening," but Petitioner does not provide a construction for this limitation or adequately explain why Patent Owner's doors fail to meet the limitation, which does not appear to require *mounting* the door to the outer shell. *See* Ex. 1001, claim 19.

²⁵ Because we find that Patent Owner establishes a presumption of nexus and that Petitioner did not rebut that presumption, we need not reach Patent Owner's alternative basis for alleging a nexus due to the claimed container design allegedly driving the success and the related reliance on declarations and customer statements. *See* PO Resp. 71–73.

Based on our review of the arguments and evidence, we find a moderate level of commercial success tied to the challenged claims. We find the evidence of unexpected results and industry praise very weak. As a whole, we view the objective indicia of nonobviousness evidence as, at best, moderate evidence of nonobviousness.

e. Conclusion as to Claim 19

“Once all relevant facts are found, the ultimate legal determination [of obviousness] involves the weighing of the fact findings to conclude whether the claimed combination would have been obvious to an ordinary artisan.” *Arctic Cat Inc. v. Bombardier Recreational Prods. Inc.*, 876 F.3d 1350, 1361 (Fed. Cir. 2017). Above, based on the full record before us, we provide our factual findings regarding (1) the level of ordinary skill in the art, (2) the scope and content of the prior art, (3) any differences between the claimed subject matter and the prior art; and (4) objective indicia of nonobviousness.

In particular, we find that (1) Petitioner’s proposed level of ordinary skill in the art is consistent with the art of record; (2) Petitioner establishes that the combination of Ekerot and Cur discloses or renders obvious all the limitations of claim 19, based on clear teachings from the prior art; and (3) Patent Owner presents moderate evidence of objective indicia of nonobviousness. Weighing these underlying factual determinations, including the strong evidence based on the prior art, we determine that Petitioner has shown, by a preponderance of the evidence, that claim 19 would have been obvious over Ekerot and Cur.²⁶

²⁶ We apply these same four factors throughout our obviousness analysis when addressing other claims and grounds. Because our findings for each

4. *Claims 35–37*

Independent claim 35 recites: “installing a power operated refrigeration unit with an *evaporator within the inner shell* and connected to a motor driven *compressor outside of the outer shell.*” Ex. 1001, 11:19–21 (emphasis added) (the “evaporator/compressor limitation”). Petitioner addresses this limitation in the following manner in the Petition:

Ekerot teaches the refrigeration unit of the claims. §VII.D.2.v. If Patent Owner argues the claimed refrigeration system requires an active cooling system, PHOSITA understood the combination to teach this limitation. Ex. 1003, ¶ 329. Cur teaches active refrigeration, in which an internal evaporator and motor driven compressor are necessary components. Ex. 1009, 1:53–57; Ex. 1003 ¶ 329. PHOSITA understood to install the refrigeration unit after the shell-in-shell structure had been assembled. Ex. 1003, ¶¶ 329-330.

Pet. 80–81.

Patent Owner argues that the combination of Ekerot and Cur fails to satisfy claim 35’s evaporator/compressor limitation. *See* PO Resp. 61 (citing Prelim. Resp. 18). Patent Owner contends that Petitioner fails to even allege that either reference discloses the limitation requiring “a motor driven compressor *outside of the outer shell.*” *See id.* Petitioner does not directly respond to this argument in its Reply, but does generally argue that

factor remain the same throughout, i.e., Petitioner’s proposed level of ordinary skill in the art is consistent with the art of record, Petitioner clearly establishes that the proposed combinations disclose all of the limitations of the challenged claim(s), and Patent Owner presents moderate evidence of objective indicia of nonobviousness, we do not repeat these findings. In addition, because we view all of the evidence based on the prior art as strong in comparison to the only moderate evidence of objective indicia, our weighing of the factors remains the same throughout the rest of this Decision.

“locating those active [refrigeration] components is within POSITAs’ knowledge.” *See* Pet. Reply 26 (citing Ex. 1049 ¶¶ 381–384).

We agree with Patent Owner that the Petition fails to address adequately the limitation requiring “a motor driven compressor *outside of the outer shell*.” The Petition does not even allude to this limitation, how the combination discloses the limitation, or why one of ordinary skill in the art would have placed the compressor on the outside of the outer shell rather than some other location. *See* Pet. 80–81. Nor does Petitioner direct us to any figures in Ekerot showing the locations of the compressor. *See id.* The cited expert testimony goes a bit further by arguing that “persons having ordinary skill in the art would have understood the installation of the refrigeration unit to occur after the shell-in-shell structure had been assembled because the shell-in-shell structure is needed to support the evaporator within the inner shell *while at the same time supporting the compressor outside of the outer shell*.” Ex. 1003 ¶ 329 (emphasis added). Even assuming that it would have been obvious to add active refrigeration components of Cur to Ekerot’s shells, this testimony fails to explain adequately why one of ordinary skill in the art would have chosen to use the shell structure to support the compressor. *See id.* Petitioner’s Reply also cites expert testimony, but that testimony does not address the limitation in question and relates more generally to the obviousness of active cooling more generally. *See* Ex. 1049 ¶¶ 381–384; Pet. Reply 26 (citing Ex. 1049 ¶¶ 381–384).

We view the Petition and cited evidence as failing to explain adequately how the proposed combination discloses the combination and why it would have been obvious to arrange the components in a manner that

meets the limitation requiring “a motor driven compressor outside of the outer shell.” Accordingly, we determine that Petitioner has not proven by a preponderance of the evidence that claim 35 would have been obvious over Ekerot and Cur. For the same reasons, we determine that Petitioner has not proven by a preponderance of the evidence that claim 36, which depends from claim 35, and claim 37, which depends from claim 36, would have been obvious over Ekerot and Cur.

5. Claims 20, 21, 28, 31

Each of claims 20, 21, 28, and 31 require particular structures for the claimed VIP panels, including parallel layers of VIPs. *See* Ex. 1001, claims 20, 21, 28, 31. We address each claim in turn below.

a. Claim 20

Claim 20 depends from claim 19 and recites: “wherein said vacuum insulated panel assemblies comprise parallel substantially flat insulation layers each having a plurality of vacuum insulated panels, and each of said panels including a core of porous material confined within an evacuated sealed bag of flexible gas impermeable film.” Ex. 1001, claim 20.

Petitioner argues that Cur’s VIPs include “one or more microporous filler insulation materials” and that Cur’s Figure 2 depicts a VIP assembly “sealed by a gas-impermeable barrier film laminate, which PHOSITA understood would be flexible and evacuated.” Pet. 68 (citing Ex. 1003 ¶ 294; Ex. 1009, 4:37–47, 4:55–64, 5:2–17, claim 1, Fig. 2). Petitioner also contends that Cur discloses assemblies with multiple vacuum sealed compartments, with each compartment filled with a microporous insulating material 34. *Id.* at 69–71 (citing Ex. 1003 ¶¶ 295–296, 299–300; Ex. 1009, 4:16–24, 4:38–52, Fig. 4; Ex. 1016, 3:39–47, 5:66–6:2, 8:54–64, 9:30–38, Fig. 13).

As part of its argument as to claim 20, Petitioner contends that U.S. Patent No. 5,018,328 (Ex. 1016, “’328 Cur”) is incorporated by reference into Cur, before discussing certain teachings from ’328 Cur allegedly relevant to Petitioner’s positions. *See* Pet. 68–71; *see also Advanced Display Sys., Inc. v. Kent State Univ.*, 212 F.3d 1272, 1282 (Fed. Cir. 2000) (“Material not explicitly contained in the single, prior art document may still be considered for purposes of anticipation if that material is incorporated by reference into the document.”). On the issue of incorporation by reference, Petitioner states:

Cur’s multicompartiment embodiment is described in additional detail in its “copending patent application,” issued as U.S. Patent 5,018,328. [Ex. 1009], 1:64–2:3 (citing Ex. 1016), 4:38–52. [A person of ordinary skill in the art] understood Cur incorporates ’328 Cur by reference and therefore each of ’328 Cur’s teachings are also disclosed by Cur. *See Husky Injection Molding Sys. Ltd. v. Athena Automation Ltd.*, 838 F.3d 1236, 1248 (Fed. Cir. 2016) (“The incorporation standard relies only on the reasonably skilled artisan and his or her ability to deduce from language, however imprecise, what a host document aims to incorporate.”).

Pet. 61.

In our Institution Decision, we addressed Patent Owner’s argument that Cur merely references ’328 Cur and does not properly incorporate by reference aspects of ’328 Cur. *See* Inst. Dec. 45–49; Prelim. Resp. 16–17. We concluded on that record “that Cur incorporates by reference the VIPs of ’328 Cur.” Inst. Dec. 49. Patent Owner does not maintain its argument that Cur fails to incorporate by reference ’328 Cur in its Patent Owner Response. *See* PO Resp. 61–63; Paper 9, 9 (stating that “any arguments not raised in the response may be deemed waived”). Based on our review of Cur, we find that Cur incorporates by reference the VIPs of ’328 Cur and consider the

teachings of Cur '328 in our analysis of any grounds relying on that material. Patent Owner does not address or dispute any of Petitioner's argument and evidence as to claim 20. *See* PO Resp. 61–63.

Based on our review of the record, we find Petitioner establishes by a preponderance of the evidence that Cur discloses VIPs that meet all of the limitations of claim 20. Pet. 68–71 (citing Ex. 1003 ¶¶ 295–296, 299–300; Ex. 1009, 4:16–24, 4:38–52, 4:55–64, 5:2–17, claim 1, Fig. 2, Fig. 4; Ex. 1016, 3:39–47, 5:66–6:2, 8:54–64, 9:30–38, Fig. 13). Weighing the underlying obviousness factual determinations, including the strong evidence based on the prior art, we determine that Petitioner has shown, by a preponderance of the evidence, that claim 20 would have been obvious based on Ekerot and Cur.

b. Claim 21

Claim 21 depends from claim 20 and recites: “wherein said layers of vacuum insulated panels are separated by an insulation panel, and said layers and insulation panel are surrounded by a flexible film of plastics material to form a vacuum insulated cassette.” Ex. 1001, claim 21. Petitioner relies in part on its argument and evidence as to claim 20 when contending that Cur discloses a VIP assembly “that includes a cassette,” with multiple compartments with each constituted “its own sealed VIPs or arrangement of VIPs within each insulation layer.” Pet. 72 (citing Ex. 1003 ¶ 302; Ex. 1009, Fig. 4). Petitioner asserts that Cur (and Cur '328) disclose metal foil layers that separate each sub-compartment of microporous core material. *Id.* at 72–73 (citing Ex. 1009, 4:44–5:29, Fig. 4; Ex. 1016, 7:7–21). According to Petitioner, the “foil layers, as taught in '328 Cur, serve as radiation shields, hamper convective transfer by forcing air around them,

and impinge conductive heat transfer through thermal breaks” and that one of ordinary skill in the art would have understood the layers to meet the “insulation panel” limitation in claim 21. *Id.* at 73 (citing Ex. 1003 ¶ 303; Ex. 1016, 6:61–7:6). Petitioner further contends that barrier films surround both “the sub-compartments (consisting of one or more VIPs) and the foil insulation panels,” which “discloses the flexible film of plastics material surrounding the cassette of the claim.” *Id.* (citing Ex. 1003 ¶¶ 305–306; Ex. 1009, 2:49–58, 4:64–5:2, Figs. 2, 4, 7A–C).

Patent Owner argues that “Petitioner never addresses that the VIP layers are separated by a plastic sheet or foam and are sandwiched between protective plastic sheets, or that panels are individually sealed (why they are multiple VIPs), which is not shown in Cur.” PO Resp. 61–62²⁷ (citing Pet. 64–67; Ex. 2023 ¶ 136; Ex. 2025, 377:1–6, 378:4–7, 380:14–20, 382:30–383:5). Patent Owner also contends that the ’855 patent describes the insulation panel “as a sheet of plastic or foam” and that one of ordinary skill in the art “would not understand” that the metal foil layers Petitioner relies on for the insulation panel meet the limitation. *Id.* at 62 (citing Pet. 72–73; Ex. 1001, code (57), 2:18–21, 4:62–65; Ex. 2023 ¶ 137).²⁸

²⁷ Patent Owner makes this argument with reference to claim 28, but states that Petitioner’s argument as to claim 21 fails “[f]or much the same reasons,” so we address it here with Patent Owner’s other arguments as to claim 21. *See* PO Resp. 61–62.

²⁸ Patent Owner mistakenly cites to Exhibit 1003 rather than Exhibit 1001 (the ’855 patent) and mistakenly refers to “Kuhn” rather than “Cur” in this argument, but we view these mistaken references as typographical errors. *See* PO Resp. 62. To the extent Patent Owner intended to refer to Kuhn, the argument lacks adequate explanation as Petitioner does not refer to Kuhn in this ground.

Petitioner responds that Patent Owner “argues only that the references do not describe each particular layer of their narrow construction” of “insulation panel,” and that even using that construction the claim would have been obvious. Pet. Reply 28 (citing PO Resp. 61–62, 67; Ex. 1049 ¶ 328).

In its Sur-reply, Patent Owner argues that “the Reply never addressed the argument that a POSA would not consider a metal foil layer to meet the required insulation layer between the VIP layers.” PO Sur-reply 28. Patent Owner also argues that Petitioner “neither addressed the entire insulation cassette structure, mentioned the protective layers on the inside and outside of the VIP layer stack, nor how any of these requirements were taught by Cur.” *Id.* at 27 (citing Pet. 72–74).

We first address Patent Owner’s argument that Cur’s “metal foil layers” cannot meet the “insulation panel” limitation of claim 21. As an initial matter, to the extent that Patent Owner suggests that the “insulation panel” must be made of the materials listed in the ’855 patent specification—“sheet of plastic or foam”—we disagree, and Patent Owner has not made that argument expressly or supported it with adequate reasoning. *See* PO Resp. 61–62 (citing Ex. 1001, code (57), 2:18–21, 4:62–65). We do agree, however, that the metal plastic foil Petitioner relies on must insulate in some fashion to meet the claim limitation. Here, Petitioner relies on specific statements from Cur ’328. *See* Pet. 72–73 (citing Ex. 1003 ¶ 303; Ex. 1009, 4:44–5:29, Fig. 4; Ex. 1016, 6:61–7:21). As Petitioner notes, Cur ’328 describes preventing “transmission of heat by radiation” by providing a “metallized plastic film or metallic foil” “so that infrared radiation is reflected rather than transmitted through the panel.” Ex. 1016,

6:61–67; Pet. 73. According to Cur ’328, even though these materials do not remove heat by themselves, “they place additional resistance in the heat-flow path . . . the overall vacuum panel heat transfer is further retarded.” Ex. 1016, 6:67–7:3. Patent Owner never addresses these portions of Cur ’328 that Petitioner relies on or explains why they fail to disclose insulating properties. *See* PO Resp. 61–62. Based on our review of Petitioner’s arguments and evidence, we find that Petitioner establishes that Cur (due in part to Cur ’328, which Cur incorporates by reference) discloses the claimed “insulation panel.”

As to Patent Owner’s argument that “Petitioner never addresses that the VIP layers are . . . sandwiched between protective plastic sheets, or that panels are individually sealed (why they are multiple VIPs), which is not shown in Cur,” we disagree. *See* PO Resp. 61–62. First, Patent Owner relies on its proposed construction of “insulation cassette” for this argument, and we declined to adopt that construction for the reasons stated above in our claim construction analysis. *See id.* Patent Owner does not argue that this argument applies in the absence of our adoption of its construction. Second, Patent Owner again fails to address directly Petitioner’s argument and evidence. Petitioner argues that “[a]s explained above [in the context of claim 20 from which claim 21 depends], Cur discloses a ‘multicompartment’ VIP assembly and PHOSITA would have understood each sub-compartment 34 to be its own sealed VIP or arrangement of VIPs within each insulation layer” and that the sub-compartments and entire cassette are surrounded by a flexible film of plastic. Pet. 72 (citing Ex. 1003 ¶ 302; Ex. 1009, Fig. 4); *see also id.* at 68–21 (addressing claim 20), 73 (citing Ex. 1003 ¶¶ 305–306; Ex. 1009, 2:49–58, 4:64–5:2, Figs. 2, 4, 7A–C); *see also id.* at 70–71

(describing multiple levels of sealed compartments in the context of claim 20). This argument and evidence shows not only that Petitioner addressed the issues Patent Owner asserts were ignored, but also establishes that Cur discloses the limitations in claim 21 requiring “layers and insulation panel . . . surrounded by a flexible film of plastics material to form a vacuum insulated cassette.” *See id.*

Based on our review of the record, we find Petitioner establishes by a preponderance of the evidence that the combination of Ekerot and Cur discloses all of the limitations of claim 21. Weighing the underlying obviousness factual determinations, including the strong evidence based on the prior art, we determine that Petitioner has shown, by a preponderance of the evidence, that claim 21 would have been obvious based on Ekerot and Cur.

c. Claim 28

Claim 28 depends from claim 19 and recites:

wherein each of said inner shell and said outer shell has integrally connected side, top, bottom and rear walls to form a one-piece unit, insulation cassettes between corresponding said walls, and each said cassette including a plurality of insulation layers each having a plurality of vacuum insulated panels each including a core of porous material confined within an evacuated sealed bag of flexible gas impermeable film.

Ex. 1001, claim 28. Petitioner relies on Ekerot as disclosing “inner and outer shells are each separately ‘formed together as one integrated part’” to meet the aspect of claim 28 requiring “each of said inner shell and said outer shell has integrally connected side, top, bottom and rear walls to form a one-piece unit.” Pet. 74 (citing Ex. 1003 ¶¶ 309–311; Ex. 1008 ¶¶ 11, 27, 30–31). Patent Owner does not dispute that Ekerot discloses this aspect of claim

28. *See* PO Resp. 61–62. We find that Petitioner proves by a preponderance of the evidence that Ekerot discloses the limitation requiring each of said inner shell and said outer shell has integrally connected side, top, bottom and rear walls to form a one-piece unit.” Pet. 74; Ex. 1003 ¶¶ 309–311; Ex. 1008 ¶¶ 11, 27, 30–31.

As to the “insulation cassettes” limitation in the remainder of claim 28, Petitioner argues that they are taught by the combination of Ekerot and Cur and refers back to its analysis of claim 21. *See* Pet. 74 (citing Pet. 72–74). Petitioner’s Reply faults Patent Owner for relying on a narrow construction of “insulation cassette.” Pet. Reply 28.

Patent Owner argues that “Petitioner never addresses that the VIP layers are separated by a plastic sheet or foam and are sandwiched between protective plastic sheets, or that panels are individually sealed (why they are multiple VIPs), which is not shown in Cur.” PO Resp. 61–62 (citing Pet. 64–67; Ex. 2023 ¶ 136; Ex. 2025, 377:1–6, 378:4–7, 380:14–20, 382:30–383:5). Patent Owner’s Sur-reply raises the same arguments noted above in the context of claim 21, which Patent Owner argues together with claim 28: (1) Patent Owner argues that “the Reply never addressed the argument that a POSA would not consider a metal foil layer to meet the required insulation layer between the VIP layers;” and (2) Petitioner “neither addressed the entire insulation cassette structure, mentioned the protective layers on the inside and outside of the VIP layer stack, nor how any of these requirements were taught by Cur.” PO Sur-reply 27–28 (citing Pet. 72–74).

As noted above in the context of our discussion of claim 21, we disagree with Patent Owner’s argument that “Petitioner never addresses that the VIP layers are . . . sandwiched between protective plastic sheets, or that

panels are individually sealed (why they are multiple VIPs), which is not shown in Cur.” *See* PO Resp. 61–62. First, Patent Owner relies on its proposed construction of “insulation cassette” for this argument, and we declined to adopt that construction for the reasons stated above in our claim construction analysis. *See id.* Patent Owner does not argue that this argument applies in the absence of our adoption of its construction. Second, Patent Owner again fails to address directly Petitioner’s argument and evidence, which clearly incorporates its argument for the “insulation cassettes” made in the context of claim 21. *See* Pet. 74 (citing to “§VII.D.4” for its “insulation cassettes” analysis, which is the section of the Petition addressing claim 21, which in turn relies on the Petition’s analysis of claim 20). Patent Owner does not directly address this reference to the claim 21 arguments, and, as noted above, does not directly address Petitioner’s arguments with respect to claim 21. *See* PO Resp. 61–62.

Notably, Patent Owner does not directly dispute that Cur teaches the aspect of claim 28 that requires “a plurality of insulation layers each having a plurality of vacuum insulated panels each including a core of porous material confined within an evacuated sealed bag of flexible gas impermeable film.” PO Resp. 61–62. That claim language parallels the language in claim 20, which Patent Owner also does not contest. We find that Cur discloses this limitation for the same reasons discussed in the context of claim 20 and set forth in the Petition addressing claims 20 and 21. *See* Pet. 68–74; Ex. 1003 ¶¶ 295–296, 299. Claim 28 includes an “insulation cassette” limitation like that in claim 21, but claim 28 does not require an “insulation panel” and is therefore broader than claim 21. *See* Ex. 1001, claims 21, 28. For the same reasons discussed above in the context of claim

21, we find that Cur discloses the “insulation cassette” limitation of claim 28. *See* Pet. 72–74; Ex. 1003 ¶¶ 302–308.

Based on our review of the record, we find Petitioner establishes by a preponderance of the evidence that the combination of Ekerot and Cur discloses all of the limitations of claim 28. Weighing the underlying obviousness factual determinations, including the strong evidence based on the prior art, we determine that Petitioner has shown, by a preponderance of the evidence, that claim 28 would have been obvious based on Ekerot and Cur.

d. Claim 31

Claim 31 depends from claim 19 and recites:

wherein said door assembly comprises a rigid outer door panel, a formed sheet of plastics material connected to said door panel and defining a space therebetween, a vacuum insulated panel assembly disposed between said sheet of plastics material and said outer door panel, and said vacuum insulated panel assembly comprising parallel layers each having a plurality of vacuum insulated panels each including a core of porous material confined within a sealed bag of flexible gas impermeable film.

Ex. 1001, claim 31. As to the door panel aspect of claim 31, Petitioner argues that Ekerot’s main lid 30 comprises Ekerot’s top wall 16 and that Ekerot teaches locating the opening and lid on another container wall. Pet. 74 (citing Ex. 1008 ¶¶ 11, 37). Petitioner contends that one of ordinary skill in the art “understood Ekerot’s main lid comprised of a reinforced polymer material and located on a side wall would constitute a rigid outer door panel.” *Id.* at 74–75 (citing Ex. 1003 ¶¶ 312–313; Ex. 1008 ¶ 37). Petitioner relies on the ’855 Patent as acknowledging the desirability of insulating all walls and doors, and argues that because “Ekerot teaches that its insulation is applied between the outer shell and the inner shell, which is

plastic,” one of ordinary skill in the art “understood this structure (as applied to the lid) to disclose a formed sheet of plastics material with a space between where Cur’s VIP assembly could be disposed.” *Id.* at 75 (citing Ex. 1001, 1:31–40; Ex. 1003 ¶¶ 312–313; Pet. 68–71). Petitioner relies on its argument as to claim 20 for the remaining limitations directed to VIP panels. *See id.* (citing Pet. 68–71).

Patent Owner argues that Ekerot’s statements describing its inner and outer shells apply to the integrated part of Ekerot’s container, not its lid. PO Resp. 62 (citing Pet. 75). According to Patent Owner, “Ekerot does not disclose a double-shell lid, space therebetween, nor does it suggest placing insulting material in this hypothetical place, and Petitioner fails to show claim 31 obvious.” *Id.* (citing Ex. 2023 ¶ 138). Patent Owner further contends that “Petitioner also fails to show that even if the lid were double-shelled with a space, how ‘Cur’s VIP assembly’ could be disposed within that space as Petitioner offers no citation to Cur.” *Id.* at 63 (citing Ex. 1003 ¶ 312; Ex. 2023 ¶ 139; Ex. 2025, 362:10–19).

In its Reply, Petitioner argues that Patent Owner’s argument that it would not have been obvious “to insulate Ekerot’s lid the same as the other walls” was impeached by expert testimony and Petitioner’s position is supported by other testimony. Pet. Reply 27 (citing Ex. 1048, ¶¶ 66–67; Ex. 1049 ¶¶ 388–390; Ex. 1061, 83:2–9, 621:2–12; Ex. 1062, 505:12–508:13, 578:3–583:11). According to Petitioner, inventor Mr. Wynne and Petitioner’s expert Mr. Jobin agree that using “the same insulation on all sides is the obvious approach.” *See id.*

In its Sur-reply, Patent Owner contends that its expert Dr. Cameron was not impeached as Petitioner alleges and that her testimony makes clear

that while insulating all sides of a container may be desirable, “it would ‘not necessarily’ be obvious to put *the same insulation* in all sides.” PO Sur-reply 24–25 (citing Ex. 1062, 506:5–9, 509:9–511:2; Ex. 2184, 81:14–84:11).

The primary dispute concerns whether Ekerot’s teaching of inner and outer shells with an interspace between them (to receive Cur’s VIPs) applies when lid 30 comprises the entire top wall 16. Based on our review of the parties’ arguments, we find Petitioner’s position, supported by Ekerot’s disclosures and credible expert testimony, more persuasive.

Ekerot discloses a container with “six walls 12, 16, 18, of which four are side walls 12,” “one is a top wall 16 and one is a bottom wall 18.” Ex. 1008 ¶ 22. Ekerot’s invention includes an embodiment with outer shell 30 and inner shell 42 separated by interspace 44 filled with an insulating material. *Id.* ¶ 26. Ekerot states that “[i]n the embodiment illustrated in FIG. 2, the five container walls 12, 18 constitute one integrated part.” *Id.* ¶ 27. Ekerot further explains that the “preferred embodiment of the invention has six walls 12, 16, 18” but in other embodiments less walls may be used, although “four walls are necessary to realise the invention.” *Id.* ¶ 37. In the next sentence, Ekerot states that “[i]t follows that it is also possible that less than five container walls constitute an integrated part.” *Id.* As we read these passages, when Ekerot states that the invention preferably includes *six* walls (all sides of the container) that include top wall 16, it does not refer to an entirely *integrated* six-wall container. *See id.* Such a container may be impossible to manufacture and Ekerot does not describe such a fully integrated container. Ekerot reinforces this reading by addressing the number of integrated walls separately from its statement that

the invention preferably includes six walls. *See id.* Accordingly, the “invention” referred to in the context of six walls refers to Ekerot’s inner and outer shell design with an interspace for insulation, which applies to top wall 16. *See id.* Consequently, when Ekerot next describes making lid 30 the “entire top wall 16,” it suggests doing so using the same double-shell with interspace design contemplated throughout Ekerot. *See id.; see also id.* ¶¶ 26–27.

All of these portions of Ekerot support Petitioner’s, and its expert’s, contention that one of ordinary skill in the art “understood this structure (as applied to the lid) to disclose a formed sheet of plastics material with a space between where Cur’s VIP assembly could be disposed.” Pet. 75 (citing Ex. 1001, 1:31–40; Ex. 1003 ¶¶ 312–313; Ex. 1008 ¶ 37); *see also* Ex. 1003 ¶ 312 (citing Ex. 1008 ¶¶ 26–27, 37). We view Patent Owner’s alternative view, that the double-shell design only applied to the integrated portions of Ekerot’s container, as less credible because Ekerot does not support that interpretation. *See* PO Resp. 62. For the same reasons discussed in the context of claim 19, we find that it would have been obvious to add Cur’s VIP panels within the interspace between Ekerot’s inner and outer shells on its lid.

We also find that Ekerot’s lid discloses a rigid outer door when it acts as the entire top wall 16, as Petitioner alleges. Pet. 74 (citing Ex. 1008 ¶¶ 11, 37). With respect to the remaining limitations of claim 31 directed to a VIP assembly “comprising parallel layers each having a plurality of vacuum insulated panels each including a core of porous material confined within a sealed bag of flexible gas impermeable film,” those limitations parallel claim 20 and Petitioner’s reliance on that portion of the Petition for

these limitations persuades us that Cur discloses these aspects of claim 31. *See* Pet. 74 (citing “§VII.D.3.,” the section of the Petition addressing claim 20).

Based on our review of the record, we find Petitioner establishes by a preponderance of the evidence that the combination of Ekerot and Cur discloses all of the limitations of claim 31. Weighing the underlying obviousness factual determinations, including the strong evidence based on the prior art, we determine that Petitioner has shown, by a preponderance of the evidence, that claim 31 would have been obvious based on Ekerot and Cur.

F. Anticipation of Claims 19, 20, 23, and 28 by Kuhn

Petitioner asserts that claims 19, 20, 23, and 28 of the ’855 patent are anticipated under pre-AIA 35 U.S.C. § 102(a) by Kuhn. Pet. 1, 10–25. As noted above, Patent Owner adequately establishes a date of invention prior to Kuhn for all these challenged claims except claims 21 and 26–30 of the ’855 patent. Accordingly, we do not treat Kuhn as prior art to claims 19, 20, and 23 in this challenge and determine that Petitioner has not proven by a preponderance of evidence that Kuhn anticipates any of claims 19, 20, and 23 of the ’855 patent. We address claim 28 below after providing a brief summary of Kuhn.

1. Kuhn

Kuhn discloses heat-insulated containers that “are used in particular, but certainly not exclusively, for purposes of transport in order to be able

convey temperature-sensitive goods, for example medications, while maintaining narrow temperature tolerance ranges.” Ex. 1005, 3:25–29.²⁹

Figures 1 and 3 of Kuhn are reproduced below:

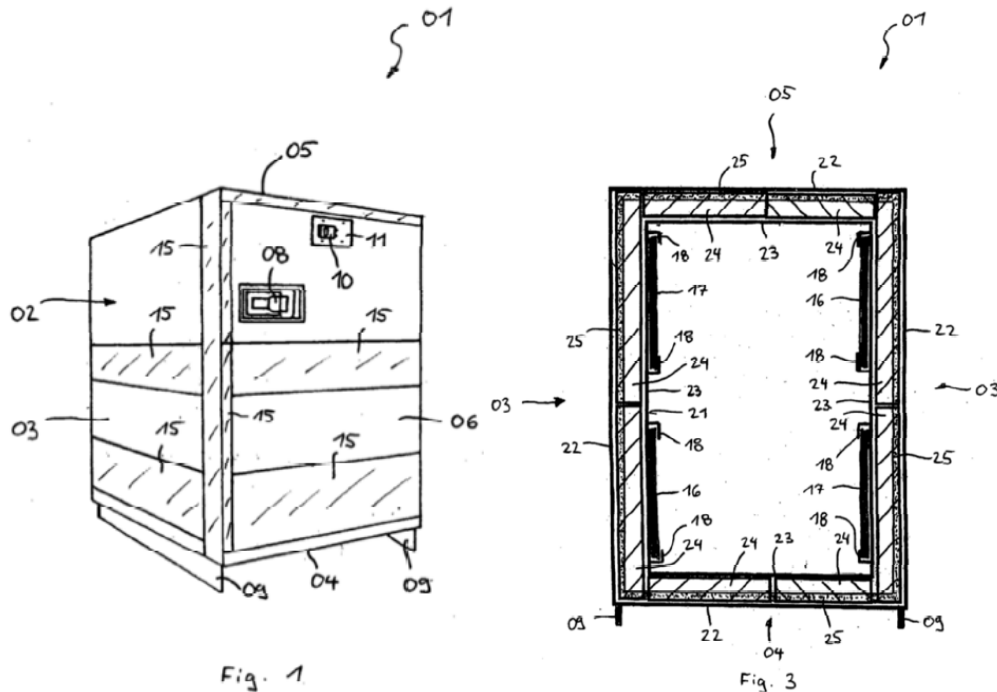


Figure 1 depicts a “transport container in an external perspective view” and Figure 3 shows the same container in cross-section. Ex. 1005, 8:18, 8:23. Both Figures 1 and 3 show container 01, which includes three side wall elements 03, floor element 04, cover element 05, and pivotably mounted door element 06. *See id.* at 9:26–10:4. Kuhn discloses that, “[a]fter closing the door element 06, the internal space 07 is enclosed on all sides and is insulated against the penetration of heat through the container wall 02 by means of vacuum insulating elements.” *Id.* at 10:6–8. Figure 3 shows, among other features, “melting storage elements 16 and 17 . . . arranged parallel to the container wall 02 on the inside 21 of the container

²⁹ For Kuhn, we use the page numbering added by Petitioner, shown after “Ex. 1005.” in the bottom right corner of each page.

01” and shows vacuum insulating elements 24 arranged between outer wall 22 and inner wall 23. *See id.* at 11:19–25.

2. *The Parties’ Positions*

Claim 28, as discussed above, requires, in part, “insulation cassettes between corresponding said walls” that have multiple layers and VIP panels within each layer, with each VIP including “a core of porous material confined within an evacuated sealed bag of flexible gas impermeable film.” Ex. 1001, claim 28. Petitioner argues that Kuhn discloses all of the limitations of independent claim 19 as well as claim 28, which depends directly from claim 19. Pet. 13–19 (claim 19 arguments), 23–25 (claim 28 arguments).

As to the “refrigeration system” limitation in claim 19, Petitioner asserts that one of ordinary skill in the art would have “understood that a ‘refrigeration system’ at the relevant time included a broad range of active and passive systems designed to cool the chamber, including for example iceboxes, dry ice, or other chemicals to chill, or maintain a cool temperature in, the container.” Pet. 18–19 (citing Ex. 1003 ¶ 125). Petitioner relies on Kuhn’s disclosures of “melting storage elements filled with a suitable melting storage material” and that “buffer the thermal flow until reaching the capacity limits.” Ex. 1005, 4:22–5:3,³⁰ *quoted at* Pet. 19. According to Petitioner, one of ordinary skill in the art would have “understood Kuhn taught its cargo would be cooled as required by” the “refrigeration system” limitation. Pet. 19 (citing Ex. 1003 ¶¶ 124–127).

³⁰ Petitioner cites to the internal pagination of Kuhn. We revise Petitioner’s citations to the page numbering added by Petitioner.

As to claim 28, Petitioner argues that Kuhn discloses the limitation requiring “each of said inner shell and said outer shell has integrally connected side, top, bottom and rear walls to form a one-piece unit” because Kuhn uses “three side wall elements 03, the floor element 04 and the cover element 05 are fixedly connected to one another, forming a rectangular internal space 07.” Pet. 23 (citing Ex. 1003 ¶ 137; Ex. 1005, 10:1–9). For the insulation cassette aspect of the claim, Petitioner argues that Kuhn teaches multiple VIPs arranged with “shock protection elements 25 made of foamed plastic” for protection between the VIPs and the outer wall. *Id.* at 24 (citing Ex. 1005, 11:19–29, Figs. 3–4). Petitioner also contends that “Kuhn teaches to install multiple VIPs in container walls so that ‘in case of damage to one vacuum insulating element . . . the entire insulation of the container wall in question does not fail.’” *Id.* (quoting Ex. 1005, 12:12–27). According to Petitioner, Kuhn also shows arranging “VIPs adjacently to cover an entire wall” and “stacking multiple VIP layers and shock protection elements to ‘increase the thermal flow resistance’ (i.e., to increase insulation).” *Id.* at 24–25 (citing Ex. 1005, 7:15–18, 12:1–27, Fig. 6). Petitioner also asserts that “[e]ach Kuhn VIP has a porous material core within an evacuated sealed bag of flexible gas impermeable film.” *Id.* at 25 (citing Ex. 1005, 6:1–8).³¹

Patent Owner relies on its proposed construction of “refrigeration system” in its argument that Kuhn does not anticipate claim 19. PO Resp.

³¹ Petitioner also argues that “[i]t would have been obvious to PHOSITA to enclose this multiple VIP layer sub-assembly in an envelope or bag of flexible multi-layer barrier film to increase resiliency.” Pet. 25 (citing Ex. 1001, 4:54–57; Ex. 1003 ¶¶ 137–140). We do not reach this argument as we find that Kuhn anticipates claim 28.

34–35. For example, Patent Owner argues that Kuhn does not satisfy the “refrigeration system” limitation “because Kuhn teaches a ‘passive’ cooling system rather than ‘a powered compressor based active cooling system.’” *Id.* at 34. Patent Owner does not raise any additional arguments against Petitioner’s anticipation arguments with respect to claim 19. *See id.*

With respect to the insulation cassette aspect of claim 28, Patent Owner relies on its proposed construction of “insulation cassette” and argues that Kuhn’s VIP disclosures fail to meet all of the requirements of that construction. PO Resp. 35–36. For example, Patent Owner argues that “Kuhn does not describe any VIP layers separated by a plastic sheet or foam nor sandwiched between protective sheets, nor wrapping the construction in a flexible plastic film, as required by the proper claim construction for ‘insulation cassette.’” *Id.* at 36 (citing claim construction argument and Ex. 1005, 10:24–27); *see also* PO Sur-reply 1–2, 17–18, 27–28 (relying on its proposed constructions when arguing that Kuhn does not meet the limitations of claims 19 and 28).

In its Reply, as to claim 19, Petitioner contends that “if ‘refrigeration system’ is correctly construed to include passive refrigeration, [c]laims 19–20, and 23 are unpatentable.” Pet. Reply 19–20 (citing PO Resp. 34–35; Ex. 1003 ¶¶124–27; Ex. 1049 ¶¶ 301–305; Ex. 2023 ¶¶ 80–82). As to claim 28, Petitioner addressed its obviousness argument issues it raises with respect to the “insulation cassette” limitation. *See id.* at 20 n.3, 28. Petitioner notes that Patent Owner argues for a narrow construction, but argues that Patent Owner “never actually argues why those cassettes would not be obvious, and thus has not opposed these elements.” *Id.* at 28.

3. Discussion

We first address Petitioner’s contention that Kuhn discloses of the limitations of claim 19. Patent Owner’s arguments as to claim 19 rely solely on its argument that we should construe “refrigeration system” to mean “a powered compressor based active cooling system.” PO Resp. 16, 34–35. For the reasons provided above, we reject that construction and Patent Owner’s arguments based on it are not persuasive. Patent Owner does not dispute that Kuhn discloses the remaining limitations of claim 19. *See id.* at 34–35. We find Petitioner’s arguments and evidence as to claim 19 persuasive and adopt Petitioner’s argument and evidence as our own.³² *See* Pet. 13–19.

As to claim 28, Patent Owner relies on its construction for “insulation cassettes” when arguing that Kuhn does not disclose that limitation. *See* PO Resp. 35–36. For example, Patent Owner argues that Kuhn lacks an insulation layer between its VIP panels, but that language does not appear in claim 28 and only appears in other claims or Patent Owner’s proposed construction. *See* PO Sur-reply 27. For the reasons provided above, we reject Patent Owner’s proposed construction for “insulation cassette” and

³² Aside from adopting Petitioner’s arguments and evidence as our own, we do not set forth separate formal findings as to Petitioner’s undisputed assertions. *See In re NuVasive, Inc.*, 841 F.3d 966, 974 (Fed. Cir. 2016) (“Although the Board did not make findings as to whether any of the other claim limitations (such as fusion apertures or anti-migration teeth) are disclosed in the prior art, it did not have to: NuVasive did not present arguments about those limitations to the Board. . . . The Board, having found the only disputed limitations together in one reference, was not required to address undisputed matters.”); Paper 9, 9 (stating that “any arguments not raised in the response may be deemed waived”).

Patent Owner's arguments based on it are not persuasive. Patent Owner does not dispute the remaining aspects of Petitioner's showing as to claim 28. *See* PO Resp. 35–36. We find Petitioner's arguments and evidence as to claim 28 persuasive, and adopt Petitioner's analysis as our own. *See* Pet. 23–25.

Based on the foregoing, we find that Petitioner proves by a preponderance of the evidence that Kuhn anticipates dependent claim 28.³³

G. Obviousness of Claims 19–21, 23, and 26–30 Based on Kuhn and Loeffler

Petitioner asserts that claims 19–21, 23, and 26–30 of the '855 patent would have been obvious under pre-AIA 35 U.S.C. § 103(a) based on Kuhn and Loeffler. Pet. 1, 26–38. As noted above, Patent Owner adequately establishes a date of invention prior to Kuhn for the challenged claims here with the exception of claims 21, 26–30. Accordingly, we do not treat Kuhn as prior art to claims 19, 20, and 23 in this challenge and determine that Petitioner has not proven by a preponderance of evidence that Kuhn and Loeffler render obvious any of claims 19, 20, and 23 of the '855 patent. We also exercise our discretion not to address claims 21 and 28 in this challenge because we already determined that Petitioner establishes that those claims are unpatentable. *Bos. Sci. Scimed, Inc. v. Cook Grp. Inc.*, 809 F. App'x 984, 990 (Fed. Cir. 2020) (recognizing that the “Board need not address

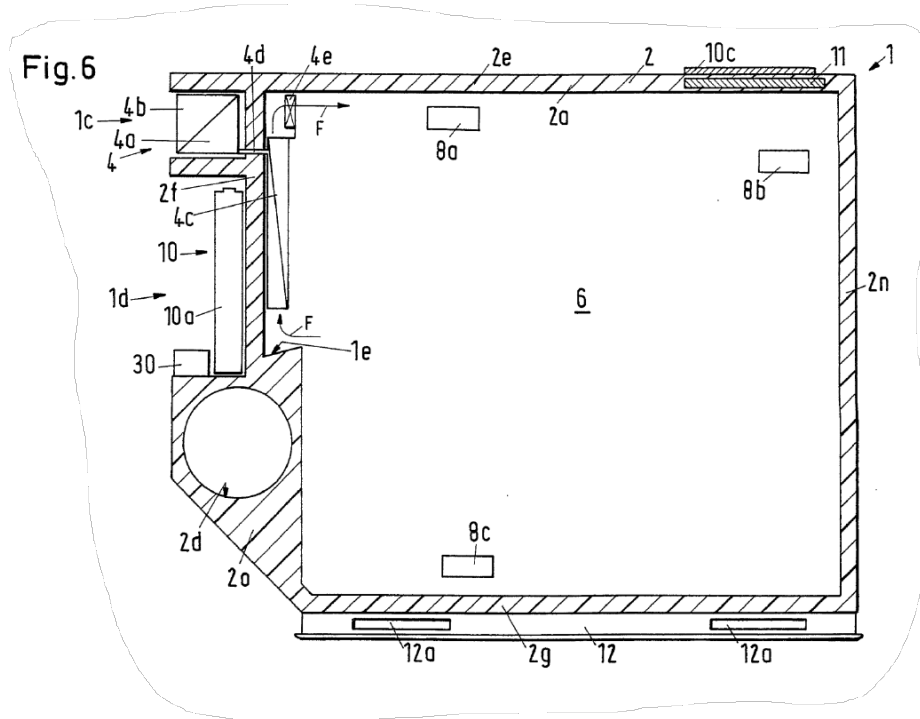
³³ Although we do not reach the merits of Petitioner's challenges to claim 20 and 23 as anticipated by Kuhn because Patent Owner establishes priority over Kuhn as to those claims, we note that Patent Owner does not dispute that Kuhn anticipates claims 20 and 23 if we found that Kuhn discloses all of the limitations of claim 19. *See* PO Resp. 33–36. Based on our review of the Petition, we agree with Petitioner that Kuhn discloses the limitations of claims 20 and 23. *See* Pet. 19–23.

issues that are not necessary to the resolution of the proceeding” and, thus, agreeing that the Board has “discretion to decline to decide additional instituted grounds once the petitioner has prevailed on all its challenged claims”). We address the remaining claims 26, 27, 29, and 30 below after providing a brief summary of Loeffler.

1. Loeffler

In this asserted ground, Petitioner relies on Loeffler, in addition to Kuhn (summarized above). Loeffler discloses a cargo container “with a highly insulating housing, as well as with an air conditioning system monitored by a control system.” Ex. 1006, 5:19–21.³⁴

Figure 6 of Loeffler is reproduced below:



³⁴ For Loeffler, we use the page numbering added by Petitioner, shown after “Ex. 1006.” in the bottom right corner of each page.

Figure 6 is a cross-sectional view of a cargo container with a refrigeration unit. *See* Ex. 1006, 8:33–37. Cargo container 1 shown above includes, among other features, insulating housing 2 and “air conditioning system 4 having a compressor 4a, a condenser 4b, and an evaporator unit 4c disposed within the interior 6 and connected to the condenser 4b via a connecting line 4d.” *Id.* at 14:32–34, 15:6–9.

2. Claims 26 and 27

Claim 26 depends from claim 19 and recites: “wherein said outer shell includes a rear wall integral with said side wall, top and bottom walls of said outer shell, one of said walls including a projecting support integral with said one wall, and a housing member enclosing said tubular support of said outer shell.” Ex. 1001, claim 26. Petitioner argues that both Loeffler and Kuhn disclose rear walls integral with the other walls of the container. *See* Pet. 33 (citing Ex. 1006, Fig. 5; Pet. 23–25). Petitioner further contends that Loeffler discloses “a projecting support integral with the rear wall.” *Id.* (citing Ex. 1006, Fig. 5). Petitioner argues that the limitation “said tubular support” “has no antecedent basis” and Petitioner “interprets this limitation to encompass any ‘projecting support integral with said one wall’ as required by the claim.” *Id.* at 33 n.2 (“At best, this term derives its basis from ‘projecting support,’ which further supports Petitioner’s interpretation.”). Petitioner further contends that “Loeffler’s projection defines cavities” and one of ordinary skill in the art would have understood that the “recessed cavities . . . would be a projecting support integral with said one wall, and thus would be the claimed tubular support.” *Id.* at 34 (citing Ex. 1003 ¶¶ 166–170; Ex. 1006, 12:17–29, Figs. 5–6). Petitioner also asserts that a “housing encloses the disclosed support.” *Id.* (citing Ex. 1006, Fig. 5).

Patent Owner argues that Petitioner relies on Kuhn for the “outer shell” in claim 19, but when claim 26 refers to that same “outer shell” Petitioner improperly shifts its reliance to Loeffler without any explanation from Petitioner or its expert. *See* PO Resp. 42 (citing Pet. 13–18, 33–34; Ex. 2023 ¶¶ 94; Ex. 2025, 155:9–22, 156:14–19, 163:8–164:13, 187:15–188:15, 195:5–15). Patent Owner also contends that “Loeffler’s shell is not a composite of resin impregnated fiber, as claim 19 requires of the outer shell, so even if utilized, Loeffler still would not meet this limitation, and neither Petitioner nor Jobin acknowledge nor explain this discrepancy.” *Id.*

Petitioner briefly addresses claims 26 and 27 in its Reply, arguing that Patent Owner “reiterates the flawed physical modifications argument.” Pet. Reply 23 (citing Ex. 1049 ¶¶ 321–330). Patent Owner disagrees, contending that its argument relies on Petitioner’s mere “summary conclusion” that the combination teaches the claim “without any explanation of the portions of the references relied upon or how they might be combined to meet the claims.” PO Sur-reply 20.

We agree with Patent Owner that Petitioner offers insufficient explanation and rationale for its proposed combination addressing claim 26. As Patent Owner points out, Petitioner’s challenge appears to rely on Loeffler for the outer shell as well as the tubular projection integral with the outer shell. *See* Pet. 33–34 (citing Ex. 1003 ¶¶ 166–170; Ex. 1006, 12:17–29, Figs. 5–6). Neither the Petition nor the supporting declarant testimony explains how or why this challenge switches from reliance on Kuhn for the outer shell in claim 19 to reliance on Loeffler for the outer shell in claim 26, which depends from claim 19. Nor does the Petition or supporting declaration acknowledge or address the different materials used for the outer

shell in Kuhn and Loeffler or the need to retain Kuhn's material choice to meet the limitations of claim 19. *See id.*; PO Resp. 42. Petitioner did not acknowledge these issues or provide any rationale for resolving them in the Petition. Moreover, Petitioner's one-sentence argument in Reply did not provide the missing explanation. *See* Pet. Reply 23 (citing Ex. 1049 ¶¶ 321–330). The new declarant testimony cited in support of the sentence in Reply did provide a new obviousness argument, but we do not consider new obviousness arguments made for the first time, and the only time, in a declaration filed with a Reply. *See* Ex. 1049 ¶¶ 321–330; *Wasica Fin. GmbH v. Cont'l Auto. Sys., Inc.*, 853 F.3d 1272, 1286–87 (Fed. Cir. 2017).

Based on the foregoing, we find that Petitioner did not prove by a preponderance of the evidence that the combination of Kuhn and Loeffler renders claim 26 obvious. Claim 27 depends from claim 26 and we find that Petitioner did not prove by a preponderance of the evidence that the combination of Kuhn and Loeffler renders claim 27 obvious for the same reasons.

3. Claims 29 and 30

Claim 29 depends from claim 19 and recites: “wherein said bottom wall of said inner shell includes a plurality of parallel spaced members defining air flow passages therebetween, and a rigid floor panel mounted on said spaced members.” Ex. 1001, claim 29. Petitioner argues that “[w]hen adding Loeffler's refrigeration system, PHOSITA would include parallel passages to enable uniform temperature distribution.” Pet. 36 (citing Ex. 1003 ¶ 177). Petitioner contends that “Loeffler teaches ‘U-shaped recesses 3c . . . between parallel spaced members within the roof or floor which are fluid guide channels’ and that one of ordinary skill in the art

would have understood that the floor sections between the recesses constitute a plurality of parallel spaced members, “while Loeffler’s fluid guide channels . . . define air flow passages between those members.” *Id.* at 36–37 (citing Ex. 1003 ¶¶ 178–179; Ex. 1006, 8:28–9:7; 9:18–34, Fig. 7). Petitioner further asserts that “Loeffler’s guide channels are located in the roof wall,” and in the area of “bottom wall 2g,” and “on the floor of the interior 6.” *Id.* at 37 (citing Ex. 1003 ¶¶ 176–181; Ex. 1006, 9:29–34, Fig. 6). Petitioner then asserts that “[i]n the latter embodiment, Loeffler teaches a rigid floor panel mounted on the passages.” *Id.* (citing Ex. 1006, Fig. 6).

Patent Owner points out that Petitioner relies on recesses in Loeffler’s walls, but relies on Kuhn for the inner shell walls, and Petitioner fails to explain how the recesses could be added to Kuhn’s bottom wall without damaging its bottom wall made of composite and plywood. PO Resp. 44 (citing Pet. 33–34). Patent Owner further argues that “the Petition summarily concludes that ‘Loeffler teaches a rigid floor panel mounted on the passages,’ without any explanation of what Loeffler structure Petitioner relied upon as teaching the floor panel” or how that floor panel is mounted on the spaced members. *Id.* at 45 (citing Pet. 35; Ex. 2025, 209:7–21, 211:10–212:4).

Petitioner submits the same one-sentence Reply to Patent Owner’s arguments as it did with respect to claim 26, arguing that Patent Owner’s arguments amount to a “flawed physical modifications argument.” Pet. Reply 23 (“For Claims 26-27 and 29-30, PO reiterates the flawed physical modifications argument (Ex. 1049, ¶¶ 321-330).”). Patent Owner responds

that its argument merely points out the fatal lack of explanation in the Petition. *See* PO Sur-reply 20.

Our analysis here generally tracks our analysis above with respect to claim 26. We agree with Patent Owner that Petitioner offers insufficient explanation and rationale for its proposed combination addressing claim 29. As Patent Owner points out, Petitioner’s challenge relies on recesses in Loeffler’s inner walls, but Petitioner relies on Kuhn’s inner walls to meet the inner shell requirements of claim 19, from which claim 29 depends. *See* Pet. 36 (citing Ex. 1003 ¶ 177); PO Resp. 44. Neither the Petition nor the supporting declarant testimony explains how or why this challenge switches from reliance on Kuhn for the inner shell in claim 19 to reliance on Loeffler’s recesses in its inner shell in claim 29, or why one of ordinary skill in the art would have been motivated to add Loeffler’s recesses to Kuhn’s bottom wall. *See* Pet. 36; Ex. 1003 ¶¶ 176–179.

Petitioner also fails to establish that Loeffler discloses “a rigid floor panel mounted on said spaced members.” Petitioner and its cited expert testimony merely state the conclusion that Loeffler “teaches a rigid floor panel mounted on the passages” and include an unannotated version of Loeffler’s Figure 6. *See* Pet. 37; Ex. 1003 ¶ 180. This analysis fails for several reasons. First, it does not track the claim language, which requires a floor panel mounted on the “spaced members,” not the “passages.” *See* Pet. 37. Second, the depiction of Figure 6 alone does not identify the floor panel, passages, or spaced members, much less the floor panel mounted to the space members. It remains unclear from the Petition whether the passages and alleged spaced members shown in Loeffler’s Figure 6 are present in Figure 7, or whether the functionality of the passages may be

compromised if a floor panel were mounted on them or the spaced members as Petitioner alleges. *See* Pet. 36–37. Finally, Petitioner does not assert that any modification of Loeffler’s structure would have been necessary or obvious to meet the limitation.

Based on the foregoing, we find that Petitioner did not prove by a preponderance of the evidence that the combination of Kuhn and Loeffler renders claim 29 obvious. Claim 30 depends from claim 29 and we find that Petitioner did not prove by a preponderance of the evidence that the combination of Kuhn and Loeffler renders claim 30 obvious for the same reasons.³⁵

*H. Obviousness of Claims 19–21, 23, 26–28, 31, 33, 35–37, and 41
Based on Sinclair and Kuhn*

Petitioner asserts that claims 19–21, 23, 26–28, 31, 33, 35–37, and 41 of the ’855 patent would have been obvious under pre-AIA 35 U.S.C. § 103(a) based on Sinclair and Kuhn. Pet. 1, 39–57. As noted above, Patent Owner adequately establishes a date of invention prior to Kuhn for the challenged claims here with the exception of claims 21, 26–28, and 37. Accordingly, we do not treat Kuhn as prior art to claims 19, 20, 23, 31, 33, 35, 36, and 41 in this challenge and determine that Petitioner has not proven by a preponderance of evidence that Sinclair and Kuhn render obvious any of those claims for that reason alone. We address the remaining claims below after providing a brief summary of Sinclair.

³⁵ The parties dispute several issues with respect to claim 19 in the context of this challenge, including motivation to combine. *See* PO Resp. 37–41. We need not reach those issues given that we found Petitioner fails to meet its burden as to the dependent claims above even if it had met its burden as to claim 19.

1. Sinclair

In this asserted ground, Petitioner relies on Sinclair, in addition to Kuhn (summarized above (*see* § II.F.1)). Sinclair discloses “thermally insulated containers suitable for use in the transport of refrigerated goods.” Ex. 1007, 1:9–12.

Figure 1 of Sinclair is reproduced below:

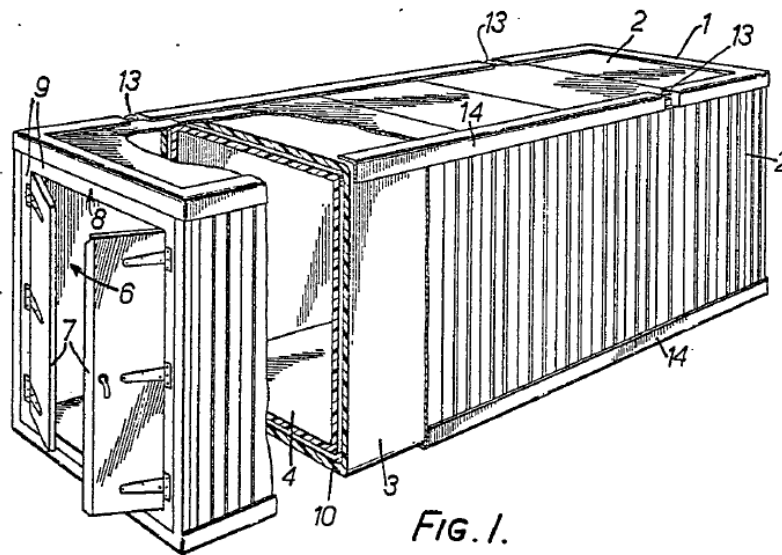


Figure 1 is “a perspective view of one container, with part broken away.” Ex. 1007, 2:11–12. The container in Figure 1 includes, among other features, “exterior casing 1 of box-like form which is rectangular in plan view and has substantially square ends one of which is closed and the other of which is open.” *Id.* at 2:19–24. Sinclair discloses that casing 1 “is externally metal clad at 2 and provided with an internal layer of thermal insulation, which may for example be a sprayed-on synthetic foam material 3.” *Id.* at 2:24–27. The container also includes “removable interior casing 4 of similar shape to the exterior casing 1 [and] dimensioned to fit within the latter,” with interior casing 4 also including closed inner end 5

and outer end 6, which is closed by two side-hung hinged doors 7. *Id.* at 2:31–35. Sinclair discloses that the container

may as usual be used in conjunction with a refrigeration plant to maintain a desired low temperature within the interior casing, and the plant may be associated with dole plates mounted below the roof of the interior casing and connected to the plant through conduits having suitable couplings at the closed end of the exterior casing.

Ex. 1007, 1:79–2:3.

Figure 2 is reproduced below:

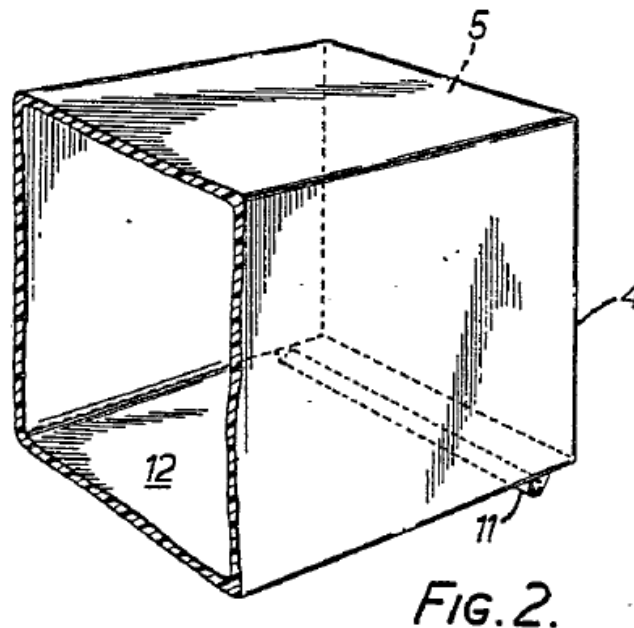


Figure 2 is a perspective view of interior casing 4. Ex. 1007, 2:13–15. Sinclair discloses that the walls of “interior casing 4 are suitably formed to provide thermal insulation and to that end they are conveniently of laminated glass-fib[er] reinforced synthetic resin.” *Id.* at 2:66–70.

2. Independent Claims 19 and 35

Although the remaining claims subject to this challenge are all dependent claims, we must first consider whether the combination of Sinclair and Kuhn discloses or renders obvious all of the limitations of

independent claims 19 and 35, because that remains a predicate to finding any of the dependent claims obvious based on the same combination.

a. The Parties' Positions

Petitioner contends that the proposed combination of Sinclair and Kuhn discloses each limitation of claims 19 and 35. Pet. 40–45, 50–54. To support its arguments, Petitioner identifies certain passages in the cited references and explains the significance of each passage with respect to the corresponding claim limitation. *Id.* Petitioner also articulates reasons to combine the relied-upon aspects of Sinclair and Kuhn. Pet. 40–41.

Patent Owner argues that (1) one of ordinary skill in the art would not have been motivated to combine Sinclair and Kuhn or place Kuhn's VIPs in Sinclair's air gap for a number of reasons; and (2) Sinclair fails to teach a container where both inner and outer shells are made of composite casings and/or of resin impregnated fibers. *See* PO Resp. 46–51. We focus on the second argument because we find it determinative.

Independent claim 19 requires that the “cargo container assembly” includes a “composite outer shell” having walls “of resin impregnated fibers” and a “composite inner shell within said outer shell.” Ex. 1001, claim 19. Independent claim 35 similarly requires “making a cargo container assembly” by, among other steps, “forming a . . . composite outer shell” having walls “of resin impregnated fibers” and “forming a . . . composite inner shell” having walls “of resin impregnated fibers.” *See id.* at claim 35. To address these limitations, Petitioner states that “Sinclair discloses that its exterior casing can be comprised of ‘laminated glass-fibre reinforced synthetic resin’” and states that “[l]aminated fiber reinforced resin is considered fiberglass, a composite structure with a combination of plastic

resin and glass fibers.” Pet. 42–43 (citing Ex. 1003 ¶ 197; Ex. 1007, 1:49–56, 3:43–51, Fig. 1). According to Petitioner, Sinclair also teaches an interior casing “made of composite: a ‘laminated glass-fibre reinforced synthetic resin.’” *Id.* at 43–44 (citing Ex. 1003 ¶¶ 199–202; Ex. 1007, 1:31–40, 1:49–56, 2:31–32, 2:66–87, Fig. 2).³⁶

Patent Owner argues that “Petitioner relies on Sinclair as disclosing a container where *both* inner and outer shells are made of composite casings and/or of resin impregnated fibers and does not argue for any modification of Sinclair” to show the combination teaches this limitation. PO Resp. 48–49 (citing Pet. 42–44, 51; Ex. 2023 ¶ 109; Ex. 2025, 219:1–221:1, 239:9–240:20, 241:8–16). Patent Owner contends that “Sinclair teaches no such structure” because “Sinclair explains only that ‘*the other* casing’ can be made of composite, ‘glass-fibre reinforced’ material (for insulation), but consistently describes that the first casing, the one that ‘may provide the main structural strength of the container’ is made of metal or metal clad.” *Id.* at 49 (citing Ex. 1007, 1:43–56; 2:19–24, 2:47–50, 2:80–87). According to Patent Owner, “Sinclair never says that the ‘structural’ casing can be a composite or glass-fibre reinforced resin, as Jobin admitted at deposition.” *Id.* (citing Ex. 2023 ¶ 109; Ex. 2025, 241:25–242:14). Patent Owner further alleges that Petitioner’s argument amounts to obviousness based on a combination of two distinct Sinclair embodiments “without acknowledgement or explanation, or proposing how to modify Sinclair to

³⁶ Although the “inner shell” of claim 19 need only be “composite” rather than of “resin impregnated fibers,” Petitioner relies on the alleged disclosure as to “resin impregnated fibers” to address the “composite” requirement. *See* Pet. 42–43.

combine features from the different embodiments.” *Id.* at 49–50 (citing Pet. 40–41; Ex. 2023 ¶ 110; Ex. 2025, 246:21–247:17, 253:2–19).

In its Reply, Petitioner argues that Patent Owner “distorts Sinclair, which teaches its *insulated* casing comprises composite resin impregnated fibers, leaving open the other casing’s composition, which could be composite.” Pet. Reply 24 (citing Ex. 1007, 1:43–56, 2:65–70; Ex. 1049 ¶¶ 347–350). Due to this teaching, “Petitioner did not propose modifying Sinclair, but instead showed POSITA would understand Sinclair to teach two composite casings: both the ‘insulated’ casing and the metal-clad casing.” *Id.* (citing Ex. 1007, 2:70–76, claim 1). Petitioner further asserts that Patent Owner “never identifies what POSITA would understand comprises Sinclair’s ‘structural’ casing.” *Id.* at 24–25 (citing PO Resp. 48–50).

In its Sur-reply, Patent Owner argues that “Petitioner cannot overcome the major flaw of Sinclair: it discloses that only one of its two casings is composite.” PO Sur-reply 21. Patent Owner also contends that Petitioner submits an “untimely new argument” when it argues that “Sinclair ‘leav[es] open’ the other casing’s composition, rather than ‘discloses’ it.” *Id.* (citing Pet. Reply 24). According to Patent Owner, this new argument also fails on the merits because “[i]n each embodiment, Sinclair describes that one casing is composite and the other is structural, which Sinclair does not suggest could be composite” and “[t]here is nothing ‘left open.’” *Id.* (citing Ex. 1007, 1:43–56, 2:19–24, 2:47–50, 2:81–87; Ex. 1062, 442:12–20, 459:11–22, 470:1–9).

b. Discussion

Based on our review of the record, Patent Owner provides a more persuasive interpretation of Sinclair, supported by Sinclair itself and credible expert testimony. *See* PO Resp. 48–49; Ex. 2023 ¶ 109. Sinclair teaches a container with interior and exterior casings where “[e]ither of the casings may provide the main structural strength of the container,” which Sinclair refers to as the “structural casing.” Ex. 1007, 1:43–50. Sinclair states that the structural casing “is conveniently provided with the layer of thermal insulation,” while the “other casing will also normally be suitably insulated, or formed from a material of low thermal conductivity” such as “laminated glass-fibre reinforced synthetic resin which provides a high degree of thermal insulation.” *Id.* at 1:45–56. These passages, which Petitioner relies on as teaching that both casings are made of the thermally-insulated resin composite, do not suggest that both casings are made of the same material, whether a composite or any other material. In fact, by emphasizing that the structural casing requires application of a layer of thermal insulation to insulate it, while the “other casing” may be similarly insulated “or” made of thermally-insulated resin that does not require application of additional insulation, these passages support Patent Owner’s view that Sinclair teaches that only one of the casings is made of thermally-insulated composite material. *See id.* at 1:43–56; *see also* Ex. 2023 ¶ 109 (addressing the same portions of Sinclair and concluding that “Sinclair only discloses that one of its casings may be made of composite”).

Other portions of Sinclair also support Patent Owner’s reading. When discussing specific embodiments, Sinclair describes a first embodiment, shown in Figures 1 and 2, where the “exterior casing 1 provides the

structural fabrication [i.e., the structural casing] of the container and the inner casing 4 is mainly for insulating purposes” and made of synthetic resin. Ex. 1007, 2:47–50, 2:65–70. In this embodiment, the exterior casing 1 “is externally metal clad at 2 and provided with an internal layer of thermal insulation.” *Id.* at 2:19–26. Contrary to Petitioner’s reading, if the external casing were made of a “metal clad” thermally-insulated composite resin material, there would be no need to add the extra layer of thermal insulation. *See id.* at 1:45–56. Sinclair also discloses a second embodiment shown in Figure 3, where the major difference involves making the structural casing the “interior casing 4 instead of the exterior casing 1, the latter [i.e., the exterior casing 1] being mainly for insulating purposes.” *Id.* at 2:81–87. Sinclair again suggests that the interior, structural casing “may be formed with an external layer of insulating material,” which Sinclair suggests would not be necessary if that casing were also made from thermally-insulating composite material. *Id.* at 2:90–92. In addition to the foregoing, because Sinclair specified the material used in a casing when desired, the absence of specificity when describing the metal-clad structural casing suggests that Sinclair did not view it as a composite material, or it would have so specified.

Based on the foregoing, we agree with Patent Owner that Sinclair teaches using composite material for one of its inner and outer casings, but not both of them. Importantly, however, even if we agreed with Petitioner’s more liberal reading of Sinclair, it would not change the outcome here. Petitioner appears to concede that at most Sinclair remains silent on the material used for its structural casing and suggests that the material “could be” a composite. Pet. Reply 24 (citing Ex. 1007, 1:43–56, 2:65–70;

Ex. 1049 ¶¶ 347–350). Petitioner’s view in its Reply undermines its argument in the Petition, which rests on the premise that Sinclair teaches that *both* of its casings are made of composite material, not that it teaches that one of the casings are made of composite material and the other merely “could be” made of composite material. *See* Pet. 42–44; Ex. 1003 ¶¶ 197–202. In order to bridge the gap between the claim requirements and Sinclair, it was incumbent upon Petitioner to argue for a modification or obviousness rationale that would result in a container with both casings made from the same material, but Petitioner made no such attempt in the Petition. *See* Pet. 42–44.

Patent Owner generously views the Petition as setting forth an implicit, but completely unsupported, obviousness combination of Sinclair’s two embodiments. *See* PO Resp. 49–50. We do not read the Petition in that manner because it never acknowledges that Sinclair only teaches that one of its casings is made of a composite material, nor mentions or articulates an obviousness argument, or argues for a combination of Sinclair’s embodiments. *See* Pet. 42–44. Even in Reply, Petitioner argues that it need not rely on any modification of Sinclair, and only raises an explicit obviousness argument for the first time in its cited expert testimony. *See* Pet. Reply 24 (citing Ex. 1049 ¶¶ 347–350). This argument does not appear in any form in the Petition or original expert declaration, and we will not consider a new obviousness argument made for the first time in a reply declaration, especially when the briefing fails to even allude to obviousness. *See* Pet. 42–44; Ex. 1003 ¶ 109; *Wasica*, 853 F.3d at 1286–87.

Based on the foregoing, we find that Petitioner fails to prove by a preponderance of the evidence that the combination of Sinclair and Kuhn

discloses all of the limitations of claims 19 or 35. As a result, Petitioner fails to prove by a preponderance of the evidence that the combination of Sinclair and Kuhn discloses all of the limitations of any of the dependent claims subject to this challenge.

I. Obviousness of Claims 19–21 and 29–31 Based on Broussard and Cur

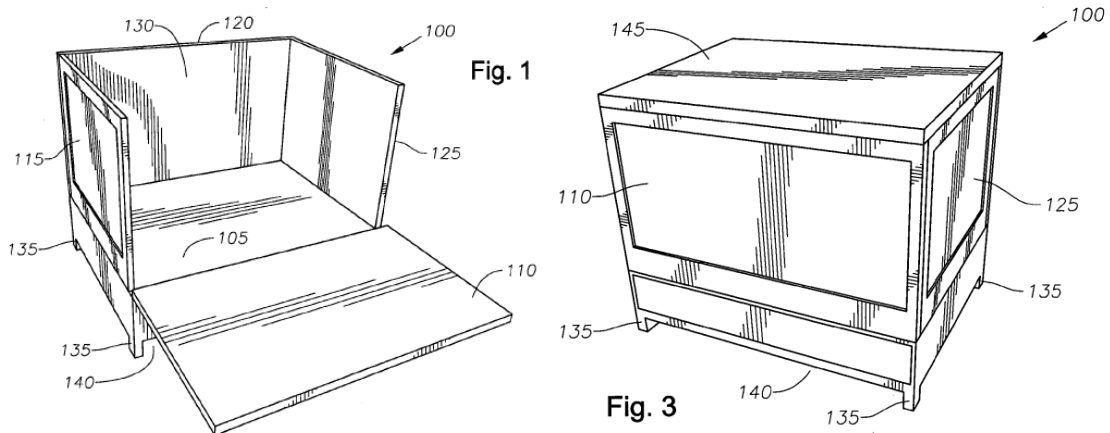
Petitioner asserts that claims 19–21 and 29–31 of the '855 patent would have been obvious under pre-AIA 35 U.S.C. § 103(a) based on Broussard and Cur. Pet. 2, 81–94. As noted above, Patent Owner adequately establishes a date of invention prior to Broussard for the challenged claims here with the exception of claims 21, 26–30. Accordingly, we do not treat Broussard as prior art to claims 19, 20, and 31 in this challenge and determine that Petitioner has not proven by a preponderance of evidence that Broussard and Cur render obvious either claim 19, 20, or 31 of the '855 patent. We also exercise our discretion not to address claim 21 in this challenge because we already determined that Petitioner establishes that claim 21 is unpatentable. We address the remaining claims 29 and 30 below after providing a brief summary of Broussard.

1. Broussard

In this asserted ground, Petitioner relies on Broussard, in addition to Cur (summarized above (*see* § II.E.2)). Broussard discloses “temperature-controlled containers that can both refrigerate and heat [a] cargo space, and

to methods of transporting temperature-sensitive goods using such containers.” Ex. 1012 ¶ 3.

Figures 1 and 3 of Broussard are reproduced below:



Figures 1 and 3 are two configurations of one embodiment of a temperature-controlled container. Ex. 1012 ¶ 18. Container 100 in both Figures includes bottom 105, sides 110, 115, 120, 125, and top 145. *Id.* ¶ 25. In Figure 1, side 110 is shown in an open position that allows easy access to cargo space 130. *Id.* Broussard discloses that, “[t]o achieve high thermal efficiency, space efficiency, and long operating times on internal batteries, the container is insulated with high R value vacuum panels.” *Id.* The sides, bottom and top are made of “durable, high impact reinforced plastic” to “protect the insulated vacuum panels from damage.” *Id.* ¶¶ 27, 33, Fig. 2.

Figure 2 is reproduced below:

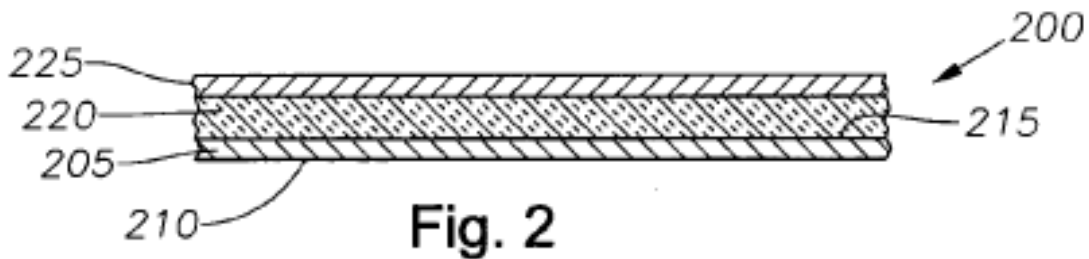


Figure 2 is a cross-section of one embodiment of a wall of the temperature-controlled container. Ex. 1012 ¶ 17. Side 200 shown in Figure 2 includes wall 205 (with outer surface 210 and inner surface 215), insulated vacuum panel 220, and protective sheet 225, which may be made of “hard plastic, metal, or other hard material.” *Id.* ¶¶ 26–27. Vacuum panel 220 “preferably has an R value per inch of at least about 20.” *Id.* ¶ 26.

Figure 4 is reproduced below:

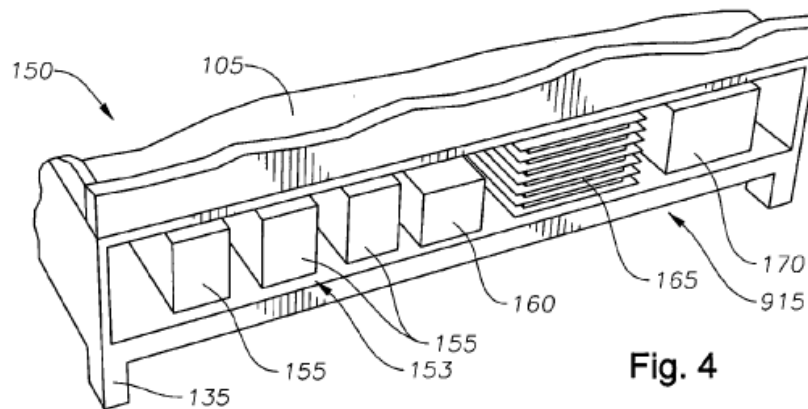


Figure 4 depicts a housing on one side of the temperature-controlled container. Ex. 1012 ¶ 19. Housing 150 is located between legs 135 and below unnumbered side 110 (shown in cutaway). *Id.* ¶ 30. As shown, housing 150 contains temperature regulating unit 915, battery charger 160, and batteries 155. *Id.* ¶¶ 30–31. Temperature regulating unit 915 includes condenser 165 and compressor 170. *Id.* ¶ 32.

2. Claims 29 and 30

As discussed above in the context of the challenge based on Kuhn and Loeffler, claim 29 depends from claim 19 and recites: “wherein said bottom wall of said inner shell includes a plurality of parallel spaced members defining air flow passages therebetween, and a rigid floor panel mounted on said spaced members.” Ex. 1001, claim 29. Petitioner argues that

“Broussard teaches cooled air is circulated through an annulus 672 . . . defined beneath the plenum 603 . . . and floor 605.” Pet. 90 (citing Ex. 1012 ¶ 38, Fig. 10). Petitioner contends that Broussard Figure 10 does not show the claimed spaced members, but that “a structure to support the plenum is necessarily inherent in the design.” *Id.* at 90–91 (citing Ex. 1003 ¶¶ 368–369). We reproduce Petitioner’s annotated version of Broussard’s Figure 8 below (Pet. 91).

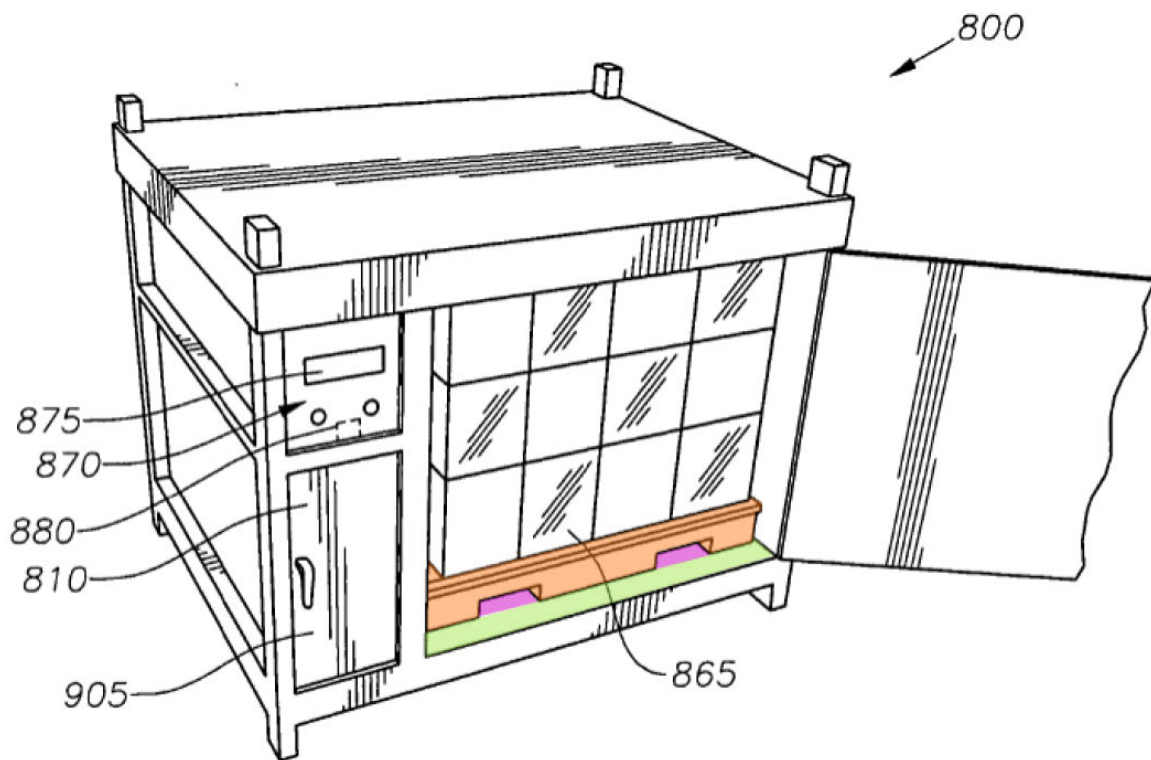


Fig. 8

The annotated version of Figure 8 shows container 800 in a perspective view. Ex. 1008 ¶¶ 23, 36. Petitioner refers to the annotated version of Figure 8 and alleges that one of ordinary skill in the art would have “understood that Figure 8 depicts a supporting member between the plenum (orange) and floor (green) that creates channels (pink).” Pet. 91 (citing Ex. 1003 ¶¶ 368–369; Ex. 1012, Fig. 8). Petitioner further asserts that “these

channels could be formed using parallel spaced members between the plenum and floor.” *Id.* (citing Ex. 1003 ¶ 370). According to Petitioner, the “plenum rests on top of these members and discloses the rigid floor panel, as the cargo would be placed on top of the plenum, rather than the floor.” *Id.* (citing Ex. 1003 ¶ 370; Ex. 1012, Fig. 8).

Patent Owner argues that “Petitioner relies on structures it admits are not shown in Broussard for this claim limitation, arguing that a structure to support ‘the plenum’ (which appears to be a pallet) ‘is necessarily inherent in the design.’” PO Resp. 67 (citing Pet. 90–91; Ex. 2023 ¶ 151). Patent Owner also faults Petitioner’s analysis of Figure 8 and its assertion that “it is merely *possible* that channels “*could be* formed using parallel spaced members.” *Id.* at 68 (citing Pet. 91). Patent Owner further argues that “[a]s for what Petitioner colored orange in Figure 8, there is no description of such a structure in Broussard and a POSA would more naturally understand the figure to depict a pallet.” *Id.* (citing Ex. 2023 ¶¶ 151–152).

In its Reply, Petitioner states that Patent Owner ignores Petitioner’s reliance on Figure 10 in the Petition. *See* Pet. Reply 28 (citing Ex. 1049 ¶¶ 398–411). In its Sur-reply, Patent Owner depicts Broussard’s Figure 10 and argues that “[n]o channels or rigid floor are depicted or described in the space (annulus 672, Petitioner colored pink) ‘defined’ between plenum 603 and floor 605, as Jobin admitted.” PO Sur-reply 26 (citing Ex. 1012 ¶ 38; Ex. 2025, 419:17–421:9; Pet. 90–93).

Based on our review of the arguments and evidence, Petitioner fails to establish that Broussard discloses claim 29’s “bottom wall of said inner shell [that] includes a plurality of parallel spaced members” or “a rigid floor panel mounted on said spaced members.” As Patent Owner points out, Figure 10

of Broussard does not show any structure that defines the annulus 672 under plenum 603. *See* PO Sur-reply 26 (citing Ex. 1012 ¶ 38); Ex. 1012, Fig. 10, ¶ 38. Figure 8 shows the structure that defines the air passages, but we agree with Patent Owner that it shows a typical pallet used to transport goods (shown in orange above in Figure 8). *See* PO Resp. 68; Ex. 1012, Fig. 8. We credit Patent Owner’s relied-upon expert testimony describing this structure as a pallet because Broussard’s figures support it. *See* Ex. 2023 ¶ 152 (“[A] POSA would more naturally understand this depicts a pallet in my opinion.”). Because the claimed “spaced members” must be a part of the bottom wall of the container’s inner shell, these features cannot be formed from a separate structure such as a pallet distinct from the container. *See* Ex. 1001, claim 29. Petitioner does not argue that, even if Broussard’s Figure 10 discloses a separate pallet, it would have been obvious to incorporate that structure into the bottom wall. *See* Pet. 90–91.

We also find Petitioner’s inherency argument based on Figure 10 unpersuasive because Broussard makes clear that Figure 8 depicts the same embodiment as Figure 10 and shows that a pallet creates the alleged spaced members. *See* Ex. 1012 ¶ 38. Contrary to Petitioner’s argument, the claimed spaced members on the bottom wall are not “necessary to achieve the disclosed circulation of air through the plenum” if they can be supplied by a structure such as a pallet separate from the bottom wall. *See* Pet. 90–91. In addition, because Petitioner fails to establish that Broussard discloses a bottom wall with spaced members, it also fails to establish a floor panel mounted to those same members.

Based on the foregoing, we find that Petitioner does not prove by a preponderance of the evidence that the combination of Broussard and Cur

renders claim 29 obvious. Claim 30 depends from claim 29 and we find that Petitioner did not prove by a preponderance of the evidence that the combination of Broussard and Cur renders claim 30 obvious for the same reasons.³⁷

J. Patent Owner's Motion to Exclude

Patent Owner moves to exclude “Exhibits 1045-1047, 1052-1055, 1064, and 1066-1067, in their entirety, as well as portions of Exhibits 1049 and 1051.” Paper 63, 1. We will address each exhibit in the order presented by Patent Owner.

1. Exhibits 1045–1047, 1064, 1066–1067, and Related Portions of Exhibit 1049

Patent Owner contends that these exhibits should be excluded under Federal Rules of Evidence (FRE) 402 and 403 as irrelevant and highly prejudicial to Patent Owner. Paper 63, 5. According to Patent Owner, all of these exhibits were improperly used by Petitioner in its Reply in support of its claim construction argument as to the “refrigeration system” limitation, even though the exhibits were available at the time the Petition was filed. *See id.* Patent Owner also seeks to exclude paragraphs 291, 292, 295, and 298 of Exhibit 1049 (Mr. Jobin’s Reply Declaration) for the same reason. *Id.* at 6. In addition, Patent Owner argues that we should exclude additional paragraphs of Mr. Jobin’s Reply Declaration because they “represent improper new evidence first presented as filed with the Reply.” *Id.* at 6–11;

³⁷ The parties also dispute several issues with respect to claim 19 in the context of this challenge. *See* PO Resp. 63–67. We need not reach those issues given that we found Petitioner fails to meet its burden as to claims 29 and 30 even if it had met its burden as to claim 19.

see also Paper 69, 1–3 (arguing that the exhibits and portions of Exhibit 1049 go beyond proper responsive argument).

Petitioner describes Patent Owner’s effort to exclude the exhibits as improper given the statement in the Consolidated Trial Practice Guide (“CTPG”³⁸) that motions to exclude are not vehicles to “address arguments or evidence that a party believes exceeds the proper scope of reply.” Paper 66, 1 (citing CTPG, 79). Petitioner argues that its claim construction arguments were implicit in the positions it took in the Petition and responsive to our Institution Decision and Patent Owner’s proposed construction. *Id.* at 1–3. As to the portions of Exhibit 1049, Petitioner argues that the paragraphs at issue are responsive to issues raised by Patent Owner. *Id.* at 3–9. Petitioner also contends that Patent Owner uses its Motion as a vehicle to devote more pages to merits arguments that should have been included with its merits briefing. *See id.* at 1, 3.

As Petitioner correctly points out, our Consolidated Trial Practice Guide instructs parties before us not to file motions to exclude that “address arguments or evidence that a party believes exceeds the proper scope of reply or sur-reply.” CTPG, 79. Yet Patent Owner’s Motion does precisely that by basing this portion of its Motion on the argument that the documents exceed the scope of a proper reply. *See* Paper 63, 5. Patent Owner does not supply any defense to its approach in its Reply in support of its Motion, after Petitioner pointed out the instruction in the Consolidated Trial Practice Guide. *See* Paper 69, 1–3. We deny this aspect of Patent Owner’s Motion

³⁸ Available at <https://www.uspto.gov/TrialPracticeGuideConsolidated>.

as improper and do not consider Patent Owner’s arguments as part of our assessment of the merits.

Although we deny the Motion as to these documents, that does not mean that we find all of Petitioner’s arguments and evidence fall within the proper scope of a reply. As our Consolidated Trial Practice Guide also points out, “the Board is capable of identifying new issues or belatedly presented evidence when weighing the evidence at the close of trial, and disregarding any new issues or belatedly presented evidence that exceeds the proper scope of reply or sur-reply.” CTPG, 80. We have followed this approach when addressing the merits in this decision.³⁹

2. *Uncited Portions of Exhibits 1049 and 1051–1055*

Patent Owner argues that we should exclude portions of Exhibits 1049 and 1051–1055 that neither party cited in any paper of record. Paper 63, 11, 13–14; *see also* Paper 69, 3–5. Petitioner argues that these documents and portions of its expert declaration, although uncited, may still provide context for the cited material. Paper 66, 13–15.

³⁹ Although we do not address the merits of Patent Owner’s arguments, we note that any exhibits or declarant testimony Petitioner filed in connection with the disputed construction of “refrigeration system” are generally appropriate, responsive documents because our Institution Decision and Patent Owner’s proposed construction in its Response opened the door to such a submission. *See* Inst. Dec. 21 (“We have not adopted a formal construction for ‘refrigeration system’ or made a final determination as to its application to Kuhn. The parties should further develop this issue at trial.”); PO Resp. 16 (proposing claim construction “slightly different from Patent Owner’s original proposed district court construction”); *Axonics, Inc. v. Medtronic, Inc.*, 75 F.4th 1374, 1383 (Fed. Cir. 2023) (holding that petitioners may respond to new claim construction in reply).

We agree with Petitioner that Patent Owner does not establish that we should exclude the uncited material. First, at least some portions of the uncited material may provide helpful context to the cited material, as Petitioner points out. Second, Patent Owner offers no compelling argument that it suffers any prejudice from the mere existence of this uncited material in the record. Third, we do not rely on any of the uncited material to decide any issues in this case, much less decide any issues in an adverse manner to Patent Owner. Based on the foregoing, we deny this aspect of Patent Owner's Motion.⁴⁰

3. Portions of Exhibits 1049 and 1051 Improperly Incorporated by Reference

Patent Owner argues that portions of Exhibits 1049 and 1051 are improperly incorporated by reference into Petitioner's Reply and should be excluded. Paper 63, 11–12; *see also* Paper 69, 3–5. Petitioner argues that both parties took the same approach when citing material and believes that both parties' approaches "are permissible." Paper 66, 9. Petitioner also argues that Patent Owner's case law supports excluding incorporated argument, not evidence. *Id.* at 10.

⁴⁰ Patent Owner argues that "it is not enough for the Board to find that this Motion is moot if the Board does not rely on the inadmissible evidence" because "[i]f the exhibits and paragraphs identified herein remain in the record, Petitioner may continue to rely upon them on appeal, and Patent Owner would be unfairly forced to address them again." Paper 63, 4. We disagree with this argument for two reasons. First, Patent Owner provides no authority that requires the Board to reach the merits of a motion to exclude evidence that has no bearing on the outcome of any issues in the case. Second, Patent Owner provides no authority for the notion that Petitioner will be unable to cite to these documents on appeal if it chooses to challenge an evidentiary ruling on appeal.

We view improper incorporation by reference disputes as similar to disputes that arguments or evidence exceed the proper scope of reply, and find they are best handled on a case-by-case basis when addressing the merits of the parties' arguments rather than through a motion to exclude the evidence. When encountering cited evidence that crosses the line from permissible citation to improper incorporation by reference, we will generally refuse to consider the cited material and instead focus only on the argument as developed in the briefs, or, in some cases, note the violation of our rules against incorporation by reference. In other cases, we need not reach the contested arguments at all. We have taken the same approach when addressing potential incorporation by reference issues in this case. Accordingly, we deny this aspect of Patent Owner's Motion.

Based on the foregoing, we deny all aspects of Patent Owner's Motion to Exclude.

K. Petitioner's Motion to Exclude

Petitioner moves to exclude "the entirety of Exhibits 2004, 2006-07, 2024, 2050, 2052, 2055, 2058-61, 2063, 2149, and 2163" and "excerpts of Exhibits 2018 (¶¶4-19), 2026 (¶¶4-91, 100-104), 2162 (¶¶30, 38-46, 52-53)." Paper 64, 1. In its Reply, in light of a declaration from Patent Owner attesting to the authenticity of several documents, Petitioner "withdraws the entirety of its request to exclude Exhibits 2018, 2026, 2052, and 2061." Paper 68, 5. Petitioner also withdraws authenticity, completeness, and best evidence objections as to Exhibits 2006, 2007, 2055, 2058, 2059, 2060, 2063, and 2163 under FRE 901; Exhibit 2006 under FRE 106, and Exhibit 2050 under FRE 1002. *Id.* Petitioner states that it maintains its hearsay

objection to Exhibit 2060 and relevance objections to Exhibits 2006, 2007, 2058, and 2059. *See id.*

In addition to the Exhibits that Petitioner acknowledges are no longer a part of its Motion, we also treat Petitioner's Motion as withdrawn with respect to Exhibits 2050, 2055, 2063, and 2163 because Petitioner withdrew the only objections it made with respect to these exhibits. *See* Paper 64, 3 (moving to exclude Exhibit 2050 "because it violates the best evidence rule under FRE 1002" and Exhibits 2055 and 2163 "under FRE 901 as PO did not authenticate them"), 6 (moving to exclude Exhibit 2063 under FRE 901); Paper 68, 5 (withdrawing objection to Exhibit 2050 "under FRE 1002" and withdrawing objections to Exhibits 2055, 2063 and 2163 "under FRE 901").

The remaining exhibits that Petitioner still seeks to exclude relate to either Patent Owner's priority challenge or its attempt to establish objective indicia of nonobviousness. Paper 64, 1–15. Petitioner also moves to exclude portions of Patent Owner's briefing and exhibits due to improper incorporation by reference, in the event that we granted Patent Owner's Motion to Exclude based on the same argument. *Id.* at 15 ("Petitioner believes both parties' citations are permissible, however, to the extent the Board disagrees, Petitioner respectfully requests that PO's block citations be treated the same as Petitioner's.").

We first address portions of Petitioner's Motion that require little or no discussion. First, we deny the portion of Petitioner's Motion as to the allegedly improperly incorporated by reference material as moot because we do not grant Patent Owner's Motion on that basis. As noted above, even if both parties violated our rules in this manner, we do not view exclusion as the proper remedy.

Second, we deny the Motion as to Exhibits 2060 and 2149 as moot because we do not rely on them in our analysis in any way.

Third, we deny Petitioner's Motion as to Exhibit 2004 because Petitioner provides no substantive argument in favor of exclusion, and merely mentions the Exhibit in its initial request for relief and a summary chart. *See* Paper 64, 1.

Fourth, we deny the Motion as to Exhibits 2006, 2007, 2058, and 2059 because the only remaining objection to these documents appears to be relevance. Paper 68, 5. These documents tell part of Patent Owner's narrative as to conception, diligence, and reduction to practice, and are not so lacking in relevance that they should be excluded. *See, e.g.*, Ex. 2001 ¶¶ 13–14, 31 (inventor Mr. Wynne referring to Exs. 2006, 2007); Ex. 2019 ¶ 34 (Mr. Wynne referring to Exs. 2058, 2059).

Petitioner seeks to exclude the Declarations of Mr. Sitzlar (Ex. 2162 ¶¶ 30, 38–46, 52, 53), Vice President of Global Strategic Accounts at Patent Owner, and Ms. Bennis (Ex. 2024), an accountant expert witness. Paper 64, 10–15. Patent Owner relies on these declarants as part of its argument that objective indicia (e.g., commercial success) support the nonobviousness of the claimed inventions. *See id.* This aspect of Petitioner's Motion is moot in the sense that whether we admit or exclude this evidence, it would not change our ultimate patentability determination for any of the challenged claims. As discussed above, even though we find aspects of Patent Owner's objective indicia arguments persuasive and due moderate weight, we found Petitioner's strong evidence of obviousness based on the prior art more compelling and sufficient to ultimately determine that the claims were unpatentable.

Additional reasons also support the denial of Petitioner’s Motion to exclude these Declarations. As to Mr. Sitzlar, the disputed testimony generally concerns his reliance on statements from “unnamed customers” as part of Patent Owner’s argument that the commercial success were the direct result of its claimed inventions. *See* Paper 64, 14–15. Because we find a presumption of nexus, we did not reach this alternative nexus argument and do not directly rely on these aspects of Mr. Sitzlar’s declaration, further reinforcing the mootness of Petitioner’s Motion as to Exhibit 2162.

As to Ms. Bennis, Petitioner argues that we should exclude the testimony pursuant to FRE 702(a) because Ms. Bennis lacks the specialized knowledge necessary to assist the Board in its rulings and used “unreliable principles and methods” in her analysis. Paper 64, 10–11. For example, Petitioner argues that Ms. Bennis improperly lumped the claims together in her nexus analysis, “takes inconsistent opinions” across multiple proceedings, and failed to consider competitive products in her analysis. *See id.* at 11–12. Patent Owner argues that an accounting degree and experience testifying as an expert in “dozens” of patent cases provides Ms. Bennis with sufficient qualifications to assist the Board, and her “opinions are also based on sufficient facts and data.” Paper 65, 12–13.

We agree with Patent Owner that the testimony of Ms. Bennis may assist the Board, and that the alleged flaws Petitioner relies on are insufficient to warrant exclusion of her testimony. We view those

arguments as going to the weight we should accord her testimony rather than admissibility.⁴¹

Based on the foregoing, we deny Petitioner's Motion to Exclude.

CONCLUSION⁴²

In summary:

Claims	35 U.S.C. §	Reference(s)/ Basis	Claims Shown Unpatentable	Claims Not Shown Unpatentable
19, 20, 23, 28	102(a)	Kuhn	28	19, 20, 23
19–21, 23, 26–30 ⁴³	103(a)	Kuhn, Loeffler		19, 20, 23, 26, 27, 29, 30

⁴¹ We note that Petitioner's arguments as to the flaws in the approach of Ms. Bennis (and by extension, Patent Owner) are far more extensive in Petitioner's Motion to Exclude than in Petitioner's Reply. *See* Paper 64, 10–13; Paper 68, 3–4; Pet. Reply 30 (addressing the subject matter of Ms. Bennis's testimony in two sentences). We do not consider Petitioner's arguments in its Motion to Exclude as part of our obviousness analysis; motions to exclude do not provide an end run around our rules limiting the length of merits briefing.

⁴² Should Patent Owner wish to pursue amendment of the challenged claims in a reissue or reexamination proceeding subsequent to the issuance of this decision, we draw Patent Owner's attention to the April 2019 Notice Regarding Options for Amendments by Patent Owner Through Reissue or Reexamination During a Pending AIA Trial Proceeding, 84 Fed. Reg. 16,654 (Apr. 22, 2019). If Patent Owner chooses to file a reissue application or a request for reexamination of the challenged patent, we remind Patent Owner of its continuing obligation to notify the Board of any such related matters in updated mandatory notices. *See* 37 C.F.R. §§ 42.8(a)(3), (b)(2).

⁴³ As noted above, because we find claim 28 unpatentable as anticipated we do not reach whether claim 28 also would have been unpatentable as obvious for this challenge, and claim 28 does not appear in the columns showing the outcome for this ground. We take the same approach for other claims that we did not reach on the merits.

Claims	35 U.S.C. §	Reference(s)/ Basis	Claims Shown Unpatentable	Claims Not Shown Unpatentable
19–21, 23, 26–28, 31, 33, 35–37, 41	103(a)	Sinclair, Kuhn		19–21, 23, 26– 28, 31, 33, 35– 37, 41
19–21, 28, 31, 35–37	103(a)	Ekerot, Cur	19–21, 28, 31	35–37
19–21, 29– 31	103(a)	Broussard, Cur		19, 20, 29–31
Overall Outcome			19–21, 28, 31	23, 26, 27, 29, 30, 33, 35–37, 41

ORDER

In consideration of the foregoing, it is hereby:

ORDERED that claims 19–21, 28, and 31 of the '855 patent are determined to be unpatentable;

FURTHER ORDERED that claims 23, 26, 27, 29, 30, 33, 35–37, and 41 of the '855 patent are not shown to be unpatentable;

FURTHER ORDERED that Patent Owner's Motion to Exclude is *denied*;

FURTHER ORDERED that Petitioner's Motion to Exclude is *denied*; and

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

IPR2022-00292
Patent 7,263,855 B2

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