

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

NEENAH, INC. and AVERY PRODUCTS CORPORATION,
Petitioner,

v.

JODI A. SCHWENDIMANN, f/k/a JODI A. DALVEY,
and NUCOAT, INC.,
Patent Owner.

IPR2020-00628
Patent RE41,623 E

Before JEFFREY W. ABRAHAM, MICHELLE N. ANKENBRAND, 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)

I. INTRODUCTION

Neenah, Inc. and Avery Products Corporation (collectively “Petitioner”)¹ filed a Petition (Paper 1, “Petition” or “Pet.”) requesting *inter partes* review of claims 1–17 of U.S. Reissue Patent No. RE41,623 (Ex. 1001, “the ’623 patent”). Pet. 1. Jodi A. Schwendimann, f/k/a Jodi Dalvey, and NuCoat, Inc. (collectively “Patent Owner”) filed a Preliminary Response (Paper 9, “Prelim. Resp.”).

Upon consideration of the Petition, Preliminary Response, and the parties’ evidence, we determined that Petitioner had demonstrated a reasonable likelihood that it would prevail with respect to at least one claim of the ’623 patent. Paper 10 (“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 the USPTO Guidance,² we instituted review of all challenged claims on all asserted grounds. *Id.*

Following institution of trial, Patent Owner filed a Patent Owner Response (Paper 14, “PO Resp.”), Petitioner filed a Reply (Paper 16, “Pet. Reply”), and Patent Owner filed a Sur-reply (Paper 20). In support of their respective positions, Petitioner relies on the testimony of Dr. Robert A.

¹ Petitioner identifies Neenah, Inc., Avery Products Corporation, and Stahls’ Inc. as real parties-in-interest. Pet. 1. “[I]n an abundance of caution, Petitioner also identifies Stahls’ Inc. as a possible real party-in-interest . . . [who] is a customer of Neenah’s and Neenah is partially indemnifying . . . in connection with certain accused products in the Michigan Lawsuit.” *Id.*

² 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”).

Wanat (Ex. 1020; Ex. 1062,), and Patent Owner relies on the testimony of Dr. Scott Williams (Ex. 2001) and the Declaration of Dr. Christopher Ellison (Ex. 2011).

An oral hearing was held on July 12, 2021, and a transcript of the hearing is included in the record (Paper 28, “Tr.”).

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 1–17 of the ’623 patent are unpatentable.

A. Related Proceedings

Petitioner identifies the pending lawsuit between the parties, styled *Jodi A. Schwendimann v. Neenah, Inc.*, Case No. 1:19-cv-00361-LPS (D. Del.) (“Delaware Lawsuit”), as a related proceeding in which Patent Owner asserts the ’623 patent. Pet. 1; *see also* Paper 8, 2 (Patent Owner’s Mandatory Notices).

The ’623 patent is also asserted in the following pending litigations:

Jodi A. Schwendimann v. Stahls’ Inc., Case No. 2:19-cv-10525-LVP-MKM (E.D. Mich.) (“Michigan Lawsuit”); and

Jodi A. Schwendimann v. Siser North America, Inc., Case No. 1:19-cv-00362-LPS (D. Del.).

Pet. 2; Paper 12, 2. The ’623 patent was also asserted in *Jodi A. Schwendimann v. Arkwright Advanced Coating, Inc. et al.*, Case No. 0:11-cv-00820-JRT-HB (D. Minn.) (“Arkwright Lawsuit”). Pet. 2, 10. The ’623 patent is the subject of separate petitions for *inter partes* review: *Stahls’ Inc. v. Jodi A. Schwendimann*, IPR2020-00633 and *Stahls’ Inc. v. Jodi A.*

Schwendimann, IPR2020-00641. Paper 8, 2. We instituted *inter partes* review in the -00633 and -00641 cases. *See* IPR2020-00633, Paper 11; IPR2020-00641, Paper 11. Concurrently with the entry of this Final Written Decision, we also separately enter judgment in the -00633 and -00641 cases.

Petitioner states that the '623 patent is a reissued patent of U.S. Patent No. 6,844,311, which issued from U.S. Patent Application No. 09/541,845 ("the '845 application"), which is a continuation-in-part of U.S. Patent Application No. 09/391,910 ("the '910 application"). Numerous patents claim priority to the '845 and '910 applications including U.S. Patent No. 7,749,581 ("the '581 patent"), U.S. Patent No. 7,754,042 ("the '042 patent"), U.S. Patent No. 7,771,554 ("the '554 patent"), and U.S. Patent No. 7,766,475 ("the '475 patent") (together with the '623 patent, collectively "the Schwendimann patents"). Pet. 3.

Petitioner also filed petitions for *inter partes* review against the '581 patent, the '042 patent, the '554 patent, and the '475 patent. Pet. 1–2; Paper 8, 2. We instituted *inter partes* review on Petitioner's challenges against the '581 patent in IPR2020-00634 (Paper 13) and IPR2020-00644 (Paper 10), against the '042 patent in IPR2020-00629 (Paper 10) and IPR2020-00635 (Paper 10), and against the '475 patent in IPR2020-00915 and IPR2020-01122 (Paper 8). We rendered judgment in IPR2020-00629, -00634, -00635, and -00644 on September 10, 2021. IPR2020-00634, Paper 39; IPR2020-00644, Paper 35; IPR2020-00629, Paper 39; IPR2020-00635, Paper 46. We declined, however, to institute review on Petitioner's challenges against the '581 patent in IPR2020-00645 (Paper 10) or against the '554 patent in IPR2020-00636 (Paper 10) or IPR2020-01121 (Paper 8).

The Schwendimann patents were also involved in Patent Interference Nos. 105,961, 105,964, and 105,966 (collectively “Interference Proceedings”). Ex. 2004, 1; Ex. 2003, 2.

B. The '623 Patent (Ex. 1001)

The '623 patent, titled “Method of Image Transfer on a Colored Base,” issued on September 7, 2010. Ex. 1001, codes (45), (54). The '623 patent is directed to “a method for transferring an image onto a colored base and to an article comprising a dark base and an image with a light background on the base.” *Id.* at 1:13–15.

The '623 patent explains that conventional image transfer processes use two-steps: applying a white or light background polymeric material to a colored base with heat and then using another sheet to impart an image to the substantially white polymeric material. *Id.* at 3:35–48. According to the '623 patent, the conventional two-step process requires careful alignment of an image with the white background, is “exceedingly time-consuming,” and produces significant waste of base and image transfer materials. *Id.* at 3:49–56.

An exemplary image transfer process of the '623 patent is depicted below in Figure 1.

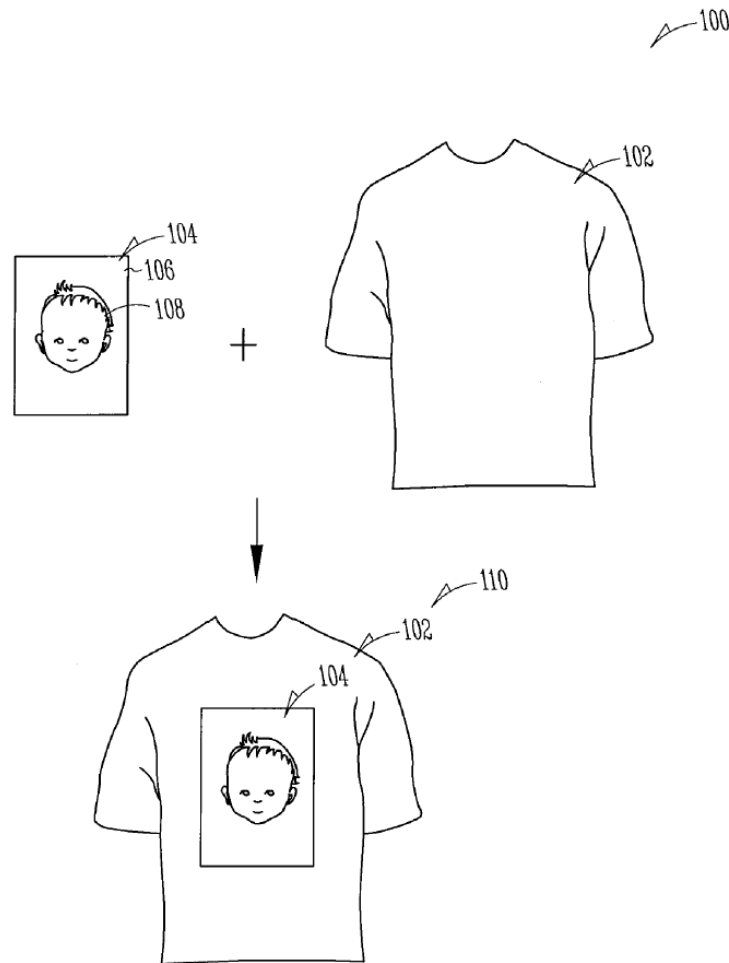


Fig. 1

Figure 1 “illustrates a schematic view of one process of image transfer onto a colored product.” *Id.* at 2:29–31. Figure 1 depicts colored base material 102 (e.g., a colored textile), image 104 including substantially white background 106, and indicia 108 disposed on substantially white background 106. *Id.* at 3:7–18. The ’623 patent states that image 104 is applied to colored base material 102 with heat to make completed article 110 in a single step. *Id.*

An embodiment of an image transfer device is depicted below in Figure 5.

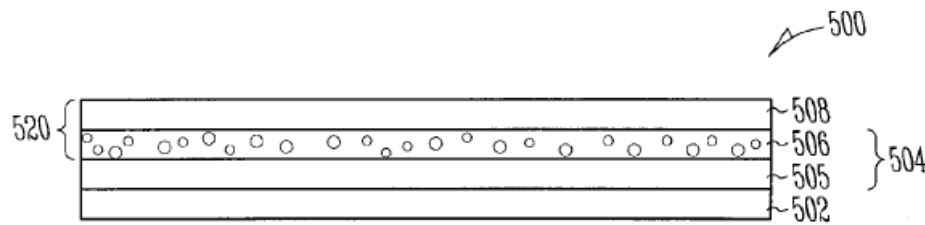


Fig. 5

Figure 5 illustrates “a cross-sectional view of one other embodiment of the image transfer device of the present invention.” *Id.* at 2:41–42. Figure 5 shows “an image transfer sheet 500 that is comprised of a substrate layer 502 [and] a release layer 504 comprising a silicone coating 505 and a white layer 506.” *Id.* at 8:48–53. Figure 5 also depicts white layer 506 and receiving layer 508 as part of peel layer 520. *See id.* at 8:57–63, 9:7–9.

The '623 patent describes the white layer as imparting “a white background on a dark substrate.” *Id.* at 3:31–34. According to one embodiment, “the white layer 506 of the image transfer sheet 500 is impregnated with titanium oxide or other white or luminescent pigment.” *Id.* at 8:57–60. In another embodiment, “the white layer 506 and a receiving layer 508, contacting the white layer 506 are impregnated with titanium oxide or other white or luminescent pigment.” *Id.* at 8:60–63. According to the '623 patent,

[f]or some embodiments, a white layer 506, 606, such as is shown in FIGS. 5-6, includes ethylene/methacrylic acid (E/MAA), with an acid content of 0-30%, and a melt index from 10 to 3500 with a melt index range of 20 to 2300 for some embodiments. A low density polyethylene with a melt index higher than 200 is also suitable for use. Other embodiments of the white layer include ethylene vinyl acetate copolymer resin, EVA, with vinyl acetate percentages up to 50%/EVA are modifiable with an additive such as DuPont Elvax, manufactured

by DuPont de Nemours of Wilmington, Del. These resins have a Vicat softening point of about 40 degrees to 220 degrees C., with a range of 40 degrees to 149 degrees C. usable for some embodiments.

Id. at 6:8–20.

Referring once again to the embodiment of Figure 5, the '623 patent describes an image transfer process. Specifically, the '623 patent discloses that “an image is imparted to the polymer component of the peel layer 520 utilizing a top coat image-imparting material such as ink or toner.” *Id.* at 9:7–9. The '623 patent explains that “[t]he image transfer sheet 500 is applied to the colored base material so that the polymeric component of the peel layer 520 contacts the colored base” and a source of heat is applied to the image transfer sheet 500. *Id.* at 9:18–26. Thus, “[t]he peel layer 520 transfers the image” and “[t]he application of heat to the transfer sheet 500 results in ink or other image-imparting media within the polymeric component of the peel layer being changed in form to particles encapsulated by the polymeric substrate.” *Id.* at 9:28–32. As a result, “[t]he encapsulated ink particles or encapsulated toner particles and encapsulated titanium oxide particles are then transferred to the colored base in a mirror image to the ink image or toner image on the polymeric component of the peel layer 520.”

Id. at 9:36–40. The '623 patent further explains the following:

[b]ecause the polymeric component of the peel layer 520 generally has a high melting point, the application of heat, such as from an iron, does not result in melting of this layer or in a significant change in viscosity of the overall peel layer 520. The change in viscosity is confined to the polymeric component that actually contacts the ink or toner or is immediately adjacent to the ink or toner. As a consequence, a mixture of the polymeric component, titanium oxide or other white or luminescent pigment, and ink or toner is transferred to the colored base as an

encapsulate whereby the polymeric component encapsulates the ink or toner or titanium oxide or other white pigment. It is believed that the image transfer sheet, with the white titanium oxide or other white or luminescent pigment background is uniquely capable of both cold peel and hot peel with a very good performance for both types of peels.

Id. at 9:41–55.

C. Illustrative Claims

Petitioner challenges claims 1–17 of the '623 patent. Of the challenged claims, claims 1 and 6 are independent, are illustrative, and are reproduced below.

1. A method for transferring an image to a colored substrate comprising woven, fabric based material, or paper, comprising:

providing an image transfer sheet comprising an image transfer substrate; a release layer contacting the image transfer substrate and an image-imparting layer that comprises a polymer that includes indicia wherein the release layer is impregnated with one or more of titanium oxide or other white pigment or luminescent pigment;

peeling the image transfer substrate from the image transfer sheet;

contacting at least the remaining portions of the image transfer sheet to the colored substrate comprising woven, fabric based material, or paper; and

applying heat to at least the remaining portions of the image transfer sheet so that an image including indicia from the image-imparting layer is transferred from the image transfer sheet to the colored substrate comprising woven, fabric based material, or paper wherein the image comprises a substantially white background or luminescent background and indicia.

Ex. 1001, 11:44–12:7 (emphasis omitted).

6. An image transfer sheet, comprising:
- a colored, substrate comprising woven, fabric based material, or paper;
 - a release layer overlaying the substrate, wherein the release layer is impregnated with titanium oxide or other white pigment or luminescent pigment; and
 - a polymer layer.

Id. at 12:20–26.

D. Prior Art and Asserted Grounds of Unpatentability

Petitioner contends that claims 1–17 are unpatentable based on the following grounds:

Claims Challenged	35 U.S.C. § ³	References/Basis
1–17	103	Oez-US, ⁴ Meyer ⁵
8, 17	103	Oez-US, Meyer, Kronzer ⁶
1–17	103	Oez-PCT, ⁷ Oez-US
1–17	103	Kronzer, Oez-US
1–17	103	Kronzer, Meyer

³ 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 ’042 patent issued was filed before this date, the pre-AIA version of § 103 applies.

⁴ Oez, US 5,655,476, issued Sept. 9, 1997 (Ex. 1013, “Oez-US”).

⁵ Meyer et al., US 3,359,127, issued Dec. 19, 1967 (Ex. 1019, “Meyer”).

⁶ Kronzer, US 5,798,179, issued Aug. 25, 1998 (Ex. 1018, “Kronzer”).

⁷ Oez, WO 97/41489, published Nov. 6, 1997 (Ex. 1016, “Oez-PCT”).

References to Oez-PCT are to Exhibit 1016, which is an English-language translation of Oez-PCT with line numbers. Pet. 4.

Pet. 5. We instituted trial on all asserted grounds. DI 2, 41; *SAS*, 138 S. Ct. at 1355.

II. ANALYSIS

A. Legal Standards

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) (2019). A claim is unpatentable 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.⁸ *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

To show obviousness, it is not enough to merely show that the prior art includes separate references covering each separate limitation in a challenged claim. *Unigene Labs., Inc. v. Apotex, Inc.*, 655 F.3d 1352, 1360 (Fed. Cir. 2011). “This is so because inventions in most, if not all, instances rely upon building blocks long since uncovered, and claimed discoveries almost of necessity will be combinations of what, in some sense, is already known.” *KSR*, 550 U.S. at 418–419.

⁸ The parties have not asserted or otherwise directed our attention to any objective evidence of nonobviousness.

On the other hand, 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.” *Id.* at 418; *accord In re Translogic Tech., Inc.*, 504 F.3d 1249, 1259 (Fed. Cir. 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 or modified the prior art references. *In re NuVasive, Inc.*, 842 F.3d 1376, 1382 (Fed. Cir. 2016); *see also Metalcraft of Mayville, Inc. v. The Toro Co.*, 848 F.3d 1358, 1366 (Fed. Cir. 2017) (“In determining whether there would have been a motivation to combine prior art references to arrive at the claimed invention, it is insufficient to simply conclude the combination would have been obvious without identifying any reason why a person of skill in the art would have made the combination.”); *Belden Inc. v. Berk-Tek LLC*, 805 F.3d 1064, 1073 (Fed. Cir. 2015) (“[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.”) (citing *InTouch Techs., Inc. v. VGO Commc’ns, Inc.*, 751 F.3d 1327, 1352 (Fed. Cir. 2014)).

B. Level of Ordinary Skill in the Art

In the Decision on Institution, we determined that a person of ordinary skill in the art at the time of the invention of the ’623 patent

would have at least a Bachelor’s degree in Chemistry, Chemical Engineering, Imaging Technology or Material Science with at

least one year of experience in coating technologies and imaging technologies, or at least five years of work experience in the field of coating technologies and imaging technologies.

DI 13 (adopting Patent Owner’s proposed definition).

For purposes of this Final Written Decision, we maintain our determination from the Decision on Institution because neither party disputes that determination and because the level of skill is consistent with the record. *See* PO Resp. 13; *see generally* Pet. Reply.

C. Claim Construction

In an *inter partes* review filed on or after November 13, 2018, we construe claims “using the same claim construction standard that would be used to construe the claim in a civil action under 35 U.S.C. 282(b), including construing the claim in accordance with the ordinary and customary meaning of such claim as understood by one of ordinary skill in the art and the prosecution history pertaining to the patent.” 37 C.F.R. § 42.100(b); *see Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc).

Furthermore, we expressly construe the claims only to the extent necessary to resolve the parties’ dispute. *See Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co. Ltd.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (“[W]e need only construe terms ‘that are in controversy, and only to the extent necessary to resolve the controversy.’” (quoting *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999))).

1. “white layer”⁹

In the Decision on Institution, we construed the term “white layer” to mean “a layer comprising a concentration or configuration of pigment providing a white background for received indicia and which further comprises a polymer that melts and mixes with another layer or layers during application.” DI 14–15. Our construction was based on the parties’ agreement that the claims of the ’623 patent require a white layer that melts and mixes with another layer and on the claim construction the district court adopted in the Arkwright Lawsuit. Ex. 1022, 17 (Arkwright Lawsuit Markman Order). The district court in the Delaware Lawsuit also adopted a similar construction of “white layer.” Ex. 1066, 6 (Delaware Markman Order). In the Decision on Institution, we rejected Patent Owner’s attempt to broaden the interpretation adopted in the Arkwright Lawsuit to include “a polymer that softens or melts and mixes to some degree with another layer.” *Id.* (Patent Owner’s modifications indicated by underlining); Prelim. Resp. 12–13.

Patent Owner now requests that we adopt a construction of “white layer” that includes “a layer comprising a concentration or configuration of pigment providing a white background for received indicia and which further comprises a polymer that softens or melts, such that it mixes with another layer or layers during application, without the resulting composition needing to be substantially uniform.” PO Resp. 18 (Patent Owner’s modifications indicated with underlining). We decline to adopt Patent

⁹ Although the term “white layer” is not expressly recited in claim 1 of the ’623 patent, both parties agree that all claims of the ’623 patent require a white layer that melts and mixes. *See, e.g.*, Pet. 18–19; PO Resp. 14–15.

Owner’s construction for the same reasons expressed in our Decision on Institution. DI 14–15. We further note that Patent Owner states that “the parties’ disputes with respect to the construction of the ‘white layer’ make no difference to the Board’s resolution of this matter.” PO Resp. 15; Tr. 13:24–14:3, 53:9–54:13. Accordingly, and for purposes of this Final Written Decision, we maintain our construction of the term “white layer.”

2. *order of steps*

Petitioner argues that the method steps recited in claim 1, i.e., the “contacting,” “peeling,” and “applying” steps, are not required to be performed in any particular order. Pet. 21. Specifically, Petitioner asserts that during the Interference Proceedings, “Patent Owner repeatedly made clear that these three steps do not have to be performed in any particular order, i.e, the claim covers peel first then apply heat or vice versa.” *Id.* (citing Ex. 1030, 17, 19; Ex. 1020 ¶¶ 79–80). Patent Owner “adopt[s] Petitioner’s argued construction regarding the order of steps” but contends that it “does not waive its right to argue that Claim 1 does require the steps to be performed in a particular order.” PO Resp. 15.

However, neither Patent Owner nor Petitioner argue that the resolution of this *inter partes* review depends on the particular order of the steps recited in the claims. *See generally* Pet.; PO Resp. Accordingly, we apply the Petitioner’s claim construction position—which Patent Owner does not dispute—that the claims do not require any particular order of contacting, peeling, and applying. *See Nidec*, 868 F.3d at 1017 (Fed. Cir. 2017) (citing *Vivid Techs.*, 200 F.3d at 803 (“[W]e need only construe terms ‘that are in controversy, and only to the extent necessary to resolve the controversy.’”)).

3. *other terms*

Petitioner additionally urges us to adopt the constructions from the Arkwright Lawsuit for the terms “overlaying/overlaid,” “colored substrate,” “contacting/contactable,” impregnated,” “layer,” and “mix/mixed/mixture.” Pet. 18–19. Petitioner also notes that Patent Owner proposed constructions for “indicia,” “image-imparting layer,” and “encapsulates” in the companion Michigan Lawsuit, though “Petitioner does not believe that any of these additional terms have a meaningful impact on the asserted grounds in this proceeding. *Id.* at 22. Patent Owner is silent as to whether these terms require express construction. *See generally* PO Resp.

As we did in our Decision on Institution, we determine the above-identified terms require no express construction. *See Nidec*, 868 F.3d at 1017.

D. Alleged Obviousness over Kronzer and Oez-US (claims 1–17)

Petitioner contends claims 1–17 would have been obvious over Kronzer in view of Oez-US. Pet. 52. Petitioner directs us to portions of Kronzer and Oez-US that purportedly disclose each of the limitations in the challenged claims. *Id.* at 54–66. Petitioner also relies on the declaration testimony of Dr. Wanat to support its arguments. *See id.*

1. *Kronzer (Ex. 1018)*

Kronzer relates to a printable heat transfer paper having cold release properties to permit the removal of the carrier or base sheet after the transfer sheet has cooled. Ex. 1018, code (57), 2:25–30. According to Kronzer, the heat transfer paper includes a flexible first layer, or base sheet, that has “sufficient strength for handling, coating, sheeting, and other operations associated with its manufacture, and for removal after transferring an

image.” *Id.* at 4:15–26. The heat transfer paper includes a second layer, or “release layer,” disposed on the base sheet and composed of a thermoplastic polymer having essentially no tack at transfer temperatures. *Id.* at 5:23–45. A third layer, overlaying the second layer, includes a thermoplastic polymer which melts in a range from about 65° C to about 180° C. *Id.* at 5:46–48. According to Kronzer, “[t]he third layer functions as a transfer coating to improve the adhesion of subsequent layers in order to prevent premature delamination of the heat transfer material.” *Id.* at 5:48–51. A fourth layer overlays the third layer to provide a layer on which an image is placed by an ink jet printer. *Id.* at 7:3–6. The printable heat transfer material of Kronzer may further include a fifth layer, including a film-forming binder and located between the second and third layers, to improve adhesion and prevent delamination. *Id.* at 8:31–46. Additionally, Kronzer states that “any of the foregoing film layers may contain other materials, such as processing aids, release agents, pigments, deglossing agents, antifoam agents, and the like,” because “use of these and similar materials is well known to those having ordinary skill in the art.” *Id.* at 8:47–51.

2. *Oez-US (Ex. 1013)*

Oez-US “relates to a transfer paper and to a process for transferring photocopies to textiles, such as, in particular, T-shirts.” Ex. 1013, 1:6–8. Oez-US describes “a transfer paper which has, as the coating of plastic, at least: a polyurethane which can be cross-linked under the action of heat by a melamine-formaldehyde resin esterified with methanol, mixed with an acrylic acid ester/acrylic acid copolymer, the latter being a thickener.” *Id.* at 1:37–42. Oez-US states that it is of “essential importance that a white pigment (TiO₂) can be incorporated into the mixture so that the prior white

coating of dark (black) textiles hitherto necessary can now be dispensed with and the print can be transferred immediately with a single film.” *Id.* at 1:51–55.

Oez-US discloses that the coating “can be peeled off from the paper as a film and can be laid as a positive on the textile substrate to be ironed on and to bond with the textile fibers.” *Id.* at 1:47–49. Oez-US describes ironing the film onto a textile “at elevated temperatures.” *Id.* at 3:56–58.

3. *Analysis of Claim 1*

Petitioner contends that Kronzer, like claim 1, “teaches a heat transfer paper comprising several layers, including a first layer ‘base sheet’ (*i.e.*, substrate), a second ‘release layer’ disposed on the base sheet, a third polymer layer overlaying the second layer, and a fourth “print layer” for receiving/imparting an image overlaying the third layer.” *Id.* at 52–53 (citing Ex. 1018, 4:27–8:31; Ex. 1020 ¶¶ 88, 185–190). Petitioner further asserts that Kronzer may include additional materials, such as pigments, in any of its above-identified layers. *Id.* at 56 (citing Ex. 1018, 8:47–51).

Petitioner acknowledges that “Kronzer does not expressly disclose that its release layer includes a ‘white’ pigment [but,] this feature is taught by Oez-US.” *Id.* (Ex. 1013, 1:47–55, 3:32–54). Petitioner explains that one of ordinary skill in the art would have had reason to substitute the white pigment, described by Oez-US, for the pigment in Kronzer’s release layer because “Oez-US . . . expressly teaches that its transfer sheets ‘can be used particularly advantageously on dark (black) fabrics.” *Id.* at 54 (citing Ex. 1013, 2:50–51, 1:27–31; Ex. 1020 ¶¶ 92, 185–194); *see also id.* at 57 (explaining that doing so “provides a contrasting white background for application of images onto dark fabrics”). Petitioner further alleges that

Kronzer and Oez-US teach the mix and melt requirement because “adjacent, contacting layers of polymers that are heated to their melting (or softening) temperatures will necessarily mix.” *Id.* at 57. Dr. Wanat testifies that “a [person of ordinary skill in the art] would have understood that Kronzer’s white layer (i.e., third layer with TiO₂/white pigment as taught by Oez-US) would melt and mix with other adjacent layers of the image transfer sheet, such as the fourth/image-imparting layer” when heat is applied. *Id.* at 57–58 (citing Ex. 1020 ¶¶ 38–59, 195–198; Ex. 1018, 2:45–67).

Lastly, Petitioner asserts that Kronzer teaches peeling the first/backing layer from the transfer sheet (*id.* at 59 (citing Ex. 1018, 4:6–14, 12:12–43; Ex. 1020 ¶ 201)), that “the polymers in its image transfer sheet ‘bond to the fabric when heat and pressure are used to effect transfer’” (*id.* at 59–60 (citing Ex. 1018, 4:1–2, 6:16–20; Ex. 1020 ¶ 202)), and that heat is applied during transfer using a “non-steam hand iron set at about 163°-177° C” (*id.* at 60 (citing Ex. 1018, 9:4–7; Ex. 1020 ¶¶ 203–204)). According to Petitioner, “Kronzer teaches first placing its image transfer sheet on a fabric, applying heat to effect an image transfer, and (after cooling) peeling off the first/base layer.” *Id.* at 60 (citing Ex. 12:12–18:6). Petitioner further explains that “a [person of ordinary skill in the art] would have found it obvious to modify Kronzer to [reorder its steps] based on the teachings of Oez-US” and to first peel off the substrate layer and then apply the image transfer sheet to the fabric so that the image is placed “face up,” before applying heat. *Id.* at 61 (citing Ex. 1013, 1:27–31, 2:50–51; Ex. 1020 ¶¶ 205–209). Therefore, Petitioner reasons that the combination of Kronzer and Oez-US discloses the steps claim 1 requires, even under a construction

of claim 1 that requires performing the steps in the specific order recited in claim 1.

Patent Owner does not challenge any of Petitioner's allegations regarding the teachings of Kronzer and Oez-US. *See generally* PO Resp. We have reviewed the evidence and argument of record and determine that Petitioner establishes, by a preponderance of the evidence, each limitation of claims 1–17 of the '623 patent is present in either Kronzer or Oez-US.

Patent Owner, however, does allege that Petitioner has not demonstrated a reason one of ordinary skill in the art would have combined the Oez-US pigment with Kronzer's structure or that such a combination would have yielded a reasonable expectation of success. *Id.* at 25.¹⁰ Patent Owner further asserts that because of the differences between Kronzer and Oez-US, a person of ordinary skill in the art would not have had a reason to combine their teachings to achieve the invention claimed by the '623 patent. *Id.* at 29. We address Patent Owner's arguments below.

a) whether Petitioner has established a reason to combine Kronzer and Oez-US

Patent Owner argues that Petitioner has failed to meet its burden of establishing that a person skilled in the art would have been motivated to

¹⁰ Patent Owner, relying on our Decision on Institution (DI 31), further contends that “[t]o the extent Petitioners are arguing that Kronzer's third layer be replaced with Oez's white **layer**, the combination would not result in a white layer that has a polymer that melts and mixes with another layer or layers” because of cross-linking in Oez-US. *Id.* at 25 n.2. As we explained in our Decision on Institution, Petitioner does not argue that Oez-US's entire white layer is included in Kronzer. DI 31–32. Rather, Petitioner proposes that only the white pigment itself is included in Kronzer's third layer. *Id.*; *see infra* Section II.D.4.

combine Kronzer and Oez-US and that each of Petitioner's reasons to combine must fail. PO Resp. 25–29. Patent Owner contends that Petitioner's first reason, i.e., that each reference teaches “printable multi-layered transfer structures having a removable substrate, release coating, and image-imparting layer,” is incorrect. *Id.* at 26. Patent Owner explains that “every example and every claim in Oez teaches a single coating of plastic, not a multi-layered transfer with a distinct ‘image-imparting layer.’” *Id.* Patent Owner additionally argues that mere identity of subject matter between two references is insufficient to establish that the skilled artisan would have had a reason to combine the teachings of those references. *Id.*

Petitioner asserts that Patent Owner's allegation regarding Oez-US being limited to a single layer of plastic is “demonstrably false.” Pet. Reply 3. Petitioner explains that “Oez-US discloses and claims a multi-layered transfer sheet” and that “[Patent Owner's] expert admitted as much during his deposition.” *Id.* at 3–4 (citing Ex. 1013, 2:36–44; Ex. 1062 ¶ 6; Ex. 1063, 295:8–296:18).

We agree with Petitioner that Oez-US is not limited to a single layer coating and instead encompasses multi-layered designs. Here, Petitioner shows that Oez-US, like Kronzer, describes multi-layered transfer structures. *See* Ex. 1013, 2:36–44 (describing a polymer layer *between* the paper and the polyurethane layer), claim 12 (same); *see also* Ex. 1063, 295:8–296:18 (testimony by Dr. Ellison describing Oez-US as having a second, optional layer).

Furthermore, although we agree with Patent Owner that identity of subject matter, alone, is insufficient to demonstrate that the ordinarily skilled artisan would have had reason to combine the teachings of Kronzer and Oez-

US, Petitioner does not rely on identity of subject matter alone, as discussed in more detail below. Moreover, we consider Petitioner's discussion of the identity of subject matter in the references relevant for purposes of demonstrating the references are analogous art, which is part of the obviousness analysis. *Wyers v. Master Lock Co.*, 616 F.3d 1231, 1238 (Fed. Cir. 2010); *see also In re Kahn*, 441 F.3d 977, 987–88 (Fed. Cir. 2006) (noting that the inquiry as to whether a person of ordinary skill in the art would have sought to combine the references “picks up where the analogous art test leaves off”).

Patent Owner next challenges Petitioner's argument that Kronzer and Oez-US “share the common goal of improving image transfer characteristics” because “Kronzer and Oez-US solve fundamentally different problems using fundamentally different technologies.” PO Resp. 27. Patent Owner explains that Kronzer “solves the problem of creating an image transfer that has ‘cold release properties’” where, in contrast, Oez-US “solves the problem of printing in ‘positive,’ incorporating white pigment into ‘a coating of plastic,’ and the use of ‘black textiles.’” *Id.* Therefore, Patent Owner reasons that “the divergent goals and solutions of the two inventions demonstrate why a [person of ordinary skill in the art] would **not** be motivated to combine them.” *Id.* at 27–28.

Similarly, Patent Owner also contends that the fact that “Oez-US teaches that its transfer sheets ‘can be used particularly advantageously on dark (black) fabrics’” is not a reason to combine Oez-US with Kronzer. *Id.* at 28. According to Patent Owner, “Petitioner does not argue that Kronzer's structure provides something beneficial that is lacking in Oez-US that would be improved by combining it with Kronzer” or how “the combination of the

two references would result in some new desirable feature.” *Id.* As a result, Patent Owner argues that Petitioner’s combination of Kronzer and Oez-US was motivated by Petitioner’s improper use of the ’623 patent claims as a “roadmap.” *Id.* at 29

Petitioner maintains that “Kronzer and Oez-US are both directed to improving the image transfer quality of multi-layer transfer sheets.” Pet. Reply 5 (citing Pet. 52–54; Ex. 1020 ¶¶ 88, 92, 185–194; Ex. 1062 ¶¶ 11–12). Citing our Decision on Institution, Petitioner explains that “Kronzer’s teachings are applicable to image transfers on any color fabric . . . and . . . [that] a [person of ordinary skill in the art] would have understood from Oez-US’s teachings that a ‘positive’ image would be printed on top of Kronzer’s layer in conjunction with adding white pigment.” *Id.* (citing DI 33–34; Ex. 1020 ¶¶ 92–93, 207–209; Ex. 1062 ¶¶ 7–14, 43). Petitioner further explains that “[t]hese grounds do not propose to modify or improve anything in Oez-US. Rather, Petitioner demonstrated that it would be obvious to improve Kronzer by adding a white pigment, as taught by Oez-US.” Pet. Reply 5. Petitioner asserts that the motivation for combining the references is found explicitly in Oez-US; that is, “having a white opaque layer on top of which a ‘positive’ image is printed in a transfer sheet to enhance image quality on dark fabrics.” *Id.* (citing Pet. 52–54; Ex. 1013, 1:27–31, 2:50–51; Ex. 1020 ¶¶ 7–12).

In weighing the evidence and arguments before us, we find Petitioner advances sufficient reasoning with rational underpinnings to explain why one of ordinary skill in the art would have had reason to combine Kronzer and Oez-US. Pet. 52–54, 56–57. Petitioner relies on Oez-US’s express teaching that including a white pigment “ensures a greater brilliance of the

image . . . especially for printing black textiles.” *Id.* at 54 (citing Ex. 1013, 1:29–31, 1:47–55, 2:50–51). Accordingly, Petitioner reasons that a person of ordinary skill in the art would have included the white pigment of Oez-US in the polymer layer of Kronzer to provide a contrasting opaque background for image transfers to dark/black fabrics. *Id.* at 54 (citing Ex. 1020 ¶¶ 92, 185–194).

Patent Owner’s arguments do not address Petitioner’s primary argument, as Patent Owner focuses on alleged differences in how Kronzer and Oez-US solve allegedly different problems, whereas Petitioner focuses on improving the quality of image transfer in general, which is a common goal in both Kronzer and Oez-US. Thus, we disagree that Kronzer and Oez-US have “divergent goals” such that a person of ordinary skill in the art would not have had reason to take advantage of the benefits described in Oez-US. *See KSR*, 550 U.S. at 420 (“Under the correct analysis, 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.”).

Patent Owner’s additional argument—that Petitioner does not allege that something is missing from Oez-US or that the combination with Kronzer improves Oez-US—once again misses the main point of Petitioner’s argument. Petitioner’s arguments are based on Oez-US supplying something beneficial that is missing from Kronzer, and therefore, improving the system of Kronzer, not the reverse. We thus disagree that Petitioner has not indicated why a person of ordinary skill in the art would have been motivated to combine Oez-US and Kronzer, and Petitioner’s

reliance on express teachings from Oez-US and Kronzer undermine any argument that Petitioner improperly relies on hindsight.

b) whether a person of ordinary skill in the art would not have had reason to combine Kronzer and Oez-US to yield the invention described in the '623 patent claims

Patent Owner further argues that there is affirmative evidence of record demonstrating that a person of ordinary skill in the art would not have had reason to combine the teachings of Kronzer and Oez-US. PO Resp. 29. Specifically Patent Owner contends that

[t]his evidence includes: (1) Kronzer's trials all involve transparent, non-pigmented sheets that would pose issues if transferred to dark t-shirts; (2) Kronzer and Oez rely upon different chemical reactions; (3) Kronzer and Oez employ different structures; (4) Kronzer and Oez solve different problems and use different technologies to solve those problems; and (5) Kronzer and Oez use opposite methods of application[].

Id. Patent Owner additionally alleges that because Petitioner incorporates only the white pigment from Oez-US, "while ignoring the impact of other functions of the white pigment," the person of ordinary skill in the art would not have had a reasonable expectation of success. *Id.* at 29–30. We address each of Patent Owner's arguments below.

(1) whether a person of ordinary skill in the art would not have had reason to combine Kronzer with Oez-US where Kronzer does not solve or address problems associated with dark fabrics

Patent Owner argues that "a [person of ordinary skill in the art] would not be motivated to combine Kronzer with Oez-US to create the inventions of the '623 Patent . . . because Kronzer does not solve – or even acknowledge – the problem of transferring an image onto dark fabric." PO Resp. 30 (citing Ex. 1018; Ex. 2011 ¶¶ 164, 267–280). For example, Patent

Owner contends that Kronzer does not acknowledge that conventional, transparent transfers result in an image that has insufficient brilliance on dark fabric, and that none of Kronzer's examples utilize a pigment at all, let alone one used to form an opaque background for dark fabrics. *Id.* at 31.

Petitioner "asserts that Oez-US—not Kronzer—discloses the problem of transferring images onto dark fabrics and discloses the solution to that problem; *i.e.*, including a white/opaque pigment to provide a white/opaque background onto which a positive image can be printed"—the same issue the '623 patent purports to solve. Pet. Reply 6. Petitioner further explains that Kronzer is not limited to any fabric color and "expressly suggests the use of pigments in its layers." *Id.*

Contrary to Patent Owner's assertions, Kronzer need not solve much less acknowledge, the problem of dark image transfer. The test for obviousness 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). One of ordinary skill can use his or her ordinary skill, creativity, and common sense to make the necessary adjustments and further modifications to result in a properly functioning device. *See KSR*, 550 U.S. at 418 ("a court can take account of the inferences and creative steps that a person of ordinary skill in the art would employ"). And where "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 his or her skill." *See id.* at 417. Here, Kronzer teaches each element of claim 1 of

the '623 patent—including a pigment in any one of its polymer layers. Pet. 52–62. Kronzer, however, is silent as to the color of the pigment and the color of the substrate used. Oez-US teaches the use of a white, opaque pigment and explains that a white pigment “ensures a greater brilliance of the image . . . especially for printing on black textiles.” Ex. 1013, 1:28–29. Thus, we agree with Petitioner that the ordinarily skilled artisan would have had reason to improve Kronzer’s method to include Oez-US’s white pigment.

(2) whether a person of ordinary skill in the art would not have had reason to combine Oez-US’s white pigment alone without cross-linking and whether a reasonable expectation of success exists

Patent Owner argues that a person of ordinary skill in the art would not have had reason to use only the white pigment from Oez-US because Oez-US teaches away from a white layer that does not cross-link. PO Resp. 32. According to Patent Owner, “[t]he cross-linking reaction in Oez is **required** for the white layer of Oez to function.” *Id.* Patent Owner explains that “[t]ransferring a pigment from a reactive system (Oez) to a non-reactive system (Kronzer) raises significant challenges from a chemistry and materials science perspective.” *Id.* at 33 (citing Ex. 2011 ¶¶ 168, 267–280). As a result, Patent Owner explains that “a ‘drop in’ replacement for an existing ingredient that will result in the identical finished part color” is “extremely rare.” *Id.* at 33–34 (citing Ex. 2012, 3). Patent Owner also states “that, in the reactive system of Oez, the titanium dioxide performs multiple functions beyond providing whiteness.” *Id.* at 34 (citing Ex. 2011 ¶¶ 171, 267–280). Patent Owner further argues that titanium dioxide is a particulate, which “would change the viscosity and flow properties of the third layer at

transfer temperatures.” *Id.* (citing Ex. 2011 ¶¶ 172, 267–280). In addition, “solid state characteristics of the third layer, such as modulus, elasticity, and flexibility” would also be changed. *Id.* As a result, a person of ordinary skill in the art would not have had a reasonable expectation of success. *Id.* at 34–35. Patent Owner states that its argument is supported by the numerous failures of the Kronzer system. *Id.* at 33.

Petitioner asserts that nothing in Oez-US teaches away from using only the white pigment; “[r]ather, it is undisputed that Oez-US explicitly teaches that including TiO₂ in a transfer sheet layer improves the image transfer quality onto dark fabrics.” Pet. Reply 6–7 (citing Ex. 1062 ¶¶ 87–91; Ex. 1013, 1:46–55). And “Kronzer **encourages** using pigments in its polymer layers.” *Id.* at 6 (citing Ex. 2011 ¶¶ 16–20; Ex. 1018, 8:46–51). Petitioner asserts that a person of skill in the art would have understood “that TiO₂ would function as a white pigment—and provide a white/opaque background—**regardless of whether it was present in a cross-linked polymer or a non-cross-linked polymer**,” as Dr. Ellison admits. *Id.* (citing Ex. 1062 ¶¶ 17–20; Ex. 1063, 304:8–22). Petitioner further states that neither Patent Owner nor its expert cite to record evidence “to support their assertion that TiO₂ somehow participates in the cross-linking reaction in Oez-US.” *Id.* (citing PO Resp. 42–43; Ex. 2011 ¶¶ 141–148; Ex. 1063, 302:4–303:21).

We do not agree with Patent Owner’s argument that Oez-US teaches away from using white pigment alone or that Oez-US requires a cross-linking polymer for the white pigment to function. *See* PO Resp. 32. 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)). Patent Owner does not identify any teaching in Oez-US that either requires use of a cross-linking polymer with its white pigment or discourages use of a white pigment without a cross-linking polymer. And our independent review of Oez-US does not reveal any such teaching. The fact that Oez-US uses a white pigment in conjunction with a cross-linked polymer does not mean that cross-linking is required for titanium dioxide to function as a pigment, nor does it teach away from pursuing the path taken in the ’623 patent.

Patent Owner’s arguments that transferring a white pigment from a reactive to non-reactive system would be unpredictable because the titanium dioxide performs functions beyond whiteness and because the properties and characteristics of the layer would be altered are similarly unavailing. *See* PO Resp. 33–34. Neither Patent Owner nor its expert, Dr. Ellison, identifies anything in Oez-US that suggests the titanium dioxide performs functions other than to provide a contrasting background. *See generally id.*; Ex. 2011. Rather, Oez-US consistently refers to the white pigment or titanium dioxide as responsible for providing contrast for images transferred to dark colored textiles. Ex. 1013, 1:28–29, 1:50–52, 2:50–51. In fact, Oez-US states that

“[i]f white textiles are to be printed on, the titanium oxide pigment can be omitted.” *Id.* at 2:31–32. Further, Dr. Ellison’s testimony that “white pigments like titanium dioxide *often* have a surface chemistry [that] . . . *can* interact with components of reactive systems [and] . . . *can* itself chemically react with the components of the single polymer layer of Oez[-US] and become part of the crosslinked network,” is inconclusive and, at best, describes *possible* interactions in a *reactive* system—not in a non-reactive system as Petitioner proposes. Ex. 2011 ¶ 171 (emphasis added).

Furthermore, record evidence supports Petitioner’s position that a person of ordinary skill in the art would have understood titanium dioxide within a polymer layer to provide a white background whether the polymer is cross-linked or not. Ex. 1062 ¶¶ 17–18 (citing Ex. 1055 ¶¶ 120–121); Ex. 1063, 304:8–22 (Dr. Ellison’s testimony that the reactions described in Oez-US would not be required for titanium dioxide to provide whiteness). Regarding the purported changes titanium dioxide would have on certain properties or characteristics of the polymer layers, Patent Owner’s argument is based solely on the conclusory declaration testimony of Dr. Ellison. *See* Ex. 2011 ¶¶ 141–148, 171–172.

Similarly, Patent Owner’s argument that “it is ‘extremely rare’ to find a ‘drop in’ replacement” for titanium dioxide (PO Resp. 34) is unavailing because it is based on an incomplete understanding of the referenced articles and is conclusory. Patent Owner relies on Dr. Ellison’s testimony and Exhibits 2012 and 2013. But Dr. Ellison admits the book excerpted in Exhibit 2013 is not relevant to inorganic pigments, like titanium dioxide, and that he had not “studied” the details of the paper in Exhibit 2012, which identifies the problem with titanium dioxide only as a possible color shift or

variance in lightness of up to 10%. Pet. Reply 8, 22–23 (citing Ex. 1063 343:11–347:7, 350:5–355:2). Indeed, Petitioner identifies persuasive evidence demonstrating that titanium dioxide is the most widely-used and well-known white pigment. Pet. Reply 7 (citing Ex. 1062 ¶¶ 17–20; Ex. 1054; Ex. 1056; Ex. 1018, 6:4–8); *see also* Ex. 2012, 2 (“Titanium dioxide is the most widely used white pigment because of its unique ability to provide exceptional opacity and lend whiteness and brightness.”); Ex. 1063, 243:6–22; Ex. 1055 (“Half of all TiO₂ pigment produced is consumed by the coatings industry and a quarter by the paper industry.”); Ex. 1057; Ex. 1058.

(3) *whether a person of ordinary skill in the art would not have had reason to combine where Kronzer and Oez-US allegedly involve different structures and manufacturing processes*

Patent Owner contends there are “fundamental differences in [the] structures and manufacturing” of Kronzer versus Oez-US such that the ordinarily skilled artisan would not have combined their teachings. PO Resp. 36. Patent Owner explains that “Kronzer is a multi-layered structure, in which each layer is laid down separately during manufacturing and in which each layer serves a different function,” whereas “every example and every claim in Oez teaches a single homogenized coating, which is pre-mixed during manufacture.” *Id.*

Petitioner argues that Oez-US is not a “single homogenized coating” as Patent Owner suggests. Pet. Reply 9. Petitioner asserts that both Oez-US itself and Patent Owner’s own expert describe Oez-US as having a multi-layered structure. *Id.*

For the same reasons discussed above in Section II.D.3.a, we do not agree with Patent Owner’s arguments in this regard. As we explained

above, Oez-US and Kronzer each describe multi-layered image transfer structures. *See* Ex. 1013, 2:36–44 (describing a polymer layer *between* the paper and the polyurethane layer), claim 12 (same); *see also* Ex. 1063, 295:8–296:18 (testimony by Dr. Ellison describing Oez-US as having a second, optional layer); Ex. 1018, 2:33–3:6 (describing a heat transfer sheet having up to five layers).

(4) whether a person of ordinary skill in the art would not have had reason to combine where the technology and problems solved are different

Patent Owner also argues that “a [person of ordinary skill in the art] would not be motivated to combine Kronzer and Oez . . . because of the fundamental differences in the problems each reference seeks to address and the fundamental differences in the technology each reference uses to solve those problems.” PO Resp. 37.

For the same reasons discussed above, in Section II.D.3.a, we do not agree with Patent Owner’s arguments in this regard. As we explained above, we consider Kronzer and Oez-US to be aligned with a common goal of improving the quality of transferred images. Moreover, Petitioner’s evidence and arguments regarding the use of the same polymers in both references undermine Patent Owner’s arguments that the technology in the two references is so different that a person of ordinary skill in the art would not have had any reason to combine the teachings of the references.

(5) whether a person of ordinary skill in the art would not have had reason to combine where the printing and applying method of Kronzer and Oez-US are opposite to one another

Lastly, Patent Owner contends that a person of ordinary skill in the art would not have had a reason to combine Kronzer and Oez-US because the

“two references use opposite methods of application” and would not have had a reasonable expectation of success. PO Resp. 37. According to Patent Owner, a person of ordinary skill in the art would be dissuaded from adding a white pigment to the third layer of Kronzer because it would “obscure the decorative graphic,” and therefore, be counterintuitive. *Id.* at 48–49.

Petitioner asserts that “far from being ‘counterintuitive’, a [person of ordinary skill in the art] (or anyone else possessing a modicum of common sense) would have understood that the inclusion of a white/opaque pigment in Kronzer’s layer would require the image to be positioned positively on top of (not underneath) the opaque/white layer, as expressly taught by Oez-US.” Pet. Reply 10.

On this issue, Petitioner has the better position. The ordinarily skilled artisan would have understood that there were two known methods for applying image transfer sheets—either “peel first” or “peel last”—and would have considered the benefits and disadvantages of each in developing an image transfer sheet. *See generally* Ex. 1016 (describing “peel first”); Ex 1018 (describing “peel last”); Tr. 36:8–37:8. Further, as Patent Owner acknowledges, using the “peel last” method would result in the white layer covering the image and therefore, the image would be obscured. PO Resp. 38 (citing Ex. 2011 ¶¶ 177, 267–280) (“[A] person having ordinary skill in the art] would expect that white pigment in the third layer would obscure the decorative graphic.”); Pet. Reply 10; Ex. 1062 ¶¶ 42–43. Therefore, the person of ordinary skill in the art would have had little reason (if any reason at all) to apply the Kronzer/Oez-US image transfer sheet in a “peel last” environment. The “person of ordinary skill is also a person of ordinary creativity, not an automaton,” and does not abandon common sense

when considering the combination of references. *KSR*, 550 U.S. at 421; *Winner Int’l Royalty Corp. v. Wang*, 202 F.3d 1340, 1349 n.8 (Fed. Cir. 2000) (explaining that a person of ordinary skill in the art would have considered both the advantages and disadvantages of the prior art). Accordingly, the person of ordinary skill in the art would not have been deterred by two different application types, but rather, would have had reason to consider the teachings as a whole and opt for the “peel first” method, which would have been well within their technical grasp. *KSR*, 550 U.S. at 421 (“When there is a design need or market pressure to solve a problem and there are a finite number of identified, predictable solutions, a person of ordinary skill has good reason to pursue the known options within his or her technical grasp.”).

c) Summary of Claim 1

For the foregoing reasons, we are persuaded by Petitioner’s arguments and evidence demonstrating that a person of ordinary skill in the art would have had reason to combine the teachings of Kronzer and Oez-US, and would have had a reasonable expectation of successfully doing so to arrive at the subject matter recited in claim 1. As noted above, we also agree with Petitioner’s undisputed arguments and evidence that Kronzer and Oez-US teach or suggest all of the limitations recited in claim 1. As a result, we find Petitioner has established, by a preponderance of evidence that claim 1 is unpatentable as obvious in view of Kronzer and Oez-US.

4. Claim 5

Claim 5 depends from claim 1 and recites a method where “the polymer of the image-imparting layer encapsulates the titanium dioxide or other white pigment and indicia and transfers the titanium dioxide or other

white pigment in a pattern that forms the indicia on the colored substrate.”
Ex. 1001, 12:15–19.

Petitioner asserts that Oez-US teaches “encapsulating.” Pet. 63. According to Petitioner, a person of ordinary skill in the art “would have understood that, when white pigment is added to Kronzer’s third layer, as taught by Oez-US, the fourth/image-imparting layer would encapsulate the white pigment and image and transfer them to the fabric/substrate, as taught by Oez-US.” *Id.* (citing Ex. 1020 ¶¶ 138–139, 211, 246–247). Dr. Wanat opines that when pigment is added to a polymer such that it becomes a “homogeneous mixture in which the pigment particles are dispersed in the formulation, prior to forming the layer[,] [t]he pigment particles would thus become dispersed in, and encapsulated by, the components of the formulation.” Ex. 1020 ¶¶ 246–247; *see also id.* ¶¶ 138–139 (“Because the polymer disclosed by Oez[-US] is formed by mixing and homogenizing with TiO₂, the TiO₂ is encapsulated by the polymer”), ¶ 211 (same). Dr. Wanat testifies that when the aqueous polymer dispersion evaporates, it leaves behind a film and a person of ordinary skill in the art would understand that the “polyurethane polymers encapsulat[e] the pigment particles” even prior to the application of heat. Ex. 1020 ¶ 139; Pet. 36; Ex. 1018, 5:44–6:3 (Kronzer explaining that its polymer layer can be formed of powdered water-dispersible copolymers).

Patent Owner argues that “Oez uses a cross-linking white layer that does not melt and mix.” PO Resp. 41. Accordingly, Patent Owner asserts that “Petitioner has not met its burden of showing encapsulation is disclosed in Oez, both because encapsulation must occur during the application of heat

and because – as a result of cross-linking – Oez does not behave as Petitioner contends it does when subjected to heat.” *Id.*

Petitioner, however, does not propose to modify Kronzer to include Oez-US’s entire white layer or the application of heat. Pet. 52–53. Rather, in Petitioner’s proposed combination, only the white pigment of Oez-US is included in Kronzer’s third polymer layer. *Id.* at 52–53, 56, 57–58. Relying on Oez-US, Dr. Wanat testifies that when an aqueous polymer becomes “mixed and homogenized” with a white pigment, the pigment becomes encapsulated when the polymer film forms upon evaporation—even before heat and pressure are applied. Ex. 1020 ¶¶ 138–139 (citing Ex. 1016, 3:32–54; Ex. 1019, 3:32–43). Because Patent Owner’s argument that encapsulation does not occur is based on applying heat and pressure, that results in a cross-linked white layer—positions Petitioner does not advance—Patent Owner’s argument is unavailing.

With regard to Patent Owner’s position that “encapsulation includes the indicia” and “occurs as a result of heat being applied,” we note that Patent Owner did not propose any claim construction for the term “encapsulation” in the Patent Owner Response. *See generally* PO Resp. The language of claim 5 does not expressly require the application of heat to effectuate “encapsulation” and claim 5 suggests that the white pigment *is* part of the indicia. Ex. 1001, 12:15–19 (stating that the polymer “transfers the titanium dioxide or other white pigment in a pattern that forms the indicia on the colored substrate”).

Therefore, on this record, the preponderance of the evidence supports Petitioner’s position that the combination of Kronzer and Oez-US render the subject matter of claim 5 unpatentable as obvious.

5. *Claim 8*

Claim 8 depends from claim 6 and additionally requires that “the polymer layer comprises polypropylene.” Ex. 1001, 12:30–31.

Petitioner argues that Krozner describes its image-imparting layer as comprising various polymers including “‘ethylene oxide, *propylene* oxide, and alcohols, and polysiloxane polyethers’ (Kronzer, 8:28–30), as well as ‘*polyolefins*, polyesters, *polyamides*, and ethylene-vinyl acetate copolymers’ (Kronzer at 7:19–21) and/or ‘polyacrylates, polyethylenes, and *ethylene-vinyl acetate* copolymers’ (Kronzer at 7:30–31) (emphasis added).” Pet. 65. Petitioner explains that polypropylene is “an extremely common type of polyolefin” and that “[i]t would have been an obvious design choice to select polypropylene.” *Id.* at 65 (citing Ex. 1020 ¶¶ 165, 219, 252).

Patent Owner contends that “[a]part from conclusory statements in the Petition and Declaration, Petitioner does not cite any evidence supporting the conclusions that polypropylene is ‘extremely common’ or that it would have been an obvious choice.” PO Resp. 42.

On this record, we agree with Petitioner that the preponderance of the evidence suggests that use of polypropylene would have been obvious to the skilled artisan in view of Kronzer. Kronzer identifies numerous polymers useful in its image-imparting layer, including “polyolefins, polyesters, polyamides, and ethylene-vinyl acetate copolymers.” Ex. 1016, 7:19–21. Dr. Wanat testifies that polypropylene, a thermoplastic, is a known polyolefin. Ex. 1020 ¶ 219. According to Dr. Wanat, polypropylene “is one of the most common polyolefins and is used in everyday applications, such as chairs, consumer goods, and automotive parts.” *Id.* Dr. Wanat reasons that “[i]t would have been obvious to a [person of skill in the art] to select

polypropylene because it has properties that are known to be useful in transfer sheets[,] . . . [it] is low in cost, has good wash and chemical resistance, and is flexible.” *Id.* Dr. Wanat further testifies that “[p]olypropylene has a melting point of 150–186°C, and a solubility parameter of 17.3 (MPa),” which overlaps with the melting point and solubility parameter of Kronzer’s third and fourth layers—65° C to 180° C and less than 19 MPa respectively. *Id.* (citing Ex. 1016, claim 8; Ex. 1043, 782¹¹); *see also* Ex. 1016 ¶¶ 59–60 (identifying the melting points for certain polymers, including polypropylene, and noting that “standard ironing/heat press temperatures will exceed the melting point(s)/Tg(s) of these polymers.”). We credit Dr. Wanat’s testimony in this regard.

Accordingly, the preponderance of the evidence supports Petitioner’s position that the combination of Kronzer and Oez-US renders the subject matter of claim 8 invalid as obvious.

6. *Claim 16*

Claim 16 depends from claim 6 and additionally requires that “the release layer includes a release coating portion and a white layer portion including titanium dioxide or other white pigment or luminescent pigment.” Ex. 1001, 12:51–54. Petitioner, referring back its discussion of claim 1, argues that Kronzer describes “a release layer having a release coating portion and a white layer portion.” Pet. 66 (referencing Section VII.D.2.d). Petitioner asserts that the combination of Kronzer and Oez-US would have resulted in a transfer paper with the second and third layers comprising the

¹¹ Dr. Wanat cites to the original page numbers of Exhibit 1043.

release layer and where the second layer is the release coating and the third layer includes the white pigment. *Id.* at 57.

Patent Owner asserts that modifying Kronzer and Oez-US as Petitioner suggests “**reverses the order of the** layers in Kronzer during & following application.” PO Resp. 38. Patent Owner explains that this “is a complete re-engineering of Kronzer” and Petitioner does not explain why a person of ordinary skill in the art would have expected such re-engineering to be successful. *Id.* at 38–40. Patent Owner argues that Petitioner “cite[s] no support or evidence for the proposition” that it would be “natural” to apply the “image transfer steps and image orientation taught by Oez-US.” *Id.* (citing Pet. 66).¹² Patent Owner reasons that “[t]his re-engineering is based on hindsight.” *Id.* at 40.

Petitioner contends that modifying Kronzer to include a “peel first” image orientation would not require a “complete reengineering” as Patent Owner alleges. Pet. Reply 10. Petitioner asserts that “[Patent Owner] and its expert make conclusory assertions that reversing the layers would not be successful, would be unpredictable and would impact the transfer.” *Id.* Petitioner’s challenge is based on reversing the order of the third and fourth layers, which “are largely the same, and can include the same thermoplastic polymers/binders having the same characteristics.” *Id.* (citing Ex. 1018, 5:46–48, 5:62–65, 6:1–19, 6:54–56, 7:12–41; Ex. 1062 ¶¶ 42–48).

Petitioner argues that a person of ordinary skill in the art “would have understood that flipping the orientation of these two layers would result in

¹² Patent Owner mistakenly cites to page 76 of the Petition. PO Resp. 38. Petitioner’s discussion of claim 16 appears at page 66 of the Petition, and Petitioner discusses orienting the layers as Oez-US suggests on pages 60–62.

the same functionality.” *Id.* at 11 (citing Ex. 1062 ¶¶ 46–47; Ex. 1018, 6:57–59, 8:47–51).

First, we observe that claim 16 is directed to a product, i.e., an image transfer sheet. As a product claim, the order of *application* of layers is not implicated so long as the layers themselves are arranged as claimed. Here, Kronzer describes a first layer, which may be a latex-impregnated paper, a second layer including a thermoplastic polymer, a third layer including a film-forming binder, and a fourth layer which overlays the third layer, that provides a printable material. Ex. 1018, 2:49–64. Kronzer describes that the second layer including a “release-enhancing additive,” and that any of the layers—including the third layer as Petitioner alleges—may include a pigment. *Id.* at 2:57, 8:46–51. Petitioner asserts that the pigment, as described in Oez-US, in the third layer is titanium dioxide. Pet. 55–57. Specifically with reference to claim 16, Petitioner alleges that Kronzer’s second and third layer *together* correspond to the claimed release layer that includes a “release coating portion and a white layer portion.” Ex. 1001, 12:51–54. Therefore, the layers described in Kronzer, as modified by Petitioner, are structured as claimed. *Compare* Ex. 1018, 2:49–64, *with* Ex. 1001, 12:20–26 (claim 6), 12:51–54 (claim 16); *see also* Pet. 55 (comparing Kronzer’s structure with that of the ’623 patent).

Second, we disagree with Patent Owner’s assertion that Petitioner improperly relies on hindsight. 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). Here,

however, Petitioner reasonably asserts that a person of skill in the art “would have naturally also applied the image transfer steps and image orientation taught by Oez-US” and would have reordered Kronzer’s third and fourth layers because to do otherwise would result in the white layer being on top of the image. Pet. 61 (citing Ex. 1020 ¶¶ 205–209). Petitioner explains that its proposed “peel first” embodiment would have been successful “because Kronzer expressly teaches that its substrate layer has ‘cold release’ properties.” *Id.* at 61–62 (citing Ex. 1018, 4:15–16; Ex. 1020 ¶¶ 205–209). Petitioner also explains that each of Kronzer’s third and fourth layers are similar and include thermoplastic polymers that melt in the same range, i.e., about 65 °C to about 180°C. *Id.* at 57–58 (quoting Ex. 1018, 2:35–67; Ex. 1020 ¶¶ 38–59, 195–198). Dr. Wanat testifies that a “complete re-engineering” is not required because “Kronzer discloses that the desired characteristics and examples of the major components of the third and fourth layer[s] **are largely the same**” and a person skilled in the art would expect the layers to function similarly regardless of orientation. Ex. 1062 ¶¶ 44–45. Therefore, 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.

Furthermore, critically lacking from Patent Owner’s argument is any explanation of why “[a] complete reversal of the order of the layers would not yield predictable results” (PO Resp. 39), what “complete re-engineering” other than a reordering the layers is required (*id.* at 40), or any suggestion that reversing the order of layers is beyond technical knowledge of the person of ordinary skill in the art.

Accordingly, on this record, we find no evidence of hindsight reconstruction. Thus for the reasons given above with respect to the additional limitation of claim 16 and in Section II.D.7 below for independent claim 6, we find Petitioner has established, by a preponderance of the evidence, that claim 16 is unpatentable as obvious in view of Kronzer and Oez-US.

7. Remaining Claims (claims 2–4, 6, 7, 9–15, 17)

Patent Owner argues claims 3, 4, 7, and 17 separately but does not present any argument different from what is argued for claim 1. PO Resp. 40 (advancing the “same reasons discussed above”), 42–43 (identifying “all of the reasons described above”). Patent Owner does not present any separate argument for the remaining claims (i.e., claims 2, 6, and 9–15) and, therefore, has forfeited any arguments based on these uncontested claims. *See generally id.* at 25–43; *cf. NuVasive*, 842 F.3d at 1381 (explaining that a patent owner waives an argument presented in the preliminary response if it fails to renew that argument in the patent owner response during the instituted trial). We have reviewed the information Petitioner provides, including the relevant portions of the Wanat Declaration and Petitioner’s arguments that a person of ordinary skill in the art would have had reason to combine the various disclosures set forth in Kronzer and Oez-US and would have had a reasonable expectation of success in achieving the claimed invention. Because a preponderance of the evidence supports Petitioner’s arguments as to claims 2–4, 6, 7, 9–15, and 17, we adopt Petitioner’s analysis as our own. Accordingly, Petitioner establishes that the subject matter of claims 2–4, 6, 7, 9–15 and 17 would have been obvious in view of the combined teachings of Kronzer and Oez-US.

E. Remaining Grounds

Having determined that Petitioner establishes by a preponderance of the evidence that the combination of Kronzer and Oez-US renders the subject matter of claims 1–17 obvious, we need not address Petitioner’s additional grounds challenging claims 1–17. *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. CONCLUSION¹³

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 1–17 of the ’623 patent is unpatentable.

¹³ 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 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).

IV. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that Petitioner establishes by a preponderance of the evidence that claims 1–17 of the '623 patent are unpatentable; and

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

In summary:

Claims	35 U.S.C. §	Reference(s)/Basis¹⁴	Claim(s) Shown Unpatentable	Claim(s) Not Shown Unpatentable
1–17	103	Oez-US, Meyer		
8, 17	103	Oez-US, Meyer, Kronzer		
1–17	103	Oez-PCT, Oez-US		
1–17	103	Kronzer, Oez-US	1–17	
1–17	103	Kronzer, Meyer		
Overall Outcome			1–17	

¹⁴ In view of our determination that claims 1–17 are rendered obvious in view of Kronzer and Oez-US, we do not reach grounds for which the last two columns of this table are blank. *See* Section II.E.

IPR2020-00628
Patent RE41,623 E

FOR PETITIONER:

Joseph Richetti
Ethan Fitzpatrick
Bryan Cave Leighton Paisner LLP
joe.richetti@bryancave.com
ethan.fitzpatrick@bryancave.com

Abigail Cotton
abigail.cotton@bclplaw.com

FOR PATENT OWNER:

Devan V. Padmanabhan
Michelle E. Dawson
Britta S. Loftus (admitted *pro hac vice*)
Padmanabhan & Dawson, PLLC

devan@paddalawgroup.com
michelle@paddalawgroup.com
britta@paddalawgroup.com