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571-272-7822

Paper 70
Date: October 20, 2022

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

TEKNI-PLEX, INC.,
Petitioner,

v.

CONVERTER MANUFACTURING, LLC,
Patent Owner.

IPR2021-00916
Patent 9,908,281 B1

Before GRACE KARAFFA OBERMANN, JAMES A. TARTAL, and AVELYN M. ROSS, *Administrative Patent Judges.*

ROSS, *Administrative Patent Judge*.

JUDGMENT
Final Written Decision
Determining All Challenged Claims Unpatentable
35 U.S.C. § 318(a)

ORDER
Denying Patent Owner's Motion to Exclude (Paper 51)
37 C.F.R. § 42.64(c)

ORDER
Entering Stipulated Protective Order (Paper 17) and
Granting Patent Owner's Motions to Seal (Papers 16, 25, 57)
37 C.F.R. § 42.54

ORDER
Granting Petitioner's Motion to Seal (Paper 41)
37 C.F.R. § 42.54

I. INTRODUCTION

Tekni-Plex, Inc. ("Petitioner") filed a Petition (Paper 1, "Pet.") requesting an *inter partes* review of claims 1–15, 17, 20–22, and 24–29 of U.S. Patent No. 9,908,281 B1 (Ex. 1001, "the '281 patent"). Converter Manufacturing, LLC ("Patent Owner") waived the preliminary response to the Petition. Paper 5.

Upon consideration of the Petition and evidence cited therein, we determined that Petitioner had demonstrated a reasonable likelihood that it would prevail with respect to at least one claim of the '281 patent. Paper 6 ("Decision on Institution" or "DI"). Thus, pursuant to the Supreme Court's decision in *SAS Institute Inc. v. Iancu*, 138 S. Ct. 1348, 1355 (2018), and USPTO Guidance,[1] we instituted review of all challenged claims on all asserted grounds. *Id.*

Following institution of trial, Patent Owner filed a Patent Owner Response (Paper 20, "PO Resp."), Petitioner filed a Reply (Paper 42,

[1] In accordance with USPTO Guidance, "if the PTAB institutes a trial, the PTAB will institute on all challenges raised in the petition." *See* USPTO, Guidance on the Impact of SAS on AIA Trial Proceedings (April 26, 2018), *available at https://www.uspto.gov/patents-application-process/patent-trial-and-appeal-board/trials/guidance-impact-sas-aia-trial* ("USPTO Guidance").

"Reply"), *see also* Paper 40 (publicly accessible, redacted version of the Reply), and Patent Owner filed a Sur-reply (Paper 55, "Sur-reply"). In support of their respective positions, Petitioner relies on the testimony of Mr. Glenn May (Ex. 1002, "May Declaration," dated May 7, 2021; Ex. 1044, "May Reply Declaration," dated June 7, 2022; Ex. 2009 (May deposition dated Jan. 20, 2022; Ex. 2070 (May deposition dated June 30 to July 1, 2002); Ex. 2075, (May deposition dated July 12, 2022) and Patent Owner relies on the testimony of Mr. James W. Clements (Ex. 2007, "Clements Declaration;" Ex. 1047, (Clements deposition dated May 12, 2022); Ex. 1048, (Clements deposition dated May 13, 2022); Ex. 2040, "Clements Supp. Declaration").

Patent Owner also filed a Motion to Exclude certain exhibits and testimony. Paper 51 ("MTE"). Thereafter, Petitioner filed an Opposition to Patent Owner's Motion to Exclude (Paper 58, "MTE Opp.") and Patent Owner filed a Reply in Support of its Motion to Exclude (Paper 61, "MTE Reply"). Petitioner also filed a Motion to Exclude Exhibit 2064 (Paper 52) but withdrew that motion during the oral hearing. Paper 69, 31:21–32:7 ("Tr.").

Patent Owner also filed three motions to seal. Papers 16, 25, 57. Petitioner filed one motion to seal. Paper 41.

We held an oral hearing for this proceeding on July 28, 2022, and a transcript of the hearing is included in the record.

We have jurisdiction under 35 U.S.C. § 6. This Final Written Decision is issued pursuant to 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73. For the reasons discussed below, we determine that Petitioner has shown by a preponderance of the evidence that claims 1–15, 17, 20–22, and 24–29 of

the '281 patent are unpatentable. We grant Patent Owner's Motions to Seal (Papers 16, 25, 57) and grant Petitioner's Motion to Seal (Paper 41). We deny Patent Owner's Motion to Exclude (Paper 51).

A. Related Proceedings

Petitioner identifies as related proceedings the pending district court litigation styled *Clearly Clean Prods., LLC, et al. v. Tekni-Plex, Inc., et al.*, No. 2:20-cv-04723-AB (E.D. Pa.) ("the district court litigation"). Pet. 154–55.

Petitioner also identifies its co-pending petitions for an *inter partes* review of U.S. Patent Nos. 10,189,624 B2 and 10,562,680 B2 as related proceedings. *Id.* at 155; IPR2021-00918, Paper 1; IPR2021-00919, Paper 1. Petitioner indicates that "Patent Owner has asserted the '281 Patent and the related '680 Patent against third parties other than Petitioner" in the following proceedings: *In re Certain Rolled-Edge Rigid Plastic Food Trays*, No. 337-TA-1203 (ITC) and *Clearly Clean Prods. LLC, et al. v. Eco Food Pak USA Inc., et al.*, No. 5:20-cv-01054 (C.D. Cal.). Pet. 155.

B. The '281 Patent

The '281 patent, titled "Formed Thermoplastic Article Having Smooth Edges," issued on March 6, 2018. Ex. 1001, codes (45), (54). The '281 patent "relates generally to the field of forming shaped thermoplastic articles" in which thermoplastics that can be thermoformed are used "to form containers that can be sealed with thin plastic films, such as trays, bowls, or bins intended to contain foodstuffs and intended to be sealed with transparent plastic film." *Id.* at 1:18–24, 28–32. The '281 patent explains that when material is trimmed to form containers, a sharp edge is left that "can injure flesh or tear or cut materials which come into contact with the

edge." *Id.* at 1:25–28. Further, the sharp edge "can cut or break the film," thereby interfering "with the sealing process." *Id.* at 1:39–41.

The '281 patent purports to solve the problem of the unwanted sharp edge by displacing the sharp edge "away from the periphery of an article made from a thermoplastic material, where the sharp edge might otherwise damage surfaces that contact the periphery of the article." *Id.* at 4:25–29. According to the '281 patent, a smooth edge and a smooth periphery are made by forming a deflectable flange at the edge of the body of the article, in which the deflectable flange "includes a peripheral edge of the thermoplastic material at the peripheral end of the deflectable flange, optionally on a peripheral flange that extends peripherally from the deflectable flange." *Id.* at 4:32–39. The peripheral flange can be "connected by an elbow to a spacer and extends peripherally beyond the spacer by a peripheral flange distance" and can be "selected to yield a desired degree of deflection when it is impinged against a surface." *Id.* at 4:39–44. "The spacer is connected by a bend region to the body, the bend region defining an angle . . . between the spacer and the body." *Id.* at 4:46–50.

Figures 1A and 1B are illustrative and are reproduced below.

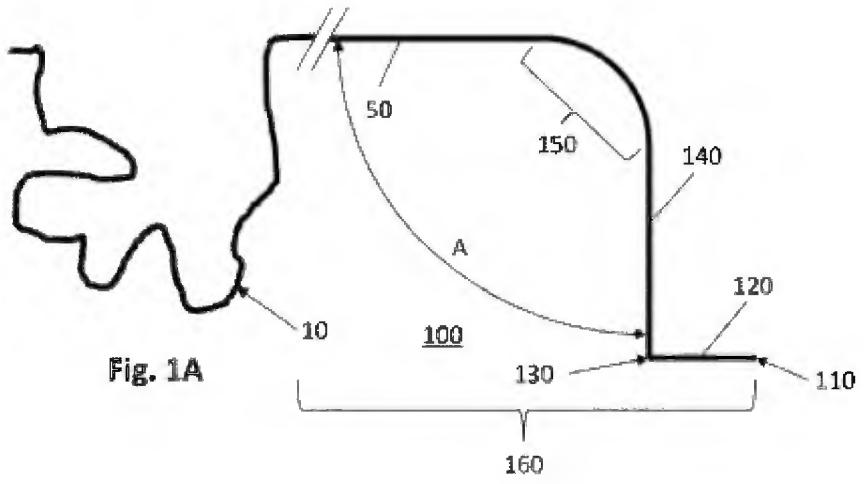


Fig. 1A

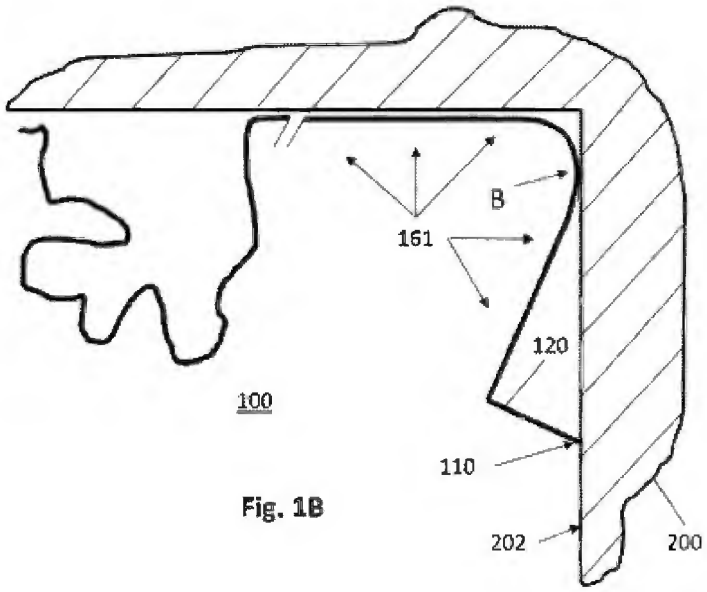


Fig. 1B

Figure 1A shows a sectional view of thermoplastic article 100 inserted within the interior of upper body 200, shown in Figure 1B, prior to bending an unwanted sharp edge away from the periphery of the article. *Id.* at 6:13–36. Thermoplastic article 100 has "deflectable flange 160 formed at an edge thereof." *Id.* at 6:13–15. Deflectable flange 160 includes extension 50, bend region 150, spacer 140, and peripheral flange 120. *Id.* at 6:15–17. Elbow 130 connects spacer 140 to peripheral flange 120. *Id.* at 6:21–22.

Figure 8K of the '281 patent, reproduced below, illustrates how thermoplastic article 100 is shaped near peripheral flange 120. *Id.* at 10:46–58.

Fig. 8K

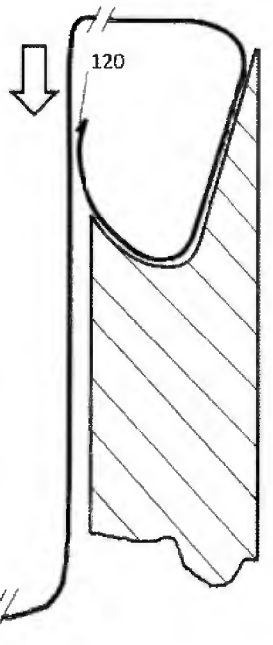


Figure 8K shows that after a series of steps (Figures 8E–8J), thermoplastic article 100 is ultimately urged into ram 300 (identified in Figures 8E, 8H) in the direction indicated by the open arrow to produce a shaped deflectable flange 160 that includes peripheral flange 120 at the peripheral end of spacer 140. *Id.* at 10:37–52. The '281 patent, in some embodiments, describes the degree of displacement of the peripheral edge in the context of its "offset angle" or ("OA"). *Id.* at 9:25–27, 13:17–22, 15:33–41. The offset angle is an angle formed by a junction of a plane extending through the thermoformable sheet at its peripheral edge with a plane extending along and through the extension. Ex. 1001, claim 1. The '281 patent discloses that shaped articles can be "in the form of a rounded rectangular tray" having "an internal concave compartment." *Id.* at 10:28–31, 21:24–26.

C. Illustrative Claims

Petitioner challenges claims 1–15, 17, 20–22, and 24–29 of the '281 patent. Independent claims 1 and 24 are the independent claims challenged and are reproduced below.

> 1. An article formed from a thermoformable sheet having a peripheral edge and having sufficient rigidity to define the conformation of the article, the article comprising a body having the shape of a rounded rectangular tray with a concave compartment formed therein and having an extension extending peripherally away from the body, the extension including the peripheral edge of the thermoformable sheet and a bent portion interposed between the peripheral edge and the junction between the body and the extension, the bent portion having a smooth periphery and being sufficiently bent that the peripheral edge of the thermoformable sheet is displaced from the periphery of the article, whereby the article has a smooth periphery.

Ex. 1001, 38:30–42.

> 24. An article formed from a thermoformable sheet having a peripheral edge and having sufficient rigidity to define the conformation of the article, the article comprising a body having the shape of a rounded rectangular tray with a concave compartment formed therein and having an extension extending peripherally away from the body, the extension including a deflectable flange comprising a spacer bearing a peripheral edge of the thermoformable sheet, the spacer being connected to the extension at an approximately right angle by a bend region, the bend region having a smooth contour.

Id. at 40:9–19.

D. The Asserted Unpatentability Challenges

Petitioner asserts that claims 1–15, 17, 20–22, and 24–29 would have been unpatentable on the following grounds:

Claims Challenged	35 U.S.C. §	Reference(s)/Basis
1–5, 9, 11–15, 17, 20–22	102	Portelli[2]
1–3, 6–8, 11, 13–15, 17, 20–22, 24, 26–29	102	Long[3]
1, 6–11, 13–15, 17, 20, 24–26	102	Meadors[4]
1–15, 17, 20–22, 24–29	103	Portelli, Long
1–3, 6–11, 13–15, 17, 20–22, 24–29	103	Long, Meadors
9, 10, 25	103	Long
24–29	103	Portelli
4, 5, 12	103	Portelli, Brown[5]

Pet. 2.

II. ANALYSIS

A. Principles of Law

To prevail in its challenge, Petitioner must demonstrate by a preponderance of the evidence that the claims are unpatentable. 35 U.S.C. § 316(e); 37 C.F.R. § 42.1(d). "In an IPR [(*inter partes* review)], the petitioner has the burden from the onset to show with particularity why the

[2] Portelli et al., WO 96/01179 A1, published January 18, 1996 (Ex. 1003, "Portelli").
[3] Long et al., WO 2012/064203 A1, published May 18, 2012 (Ex. 1004, "Long").
[4] Meadors, US 4,228,121, issued October 14, 1980 (Ex. 1005).
[5] Brown et al., US 6,960,316 B2, issued November 1, 2005 (Ex. 1006, "Brown").

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) (2012) (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 the patent owner. *See Dynamic Drinkware, LLC v. Nat'l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015) (discussing the burden of proof in *inter partes* review).

To anticipate, a reference must "show all of the limitations of the claims arranged or combined in the same way as recited in the claims." *Net MoneyIN, Inc. v. VeriSign, Inc.*, 545 F.3d 1359, 1370 (Fed. Cir. 2008); *accord see Bond*, 910 F.2d 831, 832 (Fed. Cir. 1990). Although the elements must be arranged or combined in the same way as the claim, "the reference need not satisfy an *ipsissimis verbis* test," i.e., the identity of terminology is not required. *In re Gleave*, 560 F.3d 1331, 1334 (Fed. Cir. 2009); *accord In re Bond*, 910 F.2d at 832. Further, to be anticipating, a prior art reference must be enabling and must describe the claimed invention sufficiently to have placed it in possession of a person of ordinary skill in the art. *Helifix Ltd. v. Blok-Lok, Ltd.*, 208 F.3d 1339, 1346 (Fed. Cir. 2000); *In re Paulsen*, 30 F.3d 1475, 1479 (Fed. Cir. 1994).

Obviousness is a question of law based on underlying determinations of fact. *Graham v. John Deere Co.*, 383 U.S. 1, 17 (1966); *Richardson-Vicks Inc. v. Upjohn Co.*, 122 F.3d 1476, 1479 (Fed. Cir. 1997). 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 of the invention to a person having ordinary skill in the art. *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 ordinary skill in the art; and (4) objective evidence of nonobviousness. *Graham*, 383 U.S. at 17–18. Consideration of the *Graham* factors "helps inform the ultimate obviousness determination." *Apple Inc. v. Samsung Elecs. Co.*, 839 F.3d 1034, 1048 (Fed. Cir. 2016) (en banc). To prevail in an *inter partes* review, Petitioner must explain how the proposed combinations of prior art would have rendered the challenged claims unpatentable. Subsumed within the *Graham* factors are the requirements that where all claim limitations are found in a number of prior art references, Petitioner must show that the skilled artisan would have had a reasonable expectation of success in combining the prior art references to achieve the claimed invention. *Pfizer, Inc. v. Apotex, Inc.*, 480 F.3d 1348, 1361 (Fed. Cir. 2007). "Obviousness does not require absolute predictability of success . . . all that is required is a reasonable expectation of success." *In re O'Farrell*, 853 F.2d 894, 903–04 (Fed. Cir. 1988) (citations omitted).

We analyze the challenges presented in the Petition in accordance with the above-stated principles.

B. Level of Ordinary Skill in the Art

We review the grounds of unpatentability in view of the understanding of a person of ordinary skill in the art at the time of the invention. *Graham*, 383 U.S. at 17. The level of skill in the art is a factual determination that provides a primary guarantee of objectivity in an obviousness analysis. *Al-Site Corp. v. VSI Int'l, Inc.*, 174 F.3d 1308, 1324 (Fed. Cir. 1999) (citing *Graham*, 383 at 17–18; *Ryko Mfg. Co. v. Nu-Star,*

Inc., 950 F.2d 714, 718 (Fed. Cir. 1991)). In determining the level of ordinary skill in the art, various factors may be considered, 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." *In re GPAC Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995) (citation omitted).

Petitioner contends that a person of ordinary skill in the art "would be a person with either (1) a Bachelor of Science degree in packaging science, mechanical engineering, material science, or chemistry and two years of experience designing and manufacturing thermoformed plastic items, or (2) three years of experience designing and manufacturing thermoformed plastic items. Pet. 7–8 (citing Ex. 1002 ¶ 35).

Patent Owner states that Petitioner's proposed level of skill "is acceptable" with a series of "clarifications," which do not address the relevant level of skill, but instead purport to list activities a person of ordinary skill in the art can, or cannot, do "without considerable experimentation." PO Resp. 6 (emphasis omitted) (citing, e.g., Ex. 2007 ¶ 31).

Patent Owner directs us to no authority, and we are aware of none, that informs that the level of ordinary skill in the art is determined based on a list of activities that allegedly require, or do not require, "considerable experimentation," as Patent Owner suggests. Patent Owner appears to confuse consideration of the level of ordinary skill in the art with whether a patent is enabled. *See In re Wands*, 858 F.2d 731, 737 (Fed. Cir. 1988) (explaining that the touchstone of enablement is whether undue experimentation would have been required to practice the claimed

invention). Accordingly, we find Patent Owner's purported "clarifications" of Petitioner's proposed level of ordinary skill inapplicable.

Patent Owner also argues as follows:

> In any situation, a [person of ordinary skill in the art] in thermoforming would view publications from the standpoint of whether they taught mass-producible designs and techniques that would enable large-scale production of the articles, e.g., thousands to millions of articles, with substantially no defects (e.g., sharp edges, thin sections, weakness in corners), and not just prototype endeavors.

PO Resp. 7 (citing Ex. 2007 ¶ 32). The portions of Mr. May's deposition cited by Mr. Clements do not address the level of ordinary skill in the art and do not support the proposition Patent Owner and Mr. Clements assert in regard to "large-scale" production. For example, Mr. May stated that "[t]he prototype was to better predict the operations for mass production," and that mass production "can widely vary" and "may be anywhere from hundreds of units to hundreds of thousands of units to millions of units." Ex. 2009, 25:21–26:4. Indeed, there is no support from any source that a person of ordinary skill in the art would have been limited to a person who "would only view publications from the standpoint of whether they taught mass-producible designs," as Patent Owner and Mr. Clements suggest. To the contrary, the '281 patent broadly "relates to the field of forming shaped thermoplastic articles," includes claims directed to "[a]n article formed from a thermoformable sheet," and provides no discussion of or requirement for the "large scale production of articles." Ex. 1001, 1:18–19; 38:30–40:40. That isn't to say that considerations related to the production of an article is necessarily irrelevant to our obviousness analysis, but rather, that a person of ordinary skill in the art is not limited to a person who would have only

viewed "publications from the standpoint of whether they taught mass-producible designs." *See* PO Resp. 7.

We find that the '281 patent and the cited prior art references reflect the appropriate level of skill at the time of the claimed invention and that the level of appropriate skill reflected in these references and in the '281 patent is consistent with the definition of a person of ordinary skill in the art proposed by Petitioner. *See Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001)) (explaining that specific findings on ordinary skill level are not required "where the prior art itself reflects an appropriate level and a need for testimony is not shown" (quoting *Litton Indus. Prods., Inc. v. Solid State Sys. Corp.*, 755 F.2d 158, 163 (Fed. Cir. 1985))). .

C. Claim Construction

We construe claim terms according to the standard set forth in *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312–17 (Fed. Cir. 2005) (en banc); 37 C.F.R. § 42.100(b) (2020). Under *Phillips*, we give claim terms "their ordinary and customary meaning." *Phillips*, 415 F.3d at 1312. "[T]he ordinary and customary meaning of a claim term is the meaning that the term would have to a person of ordinary skill in the art in question at the time of the invention." *Id.* at 1313. "Importantly, the person of ordinary skill in the art is deemed to read the claim term not only in the context of the particular claim in which the disputed term appears, but in the context of the entire patent, including the specification." *Id.*

Petitioner initially states that it "does not currently seek construction of any terms." Pet. 10. Patent Owner argues that the terms "formed from a thermoformable sheet" and "the article has a smooth periphery" should be construed. PO Resp. 8, 11. We address these limitations below.

1. "formed from a thermoformable sheet"

Claim 1 (and claim 24) recites, in the preamble, "[a]n article formed from a thermoformable sheet." Ex. 1001, 38:30. The Specification does not otherwise describe a "formed from a thermoformable sheet."

According to Patent Owner, "'thermoformable sheet' . . . excludes sheets made of paperboard or sheets made by injection molding," because during prosecution of a related application "the Applicant argued that 'thermoplastic sheet' . . . excluded paperboard and injection molded material." PO Resp. 10 (citing Ex. 2012, 8). We disagree with Patent Owner's characterization of the relevant prosecution history, as explained below.

A parent application to the '281 patent recited "a method of making a container . . . the method comprising thermoforming a thermoplastic sheet to yield a precursor article." Ex. 1046, 63. In regard to that claim, the Applicant argued that it recited "a method in which a thermoplastic sheet (i.e., not paperboard . . .) is thermoformed (i.e., not injection molded . . .) into a precursor article having a rim. Ex. 2012, 8.

Petitioner does not address whether "thermoformable" may include paper board. *See generally* Reply 1–2. But, Petitioner argues that "[t]he prosecution statements cited by [Patent Owner] have no relevance to its definition of 'thermoformable,'" as none of the amendments cited address the term "thermoformable" and instead address "thermoforming." Reply 1–2. Petitioner also asserts that "whether a material is thermoformed or injection molded does not dictate whether it is thermoform***able***, since many thermoplastics are both thermoformable and injection moldable." *Id.* at 2

(citing Ex. 1044 ¶ 338). Petitioner contends that the plain meaning should control and no construction necessary. *Id.*

We credit the testimony of Mr. May in this regard, who reiterates that "whether a material is thermoformed or injection molded does not dictate whether it is thermoform***able***, since many thermoplastics are both thermoformable and injection moldable." Ex. 1044 ¶ 327 (citing Ex. 1032a, 300, 315, 332–35, 613). Likewise, the Specification of the '281 patent states that "[a] wide variety of methods (e.g., thermo-forming, casting, molding, and spinning) can be used to confer shape to a molten thermoplastic or to a preformed thermoplastic sheet that has been softened or melted." *Id.* at 1:20–24. In its Sur-reply, Patent Owner argues that the record evidence provides that "[f]or something to be 'thermoformed' [means] it must be 'thermoformable'" and "'thermoformed' means something other than 'injection molded.'" Sur-reply 2–3. Patent Owner's argument does not inform the meaning of the claim phrase at issue, which is "thermoformable sheet" and does not persuade us that a thermoformable sheet is necessarily made by thermoforming.

In sum, there is no evidence to suggest that a "thermoformable sheet" may not be made by injection molding or that a "thermoformable sheet" made by injection molding was disclaimed during prosecution. Accordingly, we find that "thermoformable sheet" excludes sheets made of paperboard, but does not exclude sheets made by injection molding.

2. "the article has a smooth periphery"

Claim 1 recites an article where "the article has a smooth periphery." Ex. 1001, 38, 30–42. Patent Owner argues that because the claims use the

word "the" to refer to the article, this "signifies that the entirety of the article has a smooth periphery, and not just a portion of the article." PO Resp. 11.

Petitioner asserts that "[i]t is unclear whether [the smooth periphery] refers to the ***outer*** periphery or to an edge that may come into contact with the overwrap film. Reply 2. Petitioner argues that Patent Owner, on one hand attempts to exclude "Long's . . . peripheral edge—which is *not* at the outer periphery" as having a "smooth periphery," but on the other hand "alleges that a tray with a nearly identical edge has a smooth periphery." *Id.* at 2–3. According to Petitioner, this "will improperly allow the term to be interpreted narrowly for validity and broadly for infringement." *Id.* at 4.

Only terms that are in controversy need to be construed, and then only to the extent necessary to resolve the controversy. *Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co., Matal*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (applying *Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999) in the context of an *inter partes* review). Because the outcome of our decision does not depend on either parties' claim construction position,[6] we determine that the identified claim term requires no express construction to resolve the issues in dispute in this proceeding.

3. Additional Claim Terms

We find that no other claim term requires an express construction for purposes of rendering this Decision. *See Wellman, Inc. v. Eastman Chem. Co.*, 642 F.3d 1355, 1361 (Fed. Cir. 2011) ("[C]laim terms need only be

[6] Separate from its enablement arguments, Patent Owner does not dispute that Portelli teaches an article having a "smooth periphery" according to its construction. *See generally* PO Resp. 32–36.

construed 'to the extent necessary to resolve the controversy.'") (quoting *Vivid Techs.,*, 200 F.3d at 803).

D. Invalidity based on Portelli alone or in combination with Long (claims 1–15, 17, 20–22, 24–29)

Petitioner alleges that Portelli anticipated claims 1–5, 9, 11–15, 17, and 20–22 of the '281 patent and that Portelli alone, or in combination with Long, would have rendered obvious claims 1–15, 17, 20–22, and 24–29 of the '281 patent. Pet. 4–30, 124–135. Petitioner also relies on the testimony of Mr. May to support its arguments. *Id.*

1. Overview of the Prior Art

a) Portelli (Ex. 1003)

Portelli is directed to plastic trays used for packaging, which may be wrapped in plastic film. Ex. 1003, 1:2–3, 27–30. In particular, Portelli explains that in the past, plastic trays that are "used in packaging are formed by a thermoforming operation" but "have a sharp terminal edge forming the periphery thereof with an unfortunate tendency to tear or cut through plastic film within which the trays are wrapped." *Id.* at 1:21–2:2. According to Portelli, "[i]t would therefore be advantageous if a method and an apparatus could be found for providing these trays with a peripheral edge region which reduced the tendency of the wrap to tear." *Id.* at 2:16–18. Portelli thereby discloses steps of "heating the peripheral edge region of the tray" and producing a "fold line along which the peripheral edge region of the tray is folded." *Id.* at 3:9–13; *see also id.* at Abstract, 3:17–22, 4:1–2,6:10–13, 12:5–9, 13:23–25 (describing "rolling" the edge region).

Figure 13 of the Portelli, reproduced below, is a schematic sectional view of an edge a tray that has been deformed out of a wrap path. *Id.* at 8:11–12.

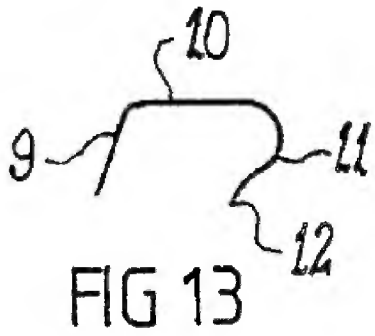


FIG 13

Figure 13 shows a finished tray edge with sloping sidewall 9, that has "a more rounded peripheral edge region" than that of other trays. *Id.* at 8:19–9:3, 14:15–17. The profile edge of the tray has rim 10 connected to peripheral edge region 11, which is connected to terminal edge 12. *Id.* at 14:10–13. Portelli discloses that the trays can have a rounded rectangular shape with a concave compartment formed therein. *See* Figs. 14–16.

b) Whether Portelli is Enabled

Patent Owner argues that "Portelli's First Embodiment (Figures 1–2 and 9–11) and Fourth Embodiment (Figures 7–8) cannot function as prior art because each is inoperative and cannot be made or used without unreasonable amounts of experimentation. PO Resp. 11. However, the cited prior art has a presumption of enablement. *See In re Antor Media Corp.*, 689 F.3d 1282, 1287–88 (Fed. Cir. 2012); *Impax Labs., Inc. v. Aventis Pharms., Inc.*, 545 F.3d 1312, 1316 (Fed. Cir. 2008). To rebut this presumption, Patent Owner[7] "must generally do more than state an unsupported belief that a reference is not enabling." *In re Morsa*, 713 F.3d

[7] Although the ultimate burden of persuasion remains with Petitioner, *Dynamic Drinkware, LLC v. Nat'l Graphics, Inc.*, 800 F.3d 1375, 1379–81 (Fed. Cir. 2015), *Antor Media* and *Morsa* make clear that Patent Owner bears a burden of production on the issue of the enablement of the prior art.

104, 110 (Fed. Cir. 2013). The touchstone of enablement is whether undue experimentation would have been required to practice the claimed invention. *See Wands*, 858 F.2d at 737. Patent Owner contends that each of the *Wands* factors weigh in its favor and establish undue experimentation. *Id.* at 11–31. These factors, include:

> (1) the quantity of experimentation necessary, (2) the amount of direction or guidance presented, (3) the presence or absence of working examples, (4) the nature of the invention, (5) the state of the prior art, (6) the relative skill of those in the art, (7) the predictability or unpredictability of the art, and (8) the breath of the claims.

Id.

Patent Owner groups its arguments according to similar *Wands* factors. We follow this same arrangement in our consideration of the *Wands* factors below.

(1) Factors 3, 5, and 6

Patent Owner argues that processes such as Portelli's thermal deformation process were known to be inoperative for rolling the flange of a thermoformed tray. PO Resp. 13. Specifically, Patent Owner cites statements made during the prosecution of the New Zealand counterpart to Long explaining that "puckering and distortion of the lip . . . often occurs with known thermal deformation processes." *Id.* (citing Ex. 2010, 1) (emphasis omitted). Patent Owner also refers to statements from Long that use of its method, in contrast to a thermoformed preform, "means none of the puckering or distortions often encountered with rolling a flange is encountered." *Id.* at 14 (citing Ex. 1004, 6:29–33) (emphasis omitted). Patent Owner contends that these statements regarding the failure of others demonstrates non-enablement of Portelli's methods of rolling a flange to

make a smooth periphery in a non-circular article. *Id.* Patent Owner further asserts that Mr. May's reproductions of the figures of Portelli illustrate puckers formed at the tray's periphery. *Id.* at 15. Patent Owner reproduces Mr. May's annotated Figure 8, including its own annotations, and argues that Mr. May's illustrations confirm puckering occurs in Portelli. *Id.* at 15–16 (reproducing a variation of Figures 8 and noting that puckering occurs at "S").

Patent Owner further argues that Mr. May admitted Portelli's fourth embodiment is not inoperative where he stated that

> "[i]f an edge adheres to a die, it's very likely that article would be defective and would be discarded on [sic.] recycled" and when the article with the adhering edges is pushed off of the die, "[t]he continuous heat of a die of this nature could deform the article, very likely causing a type of defect that would require disposal of the item."

Id. at 18–19 (quoting Ex. 2009, 276:7–277:18). Patent Owner asserts that this testimony is consistent with the thermodynamic simulations performed by Mr. Clements. *Id.* at 19. According to Patent Owner, a person of ordinary skill in the art viewing these simulations would understand that "uncontrolled expansion and rippling or deformation (buckling or melting) [would occur] in response to either (i) being pressed into die 25 and/or (ii) succumbing to the force of gravity." *Id.* at 21 (citing Ex. 2007 ¶¶ 59, 102–104). Patent Owner contends that Portelli observes that the "heat treatment step may also effect some beading of the plastic by melting." *Id.* (citing Ex. 1003, 17:5–6.

Lastly, Patent Owner states that "Portelli discloses no working examples or any information that can refute the inoperability observations by third parties." *Id.* at 23.

Petitioner argues that thermoforming is an "extremely mature" art spanning seventy years. Reply 4. Petitioner points to known thermoformed rolled rim techniques by DexterMT and OMV that employ methods similar to that of Portelli to make rounded rectangular articles. *Id.*; *see also id.* at 7–20 (describing DexterMT's and OMV's thermoformed products). Petitioner also draws our attention to an "authoritative book by James L. Throne in 1996" that "describes the 'rolled rim' technique as '[t]he classic example of rim treatment of thin-gage parts' and 'a standard method of reinforcing the rim region' which is used for a variety of different shapes." *Id.* at 4–5 (citing Ex. 1049, 569–71; Ex. 1047, 74:17–75:8). Like Portelli, Petitioner explains that Throne uses heat and a forming tool to roll the flange of a thermoformed article by displacing the peripheral inwardly. *Id.* at 6 (citing Ex. 1003, Fig. 8; Ex. 1044 ¶¶ 48, 53; Ex. 1049, 571).

Petitioner contends that Patent Owner misinterprets Long's statements about Portelli. *Id.* at 21. Specifically, "Long does not suggest that 'puckering and distortions' ***always*** occur with edge-rolling . . . only that they 'often' occur." *Id.* In fact, Petitioner argues that the record and Mr. May "shows that companies use the same methods to produce trays without puckering or distortion." *Id.* Petitioner also asserts that the "puckering defects" Patent Owner notes on Portelli Figure 8 with an "s." are "merely imperfections in a manually-drawn figure." *Id.* at 24.

Petitioner disputes Patent Owner's contention that Mr. May admitted that Portelli's fourth embodiment is inoperative. Reply 20. According to Petitioner, Patent Owner mischaracterized Mr. May's testimony and instead, Mr. May "stated the unremarkable fact that if an edge of an article [is] stuck to a die, it might be defective." *Id.* (citing Ex. 2009, 276:7–277:18).

Petitioner argues that Mr. Clements' thermodynamic simulations are flawed and only theoretical, as "no physical tests [were performed] to verify his theories." *Id.* at 24. Specifically, Petitioner explains that Mr. Clements:

> ignored all the heat flowing into the support 24 illustrated in Portelli Fig. 8, unrealistically assuming that all of the heat enters the peripheral edge region 11 from the die and propagates through the thin plastic to the base 8;
>
> [o]mitt[ed] the cooling effect of the support 24 artificially elevated the flange temperatures in Mr. Clements's model, making the flange look hotter and weaker than it would actually be, causing Mr. Clements to conclude erroneously that the flange would buckle and deflect in the wrong direction when engaged by the die 25; [and]
>
> ignore[d] heat-shielding and water-cooling [in Portelli's heated-air embodiments].

Id. at 24–25 (citing Ex. 1047, 153:4–14, 155:11–156:15; Ex. 2007 ¶¶ 39–44, 59, 83–84; Ex. 1044 ¶¶ 94–97).

Here, the statements made in Long and its New Zealand counterpart do not persuade us that Portelli's thermoforming method is inoperative or a failure. As Petitioner aptly notes, neither reference states that puckering *always* occurs. Reply 21. Rather, these prior art references contrast a problem that *often* occurs when describing the benefits of Long's claimed trimming process. We do not view statements distinguishing the purported advantages of one process against another as rising to the level of establishing that thermal deformation processes, like that of Portelli, are known to be "inoperative [or] cannot be made or used without unreasonable amounts of experimentation," as asserted by Patent Owner. PO Resp. 11, 13–14. We also do not interpret Portelli's figures as showing "sharp pointed puckers" on the tray periphery at "s" on Patent Owner's annotated figures.

See id. at 15–17 (Portelli's Figure 8 (modified) as annotated by Patent Owner). Instead, the distortions seen in the figures are a product of the enlargement of manually-drawn images. Portelli's figures are not photographs of an actual tray and Portelli does not discuss or identify these imperfections as puckering or any other aspect of its thermoformed tray. *See generally* Ex. 1003.

Furthermore, Mr. May's testimony, identified by Patent Owner (PO Resp. 18–19) does not admit any inoperability of Portelli's fourth embodiment as Patent Owner asserts. Instead, Mr. May testifies that Portelli alerts the reader to the possibility that the plastic may adhere to the tie and that:

> *[i]f* that were to occur, the part *could* stick to the mold, causing a jam, the part may not be ejected properly.· Subsequent parts, after that part ·was removed, if the residue or the plastic was not removed sufficiently, *could* be compromised in terms of proper function (Ex. 2009, 276:21–277:1 (emphasis added); [and further that]
>
> *[i]f* an edge adheres to a die, it's *very likely* that article would be defective and would be discarded or recycled.· So I think Portelli is explaining this such that a POSITA reading it would understand in the progressive deformation of the peripheral edge to beware of the edge becoming stuck to a mold or a die (277:4–10 (emphasis added).

Indeed, Patent Owner's expert Mr. Clements testifies that a person of ordinary skill in the art would understand how to overcome this issue of sticking as "there are a 'wide variety' of techniques to prevent parts from sticking to a hot die, including treating the surface with a non-stick coating, controlling process time and temperature, and the 'list goes on from there.'" Reply 20 (citing Ex. 1047, 40:19–43:14); *see also* Ex. 1044 ¶¶ 67–68 (citing Ex 1056, 305–306; Ex. 1050, 168). And, while Mr. Clements'

thermodynamic simulation indicates deformation may occur under some circumstances, Mr. Clements failed to account for numerous teachings in Portelli such as the heat flow and cooling effects identified by Petitioner. *See* Reply 24–25.

Finally, though Patent Owner argues that Portelli discloses no working examples, working examples are not required to show enablement. *See Beckman Instruments, Inc. v. LKB Produkter AB*, 892 F.2d 1547, 1551 (Fed. Cir. 1989)(actual implementation is not required to enable a prior art reference); *Schering Corp. v. Geneva Pharms., Inc.*, 339 F.3d 1373, 1380 (Fed. Cir. 2003)(explaining that anticipation does not require the actual creation or reduction to practice of the prior art subject matter).

(2) Factors 4 and 7

Patent Owner argues that "[t]he critical dependence on polymer chemistry and how plastic reacts to different degrees of heating and cooling qualifies thermoforming as a highly unpredictable field." PO Resp. 23–24 (citing Ex. 2007 ¶ 21). According to Patent Owner, the "highly unpredictable aspects" of Portelli's first embodiment include its use of hot air convection vectors and "the extend and direction of the plastic's thermal expansion along the terminal edge region." *Id.* at 24. As a result, Patent Owner explains that rippling, folding, and puckering occur which is detrimental to the smoothness of the periphery of the edge and even more so when that edge is folded over. *Id.* at 24–26. Patent Owner reasons that because Portelli does not teach

> how to (i) control the hot air from ducts 2 to consistently heat the precursor region 11 and edges 12; (ii) control the unpredictable thermal expansion of either edge 12, region 11, or tapers 42 while simultaneously avoiding the distortions and puckering that would result from using the unheated formers 34–41; or (iii)

> achieve a mass-producible rectangular article having a smooth periphery on a "high volume assembly line scale,"

Portelli is not enabled. *Id.* at 27–28.

We agree with Petitioner that thermoforming is a mature art that has been successfully practiced for many, many years. Reply 4. Further we note the numerous prior art references and commercial articles of record, predating and existing near or at the time of the '281 patent, describe using heat to thermoform and shape articles, including rectangular articles, as indicators of developed state of the art. *See e.g.*, Ex. 1049, 124–128; Ex. 1044 ¶¶ 42–49, 52; Ex. 1051; Ex. 1053; Ex. 1058; Ex. 1003; Ex. 1004; Ex. 1005; Ex. 1047 23:1–23 (describing thermoforming as a "mature art"). Patent Owner criticizes Portelli for being unpredictable and identifies use of "hot air convection" and "thermal expansion" of the plastic as unpredictable aspects of Portelli's methods. PO Resp. 23–27. According to Patent Owner, Portelli does not teach how to control these aspects and is, therefore, not enabled. On this issue, we disagree. Portelli explains that its method heats the peripheral edge of the tray such that the peripheral edge becomes malleable and can be shaped. Ex. 1003, 2:28–30. Portelli describes one embodiment that "comprises blowing hot air over the peripheral edge region of the tray" so that it is heated and is shaped around a former and complementary deforming formation. *Id.* at 6:22–29. Portelli further explains that "the apparatus includes shield means for shield[ing] that portion of the tray laterally inwardly of the peripheral edge region, from the hot air blast" and may also include a "cooling means for actively cooling the peripheral edge region of the tray." *Id.* at 7:1–6; *see also id.* at 4:3–12; 9:27–29 (interrupting the hot air blast and the edge region is cooled); 11:15–26. Portelli explains that the cycle time for its method is "dependent upon

the aggressiveness of the heating of the edge region 11 . . . [and] the rate at which the edge region 11 is cooled." *Id.* at 10:6–14. According to Portelli the preferred method for cooling the tray is to use "cooling water [that] is circulated through pipes 30 mounted on former 3 thereby acting to cool the former 3 which in turn cools the region 11." *Id.* at 10:21–24. Mr. May further testifies regarding numerous methods, known to persons of ordinary skill in the art, to control and minimize the problems identified by Patent Owner. Ex. 1044 ¶¶ 72–82 (citing Ex. 1035, 61–65, 185, 194–195; Ex. 1050, 183–187). Patent Owner does not adequately address or explain what is lacking in Portelli's disclosure or why Portelli's shielding and cooling means are not sufficient to control the heating of the peripheral edge. *See generally* PO Resp. 23–28, Sur-Reply.

Patent Owner also asserts that Portelli does not describe how to prepare mass-produced, high-volume articles. We observe however that the claims do not require any particular production volume. Ex. 1001, 38:30–40:43.

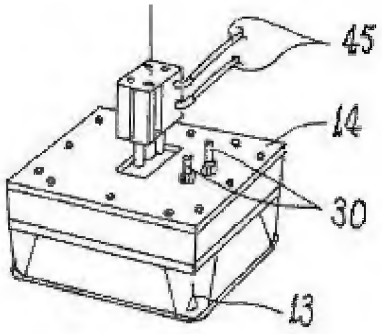
(3) Factor 2

Patent Owner argues that Portelli's first embodiment (Figures 1–2 and 9–11) use non-standard thermoforming equipment which weighs against enablement. PO Resp. 28. Specifically, Patent Owner contends that "a [person of ordinary skill in the art] would not know what a 'clacker box' is nor would . . . be able to obtain the specifications needed to make one." *Id.* Patent Owner states that Mr. May testifies that he "couldn't say [if] he had ever seen Portelli's nonstandard equipment in Figures 9–11 prior to the earliest effective filing date." *Id.* at 29. Patent Owner reasons that this testimony is "further proof that a [person of ordinary skill in the art] would

not have had the requisite equipment to even attempt Portelli's First Embodiment methods." *Id.*

Petitioner argues that using heated air for thermoforming articles was standard practice and widely-known to persons of ordinary skill in the art. Reply 25 (citing Ex. 1049, 124–128). Petitioner further contends that hot-air manifolds, such as those in Portelli's Figures 9–11, were known and used by persons of ordinary skill in the art and were "standard, off-the-shelf components." *Id.* Petitioner explains that "Portelli's manifold is not an exotic part just because of its name—'clacker box.'" *Id.*

We do not find Patent Owner's assertion that a person of ordinary skill in the art would not know what a "clacker box" is or how to obtain one, compelling. As Petitioner explains, "Portelli's manifold is not an exotic part just because of its name—'clacker box.'" Reply 25. The real question and the crux of the issue is whether the ordinarily skilled artisan would understand from the description of Portelli's "clacker box," what it is and how to use it. Portelli illustrates its "clacker box" in Figure 11, a portion of Figure 11 is reproduced below.



The excerpted figure above shows clacker box 14, including clamping feet 13, water cooling pipes 30, and compressed air conduits 45 for moving feet 13 of clacker box 14 in and out from under rim 10 of tray being formed.

Ex. 1003, 11:27–29. Portelli also explains that clacker box 14 acts to shield the upper portion of the rim from the hot air blast. *Id.* at 11:20–21. Mr. May testifies that "Portelli's part is a typical hot-air manifold whose behavior and performance would have been well-understood by a [person of ordinary skill in the art.]." Ex. 1044 ¶¶ 87–98; Reply 25–26. Thus, we are persuaded that Portelli sufficiently describes the function and features of the component, identified as a "clacker box," for a person of ordinary skill in the art to make and use that component.

(4) Factor 1

Patent Owner argues that a "combination of certainties and uncertainties make" experimentation with Portelli's first and fourth embodiments unreasonable. PO Resp. 29. With respect to the first embodiment, Patent Owner identifies the following issues: "(1) excess plastic tapers 42 on the periphery will always result and will leave puckers or other distortions on the periphery;" "(2) the convection vectors of the hot air from ducts 2 is unpredictable and there is no teaching on how to control it;" and "(3) every plastic that Portelli [uses] has a natural unpredictability in terms of its reaction to heat and its thermal expansion which necessarily prevents a POSITA from knowing what it will do in response to unequal heating by hot air from ducts 2 and repeated impact by formers 3." *Id.* at 29–30 (citing Ex. 2007 ¶¶ 35–45). Patent Owner also identifies the following combination of certainties and uncertainties with respect to Portelli's fourth embodiment: "(1) in moving the sharp terminal edge 12 away from the periphery, a new sharp corner (denoted "S" above) is formed;" "(2) an uncontrolled amount of radiant heat will cause unpredictable weakening, expansion, and rippling in the plastic;" "(3) the

adhesion between peripheral edge region 11 and hot die 25 would result in defective articles upon ejecting the same from the mold;" "(4) the adhesion between peripheral edge region 11 and hot die 25 would "un-roll" the deformed region 11 as the article is ejected from die 25;" and "(5) the combination of heating and gravity will cause the terminal edge 12 to wilt or buckle in response to being pressed into die 25 and the rim 10, zone "X", and portions of sidewall 9 will become softened, weakened, and deformed." *Id.* at 30–31 (citing Ex. 2007 ¶¶ 57–60, 78–81, 101–108).

Patent Owner argues that the amount of experimentation to make and use Portelli is unreasonable. PO Resp. 29–31. The test for enablement is "not merely quantitative." *PPG Indus. Inc. v. Guardian Indus. Corp.*, 75 F.3d 1558, 1564 (Fed. Cir. 1996). On the contrary, "a considerable amount of experimentation is permissible, if it is merely routine." *Id.*; *In re Vaeck*, 947 F.2d 488, 495 (Fed. Cir. 1991) ("That *some* experimentation may be required is not fatal; the issue is whether the amount of experimentation required is 'undue.'").

Here, however, Patent Owner does not identify what about the quality or quantity of experimentation is "undue." As explained above, we disagree with Patent Owner that the evidence of record shows that the peripheral edge *always* puckers, that Portelli results in uncontrolled heating, that adhesion necessarily occurs, or that the skilled artisan would not know how to overcome adhesion to the die. *See* PO Resp. 29–30 (listing "uncertainties" found Portelli's first and fourth embodiments). For example, Mr. Clements testifies that there are a wide variety of techniques, known to the skilled artisan, to overcome problem of parts sticking to a hot die, including treating the surface with a nonstick coating, controlling both the process time and

temperature, among others. Ex. 1047, 40:19–43:14. Furthermore, Mr. Clements acknowledges, experimentation is routine in the art of thermoforming plastics. Ex. 2007 ¶ 21.

(5) Conclusion as to Enablement

Thus, each of the *Wands* factors weigh in favor of finding that Portelli is enabled. In sum, we conclude that Portelli is an enabling disclosure and remains available as a prior art reference for establishing anticipation or obviousness of the claimed subject matter.

c) Long (Exhibit 1004)

Long "relates to an open mouthed container (eg. tray, cup or the like) having a profiled periphery outwardly of the mouth, there being a return of the edge in the under part of the profiled periphery." Ex. 1004, 1:4–6. Long discloses the use of a trimming procedure applied to "a thermoformed precursor or preform" to provide a container with "a 'concealed-from-above' in-turned edge." *Id.* at 1:19–25.

Figure 4, 5A, 5B, and 5C of Long are reproduced below.

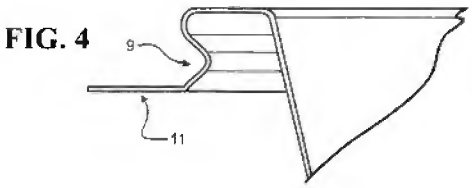


FIG. 5A

FIG. 5B

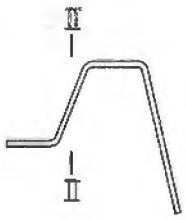


FIG. 5C

Figure 4 illustrates the edge region of a preform or precursor container prior to trimming. *Id.* at 6:4–6. Long further explains as follows in regard to Figures 5A, 5B, and 5C:

> **Figures 5A, 5B and 5C** show, as three stages, the features of Figure 4, the distortion, deforming, stretching, blowing or the like of the form of Figure 5A sufficiently to provide a cut line shown by the broken lines II-II in Figure 5B which is outwardly of the final profile periphery and Figure 5C shows how the resilience allows the under turn of the preform or precursor of Figure 5A to be reassumed after the cut has been made on the broken line as shown in Figure 5B.

Id. at 6:7–12.

d) Whether Long is Enabled

Patent Owner argues that "Long's prophetic disclosures do not enable a [person of ordinary skill in the art] to make and use any of what is

mentioned." Resp. 51–52. According to Patent Owner, "Long as a reference teaches very little except incomplete and erroneous proposals for the [person of ordinary skill in the art] to figure out on its own." *Id.* at 36 (citing Ex. 2007 ¶¶ 119–122). Critically, according to Patent Owner, "Long provides no evidence that its theoretical proposals, to the extent they can be practiced or understood, can be successfully used to make a rectangular thermoformed tray having a smooth-edged periphery *via any process amenable to mass manufacturing*." *Id.* (citing Ex. 2007 ¶¶123, 141, 152, 162) (emphasis added). Patent Owner's enablement argument is fundamentally flawed because the Challenged Claims do not recite an article manufactured by a "process amenable to mass manufacturing," therefore Petitioner may rely on Long for all that it teaches to show obviousness even if Long does not teach a "process amenable to mass manufacturing," as Patent Owner argues.

With respect to *Wands* factors 2–3, 5–6, Patent Owner argues that "Long mentions a 'first tooling assembly' but in no way describes what it is," that "Long's precursor requires a mold whose rim has a significant negative draft," and that according to modeling done by Mr. Clements "using Mr. May's dimensions of Longs periphery, . . . shrinkage of the periphery of the thermoformed thermoplastic of the article enters into the undercuts of the mold to become 'trapped.'" *Id.* at 37–38 (citing, e.g., Ex. 2007 ¶ 124–136; Ex. 2010, 13). From this, Patent Owner argues that "in the process of attempting to recreate Long's proposals using a mold with undercuts, the [person of ordinary skill in the art] would realize that the proposed methods yield a trapped part that is unusable for any further processing." *Id.* at 39 (citing Ex. 2007 ¶¶ 137. Patent Owner contends that

"a cooled precursor could not be released from the mold without breaking it while a heat-softened precursor could not be released without also permanently deforming the periphery into a contour different from the one required by Long Figure 5A," and that the "impossible remov[al] problem is further complicated if a male mold is used or if a [person of ordinary skill in the art] were to attempt mass-production of such a precursor." *Id.* at 40 (citing Ex. 2007 ¶¶ 137–141). Next Patent Owner argues that a person of ordinary skill in the art would understand that the precursor with Long's Figure 5 A periphery "as dimensioned according to Mr. May's measurements . . . "has an overhang-to-sheet thickness ratio that exceeds ratios known to permanently crimp or lock thermoplastic sheets made of PET, CPET, PP and polystyrene thermoplastics . . . to adjacent object surface." Resp. 41 (citing Ex. 2007 ¶¶ 143–148).

We find Mr. Clements attempt to model how a person of ordinary skill in the art might theoretically attempt to produce the article shown in Long's Figure 5A ambitious, but flawed and not persuasive to show that producing the article taught by Long was "impossible." *See* Ex. 2007 ¶¶ 123–148. Mr. Clements modeling is based as much on the assumptions Mr. Clements adopts as it is on what Long itself teaches. Those assumptions include using the dimensions of Figure 5A to match "those measured by Mr. May," using an "industry standard radius at each corner," and then speculates from the model he created that a person of ordinary skill in the art "would find that removal of an article with Long's Figure 5A periphery would not be possible without resort to permanent deformation or destruction of the article." *Id.*

The conclusions Mr. Clements reaches identify no persuasive support and, therefore, appear speculative and conclusory. *See*, *e.g.*, Ex. 2007 ¶¶ 139–141; *see also id.* ¶ 140 (noting that "a male mold could also be utilized," which was apparently not modeled by Mr. Clements, but he concludes would have the "previous problems" and "will also have the potential for ripping the plastic"). We further find persuasive in this regard Petitioner's showing that articles made using Long's process were, in fact, produced on a commercial scale "since at least as early as 2012." Reply 30–38 (citing, e.g., Ex. 1044 ¶¶ 126–127, 143, 150; Ex. 1045 ¶¶ 4–5; Ex. 1057). In short, the evidence provided by Patent Owner does not show that the features of the article Long teaches, corresponding to the claimed elements of the '281 patent, would have been impossible to produce in accordance with Long, as Patent Owner asserts.

Patent Owner also argues that Long refers to a "second tooling assembly" that performs "generic actions" but does not provide "details about the intricacies of the 'second tooling assembly.'" Resp. 42–43 (citing Ex. 2007 ¶¶ 155–158). According to Patent Owner, Mr. May acknowledged that Long's second tooling assembly would need to be custom made, and from this Patent Owner asserts a person of ordinary skill in the art "would have to engage in considerable and undue experimentations to make and use such non-standard equipment." *Id.* at 43–45 (citing, e.g., Ex. 2007 ¶¶ 158–165; Ex. 2009, 367:2–368:8). We are not persuaded that merely because Long may require "custom made" tooling for "generic actions" to produce an article it teaches, that shows that undue experimentation would have been required.

Patent Owner's additional arguments are misplaced in the context of seeking to show Long is not enabled. Resp. 46–55. We have considered Patent Owner's additional arguments, including that variations in the trimming tolerances result in sharp points that tear the overwrap film, that the demoldable periphery of Long necessarily creates the sharp edge it seeks to avoid, and that the nature of thermoplastics is unpredictable and known to generate microscopic hairs on the thermoformed surface. *Id.* Although Patent Owner identifies issues that may need to be refined in the production process, or may even require experimentation to perfect, lacking is any persuasive evidence that the required experimentation would be undue. *Id.*

As noted above, Petitioner shows that actual trays embodying Long have been made since before the priority date. Reply 30–41 (citing Ex. 1045 ¶¶ 4–5; Ex. 1044 ¶¶ 126–127, 143, 150; Ex. 1057). Petitioner further shows that "Mr. Clements's analysis is purely theoretical" and "[h]e did not test any trays or precursors to determine whether they could be removed from a mold." *Id.* at 42. According to Petitioner, Mr. Clements also "contradicts himself by admitting a thinner tray . . . might be easier to remove from the mold" and "admits that [Long's] peripheral edges avoid the wrap path." *Id.* at 42–43 (citing Ex. 1047:87:9–14; Ex. 1048, 123:11–124:13). Even with regard to potential problems raised by Patent Owner with the Long process, Petitioner shows that solutions were well-known to, for example, the generation of microscopic hairs on the thermoformed surface. *Id.* at 44 (citing Ex. 1035, 171, Ex. 1044 ¶ 213).

Upon balancing the *Wands* factors, we conclude that Long is supported by an enabling disclosure and remains available as a prior art reference for establishing obviousness of the claimed subject matter.

Moreover, even if Long were not self-enabled, its teachings nonetheless "qualify as prior art for the purpose of determining obviousness under § 103." *Symbol Techs., Inc. v. Opticon, Inc.*, 935 F.2d 1569, 1578 (Fed. Cir. 1991). "[A] prior art reference asserted under § 103 does not necessarily have to enable its own disclosure, i.e., be 'self-enabling,' to be relevant to the obviousness inquiry." *Raytheon Technologies Corp. v. General Electric Co.*, 993 F.3d 1374, 1380 (Fed. Cir. 2021). Rather, "a standalone § 103 reference must enable the portions of its disclosure being relied upon." *Id.* at 1381. Here Petitioner need only rely on Long to supply teachings to suggest the additional subject matter of claims 6–8. Pet. 63–71, 103. Thus, the relevant inquiry is whether a person skilled in the art would have been able to combine the structural aspects of Long with Portelli teachings to make and use the subject matter of claims 6–8 without undue experimentation. We determine that Long sufficiently enables the subject matter of claims 6–8 without undue experimentation.

2. Analysis of Claim 1

Petitioner asserts that "Portelli discloses a container formed from a thermoformable sheet having a peripheral edge" as claimed in claim 1. Pet. 14. According to Petitioner, Portelli's plastic tray is thermoformed and "would have sufficient rigidity to define its conformation." *Id.* at 15 (citing Ex. 1003, Abstract, Fig. 13, 1:6–20, 9:17–24,15:12–14, 16:15–17; Ex. 1002 ¶¶ 47–49).

Petitioner alleges that "Portelli teaches a 'base member 51' and a 'cover member 52,' either or both of which comprise a rounded rectangular tray with a concave compartment" which Portelli also describes as a "rectangular tray." *Id.* at 15–16 (citing Ex. 1003, Figs. 14–15, 1:1–5, 1:7–8,

10:17–18, 10:25–11:3, 18:6; Ex. 1002 ¶ 52); *see also* Ex. 1003, 15:27–28 (explaining that "tray 50 would generally be of rectangular configuration having a rectangular base 56"). The "rectangular base 8 or 56 and a sloping, peripheral sidewall 9 or 57 . . . form a concave-upward compartment." *Id.* at 16–17 (citing Ex. 1003, Figs. 1–8, 14, 15, 8:28–29, 15:27–30; Ex. 1002 ¶¶ 53–54); *see id.* at 2:25–29 (describing "an open top container (e.g. tray, cup or the like").

Petitioner also contends that "Portelli's tray comprises a 'circumferential peripheral rim 58 [which] projects outwardly away from the upper end of the side wall 57," which corresponds to the "extension extending peripherally away from the body," as claimed. *Id.* at 17–19 (citing Ex. 1003 Figs. 13–14, 15:28–30, 14:11–13; Ex. 1002 ¶¶ 55–58).

Petitioner identifies exemplary bent portions located between the extension and the peripheral edge, where each bent portion has a smooth periphery. *Id.* at 19–23 (identifying alternative bent portions, i.e., examples 1–3, depicted in Petitioner's modified Figure 13) (citing 1003, Fig. 13; Ex. 1002 ¶¶ 59–62). Petitioner also alleges that Portelli's "bent portion is sufficiently bent that the peripheral edge is displaced from the 'periphery,' which, as with the trays in the '281 patent, is at the outermost perimeter of the tray." *Id.* at 24–26 (citing Ex. 1003 Fig. 13, 2:2–8, 3:17–19; Ex. 1002 ¶¶ 65–66; Ex. 1001, Fig. 4, 7:48–48). And lastly, Petitioner contends that "[t]he curve at the periphery of Portelli's tray . . . is smooth." *Id.* at 26–27 (citing Ex. 1003, Fig. 13; Ex. 1002 ¶¶ 67–69).

Patent Owner does not dispute Petitioner's contentions that Portelli discloses the limitations of claim 1. PO Resp. 11–35. We have reviewed Petitioner's arguments and evidence, and agree—based on the information

provided in the Petition—that the preponderance of the evidence supports Petitioner's contention that Portelli teaches each limitation of claim 1 of the '281 patent.[8]

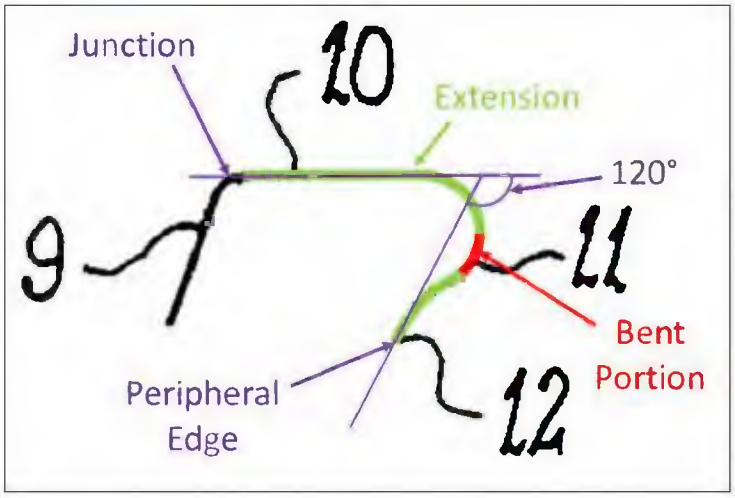
Having determined that Portelli discloses each limitation of claim 1 and that Portelli contains an enabling disclosure, we determine that Petitioner has shown by a preponderance of the evidence that claim 1 of the '281 patent is anticipated by Portelli.

3. Claims 2–5 and 11–12

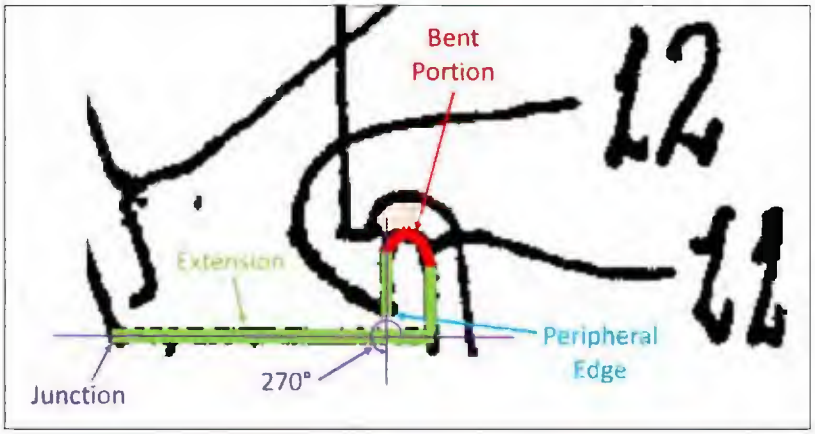
Petitioner contends that claims 2–5 and 11–12 are anticipated by Portelli or rendered obvious by Portelli alone, or in combination with Long. Pet. 27–31, 129–130 (stating that the subject matter of claims 2–5 and 11–12 are taught by both Portelli and Long). Claim 2, depends from claim 1 and additionally requires that "the bent portion of the extension is sufficiently bent [so] that a plane extending through the thermoformable sheet at the peripheral edge is offset from the plane of the extension between the bent portion and the junction by an angle of not less than 120 degrees." Ex. 1001, 38:43–47. Claims 3, 4, and 5 depend from claim 2 and recite an offset angle of not less than 135 degrees, not less than 180 degrees, and not less than 270 degrees, respectively. *Id.* at 38:48–53. Petitioner contends that an offset angle of 120 degrees is taught by both Portelli and Long and

[8] We recognize that Petitioner erroneously suggests in the Petition that "rim 58 is illustrated as item 10 in Portelli Fig. 13," however, Patent Owner does not dispute that Portelli discloses the recited features of claim 1, that is, a rectangular tray with concave compartment. *See* Pet. 16 (explaining that Portelli describes a "rectangular tray" (citing Ex. 1003, 1:1–5, 1:7–8, 5:25, 10:17–18, 18:6)), 18; *see also* Ex. 1003 ("[T]he term 'tray' shall not be limited to flat or shallow containers. Further the term shall not be limited to containers *having four* straight edge sides." (emphasis added).

that an offset angles of 135, 180, and 270 degrees is taught by Portelli. Pet. 130. According to Petitioner, Portelli's Figures 13, reproduced below with annotations, shows an offset angle of 120 degrees.

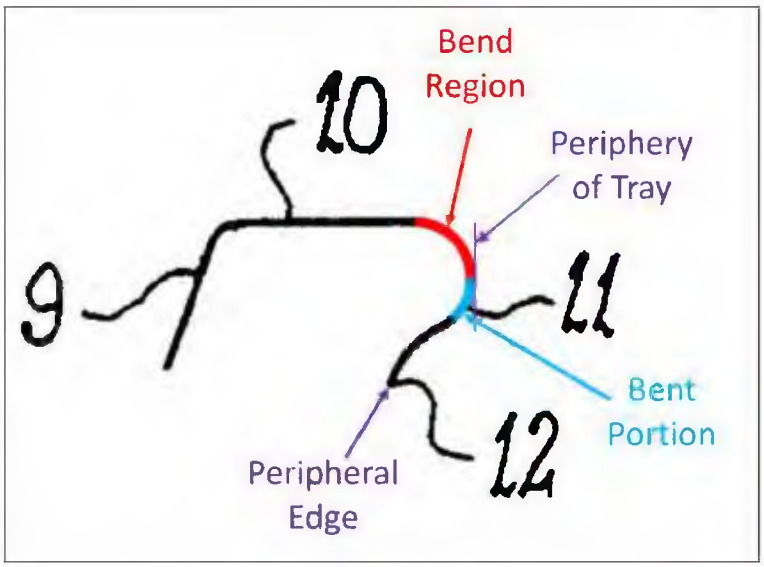


Pet. 29 (reproducing Ex. 1003, Figure 13 (modified)). Figure 13 depicts a sectional view of the edge of a tray and, as annotated, illustrates an offset angle formed by a plane (i.e., top purple line) extending parallel from the junction and along tray rim 10 and a plane (i.e., diagonal purple line) extending from peripheral edge 12 to the plane extending parallel to tray rim 12. Ex. 1003, Figure 13 (modified). Petitioner further alleges that Portelli's Figure 8 depicts an offset angle of 270 degrees.



Pet. 30 (citing Ex. 1003 Fig. 8 (annotated)). Figure 8 depicts a sectional view of the edge of a tray "after the deforming operation has taken place." Ex. 1003, 8:1–2. Annotated Figure 8 illustrates a contact angle formed by a plane extending parallel across the rim edge and a plane extending from peripheral edge 12 of the tray of 270°. Ex. 1003 Fig. 8 (annotated)). Thus, Appellant contends that Portelli meets claim limitations requiring an offset angle of not less than 120 degrees (claim 2), 135 degrees (claim 3), 180 degrees (claim 4), and 270 degrees (claim 5).

Petitioner relies on the same evidence identified for claim 1 for much of its discussion of claim 11. Claim 11 additionally requires that "the extension has a rolled over conformation whereby the curvature of the bend region and the bent portion displaces the peripheral edge anti-peripherally from the periphery of the article." Ex. 1001, 39:6–13. Petitioner contends that the bend region and bent portion of Portelli's tray satisfy this additional limitation. Pet. 36. Specifically, Petitioner relies on annotated Figure 13, reproduced below, to illustrate its position.



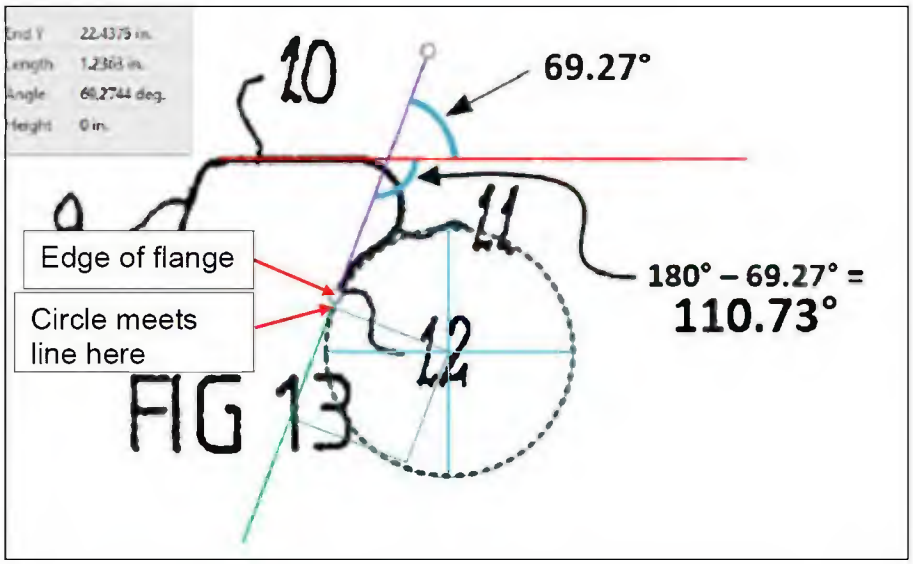
Pet. 37 (reproducing Ex. 1003, Fig. 13 (modified)). Figure 13 "is a schematic sectional view of the edge of the tray . . . after it has been deformed out of the wrap path in accordance with the invention." Ex. 1003, 8:11–13. Annotated Figure 13 shows a tray having rim 10 with a bend region (identified in red) and peripheral edge region 11 (i.e., the bent portion identified in blue) leading to terminal edge 12. *Id.* at 14:10–14. Petitioner explains the bend region and peripheral edge region 11 meet together at the periphery of the tray (noted in purple). *Id.* at Fig. 13. And, according to Portelli, the structure of Figure 13 "gives the finished tray product a more rounded peripheral edge region." *Id.* at 14:15–17. Claim 12 further recites "the curvature of the bend region and the bent portion displaces the peripheral edge sufficiently that the peripheral edge cannot be directly viewed from the exterior of the article." Ex. 1001, 39:14–17. According to Petitioner, Figure 8 of Portelli also includes a bend region and bent portion but "rolls over" the peripheral edge so that it cannot be seen from the exterior of the article. Pet. 38 (citing Ex. 1003, Fig. 8).

Patent Owner does not dispute most of Petitioner's contentions that Portelli alone, or in combination with Long, discloses the additional limitations of claims 2–5 and 11–12. *See generally* PO Resp. However, Patent Owner does argue that Portelli fails to describe the claimed offset angles and that Petitioner cannot selectively combine the features of Figures 8 and 13 to meet the limitations of claims 2–5 and 11–12. PO Resp. 32–35. We address Patent Owner's arguments below.

a) Whether Portelli describes the claimed offset angles

With respect to claims 2, 4, and 5, Patent Owner argues that Petitioner misinterprets the claim when it "reports a 120° offset angle in its annotated

version of Portelli's Fig[ure] 13" for claim 2. PO Resp. 32. Specifically, Patent Owner argues that "Petitioner was supposed to measure an angle from a plane tangent to the curvature of the peripheral edge" and under those circumstances, "the correct offset angle for Portelli Figure 13 is only 110.73°." *Id.* at 32–33. Patent Owner's modified Figure 13 is reproduced below.



Id. at 27 (citing Ex. 1003, Figure 13 (modified)). Patent Owner's modified Figure 13 purports to show a circle abutting the curvature leading to peripheral edge 12 and a plane positioned tangent to the peripheral edge and curvature of the circle and intersecting a plane parallel to rim 10. *Id.*

Petitioner argues that "Mr. Clements artificially decreases the measured angle by drawing a circle smaller than the curve in Fig[ure] 13" and, as a result, "his circle meets his proposed tangent line at a point in space not even on the flange in Fig[ure] 13." Reply 26. As a result, Petitioner argues that the "circle meets his proposed tangent line at a point in space not even on the flange." *Id.* Petitioner also contends that smaller circle Mr. Clements superimposes on Petitioner's modified Figure 13 (*see* PO

Resp. 32) creates a gap between the circle and the flange "wrongly making Mr. May's measurement appear incorrect." *Id.* at 27. Petitioner further alleges that even if as Patent Owner contends "Mr. Clement's measurement of 110.73° were correct, it would render obvious a 120° angle, since the angles of edges such as in Portelli Fig[ure] 13 typically vary by 5–10° or more due to thermal expansion and contraction." *Id.* at 28. Further, Petitioner states that Portelli's Figure 8 illustrates an offset angle of 270°. *Id.* at 28–29. Thus, Petitioner argues that claim 2 is obvious over Portelli in view of Long.

On this record, we are persuaded by Petitioner's argument that the circle drawn by Mr. Clements does not meet the proposed tangent line on the flange of Figure 13. Reply 26. Instead Patent Owner's proposed tangent line is located below the flange. As a result, Mr. Clement's measurements are incorrect. Further, Figure 8 exemplifies an offset angle of 270° which meets the requirement of "not less than 120 degrees" as claimed. Pet. 30; Reply 28; Ex. 1047, 233:10–235:9 (acknowledging that he, i.e., Mr. Clements, did not measure angles with respect to Figure 8). Moreover, we are persuaded by Mr. May's unrebutted testimony that the "angles of [t]he edges such as in Portelli Fig[ure] 13 typically vary by 5–10° or more due to thermal expansion and contraction" and would result in an angle greater than 120°. Reply 28 (citing Ex. 1044 ¶¶ 109–110; *see also* Ex. 1002 ¶¶ 74–75 (describing tolerances "which resulted in rolled flange geometry variances exceeding +/- 15 degrees"); Ex. 2040 ¶ 22 (same).

b) Whether Petitioner has identified a reason to combine Figures 8 and 13 of Portelli

Petitioner argues that a person of ordinary skill in the art "reading Portelli would see Fig[ures] 8 and 13 together in the same document and

would naturally consider the features of both" because each of the depicted trays "prevent[s] the sharp peripheral edge from cutting the overwrap, and . . . strengthening the tray rim." Pet. 145 (citing Ex. 1003, 1:29–2:18; 17:7–12). In addition, Petitioner reasons that because the figures are part of the same document, the features and extensions would have been considered interchangeable or combinable by the skilled artisan (*id.* at 146), as "[c]ombining two embodiments disclosed adjacent to each other in a prior art patent does not require a leap of inventiveness." Reply 54 (citing *Boston Scientific Scimed, Inc. v. Cordis Corp.*, 554 F.3d 982, 991 (Fed. Cir. 2009)). Petitioner further explains that the "curves and straight segments" of the figures "are textbook examples of what well-known thermoforming techniques could achieve" and combining these known features would be a matter of routine design and not hindsight. *Id.* at 54–55.

Patent Owner responds that no reason exists to combine Portelli's Figures 8 and 13 and that only through hindsight can the "disparate pieces" be combined. PO Resp. 79. Patent Owner explains that having adjacent figures in the same reference "is not by itself sufficient to show a reason or motivation to combine the features of those embodiments." Sur-reply 27 (citing *Intel Corp. v. Tela Innovations, Inc.*, IPR2019-01522, 2021 WL 886443 at *9 (PTAB Mar. 9, 2021). Patent Owner further asserts that "each of the tray peripheries in Portelli's Figure 8 and Figure 13 supposedly solved the alleged problem put forth by the reference [and,] [h]aving done so, there is no reason for a [person of ordinary skill in the art] to modify and/or combine" features of Portelli. PO Resp. 80.

It is improper to base a conclusion of obviousness upon facts gleaned only through hindsight reference to the challenged patent. "The invention must be viewed not after the blueprint has been drawn by the inventor, but as it would have been perceived in the state of the art that existed at the time the invention was made." *Sensonics, Inc. v. Aerosonic Corp.*, 81 F.3d 1566, 1570 (Fed. Cir. 1996) (citing *Interconnect Planning Corp. v. Feil*, 774 F.2d 1132, 1138 (Fed. Cir. 1985)). Therefore, "to establish a prima facie case of obviousness based on a combination of elements disclosed in the prior art, the [Petitioner] must articulate the basis on which it concludes that it would have been obvious to make the claimed invention." *Id.* Impermissible hindsight is inferred when the specific understanding or principle within the knowledge of one of ordinary skill in the art that would have motivated one (with no knowledge of the claimed invention) to make the proposed combination has not been explained. *In re Rouffet*, 149 F.3d 1350, 1358 (Fed. Cir. 1998).

We disagree that Petitioner's modification of Portelli is based on hindsight. Here, Petitioner has provided sufficient reasoning with rational underpinnings to explain why one of ordinary skill in the art would have modified the teachings of the applied references. *See KSR*, 550 U.S. at 418. The modifications proposed by Petitioner are supported by the record. Petitioner persuasively asserts that the features of Figures 8 and 13—including the rolled peripheral edge shapes depicted in Portelli—are interchangeable and combinable. Pet. 30, 38 (citing Ex. 1003, 14:10–28; Ex. 1002 ¶¶ 76–77), 146. Thus, substituting the rim design of Figure 8 for that of Figure 13 amounts to a simple substitution of one known element for another to yield a predictable result. *KSR*, 550 U.S. at 417.

We are also not persuaded by Patent Owner's argument that because Portelli does not solve the problem of "overwrap tearing and injuries to flesh," Petitioner must have resorted to hindsight. Portelli acknowledges the existing issue of a sharp terminal edge that has a tendency to tear or cut through plastic overwrap and describes solving that problem by "having a peripheral edge region terminating in a terminal edge which is deformed such that the terminal edge is displaced out of a wrap path around the tray." Ex. 1003, 1–2. Portelli is "prior art for all it teaches," including its displacement of the peripheral edge of the container to avoid tearing plastic overwrap film. *See Beckman Instruments, Inc.*, 892 F.2d at 1551; *Amgen Inc. v. Hoechst Marion Roussel, Inc.*, 314 F.3d 1313, 1357 (Fed. Cir. 2003) (explaining that even a non-enabling disclosure is prior art for all it teaches for purposes of determining obviousness). We are similarly unpersuaded by Patent Owner's contention that having already solved the problem associated with a sharp terminal edge, no reason exists to modify Portelli's Figure 13 with Figure 8 (PO Resp. 55) as the skilled artisan would have investigated other known options to provide protection including the peripheral edges of Figures 8 and 13. *DyStar Textilfarben GmbH & Co. Deutschland KG v. C.H. Patrick Co.*, 464 F.3d 1356, 1368 (Fed. Cir. 2006) (explaining that the motivating benefit maybe based in making a product "that is more desirable, for example because it is stronger, cheaper, cleaner, faster, lighter, smaller, more durable, or more efficient"). Accordingly, we find no evidence if improper hindsight reconstruction.

Accordingly, we determine that the subject matter of claims 2–5 and 11–12 would have been rendered obvious over Portelli alone.

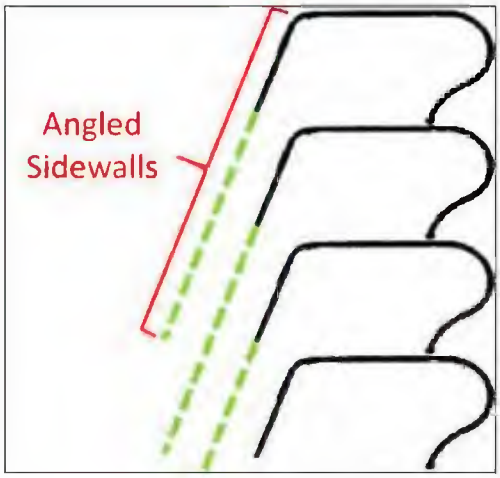
4. Claims 14 and 15

Petitioner contends that claims 14 and 15 are anticipated by Portelli or rendered obvious by Portelli alone, or in combination with Long. Pet. 41–46, 129–130 (stating that the subject matter of claims 14 and 15 are taught by both Portelli and Long). Claim 14 depends from claim 1 and additionally requires that the "concave compartment has an opening," that "the extension encircle[s] the periphery of the opening," and "the extension bear[s] a rolled over edge about the entire periphery." Ex. 1001, 39:23–26. Petitioner contends that Portelli's tray includes an opening, that rim 10 includes an extension that encircles the entire opening of the tray (as shown in Figure 14b, element 58) and that the extension has a rolled over edge. Pet. 42–45 (citing Ex. 1003, Figs. 13, 14, 3:17–19, 8:28–9:1, 14:11–13; Ex. 1002 ¶¶ 100–104). Claim 15 depends from claim 14 and further recites that "the compartment is configured such that a plurality of the article are stackable in a nested conformation." Ex. 1001, 39:27–29. Petitioner argues that because of their angled sidewalls, Portelli's trays can be nested. Pet. 45–46 (citing Ex. 1003, Fig. 13 (modified); Ex. 1002 ¶ 105).

Patent Owner does not dispute many of Petitioner's contentions that Portelli alone or in combination with Long discloses the additional limitations of claims 14 and 15. *See generally* PO Resp. Instead, Patent Owner focuses its argument that Petitioner has not established that Portelli is stackable in a nested configuration and therefore cannot prove anticipation. PO Resp. 35–36. Specifically, Patent Owner argues that "the Petitioner should have shown how Portelli's Figure 14 satisfies Claim 15, not Portelli's Figure 13." *Id.* at 35. According to Patent Owner, "[t]he 'article' of Portelli's Figure 14 is ***not*** stackable in a nested conformation based on the

cross-section of that 'article' provided in Portelli Figure 16." *Id.* (providing modified Figure 16 as an illustration). Patent Owner explains that Petitioner improperly "picks and chooses" various configurations from Figures 13 and 14 through 16 to suit its purposes. *Id.* at 36.

Here, we resolve claims 14 and 15 on the basis of obviousness—not anticipation. We observe that Patent Owner has not advanced any arguments addressing whether the teachings of Portelli, alone or in combination with Long, would have been combined to achieve a nested configuration. *See generally* PO Resp. Petitioner provides a modified version of Figure 13 (reproduced below) to illustrate that the trays of Portelli "are stackable in a nested conformation," as required by claim 15.



Pet. 46 (depicting modified Figure 13). Petitioner's modified Figure 13 duplicates Portelli's rolled-edge configuration (four times) one on top of the other to illustrate the stackable nature of Portelli's trays.

Accordingly, we determine that the subject matter of claims 14 and 15 would have been rendered obvious over Portelli alone.

5. Remaining Claims (claims 6–10, 13, 17, 20–22, and 24–29)

Petitioner alleges that claims 9, 13, 17, and 20–22 are anticipated by Portelli and claims 6–10, 13, 17, 20–22, and 24–29 rendered obvious by Portelli alone, or in combination with Long. Pet. 31–35, 39–41, 46–49, 63–71, 80–87, 124–135, 145–150.

Patent Owner does not dispute Petitioner's contentions that Portelli alone or in combination with Long discloses the additional limitations of claims 6–10, 13, 17, 20–22, and 24–29. *See generally* PO Resp. We have reviewed Petitioner's arguments and evidence, and agree that the Portelli alone, or in combination with Long, teaches or suggests the subject matter of claims 6–10, 13, 17, 20–22, and 24–29.

But, Patent Owner does assert that "the shape of the claimed article peripheries" and their functionality is not predictable and therefore not obvious to the skilled artisan (*id.* at 70, 72), that Petitioner's combination is based on hindsight (*id.* at 71), that Petitioner's reason to combine is vague and unsupported (*id.* at 73–74), and that Long teaches away from Portelli or that Petitioner's combination defeats the principle of operation of either Portelli or Long (*id.* at 75–76). We address Patent Owner's arguments below.

a) Whether the article periphery would have been predictable to the person of ordinary skill in the art

Patent Owner argues that "Petitioner cannot credibly argue that the shape of the claimed article peripheries is so simple as to be predictable to a [person of ordinary skill in the art]" because "[i]f that were so, then Petitioner would be able to confirm the exact same claim element in every reference it cites and not resort to multiple 'examples' of the same claim element in the same reference." PO Resp. 70–71. Patent Owner argues that

the multiple prior art shapes "were deemed 'impossible' to implement in a non-circular thermoformed articles prior to the critical date." Sur-reply 26 (citing Ex. 1009 ¶ 3; Ex. 1055, 5).

Petitioner argues that the available of multiple examples of each feature demonstrates that the claimed shapes are not, as Patent Owner suggests, "complex or unpredictable." Reply 48. Rather, "it shows that [these] claim elements [are] so broad that it can be applied to multiple, ***alternative*** portions of a given flange in Portelli, Long, Meadors or Brown." *Id.*

Patent Owner's argument is not well founded. Patent Owner advocates for an anticipation standard when it argues that Petitioner should not be able to "resort to multiple 'examples' of the same claim element in the same reference." PO Resp. 71. The test for obviousness, however, is not whether the claimed invention is expressly suggested in any one or all of the references, but whether the claimed subject matter would have been obvious to those of ordinary skill in the art in light of the combined teachings of those references. *See In re Keller*, 642 F.2d 413, 425 (CCPA 1981).

Here, as Petitioner contends, Portelli describes an extension having a rolled over edge where the bend region (the upper curve) and bent portion (the lower curve) meet at the periphery of the tray edge and displace the peripheral edge. Pet. 36–37 (citing Ex. 1003, Fig. 13, 3:1–3, 5:1–12, 5:25–6:3, 15:20–23, 18:3–5, 20:11–16, 20:24–27, 21:17–23; Ex. 1002 ¶¶ 93–94; *see also id.* at 37 (Petitioner's annotated Figure 13). Portelli also illustrates multiple embodiments where the peripheral edge of the tray is sufficiently displaced so that it cannot be viewed from the exterior of the article. Ex. 1003, Figs. 4, 6, 8, 16; *see also* Pet. 38 (providing annotated Fig. 8).

Petitioner explains that "[t]he features of the trays in Fig[ures] 8 and 13 are interchangeable and can be combined." Pet. 30, 38 (citing Ex. 1003, 14:10–28; Ex. 1002 ¶¶ 76–77). Petitioner relies on the testimony of Mr. May who opines that "the peripheral edge of Fig[ure] 13 could be bent all the way over into a 270-degree angle just as Portelli discloses in Fig[ure] 8" and that a person of ordinary skill in the art would understand "that the tray of Fig[ures] 12 and 13 can be introduced and thermoformed by the apparatus of Fig[ures[7 and 8" to produce a tray that has a "peripheral edge bent all the way over into a 270-degree angle like that shown in Portelli Fig[ure] 8." Ex. 1002 ¶ 77. We credit the testimony of Mr. May and are persuaded by Petitioner's arguments and evidence that the shape of the claimed article would have been obvious to the skilled artisan. As a result, Petitioner persuasively asserts that the features of Figures 8 and 13—including the rolled peripheral edge shapes depicted in Portelli—are interchangeable and combinable. Pet. 30, 38 (citing Ex. 1003, 14:10–28; Ex. 1002 ¶¶ 76–77), 146. Thus, substituting the rim design of Figure 8 for that of Figure 13 amounts to a simple substitution of one known element for another to yield a predictable result. *KSR*, 550 U.S. at 417.

Patent Owner's citation to prior patents and DexterMT marketing materials—neither of which characterize Portelli's process as "impossible"—does not persuade us otherwise. Accordingly, Petitioner has shown by a preponderance of the evidence that the shape of the claimed article would have been obvious to one of skill in the art and that the skilled artisan would have had reason to combine Figures 8 and 13 of Portelli.

b) Whether the functionality of the tray would have been predictable to the person of ordinary skill in the art

Patent Owner further asserts that the functionality of the tray is similarly unpredictable because a person of ordinary skill in the art would have known "before *and* after the earliest effective filing date" that the "flange of a non-circular article is the article's 'most frustratingly-inconsistent feature' because its dimensioning 'is extremely challenging, due to variances in the die cutting tolerances that are inherent in the thermoforming process.'" PO Resp. 72 (citing Ex. 2024, 3). Patent Owner contends that "[o]bviousness in the thermoforming art is less likely where, as here, 'artisans in this field face myriad design challenges because small design changes may cause unpredictable results and because design considerations often pull in multiple directions." *Id.* at 72–73.

Petitioner argues that "[t]here is nothing unpredictable about [the claim elements and their] functionality in a plastic food tray. Pet. 124. Petitioner explains that Portelli, among others, "all recognized and solved that same problem" as the '281 patent. *Id.* at 125 (citing Ex. 1003, 1:29–2:18, 17:7–12; Ex. 1004, 1:9–13, 7:9–13; Ex. 1002 ¶¶ 244–245). Additionally, Petitioner contends that "[m]ultiple market participants—*e.g.*, Alto, DexterMT, and OMV—came up with the same rim rolling solution for preventing the edge of a plastic food container from cutting the overwrap, while improving the rigidity." Reply 48. Petitioner explains that rolling the rim in this manner was known and the "'classic' solution nearly twenty years before the priority date" of the '281 patent. *Id.* at 49 (citing Ex. 1049, 569–571). As a result, Petitioner reasons that "[d]isplacing the edge from the periphery of the article was the predictable result of the ordinary skill of a [person of ordinary skill in the art]." *Id.* at 49–50.

Patent Owner's argument regarding the unpredictability of the functionality combination of claimed elements is unavailing. Petitioner has shown—as Patent Owner acknowledges (PO Resp. 74)—each of the limitations of the claims is disclosed or suggested by Portelli. Pet. 14–49, 129–135, 145–150. And, as discussed above, Petitioner persuasively shows that rim design of Figures 8 and 13 are interchangeable and combinable and amount to no more than a simple substitution of one known element for another to yield a predictable result. Furthermore, the function of the combination of limitations in the '281 patent is similarly described in Portelli and Long. For example, the '281 patent purports to form thermoplastic articles

> which are formed such that one or more of the edges of the article has a conformation wherein the peripheral edge of a thermoplastic sheet from which the article is formed is turned away from a face of the article, and preferably away from the periphery of the article, so that a fragile material (e.g., flesh or a thin, flexible plastic sheet) that is applied against the face or periphery does not contact the edge of the sheet. Because such sheet edges can be sharp, especially when the edge has been cut or broken, directing the edge away from a face and/or periphery of the article can prevent damage to fragile materials which contact the face or periphery. [Ex. 1001, 12:8–21]
>
> [And y]et another advantage of the 'rolled edge' depicted in FIGS. **8** and **9** is the mechanical strength imparted to a shaped article by such an edge conformation. [*id.* at 22:42–46].

Similarly, Portelli describes including "a peripheral edge region terminating in a terminal edge which is deformed such that the terminal edge is displaced out of a wrap path around the tray" in order to avoid the "unfortunate tendency to tear or cut through plastic film within which the trays are wrapped." Ex. 1003, 1:29–2:8; *see also* Ex. 1004, 1:9–13, 7:9–13

(describing Long's rolled over edge as having "no tendency for tearing."). Portelli also states that its rolled over tray edge "mechanically strengthens the rim of the tray." *Id.* at 17. Accordingly, not only is the functionality of the combination of claimed elements predictable in view of Portelli and Long, it is expressly taught by Portelli and Long. That the flange of thermoformed articles may be inconsistent and therefore a poor reference point for "locating" trays and tray cavities in automated handling systems (PO Resp. 72; Ex. 2024), does not detract from Portelli's and Long's express teachings.

c) Whether Petitioner's reason to combine is unsupported or based on hindsight

Patent Owner broadly argues that Petitioner's combination is based on hindsight. PO Resp. 71. Specifically, Patent Owner contends that Petitioner's allegation that both the cited references and the '281 patent provide solutions to overwrap tearing and injuries to flesh is based on hindsight because none of the prior art references "solved the '281 Patent's problem of disposing of the sharp peripheral edge," and leaving only the '281 patent to provide a solution. *Id.* Patent Owner also argues that mere "similarities between [the prior art] references" and "'advances in one type of plastic tray' is vague and unsupported" and fail to provide the necessary reason to combine. PO Resp. 73–74; *see id.* at 72 (explaining that "the same long-felt and unsolved problem of the sharp edge . . . does not render the '281 Patent's claimed solutions obvious").

Our review of the parties' arguments and evidence shows no "hindsight bias" or "unsupported" reason to combine Portelli and Long. A "[d]etermination of obviousness cannot be based on the hindsight combination of components selectively culled from the prior art to fit the

parameters of the patented invention." *ATD Corp. v. Lydall, Inc.*, 159 F.3d 534, 546 (Fed. Cir. 1998); *see KSR*, 550 U.S. at 421 (warning against hindsight bias). Instead, there must be "articulated reasoning with some rational underpinning" to support a conclusion of invalidity based on these combinations and to combine them in the way they are combined by the inventor. *KSR*, 550 U.S. at 418.

Here, both Portelli and Long teach rolling over the peripheral edge of thermoformed articles in order to prevent the terminal edge of the article from tearing a plastic overwrap. Ex. 1003, 1:29–2:8; Ex. 1004, 1:9–13, 7:9–13. Portelli and Long describe several rolled-over configurations to accomplish the expressed solution. *See* Ex. 1003, Figs. 8, 13; Ex. 1004, Figs. 5C, 8B. Petitioner contends that "a [person of ordinary skill in the art] would have looked at multiple rounded rectangular plastic food trays and would have considered it obvious to combine the concepts from those similar trays. Pet. 128 (citing Ex. 1002 ¶¶ 254–258). As Mr. May testifies, food retailers and brand-owners "often have strict guidelines regarding packaging dimensions, especially for refrigerated products like meats" which "enable[] efficient and modular point-of-sale merchandising at retail stores such as supermarkets. Therefore, outer dimensions of packaging for products from different suppliers tend to be similar." Ex. 1002 ¶ 254. Furthermore, Mr. May explains that the similarities in outer dimensions and periphery shapes is due to the significant investment in equipment and that "equipment manufactures tend to supply multiple competing tray manufacturers." *Id.* ¶¶ 255–256. Mr. May concludes that

> the entire supply chain—from the equipment used to manufacture food-packaging trays, to the companies that make the trays, to the food-processing companies that package the

> meat or other food in the trays, to the grocery stores that sell the food to retail customers—is geared toward the manufacture and use of trays having similar or standardized outer periphery shapes.

Id. ¶ 257. We credit the testimony of Mr. May. "[I]f a technique has been used to improve one device, and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way, using the technique is obvious unless its actual application is beyond that person's skill." *See KSR*, 550 U.S. at 401. Therefore, the evidence of record would have suggested the desirability to the ordinarily skilled artisan of substituting Long's edge design for that of Portelli, as market forces "drive manufacturers of food-packaging trays to make trays with similar dimensions and overall outer periphery shapes." Pet. 128; *See Wm. Wrigley Jr. Co. v. Cadbury Adams USA LLC*, 683 F.3d 1356, 1364 (Fed. Cir. 2012) (noting that the substitution of "one well-known cooling agent for another" presents "a strong case of obviousness"); *KSR*, 550 U.S. at 401 ("A court must ask whether the improvement is more than the predictable use of prior art elements according to their established functions. Following these principles may be difficult if the claimed subject matter involves more than the simple substitution of one known element for another or the mere application of a known technique to a piece of prior art ready for the improvement."). Therefore, Petitioner's combination is neither unsupported nor inspired by impermissible hindsight. We determine that Petitioner has shown, by a preponderance of the evidence, that the combination of Portelli and Long suggests the subject matter of claims 6–10, 13, 17, 20–22, and 24–29 and that Petitioner provides sufficient reasoning with rational

underpinning for combining the references' teachings to achieve the invention the claims of the '281 patent recite.

d) Whether Long teaches away from the combination with Portelli or whether combination defeats the principle of operation of either Portelli or Long

Patent Owner further argues that "Long's criticisms, discrediting, and discouragement of Portelli's proposed thermoformed precursor edge-rolling methods would motivate a [person of ordinary skill in the art] to avoid combining or modifying the incompatible proposals of Long and Portelli in the manner advocated by Petitioner." *Id.* at 75. Patent Owner also asserts that the combination would defeat each reference's principle of operation because "the combination advocated by the Petition would require either (i) removal from Portelli of the critical secondary thermoforming step to roll the flange, or (ii) Long to use thermoforming instead of a secondary trimming operation (which Long expressly says not to do)." *Id.* at 76.

We do not agree with Patent Owner's arguments that Long teaches away from a combination with Portelli. *See* PO Resp. 42–43. To teach away, a reference must discourage one of ordinary skill in the art from following the path set out in the reference, or lead that person in a direction divergent from the path taken by the applicant. *In re Gurley*, 27 F.3d 551, 553 (Fed. Cir. 1994) ("[A] reference will teach away if it suggests that the line of development flowing from the reference's disclosure is unlikely to be productive of the result sought by the applicant."). "A reference does not teach away . . . if it merely expresses a general preference for an alternative invention but does not 'criticize, discredit, or otherwise discourage' investigation into the invention claimed." *DePuy Spine, Inc. v. Medtronic Sofamor Danek, Inc.*, 567 F.3d 1314, 1327 (Fed. Cir. 2009) (quoting *In re*

Fulton, 391 F.3d 1195, 1201 (Fed. Cir. 2004)). Long's statements contrasting double stage thermoforming methods against Long's process merely expresses a preference for its own trimming process. Ex. 1004, 6:29–34. Patent Owner does not identify any teaching in Long that criticizes, discredits, or otherwise discourages the skilled artisan from following the path outlined by the '281 patent, and our independent review Long does not reveal any such teaching.

We are also not persuaded that the combination of Portelli and Long would be contrary to the principle of operation described in either of Portelli and Long. In considering whether a proposed modification would be obvious, we also consider whether combining references would violate the principle of operation of the modified reference. *See In re Mouttet*, 686 F.3d 1322, 1332 (Fed. Cir. 2012). A principle of operation of a prior art reference is concerned with whether the apparatus or process described therein, once modified, will operate on the same principles as before, or said another way, whether it operates in or is capable of working in the same manner. *See id.* (affirming a Board decision that using electrical versus optical components "does not affect the operability of Mouttet's broadly claimed device—a programmable arithmetic processor."); *see also Univ. of Maryland Biology Inst. v. Presens Precision Sensing GmbH*, 711 F. App'x. 1007, 1011 (Fed. Cir. 2017) (unpublished) (finding that the proposed combination would not "require a substantial reconstruction and redesign of the elements shown . . . or a 'change in [its] basic principles'"); *Smartdoor Holdings, Inc. v. Edmit Indus.*, Inc., 707 F. App'x. 705, 709 (Fed. Cir. 2017) (unpublished) (affirming the PTAB where the asserted combination would operate in the same manner), *In re Holness*, 612, F. App'x. 999, 1007 (Fed. Cir. 2015)

(unpublished) (affirming the PTAB where no evidence exists that "the bar code reader in Capuano is incapable of working for a rotational motion."). What a reference teaches and how a proposed modification of a reference would change its principle of operation are underlying factual inquiries in an obviousness analysis. *See, e.g., Icon Health & Fitness, Inc. v. Strava, Inc.*, 849 F.3d 1034, 1046 (Fed. Cir. 2017) (addressing the Board's factual findings with respect to a reference's principle of operation).

Petitioner proposes to use Long to suggest the additional limitations of claims 6–8, including "a bend region," "an angle of about 90 degrees" at the junction between the extension and bend region, and a bent portion including one of a bend region or a spacer, as detailed in Long. Pet. 130; Ex. 1001, 38:54–63. Patent Owner's arguments are unpersuasive because they relate to whether the alternate methods of Portelli and Long can be combined and not the combination proposed by Petitioner. Therefore, we determine Petitioner has shown by a preponderance of the evidence that the subject matter of claims would have been suggested by the combination of Portelli alone, or in combination with Long, and that the skilled artisan would have had reason to combine the identified teachings of Portelli and Long.

e) Patent Owner's remaining argument

Patent Owner contends, for the first time in its Sur-reply that no reasonable expectation of success has been shown for grounds 4–5 and 8.[9] Sur-reply 27.[10] Patent Owner raises this arguments for the first time in its

[9] Patent Owner's Response included a discussion of reasonable expectation of success with respect to grounds 6 and 7 only. *See generally* PO Resp.
[10] In its Sur-reply Patent Owner also argues that Mr. May's testimony should be accorded no weight because he "never considered [Patent Owner's]

Sur-reply. Sur-reply 25. As a result, Petitioner has not had the opportunity to provide any responsive argument. Thus, Patent Owner's arguments are too late and, therefore, are waived. *See* Consolidated Trial Practice Guide, 73–74 (2019) (Available at https://www.uspto.gov/TrialPracticeGuide Consolidated); Paper 7, 8 ("any arguments not raised in the response may be deemed waived").

6. Objective Indicia of Nonobviousness

The fourth Graham factor instructs that we must consider—apart from what the prior art itself would have suggested— whether objective evidence of nonobviousness (i.e., secondary considerations) may lead to a conclusion that the challenged claims would not have been obvious. *See, e.g., Stratoflex, Inc. v. Aeroquip Corp*., 713 F.2d 1530, 1538–39 (Fed. Cir. 1983) (instructing that evidence of secondary considerations, when present, must always be considered in determining obviousness). Objective evidence of nonobviousness may include evidence of commercial success, licensing, copying, praise by others, long felt but unresolved need, and failure or skepticism of others. *Graham*, 383 U.S. at 17–18. But, secondary considerations are only a part of the "totality of the evidence"; its mere existence does not control the conclusion of obviousness. *See Richardson-Vicks Inc.*, at 1483. Objective evidence of nonobviousness "may often be the most probative and cogent evidence in the record" and "may often

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objective indicia of non-obviousness in rendering his reply obviousness opinions." Sur-reply 25 (citing Ex. 1002 ¶ 25; Ex. 1044 ¶¶ 295-366; Ex. 2070, 409:14–410:5. Mr. May was not offered as an expert as to the issues raised by Patent Owner's objective evidence of nonobviousness and we accord his testimony the appropriate weight based on the topics he addressed. *See* Ex. 1044.

establish that an invention appearing to have been obvious in light of the prior art was not." *Transocean Offshore Deepwater Drilling, Inc. v. Maersk Drilling USA, Inc.*, 699 F.3d 1340, 1349 (Fed. Cir. 2012).

Objective evidence of nonobviousness "is only relevant to the obviousness inquiry 'if there is a nexus between the claimed invention and the [objective indicia of nonobviousness].'" *In re Affinity Labs of Tex., LLC*, 856 F.3d 883, 901 (Fed. Cir. 2017) (quoting *Ormco Corp. v. Align Tech., Inc.*, 463 F.3d 1299, 1312 (2006)). A "nexus" is a legally and factually sufficient connection between the objective evidence and the claimed invention such that the objective evidence should be considered in the determination of obviousness. *Henny Penny Corp. v. Frymaster LLC*, 938 F.3d 1324, 1332 (Fed. Cir. 2019); *see Paulsen*, 30 F.3d at 1482. A presumption of nexus arises where "the patentee shows that the asserted objective evidence is tied to a specific product and that product 'embodies the claimed features, and is coextensive with them.'" *Fox Factory, Inc. v. SRAM, LLC*, 944 F.3d 1366, 1373 (Fed. Cir. 2019) (quoting *Polaris Indus., Inc. v. Arctic Cat, Inc.*, 882 F.3d 1056, 1072 (Fed. Cir. 2018) (quoting *Brown & Williamson Tobacco Corp. v. Philip Morris Inc.*, 229 F.3d 1120, 1130 (Fed. Cir. 2000))); *see also Teva Pharms. USA, Inc. v. Sandoz, Inc.*, 723 F.3d 1363, 1372 (Fed. Cir. 2013) (explaining that a "presumption of a nexus" exists where a product is "coextensive" with a patent claim). If, however, the patented invention is only a component of the commercial embodiment, the patentee is not entitled to a presumption of nexus. *Fox Factory*, 944 F.3d at 1374. In addition, "[a] patent claim is not coextensive with a product that includes a 'critical' unclaimed feature that is claimed by a different patent and that materially impacts the product's functionality."

Id. at 1375. But, "[a] finding that a presumption of nexus is inappropriate does not end the inquiry into secondary considerations;" rather, "the patent owner is still afforded an opportunity to prove nexus by showing that the evidence of secondary considerations is 'the direct result of the unique characteristics of the claimed invention.'" *Id*. at 1374 (quoting *In re Huang*, 100 F.3d 125, 140 (Fed. Cir. 1996). Patent Owner bears the burden of establishing that a nexus exists between the evidence of secondary considerations and the patented invention. *Id*. at 1373.

Patent Owner argues that evidence of nonobviousness exists in the form of commercial success, industry praise, long-felt need, skepticism, and copying. PO Resp. 84–91. Patent Owner also contends that there is a nexus between these secondary considerations and the claimed invention. *Id.* at 84–86.

Petitioner does not dispute the evidence provided by Patent Owner. Instead, Petitioner asserts that Patent Owner's evidence of objective indicia are based on the faulty assumption that Clearly Clean Products "create[d] the market for such products where none had existed before." Reply 57 (citing Ex. 2030 ¶ 6). Petitioner argues that "Alto started selling rolled-edge trays in New Zealand since 2012, four years before [Clearly Clean Products] launched its trays in 2016." *Id.* at 57–58. Petitioner states that Patent Owner's deponent, Mr. Maguire, "admitted he did not know about prior sales of trays outside the US market." *Id.* (citing Ex. 1052, 28:21–29:3).

Before we address the weight of the evidence, we must first determine if Patent Owner has demonstrated a presumption of nexus or actual nexus.

a) Nexus

Patent Owner asserts it is entitled to a presumption of nexus because the Roll Over-Wrap tray, produced by Patent Owner's licensee, embodies the challenged claims of the '281 patent. PO Resp. 84–85. Patent Owner purports to show nexus by providing a table prepared by Mr. Clements that lists in one column a Roll Over-Wrap Tray Product and in a second column the claims of the '281 patent corresponding to that product. *Id.* (citing Ex. 2007 ¶ 228–232, Appendix, A1–A175). Mr. Clements provides claim charts showing how various products embody various claims of the '281 patent. Ex. 2007, A1–A175. Petitioner does not dispute that Patent Owner has shown that a presumption of nexus applies. *See* Reply 53. Accordingly, we apply a presumption of nexus for purposes of our consideration of Patent Owner's objective evidence of nonobviousness.

b) Commercial success

Patent Owner asserts that since 2016, when the first sale of the Roll Over-Wrap tray were made, that there has been and exponential grown in sales. PO Resp. 86 (citing Ex. 2030 ¶¶ 9–10). "Patent Owner's expert believes that the exponential growth in sales and customers is a strong indicatory of market acceptance and demand for the innovations captured by the Roll Over-Wrap® Trays." *Id.* (citing Ex. 2007 ¶¶ 228–237).

There are several significant deficiencies in Patent Owner's argument. First, Mr. Clements never suggested Patent Owner demonstrated "exponential growth in sales and customers." *See generally* Ex. 2007 ¶¶ 228–237. Mr. Clements did state that, in his opinion, the "unit sales and sales dollars achieved by Patent Owner . . . were extraordinary." *Id.* ¶ 230. Mr. Clements did not explain what "extraordinary" meant to him in this

context and provided no comparison to sales or customer data for any industry as whole. *Id.* Second, Patent Owner purports to rely on the Declaration of Mr. Maguire as support for the asserted "exponential growth," however, Mr. Maguire stated only that "[e]very model of Roll Over-Wrap tray has had continuous, *and in some cases*, exponential, increase in sales growth over the time span in which it was sold." Ex. 2030 ¶ 10 (emphasis added). Likewise, Mr. Maguire states that "[s]ince 2016, our number of customers for the Roll Over-Wrap trays have also grown at an *almost* exponential rate." *Id.* ¶ 11 (emphasis added). Thus, Patent Owner fails to show or explain any basis for its asserted "exponential growth" in sales numbers or customers, and, based upon our review of the sales and personnel information provided by Mr. Maguire we fail to find any support for the assertion. *See* Ex. 2031 ¶¶ 8–11. Third, Patent Owner identifies no relevant market and provides no data regarding market share for its products for us to consider. *J.T. Eaton & Co. v. Atlantic Paste & Glue Co.*, 106 F.3d 1563, 1571 (Fed. Cir. 1997) ("When a patentee can demonstrate commercial success, usually shown by significant sales in a relevant market, and that the successful product is the invention disclosed and claimed in the patent, it is presumed that the commercial success is due to the patented invention.").

Petitioner argues, and we agree, that Patent Owner exaggerates its commercial success. Reply 53. Having considered the record evidence, we accord little weight to Patent Owner's evidence of commercial success which suggests increasing sales values and numbers of customers from 2016 to 2021, but provides no context with regard to the relevant market, such as market size or market share.

c) Industry praise

Patent Owner argues that the Roll Over-Wrap tray has received industry praise. PO Resp. 87. Specifically, Patent Owner states that the Roll Over-Wrap tray was awarded the 2019 Ameristar Award by the Institute of Packaging Professionals, and that industry professionals have praised the "patented features and benefits derived from those features." *Id.* (citing Ex. 2032; Ex. 2030 ¶¶ 14–15; Ex. 2007 ¶ 235). Mr. Maguire explains that he "and others decided to enter the decided to enter the Roll Over-Wrap Tray for consideration by the Institute of Packaging Professionals ("IoPP") for the prestigious Ameristar Award," and "told the IoPP that no other company in the world has been able to produce a rolled edge on a non-circular plastic tray product" and that "we were the only ones that had a patent for rolled-edge rectangular plastic tray technology." Ex. 2031 ¶ 14.

Patent Owner also directs us to three email communications. The first from March, 2020, appears to be an email from a potential customer, who, Patent Owner notes, said "[t]he edge is impressive, and is definitely what we would need in order to not have to go up in film gauge." PO Resp. 87–88 (quoting Ex. 2034, 2). The second is an email from November, 2019, stating that "the customer has found similar trays . . . [h]owever the [competing tray] edges do not have the same rolled edge as [Patent Owner's tray]" and "[a]s a result, they may be able to use a thinner film with [Patent Owner's] trays." *Id.* (quoting Ex. 2033, 1). Third, an email from July, 2018, from a "packaging engineer" who said he was "impressed with the roll over edge design of the tray." *Id.* (quoting Ex. 2031, 2).

Having considered the record evidence, we accord little weight to Patent Owner's evidence of industry praise which consists of a single award

obtained based on an application submitted by Patent Owner that claimed its product was produced by "no other company in the world" and three private emails involving what appears to be potential customers.[11] Ex. 2032; Ex. 2033; Ex. 2031. .

d) Long-felt need

Patent Owner alleges that a sharp peripheral edge existed in the thermoforming industry and that "even as of Nov[ember] 27, 2019, competitors still could not provide the rolled edge that was only available with the Roll Over-Wrap® trays." PO Resp. 88 (citing Ex. 2031).

In order to show a long-felt but unmet need for the claimed invention, the objective evidence must show that the need was a persistent one that was recognized by those of ordinary skill in the art. *In re Gershon*, 372 F.2d 535, 538 (CCPA 1967). "Evidence of long felt but unresolved need tends to show non-obviousness because it is reasonable to infer that the need would not have persisted had the solution been obvious." *WBIP LLC v. Kohler Co.*, 829 F.3d 1317, 1332 (Fed. Cir. 2016).

Here, the record evidence shows minimal, if any, evidence of long felt need. Patent Owner directs our attention to an e-mail from a customer stating that it had examined similar trays from a competitor but "the [competitor's] edges do not have the same rolled edge as yours." Ex. 2033.[12] This e-mail simply states that the competitor does not have the

[11] We observe that although Mr. Maguire testifies that he has "an entire server filled with e-mails" regarding sales, he selected only Exhibits 2032, 2033, and 2034 to produce as examples. Ex. 1052, 19:3–11.

[12] Patent Owner cites Exhibit 2031 in the Patent Owner Response. However, Exhibit 2031 is dated July 13, 2018 (not November 27, 2019) and does not discuss competitor products. We understand that Patent Owner's citation was in error and Exhibit 2033 was intended.

same rolled edge as the Roll Over-Wrap tray—not that the competitor does not have a rolled edge or that the Roll Over-Wrap trays solve an unresolved, persistent problem. *Id.* Therefore, Exhibit 2033 falls short of establishing a long-felt need in the art. Patent Owner also directs our attention to the statement in the '281 patent that existing methods are not useful for making non-circular articles, to Portelli's teaching a rolled-over edge, and to Long's alternate teaching of trimming thermoformed articles instead of rolling the edges. PO Resp. 3–5, 88 (citing Ex. 2007 ¶¶ 24–28; Ex. 1001, Ex. 1001, 4:9–21; Ex. 1003, 2:3–8; Ex. 1004, 6:29–33; Ex. 2009, 247:23–248:10). However, Patent Owner's evidence shows that a rolled edge was known in the art through the teachings of Portelli and Long, among others. That Long prefers an alternate solution does not establish a long-felt and unresolved need in the art.

Patent Owner at best suggests problems may have existed with the mass manufacture of non-circular trays with a rolled edge, however, the '281 patent does not claim a method of manufacture that resolves any such related long felt need in manufacturing, but is instead directed to the article itself. Additionally, Patent Owner acknowledges various alternative means of packaging satisfied the need, including, for example, "utilize[ing] more expensive, heavier gauge [over wrap]." PO Resp. 5 (citing Ex. 2007 ¶ 28).

Moreover, Patent Owner directs us to no specific evidence in this case in support of its argument of long felt need, and instead ambiguously refers to "[a]s discussed above" and "[*s*]*ee supra*." We decline in this case to speculate as to what in the preceding eighty pages of Patent Owner's brief Patent Owner intends to rely on. Here, the record evidence shows minimal, if any, evidence of long felt need.

As a result, we accord little weight to Patent Owner's evidence of long felt need as need tied to the claimed features has not been shown.

e) Skepticism

Patent Owner contends that both Alto and Long "report[] that 'known thermal deformation processes' would cause 'puckering and distortion of the lip.'" PO Resp. 89 (citing Ex. 1004, 6:29–33; Ex. 2010 (a Request for Examination with Claim Amendments submitted by Alto to Intellectual Property Office of New Zealand stating, in part, that the procedure described "aims to provide faster online handling and to avoid puckering and distortion of the lip that often occurs with known thermal deformation processes")). According to Patent Owner, "[i]n spite of the skepticism of others, [it] proceeded contrary to the accepted wisdom in the art and not only used thermal deformation to achieve the rolled edge, but did so without any unwanted puckers or distortions." *Id.* We note, Patent Owner does not clarify what distinguishes "unwanted puckers or distortions" from acceptable "puckers or distortion."

"If industry participants or skilled artisans are skeptical about whether or how a problem could be solved or the workability of the claimed solution, it favors nonobviousness." *WBIP, LLC*, 829 F.3d at 1335. As explained above, Long's statements comparing its trimmed solution to a molded thermoformed edge in the prior art and stating that the "puckering or distortions *often encountered*" may be avoided, is one of preference not skepticism. As a result, we find that evidence is entitled to little weight in our analysis.

f) Copying

Patent Owner asserts that "[u]pon gaining access to thousands of Patent Owner's patented Roll Over-Wrap® trays and discussing their manufacture and features with the Patent Owner, Petitioner was able to create at least two different knockoffs with the patented features." PO Resp. 90 (citing Ex. 2004; Ex. 2030 ¶¶ 20–21). Patent Owner directs us to the testimony of Mr. Maguire, who states he approved a purchase order from Petitioner for trays sold by Patent Owner. *See* Ex. 2030 ¶¶ 20– 21 (citing Ex. 2004). Contrary to Patent Owner's argument, Mr. Maguire does not identify any discussions with Petitioner about the manufacture and features of Patent Owner's products. *See id.* According to Patent Owner, access to its patented products combined with Petitioner's manufacture and sale of substantially similar trays is sufficient evidence of copying. PO Resp. 90.

"Copying requires duplication of features of the patentee's work based on access to that work, lest all infringement be mistakenly treated as copying." *Institut Pasteur & Universite Pierre Et Marie Curie v. Focarino*, 738 F.3d 1337, 1347–48 (Fed. Cir. 2013). Evidence of copying may take the form of "internal documents, direct evidence such as photos or patented features, or disassembly of products, or access and similarity to a patented product." *Liqwd, Inc. v. L'Oreal USA, Inc.*, 941 F.3d 1133, 1137 (Fed. Cir. 2019). But, it is well established that not every competing product that arguably falls within the scope of a patent is evidence of copying; otherwise, "every infringement suit would automatically confirm the nonobviousness of the patent." *Iron Grip Barbell Co. v. USA Sports, Inc.*, 392 F.3d 1317, 1325 (Fed. Cir. 2004).

Here, Patent Owner relies on Petitioner's access and subsequent manufacture of "knockoff" products purportedly having the patented features. As a result, Patent Owner has shown some evidence of copying. However, while the evidence of record suggests Petitioner had access to Patent Owner's work, there is no evidence to suggest that copying, in fact, occurred. Therefore, we accord little weight to Patent Owner's evidence of copying from what amounts to a single purchase order of products from Patent Owner.

7. Conclusion as to Obviousness

Based upon consideration of the entire record, and for the reasons discussed above, we determine Petitioner has shown by a preponderance of the evidence that the combination of Portelli, alone or in combination with Long, teaches each limitation of claims 2, 4, 5, 11, 12, 14, 21, 22, 24, and 26–29 and has shown that an ordinarily skilled artisan would have had a reason to combine features of both Portelli and Long as asserted to arrive at the claimed invention with a reasonable expectation of success when doing so. We also determine that Petitioner's evidence of unpatentability significantly outweighs the marginal evidence of commercial success, industry praise, long felt need, and copying provided by Patent Owner. On the whole, we find that the information provided in consideration of the *Graham* factors collectively demonstrates that Petitioner has shown by a preponderance of the evidence that claims 2, 4, 5, 11, 12, 14, 21, 22, 24, and 26–29 of the '281 patent are unpatentable under 35 U.S.C. § 103(a) as obvious over Portelli and Long.

E. Invalidity based on Anticipation by Meadors (1, 6–11, 13–15, 17, 20, 24–29)

Petitioner contends that claims 1, 6–11, 13–15, 17, 20, and 24–29 of the '281 patent are anticipated by Meadors. Pet. 87–124. Petitioner provides a detailed explanation of its contentions in the Petition, including a clause-by-clause analysis specifying how Meadors discloses each limitation, frequently accompanied by annotated figures from Meadors, and those contentions are supported by the testimony of Mr. May. *Id.*; Ex. 1002 ¶¶ 179–240.

1. Overview of Meadors (Ex. 1005)

Meadors generally relates to methods and apparatus for forming "a multiple-thickness bead in a sheet or blank of a flexible material, such as thermoplastic material," in the process of making a container or lid. Ex. 1005, 1:5–9.

Figure 8 of Meadors is reproduced below.

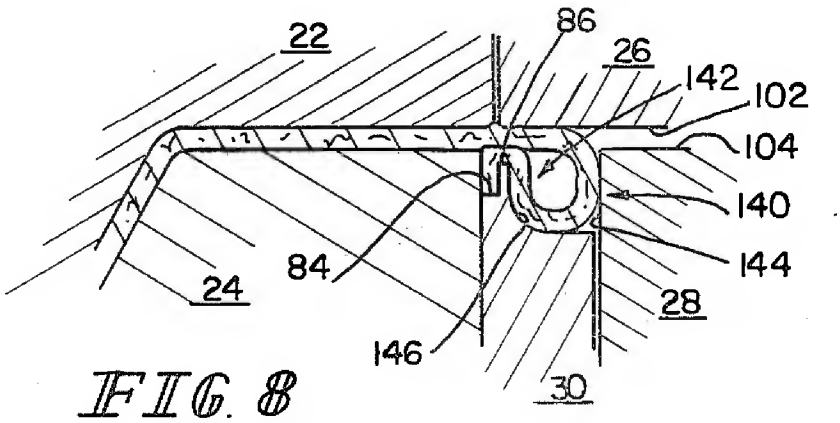

FIG. 8

In Figure 8, an apparatus with elements including vertically upper die member 22, vertically lower die member 24, vertically upper draw pad 26, vertically lower draw pad 28, and ring 30 work in conjunction to form a blank of flexible material into a desired configuration. *Id.* at 2:59–3:2, 3:57–

58, 4:67–5:3. Petitioner describes the article formed in Figure 8 of Meadors as a tray with "an extension which is bent down, in, and/or up such that the edge is displaced from the tray's periphery, giving the tray a smooth periphery." Pet. 12–13 (citing Ex. 1002 ¶ 45).

2. Whether Meadors is Enabled

Patent Owner argues that "[t]here is no guidance in Meadors on how to use its dies and heating coils to adequately thermoform a thermoplastic sheet to obtain the bead formations illustrated in Meadors' Figures 6–10 without tearing the sheet," and that Meadors is not enabled based on the following:

> (i) a [person of ordinary skill in the art] must re-invent Meadors' process using a thermoplastic substrate to investigate how, if at all, the same beads could be achieved using that thermoplastic substrate as are shown in Figures 6–10 (in which the substrate was paper stock); (ii) there is no guidance on how to adjust the dies to properly operate on a thermoplastic; (iii) there are no working examples of a thermoplastic with the beads of Figures 6–10 formed by Meadors' dies, and (iv) because ABS, a thermoplastic, and paper stock have different material properties, Ex. 2009, 194:6–9, a [person of ordinary skill in the art] cannot predict the effects of Meadors' device on ABS. Ex. 2007, ¶¶ 206-208.

PO Resp. 65–66 (discussing *Wands* factors 1, 2, 3, and 7).

Meadors expressly discloses "[a] method and apparatus for forming a double-thickness bead in a flexible sheet stock article," and states as follows:

> According to the method, a blank 100 of flexible material is provided. Blank 100 typically is in the form of a disc-like round, rectangular, elliptical, etc., flat sheet. The material may be of any known type, including, but not limited to, paper (e.g., milk carton stock), thermoplastic material (e.g., acrylonitrile butadiene styrene), or other suitable material.

Ex. 1005, 3:40–46. In light of this express disclosure, we do not find persuasive the opinion of Mr. Clements that, based on his "experience in the molding of paper products . . . Meadors' Figures 6–10 are exclusively limited to rolled peripheries in paper or fiber sheets" in light of "the material cross-section Meadors chose to use in its figures." Ex. 2007 ¶ 194; *see also id.* ¶¶ 200–202 (suggesting that Meadors "cannot possibly show its dies operating on a plastic substrate" because another reference includes illustrations that show that plastic substrate "thins in the corners of the die as it is flexed"). Mr. Clements's opinions on what cross-hatching symbols correlate to paper versus plastic or how another reference depicts the thickness of plastic in a die simply do not supersede the express disclosure of Meadors, which makes clear that the blank is a "flexible material" and may be "paper" or "thermoplastic." *See* Ex. 1005, 3:40–46; *see also* Reply 47 (noting that "[w]hatever material is denoted by the texture lines in the drawings [of Meadors], it is only an example").

Mr. Clements also states that "the Meadors process would never work on a plastic sheet of material," because, in his view, if it were plastic it would "rip or rupture in response to the stretching forces applied to it." Ex. 2007 ¶ 204. Mr. Clements identifies no persuasive support for his opinion, which we accordingly find conclusory and insufficient to supplant the express disclosures of Meadors. We have also considered Mr. Clements opinion that, even though Meadors expressly discloses heating coils 90 and 92 to "heat-set the material," this does not constitute thermoforming, which requires "heat to be constantly controlled." *Id.* ¶ 207. Mr. Clements does not direct us to any disclosure in Meadors that suggests the heat is not controlled, and neglects to address Meadors' express disclosure that

"[h]eating coils 90, 92, respectively are provided in the upper and lower dies 22, 24 as desired, depending, for example, upon the type of material to be formed in the die mechanism 20." Ex. 1005, 3:36–39; *see also* Ex. 1044 ¶ 267 (Mr. May testifying that a person of ordinary skill in the art would have known "that the reason to use heated dies to shape a thermoplastic sheet is to thermoform it").

Upon balancing the *Wands* factors, we conclude that Meadors is an enabling disclosure and remains available as a prior art reference for establishing anticipation or obviousness of the claimed subject matter.

3. Analysis

In addition to arguing that Meadors is not enabled, which we found not persuasive for the reasons provided above, Patent Owner also argues that Meadors "only teaches formed sheets of paper stock," "does not necessarily disclose an article formed in the shape of a rounded rectangular tray," that "Petitioner improperly relies on the same structure in Meadors to satisfy the 'bent portion,' the 'spacer,' and the 'elbow,'" and that "Meadors is silent as to the three-dimensional configuration of the part formed by its processes." PO Resp. 59–70. Based on our review of the Petitioner's arguments and evidence, we find that Petitioner establishes sufficiently that Meadors discloses each of the limitations of claims 1, 6–11, 13–15, 17, 20, and 24–29 of the '281 patent and adopt Petitioner's analysis as our own findings and conclusions as to these claims. Pet. 87–124. We focus our discussion below on the reasons why we find Patent Owner's arguments in opposition not persuasive. *See In re NuVasive, Inc.*, 841 F.3d at 974 (noting that "[t]he Board, having found the only disputed limitations together in one reference, was not required to address undisputed matters"); Paper 7, 8 (emphasizing

that "any arguments for patentability not raised in the response may be deemed waived").

Independent claims 1 and 24 are directed to "[a]n article formed from a thermoformable sheet." Ex. 1001, 38:30–42. Petitioner shows that Meadors expressly discloses this limitation. Pet. 87–88 (citing Ex. 1005, 1:5–9, 2:18–23, 3:36–46, 4:23–25, 4:29–30; Ex. 1002 ¶¶ 179–182). Specifically, Meadors states that its "invention relates to methods of, and apparatus for, forming a multiple-thickness bead in a sheet or blank of a flexible material, *such as thermoplastic material* or paper stock, as the sheet or blank is being formed into an article such as a container or lid for a container," and that the material used in a blank to form a container "may be of any known type, including, but not limited to, paper (e.g., milk carton stock), *thermoplastic material* (e.g., acrylonitrile butadiene styrene), or other suitable material." Ex. 1005, 1:5–9, 3:36–46 (emphasis added). Patent Owner's argument that Meadors "only teaches formed sheets of paper stock" based on the cross hatching used in certain figures and on how another reference illustrates deformed thermoplastics has no merit in light of the express disclosures of Meadors that a flexible material is used and that flexible material may be a "thermoplastic material." *See* PO Resp. 60–65.

Claims 1 and 24 also provide that the recited article includes a body that "ha[s] the shape of a rounded rectangular tray." Ex. 1001, 72:57–73:17; 73:40–41; 74:21–23. Petitioner shows that Meadors expressly discloses "a tray formed from a blank which can be rectangular." Pet. 88 (citing Ex. 1005, 2:68, 3:40–43, 4:36–39, 6:24–26, Figs. 1–4, 8).; *see also id.* at 3:41–43 ("[b]lank 100 typically is in the form of a disc-like round, rectangular, elliptical, etc., flat sheet"). Petitioner contends that "Meador's tray

necessarily has a rounded rectangular shape with a concave compartment" because, as Mr. May explains,

> (1) a thermoformed article necessarily has the same outer shape as the preform/blank from which it is formed; (2) a "tray" or "rectangular tray" would necessarily have a concave compartment to hold its contents, and (3) manufacturability and robustness considerations in thermoforming require compartments and rolled edges to have rounded corners.

Pet. 88–89; Ex. 1002 ¶ 183. Patent Owner argues that Meadors does not inherently disclose a rounded rectangular tray because Mr. May testified that the periphery of the blank "generally . . . will be similar to the periphery of the finished article," and that he used the term "'[g]enerally' because it's *possible* to . . . trim away a portion of the blank such that you would alter the overall shape," and therefore contradicted his assertion that the shape would be the same as the blank. PO Resp. 67; Ex. 2009, 202:9–16. We find no contradiction in Mr. May's testimony, as Patent Owner asserts. *See* PO Resp. 67. Mr. May explained that Meadors discloses the use of a rectangular blank and that a rectangular blank necessary produces a rectangular article. That is not contradicted by Mr. May's additional explanation that if you cut the blank the overall shape of the article may be altered. Meadors does not disclose or suggest cutting the blank. We are persuaded that a preponderance of the evidence shows that Meadors discloses an article "formed in the shape of a rounded rectangular tray."

Claims 6, 8, 10, and 25 depend from either claim 1 or claim 24 and further recite "a bend region," "a spacer," "a bent portion," and "an elbow." Ex. 1001 , 38:54–40:23. Petitioner directs our attention to Figure 8 to show that Meadors includes a bend region, a spacer, and an elbow, in its rolled-over peripheral edge design. Pet. 111–101 (illustrating a bend region and a

spacer of claim 6), 102–104 (illustrating a spacer and alternate examples of bend regions and bent portions of claim 8), 109–111 (illustrating a bend region, a spacer, and alternate examples of an elbow of claim 10), 120–123 (illustrating alternate examples of a spacer and an elbow of claim 25). Patent Owner argues that "Petitioner relies on the same portions of Meadors to show one or more of a 'bent portion,' a 'spacer,' and an 'elbow' without any rationale or explanation." PO Resp. 68–70. Patent Owner states that "[a] reference cannot anticipate when the same parts of the reference are improperly relied upon to meet two distinct limitations of the claims." *Id.* at 69. We disagree with Patent Owner that Petitioner is relying on the same feature of Meadors to meet two distinct limitations of the claims. Instead, and as Petitioner explains, the Petition "merely provides ***alternate examples*** of how the respective elements appear in Meadors." Reply 47.

Claim 15 depends from claims 1 and 14 and further requires that the "compartment [of the article] is configures such that a plurality of the article are stackable in a nested conformation." Ex. 1001, 39:27–29. Petitioner provides a modified version of Meadors' Figure 4 to illustrate that multiple of Meadors' trays positioned one on top of another are stackable and nestable. Pet. 116 (citing Ex. 1005, Fig 4 (modified); Ex. 1002 ¶ 227).. Petitioner explains that "[b]ecause of their angled sidewalls, Meadors's trays can be nested." *Id.* Patent Owner argues that Petitioner's basis for assuming the objects are nested, i.e., "because '[n]o slacking lug is mentioned in the test or shown in the drawings,'" fails because it " what Meadors does not say about a slacking lug, 'does not suggest anything about what [Meadors] inherently discloses.'" PO Resp. 70. We observe that Petitioner does not rely on the absence of a slacking lug to establish that a nesting configuration

is inherent in Meadors. Pet. 116. Instead, Petitioner persuasively shows that multiple of Meadors' trays are stackable and nestable in its modified Figure 4. *See* Pet. 183.

F. Remaining Grounds

Petitioner argues that Long anticipates claims 1–3, 6–8, 11, 13–15, 17–20–22, 24, and 26–29 and renders claims 9, 10, and 25 obvious, that Long in view of Meadors renders claims 1–3, 6–11, 13–15, 17, and 20–22, and that Portelli in view of Brown renders claims 4, 5, and 12 obvious. Pet. 2. Petitioner directs us to portions of the asserted references that purportedly disclose the limitations in these claims. *See generally id.*

Having determined that Petitioner establishes by a preponderance of the evidence that Portelli anticipates or renders obvious claims 1–5, 9, 11–15, 17, 20–22, and 24–29 and that Portelli in combination with Long renders claims 1–15, 17, 20–22, and 24–29 obvious, we need not address Petitioner's additional grounds. *See SAS*, 138 S. Ct. at 1359 (holding a petitioner "is entitled to a final written decision addressing all of the claims it has challenged"); *Boston Sci. Scimed, Inc. v. Cook Grp. Inc.*, 809 F. App'x 984, 990 (Fed. Cir. 2020) (nonprecedential) ("We agree that the Board need not address [alternative grounds] that are not necessary to the resolution of the proceeding.").

III. MOTION TO EXCLUDE

Patent Owner filed a Motion to Exclude Evidence (Paper 51), Petitioner filed its Opposition (Paper 58), and Patent Owner filed its Reply (Paper 61). Briefing was also completed on Petitioner's Motion to Exclude (*see* Papers 52, 59, 60), however Petitioner withdrew its Motion during the

oral hearing explaining that its Motion has "become moot." Tr. 31:21–32:7. Accordingly, we address Patent Owner's Motion to Exclude below.

Patent Owner seeks to exclude Exhibits 1037–1040 (MTE 2), portions of Exhibit 1044 (*id.* at 5), portions of Exhibit 1045 (*id.* at 7), as well as Exhibits 1051, 1053, 1057, and 1058 (*id.* at 12–13).

A. Exhibits 1037–1040

Exhibits 1037–1040 purport to be pictures of peripheral edges of thermoformed articles. Reply, ix; Ex. 1048, 115:23–122:6 (marking Exhibits 1037–1040). Though Exhibits 1037–1039 have been served on Patent Owner, they have not been filed as record evidence in this case and have not been substantively relied upon by Petitioner or Patent Owner. Reply, ix; *see generally id.* Likewise, we do not consider Exhibits 1037–1039 in rendering our Decision. Accordingly, we deny Patent Owner's motion to exclude Exhibits 1037–1038 as moot.

With respect to Exhibit 1040, Patent Owner argues that "Mr. Clements testified to the lack of foundation related to the article shown in Exhibit 1040" and that "Petitioner's counsel failed to provide any evidence to cure the objection." MTE 4. Patent Owner accuses Petitioner of "rely[ing] on Exhibit 1040 to show limitations of the challenged claims," which Patent Owner states is improper because Exhibit 1040 is not prior art. *Id.* at 5.

Petitioner contends that Patent Owner did not timely object to exhibit 1040 and no duty to cure exists where no objection is lodged. MTE Opp. 3–5. Petitioner also argues that the testimony of Mr. Naughton and Mr. May provide sufficient evidence as to the authenticity and foundation of Exhibit 1040. *Id.* at 5–7. Petitioner further asserts that Exhibit 1040

"constitute[s] the kind[] of 'facts or data' that may be admitted under Rule 703 because an expert . . . reasonably relied on them" and the probative value outweighs any risk of prejudice. *Id.* at 7.

We agree with Petitioner that Exhibit 1040 should not be excluded. First, we are not persuaded that Patent Owner timely objected to the Exhibit 1040. An objection that a witness's lack of foundation or the requisite knowledge to testify as to a document is not an objection to the document itself. *See, e.g.*, Ex. 1048, 123:11–126:8. Second, Mr. Naughton's testimony as to the origins of Exhibit 1040 provide sufficient basis to ascertain its authenticity. Specifically, Mr. Naughton testified that he "visited the Alto (PactGroup) facility in New Zealand in February 2017" and that images in his declaration "show rounded rectangular meat trays with rolled rims and smooth peripheries produced by Alto (PactGroup) in New Zealand using standard thermoforming equipment and Long's technology that [he] received at TSL in Washington state after that trip." Ex. 1045 ¶¶ 15–19. Mr. Naughton continues to explain that he provided these exemplary trays to Mr. May for use in forming his opinions. *Id.* Mr. Naughton further testifies that the photographs of Exhibit 1040 used in his declaration were provided by Mr. May. Ex. 2069, 140:17–141:14. And finally, contrary to Patent Owner's assertions (MTE 5 (referring to Reply 4, 13, 15, 17), Petitioner does not use Exhibit 1040 as prior art. [13] Instead, Petitioner relies on Exhibit 1040 as rebuttal evidence that Portelli and Long

[13] To the extent that Petitioner implies that Exhibit 1040 is proof that Long describes the "smooth periphery" as claimed, we accord Exhibit 1040 no weight. *See e.g.*, Reply 44–45.

are enabled. Reply 4–20, 30–44; Tr. 95:9–15. As a result, we deny Patent Owner's motion to exclude Exhibit 1040.

B. Exhibit 1044

Patent Owner seeks to exclude paragraphs 39–40, 42, 44, 46, 51–53, 116, 270–271, and 332–333 of Exhibit 1044 (Mr. May's Reply Declaration). MTE 5–6. According to Patent Owner, these paragraphs include images of articles "that were alleged by Petitioner to have been made by either DexterMT or OMV" and are unauthenticated and inadmissible hearsay. *Id.* at 6.

Petitioner argues that "even if the materials cited by Patent Owner are not authenticated—which they are, as discussed below—Mr. May would still be entitled to rely on them because it is undisputed that those materials contain the kinds of facts and data on which experts in his field would reasonably rely." MTE Opp. 8. Further, Petitioner argues that the DexterMT and OMV materials were authenticated by Mr. Naughton's testimony and Mr. May's physical possession and testing. *Id.* at 10.

On this matter, Petitioner has the better argument. Here, there exists sufficient evidence to support a finding that the images and samples Mr. May relies upon are in fact what Mr. May purports them to be. Specifically, as discussed above, the images of DexterMT samples were photographs taken by Mr. May from samples he obtained himself from Mr. Willemse (from DexterMT) or from Mr. Naughton, who secured the samples during visits to New Zealand and Washington. Ex. 2070, 136:20–137:8; Ex. 1045 ¶¶ 15–19. Mr. May further testifies that he confirmed the samples were made near the 2016 time frame through his discussions with Mr. Naughton, Mr. Willemse, and through an article appearing in Thermoforming

Quarterly, third quarter 2016, discussing the K-Show in Germany where certain samples were displayed and distributed to customers. Ex. 2070, 125:24–134:5. Furthermore, the OMV images Mr. May provides purport to originate from a presentation given at the SPE Conference in Indianapolis in 2004 and were provided to him by individuals who attended that presentation. *Id.* at 212:7–213:16; 214:13–16. Mr. May testifies that he confirmed the presentation was given at the conference by discussing the presentation with conference attendees, through internet research, and his own experience with OMV and conversations with OMV personnel. *Id.* at 213:8–214:16, 215:20–217:5. We agree with Petitioner that experts like Mr. May would reasonable rely on materials, like those described in paragraphs 39–40, 42, 44, 46, 51–53, 116, 270–271, and 332–333 Exhibit 1044, in forming the basis of their opinions. *See* Fed. R. Evid. 703. Therefore, Patent Owner's motion to strike paragraphs 39–40, 42, 44, 46, 51–53, 116, 270–271, and 332–333 of Exhibit 1044 is denied.

C. Exhibit 1045

Patent Owner seeks to exclude paragraphs 4–6, 10, and 12–14 of Exhibit 1045 (Mr. Naughton's declaration). MTE 7–12. In particular, Patent Owner alleges that, with respect to paragraphs 4–6, that Mr. Naughton's testimony is based on inadmissible hearsay. *Id.* at 7. Patent Owner also asserts that Mr. Naughton's testimony in paragraphs 10 and 12 is based on inadmissible hearsay, that paragraphs 10 and 12–14 are unauthenticated, that paragraphs 12–14 are not passed on personal knowledge, and that paragraph 14 is incomplete. *Id.* at 10–12. Petitioner asserts that the identified passages are not hearsay and even if some contain hearsay or unauthenticated information, the paragraphs are admissible as

facts and data on which an expert, such as Mr. May, can rely upon under Rule 703. MTE Opp. 11.

We disagree with Patent Owner's characterization of Mr. Naughton's testimony as based solely on hearsay and not based on personal knowledge as Mr. Naughton's testimony indicates he has been active in the thermoforming community since at least 1985. Ex. 1045 ¶ 3. Therefore, the majority of Mr. Naughton's testimony is based on his nearly forty years in the industry. *Id.* Though Patent Owner identifies some of Mr. Naughton's testimony, including his statements regarding what Alto employees may have told him as well as the testimony regarding the Alto purchase order, we do not rely on these statements for the truth of the matter asserted, i.e., that Alto manufactured the identified trays in 2012. *See, e.g.*, *Id.* ¶¶ 5 ("I know from information provided to me from Alto employees that Alto began making plastic trays . . . at least as early as 2012), 10 (discussing Alto's purchase order that was forwarded to Mr. Naughton outside the normal course of business). Instead, we consider Mr. Naughton's testimony that Alto successfully used Long's method and as evidence that Long's method is not "impossible," as Patent Owner suggests. *See* PO Resp. 40, 42, 55. To the extent the evidence may have served a hearsay purpose, we assign it little, if any, weight. Further, experts like Mr. May are permitted to rely on hearsay if experts in the same field would reasonably rely on such materials in forming opinions and inferences based on the subject. *See* Fed. R. Evid. 703. To the extent that Mr. May relies on evidence that is not of the type which "experts in the field would reasonably rely," we have assigned very

little weight to such evidence.[14] Thus, we deny Patent Owner's motion to exclude select paragraphs of Exhibit 1045.

D. Exhibits 1051, 1053

Exhibit 1051 is a two-page portion of the website of DexterMT and Exhibit 1053 are portions of the Wiley Encyclopedia of Packaging Technology. Patent Owner asserts that Exhibits 1051 and 1053 are multipage documents and "Petitioner has failed to produce the entirety of the contents" "[i]n spite of Patent Owner's request for the complete copy" and therefore should be excluded under Federal Rule of Evidence 1002. MTE 12–13.

Petitioner asserts that "Patent Owner cites no authority for the extraordinary proposition that a webpage is inadmissible unless the proponent scours the entire website of the owner of the webpage and downloads every single webpage from that site." MTE Opp. 13–14. Petitioner directs our attention to several prior cases denying motions to exclude on similar grounds.

We are not persuaded that Exhibits 1051 and 1053 should be excluded from the record. Patent Owner does not contend that the exhibits are misleading because they are excerpted. Nor does Patent Owner contend it could not access the completed exhibits or identify any omitted portion of the exhibits that should be considered for "completeness." Indeed, it appears from the record that Exhibit 1051, while an excerpted portion of the entire DexterMT website, is a complete document within that website. Ex. 1051

[14] Even if we accorded the identified paragraphs of Exhibit 1045 no weight, it would not alter our ultimate decision finding the claims anticipated or obvious as Patent Owner's arguments and evidence attempting to rebut the presumption of enablement of Long are inadequate.

The same is true with Exhibit 1053 which contains the entries for "Robots" and "Thermoforming" within the larger Wiley Encyclopedia of Packaging Technology. Ex. 1053. Accordingly, we deny Patent Owner's motion to exclude Exhibits 1051 and 1053.

E. Exhibit 1057

Exhibit 1057 is a copy of the New Zealand counterpart of Long. Patent Owner asserts that Exhibit 1057 is irrelevant and should be excluded "as not being substantively relied upon in the Reply or [Mr.] May's declaration." MTE 13. Petitioner argues that Exhibit 1057 is discussed in its Reply and used to establish that Alto marks its trays with the patent number in Exhibit 1057. MTE Opp. 15.

We are not persuaded by Patent Owner's arguments that Exhibit 1057 is irrelevant and should be excluded. Petitioner relies on Exhibit 1057 to rebut Patent Owner's contention that Long is inoperable and non-enabled. Reply 30–41. Though we do not reach the issue of whether Long is enabled in our decision, Patent Owner has not shown Exhibit 1057 lacks relevance and completeness of our trial record weighs in favor of inclusion. Accordingly, we deny Patent Owner's motion to exclude Exhibit 1057.

F. Exhibit 1058

Exhibit 1058 includes a series of four images of rolled-rim articles from OMV. Ex. 1058. Patent Owner urges that we exclude Exhibit 1058 as unauthenticated. MTE 13. According to Patent Owner, Mr. "May's understanding of Exhibit 1058 all comes from third parties who are not identified on the record or in his declaration." *Id.* at 14. Petitioner asserts that "Exhibit 1058 is not cited in isolation, but is the basis for some of Mr. May's opinions." MTE Opp. 15. Petitioner explains that "[a]s an expert, he

is entitled to rely on it" and "the probative value of Ex. 1058 . . . outweighs the non-existent risk of prejudice." *Id.*

We are not persuaded that Exhibit 1058 should be excluded from the record. Exhibit 1058 is offered by Petitioner and Mr. May as an "example of the feasibility of rolling thermoform flanges in a manner consistent with the teachings of Portelli." Ex. 1044 ¶ 52; Reply 18–20. And as Petitioner asserts, experts like Mr. May are permitted to rely on otherwise inadmissible materials if experts in the same field would reasonable rely on such materials in forming opinions and inferences based on the subject. *See* Fed. R. Evid. 703. To the extent that Mr. May relies on evidence that is not of the type which "experts in the field would reasonably rely," we have assigned very little weight to such evidence.[15] As a result, we deny Patent Owner's motion to exclude Exhibit 1058.

IV. MOTIONS TO SEAL

There are four pending motions to seal. Papers 16, 25, 41, 57. In addition, Patent Owner requests entry of an agreed protective order governing the handling of confidential and highly confidential information in this proceeding. Papers 16, 5; Paper 17 (Modified Protective Order); *see also* Paper 41 (noting that "[b]oth parties have accepted and agreed to the terms of the above-referenced Protective Order").

There is a strong public policy for making all information filed in an *inter partes* review open to the public, especially because the proceeding determines the patentability of claims in an issued patent and, therefore,

[15] Even if we accorded no weight to Exhibit 1058, Exhibit 1058 is but one example in the record of thermoformed articles having rolled over terminal edges. *See, e.g.*, Ex. 1003.

affects the rights of the public. Generally, all papers filed in an inter partes review shall be made available to the public. *See* 35 U.S.C. § 316(a)(1); 37 C.F.R. § 42.14. Our rules, however, "aim to strike a balance between the public's interest in maintaining a complete and understandable file history and the parties' interest in protecting truly sensitive information." Consolidated Patent Trial Practice Guide 19. Thus, a party may move to seal certain information (37 C.F.R. § 42.14); but only "confidential information" is protected from disclosure (35 U.S.C. § 326(a)(7)). Confidential information means trade secret or other confidential research, development, or commercial information. 37 C.F.R. § 42.2. The standard for granting a motion to seal is "for good cause." 37 C.F.R. § 42.54(a). The party moving to seal bears the burden of proof and must explain why the information sought to be sealed constitutes confidential information. 37 C.F.R. § 42.20(c). Confidential information that is subject to a protective order ordinarily becomes public 45 days after final judgment in a trial. Consolidated Trial Practice Guide 21–22. There is an expectation that confidential information relied upon or identified in a final written decision will be made public. *Id.* A party seeking to maintain the confidentiality of the information may file a motion to expunge the information from the record prior to the information becoming public. 37 C.F.R. § 42.56.

We have reviewed each of the parties' motions to seal (Papers 16, 25, 41, 57) Exhibits 1052, 2030, 2031, 2033, 2034, 2040, 2061, and 2074, and the proposed protective order, and we agree that good cause exists to seal each of the requested papers and exhibits. We observe each of the motions to seal are unopposed. *See* Papers 16, 25, 41, 57. Further the parties have provided public, redacted versions of each document they seek to protect

and thus have balanced the strong public policy interest in making information available to the public with their own interests in maintaining certain information as business confidential. Accordingly, we grant each of the pending motions (Papers 16, 25, 41, 57) to seal. We also hereby enter the proposed protective order. The protective order proposed as Appendix A, Paper 17, which is a modified version of our default protective order, shall govern the treatment of confidential and highly confidential information.

The record will be maintained undisturbed, with Exhibits 1052, 2030, 2031, 2033, 2034, 2040, 2061, and 2074 remaining sealed, pending the outcome of any appeal taken from this decision. At the conclusion of any appeal proceeding, or if no appeal is taken, the sealed documents will be made public. *See* Office Patent Trial Practice Guide, 77 Fed. Reg. 48,756, 48,760–61 (Aug. 14, 2012). Further, either party may file a motion to expunge the sealed documents from the record pursuant to 37 C.F.R. § 42.56. Any such motion will be decided after the conclusion of any appeal proceeding or the expiration of the time period for appealing, and it will be denied with respect to any sealed document identified in this decision.

V. CONCLUSION

For the foregoing reasons, we conclude that Petitioner has satisfied its burden of demonstrating, by a preponderance of the evidence, that the subject matter of claims 1–15, 17, 20–22, and 24–29 the '281 patent is unpatentable.[16] We grant Patent Owner's Motions to Seal (Papers 16, 25,

[16] 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*

57) and Petitioner's Motion to Seal (Paper 41). We deny Patent Owner's Motion to Exclude (Paper 51).

Reexamination During a Pending AIA Trial Proceeding. *See* 84 Fed. Reg. 16,654 (Apr. 22, 2019). If Patent Owner chooses to file a reissue application or a request for reexamination of the challenged patent, we remind Patent Owner of its continuing obligation to notify the Board of any such related matters in updated mandatory notices. *See* 37 C.F.R. §§ 42.8(a)(3), (b)(2).

In summary:

Claims	35 U.S.C. §	Reference(s)/ Basis	Claims Shown Unpatentable[17]	Claims Not Shown Unpatentable
1–5, 9, 11–15, 17, 20–22	102	Portelli	1, 9, 13, 17, 20–22	
1–3, 6–8, 11, 13–15, 17, 20–22, 24, 26–29	102	Long		
1, 6–11, 13–15, 17, 20, 24–26	102	Meadors	1, 6–11, 13–15, 17, 20, 24–26	
1–15, 17, 20–22, 24–29	103	Portelli, Long	1–15, 17, 20–22, 24–29	
1–3, 6–11, 13–15, 17, 20–22, 24–29	103	Long, Meadors		
9, 10, 25	103	Long		
24–29	103	Portelli	24–29	
4, 5, 12	103	Portelli, Brown		
Overall Outcome			1–15, 17, 20–22, 24–29	

[17] In view of our determination that claims 1–15, 17, 20–22, and 24–29 are anticipated by Portelli or rendered obvious by Portelli alone, or in combination with Long, we do not reach the challenged grounds where this column is blank.

VI. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that Petitioner established by a preponderance of the evidence that claims 1–15, 17, 20–22, and 24–29 of U.S. Patent No. 9,908,281 B1 are unpatentable;

FURTHER ORDERED that the Stipulated Protective Order (Paper 17) is hereby entered;

FURTHER ORDERED that Patent Owner's Motion to Exclude (Paper 51) is denied;

FURTHER ORDERED that Patent Owner's Motions to Seal (Papers 16, 25, 57) are granted;

FURTHER ORDERED that Petitioner's Motion to Seal (Paper 41) is granted;

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.

IPR2021-00916
Patent 9,908,281 B1

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Paper 75
Date: October 20, 2022

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

TEKNI-PLEX, INC.,
Petitioner,

v.

CONVERTER MANUFACTURING, LLC,
Patent Owner.

IPR2021-00918
Patent 10,189,624 B2

Before GRACE KARAFFA OBERMANN, JAMES A. TARTAL, and AVELYN M. ROSS, *Administrative Patent Judges*.

ROSS, *Administrative Patent Judge*.

JUDGMENT
Final Written Decision
Determining All Challenged Claims Unpatentable
35 U.S.C. § 318(a)

ORDER
Denying Patent Owner's Motion to Exclude (Papers 55)
37 C.F.R. § 42.64(c)

ORDER
Entering Stipulated Protective Order (Paper 17) and
Granting Patent Owner's Motions to Seal (Papers 16, 29, 62)
37 C.F.R. § 42.54

ORDER
Granting Petitioner's Motion to Seal (Paper 45)
37 C.F.R. § 42.54

I. INTRODUCTION

Tekni-Plex, Inc. ("Petitioner") filed a Petition (Paper 1, "Pet.") requesting an *inter partes* review of claims 1–20, 22–26, and 29 of U.S. Patent No. 10,189,624 B1 (Ex. 1001, "the '624 patent"). Converter Manufacturing, LLC ("Patent Owner") waived the preliminary response to the Petition. Paper 5.

Upon consideration of the Petition and evidence cited therein, we determined that Petitioner had demonstrated a reasonable likelihood that it would prevail with respect to at least one claim of the '624 patent. Paper 6 ("Decision on Institution" or "DI"). Thus, pursuant to the Supreme Court's decision in *SAS Institute Inc. v. Iancu*, 138 S. Ct. 1348, 1355 (2018), and USPTO Guidance,[1] we instituted review of all challenged claims on all asserted grounds. *Id.*

Following institution of trial, Patent Owner filed a corrected Patent Owner Response (Paper 24, "PO Resp."), Petitioner filed a Reply (Paper 46, "Reply"), *see also* Paper 44 (publicly accessible, redacted version of the Reply), and Patent Owner filed a Sur-reply (Paper 60, "Sur-reply").
In support of their respective positions, Petitioner relies on the testimony of

[1] In accordance with USPTO Guidance, "if the PTAB institutes a trial, the PTAB will institute on all challenges raised in the petition." *See* USPTO, Guidance on the Impact of SAS on AIA Trial Proceedings (April 26, 2018), *available at https://www.uspto.gov/patents-application-process/patent-trial-and-appeal-board/trials/guidance-impact-sas-aia-trial* ("USPTO Guidance").

Mr. Glenn May (Ex. 1002, "May Declaration," dated May 7, 2021; Ex. 1044, "May Reply Declaration," dated June 7, 2022; Ex. 2009, "May Deposition;" Ex. 2070 "May Second Deposition;" Ex. 2075, "May Third Deposition") and Patent Owner relies on the testimony of Mr. James W. Clements (Ex. 2007, "Clements Declaration;" Ex. 1047, "Clements Deposition;" Ex. 1048, "Clements Continued Deposition;" Ex. 2040, "Clements Supp. Declaration").

Patent Owner also filed a Motion to Exclude certain exhibits and testimony. Paper 55 ("MTE"). Thereafter, Petitioner filed an Opposition to Patent Owner's Motion to Exclude (Paper 63, "MTE Opp.") and Patent Owner filed a Reply in Support of its Motion to Exclude (Paper 66, "MTE Reply"). Petitioner also filed a Motion to Exclude Exhibit 2064 (Paper 57) but withdrew that motion during the oral hearing. Paper 74, 31:21–32:7 ("Tr.").

Patent Owner also filed three motions to seal. Papers 16, 29, 62. Petitioner filed one motion to seal. Paper 45.

We held an oral hearing for this proceeding on July 28, 2022, and a transcript of the hearing is included in the record.

We have jurisdiction under 35 U.S.C. § 6. This Final Written Decision is issued pursuant to 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73. For the reasons discussed below, we determine that Petitioner has shown by a preponderance of the evidence that claims 1–20, 22–26, and 29 of the '624 patent are unpatentable. We grant Patent Owner's Motions to Seal (Papers 16, 29, 62) and grant Petitioner's Motion to Seal (Paper 45). We deny Patent Owner's Motion to Exclude (Paper 55).

A. Related Proceedings

Petitioner identifies as related proceedings the pending district court litigation styled *Clearly Clean Prods., LLC, et al. v. Tekni-Plex, Inc., et al.*, No. 2:20-cv-04723-AB (E.D. Pa.) ("the district court litigation"). Pet. 145.

Petitioner also identifies its co-pending petitions for an *inter partes* review of U.S. Patent Nos. 9,908,281 B1 and 10,562,680 B2 as related proceedings. *Id.*; IPR2021-00916, Paper 1; IPR2021-00919, Paper 1. Petitioner indicates that "Patent Owner has asserted the '281 Patent and the related '680 Patent against third parties other than Petitioner" in the following proceedings: *In re Certain Rolled-Edge Rigid Plastic Food Trays*, No. 337-TA-1203 (ITC) and *Clearly Clean Prods. LLC, et al. v. Eco Food Pak USA Inc., et al.*, No. 5:20-cv-01054 (C.D. Cal.). Pet. 145.

B. The '624 Patent

The '624 patent, titled "Tray-Shaped Article Having Smooth Edges and Amenable to Multiple Film Sealing Methods," issued on January 29, 2019. Ex. 1001, codes (45), (54). The '624 patent "relates generally to the field of forming shaped thermoplastic articles" in which thermoplastics that can be thermoformed are used "to form containers that can be sealed with thin plastic films, such as trays, bowls, or bins intended to contain foodstuffs and intended to be sealed with transparent plastic film." *Id.* at 1:19–25, 29–33. Articles can be sealed via overwrap ("OW") technology that "involves enveloping or wrapping a shaped article," vacuum-sealed package ("VSP") technology that "involves adhering a thin . . . plastic film against a face of a shaped article bearing a foodstuff," or modified atmosphere packaging ("MAP") technology in which a flexible film "is sealed (e.g., using heat or an adhesive) about the perimeter of a substantially rigid shaped article." *Id.*

at 1:64–65, 2:16–18, 40–44. The '624 patent explains that when material is trimmed to form containers, a sharp edge is left that "can injure flesh or tear or cut materials which come into contact with the edge." *Id.* at 1:26–29. Further, the sharp edge "can cut or break the film," thereby interfering "with the sealing process." *Id.* at 1:40–42. The '624 patent purports to solve the problem of the unwanted sharp edge by displacing the sharp edge "away from the periphery of an article made from a thermoplastic material, where the sharp edge might otherwise damage surfaces that contact the periphery of the article." *Id.* at 4:31–35. According to the '624 patent, a smooth edge and a smooth periphery are made by forming a deflectable flange at the edge of the body of the article, in which the deflectable flange "includes a peripheral edge of the thermoplastic material at the peripheral end of the deflectable flange, optionally on a peripheral flange that extends peripherally from the deflectable flange." *Id.* at 4:38–45. The peripheral flange can be "connected by an elbow to a spacer and extends peripherally beyond the spacer by a peripheral flange distance" and can be "selected to yield a desired degree of deflection when it is impinged against a surface." *Id.* at 4:46–50. "The spacer is connected by a bend region to the body, the bend region defining an angle . . . between the spacer and the body." *Id.* at 4:52–56.

Figures 1A and 1B are illustrative and are reproduced below.

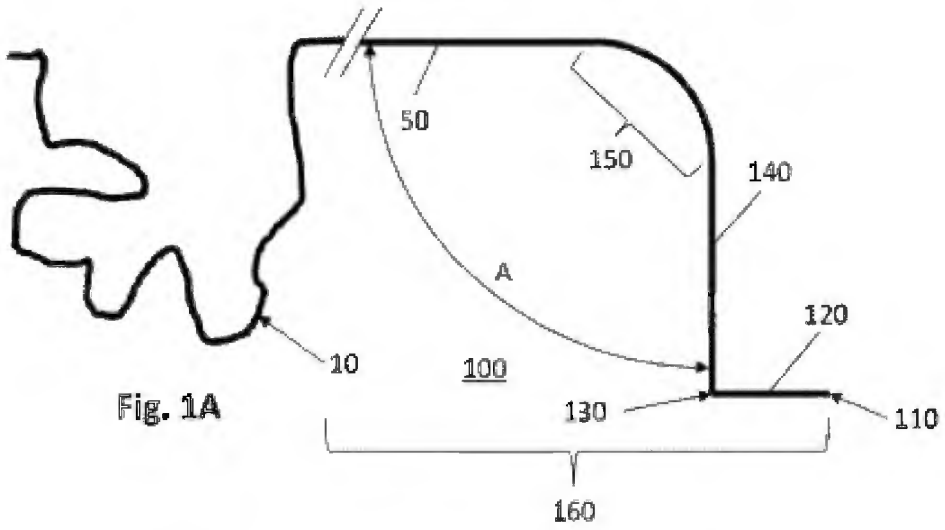


Fig. 1A

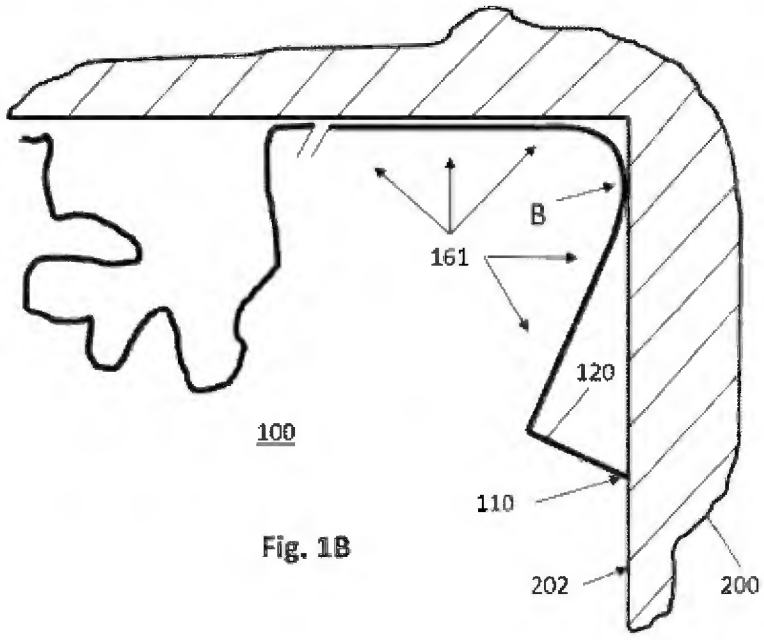


Fig. 1B

Figure 1A shows a sectional view of thermoplastic article 100 inserted within interior of upper body 200, shown in Figure 1B, prior to bending an unwanted sharp edge away from the periphery of the article. *Id.* at 6:14–34. Thermoplastic article 100 has "deflectable flange 160 formed at an edge thereof." *Id.* at 6:19–21. Deflectable flange 160 includes extension 50, bend

region 150, spacer 140, and peripheral flange 120. *Id.* at 6:21–27. Elbow 130 connects spacer 140 to peripheral flange 120. *Id.* at 6:27–28.

Figure 8K of the '624 patent, reproduced below, illustrates how thermoplastic article 100 is shaped near peripheral flange 120. *Id.* at 10:55–67.

Fig. 8K

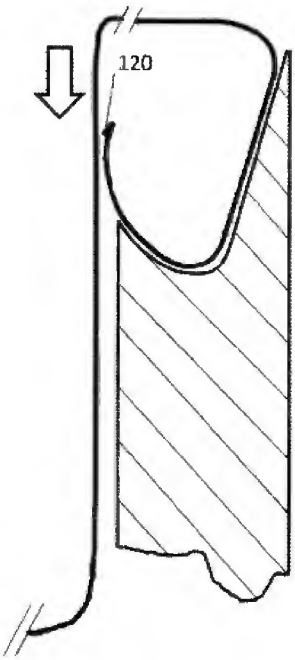


Figure 8K shows that after a series of steps (Figures 8E–8J), thermoplastic article 100 is ultimately urged into ram 300 (identified in Figures 8E, 8H) in the direction indicated by the open arrow to produce a shaped deflectable flange 160 that includes peripheral flange 120 at the peripheral end of spacer 140. *Id.* at 10:56–61. The '624 patent discloses that shaped articles can be "in the form of a rounded rectangular tray" having "an internal concave compartment." *Id.* at 10:39–40, 22:7–8.

C. Illustrative Claim

Petitioner challenges claims 1–20, 22–26, and 29 of the '624 patent. Independent claim 1 is the independent claim challenged and is reproduced below.

> 1. A tray intended to be suitable for use in any or all of overwrap (OW), vacuum-sealed packaging (VSP), and modified atmosphere packaging (MAP) sealing technologies, the tray being[:]
>
> an article formed from a thermoplastic sheet having a peripheral edge, the article comprising a tray-shaped body having a concave portion surrounded by an extension extending peripherally away from the concave portion;
>
> the extension including the peripheral edge, a flat sealing surface surrounding the concave portion and being suitable for sealing a sealing film thereto using either of VSP and MAP sealing technologies, a bend region adjacent the sealing surface and interposed between the peripheral edge and the sealing surface, the bend region having the conformation of a smooth curve, and a bent portion interposed between the peripheral edge and a spacer separating the bent portion from the bend region; and
>
> the article having a smooth periphery and having the overall shape of a rectangular tray with rounded corners, and the bent portion being bent sufficiently that the peripheral edge is turned at least approximately opposite the periphery.

Ex. 1001, 41:13–36.

D. The Asserted Unpatentability Challenges

Petitioner asserts that claims 1–20, 22–26, and 29 would have been unpatentable on the following grounds:

Claim(s) Challenged	35 U.S.C. §[2]	Reference(s)/Basis
1–9, 13–20, 22–26, 29	102	Long[3]
1–20, 24, 29	102	Portelli[4]
1, 6–14, 22, 23, 29	102[5]	Meadors[6]
1–20, 22–26, 29	103	Long, Portelli
1–20, 22–26, 29	103	Long, Meadors
1–20, 24, 29	103	Portelli
10–12	103	Portelli, Brown[7]

Pet. 2.

[2] The Leahy-Smith America Invents Act ("AIA"), Pub. L. No. 112-29, 125 Stat. 284, 287–88 (2011), amended 35 U.S.C. §§ 102 and 103, effective March 16, 2013. Because the application from which the '847 patent issued was filed before this date, the pre-AIA version of §§ 102 and 103 apply.
[3] Long et al., WO 2012/064203 A1, published May 18, 2012 (Ex. 1004, "Long").
[4] Portelli et al., WO 96/01179 A1, published January 18, 1996 (Ex. 1003, "Portelli").
[5] On page 2 of the Petition, under the "Prior Art" column of the table, Petitioner identifies a ground based on Meadors "in view of Long" even though "35 U.S.C. § 102" is the asserted basis for that ground. Pet. 2. We understand the recitation of "in view of Long" in this instance to be typographical error as it is not reasserted when the details supporting this ground are discussed in the Petition. *See* Pet. 102.
[6] Meadors, US 4,228,121, issued October 14, 1980 (Ex. 1005).
[7] Brown et al., US 6,960,316 B2, issued November 1, 2005 (Ex. 1006, "Brown").

II. ANALYSIS

A. Principles of Law

To prevail in its challenge, Petitioner must demonstrate by a preponderance of the evidence that the claims are unpatentable. 35 U.S.C. § 316(e); 37 C.F.R. § 42.1(d). "In an IPR [(*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) (2012) (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 the patent owner. *See Dynamic Drinkware, LLC v. Nat'l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015) (discussing the burden of proof in *inter partes* review).

To anticipate, a reference must "show all of the limitations of the claims arranged or combined in the same way as recited in the claims." *Net MoneyIN, Inc. v. VeriSign, Inc.*, 545 F.3d 1359, 1370 (Fed. Cir. 2008); *accord In re Bond*, 910 F.2d 831, 832 (Fed. Cir. 1990). Although the elements must be arranged or combined in the same way as the claim, "the reference need not satisfy an *ipsissimis verbis* test," i.e., the identity of terminology is not required. *In re Gleave*, 560 F.3d 1331, 1334 (Fed. Cir. 2009); *accord In re Bond*, 910 F.2d at 832. Further, to be anticipating, a prior art reference must be enabling and must describe the claimed invention sufficiently to have placed it in possession of a person of ordinary skill in the art. *Helifix Ltd. v. Blok-Lok, Ltd.*, 208 F.3d 1339, 1346 (Fed. Cir. 2000); *In re Paulsen*, 30 F.3d 1475, 1479 (Fed. Cir. 1994).

Obviousness is a question of law based on underlying determinations of fact. *Graham v. John Deere Co.*, 383 U.S. 1, 17 (1966); *Richardson-*

Vicks, Inc. v. Upjohn Co., 122 F.3d 1476, 1479 (Fed. Cir. 1997). 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 of the invention to a person having ordinary skill in the art. *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 ordinary skill in the art; and (4) objective evidence of nonobviousness. *Graham*, 383 U.S. at 17–18. Consideration of the *Graham* factors "helps inform the ultimate obviousness determination." *Apple Inc. v. Samsung Elecs. Co.*, 839 F.3d 1034, 1048 (Fed. Cir. 2016) (en banc). To prevail in an *inter partes* review, Petitioner must explain how the proposed combinations of prior art would have rendered the challenged claims unpatentable. Subsumed within the *Graham* factors are the requirements that where all claim limitations are found in a number of prior art references, Petitioner must show that the skilled artisan would have had a reasonable expectation of success in combining the prior art references to achieve the claimed invention. *Pfizer, Inc. v. Apotex, Inc.*, 480 F.3d 1348, 1361 (Fed. Cir. 2007). "Obviousness does not require absolute predictability of success . . . all that is required is a reasonable expectation of success." *In re O'Farrell*, 853 F.2d 894, 903–04 (Fed. Cir. 1988).

We analyze the challenges presented in the Petition in accordance with the above-stated principles.

B. Level of Ordinary Skill in the Art

We review the grounds of unpatentability in view of the understanding of a person of ordinary skill in the art at the time of the invention. *Graham*, 383 U.S. at 17. The level of skill in the art is a factual determination that provides a primary guarantee of objectivity in an obviousness analysis. *Al-Site Corp. v. VSI Int'l Inc.*, 174 F.3d 1308, 1324 (Fed. Cir. 1999) (citing *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966); *Ryko Mfg. Co. v. Nu-Star, Inc.*, 950 F.2d 714, 718 (Fed. Cir. 1991)). In determining the level of ordinary skill in the art, various factors may be considered, 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." *In re GPAC Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995) (citation omitted).

Petitioner contends that a person of ordinary skill in the art "would be a person with either (1) a Bachelor of Science degree in packaging science, mechanical engineering, material science, or chemistry and two years of experience designing and manufacturing thermoformed plastic items, or (2) three years of experience designing and manufacturing thermoformed plastic items." Pet. 7–8 (citing Ex. 1002 ¶ 35).

Patent Owner states that Petitioner's proposed level of skill "is acceptable" with a series of "clarifications," which do not address the relevant level of skill, but instead purport to list activities a person of ordinary skill in the art can, or cannot, do "without considerable experimentation." PO Resp. 6–7 (citing, e.g., Ex. 2007 ¶ 31).

Patent Owner directs us to no authority, and we are aware of none, that informs that the level of ordinary skill in the art is determined based on a list of activities that allegedly require, or do not require, "considerable experimentation," as Patent Owner suggests. Patent Owner appears to confuse consideration of the level of ordinary skill in the art with whether a patent is enabled. *See In re Wands*, 858 F.2d 731, 737 (Fed. Cir. 1988) (explaining that the touchstone of enablement is whether undue experimentation would have been required to practice the claimed invention). Accordingly, we find Patent Owner's purported "clarifications" of Petitioner's proposed level of ordinary skill inapplicable.

Patent Owner also argues as follows:

> In any situation, a [person of ordinary skill in the art] in thermoforming would view publications from the standpoint of whether they taught mass-producible designs and techniques that would enable large-scale production of the articles, e.g., thousands to millions of articles, with substantially no defects (e.g., sharp edges, thin sections, weakness in corners), and not just prototype endeavors.

PO Resp. 7 (citing Ex. 2007 ¶ 33). We understand Patent Owner to intend to cite paragraph 32 of Mr. Clements's declaration, which appears to be identical to the quote above and cites various portions of Mr. May's deposition. *See* Ex. 2007 ¶ 32 (citing Ex. 2009, 24:3–25:24, 44:12–16, 49:22–50:3). The portions of Mr. May's deposition cited by Mr. Clements do not address the level of ordinary skill in the art and do not support the proposition Patent Owner and Mr. Clements assert in regard to "large-scale" production. For example, Mr. May stated that "[t]he prototype was to better predict the operations for mass production," and that mass production "can widely vary" and "may be anywhere from hundreds of units to hundreds of thousands of units to millions of units." Ex. 2009, 25:21–26:4. Indeed,

there is no support from any source that a person of ordinary skill in the art would have been limited to a person who "would only view publications from the standpoint of whether they taught mass-producible designs," as Patent Owner and Mr. Clements suggest. To the contrary, the '624 patent broadly "relates to the field of forming shaped thermoplastic articles," includes claims directed to "an article formed from a thermoplastic sheet," and provides no discussion of or requirement for the "large scale production of articles." Ex. 1001, 1:19–20; 41:13–42:61. That isn't to say that considerations related to the production of an article is necessarily irrelevant to our obviousness analysis, but rather, that a person of ordinary skill in the art is not limited to a person who would have only viewed "publications from the standpoint of whether they taught mass-producible designs."

We find that the '624 patent and the cited prior art references reflect the appropriate level of skill at the time of the claimed invention and that the level of appropriate skill reflected in these references and in the '624 patent is consistent with the definition of a person of ordinary skill in the art proposed by Petitioner. *See Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001)) (explaining that specific findings on ordinary skill level are not required "where the prior art itself reflects an appropriate level and a need for testimony is not shown" (quoting *Litton Indus. Prods., Inc. v. Solid State Sys. Corp.*, 755 F.2d 158, 163 (Fed. Cir. 1985))).

C. Claim Construction

We construe claim terms according to the standard set forth in *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312–17 (Fed. Cir. 2005) (en banc); 37 C.F.R. § 42.100(b) (2020). Under *Phillips*, we give claim terms "their ordinary and customary meaning." *Phillips*, 415 F.3d at 1312. "[T]he

ordinary and customary meaning of a claim term is the meaning that the term would have to a person of ordinary skill in the art in question at the time of the invention." *Id.* at 1313. "Importantly, the person of ordinary skill in the art is deemed to read the claim term not only in the context of the particular claim in which the disputed term appears, but in the context of the entire patent, including the specification." *Id.*

Petitioner initially states that it "does not currently seek construction of any terms." Pet. 9. Patent Owner argues that the terms "formed from a thermoformable sheet" and "the article has a smooth periphery" should be construed. PO Resp. 8, 11. We address these limitations below.

1. "an article formed from a thermoplastic sheet"

Claim 1 (and claim 24) recites, in the preamble, "[a]n article formed from a thermoplastic sheet." Ex. 1001, 41:13. The Specification does not otherwise describe a "formed from a thermoformable sheet."

According to Patent Owner, "'thermoformable sheet' excludes sheets made of paperboard or sheets made by injection molding," because during prosecution of a related application "the Applicant argued that 'thermoplastic sheet' excluded paperboard and injection molded material." PO Resp. 8 (citing Ex. 2012, 8). We disagree with Patent Owner's characterization of the relevant prosecution history, as explained below.

A parent application to the '624 patent recited "[a] method of making a container . . . the method comprising thermoforming a thermoplastic sheet to yield a precursor article." Ex. 1046, 63. In regard to that claim, the Applicant argued that it recited "a method in which a thermoplastic sheet (i.e., not paperboard . . .) is thermoformed (i.e., not injection molded . . .) into a precursor article having a rim." Ex. 2012, 8.

"Petitioner agrees that paperboard is not a thermoplastic, but not that 'thermoplastic sheet' excludes injection molded materials." Reply 1. Petitioner argues that "[t]he prosecution statements cited by [Patent Owner] have no relevance to whether the phrase 'thermoplastic sheet,' requires the sheet to be thermoformed because the pending claim being discussed (claim 1) already contained the limitation 'thermoforming a thermoplastic sheet.'" *Id.* at 1–2. Therefore, "[t]he reference to the 'thermoplastic sheet . . . is thermoformed,' was to the explicit claim limitation 'thermoforming,' not restricting the term 'thermoplastic' to thermoformed materials." *Id.* at 2. Petitioner also asserts that "the term 'thermoplastic' does not exclude items made by injection molding, since many thermoplastics are commonly injection molded." *Id.* (citing Ex. 1044 ¶ 327).

We credit the testimony of Mr. May in this regard, who reiterates that "whether a material is thermoformed or injection molded does not dictate whether it is thermoform*able*, since many thermoplastics are both thermoformable and injection moldable." Ex. 1044 ¶ 327 (citing Ex. 1032a, 300, 315, 332–35, 613). Likewise, the Specification of the '624 patent states that "[a] wide variety of methods (e.g., thermo-forming, casting, molding, and spinning) can be used to confer shape to a molten thermoplastic or to a preformed thermoplastic sheet that has been softened or melted." Ex. 1001, 1:23–25. In its Sur-reply, Patent Owner argues that the record evidence provides that "for something to be 'thermoformed' means something other than 'injection molded.'" Sur-reply 2–3. Patent Owner's argument does not inform the meaning of the claim phrase at issue, which is "thermoplastic sheet" and does not persuade us that a thermoplastic sheet is necessarily made by thermoforming.

In sum, there is no evidence to suggest that a "thermoplastic sheet" may not be made by injection molding or that a "thermoplastic sheet" made by injection molding was disclaimed during prosecution. Accordingly, we find that "thermoplastic sheet" excludes sheets made of paperboard, but does not exclude sheets made by injection molding.

2. "the article has a smooth periphery"

Claim 1 recites an article where "the article ha[s] a smooth periphery." Ex. 1001, 41:32–36. Patent Owner argues that because the claims use the word "the" to refer to the article, this "signifies that the entirety of the article has a smooth periphery, and not just a portion of the article." PO Resp. 9.

Petitioner asserts that Patent Owner's "manufactured definition that 'the entire article has a smooth periphery' is ambiguous." Reply 2. Instead, Petitioner contends that no construction is required. *Id.*

Only terms that are in controversy need to be construed, and then only to the extent necessary to resolve the controversy. *Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (applying *Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999) in the context of an *inter partes* review). Because the outcome of our decision does not depend on either parties' claim construction position, we determine that the identified claim term requires no express construction to resolve the issues in dispute in this proceeding.

3. Additional Claim Terms

We find that no other claim term requires an express construction for purposes of rendering this Decision. *See Wellman, Inc. v. Eastman Chem. Co.*, 642 F.3d 1355, 1361 (Fed. Cir. 2011) ("[C]laim terms need only be construed '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)).

D. Invalidity based on Portelli alone or in combination with Long (claims 1–20, 22–26, 29)

Petitioner alleges that Portelli anticipates claims 1–20, 24 and 29 of the '624 patent and that Portelli alone, or in combination with Long, would have rendered obvious claims 1–20, 22–26, and 29 of the '624 patent. Pet. 56–100, 132–134, 139–140. Petitioner also relies on the testimony of Mr. May to support its arguments. *Id.*

1. Overview of the Prior Art

a) Portelli (Ex. 1003)

Portelli is directed to plastic trays used for packaging, which may be wrapped in plastic film. Ex. 1003, 1:2–3, 1:27–30. In particular, Portelli explains that in the past, plastic trays that are "used in packaging are formed by a thermoforming operation" but "have a sharp terminal edge forming the periphery thereof with an unfortunate tendency to tear or cut through plastic film within which the trays are wrapped." *Id.* at 1:21–2:2. According to Portelli, "[i]t would therefore be advantageous if a method and an apparatus could be found for providing these trays with a peripheral edge region which reduced the tendency of the wrap to tear." *Id.* at 2:16–18. Portelli thereby discloses steps of "heating the peripheral edge region of the tray" and producing a "fold line along which the peripheral edge region of the tray is folded." *Id.* at 3:9–13; *see also id.* at Abstract, 3:17–22, 4:1–2,6:10–13, 12:5–9, 13:23–25 (describing "rolling" the edge region).

Figure 13 of Portelli, reproduced below, is a schematic sectional view of an edge a tray that has been deformed out of a wrap path. *Id.* at 8:11–12.

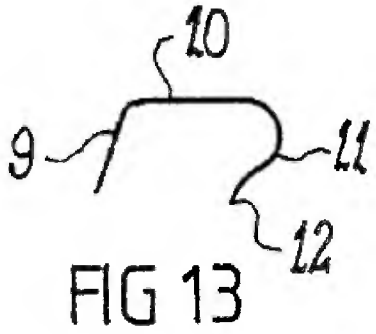


FIG 13

Figure 13 shows a finished tray edge with sloping sidewall 9, that has "a more rounded peripheral edge region" than that of other trays. *Id.* at 8:19–9:3, 14:15–17. The profile edge of the tray has rim 10 connected to peripheral edge region 11, which is connected to terminal edge 12. *Id.* at 14:10–13. Portelli discloses that the trays can have a rounded rectangular shape with a concave compartment formed therein. *See* Figs. 14–16.

b) Whether Portelli is enabled

Patent Owner argues that "Portelli's First Embodiment (Figures 1–2 and 9–11) and Fourth Embodiment (Figures 7–9) cannot function as prior art because each is inoperative and cannot be made without unreasonable amounts of experimentation." PO Resp. 9–10. However, the cited prior art has a presumption of enablement and, therefore. *See In re Antor Media Corp.*, 689 F.3d 1282, 1287–88 (Fed. Cir. 2012); *Impax Labs., Inc. v. Aventis Pharms., Inc.*, 545 F.3d 1312, 1316 (Fed. Cir. 2008). To rebut this presumption, Patent Owner[8] "must generally do more than state an unsupported belief that a reference is not enabling." *In re Morsa*, 713 F.3d

[8] Although the ultimate burden of persuasion remains with Petitioner, *Dynamic Drinkware, LLC v. Nat'l Graphics, Inc.*, 800 F.3d 1375, 1379–81 (Fed. Cir. 2015), *Antor Media* and *Morsa* make clear that Patent Owner bears a burden of production on the issue of the enablement of the prior art.

104, 110 (Fed. Cir. 2013). The touchstone of enablement is whether undue experimentation would have been required to practice the claimed invention. *In re Wands*, 858 F.2d at 737. Patent Owner contends that each of the *Wands* factors weigh in its favor and establish undue experimentation. *Id.* at 11–31. These factors, include:

> (1) the quantity of experimentation necessary, (2) the amount of direction or guidance presented, (3) the presence or absence of working examples, (4) the nature of the invention, (5) the state of the prior art, (6) the relative skill of those in the art, (7) the predictability or unpredictability of the art, and (8) the breath of the claims.

Id.

Patent Owner groups its arguments according to similar *Wands* factors. We follow this same arrangement in our consideration of the *Wands* factors below.

(1) Factors 3, 5, and 6

Patent Owner argues that processes such as Portelli's thermal deformation process were known to be inoperative for rolling the flange of a thermoformed tray. PO Resp. 11. Specifically, Patent Owner cites statements made during the prosecution of the New Zealand counterpart to Long explaining that "puckering and distortion of the lip . . . often occurs with known thermal deformation processes." *Id.* at 11–12 (citing Ex. 2010, 1) (emphasis omitted). Patent Owner also refers to statements from Long that use of its method, in contrast to a thermoformed preform, "means none of the puckering or distortions often encountered with rolling a flange is encountered." *Id.* at 12 (citing Ex. 1004, 6:29–33) (emphasis omitted). Patent Owner contends that these statements regarding the failure of others demonstrates non-enablement of Portelli's methods of rolling a flange to

make a smooth periphery in a non-circular article. *Id.* Patent Owner further asserts that Mr. May's reproductions of the figures of Portelli illustrate puckers formed at the tray's periphery. *Id.* at 13–15. Patent Owner reproduces Mr. May's annotated Figure 8, including its own annotations, and argues that Mr. May's illustrations confirm puckering occurs in Portelli. *Id.* at 14–15 (reproducing a variation of Figures 8 and noting that puckering occurs at "S").

Patent Owner further argues that Mr. May admitted that Portelli's fourth embodiment is not inoperative where he stated that

> "[i]f an edge adheres to a die, it's very likely that article would be defective and would be discarded on [sic.] recycled" and when the article with the adhering edges is pushed off of the die, "[t]he continuous heat of a die of this nature could deform the article, very likely causing a type of defect that would require disposal of the item."

Id. at 16–17 (quoting Ex. 2009, 276:7–277:18) (alterations in original). Patent Owner asserts that this testimony is consistent with the thermodynamic simulations performed by Mr. Clements. *Id.* at 17. According to Patent Owner, a person of ordinary skill in the art viewing these simulations would understand that "uncontrolled expansion and rippling or deformation (buckling or melting) [would occur] in response to either (i) being pressed into die 25 and/or (ii) succumbing to the force of gravity." *Id.* at 19 (citing Ex. 2007 ¶¶ 59, 102–104). Patent Owner contends that Portelli observes that the "heat treatment step may also effect some beading of the plastic by melting." *Id.* (citing Ex. 1003, 17:5–6).

Lastly, Patent Owner states that Portelli discloses no working examples or any information that can refute the inoperability observations by third parties. *Id.* at 21.

Petitioner argues that thermoforming is an "extremely mature" art spanning seventy years. Reply 20. Petitioner points to known thermoformed rolled rim techniques by DexterMT and OMV that employ methods similar to that of Portelli to make rounded rectangular articles. *Id.*; *see also id.* at 21–37 (describing DexterMT's and OMV's thermoformed products) Petitioner also draws our attention to an "authoritative book by James L. Throne in 1996" that "describes the 'rolled rim' technique as '[t]he classic example of rim treatment of thin-gage parts' and 'a standard method of reinforcing the rim region' which is used for a variety of shapes." *Id.* at 21–24 (citing Ex. 1049, 569–571; Ex. 1047, 74:17–75:8). Like Portelli, Petitioner explains that Throne uses heat and a forming tool to roll the flange of a thermoformed article by displacing the peripheral inwardly. *Id.* at 22 (citing Ex. 1003, Fig. 8; Ex. 1044 ¶¶ 48, 53; Ex. 1049, 571).

Petitioner contends that Patent Owner misinterprets Long's statements about Portelli. *Id.* at 38. Specifically, "Long does not suggest that 'puckering and distortions' ***always*** occur with edge-rolling . . . only that the 'often' occur." *Id.* In fact, Petitioner argues that the record and Mr. May "shows that companies use the same methods to produce trays without puckering or distortion." *Id.* Petitioner also asserts that the "puckering defects" Patent Owner notes on Portelli Figure 8 with an "s." are "merely imperfections in a manually-drawn figure." *Id.* at 41.

Petitioner disputes Patent Owner's contention that Mr. May admitted that Portelli's fourth embodiment is inoperative. *Id.* at 37. According to Petitioner, Patent Owner mischaracterized Mr. May's testimony and instead, Mr. May "stated the unremarkable fact that if an edge of an article [is] stuck to a die, it might be defective." *Id.* (citing Ex. 2009, 276:7–277:18).

Petitioner argues that Mr. Clements' thermodynamic simulations are flawed and only theoretical, as "no physical tests [were performed] to verify his theories." *Id.* at 41. Specifically, Petitioner explains that Mr. Clements:

> ignored all the heat flowing into the support 24 illustrated in Portelli Fig. 8, unrealistically assuming that all of the heat enters the peripheral edge region 11 from the die and propagates through the thin plastic to the base 8;
>
> [o]mitt[ed] the cooling effect of the support 24 artificially elevated the flange temperatures in Mr. Clements's model, making the flange look hotter and weaker than it would actually be, causing Mr. Clements to conclude erroneously that the flange would buckle and deflect in the wrong direction when engaged by the die 25; [and]
>
> ignore[d] heat-shielding and water-cooling [in Portelli's heated-air embodiments].

Id. at 41–42 (citing Ex. 1047, 153:4–14, 155:11–156:15; Ex. 2007 ¶¶ 39–44, 59, 83–84; Ex. 1044 ¶¶ 94–97).

Here, the statements made in Long and its New Zealand counterpart do not persuade us that Portelli's thermoforming method is inoperative or a failure. As Petitioner aptly notes, neither reference states that puckering *always* occurs. *Id.* at 38. Rather, these prior art references contrast a problem that *often* occurs when describing the benefits of Long's claimed trimming process. We do not view statements distinguishing the purported advantages of one process against another as rising to the level of establishing that thermal deformation processes, like that of Portelli, are known to be "inoperative [or] cannot be made or used without unreasonable amounts of experimentation," as asserted by Patent Owner. PO Resp. 9–10, 11–12. We also do not interpret Portelli's figures as showing "sharp pointed puckers" on the tray periphery at "s" on Patent Owner's annotated figures.

See id. at 14–15 (Portelli's Figure 8 (modified) as annotated by Patent Owner). Instead, the distortions seen in the figures are a product of the enlargement of manually-drawn images. Portelli's figures are not photographs of an actual tray and Portelli does not discuss or identify these imperfections as puckering or any other aspect of its thermoformed tray. *See generally* Ex. 1003.

Furthermore, Mr. May's testimony, identified by Patent Owner (PO Resp. 16–17) does not admit any inoperability of Portelli's fourth embodiment as Patent Owner asserts. Instead, Mr. May testifies that Portelli alerts the reader to the possibility that the plastic may adhere to the die and that:

> *[i]f* that were to occur, the part *could* stick to the mold, causing a jam, the part may not be ejected properly.· Subsequent parts, after that part ·was removed, if the residue or the plastic was not removed sufficiently, *could* be compromised in terms of proper function (Ex. 2009, 276:21–277:1 (emphasis added); [and further that]
>
> *[i]f* an edge adheres to a die, it's *very likely* that article would be defective and would be discarded or recycled.· So I think Portelli is explaining this such that a POSITA reading it would understand in the progressive deformation of the peripheral edge to beware of the edge becoming stuck to a mold or a die (*id.* at 277:4–10 (emphasis added).

Indeed, Patent Owner's expert Mr. Clements testifies that a person of ordinary skill in the art would understand how to overcome this issue of sticking as "there are a 'wide variety' of techniques to prevent parts from sticking to a hot die, including treating the surface with a non-stick coating, controlling process time and temperature, and the 'list goes on from there.'" Reply 37 (citing Ex. 1047, 40:19–43:14); *see also* Ex. 1044 ¶¶ 67–68 (citing Ex 1056, 305–306; Ex. 1050, 168). And, while Mr. Clements'

thermodynamic simulation indicates deformation may occur under some circumstances, Mr. Clements failed to account for numerous teachings in Portelli such as the heat flow and cooling effects identified by Petitioner. *See* Reply 41–42.

Finally, though Patent Owner argues that Portelli discloses no working examples, working examples are not required to show enablement. *See Beckman Instruments, Inc. v. LKB Produkter AB*, 892 F.2d 1547, 1551 (Fed. Cir. 1989) (actual implementation is not required to enable a prior art reference); *Schering Corp. v. Geneva Pharms., Inc.*, 339 F.3d 1373, 1380 (Fed. Cir. 2003) (explaining that anticipation does not require the actual creation or reduction to practice of the prior art subject matter).

(2) Factors 4 and 7

Patent Owner argues that "[t]he critical dependence on polymer chemistry and how plastic reacts to different degrees of heating and cooling qualifies thermoforming as a highly unpredictable field." PO Resp. 22 (citing Ex. 2007 ¶ 21). According to Patent Owner, the "highly unpredictable aspects" of Portelli's first embodiment include its use of hot air convection vectors and "the extend and direction of the plastic's thermal expansion along the terminal edge region." *Id.* As a result, Patent Owner explains that rippling, folding, and puckering occur which is detrimental to the smoothness of the periphery of the edge and even more so when that edge is folded over. *Id.* at 22–25. Patent Owner reasons that because Portelli does not teach

> how to (i) control the hot air from ducts 2 to consistently heat the precursor region 11 and edges 12; (ii) control the unpredictable thermal expansion of either edge 12, region 11, or tapers 42 while simultaneously avoiding the distortions and puckering that would result from using the unheated formers 34–41; or (iii)

> achieve a mass-producible rectangular article having a smooth periphery on "high volume assembly line scale,"

Portelli is not enabled. *Id.* at 25–26.

We agree with Petitioner that thermoforming is a mature art that has been successfully practiced for many, many years. Reply 1–2, 20. Further we note the numerous prior art references and commercial articles of record, predating and existing near or at the time of the '624 patent, describe using heat to thermoform and shape articles, including rectangular articles, as indicators of developed state of the art. *See, e.g.*, Ex. 1049, 124–128; Ex. 1044 ¶¶ 42–49, 52; Ex. 1051; Ex. 1053; Ex. 1058; Ex. 1003; Ex. 1004; Ex. 1005; Ex. 1047 23:1–23 (describing thermoforming as a "mature art"). Patent Owner criticizes Portelli for being unpredictable and identifies use of "hot air convection" and "thermal expansion" of the plastic as unpredictable aspects of Portelli's methods. PO Resp. 22. According to Patent Owner, Portelli does not teach how to control these aspects and is, therefore, not enabled. On this issue, we disagree. Portelli explains that its method heats the peripheral edge of the tray such that the peripheral edge becomes malleable and can be shaped. Ex. 1003, 2:28–30. Portelli describes one embodiment that "comprises blowing hot air over the peripheral edge region of the tray" so that it is heated and is shaped around a former and complementary deforming formation. *Id.* at 6:22–29. Portelli further explains that "the apparatus includes shield means for shield[ing] that portion of the tray laterally inwardly of the peripheral edge region, from the hot air blast" and may also include a "cooling means for actively cooling the peripheral edge region of the tray." *Id.* at 7:1–6; *see also id.* at 4:3–12; 9:27–29 (interrupting the hot air blast and the edge region is cooled); 11:15–26. Portelli explains that the cycle time for its method is "dependent on the

aggressiveness of the heating of the edge region 11 . . . and the rate at which the edge region 11 is cooled." *Id.* at 10:6–14. According to Portelli the preferred method for cooling the tray is to use "cooling water [that] is circulated through pipes 30 mounted on former 3 thereby acting to cool the former 3 which in turn cools the region 11." *Id.* at 10:21–24. Mr. May further testifies regarding numerous methods, known to persons of ordinary skill in the art, to control and minimize the problems identified by Patent Owner. Ex. 1044 ¶¶ 72–82 (citing Ex. 1035, 61–65, 185, 194–195; Ex. 1050, 183–187). Patent Owner does not adequately address or explain what is lacking in Portelli's disclosure or why Portelli's shielding and cooling means are not sufficient to control the heating of the peripheral edge. *See generally* PO Resp. 22–26; Sur-reply.

Patent Owner also asserts that Portelli does not describe how to prepare mass-produced, high-volume articles. We observe however that the claims do not require any particular production volume. Ex. 1001, 41:13–42:62.

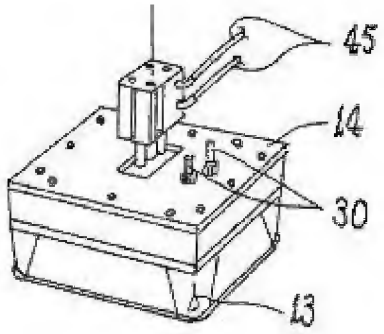
(3) Factor 2

Patent Owner argues that Portelli's first embodiment (Figures 1–2 and 9–11) use nonstandard thermoforming equipment which weighs against enablement. PO Resp. 26. Specifically, Patent Owner contends that "a [person of ordinary skill in the art] would not know what a 'clacker box' is nor would . . . be able to obtain the specifications needed to make one." *Id.* Patent Owner states that Mr. May testifies that he "couldn't say [if] he had ever seen Portelli's nonstandard equipment in Figures 9–11 prior to the earliest effective filing date." *Id.* at 27. Patent Owner reasons that this testimony is "further proof that a [person of ordinary skill in the art] would

not have had the requisite equipment to even attempt Portelli's First Embodiment methods." *Id.*

Petitioner argues that using heated air for thermoforming articles was standard practice and widely-known to persons of ordinary skill in the art. Reply 42 (citing Ex. 1049, 124–128). Petitioner further contends that hot-air manifolds, such as those in Portelli's Figures 9–11, were known and used by persons of ordinary skill in the art and were "standard, off-the-shelf components." *Id.* Petitioner explains that "Portelli's manifold is not an exotic part just because of its unusual name—'clacker box.'" *Id.*

We do not find Patent Owner's assertion that a person of ordinary skill in the art would not know what a "clackerbox" is or how to use or obtain one, compelling. As Petitioner explains, "Portelli's manifold is not an exotic part just because of its name—'clacker box.'" *Id.* at 42. The real question and the crux of the issue is whether the ordinarily skilled artisan would understand from the description of Portelli's "clackerbox," what it is and how to use it. Portelli illustrates its "clacker box" in Figure 11, a portion of which is reproduced below.



The excerpted figure above shows clackerbox 14, including clamping feet 13, water cooling pipes 30, and compressed air conduits 45 for moving feet 13 of clackerbox 14 in and out from under rim 10 of tray being formed.

Ex. 1003, 11:27–29. Portelli also explains that clackerbox 14 acts to shield the upper portion of the rim from the hot air blast. *Id.* at 11:20–21. Mr. May testifies that "Portelli's part is a typical hot-air manifold whose behavior and performance would have been well-understood by a [person of ordinary skill in the art.]" Ex. 1044 ¶¶ 87–98; Reply 25–26. Thus, we are persuaded that Portelli sufficiently describes the function and features of the component, identified as a "clackerbox," for a person of ordinary skill in the art to make and use that component..

(4) Factor 1

Patent Owner argues that a "combination of certainties and uncertainties make" experimentation with Portelli's first and fourth embodiments unreasonable. PO Resp. 27. With respect to the first embodiment, Patent Owner identifies the following issues: "(1) excess plastic tapers 42 on the periphery will always result and will leave puckers or other distortions on the periphery;" "(2) the convection vectors of the hot air from ducts 2 is unpredictable and there is no teaching on how to control it;" and "(3) every plastic that Portelli [uses] has a natural unpredictability in terms of its reaction to heat and its thermal expansion which necessarily prevents a POSITA from knowing what it will do in response to unequal heating by hot air from ducts 2 and repeated impact by formers 3." *Id.* at 27–28 (citing Ex. 2007 ¶¶ 35–45). Patent Owner also identifies the following combination of certainties and uncertainties with respect to Portelli's fourth embodiment: "(1) in moving the sharp terminal edge 12 away from the periphery, a new sharp corner (denoted "S" above) is formed;" "(2) an uncontrolled amount of radiant heat will cause unpredictable weakening, expansion, and rippling in the plastic;" "(3) the

adhesion between peripheral edge region 11 and hot die 25 would result in defective articles upon ejecting the same from the mold;" "(4) the adhesion between peripheral edge region 11 and hot die 25 would "un-roll" the deformed region 11 as the article is ejected from die 25;" and "(5) the combination of heating and gravity will cause the terminal edge 12 to wilt or buckle in response to being pressed into die 25 and the rim 10, zone "X", and portions of sidewall 9 will become softened, weakened, and deformed." *Id.* at 28–29 (citing Ex. 2007 ¶¶ 57–60, 78–81, 101–108).

Patent Owner argues that the amount of experimentation to make and use Portelli is unreasonable. *Id.* at 27–29. The test for enablement is "not merely quantitative." *PPG Indus. Inv. v. Guardian Indus. Corp.*, 75 F.3d 1558, 1564 (Fed. Cir. 1996). On the contrary, "a considerable amount of experimentation is permissible, if it is merely routine." *Id.*; *In re Vaeck*, 947 F.2d 488, 495 (Fed. Cir. 1991) ("That *some* experimentation may be required is not fatal; the issue is whether the amount of experimentation required is 'undue.'").

Here, however, Patent Owner does not identify what about the quality or quantity of experimentation is "undue." As explained above, we disagree with Patent Owner that the evidence of record shows that the peripheral edge *always* puckers, that Portelli results in uncontrolled heating, that adhesion necessarily occurs, or that the skilled artisan would not know how to overcome adhesion to the die. *See* PO Resp. 27–29 (listing "uncertainties" found Portelli's first and fourth embodiments). For example, Mr. Clements testifies that there are a wide variety of techniques, known to the skilled artisan, to overcome problem of parts sticking to a hot die, including treating the surface with a nonstick coating, controlling both the process time and

temperature, among others. Ex. 1047, 40:19–43:14. Further, Mr. Clements acknowledges, experimentation is routine in the art of thermoforming plastics. Ex. 2007 ¶ 21.

(5) Conclusion as to Enablement

Thus, each of the *Wands* factors weigh in favor of finding that Portelli is enabled. In sum, we conclude that Portelli is an enabling disclosure and remains available as a prior art reference for establishing anticipation or obviousness of the claimed subject matter.

c) Long (Exhibit 1004)

Long "relates to an open mouthed container (eg. [sic] tray, cup or the like) having a profiled periphery outwardly of the mouth, there being a return of the edge in the under part of the profiled periphery." Ex. 1004, 1:4–6. Long discloses the use of a trimming procedure applied to "a thermoformed precursor or preform" to provide a container with "a 'concealed-from-above' in-turned edge." *Id.* at 1:19–25.

Figure 4, 5A, 5B, and 5C of Long are reproduced below.

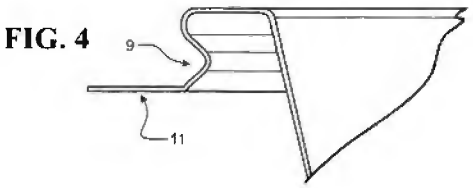


FIG. 5A

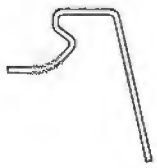


FIG. 5B

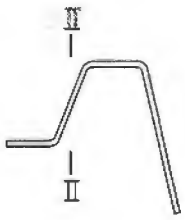


FIG. 5C

Figure 4 illustrates the edge region of a preform or precursor container prior to trimming. *Id.* at 6:4–6. Long further explains as follows in regard to Figures 5A, 5B, and 5C:

> Figures 5A, 5B and 5C show, as three stages, the features of Figure 4, the distortion, deforming, stretching, blowing or the like of the form of Figure 5A sufficiently to provide a cut line shown by the broken lines II-II in Figure 5B which is outwardly of the final profile periphery and Figure 5C shows how the resilience allows the under turn of the preform or precursor of Figure 5A to be reassumed after the cut has been made on the broken line as shown in Figure 5B.

Id. at 6:7–12.

d) Whether Long is Enabled

Patent Owner argues that "Long's prophetic disclosures do not enable a [person of ordinary skill in the art] to make and use any of what is

mentioned." Resp. 51–52. According to Patent Owner, "Long as a reference teaches very little except incomplete and erroneous proposals for the [person of ordinary skill in the art] to figure out on its own." *Id.* at 37 (citing Ex. 2007 ¶¶ 122–123). Critically, according to Patent Owner, "Long provides no evidence that its theoretical proposals, to the extent they can be practiced or understood, can be successfully used to make a rectangular thermoformed tray having a smooth-edged periphery *via any process amenable to mass manufacturing*." *Id.* (citing Ex. 2007 ¶¶ 123, 141, 152, 162) (emphasis added). Patent Owner's enablement argument is fundamentally flawed because the Challenged Claims do not recite an article manufactured by a "process amenable to mass manufacturing," therefore Petitioner may rely on Long for all that it teaches to show obviousness even if Long does not teach a "process amenable to mass manufacturing," as Patent Owner argues.

With respect to *Wands* factors 2–3 and 5–6, Patent Owner argues that "Long mentions a 'first tooling assembly' but in no way describes what it is," that "Long's precursor requires a mold whose rim has a significant negative draft," and that according to modeling done by Mr. Clements "using Mr. May's dimensions of Longs periphery, . . . shrinkage of the periphery of the thermoformed thermoplastic of the article enters into the undercuts of the mold to become 'trapped.'" *Id.* at 37–38 (citing, e.g., Ex. 2007 ¶ 126–139; Ex. 2010, 13). From this, Patent Owner argues that "in the process of attempting to recreate Long's proposals using a mold with undercuts, the [person of ordinary skill in the art] would realize that the proposed methods yield a trapped part that is unusable for any further processing." *Id.* at 39 (citing Ex. 2007 ¶ 137). Patent Owner contends that

"a cooled precursor could not be released from the mold without breaking it while a heat-softened precursor could not be released without also permanently deforming the periphery into a contour different from the one required by Long Figure 5A," and that the "impossible remov[al] problem is further complicated if a male mold is used or if a [person of ordinary skill in the art] were to attempt mass-production of such a precursor." *Id.* at 40–41 (citing Ex. 2007 ¶¶ 137–144). Next Patent Owner argues that a person of ordinary skill in the art would understand that the precursor with Long's Figure 5A periphery "as dimensioned according to Mr. May's measurements . . . "has an overhang-to-sheet thickness ratio that exceeds ratios known to permanently crimp or lock thermoplastic sheets made of PET, CPET, PP and polystyrene thermoplastics . . . to adjacent object surface." Resp. 41 (citing Ex. 2007 ¶¶ 143–148).

We find Mr. Clements attempt to model how a person of ordinary skill in the art might theoretically attempt to produce the article shown in Long's Figure 5A ambitious, but flawed and not persuasive to show that producing the article taught by Long was "impossible." *See* Ex. 2007 ¶¶ 123–148. Mr. Clements modeling is based as much on the assumptions Mr. Clements adopts as it is on what Long itself teaches. Those assumptions include using the dimensions of Figure 5A to match "those measured by Mr. May," using an "industry standard radius at each corner," and then speculates from the model he created that a person of ordinary skill in the art "would find that removal of an article with Long's Figure 5A periphery would not be possible without resort to permanent deformation or destruction of the article." *Id.*

The conclusions Mr. Clements reaches identify no persuasive support and, therefore, appear speculative and conclusory. *See*, *e.g.*, Ex. 2007 ¶¶ 139–141; *see also id.* at ¶ 140 (noting that "a male mold could also be utilized," which was apparently not modeled by Mr. Clements, but he concludes would have the "previous problems" and "will also have the potential for ripping the plastic"). We further find persuasive in this regard Petitioner's showing that articles made using Long's process were, in fact, produced on a commercial scale "since at least as early as 2012." Reply 3–13 (citing, e.g., Ex. 1044 ¶¶ 126–127, 143, 150; Ex. 1045 ¶¶ 4–5; Ex. 1057). In short, the evidence provided by Patent Owner does not show that the features of the article Long teaches corresponding to the claimed elements of the '624, patent would have been impossible to produce in accordance with Long, as Patent Owner asserts.

Patent Owner also argues that Long refers to a "second tooling assembly" that performs "generic actions" but does not provide "details about the intricacies of the 'second tooling assembly.'" Resp. 42–43 (citing Ex. 2007 ¶¶ 155–159). According to Patent Owner, Mr. May acknowledged that Long's second tooling assembly would need to be custom made, and from this Patent Owner asserts a person of ordinary skill in the art "would have to engage in considerable and undue experimentations to make and use such non-standard equipment." *Id.* at 42–46 (citing, e.g., Ex. 2007 ¶¶ 158–165; Ex. 2009, 367:2–368:8). We are not persuaded that merely because Long may require "custom made" tooling for "generic actions" to produce an article it teaches, that shows that undue experimentation would have been required.

Patent Owner's additional arguments are misplaced in the context of seeking to show Long is not enabled. Resp. 46–55. We have considered Patent Owner's additional arguments, including that variations in the trimming tolerances result in sharp points that tear the overwrap film, that the demoldable periphery of Long necessarily creates the sharp edge it seeks to avoid, and that the nature of thermoplastics is unpredictable and known to generate microscopic hairs on the thermoformed surface. *Id.* Although Patent Owner identifies issues that may need to be refined in the production process, or may even require experimentation to perfect, lacking is any persuasive evidence that the required experimentation would be undue. *Id.*

As noted above, Petitioner shows that actual trays embodying Long have been made since before the priority date. Reply 3–13 (citing Ex. 1045 ¶¶ 4–5; Ex. 1044 ¶¶ 126–127, 143, 150; Ex. 1057). Petitioner further shows that "Mr. Clements's analysis is purely theoretical" and "[h]e did not test any trays or precursors to determine whether they could be removed from a mold." *Id.* at 14. According to Petitioner, Mr. Clements also "contradicts himself by admitting a thinner tray . . . might be easier to remove from the mold" and "admits that [Long's] peripheral edges avoid the wrap path." *Id.* (citing Ex. 1047:87:9–14; Ex. 1048, 123:11–124:13). Even with regard to potential problems raised by Patent Owner with the Long process, Petitioner shows that solutions were well-known to, for example, the generation of microscopic hairs on the thermoformed surface. *Id.* at 14 (citing Ex. 1035, 171, Ex. 1044 ¶ 213).

Upon balancing the *Wands* factors, we conclude that Long is supported by an enabling disclosure and remains available as a prior art reference for establishing obviousness of the claimed subject matter.

Moreover, even if Long were not self-enabled, its teachings nonetheless "qualify as prior art for the purpose of determining obviousness under § 103." *Symbol Techs., Inc. v. Opticon, Inc.*, 935 F.2d 1569, 1578 (Fed. Cir. 1991). "[A] prior art reference asserted under § 103 does not necessarily have to enable its own disclosure, i.e., be 'self-enabling,' to be relevant to the obviousness inquiry." *Raytheon Technologies Corp. v. General Electric Co.*, 993 F.3d 1374, 1380 (Fed. Cir. 2021). Rather, "a standalone § 103 reference must enable the portions of its disclosure being relied upon." *Id.* at 1381. Here Petitioner need only rely on Long to supply teachings to suggest the additional subject matter of claims 22–23 and 25–26. Pet. 50–55, 133–132. Thus, the relevant inquiry is whether a person skilled in the art would have been able to combine the structural aspects of Long with Portelli teachings to make and use the subject matter of claims 22–23 and 25–26 without undue experimentation. We determine that Long sufficiently enables the subject matter of claims 22–23 and 25–26 without undue experimentation.

2. Analysis of Claim 1

Petitioner contends that claim 1 is anticipated by Portelli or rendered obvious by Portelli alone, or in combination with Long. Pet. 56–76, 13–32, 132–133. Petitioner asserts that "Portelli's tray is wrapped in a plastic film to form an airtight seal" and "is suitable for [over wrap] sealing technology." *Id.* at. 56 (citing Ex. 1003, Abstract, 1:2–4, 1:9–11, 5:25–28, 16:15–17). Petitioner, though the testimony of Mr. May, alleges that Portelli also "is suitable for use in VSP sealing technology." *Id.* (citing Ex. 1002 ¶¶ 132–134).

Petitioner alleges that "Portelli's tray is made of a thermoformed plastic; thus, it is thermoplastic." *Id.* at 57 (citing Ex. 1003, Abstract, 9:17–24, 14:10, 15:13–14, 16:15–17). Petitioner further asserts that Portelli's tray includes a peripheral edge. *Id.* (citing Ex. 1003, Fig. 13, 9:1, 9:17–24, 13:18–20, 14:11–13; Ex. 1002 ¶¶ 135–138). According to Petitioner, "Portelli teaches a 'base member 51' and a 'cover member 52,' either or both of which comprise a tray-shaped body" and "comprises a base 8 or 56 and a sidewall 9 or 57, which form a concave portion." *Id.* at 58–60 (citing Ex. 1003, Figs. 1–8, 14–15, 1:1–5, 1:7–8, 5:25, 8:28–29, 10:17–18, 15:27–30, 18:6; Ex. 1002 ¶ 141). Petitioner contends that Portelli's tray includes "'circumferential peripheral rim 58'—i.e., an extension—which 'projects outwardly away from the upper end of the side wall 57'—i.e., extends peripherally away from the concave portion" where "[t]he rim 10/58, 'peripheral edge region 11,' and 'terminal edge 12' (i.e., 'peripheral edge') together form an extension." *Id.* at 60–63 (citing Ex. 1003, Figs. 13–14, 9:1, 9:17–19, 13:18–20, 14:11–13, 15:28–30; Ex. 1002 ¶¶ 142–146).

Petitioner further alleges, referring to Figure 13, that extension 10 includes a flat sealing surface and is "suitable for VSP." *Id.* at 63–64 (citing Ex. 1003, Fig. 13). Petitioner explains that "VSP involves laying a thin plastic film over a tray and its contents, and sucking the air out to press the film against the contents" and to be suitable, "the tray must have no sharp peripheral edge or crimp located where they could damage the film." *Id.* at 64 (citing Ex. 1003, 2:16–30, 3:4–19, 3:64–4:10, 36:40–58, 37:34–60). Petitioner alleges that because Portelli's peripheral edge "is displaced inwardly," it does not have a sharp edge that would damage the film. *Id.* at 64–66 (citing Ex. 1003, Fig. 13, Abstract, 1:29–2:18, 3:13, 5:1–2, 5:12,

5:25–6:3, 15:20–23, 18:3–5, 20:11–16, 20:24–27, 21:17–23; Ex. 1002 ¶¶ 147–153). Petitioner argues that Portelli describes a bend region where the upper end of extension 10, curves on the right side as shown in Figure 13 and where " the entire bend region is a smooth curve." *Id.* at 66–67 (Ex. 1003, Fig. 13; Ex. 1002 ¶¶ 154–156). Petitioner alleges that the extension further includes a bent portion and identifies exemplary bent portions. *Id.* at 67–70 (identifying various bent portions, i.e., examples 1–4, depicted in Petitioner's modified Figures 8 and 13) (citing 1003, Figs. 8, 13; Ex. 1002 ¶¶ 157–161).

Petitioner contends that Portelli depicts a spacer located between the bend region and bent portion. *Id.* at 71–73 (citing Ex. 1003, Fig.13; Ex. 1002 ¶¶ 162–164). Petitioner further asserts that "the features of the trays in Fig[ures] 8 and 13 are interchangeable and can be combined" such that "it is within the teachings of Portelli to include the spacer of Fig[ure] 8 between the bent portion and bend region of Fig[ure] 13 . . . such that the spacer separates the bent portion from the bend region." *Id.* (citing Ex. 1002 ¶¶ 162–164).

Petitioner further alleges that Portelli's tray is a rectangular tray and that "the periphery of Portelli's tray is smooth." *Id.* at 65 (citing Ex. 1003, Fig. 13), 73–75 (citing Ex. 1003, Figs. 13–15, 1:1–5, 5:25, 10:17–18,18:6, 10:25–11:3; Ex. 1002 ¶¶ 166–171). And lastly, Petitioner contends that "the bent portion is sufficiently bent that the peripheral edge is turned at least approximately opposite the periphery of the tray," as claimed. *Id.* at 75–76 (examples 1–2 shown in Petitioner's modified Figure 13) (citing Ex. 1003, Fig. 13, Abstract, 2:2–8, 3:17–19; Ex. 1002 ¶¶ 172–174).

Patent Owner does not dispute most of Petitioner's contentions that Portelli discloses the limitations of claim 1. PO Resp. 11–35. We have reviewed Petitioner's arguments and evidence, and agree—based on the information provided in the Petition—that the preponderance of the evidence supports Petitioner's contention that Portelli teaches each limitation of claim 1 of the '624 patent, other than those disputed by Patent Owner.[9] Patent Owner does assert, however, that Portelli does not have a smooth periphery and that Portelli is not suitable for VSP or MAP. *Id.* at 30–33.

a) Whether Portelli teaches having a spacer with a smooth periphery

Patent Owner argues that "Petitioner's alleged 'spacer' in Figure 8 is located adjacent to a 'bend region' that has a sharp 90° corner, which cannot satisfy the limitation a 'bend region having the conformation of a smooth curve . . . .' and an 'article having a smooth periphery.'" PO Resp. 30. Patent Owner also argues that "Petitioner's reliance on modifications to Portelli's figures dooms its anticipation challenge" as Portelli does not an embodiment having all elements as arranged in the claims. *Id.* at 31.

Petitioner argues that a person of ordinary skill in the art reading Portelli would understand that Portelli anticipates "even if it 'd[oes] not expressly spell out' all the limitations arranged or combined in the claim if a

[9] We recognize Petitioner erroneously suggests in the Petition that "rim 58 is illustrated as item 10 in Portelli Fig. 13," however, Patent Owner does not dispute that Portelli discloses the recited features of claim 1, that is, a tray-shaped body with concave portion. *See* Pet. 18 (explaining that Portelli describes a "rectangular tray" (citing Ex. 1003, 1:1–5, 1:7–8, 5:25, 10:17–18, 18:6), 18; *see also* Ex. 1003 ("the term 'tray' shall not be limited to flat or shallow containers. Further the term shall not be limited to containers *having four* straight edge sides." (emphasis added)).

person of skill in the art . . . would 'at once envisage' the claimed arrangement or combination." Reply 45. Petitioner contends that, contrary to Patent Owner's contention, it need not show that the limitations of the claims are "all shown in a ***single drawing***." *Id.* Petitioner argues that a person of ordinary skill in the art

> viewing Portelli in its entirety would understand that the flanges in Figs. 8 and 13–16 are just examples of flange shapes intended to be used on the trays in Figs 14–16, since each of those flanges accomplishes Portelli's purpose of displacing the terminal edge away from the wrap path, and Portelli describes and illustrates the same rounded rectangular article in multiple drawings.

Id.

We agree with Petitioner. First, Patent Owner fails to direct our attention to any teaching in Portelli that describes the bend region as having a "sharp 90° corner." *See generally* PO Resp. Indeed, were Portelli to include a "sharp 90° corner," as Patent Owner suggests (*id.* at 30), Portelli would not achieve its express solution of avoiding the use of trays having sharp edges which have "an unfortunate tendency to tear or cut through plastic film within which the trays are wrapped." Ex. 1003, 1:30–2:2; *see also id.* at 2:9–15.

Second, though anticipation requires a prior art reference to disclose each of the claimed elements arranged or combined in the same way as in the claim, "[a]nticipation does not require the actual creation or reduction to practice of the prior art subject matter." *Shering Corp*, 339 F.3d at 1380; *Bristol-Myers Squibb Co. v. Ben Venue Labs., Inc.*, 246 F.3d 1368, 1379 (Fed. Cir. 2001) ("anticipation does not require actual performance"). Here, claim 1 requires a tray that includes a spacer separating the bent portion from the bend region. Ex. 1001, 41:29–31. Petitioner directs us to evidence

demonstrating sufficiently, that Portelli broadly describes multiple examples of flange shapes, "each [of which] accomplishes Portelli's purpose of displacing the terminal edge away from the wrap path, and Portelli describes and illustrates the same rounded rectangular article in multiple drawings." Reply 45; Pet. 70–73. Further, though Petitioner relies on different figures depicting the exemplary flange shapes, Petitioner's arguments are not limited to its discussion of the figures. Petitioner directs our attention to the testimony of Mr. May that a person of ordinary skill in the art reading Portelli would have understood that "it is within the teachings of Portelli to include the spacer of Fig. 8 between the bent portion and bend region of Fig. 13, illustrated in Element 1f, above, such that the spacer separates the bent portion from the extension's bend region." Ex. 1002 ¶ 165. According to Mr. May, this is because a person of ordinary skill in the art "would immediately understand that the flanges in Fig[ures] 8 and 13–16 are just examples of flange shapes intended to be used on the trays in Fig[ures] 14–16. Ex. 1044 ¶ 120.

Thus, we determine that Petitioner has shown, for purposes of this Decision, that the preponderance of the evidence shows that Portelli teaches a spacer together with a smooth periphery as recited by claim 1.[10]

[10] We acknowledge Patent Owner's argument that Petitioner "raises a *Kennametal* theory of anticipation not raised in the Petition." Sur-reply 21. We disagree. As discussed above, Petitioner sufficiently raised the issue in its Petition. Furthermore, as discussed below, the skilled artisan would also have had reason to combine the teachings of Figures 8 and 13 of Portelli to render claim 1 obvious. *See* Section II.D.5.

b) Whether Portelli is suitable for VSP or MAP

Patent Owner asserts that Petitioner has not shown that Portelli is suitable for VSP or MAP and that Portelli fails to teach "any specific plastic material one could use in its proposed methods." PO Resp. 32. According to Patent Owner, "Portelli's generic 'plastics' disclosure cannot inherently teach a tray 'being suitable for sealing a sealing film thereto using either of VSP or MAP sealing technologies.'" *Id.* at 33.

Petitioner argues that "[c]laim 1 recites suitability for vacuum-sealed packaging ("VSP") or modified atmosphere packaging ("MAP") in the alternative, yet . . . [Patent Owner] substantively addresses only MAP." Reply 43. Petitioner further asserts that Patent Owner "fails to rebut Petitioner's evidence that Portelli's tray is suitable for VSP." *Id.* at 43–44 (citing Ex. 1002 ¶¶ 147–153); *see* Pet. 56, 63–66. According to Petitioner, "[u]nlike MAP, for VSP the oxygen transmission rate ("OTR") of the tray material is not critical, a difference [Patent Owner] fails to address." Reply 44. Petitioner similarly notes that Patent Owner "does not rebut Petitioner's evidence that the extension in Fig[ure] 13 of Portelli is suitable for VSP." *Id.*

We are persuaded by Petitioner's arguments regarding Portelli's teachings. As Petitioner explains, because "Portelli's tray includes a flat sealing surface—the horizontal segment at the top of Fig[ure] 13—surrounding the concave portion," Portelli is suitable for VSP. Pet. 63–64. The '624 patent describes VSP as "involv[ing] adhering a thin (again, often transparent) plastic film against a face of a shaped article bearing a foodstuff (for example, or a moisture-sensitive object as an alternate example) on a face of the shaped article." Ex. 1001, 2:16–20. VSP containers "*tend* to

have a face or surface (sometimes within a concavity) adapted to carry an item to be sealed between the film and the container and adapted to receive the sealing film by virtue of the absence of sharp points, protrusions, or edges." *Id.* at 3:4–8 (emphasis added). But, "[u]nlike OW-containers, VSP-containers can have sharp edges, corners, or protrusions, at least at portions other than the film-receiving surface, because those portions need not contact the film during sealing." *Id.* at 3:10–14. Thus, Portelli's tray having a terminal edge displaced to avoid an overwrap film can similarly be used and is suitable for VSP. *See, e.g.*, Ex. 1003, Abstract ("terminal edge (12) which is deformed inwardly out of a wrap path around the tray"), 2:9–15 (explaining that tears "can lead to spoiling food within the packaged tray"), 2:22–25 (displacing the terminal edge out of the wrap path to avoid tearing), 3:1–8, 5:1–14, 5:25–6:3, 13:25, claim 1 (same).

Furthermore, we do not find fatal Portelli's silence as to the specific plastic used in its trays. Portelli describes its plastic trays as suitable for foodstuffs (*id.* at 1:6–11), as being selected from materials including "synthetic or natural which may be shaped when soft and then hardened, including resins, resinoids, polymers, cellulose derivatives, casein materials and proteins (*id.* at 1:17–20), as being thermoformed (*id.* at 9:17, 14:10), and having a softening temperature of between 100°C and 150°C and becomes molten near 200°C (*id.* at 15:4–8). Though Mr. Clements testifies that a person of ordinary skill in the art "would not know which 'plastic' among the hundreds of 'plastics' Portelli would deem suitable" (Ex. 2007 ¶ 66), it is unclear whether Mr. Clements considered Portelli's additional teachings. Moreover, neither the claims nor the '624 patent require any particular material for VSP. *See generally* Ex. 1001; *see also id.* at 30:10–21

(providing examples of thermoplastics and stating that "[o]ther suitable thermoplastics are apparent to skilled workers in the field").

Having determined that Portelli discloses each limitation of claim 1 and that Portelli contains an enabling disclosure, we determine that Petitioner has shown by a preponderance of the evidence that claim 1 of the '624 patent is anticipated by Portelli.

3. Claims 10–12

Petitioner contends that claims 10–12 are anticipated by Portelli or rendered obvious by Portelli in combination with Long. Pet. 93, 133 (stating that the subject matter of claims 10–12 are taught by both Portelli and Long). Claims 10–12, depend from claim 9—which requires that "bent portion includes a rounded portion"—and additionally require that the rounded portion "has a J-shaped conformation," "a U-shaped conformation," or "a spiral conformation," respectively. Ex. 1001, 41:60–61, 42:1–4. Petitioner asserts that each of these conformations is taught in Portelli. Pet. 92–94 (citing Ex. 1003, Fig. 3; Ex. 1002 ¶¶ 198–200).

Patent Owner asserts that "Petitioner's attempt to pick and choose disparate portions of Portelli's Figure 8 to swap into just the right portion of Portelli's Figure 13 'has no place in making of a 102, anticipation rejection.'" PO Resp. 33.

As we explained below, we are persuaded that the record evidence, including, inter alia, the testimony of Mr. May, that shows that the skilled artisan would have understood the Figures of Portelli, including Figures 8 and 13, to broadly describe exemplary flange shapes for its completed trays depicted in Figures 14–16. Accordingly, Petitioner has shown by a preponderance of the evidence that claims 10–12 are anticipated by Portelli.

4. Claims 22–23

Petitioner alleges that claims 22 and 23 are rendered obvious by the combination of Portelli and Long.[11] Pet. 133. Claims 22 and 23 ultimately depend from claim 1 and additionally require that "the concave portion of the tray is visually clear" and "the bent portion of the tray is visually clear," respectively. Ex. 1001, 42:37–40. Petitioner asserts that Long's tray, formed of polyethylene terephthalate ("PET") and polylactic acid ("PLA"), is visually clear. Pet. 50. According to Petitioner, the '624 patent makes clear that PET, among others, are optically clear. *Id.* (citing Ex. 1001, 31:1–3). Petitioner argues that "the teachings of Long, Portelli, Meadors, and Brown provide ample motivation to combine these references, and to combine the embodiments in Figs. 8 and 13 of Portelli with each other" as "any need or problem known in the field of endeavor at the time of invention and addressed by the patent can provide a reason for combining the elements in the manner claimed." *Id.* at 128 (quoting *KSR*, 550 U.S. at 420). Each of Portelli and Long, among others, identified and solved the problem associated with sharp edges on thermoformed trays tearing plastic overwrap film by displacing the terminal edge away from the film. *Id.* at 128–130 (citing Ex. 1003, Abstract, Figs. 8, 13, 1:29–2:18, 2:23–3:19, 5:1–2, 12, 5:25–6:3, 15:20–23, 18:3–5, 17:7–12, 20:11–16, 20:24–27, 21:17–23; Ex. 1004, Fig. 5C, 1:9–13, 3:21–4:3, 6:18–20, 7:9–19, 8:22–24, 8:33–9:1;

[11] Petitioner identifies claims 22–23 as subject to its asserted ground for invalidity based on anticipation by Portelli. *See* Pet. iv. But, Petitioner does not reassert its position in its listing of grounds (*id.* at 2) nor does Petitioner provide any substantive argument that Portelli anticipates claims 22–23 of the '624 patent (*id.* at 56–101). Having failed to set forth any argument or evidence on this issue, Portelli has waived any challenge to claims 22–23 as anticipated by Portelli.

Ex. 1002 ¶¶ 264–268). Petitioner reasons because both Portelli and Long describe similar solutions, a person of ordinary skill would have considered Long's thermoplastic and "considered it obvious to combine concepts from those similar trays." *Id.* at 130–131.

Patent Owner argues that "Long does not expressly or inherently disclose that its tray is 'visually clear' as required by claims 22 and 23." PO Resp. 61. Patent Owner argues that just because clear thermoplastics such as PET are used in Long, does not mean that the manufactured tray is clear as the thermoforming process and deformations that occur, may "induce development of opacity." *Id.* at 60 (citing Ex. 1001, 31:9–14; Ex. 2007 ¶ 165). Patent Owner argues that Petitioner admits that the trays made according to Long "are not necessarily visually clear." Sur-reply 12 (citing Reply 5–7; Ex. 2070, 184:24–185:12).

We are persuaded by Petitioner's argument and evidence that the combination of Portelli and Long would have suggested the additional limitations of claims 22 and 23. As Petitioner notes, the '624 patent describes using PET to provide a visually clear tray and Long expressly describes using PET. Pet. 50 (citing Ex. 1001, 31:1–3; Ex. 1004, 6:23–28). Mr. May further testifies that

> Long discloses several materials that the trays can be formed from, including, for example, PET and PLA. Based on my personal experience, I know that PET and PLA materials are naturally visually clear unless modified, e.g., by adding color or pigment. The '624 Patent acknowledges that PET is clear. Long does not suggest or imply the addition of any color or pigment that would interfere with the naturally clear visual properties of these materials. In my experience, when an article is specified to be thermoformed from a clear plastic and does not specify or suggest adding a colorant or pigment to the plastic, then the

> intended article will be clear. Long therefore teaches a tray that is visually clear, including the concave portion."

Ex. 1002 ¶ 121 (internal citations omitted). We acknowledge Mr. Clements' testimony that a person of ordinary skill in the art "would expect the combination of demolding and stretching of the article according to Long's methods to induce the development of opacity in the material." Ex. 2007 ¶ 165. But, Mr. Clements does not consider PET specifically nor does Mr. Clements opine that avoiding possible opacity is beyond the level of skill possessed by the ordinarily skilled artisan. *See generally* Ex. 2007. Rather, based on the teachings of the '624 patent, the ordinarily skilled artisan would know how to heat and bend the thermoplastic so as to not induce opacity in the article. Specifically, the '624 patent states

> [f]or this reason, clear thermoplastic trays, such as those made of PET reason, or PVC are preferably employed, and any heating or bending conditions imposed upon those trays during manufacture are preferably selected so as not to induce development of opacity in the materials (e.g., by heating above a softening temperature before flexing them).

Ex. 1001, 31:9–14. We also find Patent Owner's contention that Long's "Figure 1 shows it to be an opaque tray, not one that is visually clear," unavailing. PO Resp. 60. As Petitioner aptly explains, Figure 1 of Long is a drawing used to show the shape of the tray and not intended to show opacity or clarity, and any assertion to the contrary amounts to "speculation." Reply 20.

5. Remaining Claims (claims 1–10, 13–20, 24, and 29)

Petitioner alleges that claims 2–10, 13–20, 24, and 29 are anticipated by Portelli and claims 1–20, 22–26, and 29 rendered obvious by Portelli alone, or in combination with Long. Pet. 76–102, 127–134, 139–140.

Patent Owner does not dispute Petitioner's contentions that Portelli alone or in combination with Long discloses the additional limitations of claims 1–20, 22–26, and 29. *See generally* PO Resp. We have reviewed Petitioner's arguments and evidence, and agree the preponderance of the evidence shows that the Portelli alone, or in combination with Long, teaches or suggests the subject matter of claims 21–20, 22–26, and 29. Patent Owner, however, does asserts that Petitioner's proposed modifications to Portelli to combine the teachings of Figures 8 and 13 is based on hindsight (*id.* at 75–77), "the shape of the claimed article peripheries" and their functionality is not predictable and therefore not obvious to the skilled artisan (*id.* at 69, 71), that Petitioner's combination of Portelli and Long is based on hindsight (*id.* at 70) and is vague and unsupported (*id.* at 72–73), and that Long teaches away from Portelli or that Petitioner's combination defeats the principle of operation of either Portelli or Long (*id.* at 74–75). We address Patent Owner's arguments below. [12]

a) Whether Petitioner's reason to combine features in Portelli unsupported or based on hindsight

Petitioner argues that a person of ordinary skill in the art "seeing Figs. 8 and 13 together within Portelli would naturally consider it obvious to swap one or more features between them, especially since both illustrated trays achieve Portelli's goals of (1) preventing the sharp peripheral edge from cutting the overwrap, and (2) strengthening the tray's rim." Pet. 139 (citing Ex. 1003, 1:29–2:18; 17:7–12; Ex. 1002 ¶¶ 300–301). In addition,

[12] Patent Owner also argues that Grounds 6 and 7 also fail because Meadors and Brown are each non-analogous art. PO Resp. 78. But Petitioner's Ground 6 is based on Portelli alone and does not include either of Meadors or Brown. Pet. 2. We, therefore, do not address this argument.

Petitioner reasons that because the figures are part of the same document, the features and extensions would have been considered interchangeable or combinable by the skilled artisan (*id.* at 70, 72, 101, 128–129, 132), as "[c]ombining two embodiments disclosed adjacent to each other in a prior art patent does not require a leap of inventiveness." Reply 52 (quoting *Boston Sci. Scimed, Inc. v. Cordis Corp.*, 554 F.3d 982, 991 (Fed. Cir. 2009)). Petitioner further explains that the "curves and straight segments" of the figures "are textbook examples of what well-known thermoforming techniques could achieve" and combining these known features would be a matter of routine design and not hindsight. *Id.* at 52–53 (citing Ex. 1049, 569–571; Ex. 1044 ¶ 311).

Patent Owner also argues that no reason exists to combine Portelli's Figures 8 and 13 and that only through hindsight can the "disparate pieces" be combined. PO Resp. 75. Patent Owner explains that having adjacent figures in the same reference "by not itself sufficient to show a reason or motivation to combine the features of those embodiments." Sur-reply 29 (citing *Intel Corp. v. Tela Innovations, Inc.*, IPR2019-01522, 2021 WL 886443 at *9 (P.T.A.B. Mar. 9, 2021)). Patent Owner further asserts that each of the tray peripheries in Portelli's Figure 8 and Figure 13 supposedly solved the alleged problem identified and therefore, a person of ordinary skill in the art would have no reason to modify and combine features of Portelli. PO Resp. 76. Patent Owner also argues that a person of ordinary skill in the art "would not have a reasonable expectation of modifying or combining unrelated 'features' of Portelli at the time of the invention of the '624 Patent as there were only reports of failure." *Id.*

It is improper to base a conclusion of obviousness upon facts gleaned only through hindsight reference to the challenged patent. "The invention must be viewed not after the blueprint has been drawn by the inventor, but as it would have been perceived in the state of the art that existed at the time the invention was made." *Sensonics, Inc. v. Aerosonic Corp.*, 81 F.3d 1566, 1570 (Fed. Cir. 1996) (citing *Interconnect Planning Corp. v. Feil*, 774 F.2d 1132, 1138 (Fed. Cir. 1985)). Therefore, to establish a prima facie case of obviousness based on a combination of elements disclosed in the prior art, the Petitioner must articulate the basis on which it concludes that it would have been obvious to make the claimed invention. *Id.* Impermissible hindsight is inferred when the specific understanding or principle within the knowledge of one of ordinary skill in the art that would have motivated one (with no knowledge of the claimed invention) to make the proposed combination has not been explained. *In re Rouffet*, 149 F.3d 1350, 1358 (Fed. Cir. 1998).

We disagree that Petitioner's modification of Portelli is based on hindsight. Here, Petitioner has provided sufficient reasoning with rational underpinnings to explain why one of ordinary skill in the art would have modified the teachings of the applied references. *See KSR*, 550 U.S. at 418. The modifications proposed by Petitioner are supported by the record. Petitioner persuasively asserts that the features of Figures 8 and 13—including the rolled peripheral edge shapes depicted in Portelli—are interchangeable and combinable. Pet. 70, 72, 101, 128–129, 132 (citing Ex. 1003, 14:10–28; Ex. 1002 ¶¶ 161–165, 219). Thus, substituting the rim design of Figure 8 for that of Figure 13 amounts to a simple substitution of

one known element for another to yield a predictable result. *KSR*, 550 U.S. at 417.

We are also not persuaded by Patent Owner's argument that because Portelli does not solve the problem of "overwrap tearing and injuries to flesh," Petitioner must have resorted to hindsight. Portelli acknowledges the existing issue of a sharp terminal edge that has a tendency to tear or cut through plastic overwrap and describes solving that problem by "having a peripheral edge region terminating at a terminal edge which is deformed such that the terminal edge is displaced out of a wrap path around the tray." Ex. 1003, 1:30–2:25. Portelli is "prior art for all it teaches," including its displacement of the peripheral edge of the container to avoid tearing plastic overwrap film. *See Beckman Instruments, Inc.*, 892 F.2d at 1551; *Amgen Inc. v. Hoechst Marion Roussel, Inc*., 314 F.3d 1313, 1357 (Fed. Cir. 2003) (explaining that even a non-enabling disclosure is prior art for all it teaches for purposes of determining obviousness). We are similarly unpersuaded by Patent Owner's contention that having already solved the problem associated with a sharp terminal edge, no reason exists to modify Portelli's Figure 13 with Figure 8 (PO Resp. 76) as the skilled artisan would have investigated other known options to provide protection including the peripheral edges of Figures 8 and 13. *DyStar Textilfarben GmbH & Co. Deutschland KG v. C.H. Patrick Co.*, 464 F.3d 1353, 1368 (Fed. Cir. 2006) (explaining that the motivating benefit maybe based in making a product "that is more desirable, for example because it is stronger, cheaper, cleaner, faster, lighter, smaller, more durable, or more efficient").

Finally, Patent Owner's argument that because Portelli is a "failure," no reasonable expectation of success exists in combining Portelli's features.

PO Resp. 76. As we discussed (*supra* Section II.D.1.b and *infra* Sections II.D.6.d–e), we are not convinced that Portelli only results in failure. Further, the evidence suggests that Portelli's figures, depicting numerous flange shapes and edges, are known alternatives and can be substituted for one another with a reasonable expectation of success. Accordingly, we find no evidence if improper hindsight reconstruction and determine that Petitioner has shown by a preponderance of the evidence that the ordinarily skilled artisan would have has reason to combine the features of Portelli, and specifically, Figures 8 and 13.

b) Whether the article periphery would have been predictable to the person of ordinary skill in the art

Patent Owner argues that "Petitioner cannot credibly argue that the shape of the claimed article is so simple as to be predictable to a [person of ordinary skill in the art]" because "if it were so, then Petitioner should be able to confirm the exact claim element in every reference it cites and not resort to multiple 'examples' of the claim element in the same reference." PO Resp. 69. Patent Owner argues that the multiple prior art shapes "were deemed 'impossible' to implement on non-circular thermoformed articles prior to the critical date." Sur-reply 27 (citing Ex. 1009 ¶ 3; Ex. 1055, 5).

Petitioner argues that the available of multiple examples of each feature demonstrates that the claimed shapes are not, as Patent Owner suggests, "complex or unpredictable." Reply 48 (emphasis omitted). Rather, "it shows that [these] claim elements [are] so broad that it can be applied to multiple, ***alternative*** portions of a given flange in Portelli, Long, Meadors, or Brown." *Id.*

Patent Owner's argument is not well founded. Patent Owner advocates for an anticipation standard when it argues that Petitioner should

not be able to "resort to multiple 'examples' of the claim element in the same reference." PO Resp. 69. The test for obviousness, however, is not whether the claimed invention is expressly suggested in any one or all of the references, but whether the claimed subject matter would have been obvious to those of ordinary skill in the art in light of the combined teachings of those references. *See In re Keller*, 642 F.2d 413, 425 (CCPA 1981).

Here, as Petitioner contends, Portelli describes an extension having a rolled over edge where the bend region (the upper curve), a spacer, and bent portion (the lower curve) meet at the periphery of the tray edge and displace the peripheral edge. Pet. 56–76 (citing Ex. 1003, Figs. 8, 13, 3:1–3, 5:1–12, 5:25–6:3, 15:20–23, 18:3–5, 20:11–16, 20:24–27, 21:17–23; Ex. 1002 ¶¶ 132–174). Portelli also illustrates multiple embodiments where the peripheral edge of the tray is sufficiently displaced and form U-shapes, J-shapes, and spirals. Ex. 1003, Figs. 4, 6, 8, 16; *see also* Pet. 38 (providing annotated Fig. 8). Petitioner explains that "[t]he features of Fig[ures] 8 and 13 are interchangeable and can be combined." Pet. 70, 72, 101, 128–129, 132 (citing Ex. 1003, 14:10–28; Ex. 1002 ¶¶ 161–165, 219). Petitioner relies on the testimony of Mr. May who opines that "[c]laims 1–20, 22–26 and 29 do not contain a single element that does not appear in one or more of Long, Portelli, Meadors, and Brown" and that "the elements are relatively simple, geometric shapes, and therefore their functionality in a thermoformed plastic food tray is rather predictable, which renders their combination obvious." Ex. 1002 ¶ 263. Mr. May further testifies that "a person of ordinary skill in the art would understand "that the tray of Fig[ures] 12 and 13 can be introduced and thermoformed by the apparatus of Fig[ures] 7 and 8" to produce a tray that has a "peripheral edge bent all the

way over to form a Fig[ure] 8 bent portion." *Id.* ¶ 161. We credit the testimony of Mr. May and are persuaded by Petitioner's arguments and evidence that the shape of the claimed article would have been obvious to the skilled artisan. As a result, Petitioner persuasively asserts that the features of Figures 8 and 13 as well as the configurations of Long are predictable. Thus, substituting the rim designs and shapes depicted in Portelli and Long amounts to a simple substitution of one known element for another to yield a predictable result. *KSR*, 550 U.S. at 417.

Patent Owner's citation to prior patents and DexterMT marketing materials—neither of which characterize Portelli's process as "impossible"—does not persuade us otherwise. Accordingly, Petitioner has shown by a preponderance of the evidence that the shape of the claimed article would have been obvious to one of skill in the art.

c) Whether the functionality of the tray would have been predictable to the person of ordinary skill in the art

Patent Owner further asserts that the functionality of the tray is similarly unpredictable because a person of ordinary skill in the art would have known "before *and* after the earliest effective filing date" that the "flange of a non-circular article is the article's 'most frustratingly-inconsistent feature' because its dimensioning 'is extremely challenging, due to variances in the die cutting tolerances that are inherent in the thermoforming process.'" PO Resp. 71 (citing Ex. 2024, 3). Patent Owner contends that "[o]bviousness in the thermoforming art is less likely where, as here, 'artisans in the field face myriad design challenges because small design changes may cause unpredictable results and because design considerations often pull in multiple directions." *Id.* at 71–72.

Petitioner argues that "[t]here is nothing unpredictable about [the claim elements and their] functionality in a plastic food tray. Pet. 127–128. Petitioner explains that Portelli and Long, among others, "all recognized and solved the same problem" as the '624 patent. *Id.* at 128–129 (citing Ex. 1003, 1:29–2:18, 17:7–12; Ex. 1004, 1:9–13, 7:9–13; Ex. 1002 ¶¶ 264–265). Additionally, Petitioner contends that "[m]ultiple market participants—*e.g.*, Alto, DexterMT, and OMV—came up with the same rim rolling solution for preventing the edge of a plastic food container from cutting the overwrap, while improving the rigidity." Reply 49. Petitioner explains that rolling the rim in this manner was known and the "'classic' solution nearly twenty years before the priority date" of the '624 patent. *Id.* at 50 (citing Ex. 1049, 569–571). As a result, Petitioner reasons that "[d]isplacing the edge from the periphery of the article was the predictable result of the ordinary skill of a [person of ordinary skill in the art]." *Id.* at 49–50.

Patent Owner's argument regarding the unpredictability in the functionality of the combination of claimed elements is unavailing. Petitioner has shown that each of the limitations of the claims is disclosed or suggested by Portelli and/or Long. Pet. 14–87, 132–134, 139–140. And, Petitioner persuasively shows that rim design of Figures 8 and 13 are interchangeable and combinable and amount to no more than a simple substitution of one known element for another to yield a predictable result. Furthermore, the function of the combination of limitations in the '624 patent is similarly described in Portelli and Long. For example, the '624 patent purports to form thermoplastic articles

> [w]hich are formed such that one or more of the edges of the article has a conformation wherein the peripheral edge of a thermoplastic sheet from which the article is formed is turned

> away from a face of the article, and preferably away from the periphery of the article, so that a fragile material (e.g., flesh or a thin, flexible plastic sheet) that is applied against the face or periphery does not contact the edge of the sheet. Because such sheet edges can be sharp, especially when the edge has been cut or broken, directing the edge away from a face and/or periphery of the article can prevent damage to fragile materials which contact the face or periphery. [Ex. 1001, 12:19–21]
>
> [And] [y]et another advantage of the 'rolled edge' depicted in FIGS. 8 and 9 is the mechanical strength imparted to a shaped article by such an edge conformation. [*id.* at 23:21–23].

Similarly, Portelli describes including "a peripheral edge region terminating in a terminal edge which is deformed such that the terminal edge is displaced out of a wrap path around the tray" in order to avoid the "unfortunate tendency to tear or cut through plastic film within which the trays are wrapped." Ex. 1003, 1:29–2:25; *see also* Ex. 1004, 1:9–13, 7:9–13 (describing Long's rolled over edge as having "no tendency for tearing."). Portelli also states that its rolled over tray edge "mechanically strengthens the rim of the tray." Ex. 1003, 17:7–8. Accordingly, not only is the functionality of the combination of claimed elements predictable in view of Portelli and Long, it is expressly taught by Portelli and Long. That the flange of thermoformed articles may be inconsistent and therefore a poor reference point for "locating" trays and tray cavities in automated handling systems (PO Resp. 71; Ex. 2024), does not detract from Portelli's and Long's express teachings.

d) Whether Petitioner's reason to combine Portelli and Long is unsupported or based on hindsight

Patent Owner broadly argues that Petitioner's combination is based on hindsight. PO Resp. 70. Specifically, Patent Owner contends that Petitioner's allegation that both the cited references and the '624 patent

provide solutions to overwrap tearing and injuries to flesh is based on hindsight because "Portelli was a failure and Long does not work," leaving only the '624 patent to provide a solution. *Id.* Patent Owner also argues that mere similarities between the prior art references and "'advances in one type of plastic tray' are vague and unsupported" and fail to provide the necessary reason to combine. PO Resp. 72; *see also id.* at 70 (explaining that "the same long-felt need and unsolved problem of the sharp edge . . . does not render the '624 Patent's claimed solutions obvious").

Our review of the parties' arguments and evidence shows no "hindsight bias" or "unsupported" reason to combine Portelli and Long. A "[d]etermination of obviousness cannot be based on the hindsight combination of components selectively culled from the prior art to fit the parameters of the patented invention." *ATD Corp. v. Lydall, Inc.*, 159 F.3d 534, 546 (Fed. Cir. 1998); *see also KSR*, 550 U.S. at 421 (warning against hindsight bias). Instead, there must be "articulated reasoning with some rational underpinning" to support a conclusion of invalidity based on these combinations and to combine them in the way they are combined by the inventor. *KSR*, 550 U.S. at 418.

Here, both Portelli and Long teach rolling over the peripheral edge of thermoformed articles in order to prevent the terminal edge of the article from tearing a plastic overwrap. Ex. 1003, 1:29–2:8; Ex. 1004, 1:9–13, 7:9–13. Portelli and Long describe several rolled-over configurations to accomplish the expressed solution. *See* Ex. 1003, Figs. 8 and 13; Ex. 1004, Figs. 5C and 8B. Petitioner contends that "a [person of ordinary skill in the art] would have looked at multiple rounded rectangular plastic food trays and would have considered it obvious to combine the concepts from those

similar trays." Pet. 131–132 (citing Ex. 1002 ¶¶ 273–278). Portelli describes its trays as being formed from thermoplastic sheets. Ex. 1003, 1:6–20, 9:17–24, 14:10, 15:12–14, 16:15–17. Though Portelli is silent as to its preferred thermoplastic material, Long describes suitable thermoplastics such as PET. Ex. 1004, 1:1–6, 2:16–19, 2:25–32, 6:24–26. "[I]f a technique has been used to improve one device, and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way, using the technique is obvious unless its actual application is beyond that person's skill." *See KSR*, 550 U.S. at 401. Therefore, the evidence of record would have suggested to the ordinarily skilled artisan of combining the teachings of Portelli and Long by using Long's PET in Portelli. *See Wm. Wrigley Jr. Co. v. Cadbury Adams USA LLC*, 683 F.3d 1356, 1364 (Fed. Cir. 2012) (noting that the substitution of "one well-known cooling agent for another" presents "a strong case of obviousness"); *KSR*, 550 U.S. at 401 ("A court must ask whether the improvement is more than the predictable use of prior art elements according to their established functions. Following these principles may be difficult if the claimed subject matter involves more than the simple substitution of one known element for another or the mere application of a known technique to a piece of prior art ready for the improvement."). Therefore, Petitioner's combination is neither unsupported nor inspired by impermissible hindsight. We determine that Petitioner has shown, by a preponderance of the evidence, that the combination of Portelli and Long suggests the subject matter of the challenged claims and that Petitioner provides sufficient reasoning with rational underpinning for combining the references' teachings to achieve the invention the claims of the '624 patent recite.

e) Whether Long teaches away from the combination with Portelli or whether combination defeats the principle of operation of either Portelli or Long

Patent Owner further argues that "Long's criticisms, discrediting, and discouragement of Portelli's thermoformed precursor edge-rolling methods would motivate a [person of ordinary skill in the art] to avoid combining or modifying the incompatible proposals of Long and Portelli in the manner advocated by Petitioner." PO Resp. 74. Patent Owner also asserts that the combination would defeat each reference's principle of operation because "the combination advocated by the Petition would require either (i) removal from Portelli of the critical secondary thermoforming step to roll the flange, or (ii) Long to use thermoforming instead of a secondary trimming operation (which Long expressly says not to do)." *Id.* at 75 (citing Ex. 2007 ¶ 215).

We do not agree with Patent Owner's arguments that Long teaches away from a combination with Portelli. To teach away, a reference must discourage one of ordinary skill in the art from following the path set out in the reference, or lead that person in a direction divergent from the path taken by the applicant. *In re Gurley*, 27 F.3d 551, 553 (Fed. Cir. 1994) ("[A] reference will teach away if it suggests that the line of development flowing from the reference's disclosure is unlikely to be productive of the result sought by the applicant."). "A reference does not teach away . . . if it merely expresses a general preference for an alternative invention but does not 'criticize, discredit, or otherwise discourage' investigation into the invention claimed." *DePuy Spine, Inc. v. Medtronic Sofamor Danek, Inc.*, 567 F.3d 1314, 1327 (Fed. Cir. 2009) (quoting *In re Fulton*, 391 F.3d 1195, 1201 (Fed. Cir. 2004)). Long's statements contrasting double stage thermoforming methods against Long's process merely expresses a

preference for its own trimming process. Ex. 1004, 6:29–34. Patent Owner does not identify any teaching in Long that criticizes, discredits, or otherwise discourages the skilled artisan from following the path outlined by the '624 patent, and our independent review Long does not reveal any such teaching.

We are also not persuaded that the combination of Portelli and Long would be contrary to the principle of operation described in either of Portelli and Long. In considering whether a proposed modification would be obvious, we also consider whether combining references would violate the principle of operation of the modified reference. *See In re Mouttet*, 686 F.3d 1322, 1332 (Fed. Cir. 2012). A principle of operation of a prior art reference is concerned with whether the apparatus or process described therein, once modified, will operate on the same principles as before, or said another way, whether it operates in or is capable of working in the same manner. *See id.* (affirming a Board decision that using electrical versus optical components "does not affect the operability of Mouttet's broadly claimed device—a programmable arithmetic processor."); *see also Univ. of Maryland Biology Inst. v. Presens Precision Sensing GmbH*, 711 F. App'x. 1007, 1011 (Fed. Cir. 2017) (unpublished) (finding that the proposed combination would not "require a substantial reconstruction and redesign of the elements shown . . . or change in its basic principles"); *Smartdoor Holdings, Inc. v. Edmit Indus.*, Inc., 707 Fed. Appx. 705, 709 (Fed. Cir. 2017) (unpublished) (affirming the PTAB where the asserted combination would operate in the same manner), *In re Holness*, 612, F. App'x. 999, 1007 (Fed. Cir. 2015) (unpublished) (affirming the PTAB where no evidence exists that "the bar code reader in Capuano is incapable of working for a rotational motion."). What a reference teaches and how a proposed modification of a reference would

change its principle of operation are underlying factual inquiries in an obviousness analysis. *See, e.g., Icon Health & Fitness, Inc. v. Strava, Inc.*, 849 F.3d 1034, 1046 (Fed. Cir. 2017) (addressing the Board's factual findings with respect to a reference's principle of operation).

Petitioner proposes to use Long to suggest the additional limitations of claims 22–23 and 25–26, including "visually clear" tray and bent portion as well as a spacer having "a flat portion" and a height that is "substantially constant around the entire periphery of the tray." Pet. 133–134; Ex. 1001, 42:37–40, 42:43–52. Patent Owner's arguments are unavailing because they relate to whether the alternate methods of Portelli and Long can be combined and not the combination proposed by Petitioner. Therefore, we determine Petitioner has shown by a preponderance of the evidence that the subject matter of claims would have been suggested by the combination of Portelli alone, or in combination with Long, and that the skilled artisan would have had reason to combine the identified teachings of Portelli and Long.

f) Patent Owner's remaining argument

Patent Owner contends, for the first time in its Sur-reply that no reasonable expectation of success has been shown "in *any* of Petitioner's Obviousness Combinations."[13] Sur-reply 28 (emphasis added).[14] Patent

[13] Patent Owner's Response included a discussion of reasonable expectation of success with respect to Ground 6 only. *See* PO Resp. 75. We address reasonable expectation of success with respect to the combination of Portelli above in Section II.D.5.a.

[14] In its Sur-reply Patent Owner also argues that Mr. May's testimony should be accorded no weight because he "never considered [Patent Owner's] objective indicia of non-obviousness in rendering his reply obviousness opinions." Sur-reply 26–27 (citing Ex. 1002 ¶ 25; Ex. 1044 ¶¶ 295-366;

Owner raises this arguments for the first time in its Sur-reply. *Id.* at 25. As a result, Petitioner has not had the opportunity to provide any responsive argument. Thus, Patent Owner's arguments are too late and, therefore, are waived. *See* Consolidated Trial Practice Guide, 73–74 (2019) (Available at https://www.uspto.gov/TrialPracticeGuideConsolidated); Paper 7, 8 ("any arguments not raised in the response may be deemed waived").

6. Objective Indicia of Nonobviousness

The fourth Graham factor instructs that we must consider—apart from what the prior art itself would have suggested— whether objective evidence of nonobviousness (i.e., secondary considerations) may lead to a conclusion that the challenged claims would not have been obvious. *See, e.g., Stratoflex, Inc. v. Aeroquip Corp.*, 713 F.2d 1530, 1538–39 (Fed. Cir. 1983) (instructing that evidence of secondary considerations, when present, must always be considered in determining obviousness). Objective evidence of nonobviousness may include evidence of commercial success, licensing, copying, praise by others, long felt but unresolved need, and failure or skepticism of others. *Graham*, 383 U.S. at 17–18. But, secondary considerations are only a part of the "totality of the evidence"; its mere existence does not control the conclusion of obviousness. *See Richardson-Vicks Inc. v. Upjohn Co.*, 122 F.3d 1476, 1483 (Fed. Cir. 1997). Objective evidence of nonobviousness "may often be the most probative and cogent evidence in the record" and "may often establish that an invention appearing to have been obvious in light of the prior art was not." *Transocean Offshore*

Ex. 2070, 409:14–410:5. Mr. May was not offered as an expert as to the issues raised by Patent Owner's objective evidence of nonobviousness and we accord his testimony the appropriate weight based on the topics he addressed. *See* Ex. 1044.

Deepwater Drilling, Inc. v. Maersk Drilling USA, Inc., 699 F.3d 1340, 1349 (Fed. Cir. 2012).

Objective evidence of nonobviousness "is only relevant to the obviousness inquiry 'if there is a nexus between the claimed invention and the [objective indicia of nonobviousness].'" *In re Affinity Labs of Tex., LLC*, 856 F.3d 883, 901 (Fed. Cir. 2017) (quoting *Ormco Corp. v. Align Tech., Inc.*, 463 F.3d 1299, 1312 (2006)). A "nexus" is a legally and factually sufficient connection between the objective evidence and the claimed invention such that the objective evidence should be considered in the determination of obviousness. *Henny Penny Corp. v. Frymaster LLC*, 938 F.3d 1324, 1332 (Fed. Cir. 2019); *In re Paulsen*, 30 F.3d 1475, 1482 (Fed. Cir. 1994). A presumption of nexus arises where "the patentee shows that the asserted objective evidence is tied to a specific product and that product 'embodies the claimed features, and is coextensive with them.'" *Fox Factory, Inc. v. SRAM, LLC*, 944 F.3d 1366, 1373 (Fed. Cir. 2019) (quoting *Polaris Indus., Inc. v. Arctic Cat, Inc.*, 882 F.3d 1056, 1072 (Fed. Cir. 2018) (quoting *Brown & Williamson Tobacco Corp. v. Philip Morris Inc.*, 229 F.3d 1120, 1130 (Fed. Cir. 2000))); *see also Teva Pharms. USA, Inc. v. Sandoz, Inc.*, 723 F.3d 1363, 1372 (Fed. Cir. 2013) (explaining that a "presumption of a nexus" exists where a product is "coextensive" with a patent claim). If, however, the patented invention is only a component of the commercial embodiment, the patentee is not entitled to a presumption of nexus. *Fox Factory*, 944 F.3d at 1374. In addition, "[a] patent claim is not coextensive with a product that includes a 'critical' unclaimed feature that is claimed by a different patent and that materially impacts the product's functionality." *Id.* at 1375. But, "[a] finding that a presumption of nexus is

inappropriate does not end the inquiry into secondary considerations;" rather, "the patent owner is still afforded an opportunity to prove nexus by showing that the evidence of secondary considerations is 'the direct result of the unique characteristics of the claimed invention.'" *Id.* at 1374 (quoting *In re Huang*, 100 F.3d 125, 140 (Fed. Cir. 1996). Patent Owner bears the burden of establishing that a nexus exists between the evidence of secondary considerations and the patented invention. *Id.* at 1373.

Patent Owner argues that evidence of nonobviousness exists in the form of commercial success, industry praise, long-felt need, skepticism, and copying. PO Resp. 79–86. Patent Owner also contends that there is a nexus between these secondary considerations and the claimed invention. *Id.* at 80–86.

Petitioner does not dispute the evidence provided by Patent Owner. Instead, Petitioner asserts that Patent Owner's evidence of objective indicia are based on the faulty assumption that Clearly Clean Products "create[d] the market for such products where none had existed before." Reply 55 (citing Ex. 2030 ¶ 6). Petitioner argues that "Alto started selling rolled-edge trays in New Zealand since 2012, four years before [Clearly Clean Products] launched its trays in 2016." *Id.* at 55. Petitioner states that Patent Owner's deponent, Mr. Maguire, "admitted he did not know about prior sales of trays outside the US market." *Id.* (citing Ex. 1052, 28:21–29:3).

Before we address the weight of the evidence, we must first determine whether Patent Owner has demonstrated a presumption of nexus or an actual nexus between the claims and the objective indicia.

a) Nexus

Patent Owner asserts it is entitled to a presumption of nexus because the Roll Over-Wrap tray, produced by Patent Owner's licensee, embodies the challenged claims of the '624 patent. PO Resp. 80–81. Patent Owner purports to show nexus by providing a table prepared by Mr. Clements that lists in one column a Roll Over-Wrap Tray Product and in a second column the claims of the '624 patent corresponding to that product. *Id.* (citing Ex. 2007 ¶ 228–232, Appendix, A1–A175). Mr. Clements provides claim charts showing how various products embody various claims of the '624 patent. Ex. 2007, A1–A175. Petitioner does not dispute that Patent Owner has shown that a presumption of nexus applies. *See* Reply 55–56. Accordingly, we apply a presumption of nexus for purposes of our consideration of Patent Owner's objective evidence of nonobviousness.

b) Commercial success

Patent Owner asserts that since 2016, when the first sale of the Roll Over-Wrap tray were made, that there has been and exponential growth in sales. PO Resp. 81–82 (citing Ex. 2030 ¶¶ 9–10). "Patent Owner's expert believes that the exponential growth in sales and customers is a strong indicatory of market acceptance and demand for the innovations captured by the Roll Over-Wrap® Trays." *Id.* (citing Ex. 2007 ¶¶ 228–237).

There are several significant deficiencies in Patent Owner's argument. First, Mr. Clements never suggested Patent Owner demonstrated "exponential growth in sales and customers." *See generally* Ex. 2007 ¶¶ 228–237. Mr. Clements did state that, in his opinion, the "unit sales and sales dollars achieved by Patent Owner . . . were extraordinary." *Id.* at ¶ 230. Mr. Clements did not explain what "extraordinary" meant to him in

this context and provided no comparison to sales or customer data for any industry as whole. *Id.* Second, Patent Owner purports to rely on the Declaration of Mr. Maguire as support for the asserted "exponential growth," however, Mr. Maguire stated only that "[e]very model of Roll Over-Wrap tray has had continuous, *and in some cases*, exponential, increase in sales growth over the time span in which it was sold." Ex. 2030 ¶ 10 (emphasis added). Likewise, Mr. Maguire states that "[s]ince 2016, our number of customers for the Roll Over-Wrap trays have also grown at an *almost* exponential rate." *Id.* at ¶ 11 (emphasis added). Thus, Patent Owner fails to show or explain any basis for its asserted "exponential growth" in sales numbers or customers, and, based upon our review of the sales and personnel information provided by Mr. Maguire we fail to find any support for the assertion. *See* Ex. 2031 ¶¶ 8–11. Third, Patent Owner identifies no relevant market and provides no data regarding market share for its products for us to consider. *J.T. Eaton & Co. v. Atlantic Paste & Glue Co.*, 106 F.3d 1563, 1571 (Fed. Cir. 1997) ("When a patentee can demonstrate commercial success, usually shown by significant sales in a relevant market, and that the successful product is the invention disclosed and claimed in the patent, it is presumed that the commercial success is due to the patented invention.").

Petitioner argues, and we agree, that Patent Owner exaggerates its commercial success. Reply 55–56. Having considered the record evidence, we accord little weight to Patent Owner's evidence of commercial success which suggests increasing sales values and numbers of customers from 2016 to 2021, but provides no context with regard to the relevant market, such as market size or market share.

c) Industry praise

Patent Owner argues that the Roll Over-Wrap tray has received industry praise. PO Resp. 82–83. Specifically, Patent Owner states that the Roll Over-Wrap tray was awarded the 2019 Ameristar Award by the Institute of Packaging Professionals, and that industry professionals have praised the "patented features and benefits derived from those features." *Id.* at 82 (citing Ex. 2032; Ex. 2030 ¶¶ 14–15; Ex. 2007 ¶ 235). Mr. Maguire explains that he "and others decided to enter the decided to enter the Roll Over-Wrap Tray for consideration by the Institute of Packaging Professionals ("IoPP") for the prestigious Ameristar Award," and "told the IoPP that no other company in the world has been able to produce a rolled edge on a non-circular plastic tray product" and that "we were the only ones that had a patent for rolled-edge rectangular plastic tray technology." Ex. 2031 ¶ 14.

Patent Owner also directs us to three email communications. The first from March, 2020, appears to be an email from a potential customer, who, Patent Owner notes, said "[t]he . . . edge is impressive, and is definitely what we would need in order to not have to go up in film gauge." PO Resp. 83 (quoting Ex. 2034, 2). The second is an email from November, 2019, stating that "the customer has found similar trays . . . [h]owever the [competing tray] edges do not have the same rolled edge as [Patent Owner's tray]" and "[a]s a result, they may be able to use a thinner film with [Patent Owner's] trays." *Id.* (quoting Ex. 2033, 1). Third, an email from July, 2018, from a "packaging engineer" who said he was "impressed with the roll over edge design of the tray." *Id.* (quoting Ex. 2031, 2).

Having considered the record evidence, we accord little weight to Patent Owner's evidence of industry praise which consists of a single award obtained based on an application submitted by Patent Owner that claimed its product was produced by "no other company in the world" and three private emails involving what appears to be potential customers.[15] Ex. 2032; Ex. 2033; Ex. 2031. .

d) Long-felt need

Patent Owner alleges that a sharp peripheral edge existed in the thermoforming industry and that "even as of Nov[ember] 27, 2019, competitors still could not provide the rolled edge that was only available with the Roll Over-Wrap® trays." PO Resp. 83 (citing Ex. 2031).

In order to show a long-felt but unmet need for the claimed invention, the objective evidence must show that the need was a persistent one that was recognized by those of ordinary skill in the art. *In re Gershon*, 372 F.2d 535, 538 (CCPA 1967). "Evidence of long felt but unresolved need tends to show non-obviousness because it is reasonable to infer that the need would not have persisted had the solution been obvious." *WBIP LLC v. Kohler Co.*, 829 F.3d 1317, 1332 (Fed. Cir. 2016).

Here, the record evidence shows minimal, if any, evidence of long felt need. Patent Owner directs our attention to an e-mail from a customer stating that it had examined similar trays from a competitor but "the [competitor's] edges do not have the same rolled edge as yours."

[15] We observe that although Mr. Maguire testifies that he has "an entire server filled with e-mails" regarding sales, he selected only Exhibits 2032, 2033, and 2034 to produce as examples. Ex. 1052, 19:3–11.

Ex. 2033.[16] This e-mail simply states that the competitor does not have the same rolled edge as the Roll Over-Wrap tray—not that the competitor does not have a rolled edge or that the Roll Over-Wrap trays solve an unresolved, persistent problem. *Id.* Therefore, Exhibit 2033 falls short of establishing a long-felt need in the art. Patent Owner also directs our attention to the statement in the '624 patent that existing methods are not useful for making non-circular articles, to Portelli's teaching a rolled-over edge, and to Long's alternate teaching of trimming thermoformed articles instead of rolling the edges. PO Resp. 3–5, 83–84 (citing Ex. 2007 ¶¶ 24–28; Ex. 1001, 4:9–21; Ex. 1003, 2:3–8; Ex. 1004, 6:29–33; Ex. 2009, 247:23–248:10). However, Patent Owner's evidence shows that a rolled edge was known in the art through the teachings of Portelli and Long, among others. That Long prefers an alternate solution does not establish a long-felt and unresolved need in the art.

Patent Owner at best suggests problems may have existed with the mass manufacture of non-circular trays with a rolled edge, however, the '624 patent does not claim a method of manufacture that resolves any such related long felt need in manufacturing, but is instead directed to the article itself. Additionally, Patent Owner acknowledges various alternative means of packaging satisfied the need, including, for example, "utilize[ing] more expensive, heavier gauge [over wrap]." PO Resp. 5 (citing Ex. 2007 ¶ 28).

Moreover, Patent Owner directs us to no specific evidence in this case in support of its argument of long felt need, and instead ambiguously refers

[16] Patent Owner cites Exhibit 2031 in the Patent Owner Response. However, Exhibit 2031 is dated July 13, 2018 (not November 27, 2019) and does not discuss competitor products. We understand that Patent Owner's citation was in error and Exhibit 2033 was intended.

to "[a]s discussed above" and "[*s*]*ee supra*." We decline in this case to speculate as to what in the preceding eighty pages of Patent Owner's brief Patent Owner intends to rely on. Here, the record evidence shows minimal, if any, evidence of long felt need.

As a result, we accord little weight to Patent Owner's evidence of long felt need as need tied to the claimed features has not been shown.

e) Skepticism

Patent Owner contends that both Alto and Long "report[] that 'known thermal deformation processes' would cause 'puckering and distortion of the lip.'" PO Resp. 84 (citing Ex. 1004, 6:29–33; Ex. 2010 (a Request for Examination with Claim Amendments submitted by Alto to Intellectual Property Office of New Zealand stating, in part, that the procedure described "aims to provide faster online handling and to avoid puckering and distortion of the lip that often occurs with known thermal deformation processes")). According to Patent Owner, "[i]n spite of that skepticism of others, [it] proceeded contrary to the accepted wisdom in the art and not only used thermal deformation to achieve the rolled edge, but did so without any unwanted puckers or distortions." *Id.* We note, Patent Owner does not clarify what distinguishes "unwanted puckers or distortions" from acceptable "puckers or distortion."

"If industry participants or skilled artisans are skeptical about whether or how a problem could be solved or the workability of the claimed solution, it favors nonobviousness." *WBIP, LLC*, 829 F.3d at 1335. As explained above, Long's statements comparing its trimmed solution to a molded thermoformed edge in the prior art and stating that the "puckering or distortions *often encountered*" may be avoided, is one of preference not

skepticism. Ex. 1004, 6:31–32 (emphasis added). As a result, we find that evidence is entitled to little weight in our analysis.

f) Copying

Patent Owner asserts that "[u]pon gaining access to thousands of Patent Owner's patented Roll Over-Wrap® trays and discussing their manufacture and features with the Patent Owner, Petitioner was able to create at least two different knockoffs with the patented features." PO Resp. 86 (citing Ex. 2004; 2030 ¶¶ 20–21). Patent Owner directs us to the testimony of Mr. Maguire, who states he approved a purchase order from Petitioner for trays sold by Patent Owner. *See* Ex. 2030 ¶¶ 20– 21 (citing Ex. 2004). Contrary to Patent Owner's argument, Mr. Maguire does not identify any discussions with Petitioner about the manufacture and features of Patent Owner's products. *See id.* According to Patent Owner, access to its patented products combined with Petitioner's manufacture and sale of substantially similar trays is sufficient evidence of copying. PO Resp. 86.

"Copying requires duplication of features of the patentee's work based on access to that work, lest all infringement be mistakenly treated as copying." *Institut Pasteur & Universite Pierre Et Marie Curie v. Focarino*, 738 F.3d 1337, 1347–48 (Fed. Cir. 2013). Evidence of copying may take the form of "internal documents, direct evidence such as photos or patented features, or disassembly of products, or access and similarity to a patented product." *Liqwd, Inc. v. L'Oreal USA, Inc.*, 941 F.3d 1133, 1137 (Fed. Cir. 2019). But, it is well established that not every competing product that arguably falls within the scope of a patent is evidence of copying; otherwise, "every infringement suit would automatically confirm the nonobviousness of

the patent." *Iron Grip Barbell Co. v. USA Sports, Inc.*, 392 F.3d 1317, 1325 (Fed. Cir. 2004).

Here, Patent Owner relies on Petitioner's access and subsequent manufacture of "knockoff" products purportedly having the patented features. As a result, Patent Owner has shown some evidence of copying. However, while the evidence of record suggests Petitioner had actual access to Patent Owner's work, there is no evidence to suggest that copying, in fact, occurred. Therefore, we accord little weight to Patent Owner's evidence of copying from what amounts to a single purchase order of products from Patent Owner.

7. Conclusion as to Obviousness

Based upon consideration of the entire record, and for the reasons discussed above, we determine Petitioner has shown by a preponderance of the evidence that the combination of Portelli, alone or in combination with Long, teaches each limitation of claims 1–20, 22–26, and 29 and has shown that an ordinarily skilled artisan would have had a reason to combine features of both Portelli and Long as asserted to arrive at the claimed invention with a reasonable expectation of success when doing so. We also determine that Petitioner's evidence of unpatentability significantly outweighs the marginal evidence of commercial success, industry praise, long felt need, and copying provided by Patent Owner. On the whole, we find that the information provided in consideration of the *Graham* factors collectively demonstrates that Petitioner has shown by a preponderance of the evidence that claims 1–20, 22–26, and 29 of the '624 patent are unpatentable under 35 U.S.C. § 103(a) as obvious over Portelli and Long.

E. Invalidity based on anticipation by Meadors (1, 6–14, 22–23 and 29)

Petitioner contends that claims 1, 6–14, 22–23 and 29 of the '624 patent are anticipated by Meadors. Pet. 102–127. Petitioner provides a detailed explanation of its contentions in the Petition, including a clause-by-clause analysis specifying how Meadors discloses each limitation, frequently accompanied by annotated figures from Meadors, and those contentions are supported by the testimony of Mr. May. *Id.*; Ex. 1002 ¶¶ 220–260.

1. Overview of Meadors (Ex. 1005)

Meadors generally relates to methods and apparatus for forming "a multiple-thickness bead in a sheet or blank of a flexible material, such as thermoplastic material," in the process of making a container or lid. Ex. 1005, 1:5–9.

Figure 8 of Meadors is reproduced below.

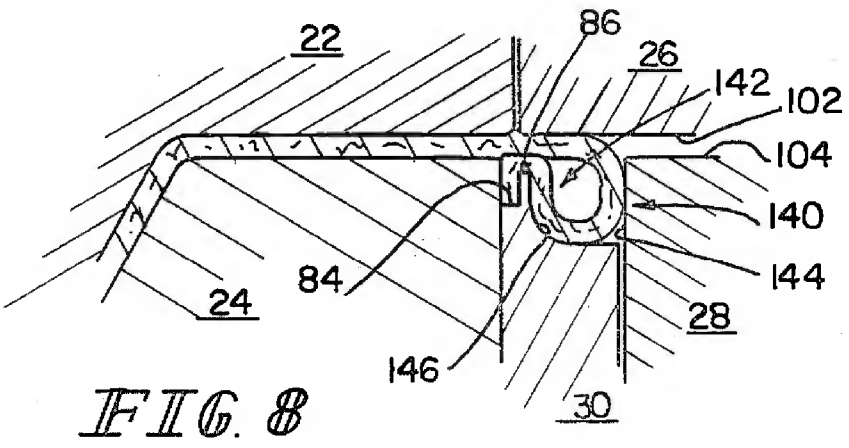


FIG. 8

In Figure 8, an apparatus with elements including vertically upper die member 22, vertically lower die member 24, vertically upper draw pad 26, vertically lower draw pad 28, and ring 30 work in conjunction to form a blank of flexible material into a desired configuration. *Id.* at 2:59–3:2, 3:57–

58, 4:67–5:3. Petitioner describes the article formed in Figure 8 of Meadors as a tray with "an extension which is bent such that the edge is displaced from the tray's periphery resulting in a smooth periphery." Pet. 11–12 (citing Ex. 1005, Fig. 8 (annotated); Ex. 1002 ¶ 45).

2. Whether Meadors is Enabled

Patent Owner argues that "[t]here is no guidance in Meadors on how to use its dies and heating coils to adequately thermoform a thermoplastic sheet to obtain the bead formations illustrated in Meadors' Figures 6–10 without tearing the sheet," and that Meadors is not enabled based on the following:

> (i) a [person of ordinary skill in the art] must re-invent Meadors' process using a thermoplastic substrate to investigate whether the same paper stock beads shown in Figures 6–10 can be achieved; (ii) there is no guidance on how to adjust the dies to properly operate on a thermoplastic; (iii) there are no working examples of a thermoplastic with the beads of Figures 6–10 formed by Meadors' dies, and (iv) because ABS, a thermoplastic, and paper stock have different material properties, Ex. 2009, 194:6–9, a [person of ordinary skill in the art] cannot predict the effects of Meadors' device on ABS. Ex. 2007, ¶¶ 206–208.

PO Resp. 65–66 (discussing *Wands* factors 1, 2, 3, and 7).

Meadors expressly discloses "[a] method and apparatus for forming a double-thickness bead in a flexible sheet stock article," and states as follows:

> According to the method, a blank 100 of flexible material is provided. Blank 100 typically is in the form of a disc-like round, rectangular, elliptical, etc., flat sheet. The material may be of any known type, including, but not limited to, paper (e.g., milk carton stock), thermoplastic material (e.g., acrylonitrile butadiene styrene), or other suitable material.

Ex. 1005, 3:40–46. In light of this express disclosure, we do not find persuasive the opinion of Mr. Clements that, based on his "experience in the

molding of paper products . . . Meadors' Figures 6–10 are exclusively limited to rolled peripheries in paper or fiber sheets" in light of "the material cross-section Meadors chose to use in its figures." Ex. 2007 ¶ 194; *see also id.* ¶¶ 200–201 (suggesting that Meadors "cannot possibly show its dies operating on a plastic substrate" because another reference includes illustrations that show that plastic substrate "thins in the corners of the die as it is flexed"). Mr. Clements's opinions on what cross-hatching symbols correlate to paper versus plastic or how another reference depicts the thickness of plastic in a die simply do not supersede the express disclosure of Meadors, which makes clear that the blank is a "flexible material" and may be "paper" or "thermoplastic." *See* Ex. 1005, 3:40–46; *see also* Reply 46 (noting that "[w]hatever material is denoted by the texture lines in the drawings [of Meadors], it is only an example").

Mr. Clements also states that "the Meadors process would never work on a plastic sheet of material," because, in his view, if it were plastic it would "rip or rupture" in response to the stretching forces applied to it." Ex. 2007 ¶ 204. Mr. Clements identifies no persuasive support for his opinion, which we accordingly find conclusory and insufficient to supplant the express disclosures of Meadors. We have also considered Mr. Clements opinion that, even though Meadors expressly discloses heating coils 90 and 92 to "heat-set the material," this does not constitute thermoforming, which requires "heat to be constantly controlled." *Id.* ¶ 207. Mr. Clements does not direct us to any disclosure in Meadors that suggests the heat is not controlled, and neglects to address Meadors' express disclosure that "[h]eating coils 90, 92, respectively are provided in the upper and lower dies 22, 24 as desired, depending, for example, upon the type of material to

be formed in the die mechanism 20." Ex. 1005, 3:36–39; *see also* Ex. 1044 ¶ 267 (Mr. May testifying that a person of ordinary skill in the art would have known "that the reason to use heated dies to shape a thermoplastic sheet is to thermoform it").

Upon balancing the *Wands* factors, we conclude that Meadors is an enabling disclosure and remains available as a prior art reference for establishing anticipation or obviousness of the claimed subject matter.

3. Analysis

In addition to arguing that Meadors is not enabled, which we found not persuasive for the reasons provided above, Patent Owner also argues that Meadors "only teaches formed sheets of paper stock," "does not necessarily disclose an article formed in the shape of a rounded rectangular tray," "does not necessarily teach a material suitable for sealing . . . using either of VSP or MAP," and "does not teach a visually clear material." PO Resp. 61–69. Based on our review of the Petitioner's arguments and evidence, we find that Petitioner establishes sufficiently that Meadors discloses each of the limitations of claims 1, 6–14, 22–23 and 29 of the '624 patent and adopt Petitioner's analysis as our own findings and conclusions as to these claims. Pet. 102–127. We focus our discussion below on the reasons why we find Patent Owner's arguments in opposition not persuasive. *See In re NuVasive, Inc.*, 841 F.3d at 974 (noting that "[t]he Board, having found the only disputed limitations together in one reference, was not required to address undisputed matters"); Paper 7, 8 (emphasizing that "any arguments for patentability not raised in the response may be deemed waived").

Claim 1 is directed to "[a]n article formed from a thermoplastic sheet." Ex. 1001, 41:17. Petitioner shows that Meadors expressly discloses

this limitation. Pet. 102–103 (citing Ex. 1005, 1:5–9, 3:36–46). Specifically, Meadors states that its "invention relates to methods of, and apparatus for, forming a multiple-thickness bead in a sheet or blank of a flexible material, *such as thermoplastic material* or paper stock, as the sheet or blank is being formed into an article such as a container or lid for a container," and that the material used in a blank to form a container "may be of any known type, including, but not limited to, paper (e.g., milk carton stock), *thermoplastic material* (e.g., acrylonitrile butadiene styrene), or other suitable material." Ex. 1005, 1:5–9, 3:36–46 (emphasis added). Patent Owner's argument that Meadors "only teaches formed sheets of paper stock" based on the cross hatching used in certain figures and on how another reference illustrates deformed thermoplastics has no merit in light of the express disclosures of Meadors that a flexible material is used and that flexible material may be a "thermoplastic material." *See* PO Resp. 61–65.

Claim 1 also provides that the recited article has a "non-circular periphery" and claims 10 and 21 further recite that the body of the article "has the shape of a rectangular tray having rounded corners and edges." Ex. 1001, 72:57–73:17; 73:40–41; 74:21–23. Petitioner shows that Meadors expressly discloses that "[b]lank 100 typically is in the form of a disc-like round, rectangular, elliptical, etc., flat sheet." Pet. 57; Ex. 1005, 3:41–43. Petitioner contends that "a non-circular periphery is inherent in Meadors," because, as Mr. May explains, "thermoform preforms typically have the general outer shape of the finished article" and "Meadors' rectangular blank means that a generally rectangular tray would be the result of subsequent processing." Pet. 57; Ex. 1002 ¶ 106. As to claims 10 and 21, Petitioner further contends that "a rounded rectangular shape is inherent in Meadors,"

because "manufacturability and robustness considerations in thermoforming require compartments and rolled flanges to have rounded corners and edges." Pet. 87, 89 (citing Ex. 1002 ¶ 141). Patent Owner argues that Meadors does not inherently disclose a noncircular periphery or rectangular tray because Mr. May testified that the periphery of the blank "generally . . . will be similar to the periphery of the finished article," and that he used the term "'[g]enerally' because it's possible to . . . trim away a portion of the blank such that you would alter the overall shape." PO Resp. 66; Ex. 2009, 202:9–16. We find no contradiction in Mr. May's testimony, as Patent Owner asserts. *See* PO Resp. 66. Mr. May explained that Meadors discloses the use of a rectangular blank and that a rectangular blank necessary produces a rectangular article. That is not contradicted by Mr. May's additional explanation that if you cut the blank the overall shape of the article may be altered. Meadors does not disclose or suggest cutting the blank. We are persuaded that a preponderance of the evidence shows that Meadors discloses an article with a "non-circular periphery" with "the shape of a rectangular tray having rounded corners and edges."

Claim 1 also provides that the recited article includes "ha[s] the overall shape of a rectangular tray with rounded corners." Ex. 1001, 41:32–33; 73:40–41. Petitioner shows that Meadors expressly discloses "a tray formed from a blank which can be rectangular." Pet. 114 (citing Ex. 1005, 2:68, 3:40–43, 4:36–39, 6:24–26, Figs. 1–4, 8).; *see also id.* at 3:41–43 ("[b]lank 100 typically is in the form of a disc-like round, rectangular, elliptical, etc., flat sheet"). Petitioner contends that "Meador's tray has the shape of a rectangular tray with rounded corners" because, as Mr. May explains,

> (1) a thermoformed article necessarily has the same outer shape as the preform/blank from which it is formed; (2) a "tray" or "rectangular tray" would necessarily have a concave compartment to hold its contents, and (3) manufacturability and robustness considerations in thermoforming require compartments and rolled edges to have rounded corners.

Pet. 114–115; Ex. 1002 ¶ 244. Patent Owner argues that Meadors does not inherently disclose a rounded rectangular tray because Mr. May testified that the periphery of the blank "generally . . . will be similar to the periphery of the finished article," and that he used the term "'[g]enerally' because it's *possible* to . . . trim away a portion of the blank such that you would alter the overall shape," and therefore undercuts Mr. May's position that that the shape would be the same as the blank. PO Resp. 67; Ex. 2009, 202:9–16. We find no contradiction in Mr. May's testimony, as Patent Owner asserts. *See* PO Resp. 67. Mr. May explained that Meadors discloses the use of a rectangular blank and that a rectangular blank necessary produces a rectangular article. That is not contradicted by Mr. May's additional explanation that if you cut the blank the overall shape of the article may be altered. Meadors does not disclose or suggest cutting the blank. We are persuaded that a preponderance of the evidence shows that Meadors discloses an article having an "overall shape of a rectangular tray with rounded corners."Claim 1 additionally recites that the extension includes "a flat sealing surface . . . being suitable for sealing a sealing film thereto using either of VSP and MAP sealing technologies." Ex. 1005, 41:24–25. Petitioner shows that [t]he extension of Meador's tray includes a flat sealing surface" that has a peripheral edge displaced away from an overwrap line making the extension suitable for use in either VSP or MAP sealing

technologies because it cannot cut the overwrap film. Pet. 106–108 (citing Ex. 1005, 3:4–19, 3:64–4:10, 36:40–58, 37:34–60, Fig. 8; Ex. 1002 ¶¶ 230–233). Patent Owner argues that "[t]he Petition asserts that Meadors' tray is suitable for use in either VSP or MAP sealing technologies based solely on the alleged features of the extension," even though "Petitioner knows that the specific tray material is critical to its suitability for MAP sealing technologies." PO Resp. 68. Patent Owner argues that acrylonitrile butadiene styrene ("ABS"), disclosed in Meadors, has an oxygen permeability similar to that of high density polyethylene which is not suitable for MAP packaging. *Id.* We disagree with Patent Owner's arguments. We observe that claim 1 recites suitability for *either* VSP or MAP sealing technologies. As Petitioner aptly notes, Patent Owner "does not dispute that Meadors's tray has an extension suitable for 'either of VSP or MAP sealing technologies" and "only addresses MAP, not VSP" when discussing the suitability of the thermoplastic itself. Reply. 47.

Claims 22 and 23 depend from claim 1 and further recites "the concave portion of the tray is visually clear" and "the bent portion of the tray is visually clear," respectively. Ex. 1001, 42:37–40. Petitioner shows that the plastic used in the tray of Meadors is ABS, that ABS is optically clear, and, thus, that the entire tray of Meadors is substantially optically clear, as required by claim 12. Pet. 127 (citing Ex. 1005, 3:45–46; Ex. 1002 ¶ 260). Patent Owner argues that the fact that "ABS *can* be naturally clear," according to Mr. May, does not mean that it is necessarily clear and therefore, the Petition is based on probabilities and possibilities." *Id.* at 68–69. We disagree. There is no dispute that Meadors discloses the use of optically clear ABS and does not disclose the use of "pigment, colorant, or

opacifier." The only conclusion the evidence supports is that Meadors discloses the use of ABS, which necessarily produces a substantially optically clear article, as required by claims 22 and 23.

F. Remaining Grounds

Petitioner argues that Long anticipates claims 1–9, 13–20, 22–26, and 29, that that Long in view of Meadors renders claims 1–20, 22–26, and 29 obvious, and that Portelli in view of Brown renders claims 10–12 obvious. Pet. 2. Petitioner directs us to portions of the asserted references that purportedly disclose the limitations in these claims. *See generally id.*

Having determined that Petitioner establishes by a preponderance of the evidence that Portelli alone, or in combination with Long, renders claims 1–20, 22–26, and 29 obvious, we need not address Petitioner's additional grounds. *See SAS*, 138 S. Ct. at 1359 (holding a petitioner "is entitled to a final written decision addressing all of the claims it has challenged"); *Boston Sci. Scimed, Inc. v. Cook Grp. Inc.*, 809 F. App'x 984, 990 (Fed. Cir. 2020) (nonprecedential) ("We agree that the Board need not address [alternative grounds] that are not necessary to the resolution of the proceeding.").

III. MOTION TO EXCLUDE

Patent Owner filed a Motion to Exclude Evidence (Paper 55), Petitioner filed its Opposition (Paper 63), and Patent Owner filed its Reply (Paper 66). Briefing was also completed on Petitioner's Motion to Exclude (*see* Papers 57, 64, 66), however Petitioner withdrew its Motion during the oral hearing explaining that its Motion has "become moot." Tr. 31:21–32:7. Accordingly, we address only Patent Owner's Motion to Exclude below.

Patent Owner seeks to exclude Exhibits 1037–1040 (MTE 2), portions of Exhibit 1044 (*id.* at 5–6), portions of Exhibit 1045 (*id.* at 7), as well as Exhibits 1051, 1053, 1057, and 1058 (*id.* at 12–13).

A. Exhibits 1037–1040

Exhibits 1037–1040 purport to be pictures of peripheral edges of thermoformed articles. Reply, ix; Ex. 1048, 115:23–122:6 (marking Exhibits 1037–1040). Though Exhibits 1037–1039 have been served on Patent Owner, they have not been filed as record evidence in this case and have not been substantively relied upon by Petitioner or Patent Owner. Reply, ix; *see generally id.* Likewise, we do not consider Exhibits 1037–1039 in rendering our Decision. Accordingly, we deny Patent Owner's motion to exclude Exhibits 1037–1038 as moot.

With respect to Exhibit 1040, Patent Owner argues that "Mr. Clements testified to the lack of foundation related to the article shown in Exhibit 1040" and that "Petitioner's counsel failed to provide any evidence to cure the objection." MTE 4. Patent Owner accuses Petitioner of "rely[ing] on Exhibit 1040 to show limitations of the challenged claims," which Patent Owner states is improper because Exhibit 1040 is not prior art. *Id.* at 5.

Petitioner contends that Patent Owner did not timely object to exhibit 1040 and no duty to cure exists where no objection is lodged. MTE Opp. 3–5. Petitioner also argues that the testimony of Mr. Naughton and Mr. May provide sufficient evidence as to the authenticity and foundation of Exhibit 1040. *Id.* at 5–7. Petitioner further asserts that Exhibit 1040 "constitute[s] the kind[] of 'facts or data' that may be admitted under Rule

703 because an expert . . . reasonably relied on them" and the probative value outweighs any risk of prejudice. *Id.* at 7.

We agree with Petitioner that Exhibit 1040 should not be excluded. First, we are not persuaded that Patent Owner timely objected to the Exhibit 1040. An objection that a witness lacks foundation or the requisite knowledge to testify as to a document is not an objection to the document itself. *See, e.g.*, Ex. 1048, 123:11–126:8. Second, Mr. Naughton's testimony as to the origins of Exhibit 1040 provide sufficient basis to ascertain its authenticity. Specifically, Mr. Naughton testified that he "visited the Alto (PactGroup) facility in New Zealand in February 2017" and that images in his declaration "show rounded rectangular meat trays with rolled rims and smooth peripheries produced by Alto (PactGroup) in New Zealand using standard thermoforming equipment and Long's technology that [he] received at TSL in Washington state after that trip." Ex. 1045 ¶¶ 15–19. Mr. Naughton continues to explain that he provided these exemplary trays to Mr. May for use in forming his opinions. *Id.* Mr. Naughton further testifies that the photographs of Exhibit 1040 used in his declaration were provided by Mr. May. Ex. 2069, 140:17–141:14. And finally, contrary to Patent Owner's assertions (MTE 5 (referring to Reply 4, 13, 15, 17), Petitioner does not use Exhibit 1040 as prior art. [17] Instead, Petitioner relies on Exhibit 1040 as rebuttal evidence that Portelli and Long are enabled. Reply 4–20, 30–44; Tr. 95:9–15. As a result, we deny Patent Owner's motion to exclude Exhibit 1040.

[17] To the extent that Petitioner implies that Exhibit 1040 is proof that Long describes the "smooth periphery" as claimed, we accord Exhibit 1040 no weight. *See e.g.*, Reply 44–45.

B. Exhibit 1044

Patent Owner seeks to exclude paragraphs 39–40, 42, 44, 46, 51–53, 116, 270–271, and 332–333 of Ex. 1044 (Mr. May's Reply Declaration). MTE 5–6. According to Patent Owner, these paragraphs include images of articles "that were alleged by Petitioner to have been made by either DexterMT or OMV" and are unauthenticated and inadmissible hearsay. *Id.* at 6.

Petitioner argues that "even if the materials cited by Patent Owner are not authenticated—which they are, as discussed below—Mr. May would still be entitled to rely on them because it is undisputed that those materials contain the kinds of facts and data on which experts in his field would reasonably rely." MTE Opp. 8. Further, Petitioner argues that the DexterMT and OMV materials were authenticated by Mr. Naughton's testimony and Mr. May's physical possession and testing. *Id.* at 10.

On this matter, Petitioner has the better argument. Here, there exists sufficient evidence to support a finding that the images and samples Mr. May relies upon are in fact what Mr. May purports them to be. Specifically, as discussed above, the images of DexterMT samples were photographs taken by Mr. May from samples he obtained himself from Mr. Willemse (of DexterMT) or from Mr. Naughton, who secured the samples during visits to New Zealand and Washington. Ex. 2070, 136:20–137:8; Ex. 1045 ¶¶ 15–19. Mr. May further testifies that he confirmed the samples were made near the 2016 time frame through his discussions with Mr. Naughton, Mr. Willemse, and through an article appearing in Thermoforming Quarterly, third quarter 2016, discussing the K-Show in Germany where certain samples were displayed and distributed to customers. Ex. 2070, 125:24–134:5.

Furthermore, the OMV images Mr. May provides purport to originate from a presentation given at the SPE Conference in Indianapolis in 2004 and were provided to him by individuals who attended that presentation. *Id.* at 212:7–213:16; 214:13–16. Mr. May testifies that he confirmed the presentation was given at the conference by discussing the presentation with conference attendees, through internet research, his own experience with OMV, and conversations with OMV personnel. *Id.* at 213:8–214:16, 215:20–217:5. We agree with Petitioner that experts like Mr. May would reasonable rely on materials, like those described in paragraphs 39–40, 42, 44, 46, 51–53, 116, 270–271, and 332–333 of Exhibit 1044, in forming the basis of their opinions. *See* Fed. R. Evid. 703. Therefore, Patent Owner's motion to strike paragraphs 39–40, 42, 44, 46, 51–53, 116, 270–271, and 332–333 of Exhibit 1044 is denied.

C. Exhibit 1045

Patent Owner seeks to exclude paragraphs 4–6, 10, and 12–14 of Exhibit 1045 (Mr. Naughton's declaration). MTE 7–12. In particular, Patent Owner alleges that, with respect to paragraphs 4–6, that Mr. Naughton's testimony is based on inadmissible hearsay. *Id.* at 7. Patent Owner also asserts that Mr. Naughton's testimony in paragraphs 10 and 12 is based on inadmissible hearsay, that paragraphs 10 and 12–14 are unauthenticated, that paragraphs 12–14 are not passed on personal knowledge, and that paragraph 14 is incomplete. *Id.* at 8–12. Petitioner asserts that the identified passages are not hearsay and even if some contain hearsay or unauthenticated information, the paragraphs are admissible as facts and data on which an expert, such as Mr. May, can rely upon under Rule 703. MTE Opp. 11–12.

We disagree with Patent Owner's characterization of Mr. Naughton's testimony as based solely on hearsay and not based on personal knowledge as Mr. Naughton's testimony indicates he has been active in the thermoforming community since at least 1985. Ex. 1045 ¶ 3. Therefore, the majority of Mr. Naughton's testimony is based on his nearly forty years in the industry. *Id.* Though Patent Owner identifies some of Mr. Naughton's testimony, including his statements regarding what Alto employees may have told him as well as the testimony regarding the Alto purchase order, we do not rely on these statements for the truth of the matter asserted, i.e., that Alto manufactured the identified trays in 2012. *See, e.g.*, *id.* ¶¶ 5 ("I know from information provided to me from Alto employees that Alto began making plastic trays . . . at least as early as 2012), 10 (discussing Alto's purchase order that was forwarded to Mr. Naughton outside the normal course of business). Instead, we consider Mr. Naughton's testimony that Alto successfully used Long's method and as evidence that Long's method is not "impossible," as Patent Owner suggests. *See* PO Resp. 40–41, 55. To the extent the evidence may have served a hearsay purpose, we assign it little, if any, weight. Further, experts like Mr. May are permitted to rely on hearsay if experts in the same field would reasonably rely on such materials in forming opinions and inferences based on the subject. *See* Fed. R. Evid. 703. To the extent that Mr. May relies on evidence that is not of the type which "experts in the field would reasonably rely," we have assigned very little weight to such evidence.[18] Thus, we deny Patent Owner's motion to exclude select paragraphs of Exhibit 1045.

[18] Even if we accorded the identified paragraphs of Exhibit 1045 no weight, it would not alter our ultimate decision finding the claims anticipated or

D. Exhibits 1051, 1053

Exhibit 1051 is a two-page portion of the website of DexterMT and Exhibit 1053 are portions of the Wiley Encyclopedia of Packaging Technology. Patent Owner asserts that Exhibits 1051 and 1053 are multipage documents and "Petitioner has failed to produce the entirety of the contents" "[i]n spite of Patent Owner's request for the complete copy" and therefore should be excluded under Federal Rule of Evidence 1002. MTE 12–13.

Petitioner asserts that "Patent Owner cites no authority for the extraordinary proposition that a webpage is inadmissible unless the proponent scours the entire website of the owner of the webpage and downloads every single webpage from that site." MTE Opp. 13–14. Petitioner directs our attention to several prior cases denying motions to exclude on similar grounds.

We are not persuaded that Exhibits 1051 and 1053 should be excluded from the record. Patent Owner does not contend that the exhibits are misleading because they are excerpted. Nor does Patent Owner contend it could not access the completed exhibits or identify any omitted portion of the exhibits that should be considered for "completeness." Indeed, it appears from the record that Exhibit 1051, while an excerpted portion of the entire DexterMT website, is a complete document within that website. Ex. 1051 The same is true with Exhibit 1053 which contains the entire entries for "Robots" and "Thermoforming" within the larger Wiley Encyclopedia of

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obvious as Patent Owner's arguments and evidence attempting to rebut the presumption of enablement of Long are inadequate.

Packaging Technology. Ex. 1053. Accordingly, we deny Patent Owner's motion to exclude Exhibits 1051 and 1053.

E. Exhibit 1057

Exhibit 1057 is a copy of the New Zealand counterpart of Long. Patent Owner asserts that Exhibit 1057 is irrelevant and should be excluded "as not being substantively relied upon in the Reply or [Mr.] May's Declaration." MTE 13. Petitioner argues that Exhibit 1057 is discussed in its Reply and used to establish that Alto marks its trays with the patent number in Exhibit 1057. MTE Opp. 15 (citing Reply 7–9).

We are not persuaded by Patent Owner's arguments that Exhibit 1057 is irrelevant and should be excluded. Petitioner relies on Exhibit 1057 to rebut Patent Owner's contention that Long is inoperable and non-enabled. Reply 30–41. Though we do not reach the issue of whether Long is enabled in our decision, Patent Owner has not shown Exhibit 1057 lacks relevance and completeness of our trial record weighs in favor of inclusion. Accordingly, we deny Patent Owner's motion to exclude Exhibit 1057.

F. Exhibit 1058

Exhibit 1058 includes a series of four images of rolled-rim articles from OMV. Ex. 1058. Patent Owner urges that we exclude Exhibit 1058 as unauthenticated. MTE 13–14. According to Patent Owner, Mr. "May's understanding of Exhibit 1058 comes from third parties who are not identified on the record or his declaration." *Id.* at 14. Petitioner asserts that "Exhibit 1058 is not cited in isolation, but as the basis for some of Mr. May's opinions." MTE Opp. 15. Petitioner explains that "[a]s an expert, he is entitled to rely on it" and "the probative value of Ex. 1058 . . . outweighs the non-existent risk of prejudice." *Id.*

We are not persuaded that Exhibit 1058 should be excluded from the record. Exhibit 1058 is offered by Petitioner and Mr. May as an "example of the feasibility of rolling thermoform flanges in a manner consistent with the teachings of Portelli." Ex. 1044 ¶ 52; Reply 18–20. And as Petitioner asserts, experts like Mr. May are permitted to rely on otherwise inadmissible materials if experts in the same field would reasonable rely on such materials in forming opinions and inferences based on the subject. *See* Fed. R. Evid. 703. To the extent that Mr. May relies on evidence that is not of the type which "experts in the field would reasonably rely," we have assigned very little weight to such evidence.[19] As a result, we deny Patent Owner's motion to exclude Exhibit 1058.

IV. MOTIONS TO SEAL

There are four pending motions to seal. Papers 16, 29, 45, 62. In addition, Patent Owner requests entry of an agreed protective order governing the handling of confidential and highly confidential information in this proceeding. Papers 16, 5; Paper 17 (Modified Protective Order); *see also* Paper 45 (noting that "[b]oth parties have accepted and agreed to the terms of the above-referenced Protective Order").

There is a strong public policy for making all information filed in an *inter partes* review open to the public, especially because the proceeding determines the patentability of claims in an issued patent and, therefore, affects the rights of the public. Generally, all papers filed in an inter partes review shall be made available to the public. *See* 35 U.S.C. § 316(a)(1); 37

[19] Even if we accorded no weight to Exhibit 1058, Exhibit 1058 is but one example in the record of thermoformed articles having rolled over terminal edges. *See, e.g.*, Ex. 1003.

C.F.R. § 42.14. Our rules, however, "aim to strike a balance between the public's interest in maintaining a complete and understandable file history and the parties' interest in protecting truly sensitive information." Consolidated Patent Trial Practice Guide 19. Thus, a party may move to seal certain information (37 C.F.R. § 42.14); but only "confidential information" is protected from disclosure (35 U.S.C. § 326(a)(7)). Confidential information means trade secret or other confidential research, development, or commercial information. 37 C.F.R. § 42.2. The standard for granting a motion to seal is "for good cause." 37 C.F.R. § 42.54(a). The party moving to seal bears the burden of proof and must explain why the information sought to be sealed constitutes confidential information. 37 C.F.R. § 42.20(c). Confidential information that is subject to a protective order ordinarily becomes public 45 days after final judgment in a trial. Consolidated Trial Practice Guide 21–22. There is an expectation that confidential information relied upon or identified in a final written decision will be made public. *Id.* A party seeking to maintain the confidentiality of the information may file a motion to expunge the information from the record prior to the information becoming public. 37 C.F.R. § 42.56.

We have reviewed each of the parties' motions to seal (Papers 16, 29, 45, 62) Exhibits 1052, 2030, 2031, 2033, 2034, 2040, 2061, and 2074, and the proposed protective order, and we agree that good cause exists to seal each of the requested papers and exhibits. We observe each of the parties' motions to seal are unopposed. *See* Papers 16, 25, 45, 57. Further the parties have provided public, redacted versions of each document they seek to protect and thus have balanced the strong public policy interest in making information available to the public with their own interests in maintaining

certain information as business confidential. Accordingly, we grant each of the pending motions (Papers 16, 25, 45, 57) to seal. We also hereby enter the proposed protective order. The protective order proposed as Appendix A, Paper 17, which is a modified version of our default protective order, shall govern the treatment of confidential and highly confidential information.

The record will be maintained undisturbed, with Exhibits 1052, 2030, 2031, 2033, 2034, 2040, 2061, and 2074 remaining sealed, pending the outcome of any appeal taken from this decision. At the conclusion of any appeal proceeding, or if no appeal is taken, the sealed documents will be made public. *See* Office Patent Trial Practice Guide, 77 Fed. Reg. 48,756, 48,760–61 (Aug. 14, 2012). Further, either party may file a motion to expunge the sealed information from the record pursuant to 37 C.F.R. § 42.56. Any such motion will be decided after the conclusion of any appeal proceeding or the expiration of the time period for appealing, and it will be denied with respect to any sealed document identified in this decision.

V. CONCLUSION

For the foregoing reasons, we conclude that Petitioner has satisfied its burden of demonstrating, by a preponderance of the evidence, that the subject matter of claims 1–20, 22–26, and 29 the '624 patent is unpatentable.[20] We grant Patent Owner's Motions to Seal (Papers 16, 29,

[20] 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*. *See* 84 Fed. Reg. 16,654 (Apr. 22, 2019). If Patent Owner chooses to file a reissue application or a request for reexamination of the challenged patent, we remind Patent

62) and grant Petitioner's Motion to Seal (Paper 45), without prejudice. We deny Patent Owner's Motion to Exclude (Paper 55).

In summary:

Claims	35 U.S.C. §	Reference(s)/ Basis	Claims Shown Unpatentable[21]	Claims Not Shown Unpatentable
1–9, 13–20, 22–26, 29	102	Long		
1–20, 24, 29	102	Portelli	1–20, 24, 29	
1, 6–14, 22, 23, 29	102	Meadors	1, 6–14, 22, 23, 29	
1–20, 22–26, 29	103	Long, Portelli	1–20, 22–26, 29	
1–20, 22–26, 29	103	Long, Meadors		
1–20, 24–26, 29	103	Portelli	1–20, 24, 29	
10–12	103	Portelli, Brown		
Overall Outcome			1–20, 22–26, 29	

VI. ORDER

In consideration of the foregoing, it is hereby:

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).

[21] In view of our determination that claims 1–20, 22–26, and 29 are anticipated by Portelli or rendered obvious by Portelli alone, or in combination with Long, we do not reach the challenged grounds where this column is blank.

ORDERED that Petitioner established by a preponderance of the evidence that claims 1–20, 22–26, and 29 of U.S. Patent No. 10,189,624 are unpatentable;

FURTHER ORDERED that the Stipulated Protective Order (Paper 17) is hereby entered;

FURTHER ORDERED that Patent Owner's Motion to Exclude (Paper 55) is denied;

FURTHER ORDERED that Patent Owner's Motions to Seal (Papers 16, 29, 62) are granted;

FURTHER ORDERED that Petitioner's Motion to Seal (Paper 45) is granted;

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.

IPR2021-00918
Patent 10,189,624 B2

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Paper 77
Date: October 20, 2022

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

TEKNI-PLEX, INC.,
Petitioner,

v.

CONVERTER MANUFACTURING, LLC,
Patent Owner.

IPR2021-00919
Patent 10,562,680 B2

Before GRACE KARAFFA OBERMANN, JAMES A. TARTAL, and AVELYN M. ROSS, *Administrative Patent Judges*.

TARTAL, *Administrative Patent Judge*.

JUDGMENT
Final Written Decision
Determining All Challenged Claims Unpatentable
35 U.S.C. § 318(a)

ORDER
Denying Patent Owner's Motion to Exclude (Paper 66)
37 C.F.R. § 42.64(c)

ORDER
Entering Stipulated Protective Order and
Granting Patent Owner's Motions to Seal (Papers 18, 30)
37 C.F.R. § 42.54

ORDER
Granting Petitioner's Motion to Seal (Paper 46)
37 C.F.R. § 42.54

We have jurisdiction to conduct this *inter partes* review under 35 U.S.C. § 6. This Final Written Decision is issued pursuant to 35 U.S.C. § 318(a) (2018) and 37 C.F.R. § 42.73 (2020). For the reasons discussed below, we determine Tekni-Plex, Inc. ("Petitioner")[1] has shown by a preponderance of the evidence that claims 1–5, 7–12, and 15–24 ("the Challenged Claims") of U.S. Patent No. 10,562,680 B2 (Ex. 1001, "the '680 patent") are unpatentable.

I. INTRODUCTION

A. Summary of Procedural History

Petitioner filed a Petition pursuant to 35 U.S.C. §§ 311–319 requesting an *inter partes* review of the Challenged Claims. Paper 1 ("Pet."). We instituted an *inter partes* review of the Challenged Claims on all grounds of unpatentability asserted in the Petition. Paper 7. Converter Manufacturing, LLC ("Patent Owner")[2] filed a Corrected Patent Owner Response. Paper 25 ("Resp."). Petitioner filed under seal a Reply to the Patent Owner Response. Paper 47 ("Reply"); *see also* Paper 45 (publicly

[1] Petitioner identifies itself and Dolco LLC as real parties in interest. Pet. 142.
[2] Patent Owner identifies no additional real parties in interest. Paper 5, 1.

accessible, redacted version of the Reply). Patent Owner filed a Sur-reply in support of the Patent Owner Response. Paper 61 ("Sur-reply").

Petitioner filed a Motion to Exclude Exhibit 2064. Paper 58; *see also* Paper 65 (Patent Owner's Opposition to Petitioner's Motion to Exclude); Paper 67 (Petitioner's Reply in Support of Its Motion to Exclude). Subsequently, Petitioner withdrew its Motion to Exclude, explaining that it was moot because Petitioner understood Patent Owner has "withdrawn the exhibit." Paper 76, 31:21–32:7. Accordingly, we consider Petitioner's Motion to Exclude as withdrawn.

Patent Owner filed a Motion to Exclude Exhibits 1037–1040, 1051, 1053, 1057, 1058, and portions of Exhibits 1044 and 1045. Paper 66 ("MTE"), 1; *see also* Paper 64 (Petitioner's Opposition to Patent Owner's MTE ("MTE Opp.")); Paper 68 (Patent Owner's Reply in Support of Its MTE ("MTE Reply"). As explained below, we deny Patent Owner's Motion to Exclude. *See infra* Section III. We also grant Patent Owner's Motions to Seal (Papers 18, 30) and Deny Without Prejudice Petitioner's Motion to Seal (Paper 46). *See infra* Section IV.

Following oral argument, we entered a transcript of the hearing in the record. Paper 76. Petitioner bears the burden of proving unpatentability of each claim it has challenged by a preponderance of the evidence, and the burden of persuasion never shifts to Patent Owner. *See* 35 U.S.C. § 316(e) (2018); 37 C.F.R. § 42.1(d); *Dynamic Drinkware, LLC v. Nat'l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015).

B. Related Matters

The parties identify the '680 patent as a subject of *Clearly Clean Prods., LLC, et al. v. Tekni-Plex, Inc., et al.*, No. 2:20-cv-04723-AB (E.D. Pa.); *Clearly Clean Prods. LLC, et al. v. Eco Food Pak USA Inc., et al.*,

No. 5:20-cv-01054 (C.D. Cal.); and *In re Certain Rolled-Edge Rigid Plastic Food Trays*, No. 337-TA-1203 (ITC). Pet. 142–43; Paper 5, 1–2. Petitioner also states that it concurrently filed petitions for *inter partes* review of U.S. Patent Nos. 9,908,281 (IPR2021-00916) and 10,189,624 (IPR2021-00918), which share a priority chain with the '680 patent. Pet. 142.

C. The '680 Patent

The '680 patent issued February 18, 2020, from an application filed on December 7, 2018, and is directed to articles processed according to "methods of displacing a sharp edge away from the periphery of an article made from a thermoplastic material, where the sharp edge might otherwise damage surfaces that contact the periphery of the article." Ex. 1001, 4:66–5:5, codes (21), (22), (45). According to the '680 patent, "[f]ormation of shaped article from thermoplastic materials is well known," and "[o]ne common use for shaped thermoplastics is to form containers that can be sealed with thin plastic films." *Id.* at 1:23–24, 1:44–47. However, if the trimmed edge of the article is sharp, "it can cut or break the film." *Id.* at 1:50–56. Thus, the '680 patent recognizes that "[i]t would be beneficial if the sharp edges of shaped thermoplastic articles could be displaced in such a way that the risk of injury or damage to sealing films could be reduced," and "[i]t would be further beneficial if such individual shaped articles could be used with multiple known sealing technologies." *Id.* at 3:48–54. The '680 patent includes over 70 figures, many with multiple drawings further labeled alphabetically. We address Figures 1, 24A, 24B, and 24C below.

Figure 1 of the '680 patent is reproduced below.

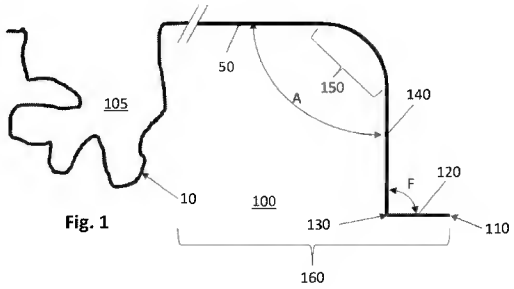
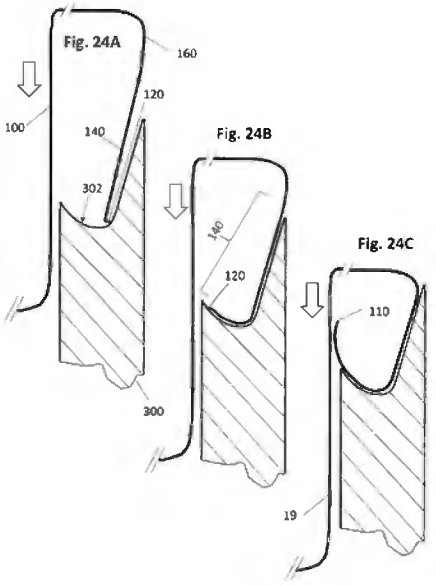


Fig. 1

Figure 1 illustrates "a sectional view of a thermoplastic article 100 having a deflectable flange 160 formed at an edge thereof." *Id.* at 6:37–39. Deflectable flange 160 includes bend region 150, peripheral edge 110, and, optionally, spacer 140. *Id.* at 19:46–48. The angle "A" formed by the bend region, between extension 50 and spacer 140, is preferably about ninety degrees. *Id.* at 13:40–44, 13:57–63, 19:52–58.

Petitioner draws attention in the Petition to Figure 25C of the '680 patent. Pet 3. Reproduced below are Figures 24A, 24B, and 24C of the '680 patent.



Figures 24A, 24B, and 24C sequentially "illustrate deflection and rolling over of the deflectable flange 160, including the sharp peripheral edge 110,"

using ram 300. *Id.* at 9:21–23, 32:53–56. The '680 patent explains that "the same deflection and rolling over of the edge can be performed on multiple edges (e.g., all edges) of the article simply by using multiple rams or a ram that contacts all edges to be so treated." *Id.* at 9:23–28. To roll and shape the edge of article 100, deflectable flange 160 is urged (in the direction indicated by the open arrows) against upper heated surface 302 of heated ram 300. *Id.* at 30:24–35. Deflectable flange 160 includes peripheral flange 120 at the peripheral end of spacer 140. *Id.* at 32:53–58. "[T]he peripheral flange 120 deflects . . . during bending of the deflectable flange 160 to the extent that it becomes completely bent over the spacer 140, forming a 'hook'-like structure." *Id.* at 32:59–63.

The '680 patent, in some embodiments, describes the degree of displacement of the peripheral edge in the context of its "offset angle" ("OA"). *Id.* at 26:48–59. The '680 patent explains that the offset angle may be assessed "using a plane that extends through the peripheral edge 110 and the portion of the deflectable flange immediately adjacent to it or by measuring the offset angle OA using a plane that extends through the elbow 130 and the portion of the deflectable flange 160 immediately proximal to it, relative to the body." *Id.*

D. Illustrative Claim of the '680 Patent

Petitioner challenges claims 1–5, 7–12, and 15–24 of the '680 patent. Pet. 1. Claim 1, the only independent claim of the '680 patent, is illustrative of the claimed subject matter and is reproduced below.

> 1. An article having a smooth, non-circular periphery, the article comprising a shaped thermoplastic substrate sheet, the shape of the substrate sheet including
>
> a body including a bottom surrounded by sidewalls and

a deflectable flange joined at a junction to the sidewalls at at least a portion of the periphery, the deflectable flange including

a peripheral edge of the substrate sheet at a position distal from the junction;

a smoothly-curved bend region interposed between the junction and the peripheral edge wherein a proximal portion of the bend region is offset from a distal portion thereof by an angle A of from 85 to 135 degrees;

a substantially planar extension interposed between the junction and the proximal portion of the bend region, the plane of the extension being substantially parallel to the bottom, and the distal portion of the bend region and the body extending away from the same face of the extension;

a peripheral flange bearing the peripheral edge and being connected to the rest of the deflectable flange by way of an elbow; and

a curved bent portion interposed between the elbow and the bend region,

wherein the curvatures of the bend region and the bent portion position the peripheral edge away from the periphery.

Ex. 1001, 72:57–73:17.

E. References and Testimony

Below we provide an abbreviated summary of the qualifications of Glenn May, who provided testimony in support of Petitioner, and James W. Clements, who provided testimony in support of Patent Owner. We also provide a table identifying the primary references relied upon by Petitioner, as well as the exhibits corresponding to the declarations and deposition testimony in the record for Mr. May and Mr. Clements. Additional testimony was provided by Mr. James Naughton, Executive Vice President at Thermoforming Systems LLC (Ex. 1045, ¶ 3), Mr. Jeff Maguire, Managing Partner of Patent Owner and of Clearly Clean Products, LLC

(Ex. 2031 ¶ 2); and Mr. Millard Wallace, Partner of Patent Owner and of Clearly Clean Products, LLC (Ex. 2063 ¶ 2).

Mr. May indicates he received a Bachelor of Science in Packaging Science from Michigan State University in 1992 and a Food Processing Certification from the University of California, Davis, in "Container Closure and Thermal Processing" in 1995. Ex. 1003 ¶ 6. He states he has "over 29 years of experience in packaging design, development, testing, sourcing and troubleshooting for large and small consumer packaged goods ("CPG) users and suppliers" in a range of products. *Id.* ¶ 8. In addition to working for various companies as a packaging engineer over his career, Mr. May is "currently owner of ProPac Consulting, which provides solutions for all types of packaging and product challenges." *Id.* ¶¶ 9–14. In addition to being an inventor on three patents, "including two for packaging," Mr. May states that he has "worked with thermoforming design, development, materials testing, supplier selection and qualification, and tooling for over three decades." *Id.* ¶¶ 7, 17.

Mr. Clements qualifications are provided on a *curriculum vitae* which indicates he received an "Associates Degree in Product Design and Development" from St. Louis Tech in 1979 and has taken "[t]raining courses from PTC Corporation in PRO/Engineer CAD software" and "[v]arious internal and external vendor courses at the Lawrence Livermore National Laboratory and Amcor Packaging." Ex. 2008, 2; *see also* Ex. 2007 ¶ 4 (Mr. Clements stating that "[d]etails of [his] professional qualifications and publications are listed in [his] current *curriculum vitae* in Exhibit 2008"). Mr. Clements indicates he was a Senior Development Engineer at Amcor Packaging from 1999 to 2021 and "[w]orked with cross-functional teams . . . to take thermoformed rigid food packaging products from

conceptual ideas through to high-volume commercial production."

Ex. 2008, 1.

References and Witness Testimony[3]	Date	Ex. No.
WO 96/01179 ("Portelli")	Jan. 18, 1996	1003
WO 2012/064203 A1 ("Long")	May 18, 2012	1004
U.S. Patent No. 4,228,121 ("Meadors")	Oct. 14, 1980	1005
U.S. Patent No. 6,960,316 B2 ("Brown")	Nov. 1, 2005	1006
Declaration of Glenn May	May 9, 2021	1002
Declaration of Glenn May	June 7, 2022	1044
Deposition Transcript of Glenn May	Jan. 20, 2022	2009
Deposition Transcript of Glenn May	June 30, 2022	2070
Deposition Transcript of Glenn May	July 12, 2022	2075
Declaration of James Naughton	June 7, 2022	1045
Deposition Transcript of James Naughton	July 6, 2022	2069
Expert Declaration of Mr. James W. Clements	Feb. 21, 2022	2007
Declaration of Mr. James W. Clements in Response to Evidentiary Objections	Mar. 14, 2022	2040
Declaration of Jeff Maguire	Feb. 21, 2022	2031[4]
Declaration of Millard Wallace in Response to Evidentiary Objections to Patent Owner Exhibits 2060, 2061, and 2062	June 28, 2022	2036
Deposition Transcript of Millard F. Wallace, III	July 12, 2022	2074

[3] The table identifies only a select number of documents particularly pertinent to this Decision. *See, e.g.*, Paper 70 (Patent Owner's Third Amended List of Exhibits); Paper 47, v–x (Petitioner's Table of Exhibits). A complete identification of the papers and exhibits that form the record of this case is available in the docket of this proceeding.

[4] Patent Owner filed a redacted version of Mr. Maguire's declaration as Exhibit 2030. Patent Owner also filed a second exhibit pertaining to an email exchange dated July 13, 2018, as Exhibit 2031 (the same exhibit number as Mr. Maguire's unredacted declaration).

F. Asserted Grounds of Unpatentability

Petitioner asserts that the Challenged Claims are unpatentable based on the following grounds (Pet. 26):

Ground[5]	Claim(s) Challenged	35 U.S.C. §	Reference(s)/Basis
1	1–3, 5, 7, 8, 10, 11, 15–23	102	Portelli
2	1–5, 7–12, 20–23	102	Meadors
3	1–5, 7–12, 15–24	103	Portelli, Long
4	1–5, 7–12, 15–24	103	Long, Meadors
5	4, 9, 24	103	Portelli
6	9	103	Portelli, Brown

II. ANALYSIS

A. Legal Standards of Anticipation and Obviousness

Petitioner contends under two grounds that the Challenged Claims are anticipated. Pet. 26. A claim is anticipated if a single prior art reference either expressly or inherently discloses every limitation of the claim. *Orion IP, LLC v. Hyundai Motor Am.*, 605 F.3d 967, 975 (Fed. Cir. 2010). "A single prior art reference may anticipate without disclosing a feature of the claimed invention if such feature is necessarily present, or inherent, in that reference." *Allergan, Inc. v. Apotex Inc.*, 754 F.3d 952, 958 (Fed. Cir. 2014) (citing *Schering Corp. v. Geneva Pharm.*, 339 F.3d 1373, 1377 (Fed. Cir. 2003)).

[5] Petitioner identifies its grounds of unpatentability in the numbered order provided in the table, which is the order in which we address the grounds below. *See* Pet. iii–vii. In its Response, Patent Owner also refers to the grounds using the numbering provided by Petitioner. *See* Resp. iii–v.

Petitioner contends under four grounds that the Challenged Claims are unpatentable based on obviousness.[6] Pet. 26. 35 U.S.C. § 103(a) sets forth as follows:

> [a] patent may not be obtained . . . if the differences between the subject matter sought to be patented 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.

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 ordinary skill in the art; and (4) when in evidence, objective evidence of nonobviousness. *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

An obviousness analysis "need not seek out precise teachings directed to the specific subject matter of the challenged claim, for a court can take account of the inferences and creative steps that a person of ordinary skill in the art would employ." *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 418 (2007). However, Petitioner cannot satisfy its burden of proving obviousness by employing "mere conclusory statements." *In re Magnum Oil Tools Int'l, Ltd.*, 829 F.3d 1364, 1380 (Fed. Cir. 2016). Instead, Petitioner must articulate a reason why a person of ordinary skill in the art would have combined the prior art references. *In re NuVasive*, 842 F.3d

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[6] The Leahy-Smith America Invents Act ("AIA"), Pub. L. No. 112-29, 125 Stat. 284, 287–88 (2011), amended 35 U.S.C. § 103, effective March 16, 2013. Because the application from which the '680 patent issued has an effective filing date prior to March 16, 2013, the pre-AIA version of § 103 applies. No issue turns on the applicable version of the statute, however, and the outcome of this Decision would be the same regardless of which version of the statute applies.

1376, 1382 (Fed. Cir. 2016); *see also Pers. Web Tech., LLC, v. Apple, Inc.*, 848 F.3d 987, 993–94 (Fed. Cir. 2017) ("[O]bviousness concerns whether a skilled artisan not only *could have made* but *would have been motivated to make* the combinations or modifications of prior art to arrive at the claimed invention") (quoting *Belden Inc. v. Berk-Tek LLC*, 805 F.3d 1064, 1073 (Fed. Cir. 2015)).

B. Level of Ordinary Skill in the Art

The level of skill in the art is a factual determination that provides a primary guarantee of objectivity in an obviousness analysis. *Al-Site Corp. v. VSI Int'l Inc.*, 174 F.3d 1308, 1324 (Fed. Cir. 1999) (citing *Graham*, 383 U.S. at 17–18; *Ryko Mfg. Co. v. Nu-Star, Inc.*, 950 F.2d 714, 718 (Fed. Cir. 1991)). In determining the level of ordinary skill in the art, various factors may be considered, 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." *In re GPAC Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995) (citation omitted).

Petitioner contends that a person of ordinary skill in the art at the time of the invention would have had "either (1) a Bachelor of Science degree in packaging science, mechanical engineering, material science, or chemistry and two years of experience designing and manufacturing thermoformed plastic items, or (2) three years of experience designing and manufacturing thermoformed plastic items." Pet. 6–7 (citing Ex. 1002 ¶ 35); Reply 53–54 (citing Ex. 1044 ¶ ¶ 28–29).

Patent Owner states that Petitioner's proposed level of skill "is acceptable" with a series of "clarifications," which do not address the relevant level of skill, but instead purport to list activities a person of

ordinary skill in the art can, or cannot, do "without considerable experimentation." Resp. 6 (citing, e.g., Ex. 2007 ¶ 31); Sur-reply 30. Patent Owner directs us to no authority, and we are aware of none, that informs that the level of ordinary skill in the art is determined based on a list of activities that allegedly require, or do not require, "considerable experimentation," as Patent Owner suggests. Patent Owner appears to confuse consideration of the level of ordinary skill in the art with whether a patent is enabled. *See In re Wands*, 858 F.2d 731, 737 (Fed. Cir. 1988) (explaining that the touchstone of enablement is whether undue experimentation would have been required to practice the claimed invention). Accordingly, we find Patent Owner's purported "clarifications" of Petitioner's proposed level of ordinary skill inapplicable.

Patent Owner also argues as follows:

> In any situation, a [person of ordinary skill in the art] in thermoforming would view publications from the standpoint of whether they taught mass-producible designs and techniques that would enable large-scale production of the articles, e.g., thousands to millions of articles, with substantially no defects (e.g., sharp edges, thin sections, weakness in corners), and not just prototype endeavors.

Resp. 7 (citing Ex. 2007 ¶ 32). We understand Patent Owner to intend to cite paragraph 33 of Mr. Clements's declaration, which appears to be identical to the quote above and cites various portions of Mr. May's deposition. Ex. 2002 ¶ 33 (citing Ex. 2009 24:7–26:3; 44:12–16; 49:23–50:4). The portions of Mr. May's deposition cited by Mr. Clements do not address the level of ordinary skill in the art and do not support the proposition Patent Owner and Mr. Clements assert in regard to "large-scale" production. For example, Mr. May stated that "[t]he prototype was to better predict the operations for mass production," and that mass production "can

widely vary" and "may be anywhere from hundreds of units to hundreds of thousands of units to millions of units." Ex. 2009, 25:21—26:4. Indeed, there is no support from any source that a person of ordinary skill in the art would have been limited to a person who "would only view publications from the standpoint of whether they taught mass-producible designs," as Patent Owner and Mr. Clements suggest. To the contrary, the '680 patent broadly "relates to the field of forming shaped thermoplastic articles," includes claims directed to "an article . . .comprising a shaped thermoplastic sheet," and provides no discussion of, or requirement for, the "large scale production of articles." Ex. 1001, 1:21–22; 72:57–73:17. That isn't to say that considerations related to the production of an article are necessarily irrelevant to our obviousness analysis, but rather, that a person of ordinary skill in the art is not limited to a person who would have only viewed "publications from the standpoint of whether they taught mass-producible designs." *See* Resp. 7.

We find that the '680 patent and the cited prior art references reflect the appropriate level of skill at the time of the claimed invention and that the level of appropriate skill reflected in these references and in the '680 patent is consistent with the definition of a person of ordinary skill in the art proposed by Petitioner. *See Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001).

C. Claim Construction

We apply the same claim construction standard that would be used to construe the claim in a civil action under 35 U.S.C. § 282(b). 37 C.F.R. § 42.100(b). Under that standard, claim terms "are generally given their ordinary and customary meaning" as understood by a person of ordinary skill in the art at the time of the invention. *Phillips v. AWH Corp.*, 415 F.3d

1303, 1312–13 (Fed. Cir. 2005) (en banc). "In determining the meaning of the disputed claim limitation, we look principally to the intrinsic evidence of record, examining the claim language itself, the written description, and the prosecution history, if in evidence." *DePuy Spine, Inc. v. Medtronic Sofamor Danek, Inc.*, 469 F.3d 1005, 1014 (Fed. Cir. 2006) (citing *Phillips*, 415 F.3d at 1312–17). Extrinsic evidence is "less significant than the intrinsic record in determining 'the legally operative meaning of claim language.'" *Phillips*, 415 F.3d at 1317.

Petitioner suggests in the Petition that no claim term requires an express construction. Pet. 9. Patent Owner discusses "thermoplastic substrate sheet" and "[a]n article having a smooth, non-circular periphery," both of which we address below.

1. "thermoplastic substrate sheet"

Claim 1 recites, in the preamble, "[a]n article . . . comprising a shaped thermoplastic sheet." Ex. 1001, 72:57–73:17. The Specification does not otherwise describe a "thermoplastic substrate sheet."

According to Patent Owner, "'thermoplastic substrate sheet' excludes sheets made of paperboard or sheets made by injection molding," because, during prosecution of a related application, "the Applicant argued that 'thermoplastic sheet' excluded paperboard and injection molded material." Resp. 8 (citing Ex. 2012, 8). We disagree with Patent Owner's characterization of the relevant prosecution history, as explained below.

A parent application to the '680 patent recited "[a] method of making a container . . ., the method comprising thermoforming a thermoplastic sheet to yield a precursor article." Ex. 1046, 68. In regard to that claim, the Applicant argued that it recited "a method in which a thermoplastic sheet

(i.e., not paperboard . . .) is thermoformed (i.e., not injection molded . . .) into a precursor article having a rim." Ex. 2012, 8.

Petitioner agrees that paperboard is not a "thermoplastic substrate sheet," but contends that the term does not exclude injection molded materials. Reply 1–2. We agree. The prosecution history relied upon by Patent Owner provides that a "precursor article" is made by "thermoforming a thermoplastic sheet," but does not address, much less limit, how the "thermoplastic sheet," itself, is formed. Thus, the prosecution history relied on by Patent Owner does not support Patent Owner's argument that "'thermoplastic substrate sheet' excludes . . . sheets made by injection molding."

We further credit the testimony of Mr. May in this regard, who explains that "whether a material is thermoformed or injection molded does not dictate whether it is thermoform*able*, since many thermoplastics are both thermoformable and injection moldable." Ex. 1044 ¶ 327 (citing Ex. 1032a, 300, 315, 332–35, 613). Likewise, the Specification of the '680 patent states that "[a] wide variety of methods (e .g., thermo-forming, casting, molding, and spinning) can be used to confer shape to a molten thermoplastic or to a preformed thermoplastic sheet that has been softened or melted." Ex. 1001, 1:24–27. In its Sur-reply, Patent Owner argues that "[t]he intrinsic evidence provides that 'thermoformed' means something other than 'injection molded.'" Sur-reply 2–3. Patent Owner's argument does not inform the meaning of the claim phrase at issue, which is "thermoplastic substrate sheet."

In sum, the Specification and the extrinsic evidence does not suggest that an injection molded sheet is precluded from being a "thermoplastic substrate sheet" and the prosecution history does not show that a

"thermoplastic substrate sheet" made by injection molding was disclaimed during prosecution. Accordingly, we find that 'thermoplastic substrate sheet' excludes sheets made of paperboard, but does not exclude sheets made by injection molding. Moreover, had we adopted Patent Owner's proposed construction, the outcome of this Decision would be the same.

2. "[a]n article having a smooth, non-circular periphery"

Claim 1 recites, in the preamble, "[a]n article having a smooth, non-circular periphery." Patent Owner argues that "the preamble of claim 1 is a limitation as it was used to overcome a rejection to the pending claim during prosecution." Resp. 9 (citing Ex. 1008, 46–47). Petitioner does not dispute that the preamble of claim 1 is limiting. *See, e.g.*, Pet. 13, 96 (arguing that "[r]egardless of whether the preamble of [c]laim 1 is limiting," it is taught by the asserted prior art). We likewise treat the preamble as a limitation.

3. Additional Claim Terms

We find that no other claim term requires an express construction for purposes of rendering this Decision. *See Wellman, Inc. v. Eastman Chem. Co.*, 642 F.3d 1355, 1361 (Fed. Cir. 2011) ("[C]laim terms need only be construed '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))

D. Scope and Content of the Asserted Prior Art

Petitioner relies on Portelli, Long, Meadors, and Brown to show that the Challenged Claims are unpatentable. Pet. 9–12. Each of these references is summarized in relevant part below. We also find that Patent

Owner fails to overcome the presumption that Portelli, Long, and Meadors are enabled for the reasons that follow.[7]

1. *Summary of Portelli*

a. *Disclosures of Portelli*

Portelli generally relates to "trays for packaging which are wrapped in plastic film or plastic wrap," as well as to methods and apparatus for producing such trays. Ex. 1003, 1:2–5. Portelli states that such plastic trays are formed by a thermoforming operation, but "have a sharp terminal edge forming the periphery thereof with an unfortunate tendency to tear or cut through plastic film within which the trays are wrapped." *Id.* at 1:29–2:2. Portelli suggests it would be advantageous to disclose "trays with a peripheral edge region which reduced the tendency of the wrap to tear." *Id.* at 2:16–18.

Figure 13 of Portelli is reproduced below.

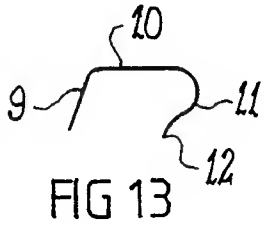


FIG 13

Figure 13 illustrates a schematic sectional view of the edge of a tray "after it has been deformed out of the wrap path." *Id.* at 8:11–13; *see also* Pet. 9–10 (discussing Figure 13 of Portelli). The tray in Figure 13 includes sidewall 9, rim 10, peripheral edge region 11, and terminal edge 12, providing "the finished tray product a more rounded peripheral edge region." *Id.* at 8:28–

[7] Patent Owner does not argue that Brown is not enabled. *See generally* Resp.

9:1, 14:10–17. Portelli discloses that the trays can have a rounded rectangular shape with a concave compartment formed therein. *See, e.g., id.* at Figs. 14–16.

b. Whether Portelli is Enabled

Patent Owner argues that "Portelli's First Embodiment (Figures 1–2 and 9–11) and Fourth Embodiment (Figures 7–8) cannot function as prior art because each is inoperative and cannot be made without unreasonable amounts of experimentation." Resp. 9–10 (citing Ex. 2007 ¶¶ 35, 36, 39, 49, 52, 53, 55, 110, 111); Sur-reply 1–11. Petitioner argues that Portelli is "operable and enabled." Reply 2–23.

Portelli "is presumptively enabling barring any showing to the contrary by a . . . patentee." *See In re Antor Media Corp.*, 689 F.3d 1282, 1287–88 (Fed. Cir. 2012); *Impax Labs., Inc. v. Aventis Pharms., Inc.*, 545 F.3d 1312, 1316 (Fed. Cir. 2008). To rebut this presumption, Patent Owner[8] "must generally do more than state an unsupported belief that a reference is not enabling." *In re Morsa*, 713 F.3d 104, 110 (Fed. Cir. 2013). With regard to allegations of anticipation, "a prior art reference need not enable its full disclosure; it only needs to enable the portions of its disclosure alleged to anticipate the claimed invention." *Antor Media*, 689 F.3d at 1290. With regard to allegations of obviousness, "[e]ven if a reference discloses an inoperative device, it is prior art for all that it teaches." *Beckman Instruments, Inc. v. LKB Produkter AB*, 892 F.2d 1547, 1551 (Fed. Cir. 1989); *see also Raytheon Technologies Corp. v. General Electric Co.*,

[8] Although the ultimate burden of persuasion remains with Petitioner, *Dynamic Drinkware, LLC v. Nat'l Graphics, Inc.*, 800 F.3d 1375, 1379–81 (Fed. Cir. 2015), *Antor Media* and *Morsa* make clear that Patent Owner bears a burden of production on the issue of the enablement of the prior art.

993. F.3d 1374, 1381 (Fed. Cir. 2021) (stating that "[i]n the absence of such other supporting evidence to enable a skilled artisan to make the claimed invention, a standalone § 103 reference must enable the portions of its disclosure being relied upon").

The touchstone of enablement is whether undue experimentation would have been required to practice the claimed invention. *Wands*, 858 F.2d at 737. A reference is enabled "even if a 'reasonable' amount of routine experimentation is required in order to practice a claimed invention." *Enzo Biochem, Inc. v. Calgene, Inc.*, 188 F.3d 1362, 1371 (Fed. Cir. 1999). Factors relevant to a determination of undue experimentation include: (1) the quantity of experimentation necessary, (2) the amount of direction or guidance presented, (3) the presence or absence of working examples, (4) the nature of the invention, (5) the state of the prior art, (6) the relative skill of those in the art, (7) the predictability or unpredictability of the art, and (8) the breadth of the claims. *Wands*, 858 F.2d at 737.

Patent Owner's arguments are primarily directed to *Wands* factors grouped in the following manner: factors 3, 5, and 6; factors 4 and 7; factor 2, and factor 1. Resp. 9–29. We follow this same arrangement and order in our consideration of the *Wands* factors below, however, we begin with factor 8, which Patent Owner does not address. *See id.*

i. The Breadth of the Claims (Factor 8)

All of the Challenged Claims are directed to an "article having a smooth, non-circular periphery, the article comprising a shaped thermoplastic sheet" with certain features, including a body with a bottom and sidewalls, and a deflectable flange. Ex. 1001 72:56–73:27, 73:31–73:45, 74:7–74:43 (claim 1 of the '680 patent and claims 2–5, 7–12, and 15–24, which depend from claim 1). The Challenged Claims do not recite a

process for making the claimed article and do not require that the claimed article be mass produced.

ii. Working Examples, State of the Prior Art, and Relative Skill of Those in the Art (Factors 3, 5, and 6)

Patent Owner argues that processes such as Portelli's thermal deformation process were known to be inoperative for rolling the flange of a thermoformed tray. Resp. 11. Specifically, Patent Owner cites statements made during the prosecution of the New Zealand counterpart to Long explaining that "puckering and distortion of the lip . . . often occurs with known thermal deformation processes." *Id.* at 11–12 (citing Ex. 2010, 1). Patent Owner also refers to statements from Long that use of its method, in contrast to a thermoformed preform, "means none of the puckering or distortions often encountered with rolling a flange is encountered." *Id.* at 14 (citing Ex. 1004, 6:29–33). Patent Owner contends that these statements would have suggested to a person of ordinary skill in the art that Portelli's process "resulted in failure and only created defective trays with puckering and distortion," and, therefore, Portelli's methods of rolling a flange to make a smooth periphery in a non-circular article was not enabled. *Id.* at 12–13 (citing Ex. 2007 ¶ 43–44).

Petitioner contends that Patent Owner misinterprets Long's statements about Portelli. Reply 20. Specifically, "Long does not suggest that 'puckering and distortions' *always* occur with edge-rolling . . . only that they 'often' occur." *Id.* Petitioner argues that the record, including Mr. May's testimony, "shows that companies use the same methods to produce trays without puckering or distortion." *Id.* Petitioner explains that thermoforming is an "extremely mature" art spanning 70 years. *Id.* at 2. Petitioner points to known thermoformed rolled rim techniques by two companies, DexterMT

and OMV, that employ methods similar to that of Portelli to make rounded rectangular articles. *Id.* at 3; *see also id.* at 6–19 (describing DexterMT's and OMV's thermoformed products). Petitioner also draws our attention to an "authoritative book by James L. Throne in 1996" that "describes the 'rolled rim' technique as '[t]he classic example of rim treatment of thin-gage parts' and 'a standard method of reinforcing the rim region' which is used for a variety of shapes." *Id.* at 3–4 (citing Ex. 1049, 569–571; Ex. 1047, 74:17–75:8). Petitioner explains that Throne, like Portelli, uses heat and a forming tool to roll the flange of a thermoformed article by displacing the peripheral edge inwardly. *Id.* at 4 (citing Ex. 1003, Fig. 8; Ex. 1044 ¶¶ 48, 53; Ex. 1049, 571).

The statements Patent Owner identifies in Long and its New Zealand counterpart do not persuade us that a person of ordinary skill in the art would have understood Portelli's thermoforming method to be inoperative or a failure. As Petitioner aptly notes, neither Long nor its New Zealand counterpart states that puckering *always* occurs. Reply 20. Rather, Long and its New Zealand counterpart contrast a problem that *often* occurs when describing the benefits of Long's claimed trimming process. We do not view statements distinguishing the purported advantages of one invention against another as rising to the level of establishing that thermal deformation processes, like that of Portelli, are known to be "inoperative [or] cannot be made or used without unreasonable amounts of experimentation," as asserted by Patent Owner. Resp. 11–13.

Next, Patent Owner argues that Mr. May's reproductions of the figures of Portelli illustrate puckers formed at the tray's periphery. *Id.* at 13–16. Patent Owner reproduces Mr. May's annotated Figure 8, including its own annotations, and argues that Mr. May's illustrations

confirm puckering occurs in Portelli. *Id.* at 15–16 (reproducing a variation of Figures 8 and noting that puckering purportedly occurs at "S"). Patent Owner dismisses the notion that the highly zoomed in figures it relies upon merely show "pixilation" or an "anomaly" in the quality of the line drawing, because that would purportedly "contradict the record evidence, including the failures" Patent Owner identified. *Id.* at 16. Petitioner argues that a person of ordinary skill in the art would have recognized the purported defects in Figure 8 of Portelli as "merely imperfections in a manually drawn figure in which the draft person overshot the lengths of certain lines." *Id.* at 21 (citing Ex. 1044 ¶ 59).

We do not interpret Portelli's figures as showing "sharp pointed puckers" on the tray periphery at "s" on Patent Owner's annotated figures. *See id.* at 13–15 (Portelli Figure 8 (modified) and annotated by Patent Owner). Patent Owner directs us to nothing in Portelli to suggest that the distortions seen in the enlarged figures are intentional, as opposed to a product of the enlargement of manually-drawn images. Portelli's figures are not photographs of an actual tray and Portelli does not discuss or identify these imperfections as puckering or any other aspect of its thermoformed tray. *See generally* Ex. 1003.

Patent Owner further argues that Mr. May admitted Portelli's fourth embodiment is not operative. Patent Owner first directs us to Portelli, which states in regard to the process shown in Figures 7 and 8 that "an ejector 27 for detaching the trays 5 with deformed edges from the die 25 is located within the interior of the die 25." *Id.* at 16; Ex. 1003, 13:15–16. Portelli further states as follows:

> In use, carrying out the method of the invention, an inverted tray is provided or mounted on the support 24. At this

> point the terminal edge 12 forms the peripheral edge of the tray 5. The support 24 is then moved upwardly towards the die 25 by actuating the piston and cylinder assembly. As a result, the peripheral edge region 11 of the tray 5 is brought into contact with the die 25. This heats the peripheral edge region 11 of the tray making it malleable and then deforms or rolls the peripheral edge region 11 of the tray 5 such that the edge 12 is displaced out of the wrap path. This position is illustrated in Fig. 8.
>
> The support 24 is then retracted downwardly away from the die 25. Generally the tray 5 would remain in contact with the die 25 after the support 24 was lowered or retracted. This is because the malleable plastic of the peripheral edge region 11 tends to adhere to the hot die 25. The ejector 27 which is sandwiched between the base 8 of the tray 5 and the die 25 is then urged downwardly away from the die 25 to detach the tray 5 from the die 25 causing it to drop onto the support 24. Any suitable means can be used for urging the ejector 27 downwardly. As such mechanisms are well known in the art they are not discussed further in the specification. Separation of the tray 5 from the die 25 facilitates cooling of the peripheral edge region 11 of the tray 5 allowing it to harden in a deformed condition.

Ex. 1003, 13:18–14:6.

According to Patent Owner, Mr. May "admitted" this portion of Portelli was inoperable because Mr. May stated during his deposition as follows:

> Q . . . in Portelli10 page 13, lines 28 to 29, did you consider in any of your opinions related to Portelli's Figures 7 and 8 that the plastic of the peripheral edge Region 11 would adhere to the hot die 25?
>
> A I think that that's understood to be a concern or an issue, and a POSITA reading Portelli would be alerted by this teaching of Portelli that that's something to beware of.
>
> Q In your experience, what issues could result when the plastic adheres to a hot die in a thermoforming operation?
>
> A If that were to occur, the part could stick to the mold, causing a jam, the part may not be ejected properly.

> Subsequent parts, after that part was removed, if the residue or the plastic was not removed sufficiently, could be compromised in terms of proper formation.
>
> Q Could sharp edges result when the plastic adheres to the die?
>
> A If an edge adheres to a die, it's very likely that article would be defective and would be discarded or recycled. So I think Portelli is explaining this such that a POSITA reading it would understand in the progressive deformation of the peripheral edge to beware of the edge becoming stuck to a mold or a die.
>
> Q And when a plastic product is stuck to the die, when you push it off of that die, have you -- do you remember the types of results that would transpire/what type of surfaces were formed by having been removed from adhering to the die?
>
> A The continuous heat of a die of this nature could deform the article, very likely causing a type of defect that would require disposal of the item.

Ex. 2009, 276:7–277:18). At no point in the testimony cited by Patent Owner, reproduced above, does Mr. May "admit" that any aspect of Portelli would have been inoperable. In this regard, we agree with Petitioner that Patent Owner mischaracterized Mr. May's testimony and that, instead, Mr. May "merely stated the unremarkable fact that if an edge of an article stuck to a die, it might be defective." Reply 19 (citing Ex. 2009, 276:7–277:18). Indeed, Patent Owner's expert, Mr. Clements, testifies that a person of ordinary skill in the art would have understood how to overcome this issue of sticking as "there are a 'wide variety' of techniques to prevent parts from sticking to a hot die, including treating the surface with a non-stick coating, controlling process time and temperature, and the 'list goes on from there.'" Reply 19 (citing Ex. 1047, 40:19–43:14); *see also* Ex. 1044 ¶¶ 67–68 (citing Ex 1056, 305–306; Ex. 1050, 168).

Patent Owner then turns to recent thermodynamic simulations performed by Mr. Clements, from which, according to Patent Owner, a person of ordinary skill in the art would have understood to show that "uncontrolled expansion and rippling or deformation (buckling or melting) [would occur] in response to either (i) being pressed into die 25 and/or (ii) succumbing to the force of gravity." Resp. 17–19 (citing Ex. 2007 ¶¶ 60, 102–105). Patent Owner argues that this is consistent with Portelli, which states that the "heat treatment step may also effect some beading of the plastic by melting." *Id.* (citing Ex. 1003, 17:5–6).

Petitioner argues that the thermodynamic simulations by Mr. Clements were flawed and only theoretical, as "no physical tests [were performed] to verify his theories." *Id.* at 21–22 (citing Ex. 1047, 73:11–74:2, 144:18–23; 147:15–148:19). Specifically, Petitioner explains that Mr. Clements simulations were "fundamentally flawed" for the following reasons:

> [Mr. Clements] ignored all the heat flowing into the support 24 illustrated in Portelli Fig. 8, unrealistically assuming that all of the heat enters the peripheral edge region 11 from the die and propagates through the thin plastic to the base 8;
>
> [o]mitt[ed] the cooling effect of the support 24 artificially elevated the flange temperatures in Mr. Clements's model, making the flange look hotter and weaker than it would actually be, causing Mr. Clements to conclude erroneously that the flange would buckle and deflect in the wrong direction when engaged by the die 25; [and]
>
> ignore[d] heat-shielding and water-cooling [in Portelli's heated-air embodiments].

Id. at 22–23 (citing Ex. 1003, 4:3–6, 4:10–12, 7:1–6, 11:20–21, 19:20–21, 22:26–28; Ex. 1044 ¶¶ 36, 71, 94–97, 122; Ex. 1047, 153:4–14, 155:11–156:15; Ex. 2007 ¶¶ 40–45, 60, 83–84). We find that the thermodynamic

simulations Mr. Clements provided indicate deformation may occur under some circumstances, but agree with Petitioner that Mr. Clements failed to account for numerous teachings in Portelli such as the heat flow and cooling effects identified by Petitioner. *See id.*

Lastly, Patent Owner states that "[n]either Patent Owner, its expert, nor Petitioner's expert are aware of any working examples of Portelli or anything similar to it." Resp. 21 (citing Ex. 2007 ¶ 35–36; Ex. 2009, 310:25–311:4). Once again, Patent Owner misrepresents the testimony of Mr. May. Mr. May was asked whether he "personally ever tried to do what Portelli has shown in Exhibit 1003." Ex. 2009, 309:2–3. Mr. May explained at length that he "created articles with rolled edges," that he "may have used processes that were similar to Portelli," and that "Portelli certainly offers a method of producing [articles with rolled edges]." *Id.* at 309:2–311:4. At no point, in the portions of Mr. May's deposition cited by Patent Owner, did Mr. May indicate that he was not aware of any working examples of Portelli or "anything similar," as Patent Owner asserts. Resp. 21. Moreover, though Patent Owner argues that Portelli discloses no working examples, working examples are not required to show enablement. *See Beckman Instruments*, 892 F.2d at 1551 (actual implementation is not required to enable a prior art reference); *Schering Corp. v. Geneva Pharms., Inc.*, 339 F.3d 1373, 1380 (Fed. Cir. 2003) (explaining that anticipation does not require the actual creation or reduction to practice of the prior art subject matter).

iii. Nature of the Invention and Predictability of the Art (Factors 4 and 7)

Patent Owner argues that "[t]he critical dependence on polymer chemistry and how plastic reacts to different degrees of heating and cooling

qualifies thermoforming as a highly unpredictable art field." Resp. 22 (citing Ex. 2007 ¶ 21). According to Patent Owner, the "highly unpredictable aspects" of Portelli's first embodiment include its use of hot air convection vectors and "the extent and direction of the plastic's thermal expansion along the terminal edge region." *Id.* As a result, Patent Owner explains that rippling, folding, and puckering occur which is detrimental to the smoothness of the periphery of the edge and even more so when that edge is folded over. *Id.* at 22–24. Patent Owner reasons that Portelli is not enabled because Portelli does not teach the following:

> how to (i) control the hot air from ducts 2 to consistently heat the precursor region 11 and edges 12; (ii) control the unpredictable thermal expansion of either edge 12, region 11, or tapers 42 while simultaneously avoiding the distortions and puckering that would result from using the unheated formers 34–41; or (iii) achieve a mass-producible rectangular article having a smooth periphery on "high volume assembly line scale."

Id. at 25–26 (citing Ex. 2007 ¶¶ 39–44).

Patent Owner's assertion that Portelli does not describe how to prepare mass-produced, high-volume articles is misplaced. The Challenged Claims are merely directed to an article and do not provide any limitations directed to whether that article is "mass-producible" or is commercially manufactured on a "high volume assembly line scale." *See* Ex. 1001 72:56–73:27, 73:31–73:45, 74:7–74:43.

We find Patent Owner's argument that Portelli describes a process that uses of "hot air convection" and "thermal expansion" that is unpredictable, because Portelli does not detail how to control the process, not persuasive and contrary to the evidence of record. *See* Resp. 22–26. Petitioner shows that thermoforming is a mature art that has been successfully practiced for many years. Reply 2–6. Further we note the

numerous prior art references and commercial articles of record, predating and existing near or at the time of the '680 patent, describe using heat to thermoform and shape articles, including rectangular articles, as indicators of a well-developed state of the art. *See e.g.*, Ex. 1049, 124–128; Ex. 1044 ¶¶ 42–49, 52; Ex. 1051; Ex. 1053; Ex. 1058; Ex. 1003; Ex. 1004; Ex. 1005; Ex. 1047, 23:1–23 (describing thermoforming as a "mature art").

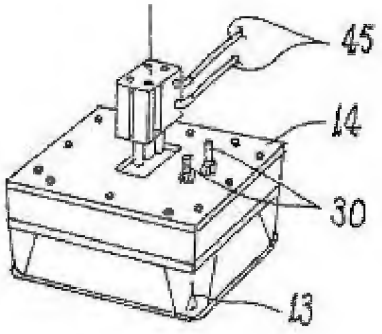
Further, Portelli explains that its method heats the peripheral edge of the tray such that the peripheral edge becomes malleable and can be shaped. Ex. 1003, 2:28–30. Portelli describes one embodiment that "comprises blowing hot air over the peripheral edge region of the tray" so that it is heated and is shaped around a former and complementary deforming formation. *Id.* at 6:22–29. Portelli also explains that "the apparatus includes shield means for shield[ing] that portion of the tray laterally inwardly of the peripheral edge region, from the hot air blast" and may also include a "cooling means for actively cooling the peripheral edge region of the tray." *Id.* at 7:1–6; *see also id.* at 4:3–12; 9:27–29 (interrupting the hot air blast and the edge region is cooled); 11:15–26. Portelli explains that the cycle time for its method is "dependent on the aggressiveness of the heating of the edge region 11 . . . and the rate at which the edge region 11 is cooled." *Id.* at 10:6–14. According to Portelli the preferred method for cooling the tray is to use "cooling water [that] is circulated through pipes 30 mounted on former 3 thereby acting to cool the former 3 which in turn cools the region 11." *Id.* at 10:21–24. Mr. May further testified regarding numerous methods, known to persons of ordinary skill in the art, to control and minimize the problems identified by Patent Owner. Ex. 1044 ¶¶ 72–82 (citing Ex. 1035, 61–65, 185, 194–195; Ex. 1050, 183–187). Patent Owner does not adequately address or explain what is lacking in Portelli's

disclosure or why Portelli's shielding and cooling means are not sufficient to control the heating of the peripheral edge. *See generally* Resp. 22–26; Sur-Reply.

iv. Amount of Direction or Guidance (Factor 2)

Patent Owner argues that Portelli's first embodiment (Figures 1–2 and 9–11) use nonstandard thermoforming equipment which weighs against enablement. Resp. 26. Specifically, Patent Owner contends that "a [person of ordinary skill in the art] would not know what a 'clacker box' is nor would . . . be able to obtain the specifications needed to make one." *Id.* Patent Owner states that Mr. May testifies that he "couldn't say [if] he had ever seen Portelli's nonstandard equipment in Figures 9–11 prior to the earliest effective filing date." *Id.* at 27 (citing Ex. 2009, 324:5–20, 338:19–340:17). In this regard, Mr. May testified that he had seen "something similar" to the thermoforming equipment of Portelli "within [his] 30 years of experience," but did not recall whether it was before or after August of 2015. Ex. 2009, 324:5–20. Patent Owner reasons that this testimony is "further proof that a [person of ordinary skill in the art] would not have had the requisite equipment to even attempt Portelli's First Embodiment methods," and that "it was incumbent on the Portelli reference to sufficiently describe this non-standard machinery." *Id.*

The crux of the issue is whether the ordinarily skilled artisan would understand from the description of Portelli's "clacker box" what it is and how to use it. A portion of Figure 11 of Portelli illustrating its "clacker box" is reproduced below.



The excerpt of Figure 11 above shows clacker box 14, including clamping feet 13, water cooling pipes 30, and compressed air conduits 45 for moving feet 13 of clacker box 14 in and out from under rim 10 of a tray being formed. Ex. 1003, 11:27–29. Portelli also explains that clacker box 14 acts to shield the upper portion of the rim from the hot air blast. *Id.* at 11:20–21.

Petitioner shows that using heated air for thermoforming articles was standard practice and widely-known to persons of ordinary skill in the art. Reply 23 (citing Ex. 1049, 124–128). Petitioner argues that "[t]he use of hot-air manifolds such as illustrated in Figs. 9–11 of Portelli was so well-established that a [person of ordinary skill in the art] could buy manifolds as standard, of-the-shelf components." *Id.* (citing Ex. 1044 ¶ 88). Petitioner explains that "Portelli's manifold is not an exotic part just because it has an unusual name—'clacker box.'" Reply 23. In this regard, Mr. May testifies that Portelli's clacker box "is a typical hot-air manifold whose behavior and performance would have been well-understood by a [person of ordinary skill in the art.]" Ex. 1044 ¶ 87.

Patent Owner does not discuss or dispute—separate from criticism of the term "clacker box"— whether Portelli describes a component sufficiently for a person of ordinary skill in the art to make and use the component identified as a clacker box. We do not find compelling Patent

Owner's assertion that a person of ordinary skill in the art would not have known from Portelli what a "clacker box" is or how to obtain one.

v. Quantity of Experimentation Necessary (Factor 1)

Patent Owner argues that a "combination of certainties and uncertainties make" experimentation with Portelli's first and fourth embodiments unreasonable. Resp. 27. With respect to the first embodiment, Patent Owner identifies the following issues: "(1) excess plastic tapers 42 on the periphery will always result and will leave puckers or other distortions on the periphery;" "(2) the convection vectors of the hot air from ducts 2 is unpredictable and there is no teaching on how to control it;" and "(3) every plastic that Portelli [uses] has a natural unpredictability in terms of its reaction to heat and its thermal expansion which necessarily prevents a [person of ordinary skill in the art] from knowing what it will do in response to unequal heating by hot air from ducts 2 and repeated impact by formers 3." *Id.* at 27–28 (citing Ex. 2007 ¶¶ 38–45, 52). Patent Owner also identifies the following "combination of certainties and uncertainties" with respect to Portelli's fourth embodiment: "(1) in moving the sharp terminal edge 12 away from the periphery, a new sharp corner . . . is formed;" "(2) an uncontrolled amount of radiant heat will cause unpredictable weakening, expansion, and rippling in the plastic;" "(3) the adhesion between peripheral edge region 11 and hot die 25 would result in defective articles upon ejecting the same from the mold;" "(4) the adhesion between peripheral edge region 11 and hot die 25 would "un-roll" the deformed region 11 as the article is ejected from die 25;" and "(5) the combination of heating and gravity will cause the terminal edge 12 to wilt or buckle in response to being pressed into die 25 and the rim 10, zone "X",

and portions of sidewall 9 will become softened, weakened, and deformed." *Id.* at 28 (citing Ex. 2007 ¶¶ 55–57, 60, 80, 81, 103–109).

We find Patent Owner's argument that the amount of experimentation to make and use Portelli would have been unreasonable not persuasive. *See* Resp. 27–29. The test for enablement is "not merely quantitative." *PPG Indus., Inc. v. Guardian Indus. Corp.*, 75 F.3d 1558, 1564 (Fed. Cir. 1996). On the contrary, "a considerable amount of experimentation is permissible, if it is merely routine." *Id.*; *In re Vaeck*, 947 F.2d 488, 495 (Fed. Cir. 1991) ("That *some* experimentation may be required is not fatal; the issue is whether the amount of experimentation required is 'undue.'"). Patent Owner fails to identify what about the quality or quantity of experimentation is "undue" with respect to enabling a person of ordinary skill in the art to practice the process taught by Portelli to produce an article with the features of the Challenged Claims. As explained above, we disagree with Patent Owner that the evidence of record shows that the peripheral edge always puckers, that Portelli results in uncontrolled heating, that adhesion necessarily occurs, or that the skilled artisan would not know how to overcome adhesion to the die. *See* Resp. 27–28. In this regard, Mr. Clements acknowledges experimentation is routine in the art of thermoforming plastics. Ex. 2007 ¶ 21.

vi. Conclusion as to Enablement of Portelli

Based on our analysis above, we find in consideration of all of the evidence and argument advanced by the parties that, on balance, each of the *Wands* factors discussed above weighs in favor of showing that Portelli is enabled for purposes of both anticipation and obviousness.

2. Summary of Long

a. Disclosures of Long

Long "relates to an open mouthed container (eg. tray, cup or the like) having a profiled periphery outwardly of the mouth, there being a return of the edge in the under part of the profiled periphery." Ex. 1004, 1:4–6. Long discloses the use of a trimming procedure applied to "a thermoformed precursor or preform" to provide a container with "a 'concealed-from-above' in-turned edge." *Id.* at 1:19–25.

Figures 4, 5A, 5B, and 5C of Long are reproduced below.

FIG. 4

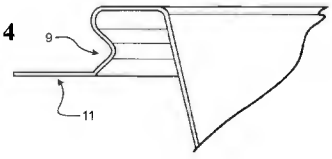


FIG. 5A

FIG. 5B

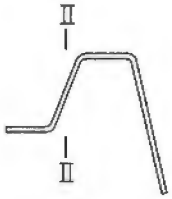


FIG. 5C

Figure 4 illustrates the edge region of a preform or precursor container prior to trimming. *Id.* at 6:4–6. Long further explains as follows in regard to Figures 5A, 5B, and 5C:

> Figures 5A, 5B and 5C show, as three stages, the features of Figure 4, the distortion, deforming, stretching, blowing or the like of the form of Figure 5A sufficiently to provide a cut line shown by the broken lines II-II in Figure 5B which is outwardly of the final profile periphery and Figure 5C shows how the resilience allows the under turn of the preform or precursor of Figure 5A to be reassumed after the cut has been made on the broken line as shown in Figure 5B.

Id. at 6:7–12.

b. Whether Long is Enabled

Patent Owner argues that "Long's prophetic disclosures taken 'as a whole' do not enable a [person of ordinary skill in the art] to make and use any of what is mentioned, experimentation or not." Resp. 50–51. According to Patent Owner, "Long as a reference teaches very little except incomplete and erroneous proposals for the [person of ordinary skill in the art] to figure out on its own." *Id.* at 34 (citing Ex. 2007 ¶¶ 122–124). Critically, according to Patent Owner, "Long provides no evidence that its theoretical proposals, to the extent they can be practiced or understood, can be successfully used to make a rectangular thermoformed tray having a smooth-edged periphery -*via any process amenable to mass manufacturing*." *Id.* (citing Ex. 2007 ¶¶122-124, 212) (emphasis added). Patent Owner's enablement argument is fundamentally flawed because the Challenged Claims do not recite an article manufactured by a "process amenable to mass manufacturing." Petitioner may rely on Long for all that it teaches to show

obviousness even if Long does not teach a "process amenable to mass manufacturing."

Specifically, Patent Owner argues that "Long mentions a 'first tooling assembly' but in no way describes what it is," that "Long's precursor requires a mold whose rim has a significant negative draft," and that according to modeling done by Mr. Clements "using Mr. May's dimensions of Long's periphery, . . . shrinkage of the periphery of the thermoformed thermoplastic of the article enters into the undercuts of the mold to become 'trapped.'" *Id.* at 35–37 (citing, e.g., Ex. 2007 ¶ 122–140, 154; Ex. 2010, 13). From this, Patent Owner argues that "in the process of attempting to recreate Long's proposals using a mold with undercuts, the [person of ordinary skill in the art] would realize that the proposed methods yield a trapped part that is unusable for any further processing." *Id.* at 37 (citing Ex. 2007 ¶¶ 136, 152). Patent Owner contends that "a cooled precursor could not be released from the mold without breaking it while a heat-softened precursor could not be released without also permanently deforming the periphery into a contour different from the one required by Long Figure 5A," and that the "impossible removal problem is further complicated if a male mold is used or if a [person of ordinary skill in the art] were to attempt mass-production of such a precursor." *Id.* at 39 (citing Ex. 2007 ¶¶ 144–146). Next Patent Owner argues that a person of ordinary skill in the art would understand that the precursor with Long's Figure 5A periphery "as dimensioned according to Mr. May's measurements . . . has an overhang-to-sheet thickness ratio that exceeds ratios known to permanently crimp or lock thermoplastic sheets made of PET, CPET, PP and polystyrene thermoplastics . . . to adjacent object surface." Resp. 39 (citing Ex. 2007 ¶¶ 143–152.

We find Mr. Clements attempt to model how a person of ordinary skill in the art might theoretically attempt to produce the article shown in Long's Figure 5A ambitious, but flawed, and not persuasive to show that producing the article taught by Long was "impossible." *See* Ex. 2007 ¶¶ 123–143. Mr. Clements modeling is based as much on the assumptions he adopts as it is on what Long, itself, taught. Those assumptions include using the dimensions of Figure 5A to match "those measured by Mr. May," using an "industry standard radius at each corner," and then speculating from the model he created that a person of ordinary skill in the art "would find that removal of an article with Long's Figure 5A periphery would not be possible without resort to permanent deformation or destruction of the article." *Id.*

The conclusions Mr. Clements reaches identify no persuasive support and, therefore, appear speculative and conclusory. *See*, *e.g.*, Ex. 2007 ¶¶ 141–143; *see also id.* ¶ 143 (noting that "a male mold could also be utilized," which was apparently not modeled by Mr. Clements, but he concludes would have the "previous problems" and "will also have the potential for ripping the plastic"). We further find persuasive in this regard Petitioner's showing that articles made using Long's process were, in fact, produced on a commercial scale "since at least as early as 2012." Reply 27–38 (citing, e.g., Ex. 1044 ¶¶ 126, 137, 143; Ex. 1045 ¶ 4–5; Ex. 1057). In short, the evidence provided by Patent Owner fails to show that the features of the article Long teaches that correspond to the claimed elements of the '680 patent would have been impossible to produce in accordance with Long, as Patent Owner asserts.

Next, Patent Owner argues that Long refers to a "second tooling assembly" that performs "generic actions," but does not provide "details

about the intricacies of the 'second tooling assembly.'" Resp. 41–42 (citing Ex. 2007 ¶¶ 156–161). According to Patent Owner, Mr. May acknowledged that Long's second tooling assembly would need to be custom made, and from this Patent Owner asserts a person of ordinary skill in the art "would have to engage in considerable and undue experimentations to make and use such non-standard equipment." *Id.* at 42–45 (citing, e.g., Ex. 2007 ¶¶ 161–163; Ex. 2009, 367:2–368:8). We are not persuaded that merely because Long may require "custom made" tooling for "generic actions" to produce an article it teaches, that shows that undue experimentation would have been required.

Patent Owner's additional arguments are misplaced in the context of whether Long was enabled. Resp. 45–57. We have considered all of Patent Owner's additional arguments, including that variations in the trimming tolerances result in sharp points that tear the overwrap film, that the demoldable periphery of Long necessarily creates the sharp edge it seeks to avoid, and that the nature of thermoplastics is unpredictable and known to generate microscopic hairs on the thermoformed surface. *Id.* While Patent Owner identifies issues that may need to be refined in the production process, or may even require experimentation to perfect, lacking is any persuasive evidence that the required experimentation would be undue. *Id.*

As noted above, Petitioner shows that actual trays embodying Long have been made since before the priority date. Reply 27–38 (citing Ex. 1045 ¶¶ 4–5; Ex. 1044 ¶¶ 126–127,143, 150; Ex. 1057). Petitioner further shows that "Mr. Clements's analysis is purely theoretical" and "[h]e did not test any trays or precursors to determine whether they could be removed from a mold." *Id.* at 39. According to Petitioner, Mr. Clements also "contradicts himself by admitting a thinner tray . . . might be easier to remove from the

mold" and "admits that [Long's] peripheral edges avoid the wrap path." *Id.* (citing Ex. 1047:87:9–14; Ex. 1048, 123:11–124:13). Even with regard to potential problems raised by Patent Owner with the Long process, Petitioner shows that solutions were well-known, for example, to address the generation of microscopic hairs on the thermoformed surface. *Id.* at 41 (citing Ex. 1035, 171, Ex. 1044 ¶ 213).

Based on our analysis above, we find in consideration of all of the evidence and argument advanced by the parties that, on balance, a preponderance of the evidence pertaining to the *Wands* factors discussed above weighs in favor of showing that Long is enabled for purposes of obviousness.

Even if Long were not self-enabled, its teachings nonetheless "qualify as prior art for the purpose of determining obviousness under § 103." *Symbol Techs., Inc. v. Opticon, Inc.*, 935 F.2d 1569, 1578 (Fed. Cir. 1991). "[A prior art reference asserted under § 103 does not necessarily have to enable its own disclosure, i.e., be 'self-enabling,' to be relevant to the obviousness inquiry." *Raytheon Technologies*, 993 F.3d at 1380.

3. Summary of Meadors

a. Disclosures of Meadors

Meadors generally relates to methods and apparatus for forming "a multiple-thickness bead in a sheet or blank of a flexible material, such as thermoplastic material," in the process of making a container or lid. Ex. 1005, 1:5–9.

Figure 8 of Meadors is reproduced below.

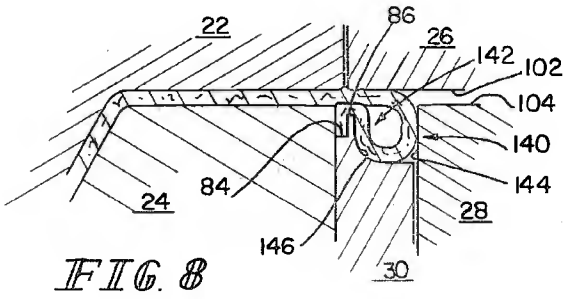


FIG. 8

In Figure 8, an apparatus with elements including vertically upper die member 22, vertically lower die member 24, vertically upper draw pad 26, vertically lower draw pad 28, and ring 30 work in conjunction to form a blank of flexible material into a desired configuration. *Id.* at 2:59–3:2, 3:57–58, 4:67–5:3. Petitioner describes the article formed in Figure 8 of Meadors as a tray with "an extension which is bent down, then in, and then up such that the edge is displaced from the periphery of the tray, giving the tray a smooth periphery." Pet. 11–12 (citing Ex. 1002 ¶ 46).

b. Whether Meadors is Enabled

Patent Owner argues that "[t]here is no guidance in Meadors on how to use its dies and heating coils to adequately thermoform a thermoplastic sheet to obtain the bead formations illustrated in Meadors' Figures 6–10 without tearing the sheet," and that Meadors is not enabled based on the following:

> (i) a POSITA must re-invent Meadors' process using a thermoplastic substrate to investigate how, if at all, the same beads could be achieved using that thermoplastic substrate as are shown in Figures 6-10 (in which the substrate was paper stock); (ii) there is no guidance on how to adjust the dies to properly operate on a thermoplastic; (iii) there are no working examples of a thermoplastic with the beads of Figures 6–10 formed by Meadors' dies, and (iv) because ABS, a thermoplastic, and paper stock have different material properties, Ex. 2009, 194:6–9, a

> [person of ordinary skill in the art] cannot predict the effects of Meadors' device on ABS. Ex. 2007, ¶¶206-208

Resp. 64–65 (discussing *Wands* factors 1, 2, 3, and 7).

Meadors expressly discloses "[a] method and apparatus for forming a double-thickness bead in a flexible sheet stock article," and states as follows:

> According to the method, a blank 100 of flexible material is provided. Blank 100 typically is in the form of a disc-like round, rectangular, elliptical, etc., flat sheet. The material may be of any known type, including, but not limited to, paper (e.g., milk carton stock), thermoplastic material (e.g., acrylonitrile butadiene styrene), or other suitable material.

Ex. 1005, 3:40–46. In light of this express disclosure, we do not find persuasive the opinion of Mr. Clements that, based on his "experience in the molding of paper products . . . Meadors' Figures 6–10 are exclusively limited to rolled peripheries in paper or fiber sheets" in light of "the material cross-section Meadors chose to use in its figures." Ex. 2007 ¶ 195; *see also id.* ¶¶ 201–202 (suggesting that Meadors "cannot possibly show its dies operating on a plastic substrate" because another reference includes illustrations that show that plastic substrate "thins in the corners of the die as it is flexed"). Mr. Clements's opinions on what cross-hatching symbols correlate to paper versus plastic or how another reference depicts the thickness of plastic in a die simply do not supersede the express disclosure of Meadors, which makes clear that the blank is a "flexible material" and may be "paper" or "thermoplastic." *See* Ex. 1005, 3:40–46; *see also* Reply 25 (noting that "[w]hatever material is denoted by the texture lines in the drawings [of Meadors], it is only an example").

Mr. Clements also states that "the Meadors process would never work on a plastic sheet of material," because, in his view, if it were plastic it would "rip or rupture" in response to the stretching forces applied to it."

Ex. 2007 ¶ 205. Mr. Clements identifies no persuasive support for his opinion, which we accordingly find conclusory and insufficient to supplant the express disclosures of Meadors. We have also considered Mr. Clements opinion that, even though Meadors expressly discloses heating coils 90 and 92 to "heat-set the material," in his view this does not constitute thermoforming, which requires "heat to be constantly controlled." *Id.* ¶ 208. Mr. Clements does not direct us to any disclosure in Meadors that suggests the heat is not controlled, and neglects to address Meadors express disclosure that "[h]eating coils 90, 92, respectively are provided in the upper and lower dies 22, 24 as desired, depending, for example, upon the type of material to be formed in the die mechanism 20." Ex. 1005, 3:36–39; *see also* Ex. 1044 ¶ 267 (Mr. May testifying that a person of ordinary skill in the art would have known "that the reason to use heated dies to shape a thermoplastic sheet is to thermoform it").

Based on our analysis above, we find in consideration of all of the evidence and argument advanced by the parties that, on balance, a preponderance of the evidence pertaining to the *Wands* factors discussed above weighs in favor of showing that Meadors is enabled for purposes of anticipation and obviousness.

4. Summary of Brown

Brown generally pertains to improvements in an extended rim of an injection-molded container. Ex. 1006, 1:8–13. Figure 6 of Brown is reproduced below.

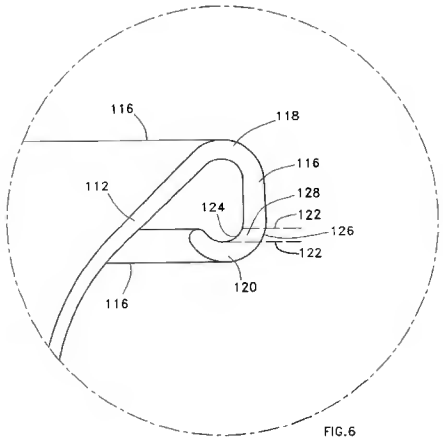


Figure 6 illustrates the rim portion of a container with rim wall 116 having an upper portion 118, lower portion 120, and inner surface 124, and an outer surface 126. *Id.* at 2:55–57, 5:7–21. Upper portion 118 extends outward and downward, and lower portion 120 extends downward and inward, then "further extends with both an inward directional component and an upward directional component." *Id.*

E. Alleged Anticipation by Portelli

Petitioner contends that claims 1–3, 5, 7, 8, 10, 11, and 15–23 of the '680 patent are anticipated by Portelli. Pet. 13–55. Claim 1 requires, in part, an article having a non-circular periphery and a shape that includes a deflectable flange with certain features. Ex. 1001, 72:57–73:17. For purposes of showing anticipation, Petitioner relies on Figure 13 of Portelli as disclosing the recited deflectable flange and on Figures 14 and 15 of Portelli as disclosing an article with a non-circular periphery. Pet. 13–16. More specifically, Petitioner asserts that "rim 58 [shown in Figure 14] is illustrated as item 10 in Portelli [Figure] 13." *Id.* at 19.

In response, Patent Owner shows in this case that rim 58 of Figure 14 of Portelli is shown in Figure 16 of Portelli and that rim 58 does not have the features that Petitioner relies on from Figure 13 of Portelli as corresponding

to the recited deflectable flange. Resp. 30. In the Reply, Petitioner argues as follows:

> A [person of ordinary skill in the art] viewing Portelli in its entirety would immediately understand that the flanges in Figs. 8 and 13–16 are just examples of flange shapes intended to be used on the trays in Figs 14–16, since (1) each flange accomplishes Portelli's purpose of displacing the terminal edge away from the wrap path, and (2) Portelli describes and illustrates the same rounded rectangular article in multiple drawings. Ex. 1003, Abstract, 1:30–2:2, 2:22–25, Figs. 10, 11, 14, 15. Furthermore, the flange shapes illustrated in Figs. 8 and 13–16 are very simple, each consisting of a small number of straight segments and arcs. Thus a [person of ordinary skill in the art] would 'at once envisage' including the flange in Fig. 13 in the trays in Figs. 14–16. Ex. 1044, ¶ 120.

Reply 24–25; *see also id.* at 24 (arguing that "a reference containing all of the elements of a claim "can anticipate [the] claim even if it 'd[oes] not expressly spell out' all the limitations arranged or combined as in the claim, if a person of skill in the art, reading the reference, would 'at once envisage' the claimed arrangement or combination" (quoting *Kennametal, Inc. v. Ingersoll Cutting Tool Co.*, 780 F.3d 1376, 1381 (Fed. Cir. 2015).

In the Sur-reply, Patent Owner argues that Petitioner improperly raises a new theory of anticipation in its reply based on *Kennametal* that was not relied upon in the Petition. Sur-reply 12. We agree. Patent Owner demonstrated in its Response that Petitioner wrongly asserted in the Petition that "rim 58 [shown in Figure 14] is illustrated as item 10 in Portelli [Figure] 13." Pet. 19; Resp. 30. Petitioner abandons that argument in its Reply, and instead turns to new testimony from Mr. May to support a new basis for anticipation, namely that a person of ordinary skill in the art would have known that teachings of different embodiments in Portelli may

be combined because they are, for example, "very similar." *See* Ex. 1044 ¶ 120. Because this is argument and evidence that was not sufficiently advanced by Petitioner as a basis for anticipation in the Petition, under the circumstances presented in this case, it constitutes a new ground of anticipation improperly raised by Petitioner for the first time in its Reply.[9] *See Intelligent Bio-Systems, Inc. v. Illumina Cambridge Ltd.*, 821 F.3d 1359, 1369 (Fed. Cir. 2016) ("It is of the utmost importance that petitioners in the IPR proceedings adhere to the requirement that the initial petition identify 'with particularity' the 'evidence that supports the grounds for the challenge to each claim'" (citing 35 U.S.C. § 312(a)(3))).

For the reasons above, Petitioner fails to show in the Petition that Portelli anticipates claim 1 of the '680 patent. For the same reasons, Petitioner fails to show that claims 2, 3, 5, 7, 8, 10, 11, and 15–23 of the '680 patent, which depend from claim 1, are anticipated by Portelli.

F. Alleged Anticipation by Meadors

Petitioner contends that claims 1–5, 7–12, and 20–23 of the '680 patent are anticipated by Meadors. Pet. 56–90. Petitioner provides a detailed explanation of its contentions in the Petition, including a clause-by-clause analysis specifying how Meadors discloses each limitation, frequently accompanied by annotated figures from Meadors, and those contentions are supported by the testimony of Mr. May. *Id.*; Ex. 1002 ¶¶ 104–148. In addition to arguing that Meadors is not enabled, which we found not persuasive for the reasons provided above, Patent Owner also

[9] Petitioner also cited in the Petition to rectangular tray 5 shown in Portelli Figure 11, but did not otherwise explain in either the Petitioner or the Reply how this disclosure related to what Petitioner relied on in Figures 13, 14, and 15 of Portelli. *See* Pet. 15 (citing Ex. 1003, 10:17–18).

argues that Meadors "only teaches formed sheets of paper stock," "does not inherently disclose an article with a non-circular periphery or one formed in the shape of a rectangular tray having rounded corners and edges," and "does not teach a material that is necessarily substantially optically clear." Resp. 59–67. Based on our review of the foregoing arguments and evidence, we find that Petitioner establishes sufficiently that Meadors discloses each of the limitations of claims 1–5, 7–12, and 20–23 of the '680 patent and adopt Petitioner's analysis as our own findings and conclusions as to these claims. Pet. 56–90. We focus our discussion below on the reasons why we find Patent Owner's arguments in opposition not persuasive. *See In re NuVasive, Inc.*, 841 F.3d 966, 974 (Fed. Cir. 2016) (noting that "[t]he Board, having found the only disputed limitations together in one reference, was not required to address undisputed matters"); Paper 8, 8 (emphasizing that "any arguments for patentability not raised in the response may be deemed waived").

Claim 1 is directed to "[a]n article . . . comprising a shaped thermoplastic substrate sheet." Ex. 1001, 72:57–73:17. Petitioner shows that Meadors expressly discloses this limitation. Pet. 56–57 (citing Ex. 1005, 1:5–9, 3:36–46, 4:23–25). Specifically, Meadors states that its "invention relates to methods of, and apparatus for, forming a multiple-thickness bead in a sheet or blank of a flexible material, *such as thermoplastic material* or paper stock, as the sheet or blank is being formed into an article such as a container or lid for a container," and that the material used in a blank to form a container "may be of any known type, including, but not limited to, paper (e.g., milk carton stock), *thermoplastic material* (e.g., acrylonitrile butadiene styrene), or other suitable material." Ex. 1005, 1:5–9, 3:36–46 (emphasis added). Patent Owner's argument that

Meadors "only teaches formed sheets of paper stock" based on the cross hatching used in certain figures, and on how another reference illustrates deformed thermoplastics, has no merit in light of the express disclosures of Meadors that a flexible material is used and such flexible material may be a "thermoplastic material." *See* Resp. 59–64.

Claim 1 also provides that the recited article has a "non-circular periphery" and claims 10 and 21 further recite that the body of the article "has the shape of a rectangular tray having rounded corners and edges." Ex. 1001, 72:57–73:17; 73:40–41; 74:21–23. Petitioner shows that Meadors expressly discloses that "[b]lank 100 typically is in the form of a disc-like round, rectangular, elliptical, etc., flat sheet." Pet. 57; Ex. 1005, 3:41–43. Petitioner contends that "a non-circular periphery is inherent in Meadors," because, as Mr. May explains, "thermoform preforms typically have the general outer shape of the finished article" and "Meadors' rectangular blank means that a generally rectangular tray would be the result of subsequent processing." Pet. 57; Ex. 1002 ¶ 106. As to claims 10 and 21, Petitioner further contends that "a rounded rectangular shape is inherent in Meadors," because "manufacturability and robustness considerations in thermoforming require compartments and rolled flanges to have rounded corners and edges." Pet. 87, 89 (citing Ex. 1002 ¶ 141). Patent Owner argues that Meadors does not inherently disclose a noncircular periphery or rectangular tray because Mr. May testified that the periphery of the blank "generally . . . will be similar to the periphery of the finished article," and that he used the term "'[g]enerally' because it's possible to . . . trim away a portion of the blank such that you would alter the overall shape." Resp. 66; Ex. 2009, 202:9–16. We find no contradiction in Mr. May's testimony, as Patent Owner asserts. *See* Resp. 66. Mr. May explained that Meadors

discloses the use of a rectangular blank and that a rectangular blank necessarily produces a rectangular article. That is not contradicted by Mr. May's additional explanation that if one cuts the blank the overall shape of the article may be altered. Meadors, itself, does not disclose or suggest cutting the blank. We are persuaded that a preponderance of the evidence shows that Meadors discloses an article with a "non-circular periphery" with "the shape of a rectangular tray having rounded corners and edges." *See* Ex. 1001, 72:57–73:17; 73:40–41; 74:21–23.

Claim 12 depends from claim 1 and further recites "wherein substantially every part of the article is substantially optically clear." Ex. 1001 , 73:44–45. The Specification of the '680 patent states that "[m]any known thermoformable plastic sheets are substantially optically clear, meaning that a substantial amount of light incident upon one face of the sheet will pass therethrough and be visible to an observer looking at the opposite face." *Id.* at 52:58–62. According to the '680 patent, "[i]t is well known that many optically clear plastic materials become opaque . . . when they are bent." *Id.* at 53:1–4. The '680 patent states that the methods described therein "permit bending of optically clear thermoplastic materials to form containers without significantly reducing the optical clarity of the materials," and that "it is believed that the ability to bend these materials without opacification is attributable to raising the temperature of the materials above their glass transition temperature (but below their melting temperature) prior to bending them." *Id.* at 53:8–10, 53:13–18. The '680 patent further states as follows:

> To the extent an objective measure of optical clarity is considered necessary, a material can be considered "substantially optically clear" if at least 50% of visible white light (measured as luminous flux) that is incident upon one face of the material from

> directly above it is transmitted out the opposite face of the material (without regard to diffraction- or scattering-related redirection of the light).

Id. at 53:19–26.

Petitioner shows that the plastic used in the tray of Meadors is ABS, that ABS is optically clear, and, thus, that the entire tray of Meadors is substantially optically clear, as required by claim 12. Pet. 88 (citing Ex. 1005, 3:45–46; Ex. 1002 ¶ 143). Patent Owner argues that "the fact that Meadors is silent as to whether its par[t]icular ABS has a pigment, colorant, or opacifier means that Meadors cannot disclose an ABS that is necessarily substantially optically clear." Resp. 67. We disagree. There is no dispute that Meadors discloses the use of optically clear ABS and that Meadors does not disclose the use of "pigment, colorant, or opacifier." The only conclusion the evidence supports is that Meadors discloses the use of ABS, which necessarily produces a substantially optically clear article, as required by claim 12.

G. Alleged Obviousness Over Portelli and Long

Petitioner contends that claims 1–5, 7–12, and 15–24 of the '680 patent would have been obvious over the combination of Portelli and Long. Pet. 96–132. Petitioner's contentions are supported by Mr. May. Ex. 1002 ¶¶ 149–230. In addition to Patent Owner's enablement arguments, which we found not persuasive for the reasons addressed above, Patent Owner further disputes only whether Petitioner has shown a sufficient reason to combine Portelli and Long and, with regard only to claim 12, whether the asserted combination teaches a "substantially optically clear" article. Resp. 32–34; 57–60.

1. Differences Between the Subject Matter of Claims 1–5, 7, 10, 11, and 15–24 and the Combination of Portelli and Long

Petitioner shows that the combination of Portelli and Long teaches each of the limitations of claims 1–5, 7, 10, 11, and 15–24. Pet. 96–132. As to claim 1, Petitioner relies on Long as teaching a tray with a smooth periphery and rounded, rectangular, non-circular shape. *Id.* at 96–98 (citing, e.g., Ex. 1004, 7:14 Figs. 1, 5C). Petitioner shows that Long's tray is comprised of a substrate sheet of thermoplastic and is thermoformed into a tray with a bottom, sidewalls, and deflectable flange. *Id.* at 98–104 (citing, e.g., Ex. 1004, 2:16–19, 2:25–32, 3:16–17, 3:25–26, 3:33–34, 4:4–11, 6:3–4, 6:22–33, 7:5–21, 8:3–9, 8:17–26, 8:32–9:8, Figs. 1, 2, 3, 5C ; *see also* Ex. 1002 ¶¶ 172–179 (Mr. May's testimony supporting Petitioner's contentions). Petitioner includes an annotated version of Figure 5 C of Long identifying how Long teaches a tray with a bend region interposed between the junction and the peripheral edge where the angle between the proximal and distal portions of the bend region is 90°. *Id.* at 104–105; Ex. 1002 ¶ 182; *see also id.* at 106–112 (detailing, with annotated figures, how Long teaches additional features of the deflectable flange of claim 1). As to the "peripheral flange bearing the peripheral edge and being connected to the rest of the deflectable flange by way of an elbow," Petitioner relies on Portelli. *Id.* at 32, 109. Petitioner shows that the peripheral flange shown in Figure 13 of Portelli includes an elbow corresponding to the "elbow" recited in claim 1. *Id.* (citing Ex. 1002 ¶ 70; Ex. 1003 Fig. 13).

Patent Owner does not dispute Petitioner's showing that the combination of Portelli and Long teaches each of the limitations of claim 1, as well as each of the limitations of claims 2–5, 7, 10, 11, and 15–24. *See generally* Resp. We have reviewed Petitioner's contentions in this regard

and determine that the Petition provides a sufficient showing that the combination of Portelli and Long teaches each limitation of claims 1–5, 7, 10, 11, and 15–24. We adopt Petitioner's arguments and evidence as to these claims and limitations as our own. *See* Pet. 96–132; *see also* Paper 8, 8 (cautioning Patent Owner "that any arguments not raised in the response may be deemed waived).

2. *Differences Between the Subject Matter of Claims 8 and 9 and the Combination of Portelli and Long*

Petitioner includes claim 8 in its heading of claims that would have been obvious over Portelli and Long, however, Petitioner provides no analysis in the Petition to support that contention. *See* Pet. v; 96–132. With respect to claim 9, which depends from claim 8, Petitioner asserts under the ground of obviousness over Portelli and Long that claim 8 "is anticipated by Portelli." *Id.* at 117. For the reasons provided above, Petitioner fails to show that claim 8 is anticipated by Portelli. *See supra* Section II.E. While we recognize that claim 9 appears to recite a narrower limitation (an offset angle (OA) of at least 230 degrees) than claim 8 (reciting an offset angle (OA) of at least 105 degrees), which arguably may suggest that if claim 9 were shown to be obvious over the asserted art, then claim 8 necessarily would have been obvious, we decline to speculate by importing allegations into the Petition directed to claim 8 not expressly asserted by Petitioner. Thus, Petitioner fails to address in the Petition the differences between claim 8 and the asserted combination of Portelli and Long, and the Petition is likewise deficient under this ground with regard to claim 9 because it depends from claim 8.

3. Differences Between the Subject Matter of Claim 12 and the Combination of Portelli and Long

Claim 12 depends from claim 1 and further recites "wherein substantially every part of the article is substantially optically clear." Ex. 1001 , 73:44–45. Petitioner contends that Long identifies plastics, including PET, PLA, CPET, PP, and HIPS, that are "optically clear," such that "Long's entire tray is optically clear." Pet. 120 (citing Ex. 1002 ¶ 209). In support, Mr. May states that in his experience "when a thermoformed article is specified to be made from an otherwise clear plastic and there is an absence of a specification or request to add a colorant or pigment, the intention and expectation is for a clear thermoform article." Ex. 1002 ¶ 209.

Patent Owner does not dispute that Long teaches the use of optically clear plastics, but instead argues that Figure 1 of Long "shows it to be an opaque tray." Resp. 57. We agree with Petitioner, as supported by Mr. May, that a person of ordinary skill in the art would have understood Figure 1 of Long "to be for the purpose of illustrating the shape of the tray, not its clarity or opacity, regardless of whether structures in the back are illustrated as visible through structures in the front." Reply 41 (citing Ex. 1044 ¶ 255). Patent Owner further argues that using PET in the Long process requires stretching that "would induce crystallinity (and therefore opacity) in the parts elongated, which would include the side wall and the bent portion." Resp. 58 (citing Ex. 2007 ¶ 66 (discussing Portelli), which we understand to have been intended to be ¶ 166 (discussing Long)). Mr. Clements did not address inducing "crystallinity" in Paragraphs 66 or 166 of his declaration, but instead stated that it was his "opinion that a [person of ordinary skill in the art] would expect the combination of demolding and stretching of the article according to Long's methods to

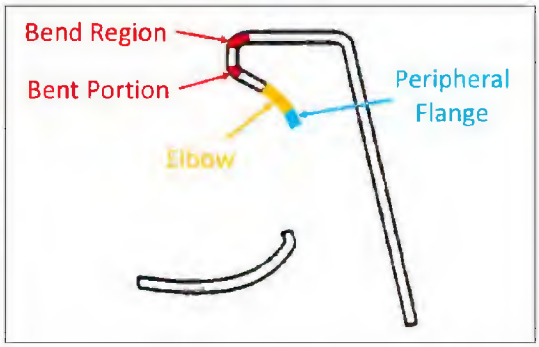
induce the development of opacity in the material (assuming the material started out as being optically or visually clear, which Long neither shows nor describes, but instead illustrates only an opaque tray in its Figure 1)." Ex. 2007 ¶ 166. Mr. Clements does not address how a process that may induce "the development of opacity" informs a determination of whether "substantially every part of the article" made by that process "is substantially optically clear," as that term is defined in the '680 patent. *See* Ex. 1001, 53:19–26

In its Reply, Petitioner provides a series of images showing that "clear trays made by Alto according to Long's process are entirely clear" to support his opinion that "Long's process does not introduce any crystallinity which would cause Long's trays to be anything but entirely clear." Reply 42–45 (citing Ex. 1044 ¶ 256, Ex. 1045); Ex. 1044 ¶ 257. Patent Owner does not dispute the evidence provided by Petitioner and Mr. May in this regard. *See generally* Sur-reply.

We find a preponderance of the evidence shows that Long teaches an article "wherein substantially every part of the article is substantially optically clear," as additionally required by claim 12. We credit the testimony of Mr. May in this regard, who explains that Long teaches the use of materials that are optically clear and shows that articles produced using Long's process are entirely clear, which is more persuasive and supported than Mr. Clements opinion as explained above.

4. Reasons Supporting Obviousness Over Portelli and Long

Petitioner argues that it would have been obvious to add the elbow and peripheral flange of Portelli's tray to Long's tray such that "the curved bent portion is interposed between the elbow and the bend region, as shown in the annotated figure below.



Pet. 111. The figure above shows an annotated and modified version of Figure 5C of Long with the Bend Region and Bent Portion shown in red, the Elbow shown in yellow and the Peripheral Flange shown in blue, where Petitioner notes that the elbow and peripheral flange are from Portelli. *Id.*

Both Portelli and Long teach rolling over the peripheral edge of thermoformed articles in order to prevent the terminal edge of the article from tearing a plastic overwrap. Ex. 1003, 1:29–2:8; Ex. 1004, 1:9–13, 7:9–13. Portelli and Long describe several rolled-over configurations to accomplish the expressed solution. *See* Ex. 1003, Figs. 8 and 13; Ex. 1004, Figs. 5C and 8B. Petitioner contends that "a [person of ordinary skill in the art] would have looked at multiple rounded rectangular plastic food trays and would have considered it obvious to combine the concepts from those similar trays." Pet. 95 (citing Ex. 1002 ¶ ¶ 160–164); *see also Wm. Wrigley Jr. Co. v. Cadbury Adams USA LLC*, 683 F.3d 1356, 1364 (Fed. Cir. 2012) (noting that the substitution of "one well-known cooling agent for another" presents "a strong case of obviousness").

Further, according to Petitioner, "a [person of ordinary skill in the art] would have been motivated to combine any or all of Portelli (including Figs. 8 and 13) [and] Long . . . because the problems addressed by the '680 Patent—(1) overwrap film or flesh being cut by the tray's sharp edges, and (2) easily deformable edges—were recognized by these references and

thus 'known in the field of endeavor at the time of invention and addressed by the patent.'" *Id.* at 92 (quoting *KSR*, 550 U.S. at 420). Petitioner argues that "the number of solutions for the problem of cutting the overwrap or the customer's skin was so limited that the inventors of Portelli [and] Long . . . and the '680 Patent all came up with the same solution: rolling the sharp edge away from the article's periphery." *Id.* at 92–93 (citing Ex. 1001, Claims 1, 11; Ex. 1002 ¶¶ 152–154; Ex. 1003, Abstract, 3:1–3, 5:1–2, 5:12, 5:25–6:3, 15:20–23, 18:3–5, 20:11–16, 20:24–27, 21:17–23; Ex. 1004, 1:9–13; 3:22–24; 4:1–3; 6:18–20; 7:9–19; 8:22–24; 8:33–9:1). Petitioner also argues the asserted combination would have been motivated by "the numerous similarities and common features" of the Portelli and Long trays. *Id.* at 93–95. In sum, Petitioner reasons that the combination of elements from Portelli and Long to arrive at the features of the Challenged Claims "is nothing more than 'the predictable use of prior art elements according to their established functions,' since the same problems addressed by the '680 Patent were recognized and addressed in the same way by Portelli [and] Long, . . . and due to market forces driving similar trays and manufacturing equipment." We find Petitioner's reasoning above sufficiently supports the asserted combination of features from Portelli and Long. We further considered Patent Owner's arguments in opposition and find them not persuasive for the reasons provided below. *See* Resp. 32–34.

According to Patent Owner, Long reports "puckering and distortion effects will result" from using "thermal deformation to roll a flanged edge," as taught by Portelli. *Id.* at 32–33 (citing Ex. 1004, 6:29–33). Patent Owner also argues that "Long further distinguished Portelli's double-stage thermoforming process from its proposed trimming procedure by calling it 'slow' and telling the reader that Portelli's process should be 'avoided.'" *Id.*

at 33. As an initial matter, Patent Owner misrepresents what Long states. Long states that "the slowness of a double stage thermoforming process" is "avoided" by using the process taught by Long, not that "Portelli's process should be avoided," as Patent Owner asserts. *See* Ex. 1004, 6:29–33.

Patent Owner argues that "Long's criticisms, discrediting, and discouragement of Portelli's proposed thermoformed precursor edge-rolling methods would motivate a [person of ordinary skill in the art] to avoid combining or modifying the incompatible proposals of Long and Portelli in the manner advocated by Petitioner." *Id.* at 33. Patent Owner also asserts that the combination would defeat each reference's principle of operation because "the combination advocated by the Petition would require either (i) removal from Portelli of the critical secondary thermoforming step to roll the flange, or (ii) that Long to use thermoforming instead of a secondary trimming operation (which Long expressly says not to do)."[10] *Id.* at 33–34 (citing Ex. 2007 ¶ 216); *see also* Sur-reply 18–19. We do not agree with Patent Owner's arguments that Long teaches away from a combination with Portelli. *See* Resp. 32–33.

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[10] Patent Owner argues for the first time in its Sur-reply that a person of ordinary skill in the art "would have no expectation of success in enabling even obvious teachings or suggestions of Portelli, whether cited individually or in combination with Brown or Long." Sur-reply 27. In its Response, Patent Owner argued that Petitioner failed to show a reasonable expectation of success with regard Petitioner's contention that claims 4, 9, and 24 would have been obvious over Portelli, alone. Resp. 72–75. Patent Owner did not argue that Petitioner failed to show a reasonable expectation of success with regard to Petitioner's contentions based on obviousness over Portelli and Long. *See generally id.* Accordingly, we find Patent Owner's arguments improper as new arguments in its Sur-reply that were not raised in the Response, and, therefore, are deemed waived. *See* Paper 8, 8 ("any arguments not raised in the response may be deemed waived").

To teach away, a reference must discourage one of ordinary skill in the art from following the path set out in the reference, or lead that person in a direction divergent from the path taken by the applicant. *In re Gurley*, 27 F.3d 551, 553 (Fed. Cir. 1994) ("[A] reference will teach away if it suggests that the line of development flowing from the reference's disclosure is unlikely to be productive of the result sought by the applicant."). "A reference does not teach away . . . if it merely expresses a general preference for an alternative invention but does not 'criticize, discredit, or otherwise discourage' investigation into the invention claimed." *DePuy Spine, Inc. v. Medtronic Sofamor Danek, Inc.*, 567 F.3d 1314, 1327 (Fed. Cir. 2009) (quoting *In re Fulton*, 391 F.3d 1195, 1201 (Fed. Cir. 2004)). Long's statements contrasting double stage thermoforming methods against Long's process merely expresses a preference for its own trimming process. Ex. 1004, 6:29–34. Patent Owner does not identify any teaching in Long that criticizes, discredits, or otherwise discourages the skilled artisan from following the path outlined by the '680 patent, and, our independent review of Long does not reveal any such teaching.

We are also not persuaded that the combination of Portelli and Long would be contrary to the principle of operation described in either of Portelli and Long. In considering whether a proposed modification would be obvious, we also consider whether combining references would violate the principle of operation of the modified reference. *See In re Mouttet*, 686 F.3d 1322, 1332 (Fed. Cir. 2012). A principle of operation of a prior art reference is concerned with whether the apparatus or process described therein, once modified, will operate on the same principles as before, or said another way, whether it operates in or is capable of working in the same manner. *See id.* (affirming a Board decision that using electrical versus optical components

"does not affect the operability of Mouttet's broadly claimed device—a programmable arithmetic processor."); *see also Univ. of Maryland Biology Inst. v. Presens Precision Sensing GmbH*, 711 F. App'x. 1007, 1011 (Fed. Cir. 2017) (unpublished) (finding that the proposed combination would not "require a substantial reconstruction and redesign of the elements shown . . . or change in its basic principles"); *Smartdoor Holdings, Inc. v. Edmit Indus., Inc.*, 707 F. App'x. 705, 709 (Fed. Cir. 2017) (unpublished) (affirming the PTAB where the asserted combination would operate in the same manner), *In re Holness*, 612, F. App'x. 999, 1007 (Fed. Cir. 2015) (unpublished) (affirming the PTAB where no evidence exists that "the bar code reader in Capuano is incapable of working for a rotational motion."). What a reference teaches and how a proposed modification of a reference would change its principle of operation are underlying factual inquiries in an obviousness analysis. *See, e.g., Icon Health & Fitness, Inc. v. Strava, Inc.*, 849 F.3d 1034, 1046 (Fed. Cir. 2017) (addressing the Board's factual findings with respect to a reference's principle of operation). There is no sufficient evidence to support that merely applying Portelli's teaching of an elbow and peripheral flange to Long's tray does not alter the operation of either reference.

Additionally, Patent Owner raises a series of arguments denoted "Deficiencies in Petitioner's Obviousness Challenges (Grounds 4–7)." Resp. 67–72. These arguments are not expressly directed to Petitioner's allegations of obviousness over Portelli and Long, which Petitioner identifies as "Ground 3." Pet. 96. Nevertheless, to the extent Patent Owner applies these additional arguments to allegations of obviousness over Portelli and Long, we find the arguments not persuasive, as explained below.

First, Patent Owner argues that "Petitioner cannot credibly argue that the shape of the claimed article peripheries is so simple as to be predictable to a [person of ordinary skill in the art]," because, if it were so simple, then "Petitioner would be able to confirm the exact same claim element in every reference." Resp. 67–68. Patent Owner's argument is not persuasive because the issue of obviousness in this case does not turn on whether the shape of the claimed article is simple. Moreover, Petitioner's assertion that "the respective elements [of the Challenged Claims] are simple, geometric shapes" and that "[t]here is nothing unpredictable about their functionality in a plastic food tray" is supported by Mr. May. Pet. 91 (citing Ex. 1002 ¶ 149). Patent Owner directs us to no evidence to the contrary.

Second, Patent Owner argues that "Portelli was a failure and Long cannot be practiced by anyone," such that there was "no path towards a solution prior to the earliest effective filing date of the '680 Patent." Resp. 68–69. According to Patent Owner, "the path taken by Patent Owner cannot prove obviousness – that is hindsight." *Id.* at 68. Patent Owner also argues that "the flange of a non-circular article is the article's 'most frustratingly-inconsistent feature,'" which, Patent Owner argues shows the "unpredictability of *any* thermoformed flange." *Id.* at 69–70 (citing Ex. 2024. The evidence Patent Owner cites, an article titled "How to Robotically Handle Trays for Parts Packaging," merely states that the flange is a "most frustratingly-inconsistent feature" and "was not intended as a parameter for automated systems to locate the tray." Ex. 2024, 3. The portions of the article relied on by Patent Owner do not address the "unpredictability" of any particular flange shape, as claimed, but instead implies potential issues in manufacturing and quality control. *See id.* (stating "[i]t is a major pitfall to instruct robotic grippers (or other end

effectors) to locate trays based on the flange because the flange dimension must be constant and consistent. Yet this is extremely challenging, due to variances in the die cutting tolerances that are inherent in the thermoforming process").

Third, Patent Owner argues that "Petitioner fails to explain how any of these similarities [between the '680 patent and the asserted references] or the market forces behind them render obvious claim limitations directed to post-forming processes on a non-circular thermoformed precursor flange." Resp. 70–71. The Challenged Claims, however, are directed to an article, not to "post-forming processes." *See*, *e.g.*, Ex. 1001, 72:57–73:17. Patent Owner also argues that "the material properties of a thermoplastic can be affected by so many different factors that even where there are similarities, the end results achievable with each one can vary tremendously." Resp 71 (citing Ex. 1032, 265–266). Patent Owner does not direct us to any evidence that the asserted references require the use of different thermoplastic materials or that the teachings of one reference are inapplicable to another based on material properties.

Fourth, Patent Owner argues that "Petitioner identifies no credible motivation for combining or modifying references," because Mr. May testified that Portelli and Long offered solutions to the same problem and stated he did not know "that a modification of them is necessarily compulsory." Resp. 72 (citing Ex. 2009, 400:18–401:4). According to Patent Owner, "Mr. May admits that a [person of ordinary skill in the art] could have been motivated to modify Portelli, Long, or Meadors but it was not necessary." *Id.* Contrary to Patent Owner's argument, Mr. May's testimony merely provides that Long and Portelli taught solutions for packaging such that their modification was not "necessarily compulsory,"

not that a person of ordinary skill in the art would have had no reason to modify them as Petitioner proposed.

5. *Objective Evidence of Nonobviousness*

The fourth *Graham* factor instructs that we must consider—apart from what the prior art itself would have suggested— whether objective evidence of nonobviousness (i.e., secondary considerations) may lead to a conclusion that the challenged claims would not have been obvious. *See, e.g., Stratoflex, Inc. v. Aeroquip Corp.*, 713 F.2d 1530, 1538–39 (Fed. Cir. 1983) (instructing that evidence of secondary considerations, when present, must always be considered in determining obviousness). Objective evidence of nonobviousness may include evidence of commercial success, licensing, copying, praise by others, long felt but unresolved need, and failure or skepticism of others. *Graham*, 383 U.S. at 17–18. But, secondary considerations are only a part of the "totality of the evidence;" its mere existence does not control the conclusion of obviousness. *See Richardson-Vicks Inc. v. Upjohn Co.*, 122 F.3d 1476, 1483 (Fed. Cir. 1997). Objective evidence of nonobviousness "may often be the most probative and cogent evidence in the record" and "may often establish that an invention appearing to have been obvious in light of the prior art was not." *Transocean Offshore Deepwater Drilling, Inc. v. Maersk Drilling USA, Inc.*, 699 F.3d 1340, 1349 (Fed. Cir. 2012).

Patent Owner argues that evidence of nonobviousness exists in the form of commercial success, industry praise, long-felt need, skepticism, and copying. Resp. 80–84. Patent Owner also contends that there is a

presumption of nexus between these secondary considerations and the claimed invention.[11] *Id.* at 78–79.

a. Nexus

Objective evidence of nonobviousness "is only relevant to the obviousness inquiry 'if there is a nexus between the claimed invention and the [objective indicia of nonobviousness].'" *In re Affinity Labs of Tex., LLC*, 856 F.3d 883, 901 (Fed. Cir. 2017) (quoting *Ormco Corp. v. Align Tech., Inc.*, 463 F.3d 1299, 1312 (2006)). A "nexus" is a legally and factually sufficient connection between the objective evidence and the claimed invention such that the objective evidence should be considered in the determination of obviousness. *Henny Penny Corp. v. Frymaster LLC*, 938 F.3d 1324, 1332 (Fed. Cir. 2019); *In re Paulsen*, 30 F.3d 1475, 1482 (Fed. Cir. 1994). A presumption of nexus arises where "the patentee shows that the asserted objective evidence is tied to a specific product and that product 'embodies the claimed features, and is coextensive with them.'" *Fox Factory, Inc. v. SRAM, LLC*, 944 F.3d 1366, 1373 (Fed. Cir. 2019) (quoting *Polaris Indus., Inc. v. Arctic Cat, Inc.*, 882 F.3d 1056, 1072 (Fed. Cir. 2018) (quoting *Brown & Williamson Tobacco Corp. v. Philip Morris Inc.*, 229 F.3d 1120, 1130 (Fed. Cir. 2000))); *see also Teva Pharms. USA, Inc. v. Sandoz, Inc.*, 723 F.3d 1363, 1372 (Fed. Cir. 2013) (explaining

[11] In its Sur-reply, Patent Owner argues that Mr. May's testimony should be accorded no weight because he "never considered [Patent Owner's] objective indicia of non-obviousness in rendering his reply obviousness opinions." Sur-reply 26–27 (citing Ex. 1002 ¶ 25; Ex. 1044 ¶¶ 295-366; Ex. 2070, 409:14–410:5. Mr. May was not offered as an expert as to the issues raised by Patent Owner's objective evidence of nonobviousness and we accord his testimony the appropriate weight based on the topics he addressed. *See* Ex. 1044.

that a "presumption of a nexus" exists where a product is "coextensive" with a patent claim). Patent Owner bears the burden of establishing that a nexus exists between the evidence of secondary considerations and the patented invention. *Fox Factory*, 944 F.3d at 1373.

Patent Owner purports to show nexus by providing a table prepared by Mr. Clements that lists in one column a Roll Over-Wrap Tray Product and in a second column the claims of the '680 patent corresponding to that product. Resp. 78–79 (citing Ex. 2007 ¶ 228–232, A-1–A-75). Mr. Clements provides claim charts showing how various products embody various claims of the '680 patent. Ex. 2007, A-1–A-75. Petitioner does not dispute that Patent Owner has shown that a presumption of nexus applies. *See* Reply 53. Accordingly, we apply a presumption of nexus for purposes of our consideration of Patent Owner's objective evidence of nonobviousness.

b. Commercial Success

Patent Owner asserts that since the first sales of the Roll Over-Wrap trays in 2016 there has been "exponential growth in the sales numbers" and that "[t]he customers . . . have also exponentially grown since 2016." Resp. 80 (citing Ex. 2030 ¶¶ 9–10). According to Patent Owner, Mr. Clements "believes that the exponential growth in sales and customers is a strong indicator of market acceptance and demand for the innovations captured by the Roll Over-Wrap Trays." *Id.* (citing Ex. 2007 ¶¶ 228–237). There are several significant deficiencies in Patent Owner's argument. First, Mr. Clements never suggested Patent Owner demonstrated "exponential growth in sales and customers." *See* Ex. 2007 ¶ 228–337. Mr. Clements did state that, in his opinion, the "unit sales and sales dollars achieved by Patent Owner . . . were extraordinary." *Id.* ¶ 231. Mr. Clements did not explain

what "extraordinary" meant to him in this context and provided no comparison to sales or customer data for any industry as whole. *Id.* Second, Patent Owner purports to rely on the Declaration of Mr. Maguire as support for the asserted "exponential growth," however, Mr. Maguire stated only that "[e]very model of Roll Over-Wrap tray has had continuous, *and in some cases*, exponential, increase in sales growth over the time span in which it was sold." Ex. 2030 ¶ 10. Likewise, Mr. Maguire states that "[s]ince 2016, our number of customers for the Roll Over-Wrap trays have also grown at an *almost* exponential rate." *Id.* ¶ 11. Thus, Patent Owner fails to show or explain any basis for its asserted "exponential growth" in sales numbers or customers, and, based upon our review of the sales and personnel information provided by Mr. Maguire we fail to find any support for the assertion. *See* Ex. 2031 ¶¶ 8–11. Third, Patent Owner identifies no relevant market and provides no data regarding market share for its products for us to consider.

Petitioner argues, and we agree, that Patent Owner exaggerates its commercial success. Reply 53. Having considered the record evidence, we accord moderate weight to Patent Owner's evidence of commercial success, which suggests increasing sales values and numbers of customers from 2016 to 2021, but provides no context with regard to the relevant market, such as market size or market share.

c. Industry Praise

Patent Owner argues that the Roll Over-Wrap® tray has received industry praise. Resp. 80–81. Specifically, Patent Owner states that the Roll Over-Wrap tray was awarded the 2019 Ameristar Award by the Institute of Packaging Professionals, and that industry professionals have praised the "patented features and benefits derived from those features." *Id.* (citing

Ex. 2032; Ex. 2030 ¶¶ 14–15; Ex. 2007 ¶¶ 236–237). Mr. Maguire explains that he "and others decided to enter the decided to enter the Roll Over-Wrap Tray for consideration by the Institute of Packaging Professionals ("IoPP") for the prestigious Ameristar Award," and "told the IoPP that no other company in the world has been able to produce a rolled edge on a non-circular plastic tray product" and that "we were the only ones that had a patent for rolled-edge rectangular plastic tray technology." Ex. 2031 ¶ 14.

Patent Owner also directs us to three email communications. The first from March, 2020, appears to be an email from a potential customer, who, Patent Owner notes, said "[t]he edge is impressive, and is definitely what we would need in order to not have to go up in film gauge." *Id.* at 81 (quoting Ex. 2034, 2). The second is an email from November, 2019, stating that "the customer has found similar trays . . . [h]owever the [competing tray] edges do not have the same rolled edge as [Patent Owner's tray]" and "[a]s a result, they may be able to use a thinner film with [Patent Owner's] trays." *Id.* (quoting Ex. 2033, 1). Third, an email from July, 2018, from a "packaging engineer" who said he was "impressed with the roll over edge design of the tray." *Id.* at 81 (quoting Ex. 2031, 2).

Having considered the record evidence, we accord little weight to Patent Owner's evidence of industry praise which consists of a single award obtained based on an application submitted by Patent Owner that claimed its product was produced by "no other company in the world" and three private emails involving what appears to be potential customers.[12] *See* Exs. 2031–2033.

[12] We observe that although Mr. Maguire testifies that he has "an entire server filled with e-mails" regarding sales, he selected only Exhibits 2032, 2033, and 2034 to produce as examples. Ex. 1052, 19:3–11.

d. Long felt Need

Patent Owner alleges that the problem of a "sharp peripheral edge in non-circular thermoformed articles existed for over half a century until it was finally solved on the earliest effective filing date of the '680 patent." Resp. 82 (citing Section II.B of the Patent Owner Response). According to Patent Owner, "attempts to move the sharp peripheral edge of a non-circular article out of the [over-wrap] path have all failed." Section II.B of the Patent Owner Response, however, states that in 1994 "Portelli proposed rolling the flange of a tray using double stage thermoforming." Resp. 4 (citing Ex. 1003, 2:3–8); Ex. 2009, 247:23–248:10. Patent Owner further suggests that "twenty years later" the "industry was told . . . rolling a flanged edge using thermoforming should be 'avoided.'" *Id.* (citing Ex. 2007 ¶ 26; Ex. 1004, 6:29–33; Ex. 2010). Patent Owner's evidence shows that a rolled edge was known in the art through the teachings of Portelli and Long, among others. That Long prefers an alternate solution does not establish a long-felt and unresolved need in the art.

In order to show a long-felt but unmet need *for the claimed invention*, the objective evidence must show that the need was a persistent one that was recognized by those of ordinary skill in the art. *In re Gershon*, 372 F.2d 535, 538 (CCPA 1967). "Evidence of long felt but unresolved need tends to show non-obviousness because it is reasonable to infer that the need would not have persisted had the solution been obvious." *WBIP, LLC v. Kohler Co.*, 829 F.3d 1317, 1332 (Fed. Cir. 2016). Here, Patent Owner at best suggests problems may have existed with the mass manufacture of non-circular trays with a rolled edge, however, the '680 patent does not claim a method of manufacture that resolves any such related long felt need in manufacturing, but is instead directed to the article itself. Additionally,

Patent Owner acknowledges various alternative means of packaging satisfied the need, including, for example, "utilize[ing] more expensive, heavier gauge [over wrap]." Resp. 5 (citing Ex. 2007 ¶ 28).

Moreover, Patent Owner directs us to no specific evidence in this case in support of its argument of long felt need, and instead ambiguously refers to "[a]s discussed above" and "[*s*]*ee supra*." We decline in this case to speculate as to what in the preceding eighty pages of Patent Owner's brief Patent Owner intends to rely on. Here, the record evidence shows minimal, if any, evidence of long felt need. As a result, we accord little weight to Patent Owner's evidence of long felt need as need tied to the claimed features has not been shown.

e. Skepticism

Patent Owner argues that skepticism of known thermal deformation processes was reported in Long (by the applicant, Alto Packaging Limited ("Alto")) because Long purports to describe a process through which "none of the puckering or distortions often encountered with rolling a flanged edge is encountered." Resp. 82–84 (citing Ex. 1004, 6:29–33; Ex. 2010, 1 (a Request for Examination with Claim Amendments submitted by Alto to Intellectual Property Office of New Zealand stating, in part, that the procedure described "aims to provide faster online handling and to avoid puckering and distortion of the lip that often occurs with known thermal deformation processes")). According to Patent Owner, "[i]n spite of that skepticism of others, [it] proceeded contrary to the accepted wisdom in the art and not only used thermal deformation to achieve the rolled edge, but did so without any *unwanted* puckers or distortions." *Id. at* 83 (emphasis added). We note, Patent Owner does not clarify what distinguishes "unwanted puckers or distortions" from acceptable "puckers or distortion."

"If industry participants or skilled artisans are skeptical about whether or how a problem could be solved or the workability of the claimed solution, it favors nonobviousness." *WBIP, LLC*, 829 F.3d at 1335. Long's statements comparing its trimmed solution to a molded thermoformed edge in the prior art and suggesting that the "puckering or distortions *often encountered*" may be avoided, is one of preference not skepticism. *See* Ex. 1004, 6:29–33. As a result, we accord little weight to Patent Owner's evidence of skepticism from what amounts to a single statement from a source in a competitive industry seeking a patent on its own purported improvement in the art.

f. Copying

Patent Owner asserts that "[u]pon gaining access to thousands of Patent Owner's patented Roll Over-Wrap trays and discussing their manufacture and features with the Patent Owner, Petitioner was able to create at least two different knockoffs with the patented features." Resp. 84 (citing; Ex. 2004; Ex. 2007, B1–B13; Ex. 2030 ¶¶ 20–21). Patent Owner directs us to the testimony of Mr. Maguire, who states he approved a purchase order from Petitioner for trays sold by Patent Owner. *See* Ex. 2030 ¶ 21 (citing Ex. 2004). Contrary to Patent Owner's argument, Mr. Maguire does not identify any discussions with Petitioner about the manufacture and features of Patent Owner's products. *See id.* According to Patent Owner, Petitioner's access to its patented products combined with Petitioner's manufacture and sale of "substantially similar infringing trays is legally sufficient evidence of copying." *Id.*

"Copying requires duplication of features of the patentee's work based on access to that work, lest all infringement be mistakenly treated as copying." *Institut Pasteur & Universite Pierre Et Marie Curie v. Focarino*,

738 F.3d 1337, 1347–48 (Fed. Cir. 2013). Evidence of copying may take the form of "internal documents, direct evidence such as photos or patented features, or disassembly of products, or access and similarity to a patented product." *Liqwd, Inc. v. L'Oreal USA, Inc.*, 941 F.3d 1133, 1137 (Fed. Cir. 2019). But, it is well established that not every competing product that arguably falls within the scope of a patent is evidence of copying; otherwise, "every infringement suit would automatically confirm the nonobviousness of the patent." *Iron Grip Barbell Co. v. USA Sports, Inc.*, 392 F.3d 1317, 1325 (Fed. Cir. 2004).

Here, Patent Owner relies on Petitioner's access and subsequent manufacture of "knockoff" products purportedly having the patented features. As a result, Patent Owner has shown some evidence of copying. However, while the evidence of record suggests Petitioner had access to Patent Owner's work, there is no evidence to suggest that copying, in fact, occurred. As a result, we accord little weight to Patent Owner's evidence of copying from what amounts to a single purchase order of products from Patent Owner.

6. *Collective Considerations of the* Graham *Factors*

Based upon consideration of the entire record, and for the reasons discussed above, we determine Petitioner has shown by a preponderance of the evidence that the combination of Portelli and Long teaches each limitation of claims 1–5, 7, 10–12, and 15–24 and has shown that an ordinarily skilled artisan would have had a reason to combine features of both Portelli and Long as asserted to arrive at the claimed invention with a reasonable expectation of success when doing so, and that Petitioner's evidence of unpatentability significantly outweighs the marginal evidence of commercial success, industry praise, long felt need, and copying provided by

Patent Owner. On the whole, we find that the information provided in consideration of the *Graham* factors collectively demonstrates that Petitioner has shown by a preponderance of the evidence that claims 1–5, 7, 10–12, and 15–24 of the '680 patent are unpatentable under 35 U.S.C. § 103(a) as obvious over Portelli and Long. Petitioner has not shown that claims 8 and 9 would have been obvious over Portelli and Long because Petitioner fails to adequately address in the Petition how Petitioner contends the asserted references teach the features of these two claims.

H. Alleged Obviousness over Long and Meadors

Petitioner contends that the subject matter of claims 1–5, 7–12, and 15–24 would have been obvious over Long and Meadors. Pet. 132–134. Petitioner generally argues that Long teaches certain limitations of claims 2, 3, 5, 7, 10–12, and 15–23 for the same reasons provided by Petitioner in its analysis of the obviousness of claims over Portelli and Long; that "every element" of claims 1–5, 7–12, and 20–23 is taught by Meadors for the same reasons provided by Petitioner in its analysis of the anticipation of claims by Meadors; and that a person of ordinary skill in the art would have had reason to combine Long and Meadors for substantially the same reasons supporting the combination Portelli and Long. *Id.* at 132. As to claim 24, Petitioner provides additional analysis, asserting claim 24 depends from claim 23, and that claim 23 "is anticipated by Long." *Id.* at 133 (citing "Ground 3, Claim 23, above"). Petitioner identifies "Ground 3" as obviousness over Portelli in view of Long, not anticipation by Long. Pet. 96.

Patent Owner argues, and we agree, that "Petitioner does not even say what aspect of Long would be used by a [person of ordinary skill in the art] to modify Meadors and vice-versa." Resp. 75. Accordingly, we find

Petitioner fails to carry its burden of showing how any of claims 2, 3, 5, 7, 10–12, and 15–24 would have been obvious over Long and Meadors.

I. Alleged Obviousness Over Portelli, Alone or in Combination with Brown

Petitioner contends that claims 4, 9, and 24 of the '680 patent would have been obvious over Portelli. Pet. 134–137. Petitioner also argues that claim 9 would have been obvious over the combination of Portelli and Brown. *Id.* at 138–140. Claim 4 depends from claim 1, claim 9 depends from claims 1, 7, and 8; and claim 24 depends from claims 1, 20, and 23. Ex. 1001, 73:23–25, 73:31–39; 74:18–19, 74:25–39.

Petitioner contends only that the additional limitations of dependent claims 4 and 24 would have been obvious over and that the additional limitations of claim 9 would have been obvious over Portelli, alone or in combination with Brown. Pet. 134–140. As to the features of the claims from which claims 4, 9, and 24 depend, Petitioner relies only on its anticipation allegations based on Portelli. *See, e.g.*, *id.* at 135 (stating that "[c]laim 9 depends from [c]laim 8, which is anticipated by Portelli"); 139. Because Petitioner fails to show, for the reasons discussed above, that claim 1 is anticipated by Portelli, and otherwise fails to argue that claim 1 would have been obvious over Portelli, alone or in combination with Brown, Petitioner fails to show that claims 4 and 24 would have been obvious over Portelli or that claim 9 would have been obvious over Portelli, alone or in combination with Brown.

III. PATENT OWNER'S MOTION TO EXCLUDE

Patent Owner seeks to exclude Exhibits 1037–1040, 1051, 1053, 1057, and 1058, as well as portions of Exhibits 1044 and 1045. MTE 1–14;

MTE Reply 1–5. Petitioner opposes the motion. MTE Opp. 1–15. For the following reasons we deny Patent Owner's Motion to Exclude.

A. Exhibits 1037–1040

Exhibits 1037–1039 have not been filed in this case and were not considered in rendering this Decision. Exhibit 1040 was filed as an exhibit in this case, however, we do not rely on Exhibit 1040 in rendering this Decision. Accordingly, we deny Patent Owner's motion to exclude Exhibits 1037–1040 as moot.

B. Exhibit 1044

Patent Owner seeks to exclude paragraphs 39–40, 42, 44, 46, 51–53, 116, 270–271, and 332–333 of Ex. 1044 (Mr. May's Reply Declaration). MTE 5–6. According to Patent Owner, these paragraphs include images of articles "that were alleged by Petitioner to have been made by either DexterMT or OMV" and are unauthenticated and inadmissible hearsay. *Id.* at 6.

Petitioner argues that "even if the materials cited by Patent Owner are not authenticated—which they are, as discussed below—Mr. May would still be entitled to rely on them because it is undisputed that those materials contain the kinds of facts and data on which experts in his field would reasonably rely." MTE Opp. 8. Further, Petitioner argues that the DexterMT and OMV materials were authenticated by Mr. Naughton's testimony and Mr. May's physical possession and testing. *Id.* at 10.

On this matter, Petitioner has the better argument. Here, there exists sufficient evidence to support a finding that the images and samples Mr. May relies upon are in fact what Mr. May purports them to be. Specifically, the images of DexterMT samples were photographs taken by Mr. May from samples he obtained himself from Mr. Willemse (from

DexterMT) or from Mr. Naughton, who secured the samples during visits to New Zealand and Washington. Ex. 2070, 136:20–137:8; Ex. 1045 ¶¶ 15–19. Mr. May further testifies that he confirmed the samples were made near the 2016 time frame through his discussions with Mr. Naughton, Mr. Willemse, and through an article appearing in Thermoforming Quarterly, third quarter 2016, discussing the K-Show in Germany where certain samples were displayed and distributed to customers. Ex. 2070, 125:24–134:5. Furthermore, the OMV images Mr. May provides purport to originate from a presentation given at the SPE Conference in Indianapolis in 2004 and were provided to him by individuals who attended that presentation. *Id.* at 212:7–213:16; 214:13–16. Mr. May testifies that he confirmed the presentation was given at the conference by discussing the presentation with conference attendees, through internet research, and his own experience with OMV and conversations with OMV personnel. *Id.* at 213:8–214:16, 215:20–217:5. We agree with Petitioner that experts like Mr. May would reasonable rely on materials, like those described in paragraphs 39–40, 42, 44, 46, 51–53, 116, 270–271, and 332–333 of Exhibit 1044, in forming the basis of their opinions. *See* Fed. R. Evid. 703. Therefore, Patent Owner's motion to strike paragraphs 39–40, 42, 44, 46, 51–53, 116, 270–271, and 332–333 of Exhibit 1044 is denied.

C. Exhibit 1045

Patent Owner seeks to exclude paragraphs 4–6, 10, and 12–14 of Exhibit 1045 (Mr. Naughton's declaration). MTE 7–12; MTE Reply 5. In particular, Patent Owner alleges that, with respect to paragraphs 4–6, that Mr. Naughton's testimony is based on inadmissible hearsay. *Id.* at 7. Patent Owner also asserts that Mr. Naughton's testimony in paragraphs 10 and 12 is based on inadmissible hearsay, that paragraphs 10 and 12–14 are

unauthenticated, that paragraphs 12–14 are not passed on personal knowledge, and that paragraph 14 is incomplete. *Id.* at 10–12. Petitioner asserts that the identified passages are not hearsay and even if some contain hearsay or unauthenticated information, the paragraphs are admissible as facts and data on which an expert, such as Mr. May, can rely upon under Rule 703. MTE Opp. 11.

We disagree with much of Patent Owner's characterization of Mr. Naughton's testimony as based solely on hearsay and not based on personal knowledge as Mr. Naughton's testimony indicates he has been active in the thermoforming community since at least 1985. Ex. 1045 ¶ 3. Therefore, the majority of Mr. Naughton's testimony is based on his nearly 40 years in the industry. *Id.* Though Patent Owner identifies some of Mr. Naughton's testimony, including his statements regarding what Alto employees may have told him as well as the testimony regarding the Alto purchase order, we do not rely on these statements for the truth of the matter asserted, i.e., that Alto manufactured the identified trays in 2012. *See, e.g.*, *id.* ¶ 5 ("I know from information provided to me from Alto employees that Alto began making plastic trays . . . at least as early as 2012), 10 (discussing Alto's purchase order that was forwarded to Mr. Naughton outside the normal course of business). Instead, we consider Mr. Naughton's testimony that Alto successfully used Long's method as evidence that Long's method is not "impossible," as Patent Owner suggests. *See*, *e.g.*, Resp. 38. To the extent the evidence may have served a hearsay purpose, we assign it little, if any, weight. Further, experts like Mr. May are permitted to rely on hearsay if experts in the same field would reasonably rely on such materials in forming opinions and inferences based on the subject. *See* Fed. R. Evid. 703. To the extent that Mr. May relies on evidence that is not of the type

which "experts in the field would reasonably rely," we have assigned very little weight to such evidence.[13] Thus, we deny Patent Owner's motion to exclude select paragraphs of Exhibit 1045.

D. Exhibits 1051, 1053

Exhibit 1051 is a two-page portion of the website of DexterMT and Exhibit 1053 are portions of the Wiley Encyclopedia of Packaging Technology. Patent Owner asserts that Exhibits 1051 and 1053 are multipage documents and "Petitioner has failed to produce the entirety of the contents" "[i]n spite of Patent Owner's request for the complete copy" and therefore should be excluded under Federal Rule of Evidence 1002. MTE 12–13.

Petitioner asserts that "Patent Owner cites no authority for the extraordinary proposition that a webpage is inadmissible unless the proponent scours the entire website of the owner of the webpage and downloads every single webpage from that site." MTE Opp. 13–14. Petitioner directs our attention to several prior cases denying motions to exclude on similar grounds.

We are not persuaded that Exhibits 1051 and 1053 should be excluded from the record. Patent Owner does not contend that the exhibits are misleading because they are excerpted. Nor does Patent Owner contend it could not access the completed exhibits or identify any omitted portion of the exhibits that should be considered for "completeness." Indeed, it appears

[13] Even if we accorded the identified paragraphs of Exhibit 1045 no weight, it would not alter our ultimate conclusion that the claims are anticipated or obvious, as Patent Owner's arguments and evidence attempting to rebut the presumption of enablement of Long are inadequate. *See supra* Section II.D.2.b.

from the record that Exhibit 1051, while an excerpted portion of the entire DexterMT website, is a complete document within that website. Ex. 1051 The same is true with Exhibit 1053 which contains the entries for "Robots" and "Thermoforming" within the larger Wiley Encyclopedia of Packaging Technology. Ex. 1053. Accordingly, we deny Patent Owner's motion to exclude Exhibits 1051 and 1053.

E. Exhibit 1057

Exhibit 1057 is a copy of the New Zealand counterpart of Long. Patent Owner asserts that Exhibit 1057 is irrelevant and should be excluded "as not being substantively relied upon in the Reply or [Mr.] May's Declaration." MTE 13. Petitioner argues that Exhibit 1057 is discussed in its Reply and used to establish that Alto marks its trays with the patent number in Exhibit 1057. MTE Opp. 15.

We are not persuaded by Patent Owner's arguments that Exhibit 1057 is irrelevant and should be excluded. Petitioner relies on Exhibit 1057 to rebut Patent Owner's contention that Long is inoperable and non-enabled. Reply 31. Patent Owner has not shown Exhibit 1057 lacks relevance and completeness of our trial record weighs in favor of inclusion. Accordingly, we deny Patent Owner's motion to exclude Exhibit 1057.

F. Exhibit 1058

Exhibit 1058 includes a series of four images of rolled-rim articles from OMV. Ex. 1058. Patent Owner urges that we exclude Exhibit 1058 as unauthenticated. MTE 13; MTE Reply 5. According to Patent Owner, "[Mr.] May's understanding of Exhibit 1058 comes from third parties who are not identified on the record or his declaration." *Id.* at 14. Petitioner asserts that "Exhibit 1058 is not cited in isolation, but as the basis for some of Mr. May's opinions." MTE Opp. 15. Petitioner explains that "[a]s an

expert, he is entitled to rely on it" and "the probative value of Ex. 1058 . . . outweighs the non-existent risk of prejudice." *Id.*

We are not persuaded that Exhibit 1058 should be excluded from the record. Exhibit 1058 is offered by Petitioner and Mr. May as an "example of the feasibility of rolling thermoform flanges in a manner consistent with the teachings of Portelli." Ex. 1044 ¶¶ 52–53; Reply 19. And as Petitioner asserts, experts like Mr. May are permitted to rely on otherwise inadmissible materials if experts in the same field would reasonable rely on such materials in forming opinions and inferences based on the subject. *See* Fed. R. Evid. 703. To the extent that Mr. May relies on evidence that is not of the type which "experts in the field would reasonably rely," we have assigned very little weight to such evidence.[14] As a result, we deny Patent Owner's motion to exclude Exhibit 1058.

IV. MOTIONS TO SEAL

Patent Owner filed two motions to seal.[15] Papers 18, 30. Patent Owner also filed Paper 17, identified in the docket as a "Motion to File

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[14] Even if we accorded no weight to Exhibit 1058, Exhibit 1058 is but one example in the record of thermoformed articles having rolled over terminal edges. *See, e.g.*, Ex. 1003.

[15] Patent Owner filed a third paper (Paper 63) that is identified in the docket as a "Motion to File Confidential Documents," however, the corresponding paper filed as Paper 63 appears to be a duplicate copy of the Patent Owner Sur-reply filed as Paper 61 on the same date. Patent Owner also appears to have filed Exhibits 2061 and 2074 under seal, accompanied by redacted versions, but does not appear to have filed a motion to seal the non-public version of these exhibits in this case. If Patent Owner seeks to maintain Exhibits 2061 and 2074 under seal, Patent Owner may contact the Board within two weeks of this Decision to seek leave to file late a motion to seal. Additionally, in some instances Patent Owner used the same exhibit number for both the sealed version and the redacted version (e.g., Exhibit 2040), while in other instances Patent Owner used different exhibit numbers, often

Confidential Documents," that is a motion captioned for related case "IPR2021-00916" between the same parties, not this case. Paper 17 refers to a modified version of the Board's Default Protective Order as "attached hereto as Appendix A." *Id.* at 1. No Appendix A was filed with Paper 17.

Patent Owner filed Paper 18 on the same date as Paper 17 and identified Paper 18 in the docket as "Appendix A to Patent Owner's Motion to File Confidential Documents." Paper 18, however, is not an "Appendix," but instead is Patent Owner's Motion to File Confidential Documents in this proceeding. Like Paper 17, Paper 18 also refers to a modified version of the Board's Default Protective Order as "attached hereto as Appendix A." *Id.* at 1. Like Paper 17, no Appendix A was filed with Paper 18 in this case, and we are unable to locate in the record of this proceeding any proposed modified version of the Board's Default Protective Order. Rather than require Patent Owner to correct the multiple errors in filing noted above at this late stage of the proceeding, we understand the parties to seek entry in this case of the same modified protective order proposed by the parties and entered in the related case IPR2021-00916. *See* Paper 18, 1 (stating that "Patent Owner and Petitioner have met and conferred on the modified version of the Board's Default Protective Order"). Accordingly, for purposes of this case we enter the Modified Protective Order filed in *Tekni-Plex, Inc. v. Converter Manufacturing, LLC*, IPR2021-00916, Paper 17 ("Protective Order").

There is a strong public policy for making all information filed in an *inter partes* review open to the public, especially because the proceeding

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overlapping with other exhibits (e.g., Exhibit 2031). The motions make sufficiently clear which documents are at issue. *See* Papers 18, 30.

determines the patentability of claims in an issued patent and, therefore, affects the rights of the public. Generally, all papers filed in an inter partes review shall be made available to the public. *See* 35 U.S.C. § 316(a)(1); 37 C.F.R. § 42.14. Our rules, however, "aim to strike a balance between the public's interest in maintaining a complete and understandable file history and the parties' interest in protecting truly sensitive information." Consolidated Patent Trial Practice Guide 19. Thus, a party may move to seal certain information (37 C.F.R. § 42.14); but only "confidential information" is protected from disclosure (35 U.S.C. § 326(a)(7)). Confidential information means trade secret or other confidential research, development, or commercial information. 37 C.F.R. § 42.2. The standard for granting a motion to seal is "for good cause." 37 C.F.R. § 42.54(a). The party moving to seal bears the burden of proof and must explain why the information sought to be sealed constitutes confidential information. 37 C.F.R. § 42.20(c). Confidential information that is subject to a protective order ordinarily becomes public 45 days after final judgment in a trial. Consolidated Trial Practice Guide 21–22. There is an expectation that confidential information relied upon or identified in a final written decision will be made public. *Id*. A party seeking to maintain the confidentiality of the information may file a motion to expunge the information from the record prior to the information becoming public. 37 C.F.R. § 42.56.

Patent Owner's first motion seeks to seal portions of Exhibits 2030, 2031, 2033, and 2034. Paper 18, 1. Patent Owner's second motion seeks to seal portions of Exhibit 2040. Paper 30, 1. We find that good cause exists to seal each of the requested exhibits. Patent Owner's motions to seal are unopposed and Patent Owner has provided public, redacted versions of each exhibit it seeks to protect with limited redactions, and, thus, has balanced the

strong public policy interest in making information available to the public with its own interests in maintaining certain information as business confidential. Accordingly, we grant Patent Owner's motions to seal Exhibits 2030, 2031, 2033, and 2034, and 2040. *See* Papers 18, 30.

Petitioner filed a motion to seal Petitioner's Reply to [Corrected] Patent Owner's Response (Paper 47) and Exhibit 1052. Paper 46, 1. Petitioner filed publicly accessible, redacted versions of its Reply (Paper 45) and Exhibit 1052. We find that good cause exists to seal both the requested paper and exhibit. Petitioner's motion to seal is unopposed and Petitioner has provided public, redacted versions of both the paper and exhibit it seeks to protect with limited redactions, and, thus, has balanced the strong public policy interest in making information available to the public with its own interests in maintaining certain information as business confidential. Accordingly, we grant Petitioner's motion to seal portions of Paper 47 and Exhibit 1052. *See* Paper 46.

The record will be maintained undisturbed, with Paper 47 and Exhibits 1052, 2030, 2031, 2033, 2034, and 2040 remaining sealed, pending the outcome of any appeal taken from this decision. At the conclusion of any appeal proceeding, or if no appeal is taken, the sealed documents will be made public. *See* Office Patent Trial Practice Guide, 77 Fed. Reg. 48,756, 48,760–61 (Aug. 14, 2012). Further, either party may file a motion to expunge the sealed documents from the record pursuant to 37 C.F.R. § 42.56. Any such motion will be decided after the conclusion of any appeal proceeding or the expiration of the time period for appealing, and it will be denied with respect to any sealed document relied upon for this Decision.

V. CONCLUSION

The outcome for the Challenged Claims in this proceeding is set forth in summary as follows:

Claim(s) Challenged	35 U.S.C. §	Reference(s)/ Basis	Claim(s) Shown Unpatentable	Claim(s) Not Shown Unpatentable
1–3, 5, 7, 8, 10, 11, 15–23	102	Portelli		1–3, 5, 7, 8, 10, 11, 15–23
1–5, 7–12, 20–23	102	Meadors	1–5, 7–12, 20–23	
1–5, 7–12, 15–24	103	Portelli, Long	1–5, 7, 10–12, 15–24	8, 9
1–5, 7–12, 15–24	103	Long, Meadors		1–5, 7–12, 15–24
4, 9, 24	103	Portelli		4, 9, 24
9	103	Portelli, Brown		9
Overall Outcome			1–5, 7–12, 15–24	

VI. ORDER[16]

Upon consideration of the record before us, it is:

[16] Should Patent Owner wish to pursue amendment of a Challenged Claim 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*. *See* 84 Fed. Reg. 16,654 (Apr. 22, 2019). If Patent Owner chooses to file a reissue application or a request for reexamination of the challenged patent, we remind Patent Owner of its continuing obligation to notify the Board of any such related matters in updated mandatory notices. *See* 37 C.F.R. § 42.8(a)(3), (b)(2).

ORDERED that Patent Owner's Motion to Exclude (Paper 66) is denied;

FURTHER ORDERED that the Stipulated Protective Order in *Tekni-Plex, Inc. v. Converter Manufacturing, LLC*, IPR2021-00916, Paper 17, is hereby entered and shall govern the treatment of confidential and highly confidential information in this case;

FURTHER ORDERED that Patent Owner's Motions to Seal (Papers 18, 30) are granted;

FURTHER ORDERED that Petitioner's Motion to Seal (Paper 46) is granted;

FURTHER ORDERED that claims 1–5, 7–12, and 15–24 of U.S. Patent No. 10,562,680 B2 have been proven by a preponderance of the evidence to be unpatentable;

FURTHER ORDERED that, pursuant to 35 U.S.C. § 318(b), upon expiration of the time for appeal of this Decision, or the termination of any such appeal, a certificate shall issue canceling claims 1–5, 7–12, and 15–24 U.S. Patent No. 10,562,680 B2; and

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

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Patent 10,562,680 B2

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